INTERNATIONAL PACIFIC HALIBUT COMMISSION

IPHC–2023–AM099–00
Last Update: 30 January 2023

99th Session of the IPHC Annual Meeting (AM099) – *Compendium of meeting documents*

23 January – 27 January 2023, Victoria, BC, Canada

Commissioners

Canada	United States of America
Paul Ryall	Jon Kurland
Neil Davis	Robert Alverson
Peter DeGreef	Richard Yamada

Executive Director

David T. Wilson, Ph.D.

DISTRIBUTION: IPHC WEBSITE
LAST UPDATE: 30 January 2023

BIBLIOGRAPHIC ENTRY
IPHC 2022. 99th Session of the IPHC Annual Meeting (AM099) - Compendium of meeting documents. Int. Pac. Halibut Comm.

INTERNATIONAL PACIFIC HALIBUT COMMISSION

Contact details:

International Pacific Halibut Commission
2320 W. Commodore Way, Suite 300
Seattle, WA, 98199-1287, U.S.A.
Phone: +1 206 634 1838
Fax: +1 206 632 2983
Email: secretariat@iphc.int
Website: http://iphc.int/

AGENDA & SCHEDULE FOR THE 99th SESSION OF THE IPHC ANNUAL MEETING (AM099)

Date: 23-27 January 2023
Location: Victoria, BC, Canada
Venue: Fairmont Empress
Time (PST): 23 Jan: 12:30-17:30;
24-27 Jan: 09:00-17:00 daily
Chairperson: Mr Paul Ryall (Canada)
Vice-Chairperson: Mr Jon Kurland (USA)

Notes:

- ***Document deadline**: 24 December 2022 (30 days prior to the opening of the Session)*
- *All sessions are open to observers and the general public, unless the Commission specifically decides otherwise.*
- *All open sessions will be webcast. Webcast sessions will also take audience comments and questions as directed by the Chairperson of the Commission.*

AGENDA FOR THE 99th SESSION OF THE IPHC ANNUAL MEETING (AM099)

1. OPENING OF THE SESSION (Chairperson)

2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION (Chairperson & Executive Director)

3. IPHC PROCESS

3.1 Update on actions arising from the 98th Session of the IPHC Annual Meeting (AM098), 2022 Special Sessions, intersessional decisions, and the 98th Session of the IPHC Interim Meeting (IM098) (D. Wilson)
3.2 Report of the IPHC Secretariat (2022) (D. Wilson & B. Hutniczak)
3.3 2nd IPHC Performance Review (PRIPHC02): Implementation of recommendations (D. Wilson)
3.4 International Pacific Halibut Commission 5-year program of Integrated Research and Monitoring (2022-26) (D. Wilson, J. Planas, I. Stewart, A. Hicks, R. Webster, B. Hutniczak, & J. Jannot)
3.5 Report of the 23rd Session of the IPHC Research Advisory Board (RAB023) (D. Wilson, J. Planas)
3.6 Reports of the IPHC Scientific Review Board (SRB Chairperson)

4. FISHERY MONITORING
- 4.1 Fishery-dependent data overview (2022) (J. Jannot)
- 4.2 Fishery-independent data overview (2022)
  - 4.2.1 IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2022 (K. Ualesi)

5. STOCK STATUS OF PACIFIC HALIBUT (2022) AND HARVEST DECISION TABLE 2023
- 5.1 Space-time modelling of survey data (R. Webster)
- 5.2 2023-25 FISS design evaluation (R. Webster)
- 5.3 Stock Assessment: Data overview and stock assessment (2022), and harvest decision table (2023) (I. Stewart, A. Hicks, R. Webster, D. Wilson, & B. Hutniczak)
- 5.4 Pacific halibut mortality projections using the IPHC mortality projection tool (2023) (I. Stewart)

6. BIOLOGICAL AND ECOSYSTEM SCIENCES – PROJECT UPDATES
- 6.1 Report on Current and Future Biological and Ecosystem Science Research Activities (J. Planas)

7. MANAGEMENT STRATEGY EVALUATION
- 7.1 Report of the 17th Session of the IPHC Management Strategy Advisory Board (MSAB017) (Co-Chairpersons)
- 7.2 IPHC Management Strategy Evaluation: update (A. Hicks)

8. IPHC FISHERY REGULATIONS: PROPOSALS FOR THE 2022-23 PROCESS
- 8.1 IPHC Secretariat fishery regulation proposals (B. Hutniczak)
- 8.2 Contracting Party fishery regulation proposals (Contracting Parties)
- 8.3 Stakeholder fishery regulation proposals (Stakeholders)
- 8.4 Stakeholder statements (B. Hutniczak)

9. CONTRACTING PARTY NATIONAL REPORTS
- 9.1 Canada (TBA)
- 9.2 United States of America (TBA)

10. REPORT OF THE 99th SESSION OF THE IPHC FINANCE AND ADMINISTRATION COMMITTEE (FAC099) (D. Wilson)

11. REPORT OF THE 93rd SESSION OF THE IPHC CONFERENCE BOARD (CB093) (CB Co-Chairpersons)

12. REPORT OF THE 28th SESSION OF THE IPHC PROCESSOR ADVISORY BOARD (PAB028) (PAB Chairperson and Vice-Chairperson)

13. OTHER BUSINESS
- 13.1 IPHC meetings calendar (2023-25) (D. Wilson)
- 13.2 Election of Chairperson and Vice-Chairperson for the next year (D. Wilson)

14. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 99th SESSION OF THE IPHC ANNUAL MEETING (AM099) (Chairperson)

SCHEDULE FOR THE 99th SESSION OF THE IPHC ANNUAL MEETING (AM099)

Monday, 23 January 2023		
Time	**Agenda item**	**Lead (support)**
99th Session of the IPHC Annual Meeting (AM099)		
Time	**Agenda item**	**Lead (support)**
12:30-12:40	1. Opening of the Session	Chairperson and Vice-Chairperson
12:40-12:50	2. Adoption of the agenda and arrangements for the Session ➢ ***IPHC-2023-AM099-01****: Agenda & Schedule for the 99th Session of the IPHC Annual Meeting (AM099)* ➢ ***IPHC-2023-AM099-02****: List of Documents for the 99th Session of the IPHC Annual Meeting (AM099)*	P. Ryall (D. Wilson)
12:50-13:30	3. IPHC Process 3.1 Update on actions arising from the 98th Session of the IPHC Annual Meeting (AM098), 2022 Special Sessions, intersessional decisions, and the 98th Session of the IPHC Interim Meeting (IM098) ➢ ***IPHC-2023-AM099-03:*** *Update on actions arising from the 98th Session of the IPHC Annual Meeting (AM098), 2022 Special Sessions, intersessional decisions, and the 98th Session of the IPHC Interim Meeting (IM098) (D. Wilson)* ➢ ***IPHC-2022-IM098-R****: Report of the 98th Session of the IPHC Interim Meeting (IM098)* 3.2 Report of the IPHC Secretariat (2022) ➢ ***IPHC-2023-AM099-04:*** *Report of the IPHC Secretariat (2022) (D. Wilson & B. Hutniczak)* 3.3 2nd IPHC Performance Review (PRIPHC02): Implementation of recommendations ➢ ***IPHC-2023-AM099-05 Rev_1:*** *Implementation of the Recommendations from the 2nd IPHC Performance Review (PRIPHC02) (D. Wilson)*	D. Wilson

	➢ ***IPHC-2023-AM099-16:*** *Minimum data collection standards for Pacific halibut by scientific observer programs (D. Wilson & J. Jannot)* 3.4 International Pacific Halibut Commission 5-year program of Integrated Research and Monitoring (2022-26) ➢ ***IPHC-2023-AM099-06:*** I*nternational Pacific Halibut Commission 5-Year program of integrated research and monitoring (2022-26) (D. Wilson, J. Planas, I. Stewart, A. Hicks, B. Hutniczak, R. Webster, & J. Jannot)* 3.5 Report of the 23rd Session of the IPHC Research Advisory Board (RAB023) ➢ ***IPHC-2022-RAB023-R:*** *Report of the 23rd Session of the IPHC Research Advisory Board (RAB023)*	
13:30-14:00	3.6 Reports of the IPHC Scientific Review Board ➢ ***IPHC-2022-SRB020-R:*** *Report of the 20th Session of the IPHC Scientific Review Board (SRB020)* ➢ ***IPHC-2022-SRB021-R:*** *Report of the 21st Session of the IPHC Scientific Review Board (SRB021)*	SRB Chairperson
14:00-14:20	4. Fishery Monitoring 4.1 Fishery-dependent data overview (2022) (J. Jannot) ➢ ***IPHC-2023-AM099-07 Rev_1****: Fishery data overview (2022) (J. Jannot, H. Tran, T. Kong, K. Magrane & K. Sawyer van Vleck)*	J. Jannot
14:20-14:40	4.2 Fishery-independent data overview (2022) ➢ ***IPHC-2023-AM099-08***: *IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2022 (K. Ualesi, C. Jones, R. Rillera, & T. Jack)*	K. Ualesi
14:40-15:30	5. Stock status of Pacific halibut (2022) & harvest decision table (2023) 5.1 Space-time modelling of survey data (R. Webster) ➢ ***IPHC-2023-AM099-09:*** Space-time modelling of survey data (R. Webster) 5.2 2023-25 FISS design evaluation (R. Webster) ➢ ***IPHC-2023-AM099-10***: 2023-25 FISS Design evaluation (R. Webster & D. Wilson)	R. Webster
15:30-15:45	Break	
15:45-17:00	5.1 Stock Assessment: Data overview and stock assessment (2021), and harvest decision table (2022)	I. Stewart

	➢ ***IPHC-2023-AM099-11****: Summary of the data, stock assessment, and harvest decision table for Pacific halibut (Hippoglossus stenolepis) at the end of 2022 (I. Stewart, A. Hicks, R. Webster, & D. Wilson)* 5.2 Pacific halibut mortality projections using the IPHC mortality projection tool (2023) ***IPHC-2023-AM099-INF02***: The IPHC mortality projection tool for 2023 mortality limits	
17:00-17:30	*Public comment and questions* ***(Agenda items 4-5)***	Chairperson
19:00-21:30	***IPHC RECEPTION*** *- The Shaughnessy Ballroom* ***Guest Speaker:*** *Honourable Nathan Cullen, Minister of Land, Water and Resource Stewardship, and Responsible for Fisheries*	Executive Director
Tuesday, 24 January 2023		
Time	**Agenda item**	**Lead (support)**
99th Session of the IPHC Annual Meeting (AM099)		
09:00-09:45	6. Biological and ecosystem sciences – Project updates 6.1 Report on Current and Future Biological and Ecosystem Science Research Activities (J. Planas) ➢ ***IPHC-2023-AM099-12:*** *Report on Current and Future Biological and Ecosystem Science Research Activities (J. Planas)*	J. Planas
09:45-10:40	7. Management strategy evaluation 7.1 Report of the 17th Session of the IPHC Management Strategy Advisory Board (MSAB017) ➢ ***IPHC-2022-MSAB017-R****: Report of the 17th Session of the IPHC Management Strategy Advisory Board (MSAB017)* 7.2 IPHC Management Strategy Evaluation: update ➢ ***IPHC-2023-AM099-13****: IPHC Management Strategy Evaluation and Harvest Strategy Policy: FOR DECISION (A. Hicks, I. Stewart & D. Wilson)*	Co-Chairpersons A. Hicks
10:40-10:50	Break	
10:50-12:15	8. IPHC Fishery Regulations: Proposals for the 2022-23 process ➢ ***IPHC-2023-AM099-14:*** IPHC Fishery Regulations: Proposals for the 2022-23 process (B. Hutniczak) 8.1 IPHC Secretariat fishery regulation proposals	B. Hutniczak

	➢ ***IPHC-2023-AM099-PropA1:*** *Mortality and Fishery Limits (Sect. 5) (IPHC Secretariat)* ➢ ***IPHC-2023-AM099-PropA2:*** *Commercial Fishing Periods (Sect. 9) (IPHC Secretariat)* ➢ ***IPHC-2023-AM099-PropA3:*** *Fishing Period Limits (Sect 14) & Licensing Vessels for IPHC Regulatory Area 2A (Sect. 15) – Accommodation of the transition of management in the IPHC Regulatory Area 2A (IPHC Secretariat)* ➢ ***IPHC-2023-AM099-PropA4 Rev_1:*** *IPHC Fishery Regulations: minor amendments (IPHC Secretariat)* 8.2 Contracting Party fishery regulation proposals ➢ ***IPHC-2023-AM099-PropB1:*** *Recreational (sport) fishing for Pacific halibut—IPHC Regulatory Areas 2c, 3a, 3b, 4a, 4b, 4c, 4d, 4e* ***(Sect. 29) - Charter Management Measures in IPHC Regulatory Areas 2C and 3A (USA: NOAA-Fisheries)*** ➢ ***IPHC-2023-AM099-PropB2****: Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Area 2B – Daily bag limit in IPHC Regulatory Area 2B (Sect. 28) (Canada: DFO)* ➢ ***IPHC-2023-AM099-PropB3:*** *Recreational (sport) fishing for Pacific halibut—IPHC Regulatory Areas 2c, 3a, 3b, 4a, 4b, 4c, 4d, 4e (Sect. 29) – Onboard consumption (USA: NOAA-Fisheries)* ➢ ***IPHC-2023-AM099-PropB4:*** *Logs (Sect 20) – Logs requirements (USA: NOAA-Fisheries)* 8.3 Stakeholder fishery regulation proposals ➢ ***IPHC-2023-AM099-PropC1:*** *Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Processing Pacific halibut for eating and preservation (J. Fields)* ➢ ***IPHC-2023-AM099-PropC2:*** *Mortality and Fishery Limits (Sect. 5) - TCEY floor in IPHC Regulatory Area 2A (P. DePoe)* ➢ ***IPHC-2023-AM099-PropC3:*** *Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Onboard consumption in IPHC Regulatory Area 2C (T. Cooper)* 8.4 Stakeholder statements ➢ ***IPHC-2023-AM099-INF01:*** *Stakeholder Statements on IPHC Fishery Regulations or published regulatory proposals (B. Hutniczak)*	*USA: NOAA-Fisheries* *Canada: DFO* *USA: NOAA-Fisheries* *USA: NOAA-Fisheries* Stakeholders B. Hutniczak
12:15-12:30	*Public comment and questions* ***(Agenda Items 6-8)***	Chairperson

12:30-13:30	Lunch	
13:30-14:00	9. Contracting Party: National Reports 9.1 Canada ➢ ***IPHC-2023-AM099-NR01:*** *Canada*	Canada
14:00-14:30	9.2 United States of America ➢ ***IPHC-2023-AM099-NR02:*** *USA*	USA
14:30-15:30	10. Report of the 99th Session of the IPHC Finance and Administration Committee (FAC099) ➢ ***IPHC-2023-FAC099-R:*** *Report of the 99th Session of the IPHC Finance and Administration Committee (FAC099)*	D. Wilson
15:30-15:45	Break	
15:45-17:00	No AM099 Session: Commissioner opportunity to caucus and/or listen to CB/PAB proceedings	-
17:00-18:30	***IPHC Website data visualisations*** – Crystal Ballroom	I. Stewart & K. Ualesi
17:00-18:30	***Poster Session: Research and Monitoring*** – Palm Court (cash bar)	J. Planas
Wednesday, 25 January 2023		
Time	**Agenda item**	**Lead (support)**
09:00-17:00	No AM099 Session: Commissioner opportunity to caucus and/or listen to CB/PAB proceedings	-
Thursday, 26 January 2023		
	99th Session of the IPHC Annual Meeting (AM099)	
09:00-12:30	No AM099 Session: Commissioner opportunity to caucus CB/PAB report finalisation and publication	-
12:30-13:30	Lunch	
13:30-14:15	11. Report of the 93rd Session of the IPHC Conference Board (CB093) ➢ ***IPHC-2023-CB093-R****: Report of the 93rd Session of the IPHC Conference Board (CB093)*	CB Co-Chairpersons
14:15-15:30	12. Report of the 28th Session of the IPHC Processor Advisory Board (PAB028)	PAB Chairperson

	➢ ***IPHC-2023-PAB028-R**: Report of the 28th Session of the IPHC Processor Advisory Board (PAB028)*	
15:30-15:45	Break	
15:45-17:00	Revisit Regulatory proposals for 2023: for decision (Agenda item 8)	B. Hutniczak
17:00-18:30	***FISS 2023 Tender Q&A*** - Crystal Ballroom	K. Ualesi
Friday, 27 January 2023		
99th Session of the IPHC Annual Meeting (AM099)		
09:00-10:00	Decision summary from AM099 – Final actions	D. Wilson
10:00-10:30	Mortality limits for 2023: For decision/announcement (Agenda Item 8)	Chairperson
10:30-10:45	Break	
10:45-11:30	Revisit final mortality projections based on adopted mortality limits for 2023	I. Stewart
11:30-12:30	13. Other business 13.1 IPHC meetings calendar (2023-25) ➢ ***IPHC-2023-AM099-15:** IPHC 3-year meetings calendar (2022-24)* 13.2 Election of a Chairperson and Vice-Chairperson for the next year	D. Wilson D. Wilson
12:30-13:30	Lunch	
13:30-17:00	14. Review of the draft and adoption of the Report of the 99th Session of the IPHC Annual Meeting (AM099)	Chairperson (D. Wilson)

LIST OF DOCUMENTS FOR THE 99th SESSION OF THE IPHC ANNUAL MEETING (AM099)

Meeting documents	Title	Availability
IPHC-2023-AM099-01	Agenda & Schedule for the 99th Session of the IPHC Annual Meeting (AM099)	✓ 19 Oct 2022 ✓ 20 Dec 2022 ✓ 17 Jan 2023
IPHC-2023-AM099-02	List of Documents for the 99th Session of the IPHC Annual Meeting (AM099)	✓ 19 Oct 2022 ✓ 8 Dec 2022 ✓ 26 Jan 2022
IPHC-2023-AM099-03	Update on actions arising from the 98th Session of the IPHC Annual Meeting (AM098), 2022 Special Sessions, intersessional decisions, and the 98th Session of the IPHC Interim Meeting (IM098) (D. Wilson)	✓ 19 Dec 2022
IPHC-2023-AM099-04	Report of the IPHC Secretariat (2022) (D. Wilson & B. Hutniczak)	✓ 20 Dec 2022
IPHC-2023-AM099-05 Rev_1	Implementation of the Recommendations from the 2nd IPHC Performance Review (PRIPHC02) (D. Wilson)	✓ 8 Dec 2022 ✓ 19 Dec 2022
IPHC-2023-AM099-06	International Pacific Halibut Commission 5-Year program of integrated research and monitoring (2022-26) (D. Wilson, J. Planas, I. Stewart, A. Hicks, B. Hutniczak, R. Webster, & J. Jannot)	✓ 8 Dec 2022
IPHC-2023-AM099-07	Fisheries data overview (2022) (J. Jannot, H. Tran, T. Kong, K. Magrane, & K. Sawyer van Vleck)	✓ 19 Dec 2022
IPHC-2023-AM099-08	IPHC Fishery-independent setline survey (FISS) design and implementation in 2022 (K. Ualesi, C. Jones, R. Rillera, & T. Jack)	✓ 19 Dec 2022
IPHC-2023-AM099-09	Space-time modelling of survey data (R. Webster)	✓ 21 Dec 2022
IPHC-2023-AM099-10	2023-25 FISS Design evaluation (R. Webster & D. Wilson)	✓ 20 Dec 2022
IPHC-2023-AM099-11	Summary of the data, stock assessment, and harvest decision table for Pacific halibut (*Hippoglossus stenolepis*) at the end of 2022 (I. Stewart, A. Hicks, R. Webster, D. Wilson)	✓ 13 Dec 2022
IPHC-2023-AM099-12	Report on Current and Future Biological and Ecosystem Science Research Activities (J. Planas)	✓ 12 Dec 2022

IPHC-2023-AM099-13	IPHC Management Strategy Evaluation and Harvest Strategy Policy: FOR DECISION (A. Hicks, I. Stewart & D. Wilson)	✓ 20 Dec 2022
IPHC-2023-AM099-14	IPHC Fishery Regulations: Proposals for the 2022-23 process (B. Hutniczak)	✓ 22 Dec 2022
IPHC-2023-AM099-15	IPHC 3-year meetings calendar (2023-25) (D. Wilson)	✓ 20 Dec 2022
IPHC-2023-AM099-16	Minimum data collection standards for Pacific halibut by scientific observer programs (D. Wilson & J. Jannot)	✓ 20 Dec 2022
Contracting Party National Reports		
IPHC-2023-AM099-NR01	**Canada**: National Report (Fisheries and Oceans Canada (DFO))	✓ 23 Dec 2022
IPHC-2023-AM099-NR02 Rev_1	**United States of America**: National Report (NOAA Fisheries)	✓ 21 Dec 2022 ✓ 18 Jan 2023
IPHC Fishery Regulation proposals for 2023		
IPHC Secretariat Fishery Regulation proposals for 2023		
IPHC-2023-AM099-PropA1	Mortality and Fishery Limits (Sect. 5) (IPHC Secretariat)	✓ 8 Dec 2022
IPHC-2023-AM099-PropA2	Commercial Fishing Periods (Sect. 9) (IPHC Secretariat)	✓ 21 Dec 2022
IPHC-2023-AM099-PropA3	Fishing Period Limits (Sect 14) & Licensing Vessels for IPHC Regulatory Area 2A (Sect. 15) – Accommodation of the transition of management in the IPHC Regulatory Area 2A (IPHC Secretariat)	✓ 21 Dec 2022
IPHC-2023-AM099-PropA4 Rev_1	IPHC Fishery Regulations: minor amendments (IPHC Secretariat)	✓ 21 Dec 2022 ✓ 11 Jan 2023
Contracting Party Fishery Regulation proposals for 2023		
IPHC-2023-AM099-PropB1	Recreational (sport) fishing for Pacific halibut—IPHC Regulatory Areas 2c, 3a, 3b, 4a, 4b, 4c, 4d, 4e (Sect. 29) - *Charter Management Measures in IPHC Regulatory Areas 2C and 3A* (USA: NOAA-Fisheries)	✓ 20 Dec 2022
IPHC-2023-AM099-PropB2 Rev_1	Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Area 2B – Daily bag limit in IPHC Regulatory Area 2B (Sect. 28) (Canada: DFO)	✓ 22 Dec 2022 ✓ 26 Jan 2023
IPHC-2023-AM099-PropB3	Recreational (sport) fishing for Pacific halibut—IPHC Regulatory Areas 2c, 3a, 3b, 4a, 4b, 4c, 4d,	✓ 20 Dec 2022

	4e (Sect. 29) – *Onboard consumption* (USA: NOAA-Fisheries)	
IPHC-2023-AM099-PropB4	Logs (Sect 20) – Logs requirements (USA: NOAA-Fisheries)	✓ 22 Dec 2022
Other Stakeholder Fishery Regulation proposals for 2023		
IPHC-2023-AM099-PropC1	Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Processing Pacific halibut for eating and preservation (J. Fields)	✓ 21 Dec 2022
IPHC-2023-AM099-PropC2	Mortality and Fishery Limits (Sect. 5) - *TCEY floor in IPHC Regulatory Area 2A* (P. DePoe)	✓ 13 Dec 2022
IPHC-2023-AM099-PropC3	Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Onboard consumption in IPHC Regulatory Area 2C (T. Cooper)	✓ 8 Dec 2022
Information papers		
IPHC-2023-AM099-INF01 Rev_2	Stakeholder Statements on IPHC Fishery Regulations or published regulatory proposals (B. Hutniczak)	✓ 20 Dec 2022 ✓ 20 Jan 2023 ✓ 23 Jan 2023
IPHC-2023-AM099-INF02	The IPHC mortality projection tool for 2023 mortality limits (I. Stewart)	✓ 20 Jan 2023
IPHC-2023-AM099-INF03	Transition of management in the IPHC Regulatory Area 2A: outreach material (IPHC Secretariat)	✓ 13 Dec 2022
IPHC-2023-AM099-INF04	Revision of the IPHC length-weight relationship (R. Webster & I. Stewart)	✓ 20 Jan 2023
Reports from IPHC subsidiary bodies (2022-23)		
IPHC-2022-SRB020-R	Report of the 20th Session of the IPHC Scientific Review Board (SRB020)	✓ 16 Jun 2022
IPHC-2022-SRB021-R	Report of the 21st Session of the IPHC Scientific Review Board (SRB021)	✓ 22 Sept 2022
IPHC-2022-MSAB017-R	Report of the 17th Session of the IPHC Management Strategy Advisory Board (MSAB017)	✓ 20 Oct 2022
IPHC-2022-RAB023-R	Report of the 23rd Session of the IPHC Research Advisory Board (RAB023)	✓ 28 Nov 2022
IPHC-2022-IM098-R	Report of the 98th Session of the IPHC Interim Meeting (IM098)	✓ 16 Dec 2022
IPHC-2023-FAC099-R	Report of the 99th Session of the IPHC Finance and Administration Committee (FAC099)	✓ 24 Jan 2023
IPHC-2023-PAB028-R	Report of the 28th Session of the IPHC Processor Advisory Board (PAB028)	✓ 26 Jan 2023

IPHC-2023-CB093-R	Report of the 93rd Session of the IPHC Conference Board (CB093)	✓ 26 Jan 2023

Update on actions arising from the 98th Session of the IPHC Annual Meeting (AM098), 2022 Special Sessions, intersessional decisions, and the 98th Session of the IPHC Interim Meeting (IM098)

PREPARED BY: IPHC SECRETARIAT (D. WILSON; 19 DECEMBER 2022)

PURPOSE

To provide the Commission with an opportunity to consider the progress made during the inter-sessional period in relation to the direct requests for action by the Commission.

BACKGROUND

At the 98th Session of the IPHC Annual Meeting (AM098), Contracting Parties agreed on a series of actions to be taken by Commissioners, subsidiary bodies, and the IPHC Secretariat on a range of issues as detailed in Appendix A.

In addition, the Commission made a number of decisions during a Special Session in 2022 (SS012), and an intersessional decision, as detailed in Appendix B.

Finally, at the 98th Session of the IPHC Interim Meeting (IM098), the Commission made several additional requests for action, as detailed in Appendix C.

DISCUSSION

Noting that best practice governance requires the prompt delivery of core tasks assigned to the IPHC Secretariat by the Commission, at each session of the Commission and its subsidiary bodies, any recommendations for action are carefully constructed so that each contains the following elements:

1) a specific action to be undertaken (deliverable);
2) clear responsibility for the action to be undertaken (i.e. a specific Contracting Party, the IPHC Secretariat staff, a subsidiary body of the Commission, or the Commission itself);
3) a desired time frame for delivery of the action (i.e. by the next session of a subsidiary body, or other date).

This involves numbering and tracking all action items from the Commission, as well as including clear progress updates and document reference numbers.

RECOMMENDATION/S

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-03, which provided the Commission with an opportunity to consider the progress made during the inter-sessional period, in relation to the direct requests for action by the Commission.

APPENDICES

Appendix A: Update on actions arising from the 98th Session of the IPHC Annual Meeting (AM098: January 2022)

APPENDIX A

Update on actions arising from the 98th Session of the IPHC Annual Meeting (AM098: January 2022)

98th Session of the IPHC Annual Meeting (AM098)		
Action No.	**Description**	**Update**
	RECOMMENDATIONS	
AM098–Rec.01 (para. 69)	***Management Strategy Evaluation*** The Commission **RECOMMENDED** that an MSE agenda item be added to the upcoming special session to discuss and provide direction on elements of the MSE workplan, including distribution procedures to incorporate in the management procedures being simulated in 2022 and evaluated at the 99th Session of the IPHC Annual Meeting (AM099).	**Lead**: IPHC Secretariat **Status/Plan**: Completed Agenda: IPHC-2022-SS012-01 Meeting page: https://www.iphc.int/venues/details/12th-special-session-of-the-iphc-ss012 Report: IPHC-2022-SS012-R
AM098–Rec.02 (para. 116)	***12th Special Session of the Commission (SS012)*** The Commission **RECOMMENDED** that the 12th Special Session of the Commission be held electronically in late February or early March 2022 and include the following agenda items: 1) FY2023 budget review and adoption; 2) Management Strategy Evaluation; 3) IPHC Fishery Regulations: Daily bag limit in IPHC Regulatory Area 2B (Sect. 28) (IPHC-2022-AM098-PropB4).	**Lead**: IPHC Secretariat & Commission **Status/Plan**: Completed Invitation: IPHC-2022-CR003 Agenda: IPHC-2022-SS012-01 Meeting page: https://www.iphc.int/venues/details/12th-special-session-of-the-iphc-ss012 Report: IPHC-2022-SS012-R
AM098–Rec.03 (para. 121)	***Length-Weight*** The Commission **RECOMMENDED** the adoption of the updated length-weight relationship as detailed in paper IPHC-2022-AM098-INF07, and its dissemination to the appropriate domestic management agencies.	**Lead**: IPHC Secretariat **Status/Plan**: Completed Published online 23 January 2022. In addition, the IPHC Pacific Halibut calculator was updated and is available for stakeholder use: https://www.iphc.int/management/science-and-research/pacific-halibut-length-weight-relationships Disseminated to appropriate domestic agencies via Secretariat@iphc.int on 23 January 2022.

<table>
<tr><th colspan="3">98th Session of the IPHC Annual Meeting (AM098)</th></tr>
<tr><th>Action No.</th><th>Description</th><th>Update</th></tr>
<tr><td colspan="3">REQUESTS</td></tr>
<tr><td>AM098–Req.01 (para. 9)</td><td>2nd IPHC Performance Review (PRIPHC02): Implementation of recommendations

The Commission REQUESTED that a ‘scorecard’ be added to the covering paper of the PRIPHC02 update paper, for future meeting documents. Mindful that a timeline to address the set of recommendations is by the end of 2024, the intention would be to better facilitate a discussion of progress and feasibility of the current set of recommendations.</td><td>Lead: IPHC Secretariat (D. Wilson)

Status/Plan: Completed

See paper IPHC-2022-IM098-05
<table><tr><th>PRIPHC02 Recommendation</th><th>Status</th></tr><tr><td>Completed and/or annually ongoing</td><td>17</td></tr><tr><td>In Progress</td><td>6</td></tr><tr><td>Pending</td><td>2</td></tr><tr><td>On-Hold</td><td>1</td></tr><tr><td>Total</td><td>26</td></tr></table></td></tr>
<tr><td>AM098–Req.02 (para. 61)</td><td>Management Strategy Evaluation

The Commission RECALLED SS011-Rec.01 and REQUESTED that the current size limit (32 inches), a 26 inch size limit, and no size limit be investigated. to understand the long-term effects of a change in the size limit.</td><td>Lead: IPHC Secretariat (A. Hicks)

Status/Plan: Completed

Results investigating these three size limits have been presented to the SRB (SRB021) the MSAB (MSAB017) and are detailed in paper IPHC-2022-IM098-13.</td></tr>
<tr><td>AM098–Req.03 (para. 63)</td><td>The Commission REQUESTED that the IPHC Secretariat work with the SRB and others as necessary to identify potential costs and benefits of not conducting an annual stock assessment. This will include a prioritized list of work items that could be accomplished in its place.</td><td>Lead: IPHC Secretariat (A. Hicks)

Status/Plan: Completed

The Secretariat has discussed this with the SRB and MSAB, and outcomes are described in paper IPHC-2022-IM098-13.
See also paper IPHC-2023-AM099-13.</td></tr>
<tr><td>AM098–Req.04 (para. 64)</td><td>The Commission REQUESTED that multi-year management procedures include the following concepts:

a) The stock assessment occurs biennially (and possibly triennial if time in 2022 allows) and no changes would occur to the FISS (i.e. remains annual);

b) The TCEY within IPHC Regulatory Areas for non-assessment years:

i. remains the same as defined in the previous assessment year, or

ii. changes within IPHC Regulatory Areas using simple empirical rules, to be developed by the IPHC Secretariat, that incorporate FISS data.</td><td>Lead: IPHC Secretariat (A. Hicks)

Status/Plan: Completed

Biennial and triennial management procedures have been investigated using constant TCEYs for non-assessment years as well as two empirical options for adjusting the TCEY in non-assessment years. Results are presented in paper IPHC-2022-IM098-13.

See also paper IPHC-2023-AM099-13.</td></tr>
</table>

98th Session of the IPHC Annual Meeting (AM098)		
Action No.	**Description**	**Update**
AM098–Req.05 (para. 66)	The Commission **NOTED** that a distribution procedure is necessary to evaluate the size limit and multi-year assessment management procedures, and **REQUESTED** that a range of distribution procedures be used to highlight potential differences in the performance of size limits and multi-year assessments.	**Lead**: IPHC Secretariat (A. Hicks) **Status/Plan**: Completed Five distribution procedures defining a potential future range of possibilities were defined by the Commission at SS012 (SS012-Rec.01, para. 10) and implemented in the MSE framework.
AM098–Req.06 (para. 68)	The Commission **REQUESTED** that work continue on methods to evaluate MSE outcomes, including providing new alternative methods to quickly evaluate large sets of management procedures, which may involve ranking them in various ways.	**Lead**: IPHC Secretariat (A. Hicks) **Status/Plan**: Completed & Ongoing The Secretariat worked with the SRB and MSAB to improve methods to evaluate MSE outcomes. Various methods are presented in paper IPHC-2022-IM098-13. See also paper IPHC-2023-AM099-13.
AM098–Req.07 (para. 73)	***Pacific halibut fishery economics – Project Report*** The Commission **AGREED** that it wished to see the Commission improve its knowledge of key inputs into the Pacific halibut stock assessment and Management Strategy Evaluation (MSE) processes, thereby providing the best possible advice for management decision making processes. Accordingly the Commission **REQUESTED** that no additional economic analyses be undertaken and that the Commission instead dedicate its efforts and funds to core areas of responsibility.	**Lead**: IPHC Secretariat (B. Hutniczak) **Status/Plan**: Completed
AM098–Req.08 (para. 105)	***IPHC Rules of Procedure (2022)*** The Commission **ADOPTED** the IPHC Rules of Procedure (2022), as provided in IPHC-2022-FAC098-09, and **REQUESTED** that the IPHC Secretariat finalise and publish them accordingly with the following amendments: 1) amend para. 1.a of the RAB ToR's to read as follows: "I.1.a *Suggest research topics to be considered for incorporation in the IPHC integrated research and monitoring activities, as well as to comment upon operational and implementation considerations of those research and monitoring activities.*" 2) retain para. 14 of the PAB TOR's: "*14. Conduct of meetings: Parliamentary procedure will be used in the conduct of the PAB*"	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: Completed Published on 8 February 2022 via IPHC Circular (IPHC-2022-CR-001) Direct link to 2022 ROP: IPHC-2022-ROP22

98th Session of the IPHC Annual Meeting (AM098)		
Action No.	**Description**	**Update**
AM098–Req.09 (para. 126)	***Review of the draft and adoption of the report of the 98th Session of the IPHC Annual Meeting (AM098)*** The Commission **REQUESTED** that the IPHC Secretariat finalise and publish the IPHC *Pacific Halibut Fishery Regulations (2022)* as soon as possible, **NOTING** that only minor editorial and formatting changes are permitted beyond the decisions made by the Commission at the AM098.	**Lead**: IPHC Secretariat **Status/Plan**: Completed Published on 2 February 2022. **Note**: Revised on 3 March 2022 following the 12th Special Session of the IPHC (IPHC-2022-SS012-R) Direct link to 2022 Fishery Regulations: IPHC-2022-FISHR22

APPENDIX B

2022 Special Sessions of the Commission

Action No.	Description	Update
12th Special Session of the IPHC (SS012) (25 February 2022)		
SS012-Rec.01 (para. 10)	***Management Strategy Evaluation*** The Commission **RECOMMENDED** the following five distribution procedures to be used in the management strategy evaluation of size limits and multi-year assessments, noting that these distribution procedures are for analytical purposes only and are not endorsed by both parties, thus would be reviewed in the future if the Commission wishes to evaluate them for implementation. a) Baseline based on recent year O32 FISS results, relative harvest rates of 1.0 for IPHC Regulatory Areas 2-3A, relative harvest rates of 0.75 for IPHC Regulatory Areas 3B-4, and no application of the current interim agreements for 2A and 2B; b) Baseline based on recent year O32 FISS results, relative harvest rates of 1.0 for IPHC Regulatory Areas 2-3A, relative harvest rates of 0.75 for IPHC Regulatory Areas 3B-4, and current interim agreements for 2A and 2B; c) Baseline based on recent year O32 FISS results with 1.65 Mlbs to 2A and 20% of the coastwide TCEY to 2B; d) Baseline based on recent year O32 FISS results, relative harvest rates of 1.0 for IPHC Regulatory Areas 2-3, 4A, and 4CDE, a relative harvest rate of 0.75 for IPHC Regulatory Area 4B, and no agreements for 2A and 2B; e) Baseline based on recent year O32 FISS results, relative harvest rates of 1.0 for IPHC Regulatory Areas 2-3, 4A, and 4CDE, a relative harvest rate of 0.75 for IPHC Regulatory Area 4B, and current interim agreements for IPHC Regulatory Areas 2A and 2B.	**Lead**: IPHC Secretariat (A. Hicks) **Status/Plan**: Completed These five distribution procedures have been implemented in the MSE framework for generating results in 2022 for final presentation at AM099 in January 2023.
REQUESTS		
SS012-Req.01 (para. 04)	***Budget Estimates: FY2023 (for approval)*** The Commission **REQUESTED** that a detailed breakdown of current Payroll Benefit Liabilities, proposed as current versus long-term liabilities, be presented for discussion at the Commission's September Work Meeting, by the IPHC Secretariat. Additional elements surrounding the Commission's movement towards being GAAP compliant (Generally Accepted Accounting Principles) should also be presented (note that OCBOA - Other Comprehensive Basis of Accounting was historically employed by the IPHC).	**Lead**: IPHC Secretariat (D. Wilson, Sommerville & Associates) **Status/Plan**: Completed See paper IPHC-2022-WM2022-13

Action No.	Description	Update
SS012-Req.02 (para. 05)	The Commission **REQUESTED** that in accordance with the IPHC's inter-sessional decision-making process (Rule 11, paragraphs 4-10 of the IPHC Rules of Procedure (2022)), a further hybrid option between Options 2 and 3 from IPHC-2022-SS012-03 Rev_1, be provided to the Commission for consideration and potential adoption that incorporates the following elements: a) Contracting Party base contributions to remain at FY2021/FY2022 levels: • **Canada**: US$900,407 • **USA**: US$4,157,760 b) Budget reductions from the total operating expenses provided in Option 2 totaling approximately US$75,000 (these should focus on reductions to Meetings and Conferences (electronic meetings for the Interim Meeting, MSAB in October 2022, and one electronic SRB meeting in 2023), Travel (COVID-19 savings or other as identified), Salaries and wages (as relates to a position that may become vacant in FY2023, and non-essential services where not fully cost recovered on a case-by-case basis); and c) An inter-fund transfer from 50-Reserve to 10-General, totaling the remaining budget shortfall of approximately US$76,745. This component involves the utilization of the non-committed funds 'carryover' in the Reserve fund which stands at US$1,476,626 (as of 1 October 2021).	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: Completed Budget paper for decision provided via IPHC Circular on 7 March 2022: IPHC-2022-CR-006. The Commission subsequently reviewed and adopted the FY2023 budget on 16 March 2022 via IPHC Circular IPHC-2022-CR-007, the '*date of notification*'.
Intersessional Decisions (ID)		
IPHC-2022-ID001:	The Commission: a) **NOTED** paper IPHC-2022-ID001 which provided revised budget estimates for FY2023 (1 October 2022 to 30 September 2023) for approval, noting the outcomes of the 12th Special Session of the Commission (SS012). b) **ADOPTED** the FY2023 budget (1 October 2022 to 30 September 2023), as detailed in Appendix I [*of IPHC-2022-ID001*], including the Contracting Party contributions to the General Fund as follows: • Canada: Contribution to the General Fund: **US$900,407** • U.S.A.: Contribution to the General Fund: **US$4,157,760** c) **NOTED** the extra-budgetary (IFCP Fund deficit and Headquarters lease/maintenance) contributions from each Contracting Party for FY2023 as follows: • Canada: ○ 50% Contribution to the IFCP Fund deficit (former staff pension plan): **US$127,848** • U.S.A.: ○ 50% Contribution to the IFCP Fund deficit (former staff pension plan): **US$127,848**	**Lead**: Commission & IPHC Secretariat (D. Wilson) **Status/Plan**: Completed Adopted on 16 March 2022 via IPHC Circular IPHC-2022-CR-007, the '*date of notification*'.

Action No.	Description	Update
	○ Contribution to the headquarters building lease and maintenance costs: **US$489,250** d) **AGREED** that it would like at least one in-person/hybrid MSAB meeting in 2023. This could occur in mid-2023 or in the standard October time slot (October 2023). In doing so, the MSAB membership may need to be reviewed and travel expenses for non-government members capped.	

APPENDIX C

Update on actions arising from the 98th Session of the IPHC Interim Meeting (IM098: November 2022)

98th Session of the IPHC Interim Meeting (IM098)		
Action No.	**Description**	**Update**
	RECOMMENDATIONS	
IM098-Rec.01 (para. 63)	***IPHC Fishery regulations: Proposals for the 2022-23 process*** The Commission **RECOMMENDED** that interested stakeholders note the deadline for submission of IPHC Fishery Regulation proposals, for consideration at the 99th Session of the Annual Meeting (AM099), of **24 December 2022**. Late proposals will not be considered at AM099, but stakeholders may also submit statements up until the day before the AM099. More information is available via the updated IPHC website: https://iphc.int/the-commission/fishery-regulations/	**Lead**: Stakeholders **Status/Plan**: Completed. Fixed deadline.
	REQUESTS	
IM098-Req.01 (para. 32)	***2023-25 FISS design evaluation*** The Commission **REQUESTED** that the IPHC Secretariat consider adding the charter region of Portlock back into the 2023 FISS should in-season revenue conditions and vessel availability, permit it. Similarly, should in-season conditions be favourable, then consider increasing the FISS station count in Regulatory Areas 4B, 4A and 2A.	**Lead**: IPHC Secretariat **Status/Plan**: Completed and ongoing. Request for tender specifications distributed via IPHC Media Release 2022-017. Should in-seasons be favourable, the tenders for Portlock may be initiated.
IM098-Req.02 (para. 59)	***Management Strategy Evaluation*** The Commission **AGREED** that it was not yet ready to provide direction to the IPHC Secretariat on a set of objectives, performance metrics, or a reduced set of Management Procedures for the IPHC Management Strategy Evaluation process and **REQUESTED** that the IPHC Secretariat present their proposals for focusing the IPHC's MSE efforts at AM099 for consideration.	**Lead**: IPHC Secretariat **Status/Plan**: Completed. **See paper IPHC-2023-AM099-13**
IM098-Req.03 (para. 78)	***IPHC Rules of Procedure: Draft amendments*** The Commission **REQUESTED** a dedicated time slot be added to the AM099 agenda, where the Commission will clarify the role and purpose of the MSAB moving forward, as well as to explain changes in membership and representation.	**Lead**: IPHC Secretariat **Status/Plan**: Completed. **See paper IPHC-2023-AM099-01** The discussion is scheduled to occur under Agenda item 7, and also for decision under agenda item 10.

Report of the IPHC Secretariat (2022)

PREPARED BY: IPHC SECRETARIAT (D. WILSON & B. HUTNICZAK, 20 DECEMBER 2022)

CONTENTS

1 PURPOSE

To provide the Commission with a draft update on the activities of the IPHC Secretariat in 2022, not already contained within other papers before the Commission.

2 IPHC SECRETARIAT 2022

The IPHC is a public international organization so designated via Presidential Executive Order 11059 and established by a Convention between Canada and the United States of America. The IPHC Convention was signed on 2 March 1923, ratified on 21 July 1924, and came into effect on **21 October 1924** upon exchange.

The basic texts of the Commission are available on the IPHC website: https://www.iphc.int/the-commission, and prescribe the mission of the organization as:

*"….. **to develop the stocks of [Pacific] halibut in the Convention waters to those levels which will permit the optimum yield from the fishery and to maintain the stocks at those levels**. ….." IPHC Convention*, Article I, sub-article I, para. 2).

The IPHC Secretariat, formed in support the Commission's activities, is based in Seattle, WA, U.S.A. (Fig. 1) and consists of 34 fulltime positions (FTEs) and 35-45 temporary/seasonal positions to staff our ports and research vessels (Appendix I). As our shared vision, ***the IPHC Secretariat aims to deliver positive economic, environmental, and social outcomes for the Pacific halibut resource for Canada and the U.S.A. through the application of rigorous science, innovation, and the implementation of international best practice*.**

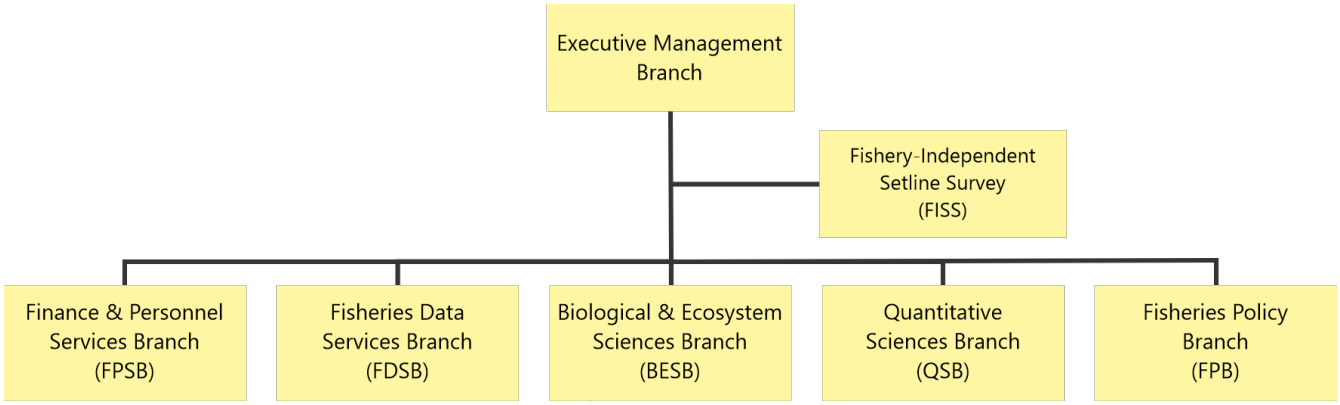


Figure 1. IPHC Secretariat organisation chart (2022).

3 IPHC INTERNSHIP PROGRAM: 2022

The IPHC funds full-time internships each summer. In 2022 the IPHC hosted two undergraduate interns, Ms Vasilisa (Vasi) **Tyurina**, a Biology major at Pacific Lutheran University (Tacoma, WA), and Ms Kaitlyn **Murray**, an Environmental Science major at Sweet Briar College (Amherst, VA).

Vasi and Kaitlyn have participated in two research activities of the Biological and Ecosystem Sciences Branch. First, Vasi and Kaitlyn have contributed to the generation of sex ratio

information from the 2021 commercial samples by participating in all components of this important monitoring effort: from extracting DNA from fin clips to conducting the genotyping assays. Secondly, Vasi and Kaitlyn have participated in the reproductive assessment project by processing blood samples and testing methods for measuring the blood levels of reproductive hormones as reproductive indicators in female Pacific halibut at different stages in their reproductive development. The internship period runs from 31 May through 15 August 2022.

4 IPHC MERIT SCHOLARSHIP FOR 2022-25

The IPHC funds several Merit Scholarships to support university, technical college, and other post-secondary education for students from Canada and the United States of America who are connected to the Pacific halibut fishery. Generally, a single new scholarship valued at US$4,000 per year is awarded every two years. The scholarships are renewable annually for the normal four-year period of undergraduate education, subject to maintenance of satisfactory academic performance.

Since the scholarships inception in 2002, the IPHC has awarded over US$150,000 in scholarship funds to 18 recipients.

In 2022, the IPHC Merit Scholarship Selection Panel reviewed applications and selected an outstanding candidate from a very strong application pool, based on academic qualifications, career goals, and relationship to the Pacific halibut industry.

The Selection Panel consists of the following five (5) panelists:

- Robert Alverson (USA Commissioner)
- Peter DeGreef (Canadian Commissioner)
- Patrick DePoe
- Angel Drobnica
- Christa Rusel

The Selection Panel unanimously awarded Lucy Hankins (Seward, AK, USA) 2022 IPHC Merit Scholarship. The current recipients and their expected years of receipt are provided below.

Name	2022	2023	2024	2025
Hahlen Behnken-Barkhau (Sitka, AK, USA)	$4,000	$4,000	-	-
Lucy Hankins (Seward, AK, USA)	-	$4,000	$4,000	$4,000

5 MEETINGS OF THE COMMISSION AND SUBSIDIARY BODIES DURING 2022

Meeting	No.	Date	Location	Secretariat material
Finance and Administration Committee (FAC)	98th	24 Jan	Electronic	9 working papers
Annual Meeting (AM)	**98th**	**24-28 Jan**	Electronic	15 working papers, 3 regulatory proposals
Conference Board (CB)	92nd	25-26 Jan	Electronic	Commission papers
Processor Advisory Board (PAB)	27th	25-26 Jan	Electronic	Commission papers

Special Session (SS)	12th	25 Feb	Electronic	4 working papers
Scientific Review Board (SRB)	20th	14-16 June	Seattle, USA & Electronic	10 working papers
Work Meeting (WM)	2022	14-15 Sept	Bellingham, USA & Electronic	14 working papers
Scientific Review Board (SRB)	21st	20-22 Sept	Seattle, USA & Electronic	7 working papers
Management Strategy Advisory Board (MSAB)	17th	18-20 Oct	Electronic	7 working papers
Research Advisory Board (RAB)	23rd	28 Nov	Seattle, USA & Electronic	10 working papers
Interim Meeting (IM)	**98th**	**30 Nov – 1 Dec**	Electronic	14 working papers

6 IPHC PACIFIC HALIBUT FISHERY REGULATIONS ADOPTED IN 2022

In 2022, the Commission adopted **seven (7)** fishery regulations/amendments (IPHC-2022-AM098-R) in accordance with Article III of the Convention, as follows:

6.1 IPHC Secretariat fishery regulation proposals

IPHC Fishery Regulations: Morality and Fishery Limits (Sect. 5)

(para. 75) The Commission **NOTED** and **ADOPTED** fishery regulation proposal IPHC-2022-AM098-PropA1 Rev_1, which provides the mortality and fishery limits framework for population at AM098 (Appendix VI).

(para. 76) The Commission **ADOPTED** the distributed mortality limits for each Contracting Party, by IPHC Regulatory Area, (Table 5) and sector, as provided in Appendix VI. [**Canada**: In favour=3, Against=0][**USA**: In favour=3, Against=0]

Table 5. Adopted TCEY mortality limits for 2022

Contracting Party IPHC Regulatory Area	Mortality limit (TCEY) (mlbs)	Mortality limit (TCEY) (metric tonnes)
Canada Total: 2B	**7.56**	**3,429**
USA: 2A	1.65	748
USA: 2C	5.91	2,681
USA: 3A	14.55	6,600
USA: 3B	3.90	1,769
USA: 4A	2.10	953
USA: 4B	1.45	658
USA: 4CDE	4.10	1,860
United States of America Total	**33.66**	**15,268**
Total (IPHC Convention Area)	**41.22**	**18,697**

IPHC Fishery Regulations: Commercial fishing periods (Sect. 9)

(para. 79) The Commission **ADOPTED** fishing periods for 2022 as provided below, thereby superseding the relevant portions of Section 9 of the IPHC Pacific halibut fishery regulations (Appendix VII) by specifying that commercial fishing for Pacific halibut in all IPHC Regulatory

Areas may begin no earlier than 1200 (noon) local lime on **6 March** and must cease at 1200 (noon) local time on **7 December**, 2022.

IPHC Fishery Regulations: minor amendments

(para. 80) The Commission **NOTED** and **ADOPTED** fishery regulation proposal IPHC-2022-AM098-PropA3, which proposed minor amendments to the existing IPHC Fishery Regulations, improving their clarity and consistency (Appendix VIII).

6.2 *Contracting Party fishery regulation proposals*

IPHC Fishery Regulations: Recreational (sport) fishing for Pacific halibut—IPHC Regulatory areas 2c, 3a, 3b, 4a, 4b, 4c, 4d, 4e (sect. 29) - Recordkeeping for charter Pacific halibut annual limits

(para. 81) The Commission **NOTED** and **ADOPTED** fishery regulation proposal IPHC-2022-AM098-PropB1 Rev_1, which proposed establishing recordkeeping requirements needed to enforce Pacific halibut annual limits for recreational (sport) fishing for Pacific halibut in IPHC Regulatory Areas 2C and 3A (Appendix IX).

IPHC Fishery Regulations: Charter management measures in IPHC Regulatory Areas 2C and 3A (Sect. 29)

(para. 82) The Commission **NOTED** and **ADOPTED** fishery regulation proposal IPHC-2022-AM098-PropB2, which proposed IPHC Regulation changes for charter recreational Pacific halibut fisheries in IPHC Regulatory Areas 2C and 3A (Appendix X), in order to achieve the charter Pacific halibut allocation under the North Pacific Fisheries Management Council's (NPFMC) Pacific halibut Catch Sharing Plan:

a) IPHC Regulatory Area 2C – one-fish bag limit with size limit of less than or equal to 40 inches or greater than or equal to 80 inches;

b) IPHC Regulatory Area 3A – two-fish bag limit with one fish of any size and a second fish less than or equal to 28 inches, Wednesdays and two Tuesdays (26 July and 2 August) closed to retention of Pacific halibut, one trip per vessel and one trip per permit per day. See IPHC-2022-AM098-PropB2 for additional detail.

IPHC Fishery Regulations: Fishing gear (Sect. 18) – Trap gear use in IPHC Regulatory Area 2b

(para. 83) The Commission **NOTED** and **ADOPTED** fishery regulation proposal IPHC-2022-AM098-PropB3, which proposed IPHC Regulation changes to allow trap gear use on directed commercial trips in IPHC Regulatory Area 2B (Appendix XI). The Commission also expressed interest in sharing experience between Contracting Parties on the effectiveness of the use of traps/pots in preventing whale depredation.

IPHC Fishery Regulations: Recreational (sport) fishing for Pacific halibut – IPHC Regulatory Area 2B (Sect. 28) – daily bag limit

(SS012-R, para. 14) The Commission **ADOPTED** a modified version of the fishery regulation proposal [IPHC-2022-SS012-PropB4], which proposed allowing a maximum daily bag limit of up

to three (3) fish per person in IPHC Regulatory Area 2B within a limited time frame, from 1 April 2021 to 31 March 2023 (Appendix IV).

7 IPHC FISHERY REGULATIONS DEFERRED IN 2022

In 2022, the Commission deferred one (1) fishery regulation proposal as follows:

7.1 *Other Stakeholder fishery regulation proposals*

IPHC Fishery Regulations: Recreational (sport) fishing for Pacific halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Processing Pacific halibut for eating and/or preservation

(para. 85) The Commission **NOTED** and **DEFERRED** fishery regulation proposal IPHC-2022-AM098-PropC1, which proposed an exception that allows recreational fishermen on pleasure craft in Alaska Regulatory Area to process Pacific halibut for eating and/or preservation, subject to measures to facilitate enforcement of the applicable daily bag limits.

8 INTERACTIONS WITH CONTRACTING PARTIES

8.1 Contracting Party reports

In 2022, the IPHC Secretariat has engaged agency representatives from both Contracting Parties regarding more comprehensive and timely reporting of all forms of Pacific halibut removals. The IPHC Secretariat is working to identify and address data gaps in reporting.

8.2 Canada

Fisheries and Oceans Canada (DFO)

Multiyear permit for the IPHC survey in Gwaii Haanas National Marine Conservation Area

In May 2022, the Archipelago Management Board (AMB) approved the application the DFO put forward to permit multi-year approvals for the IPHC Fishery-Independent Setline Survey (FISS) in Gwaii Haanas National Marine Conservation Area (NMCA). What this means is that the IPHC has approval to fish the FISS stations within Gwaii Haanas for the 2022, 2023 and 2024 FISS without having to annually apply for these permissions when they apply for their Canadian scientific licences.

Memorandum of Understanding/Collective Agreement – Rockfish

In collaboration with DFO, Pacific Halibut Management Association of BC and Archipelago Marine Research (AMR), IPHC tagged Yelloweye, Quillback and Rougheye rockfish aboard both 2B FISS vessels for dockside sampling by AMR staff. This collaboration was formed to replace prior collective agreement involving rockfish caught aboard 2B FISS vessels. 439 Yelloweye, 95 Quillback and 64 Rougheye rockfish were sampled throughout the 2B coast during the 2022 FISS.

Areas of conservation concern

The IPHC Secretariat continues to work with the DFO representatives to address gaps in coverage for the IPHC FISS in the IPHC Regulatory Area 2B. Currently, the FISS license

excludes Marine Protected Areas as described by Hecate Strait and Queen Charlotte Sound Glass Sponge Reefs Marine Protected Areas Regulations, and Rockfish Conservation Areas (RCAs).

Northern Shelf Bioregion

The action plan for the development of a network of marine protected areas (MPAs) in the Northern Shelf Bioregion is a collaborative partnership between the Government of Canada, the Province of British Columbia and 17 First Nations. While detailed management plans for individual MPAs within the network remain in the planning phase, the Secretariat follows the process in relation to network's overlap with FISS (see Fig. 2). Proposed extension of the network covers 29 FISS stations.

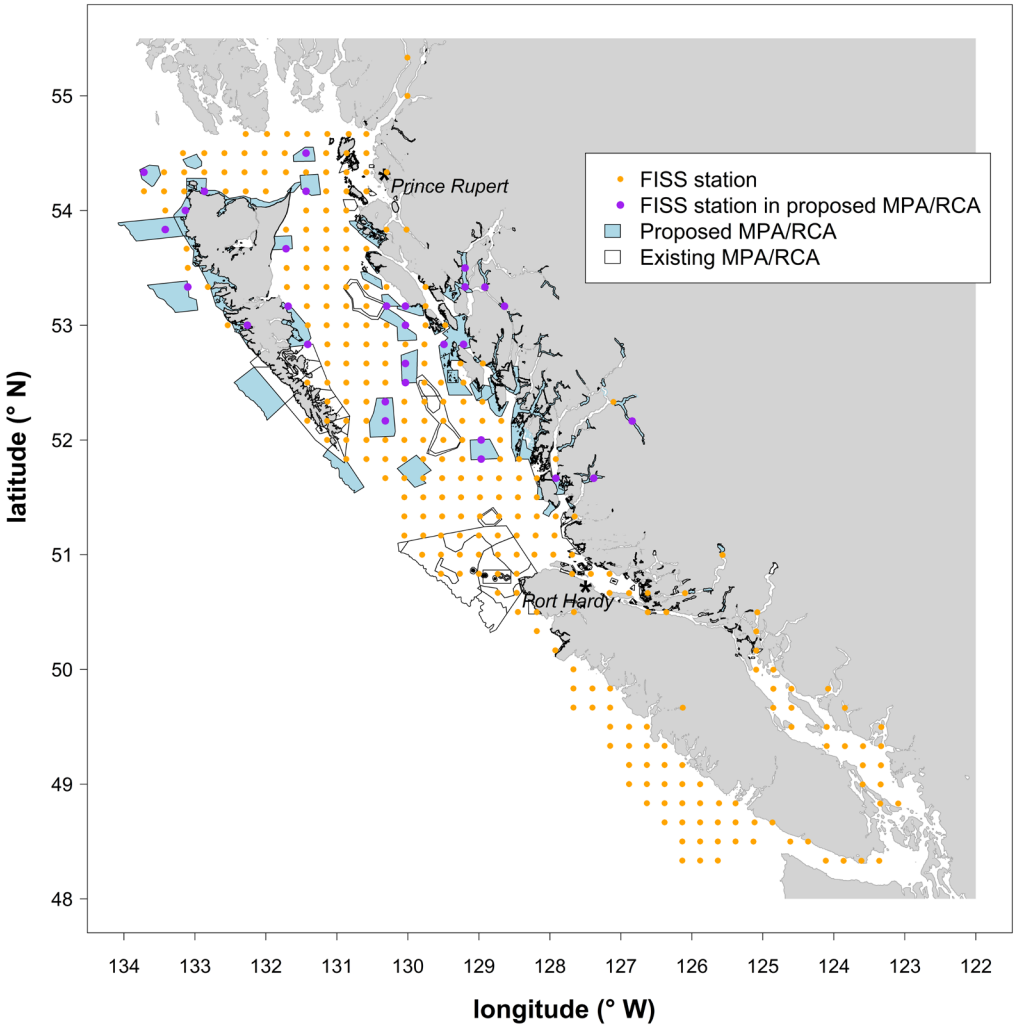


Figure 2: Overlap between locations of FISS stations and proposed area of the Northern Shelf Bioregion.

Halibut Advisory Board (HAB)

The Executive Director (Dr. Wilson) participates as a HAB member, with the Fisheries Policy Branch Manager (Dr. Hutniczak) as the IPHC alternate. This relationship is expected to continue into the future given the HAB's contributions to the Canadian decision-making process.

8.3 *United States of America*

North Pacific Fishery Management Council (NPFMC)

At the meeting in February 2022, the IPHC presented to the Council the outcomes of the 98th Session of the IPHC Annual Meeting (AM098).

At the same meeting, the Council adopted the purpose and need statement and set of alternatives for analysis of Pacific halibut catch sharing plan allocations between the charter sector and the commercial sector (D1 CM 2). This item is not yet scheduled by the Council.

At the meeting in April 2022, the Council took final action on establishing a fee collection program for charter vessel operators to fund the Recreational Quota Entity (RQE) (C2 CM). Accordingly, NMFS will develop regulations to establish the fee requirement for a Charter Halibut Stamp.

At the same meeting, the Council also adopted the following changes to individual fishing quota (IFQ) program regulations (IFQ Omnibus Action) (C1 CM):

- Clarify that “slinky pots” are a legal gear for the IFQ fishery and CDQ [Community Development Quota] fisheries, and revise regulations to allow the use of biodegradable twine in the door latch or pot tunnel.
- Remove buoy configuration, radar reflector, and flagpole requirements in regulation but retain “LP” marking requirement.
- Authorize jig gear as a legal gear type for the harvest of sablefish IFQ and CDQ.
- Revise the pot gear configuration requirements to remove the nine-inch maximum width of tunnel opening so it does not apply when a vessel begins a trip with unfished halibut IFQ onboard.
- Change the Pot Limit for Western Yakutat to 200 pots per vessel.
- Modify the gear retrieval requirement to 7 days for the CG area [Central Gulf] and 5 days in SEO [Southeast Outside]
- Remove Adak CQE [Community Quota Entity] residency requirement for a period of five years.

At the meeting in June 2022, the Council adopted the purpose and need statement and alternatives for analysis of adjusting the vessel cap for Area 4 halibut to recognize conditions leading to fewer vessels participating in the Area 4 fisheries, and to increase utilization of quota in the region (D2 CM). The Council requested NMFS to evaluate options for extending the temporary rule to waive vessel use caps in Area 4 while the Council considers permanent changes to this provision. This item is scheduled for the meeting in February 2023.

At the meeting in December 2022, the Council recommend management measures (e.g., bag limits, size restrictions, day-of-the-week closures, etc.) for the charter halibut fisheries in IPHC Areas 2C and 3A for implementation in 2023.

Nomination process for the Alaĝum Kanuux̂ as a National Marine Sanctuary

At the meeting in June 2022, the Council received an update on marine sanctuary nomination for area around the Pribilof Islands proposed by the Aleut Community of St. Paul Island Tribal Government. At this time, the Council requested additional details on the proposal (see letter from July 7, 2022) to evaluate the management implications for the region. The IPHC will monitor the progress of the designation for potential implications for FISS survey.

PACIFIC Fishery Management Council (PFMC)

IPHC Regulatory Area 2A Catch Sharing Plans and in-season management

The IPHC Secretariat collaborated with NOAA Fisheries and State agencies to conduct in-season management of the various fisheries identified in the IPHC Regulatory Area 2A Catch Sharing Plan. Date and possession restrictions were adjusted in season among the various fisheries to meet identified fishery needs while attaining and remaining within the applicable catch limits. Estimates of removals for 2022 will be presented during Agenda Item 4.1 (Fishery-dependent data overview).

IPHC Regulatory Area 2A fishery management handover to the USA

The Council took final action in November 2020, and adopted the following:

- The Council will consider the directed fishery framework during the Catch Sharing Plan process in September and November; include any guidance for vessel limits and in-season changes for NMFS implementation.
- NMFS will issue permits for all Area 2A halibut fisheries: commercial-directed, incidental salmon troll, incidental sablefish, and recreational charter halibut fisheries.
- NMFS will determine the appropriate application deadlines for all commercial halibut applications, set to accommodate Council meetings and NMFS processing time.
- Proof of permit will be required to be onboard the fishing vessel and made readily available upon request, regardless of the type of permit (e.g., paper or electronic). NMFS will provide access to permits in a printable format or send paper copies directly to the participant.

As for the status of implementation:

- In July 2022, NMFS shared with the IPHC a draft of a proposed rule; the Secretariat reviewed the document and provided NMFS with comments
- The proposed rule (87 FR 44318) went out for public comment on 26 July 2022; the comment period was open until 25 August 2022
- The final rule (87 FR 74322) was published on 5 December 2022 and is effective on 4 January 2023
- NMFS is in process of collecting information necessary to issue permits by early 2023
- NMFS will manage the non-tribal directed commercial fishery beginning in 2023
- Management alternatives will be considered through the Council process annually at the September and November meetings

More details on the transition of management in the IPHC Regulatory Area 2A can be found in the IPHC information paper IPHC-2023-AM099-INF03 intended for outreach.

Bureau of Ocean Energy Management (BOEM) offshore wind planning activities

The PFMC Marine Planning Committee (MPC), at its June 2022 meeting, considered recent BOEM offshore wind planning activities. In April 2022, BOEM formally announced a Request for Information and Nominations for offshore wind (OSW) energy development off the Oregon Coast for the Coos Bay and the Brookings Call Areas. IPHC reviewed the proposed area in relation to its overlap with FISS (see Fig. 3). Six stations are within the Coos Bay call area and two within the Brookings call area. Other stations are close to the area edges and gear from those stations may also be set within the areas given the length of the gear and that it is not always set exactly on the station's coordinates.

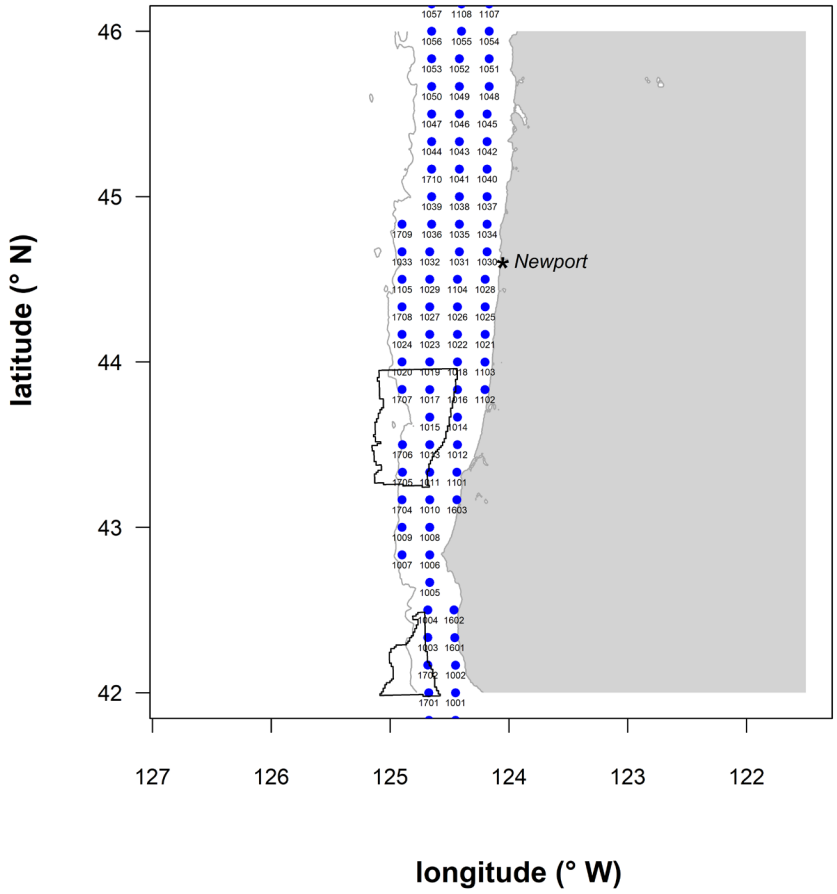


Figure 3. Overlap between locations of FISS stations and proposed area for offshore wind energy development off the Oregon Coast.

Alaska Fisheries Science Center (AFSC)

Pacific cod and Pacific spiny dogfish sampling agreement

NOAA Fisheries, through the Alaska Fisheries Science Center (AFSC), requested sex and length data from Pacific spiny dogfish and length data from Pacific cod from all FISS stations surveyed in 2022. The IPHC has been collecting these data from Pacific spiny dogfish since 2011, from Pacific cod in the Bering Sea since 2007 and from Pacific cod in the Gulf of Alaska (GOA) since 2017. In 2022, the IPHC FISS team collected 2,971 lengths of Pacific cod and 1,439 lengths/sex of Pacific spiny dogfish as a part of this agreement.

Washington Department of Fish and Wildlife (WDFW)

Memorandum of Understanding – Rockfish

The objective of the Memorandum of Understanding with the WDFW is to 1) collect and utilize catch and biological sample data from species caught during FISS; 2) agree on how proceeds from the sale of Pacific halibut, rockfish and Pacific cod will be disbursed; and 3) lay forth the financial obligations associated with undertaking additional FISS stations, as requested by the WDFW, to survey rockfish populations off the Washington coastline.

In 2022, the IPHC sampled eight (8) additional stations at the request of the WDFW. The IPHC tagged 234 rockfish at sea, which were then sampled by WDFW staff during the offloads in Neah Bay, Port Angeles, and Westport, WA. The costs incurred by these activities are 100% cost-recovered from the WDFW.

9 IPHC COMMUNICATIONS AND OUTREACH

9.1 IPHC Website

The IPHC Secretariat continues to develop new ways to display data and statistics for our stakeholders and other interested parties, focusing particularly on the addition of timely and useful visual displays such as those listed below. In 2022, we developed and published all of our historical water column profiler data which has been collated annually since 2009, as part of our FISS activities.

1) **Directed commercial fisheries:**
   https://www.iphc.int/datatest/commercial-fisheries
2) **Fishery-independent setline survey (FISS):**
   https://www.iphc.int/data/datatest/fishery-independent-setline-survey-fiss
3) **Non-Directed Commercial Discard Mortality Fisheries:**
   https://www.iphc.int/data/datatest/non-directed-commercial-discard-mortality-fisheries
4) **Geospatial Data:**
   https://www.iphc.int/datatest/data/geospatial-data
5) **Recreational Fisheries:**
   https://www.iphc.int/data/datatest/pacific-halibut-recreational-fisheries-data
6) **Time Series Data Sets:**
   https://www.iphc.int/data/time-series-datasets
7) **Subsistence Fisheries:**
   https://www.iphc.int/datatest/subsistence-fisheries
8) **Water Column Profiler Data:**
   https://www.iphc.int/datatest/data/water-column-profiler-data

Water Column Profiler Data

Download static environmental data collected during the IPHC FISS.

View Water Column Profiler Data ›

9.2 Annual Report

The 2021 Annual Report (1 January to 31 December 2021) was published on 31 March 2022 and is available for download from the IPHC website at the following link: https://www.iphc.int/uploads/pdf/ar/iphc-2022-ar2021-r.pdf

9.3 IPHC Circulars and Media Releases

2022 IPHC Circulars continue to serve as the formal inter-sessional communication mechanism for the Commission. Circulars are used to announce meetings of the Commission and its subsidiary bodies, as well as inter-sessional decisions made by the Commission. The following are those published in 2022, and a full list may be accessed via the following weblink: https://www.iphc.int/library/documents/category/circulars

Circular	Title/Subject	Date published
IPHC-2022-CR-001	IPHC Rules of Procedure (2022)	8 Feb 2022
IPHC-2022-CR-002	Reports of the 98th Session of the IPHC Finance and Administration Committee (FAC098); 92nd Session of the IPHC Conference Board (CB092); 27th Session of the IPHC Processor Advisory Board (PAB027)	8 Feb 2022
IPHC-2022-CR-003	Invitation to the 12th Special Session of the IPHC (SS012)	8 Feb 2022
IPHC-2022-CR-004	Report of the 98th Session of the IPHC Annual Meeting (AM098	18 Feb 2022
IPHC-2022-CR-005	Report of the 12th Special Session of the IPHC (SS012)	7 Mar 2022
IPHC-2022-CR-006	For Decision - Budget Estimates FY2023 (for approval)	7 Mar 2022
IPHC-2022-CR-007	Intersessional Decision - Budget Estimates: FY2023	16 Mar 2022
IPHC-2022-CR-008	Announcement of the 20th Session of the IPHC Scientific Review Board (SRB020)	17 Mar 2022
IPHC-2022-CR-009	Publication of IPHC Annual Report 2021 (IPHC-2022-AR2021-R)	31 Mar 2022
IPHC-2022-CR-010	Invitation to the 2022 Session of the IPHC Work Meeting (WM2022)	16 Jun 2022
IPHC-2022-CR-011	Report of the 20th Session of the IPHC Scientific Review Board (SRB020)	17 Jun 2022
IPHC-2022-CR-012	Announcement of the 21st Session of the IPHC Scientific Review Board (SRB021)	22 Jun 2022
IPHC-2022-CR-013	Announcement of the 17th Session of the IPHC Management Strategy Advisory Board (MSAB017)	8 Jul 2022
IPHC-2022-CR-014	Invitation to an informal Commissioner meeting (15 July 2022)	8 Jul 2022
IPHC-2022-CR-015	Invitation to the 23rd Session of the IPHC Research Advisory Board (RAB023)	19 Aug 2022
IPHC-2022-CR-016	Invitation to the 98th Session of the IPHC Interim Meeting (IM098)	19 Aug 2022
IPHC-2022-CR-017	Report of the 21st Session of the IPHC Scientific Review Board (SRB021)	22 Sept 2022
IPHC-2022-CR-018	For Decision - MSAB Membership (for approval)	7 Oct 2022
IPHC-2022-CR-019	Intersessional Decision (2022-ID002) - MSAB Membership	8 Oct 2022
IPHC-2022-CR-020	Report of the 17th Session of the IPHC Management Strategy Advisory Board (MSAB017)	21 Oct 2022

IPHC-2022-CR-021	Invitation to the 99th Session of the IPHC Finance and Administration Committee (FAC099), and the 99th Session of the IPHC Annual Meeting (AM099)	24 Oct 2022
IPHC-2022-CR-022	Invitation to the 93rd Session of the IPHC Conference Board (CB098) and the 28th Session of the IPHC Processor Advisory Board (PAB028)	24 Oct 2022
IPHC-2022-CR-021	Report of the 23rd Session of the IPHC Research Advisory Board (RAB023)	28 Nov 2022
IPHC-2022-CR-022	Report of the 98th Session of the IPHC Interim Meeting (IM098)	16 Dec 2022

2022 IPHC Media Releases are the primary informal communication with all stakeholders. https://www.iphc.int/library/documents/category/media-releases

Circular	Title/Subject	Date published
IPHC-2022-MR-001	IPHC Regulatory Area 2A Licence Applications Open for Submission (2022)	31 Jan 2022
IPHC-2022-MR-002	Completion of the 98th Session of the IPHC Annual Meeting (AM098)	31 Jan 2022
IPHC-2022-MR-003	Report of the 98th Session of the IPHC Annual Meeting (AM098)	22 Feb 2022
IPHC-2022-MR-004	Fishery-Independent Setline Survey (2022 FISS) Request for Tender Extended	28 Feb 2022
IPHC-2022-MR-005	Solicitation for the 2022 IPHC Merit Scholarship	16 Mar 2022
IPHC-2022-MR-006	Notification of Potential Pacific Halibut Sales in 2022, Seeking Buyers Interested in Fish Sales from the IPHC Fishery-Independent Setline Survey (FISS)	23 Mar 2022
IPHC-2022-MR-007	Notification of IPHC Fishery-Independent Setline Survey (FISS) 2022 Contract Awards	5 May 2022
IPHC-2022-MR-008	Non-Tribal Directed Commercial Fishery in IPHC Regulatory Area 2A: Fishing Period Limits for First (28 to 30 June 2022) Fishing Period	16 May 2022
IPHC-2022-MR-009	Fishery-Independent Setline Survey (2022 FISS) Request for Tender - 27 June 2022	27 Jun 2022
IPHC-2022-MR-010	Non-Tribal Directed Commercial Fishery in IPHC Regulatory Area 2A: Fishing Period Limits for Second (12 to 14 July 2022) Fishing Period	7 Jul 2022
IPHC-2022-MR-011	Non-Treaty Directed Commercial Fishery in IPHC Regulatory Area 2A: Fishing Period Limits for Third (26 to 28 July 2022) Fishing Period	21 Jul 2022
IPHC-2022-MR-012	Non-Treaty Directed Commercial Fishery in IPHC Regulatory Area 2A: CLOSED	2 Aug 2022
IPHC-2022-MR-013	Recreational Fishery Closure in IPHC Regulatory Area 2A: California	5 Aug 2022
IPHC-2022-MR-014	IPHC Merit Scholarship 2022 – Recipient	11 Aug 2022
IPHC-2022-MR-015	Attention Salmon Processors -Chum Salmon Needed for the 2023 IPHC Fishery-Independent Setline Survey (FISS)	23 Aug 2022
IPHC-2022-MR-016	Announcement of the 99th Session of the IPHC Annual Meeting (AM099), and associated subsidiary bodies	24 Oct 2022
IPHC-2022-MR-017	IPHC Requests tenders for the 2023 Fishery-Independent Setline Survey (FISS)	20 Dec 2022

All interested persons are encouraged to request that their email addresses be added to IPHC distribution lists at the following link: https://www.iphc.int/form/media-and-news.

9.4 IPHC External engagement

There is a considerable amount of effort put into public outreach, attending conferences and meetings that enhance knowledge, contributing expertise to the broader scientific community through participation on boards and committees, and seeking further education and training. In 2022, much of this engagement continued to take place electronically due to the COVID-19 pandemic, but there were several meetings attended in-person.

Committees and external organisation appointments

North America:

1) *Technical Subcommittee (TSC) of the Canada-United States Groundfish Committee* - Dr. Josep Planas, Dr. Basia Hutniczak.

Canada:

1) *Halibut Advisory Board* (Canada) - Dr. David Wilson (Dr. Basia Hutniczak – Alternate)
2) *Framework Review for Atlantic Halibut on the Scotian Shelf and Southern Grand Banks in NAFO Divisions 3NOPs4VWX5Zc: Part 2 - Review of Modelling Approaches (DFO) – Dr. Allan Hicks*
3) Centre for Science Advice Pacific (CSAP) Regional Peer Review (RPR) of a Revised Operating Model for Sablefish in British Columbia in 2022 – *Dr. Allan Hicks*

United States of America:

1) *Bering Sea/Aleutian Islands Plan Team* - Dr. Allan Hicks
2) *Bering Sea Fishery Ecosystem Plan Team* - Dr. Ian Stewart
3) *North Pacific Fishery Management Council (NPFMC) Abundance-based Management Working Group* – Dr. Allan Hicks
4) *NPFMC Scientific and Statistical Committee* - Dr. Ian Stewart
5) *NPFMC Trawl Electronic Monitoring Committee* – Dr. Jason Jannot
6) *North Pacific Research Board Science Panel* - Dr. Josep Planas
7) *Fisheries Monitoring Science Committee (NOAA-Alaska)* – Dr. Ray Webster
8) *Interagency electronic reporting system for commercial fishery landings in Alaska (eLandings) Steering Committee – Dr. Jason Jannot*
9) *NOAA Marine Recreational Information Program (MRIP) Alaska Regional Implementation Team – Drs. Jason Jannot and Ian Stewart*

Conferences and symposia (chronological order)

1) 20th Biennial Conference of the International Institute of Fisheries Economics and Trade (Dr. Basia Hutniczak)
2) SCS7 – 7th National Scientific Coordination Subcommittee Meeting, U.S. Regional Fishery Management Councils (Dr. Ian Stewart)

Academic affiliations 2022

Affiliate Faculty:

1) Dr. Allan Hicks - University of Washington School of Aquatic and Fishery Sciences, Seattle, WA, USA
2) Dr. Ian Stewart - University of Washington School of Aquatic and Fishery Sciences, Seattle, WA, USA

3) Dr. Josep Planas - Alaska Pacific University, Anchorage, AK, USA

Graduate student committee member:

1) Dr. Allan Hicks - University of Massachusetts School for Marine Science & Technology, Dartmouth, MA, USA
2) Dr. Allan Hicks - University of Washington School of Aquatic & Fishery Sciences, Seattle, WA, USA
3) Dr. Ian Stewart - University of Washington School of Aquatic & Fishery Sciences, Seattle, WA, USA
4) Dr. Josep Planas - Alaska Pacific University, Anchorage, AK, USA

10 IPHC PUBLICATIONS IN 2022

10.1 Published peer-reviewed journal papers

Adams GD, Holsman KK, Barbeaux SJ, Dorn MW, Ianelli JN, Spies I, **Stewart IJ**, and Punt AE. 2022. An ensemble approach to understand predation mortality for groundfish in the Gulf of Alaska. *Fisheries Research* 251: 106303, https://doi.org/10.1016/j.fishres.2022.106303.

Loher T, McCarthy O, Sadorus LL, Erickson L, Simeon A, Drinan DP, Hauser L, **Planas JV**, and **Stewart IJ.** 2022. A Test of Deriving Sex-Composition Data for the Directed Pacific Halibut Fishery via At-Sea Marking. *Marine and Coastal Fisheries* 14(4), https://doi.org/10.1002/mcf2.10218.

Hutniczak B. 2022. Assessing cross-regional flows of economic benefits: A case study of Pacific halibut commercial fishing in Alaska, *Fisheries Research* 255: 106449, https://doi.org/10.1016/j.fishres.2022.106449.

Hutniczak B. 2022 Efficient updating of regional supply and use tables with the national-level statistics, *Journal of Economic Structures* 11: 16, https://doi.org/10.1186/s40008-022-00274-8.

Good TP, **Jannot JE**, Somers KA, Ward EJ. 2022 Using Bayesian time series models to estimate bycatch of an endangered albatross. *Fisheries Research* 256: 106492, https://doi.org/10.1016/j.fishres.2022.106492.

Jasonowicz A, A. Simeon, M. Zahm, C. Cabau, C. Klopp, C. Roques, C. Iampietro, J. Lluch, C. Donnadieu, H. Parrinello, D. P. Drinan, L. Hauser, Y. Guiguen, **J. V. Planas**. 2022. Generation of a chromosome-level genome assembly for Pacific halibut (Hippoglossus stenolepis) and characterization of its sex-determining genomic region. *Molecular Ecology Resources* 22(7): 2685-2700, https://doi.org/10.1111/1755-0998.13641.

Fish T, Wolf N, Smeltz TS, Harris BP, and **Planas JV**. 2022. Reproductive Biology of Female Pacific Halibut (*Hippoglossus stenolepis*) in the Gulf of Alaska. *Frontiers in Marine Science* 9:801759, https://doi.org/10.3389/fmars.2022.80175.

Loher T, **Dykstra CL**, **Hicks A**, **Stewart IJ**, Wolf N, Harris BP, and **Planas J.V**. 2022. Estimation of postrelease longline mortality in Pacific halibut using acceleration-logging tags. *North American Journal of Fisheries Management*. 42: 37-49, http://dx.doi.org/10.1002/nafm.10711.

10.2 In press peer-reviewed journal papers

10.3 Submitted peer-review journal papers – In review

Adams G, Holsman K, Rovellini A, **Stewart I**, Wassermann S, and Punt A. Implications of predator-prey dynamics for single-species management. Fish and Fisheries.

Lomeli MJM, Wakefield WW, Abele M, **Dykstra CL**, Herrmann B, **Stewart IJ**, and Christie G. Testing of hook sizes and appendages to reduce yelloweye rockfish bycatch in the Pacific halibut longline fishery. Ocean and Coastal Management.

11 RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-04 which provides the Commission with an update on activities of the IPHC Secretariat in 2022 not detailed in other papers before the Commission.

12 APPENDICES

Appendix I: IPHC Secretariat positions – current

Appendix I
IPHC Secretariat positions – current

(https://www.iphc.int/locations/map)

Branch	Sub-Section	Position	Current Employee
Executive	-	Executive Director	Dr Wilson, David
Executive	-	Assistant Director	Keikkala, Andrea
-	Fishery-Independent Setline Survey	Setline Survey Coordinator	Ualesi, Kayla
-	Fishery-Independent Setline Survey	Setline Survey Specialist	Rillera, Rachel
-	Fishery-Independent Setline Survey	Setline Survey Specialist	Jack, Tyler
-	Fishery-Independent Setline Survey	Setline Survey Specialist	Coll, Kevin
-	Fishery-Independent Setline Survey	Setline Survey Specialist (Field)	Multiple Employees (25-35)
Quantitative Sciences	-	Quantitative Scientist (Stock Assessment)	Dr Stewart, Ian
Quantitative Sciences	-	Quantitative Scientist (Management Strategy Evaluation)	Dr Hicks, Allan
Quantitative Sciences	-	Quantitative Scientist (Biometrician)	Dr Webster, Raymond
Fisheries Policy	-	Branch Manager (FP)	Dr Hutniczak, Barbara
Finance and Personnel Services	Personnel Services	Administrative Specialist (Snr)	Chapman, Kelly
Finance and Personnel Services	Personnel Services	Administrative Specialist/Communications	Coluccio, Tara
Finance and Personnel Services	Personnel Services	Administrative Specialist	Wietecha, Ola
Finance and Personnel Services	Personnel Services	Administrative Specialist	Burkhalter, Lorissa
Finance and Personnel Services	Personnel Services	Administrative Specialist Accounting	Kuklok, Rebecca
Finance and Personnel Services	Communications Services	Communications Coordinator & Research Biologist	Sadorus, Lauri

Finance and Personnel Services	Communications Services	Communications Specialist	Henry, Edward
Finance and Personnel Services	Technology Services	Systems Administrator	Tynes, Robert
Finance and Personnel Services	Technology Services	Information Technology Specialist (Application Developer)	Taheri, Afshin
Finance and Personnel Services	Technology Services	Information Technology Specialist (Application Developer)	Outsourced
Biological and Ecosystem Sciences	-	Branch Manager (BES)	Dr Planas, Josep
Biological and Ecosystem Sciences	-	Research Scientist - Life History Modeler I (Epigenetics)	Vacant
Biological and Ecosystem Sciences	-	Research Biologist (Mortality and Survivorship)	Dykstra, Claude
Biological and Ecosystem Sciences	-	Research Biologist Genetics	Jasonowicz, Andrew
Biological and Ecosystem Sciences	-	Research Biologist (Life History)	Jones, Colin
Biological and Ecosystem Sciences	-	Biological Science Laboratory Technician	Simchick, Crystal
Fisheries Data Services	-	Branch Manager (FDS)	Dr Jannot, Jason
Fisheries Data Services	Port Operations Services	Port Operations Coordinator	Thom, Monica
Fisheries Data Services	Port Operations Services	Fisheries Data Specialist (Field)	Multiple Employees (8-10)
Fisheries Data Services	Fisheries Data Services	Fisheries Data Coordinator	Tran, Huyen
Fisheries Data Services	Fisheries Data Services	Fisheries Data Specialist (HQ-GIS)	Kong, Thomas
Fisheries Data Services	Fisheries Data Services	Fisheries Data Specialist (HQ)	Sawyer Van Vleck, Kim
Fisheries Data Services	Fisheries Data Services	Fisheries Data Specialist (HQ)	Magrane, Kelsey
Fisheries Data Services	Otolith Aging Services	Otolith Laboratory Technician (Snr)	Forsberg, Joan
Fisheries Data Services	Otolith Aging Services	Otolith Laboratory Technician	Johnston, Chris
Fisheries Data Services	Otolith Aging Services	Otolith Laboratory Technician	Tobin, Robert

Implementation of the Recommendations from the 2nd IPHC Performance Review (PRIPHC02)

PREPARED BY: IPHC SECRETARIAT (D. WILSON; 8 & 19 DECEMBER 2022)

To provide the Commission with an update on the implementation of the recommendations arising from the 2nd Performance Review of the IPHC (PRIPHC02).

BACKGROUND

The Report of the 2nd Performance Review of the IPHC (PRIPHC02), IPHC-2019-PRIPHC02-R (adopted on 11 October 2019) is available for download from the IPHC website: https://www.iphc.int/library/documents/post/iphc-2019-priphc02-r-report-of-the-2nd-performance-review-of-the-international-pacific-halibut-commission-priphc02

At the 96th Session of the IPHC Annual Meeting (AM096), the Commission:

> *(para. 137) "The Commission **NOTED** that the PRIPHC02 was carried out over the course of 2019 via three face-to-face meetings: one in Seattle, USA (4-6 June 2019), one in New York City, USA (25 August 2019) and one in Ottawa, Canada (7-11 October 2019). The Panel held several additional tele-conferences, both among themselves, and with stakeholders. The meeting was also supported by Independent Legal and Science Experts who each dedicated additional working days to providing technical reviews and reports on specific components of the review criteria relevant to their areas of expertise."*
>
> *(para 138) "The Commission **NOTED** para. 22 of the report which stated:*
>
> > *(para. 22) "The PRIPHC02 **CONGRATULATED** the Commission and Secretariat for the positive strides in response to the first performance review. Through the course of the consultations, document review and interviews, the panel saw consistent and significant improvements in transparency, availability and modernisation of documentation and background information, and heard resounding praise for this increased transparency and the movement away from previously "closed-door" and perceived "secretive" processes and decision-making."*
>
> *(para. 139) "The Commission **REQUESTED** that paper IPHC-2020-AM096-14 be reviewed intersessionally by each Contracting Party, with the intention of providing edits/additions, for endorsement. The IPHC Secretariat will facilitate this request by proposing intersessional meeting dates."*

During the 6th Special Session of the IPHC (SS06) held on 3 March 2020, the Commission:

> (para. 6) "*The Commission **ENDORSED** the recommendations, priorities, responsibilities, timelines and updates provided at Appendix B, and **AGREED** that these would be reported on at each IPHC meeting.*" (IPHC-2020-SS06-R)

DISCUSSION

The following is a summary of the status of each of the detailed updated provided in Appendix A.

PRIPHC02 Recommendation	Status
Completed and/or annually ongoing	17
In Progress	6
Pending (from Contracting Parties)	2
On-Hold (decision = no action to be taken)	1
Total	**26**

RECOMMENDATION

That the Commission **NOTE** paper IPHC-2023-AM099-05 that provides the Commission with an update on the implementation of the recommendations arising from the 2nd Performance Review of the IPHC (PRIPHC02).

APPENDICES

Appendix A: Table of recommendations arising from the PRIPHC02, including 1) priorities, 2) responsibilities, 3) timeline, and 4) any new updates on status.

Appendix A
RECOMMENDATIONS OF THE 2ND PERFORMANCE REVIEW OF THE INTERNATIONAL PACIFIC HALIBUT COMMISSION (PRIPHC02)

REF#	RECOMMENDATION	PRIORITY	RESPONSIBILITY	TIMELINE	UPDATE/STATUS
PRIPHC02 –Rec.01 (para. 32)	***Legal analysis of the IPHC Convention*** The PRIPHC02 **RECOMMENDED** that consideration be given to updating the Convention at the next opportunity, to become consistent with newer international legal instruments, and specifically consider including the following elements: a) – z)	N/A	N/A	N/A	**On-Hold:** At this time, the Contracting Parties have indicated that they do not wish to commence the process of updating the IPHC Convention. Thus, this Recommendation is on-hold until a decision is made to reopen it.
PRIPHC02 –Rec.02 (para. 33)	The PRIPHC02 **RECOMMENDED** to update the Convention, while in the interim period seek alternate mechanisms to implement international best practices and* legal principles. Commission directive: The Commission **RECOMMENDED** the exploration and implementation of alternate mechanisms to implement international best practices, such as revisions to the IPHC Rules of Procedure, IPHC Financial Regulations and IPHC Fishery Regulations.	N/A High	N/A Commission	N/A 2020-24	**N/A** **Completed** (2020, 2021, 2022): The IPHC Rules of Procedure (ROP) and the IPHC Financial Regulations (FR) will be periodically updated (at least once every 2 years) and where possible, should accommodate applicable improvements as recommended in the legal review of the IPHC Convention.
PRIPHC02 –Rec.03 (para. 44)	***Science: Status of living marine resources*** The PRIPHC02 **RECOMMENDED** that opportunities to engage with western Pacific halibut science and management agencies be sought, to strengthen science links and data exchange. Specifically, consider options to investigate pan-Pacific stock structure and migration of Pacific halibut.	High	IPHC Secretariat	2020-24	**Ongoing**: There are three non-Contracting Parties who exploit Pacific halibut: Russia, Rep. of Korea and Japan. Most recently we have engaged Russian scientists working on Pacific halibut through PICES (https://meetings.pices.int/). We will continue to explore this avenue via PICES, noting that COVID-19 has hindered/delayed interactions to a certain degree.

REF#	RECOMMENDATION	PRIORITY	RESPONSIBILITY	TIMELINE	UPDATE/STATUS
PRIPHC02 –Rec.04 (para. 45)	The PRIPHC02 **RECOMMENDED** that: a) further efforts be made to lead and collaborate on research to assess the ecosystem impacts of Pacific halibut fisheries on incidentally caught species (retained and/or discarded); b) where feasible, this research be incorporated within the IPHC's 5-Year Research Plan (https://www.iphc.int/uploads/pdf/besrp/2019/iphc-2019-besrp-5yp.pdf); c) findings from the IPHC Secretariat research and that of the Contracting Parties be readily accessible via the IPHC website.	Medium	IPHC Secretariat	2020-24	**Completed & Ongoing**: The IPHC's work in this area has been limited to date. However, some efforts to incorporate ecosystem considerations into the MSE work has commenced.
PRIPHC02 –Rec.05 (para. 63)	***Science: Quality and provision of scientific advice*** The PRIPHC02 **RECOMMENDED** that simplified materials be developed for RAB and especially MSAB use, including training/induction materials.	High	IPHC Secretariat	2020-24	**Completed & Ongoing**: The IPHC Secretariat continues to seek ways to ensure broad stakeholder understanding of our work. For the MSAB and associated MSE work, an interactive web-based tool has been developed to provide a user friendly means to explore and understand the utility of MSE and the simulation results arising. See paper **IPHC-2023-AM099-13** for the latest iteration. MSE Explorer tool: https://www.iphc.int/management/science-and-research/management-strategy-evaluation
PRIPHC02 –Rec.06 (para. 64)	The PRIPHC02 **RECOMMENDED** that consideration be given to amending the Rules of Procedure to include appropriate fixed terms of service to ensure SRB peer review remains independent and fresh; a fixed term of three years seems appropriate, with no more than one renewal.	Medium	Commission; IPHC Secretariat	2020	**Completed**: The IPHC Secretariat provided the Commission with revised Rules of Procedure for consideration at AM096, which included a two-term limit. This was adopted by the Commission and is now in force. See **IPHC Rules of Procedure**.

REF#	RECOMMENDATION	PRIORITY	RESPONSIBILITY	TIMELINE	UPDATE/STATUS
PRIPHC02 –Rec.07 (para. 65)	The PRIPHC02 **RECOMMENDED** that the peer review process be strengthened through expanded subject specific independent reviews including data quality and standards, the FISS, MSE, and biological/ecological research; as well as conversion of "grey literature" to primary literature publications. The latter considered important to ongoing information outreach efforts given the cutting-edge nature of the Commission's scientific work.	High	Commission; IPHC Secretariat	2020-24	**Completed & Ongoing**: The Commission approved peer review of the IPHC stock assessment which was **concluded** in 2019, the IPHC MSE which was concluded on 25 September 2020. See **IPHC-2020-CR-022**. The Commission has indicated its strong support topic-based peer review moving forward.
PRIPHC02 –Rec.08 (para. 66)	The PRIPHC02 **RECOMMENDED** that the IPHC Secretariat develop options for simple graphical summaries (i.e. phase plot equivalents) of fishing intensity and spawning stock biomass for provision to the Commission.	High	IPHC Secretariat	2020	**Completed**: The IPHC Secretariat now includes both time-series' and phase plots of management-related quantities See paper **IPHC-2023-AM099-11** for the latest iteration.
PRIPHC02 –Rec.09 (para. 73)	***Conservation and Management: Data collection and sharing*** The PRIPHC02 **RECOMMENDED** that observer coverage be adjusted to be commensurate with the level of fishing intensity in each IPHC Regulatory Area. Commission directive: The Commission **RECOMMENDED** that the IPHC Secretariat, in consultation with the Commission, develop minimum data collection standards for Pacific halibut by scientific observer programs. The intention would be for the Commission to review and approve the minimum standards, and recommend them for implementation by domestic agencies.	N/A High	N/A Contracting Parties	N/A 2020-24	**N/A** **In progress**: The Contracting Parties have yet to engage on this recommendation. See paper: **IPHC-2023-AM099-16**.
PRIPHC02 –Rec.10 (para. 82)	***Conservation and Management: Consistency between scientific advice and fishery Regulations adopted*** The PRIPHC02 **RECOMMENDED** that the development of MSE to underpin multi-year (strategic) decision-making be continued, and as multi-year decision making is implemented, current Secretariat capacity usage for annual stock assessments should be refocused on research to investigate MSE operating model development (including consideration of biological and fishery uncertainties) for future MSE iterations and regularised multi-year stock assessments.	High	IPHC Secretariat; Commission	2021-24	**Completed**: MSE products, including the evaluation of multi-year (biennial and triennial) management procedures, were delivered to the MSAB017, and are to be presented at AM099 in January 2023. Evaluating multi-year stock assessments was a priority task in the MSE program of work for 2021-2023.

REF#	RECOMMENDATION	PRIORITY	RESPONSIBILITY	TIMELINE	UPDATE/STATUS
PRIPHC02 –Rec.11 (para. 83)	The PRIPHC02 **RECOMMENDED** that ongoing work on the MSE process be prioritised to ensure there is a management framework/procedure with minimal room for ambiguous interpretation, and robust pre-agreed mortality limit setting frameworks.	High	IPHC Secretariat; Commission	2020-21	**In progress**: See paper IPHC-2022-IM098-13 for the latest update, and https://www.iphc.int/uploads/pdf/msab/tech/iphc-2021-mse-02.pdf for the most recent MSE program of work activities. ***Next steps***: The Commission to formally adopt a harvest strategy.
PRIPHC02 –Rec.12 (para. 88)	***Fishing allocations and opportunities*** The PRIPHC02 **STRONGLY URGED** the Commission to conclude its MSE process and **RECOMMENDED** it meet its 2021 deadline to adopt a harvest strategy.	High	Commission; IPHC Secretariat	2020-21	**In progress**: The IPHC Secretariat provided options for Commission decision at the 98th Session of the IPHC Annual Meeting (AM098) and the 98th Session of the IPHC Interim Meeting (IM098). See paper IPHC-2023-AM099-13 for the latest update. ***Next steps***: The Commission to formally adopt a harvest strategy.
PRIPHC02 –Rec.13 (para. 96)	***Compliance and enforcement: Port State measures*** The PRIPHC02 **RECOMMENDED** that Contracting Party enforcement agencies adopt common standards for assessment of implementation of the principles of port State measures.	Medium	Contracting Parties	2020-24	**Pending**: To be incorporated into the Contracting Party National Reports at each Annual Meeting. Next National Report will be provided by each Contracting Party for the AM099.
PRIPHC02 –Rec.14 (para. 105)	***Compliance and enforcement: Monitoring, control and surveillance (MCS)*** The PRIPHC02 **RECOMMENDED** enhancement of coordination of MCS activities to result in a common, integrated enforcement report for each Contracting Party to facilitate assessment of compliance efforts, trends and input into management decisions.	Medium	Contracting Parties	2021-24	**Pending**: To be incorporated into the Contracting Party National Reports at each Annual Meeting. Next National Report will be provided by each Contracting Party for the AM099.

REF#	RECOMMENDATION	PRIORITY	RESPONSIBILITY	TIMELINE	UPDATE/STATUS
PRIPHC02 –Rec.15 (para. 106)	The PRIPHC02 **RECOMMENDED** that the Commission re-assess the 'derby-style' fisheries management concept in operation in IPHC Regulatory Area 2A in terms of available resources, impact on validity of monitoring results, and safety of fishers, and amend the management processes, if and as necessary.	High	IPHC Secretariat; NOAA-Fisheries	2020	**In progress**: The IPHC Secretariat is coordinating with relevant Contracting Party domestic agencies regarding shifting management of all Pacific halibut fisheries in IPHC Regulatory Area 2A from the IPHC to the relevant domestic agencies. At IM095, the Commission requested: IM095 (para. 89) *The Commission **WELCOMED** the PFMC's commitment to transition management of Pacific halibut fisheries in IPHC Regulatory Area 2A from the IPHC to domestic agencies and **REQUESTED** that the IPHC Secretariat continue to support this process in the short-term, with the aim of transitioning management of the fishery to the domestic agencies at the earliest opportunity.* See paper **IPHC-2023-AM099-14** for the latest iteration. Handover has commended and is expected to be completed in early 2023 and the PFMC and NOAA-Fisheries have confirmed this is on-track.
PRIPHC02 –Rec.16 (para. 108)	***Compliance and enforcement: Follow-up on infringements*** The PRIPHC02 **RECOMMENDED** that the IPHC request information regarding Contracting Party follow-up of infringements, to assist in determining the overall efficacy of MCS and enforcement activities. This would support best practices with respect to transparency.	High	IPHC Secretariat; Commission; Contracting Parties	2020	**Ongoing**: The IPHC Secretariat has requested this information be provided by domestic agencies via the Contracting Party National Reports to the Commission.
PRIPHC02 –Rec.17 (para. 109)	The PRIPHC02 **RECOMMENDED** that the Commission improve the process of Contracting Party reporting to the Commission by aggregating individual agency reports into a consolidated, standardised, Contracting Party report to the Commission.	Medium	IPHC Secretariat; Contracting Parties	2020	**Completed**: The IPHC Secretariat made this request in 2020. Consolidated Contracting Party National Reports are now the standard.

REF#	RECOMMENDATION	PRIORITY	RESPONSIBILITY	TIMELINE	UPDATE/STATUS
PRIPHC02 –Rec.18 (para. 124)	***Governance: Decision-making*** The PRIPHC02 **RECOMMENDED** that the IPHC Rules of Procedure be modified to include a clear category and recognition for observer organisations, which would be in addition to the general public.	Low	IPHC Secretariat	2020-21	**Completed**: IPHC Rules of Procedure (2020) published on 7 February 2020.
PRIPHC02 –Rec.19 (para. 128)	***Governance: Dispute settlement*** The PRIPHC02 **RECOMMENDED** updating the rules of procedure to reflect intersessional decision-making approaches.	Medium	IPHC Secretariat	2020-21	**Completed**: IPHC Rules of Procedure (2020) published on 7 February 2020. Further amendments were made in 2021.
PRIPHC02 –Rec.20 (para. 137)	***Governance: Transparency*** The PRIPHC02 **RECOMMENDED** that the significant level of transparency achieved across Commission business continue to be improved.	High	Commission; IPHC Secretariat;	2020-24	**Completed & Ongoing**: Monitor progress through the annual IPHC meeting cycle and improve as identified. In June of 2022, the SRB made the following noting and recommendation of relevance: SRB020–Rec.05 (para. 36) The SRB **NOTED** the exceptional level of transparency and commitment to the principles of open science represented by the Secretariat's data and code-sharing practices and, therefore, **RECOMMENDED** that the Secretariat consider producing peer-reviewed data report publications, which would (a) enhance outreach to potential external data users and (b) allow for tracking external use of IPHC data and resources.
PRIPHC02 –Rec.21 (para. 146)	***International cooperation: Relationship to non-Contracting Parties*** The PRIPHC02 **RECOMMENDED** that the Commission prioritise scientific work to confirm the full range of the Pacific halibut stock.	High	IPHC Secretariat;	2020-24	**In progress**: There are three non-Contracting Parties who exploit Pacific halibut: Russia, Rep. of Korea and Japan. Most recently we have engaged Russian scientists working on Pacific halibut through PICES (https://meetings.pices.int/).

REF#	RECOMMENDATION	PRIORITY	RESPONSIBILITY	TIMELINE	UPDATE/STATUS
PRIPHC02 –Rec.22 (para. 147)	The PRIPHC02 **RECOMMENDED** that if the full range of the Pacific halibut stock extends outside the Convention Area, the Contracting Parties invite collaboration with all parties involved in the harvest of this stock, to ensure science and management includes accurate data regarding all removals from the stock.	Low/ Medium	IPHC Secretariat	2020-24	**In progress**: The IPHC Secretariat is engaging with other countries harvesting Pacific halibut via PICES as a first step. Known harvesters are Russia, Rep. of Korea and Japan with the latter two harvesting very minor levels at the extremity of Pacific halibut distribution in the western Pacific.
PRIPHC02 –Rec.23 (para. 156)	***Efficiency and transparency of financial and administrative management: Availability of resources for IPHC activities*** The PRIPHC02 **RECOMMENDED** the continued establishment of a Business Continuity Plan (BCP), which will serve to strengthen the long-term viability of IPHC Secretariat functioning and accountability, in line with best practices of an organisation of its size and breadth. Prioritising a financial and administrative BCP, with the ultimate goal of establishing a comprehensive BCP for the IPHC Secretariat as a whole.	High	IPHC Secretariat; FAC	2020	**Completed**: The IPHC Secretariat has developed and implemented a BCP. Periodic review will ensure BC is maintained.
PRIPHC02 –Rec.24 (para. 162)	***Efficiency and transparency of financial and administrative management: Efficiency and cost-effectiveness*** The PRIPHC02 **RECOMMENDED** the FAC produce a report detailing the actual FAC meeting and that the presentation of the report be incorporated into the Annual Meeting agenda and report, along with the final decisions of the Commission.	High	FAC; IPHC Secretariat	2020-24	**Completed**: The first report of the IPHC Finance and Administration Committee (FAC) was adopted on 4 February 2020, and presented to the Commission at its 96th Session for consideration.
PRIPHC02 –Rec.25 (para. 165)	***Efficiency and transparency of financial and administrative management: Advisory structure*** The PRIPHC02 **RECOMMENDED** that when revisiting PRIPHC01 Recommendation 3.1 on unifying subsidiary bodies, treat the CB and PAB as non-science process and maintain separated RAB and MSAB at least until the 2021 adoption and implementation of a new management strategy.	N/A	Commission	N/A	**Completed & Ongoing**: The Commission agreed to keep the two subsidiary bodies separate moving forward.
PRIPHC02 –Rec.26 (para. 166)	The PRIPHC02 **RECOMMENDED** that continued support for high quality stakeholder engagement through the science-focused subsidiary bodies (RAB and MSAB) or any future subsidiary bodies be maintained.	High	Commission; IPHC Secretariat	2020-24	**Completed & Ongoing**: The Commission agreed to keep the two subsidiary bodies separate moving forward, and for them to be enhanced wherever feasible.

INTERNATIONAL PACIFIC HALIBUT COMMISSION 5-YEAR PROGRAM OF INTEGRATED RESEARCH AND MONITORING (2022-26)

PREPARED BY: IPHC SECRETARIAT (D. WILSON, J. PLANAS, I. STEWART, A. HICKS, B. HUTNICZAK, R. WEBSTER, & J. JANNOT; 8 DECEMBER 2022)

PURPOSE

To provide the Commission with an annual opportunity to comment and amend the IPHC's 5-year Program of Integrated Research and Monitoring (2022-26) (the Plan).

BACKGROUND

Recalling that:

a) the IPHC Secretariat conducts activities to address key issues identified by the Commission, its subsidiary bodies, the broader stakeholder community, and the IPHC Secretariat;

b) the process of identifying, developing, and implementing the IPHC's science-based activities involves several steps that are circular and iterative in nature, but result in clear project activities and associated deliverables;

c) the process includes developing and proposing projects based on direct input from the Commission, the experience of the IPHC Secretariat given its broad understanding of the resource and its associated fisheries, and concurrent consideration by relevant IPHC subsidiary bodies, and where deemed necessary, including by the Commission, additional external peer review;

d) the IPHC Secretariat commenced implementation of the new Plan in 2022 and will keep the Plan under review on an ongoing basis.

Also recalling that an overarching goal of the IPHC 5-year Program of Integrated Research and Monitoring (2022-26) is to promote integration and synergies among the various research and monitoring activities of the IPHC Secretariat in order to improve knowledge of key inputs into the Pacific halibut stock assessment, and Management Strategy Evaluation (MSE) processes, thereby providing the best possible advice for management decision making processes.

The 1st iteration of the Plan was formally presented to the Commission at IM097 in November 2021 (IPHC-2021-IM097-12) for general awareness of the documents ongoing development. At the 98th Session of the IPHC Annual Meeting (AM098) in January 2022, the Commission requested a number of amendments which were subsequently incorporated.

The Plan had already been through two cycles of review and improvement with the Scientific Review Board (SRB).

In 2022, the plan went through two further cycles of review and improvement with the SRB, with amendments being suggested and incorporated accordingly, and which resulted in the version now provided at Appendix A.

The current version was presented to the Commission at it's annual Work Meeting in September 2022, and will now move to an annual comment and amendment process at each years Interim and then Annual Meetings.

DISCUSSION

The Commission should note that:

a) the intention is to ensure that the new integrated plan is kept as a '*living plan*', and is reviewed and updated annually based on the resources available to undertake the work of the Commission (e.g. internal and external fiscal resources, collaborations, internal expertise);

b) the plan focuses on core responsibilities of the Commission; and any redirection provided by the Commission;

c) each year the SRB may choose to recommend modifications to the current Plan, and that any modifications subsequently made would be documented both in the Plan itself, and through reporting back to the SRB and then the Commission.

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-06 which provides the IPHC 5-year program of Integrated Research and Monitoring (2022-26).

APPENDICES

Appendix A: IPHC 5-Year Program of Integrated Research and Monitoring (2022-26) (D. Wilson, J. Planas, I. Stewart, A. Hicks, B. Hutniczak, R. Webster, & J. Jannot)

INTERNATIONAL PACIFIC HALIBUT COMMISSION

5-YEAR PROGRAM OF INTEGRATED RESEARCH AND MONITORING

(2022 - 2026)

INTERNATIONAL PACIFIC

HALIBUT COMMISSION

Commissioners

Canada	United States of America
Paul Ryall	Vacant
Neil Davis	Robert Alverson
Peter DeGreef	Richard Yamada

Executive Director

David T. Wilson, Ph.D.

BIBLIOGRAPHIC ENTRY

IPHC 2022. International Pacific Halibut Commission 5-Year program of integrated research and monitoring (2022-26). Seattle, WA, U.S.A. *IPHC–2022-5YPIRM, 52 pp.*

INTERNATIONAL PACIFIC HALIBUT COMMISSION

Contact details:

International Pacific Halibut Commission

2320 W. Commodore Way, Suite 300

Seattle, WA, 98199-1287, U.S.A.

Phone: +1 206 634 1838

Fax: +1 206 632 2983

Email: secretariat@iphc.int

Website: http://www.iphc.int/

ACRONYMS

AM	Annual Meeting
CB	Conference Board
DMR	Discard Mortality Rate
FAC	Finance and Administration Committee
FISS	Fishery-Independent Setline Survey
FSC	First Nations Food, Social, and Ceremonial [fishery]
IM	Interim Meeting
IPHC	International Pacific Halibut Commission
MSAB	Management Strategy Advisory Board
MSE	Management Strategy Evaluation
OM	Operating Model
PAB	Processor Advisory Board
PDO	Pacific Decadal Oscillation
PHMEIA	Pacific halibut multiregional economic impact assessment [model]
QAQC	Quality assurance/quality control
RAB	Research Advisory Board
SHARC	Subsistence Halibut Registration Certificates
SRB	Scientific Review Board
TCEY	Total Constant Exploitation Yield
U.S.A.	United States of America
WM	Work Meeting

DEFINITIONS

A set of working definitions are provided in the IPHC Glossary of Terms and abbreviations: https://iphc.int/the-commission/glossary-of-terms-and-abbreviations

TABLE OF CONTENTS

EXECUTIVE SUMMARY

An overarching goal of the *IPHC 5-Year Program of Integrated Research and Monitoring (2022-26)* is to promote integration and synergies among the various research and support activities of the IPHC Secretariat in order to improve our knowledge of key inputs into the Pacific halibut stock assessment and Management Strategy Evaluation (MSE) processes, and to provide the best possible advice for management decision-making processes.

Along with the implementation of the short- and medium-term activities contemplated in this *IPHC 5-Year Program of Integrated Research and Monitoring (2022-26)*, and in pursuit of the overarching objective, the IPHC Secretariat will also aim to:

1) undertake cutting-edge research programs in fisheries research in support of Pacific halibut fisheries management;
2) undertake groundbreaking methodological research;
3) undertake applied research;
4) establish new collaborative agreements and interactions with research agencies and academic institutions;
5) promote the international involvement of the IPHC by continued and new participation in international scientific organizations and by leading international science and research collaborations;
6) effectively communicate IPHC research outcomes;
7) incorporate talented students and early researchers in research activities contemplated.

The research and monitoring activities conducted by the IPHC Secretariat are directed towards fulfilling the following four (4) objectives within areas of data collection, biological and ecological research, stock assessment, and Management Strategy Evaluation (MSE). In addition, the IPHC responds to Commission requests for additional inputs to management and policy development which are classified under management support.

The Secretariat's success in implementing the *IPHC 5-Year Program of Integrated Research and Monitoring (2022-26)* will be measured according to the following four criteria relevant to the stock assessment, the MSE and for all inputs to IPHC management:

1) Timeliness – was the research conducted, analyzed, published, and provided to the Commission at the appropriate points to be included in annual management decisions?
2) Accessibility – was the research published and presented in such a way that it was available to other scientists, stakeholders, and decision-makers?
3) Relevance – did the research improve the perceived accuracy of the stock assessment, MSE, or decisions made by the Commission?
4) Impact – did the research allow for more precision or a better estimate of the uncertainty associated with information for use in management?
5) Reliability – has research resulted in more consistent information provided to the Commission for decision-making.

1. Introduction

The International Pacific Halibut Commission (IPHC) is a public international organization so designated via Presidential Executive Order 11059 and established by a Convention between Canada and the United States of America. The IPHC Convention was signed on 2 March 1923, ratified on 21 July 1924, and came into effect on 21 October 1924 upon exchange. The Convention has been revised several times since, to extend the Commission's authority and meet new conditions in the fishery. The most recent change occurred in 1979 and involved an amendment to the 1953 Halibut Convention. The 1979 amendment, termed a "protocol", was precipitated in 1976 by Canada and the United States of America extending their jurisdiction over fisheries resources to 200 miles. The 1979 Protocol along with the U.S. legislation that gave effect to the Protocol (Northern Pacific Halibut Act of 1982) has affected the way the fisheries are conducted, and redefined the role of IPHC in the management of the fishery. Canada does not require specific enabling legislation to implement the protocol.

The basic texts of the Commission are available on the IPHC website: https://www.iphc.int/the-commission, and prescribe the mission of the organization as:

*"..... **to develop the stocks of [Pacific] halibut in the Convention waters to those levels which will permit the optimum yield from the fishery and to maintain the stocks at those levels**. ....." IPHC Convention*, Article I, sub-article I, para. 2). The IPHC Convention Area is detailed in Fig. 1.

The IPHC Secretariat, formed in support the Commission's activities, is based in Seattle, WA, U.S.A. As its shared vision, ***the IPHC Secretariat aims to deliver positive economic, environmental, and social outcomes for the Pacific halibut resource for Canada and the U.S.A. through the application of rigorous science, innovation, and the implementation of international best practice.***

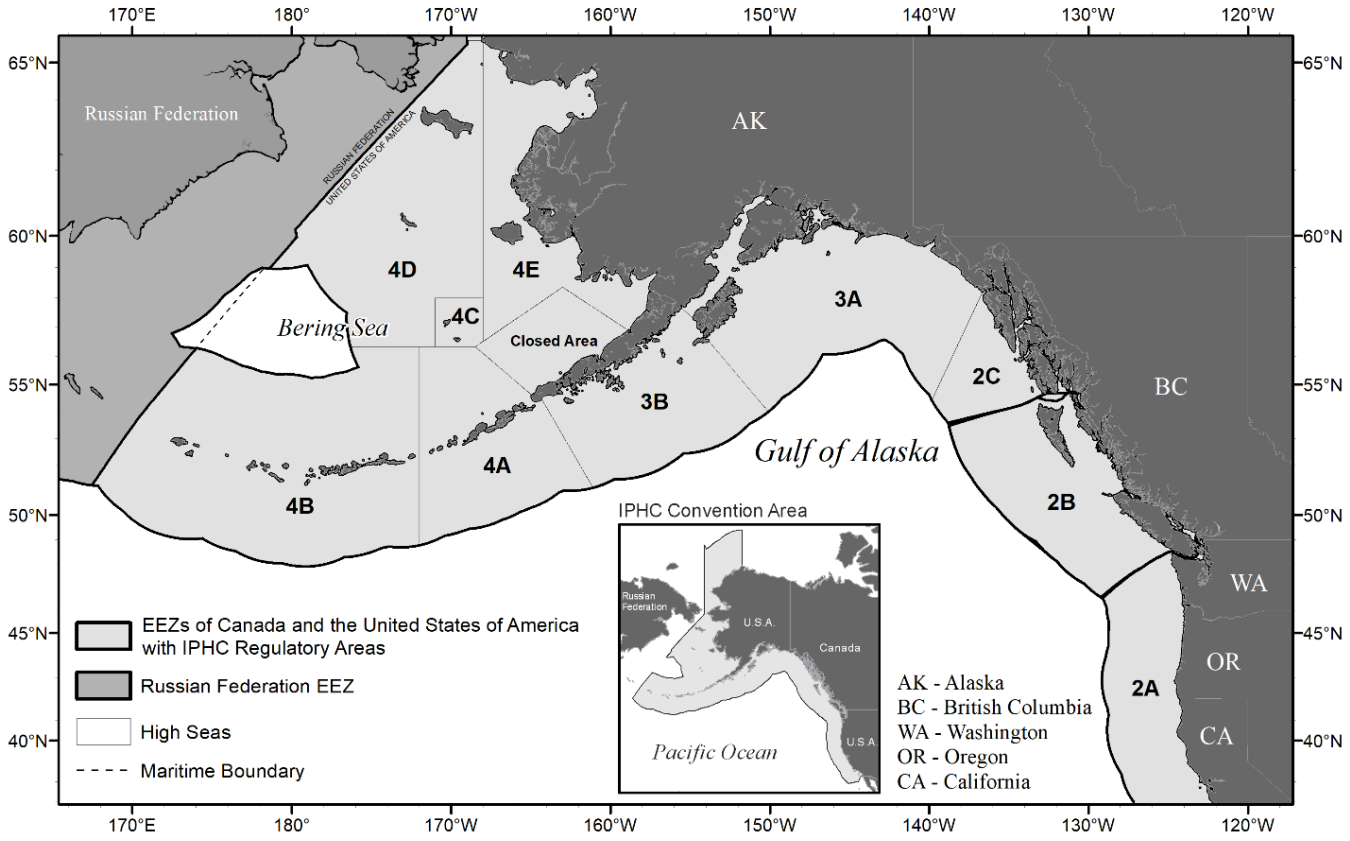


Figure 1. Map of the IPHC Convention Area (map insert) and IPHC Regulatory Areas.

2. Objectives

The IPHC has a long-standing history (since 1923) of collecting data, undertaking research, and stock assessment, devoted to describing and understanding the Pacific halibut (*Hippoglossus stenolepis*) stock and the fisheries that interact with it.

The IPHC Secretariat conducts activities to address key issues identified by the Commission, its subsidiary bodies, the broader stakeholder community, and of course, the IPHC Secretariat itself. The process of identifying, developing, and implementing our science-based activities involves several steps that are circular in nature, but result in clear research activities and associated deliverables. The process includes developing and proposing projects based on direct input from the Commission, the experience of the IPHC Secretariat given our broad understanding of the resource and its associated fisheries, and concurrent consideration by relevant IPHC subsidiary bodies, and where deemed necessary, additional external peer review.

Over the last five years (2017-2021), the research conducted by the IPHC Secretariat has been guided by a 5-Year Biological and Ecosystem Science Research Plan (IPHC–2019–BESRP-5YP) that aimed at improving knowledge on the biology of Pacific halibut in order to improve the accuracy of the stock assessment and in the management strategy evaluation (MSE) process. The IPHC-2019-BESRP-5YP contemplated research activities in five focal areas, namely Migration and Distribution, Reproduction, Growth and Physiological Condition, Discard Mortality Rates and Survival, and Genetics and Genomics. Research activities were highly integrated with the needs of stock assessment and MSE by their careful alignment with biological uncertainties and parameters, and the resulting prioritization (Appendix I). The outcomes of the IPHC-2019-BESRP-5YP have provided key inputs into stock assessment and the MSE process and, importantly, have provided foundational information for the successful pursuit of continuing and novel objectives within the new 5-Year Program of Integrated Research and Monitoring (2022-2026) (5YPIRM) (Appendix I).

The 2nd Performance Review of the IPHC (IPHC-2019-PRIPHC02-R), carried out over the course of 2019, also provided a range of recommendations to the Commission on ways in which it could continue to improve on the quality of scientific advice being provided to the Commission. There were nine (9) specific recommendations as provided below:

Science: Status of living marine resources

PRIPHC02–Rec.03 (para. 44) The PRIPHC02 ***RECOMMENDED*** *that opportunities to engage with western Pacific halibut science and management agencies be sought, to strengthen science links and data exchange. Specifically, consider options to investigate pan-Pacific stock structure and migration of Pacific halibut.*

PRIPHC02–Rec.04 (para. 45) The PRIPHC02 ***RECOMMENDED*** *that:*

a) further efforts be made to lead and collaborate on research to assess the ecosystem impacts of Pacific halibut fisheries on incidentally caught species (retained and/or discarded);

b) where feasible, this research be incorporated within the IPHC's 5-Year Research Plan (https://www.iphc.int/uploads/pdf/besrp/2019/iphc-2019-besrp-5yp.pdf);

c) findings from the IPHC Secretariat research and that of the Contracting Parties be readily accessible via the IPHC website.

Science: Quality and provision of scientific advice

PRIPHC02–Rec.05 (para. 63) The PRIPHC02 ***RECOMMENDED*** *that simplified materials be developed for RAB and especially MSAB use, including training/induction materials.*

PRIPHC02–Rec.06 (para. 64) The PRIPHC02 ***RECOMMENDED*** *that consideration be given to amending the Rules of Procedure to include appropriate fixed terms of service to ensure SRB peer review remains independent and fresh; a fixed term of three years seems appropriate, with no more than one renewal.*

PRIPHC02–Rec.07 (para. 65) The PRIPHC02 ***RECOMMENDED*** *that the peer review process be strengthened through expanded subject specific independent reviews including data quality and standards, the FISS, MSE, and biological/ecological research; as well as conversion of "grey literature" to primary literature publications. The latter considered important to ongoing information outreach efforts given the cutting-edge nature of the Commission's scientific work.*

PRIPHC02–Rec.08 (para. 66) The PRIPHC02 ***RECOMMENDED*** *that the IPHC Secretariat develop options for simple graphical summaries (i.e. phase plot equivalents) of fishing intensity and spawning stock biomass for provision to the Commission.*

Conservation and Management: Data collection and sharing

PRIPHC02–Rec.09 (para. 73) The PRIPHC02 ***RECOMMENDED*** *that observer coverage be adjusted to be commensurate with the level of fishing intensity in each IPHC Regulatory Area.*

Conservation and Management: Consistency between scientific advice and fishery Regulations adopted

PRIPHC02–Rec.10 (para. 82) The PRIPHC02 ***RECOMMENDED*** *that the development of MSE to underpin multi-year (strategic) decision-making be continued, and as multi-year decision making is implemented, current Secretariat capacity usage for annual stock assessments should be refocused on research to investigate MSE operating model development (including consideration of biological and fishery uncertainties) for future MSE iterations and regularised multi-year stock assessments.*

PRIPHC02–Rec.11 (para. 83) The PRIPHC02 ***RECOMMENDED*** *that ongoing work on the MSE process be prioritised to ensure there is a management framework/procedure with minimal room for ambiguous interpretation, and robust pre-agreed mortality limit setting frameworks.*

The work outlined in this document builds on the previous a 5-Year Biological and Ecosystem Science Research Plan (IPHC–2019–BESRP-5YP), closing completed projects, extending efforts where needed, and adding new avenues in response to new information. Appendix I provides a detailed summary of the previous plan and the status of the work specifically undertaken. Key highlights relevant to the stock assessment and MSE include:

- Completion of the genetic assay for determining sex from tissue samples, processing of commercial fishery samples collected during 2017-2020, inclusion of this information in the 2019 and subsequent stock assessments, and transfer of this effort from research to ongoing monitoring.
- Incremental progress toward population-level sampling and analysis of maturity and fecundity.
- Continued development of the understanding of physiological and environmental mechanisms determining growth for future field application.
- Published estimates of discard mortality rates for use in data processing and management accounting.
- Collection of genetic samples and genome sequencing to provide a basis for ongoing evaluation of stock structure at population-level and finer scales.

All previously described research areas continue to represent critical areas of uncertainty in the stock assessment and thus are closely linked to management performance. The previous 5-year plan was successful in either

providing direct new information to the stock assessment or building the foundation for the collection/analysis of such information in this updated plan. As noted below, some new priorities have emerged, and others have evolved based on the work completed to date. The incorporation of research objectives in the 5YPIRM that address climate change as a factor influencing Pacific halibut biology and ecology as well as fishery performance and dynamics constitutes a timely and relevant contribution towards advancing IPHC-led research to the forefront of fisheries science.

An **overarching goal** of the *IPHC 5-Year Program of integrated research and monitoring (2022-26)* is therefore to promote integration and synergies among the various research and support activities of the IPHC Secretariat in order to improve our knowledge of key inputs into the Pacific halibut stock assessment and MSE processes, in order to provide the best possible advice for management decision-making processes.

Along with the implementation of the short- and medium-term activities contemplated in this *IPHC 5-Year Program of Integrated Research and monitoring (2022-26)*, and in pursuit of the overarching objective, the IPHC Secretariat will also aim to:

1) undertake cutting-edge research programs in fisheries research in support of fisheries management of Pacific halibut;
2) undertake groundbreaking methodological research;
3) undertake applied research;
4) establish new collaborative agreements and interactions with research agencies and academic institutions;
5) promote the international involvement of the IPHC by continued and new participation in international scientific organizations and by leading international science and research collaborations.
6) effectively communicate IPHC research outcomes
7) incorporate talented students and early researchers in research activities contemplated.

The research and monitoring activities conducted by the IPHC Secretariat are directed towards fulfilling the following four (4) **objectives** within areas of data collection, biological and ecological research, stock assessment, and MSE. In addition, the IPHC responds to Commission requests for additional inputs to management and policy development which are classified under management support. The overall aim is to provide a program of integrated research and monitoring (Fig 2):

Research

1) **Stock assessment**: apply the resulting knowledge to improve the accuracy and reliability of the current stock assessment and the characterization of uncertainty in the resultant stock management advice provided to the Commission;
2) **Management Strategy Evaluation (MSE)**: to develop an accurate, reliable, and informative MSE process to appropriately characterize uncertainty and provide for the robust evaluation of the consequences of alternative management options, known as harvest strategies, using defined conservation and fishery objectives;
3) **Biology and Ecology**: identify and assess critical knowledge gaps in the biology and ecology of Pacific halibut within its known range, including the influence of environmental conditions on population and fishery dynamics;

Monitoring

4) **Monitoring**: collect representative fishery dependent and fishery-independent data on the distribution, abundance, biology, and demographics of Pacific halibut through ongoing monitoring activities;

Integrated management support

5) **Additional inputs**: respond to Commission requests for any additional information supporting management and policy development.

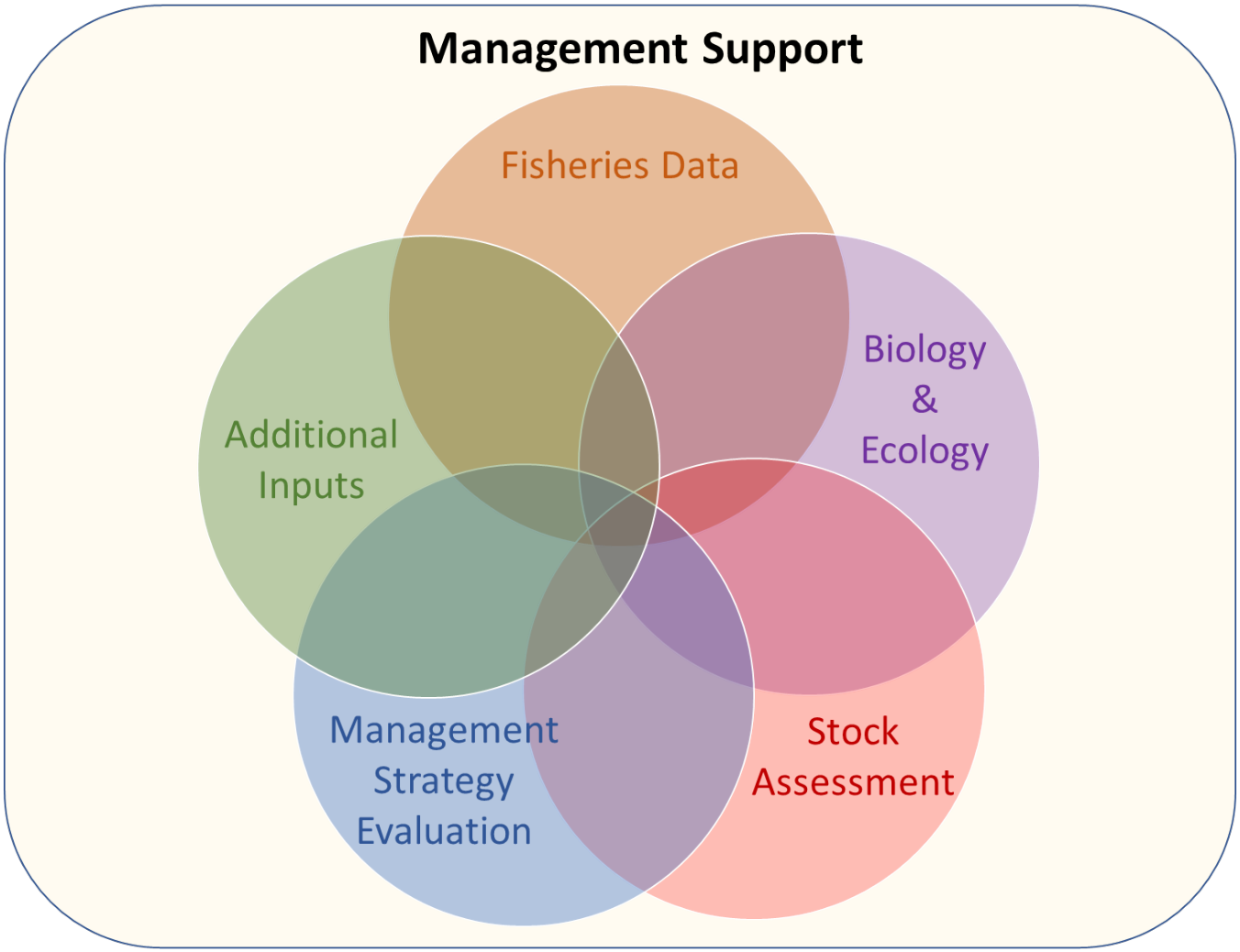


Figure 2. Core areas of the IPHC's program of integrated research and monitoring providing management support.

3. Strategy

The IPHC Secretariat has five (5) enduring strategic goals in executing our mission, including our overarching goal and associated science and research objectives, as articulated in our Strategic Plan (IPHC Strategic Plan (2019-23)): 1) To operate in accordance with international best practice; 2) Be a world leader in scientific excellence and science-based decision making; 3) To foster collaboration (within Contracting Parties and internationally) to enhance our science and management advice; 4) Create a vibrant IPHC culture; and 5) Set the

standard for fisheries commissions globally.

Although priorities and tasking will change over time in response to events and developments, the Strategic Plan provides a framework to standardise our approach when revising or setting new priorities and tasking. The Strategic goals as they apply to the science and research activities of the IPHC Secretariat, will be operationalised through a multi-year tactical activity matrix at the organisational and management unit (Branch) level (Fig. 3). The tactical activity matrix is described in the sections below and has been developed based on the core needs of the Commission, in developing and implementing robust, scientifically-based management decisions on an annual, and multi-year level. Relevant IPHC subsidiary bodies will be involved in project development and ongoing review.

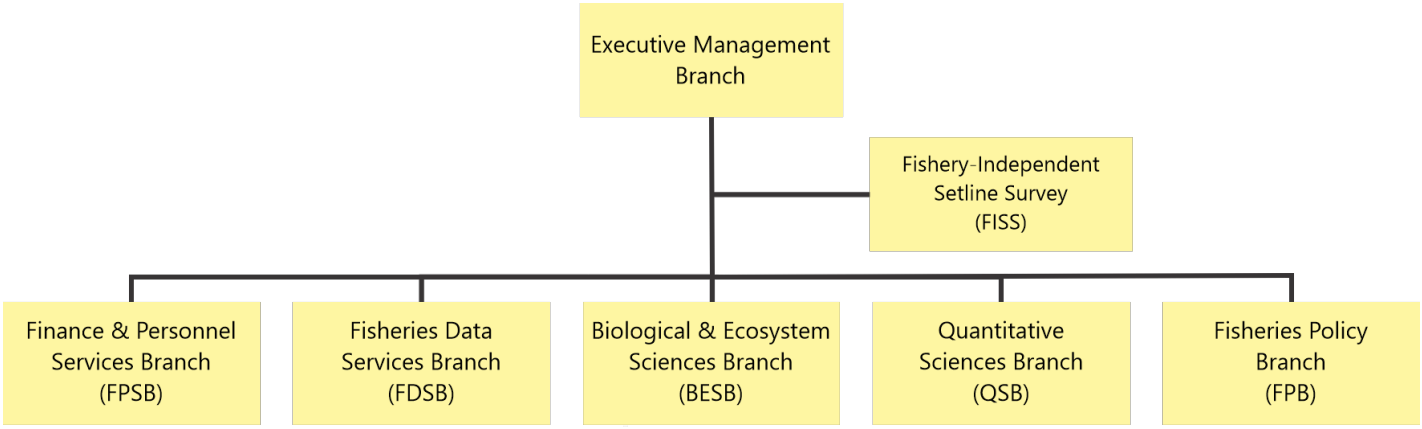


Figure 3. IPHC Secretariat organisation chart (2022).

4. Measures of Success

The Secretariat's success in implementing the *IPHC 5-Year Program of Integrated Research and Monitoring (2022-26)* will be measured according to the following four criteria relevant to the stock assessment, the MSE and for all inputs to IPHC management:

1) Timeliness – was the research conducted, analyzed, published, and provided to the Commission at the appropriate points to be included in annual management decisions?
2) Accessibility – was the research published and presented in such a way that it was available to other scientists, stakeholders, and decision-makers?
3) Relevance - did the research improve the perceived accuracy of the stock assessment, MSE or decisions made by the commission?
4) Impact – did the research allow for more precision or a better estimate of the uncertainty associated with information for use in management?
5) Reliability - has research resulted in more consistent information provided to the Commission for decision-making.

4.1 Delivery of specified products

Each project line item will contain specific deliverables that constitute useful inputs into the stock assessment and the management strategy evaluation process, as well as support their implementation in the decision-making process at the level of the Commission.

4.2 Communication

The IPHC Secretariat will disseminate information about the activities contemplated in the IPHC 5-Year Program of Integrated Research and Monitoring (2022-2026) and the resulting products to Contracting Parties, stakeholders, the scientific community, and the general public through a variety of channels:

1) IPHC website (www.iphc.int);
2) Formal documentation provided for IPHC meetings (Interim and Annual Meetings, Subsidiary Body meetings, etc.);
3) Presentations at national and international scientific conferences;
4) Published reports and peer-reviewed publications (section 4.4);
5) Outreach events;
6) Social media outlets (e.g. Facebook, Twitter, LinkedIn, etc.);
7) Informal presentations and interactions with partners, stakeholders, and decision-makers at varied times and venues when needed.

4.3 External research funding

The Secretariat has set a funding goal of at least 20% of the funds for this program to be sourced from external funding bodies on an annual basis. Continuing the successful funding-recruitment strategy adopted during the previous 5-yr research plan (IPHC–2019–BESRP-5YP) (Appendix I), the Secretariat will identify and select external funding opportunities that are timely and that aim at addressing key research objectives (as outlined in Appendix II) that have important implications for stock assessment and the MSE process. The IPHC Secretariat has the necessary expertise to propose novel and important research questions to funding agencies and to recruit external collaborators from research agencies and universities as deemed necessary. The IPHC Secretariat will continue to capitalize on the strong analytical contributions of quantitative scientists to the development of biological research questions within the framework of research projects funded by external as well as internal funding sources.

4.4 Peer-reviewed journal publication

Publication of research outcomes in peer-reviewed journals will be clearly documented and monitored as a measure of success. This may include single publications at the completion of a particular project, or a series of publications throughout the project as well as at its completion. Each sub-project shall be published in a timely manner and shall be submitted no later than 12 months after the end of the research. In the sections that follow, the expected publications from each research stream and cross-stream are defined.

5. Core focal areas – Background

The goals of the main activities of the *5-Year program of integrated research and monitoring (2022-26)* are integrated across the organisation, involving 1) monitoring (fisheries-dependent and –independent data collection), and 2) research (biological, ecological), modelling (FISS and stock assessment), and MSE, as outlined in the following sub-sections. These components are closely linked to one another, and all feed into management decision-making (Fig. 4). Additionally, management-supporting information constitute a range of additional decision-making drivers within and beyond IPHC's current research and monitoring programs. The current program builds on the outcomes and experiences of the Commission arising from the implementation of the 2017-21 5-Year Biological and Ecosystem Science Research Plan (IPHC–2019–BESRP-5YP), and which is summarized in Appendix I.

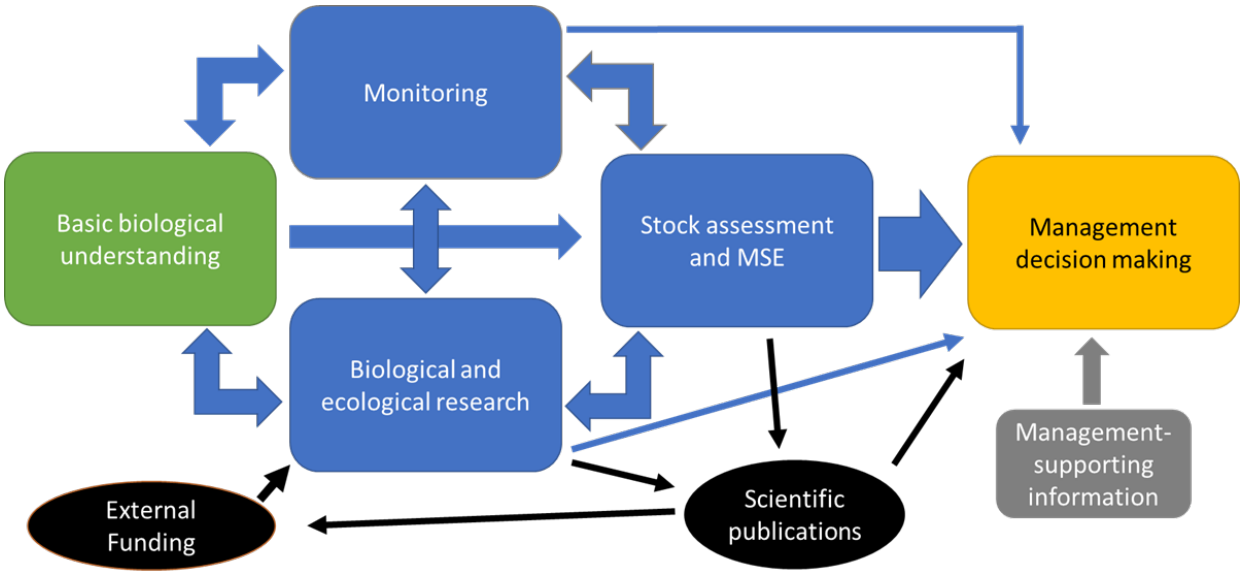


Figure 4. Flow of information from basic biological understanding of the Pacific halibut resource, through IPHC research components (monitoring, biological and ecological research, stock assessment, and MSE) to management decision-making. Management-supporting information (grey) constitute a range of additional decision-making drivers within and beyond IPHC's current research and monitoring programs. Arrows indicate the strength (size of the arrow) and direction of information exchange. Also identified (in black) are the external links from funding and scientific publications which supplement the IPHC's internal process.

5.1 Research

5.1.1 Stock Assessment

Focal Area Objective	To improve accuracy and reliability of the current stock assessment and the characterization of uncertainty in the resultant stock management advice provided to the Commission.
IPHC Website portal	https://www.iphc.int/management/science-and-research/stock-assessment

The IPHC conducts an annual stock assessment, using data from the fishery-independent setline survey (FISS), the commercial Pacific halibut and other fisheries, as well biological information from its research program. The assessment includes the Pacific halibut resource in the IPHC Convention Area, covering the Exclusive Economic Zones of Canada and the United States of America. Data sources are updated each year to reflect the most recent scientific information available for use in management decision-making.

The 2021 stock assessment relied on an ensemble of four population dynamics models to estimate the probability distributions describing the current stock size, trend, and demographics. The ensemble is designed to capture both uncertainty related to the data and stock dynamics (due to estimation) as well as uncertainty related to our understanding of the way in which the Pacific halibut stock functions and is best approximated by a statistical model (structural uncertainty).

Stock assessment results are used as inputs for harvest strategy calculations, including mortality projection tables

for the upcoming year that reflect the IPHC's harvest strategy policy and other considerations, as well as the harvest decision table which provides a direct tool for the management process. The harvest decision table uses the probability distributions from short-term (three year) assessment projections to evaluate the trade-offs between alternative levels of potential yield (catch) and the associated risks to the stock and fishery.

The stock assessment research priorities have been subdivided into four categories:

1) Assessment data collection and processing;
2) technical development;
3) biological inputs; and
4) fishery yield.

It is important to note that ongoing monitoring, including the annual FISS and directed commercial landings sampling programs is not considered research and is therefore not included in this research priority list despite the critical importance of these collections. These are described in the sections below.

5.1.2 Management Strategy Evaluation (MSE)

Focal Area Objective	To develop an accurate, reliable, and informative MSE process to appropriately characterize uncertainty and provide for the robust evaluation of the consequences of alternative management options, known as harvest strategies, using defined conservation and fishery objectives.
IPHC Website portal	https://www.iphc.int/management/science-and-research/management-strategy-evaluation

Management Strategy Evaluation (MSE) is a process to evaluate the consequences of alternative management options, known as harvest strategies. MSE uses a simulation tool to determine how alternative harvest strategies perform given a set of pre-defined fishery and conservation objectives, taking into account the uncertainties in the system and how likely candidate harvest strategies are to achieve the chosen management objectives.

MSE is a simulation technique based on modelling each part of a management cycle. The MSE uses an operating model to simulate the entire population and all fisheries, factoring in management decisions, the monitoring program, the estimation model, and potential ecosystem effects using a closed-loop simulation.

Undertaking an MSE has the advantage of being able to reveal the trade-offs among a range of possible management decisions. Specifically, to provide the information on which to base a rational decision, given harvest strategies, preferences, and attitudes to risk. The MSE is an essential part of the process of developing, evaluating and agreeing to a harvest strategy.

The MSE process involves:

- Defining fishery and conservation objectives with the involvement of stakeholders and managers;
- Identifying harvest strategies (a.k.a. management procedures) to evaluate;
- Simulating a Pacific halibut population using those harvest strategies;
- Evaluating and presenting the results in a way that examines trade-offs between objectives;
- Applying a chosen harvest strategy for the management of Pacific halibut;
- Repeating this process in the future in case of changes in objectives, assumptions, or expectations.

There are many tasks that would continue to improve the MSE framework and the presentation of future results to the Commission. The tasks can be divided into five general categories, which are common to MSE in general:

1. **Objectives**: The goals and objectives that are used in the evaluation.
2. **Management Procedures (MPs)**: Specific, well-defined management procedures that can be coded in the MSE framework to produce simulated Total Constant Exploitation Yields (TCEY) for each IPHC Regulatory Area.
3. **Framework**: The specifications and computer code for the closed-loop simulations including the operating model and how it interacts with the MP.
4. **Evaluation**: The performance metrics and presentation of results. This includes how the performance metrics are evaluated (e.g. tables, figures, and rankings), presented to the Commission and its subsidiary bodies, and disseminated for outreach.
5. **Application**: Specifications of how an MP may be applied in practice and re-evaluated in the future, including responses to exceptional circumstances.

All these categories provide inputs and outputs of the MSE process, but the Framework category benefits most from the integration of biological and ecosystem research because the operating model, the simulation of the monitoring program, the estimation model, and potential ecosystem effects are determined from this knowledge.

Outcomes of the MSE process will not only inform the Commission on trade-offs between harvest strategies and assist in choosing an optimal strategy for management of the Pacific halibut resource but will inform the prioritization of research activities related to fisheries monitoring, biological and ecological research, stock assessment, and fishery socioeconomics.

5.1.3 Biology and Ecology

Focal Area Objective	To identify and assess critical knowledge gaps in the biology and ecology of Pacific halibut within its known range, including the influence of environmental conditions on population and fishery dynamics.
IPHC Website portal	https://www.iphc.int/management/science-and-research/biological-and-ecosystem-science-research-program-bandesrp

Since its inception, the IPHC has had a long history of research activities devoted to describe and understand the biology of the Pacific halibut. At present, the main objectives of the Biological and Ecosystem Science Research Program at IPHC are to: 1) identify and assess critical knowledge gaps in the biology of the Pacific halibut; 2) understand the influence of environmental conditions in the biology of the Pacific halibut and its fishery; and 3) apply the resulting knowledge to reduce uncertainty in current stock assessment models.

The primary biological research activities at the IPHC that follow Commission objectives and that are selected for their important management implications are identified and described in the proposed 5-Year Research Plan for the period 2022-2026. An overarching goal of the 5-Year Research Plan is to promote integration and synergies among the various research activities led by the IPHC to improve our knowledge of key biological inputs that feed into the stock assessment and MSE process. The goals of the main research activities of the 5-Year Research Plan are therefore aligned and integrated with the IPHC stock assessment and MSE processes. The IPHC Secretariat conducts research activities to address key biological issues based on the IPHC Secretariat's own input as well as input from the IPHC Commissioners, stakeholders and particularly from specific subsidiary bodies to the IPHC, including the Scientific Review Board (SRB) and the Research Advisory Board (RAB).

The biological research activities contemplated in the 5-Year Research Plan and their specific aims are detailed in Section 6. Overall, the biological research activities at the IPHC aim to provide information on 1) factors that influence the biomass of the Pacific halibut population (e.g. distribution and movement of fish among IPHC Regulatory Areas, growth patterns and environmental influences on growth in larval, juvenile and adult fish, drivers of changes in size-at-age); 2) the spawning (female) population (e.g. reproductive maturity, skipped spawning, reproductive migrations); and 3) resulting changes in population dynamics. Furthermore, the research activities of IPHC also aim to provide information on the survival of regulatory-discarded Pacific halibut in the directed fisheries with the objective to refine current estimates of discard mortality rates and develop best handling practices, and reduce whale depredation and Pacific halibut bycatch through gear modifications and through a better understanding of behavioral and physiological responses of Pacific halibut to fishing gear.

5.2 Monitoring

Focal Area Objective	To collect fishery-dependent and fishery-independent data on the distribution, abundance, and demographics of Pacific halibut, as well as other key biological data, through ongoing monitoring activities.
IPHC Website portal	***Fishery-dependent data:*** • https://www.iphc.int/datatest/commercial-fisheries • https://www.iphc.int/data/datatest/non-directed-commercial-discard-mortality-fisheries • https://www.iphc.int/data/datatest/pacific-halibut-recreational-fisheries-data • https://www.iphc.int/datatest/subsistence-fisheries • https://www.iphc.int/data/time-series-datasets ***Fishery-independent data:*** • https://www.iphc.int/management/science-and-research/fishery-independent-setline-survey-fiss • https://www.iphc.int/data/datatest/fishery-independent-setline-survey-fiss • https://www.iphc.int/datatest/data/water-column-profiler-data

5.2.1 Fishery-dependent data

The IPHC estimates all Pacific halibut removals taken in the IPHC Convention Area and uses this information in its yearly stock assessment and other analyses. The data are compiled by the IPHC Secretariat and include data from Federal and State agencies of each Contracting Party. Specific activities in this area are described below.

5.2.1.1 Directed commercial fisheries data

The IPHC Secretariat collects logbooks, otoliths, tissue samples, and associated sex-length-weight data from directed commercial landings coastwide (Fig. 5). A sampling rate is determined for each port by IPHC Regulatory Area. The applicable rate is calculated from the current year's mortality limits and estimated percentages of weight of fish landed, and estimated percentages of weight sampled in that port to allow for collection of the target number of biological samples by IPHC Regulatory Area. An example of the data collected and the methods used are provided in the annually updated directed commercial sampling manual (e.g. IPHC Directed Commercial Landings Sampling Manual 2022). Directed commercial fishery landings are recorded by the Federal and State agencies of each Contracting Party and summarized each year by the IPHC. Discard mortality for the directed

commercial fishery is currently estimated using a combination of research survey (U.S.A.) and observer data (Canada).

5.2.1.2 Non-directed commercial discard mortality data

The IPHC accounts for non-directed commercial discard mortality by IPHC Regulatory Area and sector. Non-directed commercial discard mortality estimates are provided by State and Federal agencies of each Contracting Party and compiled annually for use in the stock assessment and other analyses. https://www.iphc.int/data/datatest/non-directed-commercial-discard-mortality-fisheries.

Non-directed commercial discard mortality of Pacific halibut is estimated because not all fisheries have 100% monitoring and not all Pacific halibut that are discarded are assumed to die. The IPHC relies upon information supplied by observer programs run by Contracting Party agencies for non-directed commercial discard mortality estimates in most fisheries. Non-IPHC research survey information or other sources are used to generate estimates of non-directed commercial discard mortality in the few cases where fishery observations are unavailable. Non-directed fisheries off Canada British Columbia are monitored and discard mortality information is provided to IPHC by DFO. NOAA Fisheries operates observer programs off the USA West Coast and Alaska, which monitor the major groundfish fisheries. Data collected by those programs are used to estimate non-directed commercial discard mortality.

5.2.1.3 Subsistence fisheries data

Subsistence fisheries are non-commercial, customary, and traditional use of Pacific halibut for direct personal, family, or community consumption or sharing as food, or customary trade. The primary subsistence fisheries are the treaty Indian Ceremonial and Subsistence fishery in IPHC Regulatory Area 2A off northwest Washington State (USA), the First Nations Food, Social, and Ceremonial (FSC) fishery in British Columbia (Canada), and the subsistence fishery by rural residents and federally recognized native tribes in Alaska (USA) documented via Subsistence Halibut Registration Certificates (SHARC). Subsistence fishery removals of Pacific halibut, including estimated subsistence discard mortality, are provided by State and Federal agencies of each Contracting Party, estimated, and compiled annually for use in the stock assessment and other analysis. https://www.iphc.int/datatest/subsistence-fisheries.

5.2.1.4 Recreational fisheries data

Recreational removals of Pacific halibut, including estimated recreational discard mortality, are provided by National/State agencies of each Contracting Party, estimated, and compiled annually for use in the stock assessment and other analysis. https://www.iphc.int/data/datatest/pacific-halibut-recreational-fisheries-data.

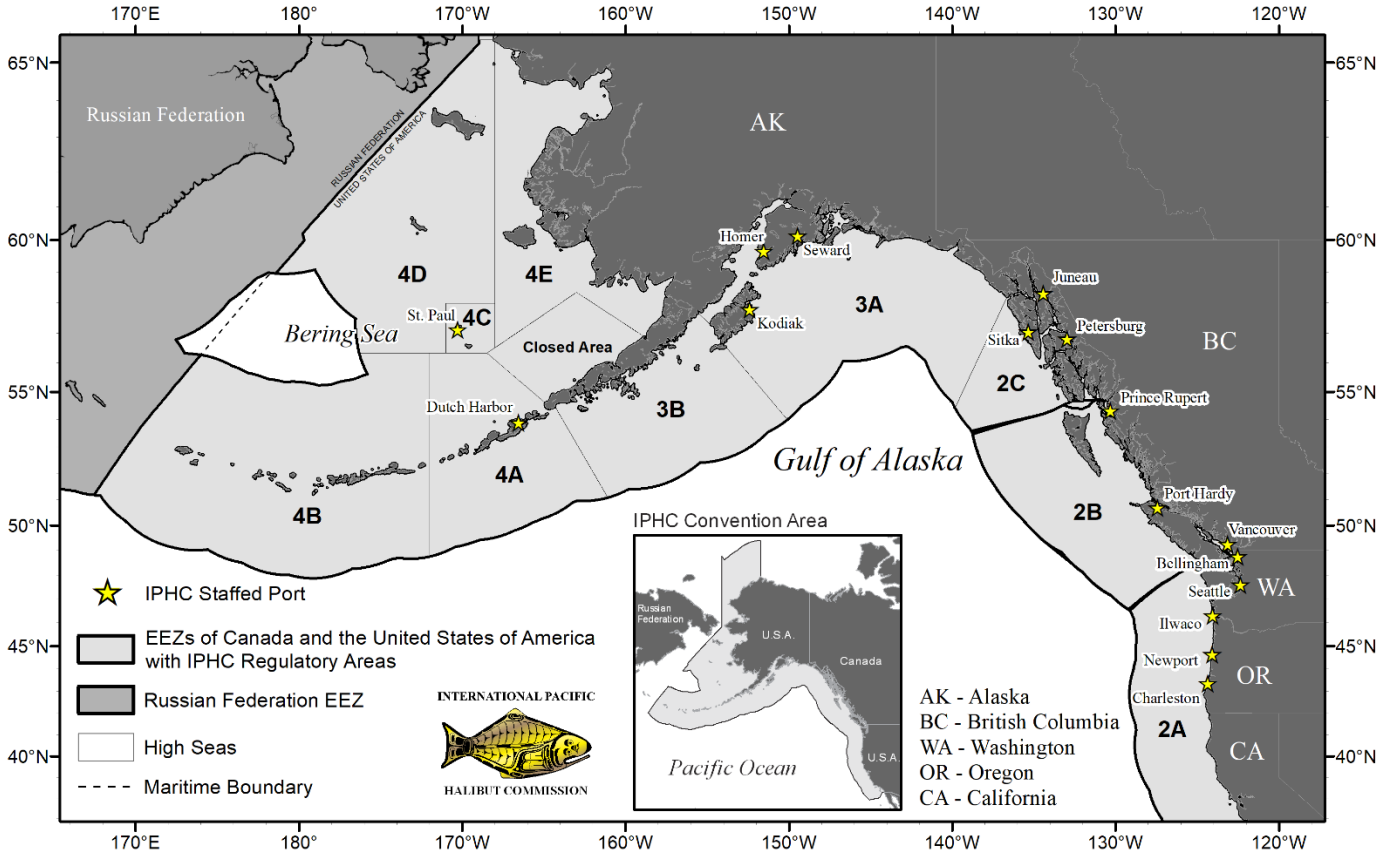


Figure 5. Ports where the IPHC has sampled directed commercial landings throughout the fishing period in recent years (note: ports sampled may change from year-to-year for operational reasons).

5.2.2 Fishery-independent data.

Data collection and monitoring activities aimed at providing a standardised time-series of biological and ecological data that is independent of the fishing fleet.

5.2.2.1 Fishery-independent setline survey (FISS)

The IPHC Fishery-Independent Setline Survey (FISS) provides catch-rate information and biological data on Pacific halibut that are independent of the fishery. These data, collected using standardized methods, bait, and gear, are used to estimate the primary index of population abundance used in the stock assessment. The FISS is restricted to the summer months but encompasses the commercial fishing grounds in the Pacific halibut fishery, and almost all known Pacific halibut habitat in Convention waters outside the Bering Sea. The standard FISS grid totals 1,890 stations (Fig. 6). Biological data collected on the FISS (e.g. the length, weight, age, and sex of Pacific halibut) are used to monitor changes in biomass, growth, and mortality. In addition, records of non-target species caught during FISS operations provide insight into bait competition, and serve as an index of abundance over time, making them valuable to the potential management and avoidance of non-target species. Environmental data are also collected including water column temperature, salinity, dissolved oxygen, pH, and chlorophyll concentration to help identify the conditions in which the fish were caught, and these data can serve as co-variates in space-time modeling used in the stock assessment. An example of the data collected and the methods used are provided in the annually updated FISS sampling manual (e.g. IPHC FISS Sampling Manual 2022).

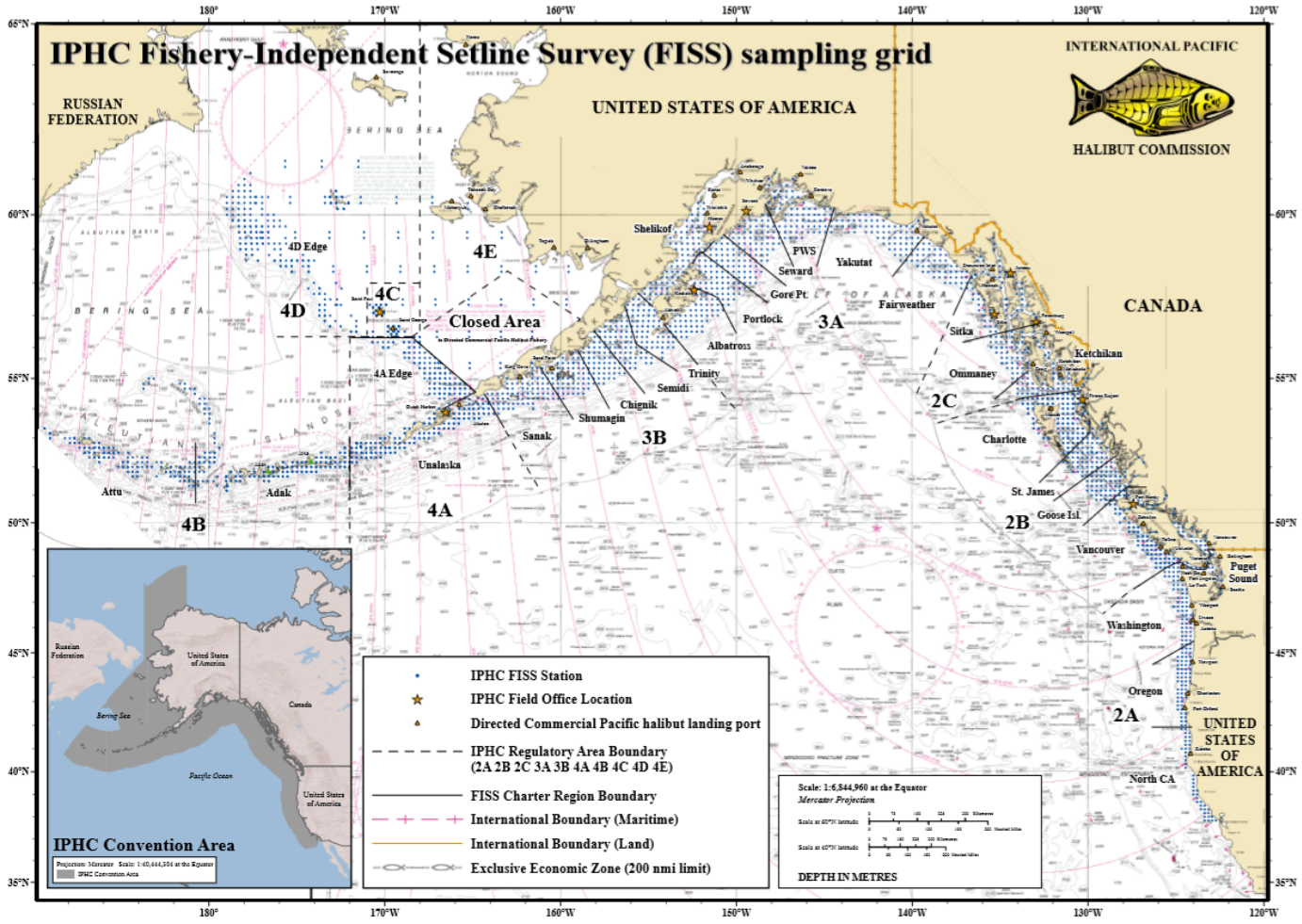


Figure 6. IPHC Fishery-Independent Setline Survey (FISS) with full sampling grid shown.

Quality control and sampling rate estimations: Following a program of planned FISS expansions from 2014-19, a process of rationialisation of the FISS was undertaken. The goal was to ensure that, given constraints on resources available for implementing the FISS, station selection was such that density indices would be estimated with high precision and low potential for bias. An annual design review process has been developed during which potential FISS designs for the subsequent three years are evaluated according to precision and bias criteria. The resulting proposed designs and their evaluation are presented for review at the June Scientific Review Board (SRB) meetings and potentially modified following SRB input before presentation to the Commissioners at the Work Meeting and Interim Meeting. Annual biological sampling rates for each IPHC Regulatory Area are calculated based on the previous year's catch rates and an annual target of 2000 sampled fish (with 100 additional archive samples).

5.2.2.2 Fishery-independent Trawl Survey (FITS)

The IPHC has participated routinely in the NOAA Fisheries trawl surveys operating in the Bering Sea (Fig. 7, annually since 1998), Aleutian Islands (intermittently since 1997) and Gulf of Alaska (since 1996). The information collected from Pacific halibut caught on these surveys, together with data from the IPHC Fishery-Independent Setline Survey (FISS) and commercial Pacific halibut data, are used directly in estimating indices of abundance and in the stock assessment and to monitor population trends, growth/size, and to supplement understanding of recruitment, distribution, and age composition of young Pacific halibut.

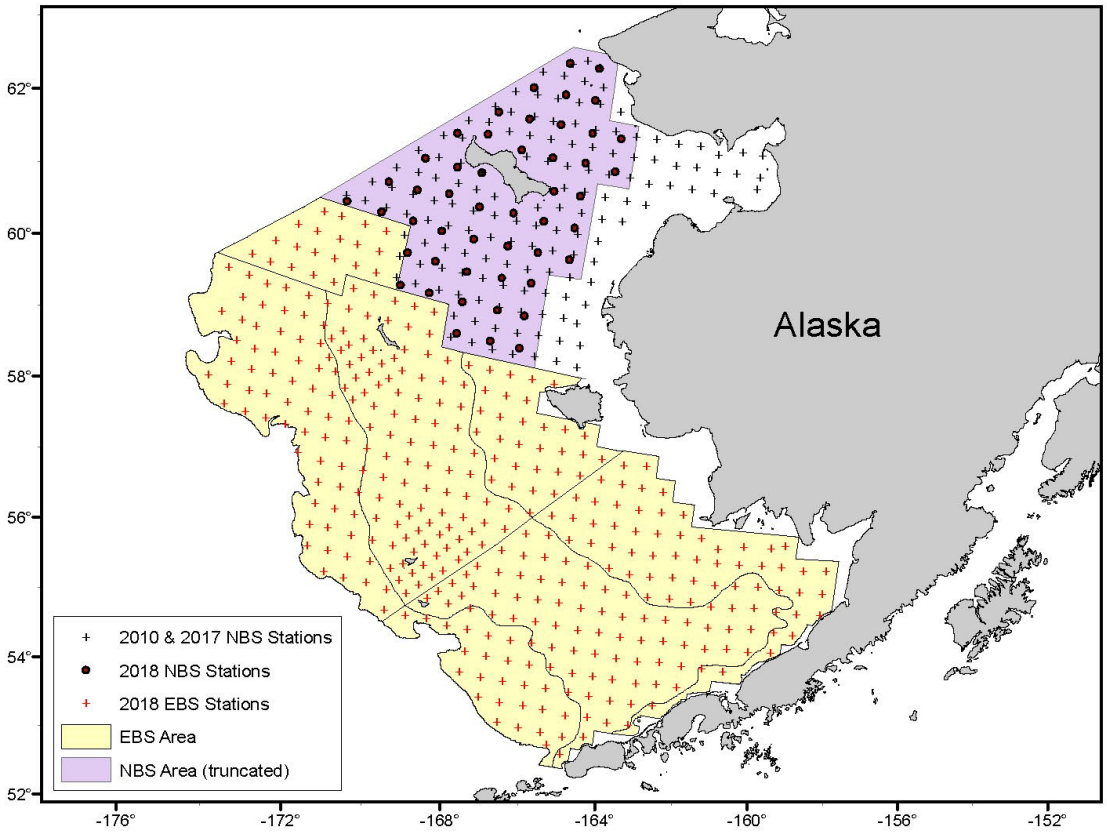


Figure 7. Sampling station design for the 2018 NOAA Bering Sea bottom trawl survey. Black dots are stations sampled in the 2018 "rapid-response" Northern Bering Sea trawl survey and black plus signs are stations sampled in standardized Northern Bering Sea trawl survey.

5.3 Management-supporting information

Successful fisheries management requires rigorous application of the scientific method of problem solving in the development of strategic alternatives and their evaluation on the basis of objectives that integrate ecosystem and human dynamics across space and time into management decision-making (Lane and Stephenson, 1995). This points to the importance of understanding a broad range of factors to deliver on the Commission's objective to develop the stocks of Pacific halibut to the levels that permit the optimum yield from the fishery over time. Management-supporting information beyond IPHC's current research and monitoring programs relate to, among others, socioeconomic considerations, community development, political constraints, and operational limitations.

Responding to the Commission's "*desire for more comprehensive economic information to support the overall management of the Pacific halibut resource in fulfillment of its mandate*" (economic study terms of reference adopted at FAC095 and endorsed at AM095 in 2019), between 2019 and 2021 the IPHC conducted a socioeconomic study. The study's core product, Pacific halibut multiregional economic impact assessment (PHMEIA) model, describes economic interdependencies between sectors and regions to bring a better understanding of the role and importance of the Pacific halibut resource to regional economies of Canada and the United States of America (see project report). The model details the within-region production structure of the Pacific halibut sectors (fishing, processing, charter) and cross-regional flows of economic benefits. The model also accounts for economic activity generated through sectors that supply fishing vessels, processing plants, and charter businesses with inputs to production, by embedding Pacific halibut sectors into the model of the entire economy of Canada and the USA. The PHMEIA model fosters stakeholders' better understanding of a broad

scope of regional impacts of the Pacific halibut resource. The results highlight that the harvest stage accounts for only a fraction of economic activity that would be forgone if the resource was not available to fishers in the Pacific Northwest. Moreover, the study informs on the vulnerability of communities to changes in the state of the Pacific halibut stock throughout its range, highlighting regions particularly dependent on economic activities that rely on Pacific halibut. Leveraging multiple sources of socioeconomic data, the project provides complementary input for designing policies with desired effects depending on regulators' priorities which may involve balancing multiple conflicting objectives. A good understanding of the localized effects is pivotal to policymakers who are often concerned about community impacts, particularly in terms of impact on employment opportunities and households' welfare.

The economic impact assessment is supplemented by an analysis of the formation of the price paid for Pacific halibut products by final consumers (end-users) that is intended to provide a better picture of Pacific halibut contribution to the gross domestic product (GDP) along the entire value chain, from the hook-to-plate. This supplemental material is available in IPHC's Pacific halibut market analysis.

6. Core focal areas – Planned and opportunistic activities (2022-2026)

Research at IPHC can be classified as "use-inspired basic research" (Stokes 1997) which combines knowledge building with the application of existing and emerging knowledge to provide for the management of Pacific halibut. The four core focal areas: stock assessment, management strategy evaluation, management supporting information, and biology & ecology, all interact with each other as well as with fisheries monitoring activities in the IPHC program of integrated research and monitoring. Progress and knowledge building in one focal area influences and informs application in other core focal areas, also providing insight into future research priorities. The circular feedback loop is similar to the scientific method of observing a problem, creating a hypothesis, testing that hypothesis through research and analysis, drawing conclusions, and refining the hypothesis.

The IPHC Secretariat has been working with IPHC advisory bodies, such as the Scientific Review Board (SRB), and the Commission to conduct scientific research in a way that utilizes the scientific method. Problems are often identified by an advisory body or Commission and hypotheses are developed by the IPHC Secretariat. Research is reviewed by the SRB and refined hypotheses are presented to advisory bodies and the Commission. This process occurs via an annual schedule of meetings, as shown in Fig. 8. In May, an MSE informational session may be held if there is significant progress in the MSE such that it would be useful to prepare stakeholders for the Management Strategy Advisory Board (MSAB) meeting in October. Recommendations related to the MSE, and development of a harvest strategy directed to the Commission are a result of the MSAB meeting. The SRB holds two meetings each year: one in June where requests are typically directed to IPHC Secretariat, and one in September where recommendations are made to the Commission. The June SRB meeting has a focus on research; the September meeting represents a final check of science products to be presented to the Commission for use in management. The Research Advisory Board (RAB) meets in November to discuss ongoing research, provide guidance and recommend new research projects. The Work Meeting (WM) is held in September and is a working session with IPHC Secretariat and the Commission to prepare for the Interim Meeting (IM) held in November and the Annual Meeting (AM) held in January. Outcomes from the AM include mortality limits (coastwide and by IPHC Regulatory Area), directed fishery season dates, domestic regulations, and requests and recommendations for the IPHC Secretariat. In conjunction with the AM are meetings of the Finance and Administration Committee (FAC), the Conference Board (CB), and the Processor Advisory Board (PAB). The Commission may also hold Special Sessions (SS) throughout the year to take up and make decisions on specific topics.

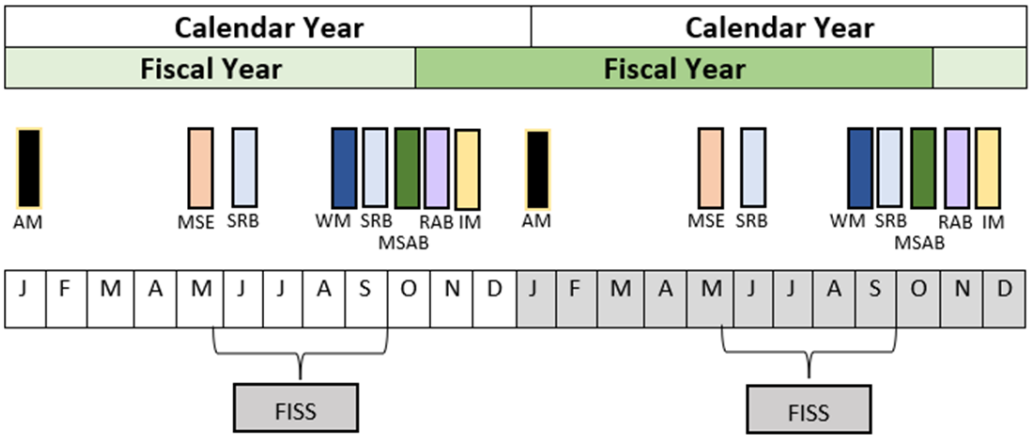


Figure 8. The typical IPHC annual meeting schedule with the calendar year and fiscal year shown. The meetings, shown in the middle row are: Annual Meeting where the Commission makes many final decisions for that year (AM), an MSE informational session (MSE), Scientific Review Board meetings (SRB), the Commission Work Meeting (WM), the Management Strategy Advisory Board meeting (MSAB), the Research Advisory Board Meeting (RAB), and the Interim Meeting (IM). The annual FISS schedule is also shown.

In addition to the annual meeting process at IPHC, individual core focal areas of research may identify and prioritize research for other core focal areas. For example, stock assessment research often identifies gaps in the knowledge of Pacific halibut biology and ecology, which then identifies priority research for the Biology and Ecology core area. Vice versa, basic biological and ecological research can identify concepts that could be better understood and result in improved implementation in any of the core areas. Furthermore, Management Strategy Evaluation can often be used to identify priority research topics for any core areas by simulation testing to identify research that may have the largest benefit to improving the management of Pacific halibut.

The top priorities of research for various categories in each of the core focal areas are provided below. The top priorities are a subset of the potential research topics in each core focal area. More exhaustive and up-to-date lists of research topics, that may extend beyond a five-year timeframe, can be found in recent meeting documents related to each core focal area.

6.1 Research

6.1.1 Stock Assessment

Within the four assessment research categories, the following topics have been identified as top priorities in order to focus attention on their importance for the stock assessment and management of Pacific halibut. A brief narrative is provided here to highlight the specific use of products from these studies in the stock assessment.

6.1.1.1 Stock Assessment data collection and processing

6.1.1.1.1 Commercial fishery sex-ratio-at-age via genetics

Commercial fishery sex-ratio information has been found to be closely correlated with the absolute scale of the population estimates in the stock assessment and has been identified as the greatest source of uncertainty since 2013. With only four years (2017-20) of commercial sex-ratio-at-age information available for the 2021 stock assessment, the annual genetic assay of fin clips sampled from the landings remains critically important. When the time series grows longer, it may be advantageous to determine the ideal frequency at which these assays need to be conducted. Development of approaches to use archived otoliths, scales or other samples to derive historical estimates (if possible) could provide valuable information on earlier time-periods (with differing fishery and

biological properties), and therefore potentially reconcile some of the considerable historical uncertainty in the present stock assessment. This assessment priority directly informs *6.1.3.2 Reproduction* as described below.

6.1.1.1.2 Whale depredation accounting and tools for avoidance

Whale depredation currently represents a source of unobserved and unaccounted-for mortality in the assessment and management of Pacific halibut. A logbook program has been phased in over the last several years, in order to record whale interactions observed by commercial harvesters. Estimation of depredation mortality, from logbook records and supplemented with more detailed data and analysis from the FISS represents a first step in accounting for this source of mortality; however, such estimates will likely come with considerable uncertainty. Reduction of depredation mortality through improved fishery avoidance and/or catch protection would be a preferable extension and/or solution to basic estimation. As such, research to provide the fishery with tools to reduce depredation is considered a closely-related high priority. This assessment priority directly informs *6.1.3.4 Mortality and Survival Assessment* as described below.

6.1.1.2 Stock Assessment technical development

6.1.1.2.1 Maintaining coordination with the MSE

The stock assessment and MSE operating models have been developed in close coordination, in order to identify plausible hypotheses regarding the processes governing Pacific halibut population dynamics. Important aspects of Pacific halibut dynamics include recruitment (possibly related to extrinsic environmental factors in addition to spawning biomass), size-at-age, movement/migration and spatial patterns in fishery catchability and selectivity. Many approaches developed as part of the tactical stock assessment have been explored in the MSE operating model, and conversely, the MSE operating model has highlighted areas of data uncertainty or alternative hypotheses for exploration in the assessment (e.g. movement rates). Although these two modelling efforts target differing objectives (tactical vs. strategic) continued coordination is essential to ensure that the stock assessment and the MSE represent the Pacific halibut similarly and provide consistent and useful advice for tactical and strategic decision-making.

6.1.1.2.2 Data weighting

The stock assessment currently relies on iterative "Francis" weighting of the age compositional data using a multinomial likelihood formulation (Francis 2011) based on the number of samples available in each year. Exploration of a stronger basis for input sample sizes through analysis of sampling design, estimation of sample weighting and alternative likelihoods may all provide for a more stable approach and a better description of the associated uncertainty.

6.1.1.2.3 Environmental covariates to recruitment

The two long time-series models included in the stock assessment ensemble allow for the Pacific Decadal Oscillation (PDO; Mantua et al. 1997) to be a binary covariate indicating periods of higher or lower average recruitment. This relationship has been observed to be consistent since its development over 20 years ago (Clark et al 1999) and is re-estimated in each year's stock assessment models. With additional years of data, evaluation of the strength of this relationship, as compared to other metrics of the PDO (e.g., annual deviations, running averages) or other indicators of NE Pacific Ocean productivity should be undertaken in order to provide the best estimates and projections of Pacific halibut recruitment and to provide for alternative hypotheses for use in the MSE. This assessment priority partially informs *6.1.3.2 Reproduction* as described below.

6.1.1.2.4 'Leading' parameter estimation

Stock assessments are generally very sensitive to the estimates of leading parameters (stock-recruitment

parameters, natural mortality, sex-specific dynamics, etc.). For Pacific halibut some of these are fully integrated into the estimation uncertainty (average unexploited recruitment), or partially integrated (e.g. estimation of natural mortality in two of the four models). As time-series of critically informative data sources like the FISS and the sex-ratio of the commercial landings grow longer it may be possible to integrate additional leading parameters directly in the assessment models and/or include them as nested models within the ensemble.

6.1.1.3 Stock Assessment biological inputs

6.1.1.3.1 Maturity, skip-spawning, and fecundity

Management of Pacific halibut is currently based on reference points that rely on relative female spawning biomass. Therefore, any changes to the understanding of reproductive output – either across age/size (maturity), over time (skip spawning) or as a function of body mass (fecundity) are crucially important. Each of these components directly affects the annual reproductive output estimated in the assessment. Ideally, the IPHC would have a program in place to monitor each of these three reproductive processes over time and use that information in the estimation of the stock-recruitment relationship, and the annual reproductive output relative to reference points. This would reduce the potential for biased time-series estimates created by non-stationarity in these traits (illustrated via sensitivity analyses in several of the recent assessments). However, at present we have only historical time-aggregated estimates of maturity and fecundity schedules. Therefore, the current research priority is to first update our estimates for each of these traits to reflect current environmental and biological conditions. After current stock-wide estimates have been achieved, a program for extending this information to a time-series via transition from research to monitoring can be developed. This assessment priority directly informs *6.1.3.2 Reproduction* as described below.

6.1.1.3.2 Stock structure of IPHC Regulatory Area 4B relative to the rest of the convention area

The current stock assessment and management of Pacific halibut assume that IPHC Regulatory Area 4B is functionally connected with the rest of the stock, i.e., that recruitment from other areas can support harvest in Area 4B and that biomass in Area 4B can produce recruits that may contribute to other Areas. Tagging (Webster et al. 2013) and genetic (Drinan et al. 2016) analyses have indicated the potential for Area 4B to be demographically isolated. An alternative to current assessment and management structure would be to treat Area 4B separately from the rest of the coast. This would not likely have a large effect on the coastwide stock assessment as Area 4B represents only approximately 5% of the surveyed stock (Stewart and Webster 2022). However, it would imply that the specific mortality limits for Area 4B could be very important to local dynamics and should be separated from stock-wide trends. Therefore, information on the stock structure for Area 4B has been identified as a top priority. This assessment priority directly informs *6.1.3.1 Migration and Population Dynamics* as described below.

6.1.1.3.3 Meta-population dynamics (connectivity) of larvae, juveniles, and adults

The stock assessment and current management procedure treat spawning output, juvenile Pacific halibut abundance, and fish contributing to the fishery yield as equivalent across all parts of the Convention Area. Information on the connectivity of these life-history stages could be used for a variety of improvements to the assessment and current management procedure, including: investigating recruitment covariates, structuring spatial assessment models, identifying minimum or target spawning biomass levels in each Biological Region, refining the stock-recruitment relationship to better reflect source-sink dynamics and many others. Spatial dynamics have been highlighted as a major source of uncertainty in the Pacific halibut assessment for decades and will continue to be of high priority until they are better understood. This assessment priority directly informs *6.1.3.1 Migration and Population Dynamics* as described below.

6.1.1.4 Stock Assessment fishery yield

6.1.1.4.1 Biological interactions with fishing gear

In 2020, 16% of the total fishing mortality of Pacific halibut was discarded (Stewart et al. 2021). Discard mortality rates can vary from less than 5% to 100% depending on the fishery, treatment of the catch and other factors (Leaman and Stewart 2017). A better understanding of the biological underpinnings for discard mortality could lead to increased precision in these estimates, avoiding potential bias in the stock assessment. Further, improved biological understanding of discard mortality mechanisms could allow for reductions in this source of fishing mortality, and thereby increased yield available to the fisheries. This assessment priority directly informs *6.1.3.4 Mortality and Survival Assessment* as described below.

6.1.1.4.2 Guidelines for reducing discard mortality

Much is already known about methods to reduce discard mortality, in non-directed fisheries as well as the directed commercial and recreational sectors. Promotion and adoption of best handling practices could reduce discard mortality, lead to greater retained yield, and reduce the potential uncertainty associated with large quantities of estimated mortality due to discarding. This assessment priority directly informs *6.1.3.4 Mortality and Survival Assessment* as described below.

Outside of the four general assessment categories, the IPHC has recently considered adding close-kin genetics (e.g., Bravington et al. 2016) to its ongoing research program (see section 6.1.3.1). Close-kin mark-recapture can potentially provide estimates of the absolute scale of the spawning output from the Pacific halibut population. This type of information can be fit directly into the stock assessment, and if estimated with a reasonable amount of precision, even a single data point could substantially reduce the uncertainty in the scale of total population estimates. Further, close-kin genetics may provide independent estimates of total mortality (and therefore natural mortality conditioned on catch-at-age), relative fecundity-at-age, and the spatial dynamics of spawning and recruitment. All of these quantities could substantially improve the structure of the current assessment and reduce uncertainty. Data collection of genetic samples from 100% of the sampled commercial landings has been in place since 2017 (as part of the sex-ratio monitoring) and from the FISS since 2021. The genetic analysis required to produce data allowing the estimation of reproductive output and other population parameters from close-kin mark-recapture modelling is both complex and expensive, and it could take several years for this project to get fully underway. This five-year plan should consider a pilot evaluation, such that a broader study could be undertaken in the future, providing the likely results would meet the Commission's objectives and prove possible given financial constraints. Research related to close-kin genetics would be pursued under *6.1.3.1 Migration and Population Dynamics* as described below.

6.1.2 Management Strategy Evaluation

MSE priorities have been subdivided into three categories: 1) biological parameterisation, 2) fishery parameterization, and 3) technical development. Research provides specifications for the MSE simulations, such as inputs to the Operating Model (OM), but another important outcome of the research is to define the range of plausibility to include in the MSE simulations as a measure of uncertainty. The following topics have been identified as top priorities.

6.1.2.1 MSE Biological and population parameterization

6.1.2.1.1 Distribution of life stages and stock connectivity

Research topics in this category will mainly inform parameterization of movement in the OM, but will also provide further understanding of Pacific halibut movement, connectivity, and the temporal variability. This

knowledge may also be used to refine specific MSE objectives to reflect reality and plausible outcomes. Research under Section 6.1.3.1 will inform this MSE priority.

This research includes examining larval and juvenile distribution which is a main source of uncertainty in the OM that is currently not fully incorporated. Outcomes will assist with conditioning the OM, verify patterns simulated from the OM, and provide information to develop reasonable sensitivity scenarios to test the robustness of MPs.

Also included in this number one priority is stock structure research, especially regarding IPHC Regulatory Area 4B. The dynamics of this IPHC Regulatory Area are not fully understood and it is useful to continue research on the connectivity of IPHC Regulatory Area 4B with other IPHC Regulatory Areas.

Finally, genomic analysis of population size is also included in this ranked category because that would help inform development of the OM as well as the biological sustainability objective related to maintaining a minimum spawning biomass in each IPHC Regulatory Area. An understanding of the spatial distribution of population size will help to inform this objective as well as the OM conditioning process.

6.1.2.1.2 Spatial spawning patterns and connectivity between spawning populations

An important parameter that can influence simulation outcomes is the distribution of recruitment across Biological Regions. Continued research in this area will improve the OM and provide justification for parameterising temporal variability. Research includes assigning individuals to spawning areas and establishing temporal and spatial spawning patterns. Outcomes may also provide information on recruitment strength and the relationship with environmental factors. For example, recent work by Sadorus et al (2020) used a biophysical and spatio-temporal models to examine connectivity across the Bering Sea and Gulf of Alaska. Furthermore, close-kin mark-recapture (Bravington et al. 2016) may provide insights into spatial relationships between juveniles and adults as well as abundance in specific regions. Research under Sections 6.1.3.1 and 6.1.3.2 will inform this MSE priority.

6.1.2.1.3 Understanding growth variation

Changes in the average weight-at-age of Pacific halibut is one of the major drivers of changes in biomass over time. The OM currently simulates temporal changes in weight-at-age via a random autocorrelated process which is unrelated to population size or environmental factors. Ongoing research in drivers related to growth in Pacific halibut will help to improve the simulation of weight-at-age. Research under Section 6.1.3.3 will inform this MSE priority.

6.1.2.1.4 MSE fishery parameterization

The specifications of fisheries and their parameterizations involved consultation with Pacific halibut stakeholders but some aspects of those parameterizations benefit from targeted research. One specific example is knowledge of discarding and discard mortality rates in directed and non-directed fisheries. Discard mortality can be a significant source of fishing mortality in some IPHC Regulatory Areas and appropriately modelling that mortality will provide a more robust evaluation of MPs. Research under Sections 6.1.3.4 and 6.1.3.5 will inform this MSE priority.

6.1.2.2 MSE technical development

Technical improvements to the MSE framework will allow for rapid development of alternative operating models and efficient simulation of management strategies for future evaluation. Coordination with the technical development of the stock assessment (Section 6.1.1.2.1) is necessary to ensure consistent assumptions and hypotheses for tactical (i.e. stock assessment) and strategic (i.e. MSE) models. Investigations done in the stock

assessment will inform the stock assessment, which will then be informed by investigations using the closed-loop simulation framework. Multi-year assessments may allow for additional opportunity to coordinate between stock assessment and MSE.

6.1.2.2.1 Alternative migration scenarios

Including alternative migration hypotheses in the MSE simulations will assist in identifying management procedures that are robust to this uncertainty. This exploration will draw on general research on the movement and migration of Pacific halibut, observations from FISS and fisheries data, and outcomes of the stock assessment. Identification of reasonable hypotheses for the movement of Pacific halibut is essential to the robust investigation of management procedures. Research under Section 6.1.3.1 will inform this MSE priority.

6.1.2.2.2 Realistic simulations of estimation error

Closed loop simulation uses feedback from the management procedure to update the population in the projections. The management procedure consists of data collection, an estimation model, and harvest rules; currently IPHC uses a stock assessment as the estimation model. Future development of an efficient simulation process to mimic the stock assessment will more realistically represent the current management process. This involves using multiple estimation models to represent the ensemble and appropriately adding data and updating those models in the simulated projections. Improvements to the current MSE framework include adding additional estimation models to better represent the ensemble stock assessment, ensuring that the simulated estimation accurately represent the stock assessment now and, in the future, and speeding up the simulation process.

6.1.2.2.3 Incorporate additional sources of implementation uncertainty

Implementation uncertainty consists of three subcategories: 1) decision-making uncertainty, 2) realized uncertainty, and 3) perceived uncertainty. Decision-making uncertainty is the difference between mortality limits determined from the management procedure and those adopted by the Commission. This uncertainty is currently not implemented in the MSE framework but has been requested by the SRB and the independent peer review of the MSE. Realized uncertainty is the difference between the mortality limit set by the Commission and the actual mortality realized by the various fisheries. This type of uncertainty is currently partially implemented in the MSE framework. Finally, perceived uncertainty is the difference between the realized mortality and the estimated mortality limits from the various fisheries, which would be used in the estimation model. This third type of implementation uncertainty has not been implemented in the MSE framework. Implementing decision-making uncertainty is a priority for the MSE and will assist in understanding the performance of management procedures when they may not be followed exactly.

6.1.2.3 MSE Program of Work for 2021–2023

Following the 11th Special Session of the IPHC, an MSE program of work for 2021–2023 was developed. Seven tasks were identified that pertained to further developments of the MSE framework, evaluation of alternative MPs, and improvements in evaluation and presentation of results. Table 1 lists these tasks and provides a brief description. Additional details can be found in the program of work available on the MSE webpage.

Table 1. Tasks recommended by the Commission at SS011 (IPHC-2021-SS011-R para 7) for inclusion in the IPHC Secretariat MSE Program of Work for 2021–23.

ID	Category	Task	Deliverable
F.1	Framework	Develop migration scenarios	Develop OMs with alternative migration scenarios
F.2	Framework	Implementation variability	Incorporate additional sources of implementation variability in the framework
F.3	Framework	Develop more realistic simulations of estimation error	Improve the estimation model to more adequately mimic the ensemble stock assessment
F.5	Framework	Develop alternative OMs	Code alternative OMs in addition to the one already under evaluation.
M.1	MPs	Size limits	Identification, evaluation of size limits
M.3	MPs	Multi-year assessments	Evaluation of multi-year assessments
E.3	Evaluation	Presentation of results	Develop methods and outputs that are useful for presenting outcomes to stakeholders and Commissioners

6.1.2.4 Potential Future MSE projects

Management Strategy Evaluation is an iterative process where new management procedures may be evaluated, current management procedures may be re-evaluated under different assumptions, and the understanding of the population, environment, and fisheries may be updated with new information stemming from the stock assessment and biological/ecological research. The current Program of Work (Table 1) focuses on two elements of Management Procedures, but in the future other elements may be of interest, such as distribution procedures. The research being done now will inform the development of the MSE in the future to ensure a robust evaluation of any management procedure.

6.1.3 Biology and Ecology

Capitalizing on the outcomes of the previous 5-year plan (IPHC–2019–BESRP-5YP) (Appendix I), the IPHC Secretariat has identified five research areas that will provide key inputs for stock assessment and the MSE process. In addition to linking genetics and genomics with migration and distribution studies in the newly coined area of Migration and Population Dynamics, the IPHC Secretariat has incorporated a novel research area on Fishing Technology. A series of key objectives for each the five research areas have been identified.

6.1.3.1 Migration and Population Dynamics

Genetic and genomic studies aimed at improving current knowledge of Pacific halibut migration and population dynamics throughout all life stages in order to achieve a complete understanding of stock structure and distribution across the entire distribution range of Pacific halibut in the North Pacific Ocean and the biotic and abiotic factors that influence it (specifically excluding satellite tagging). Specific objectives in this area include:

- Improve current knowledge of the genetic structure of the Pacific halibut population through the use of state-of-the-art low-coverage whole genome resequencing approaches. Establishment of genetic signatures of spawning sites.
- Improve our understanding of the mechanisms and magnitude of larval connectivity in the North Pacific

Ocean. Identification of environmental and biological predictors of larval abundance and recruitment.

- Improve our understanding of spawning site contributions to nursery/settlement areas in relation to year-class, recruit survival and strength, and environmental conditions in the North Pacific Ocean. Measure of genetic diversity of Pacific halibut juveniles from the eastern Bering Sea and the Gulf of Alaska.
- Improve our understanding of the relationship between nursery/settlement origin and adult distribution and abundance over temporal and spatial scales. Genomic assignment of individuals to source populations and assessment of distribution changes.
- Integrate analyses of Pacific halibut connectivity and distribution changes by incorporating genomic approaches.
- Improve estimates of population size, migration rates among geographical regions, and demographic parameters (e.g. fecundity-at-age, survival rate), through the application of close-kin mark-recapture-based approaches.
- Improve our understanding of the influences of oceanographic and environmental variation on connectivity, population structure and adaptation at a genomic level using seascape genomics approaches.
- Exploration and development of alternative methods for aging Pacific halibut based on genetic analyses of DNA methylation patterns in tissues (fin clips).
- Exploration of methods for individual identification based on computer-assisted tail image matching systems as an alternative for traditional mark and recapture tagging.

6.1.3.2 Reproduction

Studies aimed primarily at addressing two critical issues for stock assessment analysis based on estimates of female spawning biomass: 1) the sex ratio of the commercial catch and 2) maturity estimations. Specific objectives in this area include:

- Continued improvement of genetic methods for accurate sex identification of commercial landings from fin clips and otoliths in order to incorporate recent and historical sex-at-age information into the stock assessment process.
- Improve our understanding of the temporal progression of reproductive development and gamete production during an entire annual reproductive cycle in female and male Pacific halibut.
- Update current maturity-at-age estimates.
- Provide estimates of fecundity-at-age and fecundity-at-size.
- Investigate the possible presence of skip spawning in Pacific halibut females.
- Improve accuracy in current staging criteria of maturity status used in the field.
- Investigate possible environmental effects on the ontogenetic establishment of the phenotypic sex and their influence on sex ratios in the adult Pacific halibut population.
- Improve our understanding of potential temporal and spatial changes in maturity schedules and spawning patterns in female Pacific halibut and possible environmental influences.
- Improve our understanding of the genetic basis of variation in age and/or size-at-maturity, fecundity, and spawning timing, by conducting genome-wide association studies.

6.1.3.3 Growth

Studies aimed at describing the role of factors responsible for the observed changes in size-at-age and at evaluating growth and physiological condition in Pacific halibut. Specific objectives in this area include:

- Evaluate possible variation in somatic growth patterns in Pacific halibut as informed by physiological growth markers, physiological condition, energy content and dietary influences.
- Investigate the effects of environmental and ecological conditions that may influence somatic growth in Pacific halibut. Evaluate the relationship between somatic growth and temperature and trophic histories in Pacific halibut through the integrated use of physiological growth markers.
- Improve our understanding of the genetic basis of variation in somatic growth and size-at-age by conducting genome-wide association studies.

6.1.3.4 Mortality and Survival Assessment

Studies aimed at providing updated estimates of discard mortality rates (DMRs) for Pacific halibut in the guided recreational fisheries and at evaluating methods for reducing mortality of Pacific halibut. Specific objectives in this area include:

- Provide information on the types of fishing gear and fish handling practices used in the Pacific halibut recreational (charter) fishery as well as on the number and size composition of discarded Pacific halibut in this fishery.
- Establish best handling practices for reducing discard mortality of Pacific halibut in recreational fisheries.
- Investigate new methods for improved estimation of depredation mortality from marine mammals.

6.1.3.5 Fishing Technology

Studies aimed at developing methods that involve modifications of fishing gear with the purpose of reducing Pacific halibut depredation and bycatch. Specific objectives in this area include:

- Investigate new methods for whale avoidance and/or deterrence for the reduction of Pacific halibut depredation by whales (e.g. catch protection methods).
- Investigate physiological and behavioral responses of Pacific halibut to fishing gear in order to reduce bycatch.

6.2 Monitoring

The Commission's extensive monitoring programs include both direct data collection and coordination with domestic agencies to produce both fishery-dependent and fishery-independent information on the stock and fishery trends, and other information. These critical sources include estimates of fishing mortality from all fisheries encountering Pacific halibut, biological sampling from these fisheries as well as catch-rates and biological sampling from longline and trawl surveys. Monitoring data provide the basis for stock assessment and MSE analysis, many biological research studies, and some inputs directly to the decision-making process (Figure 4). While not the primary focus of this 5-year plan, a basic summary of the components led by the IPHC and those that are provided by domestic agencies is provided below.

6.2.1 Fishery-dependent data

Data collection and monitoring activities aimed at providing standardised time-series of mortality, fishery, and biological data from both direct target fisheries as well as fisheries that incidentally catch Pacific halibut. Directed commercial fisheries data are managed by IPHC. Non-directed commercial discard mortality data, subsistence

fisheries data, and recreational fisheries data are managed by Contracting Party domestic agencies.

6.2.1.1 Directed commercial fisheries data

6.2.1.2 Annually review the spatial distribution of sampling effort among ports, data collection methods, sampling rates, and quality assurance/quality control (QAQC) processes, including in-season review of port sampling activities

Ensure current data collection efforts meet current and future needs of stock assessment, MSE and management. Collaborate and coordinate with other Secretariat functions to develop methods and procedures for incorporating promising research results into long-term monitoring program. The IPHC relies on domestic and Tribal agency programs to report annual mortality from incidental catches in non-directed commercial fisheries, catches from subsistence fisheries, and catches from recreational fisheries. Non-directed commercial discard mortality data

Annually collaborate with observer programs and other partners to ensure robust data collection and sampling, QAQC processes, and reporting of incidental catch and mortality, as well as biological sampling.

6.2.1.3 Subsistence fisheries data

Annually collaborate with Tribal, State and Federal agencies of each Contracting Party to ensure high quality data collection, sampling, and reporting in the subsistence fisheries in Canada and the United States of America.

6.2.1.4 Recreational fisheries data

Annually collaborate with National/State agencies of each Contracting Party to ensure and validate high quality data and reporting of recreational fishery mortality estimates and biological data.

6.2.2 Fishery-independent data

Data collection and monitoring activities aimed at providing a standardised time-series of biological and ecological data that is independent of the fishing fleet.

6.2.2.1 Fishery-independent setline survey (FISS)

An annual review process for the FISS station design has been developed (Fig. 9) and is expected to continue in coming years. This process involves scientific review of proposed FISS designs by the Scientific Review Board and includes input from stakeholders prior to review and approval of designs by the Commissioners.

Direct weighing of Pacific halibut has been integrated into the annual FISS sampling since 2019 and will continue into the future to ensure accurate estimation of WPUE and other weight-derived quantities. Sample rates for genetic monitoring will need to be determined for future sampling. Sampling rates of otoliths for aging, archive otoliths and tagged fish will continue to be reviewed annually to ensure the data needs of the IPHC stock assessment and research program are met. Annual FISS sampler training and data QAQC (including at point of data collection and during post-sampling review) will ensure high quality data from the FISS program. Procedures are reviewed annually.

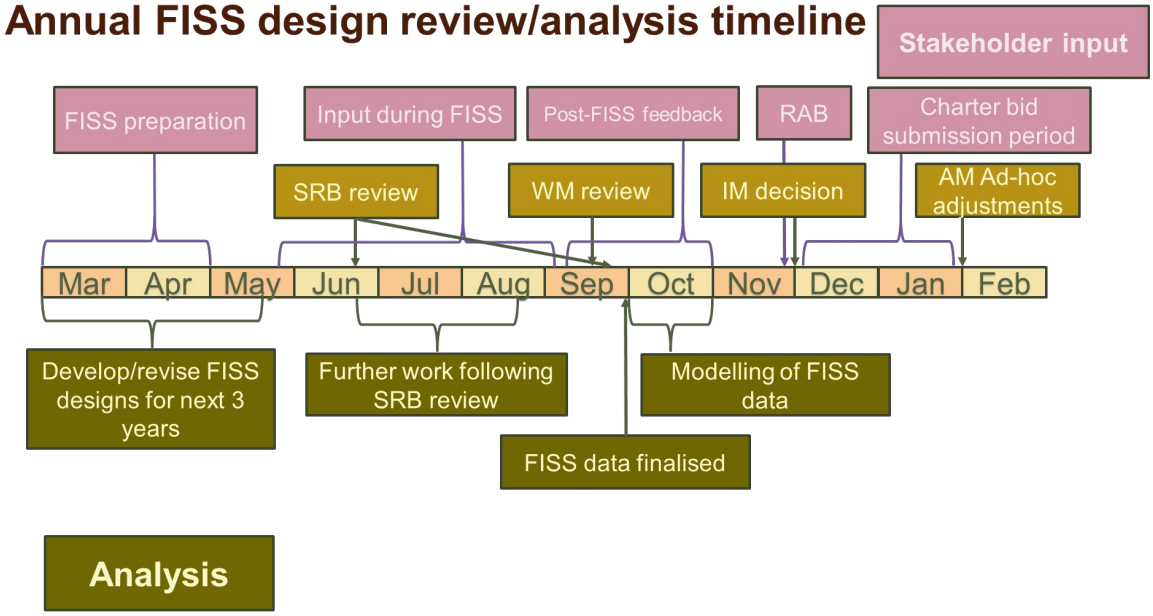


Figure 9. Timeline of annual FISS design review process.

6.2.2.2 Fishery-independent Trawl Survey (FITS)

The IPHC will continue to collaborate with NMFS on sampling procedures for Pacific halibut on the placement of an IPHC sampler onboard a survey vessel for the collection of biological data.

6.3 Potential of integrating human dynamics into management decision-making

Understanding the complexity of human dimension of the fisheries sectors is becoming increasingly important in the context of globalization. Local products compete on the market with a large variety of imported seafood. High exposure to international markets makes seafood accessibility fragile to perturbations, as shown by the COVID-19 pandemic (OECD 2020). Seafood production is also highly dependent on the production and price of imports. The IPHC's socioeconomic study showed that Pacific halibut contribution to households' income dropped by a quarter throughout the pandemic. While signs of strong recovery were present in 2021 (Fry 2021), the study called attention to Pacific halibut sectors' exposure to external factors beyond stock condition and the need for expanding the scope of management-supporting information the IPHC provides.

It is also unclear how small remote communities can capitalize on the high prices that the final customers are paying for premium seafood products. In 2021, fresh Alaskan Pacific halibut fillets routinely sold for USD 24-28 a pound, and often more, in downtown Seattle (e.g. USD 38 at Pike Place Market). Pacific halibut dishes at the restaurants typically sell for USD 37-43 for a dish including a 6oz fish portion. The IPHC's socioeconomic study detailed the geography of impacts of the Pacific halibut fisheries, providing a coherent picture of the exposure of fisheries-dependent households by location to changes in resource availability, but paying closer attention to quantifying leakage of economic benefits from communities strongly involved in fisheries, highlighted that the local earnings often do not align with how much fishing occurs within the community. This suggests the need for research focused on how to operationalize social equity in the context of the globalized market dynamics and the pursuit of stock sustainability.

In addition, fisheries are at the forefront of exposure to the accelerating impacts of climate change. For example, a rapid increase in water temperature off the coast of Alaska in 2014-16, termed *the blob*, affected fisheries (Cheung and Frölicher 2020) and may have a long-term impact on Pacific halibut distribution. The consequences

may include shifts in the distribution of benefits, but possibly go further, affecting the stability of agreements over allocation of a shared resource. Research on decision quality under fast-progressing climate-induced changes to stock distribution may be warranted.

Conflicting objectives among stakeholders regarding the use of limited resource in the context of globalization, calls for social equity and climate change are a major challenge of decision-making in fisheries management. Integrating approaches aimed at understanding the human dynamics and external factors with stock assessment and MSE can assist fisheries in bridging the gap between the current and the optimal performance without compromising the stock biological sustainability. For example, socioeconomic performance metrics presented alongside already developed biological/ecological performance metrics would supplement IPHC's portfolio of tools for assessing policy-oriented issues (as requested by the Commission, IPHC-2021-AM097-R, AM097-Req.02) and support decision-making. Moreover, continuing investment in understanding the human dimension of Pacific halibut fishing can also inform on other drivers such as human behavior or human organization that affect the dynamics of fisheries, and thus contribute to improved accuracy of the stock assessment and the MSE (Lynch et al.2018). As such, it can contribute to research integration at the IPHC and provide a complementary resource for the development of harvest control rules.

Lastly, Pacific halibut value is also in its contribution to the diet through subsistence fisheries and importance to the traditional users of the resource. To native people, traditional fisheries constitute a vital aspect of local identity and a major factor in cohesion. One can also consider the Pacific halibut's existence value as an iconic fish of the Pacific Northwest. Recognizing and adopting such an all-encompassing definition of the Pacific halibut resource contribution, the IPHC echoes a broader call to include the human dimension into the research on the impact of management decisions, as well as changes in environmental or stock conditions.

7. Amendment

The intention is to ensure the plan is kept as a '*living plan'*, that is reviewed and updated annually based on the resources available to undertake the work of the Commission (e.g. internal and external fiscal resources, collaborations, internal expertise). The IPHC Secretariat is committed to ensuring an exceptional level of transparency and commitment to the principles of open science.

8. References

Bravington, M.V., Skaug, H.J., and Anderson, E.C. 2016. Close-Kin Mark-Recapture. Statistical Science 31(2): 259-274. doi:10.1214/16-sts552.

Cheung, William W.L., and Thomas L. Frölicher. 2020. "Marine Heatwaves Exacerbate Climate Change Impacts for Fisheries in the Northeast Pacific." Scientific Reports 10 (1): 1–10. https://doi.org/10.1038/s41598-020-63650-z.

Clark, W.G., Hare, S.R., Parma, A.M., Sullivan, P.J., and Trumble, R.J. 1999. Decadal changes in growth and recruitment of Pacific halibut (*Hippoglossus stenolepis*). Canadian Journal of Fisheries and Aquatic Sciences 56: 242-252.

Drinan, D.P., Galindo, H.M., Loher, T., and Hauser, L. 2016. Subtle genetic population structure in Pacific halibut Hippoglossus stenolepis. J Fish Biol 89(6): 2571-2594. doi:10.1111/jfb.13148.

Francis, R.I.C.C. 2011. Data weighting in statistical fisheries stock assessment models. Canadian Journal of Fisheries and Aquatic Sciences 68: 1124-1138.

Fry, Cristy. 2021. "Seawatch : Halibut Prices Soaring." Homer News, 2021. https://www.homernews.com/business/seawatch-halibut-prices-soaring/.

Lane, Daniel E, and R L Stephenson. 1995. "Fisheries Management Science: The Framework to Link Biological, Economic, and Social Objectives in Fisheries Management." Aquatic Living Resources 8 (3): 215–21.

Leaman, B.M., and Stewart, I.J. 2017. 2.12 Research basis for estimated discard mortality rates used for Pacific halibut in longline and trawl fisheries. IPHC Report of Assessment and Research Activities 2016: 133-172.

Lynch, Patrick D, Richard D Methot, and Jason S Link. 2018. "Implementing a Next Generation Stock Assessment Enterprise: Policymakers' Summary." NOAA Technical Memorandum NMFS-F/SPO-183.

OECD. 2020. "Fisheries, Aquaculture and COVID-19: Issues and Policy Responses." Tackling Coronavirus (Covid-19).

Mantua, N.J., Hare, S.R., Zhang, Y., Wallace, J.R., and Francis, R.C. 1997. A Pacific interdecadal climate oscillation with impacts on salmon production. Bulletin of the American Meteorological Society 78(6): 1069-1079.

Sadorus, Lauri L., Esther D. Goldstein, Raymond A. Webster, William T. Stockhausen, Josep V. Planas, and Janet T. Duffy-Anderson. 2020. "Multiple life-stage connectivity of Pacific halibut (*Hippoglossus stenolepis*) across the Bering Sea and Gulf of Alaska." Fisheries Oceanography 30 (2): 174-193. https://doi.org/10.1111/fog.12512

Stewart, I., and Webster, R. 2022. Overview of data sources for the Pacific halibut stock assessment, harvest policy, and related analyses. IPHC-2022-SA-02. 56 p.

Stewart, I., Hicks, A., Webster, R., and Wilson, D. 2021. Stock assessment: Summary of the data, stock assessment, and harvest decision table for Pacific halibut (Hippoglossus stenolepis) at the end of 2020. IPHC-2021-AM097-08. 19 p.

Webster, R.A., Clark, W.G., Leaman, B.M., and Forsberg, J.E. 2013. Pacific halibut on the move: a renewed understanding of adult migration from a coastwide tagging study. Canadian Journal of Fisheries and Aquatic Sciences 70(4): 642-653. doi:10.1139/cjfas-2012-0371.

ACKNOWLEDGEMENTS

This document was developed by Dr. David Wilson, Dr. Josep Planas, Dr. Ian Stewart, Dr. Allan Hicks, Dr. Ray Webster, Dr. Basia Hutniczak, Dr Jason Jannot, in collaboration with other current members of the IPHC Secretariat.

APPENDICES

Appendix I: Outcomes of the IPHC 5-Year Biological and Ecosystem Science Research Plan (2017-21)

Appendix II: Proposed schedule of outputs

Appendix III: Proposed schedule with funding and staffing indicators

APPENDIX I

Outcomes of the IPHC 5-Year Biological and Ecosystem Science Research Plan (2017-21) (IPHC–2019–BESRP-5YP)

A. Outcomes by Research Area:

1. Migration and Distribution.

1.1. Larval and juvenile connectivity and early life history studies. Planned research outcomes: improved understanding of larval and juvenile distribution.

Main results:

- Larval connectivity between the Gulf of Alaska and the Bering Sea occurs through large island passes across the Aleutian Island chain.
- The degree of larval connectivity between the Gulf of Alaska and the Bering Sea is influenced by spawning location.
- Spawning locations in the western Gulf of Alaska significantly contribute Pacific halibut larvae to the Bering Sea.
- Pacific halibut juveniles counter-migrate from inshore settlement areas in the eastern Bering Sea into the Gulf of Alaska through Unimak Pass.
- Elemental signatures of otoliths from juvenile Pacific halibut vary geographically at a scale equivalent to IPHC regulatory areas.

Publications:

Sadorus, L.; Goldstein, E.; Webster, R.; Stockhausen, W.; Planas, J.V.; Duffy-Anderson, J. Multiple life-stage connectivity of Pacific halibut (*Hippoglossus stenolepis*) across the Bering Sea and Gulf of Alaska. *Fisheries Oceanography*. 2021. 30:174-193. doi: https://doi.org/10.1111/fog.12512.

Loher, T., Bath, G. E., Wischniowsky, S. The potential utility of otolith microchemistry as an indicator of nursery origins in Pacific halibut (*Hippoglossus stenolepis*) in the eastern Pacific: the importance of scale and geographic trending. *Fisheries Research*. 2021. 243: 106072. https://doi.org/10.1016/j.fishres.2021.106072.

Links to 5-Year Research Plan (2022-2026):

- Evaluate the level of genetic diversity among juvenile Pacific halibut in the Gulf of Alaska and the Bering sea due to admixture.
- Assignment of individual juvenile Pacific halibut to source populations.

Integration with Stock Assessment and MSE: The relevance of research outcomes from activities in this research area for stock assessment is in the improvement of estimates of productivity. Research outcomes will be used to generate potential recruitment covariates and to inform minimum spawning biomass targets by Biological Region and represent one of the top three biological inputs into stock assessment. The relevance of these research outcomes for MSE is in the improvement of the parametrization of the Operating Model and represent the top ranked biological input into the MSE.

2. Reproduction.

2.1 Sex ratio of commercial landings. Planned research outcomes: sex ratio information.

Main results:

- Establishment of TaqMan-based genetic assays for genotyping Pacific halibut in the IPHC Biological Laboratory.
- Sex ratio information for the 2017-2020 commercial landings.
- Transfer of genotyping efforts for sex identification to IPHC monitoring program.

Links to 5-Year Research Plan (2022-2026):

- Monitoring effort.

2.2 Histological maturity assessment. Planned research outcomes: updated maturity schedule.

Main results:

- Oocyte developmental stages have been characterized and fully described in female Pacific halibut for the first time.
- Oocyte developmental stages have been used for the classification of female developmental stages and to be able to characterize female Pacific halibut as group synchronous with determinate fecundity.
- Female developmental stages have been used for the classification of female reproductive phases and to be able to characterize female Pacific halibut as following an annual reproductive cycle with spawning in January and February.
- Female developmental stages and reproductive phases of females collected in the central Gulf of Alaska have been used to identify the month of August as the time of the transition between the Vtg2 and Vtg3 developmental stages marking the beginning of the spawning capable reproductive phase.
- Future gonad collections for revising maturity schedules and estimating fecundity can be conducted in August during the FISS.

Publications:

Fish, T., Wolf, N., Harris, B.P., Planas, J.V. A comprehensive description of oocyte developmental stages in Pacific halibut, *Hippoglossus stenolepis*. *Journal of Fish Biology* 2020. 97: 1880-1885. doi: 10.1111/jfb.14551.

Fish, T., Wolf, N., Smeltz, T. S., Harris, B. P., and Planas, J. V. Reproductive Biology of Female Pacific Halibut (*Hippoglossus stenolepis*) in the Gulf of Alaska. *Frontiers in Marine Science* 2022. 9:801759. doi: 10.3389/fmars.2022.801759.

Links to 5-Year Research Plan (2022-2026):

- Revision of maturity schedule by gonad collection during the FISS, as informed by previous studies on reproductive development.

- Estimation of fecundity by age and size, as informed by previous studies demonstrating determinate fecundity.

Integration with Stock Assessment and MSE: Research activities in this Research Area aim at providing information on key biological processes related to reproduction in Pacific halibut (maturity and fecundity) and to provide sex ratio information of Pacific halibut commercial landings. The relevance of research outcomes from these activities for stock assessment is in the scaling of Pacific halibut biomass and in the estimation of reference points and fishing intensity. These research outputs will result in a revision of current maturity schedules and will be included as inputs into the stock assessment and represent the most important biological inputs for stock assessment. The relevance of these research outcomes for MSE is in the improvement of the simulation of spawning biomass in the Operating Model.

3. Growth.

3.1 Identification of physiological growth markers and their application for growth pattern evaluation. Planned research outcomes: informative physiological growth markers.

Main results:

- Transcriptomic profiling by RNAseq of white skeletal muscle from juvenile Pacific halibut subjected to growth suppression and to growth stimulation resulted in the identification of a number of genes that change their expression levels in response to growth manipulations.
- Proteomic profiling by LC-MS/MS of white skeletal muscle from juvenile Pacific halibut subjected to growth suppression and to growth stimulation resulted in the identification of a number of proteins that change their abundance in response to growth manipulations.
- Genes and proteins that changed their expression levels in accordance to changes in the growth rate in juvenile Pacific halibut were selected as putative growth markers for future studies on growth pattern evaluation.

Publications:

Planas et al. 2022. In Preparation.

Links to 5-Year Research Plan (2022-2026):

- Application of identified growth markers in studies aiming at investigating environmental influences on growth patterns and at investigating dietary influences on growth patterns and physiological condition.

3.2 Environmental influences on growth patterns. Planned research outcomes: information on growth responses to temperature variation.

Main results:

- Laboratory experiments under controlled temperature conditions have shown that temperature affects the growth rate of juvenile Pacific halibut through changes in the expression of genes that regulate growth processes.

Publications:

Planas et al. 2022. In Preparation.

Links to 5-Year Research Plan (2022-2026):

- Identification of temperature-specific responses in skeletal muscle through comparison between transcriptomic responses to temperature-induced growth changes and to density- and stress-induced growth changes.
- Application of growth markers for additional studies investigating the link between environmental variability and growth patterns and the effects of diet (prey quality and abundance) on growth and physiological condition.

Integration with Stock Assessment and MSE: Research activities conducted in this Research Area aim at providing information on somatic growth processes driving size-at-age in Pacific halibut. The relevance of research outcomes from these activities for stock assessment resides, first, in their ability to inform yield-per-recruit and other spatial evaluations for productivity that support mortality limit-setting, and second, in that they may provide covariates for projecting short-term size-at-age and may help delineate between fishery and environmental effects, thereby informing appropriate management responses. The relevance of these research outcomes for MSE is in the improvement of the simulation of variability and to allow for scenarios investigating climate change.

4. Mortality and Survival Assessment.

4.1 Discard mortality rate estimation in the longline Pacific halibut fishery. Planned research outcomes: experimentally-derived DMR.

Main results:

- Different hook release methods used in the longline fishery result in specific injury profiles and viability classification.
- Plasma lactate levels are high in Pacific halibut with the lowest viability classification.
- Mortality of discarded fish with the highest viability classification is estimated to be between 4.2 and 8.4%.

Publications:

Kroska, A.C., Wolf, N., Planas, J.V., Baker, M.R., Smeltz, T.S., Harris, B.P. Controlled experiments to explore the use of a multi-tissue approach to characterizing stress in wild-caught Pacific halibut (*Hippoglossus stenolepis*). *Conservation Physiology* 2021. 9(1):coab001; doi:10.1093/conphys/coab001.

Loher, T., Dykstra, C.L., Hicks, A., Stewart, I.J., Wolf, N., Harris, B.P., Planas, J.V. Estimation of postrelease longline mortality in Pacific halibut using acceleration-logging tags. *North American Journal of Fisheries Management*. 2022. 42: 37-49. DOI: https://doi.org/10.1002/nafm.10711.

Links to 5-Year Research Plan (2022-2026):

- Integration of information on capture and handling conditions, injury and viability assessment and physiological condition will lead to establishing a set of best handling practices in the longline fishery.

4.2 Discard mortality rate estimation in the guided recreational Pacific halibut fishery. Planned research outcomes: experimentally-derived DMR.

Main results:

- Field experiments testing two different types of gear types (i.e. 12/0 and 16/0 circle hooks) resulted in the capture, sampling and tagging of 243 Pacific halibut in IPHC Regulatory Area 2C (Sitka, AK) and 118 in IPHC Regulatory Area 3A (Seward, AK).
- The distributions of fish lengths by regulatory area and by hook size were similar.

Links to 5-Year Research Plan (2022-2026):

- Estimation of discard mortality rate in the guided recreational fishery.
- Integration of information on capture and handling conditions, injury and viability assessment and physiological condition linked to survival.
- Establishment of a set of best handling practices in the guided recreational fishery.

Integration with Stock Assessment and MSE: The relevance of research outcomes from these activities for stock assessment resides in their ability to improve trends in unobserved mortality in order to improve estimates of stock productivity and represent the most important inputs in fishery yield for stock assessment. The relevance of these research outcomes for MSE is in fishery parametrization

5. Genetics and genomics.

5.1 Generation of genomic resources for Pacific halibut. Planned research outcomes: sequenced genome and reference transcriptome.

Main results:

- A first draft of the chromosome-level assembly of the Pacific halibut genome has been generated.
- The Pacific halibut genome has a size of 602 Mb and contains 24 chromosome-size scaffolds covering 99.8% of the complete assembly with a N50 scaffold length of 27 Mb at a coverage of 91x.
- The Pacific halibut genome has been annotated by NCBI and is available as NCBI Hippoglossus stenolepis Annotation Release 101 (https://www.ncbi.nlm.nih.gov/assembly/GCA_022539355.2/).
- Transcriptome (i.e. RNA) sequencing has been conducted in twelve tissues in Pacific halibut and the raw sequence data have been deposited in NCBI's Sequence Read Archive (SRA) under the bioproject number PRJNA634339 (https://www.ncbi.nlm.nih.gov/bioproject/PRJNA634339) and with SRA accession numbers SAMN14989915 - SAMN14989926.

Publications:

Jasonowicz, A.C., Simeon, A., Zahm, M., Cabau, C., Klopp, C., Roques, C., Iampietro, C., Lluch, J., Donnadieu, C., Parrinello, H., Drinan, D.P., Hauser, L., Guiguen, Y., Planas, J.V. Generation of a chromosome-level genome assembly for Pacific halibut (*Hippoglossus stenolepis*) and characterization of its sex-determining genomic region. *Molecular Ecology Resources. 2022. In Press*. doi: https://doi.org/10.1111/1755-0998.13641.

Jasonowicz et al. 2022. In Preparation.

Links to 5-Year Research Plan (2022-2026):

- Genome-wide analysis of stock structure and composition.

5.2 Determine the genetic structure of the Pacific halibut population in the Convention Area. Planned research outcomes: genetic population structure.

Main results:

- The collection of winter genetic samples in the Aleutian Islands completed the winter sample collection needed to conduct studies on the genetic population structure of Pacific halibut in the Convention Area.
- Initial results of low coverage whole genome resequencing of winter samples indicate that an average of 26.5 million raw sequencing reads per obtained per sample that provided average individual genomic coverages for quality filtered alignments of 3.2x.

Links to 5-Year Research Plan (2022-2026):

- Fine-scale delineation of population structure, with particular emphasis on IPHC Regulatory 4B structure.

Integration with Stock Assessment and MSE: The relevance of research outcomes from these activities for stock assessment resides in the introduction of possible changes in the structure of future stock assessments, as separate assessments may be constructed if functionally isolated components of the population are found (e.g. IPHC Regulatory Area 4B), and in the improvement of productivity estimates, as this information may be used to define management targets for minimum spawning biomass by Biological Region. These research outcomes provide the second and third top ranked biological inputs into stock assessment. Furthermore, the relevance of these research outcomes for MSE is in biological parametization and validation of movement estimates and of recruitment distribution.

B. List of ranked biological uncertainties and parameters for stock assessment (SA) and their links to research areas and activities contemplated in the IPHC 5-Year Biological and Ecosystem Science Research Plan (2017-21)

SA Rank	Research outcomes	Relevance for stock assessment	Specific analysis input	Research Area	Research activities
1. Biological input	Updated maturity schedule	Scale biomass and reference point estimates	Will be included in the stock assessment, replacing the current schedule last updated in 2006	Reproduction	Histological maturity assessment
	Incidence of skip spawning		Will be used to adjust the asymptote of the maturity schedule, if/when a time-series is available this will be used as a direct input to the stock assessment		Examination of potential skip spawning
	Fecundity-at-age and -size information		Will be used to move from spawning biomass to egg-output as the metric of reproductive capability in the stock assessment and management reference points		Fecundity assessment
	Revised field maturity classification		Revised time-series of historical (and future) maturity for input to the stock assessment		Examination of accuracy of current field macroscopic maturity classification
2. Biological input	Stock structure of IPHC Regulatory Area 4B relative to the rest of the Convention Area	Altered structure of future stock assessments	If 4B is found to be functionally isolated, a separate assessment may be constructed for that IPHC Regulatory Area	Genetics and Genomics	Population structure
3. Biological input	Assignment of individuals to source populations and assessment of distribution changes	Improve estimates of productivity	Will be used to define management targets for minimum spawning biomass by Biological Region		Distribution
	Improved understanding of larval and juvenile distribution		Will be used to generate potential recruitment covariates and to inform minimum spawning biomass targets by Biological Region	Migration	Larval and juvenile connectivity studies
1. Assessment data collection and processing	Sex ratio-at-age	Scale biomass and fishing intensity	Annual sex-ratio at age for the commercial fishery fit by the stock assessment	Reproduction	Sex ratio of current commercial landings
	Historical sex ratio-at-age		Annual sex-ratio at age for the commercial fishery fit by the stock assessment		Historical sex ratios based on archived otolith DNA analyses
2. Assessment data collection and processing	New tools for fishery avoidance/deterence; improved estimation of depredation mortality	Improve mortality accounting	May reduce depredation mortality, thereby increasing available yield for directed fisheries. May also be included as another explicit source of mortality in the stock assessment and mortality limit setting process depending on the estimated magnitude	Mortality and survival assessment	Whale depredation accounting and tools for avoidance
1. Fishery yield	Physiological and behavioral responses to fishing gear	Reduce incidental mortality	May increase yield available to directed fisheries	Mortality and survival assessment	Biological interactions with fishing gear
2. Fishery yield	Guidelines for reducing discard mortality	Improve estimates of unobserved mortality	May reduce discard mortality, thereby increasing available yield for directed fisheries	Mortality and survival assessment	Best handling practices: recreational fishery

C. List of ranked biological uncertainties and parameters for management strategy evaluation (MSE) and their links to research areas and activities contemplated in the IPHC 5-Year Biological and Ecosystem Science Research Plan (2017-21)

MSE Rank	Research outcomes	Relevance for MSE	Research Area	Research activities
1. Biological parameterization and validation of movement estimates	Improved understanding of larval and juvenile distribution	Improve parametization of the Operating Model	Migration	Larval and juvenile connectivity studies
	Stock structure of IPHC Regulatory Area 4B relative to the rest of the Convention Area		Genetics and Genomics	Population structure
2. Biological parameterization and validation of recruitment variability and distribution	Assignment of individuals to source populations and assessment of distribution changes	Improve simulation of recruitment variability and parametization of recruitment distribution in the Operating Model		Distribution
	Establishment of temporal and spatial maturity and spawning patterns	Improve simulation of recruitment variability and parametization of recruitment distribution in the Operating Model	Reproduction	Recruitment strength and variability
3. Biological parameterization and validation for growth projections	Identification and application of markers for growth pattern evaluation	Improve simulation of variability and allow for scenarios investigating climate change	Growth	Evaluation of somatic growth variation as a driver for changes in size-at-age
	Environmental influences on growth patterns			
	Dietary influences on growth patterns and physiological condition			
1. Fishery parameterization	Experimentally-derived DMRs	Improve estimates of stock productivity	Mortality and survival assessment	Discard mortality rate estimate: recreational fishery

D. External funding received during the IPHC 5-Year Biological and Ecosystem Science Research Plan (2017-21):

Project #	Grant agency	Project name	PI	Partners	IPHC Budget ($US)	Management implications	Grant period
1	**Saltonstall-Kennedy NOAA**	Improving discard mortality rate estimates in the Pacific halibut by integrating handling practices, physiological condition and post-release survival (NOAA Award No. NA17NMF4270240)	IPHC	Alaska Pacific University	$286,121	Bycatch estimates	September 2017 – August 2020
2	**North Pacific Research Board**	Somatic growth processes in the Pacific halibut (*Hippoglossus stenolepis*) and their response to temperature, density and stress manipulation effects (NPRB Award No. 1704)	IPHC	AFSC-NOAA-Newport, OR	$131,891	Changes in biomass/size-at-age	September 2017 – February 2020
3	**Bycatch Reduction Engineering Program - NOAA**	Adapting Towed Array Hydrophones to Support Information Sharing Networks to Reduce Interactions Between Sperm Whales and Longline Gear in Alaska	Alaska Longline Fishing Association	IPHC, University of Alaska Southeast, AFSC-NOAA	-	Whale Depredation	September 2018 – August 2019
4	**Bycatch Reduction Engineering Program - NOAA**	Use of LEDs to reduce Pacific halibut catches before trawl entrainment	Pacific States Marine Fisheries Commission	IPHC, NMFS	-	Bycatch reduction	September 2018 – August 2019
5	**National Fish & Wildlife Foundation**	Improving the characterization of discard mortality of Pacific halibut in the recreational fisheries (NFWF Award No. 61484)	IPHC	Alaska Pacific University, U of A Fairbanks, charter industry	$98,902	Bycatch estimates	April 2019 – November 2021
6	**North Pacific Research Board**	Pacific halibut discard mortality rates (NPRB Award No. 2009)	IPHC	Alaska Pacific University,	$210,502	Bycatch estimates	January 2021 –March 2022
7	**Bycatch Reduction Engineering Program - NOAA**	Gear-based approaches to catch protection as a means for minimizing whale depredation in longline fisheries (NA21NMF4720534)	IPHC	Deep Sea Fishermen's Union, Alaska Fisheries Science Center-NOAA, industry representatives	$99,700	Mortality estimations due to whale depredation	November 2021 – October 2022
8	**North Pacific Research Board**	Pacific halibut population genomics (NPRB Award No. 2110)	IPHC	Alaska Fisheries Science Center-NOAA	$193,685	Stock structure	December 2021- January 2024
				Total awarded ($)	**$1,020,801**		

E. Publications in the peer-reviewed literature resulting from the IPHC 5-Year Biological and Ecosystem Science Research Plan (2017-21):

2020:

Fish, T., Wolf, N., Harris, B.P., Planas, J.V. A comprehensive description of oocyte developmental stages in Pacific halibut, *Hippoglossus stenolepis*. *Journal of Fish Biology*. 2020. 97: 1880-1885. https://doi: 10.1111/jfb.14551.

2021:

Carpi, P., Loher, T., Sadorus, L., Forsberg, J., Webster, R., Planas, J.V., Jasonowicz, A., Stewart, I. J., Hicks, A. C. Ontogenetic and spawning migration of Pacific halibut: a review. *Rev Fish Biol Fisheries*. 2021. https://doi.org/10.1007/s11160-021-09672-w.

Kroska, A.C., Wolf, N., Planas, J.V., Baker, M.R., Smeltz, T.S., Harris, B.P. Controlled experiments to explore the use of a multi-tissue approach to characterizing stress in wild-caught Pacific halibut (*Hippoglossus stenolepis*). *Conservation Physiology* 2021. 9(1):coab001. https://doi:10.1093/conphys/coab001.

Loher, T., Bath, G. E., Wischniowsky, S. The potential utility of otolith microchemistry as an indicator of nursery origins in Pacific halibut (*Hippoglossus stenolepis*) in the eastern Pacific: the importance of scale and geographic trending. *Fisheries Research*. 2021. 243: 106072. https://doi.org/10.1016/j.fishres.2021.106072.

Lomeli, M.J.M., Wakefield, W.W., Herrmann, B., Dykstra, C.L., Simeon, A., Rudy, D.M., Planas, J.V. Use of Artificial Illumination to Reduce Pacific Halibut Bycatch in a U.S. West Coast Groundfish Bottom Trawl. *Fisheries Research*. 2021. 233: 105737. doi: 10.1016/j.fishres.2020.105737.

Sadorus, L., Goldstein, E., Webster, R., Stockhausen, W., Planas, J.V., Duffy-Anderson, J. Multiple life-stage connectivity of Pacific halibut (*Hippoglossus stenolepis*) across the Bering Sea and Gulf of Alaska. *Fisheries Oceanography*. 2021. 30:174-193. doi: https://doi.org/10.1111/fog.12512.

2022:

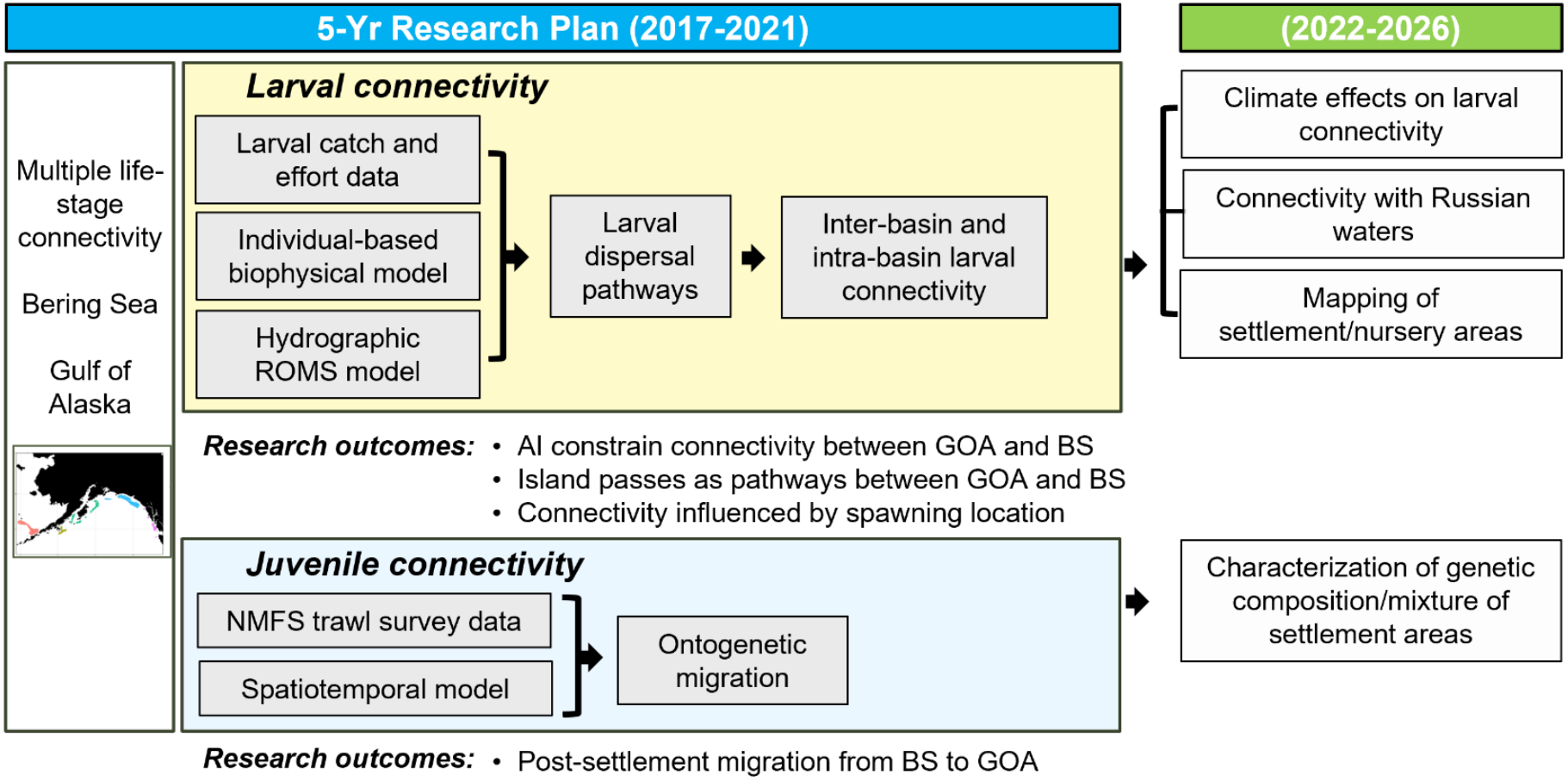
Fish, T., Wolf, N., Smeltz, T. S., Harris, B. P., and Planas, J. V. Reproductive Biology of Female Pacific Halibut (*Hippoglossus stenolepis*) in the Gulf of Alaska. *Frontiers in Marine Science* 2022. 9:801759. doi: 10.3389/fmars.2022.801759.

Jasonowicz, A.C., Simeon, A., Zahm, M., Cabau, C., Klopp, C., Roques, C., Iampietro, C., Lluch, J., Donnadieu, C., Parrinello, H., Drinan, D.P., Hauser, L., Guiguen, Y., Planas, J.V. Generation of a chromosome-level genome assembly for Pacific halibut (*Hippoglossus stenolepis*) and characterization of its sex-determining genomic region. *Molecular Ecology Resources.* 2022. In Press. doi: https://doi.org/10.1111/1755-0998.13641.

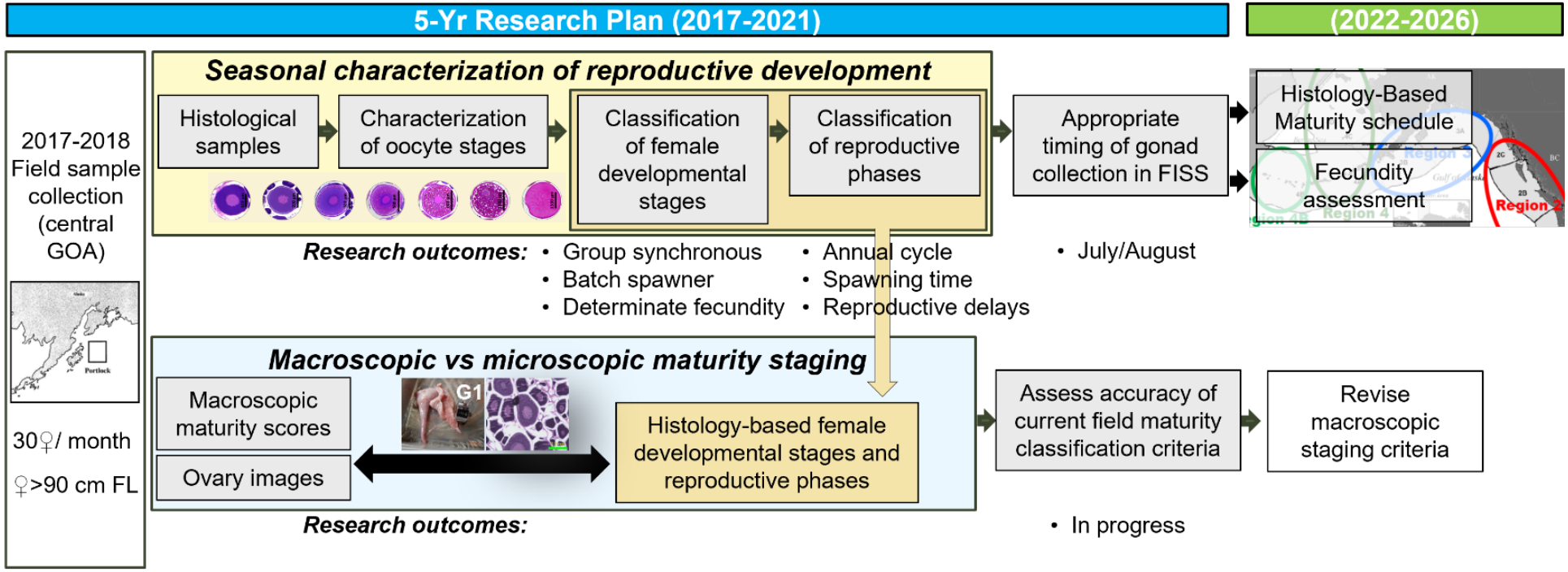
Loher, T., Dykstra, C.L., Hicks, A., Stewart, I.J., Wolf, N., Harris, B.P., Planas, J.V. Estimation of postrelease longline mortality in Pacific halibut using acceleration-logging tags. *North American Journal of Fisheries Management*. 2022. 42: 37-49. DOI: http://dx.doi.org/10.1002/nafm.10711.

F. Flow chart of progress resulting from the IPHC 5-Year Biological and Ecosystem Science Research Plan (2017-21) by research area leading to the IPHC 5-Year Program of Integrated Research and Monitoring (2022-2026)

1. Migration and Distribution

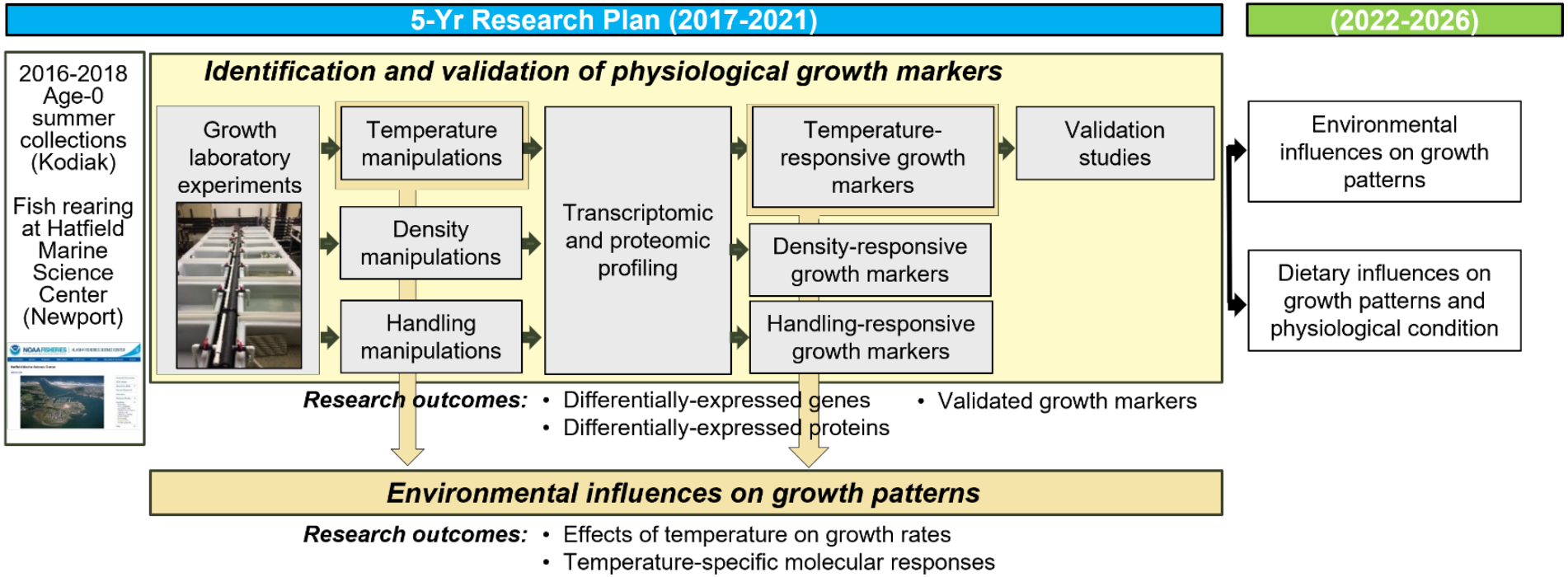


2. Reproduction



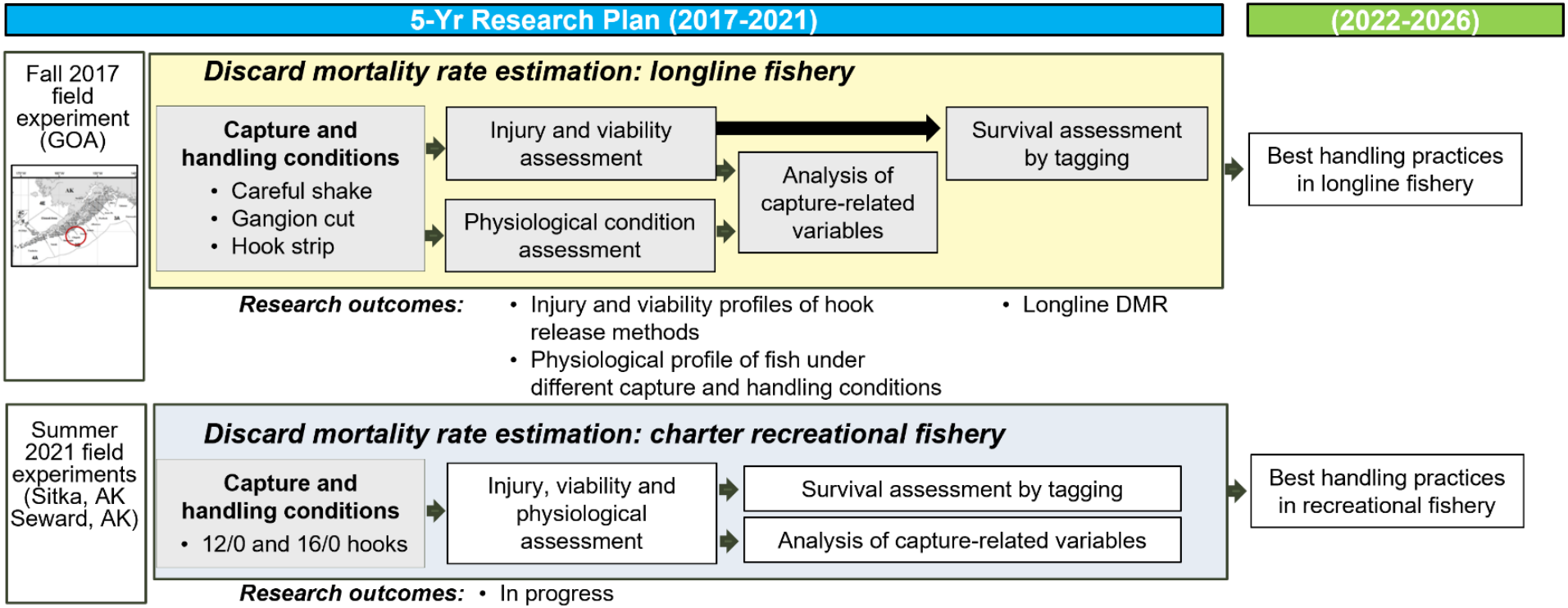
Staff involved: Teresa Fish, MSc APU (2018-2020), Crystal Simchick, Ian Stewart, Allan Hicks, Josep Planas
Funding: IPHC (2018-2020)
Publications (2): Fish et al. (2020) *J. Fish Biol*. **97**: 1880–1885 ; Fish et al. (2022) Front. Mar. Sci. 9:801759

3. Growth



Staff involved: Andy Jasonowicz, Crystal Simchick, Josep Planas
Funding: NPRB Grant#1704 (Sept. 2017-Feb. 2020)
Publications: Planas et al. (in preparation)

4. Mortality and Survival Assessment



Staff involved: Claude Dykstra, Allan Hicks, Ian Stewart, Josep Planas
Funding (3): Saltonstall-Kennedy NOAA (Sept. 2017-Aug. 2020); NFWF (Apr. 2019-Nov. 2021); NPRB#2009 (Jan. 2021-Mar. 2022)
Publications (2): Kroska et al. (2021) *Conserv. Physiol.*; Loher et al. (2022) *North Amer. J. Fish. Manag. 42: 37-49*

5. Genetics and Genomics

5-Yr Research Plan (2017-2021)

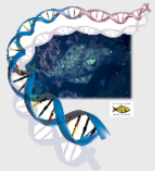
(2022-2026)

Collection of genetic samples of spawning aggregations spanning the Gulf of Alaska, Bering Sea and Aleutian Islands

(1999-2020)

Development and application of genomic approaches

Chromosome-level genome assembly



Development of methods based on low-coverage whole genome resequencing

Establishment of a bioinformatic pipeline in the cloud (Microsoft Azure)

Population structure analyses

Establishment of a baseline of genetic diversity

Delineation of fine-scale stock structure

Research outcomes:

- Sequenced genome (size=602 Mbp)
- Full annotation (NCBI) (27,944 genes)
- 24 chromosome-length scaffolds
- SNP detection and genotyping

Staff involved: Andy Jasonowicz, Josep Planas
Funding: IPHC, NPRB#2110
Publications: Jasonowicz et al. (2022) *Mol. Ecol. Resour. (In Review)*

APPENDIX II

Proposed schedule of outputs

	2022		2023		2024		2025		2026	
Biology and Ecology										
Migration and population dynamics										
Reproduction										
Growth										
Mortality and survival assessment										
Fishing technology										
Stock Assessment										
Management Strategy Evaluation										
Monitoring										

APPENDIX III

Proposed schedule of funding and staffing indicators: Biology and Ecology

Research areas	Research activities	Required FTEs/Year	IPHC FTEs/Year	2022	2023	2024	2025	2026	IPHC Funds	Grant Funds
Migration and Population Dynamics	Larval and juvenile connectivity and early life history studies	0.45	0.45		RB1	RB2			Yes	NPRB #2100
	Population structure	0.4	0.8		RB1				No	NPRB #2110
	Adult migration and distribution	0.4							No	NPRB #2110
	Close-kin mark-recapture studies	1	0						No	Planned
	Seascape genomics	1	0						No	Planned
	Genome-wide association analyses	1	0						No	Planned
	Genomic-based aging methods	1	1		RS 1				Yes	No
Reproduction	Maturity-at-age estimations	0.75	0						Yes	No
	Fecundity assessment	0.5	0.25			RB4	RS 2		Yes	No
	Examination of accuracy of current field macroscopic maturity classification	0.25							Yes	No
	Sex ratio of current commercial landings	0.5	0.75	LT					Yes	No
	Recruitment strength and variability	0.5	0				RS 2		Yes	Planned
Growth	Environmental influences on growth patterns	0.5	0.5		MSc student				No	Planned
	Dietary influences on growth patterns and physiological condition	0.5	0.2		RB3				No	Planned
Mortality and survival assessment	Discard mortality rate estimate: recreational fishery	0.5	1						No	NPRB #2009
	Best handling practices: recreational fishery	0.5		RB 3					No	NPRB #2009
	Whale depredation accounting and tools for avoidance	0.5							No	BREP
	Biological interactions with fishing gear	0.5							No	BREP

IPHC staff (Planned):

RS1: Research Scientist 1(PhD; Life History Modeler I). Full time temporary position (100% research;
RS2: Research Scientist 1(PhD; Life History Modeler II). Full time temporary position (100% research;
RB1: Research Biologist 1 (Geneticist; MSc). Full time temporary position (until April 2022; 1 FTE). 55% of salary covered by Grant NPRB#2110.
RB2: Research Biologist 2 (Early Life History; MSc). Full time permanent position (40% research; 0.4 FTE)
RB3: Research Biologist 3 (DMR; MSc). Full time permanent position (100% research; 1 FTE)
RB4: Research Biologist 4 (Maturity and Fecundity; MSc). Full time permanent position (100% research; 1 FTE)
LT: Laboratory Technician (MSc). Full time temporary position (100% research; 1 FTE)

Fisheries Data Overview (2022)

PREPARED BY: IPHC SECRETARIAT (J. Jannot, H. TRAN, T. KONG, K. Magrane, & K. S. Van Vleck; 19 December 2022 & 12 January 2023)

PURPOSE

To provide an overview of the key fisheries data regarding Pacific halibut removals from fisheries catching Pacific halibut during 2022, including the status of landings compared to fishery limits implemented by the Contracting Parties to the Commission. Data provided in this paper is the best available up to and including data on 10 January 2023.

BACKGROUND

The International Pacific Halibut Commission (IPHC) estimates all Pacific halibut (*Hippoglossus stenolepis*) removals taken in the IPHC Convention Area and uses this information in its yearly stock assessment (see IPHC-2023-AM099-11) and other analyses. The data are compiled by the IPHC Secretariat and include data from Federal and State agencies of each Contracting Party. All 2022 data are in net weight (head-off, dressed, ice and slime deducted) and are considered preliminary at this time.

This paper includes Pacific halibut removals for:

- Directed commercial fisheries, including landings and discard mortality
- Recreational fisheries, including landings and discard mortality
- Subsistence fisheries
- Non-directed commercial discard mortality (e.g. trawl, pot, longline)
- IPHC Fishery-Independent Setline Survey (FISS) and other IPHC research

Figure 1 shows the distribution of Pacific halibut removals (mortality) by fishery sources in 2022. Table 1 and Table 2 provide estimates of total removals by IPHC Regulatory Area (Figure 2).

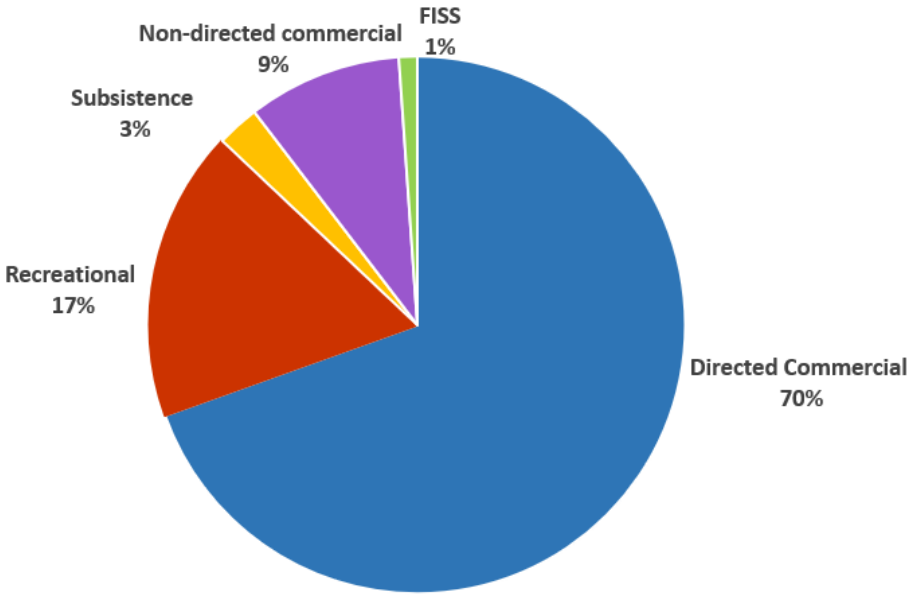


Figure 1. Distribution of Pacific halibut mortality by source in 2022.

Table 1. 2022 Mortality limits (TCEYs) and projection estimates (TCEYs and U26).

	Mortality limits (net weight)		Mortality (net weight)		Percent
	Tonnes (t)	Pounds (lb)	Tonnes (t)	Pounds (lb)	%
Canada	**3,429**	**7,560,000**	**3,391**	**7,475,240**	**99**
United States of America	**15,268**	**33,660,000**	**13,617**	**30,021,410**	**89**
IPHC Regulatory Area 2A	748	1,650,000	676	1,490,980	90
IPHC Regulatory Area 2C	2,681	5,910,000	2,713	5,981,641	101
IPHC Regulatory Area 3A	6,600	14,550,000	5,889	12,982,854	89
IPHC Regulatory Area 3B	1,769	3,900,000	1,564	3,447,106	88
IPHC Regulatory Area 4A	953	2,100,000	764	1,683,903	80
IPHC Regulatory Area 4B	658	1,450,000	321	706,948	49
IPHC Regulatory Area 4CDE and Closed Area	1,860	4,100,000	1,691	3,727,978	91
Subtotal (TCEY)	**18,697**	**41,220,000**	**17,008**	**37,496,650**	**91**
Non-directed commercial discard mortality (U26)	558	1,230,000	727	1,602,000	130
Total	**19,255**	**42,450,000**	**17,735**	**39,098,650**	**92**

Table 2. 2022 estimates of fishery removals and mortality (net weight), including fishery limits and mortality projections of Pacific halibut by IPHC Regulatory Area.

IPHC Regulatory Area	Fishery limit/mortality projection		Mortality (net weight)		Percent
	Tonnes (t)	Pounds (lb)	Tonnes (t)	Pounds (lb)	%
Canada – Area 2B (British Columbia)	3,429.16	7,560,000	3,390.71	7,475,240	99
Directed commercial fishery landings	2,585.48	5,700,000	2,487.55	5,484,107	96
Directed commercial discard mortality	95.25	210,000	89.81	198,000	94
Recreational fishery	458.13	1,010,000	427.14	941,686	93
Recreational discard mortality[1]	13.61	30,000	13.26	29,237	97
Recreational fishery (XRQ)	--	--	6.80	15,000	--
Subsistence[1]	185.97	410,000	183.70	405,000	99
Non-directed commercial discard mortality (O26)[1]	95.25	210,000	133.36	294,000	140
IPHC fishery-independent setline survey and research[2]	--	--	49.08	108,210	--
Non-directed commercial discard mortality (U26)	13.61	30,000	19.05	42,000	140
USA – 2A (California, Oregon, and Washington)	748.43	1,650,000	676.30	1,490,980	90
Non-treaty directed commercial	114.64	252,730	109.48	241,365	96
Non-treaty incidental to salmon troll fishery	20.23	44,599	12.37	27,281	61
Non-treaty incidental to sablefish fishery	22.68	50,000	27.67	61,000	122
Treaty Indian directed commercial	225.89	498,000	225.51	497,173	100
Directed commercial discard mortality	31.75	70,000	23.59	52,000	74
Recreational – Washington	133.71	294,786	112.97	249,063	84
Recreational – Oregon	130.47	287,645	82.39	181,644	63
Recreational – California	17.57	38,740	18.13	39,967	103
Recreational discard mortality	--	--	1.70	3,739	--
Treaty Indian ceremonial and subsistence	10.66	23,500	10.66	23,500	100
Non-directed commercial discard mortality (O26)[1]	40.82	90,000	46.27	102,000	113
IPHC fishery-independent setline survey and research[2]	--	--	5.56	12,248	--
Non-directed commercial discard mortality (U26)	--	--	1.81	4,000	--

continued….

Table 2 continued. 2022 estimates of fishery removals and mortality (net weight), including fishery limits and mortality projections of Pacific halibut by IPHC Regulatory Area.

IPHC Regulatory Area	Fishery limit/mortality projection		Mortality (net weight)		Percent
	Tonnes (t)	Pounds (lb)	Tonnes (t)	Pounds (lb)	%
USA – Area 2C (southeastern Alaska)	2,680.73	5,910,000	2,713.23	5,981,641	101
Directed commercial fishery landings	1,592.11	3,510,000	1,459.19	3,216,972	92
Directed commercial discard mortality	63.50	140,000	75.75	167,000	119
Metlakatla (Annette Island Reserve)	--	--	14.12	31,127	--
Guided recreational fishery	371.95	820,000	366.05	807,000	98
Guided recreational discard mortality[3]	--	--	16.58	36,557	--
Guided recreational fishery (GAF)[1]	--	--	45.39	100,067	--
Unguided recreational fishery[1]	494.42	1,090,000	510.29	1,125,000	103
Unguided recreational discard mortality[3]	--	--	6.80	15,000	--
Subsistence[1]	131.54	290,000	131.60	290,137	100
Non-directed commercial discard mortality (O26)[1]	31.75	70,000	31.30	69,000	99
IPHC fishery-independent setline survey and research[2]	--	--	56.15	123,781	--
Non-directed commercial discard mortality (U26)	--	--	0.45	1000	--
USA – Area 3A (central Gulf of Alaska)	6,599.77	14,550,000	5,888.92	12,982,854	89
Directed commercial fishery landings	4,331.81	9,550,000	3,965.43	8,742,275	92
Directed commercial discard mortality	185.97	410,000	307.08	677,000	165
Guided recreational fishery	957.08	2,110,000	798.32	1,760,000	83
Guided recreational discard mortality[3]	--	--	6.19	13,641	--
Guided recreational fishery (GAF)	--	--	2.94	6,487	--
Unguided recreational fishery[1]	716.68	1,580,000	536.15	1,182,000	75
Unguided recreational discard mortality[3]	--	--	8.88	19,573	--
Subsistence[1]	81.65	180,000	80.28	176,993	98
Non-directed commercial discard mortality (O26)[1]	326.59	720,000	132.00	291,000	40
IPHC fishery-independent setline survey and research[2]	--	--	51.66	113,885	--
Non-directed commercial discard mortality (U26)	131.54	290,000	88.00	194,000	67
USA – Area 3B (western Gulf of Alaska)	1,769.01	3,900,000	1,563.58	3,447,106	88
Directed commercial fishery landings	1,519.53	3,350,000	1,314.11	2,897,116	86
Directed commercial discard mortality[1]	86.18	190,000	136.08	300,000	158
Recreational fishery[1]	4.54	10,000	2.93	6,460	65
Recreational discard mortality	--	--	--	--	--
Subsistence[1]	4.54	10,000	6.29	13,861	139
Non-directed commercial discard mortality (O26)[1]	158.76	350,000	89.81	198,000	57
IPHC fishery-independent setline survey and research[2]	--	--	14.36	31,669	--
Non-directed commercial discard mortality (U26)	31.75	70,000	40.37	89,000	127
USA – Area 4A (eastern Aleutians)	952.54	2,100,000	763.81	1,683,903	80
Directed commercial fishery landings	798.32	1,760,000	579.49	1,277,563	73
Directed commercial discard mortality[1]	31.75	70,000	23.13	51,000	73
Recreational fishery[1]	4.54	10,000	4.91	10,829	108
Recreational discard mortality	--	--	--	--	--
Subsistence[1]	4.54	10,000	5.50	12,118	121
Non-directed commercial discard mortality (O26)[1]	108.86	240,000	146.96	324,000	135
IPHC fishery-independent setline survey and research[2]	--	--	3.81	8,393	--
Non-directed commercial discard mortality (U26)	36.29	80,000	58.97	130,000	163

continued….

IPHC Regulatory Area	Fishery limit/mortality projection		Mortality (net weight)		Percent
	Tonnes (t)	Pounds (lb)	Tonnes (t)	Pounds (lb)	%
USA – Area 4B (central/western Aleutians)	657.71	1,450,000	320.67	706,948	49
Directed commercial fishery landings	580.60	1,280,000	248.14	547,046	43
Directed commercial discard mortality[1]	22.68	50,000	2.72	6,000	12
Recreational fishery[1]	--	--	--	--	--
Recreational discard mortality	--	--	--	--	--
Subsistence[1]	--	--	0.45	987	--
Non-directed commercial discard mortality (O26)[1]	54.43	120,000	67.13	148,000	123
IPHC fishery-independent setline survey and research[2]	--	--	2.23	4,915	--
Non-directed commercial discard mortality (U26)	4.54	10,000	3.63	8,000	80
USA – Area 4CDE and Closed (Bering Sea)	1,859.73	4,100,000	1,690.98	3,727,978	91
Directed commercial fishery landings	934.40	2,060,000	710.95	1,567,372	76
Directed commercial discard mortality[1]	18.14	40,000	26.31	58,000	145
Recreational fishery[1]	--	--	--	--	--
Recreational discard mortality	--	--	--	--	--
Subsistence[1]	18.14	40,000	16.63	36,661	92
Non-directed commercial discard mortality (O26)[1]	889.04	1,960,000	932.13	2,055,000	105
IPHC fishery-independent setline survey and research[2]	--	--	4.96	10,945	--
Non-directed commercial discard mortality (U26)	353.80	780,000	514.37	1,134,000	145
Totals	18,697.07	41,220,000	17,008.19	37,496,650	91
Directed commercial fishery	13,263.04	29,240,000	11,838.49	26,099,397	89
Recreational fishery	3,288.54	7,250,000	2,967.83	6,542,950	90
Subsistence[1]	439.98	970,000	435.11	959,257	99
Non-directed commercial discard mortality (O26)[1]	1,705.51	3,760,000	1,578.95	3,481,000	93
IPHC fishery-independent setline survey and research[2]	--	--	187.81	414,046	--
Non-directed commercial discard mortality (U26)	557.92	1,230,000	726.65	1,602,000	130

[1] 'Fishery projection' values are from 2021 estimates which were used in setting the TCEY for each IPHC Regulatory Area.

[2] Includes U32 Pacific halibut landed during FISS

[3] Limit included in limit listed above.

XRQ = Experimental Quota and GAF = Guided Angler Fish (XRQ and GAF leased from commercial quota).

DEFINITIONS

Directed commercial fisheries include commercial landings and discard mortality. Directed commercial discard mortality include estimates of sub-legal Pacific halibut (under 81.3 cm [32 inches], a.k.a. U32), fish that die on lost or abandoned fishing gear, and fish discarded for regulatory compliance reasons.

Recreational fisheries include recreational landings including landings from commercial leasing and discard mortality.

Subsistence fisheries are non-commercial, customary, and traditional use of Pacific halibut for direct personal, family, or community consumption or sharing as food, or customary trade. Subsistence fisheries include:

Ceremonial and subsistence (C&S) removals in the IPHC Regulatory Area 2A treaty Indian fishery

i) Sanctioned First Nations Food, Social, and Ceremonial (FSC) fishery conducted in British Columbia;
ii) Federal subsistence fishery in Alaska, USA that uses Alaska Subsistence Halibut Registration Certificate (SHARC); and
iii) U32 Pacific halibut retained in IPHC Regulatory Areas 4D and 4E by the CDQ fishery

for personal use.

Non-directed commercial discard mortality incidentally caught Pacific halibut by fisheries targeting other species and that cannot legally be retained, e.g., by the trawl fleet. Refers only to those Pacific halibut that subsequently die due to capture.

IPHC Fishery-Independent Setline Survey (FISS) and IPHC Research includes Pacific halibut landings and removals by the IPHC Fishery-Independent Setline Survey (FISS) and other IPHC research.

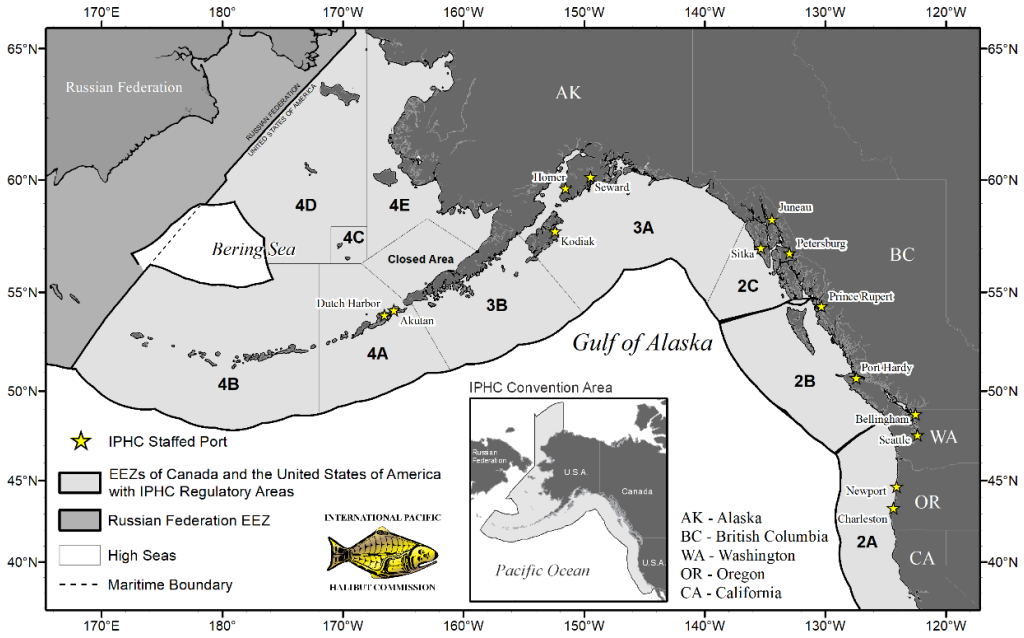


Figure 2. Map of the IPHC Convention Area (insert) and IPHC Regulatory Areas.

DIRECTED COMMERCIAL FISHERIES

The IPHC's directed commercial fisheries span from northern California through to northern and western Alaska in USA and Canadian waters of the northeastern Pacific Ocean. The IPHC sets annual limits for the retention of Pacific halibut in each IPHC Regulatory Area. Participants in these commercial fisheries use longline and pot gear to catch Pacific halibut for sale. The directed commercial Pacific halibut fisheries in IPHC Regulatory Area 2A consisted of the directed commercial fishery with fishing period limits, the incidental Pacific halibut catch during the salmon troll and limited-entry sablefish (*Anoplopoma fimbria*) fisheries, and the treaty Indian fisheries. Farther north, the directed commercial fisheries consisted of the Individual Vessel Quota (IVQ) fishery in IPHC Regulatory Area 2B in British Columbia, Canada; the Metlakatla fishery in IPHC Regulatory Area 2C; the Individual Fishing Quota (IFQ) system in Alaska, USA; and the Community Development Quota (CDQ) fisheries in IPHC Regulatory Areas 4B and 4CDE. All 2022 landing and discard mortality data presented in this document are preliminary.

Directed Commercial Fishing Periods

The Canadian IVQ fishery in IPHC Regulatory Area 2B and the USA IFQ and CDQ fisheries in IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E commenced at 12 noon local time on 6 March and closed at 12 noon local time on 7 December (Table 3). The IPHC Regulatory Area 2A directed commercial fisheries, including the treaty Indian commercial fisheries, occurred during the same calendar period (6 March to 7 December 2022). For IPHC Regulatory Area 2A, the potential of 58-hour fishing periods every two weeks beginning on the fourth Tuesday in June for the non-treaty directed commercial fishery were adopted. Fishing periods began on the Tuesday at 0800 and ended on the

Thursday at 1800 local time (58-hours), were further restricted by fishing period limits, and closed for the remainder of the year after the third opening on 28 July, when the IPHC Regulatory Area 2A directed commercial non-treaty fishery allocation was estimated to have been reached.

Table 3. Fishing periods for directed commercial Pacific halibut fisheries by IPHC Regulatory Area, 2018-2022. d = days; h = hours

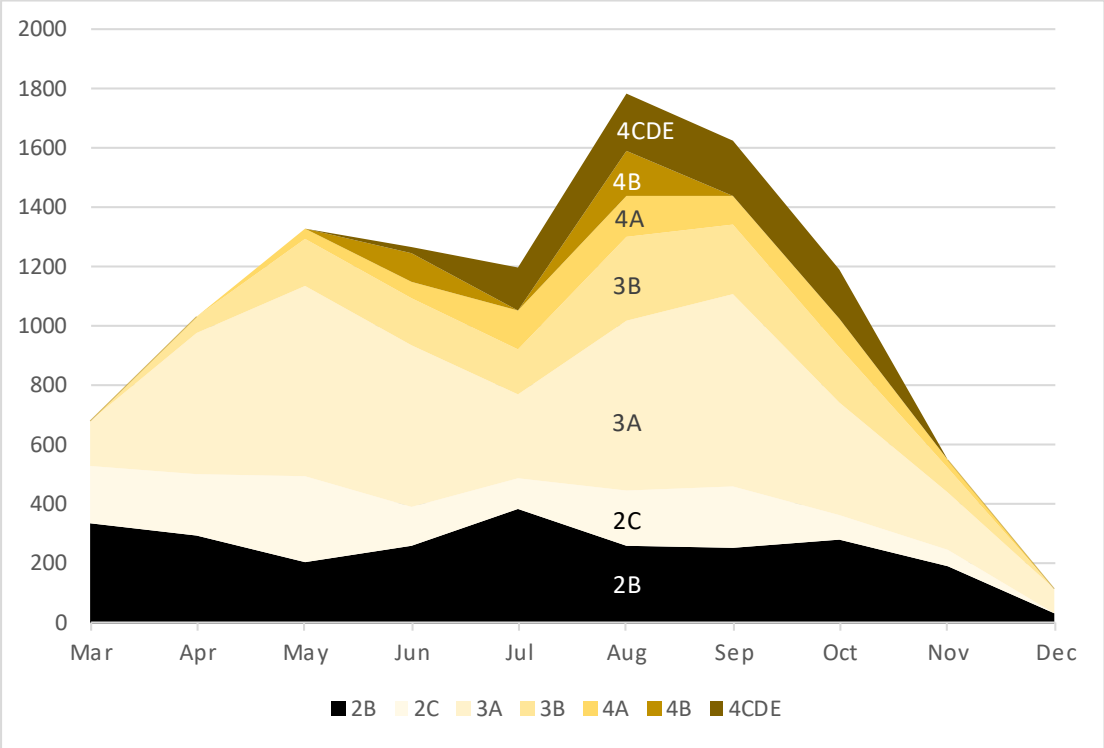
IPHC Regulatory Area	Year				
	2022	2021	2020	2019	2018
Canada: 2B	6 Mar–7 Dec (276 d)	6 Mar–7 Dec (276 d)	14 Mar-7 Dec (268 d)	15 Mar-14 Nov (244 d)	24 Mar–7 Nov (228 d)
USA: 2A Treaty Indian	6 Mar-31 May (55 h) (Unrestricted) 6 Mar-31 May (122 h) (Restricted) 3 Jun-30 Sept (48 h and 72 h) (Restricted)	6 Mar-16 May (55 h) (Unrestricted) 6 Mar-16 May (102 h) (Restricted) 16 May-20 Jun (24 h)	14 Mar-30 Sep (55 h) (Unrestricted) 14 Mar-30 Sep (222 h) (Restricted) 5 Oct -18 Oct (13 d)	15 Mar-15 May (55 h) (Unrestricted) 15 Mar-15 May (84 h) 20 May-15 Jun (72 h) (Restricted) 11 Jun-24 Jul (35 d)	24 Mar – 28 Apr (36 h) 24 Mar – 28 Apr (37 h) 4 May – 23 May (30 h)
USA: 2A Commercial Directed	28-30 Jun 12-14 Jul 26-28 Jul (58 h each)	22-24 Jun 6-8 Jul 20-22 Jul (58 h each)	22-24 Jun 6-8 Jul 20-22 Jul 3-5 Aug 17-19 Aug (58 h each)	26 Jun 10 Jul 24 Jul (10 h each)	27 Jun 11 Jul 25 Jul (10 h each)
USA: 2A Commercial Incidental	Salmon 1 Apr – 31 Oct (213 d) Sablefish 1 Apr – 31 Oct (213 d)	Salmon 1 Apr – 7 Dec (250 d) Sablefish 1 Apr – 7 Dec (250 d)	Salmon 15 Apr–30 Sep (WA – 168 d) 15 Apr–31 Oct (OR - 199 d) 1 Aug–30 Sep (CA - 60 d) Sablefish 1 Apr – 15 Nov (228 d)	Salmon 20 Apr - 30 Sep (WA, CA - 163 d) 20 Apr - 31 Oct (OR - 194 d) Sablefish 1 Apr- 31 Oct (213 d)	Salmon 24 Mar – 8 Aug (137 d) Sablefish 24 Mar – 7 Nov (228 d)
USA: Alaska (2C, 3A, 3B, 4A, 4B, 4CDE)	6 Mar–7 Dec (276 d)	6 Mar–7 Dec (276 d)	14 Mar-15 Nov (246 d)	15 Mar-14 Nov (244 d)	24 Mar–7 Nov (228 d)

Directed Commercial Landings

Directed commercial fishery limits and landings by IPHC Regulatory Area for the 2022 fishing season are shown in Table 2. The directed commercial fishery limit, as referred to here, is the IPHC commercial fishery limit set by the Contracting Parties following the IPHC Annual Meeting and is equivalent to the Fishery Constant Exploitation Yield (FCEY). The fishery limits with adjustments from the underage and overage programs from the previous year's quota share programs are not shown. The Use of Fish allocation in IPHC Regulatory Area 2B are also not presented. Historical landings and fishery limits are available on the IPHC website (https://www.iphc.int/data).

The 2022 directed commercial fishery landings were spread over ten months (March – December) of

the year in Canada and the USA (Figure 2). On a month-to-month comparison, July took the lead as the busiest month for total poundage (15%) landed from IPHC Regulatory Area 2B. On a month-to-month comparison, August was the busiest month for total poundage (18%) from Alaska, USA. A year-to-date visualization is also available on the IPHC website: https://www.iphc.int/data/year- to-date-directed-commercial-landing-patterns-ak-and-bc



Regulatory Area 2B landings from DFO Fishery Operations System (FOS).
Regulatory Areas 2C, 3, and 4 landings from NOAA Fisheries Restricted Access Management (RAM) Program.
Regulatory Area 2C: December combined with and shown above in November for confidentiality reasons.
Regulatory Area 3B: March combined with and shown above in April; December combined with and shown above in November for confidentiality reasons.
Regulatory Area 4A: April combined with and shown above in May; December combined with and shown above in November for confidentiality reasons.
Regulatory Area 4B: April/May combined with and shown above in June; Jul/Sep/Oct combined with and shown above in August for confidentiality reasons
Regulatory Areas 4CDE: November combined with and shown above in October for confidentiality reasons.

Figure 3. 2022 directed commercial landings (tonnes, net weight, preliminary) of Pacific halibut for IQ fisheries by IPHC Regulatory Area and month.

Canada – IPHC Regulatory Area 2B (British Columbia)

Under the IVQ fishery in British Columbia, Canada, the number of active Pacific halibut licences (L licences), and First Nations communal commercial licences (FL licences) was 148 in 2022. In addition, Pacific halibut can be landed as incidental catch in other licensed groundfish fisheries. Pacific halibut was landed from a total of 211 active licences in 2022, with 63 of these licences from other fisheries. The 2022 directed commercial landings represented 2,488 tonnes (5,484,107 pounds) of Pacific halibut (Table 2).

Directed commercial trips from IPHC Regulatory Area 2B were delivered into 13 different ports in 2022. The ports of Port Hardy (including Coal Harbour and Port McNeill) and Prince Rupert/Port Edward were the major landing locations, receiving 93% of the commercial landings. Port Hardy received 46% while Prince Rupert received 47% of the directed commercial landings. All IVQ landings were landed in IPHC Regulatory Area 2B. Canadian vessels landed frozen, head-off Pacific halibut in 2022: 54 landings 38 tonnes (84,596 net pounds) reported frozen- at-sea head-off product from 24 vessels.

According to logbook data, less than 0.05% by weight of Pacific halibut were caught with pot gear and landed within the directed commercial fishery in IPHC Regulatory Area 2B.

USA – IPHC Regulatory Area 2A (Washington, Oregon, California)

The 2022 IPHC Regulatory Area 2A fisheries and respective fishery limits are listed in Table 2. The total IPHC Regulatory Area 2A directed commercial landings of 375 tonnes (826,819 pounds) are 2% below the fishery limit. The total non-treaty directed commercial landings of 109 tonnes (241,365 pounds) were 4% under the fishery limit of 115 tonnes (252,730 pounds) after three 58-hour openers. The fishing period limits by vessel size class for each opening in 2022 are listed in Table 4.

The salmon troll fishery season began on 1 April with an allowable incidental landing ratio of one Pacific halibut per two Chinook (*Oncorhynchus tshawytscha*), plus one (1) additional Pacific halibut per landing, and a vessel trip limit of 35 fish. On 1 July, the fishery was extended at the same ratio and landing limit. Total landings of 12 tonnes (27,281 pounds) were 39% under the fishery limit 20 tonnes (44,599 pounds).

Incidental Pacific halibut retention during the limited-entry sablefish (*Anoplopoma fimbria*) fishery was open from 1 April to 31 October. Beginning 1 April, the allowable landing ratio was 0.10 tonnes (225 pounds) (net weight) of Pacific halibut to 0.45 tonnes (1,000 pounds) of sablefish, and up to two additional Pacific halibut in excess of the ratio limit. Beginning 9 May, the allowable landing ratio was reduced to 0.07 tonnes (150 pounds) of Pacific halibut to 0.45 tonnes (1,000 pounds) of sablefish, and up to two additional Pacific halibut in excess of the ratio limit. The total landings of 28 tonnes (61,000 pounds) were 22% over the fishery limit (23 tonnes [50,000 pounds]).

In IPHC Regulatory Area 2A, north of Point Chehalis (46°53.30´ N. latitude), the treaty Indian tribes manage the directed commercial landings for three fisheries under a Memorandum of Understanding among the 13 tribes. These consist of an unrestricted fishery, a restricted fishery with trip limits, and a late season fishery. These fisheries are subject to in-season management. There was one unrestricted, open access fishery, not to exceed 55 hours from 6 March to 31 May and one restricted fishery not to exceed 122 hours including a vessel per day limit of 0.23 tonnes (500 pounds) from 6 March to 31 May. A final fishery with two options one to not exceed 48 hours in duration 1 tonne (2,200 pounds) limit and option two 72 hours with 0.7 tonne (1500 pounds) were open from 3 June to 30 September. Estimated total landings of 226 tonnes (497,173 pounds) were at the fishery limit (226 tonnes [498,000 pounds]).

Table 4. The fishing periods and limits (tonnes, dressed, head-on with ice/slime) by vessel class used in the 2022 directed commercial fishery in IPHC Regulatory Area 2A.

Vessel Class		**Fishing Period (dates) & Limits (t)**		
Letter	**Feet**	**28-30 June**	**12-14 July**	**26-28 July**
A, B and C	1-35	1.03	1.03	1.00
D and E	36-45	1.55	1.55	1.51
F and G	46-55	2.06	2.06	2.01
H	56+	2.32	2.32	2.26

USA – IPHC Regulatory Areas 2C, 3, and 4 (Alaska)

In Alaska, USA, the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) Restricted Access Management (RAM) Program allocated Pacific halibut quota share (QS) to recipients by IPHC Regulatory Area. Quota share transfers were permitted with restrictions on the amount of QS a person could hold and the amount that could be fished per vessel. In 2022, RAM reported that 2,241 persons/entities held QS.

The total 2022 landings from the IFQ/CDQ Pacific halibut fishery for the waters off Alaska, USA were

8,277 tonnes (18,248,00 pounds), 15% under the directed commercial fishery limit (Table 2). By IPHC Regulatory Area, the directed commercial landings were all under the fishery limit: in Area 2C was under the limit by 8%; Area 3A was 8% under the limit; Area 3B was 14% under the limit; Area 4A was 27% under the limit; Area 4B was 57% under the limit; and 4CDE/Closed (IFQ) was 24% under the limit. (Table 2).

Kodiak received approximately 15% of the directed commercial landings of Alaskan catch making it the port that received the greatest number of pounds in 2022. Homer received the second and Seward the third largest landing volume at 14% and 11% of the Alaskan commercial landings, respectively. In Southeast Alaska, the two largest landing volumes were received in Sitka and Juneau, and their combined landings represented 14% of the directed commercial Alaskan landings. The Alaskan QS catch that was landed in Bellingham, WA, USA was less than 3%.

In Alaska, 24 tonnes (53,000 pounds) of Pacific halibut were caught with pot gear and landed within the directed commercial fishery representing 0.3% of the total Alaska landings.

The Metlakatla Indian Community (within IPHC Regulatory Area 2C) was authorized by the United States government to conduct a commercial Pacific halibut fishery within the Annette Islands Reserve. There were 11 two-day openings between 6 May and 02 October for total landings of 14 tonnes (31,127 pounds). The fishery closed on 4 October.

Directed Commercial Discard Mortality

Incidental mortality of Pacific halibut in the directed commercial Pacific halibut fishery is the mortality of all Pacific halibut that do not become part of the landed catch. The three main sources of discard mortality estimate include: 1) fish that are captured and discarded because they are below the legal-size limit of 81.3 cm (32 inches); 2) fish that are estimated to die on lost or abandoned fishing gear; and 3) fish that are discarded for regulatory reasons (e.g., the vessels trip limit has been exceeded). The methods that are applied to produce each of these estimates differ due to the amount and quality of information available. Information on lost gear and regulatory discards is collected through logbook interviews and fishing logs received by mail. The ratio of U32 to O32 Pacific halibut (>81.3 cm or 32 inches in length) is determined from the IPHC FISS in most areas and by direct observation in the IPHC Regulatory Area 2B fishery. Different mortality rates are applied to each category: released Pacific halibut have a 16% mortality rate and Pacific halibut mortality from lost gear is 100%.

Pacific halibut discard mortality estimates from the commercial Pacific halibut fishery are summarized by IPHC Regulatory Area in Table 2.

RECREATIONAL FISHERIES

The 2022 recreational removals of Pacific halibut, including discard mortality, was estimated at 2,968 tonnes (6,542,950 pounds). Changes in harvests varied across areas, in some cases, in response to changes in size restrictions. Recreational fishery limits and landings are detailed by IPHC Regulatory Area in Table 2. Historical recreational removals are also available at the IPHC website: https://www.iphc.int/data/datatest/pacific-halibut-recreational-fisheries-data

Recreational Landings

Canada – IPHC Regulatory Area 2B (British Columbia)

IPHC Regulatory Area 2B operated under a 133 cm (52.4 inch) maximum size limit and one Pacific halibut had to be between 90 – 133 cm (35.4 - 52.4 inches) or both under 90 cm (35.4 inch) when attaining the two fish possession limit, with an annual limit of ten per licence holder. On 20 August, the possession limit was increased to three fish if all were under 90 cm (35.4 inch), still with an annual limit of ten per licence holder. The IPHC Regulatory Area 2B recreational harvest was 7% under the recreational fishery limit at 427 tonnes (941,686).

USA – IPHC Regulatory Area 2A (Washington, Oregon, California)

The 2022 IPHC Regulatory Area 2A recreational allocation was 282 tonnes (621,171 pounds) net weight and based on the Pacific Fishery Management Council's Catch Sharing Plan formula, which divides the overall fishery limit among all sectors. The recreational allocation was further subdivided to seven subareas, after 23 tonnes (50,000 pounds) were allocated to the incidental Pacific halibut catch in the commercial sablefish fishery in Washington. This subdivision resulted in 134 tonnes (249,786 pounds) being allocated to Washington subareas and 130 tonnes (287,645 pounds) to Oregon subareas. In addition, California received an allocation of 18 tonnes (38,740 pounds). The IPHC Regulatory Area 2A recreational harvest totaled 213 tonnes (WA + OR + CA; 470,674 pounds), 24% under the recreational fishery limit. Recreational fishery harvest seasons by subareas varied and were managed in season with fisheries opening on 1 April.

IPHC Regulatory Areas 2C, 3, and 4 (USA: Alaska)

A reverse slot limit allowing for the retention of Pacific halibut, if ≤ 101.6 cm (40 inches) or ≥ 203.2 cm (80 inches) in total length, was in place for the charter fishery in IPHC Regulatory Area 2C. In IPHC Regulatory Area 3A, charter anglers were allowed to retain two fish per day, but only one could exceed 71.1 cm (28 inches) in length, with a recording requirement. A 2 fish daily bag limits and no annual limit. One trip per calendar day per charter permit was allowed, with no charter retention of Pacific halibut on Wednesdays.

The Contracting Party agencies in Alaska (USA) have a program that allow recreational harvesters to land fish that is leased from commercial fishery quota shareholders for the current season.

Recreational Discard Mortality

Pacific halibut discarded for any reason suffer some degree of discard mortality, and impacts more of the stock with the increasing use of size restrictions, such as reverse slot limits. Current year estimates from Contracting Parties' agencies of recreational discard mortality have been received from both Contracting Parties and are provided in Table 2.

SUBSISTENCE FISHERIES

Pacific halibut is taken throughout its range as subsistence harvest by several fisheries. Subsistence fisheries are non-commercial, customary, and traditional use of Pacific halibut for direct personal, family, or community consumption or sharing as food, or customary trade. The primary subsistence fisheries are the treaty Indian Ceremonial and Subsistence fishery in IPHC Regulatory Area 2A off northwest Washington State (USA), the First Nations Food, Social, and Ceremonial (FSC) fishery in British Columbia (Canada), and the subsistence fishery by rural residents and federally recognized native tribes in Alaska (USA) documented via Subsistence Halibut Registration Certificates (SHARC).

The coastwide subsistence estimate for 2022 was 435 tonnes (959,257 pounds) (Table 2). Historical subsistence removals are also available at the IPHC website: https://www.iphc.int/datatest/subsistence-fisheries

Estimated subsistence harvests by area

In the commercial Pacific halibut fisheries coastwide, the state and federal regulations require that take-home Pacific halibut caught during commercial fishing be recorded as part of the commercial fishery on the landing records (i.e., State fish tickets or Canadian validation records). This is consistent across areas, including the quota share fisheries in Canada and USA, and as part of fishing period limits and Pacific halibut ratios in the incidental fisheries in IPHC Regulatory Area 2A. Therefore, personal use fish or take-home fish within the commercial fisheries are accounted for as commercial catch and are not included here.

IPHC Regulatory Area 2A (USA: Washington, Oregon, California)

The Pacific Fishery Management Council's Catch Sharing Plan allocates the Pacific halibut fishery limit to commercial, recreational, and treaty Indian users in IPHC Regulatory Area 2A. The treaty tribal fishery limit is further sub-divided into commercial and ceremonial and subsistence (C&S) fisheries. It is estimated that 11 tonnes (23,500 pounds) were retained as C&S. A revised estimate of the 2022 removals will be provided at the end of the year.

IPHC Regulatory Area 2B (Canada: British Columbia)

The source of Pacific halibut subsistence harvest in British Columbia is the First Nations FSC fishery. The IPHC receives some logbook and landing data for this harvest from the DFO, but those data have not been adequate for the IPHC to make an independent estimate of the FSC fishery harvest. DFO estimated the First Nations FSC harvest to be 136 tonnes (300,000 pounds) annually until 2006, and since 2007, the yearly estimate has been provided as 184 tonnes (405,000 pounds).

IPHC Regulatory Areas 2C, 3, and 4 (USA: Alaska)

In 2003, the subsistence Pacific halibut fishery off Alaska was formally recognized by the North Pacific Fishery Management Council and implemented by IPHC and NOAA Fisheries regulations. The fishery allows the customary and traditional use of Pacific halibut by rural residents and members of federally recognized Alaska, USA native tribes who can retain Pacific halibut for non-commercial use, food, or customary trade. The NOAA Fisheries regulations define legal gear, number of hooks, and daily bag limits, and IPHC regulations set the fishing season. Prior to subsistence fishing, eligible persons registered with NOAA Fisheries Restricted Access Management to obtain a SHARC. The Division of Subsistence at ADF&G was contracted by NOAA Fisheries to estimate the subsistence harvest in Alaska, USA through a data collection program. A voluntary survey of fishers is conducted by mail or phone, with some onsite visits. Beginning in 2018, this survey is conducted on a biannual schedule, rather than annually. The 2020 estimate has been carried forward for 2022.

In addition to the SHARC harvest, IPHC regulations allow Pacific halibut less than 81.3 cm or 32 inches in fork length (also called U32) to be retained in the IPHC Regulatory Area 4D and 4E commercial Pacific halibut CDQ fishery, under an exemption requested by the North Pacific Fishery Management Council, if the fish are not sold or bartered. The exemption originally applied only to CDQ fisheries in IPHC Regulatory Area 4E in 1998 but was expanded in 2002 to also include IPHC Regulatory Area 4D. The CDQ organizations are required to report to the IPHC the amounts retained during their commercial fishing operations. This harvest is not included in the SHARC program estimate and is reported separately.

Reports for 2022 removals were received from three CDQ management organizations: Bristol Bay Economic Development Corporation (BBEDC), Norton Sound Economic Development Corporation (NSEDC), and Coastal Villages Regional Fund (CVRF).

<u>CDQ - Bristol Bay Economic Development Corporation (BBEDC)</u>

BBEDC requires their fishers to record the lengths of retained U32 Pacific halibut in a separate log, which are then tabulated by BBEDC at the conclusion of the season. The lengths were converted to weights using the IPHC length/weight relationship and summed to estimate the total retained U32 weight. Pacific halibut were landed by BBEDC vessels primarily in King Salmon and Dillingham in a lesser amount. A small amount was landed in Dillingham. BBEDC reported 5 harvesters landed 137 U32 Pacific halibut (<1 tonne; 1,209 pounds).

<u>CDQ - Coastal Villages Regional Fund (CVRF)</u>

CVRF reported that no Pacific halibut were landed by their fishers or received by their facilities.

<u>CDQ - Norton Sound Economic Development Corporation (NSEDC)</u>

NSEDC required their fishers to offload the U32 Pacific halibut for weighing. The fish were not washed nor were the heads removed. The U32 Pacific halibut were then returned to the harvester. NSEDC reported 57 U32 Pacific halibut weighing <1 tonne (664 pounds) were caught in the local CDQ fishery

and landed at the Nome plant.

NON-DIRECTED COMMERCIAL DISCARD MORTALITY

The IPHC accounts for non-directed commercial discard mortality by IPHC Regulatory Area and sector. All removals for 2022 are available in Table 2. Historical data are also available on the IPHC website: https://www.iphc.int/data/datatest/non-directed-commercial-discard-mortality- fisheries

Estimating Non-Directed Commercial Discard Mortality

Non-directed commercial discard mortality of Pacific halibut is estimated because not all fisheries have 100% monitoring and not all Pacific halibut that are discarded are assumed to die. Agencies estimate the amount of non-directed commercial discard that will not survive, called non-directed commercial discard mortality.

The IPHC relies upon information supplied by observer programs run by Contracting Party agencies for non-directed commercial discard mortality estimates in most fisheries. Non-IPHC research survey information is used to generate estimates of non-directed commercial discard mortality in the few cases where fishery observations are unavailable. Trawl fisheries off British Columbia, Canada are monitored, and non-directed commercial discard mortality information is provided to IPHC by DFO. NOAA Fisheries operates observer programs off the USA West Coast and Alaska, which monitor the major groundfish fisheries. Data collected by NOAA fisheries observer programs are used to estimate non-directed commercial discard mortality. A breakout of removals from each non-directed commercial fishery by IPHC Regulatory Area and year is available on the IPHC website: https://www.iphc.int/data/datatest/non-directed-commercial-discard-mortality-fisheries.

Non-directed Commercial Discard Mortality by Area

Canada – IPHC Regulatory Area 2B (British Columbia)

In Canada, Pacific halibut non-directed commercial discard mortality in trawl fisheries are capped at 454 tonnes round weight by DFO. Non-trawl non-directed commercial discard mortality is handled under an IFQ system within the directed Pacific halibut fishery cap.

USA – IPHC Regulatory Area 2A (Washington, Oregon, California)

Groundfish fisheries off Washington, Oregon, and California are managed by NOAA Fisheries, following advice and recommendations developed by the Pacific Fishery Management Council. Non-directed commercial discard mortality projected estimates are provided by NOAA Fisheries.

USA – IPHC Regulatory Areas 2C, 3, and 4 (Alaska)

Groundfish fisheries in Alaska are managed by NOAA Fisheries, following advice and recommendations developed by the North Pacific Fishery Management Council. Non-directed commercial discard mortality projected estimates for Alaskan areas are provided by NOAA Fisheries and ADF&G.

IPHC Regulatory Area 2C (Southeast Alaska)

For the federal waters of IPHC Regulatory Area 2C, non-directed commercial discard mortality by hook-and-line and pot vessels fishing in the outside waters were reported by NOAA Fisheries. These vessels are primarily targeting Pacific cod and rockfish (*Sebastes* spp.) in open access fisheries, and sablefish in the IFQ fishery. In 1998, a no trawl zone was established in the Gulf of Alaska eliminating trawl fishing in this area.

Fisheries occurring within state waters and resulting in Pacific halibut non-directed commercial discard mortality include pot fisheries for red and golden king crab, and tanner crab. Information is provided periodically by ADF&G, and the estimate was rolled forward from 2021 to 2022.

IPHC Regulatory Area 3 (Eastern, Central and Western Gulf of Alaska)

IPHC Regulatory Area 3 is comprised of Areas 3A and 3B. For the purposes of stock assessment and management, IPHC tracks non-directed commercial discard mortality in both IPHC Regulatory Areas. Federal groundfish fisheries operate throughout both areas and a subset of these vessels are monitored for discarded Pacific halibut. Trawl fisheries are responsible for most of the non-directed commercial discard mortality in Regulatory Area 3, with hook-and-line fisheries a distant second. State-managed crab and scallop fisheries are also known to take Pacific halibut as non-directed commercial discard mortality, but data from these state-managed fisheries is currently unavailable.

Estimates of non-directed commercial discard mortality in IPHC Regulatory Area 3 reflect different levels of observer coverage by gear and type of fishing trip. 2021 coverage rates vary from 100% to 15% of the estimated discarded groundfish pounds by gear and fishery (Table 3-4 in AFSC 2021). The lowest coverage rates are realized for the non-pelagic trawl fishery, which also has the highest likelihood of encountering Pacific halibut. Analyses of observed and unobserved trip properties (magnitude of the landings, trip duration, species composition of the landed catch, etc.) have shown that observed trips are not representative of all trips in some of these metrics (observed and unobserved) (Appendix A in AFSC 2019). Therefore, non-directed discard mortality estimates for IPHC Regulatory Area 3 have both a greater uncertainty and potential for bias then those from areas with higher coverage rates and/or where there is no evidence of different behavior when observed.

IPHC Regulatory Area 4 (Bering Sea and Aleutian Islands)

The Pacific cod fishery, which is conducted in the late winter/early spring and late summer, contributes a large fraction of the Pacific halibut non-directed commercial discard mortality in IPHC Regulatory Area 4. Almost all vessels are required to have 100% observer coverage because of the vessel's size and requirements of their fishery cooperative; a few small vessels fish Pacific cod in this IPHC Regulatory Area. The high level of observer coverage for fisheries in IPHC Regulatory Area 4 results in reliable estimates of non-directed commercial discard mortality.

Pots are used to fish for Pacific cod and sablefish and are very selective. Non-directed commercial discard mortality rates are quite low, and survival is relatively high. Annual non-directed commercial discard mortality estimates are typically low, usually less than 7 tonnes.

In IPHC Regulatory Area 4CDE non-directed commercial discard mortality estimates have typically been the highest (Table 2) due to groundfish fisheries which target flatfish in the Bering Sea.

IPHC FISHERY-INDEPENDENT SETLINE SURVEY (FISS)

Approximately 188 tonnes (414,046 pounds) of Pacific halibut were landed from the FISS and in 2022 with the amount landed from each IPHC Regulatory Area documented in Table 2. There were no other IPHC research Pacific halibut retained, landed, or sold in 2022.

RECOMMENDATION

That the Commission **NOTE** paper IPHC-2023-AM099-07 Rev_1 which provides an overview of the key fisheries data regarding Pacific halibut removals from fisheries catching Pacific halibut during 2022, including the status of landings compared to fishery limits implemented by the Contracting Parties of the Commission.

CITATIONS

AFSC Alaska Fisheries Science Center (U.S.). 2022. North Pacific Observer Program 2021 Annual Report. AFSC processed report 2022-06. DOI : https://doi.org/10.25923/qnbj-nt98

AFSC Alaska Fisheries Science Center (U.S.). 2021. North Pacific Observer Program 2019 Annual Report. AFSC Processed Report 2021-05. DOI : https://doi.org/10.25923/5hcp-j028

INTERNATIONAL PACIFIC HALIBUT COMMISSION

IPHC-2023-AM099-08

IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2022

PREPARED BY: IPHC SECRETARIAT (K. UALESI , C. JONES, R. RILLERA, T. JACK; 19 DECEMBER 2022)

PURPOSE

To provide a summary of the IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2022.

BACKGROUND

The annual IPHC Fishery-Independent Setline Survey (FISS) of the Pacific halibut stock was augmented from 2014-2019 with expansion stations that filled in gaps in coverage in the annual FISS. Prior to 2020, the standard grid of stations comprised 1,200 stations. Following the completion in 2019, expansion stations were added to the standard grid in all IPHC Regulatory Areas, now totaling 1,890 stations for the full FISS design (Fig. 1), within the prescribed depth range of 18 to 732 metres (10 to 400 fathoms).

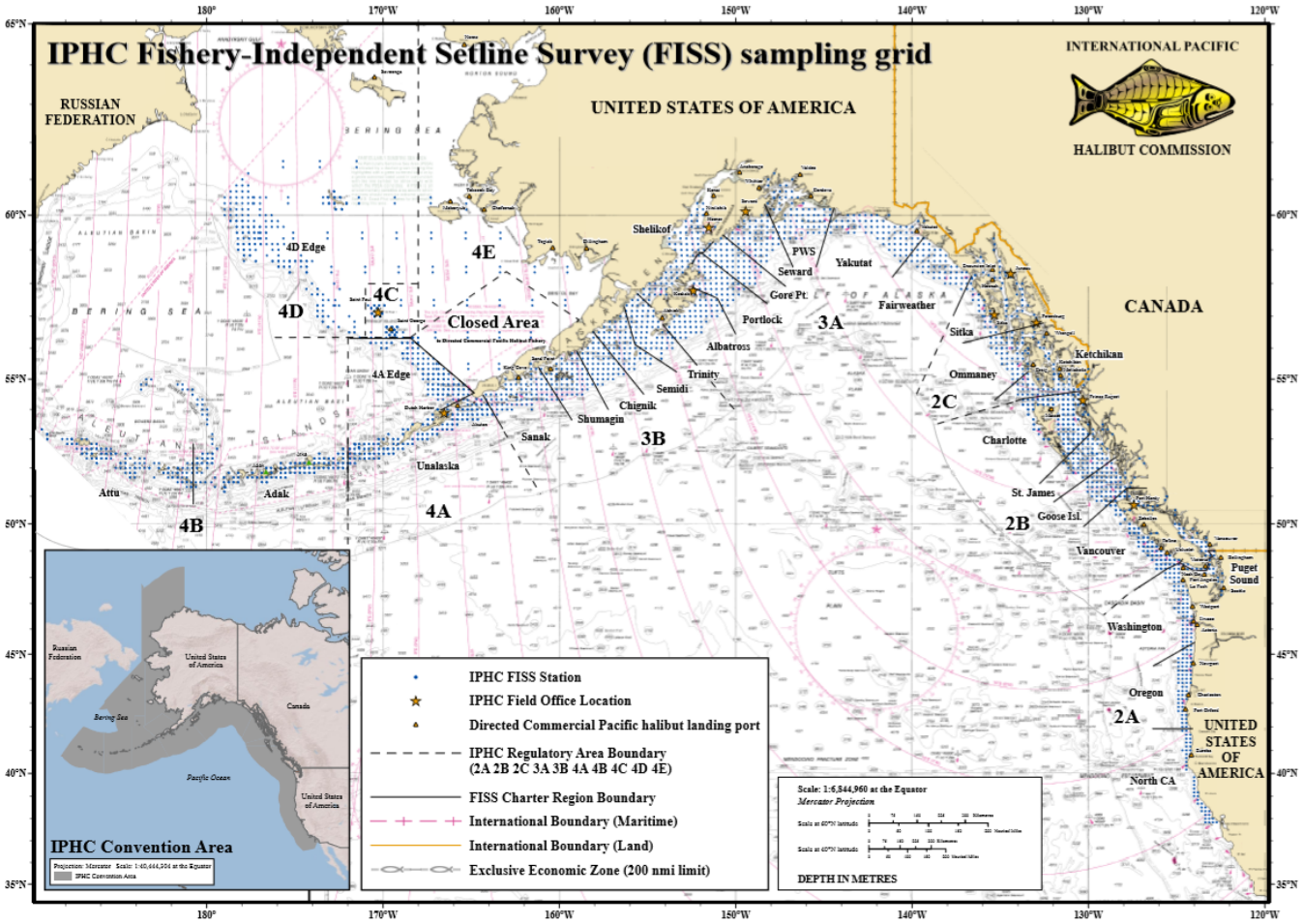


Figure 1. IPHC Fishery-Independent Setline Survey (FISS) with full sampling grid shown.

Prior to 2019, only fixed gear was used to fish FISS sets. With increasing use of snap gear in the commercial fishery, this restriction has limited the number of vessels available for the FISS. Further, any differences between snap and fixed gears (including catch rate differences and differences in fishing locations) may affect our understanding of trends in commercial fishery indices. This has motivated the need for a study comparing the two gear types with this work being done in 2019, 2020,

and again in 2021. While no study was completed in 2022, we recognize the increased use of snap gear and hope to continue the fixed vs snap gear comparison in the future.

Beginning in 2019, individual weight data were collected coastwide from Pacific halibut caught on the FISS to eliminate questions that have arisen regarding the accuracy of estimates that depend on these weights, including weight per unit effort (WPUE) indices of density. Data from IPHC collections from commercial landings and other sources had provided evidence that the current standard length-net weight curve used for estimating Pacific halibut weights on the FISS may have been over-estimating weights on average in most IPHC Regulatory Areas, and that the relationship between weight and length may vary spatially.

2022 FISS design

At the 97th Session of the IPHC Interim Meeting (IM097), the Commission recommended a FISS design for 2022 that included 1,188 stations coastwide (Fig. 2). The design comprised sampling of subareas within IPHC Regulatory Areas 2A, 2B, 3A, 3B, 4A, 4B and 4CDE intended to reduce potential bias (relative to historical observed changes year-to-year) and to achieve a level of precision comparable to or better than recent setline surveys. 2022 sampling in IPHC Regulatory Areas 2C included random subsampling from the full design in IPHC charter region Ketchikan while sampling in IPHC charter regions Ommaney & Sitka included 100% of the full FISS design.

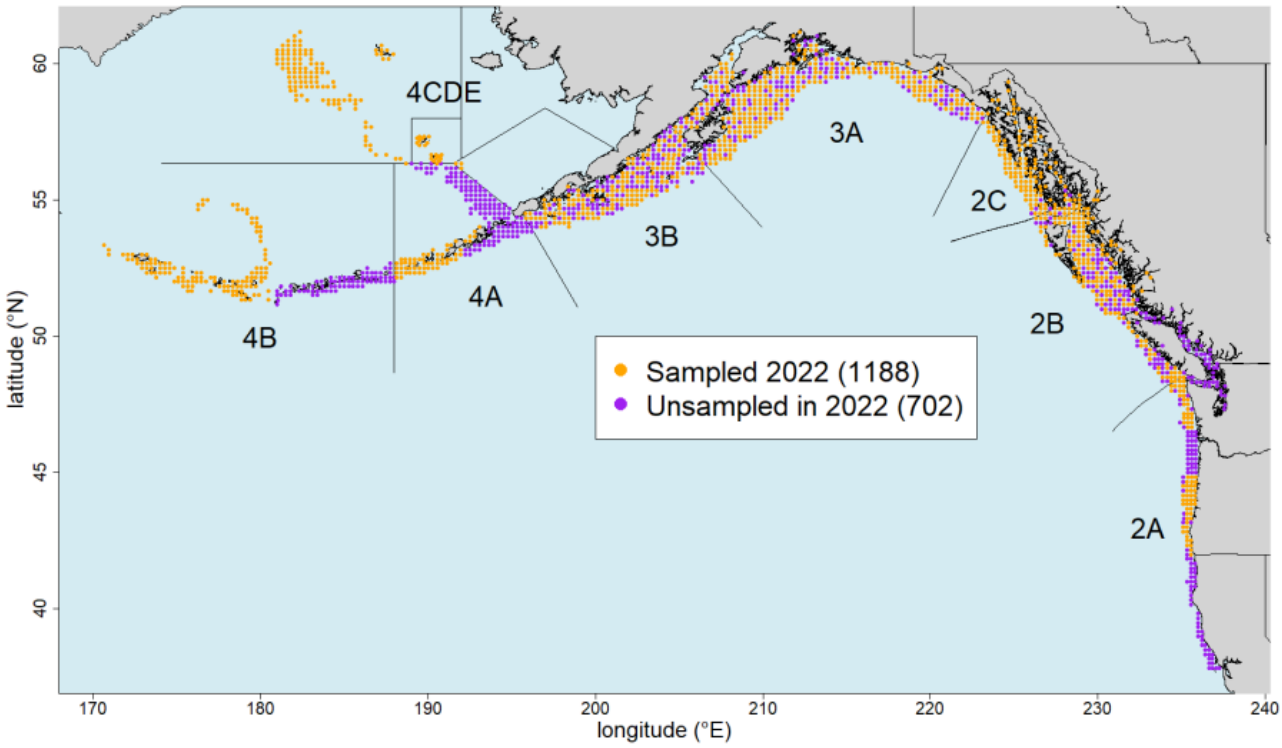


Figure 2. Map of the 2022 FISS design endorsed by the Commission on 1 December 2021. (IPHC-2021-IM097) Purple circles were not sampled in 2022

At the 98th Session of the IPHC Annual Meeting (IPHC-2022-AM098-R), the Commission:

> (para. 38) "***RECALLED*** *the IM097 endorsement of the FISS design options for 2022 (Appendix IVa and b) and provisional endorsement of the proposed designs for 2023 and 2024 (Appendix V) (IPHC-2021-IM097-R, paras. 31, 32), and made no further amendments at AM098."*

> IPHC-2021-IM097-R, para. 31 "*The Commission **ENDORSED** optimized design 1 for the 2022 FISS, with full sampling in IPHC Regulatory Area 4CDE (Appendix IV), and optimized design 2, reduced sampling in IPHC Regulatory Area 4CDE (Appendix V), as an alternative if necessary...*"
>
> (para. 38) "*The Commission **NOTED** that the endorsed FISS design for 2022 may undergo further modification depending on the outcome of the 2022 request for tender process, as well as unforeseen in-season logistical issues that IPHC contracted vessels may encounter throughout 2022 (e.g. weather, mechanical).*"

MATERIALS AND METHODS

The IPHC's FISS design encompasses nearshore and offshore waters of the IPHC Convention Area (Fig. 1). The IPHC Regulatory Areas are divided into 29 charter regions, each requiring between 10 and 46 charter days to complete. FISS stations are located at the intersections of a 10 nmi by 10 nmi square grid within the depth range occupied by Pacific halibut during summer months (18 – 732 m [10 – 400 fm]). Figure 2 depicts the 2022 FISS station positions, and IPHC Regulatory Areas.

Fishing vessels are chosen through a competitive bid process where up to four (4) charter regions per vessel may be awarded and typically 10-15 vessels are chosen. In 2022, the process has been clearly documented on the IPHC website for accountability and transparency purposes:https://www.iphc.int/management/science-and-research/fishery-independent-setline-survey-fiss/62-fiss-vessel-recruiting.

In 2022, 9 vessels were chartered to complete the FISS, as detailed in Media Release 2022-007: Notification of IPHC Fishery-Independent Setline Survey (FISS) 2022 Contract Awards.

Sampling protocols

IPHC Setline Survey Specialists (Field) collected data according to protocols established in the 2022 FISS Sampling Manual (IPHC-2022-VSM01).

Sampling challenges - 2022

Of the 1,196 FISS stations planned for the 2021 FISS season (1,188 stations plus eight (8) rockfish index stations in Washington), 862 (72%) were effectively sampled.

Not sampled: A total of 289 initially planned stations were not sampled in 2022. There were challenges with vessel recruitment this season due to 1) increased sablefish quota availability; 2) several vessels transitioning to snap-gear; 3) vessel maintenance; and 4) challenges with vessel crew recruitment.

Due to the challenges with vessel recruitment, the following stations within IPHC charter regions were not sampled: Gore Point (35 stations), Semidi (27 stations), Chignik (35 stations), Shumagin (26 stations), and 4CDE North (40 stations), Attu (61 stations), Portlock (27 stations), Shelikof (9 stations), Ketchikan (12 stations) and Ommaney (12 stations).

In addition, two (2) stations in Sitka were unsampled as they were within Glacier Bay National Park and we were not permitted to complete these stations within the park this year by NOAA. Two (2) stations in Yakutat were unsampled due to the presence of sea ice restricting the vessel's access. One (1) station in Unalaska was also not sampled due to poor weather and tides.

Ineffective stations: Coastwide, forty-five (45) stations were deemed ineffective due to Orca depredation (n=16), Sperm whale depredation (n=15), gear soak time (n=4), shark predation (n=1), sand flea activity (n=1), station moved > 3nmi (n=1), and setting and gear issues (n=7).

Bait (Chum salmon)

The minimum quality requirement for FISS bait is No. 2 semi-bright (Alaska Seafood Marketing Institute grades A through E), headed and gutted, and individually quick-frozen chum salmon. Bait usage is based on 0.17 kilograms (0.37 pounds) per hook resulting in approximately 136 kilograms (300 pounds) per eight skate station. Bait quality was monitored and documented throughout the season and found to meet the standard as described above.

Pre-season: In September 2021 (IPHC Media Release 2021-025), the Secretariat made pre-season bait purchases of approximately 102 tonnes (225,600 lbs) to ensure a smooth start to the 2022 FISS, and to take advantage of advance purchase prices.

RESULTS

Interactive views of the FISS results are provided via the IPHC website and can be found here once published:

https://www.iphc.int/data/setline-survey-catch-per-unit-effort

As in previous years, legal-sized (O32) Pacific halibut that were caught on FISS stations and sacrificed in order to obtain biological data were retained and sold. In addition, beginning in 2020, sub-legal (U32) Pacific halibut that were caught and randomly selected for otolith sampling were also retained and sold. This helps to offset costs of the FISS. FISS vessels also retained for sale incidentally captured rockfish (*Sebastes spp*.) and Pacific cod (*Gadus macrocephalus*). These species were retained because they rarely survive the barotrauma resulting from capture. Most vessel contracts provided the vessel a lump sum payment, along with a 10% share of the Pacific halibut proceeds and a 50% share of the incidental catch proceeds.

The 2022 FISS chartered 8 commercial longline vessels (four Canadian and four USA) during a combined 49 trips and 513 charter days (Tables 1). Otoliths were removed from 10,308 fish coastwide. Approximately 188 tonnes (414,000 pounds) of Pacific halibut, 31 tonnes (69,200 pounds) of Pacific cod, and 32 tonnes (71,400 pounds) of rockfish were landed from the FISS stations.

Table 1a. Effort and landing summary by FISS charter region and vessel for all 2022 stations and all Pacific halibut (sampled U32 and all O32).

IPHC Regulatory Area	Charter Region	Vessel	Vessel Number[1]	Charter Days[2]	Planned Stations	Effective Stations[3]	Pacific halibut Sold (t) [4]	Pacific halibut Sold (lb)[4]	Average Price USD/kg[5]	Average Price USD/lb[5]
2A	Oregon	*Pacific Surveyor*	947061	20	43	42	2	4,172	$13.24	$6.00
2A	Washington	*Pacific Surveyor*	947061	16	37	37	4	8,076	$11.92	$5.40
2B	Charlotte	*Bold Pursuit*	99997	35	75	72	20	43,957	$19.93	$9.04
2B	Goose Island	*Bold Pursuit*	99997	17	32	32	11	23,382	$20.02	$9.08
2B	St. James	*Pender Isle*	27282	20	36	36	12	26,241	$19.73	$8.95
2B	Vancouver	*Bold Pursuit*	99997	18	31	31	7	14,630	$19.59	$8.89
2C	Ketchikan	*Vanisle*	21912	21	35	23	7	16,142	$15.49	$7.02
2C	Ommaney	*Vanisle*	21912	23	52	36	27	58,911	$15.78	$7.16
2C	Sitka	*Vanisle*	21912	32	52	46	22	48,728	$16.88	$7.66

3A	Albatross	*Devotion*	42892	23	35	32	14	31,077	$17.00	$7.71
3A	Fairweather	*Pender Isle*	27282	14	26	26	7	14,508	$17.11	$7.76
3A	Portlock	*Star Wars II*	99997	8	13	12	2	4,562	$13.45	$6.10
3A	Prince William Sound	*St. Nicholas*	45399	35	39	38	8	18,625	$16.25	$7.94
3A	Seward	*St. Nicholas*	45399	26	35	32	5	11,832	$17.52	$7.94
3A	Shelikof	*Star Wars II*	99997	17	36	35	5	10,201	$13.88	$6.30
3A	Yakutat	*Pender Isle*	27282	26	55	51	10	23,080	$16.41	$7.44
3B	Sanak	*Star Wars II*	99997	25	49	45	7	16,402	$15.08	$6.84
3B	Trinity	*Devotion*	42892	14	27	26	7	15,267	$17.06	$7.74
4A	Unalaska	*Devotion*	42892	39	59	50	4	8,393	$15.02	$6.81
4B	Adak	*Kema Sue*	41033	32	45	44	1	2,703	$15.22	$6.90
4B	Attu	*Kema Sue*	41033	10	24	22	1	2,212	$15.22	$6.90
4C	4CDE South	*Kema Sue*	41033	8	20	18	2	3,951	$15.08	$6.84
4D	4CDE Central	*Kema Sue*	41033	19	40	38	2	3,684	$14.99	$6.80
4D	4CDE South	*Kema Sue*	41033	14	37	35	2	3,310	$15.08	$6.84
Closed Area	4CDE	*Kema Sue*	41033	1	3	3	0	0	-	-
Total		**8 Vessels**		**513**	**936**	**862**	**188**	**414,046**	**$17.01**	**$7.72**

1 Canada: Vessel Registration Number and USA: ADF&G vessel number.

2 Days are estimated - some vessels fished two charter regions in one day.

3 Stations that did not meet setting parameters or deemed ineffective are excluded.

4 Net weight (head-off, dressed, washed). May not sum to correct total due to rounding.

5 Ex-vessel price.

Table 1b. Effort and landing summary by FISS charter region and vessel for all 2022 stations and O32 Pacific halibut.

IPHC Regulatory Area	Charter Region	Vessel	Vessel Number[1]	Charter Days[2]	Planned Stations	Effective Stations[3]	Pacific halibut Sold (t) [4]	Pacific halibut Sold (lb)[4]	Average Price USD/kg[5]	Average Price USD/lb[5]
2A	Oregon	*Pacific Surveyor*	947061	20	43	42	2	3,716	$13.78	$6.25
2A	Washington	*Pacific Surveyor*	947061	16	37	37	2	5,407	$12.90	$5.85
2B	Charlotte	*Bold Pursuit*	99997	35	75	72	19	42,187	$19.99	$9.07
2B	Goose Island	*Bold Pursuit*	99997	17	32	32	10	22,778	$20.06	$9.10
2B	St. James	*Pender Isle*	27282	20	36	36	12	25,836	$19.75	$8.96
2B	Vancouver	*Bold Pursuit*	99997	18	31	31	6	14,051	$19.64	$8.91
2C	Ketchikan	*Vanisle*	21912	21	35	23	7	15,568	$15.51	$7.04
2C	Ommaney	*Vanisle*	21912	23	52	36	26	57,462	$15.80	$7.17
2C	Sitka	*Vanisle*	21912	32	52	46	21	46,404	$16.90	$7.67
3A	Albatross	*Devotion*	42892	23	35	32	13	29,458	$17.00	$7.71
3A	Fairweather	*Pender Isle*	27282	14	26	26	6	14,069	$17.12	$7.77
3A	Portlock	*Star Wars II*	99997	8	13	12	2	4,459	$13.50	$6.12

3A	Prince William Sound	*St. Nicholas*	45399	35	39	38	8	18,546	$16.25	$7.37
3A	Seward	*St. Nicholas*	45399	26	35	32	5	11,587	$17.51	$7.94
3A	Shelikof	*Star Wars II*	99997	17	36	35	4	9,899	$13.93	$6.32
3A	Yakutat	*Pender Isle*	27282	26	55	51	10	21,762	$16.41	$7.44
3B	Sanak	*Star Wars II*	99997	25	49	45	6	14,086	$15.18	$6.88
3B	Trinity	*Devotion*	42892	14	27	26	7	14,467	$17.06	$7.74
4A	Unalaska	*Devotion*	42892	39	59	50	3	6,589	$15.30	$6.94
4B	Adak	*Kema Sue*	41033	32	45	44	1	2,591	$15.23	$6.91
4B	Attu	*Kema Sue*	41033	10	24	22	1	2,120	$15.23	$6.91
4C	4CDE South	*Kema Sue*	41033	8	20	18	1	2,967	$15.17	$6.88
4D	4CDE Central	*Kema Sue*	41033	19	40	38	1	2,803	$15.17	$6.88
4D	4CDE South	*Kema Sue*	41033	14	37	35	1	2,469	$15.44	$7.00
Closed Area	4CDE	*Kema Sue*	41033	1	3	3	0	0	-	-
Total		**8 Vessels**		**513**	**936**	**862**	**177**	**391,281**	**$17.13**	**$7.77**

1 Canada: Vessel Registration Number and USA: ADF&G vessel number.

2 Days are estimated - some vessels fished two charter regions in one day.

3 Stations that did not meet setting parameters or deemed ineffective are excluded.

4 Net weight (head-off, dressed, washed). May not sum to correct total due to rounding.

5 Ex-vessel price.

Table 1c. Effort and landing summary by FISS charter region and vessel for all 2022 stations and sampled U32 Pacific halibut.

IPHC Regulatory Area	Charter Region	Vessel	Vessel Number[1]	Charter Days[2]	Planned Stations	Effective Stations[3]	Pacific halibut Sold (t) [4]	Pacific halibut Sold (lb)[4]	Average Price USD/kg[5]	Average Price USD/lb[5]
2A	Oregon	*Pacific Surveyor*	947061	20	43	42	0	456	$8.82	$4.00
2A	Washington	*Pacific Surveyor*	947061	16	37	37	1	2,669	$9.91	$4.50
2B	Charlotte	*Bold Pursuit*	99997	35	75	72	1	1,770	$18.50	$8.39
2B	Goose Island	*Bold Pursuit*	99997	17	32	32	0	604	$18.39	$8.34
2B	St. James	*Pender Isle*	27282	20	36	36	0	405	$18.39	$8.34
2B	Vancouver	*Bold Pursuit*	99997	18	31	31	0	579	$18.32	$8.31
2C	Ketchikan	*Vanisle*	21912	21	35	23	0	574	$14.79	$6.71
2C	Ommaney	*Vanisle*	21912	23	52	36	1	1,449	$15.07	$6.83
2C	Sitka	*Vanisle*	21912	32	52	46	1	2,324	$16.39	$7.44
3A	Albatross	*Devotion*	42892	23	35	32	1	1,619	$17.03	$7.73
3A	Fairweather	*Pender Isle*	27282	14	26	26	0	439	$16.67	$7.56
3A	Portlock	*Star Wars II*	99997	8	13	12	0	103	$11.10	$5.03
3A	Prince William Sound	*St. Nicholas*	45399	35	39	38	0	79	$16.25	$7.37
3A	Seward	*St. Nicholas*	45399	26	35	32	0	245	$17.66	$8.01
3A	Shelikof	*Star Wars II*	99997	17	36	35	0	302	$12.21	$5.54

3A	Yakutat	*Pender Isle*	27282	26	55	51	1	1,318	$16.53	$7.50
3B	Sanak	*Star Wars II*	99997	25	49	45	1	2,316	$14.50	$6.58
3B	Trinity	*Devotion*	42892	14	27	26	0	800	$17.07	$7.74
4A	Unalaska	*Devotion*	42892	39	59	50	1	1,804	$14.00	$6.35
4B	Adak	*Kema Sue*	41033	32	45	44	0	112	$14.82	$6.72
4B	Attu	*Kema Sue*	41033	10	24	22	0	92	$14.82	$6.72
4C	4CDE South	*Kema Sue*	41033	8	20	18	0	984	$14.82	$6.72
4D	4CDE Central	*Kema Sue*	41033	19	40	38	0	881	$14.42	$6.54
4D	4CDE South	*Kema Sue*	41033	14	37	35	0	841	$14.04	$6.37
Closed Area	4CDE	*Kema Sue*	41033	1	3	3	0	0	-	-
Total		**8 Vessels**		**513**	**936**	**862**	**10**	**22,765**	**$15.05**	**$6.83**

1 Canada: Vessel Registration Number and USA: ADF&G vessel number.

2 Days are estimated - some vessels fished two charter regions in one day.

3 Stations that did not meet setting parameters or deemed ineffective are excluded.

4 Net weight (head-off, dressed, washed). May not sum to correct total due to rounding.

5 Ex-vessel price.

Vessels chartered by the IPHC delivered fish to 21 different ports (Tables 2). Fish sales were awarded based on obtaining a fair market price. When awarding sales, the Commission considered the price offered, the number of years that a buyer had been buying and marketing Pacific halibut, how fish were graded at the dock (including the determination of No. 2 and chalky Pacific halibut), and the promptness of settlements following deliveries. Individual sales were evaluated after each event to ensure that the buyer was meeting IPHC standards. Average prices increased from $15.13/kg in 2021 to $17.01/kg in 2022 (Tables 3). This represents a 12.4% increase in price.

Table 2a. FISS Pacific halibut landings by port for all Pacific halibut (sampled U32 and all O32), 2022[1,2].

Offload Port	Trips	Tonnes	Pounds	Total USD	Average Price (USD/kg)	Average Price (USD/lb)
Coos Bay	1	0	891	$5,429.25	$13.43	$6.09
Dutch Harbor	10	13	29,137	$199,997.80	$15.13	$6.86
Homer	3	5	10,043	$66,356.68	$14.57	$6.61
Juneau	3	14	30,550	$238,344.80	$17.20	$7.80
Ketchikan	4	18	40,356	$284,053.50	$15.52	$7.04
King Cove	1	4	9,716	$66,044.50	$14.99	$6.80
Kodiak	6	25	54,484	$407,212.04	$16.48	$7.47
Neah Bay	1	1	2,816	$15,689.39	$12.28	$5.57
Newport	2	1	3,281	$19,619.75	$13.18	$5.98
Petersburg	4	12	26,121	$180,374.30	$15.22	$6.91
Port Angeles	1	1	3,129	$17,081.81	$12.04	$5.46
Port Hardy	5	18	39,176	$355,343.60	$20.00	$9.07
Prince Rupert	5	26	56,333	$506,381.92	$19.82	$8.99
Sand Point	1	1	1,802	$12,006.50	$14.69	$6.66
Seward	7	12	27,037	$207,521.95	$16.92	$7.68

Sitka	4	18	38,953	$300,658.41	$17.02	$7.72
Tofino/Ucluelet	1	5	11,596	$102,617.64	$19.51	$8.85
Valdez	1	2	5,098	$36,960.50	$15.98	$7.25
Vancouver	1	1	1,105	$10,121.68	$20.19	$9.16
Westport	1	1	2,131	$10,876.25	$11.25	$5.10
Yakutat	4	9	20,291	$152,182.50	$16.53	$7.50
Grand Total	**66**	**188**	**391,624**	**$3,194,874.77**	**$17.01**	**$7.72**

[1] Net weight (head-off, dressed, washed).
[2] Prices based on net weight.

Table 2b. FISS Pacific halibut landings by port for O32 Pacific halibut, 2022[1,2].

Offload Port	Trips	Tonnes	Pounds	Total USD	Average Price (USD/kg)	Average Price (USD/lb)
Coos Bay	1	0	829	$5,181.25	$13.78	$6.25
Dutch Harbor	10	11	23,946	$166,024.63	$15.29	$6.93
Homer	3	4	9,815	$65,041.12	$14.61	$6.63
Juneau	3	13	29,464	$230,377.40	$17.24	$7.82
Ketchikan	4	18	39,940	$281,217.50	$15.52	$7.04
King Cove	1	4	8,309	$56,599.31	$15.02	$6.81
Kodiak	6	24	51,888	$387,634.63	$16.47	$7.47
Neah Bay	1	1	1,948	$11,526.95	$13.05	$5.92
Newport	2	1	2,887	$18,043.75	$13.78	$6.25
Petersburg	4	11	24,854	$172,152.05	$15.27	$6.93
Port Angeles	1	1	1,830	$10,732.95	$12.93	$5.87
Port Hardy	5	17	38,316	$348,144.65	$20.03	$9.09
Prince Rupert	5	25	54,351	$489,790.50	$19.87	$9.01
Sand Point	1	1	1,370	$9,630.50	$15.50	$7.03
Seward	7	12	26,713	$204,966.75	$16.92	$7.67
Sitka	4	17	37,109	$286,625.64	$17.03	$7.72
Tofino/Ucluelet	1	5	11,095	$98,453.27	$19.56	$8.87
Valdez	1	2	5,098	$36,960.50	$15.98	$7.25
Vancouver	1	0	1,090	$9,994.19	$20.21	$9.17
Westport	1	1	1,629	$9,387.19	$12.70	$5.76
Yakutat	4	9	18,800	$141,000.00	$16.53	$7.50
Grand Total	**66**	**177**	**391,281**	**$3,039,484.73**	**$17.13**	**$7.77**

[1] Net weight (head-off, dressed, washed).
[2] Prices based on net weight.

Table 2c. FISS Pacific halibut landings by port for sampled U32 Pacific halibut, 2022[1,2].

Offload Port	Trips	Tonnes	Pounds	Total USD	Average Price (USD/kg)	Average Price (USD/lb)
Coos Bay	1	0	62	$248.00	$8.82	$4.00
Dutch Harbor	10	0	5,191	$33,973.17	$14.43	$6.54
Homer	3	0	228	$1,315.56	$12.72	$5.77
Juneau	3	0	1,086	$7,967.40	$16.17	$7.34
Ketchikan	4	0	416	$2,836.00	$15.03	$6.82
King Cove	1	1	1,407	$9,445.19	$14.80	$6.71
Kodiak	6	1	2,596	$19,577.41	$16.63	$7.54
Neah Bay	1	0	868	$4,162.44	$10.57	$4.80
Newport	2	0	394	$1,576.00	$8.82	$4.00
Petersburg	4	1	1,267	$8,222.25	$14.31	$6.49
Port Angeles	1	1	1,299	$6,348.86	$10.78	$4.89
Port Hardy	5	0	860	$7,198.95	$18.45	$8.37
Prince Rupert	5	1	1,982	$16,591.42	$18.46	$8.37
Sand Point	1	0	432	$2,376.00	$12.13	$5.50
Seward	7	0	324	$2,555.20	$17.39	$7.89
Sitka	4	1	1,844	$14,032.77	$16.78	$7.61
Tofino/Ucluelet	1	0	501	$4,164.37	$18.33	$8.31
Valdez	1	0	0	-	-	-
Vancouver	1	0	15	$127.49	$18.74	$8.50
Westport	1	0	502	$1,489.06	$6.54	$2.97
Yakutat	4	1	1,491	$11,182.50	$16.53	$7.50
Grand Total	**66**	**10**	**22,765**	**$155,390.04**	**$15.05**	**$6.83**

[1] Net weight (head-off, dressed, washed).
[2] Prices based on net weight.

Table 3a. FISS landings (total pounds and price) of all Pacific halibut (sampled U32 and all O32) by IPHC Regulatory Area in 2022[1].

IPHC Regulatory Area	2A	2B	2C	3A	3B	4A	4B	4C	4D	Closed Area	Total Weight and Average Price
Tonnes	6	49	56	52	14	4	2	2	3	0	188
Pounds	12,248	108,210	123,781	113,885	31,669	8,393	4,915	3,951	6,994	0	414,046
Price USD/kg	$12.37	$19.85	$16.18	$16.40	$16.04	$15.02	$15.22	$15.08	$15.04	$ -	$17.01
Price USD/lb	$5.61	$9.01	$7.34	$7.44	$7.27	$6.81	$6.90	$6.84	$6.82	$ -	$7.72

1 Net weight (head-off, dressed, washed)

Table 3b. FISS landings (total pounds and price) of O32 Pacific halibut by IPHC Regulatory Area in 2022[1].

IPHC Regulatory Area	2A	2B	2C	3A	3B	4A	4B	4C	4D	Closed Area	Total Weight and Average Price
Tonnes	4	48	54	50	13	3	2	1	2	0	177
Pounds	9123	104,852	119,434	109,780	28,553	6,589	4,711	2,967	5,272	0	391,281
Price USD/kg	$13.26	$19.90	$16.19	$16.40	$16.13	$15.30	$15.23	$15.17	$15.30	$ -	$17.13
Price USD/lb	$6.01	$9.03	$7.34	$7.44	$7.32	$6.94	$6.91	$6.88	$6.94	$ -	$7.77

1 Net weight (head-off, dressed, washed)

Table 3c. FISS landings (total pounds and price) of sampled U32 Pacific halibut by IPHC Regulatory Area in 2022[1].

IPHC Regulatory Area	2A	2B	2C	3A	3B	4A	4B	4C	4D	Closed Area	Total Weight and Average Price
Tonnes	1	2	2	2	1	1	0	0	1	0	10
Pounds	3125	3,358	4,347	4,105	3,116	1,804	204	984	1,722	0	22,765
Price USD/kg	$9.75	$18.44	$15.74	$16.36	$15.16	$14.00	$14.82	$14.82	$14.24	$ -	$15.05
Price USD/lb	$4.42	$8.36	$7.14	$7.42	$6.88	$6.35	$6.72	$6.72	$6.46	$ -	$6.83

1 Net weight (head-off, dressed, washed)

FISS timing

Each year, the months of June, July, and August are targeted for FISS fishing. In 2022, this activity took place from 28 May through 16 September. On a coastwide basis, FISS vessel activity was highest in intensity at the beginning of the FISS season and declined early in August as boats finished their charter regions (Figure 8). All FISS activity was completed by mid-September.

		Week 22	Week 23	Week 24	Week 25	Week 26	Week 27	Week 28	Week 29	Week 30	Week 31	Week 32	Week 33	Week 34	Week 35	Week 36	Week 37	Week 38	Week 39	Week 40
2A	2022		9%	25%	17%	17%	17%	15%												
	2021		19%	15%	13%	8%	23%	10%	14%											
	2019	7%	21%	13%	8%	13%	11%	13%	13%											
	2018	10%	11%	9%	8%	12%	10%	4%	7%	6%	10%	3%	8%	1%						
	2017	8%	7%	7%	5%	6%	7%	1%	6%	4%	7%	10%	8%	8%	4%	6%	4%	2%		
	2016		18%	11%	17%	12%	17%	9%	10%	7%										
	2015	20%	9%	15%	12%	16%	2%	13%	9%	4%										
2B	2022	2%	10%	9%	9%	8%	7%	10%	14%	16%	13%	2%								
	2021		16%	12%	9%	11%	6%	9%	6%	5%	6%	5%	5%	2%	8%					
	2020					2%	14%	16%	11%	6%	6%	10%	7%	1%	9%	13%	6%			
	2019	8%	8%	8%	2%	4%	8%	18%	11%	8%	11%	9%	5%							
	2018	7%	9%	10%	10%	10%	12%	10%	4%	10%	8%	9%	1%							
	2017	10%	10%	7%	8%	5%	15%	18%	17%	10%										
	2016				5%	9%	7%	9%	15%	20%	15%	11%	11%							
	2015	11%	11%	8%	9%	9%	4%	2%	11%	12%	9%	9%	7%							
2C	2022		12%	10%	8%	9%	7%	16%	10%	5%	11%	5%	7%							
	2021	1%	19%	8%	9%	9%	7%	7%	10%	12%	10%	7%								
	2020						14%	11%	7%	9%	6%	7%	18%	14%	8%	5%				
	2019	1%	11%	13%	5%	11%	8%		5%	9%	10%	12%	12%	4%						
	2018				1%	10%	18%	13%	13%	8%	8%	7%	8%	9%	4%					
	2017	15%	15%	10%	15%	13%					7%	9%	15%	2%						
	2016		15%	14%	9%	13%	15%	10%	11%	1%	7%	5%								
	2015	15%	5%		19%	12%	13%	17%	20%											
3A	2022		10%	17%	17%	10%	5%	3%					5%	2%	7%	11%	5%	6%		
	2021		6%	12%	10%	6%	8%	7%	9%	10%	12%	7%	7%	2%	2%	1%				
	2020					0%	13%	11%	12%	16%	12%	11%	7%	5%	4%	5%	3%			
	2019	7%	18%	17%	13%	10%	7%	3%	3%	3%	1%	2%		0%	1%	7%	7%	1%		
	2018	15%	15%	12%	10%	7%	8%	2%	8%	5%	6%	5%	4%	2%	2%					
	2017	14%	9%	11%	11%	9%	10%	9%	8%	6%		3%	3%	2%	3%					
	2016		11%	10%	11%	11%	5%	6%	8%	14%	9%	8%	4%	2%						
	2015	12%	18%	19%	16%	10%	6%	5%	2%	4%	4%	4%								

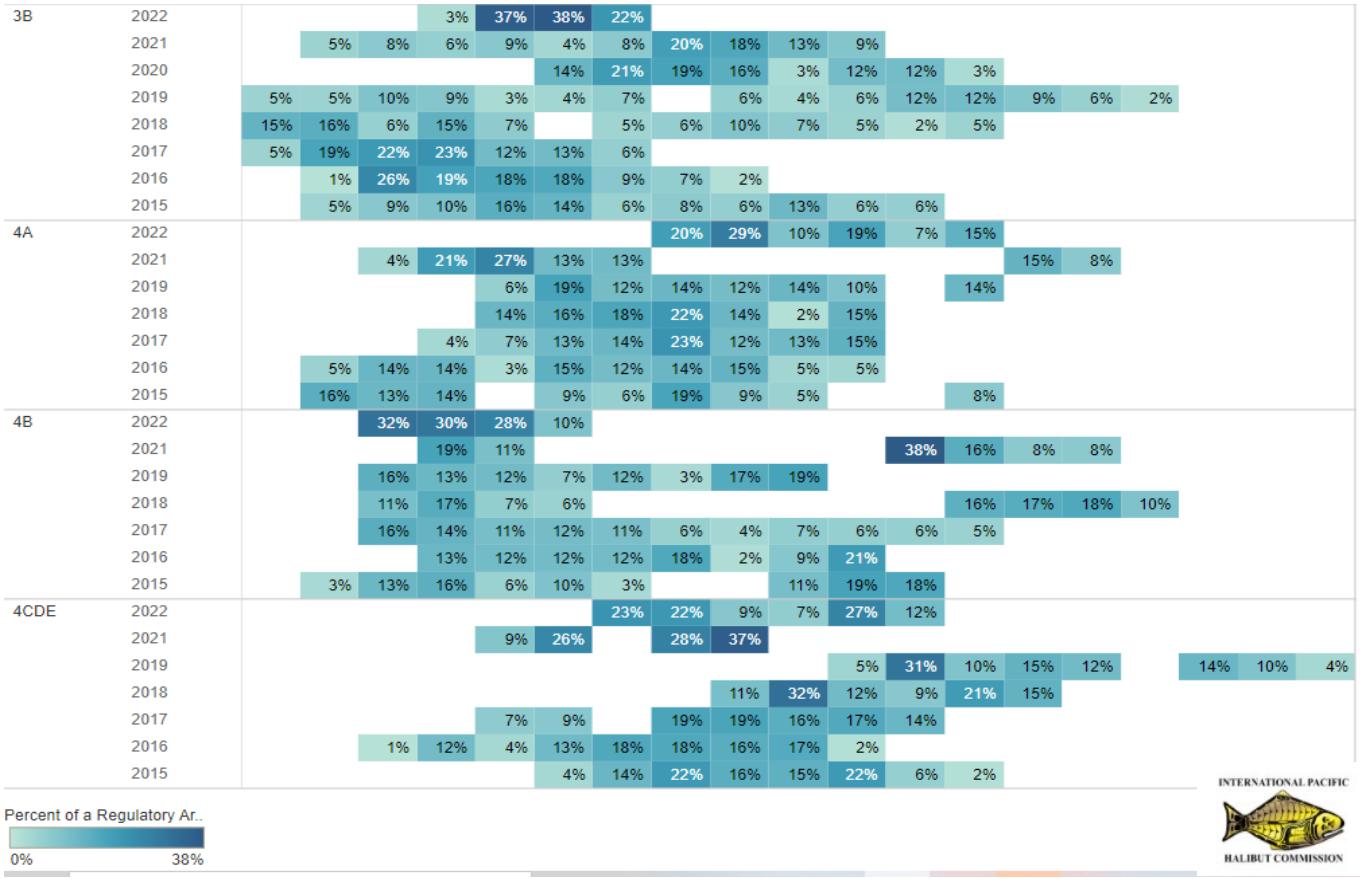


Figure 8. Percent of the total FISS stations completed by IPHC Regulatory Area during each week of the year (2015-2022). Week 22 begins in late May or early June depending on the year.

RECOMMENDATION/S

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-08 which provides a summary of the IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2022.

APPENDICES

Nil.

Space-time modelling of survey data

PREPARED BY: IPHC SECRETARIAT (R. A. WEBSTER; 21 DECEMBER 2022)

PURPOSE

To provide results of the space time modelling of Pacific halibut survey data for the period 1993-2022.

INTRODUCTION

Since 2016 space-time modelling has been used by the IPHC to produce estimates of mean O32 WPUE (weight per unit effort), all sizes WPUE and all sizes NPUE (numbers per unit effort) indices of Pacific halibut density and abundance. The modelling depends primarily on data from the IPHC's fishery-independent setline survey (FISS, Ualesi et al. 2022), but in the Bering Sea also integrates data from the National Marine Fisheries Service annual trawl survey and the Alaska Department of Fish and Game's annual Norton Sound trawl survey. Both surveys are fishery-independent data sources.

Since 2019, weighing of Pacific halibut onboard FISS charter vessels has meant that the weight data used to compute WPUE now comes almost entirely from observed weights of fish rather than estimates from a length-net weight relationship. For fish without directly measured weights, weights are predicted from a year- and IPHC Regulatory Area-specific length-net weight relationship estimated from the FISS length and weight data. For U32 fish with round weight recorded, net weights are estimated from a round-net weight relationship estimated from coastwide sample data from the 2019 FISS.

RESULTS OF SPACE-TIME MODELLING IN 2022

Figures 1 to 3 show time series estimates of O32 WPUE (most comparable to fishery catch-rates), all sizes WPUE and all sizes NPUE over the 1993-2022 period included in the 2022 space-time modelling. Coastwide, we estimate declines in all three series since 2021, with greatest decline for O32 WPUE (18%) and least for all sizes NPUE (8%). These declines were largely due to decreases in the indices for Region 3, with Region 4 also contributing to the O32 WPUE decrease. Indices in Region 2 have been generally stable since 2021. Estimated 1993-22 time series by IPHC Regulatory Area are in Appendix A.

Tables of model output (time series, stock distribution estimates) are updated annually on the IPHC website at https://www.iphc.int/data/time-series-datasets.

FISS model output may also be explored interactively using the link on this page of the IPHC website: https://www.iphc.int/data/datatest/fishery-independent-setline-survey-fiss.

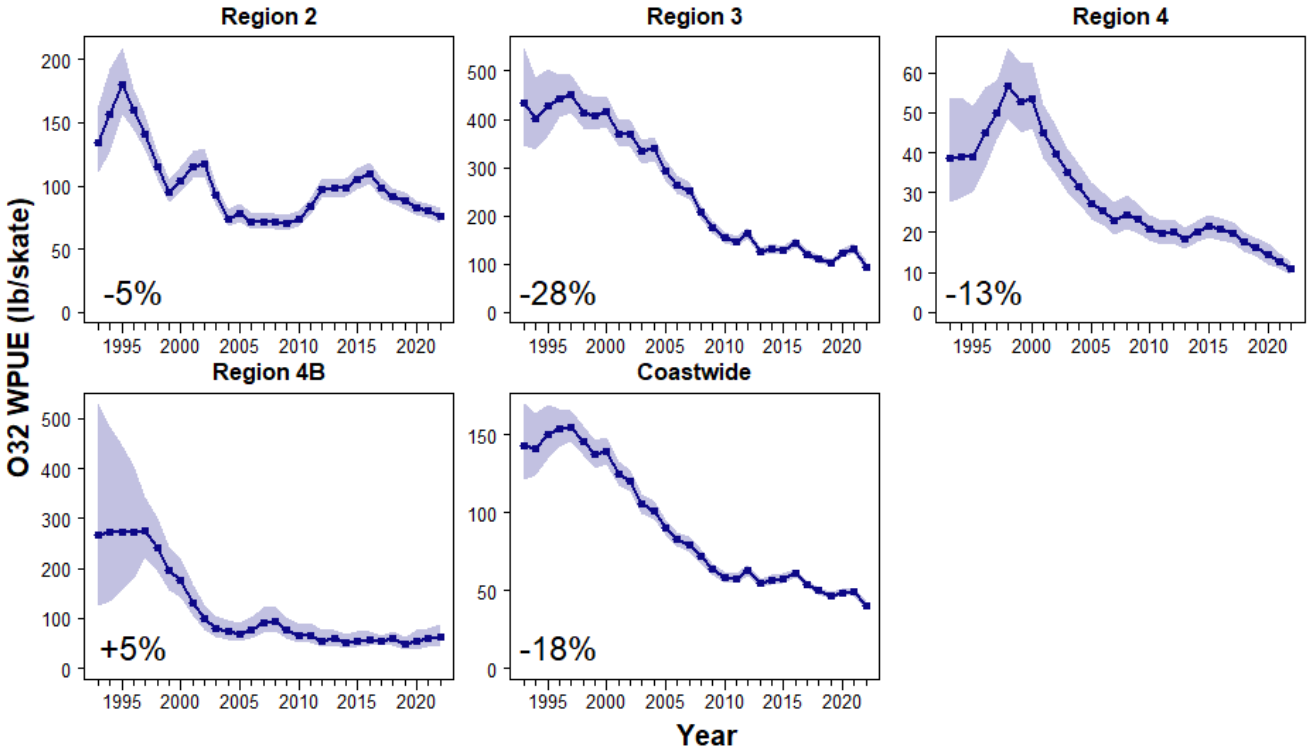


Figure 1. Space-time model output for O32 WPUE for 1993-2022 for Biological Regions. Filled circles denote the posterior means of O32 WPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean O32 WPUE from 2021 to 2022.

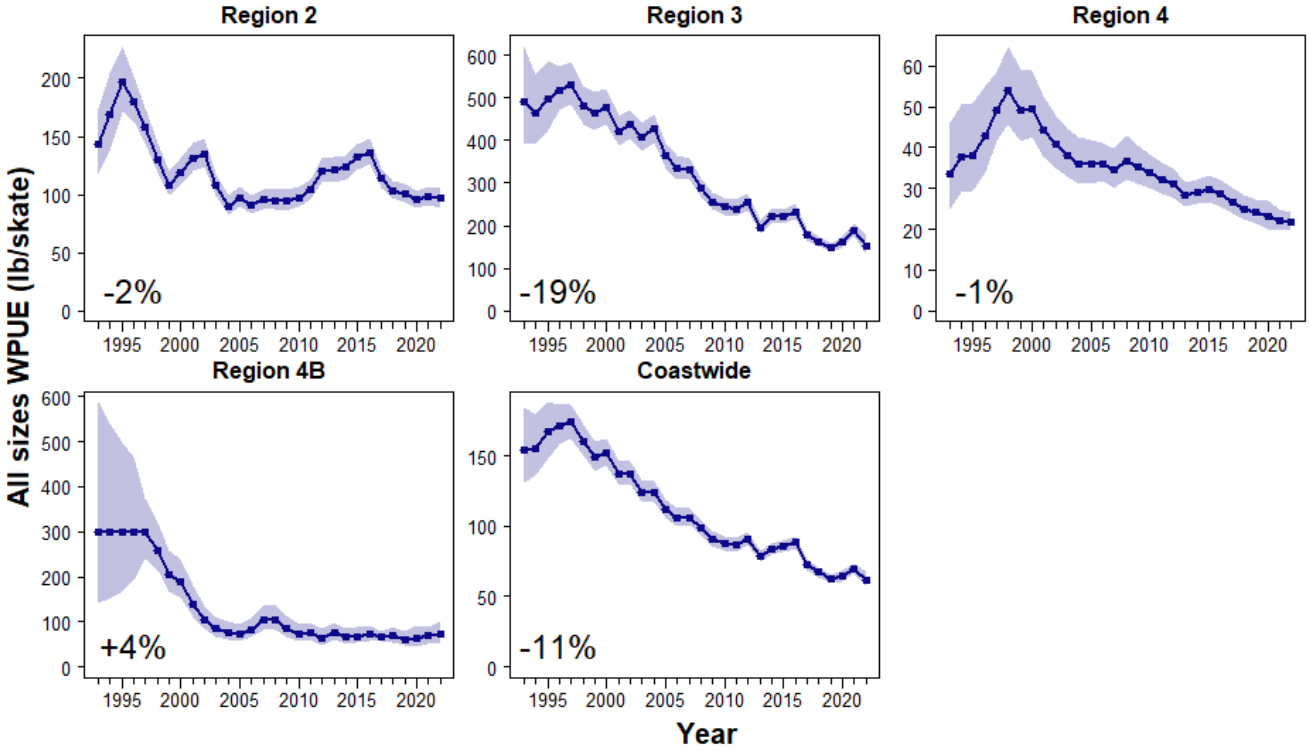


Figure 2. Space-time model output for all sizes WPUE for 1993-2022 for Biological Regions. Filled circles denote the posterior means of all sizes WPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean all sizes WPUE from 2021 to 2022.

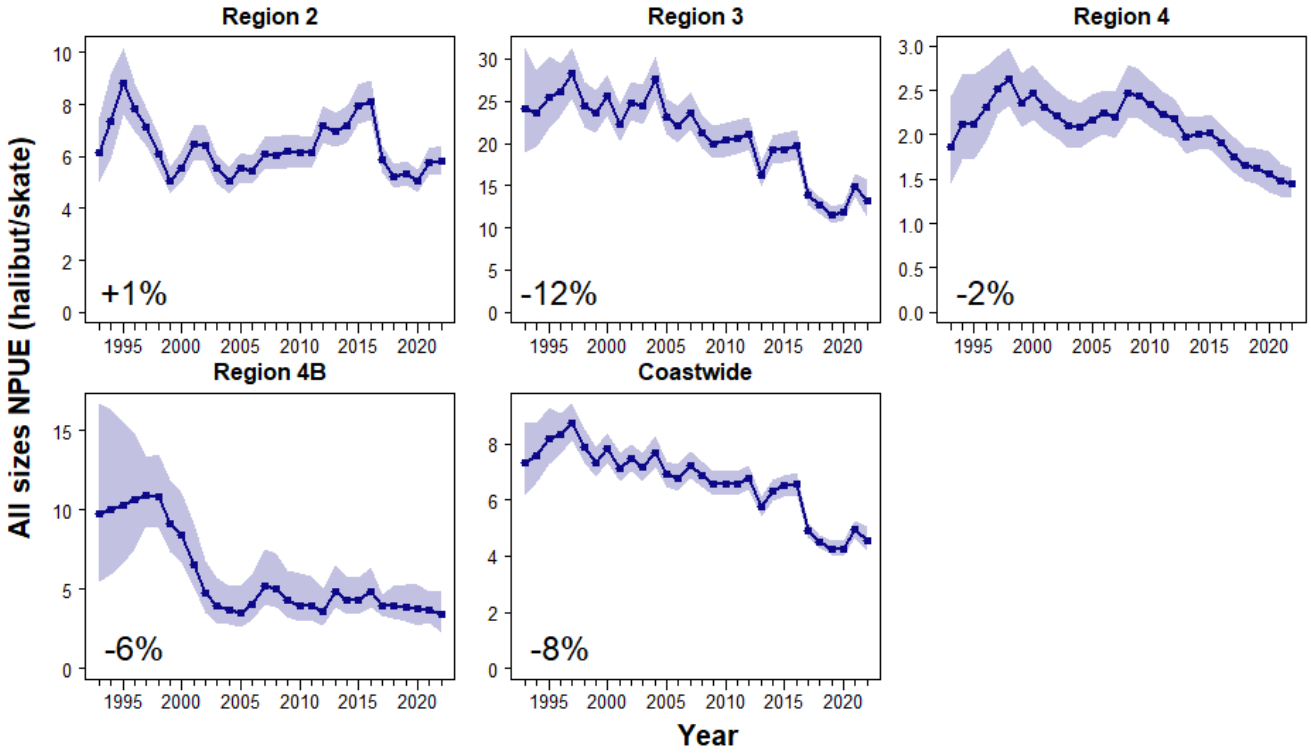


Figure 3. Space-time model output for all sizes NPUE for 1993-2022 for Biological Regions. Filled circles denote the posterior means of all sizes NPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean all sizes NPUE from 2021 to 2022.

RECOMMENDATION

That the Commission **NOTE** paper IPHC-2023-AM099-09 which provides results of the space-time modelling of Pacific halibut survey data for 1993-2022.

REFERENCE

Ualesi, K., Jones, C., Rillera, R. and Jack, T. (2022) IPHC Fishery-independent setline survey (FISS) design and implementation in 2022. IPHC-2022-IM098-08.

APPENDIX A

Space-time modelling results by IPHC Regulatory Area

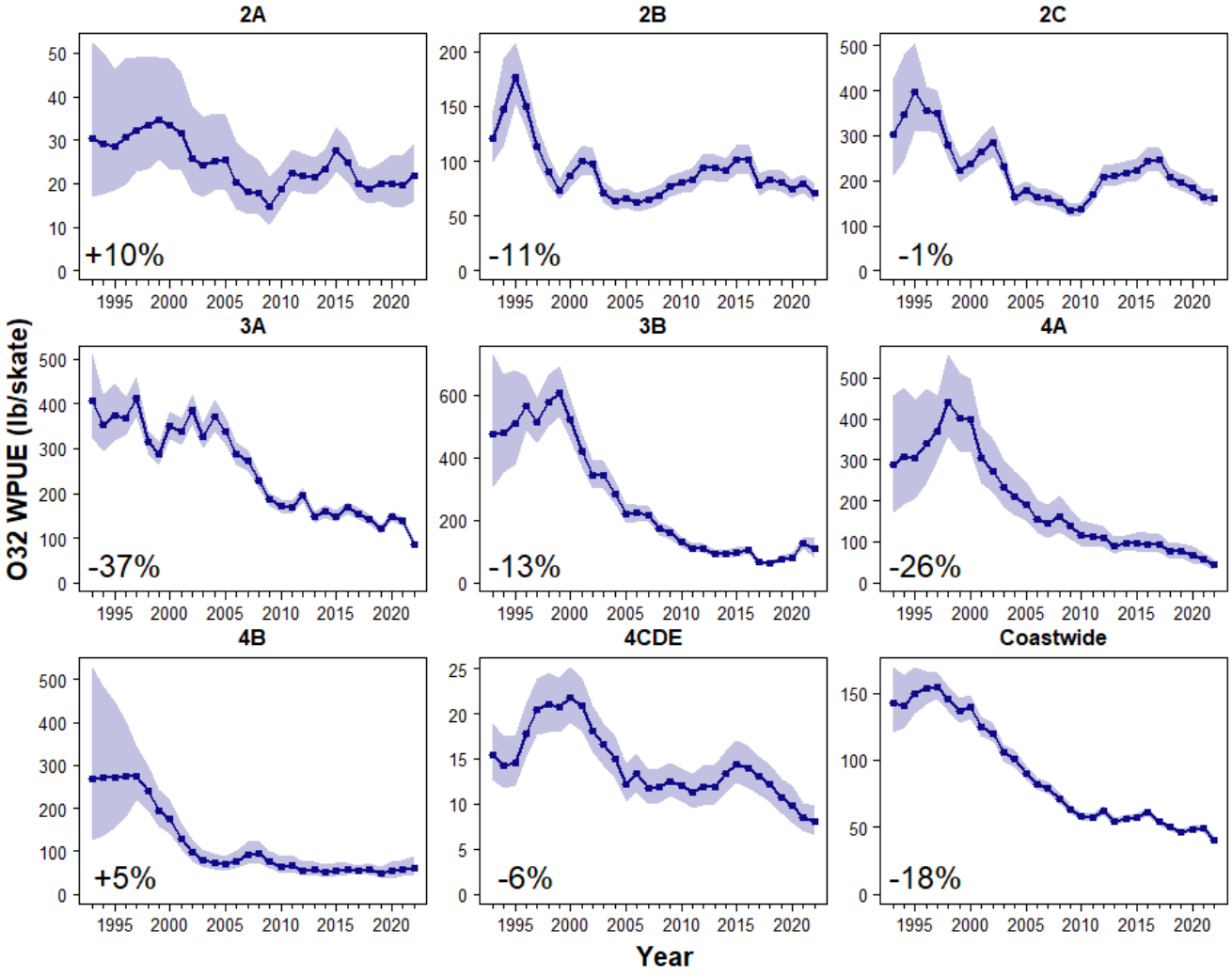


Figure A.1. Space-time model output for O32 WPUE for 1993-2022. Filled circles denote the posterior means of O32 WPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean O32 WPUE from 2021 to 2022.

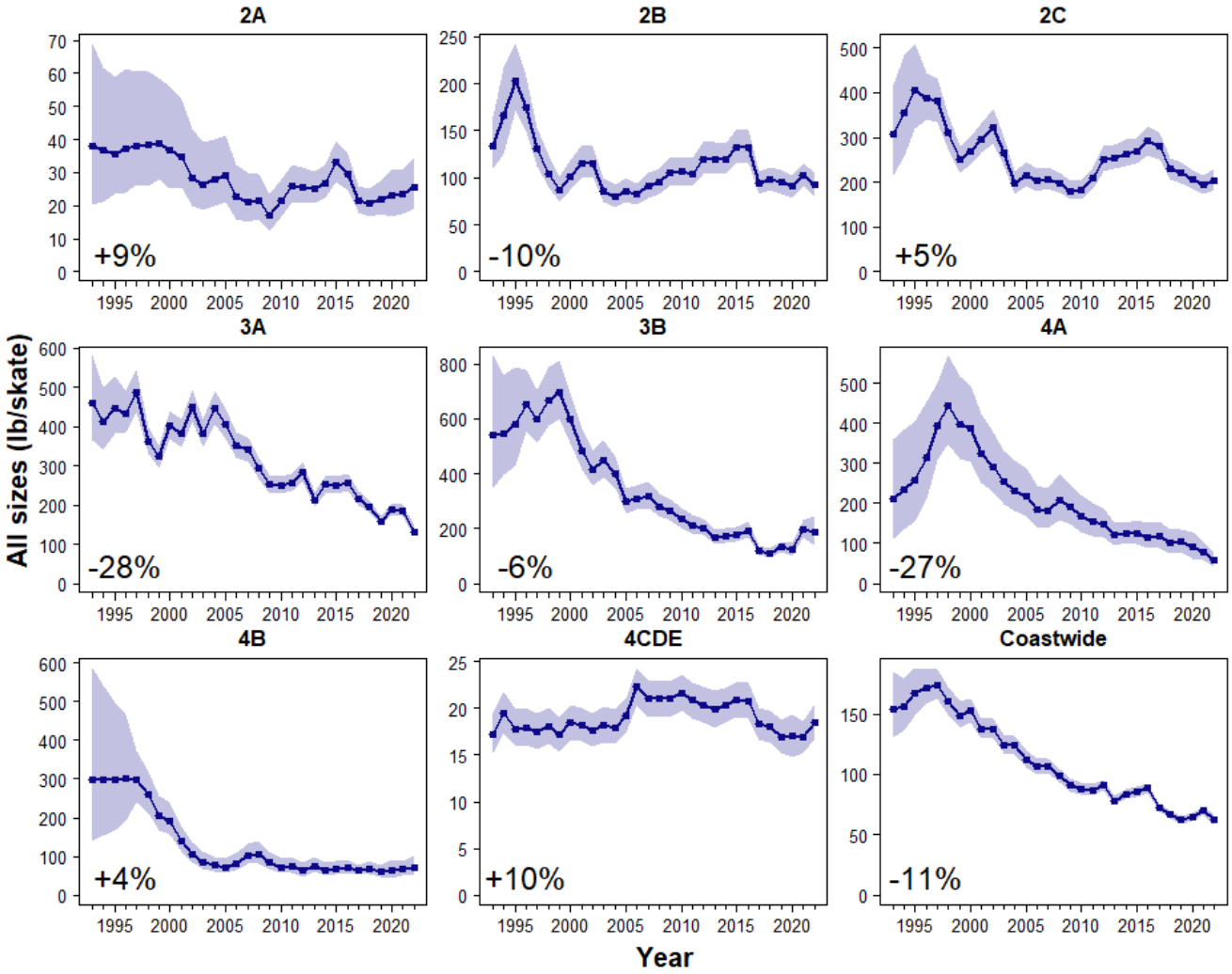


Figure A.2. Space-time model output for all sizes WPUE for 1993-2022. Filled circles denote the posterior means of all sizes WPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean total WPUE from 2021 to 2022.

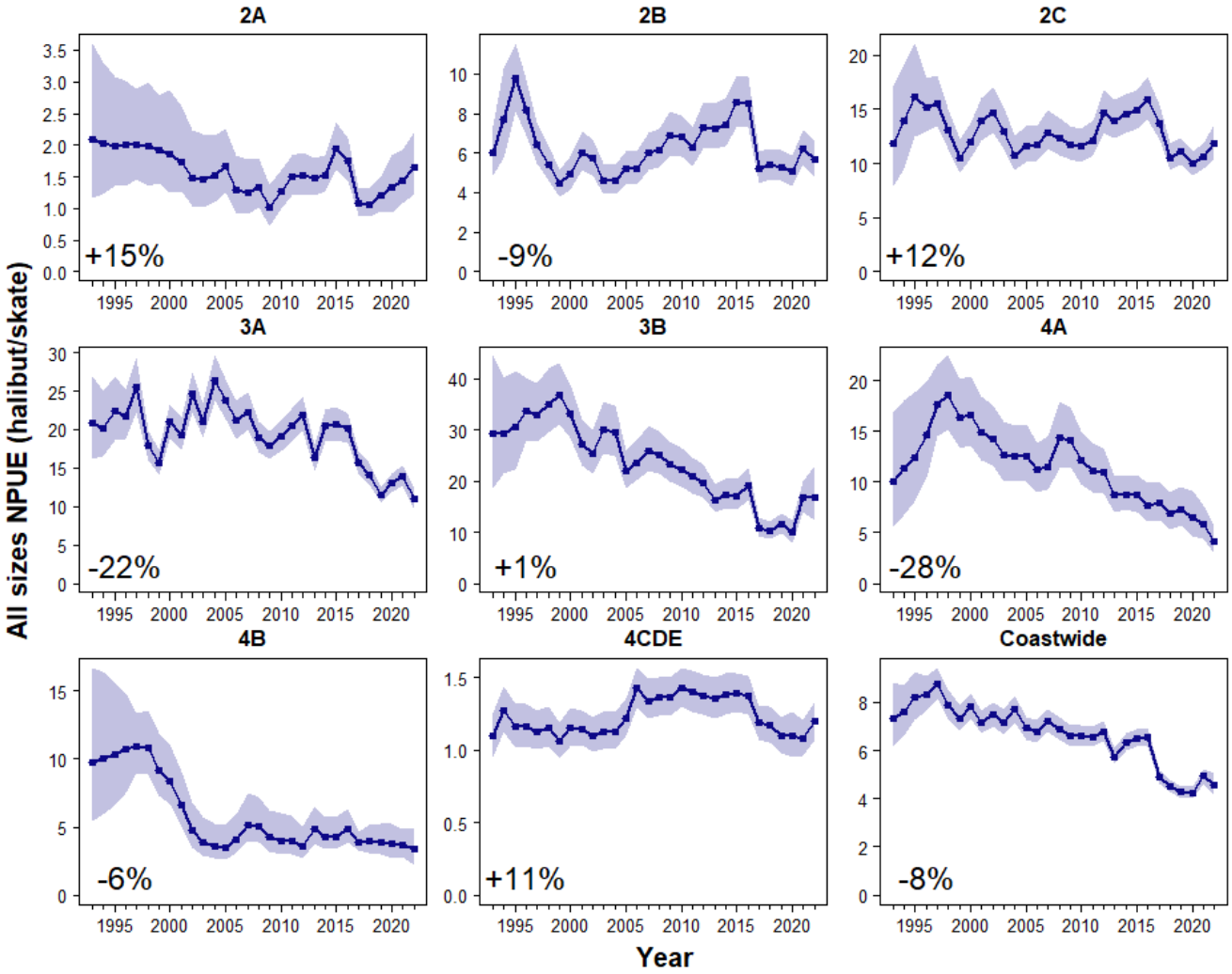


Figure A.3. Space-time model output for all sizes NPUE for 1993-2022. Filled circles denote the posterior means of all sizes NPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean total NPUE from 2021 to 2022.

2023-25 FISS design evaluation

PREPARED BY: IPHC SECRETARIAT (R. WEBSTER & D. WILSON; 20 DECEMBER 2022)

PART 1: PRIMARY OBJECTIVE - SAMPLE PACIFIC HALIBUT FOR STOCK ASSESSMENT AND STOCK DISTRIBUTION ESTIMATION (SCIENTIFIC EVALUATION)

PURPOSE

To present proposed science-based designs for the IPHC's Fishery-Independent Setline Survey (FISS) for the 2023-25 period as reviewed and endorsed by the Scientific Review Board.

BACKGROUND

The IPHC's Fishery-Independent Setline Survey (FISS) provides data used to compute indices of Pacific halibut density for use in monitoring stock trends, estimating stock distribution, and as an important input in the stock assessment. Stock distribution estimates are based on the annual mean weight per unit effort (WPUE) for each IPHC Regulatory Area, computed as the average of WPUE of all Pacific halibut and for O32 (greater than or equal to 32" or 81.3cm in length) Pacific halibut estimated at each station in an area. Mean numbers per unit effort (NPUE) is used to index the trend in Pacific halibut density for use in the stock assessment models.

FISS history 1993-2019

The IPHC has undertaken FISS activity since the 1960s. However, methods were not standardized to a degree (e.g., the bait and gear used) that allows for simple combined analyses until 1993. From 1993 to 1997, the annual design was a modification of a design developed and implemented in the 1960s, and involved fishing triangular clusters of stations, with clusters located on a grid (IPHC 2012). Coverage was limited in most years and was generally restricted to IPHC Regulatory Areas 2B through 3B. The modern FISS design, based on a grid with 10 nmi (18.5 km) spacing, was introduced in 1998, and over the subsequent two years was expanded to include annual coverage in parts of all IPHC Regulatory Areas within the depth ranges of 20-275 fathoms (37-503 m) in the Gulf of Alaska and Aleutian Islands, and 75-275 fathoms (137-503 m) in the Bering Sea (IPHC 2012). Annually-fished stations were added around islands in the Bering Sea in 2006, and in the same year, a less dense grid of paired stations was fished in shallower waters of the southeastern Bering Sea, providing data for a calibration with data from the annual National Marine Fishery Service (NMFS) bottom trawl survey (Webster et al. 2020).

Through examination of commercial logbook data and information from other sources, it became clear by 2010 that the historical FISS design had gaps in coverage of Pacific halibut habitat that had the potential to lead to bias in estimates derived from its data. These gaps included deep and shallow waters outside the FISS depth range (0-20 fathoms and 275-400 fathoms), and unsurveyed stations on the 10 nmi grid within the 20-275 fathom depth range within each IPHC Regulatory Area. This led the IPHC Secretariat to propose expanding the FISS to provide coverage of the unsurveyed habitat with United States and Canadian waters. In 2011 a pilot expansion was undertaken in IPHC Regulatory Area 2A, with stations on the 10 nmi grid added to deep (275-400 fathoms) and shallow (10-20 fathoms) waters, the Salish Sea, and other, smaller gaps in coverage. (The 10 fathom limit in shallow waters was due to logistical difficulties

in standardized fishing of longline gear in shallower waters.) A second expansion in IPHC Regulatory Area 2A was completed in 2013, with a pilot California survey between latitudes of 40-42°N.

The full expansion program began in 2014 and continued through 2019, resulting in the sampling of the entire FISS design of 1890 stations in the shortest time logistically possible. The FISS expansion program allowed us to build a consistent and complete picture of Pacific halibut density throughout its range in Convention waters. Sampling the full FISS design has reduced bias as noted above, and, in conjunction with space-time modelling of survey data (see below), has improved precision and fully quantified the uncertainty associated with estimates based on partial annual sampling of the species range. It has also provided us with a complete set of observations over the full FISS design (Figure 1.1) from which an optimal subset of stations can be selected when devising annual FISS designs. This station selection process began in 2019 for the 2020 FISS and continues with the current review of design proposals for 2023-25. Note that in the Bering Sea, the full FISS design does not provide complete spatial coverage, and FISS data are augmented with calibrated data from National Marine Fisheries Service (NMFS) and Alaska Department of Fish and Game (ADFG) trawl surveys (stations can vary by year – 2019 designs are typical for recent years and are shown in Figure 1.1). Both supplementary surveys have been conducted approximately annually in recent years.

Space-time modelling

In 2016, a space-time modelling approach was introduced to estimate time series of weight and numbers-per-unit-effort (WPUE and NPUE), and to estimate the stock distribution of Pacific halibut among IPHC Regulatory Areas. This represented an improvement over the largely empirical approach used previously, as it made use of additional information within the survey data regarding the degree of spatial and temporal of Pacific halibut density, along with information from covariates such as depth (see Webster 2016, 2017). It also allowed a more complete of accounting of uncertainty; for example, prior to the use of space-time modelling, uncertainty due to unsurveyed regions in each year was ignored in the estimation. Prior to the application of the space-time modelling, these unsampled regions were either filled in using independently estimated scalar calibrations (if fished at least once), or catch-rates at unsampled stations were assumed to be equal to the mean for the entire Regulatory Area. The IPHC's Scientific Review Board (SRB) has provided supportive reviews of the space-time modelling approach (e.g., IPHC-2018-SRB013-R), and the methods have been published in a peer-review journal (Webster et al. 2020). Similar geostatistical models are now routinely used to standardise fishery-independent trawl surveys for groundfish on the West Coast of the U.S. and in Alaskan waters (e.g., Thorson et al. 2015 and Thorson 2019).

FISS design objectives

The primary purpose of the annual FISS is to sample Pacific halibut to provide data for the stock assessment (abundance indices, biological data) and estimates of stock distribution for use in the IPHC's management procedure. The priority of the current rationalised FISS is therefore to maintain or enhance data quality (precision and bias) by establishing baseline sampling requirements in terms of station count, station distribution and skates per station. Potential considerations that could add to or modify the design are logistics and cost (secondary design layer), and FISS removals (impact on the stock), data collection assistance for other agencies, and IPHC policies (tertiary design layer). These priorities are outlined in Table 1.1.

Table 1.1 Prioritization of FISS objectives and corresponding design layers.

Priority	Objective	Design Layer
Primary	Sample Pacific halibut for stock assessment and stock distribution estimation	Minimum sampling requirements in terms of: • Station distribution • Station count • Skates per station
Secondary	Long-term revenue neutrality	Logistics and cost: operational feasibility and cost/revenue neutrality
Tertiary	Minimize removals, and assist others where feasible on a cost-recovery basis.	Removals: minimize impact on the stock while meeting primary priority Assist: assist others to collect data on a cost-recovery basis IPHC policies: ad-hoc decisions of the Commission regarding the FISS design

Design review and finalisation process

Since completion of the FISS expansions, a review process has been developed for annual FISS designs created according to the above objectives:

- The Secretariat presents design proposals based only on primary objectives (Table 1.1) to the SRB for three subsequent years at the June meeting (recognizing that data from the current summer FISS will not be available for analysis prior to the September SRB meeting);
- These design proposals, revised (if necessary) based on June SRB input, are then reviewed by Commissioners at the September work meeting;
- At their September meeting, the SRB reviews revisions to the design proposals made to account for secondary and tertiary objectives

Following the review process, designs may be further modified to account for any updates based on secondary and tertiary objectives before being finalised during the Interim and Annual meetings and the period prior to implementation:

- Presentation of FISS designs for 'endorsement' by the Commission occurs at the November Interim Meeting;
- Ad hoc modifications to the design for the current year (due to unforeseen issues arising) are possible at the Annual Meeting;
- The endorsed design for current year is then modified (if necessary) to account for any additional tertiary objectives prior to summer implementation (February-April).

Consultation with industry and stakeholders occurs throughout the FISS planning process, at the Research Advisory Board meeting and particularly in finalizing design details as part of the FISS charter bid process, when stations can be added and other adjustments made to provide

for improved logistical efficiency. We also note the opportunities for stakeholder input during public meetings (Interim and Annual Meetings).
Note that while the review process examines designs for the next three years, revisions to designs for the second and third years are expected during subsequent review periods as additional data are collected. Having design proposals available for three years instead of the next year only assists the IPHC with medium-term planning of the FISS, and allows reviewers (SRB, IPHC Commissioners) and stakeholders to see more clearly the planning process for sampling the entire FISS footprint over multiple years. Extending the proposed designs beyond three years was not considered worthwhile, as we expect further evaluation undertaken following collection of data during the one to three-year period to influence design choices for subsequent years.

PROPOSED DESIGNS FOR 2023-25

The designs proposed for 2023-25 (Figures 1.2 to 1.4) use efficient subarea sampling in IPHC Regulatory Areas 2A, 4A and 4B, and incorporate a randomized subsampling of FISS stations in IPHC Regulatory Areas 2B, 2C, 3A and 3B (except for the near-zero catch rate inside waters around Vancouver Island), with a sampling rate chosen to keep the sample size close to 1000 stations in an average year, a logistically feasible footprint for the annual FISS. In 2021, designs for 2023-24 were also approved subject to later revision (IPHC-2022-AM098-R). The designs developed in 2021 have largely been carried over into the current 2023-24 proposal, with exceptions noted below.

- IPHC Regulatory Area 2A: Sample the highest-density waters of IPHC Regulatory 2A in northern Washington and central/southern Oregon each year of the 2023-25 period, and in 2023 only, add the moderate density waters of southern Washington/northern Oregon and northern California **(revision from previous 2023 design proposal)**.
- IPHC Regulatory Area 4A: Sample the higher-density western subarea of IPHC Regulatory Area 4A in all three years, the medium-density northern shelf edge subarea in 2023 only, and the historically lower-density southeastern subarea in 2025 only.
- IPHC Regulatory Area 4B: Sample the high-density eastern subarea in all three years, and the western subarea in 2023 only **(revision from previous 2023 design proposal)**.

Stations in the moderate-density waters of IPHC Regulatory 2A proposed for 2023 sampling have not been sampled since 2017 (California) or 2019 (WA/OR). This is a revision from previous proposals, which did not include these stations prior to 2025 (Webster 2021). Evaluation of potential designs in IPHC Regulatory Area 2A showed that unless these waters were sampled in 2023, we project that precision targets would not be met, with an expected 2023 coefficient of variation for mean O32 WPUE of 20% (target range is <15%). We have also received anecdotal reports of increasing recreational catch rates in northern California, providing additional motivation for bringing forward sampling in those waters.

A review of commercial catch data shows moderate catch rates in recent years in southeast IPHC Regulatory 4A. With these stations last sampled in 2019, sampling in 2025 will provide an updated understanding of Pacific halibut density in this subarea and inform future decisions on sampling frequency in IPHC Regulatory Area 4A. Note that several stations on the IPHC Regulatory Area 4A shelf edge overlap the NMFS bottom trawl survey (in purple in Figure 1.2, and are not proposed for FISS sampling in the foreseeable future.

In the most recent surveys of IPHC Regulatory Area 4B, the eastern subarea had by far the highest catch rates and is the priority for frequent sampling. The western and central subareas

were approved for sampling in 2022, but only the central subarea is to be sampled due to a lack of charter vessel bids for the western subarea. Thus, the western subarea has been added to the 2023 proposal to reduce the risk of bias.

Following this three-year period, the only remaining waters unsampled since FISS rationalization began in 2020 will be:

- Zero-to-low density waters in IPHC Regulatory Area 2A comprising deep (>275 ftm) and shallow (<20 ftm) stations and northern California south of 40°N (sampled comprehensively in 2017), and low-density waters of the Salish Sea (previously sampled in 2018).
- Near-zero density waters in the Salish Sea in IPHC Regulatory Area 2B (sampled in 2018 only).

We anticipate proposing these stations for sampling in 2026-28, 9-10 years after previous FISS sampling, so that the entire 1890-station FISS grid will have been fished from 2020-28.

The design proposals again include full sampling of the standard FISS grid in IPHC Regulatory Area 4CDE. The Pacific halibut distribution in this area continues to be of particular interest, as it is a highly dynamic region with an apparently northward-shifting distribution of Pacific halibut, and increasing uncertainty regarding connectivity with populations adjacent to and within Russian waters. Ongoing oceanographic (e.g., sea ice and bottom temperatures) and ecosystem (e.g., prey species abundance and distribution) changes in this Regulatory Area highlight the potential for changes in the biology and abundance of Pacific halibut in the Bering Sea. Despite prioritizing comprehensive sampling of this Regulatory Area in 2020-22, in each year logistical challenges have precluded achieving the full design. Therefore, it is retained throughout the current three-year plan, to be re-evaluated when and if sampling is successful.

While the proposed designs continue to rely on randomised subsampling of stations within the core IPHC Regulatory Areas (2B, 2C, 3A and 3B) and logistically efficient subarea designs elsewhere, other designs have been considered and remain as options (Webster 2021, Appendix A).

We note that at SRB020 and SRB021, the SRB endorsed the final 2023 FISS design as presented in Figure 1.2, and provisionally endorsed the 2023-24 designs (Figures 1.3 and 1.4) (IPHC-2022-SRB020-R) while also recognising that the 2023 design will need to be further optimised to ensure other Commission objectives are met, including but not limited to maintaining long-term revenue neutrality (IPHC-2022-SRB021-R).

FISS DESIGN EVALUATION

Precision targets

In order to maintain the quality of the estimates used for the assessment, and for estimating stock distribution, the IPHC Secretariat has set a target range of less than 15% for the coefficient of variation (CV) of mean O32 and all sizes WPUE for all IPHC Regulatory Areas. We also established precision targets of IPHC Biological Regions and a coastwide target (IPHC-2020-AM096-07), but achievement of the Regulatory Area targets is expected to ensure that targets for the larger units will also be met.

Reducing the potential for bias

In IPHC Regulatory Areas in which stations are not subsampled randomly (IPHC Regulatory Areas 2A, 4A and 4B), sampling a subset of the full data frame in any area or region brings with it the potential for bias. This is due to trends in the unsurveyed portion of a management unit (Regulatory Area or Biological Region) potentially differing from those in the surveyed portion. Therefore, we also examine how frequently part of an area or region (subarea) should be surveyed in order to reduce the likelihood of appreciable bias. For this, we use a threshold of a 10% absolute change in biomass percentage: based on historical trends (1993-2021): how quickly can a subarea's percent of the biomass of a Regulatory Area change by at least 10% (e.g., from 15 to 25% of the area's biomass)? By sampling each subarea frequently enough to reduce the chance of its percentage changing by more than 10% between successive surveys of the subarea, we minimize the potential for appreciable bias in the Regulatory Area's index.

We examined the effect of subsampling the FISS stations for a management unit on precision as follows:

- Where a randomised design is not used, identify logistically efficient subareas within each management unit and select priorities for future sampling.
- Generate simulated data for all FISS stations based on the output from the most recent space-time modelling.
- Fit space-time models to the observed data series augmented with 1 to 3 additional years of simulated data, where the design over those three years reflects the sampling priorities identified above.
- Project precision estimates and quantify bias potential for comparison against threshold.

Table 1.2 shows projected CVs following completion of the proposed 2022-25 FISS designs. With these designs, we are projected to maintain CVs within the target range. Estimates from the terminal year are most informative for management decisions, but they also typically have the largest CVs (all else being equal; these are then reduced in subsequent years as observations are available in both adjacent years, due to the temporal correlation). The final column in Table 2 shows the CV projections immediately following the 2023 FISS, which are also within the target range.

Table 1.2 Projected CVs (%) for 2022-25 for O32 WPUE estimated after completion of the proposed 2023-25 FISS designs, and (final column) after completion of the proposed 2023 FISS design only.

Reg. Area	2022	2023	2024	2025	**2023** (Estimated in 2023)
2A	13	12	13	15	14
4A	10	9	10	10	12
4B	12	9	10	12	9

For maintaining low bias, we looked at estimates of historical changes in the proportion of biomass in each subarea, and used that to guide the sampling frequency in future designs. Thus, subareas that have historically had rapid changes in biomass proportion need to be sampled most frequently, and those that are relatively stable can be sampled less frequently. For example, if a subarea's % of its Regulatory Area's biomass changed by no more than 8% over 1-2 years but by up to 12% over three years, we should sample it at least every three years based on the 10% criterion discussed above. These criteria are updated as new data are collected and they therefore respond to updates in our understanding of the rates of change occurring in each subarea.

Based on estimates from the historical times series (1993-2021) of O32 WPUE, the proposed designs for 2023-25 would be expected to maintain low bias by ensuring that it is unlikely that biomass proportions for all subareas change by more than 10% since they were previously sampled (Table 1.3). We note that the lack of sampling in the western subarea of IPHC Regulatory 4B in 2022 means that maximum change from the historical time series for this subarea was 13%, exceeding the 10% threshold. Sampling this historically-variable subarea in 2023 again reduces values to within 10%.

Table 1.3. Maximum expected absolute changes (%) in biomass proportion since previous sampling of subareas that are unsampled in a given year, based on the estimated 1993-2021 time series.

Reg. Area	2022	2023	2024	2025
2A	9	9	9	9
4A	10	7	6	8
4B	13	5	8	10

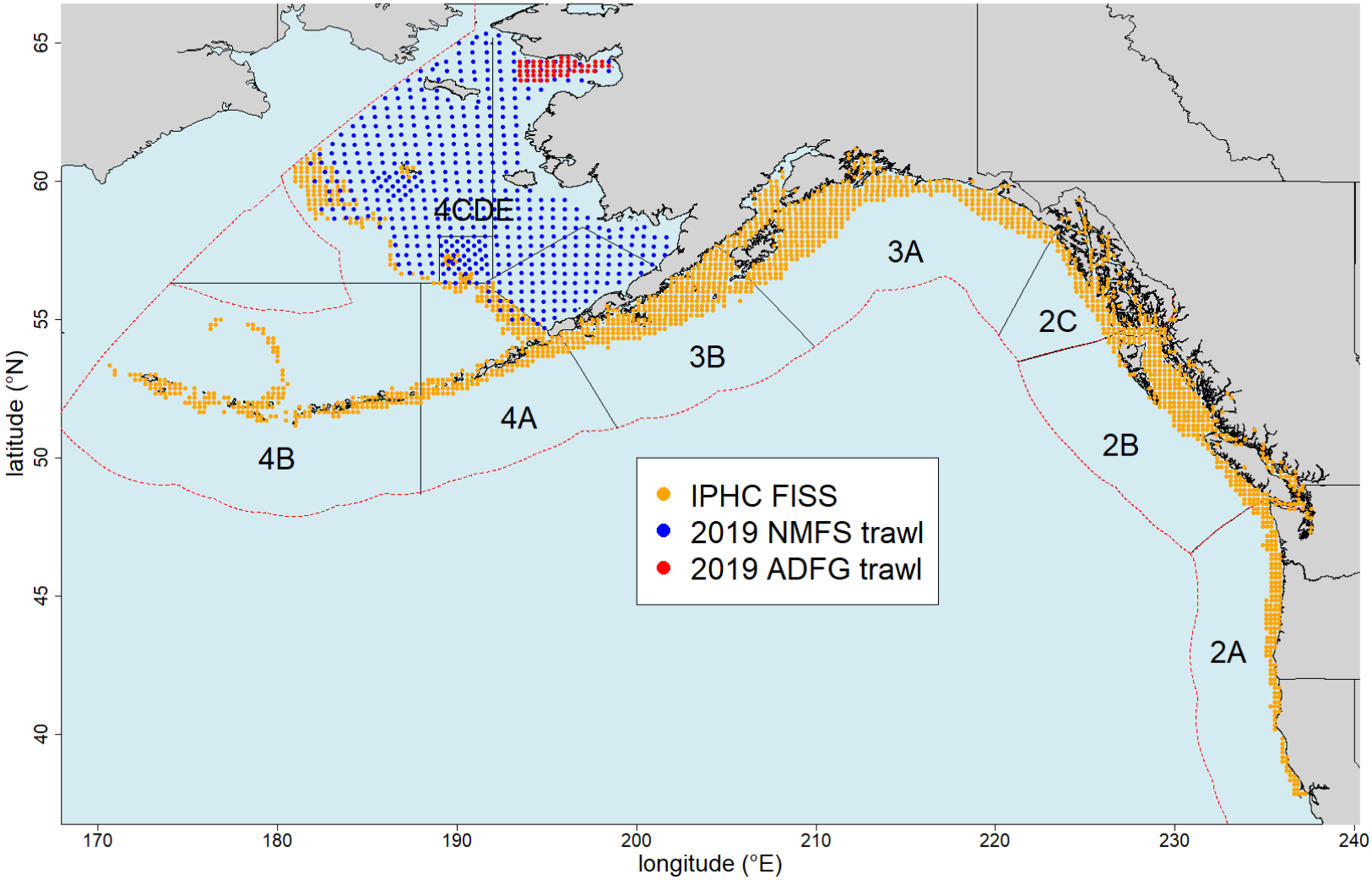


Figure 1.1. Map of the full 1890 station FISS design, with orange circles representing stations available for inclusion in annual sampling designs, and other colours representing trawl stations from 2019 NMFS and ADFG surveys used to provide complementary data for Bering Sea modelling.

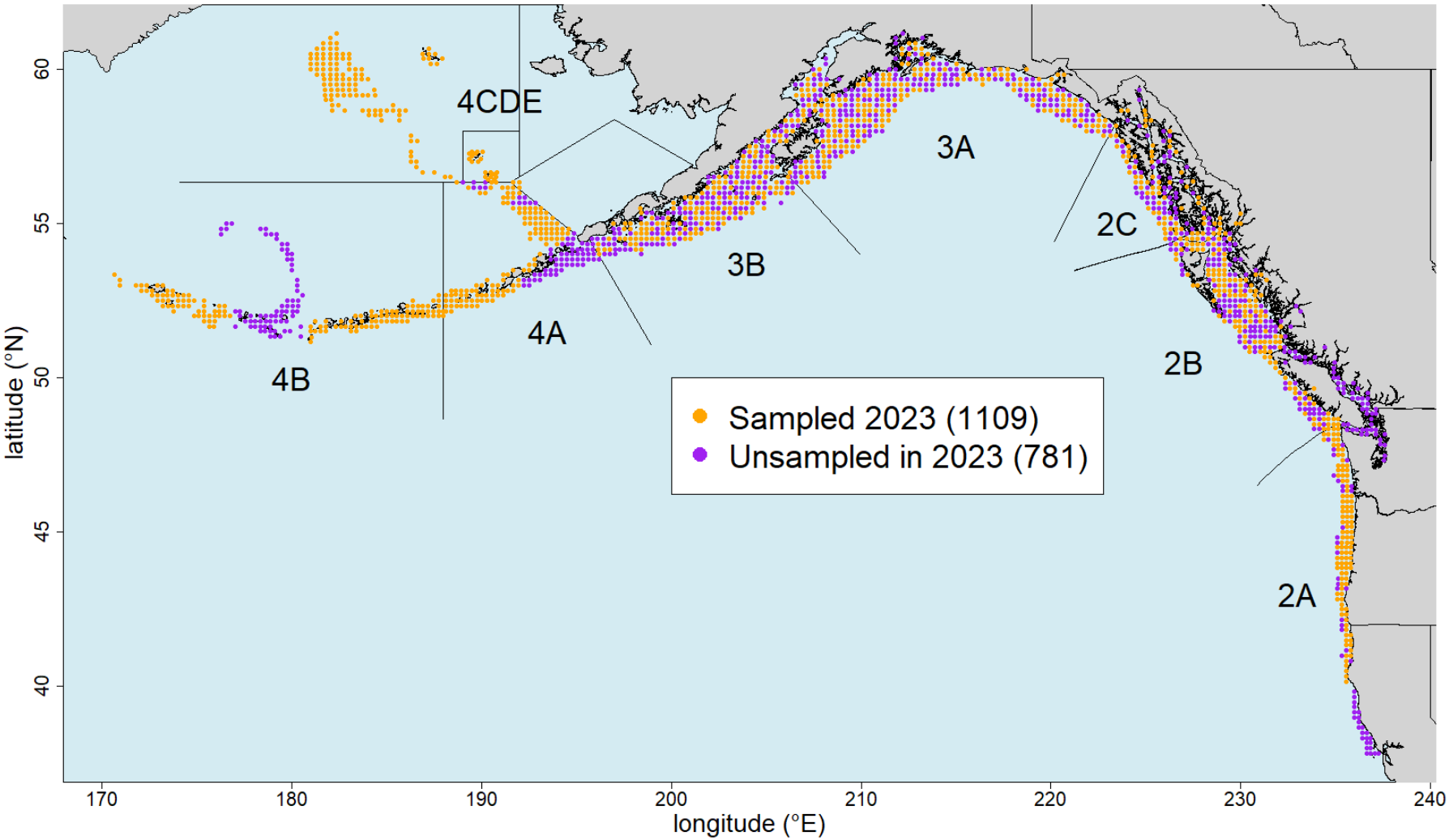


Figure 1.2. Proposed science-based FISS design in 2023 (orange circles) based on randomized sampling in 2B-3B, and a subarea design elsewhere. Purple circles are optional for meeting data quality criteria.

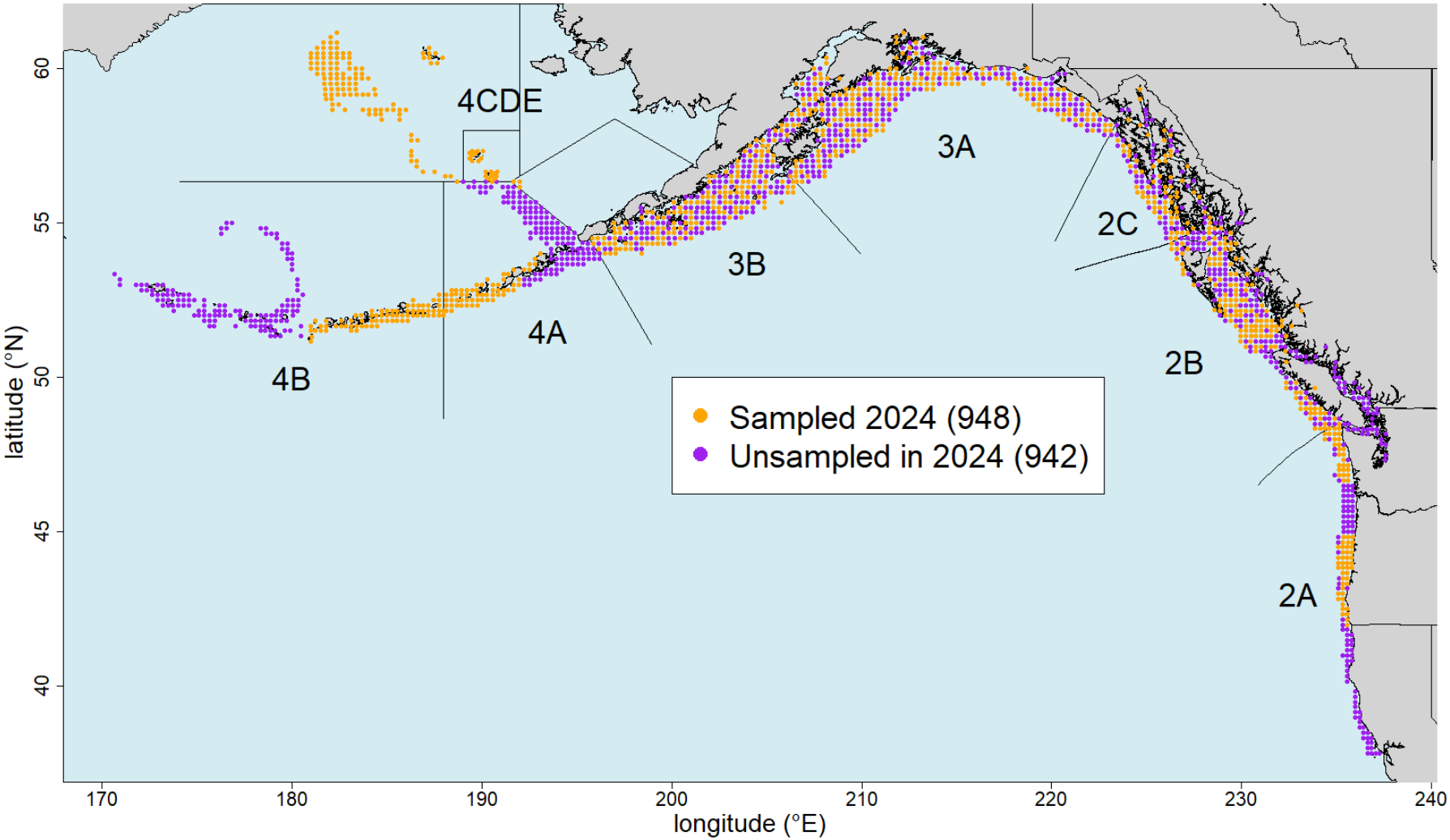


Figure 1.3. Proposed science-based FISS design in 2024 (orange circles) based on randomized sampling in 2B-3B, and a subarea design elsewhere. Purple circles are optional for meeting data quality criteria.

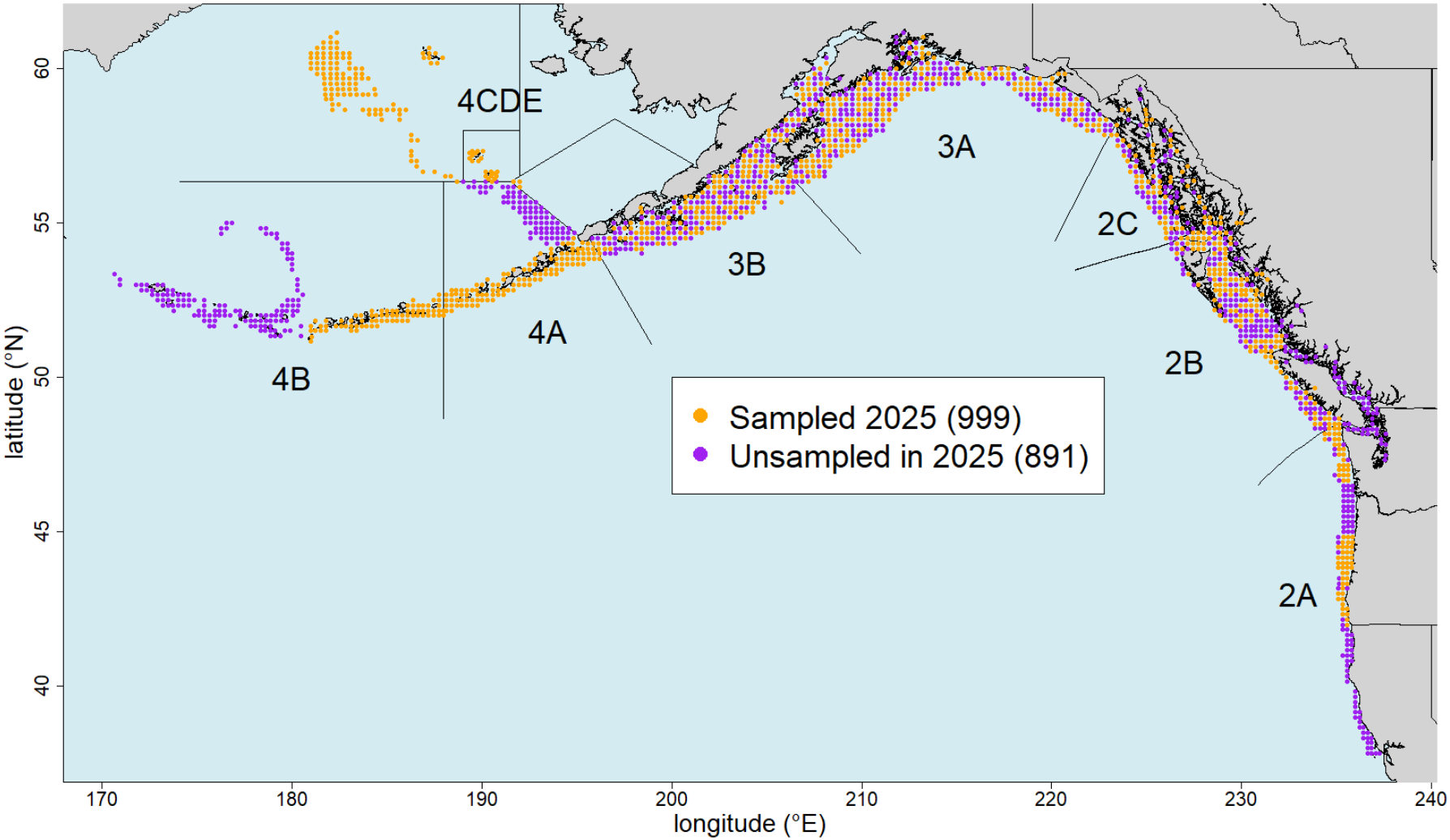


Figure 1.4. Proposed science-based FISS design in 2025 (orange circles) based on randomized sampling in 2B-3B, and a subarea design elsewhere. Purple circles are optional for meeting data quality criteria.

PART 2: OBJECTIVE 2 - LONG-TERM REVENUE NEUTRALITY (COST EVALUATION)

PURPOSE

To present the cost-optimized FISS design for 2023 endorsed by the Commission at IM098.

BACKGROUND

Consideration of cost

Ideally, the FISS design would be based only on scientific needs. However, some Regulatory Areas are consistently more expensive to sample than others, so for these the efficient subarea designs were developed. The purpose of factoring in cost was to provide a statistically efficient and logistically feasible design for consideration by the Commission. During the Interim and Annual Meetings and subsequent discussions, cost, logistics and tertiary considerations (Table 1.1) are also factored in developing the final design for implementation in the current year. It is anticipated that under most circumstances, cost considerations can be addressed by adding stations to the minimum design proposed in this report. In particular, the FISS is funded by sales of captured fish and is intended to have long-term revenue neutrality, meaning that any design must also be evaluated in terms of the following factors:

- Expected catch of Pacific halibut
- Expected Pacific halibut sale price
- Charter vessel costs, including relative costs per skate and per station
- Bait costs
- IPHC Secretariat administrative costs

Balancing these factors may result in modifications to the proposed science-based designs reviewed by the SRB. Changes can include increasing sampling effort in high-density regions and decreasing effort in low density regions and varying the number of skates per station across FISS charter regions.

FISS design objectives

The primary objective of the annual IPHC Fishery-Independent Setline Survey (FISS) is to sample Pacific halibut to provide data for the stock assessment (abundance indices, biological data) and estimates of stock distribution for use in the IPHC's management procedure. The priority of the current rationalised FISS is therefore to maintain or enhance data quality (precision and bias) by establishing baseline sampling requirements in terms of station count, station distribution and skates per station. Potential considerations that could add to or modify the design are logistics and cost (secondary design layer), FISS removals (impact on the stock), data collection assistance for other agencies, and IPHC policies (tertiary design layer). These priorities were outlined in Table 1.1 in Part 1 of this report.

At IM098 (Webster and Wilson 2022), Secretariat staff presented a sequence of designs that accounted for varying degrees of cost optimization, ranging from the science-based design

(Figure 1.2) to a revenue neutral design. The Commission endorsed a design (Figure 2.1) that provides comprehensive spatial coverage in IPHC Regulatory Areas 2B, 2C and 3B, extensive coverage in IPHC Regulatory Area 3A (with three revenue-negative charter regions excluded), and a minimal number of stations in IPHC Regulatory Areas 2A, 4A, and 4B (IPHC-2022-IM098-R).

> IM098 para. 31:
>
> *The Commission **ENDORSED** an optimized design for the 2023 FISS as provided at Appendix IV, that balances the Commission's primary and secondary objectives for the FISS. As with all years, the Commission will have an additional opportunity to modify the 2023 FISS design at AM099.*

The endorsed design is not projected to be revenue neutral, but the moderate projected deficit is consistent with the goal of long-term revenue neutrality while ensuring that data are obtained from all IPHC Regulatory Areas in 2023. (Note that it is anticipated that the NMFS trawl survey will provide data on Pacific halibut in IPHC Regulatory Area 4CDE).

Discussion

With sampling in all IPHC Regulatory Areas, the Commission-endorsed design (Figure 2.1) will provide improved information on trends and stock distribution over a projected revenue- neutral design (see IPHC-2022-IM098-R), which would have resulted in no sampling in IPHC Regulatory Areas 2A, 4A and 4B. Proceeding with the Commission-endorsed design in 2023 would allow for 'normal' stock assessment and management procedure inputs and results, except for annual stock distribution for management use.

Large coverage gaps remain in the endorsed FISS design relative to the science-based proposal (Figure 1.2). If such coverage gaps persist in subsequent years, then the risk of unmonitored changes in density or distribution occurring increases and estimates from the ends of the stock will become increasingly unreliable. IPHC Regulatory Areas 2A, 4A, 4B and 4CDE are challenging areas to sample, but ongoing sampling reductions will have implications for our overall understanding of stock trends and distribution. Importantly, the Pacific halibut stock and fishery are currently in transition between a strong 2005 year-class and more recent 2011 and 2012 year-classes. While the distribution of these year-classes is likely to become more uniform as they age, a multiple-year sampling gap at the ends of the geographic range (particularly 4A-4CDE) increases the likelihood that stock distribution and therefore realized harvest rates may differ appreciably from those intended by the IPHC's interim management procedure. With reduced precision, the ability of the stock assessment model to update currently predicted trends based on new information is much more limited: increases or decreases in overall stock trend may not be tracked by the assessment model, which relies heavily on the trend information provided by the annual FISS.

Reductions in the FISS in 2023 will have implications for the 2024-2026 FISS designs as well. Current design planning spreads the most challenging charter regions (logistically and financially) over a three-year time-horizon. To 'catch-up' from the larger variances that would be

produced in 2023 in IPHC Regulatory Areas 2A, 4A and 4B, an increased level of sampling would be required in subsequent years, including the regions omitted in 2023 as well as at least some of those currently proposed for 2024-25. The longer such gaps in coverage persist, the more difficult it becomes to maintain the quality of time series estimates, and the result may be a period in the time series with permanently high uncertainty around our understanding of stock trends and distribution.

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-10 that presents the FISS design proposals for 2023-25 together with scientific evaluations of the designs, and a discussion of the FISS design endorsed by the Commission at IM098, which balances the Commission's primary and secondary objectives for the FISS;
2) **RECOMMEND** ad-hoc modifications to the design for 2023 if necessary, and associated funding if needed.

REFERENCES

IPHC 2012. IPHC setline charters 1963 through 2003 IPHC-2012-TR058. 264p.

IPHC 2018. Report of the 13th Session of the IPHC Scientific Review Board (SRB) IPHC-2018-SRB013-R. 17 p.

IPHC 2020. Report of the 96th Session of the IPHC Annual Meeting (AM096) IPHC-2020-AM096-R. 51 p.

IPHC 2022. Report of the 98th Session of the IPHC Annual Meeting (AM098) IPHC-2022-AM098-R. 60 p.

IPHC 2022. Report of the 20th Session of the IPHC Scientific Review Board (SRB020) IPHC-2022-SRB20-R. 19 p.

IPHC 2022. Report of the 21st Session of the IPHC Scientific Review Board (SRB021) IPHC-2022-SRB21-R. 22 p.

IPHC 2022. Report of the 98th Session of the IPHC Interim Meeting (IM098) IPHC-2022-IM098-R. 30 p.

Thorson, J. T., Shelton, A. O., Ward, E. J., and Skaug, H. J. 2015. Geostatistical delta-generalized linear mixed models improve precision for estimated abundance indices for West Coast groundfishes. ICES Journal of Marine Science 72(5): 1297-1310. doi:10.1093/icesjms/fsu243.

Thorson, J. T. 2019. Guidance for decisions using the Vector Autoregressive Spatio-Temporal (VAST) package in stock, ecosystem, habitat and climate assessments. Fisheries Research 210: 143-161. doi:10.1016/j.fishres.2018.10.013.

Webster R. A. 2016. Space-time modelling of setline survey data using INLA. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2015: 552-568.

Webster R. A. 2017. Results of space-time modelling of survey WPUE and NPUE data. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2016: 241-257.

Webster R. 2019. Space-time modelling of IPHC Fishery-Independent Setline Survey (FISS) data. IPHC-2020-AM096-07. 32 p.

Webster R. A., Soderlund E, Dykstra C. L., and Stewart I. J. 2020. Monitoring change in a dynamic environment: spatio-temporal modelling of calibrated data from different types of fisheries surveys of Pacific halibut. Can. J. Fish. Aquat. Sci. 77(8): 1421-1432.

Webster, R. A. 2021. 2022-24 FISS design evaluation. IPHC-2021-SRB018-05 Rev_1. 18 p

Webster, R. 2022a. 2023-25 FISS design evaluation. IPHC-2022-SRB020-05.

Webster, R. 2022b. 2023-25 FISS design evaluation. IPHC-2022-SRB021-06.

Webster, R. and Wilson, D. 2022. 2023-25 FISS design evaluation. IPHC-2022-IM098-10.

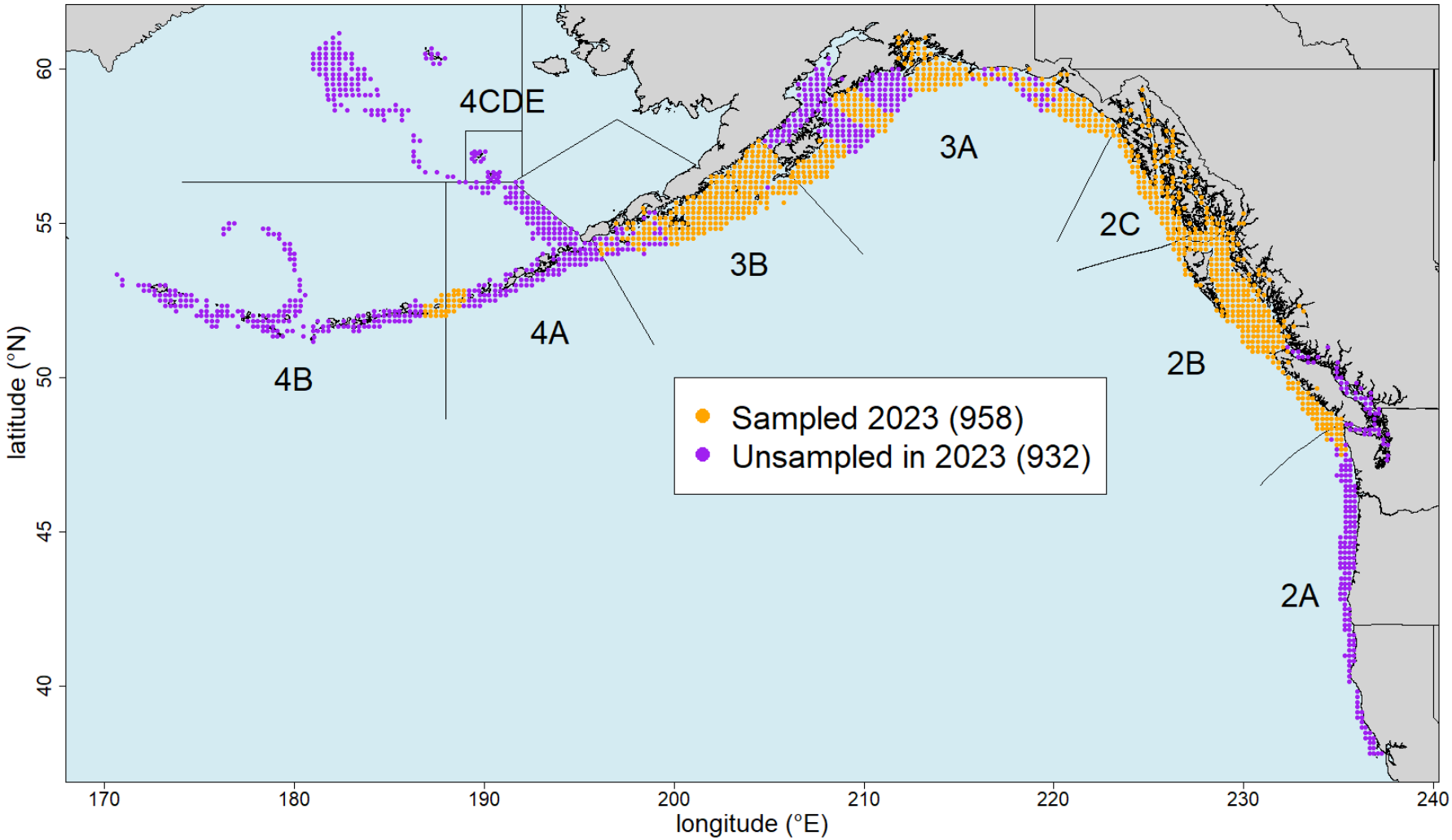


Figure 2.1. The cost-optimised FISS design for 2023 as endorsed by the Commission at IM098.

Summary of the data, stock assessment, and harvest decision table for Pacific halibut (*Hippoglossus stenolepis*) at the end of 2022

PREPARED BY: IPHC SECRETARIAT (I. STEWART, A. HICKS, R. WEBSTER, AND D. WILSON; 13 DECEMBER 2022)

PURPOSE

To provide the Commission with a summary of the data, stock assessment, and harvest decision table at the end of 2022.

INTRODUCTION

In 2022 the International Pacific Halibut Commission (IPHC) undertook its annual coastwide stock assessment of Pacific halibut (*Hippoglossus stenolepis*). This assessment represents a full analysis, following the previous full assessment conducted in 2019, updated in 2020 and again in 2021. Changes from the 2021 assessment were developed and reviewed by the IPHC's Scientific Review Board (SRB), in June (SRB020; IPHC-2022-SRB020-07, IPHC-2022-SRB020-R) and September 2022 (SRB021; IPHC-2022-SRB021-08, IPHC-2022-SRB021-R). Changes to the modelling that were included in the stock assessment and new data for 2022 include:

1. Update the version of the stock synthesis software used for the analysis (3.30.19).
2. Expand the treatment of natural mortality (*M*) to include an informative prior based on longevity and assign increased values at the youngest ages based on meta-analysis of other flatfish species.
3. Improve the basis for data weighting via use of bootstrapped effective sample sizes as model inputs based on the FISS and fishery sampling programs, rather than the raw number of sets/trips used in previous assessments.
4. Estimate *M* in the short time-series Areas-As-Fleets (AAF) model.
5. Include standard updates to mortality estimates from all fisheries, directed commercial fishery and FISS (fishery-independent setline survey) biological and trend information, and other sources including data collected in 2022.

This document provides an overview of the data sources available for the 2022 Pacific halibut stock assessment including the population trends and distribution among IPHC Regulatory Areas based on the modelled IPHC fishery-independent setline survey (FISS), directed commercial fishery data, and results of the stock assessment.

Overall, spawning biomass estimates remain highly consistent with those of recent stock assessments. However, the higher estimated value of natural mortality in the AAF short model when included with the other four models (two of which already estimated natural mortality) strongly affected the ensemble stock assessment estimates of recent and historical fishing intensity. **The 2022 stock assessment estimates a lower level of fishing intensity and higher relative stock status compared to previous assessments, as well as a 26% increase in the yield corresponding to the reference level of fishing intensity ($F_{43\%}$) for 2023 compared to 2022**. Spawning biomass trends appear to have stabilized, as fish from the 2012 year-class, critically important to short-term projections of stock and fishery dynamics, continue to mature.

STOCK AND MANAGEMENT

The stock assessment reports the status of the Pacific halibut (*Hippoglossus stenolepis*) resource in the IPHC Convention Area. As in recent stock assessments, the resource is

modelled as a single stock extending from northern California to the Aleutian Islands and Bering Sea, including all inside waters of the Strait of Georgia and the Salish Sea, but excludes known extremities in the western Bering Sea within the Russian Exclusive Economic Zone (Figure 1).

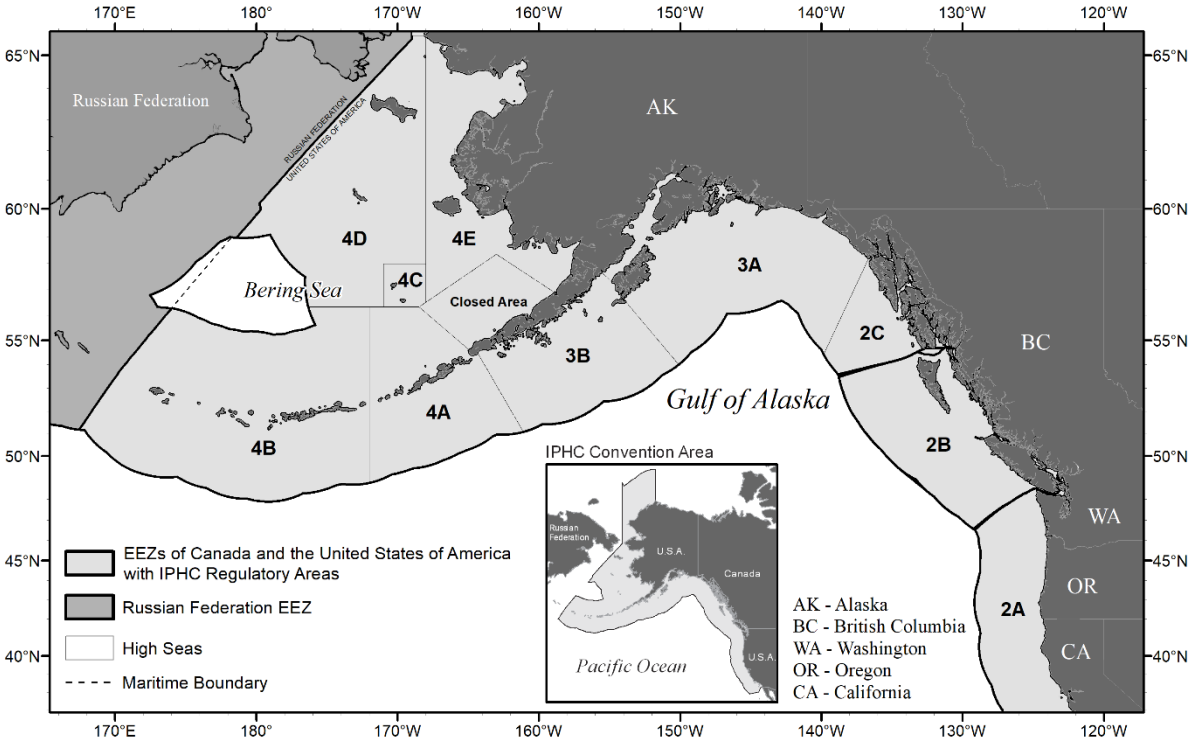


FIGURE 1. IPHC Convention Area (inset) and IPHC Regulatory Areas.

The Pacific halibut fishery has been managed by the IPHC since 1923. Mortality limits for each of eight IPHC Regulatory Areas[1] are set each year by the Commission. The stock assessment provides a summary of recently collected data, and model estimates of stock size and trend. Specific management information is summarized via a decision table reporting the estimated short-term risks associated with alternative management actions. Mortality tables projecting detailed summaries for fisheries in each IPHC Regulatory Area (and reference levels indicated by the IPHC's interim management procedure) will be provided in early January 2022 for use during the IPHC's 99th Annual Meeting (AM099).

DATA

Historical mortality

Known Pacific halibut mortality consists of directed commercial fishery landings and discard mortality (including research), recreational fisheries, subsistence, and discard mortality in fisheries targeting other species ('non-directed' fisheries where Pacific halibut retention is prohibited). Over the period 1888-2022, mortality from all sources has totaled 7.3 billion pounds (~3.3 million metric tons, t). Since 1923, the fishery has ranged annually from 34 to 100 million pounds (15,000-45,000 t) with an annual average of 63 million pounds (~29,000 t; Figure 2). Annual mortality was above this 100-year average from 1985 through 2010 and has averaged 38.1 million pounds (~17,300 t) from 2018-22.

[1] The IPHC recognizes sub-Areas 4C, 4D, 4E and the Closed Area for use in domestic catch agreements but manages the combined Area 4CDE.

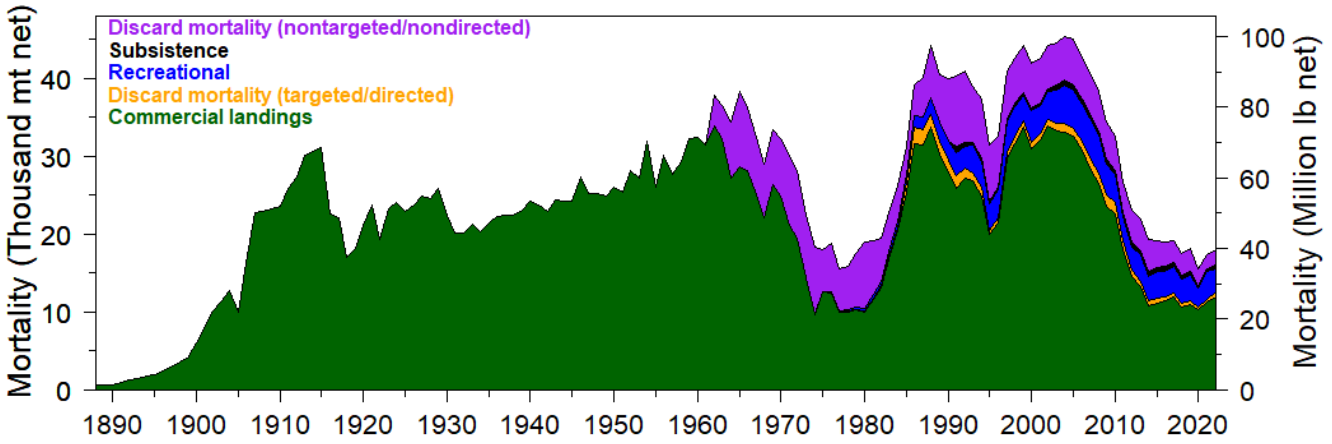


FIGURE 2. Summary of estimated historical mortality by source (colors), 1888-2022.

2022 Fishery and IPHC FISS statistics

Data for stock assessment use are compiled by IPHC Regulatory Area, and then aggregated to four Biological Regions: Region 2 (Areas 2A, 2B, and 2C), Region 3 (Areas 3A, 3B), Region 4 (4A, 4CDE) and Region 4B and then coastwide (Figure 1). The assessment data from both fishery-dependent and fishery-independent sources, as well as auxiliary biological information, are most spatially complete since the late-1990s. Primary sources of information for this assessment include mortality estimates from all sources (IPHC-2022-IM098-07_Rev_1), modelled indices of abundance (IPHC-2022-IM098-08) based on the IPHC's FISS (in numbers and weight) and other surveys, commercial Catch-Per-Unit-Effort (in weight), and biological summaries from both sources (length-, weight-, and age-composition data).

All data sources are reprocessed each year to include new information from the terminal year, as well as any additional information for or changes made to the entire time-series. For 2022, the most important information came from the modelled index of abundance reflecting the 2022 FISS and associated biological sampling. Routine updates of logbook records from the 2022 (and earlier) directed commercial fishery, as well as age-frequency observations and individual weights from the commercial fishery were also included. Directed commercial fishery sex-ratios at age were available for 2021 (building on the time-series from 2017-2020 previously available). All mortality estimates (including changes to the existing time-series where new estimates have become available) were extended to include 2022. All available information was finalized on 1 November 2022 in order to provide adequate time for analysis and modeling. As has been the case in all years, some data are incomplete (commercial fishery logbook and age information), or include projections for the remainder of the year (mortality estimates for ongoing fisheries or for fisheries where final estimation is still pending).

Coastwide commercial Pacific halibut fishery landings (including research landings) in 2022 were approximately 26.1 million pounds (~11,900 t), up 6% from 2021[2]. Discard mortality in non-directed fisheries was estimated to be 4.5 million pounds in 2022 (~2,000 t)[3], up 17% from 2021

[2] The mortality estimates reported in this document are those available on 1 November 2021 and used in the assessment analysis; they include projections through the end of the fishing season.

[3] The IPHC receives preliminary estimates of the current year's non-directed commercial discard mortality in from the NOAA-Fisheries National Marine Fisheries Service Alaska Regional Office, Northwest Fisheries Science Center, and Fisheries and Oceans Canada in late October. Where necessary, projections are added to approximate

which was the lowest estimate in the time-series. The total recreational mortality (including estimates of discard mortality) was estimated to be 6.6 million pounds (~3,000 t) down 14% from 2021. Mortality from all sources increased by 4% to an estimated 39.7 million pounds (~18,000 t) in 2022 based on preliminary information available for this assessment.

The 2022 modelled FISS results detailed a coastwide aggregate NPUE (numbers per unit effort) which decreased by 8% from 2021 to 2022, back to levels similar to those observed in 2018-2020 (Figure 3). Biological Region 3 decreased by 12%, while Biological Region 2 increased by 1%. Biological Regions 4, and 4B both showed small declines (2 and 6%) and are at the lowest values in the estimated time-series. The 2022 modelled coastwide WPUE of legal (O32) Pacific halibut, the most comparable metric to observed commercial fishery catch rates, decreased by 18% from 2021 to 2022. This reduced trend relative to that for NPUE indicates younger fish are contributing increasingly more to current stock productivity than somatic growth of fish already over the legal minimum size limit (particularly the 2012 year-class). Individual IPHC Regulatory Areas varied from a 10% increase (Regulatory Area 2A) to a 37% decrease (Regulatory Area 3A) in O32 WPUE (Figure 4).

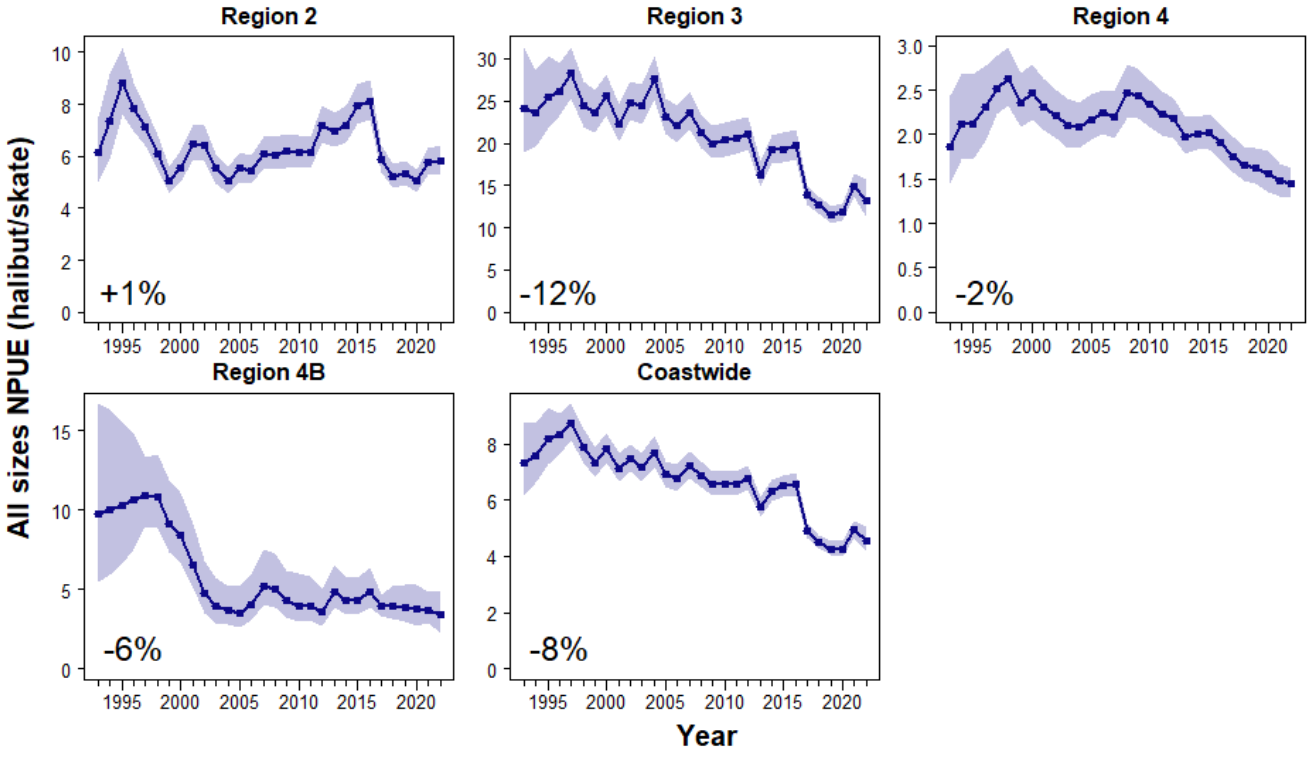


FIGURE 3. Trends in modelled FISS NPUE by Biological Region, 1993-2022. Percentages indicate the change from 2021 to 2022. Shaded zones indicate 95% credible intervals.

Preliminary commercial fishery WPUE estimates from 2022 logbooks showed a similar trend to the FISS index, decreasing by 15% at the coastwide level (Figure 5). The bias correction to account for additional logbooks compiled after the fishing season resulted in an estimate of −18% coastwide. Trends varied among IPHC Regulatory Areas and gears; however, all areas except 2A showed decreased CPUE in one or both gear types.

the total mortality through the end of the calendar year. Further updates are anticipated in January 2023 and will be incorporated into final projections for 2023.

Biological information (ages and lengths) from the commercial fishery landings showed that in 2022 the fishery transitioned from the 2005 year-class to the 2012 year-class (now 10 years old) as the largest coastwide contributor (in number) to the fish encountered. The FISS also observed the 2012 year-class at the largest proportion in the total catch of any age class. Continued observation of these fish both above and below the commercial fishery minimum size limit indicates their importance to the current stock and to future fisheries. Individual size-at-age appears to be increasing for younger ages (<=14) in most IPHC Regulatory Areas and coastwide. Although size-at-age changes slowly, if the current pattern persists into older ages, it could have positive implications for overall future yield.

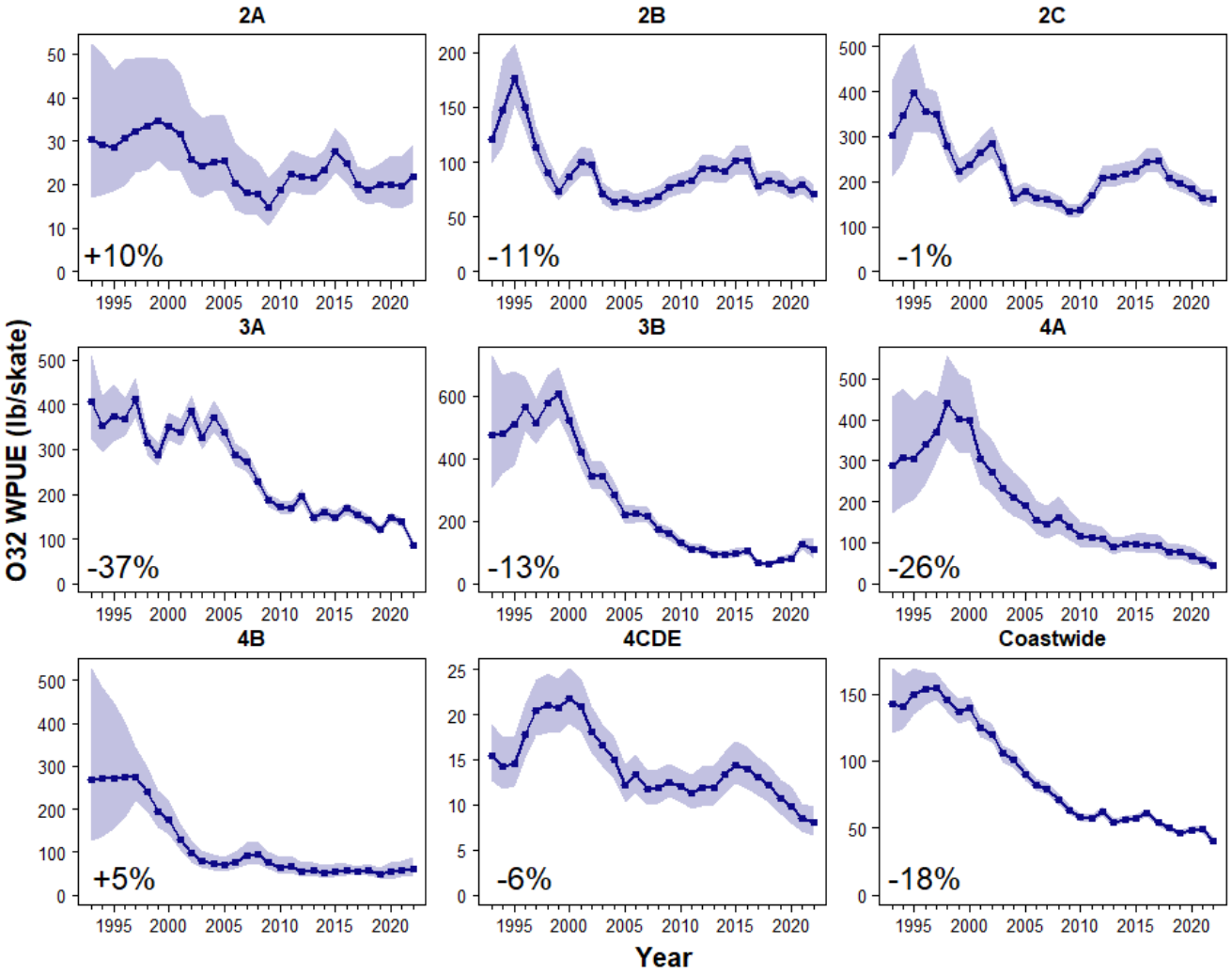


FIGURE 4. Trends in modelled FISS legal (O32) WPUE by IPHC Regulatory Area, 1993-2022. Percentages indicate the change from 2021 to 2022. Shaded zones indicate 95% credible intervals.

Biological stock distribution

The current trend in population distribution (measured via the modelled FISS catch in weight of all Pacific halibut) showed a sharp drop in Biological Region 3 after increases in 2020 and 2021. This corresponds to an increase in all other Biological Regions (Figure 6; recent years in Table 1). Survey data are insufficient to estimate stock distribution prior to 1993. It is therefore unknown

how historical distributions or the average distribution in the absence of fishing mortality may compare with recent observations.

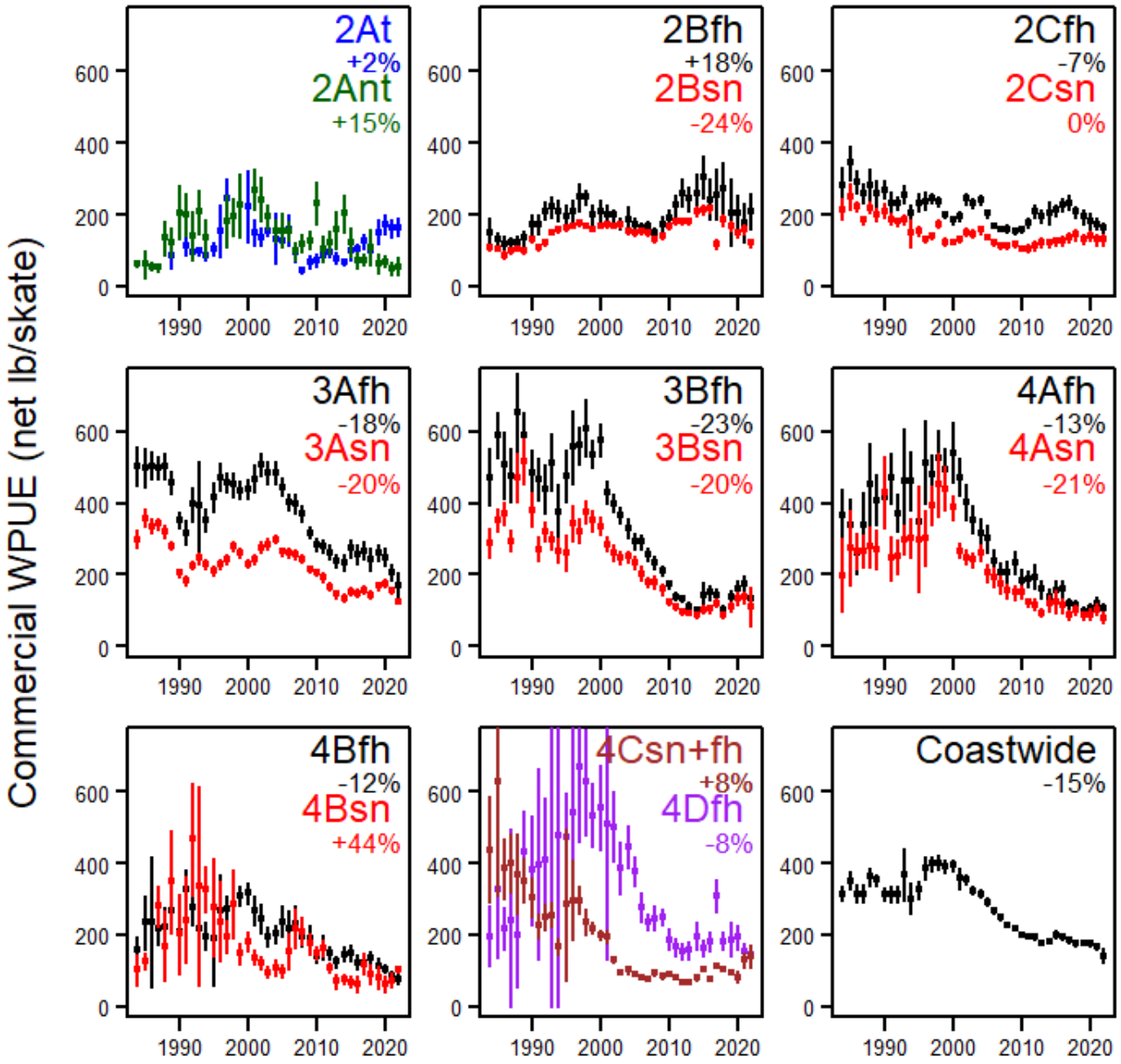


FIGURE 5. Trends in commercial fishery WPUE by IPHC Regulatory Area and fishery or gear, 1984-2022. The tribal fishery in 2A is denoted by "2At", non-tribal by "2Ant", fixed hook catch rates by "fh" and snap gear catch rates by "sn" for IPHC Regulatory Areas 2B-4D. Percentages indicate the change from 2020 to 2021 uncorrected for bias due to incomplete logbooks (see text above). Vertical lines indicate approximate 95% confidence intervals.

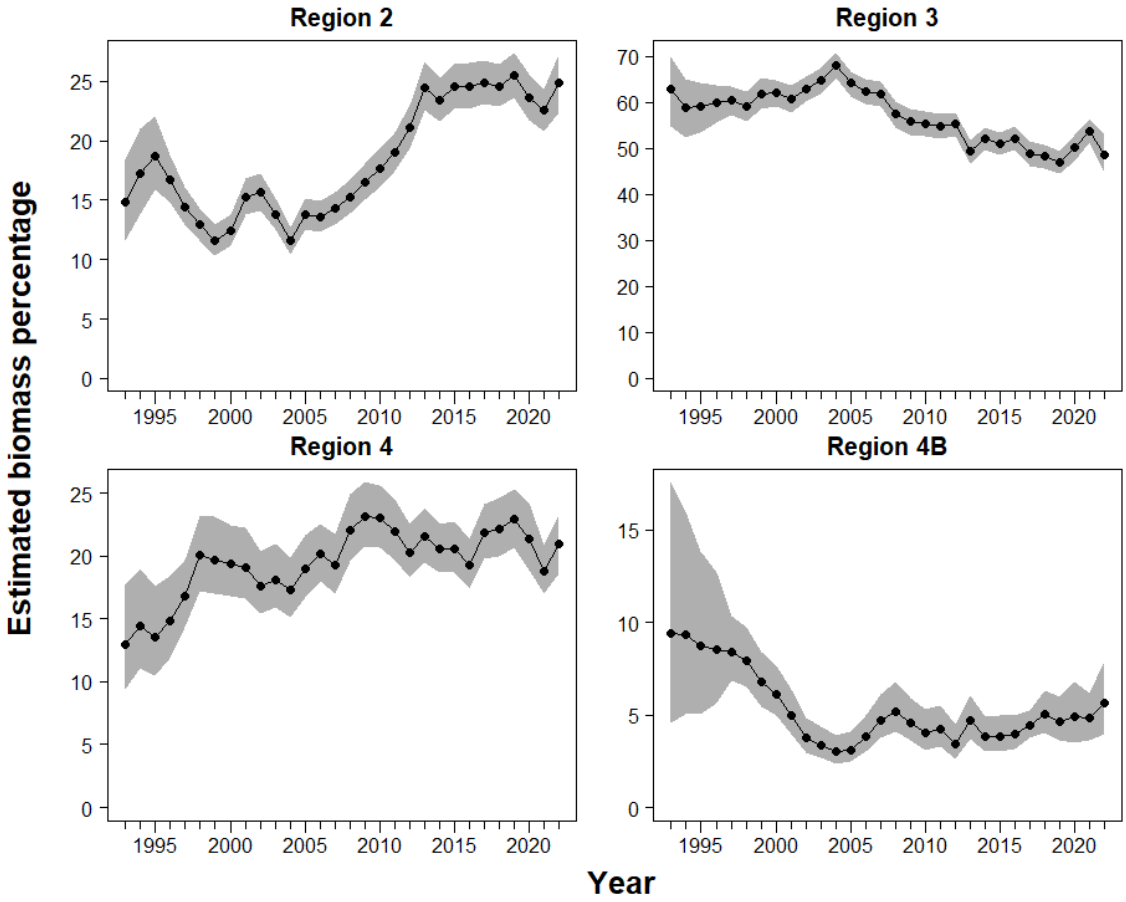


FIGURE 6. Estimated stock distribution (1993-2022) based on modelled survey catch weight per unit effort of all sizes of Pacific halibut. Shaded zones indicate 95% credible intervals.

TABLE 1. Recent stock distribution estimates by Biological Region based on modelling of all Pacific halibut captured by the FISS.

Year	Region 2 (2A, 2B, 2C)	Region 3 (3A, 3B)	Region 4 (4A, 4CDE)	Region 4B
2018	24.6%	48.3%	22.1%	5.1%
2019	25.5%	46.9%	22.9%	4.7%
2020	23.6%	50.1%	21.4%	4.9%
2021	22.6%	53.8%	18.8%	4.8%
2022	24.8%	48.6%	20.9%	5.6%

STOCK ASSESSMENT

This stock assessment continues to be implemented using the generalized software stock synthesis (Methot and Wetzel 2013). The analysis consists of an ensemble of four equally weighted models: two long time-series models, reconstructing historical dynamics back to the beginning of the modern fishery, and two short time-series models incorporating data only from 1992 to the present, a time-period for which estimates of all sources of mortality and survey indices for all regions are available. For each time-series length, there are two models: one fitting to coastwide aggregate data, and one fitting to data disaggregated into the four Biological

Regions. This combination of models includes uncertainty in the form of alternative hypotheses about several important axes of uncertainty, including: natural mortality rates (estimated in three of the four models), environmental effects on recruitment (estimated in the long time-series models), and other model parameters.

The results of this stock assessment are based on the approximate probability distributions derived from the ensemble of models, thereby incorporating the uncertainty within each model (parameter or estimation uncertainty) as well as the uncertainty among models (structural uncertainty). This uncertainty provides a basis for risk assessment and reduces the potential for abrupt changes in management quantities as improvements and additional data are added to individual models. The four models continue to be equally weighted. Within-model uncertainty was propagated through to the ensemble results via the maximum likelihood estimates and an asymptotic approximation to individual model variance estimates. Point estimates in this stock assessment correspond to median values from the ensemble with the simple probabilistic interpretation that there is an equal probability above or below the reported value.

The 2019 stock assessment was a full analysis, including a complete re-evaluation of all data sources and modelling choices, particularly those needed to accommodate the newly available sex-ratio at age data from the commercial fishery. The 2020 and 2021 stock assessments represented updates, adding data sources where available, but retaining the same basic model structure for each of the four component models. The 2022 assessment was another full assessment; all changes from the 2021 assessment were developed and reviewed by the IPHC's Scientific Review Board (SRB), in June (SRB020; IPHC-2022-SRB020-07, IPHC-2022-SRB020-R) and September 2022 (SRB021; IPHC-2022-SRB021-08, IPHC-2022-SRB021-R).

The most important change in the 2022 assessment was the estimation of natural mortality (*M*) in the short AAF model. Natural mortality has been a primary source of uncertainty in the Pacific halibut stock assessment (and in most fisheries analyses) for decades. Prior to 1998, the Pacific halibut stock assessment used a value of 0.20. This was changed to a value of 0.15 in 1998, based on concerns that the consequences of an inaccurate estimate were less serious if the value was underestimated (Clark 1999; Clark and Parma 1999). The value of 0.15 was used for female Pacific halibut for all analyses until 2012. In the 2012 assessment, alternate values of natural mortality were used to include a broader range of uncertainty in the harvest decision table (Stewart et al. 2013). In the 2013 assessment, a model (similar to the current coastwide long time-series model) was included that estimated a higher level of natural mortality directly from the data (Stewart and Martell 2014). For the 2014 stock assessment, four models were used, two of which estimated natural mortality (both at higher values) and two relied on the fixed value of 0.15 (Stewart and Martell 2015). This approach of four models, two estimating natural mortality and two using the fixed value of 0.15 continued through the 2021 assessment. With the additional years of data available and the directed commercial fishery sex-ratio time series reaching 4 years in length, for the 2022 stock assessment there was sufficient information to estimate natural mortality directly in the AAF short model, leading estimation in 3 of the 4 models contributing to the ensemble. Estimates for female Pacific halibut from these three models span values of 0.184 (AAF long), 0.213 (AAF short) and 0.215 (coastwide long); the coastwide short model retains the fixed value of 0.15. With equal weighting of the four models the median productivity estimates (e.g., yield at a given level of fishing intensity) are considerably higher than the 2021 and earlier assessment models, as reflected in the projections reported below.

BIOMASS AND RECRUITMENT TRENDS

The results of the 2022 stock assessment indicate that the Pacific halibut stock declined continuously from the late 1990s to around 2012 (Figure 7). That trend is estimated to have been largely a result of decreasing size-at-age, as well as somewhat weaker recruitment strengths than those observed during the 1980s. The spawning biomass (SB) is estimated to have increased gradually to 2016, and then decreased to an estimated 192 million pounds (~87,100 t) at the beginning of 2023, with an approximate 95% credible interval ranging from 122 to 272 million pounds (~55,400-123,200 t; Figure 8). The recent spawning biomass estimates from the 2022 stock assessment are very consistent with previous analyses, back to 2012 (Figure 9) and suggest that the trend is effectively flat after a slow decline since 2016.

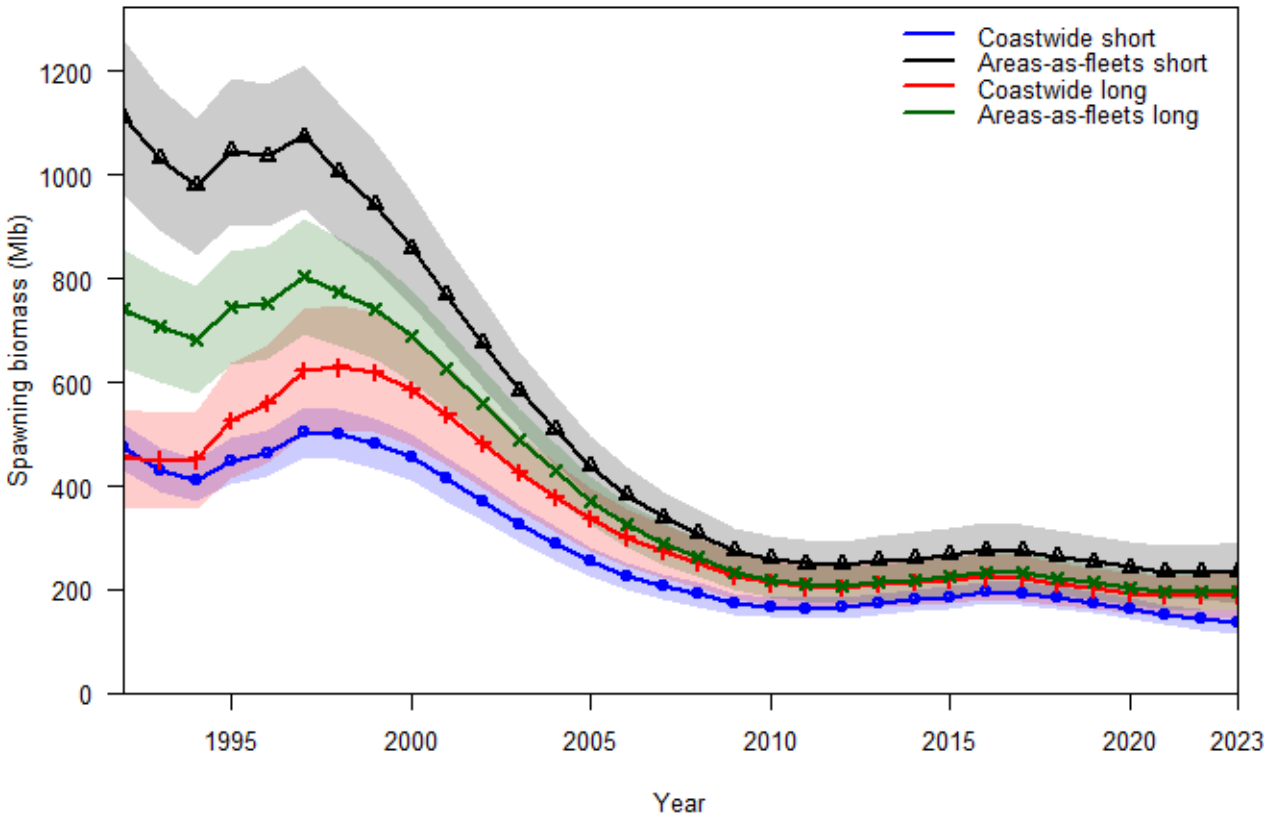


FIGURE 7. Estimated spawning biomass trends (1992-2023) based on the four individual models included in the 2022 stock assessment ensemble. Series indicate the maximum likelihood estimates; shaded intervals indicate approximate 95% credible intervals.

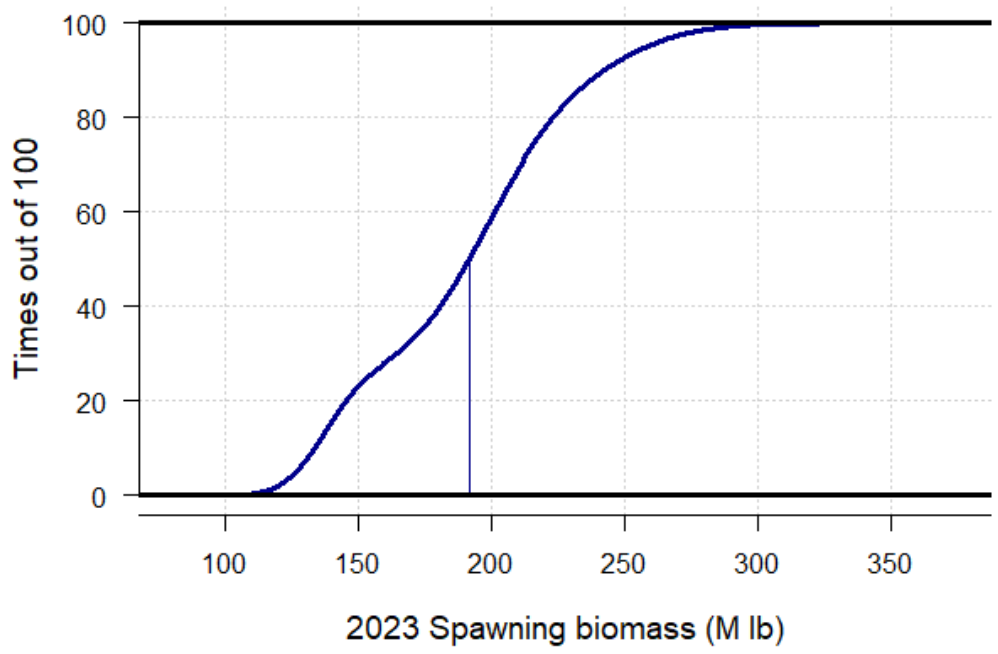


FIGURE 8. Cumulative distribution of the estimated spawning biomass at the beginning of 2023. Curve represents the estimated probability that the biomass is less than or equal to the value on the x-axis; vertical line represents the median (192 million pounds, ~87,100 t).

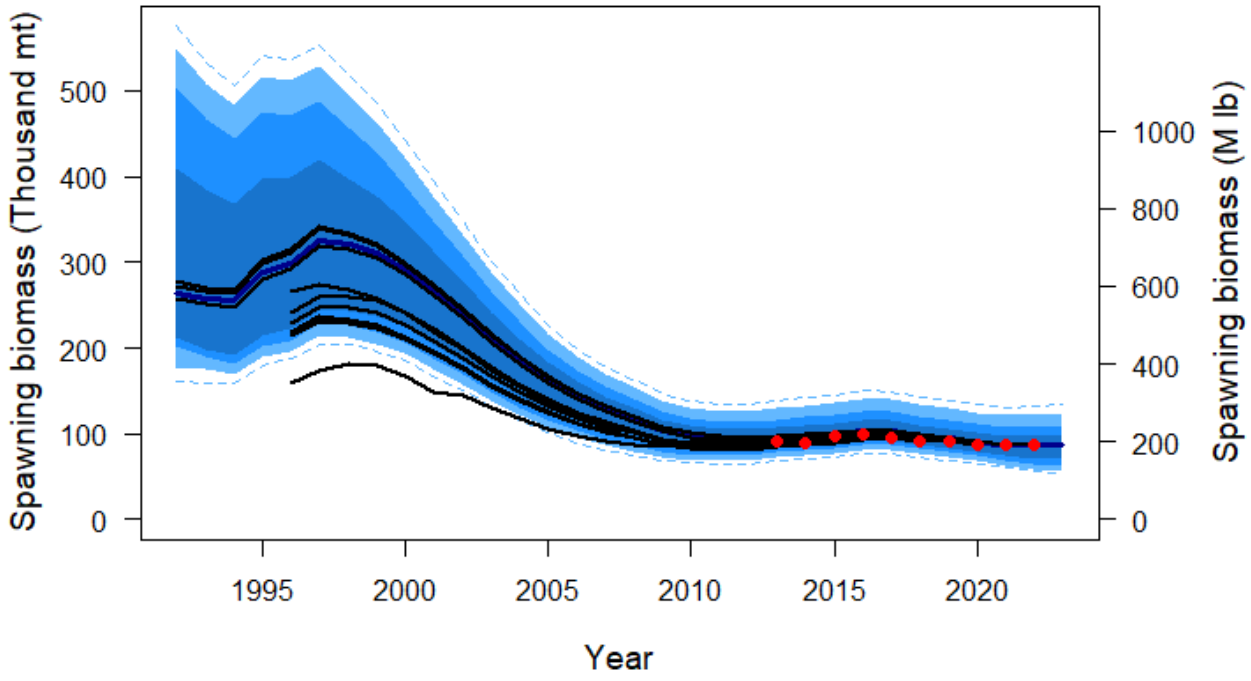


FIGURE 9. Retrospective comparison of female spawning biomass among recent IPHC stock assessments. Black lines indicate estimates from assessments conducted in 2012-2021 with the terminal estimate shown as a red point. The shaded distribution denotes the 2022 ensemble: the dark blue line indicates the median (or "50:50 line") with an equal probability of the estimate falling above or below that level; and colored bands moving away from the median indicate the intervals containing 50/100, 75/100, and 95/100 estimates; dashed lines indicating the 99/100 interval.

In contrast to the close correspondence of the spawning biomass estimates between this assessment and previous analyses, the time-series of fishing intensity is estimated to be considerably lower than in past assessments (Figure 10). All but one of the recent assessments (2015) projected a fishing intensity for the pending adopted mortality limits higher than estimated in the 2022 assessment, with this change attributable to the transition from 2 to 3 models estimating higher natural mortality. The relative trend over the historical period does remain similar: much higher fishing intensity estimated for the early 2000s through about 2012.

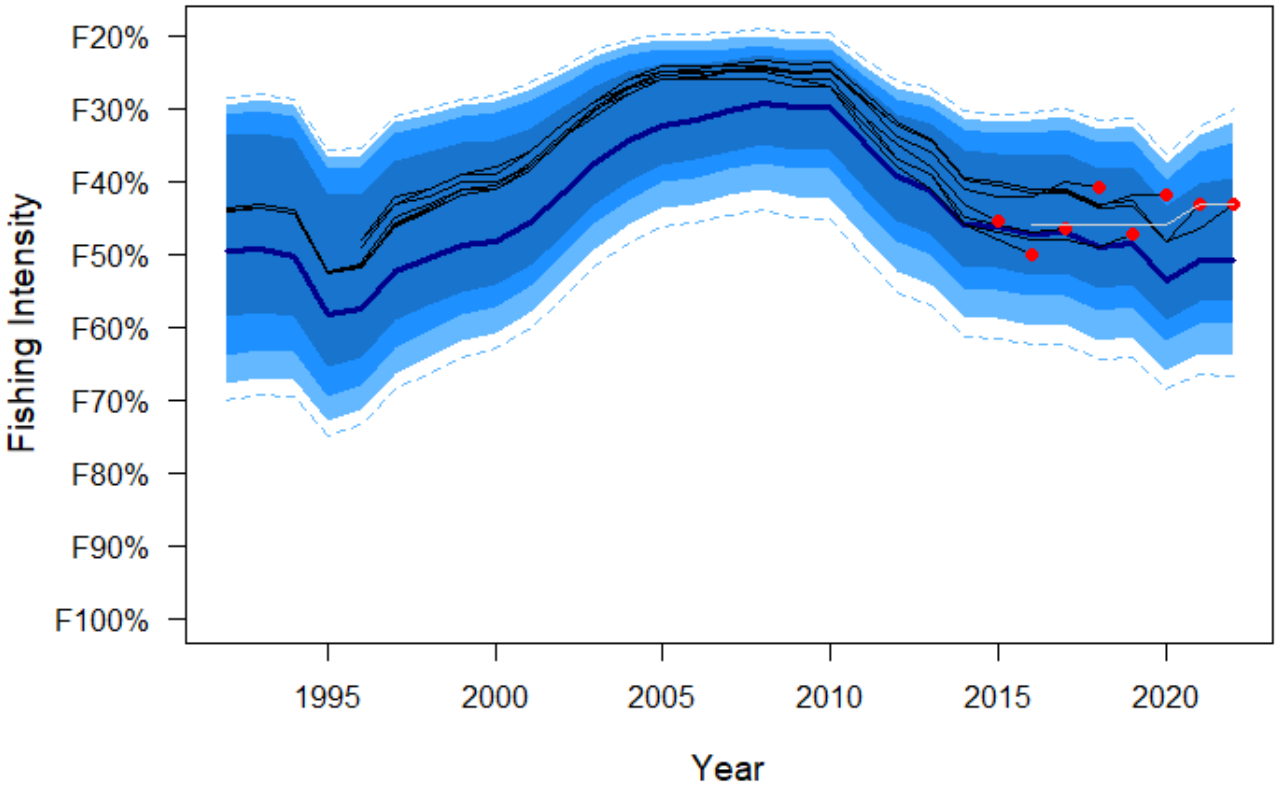


FIGURE 10. Retrospective comparison of fishing intensity (measured as $F_{xx\%}$, where xx% indicates the Spawning Potential Ratio (SPR) or the reduction in the lifetime reproductive output due to fishing) among recent IPHC stock assessments. Black lines indicate estimates of fishing intensity from assessments conducted in 2014-2021 with the projection for the mortality limit adopted based on that assessment shown as a red point. The shaded distribution denotes the 2022 ensemble: the dark blue line indicates the median (or "50:50 line") with an equal probability of the estimate falling above or below that level; and colored bands moving away from the median indicate the intervals containing 50/100, 75/100, and 95/100 estimates; dashed lines indicating the 99/100 interval. The grey line indicates the reference level of fishing intensity used by the Commission in each year it has been specified ($F_{46\%}$ during 2016-2020 and $F_{43\%}$ during 2021-2022).

Average Pacific halibut recruitment is estimated to be higher (71 and 72% for the coastwide and AAF models respectively) during favorable Pacific Decadal Oscillation (PDO) regimes, a widely recognized indicator of ecosystem productivity in the north Pacific (primarily the Gulf of Alaska). Historically, these regimes included positive conditions prior to 1947, poor conditions from 1947-77, positive conditions from 1978-2006, and poor conditions from 2007-13. Annual averages from 2014 through 2019 were positive, with 2020 and 2021 (through September) showing

negative average conditions. Although strongly correlated with historical recruitments, it is unclear whether recent conditions are comparable to those observed in previous decades.

Pacific halibut recruitment estimates show the recent large cohorts in 1999 and 2005 (Figure 11). Cohorts from 2006 through 2011 are estimated to be much smaller than those from 1999-2005, which has resulted in a decline in both the stock and fishery yield as these low recruitments have moved into the spawning biomass. Based on age data through 2022, individual models in this assessment produced estimates of the 2012 year-classes that were slightly lower than the magnitude of the 2005 year-class. The 2012 year-class is estimated to be 29% mature in 2022 and the maturation of this cohort has a strong effect on the short-term projections.

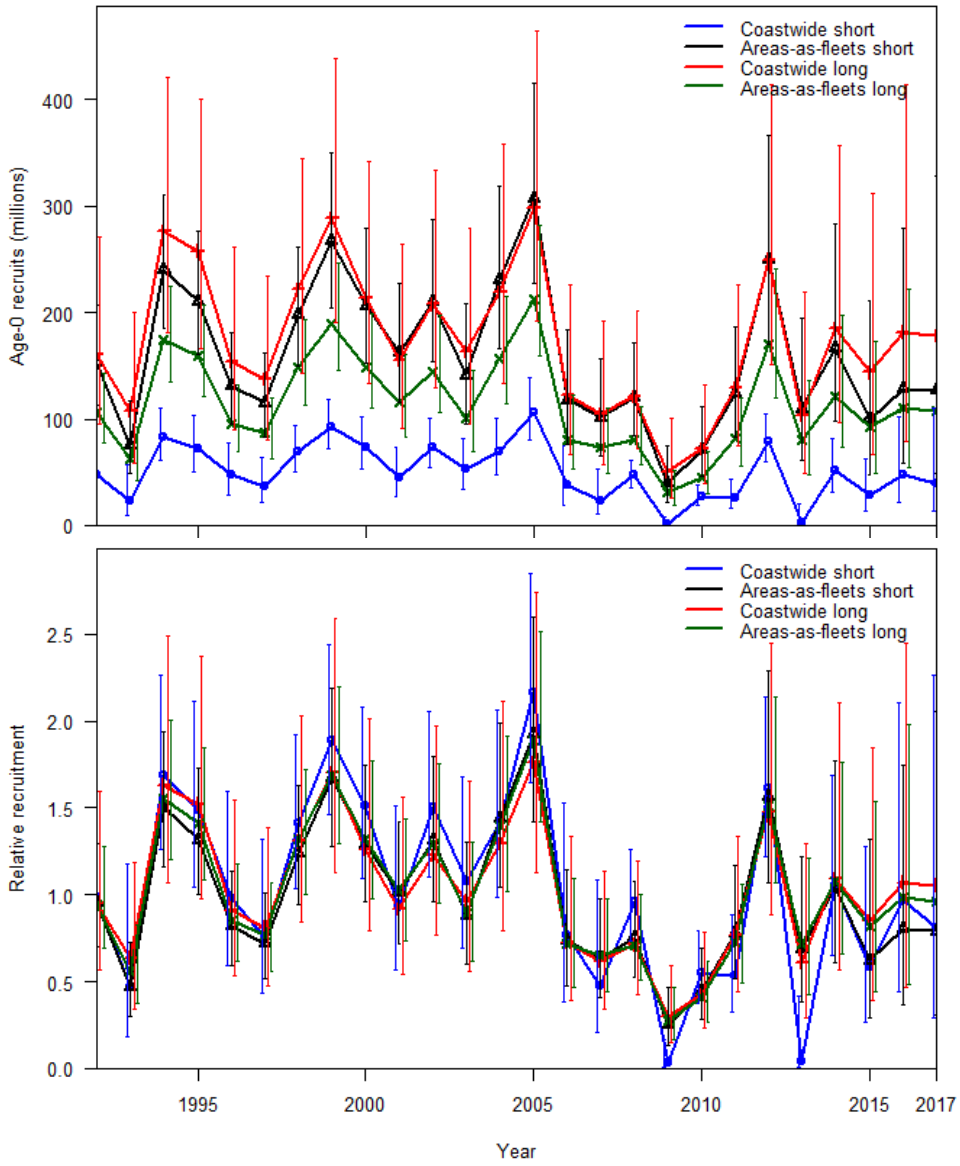


FIGURE 11. Estimated trends in age-0 recruitment (upper panel) and relative recruitment (standardized to the mean for each model over this time-period; lower panel) 1992-2017, based on the four individual models included in the 2022 stock assessment ensemble. Series indicate the maximum likelihood estimates; vertical lines indicate approximate 95% credible intervals.

The IPHC's interim management procedure uses a relative spawning biomass of 30% as a trigger, below which the reference fishing intensity is reduced. At a spawning biomass limit of 20%, directed fishing is halted due to the critically low biomass condition. This calculation is based on recent biological conditions: current weight-at-age and estimated recruitments still influencing the stock. Thus, the 'dynamic' calculation measures only the effect of fishing on the spawning biomass. The relative spawning biomass in 2023 was estimated to be 42% (credible interval: 21-55%) slightly higher than the estimate for 2022 (41%). Both of these estimates are much higher than those from the 2021 stock assessment (i.e., 2022 was estimated at 33%), with the change caused by the higher estimate of natural mortality in the current analysis. The probability that the stock is below the $SB_{30\%}$ level is estimated to be 25% at the beginning of 2023, with less than a 1% chance that the stock is below $SB_{20\%}$. The two long time-series models (coastwide and areas-as-fleets) show different results when comparing the current stock size to that estimated at the historical low in the 1970s. The AAF model estimates that recent stock sizes are well below those levels (44%), and the coastwide model above (172%). The relative differences among models reflect both the uncertainty in historical dynamics as well as the importance of spatial patterns in the data and population processes, for which all of the models represent only simple approximations.

The IPHC's interim management procedure specifies a reference level of fishing intensity of a Spawning Potential Ratio (SPR) corresponding to an $F_{43\%}$; this equates to the level of fishing that would reduce the lifetime spawning output per recruit to 43% of the unfished level given current biology, fishery characteristics and demographics. The 2022 fishing intensity is estimated to correspond to $F_{51\%}$ (credible interval: 32-64%; Table 2). All three years from 2020-2022 are estimated to be less than values for the last 20+ years, and less than those estimated in recent stock assessments. Comparing the relative spawning biomass and fishing intensity over the recent historical period shows that the relative spawning biomass decreased as fishing intensity increased through 2010, then subsequently increased (Figure 12).

MAJOR SOURCES OF UNCERTAINTY

This stock assessment includes uncertainty associated with estimation of model parameters, treatment of the data sources (e.g., short and long time-series), natural mortality (fixed vs. estimated), approach to spatial structure in the data, and other differences among the models included in the ensemble. Although this is an improvement over the use of a single assessment model, there are important sources of uncertainty that are not included.

The assessment utilized five years (2017-21) of sex-ratio information from the directed commercial fishery landings. However, uncertainty in historical ratios remains unknown. Additional years of data are likely to further inform selectivity parameters and cumulatively reduce uncertainty in stock size in the future. The treatment of spatial dynamics and movement rates among Biological Regions, which are represented via the coastwide and AAF approaches, has large implications for the current stock trend, as evidenced by the different results among the four models comprising the stock assessment ensemble. This assessment also does not include mortality, trends, or explicit demographic linkages in Russian waters, although such linkages may be increasingly important as warming waters in the Bering Sea allow for potentially important exchange across the international border.

TABLE 2. Status summary of the Pacific halibut stock and fishery in the IPHC Convention Area at beginning of 2023.

Indicators	Values	Trends	Status
BIOLOGICAL			
SPR_{2022}: P(SPR<43%): P(SPR<limit):	51% (32-64%)[2] 27% LIMIT NOT SPECIFIED	FISHING INTENSITY UNCHANGED FROM 2021 TO 2022	**FISHING INTENSITY BELOW REFERENCE LEVEL**[3]
SB_{2023} (MLBS): SB_{2023}/SB_0: P(SB_{2023}<SB_{30}): P(SB_{2023}<SB_{20}):	192 (122–272) Mlbs 42% (21-55%) 25% <1%	SB DECREASED 16% FROM 2016 TO 2023	**NOT OVERFISHED**[4]
Biological stock distribution:	SEE TABLES AND FIGURES	REGION 3 DECREASED FROM 2021 TO 2022	**WITHIN HISTORICAL RANGES**
FISHERY CONTEXT			
Total mortality 2022: Percent retained 2022: Average mortality 2018–22:	39.69 Mlbs, 18,003 t[1] 85% 38.10 Mlbs, 17,284 t	MORTALITY INCREASED FROM 2021 TO 2022	**2022 MORTALITY NEAR 100-YEAR LOW**

[1] Weights in this document are reported as 'net' weights, head and guts removed; this is approximately 75% of the round (wet) weight.
[2] Ranges denote approximate 95% credible intervals from the stock assessment ensemble.
[3] Status determined relative to the IPHC's interim reference Spawning Potential Ratio level of 43%.
[4] Status determined relative to the IPHC's interim management procedure biomass limit of $SB_{20\%}$.

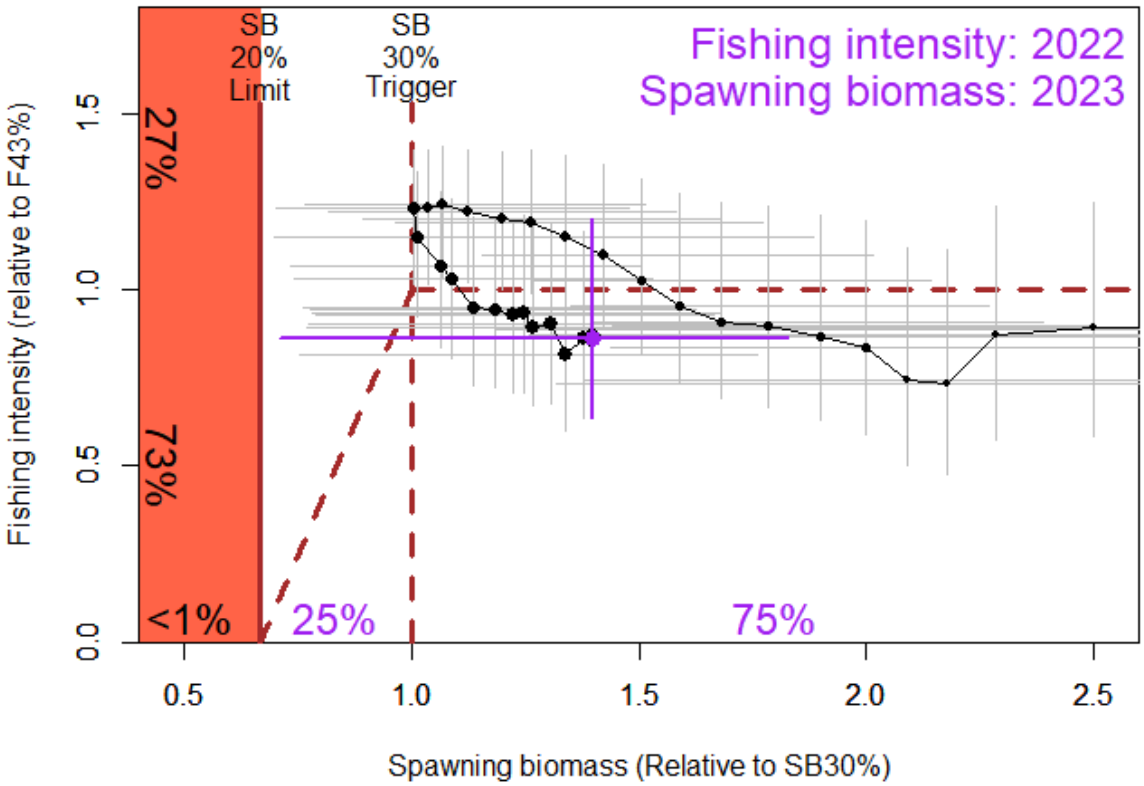


FIGURE 12. Phase plot showing the time-series (1992-2023) of estimated spawning biomass and fishing intensity relative to the reference points specified in the IPHC's interim management procedure. Dashed lines indicate the current $F_{43\%}$ (horizontal) reference fishing intensity, with linear reduction below the $SB_{30\%}$ (vertical) trigger, the red area indicates relative spawning biomass levels below the $SB_{20\%}$ limit. Each year of the time series is denoted by a solid point (credible intervals by horizontal and vertical whiskers), with the relative fishing intensity in 2022 and spawning biomass at the beginning of 2023 shown as the largest point (purple). Percentages along the y-axis indicate the probability of being above and below $F_{43\%}$ in 2022; percentages on the x-axis the probabilities of being below $SB_{20\%}$, between $SB_{20\%}$ and $SB_{30\%}$ and above $SB_{30\%}$ at the beginning of 2023.

Additional important contributors to assessment uncertainty (and potential bias) include the lag in estimation of incoming recruitment between birth year and direct observation in the fishery and survey data (6-10 years). Like most stock assessments, there is no direct information on natural mortality, and increased uncertainty for some estimated components of the fishery mortality. Fishery mortality estimates are assumed to be accurate; therefore, uncertainty due to discard mortality estimation (observer sampling and representativeness), discard mortality rates, and any other documented mortality in either directed or non-directed fisheries (e.g., whale depredation) could create bias in this assessment. Maturation schedules and fecundity are currently under renewed investigation by the IPHC. Currently used historical values are based on visual field assessments, and the simple assumption that fecundity is proportional to spawning biomass and that Pacific halibut do not experience appreciable skip-spawning (physiologically mature fish which do not actually spawn due to environmental or other conditions). To the degree that maturity, fecundity or skip spawning may be temporally variable, the current approach could result in bias in the stock assessment trends and reference points. New information will be incorporated as it becomes available; however, it may take years to better understand trends in these biological processes at the scale of the entire population.

Projections beyond three years are avoided due to the lack of mechanistic understanding of the factors influencing size-at-age and relative recruitment strength, the two most important factors in historical population trends.

Due to the many remaining uncertainties in Pacific halibut biology and population dynamics, a high degree of uncertainty in both stock scale and trend will continue to be an integral part of an annual management process. Results of the IPHC's ongoing Management Strategy Evaluation (MSE) process can inform the development of management procedures that are robust to estimation uncertainty via the stock assessment, and to a wide range of hypotheses describing population dynamics.

OUTLOOK

Stock projections were conducted using the integrated results from the stock assessment ensemble in tandem with summaries of the 2022 directed and non-directed fisheries. The harvest decision table (Table 3) provides a comparison of the relative risk (in times out of 100), using stock and fishery metrics (rows), against a range of alternative harvest levels for 2023 (columns). The block of rows entitled "Stock Trend" provides for evaluation of the risks to short-term trend in spawning biomass, independent of all harvest policy calculations. The remaining rows portray risks relative to the spawning biomass reference points ("Stock Status") and fishery performance relative to the approach identified in the interim management procedure. The alternatives (columns) include several levels of mortality intended for evaluation of stock and management procedure dynamics including:

- No fishing mortality (useful to evaluate the stock trend due solely to population processes)
- A 30 million pound (~13,600 t) 2022 TCEY
- The mortality consistent with an 18% reduction to the coastwide TCEY set for 2022
- The mortality consistent with an 15% reduction to the coastwide TCEY set for 2022
- The mortality consistent with an 10% reduction to the coastwide TCEY set for 2022
- The mortality consistent with repeating the coastwide TCEY set for 2022 (41.22 million pounds, 18,697 t; *"status quo"*)
- The mortality at which there is a 50% chance that the spawning biomass will be smaller in three years than in 2023 ("*3-year surplus*")
- The mortality consistent with the current "Reference" SPR ($F_{43\%}$) level
- A 60 million pound (~27,200 t) 2022 TCEY

A grid of alternative TCEY values corresponding to SPR values from 40% to 46% is also provided to allow for finer detail across the range of estimated SPR values identified by the MSE process as performing well with regard to stock and fishery objectives. For each column of the decision table, the total fishing mortality (including all sizes and sources), the coastwide TCEY and the associated level of fishing intensity projected for 2023 (median value with the 95% credible interval below) are reported.

The projections for this assessment are much more optimistic than those from recent assessments due to the increase in the estimated productivity of the stock resulting from 3/4 rather than 2/4 models estimating natural mortality at much higher values than the historical fixed assumption of 0.15. Further, the trend in spawning biomass is estimated to have stabilized as the 2012 year-class continues to mature. This translates to a lower probability of stock decline at higher yields for 2023 than in recent assessments as well as a decrease in this probability through 2024-26. There is greater than a 50% probability of stock decline in 2024 (53-86/100) for all yields greater than the *status quo*, including the entire range of SPR values from 40-46%. The 2023 "3-year surplus" alternative, corresponds to a TCEY of 43.0 million pounds 19,504 t), and a projected SPR of 48% (credible interval 28-62%; Table 3, Figure 13). At the reference level (a projected SPR of 43%), the probability of spawning biomass decline from 2023 to 2024 is 75%, decreasing to 71% in three years. The one-year risk of the stock dropping below $SB_{30\%}$ is 25% across all alternatives.

TABLE 3. Harvest decision table for 2023 mortality limits. Columns correspond to yield alternatives and rows to risk metrics. Values in the table represent the probability, in "times out of 100" (or percent chance) of a particular risk.

	2023 Alternative				*Status quo -18%*	*Status quo -15%*	*Status quo -10%*	*Status quo*	3-Year Surplus				*Reference* $F_{43\%}$					
	Total mortality (M lb)		0.0	31.3	35.1	36.4	38.4	42.5	44.3	48.1	49.8	51.5	53.3	55.1	57.1	59.1	61.3	
	TCEY (M lb)		0.0	30.0	33.8	35.0	37.1	41.2	43.0	46.8	48.4	50.2	52.0	53.8	55.8	57.8	60.0	
	2023 fishing intensity		$F_{100\%}$	$F_{59\%}$	$F_{55\%}$	$F_{54\%}$	$F_{53\%}$	$F_{50\%}$	$F_{48\%}$	$F_{46\%}$	$F_{45\%}$	$F_{44\%}$	$F_{43\%}$	$F_{42\%}$	$F_{41\%}$	$F_{40\%}$	$F_{39\%}$	
	Fishing intensity interval		--	37-71%	34-68%	33-67%	32-66%	29-63%	28-62%	26-59%	25-59%	24-58%	24-57%	23-56%	22-55%	21-54%	21-53%	
Stock Trend (spawning biomass)	in 2024	is less than 2023	<1	20	29	32	38	49	53	63	67	71	75	79	83	86	89	a
		is 5% less than 2023	<1	2	4	5	7	13	15	22	25	28	31	35	39	43	47	b
	in 2025	is less than 2023	<1	18	27	30	35	46	50	60	64	68	72	76	80	83	87	c
		is 5% less than 2023	<1	6	11	13	16	24	28	36	40	44	48	52	57	62	67	d
	in 2026	is less than 2023	<1	20	28	31	36	46	50	60	63	67	71	75	79	82	85	e
		is 5% less than 2023	<1	10	16	18	22	31	35	43	47	51	55	59	64	68	72	f
Stock Status (Spawning biomass)	in 2024	is less than 30%	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	g
		is less than 20%	<1	<1	<1	1	1	1	1	1	1	2	2	2	2	3	3	h
	in 2025	is less than 30%	18	25	25	25	25	25	25	25	25	25	25	25	25	25	25	i
		is less than 20%	<1	<1	1	1	1	1	2	3	3	4	4	5	6	6	7	j
	in 2026	is less than 30%	6	23	24	24	24	25	25	25	25	25	25	25	25	25	25	k
		is less than 20%	<1	<1	1	1	1	2	3	4	5	6	6	7	9	10	11	l
Fishery Trend (TCEY)	in 2024	is less than 2023	0	17	24	24	25	28	31	38	41	45	50	55	59	64	69	m
		is 10% less than 2023	0	11	20	22	24	26	27	32	35	38	42	46	51	55	60	n
	in 2025	is less than 2023	0	15	22	24	25	28	30	37	41	45	50	55	60	66	71	o
		is 10% less than 2023	0	11	19	21	23	26	27	32	35	38	42	47	52	57	62	p
	in 2026	is less than 2023	0	14	21	23	24	28	30	37	41	46	51	56	62	67	72	q
		is 10% less than 2023	0	10	18	20	22	25	27	32	35	39	43	48	53	58	64	r
Fishery Status (Fishing intensity)	in 2023	is above $F_{43\%}$	0	19	24	25	26	29	31	38	42	46	50	54	59	63	68	s

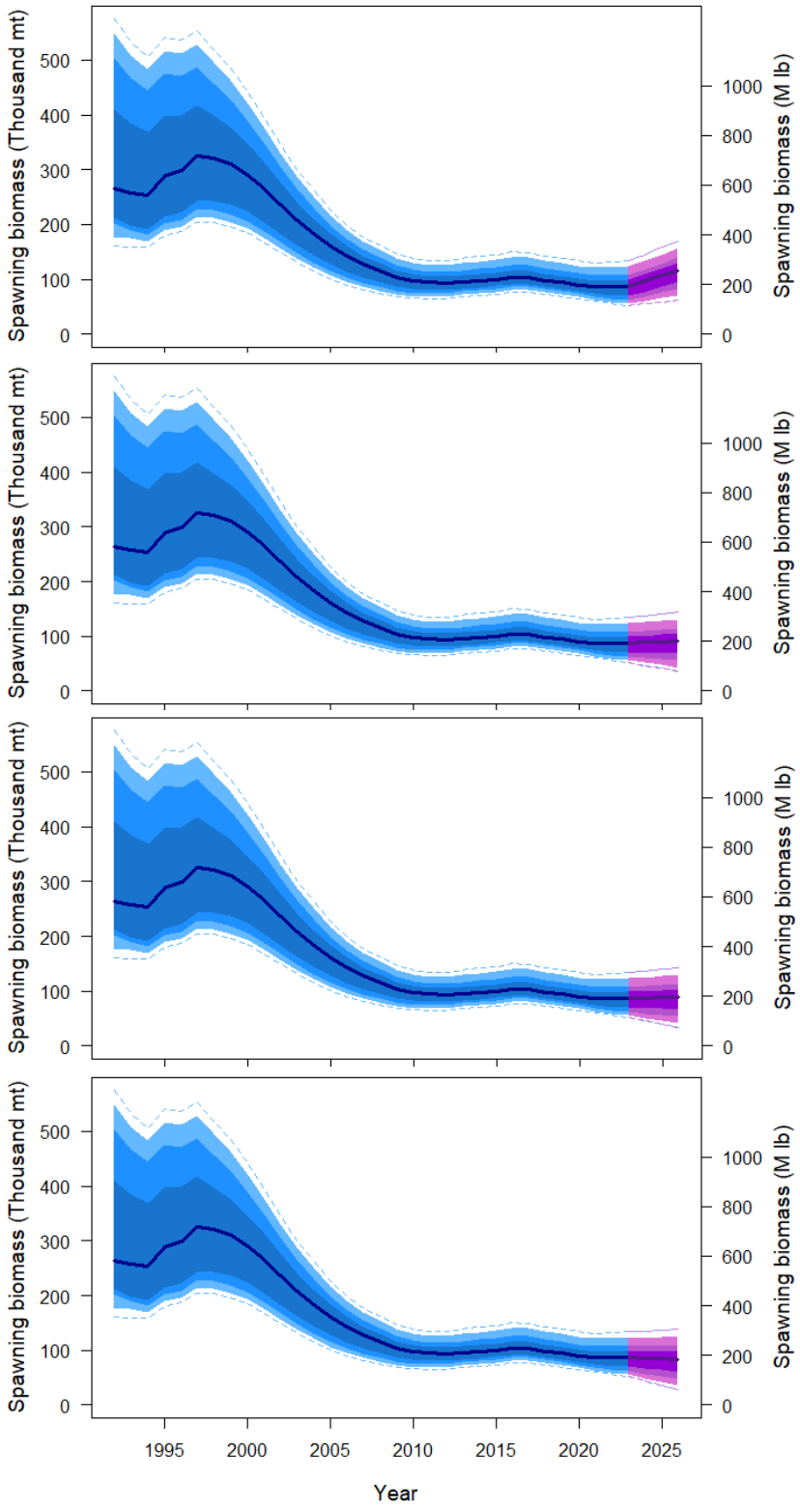


FIGURE 13. Three-year projections of stock trend under alternative levels of mortality: no fishing mortality (upper panel), the *status quo* TCEY set in 2022 of 41.2 million pounds, 18,697 t; second panel), the 3-year surplus (a TCEY of 43.0 million pounds, 19,504 t; third panel), and the TCEY projected for the IPHC's interim management procedure (52.0 million pounds, 23,564 t; lower panel).

SCIENTIFIC ADVICE

Sources of mortality: In 2022, total Pacific mortality due to fishing increased to 39.69 million pounds (18,003 t), above the 5-year average of 38.10 million pounds (17,284 t). Of that total, 85% comprised the retained catch (Table 2), down from 87% in 2021.

Fishing intensity: The 2022 fishing mortality corresponded to a point estimate of SPR = 51%; there is a 27% chance that fishing intensity exceeded the IPHC's current reference level of $F_{43\%}$ (Table 2). The Commission does not currently have a coastwide fishing intensity limit reference point.

Stock status (spawning biomass): Current (beginning of 2023) female spawning biomass is estimated to be 192 million pounds (87,058 t), which corresponds to an 25% chance of being below the IPHC trigger reference point of $SB_{30\%}$, and less than a 1% chance of being below the IPHC limit reference point of $SB_{20\%}$. The stock is estimated to have declined by 16% since 2016 but is currently at 42% of the unfished state. Therefore, the stock is considered to be '**not overfished**'. Projections indicate that mortality consistent with the interim management procedure reference fishing intensity ($F_{43\%}$) is very likely to result in further declining biomass levels in the near future.

Stock distribution: After increases in 2020-2021, the proportion of the coastwide stock represented by Biological Region 3 has decreased sharply in 2022, (Figure 6, Table 1). This trend occurs in tandem with increases in Biological Regions 2, 4 and 4B; however, all regions remain within the historical range observed from 1993-2021.

Additional risks not included in this analysis: Directed commercial fishery catch rates coastwide, and in nearly all IPHC Regulatory Areas were at or near the lowest observed in the last 40 years. The spawning biomass is also estimated to be near the lowest observed since the 1970s. Harvest levels based on a TCEY greater than 43 million pounds are likely to result in further declines in both the stock and fishery, despite being consistent with long-term sustainable harvest rates. The fishery in 2022 largely transitioned from the 2005 year-class to the 2012 year-class, contributing to observed reduced catch rates. This year-class is estimated to be only 29% mature in 2022; the spawning stock and fishery will be relying on this cohort heavily in the near future.

RESEARCH PRIORITIES

Research priorities for the stock assessment and related analyses have been consolidated with those for the IPHC's MSE and the Biological Research program and are included in the IPHC's 5-year research plan (IPHC-2022-IM098-06).

DETAILED MANAGEMENT INFORMATION

The IPHC's recent interim management procedure determined the TCEY distribution method through 2022. Detailed description of the distribution of the TCEY among IPHC Regulatory Areas and fishery sectors will be provided for the 2023 Annual Meeting (AM098), based on guidance from the Commission and updated end-of-year mortality estimates for non-directed commercial fishery discard mortality.

ADDITIONAL INFORMATION

A more detailed description of the stock assessment (IPHC-2023-SA-01) and the data sources (IPHC-2023-SA-02), will be published directly to the stock assessment page on the IPHC's website. That page also includes recent peer review documents and previous stock assessment documents. Further, the IPHC's website contains many interactive tools for both FISS and commercial fishery information, as well as historical data series providing detailed tables of data and other information.

RECOMMENDATION/S

That the Commission:

a) **NOTE** paper IPHC-2023-AM099-11 which provides a summary of data, the 2022 stock assessment and the harvest decision table for 2023.

REFERENCES

Clark, W.G. 1999. Effects of an erroneous natural mortality rate on a simple age-structured stock assessment. Canadian Journal of Fisheries and Aquatic Sciences **56**(10): 1721-1731. doi:10.1139/f99-085.

Clark, W.G., and Parma, A.M. 1999. Assessment of the Pacific halibut stock in 1998. IPHC Report of Assessment and Research Activities 1998. p. 89-112.

IPHC. 2022a. Report of the 20th session of the IPHC Scientific Review Board (SRB020). Meeting held electronically, 14-16 June 2022. IPHC-2022-SRB020-R. 19 p.

IPHC. 2022b. Report of the 21st session of the IPHC Scientific review board (SRB021). IPHC-2022-SRB021-R.

Jannot, J., Tran, H., Kong, T., Magrane, K., and Van Vleck, K.S. 2022. Fisheries data overview: preliminary statistics. IPHC-2022-IM098-07 Rev_1. 13 p.

Methot, R.D., and Wetzel, C.R. 2013. Stock synthesis: A biological and statistical framework for fish stock assessment and fishery management. Fisheries Research **142**(0): 86-99. doi:http://dx.doi.org/10.1016/j.fishres.2012.10.012.

Stewart, I., and Hicks, A. 2022. Development of the 2022 Pacific halibut (*Hippoglossus stenolepis*) stock assessment. IPHC-2022-SRB020-07. 128 p.

Stewart, I.J., and Martell, S. 2014. Assessment of the Pacific halibut stock at the end of 2013. IPHC Report of Assessment and Research Activities 2013. p. 169-196.

Stewart, I.J., and Martell, S. 2015. Assessment of the Pacific halibut stock at the end of 2014. IPHC Report of Assessment and Research Activities 2014. p. 161-180.

Stewart, I.J., Leaman, B.M., Martell, S., and Webster, R.A. 2013. Assessment of the Pacific halibut stock at the end of 2012. IPHC Report of Assessment and Research Activities 2012. p. 93-186.

Webster, R. 2022. Space-time modelling of survey data. IPHC-2022-IM098-09 Rev_1. 6 p.

Report on Current and Future Biological and Ecosystem Science Research Activities

PREPARED BY: IPHC SECRETARIAT (J. PLANAS, 12 DECEMBER 2022)

PURPOSE

To provide the Commission with a description of the biological and ecosystem science research projects conducted and planned by the IPHC Secretariat and contemplated within the IPHC's Five-year Program of Integrated Research and Monitoring (2022-2026).

BACKGROUND

The primary biological research activities at IPHC that follow Commission objectives are identified and described in the IPHC Five-Year Program of Integrated Research and Monitoring (2022-2026). These activities are summarized in five broad research areas designed to provide inputs into stock assessment (SA) and the management strategy evaluation (MSE) processes, as follows:

1) Migration and Population Dynamics. Studies are aimed at improving current knowledge of Pacific halibut migration and population dynamics throughout all life stages in order to achieve a complete understanding of stock structure and distribution across the entire distribution range of Pacific halibut in the North Pacific Ocean and the biotic and abiotic factors that influence it.
2) Reproduction. Studies are aimed at providing information on the sex ratio of the commercial catch and to improve current estimates of maturity and fecundity.
3) Growth. Studies are aimed at describing the role of factors responsible for the observed changes in size-at-age and at evaluating growth and physiological condition in Pacific halibut.
4) Mortality and Survival Assessment. Studies are aimed at providing updated estimates of discard mortality rates in the guided recreational fisheries and at evaluating methods for reducing mortality of Pacific halibut.
5) Fishing Technology. Studies are aimed at developing methods that involve modifications of fishing gear with the purpose of reducing Pacific halibut mortality due to depredation and bycatch.

A ranked list of biological uncertainties and parameters for SA (Appendix I) and the MSE process (Appendix II) and their links to research activities and outcomes derived from the five-year research plan are provided.

UPDATE ON PROGRESS ON THE MAIN RESEARCH ACTIVITIES

1. Migration and Population Dynamics.

   The IPHC Secretariat is currently conducting studies on Pacific halibut juvenile habitat and movement through conventional wire tagging, as well as studies that incorporate genomics approaches in order to produce useful information on population structure, distribution and connectivity of Pacific halibut. The relevance of research outcomes from these activities for stock assessment (SA) resides (1) in the introduction of possible changes in the structure of future stock assessments, as separate assessments may be constructed if functionally isolated components of the population are found (e.g. IPHC Regulatory Area 4B), and (2) in the improvement of productivity estimates, as this information may be used to define

management targets for minimum spawning biomass by Biological Region. These research outcomes provide the second and third top ranked biological inputs into SA (Appendix I). Furthermore, the relevance of these research outcomes for the MSE process is in biological parameterization and validation of movement estimates, on one hand, and of recruitment distribution, on the other hand (Appendix II).

1.1. Estimation of Pacific halibut juvenile habitat. The IPHC Secretariat recently completed a study to investigate the connectivity between spawning grounds and possible settlement areas based on a biophysical larval transport model (please see paper in the journal Fisheries Oceanography: https://doi.org/10.1111/fog.12512). Although it is known that, following the pelagic larval phase, Pacific halibut begin their demersal stage as approximately 6-month-old juveniles, settling in shallow nursery (settlement) areas, near or outside the mouths of bays (please see paper in *Reviews in Fish Biology and Fisheries*: https://doi.org/10.1007/s11160-021-09672-w), very little information is available on the geographic location and physical characteristics of these areas. In order to fill this knowledge gap and set the stage for future studies to further investigate the connectivity between spawning and nursery grounds, the IPHC Secretariat has initiated studies to identify potential settlement areas for juvenile Pacific halibut throughout IPHC Convention Waters. A first objective of this study is to create a map of suitable settlement habitat by combining available bathymetry information (e.g. benthic sediment composition and shoreline morphological data) and information on recorded presence of age-0, age-1 and age-2 Pacific halibut juveniles as well as absence of young Pacific halibut noted by various nursery habitat projects focused on other flatfish species. Data sources are currently being collected.

1.2. Wire tagging of U32 Pacific halibut. The patterns of movement of Pacific halibut among IPHC Regulatory Areas have important implications for management of the Pacific halibut fishery. The IPHC Secretariat has undertaken a long-term study of the migratory behavior of Pacific halibut through the use of externally visible tags (wire tags) on captured and released fish that must be retrieved and returned by workers in the fishing industry. In 2015, with the goal of gaining additional insight into movement and growth of young Pacific halibut (less than 32 inches [82 cm]; U32), the IPHC began wire-tagging small Pacific halibut encountered on the National Marine Fisheries Service (NMFS) groundfish trawl survey and, beginning in 2016, on the IPHC fishery-independent setline survey (FISS). In 2022, 1,499 Pacific halibut were tagged and released on the IPHC FISS but no tagging was conducted in the NMFS groundfish trawl surveys. Therefore, a total of 7,610 U32 Pacific halibut have been wire tagged and released on the IPHC FISS to date. Of these, a total of 149 tags have been recovered to date. In the NMFS groundfish trawl surveys through 2019, a total of 6,421 tags have been released and, to date, 78 tags have been recovered.

1.3. Population genomics. The primary objective of the studies that the IPHC Secretariat is currently conducting is to investigate the genetic structure of the Pacific halibut population and to conduct genetic analyses to inform on Pacific halibut movement and distribution within the Convention Area.

1.3.1. Pacific halibut genome and characterization of the sex determining region in Pacific halibut. The IPHC Secretariat has updated the Pacific halibut genome assembly. The updated Pacific halibut genome has an estimated size of 602 Mb, 24 chromosome-length scaffolds that contain 99.8% of the assembly and a N_{50} scaffold length of 27.3 Mb. The Pacific halibut whole genome sequencing data are openly available in NCBI at https://www.ncbi.nlm.nih.gov/bioproject/622249, under BioProject PRJNA622249, and the updated assembly is openly available in NCBI at https://www.ncbi.nlm.nih.gov/assembly/GCA_022539355.2/ with GenBank assembly accession number GCA_022539355.2. The master record for the whole genome shotgun sequencing project has been deposited at DDBJ/ENA/GenBank under the accession JAKRZP000000000 and is openly available in NCBI at https://www.ncbi.nlm.nih.gov/nuccore/JAKRZP000000000. Sample metadata is openly available in NCBI at https://www.ncbi.nlm.nih.gov/biosample?Db=biosample&DbFrom=bioproject&Cmd=Link&LinkName=bioproject_biosample&LinkReadableName=BioSample&ordinalpos=1&IdsFromResult=622249, under BioSamples SAMN14503176, SAMN25516224, SAMN25600010 and SAMN25600011. This improved genome assembly will increase our ability to resolve Pacific halibut population structure at a fine scale using the proposed approach (Section 1.3.2).

Using the updated genome assembly, we conducted genome-wide analyses of sex-specific genetic variation by pool sequencing by mapping reads from male and female pools to the Pacific halibut genome assembly. We identified a potential sex-determining region in chromosome 9 of approximately 12 Mb containing a high density of female-specific SNPs. Within this sex-determining region, we identified among the annotated genes a potential candidate for the master sex-determining gene in Pacific halibut. Mapping of previously identified Pacific halibut RAD-tags associated with sex (Drinan et al., 2018) to the updated Pacific halibut genome assembly resulted in the alignment of 55 of the 56 RAD-tags, all of which mapped to the putative SD region, including the two tags containing the sex-linked markers currently used for genetic sex identification (2.1.1). These results, together with data on the Pacific halibut genome sequencing and assembly, have been published in the journal *Molecular Ecology Resources* (https://doi.org/10.1111/1755-0998.13641).

1.3.2. Studies to resolve the genetic structure of the Pacific halibut population in the Convention Area. This project has recently received funding from the North Pacific Research Board (NPRB Project No. 2110; Appendix III). The IPHC Secretariat has generated genomic sequences from 610 individual Pacific halibut collected from five spawning groups in different geographic areas (Figure 1) using low-coverage whole-genome resequencing (lcWGR). The lcWGR approach offers a cost-effective way to develop a large number (~millions) of single nucleotide polymorphisms (SNPs) that can be used as genetic markers to evaluate population structure with very high resolution. Using this method, the IPHC Secretariat is working to establish a baseline of genetic diversity using sample collections made during the spawning season and will use this data set

to develop genomic tools (i.e. genetic marker panels) that can be applied to conduct mixed stock analysis and identify the population of origin for samples collected outside of the spawning season.

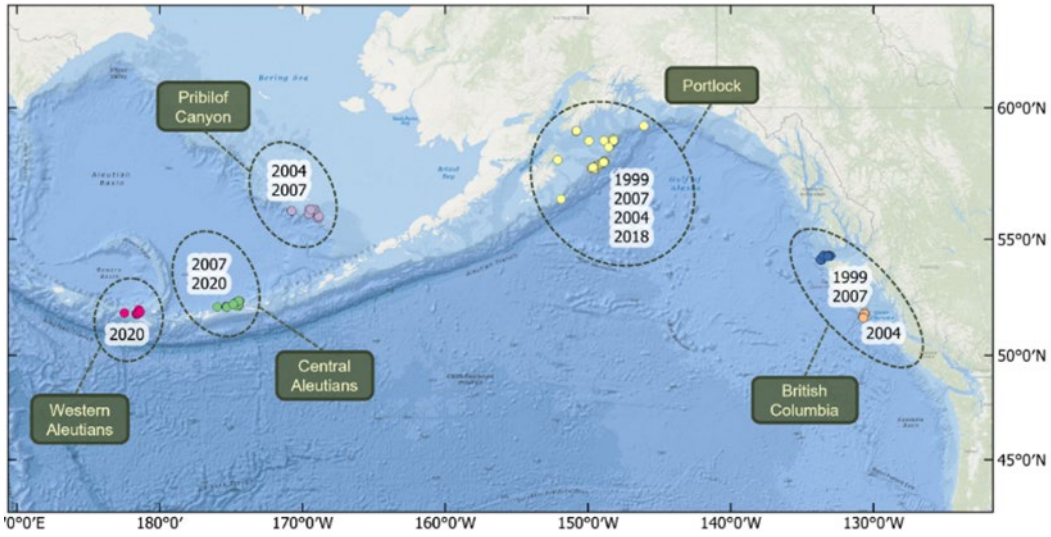


Figure 1. Map of sample collections made during the spawning season used for genomic analysis of population structure in Pacific halibut in the Northeast Pacific Ocean.

2. Reproduction.

Research activities in this Research Area aim at providing information on key biological processes related to reproduction in Pacific halibut (maturity and fecundity) and to provide sex ratio information of Pacific halibut commercial landings. The relevance of research outcomes from these activities for stock assessment (SA) is in the scaling of Pacific halibut biomass and in the estimation of reference points and fishing intensity. These research outputs will result in a revision of current maturity schedules and will be included as inputs into the SA (Appendix I), and represent the most important biological inputs for stock assessment (please see document IPHC-2021-SRB018-06). The relevance of these research outcomes for the management and strategy evaluation (MSE) process is in the improvement of the simulation of spawning biomass in the Operating Model (Appendix II).

2.1. Sex ratio of the commercial landings. The IPHC Secretariat has completed the processing of genetic samples from the 2021 aged commercial landings, completing five consecutive years of sex ratio information (2017-2021).

2.2. Maturity assessment. Recent sensitivity analyses have shown the importance of changes in spawning output due to skip spawning and/or changes in maturity schedules for stock assessment (Stewart and Hicks, 2018). Information on these key reproductive parameters provides direct input to stock assessment. For example, information on

fecundity-at-age and fecundity–at-size could be used to replace spawning biomass with egg output as the metric of reproductive capability in SA and management reference points. This information highlights the need for a better understanding of factors influencing reproductive biology and success of Pacific halibut. In order to fill existing knowledge gaps related to the reproductive biology of female Pacific halibut, research efforts are devoted to characterize female maturity and fecundity in this species. Specific objectives of current studies include: 1) histological assessment of the temporal progression of female developmental stages and reproductive phases throughout an entire reproductive cycle; 2) update of maturity schedules based on histological-based data; and, 3) fecundity determinations.

2.2.1. Histological assessment of the temporal progression of female developmental stages and reproductive phases throughout an entire reproductive cycle. The IPHC Secretariat has completed the first detailed examination of temporal changes in female ovarian developmental stages, reproductive phases, and biological indicators of Pacific halibut reproductive development. The results obtained by ovarian histological examination indicate that female Pacific halibut follow an annual reproductive cycle involving a clear progression of female developmental stages towards spawning within a single year. These results provide foundational information for future studies aimed at updating maturity ogives by histological assessment and at investigating fecundity in Pacific halibut. Furthermore, the potential use of easily-obtained biological indicators in predictive models to assign reproductive phase in Pacific halibut was demonstrated. The results of this study have been published in the journals *Journal of Fish Biology* (https://doi.org/10.1111/jfb.14551) and *Frontiers in Marine Science (*https://doi.org/10.3389/fmars.2022.801759).

2.2.2. Update of maturity schedules based on histological-based data. The IPHC Secretariat is undertaking studies to revise maturity schedules in all four Biological Regions through histological (i.e. microscopic) characterization of maturity. The maturity schedule that is currently used in SA was based on past visual (i.e. macroscopic) maturity classifications in the field (FISS). In order to be able to accomplish this objective, the IPHC Secretariat has collected ovarian samples for histology in the 2022 FISS by targeting Biological Regions 2, 3, 4 and 4B. Ovarian samples are currently being processed for histology and are expected to be available for examination by early 2023. Subsequently, histological maturity classifications will be conducted by IPHC Secretariat staff to generate biological region-specific maturity ogives. A comparison between macroscopic and histological maturity classification criteria will be established.

2.2.3. Fecundity estimations. Different methods for fecundity determinations were investigated and, based on the current literature and recommendations from experts in the field, the auto-diametric method was selected as the method of choice (Witthames et al., 2009). The IPHC Secretariat is currently designing plans for ovarian sample collection for fecundity estimations during the 2023 FISS.

3. Growth.

   Research activities conducted in this Research Area aim at providing information on somatic growth processes driving size-at-age in Pacific halibut. The relevance of research outcomes from these activities for stock assessment (SA) resides, first, in their ability to inform yield-per-recruit and other spatial evaluations for productivity that support mortality limit-setting, and, second, in that they may provide covariates for projecting short-term size-at-age and may help delineate between fishery and environmental effects, thereby informing appropriate management responses (Appendix I). The relevance of these research outcomes for the management and strategy evaluation (MSE) process is in the improvement of the simulation of variability and to allow for scenarios investigating climate change (Appendix II).

   The IPHC Secretariat has conducted studies aimed at elucidating the drivers of somatic growth leading to historical changes in size-at-age by investigating the physiological mechanisms that contribute to growth changes in the Pacific halibut. The two main objectives of these studies have been: 1) the identification and validation of physiological markers for somatic growth; and 2) the application of molecular growth markers for evaluating growth patterns in the Pacific halibut population. Results from these studies are currently being analyzed and a draft manuscript intended for peer-reviewed publication is being prepared.

4. Mortality and Survival Assessment.

   Information on all Pacific halibut removals is integrated by the IPHC Secretariat, providing annual estimates of total mortality from all sources for its stock assessment (SA). Bycatch and wastage of Pacific halibut, as defined by the incidental catch of fish in non-target fisheries and by the mortality that occurs in the directed fishery (i.e. fish discarded for sublegal size or regulatory reasons), respectively, represent important sources of mortality that can result in significant reductions in exploitable yield in the directed fishery. Given that the incidental mortality from the commercial Pacific halibut fisheries and bycatch fisheries is included as part of the total removals that are accounted for in SA, changes in the estimates of incidental mortality will influence the output of the SA and, consequently, the catch levels of the directed fishery. Research activities conducted in this Research Area aim at providing information on discard mortality rates and at producing guidelines for reducing discard mortality in Pacific halibut in the longline and recreational fisheries. The relevance of research outcomes from these activities for SA resides in their ability to improve trends in unobserved mortality in order to improve estimates of stock productivity and represent the most important inputs in fishery yield for SA (Appendix I). The relevance of these research outcomes for the management and strategy evaluation (MSE) process is in fishery parametrization (Appendix II).

   For this reason, the IPHC Secretariat is conducting two research projects to investigate the effects of capture and release on survival and to improve estimates of DMRs in the directed longline and guided recreational Pacific halibut fisheries:

4.1. Evaluation of the effects of hook release techniques on injury levels and association with the physiological condition of captured Pacific halibut and estimation of discard mortality using remote-sensing techniques in the directed longline fishery. The results of the study reporting discard mortality rate estimations in the directed longline fishery have been published in the journal *North American Journal of Fisheries Management* (https://doi.org/10.1002/nafm.10711). The results of the second component of this study, namely the relationships among hook release techniques, injury levels, stress levels and physiological condition of released fish, are presently being written for publication in a peer-reviewed journal.

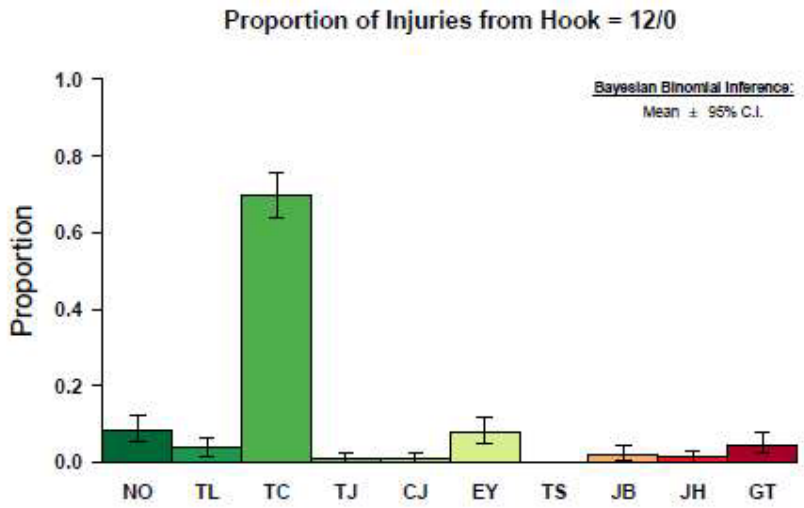
4.2. Estimation of discard mortality rates in the charter recreational sector. The IPHC Secretariat is conducting a research project to better characterize the nature of charter recreational fishery with the ultimate goal of better understanding discard practices in this fishery relative to that which is employed in the directed longline fishery. This project has received funding from the National Fish and Wildlife Foundation and the North Pacific Research Board (Appendix III). The experimental field components of this research project took place in Sitka, Alaska (IPHC Regulatory Area 2C) from 21-27 May 2021, and in Seward, Alaska (IPHC Regulatory Area 3A) from 11-16 June 2021.

The fishing vessels were required to fish 6 rods at a time, three (3) rigged with 12/0 circle hooks and three (3) rigged with 16/0 circle hooks in order to establish a comparison of the two most common gear types used in the Alaskan Pacific halibut recreational fishery, as informed by the survey conducted in 2019 and subsequent discussions. In IPHC Regulatory Area 2C (Sitka, AK), 243 Pacific halibut were captured, sampled and released that were on average 80.1 ± 19.0 cm in fork length (range from 52 to 149 cm) and 7.4 ± 7.5 Kg in weight (range from 1.5 to 49.75 Kg). In IPHC Regulatory Area 3A (Seward, AK), 118 Pacific halibut were captured, sampled and released that were on average 72.5 ± 14.1 cm in fork length (range from 42 to 110 cm) and 5.0 ± 3.3 Kg in weight (range from 0.55 to 17 Kg). Therefore, a total of 361 Pacific halibut were captured, sampled and released in the two research charters conducted

The proportion of the different types of injuries incurred over the hooking and release process were determined for Pacific halibut captured with 12/0 hooks and 16/0 hooks. For Pacific halibut captured with 12/0 hooks, approximately 70% of the fish had injuries corresponding to torn cheek, a type of minor injury that is incurred by the hook penetrating the cheek musculature through a single location during the capture event (Figure 2A). All other injuries were in much smaller proportion. Very similar distribution of injuries were observed in Pacific halibut captured with 16/0 hooks, again with a predominance of torn cheek injuries (Figure 2B). Overall, the predominant injury profile of Pacific halibut captured with either type of hook and subsequently released corresponded to relatively minor injuries. In accordance with this observation, release viabilities of captured Pacific halibut corresponded mostly to the excellent viability category (350/361 fish), followed by reduced numbers of fish in the moderate and poor viability categories (9/361 and 2/361 fish, respectively) and no fish in the dead viability category (0/361).

To date, of the 281 fish that were tagged with opercular wire tags (243 fish in IPHC Regulatory Area 2C and 38 in IPHC Regulatory Area 3A) 28 tags have been recovered: 19 from IPHC Regulatory Area 2C and 9 from IPHC Regulatory Area 3A.

A)



B)

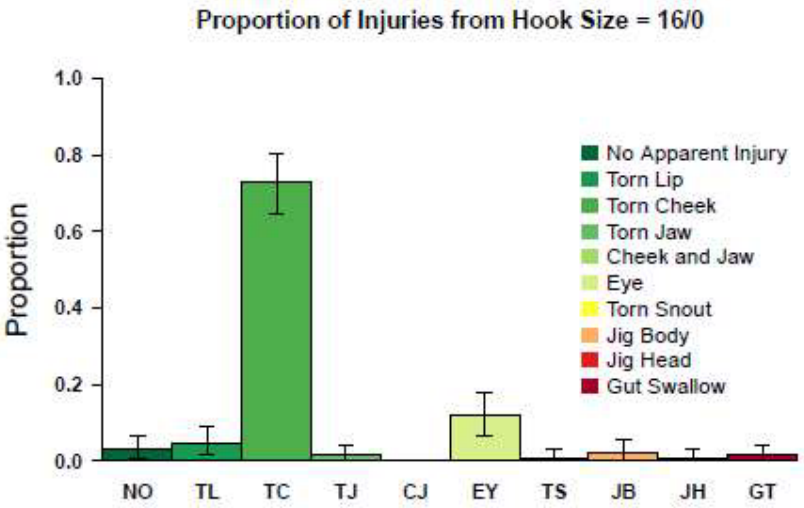


Figure 2. Proportion of the different types of injuries in fish captured with 12/0 hooks (top) and 16/0 hooks (bottom). The legend of injury types corresponds to the abbreviations in the horizontal axis.

In order to directly assess the survival of discarded Pacific halibut from the recreational fishery, 80 fish in the excellent viability category were tagged with satellite-transmitting electronic archival tags equipped with accelerometers (sPAT tags). To date, 76 out of the 80 released sPAT tags provided data reports. Of the 4 sPAT tags that did not provide data, 2 sPAT tags never reported and 2 tags did not have sufficient data for successful interpretation. Therefore, 95% of the sPAT tags deployed provided survival information, a similar data transmission success as compared to our recently published report on the use of sPATs to evaluate survival of Pacific halibut discarded from the longline

fishery (please see paper in the journal *North American Journal of Fisheries Management*: https://doi.org/10.1002/nafm.10711). Of the 76 useable sPAT tags, 48 tags were at liberty for the full duration of the pre-programmed 96-day period, whereas 21 sPAT tags reported prematurely for unknown reasons, with an average time of at liberty reporting of 37.1 days (range of 3.6-76.8 days). The remaining 7 sPAT tags were physically recovered by fishery captures, with an average time at liberty of 58 days (range of 37.1-69.1 days). Of the physically recovered tags, one was recovered 2 Km from its release location, another one 16 Km from its release location and the remaining 5 tags were recovered less than 0.5 Km from their release location.

Final analysis of the accelerometer data from all 76 tags that successfully reported data, following the survival criteria previously reported (https://doi.org/10.1002/nafm.10711), indicates that only one discarded fish in the excellent viability category was confidently estimated to have died (its tag reported 8.3 days after deployment). Therefore, our experimentally-derived estimates of discard mortality from the guided recreational fishery point towards a 1.35% (95% CI 0.00-3.95%) discard mortality rate for Pacific halibut released in excellent viability category captured and released from circle hooks. This estimate is consistent with the supposition that fish discarded in the recreational fishery from circle hooks in excellent condition have a mortality rate that is arguably lower than 3.5%, as is currently used for excellent viability fish released in the commercial fishery (Meyer, 2007). As this estimate does not factor in mortality rates on fish in less than excellent condition, does not inform mortality rates on non-circle hooks (J-hooks, jigs, other), nor directly applies to fish captured and released from non charter practices, changes to the overall recreational discard mortality estimation are not currently contemplated. The deduced discard mortality rate estimated in the present study is lower than the minimum 4.2% discard mortality rate recently estimated for Pacific halibut discarded in excellent viability category from the longline fishery (https://doi.org/10.1002/nafm.10711). The difference in estimated survival between Pacific halibut captured and discarded from the two types of fisheries is consistent with the lower capture (hooking) and release time, under best practice handling conditions, of Pacific halibut captured by the recreational fishery. These results represent the first report of experimentally-derived estimates of mortality of Pacific halibut captured and discarded in the recreational fishery.

5. Fishing technology.

The IPHC Secretariat has determined that research to provide the Pacific halibut fishery with tools to reduce Pacific halibut mortality by whale depredation is considered a high priority. This research is now contemplated as one of the research areas of high priority within the 5-year Program of Integrated Research and Monitoring (2022-2026). Towards this goal, the IPHC secretariat has recently obtained funding from NOAA's Bycatch Research and Engineering Program (BREP) to investigate gear-based approaches to catch protection as a means for minimizing whale depredation in the Pacific halibut and other longline fisheries (NOAA Award NA21NMF4720534; Appendix III). The objectives of this study are to: 1) work with fishermen and gear manufacturers, via direct communication and through an international workshop, to identify effective methods for protecting hook-captured flatfish from

depredation; and 2) develop and pilot test 2-3 simple, low-cost catch-protection designs that can be deployed effectively using current longline fishing techniques and on vessels currently operating in the Northeast Pacific Ocean.

The first phase of this project consisted in recruiting participants for a catch protection workshop from the scientific community and from the harvesters active in the waters of Alaska, British Columbia and the U.S. west coast. Initial screening of research conducted around the world led to invitations to three different groups actively working on development of catch protection devices (Sago Solutions, Norway; National Institute for Sustainable Development (IRD) – Marine Biodiversity, Exploitation, and Conservation Unit (MARBEC), University of Montpellier – CNRS-INFREMER-IRD National Centre for Scientific Research, Centre d'Etudes Biologiques de Chisé, France; and Fish Tech Inc., United States). In parallel, harvesters active in the Pacific halibut and Greenland Turbot fisheries as well as scientists involved in marine mammal research were actively recruited for participation. The "1st International Workshop on Protecting Fishery Catches from Whale Depredation (WS001)" was held electronically on 9 February 2022. The Workshop brought together 74 participants from 6 countries, ranging from research scientists to active harvesters. A report summarizing the material presented and discussions was produced and posted in the IPHC's website along with video recordings of the entire workshop: https://www.iphc.int/venues/details/1st-international-workshop-on-protecting-fishery-catches-from-whale-depredation-ws001.

Current efforts are devoted to the development of designs for two devices (i.e. shuttle and shroud) for field testing in the Spring of 2023.

RECOMMENDATION/S

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-12 which provides a report on current and planned biological and ecosystem science research activities contemplated in the IPHC's Five-Year Program of Integrated Research and Monitoring (2022-2026).

REFERENCES

Fish, T., Wolf, N., Harris, B.P., Planas, J.V. 2020. A comprehensive description of oocyte developmental stages in Pacific halibut, Hippoglossus stenolepis. *Journal of Fish Biology*. 97: 1880–1885. DOI: https://doi.org/10.1111/jfb.14551.

Fish, T., Wolf, N., Smeltz, T.S., Harris, B.P., Planas, J.V. 2022. Reproductive biology of female Pacific halibut (Hippoglossus stenolepis) in the Gulf of Alaska. *Frontiers in Marine Science*. 9: 801759. DOI: https://doi.org/10.3389/fmars.2022.801759.

Jasonowicz, A.J., Simeon, A:, Zahm, M., Cabau, C., Klopp, C., Roques, C., Iampietro, C., Lluch, J., Donnadieu, C., Drinan, D., Hauser, L., Guiguen, Y., Planas, J. V. 2022. Generation of a chromosome-level genome assembly for Pacific halibut (Hippoglossus stenolepis) and characterization of its sex determining region. *Molecular Ecology Resources*. 22:2685-2700. DOI: https://doi.org/10.1111/1755-0998.13641.

Loher, T., Dykstra, C.L., Hicks, A., Stewart, I.J., Wolf, N., Harris, B.P., Planas, J.V. 2022. Estimation of postrelease longline mortality in Pacific halibut using acceleration-logging tags.

North American Journal of Fisheries Management. 42: 37-49. DOI: https://doi.org/10.1002/nafm.10711.

Meyer, S. 2007. Halibut discard mortality in recreational fisheries in IPHC Areas 2C and 3A. Discussion paper submitted to the North Pacific Fishery Management Council, September 2007. https://www.adfg.alaska.gov/static/home/library/pdfs/sportfish/HalibutDiscards907.pdf

Sadorus, L.; Goldstein, E.; Webster, R.; Stockhausen, W.; Planas, J.V.; Duffy-Anderson, J. 2021.Multiple life-stage connectivity of Pacific halibut (Hippoglossus stenolepis) across the Bering Sea and Gulf of Alaska. *Fisheries Oceanography*. 30:174-193. DOI: https://doi.org/10.1111/fog.12512

Stewart, I.J., Hicks, A. 2018. Assessment of the Pacific halibut (Hippoglossus stenolepis) stock at the end of 2017. IPHC-2018-AM094-10.

Witthames, P.R., Greenwood, L.N., Thorsen, A., Dominguez, R., Murua,H., Korta, M., Saborido-Rey, F., Kjesbu, O.S. 2009. Advances in methods for determining fecundity: application of the new methods to some marine fishes. *Fishery Bulletin*. 107, 148–164.

APPENDIX I

List of ranked biological uncertainties and parameters for stock assessment (SA) and their links to potential research areas and research activities

SA Rank	Research outcomes	Relevance for stock assessment	Specific analysis input	Research Area	Research activities
1. Biological input	Updated maturity schedule	Scale biomass and reference point estimates	Will be included in the stock assessment, replacing the current schedule last updated in 2006	Reproduction	Histological maturity assessment
	Incidence of skip spawning		Will be used to adjust the asymptote of the maturity schedule, if/when a time-series is available this will be used as a direct input to the stock assessment		Examination of potential skip spawning
	Fecundity-at-age and -size information		Will be used to move from spawning biomass to egg-output as the metric of reproductive capability in the stock assessment and management reference points		Fecundity assessment
	Revised field maturity classification		Revised time-series of historical (and future) maturity for input to the stock assessment		Examination of accuracy of current field macroscopic maturity classification
2. Biological input	Stock structure of IPHC Regulatory Area 4B relative to the rest of the Convention Area	Altered structure of future stock assessments	If 4B is found to be functionally isolated, a separate assessment may be constructed for that IPHC Regulatory Area	Genetics and Genomics	Population structure
3. Biological input	Assignment of individuals to source populations and assessment of distribution changes	Improve estimates of productivity	Will be used to define management targets for minimum spawning biomass by Biological Region		Distribution
	Improved understanding of larval and juvenile distribution		Will be used to generate potential recruitment covariates and to inform minimum spawning biomass targets by Biological Region	Migration	Larval and juvenile connectivity studies
1. Assessment data collection and processing	Sex ratio-at-age	Scale biomass and fishing intensity	Annual sex-ratio at age for the commercial fishery fit by the stock assessment	Reproduction	Sex ratio of current commercial landings
	Historical sex ratio-at-age		Annual sex-ratio at age for the commercial fishery fit by the stock assessment		Historical sex ratios based on archived otolith DNA analyses
2. Assessment data collection and processing	New tools for fishery avoidance/deterence; improved estimation of depredation mortality	Improve mortality accounting	May reduce depredation mortality, thereby increasing available yield for directed fisheries. May also be included as another explicit source of mortality in the stock assessment and mortality limit setting process depending on the estimated magnitude	Mortality and survival assessment	Whale depredation accounting and tools for avoidance
1. Fishery yield	Physiological and behavioral responses to fishing gear	Reduce incidental mortality	May increase yield available to directed fisheries	Mortality and survival assessment	Biological interactions with fishing gear
2. Fishery yield	Guidelines for reducing discard mortality	Improve estimates of unobserved mortality	May reduce discard mortality, thereby increasing available yield for directed fisheries	Mortality and survival assessment	Best handling practices: recreational fishery

APPENDIX II

List of ranked biological uncertainties and parameters for management strategy evaluation (MSE) and their potential links to research areas and research activities

MSE Rank	Research outcomes	Relevance for MSE	Research Area	Research activities
1. Biological parameterization and validation of movement estimates	Improved understanding of larval and juvenile distribution	Improve parametization of the Operating Model	Migration	Larval and juvenile connectivity studies
	Stock structure of IPHC Regulatory Area 4B relative to the rest of the Convention Area		Genetics and Genomics	Population structure
2. Biological parameterization and validation of recruitment variability and distribution	Assignment of individuals to source populations and assessment of distribution changes	Improve simulation of recruitment variability and parametization of recruitment distribution in the Operating Model		Distribution
	Establishment of temporal and spatial maturity and spawning patterns	Improve simulation of recruitment variability and parametization of recruitment distribution in the Operating Model	Reproduction	Recruitment strength and variability
3. Biological parameterization and validation for growth projections	Identification and application of markers for growth pattern evaluation	Improve simulation of variability and allow for scenarios investigating climate change	Growth	Evaluation of somatic growth variation as a driver for changes in size-at-age
	Environmental influences on growth patterns			
	Dietary influences on growth patterns and physiological condition			
1. Fishery parameterization	Experimentally-derived DMRs	Improve estimates of stock productivity	Mortality and survival assessment	Discard mortality rate estimate: recreational fishery

APPENDIX III

Summary of active research grants during the reporting period

Project #	Grant agency	Project name	PI	Partners	IPHC Budget ($US)	Management implications	Grant period
1	**National Fish & Wildlife Foundation**	Improving the characterization of discard mortality of Pacific halibut in the recreational fisheries (NFWF No. 61484)	IPHC	Alaska Pacific University, U of A Fairbanks, charter industry	$98,902	Bycatch estimates	April 2019 – November 2021
2	**North Pacific Research Board**	Pacific halibut discard mortality rates (NPRB No. 2009)	IPHC	Alaska Pacific University,	$210,502	Bycatch estimates	January 2021 – March 2022
3	**Bycatch Reduction Engineering Program - NOAA**	Gear-based approaches to catch protection as a means for minimizing whale depredation in longline fisheries (NA21NMF4720534)	IPHC	Deep Sea Fishermen's Union, Alaska Fisheries Science Center-NOAA, industry representatives	$99,700	Mortality estimations due to whale depredation	November 2021 – October 2023
4	**North Pacific Research Board**	Pacific halibut population genomics (NPRB No. 2110)	IPHC	Alaska Fisheries Science Center-NOAA	$193,685	Stock structure	December 2021- January 2024
Total awarded ($)					**$602,789**		

IPHC Management Strategy Evaluation and Harvest Strategy Policy: FOR DECISION

PREPARED BY: IPHC SECRETARIAT (A. HICKS, I. STEWART & D. WILSON; 20 DECEMBER 2023)

PURPOSE

To provide the Commission with results of the Management Strategy Evaluation (MSE) simulations of size limit and multi-year stock assessment management procedures (MPs), and to request decisions from the Commission on the Objectives, Performance Metrics, and Management Procedures.

BACKGROUND AND DISCUSSION

1) **Operating Model:** the Scientific Review Board (SRB) has reviewed the IPHC's MSE Operating Model (OM) at the 21st and 22nd Sessions of the Scientific Review Board. Additional details can be found in document IPHC-2023-MSE-01 on the IPHC MSE Research Website. The IPHC's MSE Operating Model has been thoroughly reviewed by the SRB and is performing well for evaluating management procedures, noting that further adjustments may be made, at the request of the Commission, to align with the stock assessment (i.e. conditioning to updated stock assessment outputs).

2) **Objectives:** The IPHC Secretariat is requesting that the Commission agree to a reduced set of MSE objectives. These are a reduced set of important coastwide objectives taken from the larger set presented in Appendix B and reworded for clarity. They are presented here in an order of importance.

    a. Maintain the long-term coastwide female spawning stock biomass above a biomass limit reference point ($B_{20\%}$) at least 95% of the time.

    b. Maintain the long-term coastwide female spawning stock biomass above a biomass target reference point ($B_{36\%}$) at least 50% of the time.

    c. Optimise average coastwide TCEY.

    d. Limit annual changes in the coastwide TCEY.

3) **Performance Metrics:** The IPHC Secretariat is requesting that the Commission endorse the following Performance Metrics to move forward with, which is a subset from the range of metrics presented in Appendix B:

    P(RSB<20%): Probability that the long-term Spawning Biomass is less than the Spawning Biomass Limit: SB_{Lim}=20% of unfished spawning biomass. This is associated with objective (a) and is reported as a pass if the probability is less than 0.05.

    P(RSB<36%): Probability that the Spawning Biomass is less than the Spawning Biomass Target: SB_{Targ}=36% of unfished spawning biomass. This is associated with objective (b) and is reported as a probability.

Median TCEY: The median of the short-term average TCEY over a ten-year period. This is a measure of the TCEY in the next 4-13 years and is associated with objective (c). This is only reported if the spawning biomass objectives are passed.

Median AAV TCEY: The median of the average annual variability of the short-term TCEY determined as the average difference in the TCEY over a ten-year period. This is a measure of the inter-annual variability of the TCEY in the next 4-13 years and is associated with objective (d). This is reported only if the spawning biomass limit objective is passed.

4) **Management Procedures:** The IPHC Secretariat is requesting that the Commission note the following reduced set of MPs presented for decision-making at AM099 or further testing.

MP-A32: Annual assessment frequency and a 32-inch size limit for the directed commercial fishery.

MP-A26: Annual assessment frequency and a 26-inch size limit for the directed commercial fishery.

MP-A0: Annual assessment frequency and no size limit (full retention) for the directed commercial fishery.

MP-Bb32: Biennial assessment frequency and a 32-inch size limit for the directed commercial fishery. The coastwide TCEY in non-assessment years is determined from the change in the coastwide O32 FISS index. The distribution of TCEY is calculated using the FISS observations within a defined distribution procedure.

MP-Tb32: Triennial assessment frequency and a 32-inch size limit for the directed commercial fishery. The coastwide TCEY in non-assessment years is determined from the change in the coastwide O32 FISS index. The distribution of TCEY is calculated using the FISS observations within a defined distribution procedure.

5) **Results:** MSE simulation results are shown below using the four (4) performance metrics described above. The reference fishing intensity, SPR=43%, was used for all MPs. The MP most similar to the recent interim harvest strategy is shaded in grey.

MP name	**MP-A0**	**MP-A26**	**MP-A32**	**MP-Bb32**	**MP-Tb32**
Assessment Frequency	**Annual**	**Annual**	**Annual**	**Biennial**	**Triennial**
Size Limit	**0**	**26**	**32**	**32**	**32**
Empirical Rule	**–**	**–**	**–**	**b**	**b**
P(RSB<20%)	PASS	PASS	PASS	PASS	PASS
P(RSB<36%)	0.174	0.174	0.180	0.164	0.197
Median TCEY	60.5	59.9	58.3	58.5	58.3
Median AAV TCEY	17.2%	17.5%	17.8%	17.0%	14.1%

The IPHC Secretariat is currently in the process of updating the IPHC harvest strategy policy document, which was first developed in 2019, based on decisions of the Commission at IM098 and AM099.

RECOMMENDATION/S

1) That the Commission **NOTE**:
    a. paper IPHC-2023-AM099-13 incorporating Appendix A that describes the MSE framework, size limit and multi-year assessment management procedures, and simulation results.
2) That the Commission **AGREE** to the following MSE priority coastwide objectives, presented in an order of importance:
    a) Maintain the long-term coastwide female spawning stock biomass above a biomass limit reference point (B20%) at least 95% of the time.
    b) Maintain the long-term coastwide female spawning stock biomass above a biomass target reference point (B36%) at least 50% of the time.
    c) Optimise average coastwide TCEY.
    d) Limit annual changes in the coastwide TCEY.
3) That the Commission **ENDORSE** the following Performance Metrics, associated with the priority coastwide objectives:
    a) **P(RSB<20%)**: Probability that the long-term Spawning Biomass is less than the Spawning Biomass Limit, failing if the value is greater than 0.05.
    b) **P(RSB<36%)**: Probability that the Spawning Biomass is less than the Spawning Biomass Target.
    c) **Median TCEY**: The median of the short-term average TCEY over a ten-year period, reported only if the spawning biomass limit objective is passed.
    d) **Median AAV TCEY**: Average annual variability of the short-term TCEY determined as the average difference in the TCEY over a ten-year period, reported only if the spawning biomass limit objective is passed.
4) That the Commission **ENDORSE** the following reduced set of MPs presented for decision-making at AM099 or further testing.
    a) **MP-A32:** Annual assessment frequency and a 32-inch size limit for the directed commercial fishery.
    b) **MP-A26:** Annual assessment frequency and a 26-inch size limit for the directed commercial fishery.
    c) **MP-A0:** Annual assessment frequency and no size limit (full retention) for the directed commercial fishery.
    d) **MP-Bb32:** Biennial assessment frequency and a 32-inch size limit for the directed commercial fishery. The coastwide TCEY in non-assessment years is determined from the change in the coastwide O32 FISS index. The distribution of TCEY in all

years is calculated using the FISS observations within a defined distribution procedure.

e) **MP-Tb32:** Triennial assessment frequency and a 32-inch size limit for the directed commercial fishery. The coastwide TCEY in non-assessment years is determined from the change in the coastwide O32 FISS index. The distribution of TCEY in all years is calculated using the FISS observations within a defined distribution procedure.

5) That the Commission **NOTE** that:

a) for all management procedures evaluated, the long-term relative spawning biomass passed both spawning biomass objectives for all MPs and was more often above the target for SPR values ranging between 40% and 46%;

b) removal of a size limit results in a 3.7% increase, on average, for the short-term median coastwide TCEY and a 2.7% increase, on average, for the long-term median coastwide TCEY. A majority of that increase occurs when reducing the size limit for directed commercial fisheries to 26 inches;

c) without a size limit for the directed commercial fishery, landings of O32 fish would likely decline while U32 landings would likely increase, and the trade-off is dependent on population characteristics such as incoming recruitment and size-at-age;

d) without a size limit for the directed commercial fishery, short-term coastwide directed commercial fishery discard mortality would decline by, on average, 78%;

e) for the directed commercial fishery without a size limit to maintain equal value to the fishery with a 32-inch size limit, the price of U32 fish would have to be near one-half the price of O32 fish, on average, and this equal value price ratio would most likely range between zero and one, depending on stock conditions;

f) a biennial assessment frequency with an empirical rule using FISS observations in non-assessment years shows similar results to an annual assessment;

g) a triennial assessment frequency with an empirical rule using FISS observations in non-assessment years shows a similar short-term median TCEY along with a significant reduction in inter-annual variability of the TCEY;

h) costs associated with multi-year assessments include 1) lack of detailed management information every year, 2) possibly a loss in long-term yield, and 3) a chance of a smaller stock size. Benefits include 1) reduced inter-annual variability in the TCEY, 2) use of the annual FISS index in a transparent process, 3) more focused assessment research, 4) potential for additional collaboration within the Secretariat, 5) consistency with the three-year cycle of update and full assessments, and 6) following the precedent of other fisheries commissions.

APPENDICES

Appendix A: A summary of the IPHC MSE results for 2022

Appendix B: Primary objectives defined by the Commission for the MSE

Appendix C: Results using metrics associated with the primary objectives

Appendix D: Supplementary material

APPENDIX A

A summary of the IPHC MSE results for 2022

This paper presents the outcomes of the MSE Program of Work for 2021–2023 which included tasks related to the MSE framework, investigating management procedures (MPs) related to size limits and multi-year assessments, and improving the process of evaluating MPs (Table 1). Using the primary objectives of the Commission as well as other metrics, results of size limit and multi-year assessment MPs are presented.

Table 1. Tasks recommended by the Commission at SS011 (IPHC-2021-SS011-R para 7) for inclusion in the IPHC Secretariat MSE Program of Work for 2021–2023.

ID	Category	Task	Deliverable
F.1	Framework	Develop migration scenarios	Develop OMs with alternative migration scenarios
F.2	Framework	Implementation variability	Incorporate additional sources of implementation variability in the framework
F.3	Framework	Develop more realistic simulations of estimation error	Improve the estimation model to more adequately mimic the ensemble stock assessment
F.5	Framework	Develop alternative OMs	Code alternative OMs in addition to the one already under evaluation.
M.1	MPs	Size limits	Identification, evaluation of size limits
M.3	MPs	Multi-year assessments	Evaluation of multi-year assessments
E.3	Evaluation	Presentation of results	Develop methods and outputs that are useful for presenting outcomes to stakeholders and Commissioners

1 PRIMARY GOALS AND OBJECTIVES

The Management Strategy Advisory Board (MSAB) has previously suggested four potential goals for evaluating management procedures, and the Commission has identified two of these as primary goals, each one with one or more objectives.

1. Biological Sustainability (also referred to as a conservation goal)
   1.1. Keep biomass above a limit to avoid critical stock sizes
2. Optimise directed fishing opportunities (also referred to as a fishery goal)
   2.1. Maintain spawning biomass around a level (i.e. a target biomass reference point) that optimises fishing activities
   2.3. Provide directed fishing yield
   2.2. Limit variability in mortality limits

Details of the primary goals and objectives defined by the Commission, along with performance metrics, are shown in Appendix B. The objectives are listed above in an order of importance that should be considered when evaluating management procedures.

Metrics or statistics (both words are used interchangeably) are developed from these objectives. For objectives with defined thresholds and tolerances, performance metrics can be developed. A performance standard is the binary outcome of whether an objective is met and can be determined from the performance metric (e.g. does not exceed the tolerance). Evaluation is performed by examining the metrics associated with the primary objectives, but in many cases additional metrics are useful to understand the trade-offs and important outcomes between management procedures.

Priority metrics include the probability that the female spawning biomass is less than 20% of unfished spawning biomass (objective 1.1), probability that the female spawning biomass is less than 36% of unfished spawning biomass (objective 2.1), the median TCEY determined from the simulations averaged over a ten-year short-term period in each simulation (objective 2.3), and the median annual variability determined from the simulations averaged over a ten-year short-term period in each simulation (objective 2.2; AAV). These are presented in order of importance. Additional objectives and performance metrics can be found in Appendix B.

1.1 Clarification of a spawning biomass target

The primary objectives have been endorsed by the Commission, but additional clarity on one objective may be useful.

> **IPHC-2019-AM095-R, para 59a.** *The Commission **ENDORSED** the primary objectives and associated performance metrics used to evaluate management procedures in the MSE process (as detailed in paper IPHC-2019-AM095-12).*
>
> **IPHC-2022-MSAB017-R, para. 28**. *The MSAB **NOTED** that objective 2.1 is stated as a target that has also been interpreted as a threshold and **REQUESTED** clarification from the Commission.*

The development of a spawning biomaaaass target (i.e. a biomass level with a 50% probability of being above or below) was discussed extensively at MSAB013 following the direction of the Commission.

> **AM095-R, para 59c.** *The Commission **RECOMMENDED** the MSAB develop the following additional objective, as well as prioritize this objective in the evaluation of management procedures, for the Commission's consideration.*
>
> *i. A conservation objective that meets a spawning biomass target.*

Four dynamic equilibrium reference points were estimated previously for the Pacific halibut stock: 1) unfished equilibrium dynamic spawning biomass (SB_0), 2) MSY, 3) B_{MSY} as a percentage of SB_0 (RSB_{MSY}), and 4) the equilibrium fishing intensity to achieve MSY using spawning potential ratio (SPR_{MSY}), using three different methods (IPHC-2019-SRB015-11 Rev_1). Estimates of the dynamic equilibrium RSB_{MSY} for Pacific halibut are likely to be in the range of 20% to 30% and SPR_{MSY} to likely be between 30% and 35%. A reasonable RSB_{MSY} proxy, including a precautionary allowance for unexplored sources of uncertainty, would be 30%, and would put a proxy for SB_{MEY} between 36% and 44% given the recommendations of Rayns (2007) and Pascoe et al. (2014).

The objective of maintaining the spawning biomass around a target or above a level that optimises fishing activities was not specifically stated, and objective 2.1 in Appendix B is ambiguous with the general objective and measurable objective potentially in conflict. Below are some insights into the implications of 'around a target' and 'above a level/threshold'.

1.1.1 Around a target

Specifying objective 2.1 in Appendix B as a target implies that a management procedure would be tuned to specifically meet this target with a 50% chance. This means that the expectation is to be above the target spawning biomass half of the time and below the target spawning biomass half of the time. How much above and below is not specified, other than the spawning biomass limit of 20% specified in Objective 1.1. This would typically be accomplished by adjusting the fishing intensity (i.e. SPR) for a specific management procedure until the target is met. If this was a strict performance standard (the probability of 0.5 must be met) it would potentially disregard the trade-offs between the other primary objectives of limiting the variability in mortality limits and provide directed fishing yield. However, other elements introduced into a MP could possibly allow for variability in mortality limits to be minimized, although it would likely result in a complex MP with many elements each aimed at achieving various objectives.

1.1.2 Above a level/threshold

Defining objective 2.1 in Appendix B as a threshold would allow some flexibility in the evaluation. However, this could result in a less clear identification of MPs that meet the objectives, and instead focus the evaluation on identifying trade-offs between objectives. A threshold simply means that the spawning biomass may not drop below the threshold more than 50% of the time (i.e. in half of the simulations) but may remain above the threshold more often. This is similar to the biological sustainability objective 1.1. It would identify MPs with fishing intensities too high to satisfy this objective, but allow for lower fishing intensities that would possibly meet other objectives.

1.1.3 At or above a target

It may seem contradictory to define an objective using the phrase 'above a target', but that may be useful to allow for flexibility in the evaluation of MPs, increase the utility of other objectives, allow for less complex and more transparent MPs, incorporate the precautionary approach, and meet international fisheries guidance as well as ecocertification standards. Furthermore, the concept of a 'target' could be incorporated into the harvest policy in other ways, such as in a definition of overfishing.

Defining a target is common practice in fisheries and is often combined with balancing other objectives. When describing the precautionary approach, FAO states:

> ***FAO (1996) para. 29****. Targets identify the desired outcomes for the fishery. For example, these may take the form of a target fishing mortality, or a specified level of average abundance relative to the unfished state. In some cases, these targets are likely to be identical with those that would be specified for fisheries management, regardless of whether a precautionary approach was to be adopted.*

In other cases, targets may need to be adjusted to be precautionary, for example, by setting the target fishing mortality lower than FMSY.

The Canadian Fisheries Act[1], under 'measures to maintain fish stocks', uses the phrase 'at or above' when describing a level necessary for sustainability.

> ***Canadian Fisheries Act, § 6.1 (1)***: *In the management of fisheries, the Minister shall implement measures to maintain major fish stocks at or above the level necessary to promote the sustainability of the stock, taking into account the biology of the fish and the environmental conditions affecting the stock.*

National Standard 1 of the U.S. Magnusson-Stevens Act[2] defines optimal yield (OY) as a value to achieve, on a continuing bases, and that the OY must not exceed MSY. Furthermore, it states to maintain the long-term average biomass near or above Bmsy.

> ***U.S. Magnusson-Stevens Act § 600.310 (b)(2)(i):*** *MSY. The Magnuson-Stevens Act establishes MSY as the basis for fishery management and requires that: The fishing mortality rate does not jeopardize the capacity of a stock or stock complex to produce MSY; the abundance of an overfished stock or stock complex be rebuilt to a level that is capable of producing MSY; and OY not exceed MSY.*
>
> ***U.S. Magnusson-Stevens Act § 600.310 (b)(2)(ii)****: OY. The determination of OY is a decisional mechanism for resolving the Magnuson-Stevens Act's conservation and management objectives, achieving a fishery management plan's (FMP) objectives, and balancing the various interests that comprise the greatest overall benefits to the Nation. OY is based on MSY as reduced under paragraphs (e)(3)(iii) and (iv) of this section…*
>
> ***U.S. Magnusson-Stevens Act S 600.310 (e)(3)(i)*** *(B) In NS1, use of the phrase "achieving, on a continuing basis, the optimum yield from each fishery" means producing, from each stock, stock complex, or fishery: a long-term series of catches such that the average catch is equal to the OY, overfishing is prevented, the long term average biomass is near or above Bmsy, and overfished stocks and stock complexes are rebuilt consistent with timing and other requirements of section 304(e)(4) of the Magnuson-Stevens Act and paragraph (j) of this section.*

Allowing for the spawning biomass to be above the target while accounting for other objectives would still meet ecocertification standards, such as those defined by the Marine Stewardship Council (MSC). The criteria to achieve a score of 100 for stock status in relation to achievement of Maximum Sustainable Yield (MSY), according to the MSC fishery standard V2.01, is "there is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years." This allows for the principle to be met while also allowing for other objectives.

[1] https://laws-lois.justice.gc.ca/PDF/F-14.pdf

[2] https://www.govinfo.gov/content/pkg/CFR-2012-title50-vol12/pdf/CFR-2012-title50-vol12-part600.pdf

2 CLOSED-LOOP SIMULATION FRAMEWORK

The closed-loop framework with a multi-area operating model (OM) and three options for examining estimation error was initially described in Hicks et al. (2021). Technical details are described in IPHC-2022-MSE-01 on the IPHC MSE Research website and updated as needed. Improvements to the framework have been made in accordance with the MSE program of work and a new OM has been developed.

2.1 Development of a new Operating Model

The IPHC stock assessment (Stewart & Hicks 2022) consists of four stock synthesis models integrated into an ensemble to provide probabilistic management advice accounting for observation, process, and structural uncertainty. A similar approach was taken when developing the models for the closed-loop simulation framework along with some other specifications to improve the efficiency when conditioning models and running simulations. Specific details are provided in IPHC-2023-MSE-01 on the IPHC MSE Research website.

2.2 Projections

The multiple trajectories from the conditioned OM provide replicate time-series of population and fishery processes and are the starting point for the closed-loop simulation to project forward in time using various management procedures (MPs) and assumptions. Processes such as weight-at-age, selectivity/retention deviations, the environmental regime, recruitment, and implementation variability are simulated during the closed-loop simulations. These processes may or may not depend on the size of the population, or a certain demographic. An example of the projection period is shown in Figure 1.

2.2.1 Implementation variability and uncertainty

Implementation variability is defined as the deviation of the fishing mortality from the mortality limit determined from an MP. It can be thought of as what actually (or is believed to have) happened compared to the limits that were set. Decision-making variability is the difference between the MP mortality limits and the adopted mortality limits set by the Commission.

Decision-making variability was simulated as a random process that could modify the coastwide TCEY from the MP TCEY and also modify the distribution of the TCEY among IPHC Regulatory Areas. For these simulations, the coastwide TCEY is equal to the coastwide TCEY from the MP, but distribution of the TCEY is subjected to decision-making variability. The variability was parameterised by comparing adopted TCEYs since 2013 to TCEYs from the MP to reflect potential variability among IPHC Regulatory Areas. Simulations were also performed where the adopted coastwide TCEY may deviate from the MP, along with distribution, but are not reported in this document.

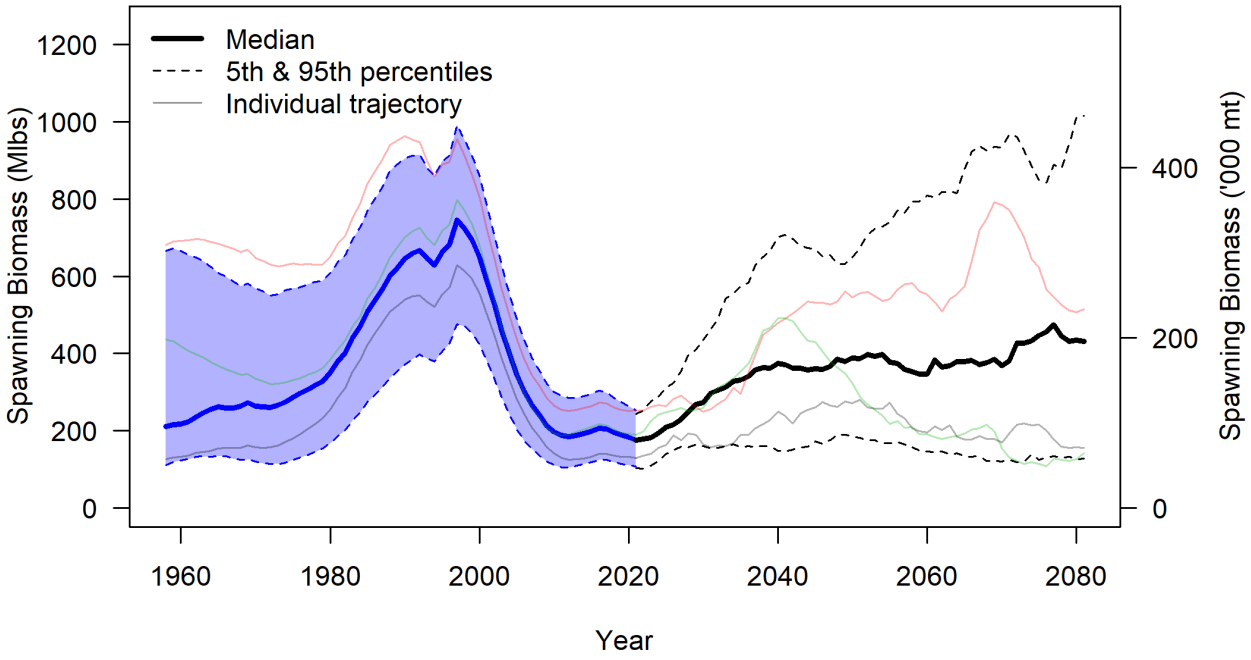


Figure 1. Median, 5th percentile, and 95th percentile of projected spawning biomass when using an SPR of 43%. Three individual trajectories (chosen ad hoc) are shown as thin lines to provide an idea of the variability in one trajectory over the entire period.

3 MANAGEMENT PROCEDURES FOR EVALUATION

Two categories of MPs were prioritised in the MSE Program of Work for 2021–2023 (Table 1). One was the investigation of size limits (M.1) and the other was to investigate multi-year stock assessments (i.e. not conducting the stock assessment annually; M.3). Due to improvements in the MSE framework, changes in the OM, and alternative MPs, select additional MP elements investigated previously, such as SPR, may need to be re-evaluated.

3.1 Size limits

The Commission requested that three size limits be investigated: 32 inches, 26 inches, and no size limit.

> **IPHC-2022-AM098-R, para. 61**: *The Commission **RECALLED** SS011-Rec.01 and **REQUESTED** that the current size limit (32 inches), a 26 inch size limit, and no size limit be investigated. to understand the long-term effects of a change in the size limit.*

The removal of a size limit resulted in a 3.7% increase, on average, in the short-term median coastwide TCEY and a 2.7% increase, on average, in the long-term median coastwide TCEY (Table 2). A majority of that increase occurs when reducing the size limit for directed commercial fisheries to 26 inches. Even though a gain in overall yield is likely, reducing the size limit for the directed commercial fishery would likely result in a decline in directed commercial landings of

O32 Pacific halibut while U32 landings would likely increase (Figure 2), which is dependent on population characteristics such as incoming recruitment and size-at-age. Without a size limit for the directed commercial fishery, short-term directed commercial fishery discard mortality would decline by, on average, 80% coastwide and between 67% to 89% across IPHC Regulatory Areas.

Table 2. Performance metrics related to primary objectives for size limit MPs with an annual assessment, estimation error and decision-making variability option 1. Biological sustainability metrics are long-term and fishery sustainability are short-term (4–13 years).

MP name	**MP-A0**	**MP-A26**	**MP-A32**
Size Limit	**0**	**26**	**32**
SPR	**0.43**	**0.43**	**0.43**
Replicates	1100	1100	1100
Biological Sustainability			
Median average RSB	38.9%	38.9%	38.8%
P(any RSB_y<20%)	<0.001	<0.001	<0.001
Fishery Sustainability			
P(all RSB<36%)	0.174	0.174	0.180
Median TCEY	60.5	59.9	58.3
P(any3 change TCEY > 15%)	0.880	0.894	0.906
Median AAV TCEY	17.2%	17.5%	17.8%

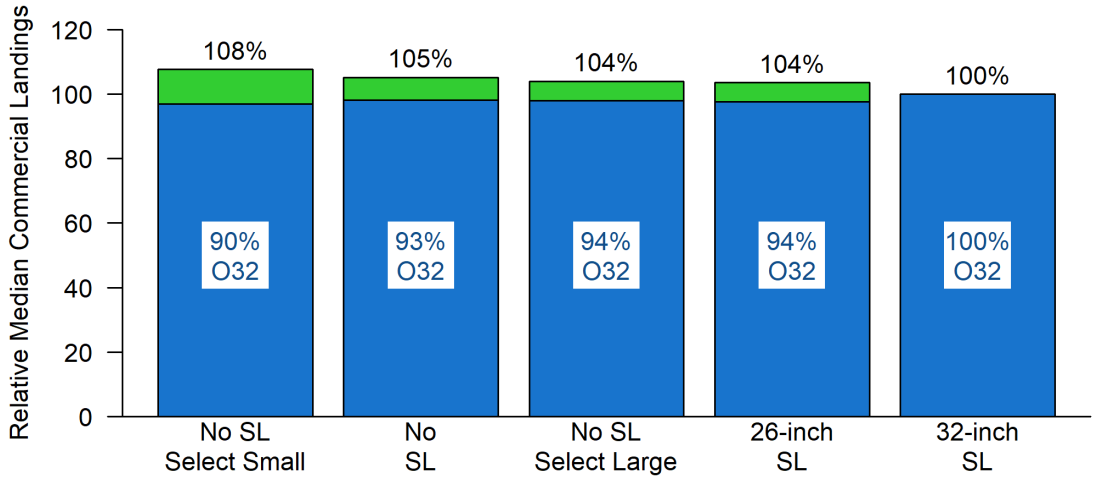


Figure 2. Median short-term directed commercial landings relative to the landings (bar height) with the current size limit (32-inches) for three no size limit scenarios (selecting smaller fish, recent selectivity, and selecting larger fish), a 26-inch size limit, and the current size limit. The percentage of O32 Pacific halibut in the directed commercial landings is shown in blue (bottom) and the percentage of U32 Pacific halibut in the directed commercial landings is shown in green (top).

An important concept to bring into the evaluation of size limits is market considerations. Stewart et al. (2021) used the ratio between the U32 price and O32 price for Pacific halibut to determine what ratio is necessary for the fishery to break even economically. Here, we call that the Equal Value Price Ration (EVPR), and a value between 0 and 100 indicates the percentage the price for U32 fish compared to the price of O32 fish must be for the Pacific halibut fishery to have the same value as with a 32-inch size limit (Figure 3).

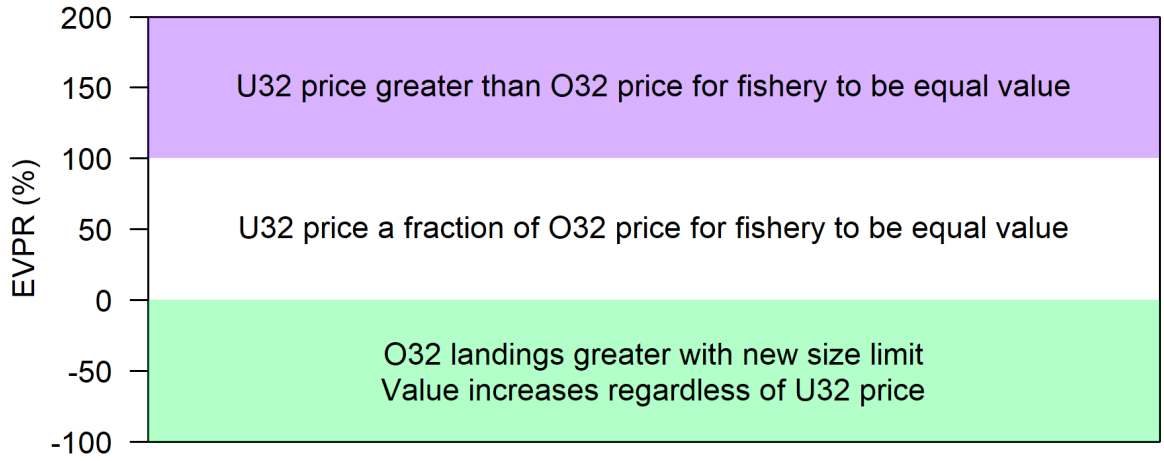


Figure 3. Descriptions of the meaning of EVPR for three different ranges.

The EVPR may be another useful metric for evaluating size limits and it is worth noting that the SRB recently requested a similar product.

> **IPHC-2021-SRB019-R** (para 61): *The SRB **REQUESTED** further information (e.g. inverse demand curves), to be presented at SRB020, on the regional supply-price relationships for commercial landings, as well as localized importance of the Pacific halibut fishery to communities.*

It is unknown what prices will be for U32 Pacific halibut if a size limit was removed, but the FISS has recently begun selling U32 fish, which may be an indicator for the potential price of small fish. This empirical price ratio was near 88% in 2022 and has been above 80% in recent years (see Table 4 in IPHC-2021-ECON-02-R03).

The short-term Equal Value Price Ratio (EVPR) shows a median near 0.5 for both comparisons of no size limit to the current size limit and a 26-inch size limit compared to the current size limit (Figure 4). Most of the distribution of the short-term EVPR was between 0 and 1 although a small proportion was less than 0 (O32 commercial landings increased with a lower size limit) and above 1 (the price of U32 Pacific halibut would have to be greater than the price of O32 Pacific halibut for equal fishery value).

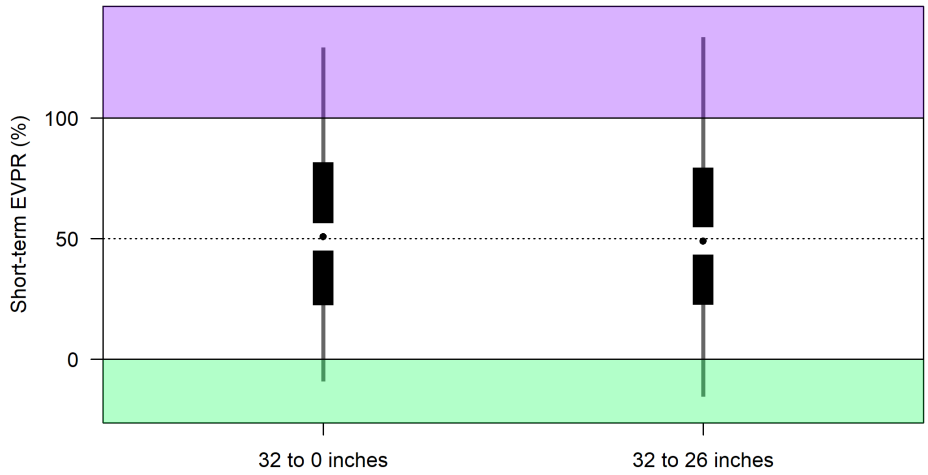


Figure 4. The short-term Equal Value Price Ratio (EVPR) for simulations comparing no size limit to the current size limit (left) and a 26-inch size limit compared to the current size limit (right). The black dot is the median of 1,100 simulations, the thick bar shows the 25th and 75th percentiles, and the thin line shows the 5th and 95th percentiles. Various ranges of values of the EVPR are shaded in colors corresponding to Figure 3.

3.2 Multi-year assessments

Management procedures with multi-year assessments incorporate a process where the stock assessment occurs at intervals longer than annually. The mortality limits in a year with the stock assessment can be determined as in previously defined MPs, but in years without a stock assessment, the mortality limits would need an alternative approach. This may be as simple as maintaining the same mortality limits for each IPHC Regulatory Area in years with no stock assessment, or as complex as invoking an alternative MP that does not require a stock assessment (such as an empirical-based MP relying only on data/observations).

The Commission requested that the Secretariat investigate biennial assessments and potentially longer intervals as time allows.

> **IPHC-2022-AM098-R, para 64**: *The Commission **REQUESTED** that multi-year management procedures include the following concepts:*
>
> *a) The stock assessment occurs biennially (and possibly triennial if time in 2022 allows) and no changes would occur to the FISS (i.e. remains annual);*
>
> *b) The TCEY within IPHC Regulatory Areas for non-assessment years:*
>
> *i. remains the same as defined in the previous assessment year, or*
>
> *ii. changes within IPHC Regulatory Areas using simple empirical rules, to be developed by the IPHC Secretariat, that incorporate FISS data.*

Furthermore, in 2022, the SRB made a request for triennial assessments.

> **IPHC-2022-SRB021-R, para. 30**. *The SRB **REQUESTED** that the Secretariat examine MPs based on a three-year assessment cycle with annual TCEY changes proportional to changes in the FISS index because (i) this approach would be simpler and more transparent than a model, which has not yet been developed); (ii) the high benefit to cost ratio for multi-year TCEYs; (iii) it matches the current three-year full assessment cycle; and (iv) the general approach has precedents in other fishery commissions (e.g. Southern Bluefin Tuna).*

There are many different empirical rules that could be applied to determine the TCEY in non-assessment years. We identified three empirical rules for determining IPHC Regulatory Area specific TCEYs in non-assessment years, which either use no observations or FISS observations.

a. The same TCEY from the previous year for each IPHC Regulatory Area.
b. Updating the coastwide TCEY proportionally to the change in the coastwide FISS O32 WPUE and updating the distribution of the TCEY using FISS results and the applied distribution procedure.
c. Maintaining the same coastwide TCEY as the previous year but updating the distribution of the TCEY using FISS results and the applied distribution procedure.

Empirical rule (a) does not update the TCEY in IPHC Regulatory Areas, which may deviate from distribution agreements related to a percentage of the coastwide TCEY, if present, due to changes in the distribution of biomass. Empirical rules (b) and (c) both adjust the distribution of the coastwide TCEY and would maintain any agreements related to distribution.

Table 3. Performance metrics related to primary objectives for annual, biennial, and triennial MPs with a size limit of 32 inches simulated with estimation error and option 1 decision-making variability. Biological sustainability metrics are long-term and fishery sustainability are short-term (4–13 years). Empirical rules for non-assessment years are described in the text.

MP name	**MP-A32**	**MP-Ba32**	**MP-Bb32**	**MP-Bc32**	**MP-Tb32**
Assessment Frequency	**Annual**	**Biennial**	**Biennial**	**Biennial**	**Triennial**
Size Limit	**32**	**32**	**32**	**32**	**32**
Empirical Rule	**–**	**a**	**b**	**c**	**b**
SPR	**0.43**	**0.43**	**0.43**	**0.43**	**0.43**
Replicates	1100	1100	1100	1100	1100
Biological Sustainability					
Median average RSB	38.8%	38.7%	38.9%	38.7%	39.1%
P(any RSB_y<20%)	<0.001	<0.001	<0.001	<0.001	<0.001
Fishery Sustainability					
P(all RSB<36%)	0.180	0.164	0.164	0.168	0.197
Median average TCEY	58.3	57.8	58.5	57.7	58.3
P(any3 change TCEY > 15%)	0.906	0.682	0.809	0.682	0.628
Median AAV TCEY	17.8%	13.2%	17.0%	13.2%	14.1%

A biennial assessment frequency with an empirical rule using FISS observations in non-assessment years shows similar results to an annual assessment (Table 3). This occurs because the FISS index tracks closely with the stock assessment. A triennial assessment frequency with an empirical rule using FISS observations in non-assessment years shows a slight reduction in the long-term TCEY along with a significant reduction in short-term and long-term inter-annual variability in the TCEY.

The Secretariat worked with the SRB to identify costs and benefits of multi-year stock assessments, which are outlined in paragraph 27 from IPHC-2022-SRB020-R and paragraph 30 from IPHC-2022-SRB021-R. Also incorporating comments from IPHC-2022-MSAB017-R, a list of costs and benefits is provided below.

1) Costs include
    a) Detailed management information is not available every year (e.g. stock status),
    b) The TCEY in non-assessment years may not follow stock trends (for options a and c without an empirical rule on coastwide TCEY),
    c) Potentially a small loss in yield (for options a and c with a constant coastwide TCEY across non-assessment years),
    d) Potentially may not meet distribution agreements, if any (only for option a),
    e) A slightly higher chance of a smaller stock size.
2) Benefits include
    a) Reduced inter-annual variability in the TCEY,
    b) Multi-year stability and short-term predictability of the TCEY,
    c) Use of the annual FISS index in a transparent process to determine the TCEY in non-assessment years,
    d) More focused assessment research,
    e) Potential for additional time to collaborate within the Secretariat,
    f) A triennial assessment frequency would be consistent with the current assessment cycle of update and full assessments,
    g) The multi-year approach has precedent at other fisheries commissions

4 NEXT STEPS

A secondary set of MPs can be developed based on the performance of the primary set presented above. This may include crossing size limits with biennial assessments, tuning SPR values to best meet objectives, examining different levels of estimation error, incorporating various forms of implementation variability, or examining additional MP elements such as constraints on the inter-annual change in TCEY. This secondary set would not be a full factorial, but instead a specific investigation of relevant factors with the goal to refine the best performing MPs relative to stock and fishery objectives. Other tasks include developing performance metrics for other objectives, such as reducing discard mortality, or specifying and evaluating elements of the Harvest Strategy Policy (e.g. overfishing limit).

An important task for the MSE would be to tune the coastwide specifications to optimise a selected distribution procedure. At a minimum, that would include evaluating SPR values, but may also incorporate investigations of the control rule, size limits, assessment frequency, and constraints on the inter-annual change in TCEY. Furthermore, the MSE may evaluate elements of distribution procedures for future incorporation by the Commission.

5 SCIENTIFIC ADVICE

5.1 Clarifying a target objective

Objective 2.1 could be phrased consistently as currently stated under measurable objective to reflect that the objective is met when the relative spawning biomass is above the target (Appendix B). This would mean editing the description under "General Objective" in Appendix B to "Maintain spawning biomass [above] a level that optimi[s]es fishing activities". The Commission may choose to "tune" the SPR value such that the relative spawning biomass is more often closer to the target, while accounting for other objectives.

5.2 Size limits

The removal of a size limit meets or optimises all of the primary objectives, resulting in a 3.7% increase, on average, in the short-term median coastwide TCEY and a 2.7% increase, on average, in the long-term median coastwide TCEY. A majority of that increase occurs when reducing the size limit for directed commercial fisheries to 26 inches. Furthermore, short-term and long-term yield in all IPHC Regulatory Areas increased. Reducing the size limit for the directed commercial fishery would replace some directed commercial landings of O32 Pacific halibut with U32 landings. The magnitude of U32 landings at any point in time is dependent on population characteristics such as incoming recruitment and size-at-age. Over the long term, the price for U32 landings would need to be at least 50% of that for O32 landings to maintain a higher value in the absence of a size limit. Without a size limit for the directed commercial fishery, short-term directed commercial fishery discard mortality would decline by, on average, 78% coastwide and between 67% to 88% across IPHC Regulatory Areas.

5.3 Multi-year Assessments

A biennial assessment frequency with an empirical rule using FISS observations in non-assessment years shows similar performance to an annual assessment. This occurs because the FISS index tracks closely with the stock assessment. A triennial assessment frequency with an empirical rule using FISS observations in non-assessment years shows a slight reduction in the long-term TCEY along with a significant reduction in short-term and long-term inter-annual variability in the TCEY. Costs associated with a triennial assessment using an empirical MP that adjusts the coastwide TCEY and distribution using FISS data include 1) lack of detailed management information (e.g. estimates of SPR, stock status) every year, 2) possibly a loss in long-term yield, and 3) a chance of a smaller stock size. Benefits include 1) reduced inter-annual variability in the TCEY, 2) multi-year stability and short-term predictability of the TCEY, 3) use of the annual FISS index in a transparent process, 4) more focused assessment research, 5) potential of additional time for collaboration within the Secretariat, 6) consistency with the three-

year cycle of update and full assessments, and 7) following the precedent of other fisheries commissions.

5.4 Uncertainties not included in these MSE simulations

Relevant uncertainty was captured with the use of four OMs and five distribution procedures. However, it is unknown if the range of the five distribution procedures captures the future distribution procedures that are used. An extreme departure from the five distribution incorporated here may have an unexpected outcome on the results.

REFERENCES

FAO 1996. Precautionary approach to fisheries. *FAO Fish. Tech. Pap.* 350 (2): 210p. https://www.fao.org/3/w3592e/w3592e.pdf

Hicks, A, P Carpi, I Stewart, and S Berukoff. 2021. IPHC Management Strategy Evaluation for Pacific halibut (Hippoglossus stenolepis). https://iphc.int/uploads/pdf/am/am097/iphc-2021-am097-11.pdf.

Pascoe, S., Thebaud, O. and Vieira, S. 2014. Estimating proxy economic target reference points in data-poor single-species fisheries. Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science 6(1): 247-259.

Rayns, N. 2007. The Australian government's harvest strategy policy. ICES Journal of Marine Science 64: 596- 598.

Stewart, I., A. Hicks. 2022. Assessment of the Pacific halibut (*Hippoglossus stenolepis*) stock at the end of 2023. IPHC-2023-SA-01. https://www.iphc.int/uploads/pdf/sa/2023/iphc-2023-sa-01.pdf

Stewart, I., A. Hicks, B. Hutniczak. 2021. Evaluation of directed commercial fishery size limits in 2020. IPHC-2021-AM097-09. 15 December 2020. https://www.iphc.int/uploads/pdf/am/am097/iphc-2021-am097-09.pdf

APPENDIX B
OBJECTIVES USED BY THE COMMISSION FOR THE MSE

Table B1. Objectives, evaluated over a simulated ten-year period, reviewed by the Commission at the 7th Special Session of the Commission (SS07). Objective 1.1 is a biological sustainability (conservation) objective and objectives 2.1, 2.2, and 2.3 are fishery objectives.

GENERAL OBJECTIVE	MEASURABLE OBJECTIVE	MEASURABLE OUTCOME	TIME-FRAME	TOLERANCE	PERFORMANCE METRIC
1.1. KEEP FEMALE SPAWNING BIOMASS ABOVE A LIMIT TO AVOID CRITICAL STOCK SIZES AND CONSERVE SPATIAL POPULATION STRUCTURE	Maintain a female spawning stock biomass above a biomass limit reference point at least 95% of the time	*SB* < Spawning Biomass Limit (SB_{Lim}) SB_{Lim}=20% unfished spawning biomass	Long-term	0.05	$P(SB < SB_{Lim})$
	Maintain a defined minimum proportion of female spawning biomass in each Biological Region	$p_{SB,2} > 5\%$ $p_{SB,3} > 33\%$ $p_{SB,4} > 10\%$ $p_{SB,4B} > 2\%$	Long-term	0.05	$P(p_{SB,R} < p_{SB,R,min})$
2.1 MAINTAIN SPAWNING BIOMASS AROUND A LEVEL THAT OPTIMIZES FISHING ACTIVITIES	Maintain the coastwide female spawning biomass above a biomass target reference point at least 50% of the time	*SB*<Spawning Biomass Target (SB_{Targ}) SB_{Targ}=36% unfished spawning biomass	Long-term	0.50	$P(SB < SB_{Targ})$
2.2. LIMIT VARIABILITY IN MORTALITY LIMITS	Limit annual changes in the coastwide TCEY	Annual Change (*AC*) > 15% in any 3 years	Short-term		$P(AC_3 > 15\%)$
		Median coastwide Average Annual Variability (AAV)	Short-term		*Median AAV*
	Limit annual changes in the Regulatory Area TCEY	Annual Change (*AC*) > 15% in any 3 years	Short-term		$P(AC_3 > 15\%)$
		Average AAV by Regulatory Area (AAV_A)	Short-term		*Median* AAV_A
2.3. PROVIDE DIRECTED FISHING YIELD	Optimize average coastwide TCEY	Median coastwide TCEY	Short-term		*Median* $\overline{TCEY}$
	Optimize TCEY among Regulatory Areas	Median $TCEY_A$	Short-term		*Median* $\overline{TCEY_A}$
	Optimize the percentage of the coastwide TCEY among Regulatory Areas	Median $\%TCEY_A$	Short-term		*Median* $\overline{\left(\frac{TCEY_A}{TCEY}\right)}$
	Maintain a minimum TCEY for each Regulatory Area	Minimum $TCEY_A$	Short-term		*Median Min(TCEY)*
	Maintain a percentage of the coastwide TCEY for each Regulatory Area	Minimum $\%TCEY_A$	Short-term		*Median Min(%TCEY)*

APPENDIX C
RESULTS USING METRICS ASSOCIATED WITH THE PRIMARY OBJECTIVES

Table C1. Short-term metrics associated with primary objectives for simulations (1,100 replicates) with simulated estimation error, decision-making variability option 1, and SPR=43%.

	MP	MP-A0	MP-A26	MP-A32	MP-Bb	MP-Tb
Short-term	**Biological Sustainability**					
	P(any RSB_y<20%)	0.005	0.005	0.005	0.005	0.005
	Fishery Sustainability					
	P(all RSB<36%)	0.369	0.372	0.376	0.411	0.403
	Median average TCEY	60.46	59.92	58.33	58.46	58.32
	Median average TCEY-2A	1.63	1.63	1.62	1.60	1.60
	Median average TCEY-2B	8.86	8.82	8.52	8.36	8.43
	Median average TCEY-2C	6.66	6.60	6.33	6.39	6.35
	Median average TCEY-3A	24.29	24.04	23.24	23.38	23.39
	Median average TCEY-3B	7.42	7.36	7.13	7.09	7.17
	Median average TCEY-4A	3.52	3.48	3.35	3.39	3.41
	Median average TCEY-4CDE	4.06	4.04	3.92	3.94	3.91
	Median average TCEY-4B	2.86	2.82	2.70	2.71	2.72
	P(any3 change TCEY > 15%)	0.880	0.894	0.906	0.809	0.628
	P(any3 change TCEY 2A > 15%)	0.254	0.252	0.264	0.357	0.288
	P(any3 change TCEY 2B > 15%)	0.644	0.639	0.679	0.639	0.432
	P(any3 change TCEY 2C > 15%)	0.696	0.711	0.722	0.641	0.434
	P(any3 change TCEY 3A > 15%)	0.738	0.750	0.757	0.669	0.447
	P(any3 change TCEY 3B > 15%)	0.756	0.759	0.777	0.751	0.526
	P(any3 change TCEY 4A > 15%)	0.782	0.778	0.804	0.723	0.496
	P(any3 change TCEY 4CDE > 15%)	0.514	0.527	0.524	0.430	0.241
	P(any3 change TCEY 4B > 15%)	0.771	0.753	0.781	0.709	0.442
	Median AAV TCEY	17.2%	17.5%	17.8%	17.0%	14.1%
	Median AAV TCEY 2A	2.5%	2.6%	2.7%	4.3%	1.9%
	Median AAV TCEY 2B	16.6%	17.0%	17.4%	18.4%	15.2%
	Median AAV TCEY 2C	17.8%	17.8%	18.2%	18.2%	15.0%
	Median AAV TCEY 3A	18.9%	19.1%	19.4%	19.0%	15.3%
	Median AAV TCEY 3B	19.9%	20.2%	20.7%	20.2%	16.1%
	Median AAV TCEY 4A	20.0%	20.1%	20.5%	20.8%	16.7%
	Median AAV TCEY 4CDE	15.0%	15.1%	14.9%	14.1%	11.7%
	Median AAV TCEY 4B	20.0%	19.8%	20.3%	20.5%	15.9%

Table C2. Long-term metrics associated with primary objectives for simulations (1,100 replicates) with simulated estimation error, decision-making variability option 1, and an SPR of 43%.

	MP	MP-A0	MP-A26	MP-A32	MP-Bb	MP-Tb
Long-term	**Biological Sustainability**					
	P(any RSB_y<20%)	<0.001	<0.001	<0.001	<0.001	<0.001
	Fishery Sustainability					
	P(all RSB<36%)	0.174	0.174	0.180	0.164	0.197
	Median average TCEY	63.88	63.53	62.21	61.26	62.95
	Median average TCEY-2A	1.63	1.63	1.62	1.61	1.61
	Median average TCEY-2B	9.32	9.21	9.09	8.83	8.97
	Median average TCEY-2C	7.11	7.07	6.97	6.80	6.93
	Median average TCEY-3A	26.10	26.08	25.69	25.43	26.08
	Median average TCEY-3B	8.00	8.03	7.83	7.81	7.99
	Median average TCEY-4A	3.04	3.02	2.92	2.94	2.94
	Median average TCEY-4CDE	3.46	3.40	3.32	3.44	3.46
	Median average TCEY-4B	2.85	2.82	2.70	2.69	2.66
	P(any3 change TCEY > 15%)	0.855	0.852	0.852	0.781	0.515
	P(any3 change TCEY 2A > 15%)	0.226	0.232	0.245	0.340	0.249
	P(any3 change TCEY 2B > 15%)	0.630	0.637	0.637	0.617	0.385
	P(any3 change TCEY 2C > 15%)	0.693	0.704	0.711	0.636	0.281
	P(any3 change TCEY 3A > 15%)	0.720	0.720	0.715	0.631	0.343
	P(any3 change TCEY 3B > 15%)	0.778	0.778	0.784	0.689	0.423
	P(any3 change TCEY 4A > 15%)	0.785	0.788	0.820	0.766	0.500
	P(any3 change TCEY 4CDE > 15%)	0.484	0.464	0.452	0.390	0.218
	P(any3 change TCEY 4B > 15%)	0.776	0.766	0.776	0.760	0.507
	Median AAV TCEY	15.9%	16.1%	16.3%	15.7%	11.9%
	Median AAV TCEY 2A	1.5%	1.5%	1.6%	1.9%	1.3%
	Median AAV TCEY 2B	15.8%	15.8%	16.1%	17.7%	13.7%
	Median AAV TCEY 2C	16.7%	16.9%	17.0%	17.4%	13.1%
	Median AAV TCEY 3A	16.8%	16.9%	17.2%	17.5%	13.4%
	Median AAV TCEY 3B	18.4%	18.0%	18.5%	18.7%	14.6%
	Median AAV TCEY 4A	18.5%	18.7%	19.2%	19.6%	15.3%
	Median AAV TCEY 4CDE	13.6%	13.6%	13.5%	13.0%	9.0%
	Median AAV TCEY 4B	18.3%	18.3%	18.6%	19.3%	15.7%

APPENDIX D
SUPPLEMENTARY MATERIAL

The IPHC MSE Research website contains additional documents with more detailed information.

https://www.iphc.int/management/science-and-research/management-strategy-evaluation

This includes a more detailed description of the MSE framework and current results in document IPHC-2023-MSE-01, and a technical description in document IPHC-2022-MSE-01.

The MSE Explorer will be updated as additional results are produced.

http://shiny.westus.cloudapp.azure.com/shiny/sample-apps/MSE-Explorer/

Results with 500 simulations, that examine a wider range of options and elements and were presented at MSAB017, are available at

http://shiny.westus.cloudapp.azure.com/shiny/sample-apps/IPHC-MSE-MSAB017/

IPHC Fishery Regulations: Proposals for the 2022-23 process

PREPARED BY: IPHC SECRETARIAT (B. HUTNICZAK; 22 DECEMBER 2022)

PURPOSE

To provide the Commission with an overview of the IPHC Fishery Regulations proposals that the IPHC Secretariat, Contracting Parties, and other stakeholders have submitted for consideration by the Commission at the 99th Session of the IPHC Annual Meeting (AM099).

BACKGROUND

Recalling the IPHC Fishery Regulations proposals submission and review process instituted in 2017, this paper is intended to provide an overview of the fishery regulations proposals being submitted to the Commission in the 2022-23 process.

The Commission had a chance for a preliminary review of majority of the proposals at the 98th Session of the IPHC Interim Meeting (IM098). The deadline for submission of regulatory proposals for consideration by the Commission at the 99th Session of the IPHC Annual Meeting (AM099) is 24th December 2022.

DISCUSSION

A list of titles, subjects, and sponsors for IPHC Fishery Regulations proposals submitted as part of the 2022-23 process is provided at **Appendix I**.

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-14, which provides the Commission with an overview of the IPHC Fishery Regulations proposals that the IPHC Secretariat, Contracting Parties, and other stakeholders have submitted for consideration by the Commission in the 2022-23 process.

APPENDICES

Appendix I: Titles, subjects, and sponsors for IPHC Fishery Regulations proposals submitted for consideration in the 2022-23 process.

APPENDIX I

Titles, subjects, and sponsors for IPHC Fishery Regulations proposals submitted for consideration in the 2022-23 process.

Ref. No.	Title	Brief description
IPHC Secretariat		
IPHC-2023-AM099-PropA1	Mortality and Fishery Limits (Sect. 5)	To provide clear documentation of mortality and fishery limits within the IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5). *Mortality and fishery limits tables will be filled when the Commission adopts TCEYs for the individual IPHC Regulatory Areas.*
IPHC-2023-AM099-PropA2	Commercial Fishing Periods (Sect. 9)	To specify fishing periods for the directed commercial Pacific halibut fisheries within the IPHC Fishery Regulations: Commercial Fishing Periods (Sect. 9).
IPHC-2023-AM099-PropA3	Fishing Period Limits (Sect 14) & Licensing Vessels for IPHC Regulatory Area 2A (Sect. 15) – Accommodation of the transition of management in the IPHC Regulatory Area 2A	To accommodate the transition of management in the IPHC Regulatory Area 2A from the IPHC to the PFMC and NOAA Fisheries (Sect. 14 & 15). *See more details in IPHC-2023-AM099-04 and IPHC-2023-AM099-INF03. This proposal will also have implications for sections the IPHC Fishery Regulations other than Sect. 14 & 15.*
IPHC-2023-AM099-PropA4	IPHC Fishery Regulations: minor amendments	To improve clarity and consistency in the IPHC Fishery Regulations.
Contracting Parties		
IPHC-2023-AM099-PropB1	Recreational (Sport) Fishing for Pacific Halibut – IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Charter Management Measures in IPHC Regulatory Areas 2C and 3A	**Proponent**: USA (NOAA Fisheries); 20 December 2022 To propose charter management measures in IPHC Regulatory Areas 2C and 3A reflective of mortality limits adopted by the IPHC and resulting allocations under the North Pacific Fishery Management Council (NPFMC) Pacific halibut Catch Sharing Plan.
IPHC-2023-AM099-PropB2	Recreational (Sport) Fishing for Pacific Halibut - IPHC Regulatory Area 2B (Sect. 28) - Daily bag limit in IPHC Regulatory Area 2B	**Proponent**: Canada (Fisheries and Oceans Canada) To propose the daily bag limit of up to three fish per day per person in the recreational fishery in IPHC Regulatory Area 2B.

IPHC-2023-AM099-PropB3	Recreational (Sport) Fishing for Pacific Halibut - IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Onboard consumption	**Proponent**: USA (NOAA Fisheries); 20 December 2022 To propose adding flexibility to existing recreational (sport) Pacific halibut fishing regulations in Alaska Regulatory Areas and allow limited consumption of recreationally-caught Pacific halibut on board charter vessels and pleasure craft, while retaining existing regulations that provide effective enforcement of daily bag limits and possession limits.
IPHC-2023-AM099-PropB4	IPHC-2023-AM099-PropB4: Logs (Sect 20) – Logs requirements	**Proponent**: USA (NOAA Fisheries) To propose an update to IPHC regulatory language regarding the qualifying logbooks in IPHC Regulatory Area 2A.
Stakeholders		
IPHC-2023-AM099-PropC1	Recreational (Sport) Fishing for Pacific Halibut - IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Processing Pacific halibut for eating and preservation	**Proponent**: John Fields, recreational fisherman; 21 December 2022 To propose an exception that allows recreational fishermen in Alaska Regulatory Areas who do not return to port each day to process Pacific halibut for eating and/or preservation, subject to measures to facilitate enforcement of the applicable daily bag limits (Proposal No. 1); or exclude preserved and consumed on board fish from applicable possession limits (Proposal No. 2); or create a narrow exception that allows for limited processing of a single fish per day for consumption only (Proposal No. 3). *Proposal No. 1 was deferred by the Commission at the AM098 (IPHC-2022-AM098-R, para. 84).*
IPHC-2023-AM099-PropC2	Mortality and Fishery Limits (Sect. 5) - TCEY floor in IPHC Regulatory Area 2A	**Proponent**: Patrick DePoe, Makah Tribe; 12 December 2022 To propose a constant TCEY floor in IPHC Regulatory Area 2A.
IPHC-2023-AM099-PropC3	Recreational (Sport) Fishing for Pacific Halibut - IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Onboard consumption in IPHC Regulatory Area 2C	**Proponent**: Tim Cooper, recreational fisherman; 8 December 2022 To propose adding flexibility to existing recreational (sport) Pacific halibut fishing regulations in IPHC Regulatory Area 2C and allow limited consumption of Pacific halibut on board of unguided recreational vessels.

IPHC 3-year meetings calendar (2023-25)

PREPARED BY: IPHC SECRETARIAT (20 DECEMBER 2022)

PURPOSE

To provide the Commission with an opportunity to consider the tentative IPHC 3-year meetings calendar (2023-25) (Appendix I).

BACKGROUND

Commission: The Commission's annual cycle of meetings is built around the management needs of the Pacific halibut fishery. The IPHC Interim Meeting (IM) follows the completion of the commercial fishing period, and is timed to allow the IPHC Secretariat to incorporate data from that fishing period into the stock assessment and harvest decision support for the coming season. The IPHC Annual Meeting (AM) is scheduled to allow harvest and regulation decisions to be made by the Commission and implemented by the Contracting Parties in time for the opening of the next commercial fishing period.

Subsidiary bodies: The Finance and Administration Committee (FAC), Conference Board (CB) and Processor Advisory Board (PAB) meet adjacent to, or during the course of the Annual Meeting. The Scientific Review Board (SRB) and Management Strategy Advisory Board (MSAB) have historically each met twice during the course of the year, in a sequence that supports both their mutual collaboration and the timing of their advice for the Commission. The Research Advisory Board (RAB) meets in November, immediately prior to the Interim Meeting (IM), when its members are best able to convene and consider the IPHC's research activities.

DISCUSSION

Meetings of the Commission and its subsidiary bodies are of interest to the Pacific halibut stakeholder community and the general public, and the publication of their schedule as far in advance as possible enhances meeting preparation and collaboration among stakeholders and Contracting Party agencies.

The 100th Session of the IPHC Annual Meeting (AM100) is scheduled for late January 2024 in the USA.

RECOMMENDATIONS

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-15, which provides the Commission with an opportunity to consider the IPHC 3-year meetings calendar (2023-25).
2) **APPROVE** the IPHC 3-year meetings calendar (2023-25), while also noting date and venue changes may apply for 2024-25.

APPENDICES

Appendix I: IPHC 3-year meetings calendar (2023-25)

APPENDIX I

IPHC 3-year meetings calendar (2023-25)

	2023			2024			2025		
Meeting	**No.**	**Dates**	**Location**	**No.**	**Dates**	**Location**	**No.**	**Proposed Dates**	**Location**
Annual Meeting (AM)	**99th**	**23-27 Jan**	**Victoria, Canada**	**100th**	**22-26 Jan**	TBD, **USA**	**101st**	**22-26 Jan**	TBD, **Canada**
Finance and Administration Committee (FAC)	99th	23 Jan	Victoria, Canada	**100th**	22 Jan	TBD, USA	**101st**	22 Jan	TBD, Canada
Conference Board (CB)	93rd	24-25 Jan	Victoria, Canada	94th	23-24 Jan	TBD, USA	95th	23-24 Jan	TBD, Canada
Processor Advisory Board (PAB)	28th	24-25 Jan	Victoria, Canada	29th	23-24 Jan	TBD, USA	30th	23-24 Jan	TBD, Canada
Scientific Review Board (SRB)	22nd	20-22 June	Seattle, USA	24th	TBD June	Seattle, USA	26th	TBD June	Seattle, USA
	23rd	19-21 Sept	Seattle, USA	25th	TBD Sept	Seattle, USA	27th	TBD Sept	Seattle, USA
Management Strategy Advisory Board (MSAB)	18th	TBD Oct	Seattle, USA	19th	TBD Oct	Seattle, USA	20th	TBD Oct	Seattle, USA
Work Meeting (WM)	--	13-14 Sept	Bellingham, USA	--	11-12 Sept	Bellingham, USA		10-11 Sept	Bellingham, USA
Research Advisory Board (RAB)	24th	28 Nov	Seattle, USA	25th	22 Nov	Seattle, USA	26th	24 Nov	Seattle, USA
Interim Meeting (IM)	**99th**	**30 Nov-1 Dec**	**Bellingham, USA**	**100th**	**25-26 Nov**	**TBD**	**101st**	**25-26 Nov**	**TBD**

Minimum data collection standards for Pacific halibut by scientific observer programs

PREPARED BY: IPHC SECRETARIAT (D. WILSON & J. JANNOT; 20 DECEMBER 2022)

PURPOSE

To provide the Commission with an opportunity to consider minimum data collection standards for Pacific halibut by scientific observer programs.

BACKGROUND

The Report of the 2nd Performance Review of the IPHC (PRIPHC02), IPHC-2019-PRIPHC02-R (adopted on 11 October 2019), included a recommendation that was subsequently modified and adopted by the Commission as follows:

> PRIPHC-Rec-09: "*The Commission **RECOMMENDED** that the IPHC Secretariat, in consultation with the Commission, develop minimum data collection standards for Pacific halibut by scientific observer programs. The intention would be for the Commission to review and approve the minimum standards, and recommend them for implementation by domestic agencies.*"

Subsequent to this recommendation, the IPHC Secretariat has received conflicting directions from Contracting Parties, and as such, we are seeking direct input and feedback from the Commission at AM099 on how the Commission would like us to proceed with this Performance Review recommendation. To assist, we have provided a number of potential paths forward, as detailed in this present document.

DISCUSSION

There is a wealth of options available for the Commission to consider when developing minimum data collection standards for observer programs collecting data on Pacific halibut.

Attached are some examples from Regional Fisheries Management Organisations (RFMO's) that the Commission may find useful as a starting point for discussion.

Alternatively, the Commission may wish to use the two national standards in place from each Contracting Party, and seek to combine into a mutually agreeable standard for Pacific halibut.

However the Commission decides to proceed, there are a number of key elements that should be incorporated:

1) Robust training, debriefing/briefing, certification, and professional development program for the observers. This ensures high quality data at the time of collection as well as a robust QAQC process;
2) Statistically sound methods for sampling catch which account for the variance in, and is both representative and unbiased relative to, space, time, vessel size, fishing method, and fishing effort;

3) Statistically sound sub-sampling design for collecting length, weight, viability, and other biological data from Pacific halibut;
4) For both 2 and 3 above, sampling designs should lead to precise estimates of Pacific halibut removals, noting that industry standards (ref Tech Memo) suggest that a coefficient of variation of <30% is desirable;
5) In fisheries where only a portion of vessels can be monitored by observers, an EM system could be deployed on the remainder of the vessels to obtain data from otherwise unobserved vessels. This would bring monitoring to near 100%.

RECOMMENDATION/S

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-16, that provides the Commission with an opportunity to consider minimum data collection standards for Pacific halibut by scientific observer programs;
2) **PROVIDE** direction to the IPHC Secretariat on how it would like to proceed.

APPENDICES

Appendix A: SPRFMO

Appendix B: WCPFC

Appendix C: IOTC

Appendix D: ICCAT

Appendix E: CCSBT

Appendix F: ICCAT/IOTC/CCSBT Manual

APPENDIX A

SPRFMO
South Pacific Regional Fisheries Management Organisation

CMM 16-2021

Conservation and Management Measure Establishing the SPRFMO Observer Programme

(Supersedes CMM 16-2019)

The Commission of the South Pacific Regional Fisheries Management Organisation;

RECOGNISING United Nations General Assembly Sustainable Fisheries Resolutions 63/112 and 71/123 which encourage the development of observer programmes by regional fisheries management organisations (RFMOs) and arrangements to improve data collection;

RECALLING that, according to Article 28 of the Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean (the Convention), the Commission shall establish an observer programme, to be operated in accordance with standards, rules and procedures developed by the Commission;

NOTING that Article 28 of the Convention sets out the functions of the observer programme and that the observer programme shall be coordinated by the Secretariat of the Commission in a flexible manner to take account of the nature of the fisheries resources and other relevant factors;

NOTING that the primary function of observers on board fishing vessels is the collection of scientific information and that observers are not enforcement officials, but that Article 28 of the Convention specifies that the information collected by the observer programme shall, as appropriate, also be used to support the functions of the Commission and its subsidiary bodies, including the Compliance and Technical Committee (CTC);

NOTING the importance of the collection of robust scientific information, consideration should be given to *inter alia* cost-effectiveness and safety at sea;

NOTING that Article 19(2)(b) of the Convention stresses the need to avoid adverse impacts on, and ensure access to fisheries by, subsistence, small-scale and artisanal fishers and women fish workers when establishing CMMs for fishery resources covered by the Convention;

NOTING ALSO that one of the functions of the Commission is to promote the conduct of scientific research to improve knowledge of fishery resources and marine ecosystems in the Convention Area and of the same fishery resources in adjacent waters under national jurisdiction;

NOTING FURTHER that scientific research vessels performing fishing operations for research purposes will have on board scientific personnel whose primary function is the collection of scientific data and information;

ACKNOWLEDGING that high-quality data and information related to the fishing activity in the Convention Area, and its impacts on the marine environment occurring in the SPRFMO area are essential for the Commission to adopt and implement effective and timely Conservation and Management Measures (CMMs);

DETERMINED to ensure the collection of data and information that can be used for effective assessment and management of SPRFMO fisheries resources, including target species and bycatch, and interaction of fishing activities with the environment and species occurring in the Convention Area, to improve the certainty of future scientific advice while taking into account ecosystem considerations;

RECOGNISING the international nature of fishing activity and management of SPRFMO fisheries resources, and the consequent need to deploy well-trained and accredited observers;

RECOGNISING the nature of the observer's work at sea and that the collection of data and information needs

to be coupled with safe conditions for observers while on board fishing vessels;

ACKNOWLEDGING that electronic monitoring systems, study fleets and self-sampling have been successfully tested for certain types of data in some fisheries and that the Commission, with the advice of the Scientific Committee (SC), could explore minimum standards for their implementation, as practical and appropriate;

COMMITTED to ensure that the SPRFMO Observer Programme (SPRFMO OP) is developed under a robust and transparent governance framework;

RECOGNISING the need to establish clear procedures for attaining accreditation of national observer programmes and service providers under the SPRFMO OP;

ADOPTS the following CMM in accordance with Articles 8 and 28 of the Convention:

General Rules

1. This CMM establishes the standards, rules and procedures to establish the SPRFMO OP and to ensure it achieves the objectives specified in Article 28 of the Convention.
2. The purpose of the SPRFMO OP is to facilitate the collection of verified scientific data and additional information related to fishing activities in the Convention Area and its impacts on the ecosystem, and also to support the functions of the Commission and its subsidiary bodies, including the CTC.
3. The SPRFMO OP shall apply to all fishing vessels flying the flag of a Member or Cooperating non-Contracting Party (CNCP) fishing for fisheries resources in the Convention Area for which a minimum level of observer coverage applies in the relevant CMMs in force.
4. Notwithstanding paragraph 3 above, for artisanal fishing vessels less than 15 metres from coastal developing States fishing for jumbo flying squid, where extraordinary accommodation and safety concerns may exist that precludes deployment of an onboard observer in accordance with the SPRFMO Observer Programme, a coastal developing State will employ an alternative scientific monitoring approach that will collect data equivalent to that specified in this Observer Programme and in CMM 18-2020 (Squid), in a manner that ensures comparable coverage. In any such cases, the Member or CNCP wishing to avail itself of an alternative approach must present the details of the approach to the Scientific Committee for evaluation. The Scientific Committee will advise the Commission on the suitability of the alternative approach for carrying out the data collection obligations set forth in this Observer Programme and in CMM 18-2020 (Squid). Alternative approaches implemented pursuant to this provision shall be subject to the approval of the Commission at the annual meeting prior to implementation. Once the alternative approach has been approved, the coastal developing State will notify the Commission prior to the start of their fishing operations. This derogation does not extend to any other obligations contained in this or other CMMs in force. This exception will be revised by the Commission in 2026. Unless otherwise decided by the Commission, this derogation will expire on 1 January 2026.
5. Members and CNCPs are encouraged to undertake their best efforts to have observers on board their fishing vessels[1] flying their flags and fishing for fisheries resources in the Convention Area for which there is no fishery-specific CMM in force. The Scientific Committee shall provide advice to the 8th meeting of the Commission in 2020 on the appropriate levels of observer coverage for these fisheries.
6. Observers shall have the rights and duties set out in Annex 1 of this CMM. Members and CNCPs shall ensure that observers from their national observer programmes perform their duties.

[1] For the purposes of this paragraph, fishing vessels exclude reefer and supply vessels.

7. Members and CNCPs shall also ensure that owners and fishing operators, vessel captains, officers and crew of vessels flying their flag:
   a) Respect the rights of observers set out in Annex 1 of this CMM, and
   b) comply with the standards and duties set out in Annex 2 of this CMM.
8. Members and CNCPs shall ensure that their national observer programmes and service providers only deploy independent and impartial observers.
9. The Commission, based on the advice of the SC, should explore and, where feasible, complementary with other means of collecting scientific data and additional information in conjunction with human observers.

Deployment of Observers

10. To fulfil their obligations under the Convention and the relevant CMMs adopted by the Commission, Members and CNCPs shall only deploy observers sourced from a national observer programme or service provider accredited according to the provisions of this CMM.
11. Observers from an accredited national observer programme of a Member or CNCP shall only be deployed on board vessels flagged to another Member or CNCP with the consent of both Members or CNCPs.
12. Individual observers have the right to refuse a deployment on board a fishing vessel for justified reasons, including when safety issues have been identified on the vessel to be deployed or due to serious illness of the observer before boarding. The national observer programme or service provider shall ensure that the reasons for such refusal are documented and that a copy of such documentation is provided to the SPRFMO Secretariat, which will forward it to the relevant Member or CNCP.

Levels of Coverage

13. Members and CNCPs shall ensure that all fishing vessels flying their flag carry observers from a national observer programme or service provider accredited under the SPRFMO OP to meet the minimum levels of observer coverage required by the relevant applicable SPRFMO CMM(s) while operating in the Convention Area[2].
14. Scientific research vessels flying the flag of a Member or CNCP fishing for research purposes in the Convention Area shall be exempted from the obligation to carry accredited observers on board[3]. In these cases, Members and CNCPs shall comply with the data collection and reporting obligations of paragraphs 44, 45 and 46, and shall ensure that scientific personnel on board possess the capacity to perform in full all of the observation and reporting responsibilities contained in those paragraphs.
15. For fisheries where 100 percent of observer coverage is not required, Members and CNCPs shall ensure that the method of assigning observers on vessels flying their flag is representative for the fishery to be monitored and commensurate with the specific data needs of the fishery as a whole. This requirement is subject to practical constraints related to Members and CNCPs with a small number of fishing vessels or trips.
16. In relation to paragraph 15 of this CMM, Members and CNCPs shall document and provide information on the methods used to allocate observers on fishing vessels flying their flag to meet the observer coverage requirements, and shall also provide this information in their National Annual Report to the SC. The SC shall review the method used by each Member or CNCP and provide recommendations for improvement, when necessary.

[2] CMM 01-2020 (*Trachurus murphyi*), CMM 03-2020 (Bottom fishing) and CMM 13-2020 (Exploratory fisheries) specify observer coverage levels for these fisheries.
[3] This paragraph does not apply to fishing under CMM 13-2021 (Exploratory Fisheries) - observer requirements for exploratory fishing are specified under paragraph 20 of that CMM.

Accreditation

Accreditation Evaluator

17. The SPRFMO OP Accreditation Evaluator is the public or private person or entity tasked by the Commission to assess and evaluate the applications for accreditation. The SPRFMO OP Accreditation Evaluator shall have addressed any potential or actual conflict of interest in the course of delivering its service.
18. Applications for the accreditation of national observer programmes may be submitted by Members or CNCPs while applications by service providers may be submitted directly by an external, non-governmental provider of observers, or a Member or CNCP under the SPRFMO OP. Subject to paragraphs 36 and 38 of this CMM, the evaluation of each national observer programme or service provider shall only be undertaken by the SPRFMO OP Accreditation Evaluator.
19. Subject to paragraphs 29, 30 and 31 of this CMM, the SPRFMO OP Accreditation Evaluator shall evaluate the national observer programmes and service providers against the minimum requirements and standards set by the Commission in Annex 3 of this CMM.
20. The Secretariat shall ensure that the SPRFMO OP Accreditation Evaluator is required, through its service contract, to maintain the confidentiality of any information received by a Member, CNCP or service provider pursuant to this accreditation process.
21. A Decision of the Commission will designate a SPRFMO OP Accreditation Evaluator no later than at its 8th annual meeting. The procedure for appointing the SPRFMO OP Accreditation Evaluator, as well as the terms and conditions of engagement, are outlined in COMM7-Report Annex 7i.
22. The SPRFMO OP Accreditation Evaluator shall be paid out of the Commission budget.

Evaluation of Observer Programmes of Members, CNCPs and Service Providers by the SPRFMO OP Accreditation Evaluator

23. Consistent with Article 28(1) of the Convention, the SPRFMO OP, including the accreditation process, shall be coordinated by the Secretariat and operated in accordance with the standards, rules and procedures detailed in this CMM.
24. Each Member, CNCP or service provider seeking to accredit its observer programme under the SPRFMO OP shall submit to the Secretariat and the Accreditation Evaluator, at any time, all the relevant information and documentation to fulfil the standards provided for in Annex 3, including manuals, guides and training materials. Where applications are submitted by service providers on behalf of a Member or CNCP, final responsibility for the completeness and accuracy of the information submitted shall rest with the Member or CNCP. All the information and documentation shall be provided in the official language of the Commission or with appropriate translations. The Secretariat may recommend that the Member, CNCP or service provider complete the application when there is clear evidence that substantive or essential information is missing.
25. Members and CNCPs are encouraged to inform the Secretariat and the Accreditation Evaluator a year in advance of their intention to pursue accreditation under the SPRFMO OP and to commence the accreditation process at least six months prior to the date fixed for the opening of the next Commission meeting.
26. The Secretariat shall promptly provide the information and documentation referred to in paragraph 24 to the SPRFMO OP Accreditation Evaluator.

27. The SPRFMO OP Accreditation Evaluator shall liaise with Members, CNCP and service providers, as appropriate. Members, CNCPs and service providers shall have the opportunity to provide additional information and corrections relevant to their evaluation to the Secretariat and the Accreditation Evaluator. This process will be conducted by the SPRFMO OP Accreditation Evaluator in a fair, equitable, transparent and non-discriminatory manner.

28. Following evaluation and bilateral consultation, the SPRFMO OP Accreditation Evaluator shall provide a Draft Preliminary Evaluation Report to the Member, CNCP or service provider pursuing accreditation within 30 days for comment prior to the report being provided to the Secretariat. The SPRFMO OP Accreditation Evaluator shall then incorporate any additional information and provide the Preliminary Evaluation Report simultaneously to both the Secretariat and the Member, CNCP or service provider indicating whether the nominated national observer programme or service provider has met the minimum standards for accreditation under the SPRFMO OP.

29. When preparing a Preliminary Evaluation Report, and in addition to assessing the fulfilment of the standards indicated in Annex 3, the SPRFMO OP Accreditation Evaluator shall also consider those national programmes and service providers currently accredited by other RFMOs.

30. The SPRFMO OP Accreditation Evaluator shall assess the consistency and compatibility between the SPRFMO Minimum standards for accreditation under Annex 3 and those required by other RFMOs, along with their practical implementation and functioning. The Member or CNCP shall provide to the Secretariat the name of the national observer programme or service provider accredited by other RFMOs, the RFMO that has accredited it, and any other supporting information requested by the Accreditation Evaluator.

31. If the Accreditation Evaluator finds that the observer programme has accreditation under another RFMO or arrangement that meets the SPRFMO Minimum standards for accreditation under Annex 3, along with its practical implementation and functioning, it will find the application favourable.

32. The Accreditation Evaluator shall submit the Final Evaluation Report to the Secretariat no later than 60 days in advance of the next Commission meeting. The Secretariat shall circulate the Final Evaluation Report as an annex to the SPRFMO Observer Programme Implementation Report prior to the next CTC meeting.

33. The CTC shall assess the Final Evaluation Report and make recommendations to the Commission regarding whether the observer programme has met the requirements of this CMM and, where relevant, whether a recommendation based on paragraphs 35 to 38 is appropriate.

34. The Commission shall decide whether to grant accreditation at its next meeting on the basis of the Final Evaluation Report and any recommendations from the CTC.

35. If the Final Evaluation Report by the SPRFMO OP Accreditation Evaluator is favourable, the Commission may decide to adopt the report and grant accreditation under the SPRFMO OP for 5 years from the date upon which accreditation is granted.

36. Should the Commission decide that, despite the favourable findings of the Final Evaluation Report by the SPRFMO OP Accreditation Evaluator, the application does not meet the minimum standard required for accreditation (Annex 3), it may decide not to grant accreditation. In that case it shall clearly outline the basis for its decision.

37. If the Final Report by the SPRFMO OP Accreditation Evaluator is not favourable, the Commission may decide to adopt the report and not grant accreditation.

38. Should the Commission decide that, despite the findings of the non-favourable Final Evaluation Report by the SPRFMO OP Accreditation Evaluator, the application meets the minimum standard required for accreditation (Annex 3), the Commission may decide to grant accreditation under any conditions as may be specified by the Commission. These conditions may include the accreditation of a national observer programme or a service provider on a temporary and conditional basis pending the fulfilment by that Member, CNCP or service provider of the deficiencies detected during the accreditation process.

39. In case an application for accreditation is not granted, nothing prevents a Member, CNCP or service provider from presenting a new application to seek accreditation. When reapplying for accreditation Members, CNCPs and service providers shall consider the findings and recommendations of the SPRFMO OP Accreditation Evaluator and the Commission.

40. Members, CNCPs and service providers shall be entitled to renew accreditation.

41. A Member may request that the Commission revoke, condition or suspend accreditation for a national observer programme or service provider at any time but not later than 30 days in advance of the next CTC meeting by providing evidence that the national observer programme or service provider is not meeting the minimum standards for accreditation. The Executive Secretary shall circulate the request for revocation, condition or suspension to Members as soon as possible but no later than 15 days after the request is received, and the SPRFMO OP Accreditation Evaluator shall be asked to advise the CTC on the matter no later than 20 days after the request was circulated.

42. The CTC shall assess the request to revoke, condition or suspend an accreditation and the information provided at its next annual meeting, as well as any information provided by other Members, and may provide recommendations to the Commission. The Commission shall consider the CTC's recommendations and the request to revoke suspend or condition accreditation at its next annual meeting.

43. The Secretariat shall publicise the name of all observer programmes accredited under the SPRFMO OP, together with relevant contact details, on the SPRFMO website and shall include a list of all national observer programmes or service providers accredited under the SPRFMO OP in the annual OP Implementation Report described in paragraph 47.

Data Collection

44. Members and CNCPs shall ensure that observers deployed on vessels flying their flag, and, where applicable, complementary means of collecting data and information, collect and provide the information specified in Annex 7 of CMM 02-2021 (Data Standards) in the manner set forth in that CMM and shall also provide relevant observer information required under any other CMM.

45. Nothing in this CMM shall prevent Members and CNCPs from taking additional actions related to data collection compatible with this measure.

Reporting

46. Members and CNCPs shall include a brief overview of the national observer programmes or service providers covering its fishing activity as a component of the Annual National Reports submitted by Members and CNCPs to the SC and developed in accordance with the "Guidelines for Annual National Reports to the SPRFMO Scientific Committee".

47. The Secretariat shall prepare a report on the implementation of the SPRFMO OP for presentation at each annual meeting of the CTC, using information from annual reports, observer data, and all other suitably documented and relevant information in its possession. The SPRFMO OP Implementation Report will address, *inter alia*: (1) information on problems that have been encountered; (2) recommendations for improving current standards and practices; (3) developments in observer programmes and observational methods; (4) constraints to accreditation and (5) in general any identifiable problem or obstacle in fulfilling the objectives and purpose of this CMM as outlined in paragraphs 1 and 2.

48. The SPRFMO OP Implementation Report shall be distributed to Members and CNCPs 30 days prior to each annual CTC meeting.

49. The CTC shall review the recommendations delivered by the SPRFMO OP Implementation Report and provide advice to the Commission thereon, including proposed actions to be taken.

50. The Secretariat shall make available observer data to the SC, at its request. Data confidentiality shall be maintained as set forth in procedures specified in Paragraph 6 of CMM 02-2021 (Data Standards) and in any other data procedures that may be adopted by the Commission.

Review

51. The CTC shall review the implementation and effectiveness of this CMM at least every five years, including the observer safety requirements, the applicability of the SPRFMO OP to other fishing vessels and any additional requirements as necessary to meet the objectives of both Article 28 of the Convention and this CMM.
52. The SC shall periodically review and provide advice on the appropriate level of observer coverage needed in each fishery to meet data needs.
53. Should the SC recommend that a change in coverage or research priorities for specific fisheries is needed, the revised coverage levels, if adopted by the Commission, will be specified in the relevant fishery CMMs.

Entry into Force

54. This CMM shall enter into force 120 days after the conclusion of the Commission's 2019 Annual Meeting.
55. Members and CNCPs may continue using their own non-accredited national observer programme or service provider to meet observer coverage requirements until 31 December 2023. From 1 January 2024 Members and CNCPs shall only deploy observers from national observer programmes or service providers accredited under the SPRFMO

ANNEX 1
Minimum Standards for Observers

Observer Rights

In fulfilling their tasks and duties, observers shall have the following rights:

a) Freedom to carry out their duties without being assaulted, obstructed, delayed, intimidated or interfered with;
b) Access to and use of all facilities and equipment of the vessel necessary to carry out the observer's duties, including but not limited to full access to the bridge, catch before being sorted, processed catch and any bycatch on board, as well as areas which may be used to hold, process, weigh, and store fish, as safety permits;
c) Access to the vessel's records, including logbooks, vessel diagrams and documentation for reviewing records, assessment and copying, as well as access to navigational equipment, charts, and other information related to fishing activities;
d) Access to and use of communications equipment and personnel, upon request, for entry, transmission, and reception of work-related data or information;
e) Reasonable use of the communication equipment on board to communicate with the observer programme on land at any time including emergencies;
f) Access to additional equipment, if present, to facilitate the work of the observer while on board the vessel, such as high-powered binoculars, electronic means of communication, freezer to store specimens, scales, et cetera;
g) Safe access to the working deck or hauling station, during net or line retrieval and access to specimens on deck (alive or dead) in order to collect samples;
h) Unrestricted access to food, accommodation and sanitary facilities of a standard equivalent to those normally available to an officer on board the vessel as well as medical facilities that meet international maritime standards;
i) Access to verify safety equipment on board (through a safety orientation tour provided by officers or crew) before the vessel leaves the dock;
j) Unrestrained permission to record any pertinent information relevant for scientific purposes and data collection;
k) A designated contact or supervisor on land to communicate with at any time while at sea;
l) To refuse deployment on board a fishing vessel for justified reasons, including where safety issues have been identified. The national observer programme or service provider shall ensure that the reasons for such refusal are documented and a copy of such document is provided to the SPRFMO Secretariat, which will forward it to the flag State of the vessel;
m) The ability to communicate at any time the occurrence of safety issues to the vessel captain, national observer programme, service provider, the Secretariat, and flag State, as appropriate;
n) Upon request by the observer, receiving reasonable assistance by the crew to perform their duties including, among others, sampling, handling large specimens, releasing incidental specimens and measurements;
o) Privacy in the observer's personal areas;
p) Not performing duties assigned to the crew, such as gear handling (for fishing purposes), offloading fish, et cetera;
q) Observer data, records, documents, equipment and belongings will not be accessed, harmed, or destroyed.

Members and CNCPs shall ensure that operators, captains, officers and crew on board vessels flying their flag respect the rights of observers and that a copy of these rights are provided to the crew and/or prominently displayed.

Observer duties

The duties of observers include:

a) Carrying complete and valid documents before boarding the vessel, including, when relevant, identification documents, passport, visas, and certificates of at sea security training;
b) Submitting copies of the documents indicated above to the programme managers of the national observer programme or service provider, as required;
c) Maintaining independence and impartiality at all times while on duty;
d) Complying with the laws and regulations of the Member or CNCP whose flag the vessel is flying, as applicable;
e) Respecting the hierarchy and general rules of behaviour that apply to the vessel personnel;
f) Performing duties in a manner that does not unduly interfere with the operations of the vessel and while carrying out their functions giving due consideration to the operational requirements of the vessel and communicating regularly with the captain or master of the vessel;
g) Being familiar with the emergency procedures aboard the vessel, including the locations of life rafts, fire extinguishers, and first aid kits, and participating regularly in emergency drills for which the observer has received training;
h) Communicating regularly with the vessel captain on relevant observer issues and duties;
i) Refraining from actions that could negatively affect the image of the SPRFMO OP;
j) Adhering to any required codes of conduct for observers, including any applicable laws and procedures;
k) Communicating as regularly as is required with the programme managers and/or national programme coordinator on land;
l) Complying with any SPRFMO CMMs whose provisions are directly applicable to observers;
m) Respect the privacy in the captain and crew areas.

ANNEX 2
Duties of Vessel Operators, Captain, Officers and Crew

Members and CNCPs shall ensure that vessel operators and captains, officers and crew, as applicable, comply with the following provisions regarding the SPRFMO OP:

Rights of Vessel Operators and Captains

Vessel operators and captains shall have the following rights:

a) To agree to the timing and placement, when required to take on board one or more observers;
b) To conduct operations of the vessel without undue interference due to the observer's presence and performance of the observer's duties;
c) To assign, at his or her discretion, a vessel crew member to accompany the observer when the observer is carrying out duties in hazardous areas;
d) To be timely notified by the observer provider on completion of the observer's trip of any comments regarding the vessel operations. The captain shall have the opportunity to review and comment on the observer's report and shall have the right to include additional information deemed relevant or a personal statement.

Duties of Vessel Operators and Captains

Vessel operators and captains shall have the following duties:

a) Accept on board the vessel one or more persons identified as observers by the SPRFMO OP when required by the Member or CNCP to which the vessel is flagged;
b) Ensure the vessel crew is properly briefed and does not assault, harass, obstruct, resist, intimidate, influence, or interfere with the SPRFMO OP observer or impede or delay the observer in the performance of duties;
c) If required by a SPRFMO CMM, as a complementary monitoring tool, install and maintain functioning electronic monitoring systems or devices throughout the selected fishing trips;
d) Ensure the observer has access to the catch before any sorting, grading or other separation of the components of the catch are made;
e) Ensure that vessels operating in the Convention Area include adequate space for the observer to conduct bycatch sampling or other sampling as needed, in a safe manner that limits interference with vessel operations, with a dedicated sample station and other equipment such as scales;
f) Maintain a safe and clean sampling station to be used by the observer;
g) Not alter the sampling station during an observed trip without consultation with the observer and subsequent notification to the Member or CNCP in control of the vessel;
h) Inform the crew regarding the timing and objectives of the SPRFMO OP and schedule for observer boarding, as well as their responsibilities when an observer from the SPRFMO OP boards the vessel;
i) Assist the SPRFMO OP observer to safely embark and disembark the vessel at an agreed upon place and time;
j) Allow and assist the SPRFMO OP observer to carry out all duties safely and ensure the observer is not unduly obstructed in the execution of duties unless there is a safety issue that requires intervention;
k) Allow and assist the SPRFMO OP observer to remove and store samples from the catch and allow the observer access to stored specimens;
l) Provide the observer, while on board the vessel, at no expense to the observer, national programme or service provider, with food, accommodation, adequate sanitary amenities and medical facilities of a standard equivalent to those normally available to an officer on board the vessel according to generally accepted international standards;

m) Allow and assist full access to and use of all facilities and equipment of the vessel that is necessary for the observer to carry out his or her duties, including but not limited to full access to the bridge, catch before being sorted, processed catch and any bycatch on board, as well as areas which may be used to hold, process, weigh and store fish;
n) Follow an established mechanism, if adopted by the Commission, for solving conflicts that would complement the established dispute settlement processes provided by observer programmes and providers;
o) Cooperate with the observer when the observer is sampling the catch;
p) Provide notice to the observer at least fifteen (15) minutes before fishing gear hauling or setting procedures, unless the observer specifically requests not to be notified;
q) Provide adequate space to the observer in the bridge or other designated area for clerical work, as well as adequate space on deck or the factory to perform the observer's duties;
r) Provide personal protective equipment, and, where appropriate, an immersion suit;
s) Provide to the observer timely medical attention in case of physical or psychological illness or injury;
t) Develop and maintain an emergency action plan (EAP) regarding observer safety.

Safety Orientation Briefing

Vessel captains or a crew member designated by the captain shall provide the observer with a safety orientation briefing at the time of boarding the vessel and before it leaves the dock. The orientation briefing shall include:

a) Safety documentation of the vessel;
b) Location of life rafts, raft capacities, observer's assignment, expiration, installation, and any other relevant safety related information;
c) Location and instructions for use of emergency radio beacons indicating position in case of an emergency;
d) Location of immersion suits and personal floating devices, their accessibility, and the quantities for everyone onboard;
e) Location of flares, types, numbers, and expiration dates;
f) Location and number of fire extinguishers, expiration dates, accessibility, et cetera;
g) Location of life rings;
h) Procedures in case of emergencies and essential actions of the observer during each type of emergency, such as a fire on board, recovering a person overboard, et cetera;
i) Location of first aid materials and familiarity with crew members in charge of first aid;
j) Location of radios, procedures for making an emergency call, and how to operate a radio during a call;
k) Safety drills;
l) Safe places to work on deck and safety equipment required;
m) Procedures in case of illness or accident of the observer or any other crew member.

Procedure in the Event of an Emergency

If a SPRFMO observer dies, is missing or presumed fallen overboard, the Member whose flag the vessel is flying shall ensure that the fishing vessel:

a) Immediately ceases all fishing operations;
b) Immediately commences search and rescue if the observer is missing or presumed fallen overboard, and searches for at least 72 hours, unless the observer is found sooner, or unless instructed by the Member whose flag the vessel is flying to continue searching;
c) Immediately notifies the Member whose flag the vessel is flying;
d) Immediately notifies the Member or observer provider to whom the SPRFMO OP observer belongs, if

applicable;

e) Immediately alerts other vessels in the vicinity by using all available means of communication;
f) Cooperates fully in any search and rescue operation;
g) Whether or not the search is successful, return the vessels for further investigation to the nearest port, as agreed by the Member whose flag the vessel is flying and the national observer programme or service provider;
h) Provides the report to the observer providers and appropriate authorities on the incident; and
i) Cooperates fully in any and all official investigations, and preserves any potential evidence and the personal effects and quarters of the deceased or missing observers.

Flag States shall take and implement all steps, as a matter of due diligence, to prevent incidents causing serious harm or death to observers on board vessels flying their flag, and to sanction or punish those involved, including through criminal investigation and prosecution. The flag State and other Members and CNCPs shall cooperate to that end.

ANNEX 3

Minimum Standards for Accreditation Under the SPRFMO OP

This Annex contains the Commission's minimum standards for accreditation under the SPRFMO OP. In accordance with paragraphs 28 and 32 of this CMM, the OP Accreditation Evaluator shall assess and decide all applications against these standards.

Impartiality, Independence and Integrity

1. National observer programmes and service providers shall only deploy independent and impartial observers. This means that neither the national observer programme or service provider, as the case requires, nor the individual observers, have a direct financial interest, ownership or business links with vessels, processors, agents and retailers involved in the catching, taking, harvesting, transporting, processing or selling of fish or fish products.
2. The national programme or service provider, and the individual observers:
    a) Shall not have a direct financial interest, other than the provision of observer services, in the fisheries under the purview of the Commission, including, but not limited to: i) any ownership, mortgage holder, or other secured interest in a vessel or processor involved in the catching, taking, harvesting or processing of fish; ii) any business selling supplies or services to any vessel or processor in the fishery; iii) any business purchasing raw or processed products from any vessel or processor in the fishery;
    b) Shall not solicit or accept, directly or indirectly, any gratuity, gift, favour, entertainment, inordinate accommodation, loan or anything of monetary value from anyone who either conducts activities that are regulated by a Member or CNCP connected with its services or the Commission, or has interests that may be substantially affected by the performance or non-performance of the observer's official duties;
    c) Shall not serve as an observer on any vessel or at any processors owned or operated by a person who previously employed the observer in another capacity within the last three years (e.g., as a crew member); and,
    d) Shall not solicit or accept employment as a crew member or an employee of a vessel or processor while employed by a national observer programme or service provider.

Observer Qualifications

The qualification of individual observers is the responsibility of national observer programmes or service providers. The national observer programme or service provider shall demonstrate that observers that are recruited into their programme have relevant education or technical training and/or experience for the fleets concerned; ability to meet the observer duties described in this annex; no record of convictions calling into question the integrity of the observer or indicating a propensity towards violence; and the ability to obtain all necessary documentation, including passports and visas.

Observer Training

National observer programmes or service providers shall demonstrate that observers are adequately trained before their deployment. Training shall include the following:

1. The relationship between fisheries science and fisheries management and the importance of data collection in this context;
2. The relevant provisions of the Convention and SPRFMO CMMs relevant to the functions and duties of observers;
3. Importance of observer programmes, including understanding the duties, rights, authority and responsibilities of observers;
4. Safety at sea, including emergencies at sea, donning survival suits, use of safety equipment, use of radios, survival at sea, management of conflicts, and cold-water survival;

5. First aid training, appropriate to working at-sea or in remote situations;
6. Species identification and record of species encountered at sea, including target and non-target species, protected species, seabirds, marine mammals, sea turtles, invertebrates indicating vulnerable marine ecosystems, et cetera;
7. Knowledge of the different types and functioning of bycatch mitigation devices required by SPRFMO CMMs;
8. Safe handling protocols to rehabilitate and release seabirds, marine mammals and sea turtles;
9. Fishing vessel and fishing gear types relevant to SPRFMO;
10. Techniques and procedures for estimating catch and species composition;
11. Use and maintenance of sampling equipment including scales, callipers, et cetera;
12. Sampling methodologies at sea, i.e., fish sampling, fish sexing, measuring and weighing techniques, specimen collection and storage, and sampling methodologies;
13. Understand potential biases in sampling, how they arise and how they could be avoided;
14. Preservation of samples for analysis;
15. Data collection codes and data collection formats;
16. Familiarity with catch logbooks and recordkeeping requirements to aid observers' collection of data as required under SPRFMO CMMs;
17. Use of digital recorders or electronic notebooks;
18. Electronic equipment used for observer work and understanding their operation;
19. Use of electronic monitoring systems as a complement to their work, when applicable;
20. Verbal debriefing and report writing;
21. Training on relevant aspects of the International Convention for the Prevention of Pollution from Ships (MARPOL).

Refresher training should be ongoing dependent on the qualification requirements. Relevant updates to CMMs and observer requirements should be communicated to observers before each deployment as part of the briefing process, for example in an updated manual.

Observer Trainers

National programmes or service providers shall demonstrate that observer trainers have the appropriate skills and have been authorised by that national programme or service provider to train observers.

Briefing and Debriefing

National observer programmes or service providers shall demonstrate that there are systems for briefing and debriefing observers and communicating at any time with vessel captains. The briefing and debriefing process shall be conducted by properly trained personnel and shall ensure that observers and vessel captains clearly understand their respective roles and duties.

Data Validation Process

National observer programmes or service providers shall demonstrate that they have in place an observer data validation process in place. The data validation process shall be conducted by properly trained personnel and shall ensure that data and information collected by an observer are checked for discrepancies or inaccuracies that are corrected before the information is entered into a database or used for analysis. This includes ensuring that the national observer programme or service provider has in place a mechanism to receive data, reports and any other relevant information from an observer in such a way that prevents interference in that data from other sources. The data validation process shall ensure that the data meet the following standards:

a) A mechanism that allows scientific data to be stored and transferred to the national observer programme (or service provider) in a secure and confidential manner.
b) Vessel information uniquely identifies the actual vessel from which the fishing occurred;
c) Dates and times of fishing effort are included and internally consistent (for example an end time should be after a start time);
d) Location of fishing is included and valid (for example, logical latitude/longitude combinations), internally consistent and entered in the correct units;

e) Effort data allows quantification of the amount of effort invested by the vessel, appropriate to the fishing method used, which is also identified;
f) Catch information identifies the fishery resource (to the species level where possible) and the quantity of that species retained or discarded. If used, species codes are accurate;
g) Where biological or length information is collected for a fish, it is directly linked to the effort in which it was caught – including date and time, location, and fishing method information, and includes the methodology of data collection;
h) If the observer programme extends to transhipment and/or landings, then the amount and species of fishery resources transhipped/landed is quantified and recorded according to a standard methodology;
i) Interaction data involving marine mammals, seabirds, reptiles and/or other species of concern identifies the individual species (where possible), the number of animals, fate (retained or released/discarded), life status if released (vigorous, alive, lethargic, dead), and the type of interaction (hook/line entanglement/warpstrike/net capture/other).

Observer Identification Cards

National observer programmes or service providers shall provide observers with identification cards that include the full name of the observer, date of issue and expiration, the name of the national observer programme or service provider, a unique identifying number (if issued by the national observer programme or service provider) a passport style photo of the observer, an emergency phone number.

Coordinating Observer Placements and Observer Deployments

National observer programmes or service providers shall demonstrate responsibility and capacity for the timely deployment of observers and will ensure that the selected observer receives all possible assistance during the entire length of their placements.

National observer programmes or service providers shall have in place a protocol to replace an observer if the observer becomes unable to perform their duties.

National observer programmes or service providers shall also seek, to the extent possible, to avoid deploying a single observer on multiple consecutive trips on the same vessel.

It is the responsibility of a national observer programme or service provider to administer observer placements, to maintain the independence and impartiality of observers as described in this measure and ensure that all placements are administratively finalised as soon as practicable after the observers return to port. The national observer programme or service provider is expected to communicate with the observer regarding upcoming deployments, coordinate observer travel, and provide the necessary supplies for observer duties.

Observer Safety Equipment

National observer programmes or service providers must demonstrate that observers are provided with appropriate equipment, including safety equipment, which is in good working order, routinely checked and renewed to carry out their duties on board a vessel. Essential equipment includes a lifejacket, independent two-way communication device capable of sending and receiving voice or text communications, personal locator beacons (PLBs), immersion suits, hard hat, proper deck working boots or shoes, gloves and protective glasses (including sunglasses).

Responding to Allegations of Observer Misconduct

National observer programmes or service providers must establish procedures for preventing, investigating, and reporting on the misconduct of observers, in coordination with observers, vessel captains, and relevant Members and CNCPs.

Dispute Settlement

National observer programmes or service providers shall demonstrate the existence of a dispute resolution process fair to all parties that provides a process to resolve issues through appropriate means including facilitation and mediation.

Observer Safety

National programmes or service providers must demonstrate that procedures are in place to support observers in their ability to carry out their duties unimpeded and in a safe working environment, including an established Emergency Action Plan (EAP). The EAP must provide instructions on sending reports to the provider's designated 24-hour point(s) of contact to report unsafe conditions, including instances of harassment, intimidation or assault.

National observer programmes or service providers must also provide a permanent delegate or supervisor on land to communicate with the observer at any time while at sea.

Insurance and Liability

National observer programmes or service providers must demonstrate that observers have health, safety and liability insurance commensurate with the national standards of the observer programme or service provider for such insurance for the duration of any deployment before placing the observer on a vessel.

SCIENTIFIC COMMITTEE
THIRD REGULAR SESSION

13-24 August 2007
Honolulu, United States of America

WCPFC DATA STANDARDS FOR REGIONAL OBSERVER PROGRAMME

WCPFC-SC3/GN WP-6

Introduction

1. Standards for data collection and reporting have been in place in the Pacific Island SPC/FFA member countries since 1996. The standards are flexible and discussion on changes and new data fields occurs on a bi-annual basis at the FFA/SPC Tuna Fishery Data Collection Committee (DCC). The DCC has put in place data format standards for all SPC/FFA Pacific Island Observer programmes operating in the FFA and SPC region. The bi-annual meeting reviews all the data collection formats and makes adjustments where they are required. Wherever practical all coding in the formats have been standardised using global standards such as the FAO species identifiers. Where no practical code system is in place codes have been developed. Discussion on formats at DCC involves the current needs of scientists, compliance, mitigation measures and any other current priorities. Vessel trip monitoring standards will be same as standards for the Trip Monitoring and ROP Incident Forms.

2. The Commission ROP will monitor the outcomes of the DCC to ensure that minimum ROP observer data collection standards are maintained. National observer programmes with different observer collection formats to the ROP should not be affected by the ROP requirements on standardised data collection, providing the data that are collected by their programme is able to satisfy the requirements for minimum ROP standards.

Sampling Protocols

3. Sampling protocols for observers depend on the objective of the sampling programme. The current protocols widely used in the WCPFC region for sampling the species composition and the size composition of the catch are as follows.

a) offshore longline, the species and the length are recorded for all of the catch, for all sets during a trip;
b) distant-water longline, the species and the length are recorded for all of the catch, for two out of every three sets during a trip;
c) purse seine, the species and the length are recorded for five fish randomly collected from every brail for every set."

Minimum Standards for ROP Data

4. Regional Observer Programme Minimum Data Standards required to be collected by ROP observers, when performing duties on a vessel chosen to take a ROP observer for Commission coverage purposes.

Table 1. Vessel and trip information

VESSEL IDENTIFICATION	
Name of vessel	Name of vessel includes any number
Flag	Country where vessel is flagged
Flag state registration number	Registration number issued by flag State of vessel
International radio call sign	Call sign used by vessel & painted on vessel
TRIP INFORMATION	
Date and time of departure from port	
Port of departure	Port name vessel departs from for start of trip
Date and time of return to port	
Port of return	Port name vessel returns to end trip
OBSERVER INFORMATION	
Observer name	First name first - last name last
Observer's ROP certification number	Number given to observer when certified for ROP
Date, time and location of embarkation	When and where observer boards the vessel
Date, time and location of disembarkation	When and where observer leaves the vessel
CREW INFORMATION	
Name of captain	First name first - Last name last
Nationality of captain	Passport nationality
Name of fishing master	First name first - Last name last
Nationality of fishing master	Passport nationality
Other crew	Number of crew, by nationality from passports
VESSEL ATTRIBUTES	
[to be determined by TCC and SC]	TBD
VESSEL ELECTRONICS	
Radars	Presence or absence, and usage for all equipment recorded. **Usage codes**. **ALL** - used all the time **TRA** - used only in transit **OIF** - used often but only in fishing **SIF** - used - sometimes only in fishing
Depth sounder	
Global positioning system (GPS)	
Track plotter	
Weather facsimile	

Sea surface temperature (SST) gauge	**RAR** - rarely used **BRO** - broken now but used normally **NOL** - no longer ever used
Sonar	
Radio/ Satellite buoys	
Doppler current meter	
Expendable bathythermograph (XBT)	
Satellite communications services	
Fishery information services	
Vessel monitoring system	Presence or absence? Security seals in tact?

Table 2. Longline information and data

VESSEL ATTRIBUTES	
Refrigeration Method	Ice, chilled sea water, refrigerated sea water, blast freezer, or other
GEAR ATTRIBUTES	
Mainline material	Monofilament or kuralon [further types]
Mainline length	Nautical miles
Mainline diameter	Millimeters
Branch line material(s)	Monofilament [further types]
Wire trace	Presence or absence
Mainline hauler	Presence or absence, and usage
Branch line hauler	
Line shooter	
Automatic bait thrower	
Automatic branch line attacher	
Hook type	J, square, circle [other types]
Hook size	size numbers for hooks
Tori pole	Presence/absence/usage code
Bird curtain	Presence/absence/usage code
Weighted branch lines	Presence/absence/usage code
Blue dyed bait	Presence/absence/usage code
Underwater setting shoot	Presence/absence/usage code
Disposal method for offal management	Retained/mass dispersal/ad hoc dispersal
SET AND HAUL INFORMATION	
Date and time of start of set	Ship's date and time, and UTC date and time

Latitude and longitude of start of set	dd°mm'.mmm N/S - ddd°mm'.mmm E/W
Date and time of end of set	Ship's date and time
Latitude and longitude of end of set	dd°mm'.mmm N/S - ddd°mm'.mmm E/W
Total number of baskets or floats	Count buoys set to determine baskets used
Number of hooks per basket or number of hooks between floats	Count hooks , if varied indicate
Total number of hooks used in a set	Number of hooks used
Length of float-line	metres
Distance between branch-lines	metres
Length of branch-lines	metres
Time-depth recorders (TDRs)	Presence or absence
Number of light-sticks	# branch-lines with light-stick
Target species	Tuna, swordfish, marlins or shark
Bait species	Name(s) of species
Date and time of start of haul	Ship's date and time
Date and time of end of haul	Ship's date and time
Total number of baskets or floats observed	How many did observer watch out of a set
INFORMATION ON CATCH OF INDIVIDUAL FISH FOR EACH SET	
Hook number between floats	Number of hooks set between each float, Do not record hooks attached directly to floats, these are accounted for elsewhere
Species code	FAO 3-alpha code
Length of fish	Centimetres
Length measurement code	**Length codes** **TL**- tip of snout to end of tail **UF**- upper jaw to fork in tail **LF**- lower jaw to fork in tail **PF**- pectoral fin to fork in tail **TW**- total width (tips of wings - rays) **CL**- carapace length (turtles) **NM**- not measured
Gender	**Gender codes** Male (**M**), female (**F**), indeterminate (**I**) unknown (**U**).
Condition when caught	**Condition codes** **A0** – Alive unable to further categorise condition. **A1** - Alive and healthy. **A2** – Alive injured or distressed probably will survive. **A3** - Alive, unlikely to live. **D** - Dead

	U - Condition unknown
Fate	**Retained Fate codes** **RGG** - Retained - gilled and gutted **RGT** Retained - gilled gutted and tailed **RWW** Retained - whole **RPT** Retained - partial (e.g. fillet, loin, trunk) **RFR** Retained - both fins and trunk (sharks) **RHG** Retained - headed and gutted (billfish) **RSD** Retained - shark damaged **RCC** Retained - crew consumption **RGO** Retained - gutted only **ROR** Retained - other reason (specify) **Discard Fate codes** **DFR** Discarded trunk - fins retained (sharks) **DGD** Discarded - gear damage (target species only) **DSD** Discarded - shark damage **DWD** Discarded - whale damage **DUS** Discarded - uneconomic species **DDL** Discarded - too difficult to land **DSO** Discarded - struck off before landing **DTS** Discarded - too small (target species only) **DPQ** Discarded - poor quality (target species only) **DPA** Discarded - species of special interest Alive **DPD** Discarded - species of special interest Dead **DPU** Discarded in an unknown condition **DOR** Discarded for other reasons (specify reason) **ESC** Escaped
Condition when discarded	Condition codes same as when caught
Tag recovery information	Number of tags recorded, Tag number, species code, length and gender, for each tag

Table 3. Pole-and-line information and data

GEAR ATTRIBUTES	
Automatic poling devices	Presence or absence, and usage
INFORMATION ON DAILY ACTIVITIES	
Date and time of start of daily activities	Ship's date and time, and UTC date and time
Time of activity	Ship's time
Latitude and longitude of activity	dd°mm'.mmm N/S - ddd°mm'.mmm E/W
Type of activity	**Activity codes** **1** Spraying, chumming or poling **2** Searching **3** Transit **4** No fishing - breakdown **5** No fishing - bad weather **6** In port - please specify
Numbers of school sighted per day	Numbers of schools, by type of association

BAITFISHING INFORMATION	
Bait species caught	Names of main species caught
Number of buckets of bait caught	
SCHOOL INFORMATION	
Method of detection of school	**Detection codes** **1** Seen from vessel **2** Seen from helicopter **3** Marked with beacon **4** Bird radar **5** Sonar / depth sounder **6** Info. from other vessel **7** Anchored FAD / payao}
Type of school association	**School Association (tuna)** **1** Unassociated **2** Feeding on Baitfish **3** Drifting log, debris or dead animal **4** Drifting raft, FAD or payao **5** Anchored raft, FAD or payao **6** Live whale **7** Live whale shark **8** Other (please specify)
INFORMATION ON CATCH PER SCHOOL FISHED	
Number of crew poling	How many crew used for each set
Time of start of spraying, chumming and poling	Ship's time
Time of end of spraying, chumming and poling	Ship's time
Retained catch, by species	FAO 3-alpha species code; catch in number of fish or tonnes
Discards, by species	FAO 3-alpha species code; discards in number of fish or tonnes
Tag recovery information	Tag number, species code, length and gender, for each tag
SAMPLING DATA	
Species code	FAO 3-alpha code
Length measurement code	As per ‘Length Measurement codes” for longline
Length	Centimetres

Table 4. Purse seine information and data

VESSEL AND RELATED ATTRIBUTES	
Vessel cruising speed	Knots

Helicopter	Presence or absence
GEAR ATTRIBUTES	
Maximum depth of net	Metres
Maximum length of net	Metres
Net mesh size	Centimetres
INFORMATION ON DAILY ACTIVITIES	
Date and time of start of daily activities	Ship's date and time, and UTC date and time
Time of activity	Ship's time
Latitude and longitude of activity	dd°mm'.mmm N/S - ddd°mm'.mmm E/W
	Activity and Helicopter codes **1** Set **2** Searching **3** Transit **4** No fishing - Breakdown **5** No fishing - Bad weather **6** In port - please specify **8** Investigate free school **9** Investigate floating object **10D** Deploy - raft, FAD or payao **10R** Retrieve - raft, FAD or payao **11** No fishing - Drifting at day's end **13** No fishing - Other reason (specify) **16** Transhipping or bunkering
Numbers of school sighted per day	Numbers of schools, by type of association
SCHOOL INFORMATION	
Method of detection of school	**How Detected** **1** Seen from vessel **2** Seen from helicopter **3** Marked with beacon **4** Bird radar **5** Sonar / depth sounder **6** Info. from other vessel **7** Anchored FAD / payao (recorded)
Type of school association	**School Association (tuna)** **1** Unassociated **2** Feeding on Baitfish **3** Drifting log, debris or dead animal **4** Drifting raft, FAD or payao **5** Anchored raft, FAD or payao **6** Live whale **7** Live whale shark **8** Other (please specify) **9** No tuna associated
SET INFORMATION	
Observer's record of date and time of start of set	Skiff launched. Ship's date and time

Observers record of date and time of end of set	Skiff on board, ships date and time
Vessel's record of date and time of start of set	Ship's date and time
Retained catch, by species	FAO 3-alpha species code; catch in number of fish or tones
Discards, by species	FAO 3-alpha species code; discards in number of fish or tones
Tag recovery information	Amount of Tags Recovered -Tag number, species code, length and gender, for each tag
SAMPLING DATA	
Species code	FAO 3-alpha code
Length measurement code	**Length codes** **TL** - tip of snout to end of tail **UF**- upper jaw to fork in tail **LF**- lower jaw to fork in tail **PF**- pectoral fin to fork in tail **TW**- total width (tips of wings - rays) **CL**- carapace length (turtles) **NM**- not measured
Length	Centimetres

Table 5. Species of special interest

GENERAL INFORMATION	
Type of interaction	Landed on deck, interacted with vessel or gear only, or sighted only
Date and time of interaction	Ship's date and time
Latitude and longitude of interaction	dd°mm'.mmm N/S - ddd°mm'.mmm E/W
Species code of marine reptile, marine mammal or seabird	FAO 3-alpha code
LANDED ON DECK	
Length	Centimetres
Length measurement code	**Length codes** **TL** - tip of snout to end of tail **UF**- upper jaw to fork in tail **LF**- lower jaw to fork in tail **PF**- pectoral fin to fork in tail **TW**- total width (tips of wings - rays) **CL**- carapace length (turtles) **NM**- not measured
Gender	Male, female, indeterminate, unknown
Condition when landed on deck	**Condition codes for Species of Special Interest** **A0** – Alive unable to further categorise condition. **A1** - Alive and healthy.

	A2 – Alive injured or distressed probably will survive. **A3** - Alive, unlikely to live. **D** - Dead **U** - Condition unknown.
Condition when released	Same as condition codes for landed on deck
Tag recovery information	Type (dart, archival or pop-up, acoustic, leg band, wing, flipper) and tag number
Tag release information	Type (dart, archival or pop-up, acoustic, leg band, wing, flipper) and tag number
INTERACTION WITH VESSEL OR GEAR ONLY	
Vessel's activity during interaction	Setting, hauling, transiting, other
Condition observed at start of interaction	Same as condition codes for landed on deck
Condition observed at end of interaction	Same as condition codes for landed on deck
Description of interaction	For example, "dolphin trapped in net and then released"
SIGHTING ONLY	
Number of animals sighted	How many sighted away from vessel and including any interactions

Table 6 Vessels & Aircraft sightings

Date & Time of sighting	UTC Date and time only
Observers Vessel position	dd°mm'.mmm N/S - ddd°mm'.mmm E/W
Sighted Vessel or Aircraft Name / Callsign	Vessel full or part name & full or part callsign
Flag of Vessel	International abbreviation codes for countries
Type of Vessel	**Vessel Type codes** **1** Single purse seine **2** Longline **3** Pole and Line **4** Mother-ship **5** Troll **6** Net boat **7** Bunker **8** Search, Anchor, or Light boat **9** Fish Carrier **10** Trawler **21** Light aircraft **22** Helicopter **31** Other- please specify
Compass bearing to sighted vessel	Bearing in degrees
Distance to sighted vessel	Distance in nautical miles
Activity of sighted vessel	**Action codes of sighted vessel** **FI** Fishing **PF** Possibly fishing **NF** Not fishing **SR** Set Sharing (Vessel receiving fish)

	SG Set Sharing (Vessel giving fish) **TR** Transhipping fish (Vessel receiving fish) **TG** Transhipping fish (Vessel giving fish) **BR** Bunkering (Vessel receiving fuel) **BG** Bunkering (Vessel giving fuel) **DF** Dumping of fish **OR** Other (Vessels receiving please specify item/s) **OG** Other (Vessel Giving please specify item/s)

Table 7 Vessel Trip Monitoring record

Vessel trip monitoring	Vessel trip monitoring standards will be same as standards for the ROP incident form.

APPENDIX C

RESOLUTION 22/04
ON A REGIONAL OBSERVER SCHEME

The Indian Ocean Tuna Commission (IOTC),
TAKING INTO ACCOUNT the need to increase the scientific information, in particular to provide the IOTC Scientific Committee (SC) working material in order to improve the management of the tuna and tuna-like species fished in the Indian Ocean;

REITERATING the responsibilities of flag States to ensure that their vessels conduct their fishing activities in a responsible manner, fully respecting IOTC Conservation and Management Measures;

CONSIDERING the need for action to ensure the effectiveness of the IOTC objectives;

CONSIDERING the obligation of all IOTC Contracting Parties and Cooperating Non-Contracting Parties (hereinafter CPCs) to fully comply with the IOTC Conservation and Management Measures;

AWARE of the necessity for sustained efforts by CPCs to ensure the enforcement of IOTC's Conservation and Management Measures, and the need to encourage Non-Contracting Parties (NCPs) to abide by these measures;

UNDERLINING that the adoption of this measure is intended to help support the implementation of Conservation and Management Measures as well as scientific research for tuna and tuna-like species;

CONSIDERING the provisions set forth in Resolution 11/04 *On A Regional Observer Scheme*, adopted by the Commission;

CONSIDERING Resolution 16/04 On the implementation of a pilot project in view of promoting the regional observer scheme of IOTC;

FURTHER CONSIDERING the deliberation of the 21st Session of the IOTC Scientific Committee held in Seychelles, from 3 to 7 December 2018;

RECALLING the discussion of the 23rd session of the IOTC held in Hyderabad, India, from 17 to 21 June 2019;

FURTHER RECALLING that the 23rd session of the IOTC Scientific Committee expressed the concern on the low observer coverage level at 2.15% and on the fact that there is no coverage of the artisanal fleet, which comprise a large portion of catches taken in the Indian Ocean;

CONSIDERING the recurrent non-compliance of multiple fleets to the minimum observer coverage since the adoption of Resolution 11/04;

ADOPTS, in accordance with the provisions of Article IX, paragraph 1 of the IOTC Agreement, the following:

Definition

1. In this Resolution:

    a. "field sampler" means a person who collects information on land during the unloading of fishing vessels and field sampling programs can be used *inter alia* for quantifying catch, retained bycatch and collecting tag returns; and

    b. "observer" means a person who collects information on board fishing vessels, in the framework of observer programs, can be used *inter alia* for monitoring fishing activities, quantifying species composition of target species and bycatch, whether they are retained or discarded and deploying or collecting tags.

c. "Electronic Monitoring System" (EMS) means an integrated system of hardware and software that supports acquisition of video footages of fishing activity, positional data and/or sensor, that allows the analysis and reporting of EM records.

d. "Pool of observers" means a list of IOTC recognised observers that have been allocated an IOTC registration number and trained according to IOTC standards who may be called upon by other flag States.

Objective

2. The objective of the IOTC Regional Observer Scheme (ROS) shall be to collect verified catch data and other scientific data related to the fisheries for tuna and tuna-like species in the IOTC area of competence.

Observer Scheme

3. In order to improve the collection of scientific data, each CPC shall ensure that all fishing vessels of 24 meters length overall and above and under 24 meters, if they operate outside the exclusive economic zone (EEZ) of the flag CPC and in the IOTC area of competence, comply with the minimum observer coverage of 5% as defined by the number of operations/sets.

4. The IOTC Scientific Committee, in collaboration with the Compliance Committee, shall develop and agree on minimum standards for the use of EMS for purse seine, longline, bait boat (pole and line), handline, and gillnet fleets by 2023 at the latest, including on modalities of the substitution of the human observer coverage by an EMS, taking into account factors such as, the principles and regulations regarding minimum safe manning requirements. The Commission may consider and adopt these standards by 2024 in a separate Resolution.

5. Once the EMS standards are adopted and providing CPCs meet the minimum mandatory ROS data reporting standards, the minimum human observer coverage provided for in paragraph 3 may be complemented or substituted by means of an EMS. To ensure the minimum mandatory ROS data reporting standards are met, the EMS may be complemented by port sampling and/or other Commission approved data collection methods. CPCs are encouraged to use an EMS to improve the collection of scientific data before the standards mentioned in paragraph 4 are adopted.

6. CPCs shall endeavor to provide a list of observers to the IOTC Secretariat constituting the basis for the development of a regional pool of observers. The regional pool of observers shall be composed of observers registered through authorised observer providers according to the IOTC ROS standards. Each observer shall be allocated an IOTC registration number that must be included on reported data.

7. When purse seiners are carrying an observer in accordance with paragraph 3, this observer shall also monitor the catches at unloading to identify the species composition of targeted tuna species. The requirement for the observer to monitor catches at unloading is not applicable to CPCs already having a sampling scheme, with at least the coverage set out in paragraph 3.

8. Landings from artisanal fishing vessels shall also be monitored at the landing place by field samplers. The indicative level of the coverage of the artisanal fishing vessels shall be 5% of the total levels of vessel activity (i.e. total number of vessel trips or total number of active vessels).

9. Field samplers shall monitor catches at the landing place with a view to estimating catch-at-size by type of boat, gear and species, or carry out such scientific work as may be requested by the IOTC Scientific Committee.

10. CPCs shall:

    a. have the primary responsibility to obtain qualified observers and each CPC may choose to use either deployed national or non-national of the flag State of the vessel on which they are deployed;

    b. ensure that the minimum level of coverage is met;

    c. take all necessary measures to ensure that observers are able to carry out their duties in a competent and safe manner;

    d. endeavour to ensure that the observers alternate vessels between their assignments;

e. ensure that observers perform duties described in paragraphs 7, 15 and 16. If observers are entrusted with complementary tasks by the relevant CPC fisheries research institutes, this shall in no way affect their performance on the above-mentioned duties;

f. ensure that the vessel on which an observer is placed shall provide suitable food and lodging during the observer's deployment at the same level as the officers, where possible; and

g. require vessel masters to ensure that all necessary cooperation is extended to observers in order for them to carry out their duties safely including providing access, as required, to the retained catch, and catch which is intended to be discarded.

11. If the coverage referred in paragraphs 3 is not met by a CPC, any other CPC may, subject to the consent of the CPC who has not met its coverage, place an observer to fulfil the tasks defined in the paragraphs 7, 15, 16 and 17 until that CPC provides a replacement or the target coverage level is met.

12. CPCs shall provide to the IOTC Secretariat and the IOTC Scientific Committee, annually in their national scientific reports, a description of the protocols supporting their observer programs and sampling schemes mentioned in paragraphs 3, 5, 7 and 8, the number of fishing vessels and of fishing effort sampled, as well as the coverage achieved by gear type in accordance with the provisions of this Resolution.

13. Observers shall:

    a. record and report fishing activities, verify positions of the vessel;

    b. observe and estimate catches as far as possible with a view to identifying catch composition and bycatch and to monitoring discards including their fate (e.g. released alive) and size frequency;

    c. record the gear type, mesh size and attachments employed by the master;

    d. collect information to enable the cross-checking of entries made to the logbooks (species composition and quantities, live and processed weight and location, where available); and

    e. carry out such scientific work (e.g. collecting samples), as requested by the IOTC Scientific Committee.

14. The IOTC Scientific Committee shall adopt by 2023 the IOTC ROS Observer Manual and the IOTC Observer Forms used for reporting (including minimum data fields) and provide advice on a training program.

15. Once adopted by the IOTC Scientific Committee, observers shall use the IOTC ROS *Minimum Standard Data Fields*, the IOTC data collection forms, the IOTC Species identification cards, the IOTC Regional Observers Scheme (ROS) Observer Manual and the IOTC Observer Forms when carrying out their duty. The Secretariat shall publish this information in a dedicated area of the IOTC website.

16. Each observer shall provide, within 30 days of completion of each trip, a report to the flag CPC of the vessel. If the vessel was fishing in the EEZ of a coastal State, the part of the observer report covering fishing activities in the EEZ shall be also submitted to that coastal State.

17. Each CPC shall provide, to the IOTC Secretariat within 150 days the latest, each report and observer data, following IOTC observer reporting templates and standards. The Executive Secretary shall make the information available to the IOTC Scientific Committee.

18. The data referenced in paragraph 17 shall be provided by 1°x1° square and month. CPC shall endeavor to send these data in an electronic format suitable for automated data extraction.

19. The confidentiality rules set out in Resolution 12/02 *Data confidentiality policy and procedures for fine-scale data* shall apply.

20. The funds available from the IOTC balance of funds may be used to support the implementation of this program in developing coastal CPCs, notably the training of observers and field samplers.

21. The elements of the Observer Scheme, notably those regarding its coverage and the adoption of EMS standards, are subject to review and revision, as appropriate, for application in 2023 and subsequent years.

22. All provisions in this resolution related to the deployment of observers onboard fishing vessels, shall apply *mutatis mutandis* to the use of EMS, as applicable.

23. This Resolution supersedes Resolution 11/04 *On A Regional Observer Scheme*.

16-14 **GEN**

RECOMMENDATION BY ICCAT TO ESTABLISH MINIMUM STANDARDS FOR FISHING VESSEL SCIENTIFIC OBSERVER PROGRAMS

RECALLING that Article IX of the Convention requires Contracting Parties to furnish, on the request of the Commission, any available statistical, biological and other scientific information needed for the purposes of the Convention*;*

FURTHER RECALLING the 2001 *Resolution by ICCAT on the Deadlines and Procedures for Data Submission* [Res. 01-16], in which the Commission established clear guidelines for the submission of Task I and Task II data;

ACKNOWLEDGING that poor quality data impacts the ability of the SCRS to complete robust stock assessments and provide management advice as well as the ability of the Commission to adopt effective conservation and management measures;

DETERMINED to ensure the collection of data accounting for all sources of mortality in ICCAT fisheries, for both target species and by-catch, to improve the certainty of future scientific advice while taking into account ecosystem considerations;

RECOGNIZING that observer programmes are used at both the national and RFMOs level for the purposes of collecting scientific data;

RECOGNIZING the international nature of the fishing activity on and management of ICCAT species and the consequent need to embark well-trained observers to improve the collection of relevant data, in terms of consistency and quality;

TAKING INTO ACCOUNT the needs of developing States with regard to capacity building;

RECOGNIZING the United Nations General Assembly Sustainable Fisheries Resolution 63/112, that encourages the development of observer programmes by RFMOs and arrangements to improve data collection;

CONSIDERING that the SCRS suggested that the current level of scientific observers (5%) seems to be inappropriate to provide reasonable estimates of total by-catch and recommended increasing the minimum level to 20%;

FURTHER CONSIDERING that the SCRS recommended studying the issue further, in order to determine the level of coverage appropriate to meet management and scientific objectives;

RECOGNIZING that the SCRS noted that the current mandatory level of observer coverage of 5% may have not been implemented by many of the fleets and underlined the need for achieving those minimum coverages so the SCRS could address the mandate given by the Commission;

ACKNOWLEDGING that electronic monitoring systems were successfully tested in some fisheries and that the SCRS adopted minimum standards for their implementation for the tropical purse seine fleet;

RECALLING the *Recommendation by ICCAT to Establish Minimum Standards for Fishing Vessel Scientific Observer Programs* [Rec. 10-10] and desiring to enhance its provisions to improve the availability of scientific data and the safety of observers;

THE INTERNATIONAL COMMISSION FOR THE CONSERVATION
OF ATLANTIC TUNAS (ICCAT) RECOMMENDS THAT:

General Provisions

1. Notwithstanding additional observer program requirements that may be in place or adopted by ICCAT in the future for specific fisheries or fishing activities, each Contracting Party and Cooperating non-Contracting Party, Entity, or Fishing Entity (CPC) shall implement the following minimum standards and protocols with respect to their domestic scientific observer programs to ensure the collection and reporting of relevant scientific information from ICCAT fisheries.

Qualifications of Observers

2. Without prejudice to any training or technical qualifications recommended by the SCRS, CPCs shall ensure that their observers have the following minimum qualifications to accomplish their tasks:

   a) sufficient knowledge and experience to identify ICCAT species and fishing gear configurations;

   b) the ability to observe and record accurately the information to be collected under the Program;

   c) the capability of performing the tasks set forth in paragraph 7 below;

   d) the ability to collect biological samples; and

   e) minimum and adequate training in safety and sea survival.

3. In addition, in order to ensure the integrity of their domestic observer program, CPCs shall ensure the observers:

   a) are not crew members of the vessel being observed;

   b) are not employees of the owner or beneficial owner of the fishing vessel being observed ; and

   c) do not have current financial or beneficial interests in the fisheries being observed.

Observer Coverage

4. Each CPC shall ensure the following with respect to its domestic observer programs:

   a) A minimum of 5% observer coverage of fishing effort in each of the pelagic longline, purse seine, and, as defined in the ICCAT glossary, baitboat, traps, gillnet and trawl fisheries. The percentage coverage will be measured:

      i. for purse seine fisheries, in number of sets or trips;
      ii. for pelagic longline fisheries, in fishing days, number of sets, or trips;
      iii. for baitboat and trap fisheries, in fishing days;
      iv. for gillnet fisheries, in fishing hours or days; and
      v. for trawl fisheries, in fishing hauls or days.

   b) Notwithstanding paragraph a), for vessels less than 15 meters, where an extraordinary safety concern may exist that precludes deployment of an onboard observer, a CPC may employ an alternative scientific monitoring approach that will collect data equivalent to that specified in this recommendation in a manner that ensures comparable coverage. In any such cases, the CPC wishing to avail itself of an alternative approach must present the details of the approach to the SCRS for evaluation. The SCRS will advise the Commission on the suitability of the alternative approach for carrying out the data collection obligations set forth in this Recommendation. Alternative approaches implemented pursuant to this provision shall be subject to the approval of the Commission at the annual meeting prior to implementation.

c) Representative temporal and spatial coverage of the operation of the fleet to ensure the collection of adequate and appropriate data as required under this Recommendation and any additional domestic CPC observer program requirements, taking into account characteristics of the fleets and fisheries;

d) Data collection on pertinent aspects of the fishing operation, including catch, as detailed in paragraph 7.

5. CPCs may conclude bilateral arrangements whereby one CPC places its domestic observers on vessels flying the flag of another CPC, as long as all provisions of this Recommendation are complied with.

6. CPCs shall endeavour to ensure that observers alternate vessels between their assignments.

Tasks of the Observer

7. CPCs shall require, *inter alia*, observers to:

a) record and report upon the fishing activity of the observed vessel, which shall include at least the following:

i. data collection, that includes quantifying total target catch, discards and by-catch (including sharks, sea turtles, marine mammals, and seabirds), estimating or measuring size composition as practicable, disposition status (i.e., retained, discarded dead, released alive), the collection of biological samples for life history studies (e.g., gonads, otoliths, spines, scales);

ii. collect and report on all tags found;

iii. fishing operation information, including:
- location of catch by latitude and longitude;
- fishing effort information (e.g., number of sets, number of hooks, etc.);
- date of each fishing operation, including, as appropriate, the start and stop times of the fishing activity;
- use of fish aggregating objects, including FADs; and
- general condition of released animals related to survival rates (i.e. dead/alive, wounded, etc.).

b) observe and record the use of by-catch mitigation measures and other relevant information;

c) to the extent possible, observe and report environmental conditions (e.g., sea state, climate and hydrologic parameters, etc.).

d) observe and report on FADs, in accordance with the ICCAT Observer program adopted under the multi-annual conservation and management programme for tropical tuna; and

e) perform any other scientific tasks as recommended by SCRS and agreed by the Commission.

Obligations of the Observer

8. CPCs shall ensure that the observer:

a) does not interfere with the electronic equipment of the vessel;

b) is familiar with the emergency procedures aboard the vessel, including the location of life rafts, fire extinguishers and first aid kits;

c) communicates as needed with the Master on relevant observer issues and tasks;

d) does not hinder or interfere with the fishing activities and the normal operations of the vessel;

e) participates in a debriefing session(s) with appropriate representatives of the scientific institute or the domestic authority responsible for implementing the observer program;

Obligations of the Master

9. CPCs shall ensure that the Master of the vessel to which the observer is assigned:

a) permits appropriate access to the vessel and its operations;

b) allows the observer to carry out his/her responsibilities in an effective way, including by:

i. providing appropriate access to the vessel's gear, documentation (including electronic and paper logbooks), and catch;

ii. communicating at any time with appropriate representatives of the scientific institute or domestic authority;

iii. ensuring appropriate access to electronics and other equipment pertinent to fishing, including but not limited to:

- Satellite navigation equipment
- Electronic means of communication;

iv. ensuring that no one on board the observed vessel tampers with or destroys observer equipment or documentation; obstructs, interferes with, or otherwise acts in a manner that could unnecessarily prevent the observer from performing his/her duties; intimidates, harasses, or harms the observer in any way; or bribes or attempts to bribe the observer.

c) provides accommodation to observers, including berthing, food and adequate sanitary and medical facilities, equal to those of officers;

d) provides the observer adequate space on the bridge or pilot house to perform his/her tasks, as well as space on deck adequate for carrying out observer tasks;

Duties of the CPCs

10. Each CPC shall:

a) require its vessels, when fishing for ICCAT species, to carry a scientific observer in accordance with the provisions of this recommendation.;

b) oversee the safety of its observers;

c) encourage, where feasible and appropriate, their scientific institute or domestic authority to enter into agreements with the scientific institutes or domestic authorities of other CPCs for the exchange of observer reports and observer data between them;

d) provide in its Annual Report for use by the Commission and the SCRS, specific information on the implementation of this recommendation, which shall include:

i. details on the structure and design of their scientific observer programs, including, *inter alia*:
- the target level of observer coverage by fishery and gear type as well as how measured;
- data required to be collected;
- data collection and handling protocols in place;

- information on how vessels are selected for coverage to achieve the CPC's target level of observer coverage;
- observer training requirements; and
- observer qualification requirements;

ii. the number of vessels monitored, the coverage level achieved by fishery and gear type, and details on how those coverage levels were calculated;

e) following the initial submission of the information required under paragraph 10(d)(i), report changes to the structure and/or design of its observer programs in its Annual Reports only when such changes occur. CPCs shall continue to report the information required pursuant to paragraph 10(d)(ii) to the Commission annually.

f) each year, using the designated electronic formats that are developed by the SCRS , report to the SCRS information collected through domestic observer programs for use by the Commission, in particular for stock assessment and other scientific purposes, in line with procedures in place for other data reporting requirements and consistent with domestic confidentiality requirements.

g) ensure implementation of robust data collection protocols by its observers, when carrying out their tasks referred to in paragraph 7, including, as necessary and appropriate, the use of photography.

Duties of the Executive Secretary

11. The Executive Secretary facilitates access by SCRS and the Commission to relevant data and information submitted pursuant to this recommendation;

Duties of the SCRS

12. The SCRS shall:

a) develop, as needed and appropriate, an observer working manual for voluntary use by CPCs in their domestic observer programs, that includes model data collection forms and standardized data collection procedures, taking into account observer manuals and related materials that may already exist through other sources, including CPCs, regional and sub-regional bodies, and other organizations;

b) develop fisheries specific guidelines for electronic monitoring systems;

c) provide the Commission with a summary of the scientific data and information collected and reported pursuant to this recommendation and any relevant associated findings;

d) make recommendations, as necessary and appropriate, on how to improve the effectiveness of scientific observer programs in order to meet the data needs of the Commission, including possible revisions to this Recommendation and/or with respect to implementation of these minimum standards and protocols by CPCs.

Electronic Monitoring Systems

13. Where they have been determined by SCRS to be effective in a particular fishery, electronic monitoring systems may be installed on board fishing vessels to complement or, pending SCRS advice and a Commission decision, to replace the human observer on board.

14. CPCs should consider any applicable guidelines that are endorsed by SCRS on the use of electronic monitoring systems.

15. CPCs are encouraged to report to the SCRS their experiences in the use of electronic monitoring systems in their ICCAT fisheries to complement human observer programs. CPCs who have not yet implemented such systems are encouraged to explore their use and report their findings to the SCRS.

Support to Developing States

16. Developing States shall report to the Commission on their special requirements in the implementation of the provisions of this Recommendation. The Commission shall take due regard of these special requirements.

17. Available ICCAT funds will be used to support the implementation of scientific observer programs in developing States, notably the training of observers.

Final provisions

18. The Commission shall review this Recommendation no later than its 2019 annual meeting and consider revising it, in particular, in the light of information provided by CPCs and of SCRS recommendations.

19. Recommendation [10-10] is repealed and replaced by this Recommendation.

APPENDIX E

Commission for the
Conservation ofSouthern
Bluefin Tuna

みなみまぐろ保存委員会

CCSBT Scientific Observer Program Standards

(revised at the Twenty-Ninth Annual Meeting: 14 October 2022)

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1. BACKGROUND

The Commission for the Conservation of Southern Bluefin Tuna (CCSBT) has adopted a Scientific Research Program (SRP) with an overall objective of improving the quality of the data and information used as input to the stock assessment for Southern Bluefin Tuna (SBT), contributing to the development of reliable indices to monitor future trends in SBT stock size and identifying directions for further scientific research.

At CCSBT7 in April 2001 the Commission adopted the report of the Fifth Meeting of Scientific Committee, which recommended a SRP incorporating a Scientific Observer Program as one of four priority elements. The Observer Program endorsed by the Commission comprised the following features:-

- an observer coverage of 10% for catch and effort as a target level
- the level of observer coverage for estimation of tag reporting rates will depend on the scale of the tagging program subsequently agreed by the Commission and the tag recapture rate.
- standards for training of observers, operation of observer programs and the data to be collected including the forms to be used will be prepared
- data collected would become part of the CCSBT database as subsequently agreed in CCSBT protocols
- member countries will be responsible for operation of observers in high seas and domestic EEZ fisheries on their flag vessels
- all fleet components should be observed and target levels of observer coverage should be the same for all fleet components
- an exchange of observers between countries on a regular basis should be encouraged to maintain consistency and increase mutual trust in the results of the observer program
- recruitment of some observers from non-member nations would be encouraged

To facilitate implementation, the 6th Scientific Committee agreed that:-

- there would be an exchange of data sheets and standards for longline fleets between member countries through the Secretariat
- Australia would develop proposed program standards and data forms for the surface fisheries, taking note of the characteristics of observer programs administered by other fisheries management organizations
- the information gathered would be exchanged through the Secretariat
- proposals on draft CCSBT observer program standards will be presented and finalized at the 7th Scientific Committee meeting in 2002

Dr. Ianelli of the Advisory Panel together with the SC chair developed an initial draft of proposed outline of a CCSBT scientific observer program at the 6th Scientific Committee to serve as a basis for further discussion (See the Attachment F of the 6th SC Report.).

CCSBT8 endorsed the 6th Scientific Committee's proposals in October 2001.

Advances in the development of electronic monitoring systems (EMS) presented an opportunity to diversify monitoring options and some Members independently developed systems to provide additional coverage of their fleets both domestically and on the high seas. At CCSBT29 in 2022 the Commission adopted the recommendation of ESC27 to update the Scientific Observer Program Standards to accommodate this development.

The standards set out in this document reflect these decisions of the Commission and were developed in consultation with national observer program coordinators. A target level of observer coverage to meet tag reporting rate objectives has not yet been determined. When determined, the standards will be updated.

In developing the standards, the Secretariat has prepared a generic document for both surface and longline fisheries. Where the natures of the two types of fishery are differentiated in terms of observer activity, this is identified.

The tasks and record keeping requirements have been formulated to gather only that information,

which is relevant to the objectives of the SRP. Consideration was also given to the practical limitations on the ability of observers to complete tasks in the fishing environment they would be operating in.

In order to facilitate implementation of the standards, the term "member" in this document means any Member of the Extended Commission of the CCSBT.

Reference to the acronym CCSBT is inclusive of the Commission and Extended Commission.

2. OBJECTIVES

The standards set out below provide the framework for the operation of the CCSBT Scientific Observer Program by members.

The objectives of the standards are:

1. To provide a framework for the alignment of members' scientific observer programs with the objectives of the SRP.

2. To standardize scientific observer programs across fleets and fisheries among members.

3. To specify minimum standards for the development of a scientific observer program for members without a program.

4. To provide a minimum set of standards for collection of bycatch data, consistent with international recommendations, and where appropriate to assist in harmonization of bycatch data collection across tuna Regional Fisheries Management Organisations.

All members are expected to adapt their respective programs to, at a minimum, meet these standards but noting that members are encouraged to implement further requirements in their respective programs.

3. RESPONSIBILITY FOR PROGRAM OPERATION

Responsibility for the operation of the CCSBT Scientific Observer Program on the high seas and in domestic EEZ fisheries will lie with the member whose flag is flown on the vessel.

Each member's Scientific Observer Program will be managed taking into account these standards.

Where there is an external observer exchanged under agreements concluded between members or an observer recruited from a non-member nation, that observer shall comply with the laws and regulations of the member which exercises jurisdiction over the vessel to which the observer is assigned.

4. COVERAGE

The CCSBT Scientific Observer Program, including electronic monitoring systems (EMS), will cover the fishing activity of CCSBT members and cooperating non-members wherever southern bluefin tuna are targeted or are a significant bycatch.

5. LEVELS OF SCIENTIFIC OBSERVER COVERAGE

The Program will have a target observer coverage of 10% for catch and effort monitoring for each fishery. For the purposes of this document, 'observer coverage' is defined as monitoring by either human observers deployed physically onboard vessels, or reviewed catch and effort data from EMS.

Observer coverage, including the selection of EMS data for review, should therefore be representative

of different vessel-types in distinct areas andtimes[1].

In order to approach 10% coverage in some strata (e.g., specific vessel-types in certain areas and times) it may be necessary to have higher than 10% coverage in other strata[2].

The exact level of observer placement or EMS data review will require periodic assessment to determine if the target level of coverage is achieved.

Consideration should also be given to higher levels of coverage in some strata from time to time to address specific fisheries management questions (e.g. to better quantify non-fish and protected species bycatch where this is identified as a risk). Review of historically gathered EMS data may also be used for this purpose.

6. ASSIGNMENT OF SCIENTIFIC OBSERVERS TO VESSELS AND SELECTION OF EMS DATA FOR REVIEW

From the scientific perspective, it is important to ensure that the data collected through the scientific observer programs and EMS provide representative information and sampling for the entire fleet. Ideally, each individual operation should have an equal and independent probability of being physically observed or having EMS data from the vessel reviewed. In practice, this ideal may not be possible to achieve. Nevertheless, the basic principle of representative sampling should underlie the assignment of scientific observers to vessels and/or the selection of EMS data for review.

It is the responsibility of each member when implementing an observer program, to assign observers or EMSto its vessels and cruises based on a carefully considered and appropriately designed sampling scheme that has a high likelihood of ensuring reasonably representative coverage. The program should ensure that, within the main fishing areas and seasons and to the extent possible, all representative vessels, areas, and time periods have an approximately equal probability of being sampled.[3]

Each member should evaluate and analyse the sampling scheme used for the assignment of observers against the principles outlined above. Each member should document the scheme used for the observer assignments or selection of EMS footage for review that is implemented and make this information and data collected availableto the Commission in the manner described in Section 11 to enable review within the Commission of whether or not the standards are being met.

The placement of observers and EMS should also encompass arrangements to ensure the independence and scientific integrity of the data.

7. TAGGING PROGRAM

Observer programs make a very valuable contribution to the direct recording of recaptured tags, and to the estimation of non-reporting rates. Failure to adequately quantify the uncertainty associated with estimates of tag reporting rates will substantially degrade the value of any resultant mortality estimates for use in stock assessments.

Observer plans and training programs should include specific provision for the role and responsibilities of observers for tag recapture reporting. A supplemental level of observer coverage

---

[1] For the purpose of this standard, it is recognized that there are many ways in which catch and effort can be stratified including vessels, areas and times. This level of coverage is relative to actual fishing operations, which, if randomly distributed, should result in about 10% of the catch.

[2] While it might be possible to observe 10% of the catch from a single vessel (if a hypothetical fleet consistedof 10 vessels with equal catch allocations), this would not achieve the objective of sampling fishing operations with approximately equal probability, particularly if the vessels fish in different areas using different techniques. Clearly there are logistical difficulties in achieving random observations of fishing operations.

[3] To achieve a desired target coverage level may require a higher observer placement level. For example, itmay take 150 observed vessel days out of a hypothetical 1,000 vessel-day year to achieve a target of 10% coverage for all important strata. In part, this may be due to the fact that the ability of observers to transfer among vessels on the fishing grounds is limited. The factors affecting this include the heterogeneity of the fleet and fishing behaviour.

may be required to take into account the results of the CCSBT tagging program.

8. RECRUITMENT AND TRAINING

Each member is responsible for the recruitment and training of observers for placement on their flagged vessels. Details of the processes maintained for this responsibility are for members to manage consistent with the domestic environment in which they operate.

Training schemes should be constructed to impart the skills necessary to adequately collect the scientific data and should take account of the following principles.

Qualifications of Observers

Scientific Observers for the program should have the following attributes:

- Technically trained or experienced personnel for the fleets concerned, with interests related to fisheries.
- Ability to work at sea in difficult conditions.
- Ability to work under stressful psychological and physical situations.
- Ability to work with a boat's crew on a cooperative and team basis over long and continuous periods at sea.
- Soundness of mind and body.

Independence / Integrity

Observers should not have current financial or beneficial interests in the fisheries in which they will be required to operate as observers.

Observers should not have been found guilty of a serious criminal offence for five years prior to appointment as an observer.

Scientific Observer Training

Members should establish and maintain a structured training program for the CCSBT Scientific Observer Program. Manuals should be developed for this purpose and courses operated, which would allow for observers to exchange approaches and experiences to improve the data collection process.

A Scientific Observer Training program of each Member should include, at least, the following items.

- Briefing on the CCSBT SRP, particularly the CCSBT Scientific Observer and Tagging Program elements to promote a full understanding of the rationale for the Programs.
- Fishery management and biological field collection programs including species identification, data collection and sampling procedures. This should also include identification of bycatch species, such as seabirds, sharks, marine reptiles, other ERS and knowledge of current mitigation measures that are used in the CCSBT.
- Monitoring tag recovery.
- Training on safety at sea and first aid.
- Protocols for dealing with difficult situations (personal conflicts and physical hazards).
- Preparation of cruise/trip reports
- De-briefing with observers to provide feedback on improvement.
- Any additional technical training required for special project such as tagging fish, when necessary

Recruitment of Observers

Scientific observers could be recruited from a variety of related fishery sectors to widen the knowledge and experience base of the observer cohort.

Exchange of observers between members and recruiting some observers from non-members should be encouraged to improve consistency and transparency in the program. Responsibility for implementing observer exchanges would reside with members and the exchanges would be

organised between relevant members and non-members as appropriate

9. THE OBSERVED VESSEL

Any vessel selected for an observation should be capable of meeting the minimum requirements for accommodation, sanitary facilities, meals, equipment and communication systems equivalent to those of the crew (junior officer when possible) so that the observer's duties are not compromised.

A selected vessel should be advised of its responsibility for the observer while they are on board.

10. ELECTRONIC MONITORING SYSTEMS (EMS)

Each member is responsible for the evaluation and contracting of EMS for placement aboard their flagged vessels. Details of the proportion of the fleet that is covered by EMS, as well as the proportion and diversity of footage that is reviewed, is for members to manage consistent with the domestic environment in which they operate.

EMS should be designed and installed to adequately collect relevant scientific information and data, and reporting provided to the Secretariat per section 12 of this document.

EMS can be used by Members on an experimental basis prior to the development of a new set of standards specific the use of EMS in SBT fisheries. Data from EMS may be used to contribute to the 10% target for observer coverage set out in this document. Members using EMS should report its implementation to ESC to review including the items related to EMS in this document.

11. INFORMATION AND DATA

Scientific data to be collected by observers and/or, where relevant, by EMS, should include the following categories of information:

A. Details of the observed vessel, including its size, capacity and equipment.

B. Summary of the observed trip, which will include information such as the observer name and identification number, degree of experience, dates of embarkation and disembarkation.

C. Comprehensive catch, effort and environmental information for each set that occurred while the observer was on-board the vessel, regardless of whether the set/haul was actually observed. This includes the target species, location fished and quantity of gear used.

D. Fishing methods and gear, including mitigation measures in use while fishing. The observer should record/describe mitigation measures, including the configurations that were in use during the observed period. This includes the details of mitigation measures and their use as described in Attachment 1. Where applicable, the absence of mitigation equipment should also be noted.

E. Observed catch information for each period of observation, including the time at start and end of observation, the number of hooks observed, the observed catch in number and weight for SBT and all other species caught to the extent possible.

F. Biological measurements taken of individual SBT, as much as possible, including its condition, length, weight, sex and details of samples (otoliths, scales, gonads, etc.) that were taken from the SBT for later analysis.

G. Information on SBT and ERS not retained should include counts by species and their life status (using the relevant codes as detailed in Attachment 1).

H. SBT tag recovery information, including, both tag numbers (actual tags also to be provided), date, location, length, weight, sex, details of samples taken (e.g. otoliths), and whether or not the tags were spotted during a period of fishing that was being observed.

Most of the above categories of information are related to each other in a hierarchical relationship.

So, the biological details of a fish (F) relates to a particular observed period (E) from a specific set (C) for a trip (B) on a particular vessel (A).

A detailed description of the proposed information to be collected for each of the above categories is provided in Attachment 1. Hierarchies for prioritising the collection of data by species caught andSBT data are at Annex 1. In severe weather conditions, data collection should only be conducted tothe extent that is it safe for the observer to do so.

12. REPORTING

Each member shall provide a report to the Extended Scientific Committee and the Ecologically Related Species Working Group on the sampling scheme and arrangements for collecting data of its observer program as a separate section in the member's annual fishery report. Attachment 2 documents the information that should be provided.

Each member shall include in National Reports to the Compliance Committee and Commission, a summary of the levels of compliance in relation to the implementation of mandatory mitigation measures.

13. CONFIDENTIALITY OF DATA AND INFORMATION

All data and information obtained through an observer program belongs to the flag country of the observed vessel. An observer should not disclose any information without the permission of the flag country.

Attachment 1

Type and Format of Scientific Observer Data

For observer coverage provided by EMS, not all of the information below will be readily available; therefore, as much detail as possible should be provided based on the below descriptions of data type/format

A) Details of the observed vessel and gear

The vessel details are recorded only once for an entire trip

All fishing:

- Vessel's Name
- Vessel's Call-sign
- Vessel's Flag Country
- Name of the Captain
- Name of the fishing master
- Year vessel built
- Engine brake power (kw/hp)
- Overall length (metres)
- Gross tonnage (tonnes)
- Number of people in crew (all staff, excluding observers)
- Total freezer capacity (cubic metres)
- Fuel capacity (tonnes)
- Instrumentation and electronic fishing equipment

Instrumentation	Yes/No (or code)
GPS	
Radio direction finder	
Radar	
Weather Fax	
Track plotter	
NOAA receiver	
Sounder (1=colour monitor, 2=monochrome monitor, 3=printer)	
Sonar (1=scanning, 2=PPI)	
Doppler current monitor	
Sea surface temperature recorder	
Bathy-thermograph	
Bird radar	

Longliners only:

- Material of mainlines (Nylon, Cotton thread, Other)
- Material of branchlines (Nylon, Cotton thread, Type of trace, Other)
- Material of buoylines (Nylon, Cotton thread, Other)

Purse seiners only:

- Capacity of power block
- Capacity of purse winch
- Lengths and depths of all nets on board including expanded figure
- Mesh sizes of nets on board
- Number of net skiffs on board

B) Summary of the observed trip

- Observer's name
- Observer's organisation
- Date observer embarked (translatable to 24 hour clock, UTC to the day)
- Date observer disembarked (translatable to 24 hour clock, UTC to the day)

C) Comprehensive catch, effort and environmental information for each set

This information is recorded for each set while the observer is on-board a vessel, regardless of whether the set/haul was actually observed.

All fishing:

- Date and time at start of Set (translatable to 24 hour clock, UTC)
- Date and time at end of Set (translatable to 24 hour clock, UTC)
- Date and time at start of Retrieval (translatable to 24 hour clock, UTC)
- Date and time at end of Retrieval (translatable to 24 hour clock, UTC)
- Location at start of Set (latitude+N/S and longitude+E/W to a minute of accuracy)
- Wind speed (with unit) and direction (N, NNE, NE, etc.) of the operation
- Time of wind measurement for operation (e.g. Noon, start of set etc.)
- Sea surface temperature (degrees Celsius, to 1 decimal place) at start of Set[4]
- Intended target species[5]

Longlining:

- Location at end of Set (latitude+N/S and longitude+E/W to a minute of accuracy)
- Direction of line set (eg straight, curved)[6]
- Direction of line set (straight,curved)
- Actually used mainline length (km)
- Actually used branchline length (m)
- Actually used buoyline length (m)
- Intended depth of the shallowest hook (m)
- Intended depth of the deepest hook (m)
- Type of hooks
- Number of hooks
- Number of baskets
- Seabird mitigation measure used:
    - Line weights used (Y/N)
    - Mass of added line weight (where applicable)
    - Distance between weight and hook (where applicable)
    - Number of tori lines used (where applicable)
    - Estimate of the aerial coverage achieved by tori lines (m)
    - Night setting with minimal deck lighting (Y/N)
    - Bait thrower/line shooter used (Y/N)
    - Dyed Bait (Y/N)
    - Details about management of offal
    - Underwater setting chute (Y/N)
    - Side setting (Y/N)
    - Haul mitigation (Y/N)
        - Branch line/snood haulers
        - Brickle curtain
        - Water cannon
    - Other mitigation measures used
- Distance between baskets, beacons, buoys, or floats as is appropriate to the operation (m)
- Percentage of bait by bait categories that were Fish, Squid, Artificial, and Other
- Bait status (live or dead)
- Total number by species[5] of SBT, and other tuna and tuna-like species caught, retained or discarded.
- Total processed weight (kg) and Processed State[7] by species[5] of SBT, and all other species caught.

Purse Seining:

[4] It is sufficient to collect the temperature at the start of a set – i.e. at the time the location and wind are measured (e.g. Noon, start of set, etc.).

[5] All species should be reported with FAO species codes, or using National codes and providing a translationtable to FAO species codes. Individuals should be identified as far as possible to species level.

[6] Codes will be used to describe the type of line set, e.g. S=straight, C=curved, U=u-shaped.

[7] As per processing codes identified in the CCSBT CDS Resolution.

- Spotter plane used (Y/N). If used:
    - Time (translatable to 24 hour clock, UTC) and location aircraft began search
    - Time (translatable to 24 hour clock, UTC) and location aircraft ended search
    - Number, location of schools spotted by aircraft
    - Estimated size of each school spotted by the aircraft
    - Total searched distance
- Bird Radar used (Y/N)
- Logbook number and type
- Start and end Time spent for searching (from xx:xx to yy:yy translatable to 24 hour clock, UTC), location and total searched distance
- School finder (plane/vessel)
- Chumming boat used (yes/no)
- Chum status (Alive/Dead)
- Amount of chum used
- Start and end time for chumming (translatable to 24 hour clock, UTC)
- Start and end time for net shooting (translatable to 24 hour clock, UTC)
- Start and end time for net hauling (translatable to 24 hour clock, UTC)
- Start and end location for net shooting
- Start and end location for net hauling
- Light attraction used (yes/no)
- Total of wattage of lights used
- Start and end time for light attraction
- School type (e.g., shoaling/surface, FAD/debris associated)
- Length (m) of net set
- Height (m) of the net
- Number of net skiffs used
- Date and time that transfer to tow cage commenced
- Identification number of the tow cage to which the SBT were transferred
- Name of Carrier Boat that received the fish
- Estimated catch per set, species composition
- Estimated weight (kg) and/or number by species of SBT and other species caught
- Estimated weight of SBT caught alive
- Estimated weight and/or number of SBT dead during operation

<u>Cage Towing:</u>

- Name of carrier boat
- Tow cage identification number
- Cage depth (metres)
- Cage ring diameter (metres)
- Cage mesh size (in centimetres)
- Cage has second or predator net (Y/N)
- Number of divers used
- Chute fitted in cage (Y/N)
- Effective tow speed (km/hour)
- If the catch was received from fishing operations, then for each catcher boat from which SBT were transferred, record:
    - Name of catcher boat
    - Call sign of catcher boat
    - Date and time (translatable to 24 hour clock , UTC) transfer started
    - Estimated weight of SBT transferred (tonnes)/dead SBT before transfer
- If the catch was received from another tow cage, then, record:
    - Name of the carrier boat from which the SBT came
    - Identification number of the tow cage from which the SBT came
    - Date and time (translatable to 24 hour clock, UTC) transfer started.
    - Estimated weight of SBT transferred (tonnes)/dead SBT before transfer
- Date and time (translatable to 24 hour clock, UTC) and place that tow finished
- Total weight of SBT mortalities per day from commencement of towing to end of transfer to farm

- Total number of SBT mortalities per day from commencement of towing to end of transfer to farm

D) Observed catch information

This relates to that part of the catch that was actually observed by the observer during the hauling process. All information recorded here relates only to the period(s) that were observed. Annex 1 provides hierarchies for the collection of data. Observers should use these hierarchies to prioritise data collection as circumstances prevail on the observed vessel.

Longlining:
- Date and time at the start of the observation period (translatable to 24 hour clock, UTC)
- Date and time at the end of the observation period (translatable to 24 hour clock, UTC)
- Number of hooks observed
- Total number by species[5] of all species caught and retained during the observed period[8]
- Total processed weight (kg) by species[5] and Processed State[7] of all species caught and retained during the observed period
- Total number and weight when possible (whole weight, in kilograms) by species[5] of all species caught but discarded during the observed period and life status[8,9].

Purse Seining:
The entire purse seining shooting and hauling operation should be observed
- Date and time at the start of the observation period (translatable to 24 hour clock, UTC)
- Date and time at the end of the observation period (translatable to 24 hour clock, UTC)
- Estimated % of school caught
- Estimated weight (tonnes for SBT, kg for all other species[5]) and/or number by species of SBT, and all other species caught, retained or discarded including life status[89]
- Weight of SBT mortalities from commencement of fishing to end of transfer to cage
- Number of SBT mortalities from commencement of fishing to end of transfer to cage
- Number of species identified as escaped from commencement of fishing to end of transfer to cage
- Number by species identified as discarded from commencement of fishing to end of net hauling

Cage Towing:
The observer must observe or conduct each mortality count during the period of the tow.
- Date and time at the start of the observation period (translatable to 24 hour clock, UTC)
- Date and time at the end of the observation period (translatable to 24 hour clock, UTC)
- Total weight of SBT mortalities per day from commencement of towing to end of transfer to farm
- Total number of SBT mortalities per day from commencement of towing to end of transfer to farm

E) Biological measurements of individual fish. Biological measurements are only required for SBT, but where possible, effort should be made to measure other species.

For the purposes of SBT analyses, accurate size measurements of SBT are required. SBT should be selected in a manner to ensure within strata randomness. For example, for large numbers of fish caught in a single operation (e.g., a purse seine vessel) a systematic sampling may be appropriate.

The actual number of fish should be spread throughout as many separate fishing operations as possible. For example, it is nearly always the case that sampling 20 fish (randomly) from 10 operations is much better than sampling 200 fish from every 10th operation. The required actual number of samples should be re-evaluated from time to time and as needs change.

[8] This includes target species (such as SBT) and all bycatch species such as seabirds, sharks, marine reptilesetc.
[9] Individuals that are discarded with significant injuries and are not considered likely to survive should beincluded in the number of dead individuals.

- Species[5]
- Life status category[10]
- Length (for SBT, fork length measured on straight length, rounded up to the centimetre[11])
- Length unit
- Length code (fork length, eye fork, etc.)
- Length, lower jaw-fork length
- Whole weight (kg), if possible. This is the measured weight before processing as opposed to a calculated whole weight.
- Processed weight (kg)
- Processed State[7]
- Sex (F=female, M=male, I=indeterminate, D= not examined)
- Samples taken, specifying:
    - A unique identification number given to the sample
    - The type of samples taking, including: whole specimen, or samples of otoliths, scales, vertebrae, stomach, muscle, tissue, gonads, feathers, bird bands etc.)
    - Any additional details that may explain the capture of the sample (e.g. for seabirds the specific mitigation at the time of capture)

F) SBT Tag recovery information

Some of the data recorded here duplicates data that already exists in the previous categories of information. This is necessary because tag recovery information may be sent separately to other observer data.

- Observer's name
- Vessel's name
- Vessel's call sign
- Vessel flag
- Collect and provide the actual tags
- Tag colour
- Tag numbers (The tag number is to be provided for all tags when multiple tags were attached to one fish. If only one tag was recorded, a statement is required that specifies whether or not the other tag was missing)
- Date and time of capture (UTC)
- Location of capture (latitude+N/S and longitude+E/W to 1 minute of accuracy)
- Length (fork length, rounded up to the nearest centimetre[11])
- Processed Weight (kg.)
- Processed State[7]
- Details of samples taken, specifying:
    - A unique identification number given to the sample,
    - The type of samples taking, including: whole specimen, or samples of otoliths, scales, vertebrae, stomach, muscle, tissue, gonads, etc.)
- Sex (F=female, M=male, I=indeterminate, D=not examined)
- Condition of recaptured fish and their life status
- Whether the tags were found during a period of fishing that was being observed (Y/N)
- Reward information (e.g., name and address where to send reward)

[10] The observer program will, as a minimum, distinguish the following life status categories: dead anddamaged; dead and undamaged; alive and vigorous; and unknown.

[11] Length should be rounded (not truncated) to the nearest centimeter. For example, 62.4cm becomes 63cm and 62.5cm becomes 63cm (63 cm for both cases).

HIERARCHIES FOR DATA COLLECTED BY SPECIES AND SBT DATA

This annex provides a guideline for the collection of data by observers to enableprioritising of observer activities.

The flow of the main data collection activities are:

Fishing operation information

- All vessel and shot information

Monitoring of hauls

- Record time and species caught
- Record whether the specimen was retained or discarded (with lifestatus)

Monitoring of sets

- To collect counts of seabird abundance around the vessel when setting(using standard counting practices)

Biological sampling

- Collect data on length and whole and/or processed weight (includingprocessed state)
- Check for presence of tags
- Record sex
- Collect biological samples
- Take photos, in particular to facilitate the identification of ERS

Both the monitoring of hauls and the biological sampling procedures should beprioritised among species groups as follows:

Species	Priority (1 is the highest)
SBT	1
Other tunas, billfishes, Gasterochisma, and sharks	2
All other species	3

"other tunas" means all *Thunnus* species except SBT

The allocation of observer effort among these activities will depend on the type of operation and setting. The size of sub-samples relative to unobserved quantities (e.g., number of hooks examined for species composition relative to the number ofhooks set) should be explicitly recorded under the guidance of member country observer programs.

Attachment 2

FORMAT OF NATIONAL REPORT SECTIONS ON DEVELOPMENT AND IMPLEMENTATION OF SCIENTIFIC OBSERVER PROGRAMS

REPORT COMPONENTS

The observer program implementation report should form a component of the annual National Reports submitted by members to the Scientific Committee. This report should provide a brief overview of observer programs for SBT fisheries, and is not intended to replace submitted papers containing proper analyses of collected observer data. This observer program report should include the following sections:

A. Observer Training

An overview of observer training conducted, including:
- Overview of training program provided to scientific observers.
- Number of observers trained.
- Summary of qualifications / training and years of experience of the observers deployed in SBT fisheries during the past year.
- A copy of the latest version of relevant manuals in their original language for reference

B. Scientific Observer Program Design and Coverage

Details of the design of the observer program, including:
- Which fleets, fleet components or fishery components were covered by the program.
- How vessels were selected to carry observers within the above fleets or components.
- How was observer coverage stratified: By fleets, fisheries components, vessel types, vessel sizes, vessel ages, fishing areas and seasons.
- The proportion of coverage provided by observers vs. EMS.

Details of observer coverage of the above fleets, including:
- Components, areas, seasons and proportion of total SBT catch, specifying units used to determine coverage.
- Total number of observer employment days, and number of actual days deployed on observation work.
- Total number of vessels with EMS systems deployed onboard, as well as the proportion of data returned to agencies that was analysed.

C. Observer Data Collected

List of observer data collected against the agreed range of data set out in Attachment 1. In broad structure this would include:

- Effort data: Amount of effort observed (vessel days, sets, hooks, etc), by area and season and % observed out of total by area and seasons
- Catch data: Amount of catch observed of SBT and other species (if collected), by area and season, and % observed out of total estimated SBT catch by area and seasons
- Length frequency data: Number of fish measured per species, by area and season.
- Biological data: Type and quantity of other biological data or samples (otoliths, sex, maturity, Gonosomatic index, etc) collected per species.
- The size of sub-samples relative to unobserved quantities.

D. Tag Return Monitoring

Number of tags returns observed, by fish size class and area.

E. Problems Experienced

– Summary of problems encountered by observers and observer managers that could affect the CCSBT Observer Program Standards and/or each member's national observer program developed in the light of the Standards.

APPENDIX F

ICCAT CICTA CICAA

Indian Ocean Tuna Commission
Commission des Thons de l'Ocean Indien
iotc ctoi

COMMISSION FOR THE
CONSERVATION OF
SOUTHERN BLUEFIN TUNA

ICCAT, IOTC and CCSBT Regional Observer Programme

Programme Manual

Table of Contents

Abbreviations

ATF	Authorisation to Fish
ATT	Authorisation to Tranship (ICCAT only)
AVL	Active Vessel List (ICCAT)
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CDS	Catch Documentation Scheme (for SBT)
CMF	Catch Monitoring Form (for SBT)
CMM	Conservation and Management Measures
CPC	Cooperating Non-Contracting Party, Entity or Fishing Entity (ICCAT) / Contracting Parties and Cooperating Non-Contracting Parties (IOTC)
CV	Carrier Vessel
CVO	Carrier Vessel Operator
EEZ	Economic Exclusive Zone
EPIRB	Emergency Position-Indicating Radiobeacon Station
FAO	Food and Agriculture Organization
FV	Fishing vessel including LSPLV / LSTLV
GMDSS	Global Maritime Distress and Safety System
ICCAT	International Commission for the Conservation of Atlantic Tunas
IOTC	Indian Ocean Tuna Commission
IRCS	International Radio Call Sign
LSPLV	Large Scale Tuna Longlining Vessel (ICCAT)
LSTLV	Large Scale Tuna Longlining Vessel (IOTC)
MARPOL	International *Convention* for the Prevention of Pollution from Ships
MoU	Memorandum of Understanding
NAVTEX	NAVigational TEXt messages
NRN	National Registration Number
RAV	Record of Authorised Vessels (IOTC)
RFMO	Regional Fisheries Management Organization (including CCSBT, ICCAT and IOTC)
ROP	Regional Observer Programme
RoV	Record of Vessels (IOTC)
SART	Search and Rescue Transponder
SOLAS	International Convention for the Safety Of Life At Sea
VMS	Vessel Monitoring System

1 Deployment Status

MRAG and Capfish (the Consortium) will maintain a list of observers that have completed training and have observed in the past year. Observers will be notified of potential deployments and trips will be assigned to available observers based on a rota system.

1.1 Standby

Between leaving home and boarding the vessel observers will be in 'Travel Status' and on a lower pay rate. This will normally be two days and will include a briefing in the office where they will collect their equipment and travel documents. Additional items required by observers for travelling are covered in Section 3.1 below.

1.2 Travel and Briefing

Observers are considered deployed once they board the vessel and they will go onto the higher pay rate. If they board the vessel before 12:00 they will receive a full at sea day pay, after 12:00 and they will receive half a day at sea rate and half a day at travel rate. 'At Sea Status' ends when the observer disembarks the vessel to begin return trip and they will go back to travel status.

1.3 At Sea

Observers are considered deployed once they board the vessel, complete the T3-Pre-Sea Safety Check and R1-Boarding report. "At Sea Status" ends when the observer disembarks the vessel to begin return trip. During this phase of the deployment the observer will need to submit regular 5-day R2 reports and will complete T4 and T5 forms for every transhipment.

1.4 Debriefing

Observers will be expected to attend a debriefing at the completion of the cruise. Observers should have the following completed prior to debriefing:

- R4-Final Report completed.
- All R1, R2, T3, T4 forms inputted into the database
- All pictures correctly labelled and tagged
- Daily Notes and Transhipment Declarations in order; and,
- Gear cleaned, packed and ready to return

2 Deployment Preparation

Any personal matters, immunisations and other medical requirements must be attended to before to accepting a contract. An observer must ensure that their passport has a minimum of **four blank pages** remaining and that it is valid for a minimum of **six months** from the beginning of the deployment. When an observer goes on Standby Status, the Consortium will provide any details regarding deployment location, vessel name, flag state, crew nationality, trip length and previous observer feedback. Observers should prepare for a deployment period of up to three months in what can sometimes be a demanding environment. Once a contract has been accepted they should be prepared to deploy at short notice. Care should be taken when packing personal gear as the observer may be liable for excess baggage charges if they have taken an unreasonably large amount.

Observers must ensure they have a **current medical** (ENG1), **survival at sea** and **first aid** certificate. These are requirements for the programme and it is the observer's responsibility to ensure these are in date (ENG 1 medicals are normally valid for two years, survival at sea and first aid will vary). Without these, insurance will be invalidated and the observer will not be allowed to deploy. You must ensure your employer has current copies. Observers are also encouraged to seek out their own insurance to cover personal effects and loss of earnings due to illness.

2.1 Deployment Checklist

Observers may be required to travel large distances and accommodation facilities may be limited. There are certain essential items that they should bring, a provisional list is provided below:

- passport – with sufficient blank pages (minimum of four) and at least six months validity;
- Transhipment ROP ID Card as issued by the Consortium;
- travel letter / immigration document where required;
- cash (reasonable amount to cover things like taxis and other sundry items);
- credit card to cover emergencies such as excess baggage payments, change of or purchase of flight[1].
- copy of the MoU;
- complete gear set, issued by the Consortium (see below);
- medicinal - need items such as prescriptions[2] (in observer's name), vitamins, first-aid, etc.;

[1] All purchases will be refunded by the Consortium with receipt, provided that the changes or flight purchases were unavoidable.

[2] Observers on prescription should notify the Consortium when first contacted about the deployment as some prescriptions may not be compatible with the work required and conditions at sea

- phrase book(s);
- mobile / cell phone with roaming enabled (ensure that consortium are aware of the number);
- contact details and arrangements made with the vessel agent (if applicable); and
- personal items, clothes, footwear, sunglasses, books, music, etc.

2.2 Issued Gear Set (Equipment)

A set of gear will be issued prior to deployment and a Gear Checklist will be signed upon receipt. Observers will need to provide their own safety boots which should have steel toe caps and protective soles. Equipment issued by the coordinator is outlined below.

2.2.1 Health & Safety Gear:

- 1 PLB (Personal Locator Beacon)- a 406MHz Emergency Position Indicating Radio Beacon (EPIRB), with integrated GPS navigation receiver[3];
- 1 satellite communicator (for example, InReach) with two-way communications to allow emergency communications with the coordinator [4];
- 1 Immersion suit with whistle;
- 1 Personal Floatation Device (PFD);
- 1 Signal mirror;
- 1 Strobe;
- 1 Safety helmet; and,
- Safety boots with steel toe caps and protective soles – ***to be provided by the observer.***

2.2.2 Professional Gear:

- 1 Protective Case to store all electronic and sensitive equipment;
- 1 Laptop computer and USB storage device;
- programme Manual, Electronic and hard copies programme manual and forms; and other resources (provided on storage device);
- 1 plug adapter;
- 1 digital camera (video capable) and memory card;
- species ID guide, inspection ID guides;
- 1 clipboard;
- 1 kit bag;
- pens, pencils, binder, etc.; and,

[3] The EPIRB must be carried with the observer's hand luggage while travelling.
[4] The Satellite Communicator must be carried with the observer's hand luggage while travelling.

- Observer RFMO Stamp

Observers will thoroughly check that all issued gear is in working order before signing the checkout list. Gear checkout list must be signed prior to travelling and a copy retained for debriefing. During the deployment the gear should be maintained and kept clean and should be washed and dried at the end of the deployment before the debrief.

Observers will be held responsible for any item damaged due to mistreatment (at the discretion of the coordinator) and ***a written explanation will be required for any damaged, broken, or missing items***.

Observers wishing to use their own laptops may do so but personal laptops are not covered under the programme insurance. They must also ensure that that they have the correct software installed so that Access and Picasa run correctly on their machine.

2.3 Travel Logistics and Travel Letter

The Consortium will make all international travel arrangements, including visas where required. Prior to being deployed, observer will be issued a Travel Pack detailing flights and any other travel, immigration documents, vessel agent contacts, and hotel reservations. Observers will sometimes be travelling on a one-way flight and, it is important to have the printed immigration documents (where appropriate) available to provide to immigration authorities at the arrival airport or departure port. Observers are encouraged to get Seamans Books to ease transit through immigration and allow them excess baggage.

All boarding passes must be kept by observers, failure to do so will result in the cost of flight being deducted from your payment. Electronic boarding passes are also valid, although these must be PDF, NOT screen shots of mobile boarding passes.

In the port of the intended deployment, local agents appointed by the operator/company of the Carrier Vessel (CV) will be available to assist by meeting at the airport, and arranging accommodation and transport.

Observers may be required to organise local travel or accommodation themselves in which case they should keep the Consortium and local agents informed of any arrangements they have made. Travel expenses incurred can only be reimbursed if receipts are presented at the end of the deployment.

The Consortium coordinator will provide a travel advance prior to flight if necessary to ensure observers have sufficient funds for travelling, two days' notice must be given before a travel advance can be given.

It is also recommended that observers carry an amount of cash in the local currency, as well as American dollars to cover any expenses incurred on the vessel.

While in transit, observers must behave in a responsible manner and in accordance with the Observer Standards of Conduct, a signed copy of which will be included with every observer contract. Observers will always keep their coordinator updated in regards to all actions and developments pertinent to their deployment particularly any changes in embarkation and disembarkation dates.

While in 'Travel Status', observers are still under contract and as such are considered on duty. They represent the Consortium and the ROP and any behaviour not considered in line with this will not be tolerated. They will be considered to be in breach of contract and will subsequently be dismissed and their pay withheld.

2.4 Memorandum of Understanding (MoU)

Prior to any deployment, a Memorandum of Understanding (MoU) (refer Appendix A: MoU), between the CV operator and the Consortium, will have been signed. It outlines the rights and obligations of all parties: the observer, the vessel operator, the vessel and the Consortium. Through the MoU the vessel operator must ensure that all vessels have adequate health and safety measures, including up to date certifications, before an observer can be deployed. All vessels will be subject to a pre-sea safety check by the observer and the MoU alerts the operators to this procedure. It runs through the items that will be checked and the actions to be taken if a vessel fails. The observer should be familiar with its contents, an example is given in Appendix A for reference.

3 Pre-Sea Observer Duties

Prior to the CV's departure from port and within 24 hours of embarkation (deployment), observers will complete the following pre-sea duties:

1. With the local vessel agent, meet with the vessel's Captain/Officers to discuss accommodation, trip plans, the MoU, observer duties, vessel access, etc;
2. Conduct the Pre-Sea Safety Check (PSSC) and familiarisation tour, completing Form T3 and R1 Report. The PSSC should be completed during daylight hours and should not under any circumstances be completed at night;
3. Email the R1 Report to the coordinator within 24 hours of boarding the vessel, the T3 form should also be emailed through to the Consortium. Should there be a problem identified during the PSSC then the observer provider should be notified of the problem immediately and the vessel must remain in port until rectified;
4. If you are unsure of anything during the PSSC, contact your Coordinator for guidance;
5. Complete initial entry in Observer Daily Log and complete Form T1 and Form T2.

3.1 At sea Transfers

Observers will normally embark via an in-port launch or directly from the dockside. However, on very rare occasions, an observer may be required to deploy or disembark at sea, via use of transfer vessel(s) between port and the assigned CV. This procedure is not without risk and the Consortium shall consider transfer options under the following Terms and Conditions:

- CV must notify the Consortium at least 3 days (72 hours) prior to an at sea transfer
- Transfer vessels involved must be identified and approved by the IOTC and the Consortium to undertake such transfers;
- Approved transfer vessels are required to have port inspections and must have a clean safety record issued by the flag state safety authority; and
- When possible, the observer may arrange for a safety check while the two vessels are alongside. When this is not possible, agents for these vessels must at least submit safety certification prior to the observer embarking the vessel.

Observers will verify (with the Consortium, and their CV) that these terms and conditions have been met prior to embarking on any transfer vessel**.**

3.2 CVO / Captains Refusal to embark the observer

If the captain or owner refuses to accept the observer on a vessel, the observer must notify their coordinator immediately, and they will inform the Secretariat. The Consortium will provide instruction to the observer on what to do next.

4 General Data Form and Reporting Instructions

Observers should initially record all their observations onto paper forms, the data are then then transferred into their database at the earliest possible opportunity, preferably after each transhipment but at least on a daily basis. At the end of each trip the data will be transferred into the master database which is then submitted to the Secretariat.

Observers are required to maintain both electronic and hard copies of data until debriefing. Electronic copies should be maintained on the computer and a copy on the USB that has been provided. Back-up of all digital files regularly (preferably daily).

- **RFMO Observer Number:** This is unique to each observer and will have been assigned by the Coordinator on completion of training. It will remain the same through all deployments and across ICCAT, IOTC and CCSBT. You can find this on your observer identification card.

- **RFMO Request Number:** This is unique for each deployment, and will be provided by the coordinator prior to deployment. It should be used for all forms, reports, photographs and in the database.

- **FV RFMO Number:** This is a unique, vessel-specific, identifier assigned to each vessel on the ICCAT / IOTC / CCSBT authorised vessel list. Each vessel should keep the same number throughout its history even if other details such as name or callsign change. The RFMO number can be found in the observer database, vessels not on the database should be verified with the consortium after transhipment. Observers should not modify the vessel list in the database, this will be amended, should a vessel be missing, at debriefing. The vessel list is dynamic, and may have been updated since the observer was deployed.

  The authorised vessel list can also be accessed from the websites:

RFMO	Hyperlink
ICCAT	https://www.iccat.int/en/vesselsrecord.asp
IOTC	https://www.iotc.org/vessels
CCSBT	https://www.ccsbt.org/en/content/ccsbt-record-authorised-vessels

  This can be downloaded prior to deployment for use as reference material only.

- **CV RFMO Number** (observed vessel): This number can be found in the authorised vessel list and the observer database.

- **(Vessel) National Registration Number (NRN):** This is a vessel-specific identifier, issued to the vessel by their Flag state authority. This “number” may be made up

of digits, characters, and sometimes dashes. Record it exactly how it is printed with characters always recorded as capital letters. This will be available on the vessel list / database for verification, and displayed on vessel markings or the vessels documentation (including Transhipment Declarations).

- **FV Vessel Name:** Record the name exactly as it is marked on the vessel. It should be noted that there are different ways by which a numerical value may be associated with a vessel's name for example: No. 4 Sea Bird, Sea Bird No. 4, Sea Bird IV. Additionally, there may be breaks in the name or words joined together. Refer to Appendix F: Guidelines for Vessel and Gear Markings for further information on vessel markings. All vessel markings (bow, stern, TD, ATF, Logbook) should be identical to the name recorded in the list of authorised vessels. Different companies may operate similarly named vessels, and these seemingly small differences may have significance in verifying the identity of a vessel. Follow the non-compliance reporting procedure for vessel markings outlined in Appendix E: PNC's Instructions and Forms (ICCAT only).

- **International Radio Call Sign (IRCS):** This is an international vessel identifier and should be displayed on the side of the vessel, on the top of the wheelhouse. All characters will be recorded as capital letters. Call signs are included in the vessel list provided. Guidelines on vessel markings are given in Appendix F: Guidelines for Vessel and Gear Markings.

- **Operator/Company:** The terms "operator" and "company" are interchangeable. Observers can retrieve the Operator by asking FV captains. CVs will have documentation of this available on board. Record operator/company names exactly as they are provided - names may be very similar in spelling though not at all associated. Owners of the vessels may be different to the operators of the vessel as many vessels are chartered.

- **Flag State:** The flag state of a vessel is the jurisdiction under whose laws the vessel is registered or licensed, and is deemed the nationality of the vessel. However, this does not always correlate with the nation of origin of the vessel, the crew on board the vessel, or the operating company of the vessel. Flag states participating in the ROP are listed below.

ICCAT	IOTC		CCSBT
Belize	China	Oman	Japan
China	Taiwan, China	Philippines	Korea
Chinese Taipei	Indonesia	Seychelles	Taiwan
Japan	Japan	Tanzania	
Korea	Korea	Thailand	
St. Vincent & the Grenadines	Malaysia		
Namibia			

- **Date:** Record date fields in the following format:

dd/mm/yyyy

- **Time:** Record time fields in the following format:

hh:mm in 24-hour format.

Record all times in local (vessel) time according to the time they use on the CV. Make a note of the time zone the vessel is operating in on the T2 form (i.e. GMT + X hours).

- **Position:** Latitude and Longitude will be filled out in the following format

DD°MM' N/S / DD°MM.' W/E (Degrees, Minutes)

- **Weight:** Is recorded in metric tonnes in the database but reported as kg in the final report.

- **Measurements:** If taken will be reported in centimetres.

- **Speed:** Will be reported in knots (nautical miles / hour).

- **Deployment Method:** There are three recognised methods for an observer to embark (board) or disembark a vessel (carrier or transfer), thus beginning or ending a deployment on a vessel:
  - Portside, directly on to/off of the CV.
  - Within port, by way of a launch, on to/off of the CV.
  - At sea, off of/on to a transfer vessel on to/off of a CV.

- **Species Names:** When writing out species names (for the final report), common names will all be written in lower case and the scientific name should follow when mentioned for the first time e.g. bigeye tuna (*Thunnus obesus*). After that the common name should be used.

- **Product types:** Observers should refer to the product types document included in Appendix C: IOTC and ICCAT Species guides for guidance on identifying species product types.

Product Code	Product Type	Description
GG	Gilled & Gutted	Transhipped with gills, guts, fins and tail removed.
RD	Rounded Weight	Transhipped frozen whole and intact.
FL	Fillet	Sections of meat frozen into fillets.
DR	Dressed Weight	Gilled and gutted, head and fins removed.
BM	Belly Meat	Sections of belly meats transhipped in tied bundles.
SF	Shark Fins	Bundles / blocks of frozen shark fins, not accompanied with shark bodies.

- **Species Group Codes:** Observers should identify transhipped fish down to the species level. However, they may need to classify unidentifiable species under a more general code; below are the codes used for grouping commonly transhipped species:
    - **SKH** (various sharks; Selachimorpha/Pleurotremata): unclassified shark species. Shark fins will be listed under this code, the product should be recorded as fins.
    - **BIL** (marlin, sailfish, spearfish; Istiophoridae): unidentified billfish species (i.e. blue marlin; BUM; *Makaira nigricans*) will be recorded under this code. Swordfish (SWO; *Xiphius gladius*) will be readily identifiable and shouldn't be recorded under BIL. **.**
    - **MIX** (Mixed tunas): where BET and YFT are transferred together and it is not possible to record separately, they should be counted together and then proportioned by species in accordance with the TD, **MIX** should not be used.
    - **TUN** (tunas; Thunnini): unidentified tuna or tuna products should be record as TUN. Tuna roe and stomachs will be listed under this code, though notes should accompany these tuna products.
    - **OTF** (other fish unclassified): unidentified fish transhipped (or a group of unidentified fish products) will be recorded as OTF. For instance, when a brailer/cargo net is being used to tranship miscellaneous fish products and cannot be identified.

- **Templates:** A complete electronic pack of template forms, reports, and databases will be provided to the observer with the electronic version of the observer manual. It is recommended that a backup is made of this file as soon as they are

received at briefing and additionally kept on the USB provided. A copy of this pack should be used for working on and editing. This should be renamed DeploymentRequestNo_VesselName_ObserverName. E.g. 561_Yong Man Shun_ Joe Bloggs.

- **Photographs:** All photographs and naming conventions for photographs are outlined in the guidance document under Appendix K: Tagging photos using Picasa.

- **Emails:** All emails should be sent to rop_reports@mrag.co.uk

- **Database:** A database instruction guide is provided in Appendix M. This covers data entry and how to fulfil reporting requirements using the database. Please pay particular note to this as database use is not covered in this manual.

5 Pre-Sea Forms and Report

The pre-sea forms can all be found in Appendix B and are summarised below:

- Form T1 - observer/vessel details
- Form T2 - deployment form
- Form T3 – Pre-Sea Safety Check checklist
- R1 Report – observer deployment report

5.1 Form T1 - Observer/Vessel Details:

Form T1 gives the basic information about the observer's deployment and their assigned CV, it will only be completed once in hard copy.

5.2 Form T2 - Deployment Form:

If the observer uses a transfer vessel (other than pilot vessels in port) for the beginning of the deployment (Outgoing) or for the end of deployment (Return) from the CV, complete the T2. Please note section 3.1 (At sea Transfers) – for direction on the protocol on transfers at sea.

From the working/editing copy of the deployment pack provided. Complete the form T2 (found in Logbooks T1 to T5 folder) as a Word document; renaming the file in the following format:

ICCAT_RequestNo_VesselName_T2 / IOTC_RequestNo_VesselName_T2.

5.3 Form T3 – Pre-Sea Safety Check Checklist:

The form T3 , will be completed for all carrier and transfer vessels boarded by the observer during a deployment. This should be sent with the R1 within 24 hours of boarding as outlined in Section 3: Pre-Sea Observer Duties.

Depending on the circumstances of embarkation on to a vessel, arranging a proper Pre-Sea Safety Check may require foresight and planning on the part of the observer (especially in cases of at sea transfers). At the point of embarkation, the captain and officers will be busy preparing the vessel for its voyage into open ocean. It is recommended that the observers remind the captain/officers/agent (if present) that they need to do the PSSC prior to sailing and that the observer should remain patient until an officer becomes available. Vessels may move between anchorages within the port limits, it is fine to remain on board the vessel without PSSC until such a time that the vessel intends to leave port.

In completing the form, the observer will need to personally check a number of features around the vessel, particularly relating to safety and communications. This Inspection will be performed by the observer in the presence of at least one vessel officer and, when possible, a local vessel agent.

The following items are considered to be **Minimum Compulsory Requirements** for passing the PSSC (as defined in the MoU):

- **Safety Certificate (Safety Management Certificate)**
  - The vessel must have onboard a current valid safety certificate that does not expire for a period of at least four months from the date of embarkation of the observer. This (or similar documentation) must display the total compliment that the vessel is certified to carry.
  - The observer must take a photograph or receive an electronic copy of this.
- **Life Rafts / Life Boats**
  - The capacity of the life rafts and boats on both the Port and Starboard sides of the vessel must have the capacity to accommodate the full crew complement; including the observer. (The total life raft / boat capacity must be 200% of the vessels compliment).
  - Life rafts / boats must be within their serviceable dates, which must cover the expected maximum duration of observer deployment. Under SOLAS regulations all life rafts shall be serviced at 12-month intervals unless this is impractical in which case this can be extended to 17 months by the relevant Administration.
  - All Life Rafts must be fitted with a hydrostatic release mechanism.
  - The observer must photograph the life rafts / boats service certificates and plates.
- **Life Jackets**
  - There must be a total number of life jackets onboard, stowed at a readily location, to accommodate all persons onboard.
  - All Life Jackets must comply with IMO – SOLAS standards
  - The observer must photograph the life jackets and model information. Not all lifejackets need to be photographed, just a sample.

- **Immersion Suits**
  - There must be a total number of Immersion Suits onboard, stowed at a readily location, to accommodate all persons onboard.
  - All Immersion Suits must comply with IMO – SOLAS standards
  - The observer must photograph the Immersion Suits and model information. Not all Immersion Suits need to be photographed, just a sample.

Including the minimum compulsory requirements (listed above), ensure that each field of the T3 is completed. Instruction on what is required in section is given on the form. Some notes are included below

- Vessel details:
  - Size GRT: record in metric tons; found in vessel documentation
  - Length over all (LOA): report in meters; found in vessel documentation

    - Number of crew: including passengers; excluding the observer
    - Vessel contact details: satellite codes in phone numbers and vessel email address
    - Vessel agents: If available, include country codes in phone numbers; include email address when it is available
- Safety Equipment
    - Flares – provide a number if in date
    - First aid and medical officer – direct where and who this is
    - Fire extinguishers – you are checking they haven't been used and not replaced. Broken seals or lower pressure on the gauges indicate use.
- Accommodation (Observer):
    - Single cabin or sharing, and comments
    - This is a basic check to see if accommodations are acceptable. Further details regarding accommodations will be recorded in the vessel's internal report.

If any of the minimum compulsory requirements do not comply with the Pre-Sea Safety Check and/**or the observer believes their safety would be compromised** by deploying on the vessel, the observer will inform the Consortium immediately - first email the coordinator the T3, R1 and follow up with a call.

The T3 should be completed in hard copy format, from the working/editing copy of the deployment pack provided. Complete the form T3 (found in Logbooks T1 to T5 folder) as a Word document; renaming the file in the following format:

ICCAT_RequestNo_VesselName_T3 / IOTC_RequestNo_VesselName_T3.

This should be emailed with the R1.

5.4 R1 Report – Observer Deployment Report:

The R1 Report summarizes certain essential details collected in the T1, T2, and T3 forms. This report must be completed and submitted to rop_reports@mrag.co.uk within 24 hours of boarding the CV. It must also be completed for boarding transfer vessels, another CV or crossing into another RFMO and the commencement of a new deployment. Ensure that all fields are complete as directed on the form.

To note:

- Deployment details:
    - Departure date and time - The date and time that the Observer began their travels from briefing (or home if briefed and the observer returned home).
    - Deployment method - method of embarkation (portside, launch, transfer vessel or cross over from a different RFMO)

    - Area of Entry: provide the coordinates that the vessel crossed over and into which RFMO.
- Inspection Status:
    - Safety Inspection (Y/N)
    - Deployment Refusal (Y/N): Did captain refuse to accept observer on board or did observer refuse to deploy upon an assigned vessel?
    - Problems (Y/N): What were the issues with the T3 – use comments box for detail.
    - Form T3 Attached (Y/N): The Form T3 will accompany the R1 Report in the Pre-Sea reporting.

The R1 should be completed in hard copy format, from the working/editing copy of the deployment pack provided. Complete the form R1 (observer reporting forms) as a Word document; renaming the file in the following format:

ICCAT_RequestNo_VesselName_R1 / IOTC_RequestNo_VesselName_R1.

This should be emailed with the T3.

6 Mid-Deployment Forms and Reports

The mid-deployment forms and reports can be found in Appendix B and need to be completed periodically throughout an observer's deployment; they are outlined below.

6.1 Form T4 – Transhipment Details Form:

A T4 form must be completed for each transhipment. Only transhipments of fish on the high seas are to be recorded in this way. Non ICCAT / IOTC / CCSBT transhipments (cargo / bait and fuel transhipments (bunkering) at sea and in-port transhipments) should be summarised only in the final report. Data collected includes details of date, time, position and vessel identification. However, if the observer is onboard during an in-port transhipment, a copy of the TD can be requested from the captain to give a summary of what has been transhipped. The captain is not obliged to provide this and the observer should not monitor the transhipment itself.

The observer is required to identify the FV transhipping with the CV and the position of the transhipment. The total time of the transhipment will be recorded here along with the total amount of interruption time. Interruption time is classified as a break in the entire transhipment operation and should only be recorded for breaks of over 30 minutes. Note, a short break in the transhipment, for example while switching holds, does not constitute an interruption. Include in the comments when interruptions happened and for how long.
Breaks in observation: record any breaks or unobserved portion of the transhipment for T4(ii & iv). If a break is over 30 minutes, than a new T4(iv) will be used. As such an observer with multiple breaks over 30 minutes during a transhipment, will have multiple T4(iv) forms. Reasons for breaks should be recorded in the comments section of the T4 form.

The next part of the form (T4 (ii)) contains the totals of observer estimates by species, stock (ICCAT only) product code, numbers and weights. This should be completed at the end of the transhipment when the observer has time to tally their counts. Weights should be entered using the following formula:

$$\frac{\text{Declared Species (by product) Total Weight}}{\text{Declared Number of Individuals Transhipped}} = \text{Average Weight of individual} \times \text{Observed Counts} = \text{Observed Weight}$$

When a Declared Number of Individuals is not provided, it is recommended that observers use the below average weights for each species / product transhipped. All average weights are given in Kg.

Species	Product Code	Average Weight	Minimum Weight	Maximum Weight
Albacore	GG/RD/HO	12.5	6	30
Bigeye Tuna	GG/DR/HO	40	20	60
Dorado	DR/RD/HO	7.5	6	9
Escolar / Oilfish	RD/HO	8	7	9
Marlins				
White Marlin	DR/GG/HO	60	40	150
Blue Marlin	DR/GG/HO	80	60	150
Black Marlin	DR/GG/HO	80	60	150
Striped Marlin	DR/GG/HO	50	40	100
Sailfish	DR/GG/HO	40	20	80
Swordfish	DR/FL/HO	45	30	100
Narrow barred Spanish Mackerel		11	8	13
Sharks				
Blue Shark	RD/DR	35	30	45
Mako Shark	FL/HO/DR	45	30	65
Shortfin Mako	FL/DR/HO	40	30	55
Southern Bluefin	GG/DR/HO	45	20	100
Yellowfin Tuna	GG/DR/HO	30	25	50

In T4 (iii) there are three tables tallying the transhipped products. Data will be taken from the transhipment declaration, prior notification given by the FV, and separate recordings carried out by the CV. In the majority of transhipments, data will be taken from the transhipment declaration, in this case the observer should only complete the first table (Summary as per Declaration Form).

The final part of the form, T4 (iv), is used to record the tuna products transferred between vessels. The tunas are normally transferred using a crane on the CV, typically in strings of fish although a cargo nets, sacks and boxes are also occasionally used for non-tuna species or products such as shark fins or roe. The observer will need to estimate the numbers of fish and species composition of each load or string. The observer will refer to the species identification guides provided with the manual (Appendix C: IOTC and ICCAT Species guides) so that they become practiced at discerning between species. Guidance on how to complete the T4 and T5 is given in the boarding procedure below.

6.2 Form T5 – Boarding Report:

This form is to be completed with the T4 for every transhipment. It is used as a checklist of items to observe if the FV is compliant with RFMO regulations. Ensure this form is completed in full and signed by the fishing vessel captain, and signed and stamped by the

observer. Instruction on how to complete the T5 are provided under the boardings section below.

6.3 Report R2 – Observer 5-Day Report:

The R2 Report (refer Appendix B: Observer reporting forms) is a summary of the ROP transhipments that occurred during the 5-day reporting period. If a transhipment is in progress at the end of a reporting period then it will be included in the next R2. Observers will compile and send their R2 reports on the day after each period using the schedule below:

- Period A – 1st to 5th
- Period B – 6th to 10th
- Period C – 11th to 15th
- Period D – 16th to 20th
- Period E – 21st to 25th
- Period F – 26th to the end of the month

To complete an R2 Report:

1. Rename the report under the following format: ROP_Vessel_Observer_Month (numerical)_Period For example: ICCAT / IOTC_Tuna_Queen_SYoung_07_A
2. Enter the fields as outlined below.
3. Save the file when complete or as required – both to the computer and to a flash drive, to ensure no loss of data.
4. Send the report to the following email address: rop_reports@mrag.co.uk. It is important to send the R2s on time. If the e-mail is not working, fax a copy to +44 (0)20 7499 5388.

The following outlines the information to be entered into the R2:

- Permissible CV Complement – this is the total allowable number of persons the vessel is certified to carry. This should be consistent with the information recorded during the PSSC.
- Current CV Complement – this is a reflection of the number of persons onboard the vessel at the time of submission. Any changes to crew numbers should be reflected in the comments.
- Days Steaming – days during the five-day period underway/steaming.
- Days on Standby – days during the five-day period waiting for fishing vessels.
- Days Transhipping - If a transhipment occurs on a given day, then this will not be counted as Steaming / Standby days and instead as a transhipment day.
    - Record days in full.

- Transhipment Details
    - Transhipment Number: assigned by observer, will be chronological throughout trip.
    - Record the FVs RFMO number copied from the database record.
    - Record the FVs name copied from the database record.

- Record if any southern bluefin tuna are being transhipped and whether it was accompanied by a Catch Monitoring Form (CMF).
- Date – of Transhipment, dd/mm/yyyy
- Position – Record the start position in degrees, minutes and hundredths of minutes. Be sure to include whether it north or south.

- Embarkation Date – date observer boarded CV.
- Embarkation Port – City or location observer boarded the vessel.
- Disembarkation Date – date observer disembarks CV.
- Embarkation Port – City or location observer disembarks the vessel
- Return Date – Date observer returns to disembarkation port
- Complete any comments.
    - This is an opportunity for the observer to report any non-compliances.
    - Complete the same information for reverse transhipments in the comments.
    - Comment on any changes to vessels schedules. This should be included in the body of the email sent to rop_reports@mrag.co.uk.
    - Comment on any changes to crew complement.

6.4 Photos and videos

Observers need to name and organise all photos in accordance naming convention. In addition, all photos will need to be appropriately tagged using Picasa photo software. The protocol to tag pictures using Picasa is outlined below. Detailed guidance is available in Appendix K: Tagging photos using Picasa.

- All pictures are tagged with the deployment request number and MRAG's internal project code ZI0902 (ICCAT) / ZG2013 (IOTC);
- All pictures for each transhipment are tagged with the transhipment number and the vessel name. For non ROP transhipments tag them "Non-ROP1" and continue as such.
- Individual photos need to be tagged with a meaningful name. For required photographs the format to use is: Port / Starboard / Stern / VMS / Logbook / ATF / ATT / other (as appropriate). It is possible to have more than one picture with the same tag e.g. observers will have multiple pictures of the fishing logbook. In this case use a sequential number to differentiate.

Do not save poor quality pictures, accidental pictures, multiple pictures of the same subject or pictures of nice sunsets. Select the most representative pictures to meet the minimum requirements for each transhipment.

7 Transhipment operations

Observers will complete the following procedure for each transhipment. The transhipments will be numbered in chronological order (don't include non-ROP transhipments (in-port / inside of EEZ, baits and supplies)). If the observer takes a break of over 30 minutes (e.g. for food or sleep on exceptionally long transhipments) then a start a separate T4 IV and treat it as a new observation period.

1. Keep updated on the status of upcoming transhipments. Communicate with the captain and officers to determine when these will be. Not all vessels provide this information readily so remain prepared and well organised for a short notice transhipment operation taking place.

2. Prior to the transhipment (if given notice), check the vessel information from the observers database (this can be done retrospectively after completion of the transhipment if needed). Prefill the available information on vessel name, callsign, RFMO number, etc. from the database. Record the transhipment number (top right of the page), this will be chronological from the previous one. ***Remember that only-ROP transhipments are to be observed. Non ROP transhipments are recorded as an Annex in the T4.***

3. While the FV is approaching and tying up verify the vessel name, IRCS and registration number (if marked on vessel). Take photographs of all markings and any other identifying features such as damage. Unless there is anything unusual restrict these to four photographs:
    i. Whole vessel
    ii. Bow
    iii. Stern
    iv. VMS antennae

4. Record latitude and longitude position at start and end of the transhipment in the T4.
    a. For transhipments that occur near the equator make sure you record carefully whether it is north or south, while for transhipments in the Atlantic Ocean, make sure you record carefully whether it is East or West.
    b. For transhipments that occur near EEZ boundaries make sure that the correct position is recorded on all data forms as transhipments within EEZs are a serious compliance issue.
    c. Transhipment locations should be verified through a photograph of the GPS unit. This should include the minimum following information:
        i. Deployment Number
        ii. Transhipment Number
        iii. Fishing Vessel Name
        iv. Transhipment Start Date and Time (when they tie alongside)
        v. Transhipment End Date and Time (when they separate – completed at the end)

5. Board the fishing vessel (see FV Boardings on how this is to be done) if it is safe to do so and complete the front page of T5 boarding report (See FV Boardings for instruction on how to do this). A number of photographs will need to be taken:
    a. ATF
    b. ATF + Language guide (in the language of the FV)
    c. ATT (ICCAT only)
    d. VMS unit
    e. Logbook Front Cover
    f. Logbook latest entry + last four pages.

6. Ask the captain of FV estimates of fish to be transhipped for T4 (iii). To be filled after the transhipment has finished.

7. Complete the back page of the T5, remark on any non-compliances and ask the captain to complete and sign section 6 and 7 of the back page.

8. Transfer back to your CV to begin observing the transhipment of fish. The observer will record this using the T4 IV.
    a. The vessel will sometimes tranship cargo while you are conducting the boarding. This is okay. They will sometimes try to tranship fish before you have returned to the CV. If this is the case be insistent that they wait for you to get back before beginning the transhipment. The boarding should be completed in under 15 minutes.

9. Record the estimated number of fish by species and code, and, if a hook scale is used, weight of each string on T4(ii).
    a. Roe and stomachs maybe transhipped in sacks.

b. Shark fins maybe transhipped in rectangular bundles or sacks.

10. For partial fish products such as tuna roe, stomachs, belly meats or shark fins – use the general species group codes (i.e. TUN, SKH) given in General Data Form and Reporting Instructions. Summarise these types of products and record the estimated weights. If it is unclear what is in a particular sack get the winch operator to lower the net on to the deck so that the observer can check the contents.

11. On completion of the transhipment record end time and position in the T4 (i). Take another picture of the GPS with completed date and time using the same note outlined above. Verify final transfer records from the FV and the CV for summary in the T4 (ii).

12. In **all** cases of ROP transhipments the observer will sign and stamp the transhipment declaration. This will be prepared by the master of the CV to confirm that the transhipment was conducted and an observer was onboard.
    a. Signing this does not mean that observer agrees or disagrees with the information in the declarations - it simply confirms that the transhipment has taken place while the observer was onboard. The observer can advise the captain of any errors in the TD. However, any discrepancies in the final version will be included in the final report. Any serious discrepancies may also be reported in the R2 or via InReach (if sensitive).
    b. The observer may be asked to sign this before completion of the transhipment. This is again fine as the observer only indicates they were present.
    c. The observer must receive a copy of the TD post transhipment. Either as an electronic scan or physical copy. The observer should photograph the TD after they have signed it.
    d. The observer should not sign a blank TD.

13. Reverse transhipments – record the details of any reverse transhipments in the same above format. Vessel boardings are required if transhipping between carrier vessel and fishing vessel. Not between carrier vessel and carrier vessel. Do not enter these into the database. Reverse transhipments will be entered at debriefing. Make comment in the observers notes and final report to be discussed at debriefing. Include why the reverse transhipment took place. Reverse transhipments should be reported in the comments of the R2.

14. Post transhipment operations each day. The observer should:
    a. Sum the total number of fish and weight for each species and product type at the bottom of the T4 (ii). Calculate an average weight (refer Weight Estimations: below). Summarise species, product code, number of fish and estimated weight in T4 (iii).

b. Calculate the observer coverage for the transhipment.
c. Complete any comments or notes regarding product transhipped, FV, etc.
d. Note MARPOL and SOLAS violations, include comments in the database and final report (with photographs if possible and safe to do so)
e. Record the transhipment number, FV name and RFMO number, date, position on the R2 for the current period (refer Report R2 – Observer 5-Day Report).
f. Complete electronic copies of the T4 and T5 should be saved in the following format: ICCAT_RequestNo_VesselName_T4 / IOTC_RequestNo_VesselName_T4.
g. Data should be entered from the T4 and T5 into the database. Follow the database guidance document for how to do this (Appendix M: Database Guidance and Data Entry).

8 FV Boardings

The following items are required to be inspected before and / or during a boarding of the FV, prior to the transhipment occurring, by the observer under ICCAT Recommendation 16-05 Annex 2 (6) and IOTC Resolution 18/06 Annex III (5) a) (refer Appendix D: ICCAT and IOTC Relevant Recommendation / Resolutions):

Before the vessel boarding

I. Verify the vessel markings against the ICCAT Active Vessels List (AVL) / IOTC Record of Authorised Vessels (RAV).

During the boarding

II. check the validity of the fishing vessel's authorisation to fish (ATF) tuna and tuna-like species and other species / sharks in the ICCAT Convention Area / IOTC area of competence;
III. Inspect the fishing vessel's prior authorizations to tranship as sea from the flag CPC and if appropriate , the coastal state (ICCAT only);
IV. check that the VMS is functioning and is tamper proof;
V. examine the logbook, note the format, and verify entries / record the date of last entry;
VI. check and note the total quantity of catch on board, and the quantity to be transferred to the carrier vessel; and
VII. verify whether any of the catch on board resulted from transfers from other vessels, and check documentation on such transfers.

These boardings should only be carried out on those vessels transhipping tuna and tuna like species (i.e. not bait or supply only transfers). Observers do not have any authority to demand access to other documents or access to the hold of the FV. During the boarding the observer should fill in a boarding report (T5) a detailed explanation on how this is done is given below.

8.1 Boarding Vessels

Observers should only transfer to the FV when they consider that weather and sea conditions are safe enough, although the final decision on whether it is safe to perform a transfer rests with the Master of the CV. All transfers occur using the CV crane, normally on a crate surrounded by a cargo net.

The health and safety of the observer is paramount in this situation and if conditions are considered to be too dangerous, the observer should not cross over to the LSTLV. Safety gear (lifejacket, helmet and boots) is to be worn during the transfer, with the EPIRB and InReach Units stored in the observers bag.

In cases when it is not possible to transfer safely to the FV, the ATF, ATT and fishing logbook should be transferred to the CV via a handheld net for inspection, for verification.

During boardings, the observer should have available the T5 report and reference pack. In this will be a copy of the T5 in the Captain's language to ensure that the observer's requests are understood. In all cases, this language aid should be photographed alongside the vessels ATF. If you are unsure what nationality the Master of the FV is, liaise with the Captain of the CV before transferring.

8.1.1 Verifying Vessel Markings.

There is no clear protocol on how a vessel shall be marked, although the FAO Standard Specification for the Marking and Identification of Fishing Vessels is used as a guideline (refer Appendix F: Guidelines for Vessel and Gear Markings). However, at all times a vessel a vessel must be easily identifiable, without conflicting or misleading information. As such vessel markings should be clear and visible and consistent with information in the ICCAT AVL / IOTC RoV, and the vessel's ATF.

Box 1 ICCAT Recommendation 13-13 Requirements for vessel markings.

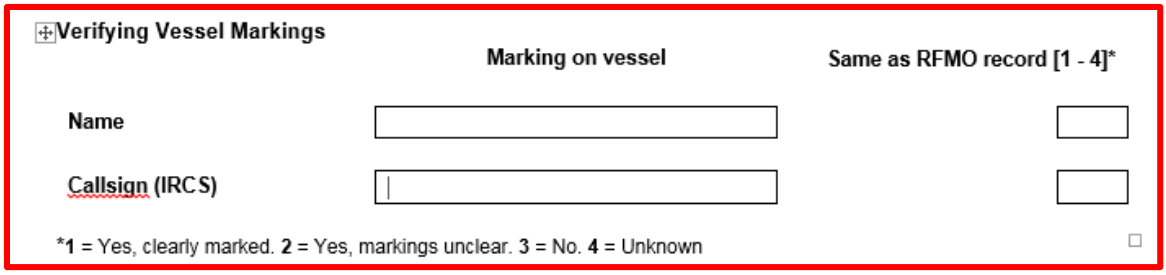
While there is no specific requirement for vessel markings within ICCAT, Paragraph 2 states 'Each CPC shall submit to the ICCAT Executive Secretary, the list of its LSFVs that are authorized to operate in the Convention area…..This list shall include the following information:

- Name of vessel, register number
- International radio callsign'

Box 2 IOTC Resolution 15/04 Requirements for vessel markings.

- Paragraph 14 'Each Contracting Party and Cooperating Non-Contracting Party with the IOTC shall ensure that its fishing vessels authorised to fish in the IOTC area of competence are marked in such a way that they can be really identified with generally accepted standards such as the FAO Standard Specification for the Marking and Identification of Fishing vessels.'

As such, in addition to examining compliance with ICCAT / IOTC CMMs during the boarding, the observer is also required to verify the vessel name and IRCS against those recorded in the relevant vessel register. Prior to boarding the vessel, the observer should note the vessel name and IRCS and confirm if it is the same as the RFMO vessel register. Note that there is no requirement to display the national registration number. However, if shown this must be consistent with both the information held in the ATF and the vessel register.



Enter 1, 2, 3, or 4 into the box next to the name and callsign. These are the same codes used for entering the information in the database.

1 the vessel markings are correct and clear to read.

2 the vessel markings are correct but not clear to read. This can mean they have been worn, partially worn, covered in dirt, rust algae and cannot be read.

3 the vessel markings are inconsistent with the vessel list.

4 the vessel markings are not present / not able to be verified.

8.1.2 Authorisation to fish and transhipment

Under ICCAT 13-13 and IOTC Resolution 15/04 vessels are required to carry a valid authorisation to fish (ATF) on board at all times. In the case of ICCAT, vessels are also required to carry an authorization to transhipment (ATT).

Box 3 ICCAT Recommendation 13-13 references related to ATFs.

Paragraph 5 c) The flag CPCs of the vessels shall:
…keep on board valid certificates of vessel registration and valid authorisation to fish and / or transhipment;

Box 4 ICCAT Recommendation 12-06 references related to ATTs.

Paragraph 14 Transhipments by LSPLVs in waters under the jurisdiction of a CPC are subject to prior authorization from that CPC. An original or copy of the documentation of coastal State prior authorization must be retained on the vessel and made available to the ICCAT observer when requested.

Box 5 IOTC Resolution 15/04 references related to ATFs.

- Paragraph 7 c) …keep on board valid certificates of vessel registration and valid authorisation to fish and / or transhipment;
- Paragraph 13 a) i) [carry on board] '…licence, permit or authorisation to fish…'
- Paragraph 13 b) 'verify above documents on a regular basis and at least every year.'
- Paragraph 13 c) '…modification…certified by the competent authority…'

The observer should confirm:

- the ATF is on board;
- that this matches the ATF flag state template (Refer Appendix G: Flag state ATFs) for examples of different authorisations to fish);
- the ATF is valid and within date; and extends to the ocean the vessel is operating in.

- ***In the case of ICCAT only,*** check that the ATT is onboard; and,
- that the national registration number (NRN) is the same as that listed in the database.

1. Authorisation to Fish

1a. Observer shown an ATF [Y/N/F**]: ☐ **1b.** ATF match Flag State template [Y/N] ☐

1c. Date of expiry: ___ / ___ / _____ **1d.** Area of operations: ☐

1e. NRN same as RFMO record [Y/N]: ☐ **1f. (ICCAT only)** ATT on board [Y/N/F**]: ☐

**Faxed or emailed to CV after transhipment completed

8.1.3 VMS

Vessels fishing for tuna and tuna like species in the ICCAT Convention and within the IOTC area of competence are required to have a VMS onboard.

Box 6 ICCAT Recommendation 14-09 references related to VMS.

Paragraph 1 '….shall implement a vessel monitoring system (VMS) for its commercial fishing vessels exceeding 24m length overall….'

Box 7 IOTC Resolution 15/03 references related to VMS.

Paragraph 1 '….shall adopt a satellite-based vessel monitoring system (VMS) for all vessels….'

Under the ROP, observer tasks under include checking that a VMS is functioning. However, in practice it is not possible for observers to check this. Instead observers need to check:

- for the presence of a VMS;
- if a power light is on (irrespective of colour); and
- verify the make and model of the VMS using the codes in Appendix D.

Please note that some models, such as the Thrane & Thrane TT3022D, do not come with an indoor unit as the unit is built into the antennae on the roof. As such it may be difficult to verify. Additionally, with the number of new units entering the market, any unidentified VMS units need photographs showing, make, design and model details. Refer to Appendix H: VMS units and codes for examples of different VMS units and relevant codes. Not all VMS units in the guidance document will be used with the photographed VMS antennae, be aware that some vessels will use different combinations.

2. VMS

2a. VMS shown to observer [Y/N]: ☐ **2b.** VMS power light on [Y/N/U]: ☐

2c. VMS make and model: ☐ (For codes see guide)

When taking photographs of VMS units ensure that the display lights on the VMS units are visible. If no display light is shown, the photo does not prove that the VMS was on.

8.1.4 Logbook

Fishing vessel logbooks are required to be either electronic or bound and are also required to contain all data filed as outlined in ICCAT Recommendation 03-13 and IOTC Resolution 15/01.

Box 8 ICCAT Recommendation 03-13 references related to logbook.

'All commercial fishing vessels over 24 m length overall shall keep a bound or electronic logbook recording the information required in the ICCAT Field Manual for Statistics and Sampling.'

Box 9 IOTC Resolution 15/01 references related to logbook.

Paragraph 3 'All vessels shall keep a bound paper or electronic logbook to record data that includes…. the information and data in the logbook set forth in **Annex I, II** and **III**.' Paragraph 4. 'Each flag CPC shall submit to the IOTC Executive Secretary…a template of its official logbooks…'

The observer should:

- verify the presence or absence of a fishing logbook;
- determine the type (paper / computer / none);
- ***In the case of IOTC deployments***, determine whether it matches the flag state template (refer Appendix I: Logbook templates);
- whether it is bound;
- whether it is consecutively numbered; and
- the date of last entry.

3. Logbook

3a. Shown to observer [Y/N]: ☐ **3b.** Type [Paper / Computer / None]: ☐

3c. (IOTC only) Matches Flag State template [Y/N/U]: ☐ **3d.** Bound [Y/N/U]: ☐

3e. Pages numbered consecutively [Y/N/U] ☐ **3f.** Date of last entry: ___ / ___ / _____

Observers should take a single clear photo of the most recent logbook page. In addition, observers are required to take five further pictures of the last entry into the logbook and the preceding four pages.

8.1.5 Catch on board

In addition to the above, the observer should also ascertain the total quantity of fish before and after transhipments and whether transhipments from other vessels had occurred. In the case of ICCAT, the observer should try and obtain specific information on the catch onboard by species and stock.

Box 10 ICCAT Recommendation 16-15 references related to verifying catch onboard before and after transhipment.

Annex 2, Paragraph 6 'The observer tasks shall be, in particular, to:'
c) 'Check and record the total quantity of catch on board by species and, if possible, by stock, and the quantities to be transhipped to the carrier vessel'; and
e) 'Verify whether any of the catch on board resulted from transfers from other vessels, and check the documentation on such transfers'.

Box 11 IOTC Resolution 14/06 references related to verifying catch onboard before and after transhipment.

Annex III, Paragraph 5 'The observer tasks shall be in particular to:'
a) ii 'check and note the total quantity of catch on board, and the quantity to be transferred to the carrier vessel'; and
a) iv 'verify whether any of the catch on board resulted from transfers from other vessels, and check documentation on such transfers'.

Note, as per above LSPLVs in ICCAT must now record species by stock if applicable as per Box 12 below and Appendix J: ICCAT stock boundaries.

Box 12 ICCAT species stocks and associated codes.

BFT – northern Bluefin tuna – *Thunnus thynnus*

- **BFT-E**: Eastern and Mediterranean management units
- **BFT-W**: Western stock

ALB – albacore – *Thunnus alalunga*

- **ALB-N**: Northern stock
- **ALB-S**: Southern stock
- **ALB-M**: Mediterranean stock

SWO – swordfish – *Xiphias gladius*

- **SWO-N:** Northern stock
- **SWO-S:** Southern stock

- **SWO-M:** Mediterranean stock

BET – bigeye tuna – *Thunnus obesus*

- All Atlantic

YFT – yellowfin tuna – *Thunnus albacares*

- All Atlantic

SKJ – skipjack tuna – *Katsuwonus pelamis*

- **SKJ-E**: Eastern stock
- **SKJ-W**: Western stock

SAI – Atlantic sailfish – *Istiophorus albicans*

- **SAI-E**: Eastern stock
- **SAI-W**: Western stock

SPF – Longbill spearfish – *Tetrapturus pfluegeri*

- **SPF-E**: Eastern stock
- **SPF-W**: Western stock

BUM – Atlantic blue marlin – *Makaira nigricans*

- **BUM-N**: Northern stock
- **BUM-S**: Southern stock

WHM – Atlantic white marlin – *Tetrapturus albidus*

- **WHM-N**: Northern stock
- **WHM-S**: Southern stock

All other ICCAT species (sharks, other billfishes, small tunas, others spp.) from 5 geographical areas.

- **AT-NE**
- **AT-NW**
- **AT-SE**
- **AT-SW**
- **MED**

The observer should obtain from the captain:

- the total catch onboard before transhipment;
- the total to be transhipped to the CV;
- the amount (if any) of tuna transhipped from other vessels; and
- the total after transhipment.

4. Catch on board

4a. Total before transhipment: ____ t **4b.** To be transhipped to CV: ____ t

4c. Transhipments from other vessels*** ____ t **4d.** Total after transhipment: ____ t

***If transhipments have come from other vessels, check authorization.

During inspections, if the observer is able to communicate adequately with the FV Master, the observer should also get the species breakdown of the catch remaining on board.

Remember, observers do not have any authority to demand access to other documents or access to the hold of the FV.

8.1.6 Completion of boarding

Upon completion of the boarding, the observer should comment on any observations of possible non-compliance with the CMMs.

5. Observer comments

5a No non-compliance was observed (Put an X through as appropriate)	Y	N	
Following potential non-compliance(s) was / were observed:			
5b Vessel Markings (Put an X through as appropriate) Comment:	Y	N	
5c Authorization to Fish / Transhipment* (Put an X through as appropriate) Comment:	Y	N	
5d VMS (Put an X through as appropriate) Comment:	Y	N	
5e Fishing logbook (Put an X through as appropriate) Comment:	Y	N	
5f Catch on board includes undocumented transhipments (Put an X through as appropriate) Comment:	Y	N	
5g Other (Put an X through as appropriate) Comment:	Y	N	

***ICCAT only**

Finally, the observer should provide the LSTLV Captain with an opportunity to make any comments on the boarding report findings in their own language. The observer should then sign and stamp the form and ensure that the Captain countersigns. If it is practicable, make a copy of the completed boarding report form and pass this back to the LSTLV.

6. Comments from the LSPLV / LSTLV Captain

Dear Captain,
If you have any comments on this inspection or the recordings of this report, please feel free to express your opinion here in your first language (e.g. Japanese).

7. LSPLV / LSTLV Captain*

Print name:		Signed:		Date, time	__ / __ / ____, __ : __

8. Observer

Print name:		Signed:		Date, time	__ / __ / ____, __ : __

*The signature of the boarding report by the Captain of the LSPLV / LSTLV does not mean that the Captain accepts the content of the report but acknowledges that the boarding report was shown to the Captain.

8.1.7 Boarding photos

Photographs are to be taken of all of the articles listed above for verification. Photographs required before and during boardings are;

- The FV, its bow, stern and stack insignia (if present);
- Authorisation/licence to fish;
- VMS unit (and if required the outside aerial unit);
- A minimum of five most recent pages of the fishing logbook;
- Any other relevant documentation, for example prior transhipment declarations relevant to catch on board; and
- Any interesting features (such as shark fins or former names painted over but still visible, or other identifying characteristic.

Observers are required to record the number of photographs taken during a boarding. In order to easily sort and track pictures taken by observers, all relevant pictures taken on the cruise must be tagged using Picasa (refer Appendix K: Tagging photos using Picasa).

9 Mid-Deployment Observer Duties

9.1 Priority Mid-Deployment Duties:

The main purpose for deploying observers aboard transhipment (carrier) vessels is to track at sea transhipment operations between FVs and CVs as outlined in ICCAT Recommendation 16/15 and IOTC Resolution 16-06 (refer Appendix D: ICCAT and IOTC Relevant Recommendation / Resolutions). The list of essential duties for observers on board CVs operating in the assigned ROP Convention Area(s):

1) Record and verify identification information and other identifying characteristics of all transhipping FVs.
2) Record and verify the times and positions of all transhipments.
3) Sign transhipment declaration documentation on observed transhipments.
4) Record and verify the species and product types transhipped, estimating numbers and estimating and/or verifying weights.
5) Issue periodic reports upon all transhipments.

Though observers should be equipped and able to complete all mid-deployment duties, they should know their priorities well and not jeopardize the completion of higher priority duties for the sake of completing less-essential duties.

Each day an observer is onboard the vessel there are three main duties that will be completed daily:

a) Take daily position with heading and speed (same time each day if possible)
b) Determine the ETA for next stop and/or next transhipment
c) Record in Daily Observer Log notes regarding the day's activities.

9.2 Observer Daily Log:

Regardless of whether or not transhipment operations occur, there are certain important tasks that observers will complete on a daily basis throughout their entire deployment. The observer daily log is a day-by-day record, maintained privately by each observer, in regards to all professional activities occurring among the course of the observer's deployment.

The following information will be recorded in the observer daily log:

- Position, course, and speed of CV, preferably taken at the same time each day (i.e. noon). position and date, can act as the header to each day's log.
- Estimated date of upcoming transhipments and other activities, including an ETA for the next port stop as the dates are made available or adjusted.
- Other (than fish transhipments) cargo transhipments (i.e. goods, fuel, crew).
- Potential violations, vessel problems, and interpersonal conflicts.
- Anything else of professional noteworthiness, such as:
    - Important correspondences with the contractor.

- Professional planning.
- Issues concerning job performance.
- Marine mammal, seabird, and other professional interest sightings.

The daily log will be considered a professional document. Always use detailed, appropriate, clear, and precise language when drafting entries. Observers do not need to maintain a hard copy of their observer daily log.

The observer daily log will be completed digitally as a Word document:

- Create log as a MS Word document.
- Enter header information, where xxx is the RFMO request number. The observer will enter their name and vessel name in format:
  ICCAT / IOTCxxx Observer Daily Log: observer name; M/V vessel name;
- Save the file entitled in the following format: ICCAT / IOTCxxx – Daily Log, with ICCAT / IOTCxxx as the relevant RFMO request number.
- Enter the file name in the footer of the document.
- Save this running file with each entry.

Below are some examples of a typical entry in a Daily Log:

MM/DD/YY

Position: xx.xx N/S, xxx.xx E/W; Speed: x.x knots; Course: xx°xx

Flew from London to Singapore via Doha today. Upon arriving, was greeted at the Changi by the vessel agent, Henry from Trimarine group (number (xxx) xxxxxxxx). As it was late was taken to hotel to join the vessel the next day. Arranged to meet the agent at 09:00 the next morning at reception.

MM/DD/YY

Position: xx.xx N/S, xxx.xx E/W; Speed: x.x knots; Course: xx°xx

Steaming to the next scheduled transhipment, ETA on MM/DD/YY

MM/DD/YY

Position: xx.xx N/S, xxx.xx E/W; Speed: x.x knots; Course: xx°xx

The vessel bunkered with the LSPLV Tuna Queen. No fish was transhipped. Photos were taken of the LSPLV bow, stern and overall. IRCS and vessel name match that given in the ICCAT database. Records of this non-ROP transhipment will be provided in the annex of the final report.

MM/DD/YY

Position: xx.xx N/S, xxx.xx E/W; Speed: x.x knots; Course: xx°xx

1. Transhipments with the LSTLV Neptun No. 2. The vessel was boarded and compliance with IOTC CMMs was assessed. There were no issues. No SBT was transhipped. The amount transhipped was XXT with the amount estimated by the observer to be XXT. Refer T4 IOTC378T4_3.

9.3 Pre-Transhipment Planning:

The number of transhipments may vary greatly on trips. Transhipments are typically segmented, for instance vessel may have a long steam to a certain area where a series of transhipments will occur. The vessel will steam for a couple of days to a new location and take more transhipments. The vessel may continue this pattern throughout the deployment before steaming on to the port of disembarkation.

Prior to transhipment operations, there are certain actions to help plan for transhipments and ensure successful completion of mid-deployment duties:

1. Observer will visit the wheelhouse at least once per day to obtain location information and to liaise with vessel officers in regards to any updates in transhipment plans.
2. Once a transhipment is scheduled**:**
    a. Record identification details the CV has on file for that vessel;
    b. Verify FV is registered in ICCAT / IOTC by consulting the relevant vessel list and e-mail the Consortium if vessel not present. The Consortium will relay any recent updates to vessel list to observer; and
    c. Check the boarding history of the FV in the observer database and make notes of any previous findings. Also make a note of previous VMS, ATF validity and logbook type recorded.
3. Keep a list (with schedule information) of all FVs the CV plans to tranship with, updating the list as plans change.
4. Fishing vessels may provide notification of species and weights to be transhipped. This can be useful when the observer is conducting observations of species to look out for. Most importantly, of when southern bluefin tuna is being transhipped.
5. Prepare all needed gear for deck work, ensuring that:
    a. have all deck-use paperwork ready, with all known FV information completed beforehand;
    b. have notes of previous boardings made and ready to reference if required;
    c. All batteries are charged for digital camera;
    d. Health and safety equipment ready and at hand; and,
    e. Dress appropriately for the conditions at hand- sunscreen, sunglasses, floppy hat, and lots of water, or rain gear as conditions warrant.

9.4 Transhipping Safety and wellbeing:

When on deck, be keen to anticipate potential hazards, such as:

- Unforeseen factors necessitating the sudden separation of vessels.
- Cables under tension.
- Cargo or rigging moving about overhead.
- Strings of product dangerously swinging about in rough weather conditions.

- The bites of mooring lines.
- Nylon loops (used to string fish together) which can be slippery if stepped upon.

Stay out of the crew's way as much as possible, while maintaining the ability to signal them easily when need be. Map the best observation point(s) to conduct observations avoiding the direct sunlight and high traffic zones. Often a good location is under the cover of the mast house near the cargo hold to be loaded.

9.5 General notes on transhipment practices:

There are no general rules for how products are transhipped and there are many variables to consider. It is good practice to liaise with the CV crew and/or the FV vessel Captain prior to transhipment to get an idea of which species and approximate number of metric tons (by species) of product they intend to tranship. Find out how (hold to hold, deck to hold, etc) and where (which hold) they intend to conduct the operations. It is quite common for different species to be separated between the CV's holds and this information can be gathered prior to the start of the transhipment.

There are two main ways that product are hoisted over:

- All strings moved with CV equipment: hoisted directly out of the FV cargo hold, swung over, and then lowered into the cargo hold of the CV
- Strings/cargo net loaded on the deck of the FV with their equipment. Then, with CV equipment, hoisted, swung over, and lowered into the cargo hold of the CV.

Products are generally transhipped in strings, though cargo nets may be used throughout or just for a portion of operations. For instance, a mix of small fish, is often found towards the end of operations, may be hoisted over in nets because stringing together small fish may be too time consuming. Certain species, such as oilfish will always be transhipped in a cargo net. Products may be predominately separated by species and species groups throughout an entire transhipment. Generally, there is some mixing among species/species groups and the severity of mixing can vary greatly from one transhipment to another and even within one transhipment.

The per string average may vary greatly, but a normal number of fish per string ranges from 10 to 30, with sometimes more than 50-60 fish in a string. Additionally, the use of nets may significantly inhibit counts and identification. Where nets are used it is best to try and identify and count the fish as it is being removed from the FV hold and arranged on the net.

9.6 Species Identification and Tallying Estimations:

Species identification of frozen fish (of various product types) will always be limited as compared to freshly caught, pre-dressed fish. The variable nature by which product is transhipped from one transhipment operation to another and even within a single transhipment operation (as discussed above) can have significant influence on observers' methodology and in the ultimate effectiveness of successfully identifying and tallying transhipped product. Prior experience working with pelagic (tuna and/or swordfish) longline fisheries and increased transhipment observer experience will greatly help the observer's species identification and tallying of product.

Note: While the observer may be able to request that a string is lowered from time to time to more accurate estimate of species compositions, it is important that the observer does not adversely affect the transhipment operations.

Observers should not expect their species identification and tallying functions to be as accurate as with more ideal circumstances:

- Use best judgment and utilize all the tools available;
- Identify, minimize and take into account limiting factors that influence identification and tallying.
- Follow training on how to quickly identify and tally species.
- Maintain detailed records of all influences upon the accuracy of collected data, as well as any adjustments made to the observation methodology in order to account for such influences.

Observers will tally product by species and species groups. Products should be identified down to the most precise grouping (coding) where possible, however, regularly they will need to classify fish products under more general groupings (codes). See the selection of commonly used species group codes in the General Data Form and Report Instructions above (for tuna, sharks, billfish, and other unclassified fish species) that may be helpful.

There are multiple tools available for completing species identification and tallying duties:

- **Digital Camera**: photo and video footage of strings can help verify species identification and tally estimations
    - Especially useful for large and/or highly mixed strings
    - Pictures and video can be reviewed multiple times in between strings.
    - For further verification, retain footage to review on a computer after transhipment operations are complete.
    - Observers can save footage of pictures of product they have trouble identifying, to be later reviewed during debriefing.
- **Thumb Counter**: counters can be very useful for tallying transhipped products. This should be used for the main species in a string or net. A thumb counter will allow the observer to focus on different products and species on a mixed string.
- **Deck Forms**: It is recommended that the observers has other blank T4 forms on a clipboard for tallying, taking notes, and for particularly lengthy transhipments.

It is important that the observer accurately notes the processing code. The five main processing codes that the observer will encounter are LW/RD (whole), DR (partially processed, including, but not limited to head off or partially removed, gilled and gutted, tails removed), FL (completely dressed fish, parted into fillets), SF (shark fins) and OT (Any other processing, including but not limited to tuna roe, highly processed fish such as dried fish, fish loins, meat, oil). In cases where the observer is unable to determine the product being transhipped, the code OT should be used.

The observer should also be aware that processing codes can vary both between RFMOs, and between flag states within RFMOs. A list of the codes and associated descriptions used in the ROP, as well as alternative codes and descriptions that the observer may encounter, are shown in Table 1.

Some species/species groups may be transhipped as multiple product types. Be sure to record all product types for each species/species group recorded (per string and for "Observer Fraction" on the T4(ii).

Table 1: ICCAT and IOTC product codes

ROP Product code	ROP Product type description	Other product codes used	Product type description
LW	Live weight	WHO (IOTC)	Fish frozen in whole state
		RWT (ICCAT)	The whole weight of an individual fish before it is processed.
		RND (IOTC)	Unprocessed
		RD (IOTC)	Rounded weight (fins may be off, though trunk not dressed/processed at all; whole)
DR	Dressed weight (gilled-and-gutted and/or headed and/or tailed and/or fins-off, etc.)	DWT (ICCAT).	Dressed weight (gilled, gutted, part or all of head off, fins off)
		GWT / (ICCAT)	Gilled and gutted (tails and fins off, head sometimes present)
		GGT (IOTC)	Gilled and gutted (tails and fins off, head sometimes present)
		HDD (IOTC)	Dressed carcasses with head and fins off, and caudal peduncles present.

ROP Product code	ROP Product type description	Other product codes used	Product type description
		PDD (IOTC)	Dressed carcasses with head and fins off, and caudal peduncles off.
GG	Gilled and gutted	GG (ICCAT)	Gilled and gutted
FL	Fillet (completely dressed fish, parted into fillets)	FIL (ICCAT)	
ST	Steak	ST	Tuna Steaks
SF	Shark fins (a partial product usually shipped in bundles)		
OT	Other (any other product, such as tuna roe, highly processed tuna products)		

Proportioning

The following tips are listed to assist observers with proportioning tasks associated with deriving weights from "declared" average weights:

1. For proportion only, it is acceptable to visually estimate relative average weights of the various species/species groups that fall under the assumed declaration.
2. For instance, observer tallies 10 opah (OPA) and 10 billfish (BIL) that are declared as "other" on Declaration. From estimations, the average weight of BIL is significantly larger than that of OPA. Use the given average weights for any species where an average weight cannot be calculated. In exception, if the observer feels the weight is significantly larger or smaller than that of the average transhipped then the observer can use the upper or lower limits given in section 6.1.
3. Certain products such as shark fins, tuna row, and tuna stomachs may come on board in bundles or sacks. Estimate the average weight of the bundles or sacks that these products are transhipped in. Then multiply the average weight by the number of bundles/sacks tallied to find their proportion among the "other" species.
4. Justify all proportioning with notes.

9.7 CCSBT Transhipment Program for transhipment of Southern Bluefin Tuna.

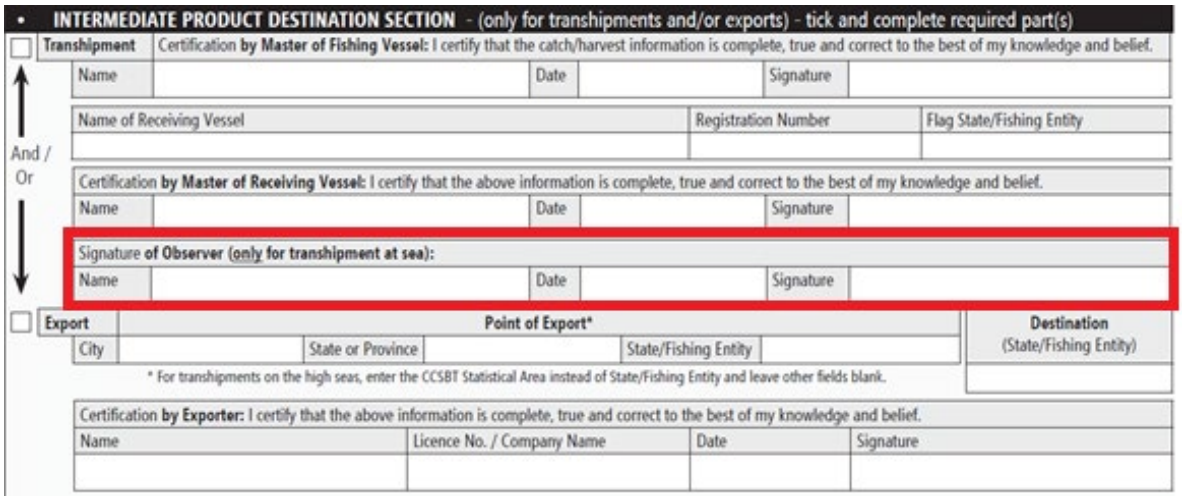
The CCSBT Catch Documentation Scheme (CDS), which started in January 1 2010, has had a minor impact on the work of transhipment observers for transhipments of SBT at sea.
As per the CCSBT Resolution of the Implementation of a CCSBT Catch Documentation Scheme (*revised at the Twenty-First Annual meeting: 16 October 2014*) (Appendix L: CCSBT Resolution on Catch Documentation Scheme), all transhipments, landings of domestic product, exports, imports and re-exports of SBT must be accompanied by the appropriate CCSBT CDS Document. The CDS Resolution also requires that each SBT that is transhipped, landed as domestic product, exported, imported or re-exported must have a uniquely numbered tag attached to it.

There are a number of different CDS forms which depend on the type of operation being carried out. In the case of a transhipment at sea, the form is a Catch Monitoring Form (CMF). This same form is also in the found within the CDS resolution. The Catch Monitoring Form is made up of a Catch / Harvest section, an Intermediate Product Destination section, and a Final Product Destination Section. A copy of the

9.7.1 Verification of SBT Catch Monitoring Form

In the cases of transhipments at sea, the observer must enter his/her full name, signature and date (dd/mm/yyyy), as specified by the CCSBT Resolution on Establishing a Program for Transhipment by Large-Scale Fishing Vessels (*revised at the Twenty-First Annual meeting: 16 October 2014*), in the Intermediate Product Destination Section (refer Figure 1). Observers should take a photograph or photocopy of the CMF and CTFs after they have signed and stamped it.

Note, that in the case of transhipments, the CMF records the amount of SBT being transhipped, NOT any of the amount that may be remaining on board the FV.



• **INTERMEDIATE PRODUCT DESTINATION SECTION** - (only for transhipments and/or exports) - tick and complete required part(s)

☐ **Transhipment** — Certification **by Master of Fishing Vessel:** I certify that the catch/harvest information is complete, true and correct to the best of my knowledge and belief.

Name		Date		Signature	

Name of Receiving Vessel	Registration Number	Flag State/Fishing Entity

And / Or

Certification **by Master of Receiving Vessel:** I certify that the above information is complete, true and correct to the best of my knowledge and belief.

Name		Date		Signature	

Signature **of Observer (only for transhipment at sea):**

Name		Date		Signature	

☐ **Export**

Point of Export*				Destination (State/Fishing Entity)
City	State or Province		State/Fishing Entity	

* For transhipments on the high seas, enter the CCSBT Statistical Area instead of State/Fishing Entity and leave other fields blank.

Certification **by Exporter:** I certify that the above information is complete, true and correct to the best of my knowledge and belief.

Name	Licence No. / Company Name	Date	Signature

Figure 1: Intermediate Product Destination Section of the CCSBT CMF.

Note, signing the form is obligatory, and only confirms the observer's presence and that the completed sections (catch/harvest section and transhipment part of the intermediate product destination section) of the CMF document have been examined.

However:

- The observer's transhipment report should record any discrepancies between the observed details and the details recorded on the CMF form (particularly discrepancies in weights or number of SBT, catching vessel details, transhipment vessel details, or dates);
- It is preferable for discrepancies to be sorted out at the time of transhipment, but this is up to the discretion of the observer and the perceived nature of the discrepancy (e.g. accidental mistake or otherwise);
- For discrepancies that cannot be sorted out at the time of transhipment, the CCSBT is investigating ways of providing early notification to flag States and Fishing Entities of such discrepancies so solutions may be found more easily. Currently, any discrepancies can be completed under the comments section on the R2 form, (the R2 form includes a field so the observer can record if a CMF was present – refer Report R2 – Observer 5-Day Report:.

9.7.2 Transhipments and SBT Tags

All whole SBT transhipped are required to have a uniquely numbered tag to be attached to it. Any transhipments where SBT are observed to be without tags should be recorded in the observer's report.

The observer should determine whether tags were present and identify the serial number given on the tag. Observers are required to record all tag numbers of SBT transhipped and

verify this information with the CTF and CMF. Practicably, this may not be possible at a distance, and would significantly impact on transhipment operations. It is recommended that the observer should at least record a proportion of the tag numbers transhipped and ensure these fall within the tag numbers declared on the CMF and CTF.

This can be done by asking the winchman to lower a string of SBT to the carrier vessel deck. The observer can then take photographs of the tags up close and verify that a sampled number of tags fit within the range declared. Vessels can tranship 100 SBT or more than 1000 SBT in a single transhipment. It is therefore recommended that the observer sample up to 20 fish for 100 transhipped and more than 20 individuals for greater than 100 fish. Again, the number is determined by the observers judgement and the amount practicably sampleable.

Further information and example pictures are available in the guidance document under Appendix L: CCSBT Resolution on Catch Documentation Scheme.

9.8 Post-Transhipment Duties:

Observers will complete post-transhipment duties as soon as possible following the completion of transhipment operations. Below are the post-transhipment observer duties:

- Use photo, video, and/or voice-recorder media as needed for verifying any collected information, such as:
    - Vessel identification;
    - Species identification;
    - Tally figures; and
    - Potential violations including RFMO CMMs and MARPOL.
- Label and save media using proper file name format (i.e. photos, video) in a digital folder and complete Photo Log;
- Verify final transfer records from the FV and the CV ;
- Complete hard copy of the T4 form ;
- Enter data into electronic T4 report;
- Enter the data into the database; and,
- Enter transhipment information into the R2 report.

10 End-Deployment Reports

10.1 Form R4 – End of Trip Report

Observer will complete an R4 report for each deployment (refer Appendix B: Observer reporting forms and logbooks). A template is provided with headings, some narrative and instructions. Observers will use their daily log, forms, reports and database to add the required information. In order to give the captain an opportunity to comment on the report, an initial draft report will be submitted to prior to disembarking vessel. Observer will emphasize the report is a draft only and the captain can submit any comments to the Consortium or the observer within five days of receiving it.

The observer must also submit a draft report during their debriefing session; this will be reviewed along with health and safety issues, conditions onboard and ease of performing observer duties. The Consortium will combine any comments from the master of the CV, edit the report and submit to the IOTC secretariat.

10.1.1 Guidelines for Completion

Use the electronic template when creating the cruise final report. The following general points will be considered when writing the report:

- The observer report is a means of presenting all work carried out by the observer in a clear and concise format. All information requested is essential and will be used for assessing vessel compliance.
- The report, together with the data set, also provides a standard format for evaluating observer performance.

- All final reports and data are submitted to the IOTC Secretariat, the report is the road map to the data set.
- It is essential that observers dedicate sufficient time and effort to both writing and editing R4 cruise reports. Report quality not only reflects upon the professionalism of the observers, but also upon the program.

The ROP requires that observers provide an opportunity for the Master of the vessel to contribute to or comment on the trip report. To enhance transparency, the Consortium recommends that as standard:

- A draft copy of the report will be provided to the Master prior to the Observer leaving the vessel.
- The observer will bring to the Masters attention the relevant section of the ROP relating to records/reports.
- The observer will respond to any (reasonable) request from the Master to include information in the report.
- When submitting report to the Master, observer will indicate that the report is a draft only and that some changes may be made by MRAG to the final report.
- The report will provide contact details of the Consortium with instructions that the Master must submit contributions to the report within 5 days.

10.1.2 Political Issues and Violations

If RFMO CMMs are contravened, accurately document any observations and include them in the table listing observations during the transhipments. Photographs of any potential infringements will also need to be included in this table. The observer will not state that the vessel was in breach of “rule xxxx”, but simply report factually the details of what occurred.

Items of a sensitive nature such as MARPOL violations, suspected fish laundering, safety concerns, etc. will be placed in an addendum to the report at this time. The addendum will not be a part of the main report given to the Master of the vessel. If an observer has questions regarding the sensitivity of a subject, please confirm with the Consortium before including in the main body of the report.

It is not the observer’s responsibility to provide any judgment of the vessel activity. The ICCAT / IOTC Secretariat will determine if further action is required. As such it is important that any such observations and reports are clear and concise and supported by objective evidence.

10.1.3 Technical Points

a) Restrict the report to ROP tasks only; if in doubt include details in an annex.

b) Write the report in third person, past tense. For example, “The observer measured” rather than “ I measure”.
c) Check the document with an English UK spell-checker.
d) Ensure that spellings and names used are correct.
e) Use the appropriate terminology for species, vessels etc.
f) All scientific names used will be in italics, genus capitalized, species lower case, e.g. southern bluefin tuna (*Thunnus thynnus*).
g) Common names, unless proper nouns (for example Indian Ocean), will all be written in lower case and the IOTC recognized scientific name will follow, when mentioned for the first time in the report. e.g. southern bluefin tuna (*Thunnus thynnus*)
h) When referring to fish species, use the scientific name, when possible. If a scientific name is repeated, contract the genus to a single capitalized letter followed the species as usual e.g. *T. thynnus.*
i) Ensure that values stored in the e-reports match those included in the report; compiling the report will allow a review of inputted data and check for typos or omissions made whilst at sea.
j) Ensure that comas (,) are used to separate 1,000s and full stops (.) are used as decimal points
k) Once complete, set the report aside for a day and then re-read it with a fresh perspective and a critical eye. If possible, ask someone to proof read it. Remember this is a report and flippant language is to be avoided.
l) Do not manually change the weight units (tonnes or kg) used in database outputs. In most cases, weights will be in tonnes. Be aware that table 3 (comparison of vessel and observer figures) outputs are in kg for IOTC but tonnes for ICCAT. This reflects the preferences of the client.

10.2 Vessel-Internal Report

In an attempt to build a record for future observers, the Consortium is asking all observers to create a ‘How To Guide’ for each vessel. The guides will be provided to the subsequent observers on the vessel, who will update with any changes.
Please record the following items:

- Electrical outlet type;
- Communication facilities (fax, email);
- Scanner availability;
- Satellite phone;
- Use of USB drives/Attachments/Printing;
- Safety observations and concerns;
- Meals (times and observations);
- Vessel store and currency;
- Location of cabin;
- Toilet and shower facilities;
- Suggestions of things to bring (towels, bed sheets); and

- Other miscellaneous instructions / observations

11 Disembarkation

Upon completion of transhipment activities, observers will jointly notify their coordinator and the vessel's agent in the port of destination of the ETA in the port of disembarkation. The Consortium, liaising with the vessel agent, will provide hotel, connections and flight information. The observer should notify the consortium ahead of their arrival to port and keep the consortium updated with ETAs.

12 In Port Stays

The observer is welcome to enjoy an in-port stay, the vessel will sometimes stop in different ports along its route to resupply or conduct in-port transhipments. It is the privilege not the right for an observer to go ashore while on deployment. This is considered one of the observers highlights for the trip and will be encouraged where possible. However, it remains at the consortium and vessels discretion to do so.

Should the vessel wish to put the observer ashore, then it is upon the vessel to provide suitable accommodation and expenses occurred by the observer can be expensed to the consortium who will charge this back from the vessel operator. Should the observer wish to go ashore, then they will have to provide their own accommodation and cover their expenses. The observer will continue to be paid at the full sea day rate; expenses however will not be covered. It is both the obligation of the observer to remain in contact with the vessel and vessel agent daily, maintaining a constant readiness to reembark at short notice. More information covering roles and responsibilities is provided under the conditions of the MoU.

13 Debriefing

Upon return observers will be expected to visit the Consortium office for a debriefing session. Observers should have a first draft of their final reported, ready to submit to the observer coordinator . The observer should also highlight any issues or question marks in the report. This provides an opportunity for any outstanding matters in the report to be addressed. Observers will be expected to have the following completed prior to debriefing:

- R4-Final Report completed;
- All R1, R2, T1, T2, T3, T4 forms imputed into e-reports;
- All pictures correctly labelled and archived in the Picture Log;
- Daily Notes and Transhipment Declarations in order; and
- Gear cleaned, packed and ready to return.

Observers are to place all e-reports and files in the following file format, where ICCATxxx / IOTCxxx is the RFMO request number for the current cruise. An example folder structure is given on the USB at briefing and should be used for organising deployment outputs.

Appendix A: MoU

Appendix B: Observer reporting forms and logbooks

Appendix C: IOTC and ICCAT Species guides

Appendix D: ICCAT and IOTC Relevant Recommendation / Resolutions

Appendix E: PNC's Instructions and Forms (ICCAT only)

Appendix F: Guidelines for Vessel and Gear Markings

Appendix G: Flag state ATFs

Appendix H: VMS units and codes

Appendix I: Logbook templates

Appendix J: ICCAT stock boundaries

Appendix K: Photograph Guidance and Tagging photos using Picasa

Appendix L: CCSBT Resolution on Catch Documentation Scheme

Appendix M: Database Guidance and Data Entry

Contracting Party National Report:

Canada

SUBMITTED BY: CANADA (FISHERIES AND OCEANS CANADA) (23 DECEMBER 2022)

CONTRACTING PARTY: CANADA

AGENCY:

Fisheries and Oceans Canada

Gwyn Mason, Halibut Coordinator, Gwynhyfar.Mason@dfo-mpo.gc.ca

FISHERY SECTOR/S

All

IPHC REGULATORY AREA/S

IPHC Regulatory Area 2B (Canada: British Columbia)

DISCUSSION

Each year Fisheries and Oceans Canada provides harvest opportunities to First Nations for food, social and ceremonial (FSC) purposes (or domestic purposes for First Nations with modern treaties), and the commercial and recreational fisheries. First Nations, recreational, and commercial fisheries on the Pacific coast of Canada have long harvested groundfish. Groundfish serve as a source of food, they provide jobs, income, and enjoyment for individuals, businesses, and coastal communities and they play key roles in natural ecosystems.

The B.C. Ministry of Agriculture is responsible for collection and reporting of data and statistics for the agri-food sector. An important part of that mandate is to analyze the impact of various sectors, including fisheries and seafood to the broader provincial economy. B.C. commercially harvests and reports on over 25 wild fisheries including Pacific halibut which is within B.C.'s top most valuable wild fishery commodities.

Indigenous fisheries

In the 1990 Sparrow decision, the Supreme Court of Canada found that where an Indigenous group has an Indigenous right to fish for food, social, and ceremonial (FSC) purposes, it takes priority, after conservation, over other uses of the resource. Fisheries are authorized via a Communal Licence issued by the Department under the Aboriginal Communal Fishing Licences Regulations.

Commercial fisheries

There are seven distinct commercial groundfish sectors: Groundfish trawl, Halibut, Sablefish, Inside Rockfish, Outside Rockfish, Lingcod, and Dogfish fisheries that are managed according to the measures set out in the Integrated Fisheries Management Plan (IFMP). The management of these sector groups is integrated, with all groups subject to 100% at-sea monitoring and 100% dockside monitoring, individual vessel accountability for all catch (both retained and released), individual transferable quotas (ITQ), and

reallocation of these quotas between vessels and fisheries to cover catch of non-directed species. There are approximately 308 active commercial groundfish vessels. Information on licensed vessels is available online at the DFO website: http://www.pac.dfo-mpo.gc.ca/fm-gp/licence-permis/index-eng.htm.

The 2022 commercial fishery is described in appendix 1 of this report, "Fisheries and Oceans Canada 2022 IPHC Annual Report," and appendix 3 of this report, "Halibut Compliance and Enforcement."

Recreational fisheries

A recreational fishery may occur where authorized by a valid Tidal Waters Sport Fishing licence, which is required for the recreational harvest of all species of fish. Approximately 300,000 Tidal Waters Sport Fishing licences are sold each year. Tidal Waters Sport Fishing Licences can be purchased online by using the DFO website: http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/licence-permis/application-eng.html

The 2022 recreational fishery is described in appendix 2 of this report, "2022 Canadian Recreational Fishery Halibut Catch Report," and appendix 3 of this report, "Halibut Compliance and Enforcement."

RECOMMENDATIONS

That the Commission:

1) **NOTE** paper IPHC-2023-AM099-NR01 which provides the Commission with a summary from Fisheries and Oceans Canada of halibut fisheries in IPHC Regulatory Area 2B.

REFERENCES

Integrated Fisheries Management Plan for Groundfish, effective February 21, 2022. https://waves-vagues.dfo-mpo.gc.ca/library-bibliotheque/41034971.pdf

APPENDICES

Appendix 1: Fisheries and Oceans Canada 2022 Fishery Overview Report
Appendix 2: Fisheries and Oceans Canada 2022 Recreational Fishery Report
Appendix 3: Fisheries and Oceans Canada 2022 Enforcement Report
Appendix 4: Province of British Columbia 2022 Annual Report

APPENDIX 1

Fisheries and Oceans Canada 2022 Fishery Overview Report

PREPARED BY: FISHERIES AND OCEANS CANADA (23 DECEMBER 2022)

CONTRACTING PARTY: CANADA

AGENCY:

Fisheries and Oceans Canada

CONTACT:

Gwyn Mason, Halibut Coordinator, Gwynhyfar.Mason@dfo-mpo.gc.ca

FISHERY SECTOR/S:

All

IPHC REGULATORY AREA:

IPHC Regulatory Area 2B (Canada: British Columbia)

Discussion

Catch Limits

Fisheries and Oceans Canada follows an allocation policy that defines access to the Pacific Halibut Canadian Total Allowable Catch (CTAC) for Canadian commercial, recreational, and food, social, and ceremonial (FSC) fisheries. For 2022, the CTAC was 7,110,000 net pounds (fresh, head-off, dressed weight). The CTAC is composed of the catch limit for regulatory area 2B and an allocation for FSC. In addition to the CTAC, a carryover of quota from previous seasons is allocated to some licences.

Priority access is provided to the CTAC for FSC purposes, while commercial and recreational access is divided between the sectors 85% / 15% respectively. The 2022 Commercial and Recreational catch limit for allocation purposes was 6,945,000 net pounds. After accounting for O26 wastage, domestic research, commercial carryover from 2021 to 2022 and net reallocations into and out of the 2022 fishery, the resulting TAC for commercial and recreational harvest in 2022 was 6,337,437 net pounds.

Commercial and Recreational Fishery Summaries

For allocation purposes, the commercial / recreational total allowable catch (TAC) is equal to the Canadian catch limit, plus "O26" wastage mortality. The TAC is then allocated between the commercial and recreational sectors, and the respective "O26" wastage mortality is removed from the commercial and recreational TACs (Table 1). The domestic research allocation (use of fish) is also removed from the commercial sector's allocation prior to establishing the 2022 commercial TAC. The combined commercial and recreational TAC, including carryover adjustments, for 2022 was 6,337,437 net pounds. As of December 20, 2022, the combined commercial and recreational halibut catch (including XRQ landed catch, commercial landed catch and mortality associated with all released fish in the commercial groundfish fisheries) was 6,304,730 net pounds.

Commercial Fishery Summary

The 2022 Canadian commercial Halibut TAC, including the catch limit allocation and carryover, was 5,758,264 net pounds. Halibut may be caught and retained by all commercial hook and line, and trap groundfish fisheries in Canada. This includes category L, K, ZN, and Schedule II licences.

In 2022, the Canadian commercial Halibut catch totalled 5,375,537 net pounds (Table 2). This catch, reported by all hook and line/trap groundfish fisheries in area 2B, includes both landed and released at-sea mortality. Given that non-halibut groundfish fisheries continue throughout the Halibut winter closure, additional released at-sea mortality will continue to be attributed to the 2022 Halibut catch until February 20, 2023, after which released at-sea mortality will be attributed to the 2023 TAC. As such the 2022 commercial catch is current as of December 20, 2022.

Commercial Integrated Management Plan

First introduced as a pilot program in 2006, the Commercial Groundfish Integration Program (CGIP) was made permanent in January 2010 to manage groundfish fisheries, including Pacific Halibut, in British Columbia. The objectives of the CGIP are to improve and maintain groundfish harvest sustainability and management through improved catch monitoring and catch accountability. The CGIP implemented individual vessel accountability for all catch, both retained and released, via individual transferable quotas which may be reallocated between licences and fisheries to cover non-directed catch. In addition these management tools are supported by 100% at-sea monitoring and 100% dockside monitoring for all groundfish vessels.

Notable management changes for the 2022 season include:

- The ongoing rebuilding measures for Yelloweye Rockfish and Bocaccio Rockfish in all commercial groundfish fisheries.

- A rollover of the seasonal expansion (Nov 1st, 2022 – April 30th, 2023) to the existing 800-line pilot bottom trawl closure was first implemented in 2020. The existing and expanded seasonal closures are at a fishing location in the Queen Charlotte Sound known as the Circle Tow by the groundfish trawl fleet and the 800-line by the Halibut fleet. This expanded seasonal closure is an interim management measure that is intended to limit harvest of spawning aggregations of Arrowtooth Flounder and Halibut. The year-round pilot bottom trawl closure that was implemented in March 2019 continues to be in effect. This expanded seasonal closure is

intended for the short term and will be re-evaluated during the 2023/2024 fishing season. More information can be found at: https://notices.dfo-mpo.gc.ca/fns-sap/index-eng.cfm?pg=view_notice&DOC_ID=267945&ID=all.

The 2023/2024 commercial groundfish fishing season will commence February 21, 2023, at which time the renewed Groundfish Integrated Fisheries Management Plan (IFMP) will be available. All commercial groundfish management measures are detailed in the IFMP, which can be requested once available at: http://www.pac.dfo-mpo.gc.ca/fm-gp/ifmp-eng.html#Groundfish

Recreational Fishery Summary

There are two opportunities for recreational halibut fishing in area 2B, the recreational fishery, and the Experimental Recreational Halibut fishery pilot program (XRQ fishery). The 2022 recreational Halibut TAC was 1,011,750 net pounds. The 2022 XRQ fishery acquired 20,423 net pounds, resulting in a combined recreational and XRQ fishery TAC of 1,032,173 net pounds as of December 20, 2022 (Table 3). The estimated 2022 Canadian recreational Halibut catch totalled 938,369 net pounds, including 9,176 net pounds of catch in the XRQ fishery. The estimation methods of the recreational catch are outlined in *2022 Canadian Recreational Fishery Halibut Catch Report*. Management measures for the 2022 recreational fishery are summarised in the Area 2B Recreational Fishery Halibut Catch Report.

Halibut Experimental Recreational Fishery Program

The Experimental Recreational Halibut fishery pilot program allows individual anglers as well as guides, charters, lodges, marinas and other fishing experience providers to lease Halibut quota from the commercial fishery and subsequently retain Halibut that is in excess of the regular recreational fisheries daily and possession limits, and maximum size limits. An XRQ licence holder is permitted to fish for and retain Halibut from April 1 – December 31, even if the traditional recreational fishery is closed prior to December 31. Participants in the XRQ fishery must complete logbooks and submit them electronically within seven days of retaining a Halibut.

The XRQ fishery has operated as a pilot program since 2011. A regulatory process is underway to create a category of annual sport fishing licence in s.17 of the *British Columbia Sport Fishing Regulations, 1996*. Public consultations about the regulatory changed were held throughout 2012/2013, and a Regulatory Impact Assessment Statement that summarizes feedback from the public meetings on the experimental licence and regulatory change has been presented to the Minister. A regulatory intent document will be presented for additional public comment prior to the proposed regulatory changes being posted in Canada Gazette 1.

As part of the XRQ program, licence holders are permitted to carry forward uncaught quota (up to 10% or 200 net pounds, whichever is greater) to the subsequent season upon licence issuance. Licence holders carried forward 8,100 net pounds of uncaught quota from the 2021 season to the 2022 season. For the 2022 season, 12,323 net pounds of quota has been reallocated from commercial groundfish fisheries, resulting in a total available quota of 20,686 net pounds and a total YTD catch of 9,176 net pounds (as of December 20, 2022).

Additional details about the XRQ program are available online: https://www.pac.dfo-mpo.gc.ca/fm-gp/groundfish-poissons-fond/halibut-fletan/index-eng.html.

Canadian Aquaculture Research

There were no halibut aquaculture research or production activities in area 2B for 2022.

Food, Social and Ceremonial and Treaty Fishery

The estimated Food, Social, and Ceremonial (FSC) halibut catch in area 2B is 405,000 net pounds. Since 2009, new conditions have been applied to commercial Halibut licences and many communal halibut permits, to improve catch reporting of FSC caught fish on commercial trips. Of the total FSC halibut caught in 2022, approximately 37,063 net pounds were caught in conjunction with commercial fishing trips and were subject to all commercial monitoring requirements, including 100% at-sea and 100% dockside monitoring. In addition, First Nations engaging in fishing only for FSC used tools such as catch calendars, some dockside monitoring and phone surveys to estimate their catch. Fisheries and Oceans Canada continues to work with First Nations to improve catch reporting within the FSC fisheries.

In April 2011 the Maa-nulth Final Agreement came into effect. The agreement allocates 26,000 net pounds of FSC Halibut (part of the 405,000 net pounds described above) plus 0.39% of the total CTAC to the Maa-nulth First Nations for FSC purposes (equivalent to 53,729 net pounds in 2022). In 2011 DFO mitigated for the additional treaty allocation through acquisition of 0.47% of the commercial TAC which is set aside for the Maa-nulth First Nation on an annual basis (identified as part of the “net reallocations into/out of the commercial fishery” in Table 1).

RECOMMENDATIONS: NA

REFERENCES: See hyperlinks above

Appendices

Tables

Table 1. Halibut allocations in 2B as of December 20, 2022. All values in net pounds.

Commercial / recreational TAC for allocation		6,945,000
Commercial allocation	x 85%	
O26 wastage	- 210,000	
Research (use of fish)	- 60,000	
Commercial TAC for allocation purposes		5,633,250
Net carryover and net reallocations into/out of the commercial fishery[A]	+ 125,014	
Commercial TAC (Total Available Quota)		5,758,264

Recreational allocation	x 15 %	
O26 wastage	- 30,000	
Recreational TAC		1,011,750
XRQ allocation	X 0%	
XRQ acquired quota	+12,323	
Net carryover	+8,100	
XRQ TAC [B]		20,686
Recreational and XRQ TAC [B]		1,032,173

2B commercial and recreational TAC[B]	6,337,437
2B commercial and recreational catch [C]	6,304,730

A Net reallocations include quota reallocated from the commercial halibut sector to Maa-nulth First Nations Treaty, the Pacific Integrated Commercial Fisheries Initiative (PICFI), and Allocation Transfer Program (ATP), as well as the Halibut Experimental Recreational Fishery (XRQ) pilot program.

B There is no initial allocation provided to XRQ fishery, though quota may be transferred into the XRQ fishery from commercial Halibut fisheries. As a result the XRQ TAC changes proportionately with the commercial TAC as quota is transferred between fisheries.

C Catch includes all landed fish, as well as the mortality associated with legal-sized released fish in the commercial fishery

Table 2. Halibut for 2B commercial groundfish fisheries as of December 20, 2022. All values in net pounds.

Commercial TAC	5,758,264
Total Commercial Catch	5,375,537

Table 3. Halibut for 2B recreational and the Halibut Experimental Recreational pilot program (XRQ) fisheries as of as of December 20, 2022. All values in net pounds.

Recreational TAC	1,011,750
Recreational catch [C]	929,193
XRQ TAC	20,686
XRQ catch	9,176 [D]
Recreational and XRQ TAC [B]	1,032,173
Recreational and XRQ catch [C]	938,369

B There is no initial allocation provided to XRQ fishery, though quota may be transferred into the XRQ fishery from commercial Halibut fisheries. As a result the XRQ TAC changes proportionately with the commercial TAC as quota is transferred between fisheries.

C Catch includes all landed fish.

D Effective December 20, 2022.

APPENDIX 2

Fisheries and Oceans Canada 2022 Recreational Fishery Report

PREPARED BY: FISHERIES AND OCEANS CANADA (23 DECEMBER 2022)

CONTRACTING PARTY: CANADA

AGENCY: Fisheries and Oceans Canada

CONTACT:

Pratima Alexander, A/Groundfish Recreational Coordinator, Pratima.Alexander@dfo-mpo.gc.ca

Greg Hornby, A/Regional Recreational Manager, Greg.Hornby@dfo-mpo.gc.ca

FISHERY SECTOR/S: Recreational

IPHC REGULATORY AREA: IPHC Regulatory Area 2B (Canada: British Columbia)

DISCUSSION

Table of Contents

1. Overview

This report summarizes the 2022 harvest and biological data from the Canadian recreational Halibut fishery in the tidal waters of British Columbia (BC). The recreational total allowable catch for 2022 was 1,011,750 net pounds[1], with an estimated harvest of 929,193 net pounds (82,557 net pound underage). The estimated harvest by pieces is 68,597 pieces.

The 2022 season opened on February 15 and closed on December 31. Traditional monitoring and reporting programs, such as logbooks, lodge manifests and recreational creel surveys, collected catch, effort and biological data during peak months and areas of the fishery. Estimates of catch in months and areas not monitored by traditional programs were generated from data collected during DFO's internet-based recreational survey (iREC). Initiated in 2012, the iREC survey collects catch and effort information from recreational licence holders on a monthly basis throughout the recreational fishing year[2].

Final estimates are anticipated to be available by the spring of 2023. Estimated harvest in pieces and net weight by regional areas are noted below.

1.1. Harvest

Table 1. Estimated Harvest in Pieces and Net Pounds by Regional Area

Area	Pieces	Net Pounds
North Coast	38,142	457,942
Central Coast	2,481	26,671
South Coast	27,974	444,580
Totals	**68,597**	**929,193**

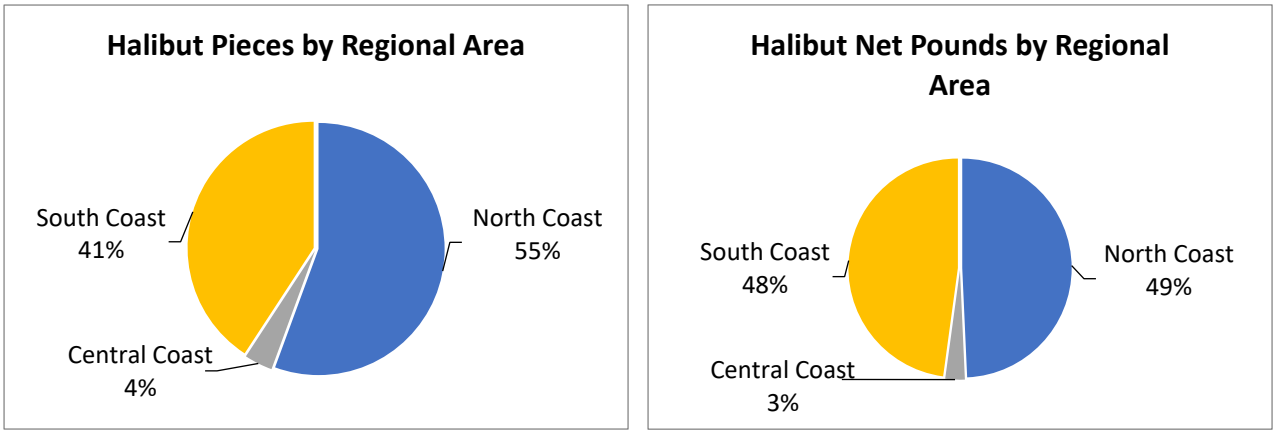


Figure 1. Percentage of Halibut harvested by piece and weight by Regional Area

[1] Pounds in this document refer to net weight (head off, dressed) pounds. See Biological Sampling section for the equations used to convert round weight (head on, undressed) and fork length to net weight.

1.2. Biological Samples

A coast wide total of 14,373 halibut were biologically sampled for either length or weight in 2022, representing 21% of the estimated harvest. The number of biological samples collected by regional areas is noted below.

Samples were collected from lodges, guides and independent anglers interviewed at access points and converted to net weight, head off and dressed, using the following formulas developed by the IPHC:

$$\text{Round Weight} = \text{Fork Length (cm)}^{3.24} \times (6.921 \times 10^{-6})$$
$$\text{Net Weight} = \text{Round Weight} \times 0.75$$

Average net weights were calculated for each Area on a monthly basis to generate estimates of total net weight by month and area caught in the fishery.

Table 2. Number of Halibut Biologically Sampled by Regional Area

Area	Samples
North Coast	10,876
Central Coast	1,492
South Coast	2,005
Totals	**14,373**

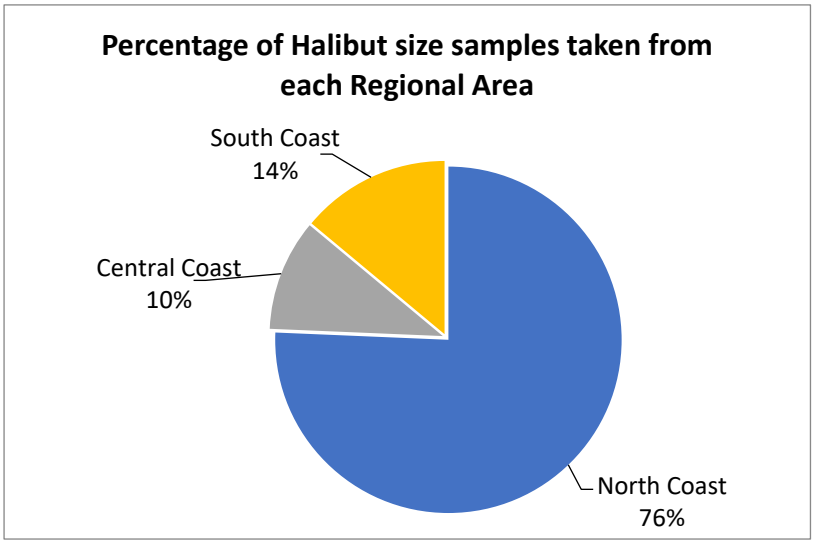


Figure 2. Percentage of Halibut size samples taken from each regional area.

1.3. Fishery Logistics

Catch monitoring of the recreational fishery in BC is extremely challenging given the large geographic area (numerous remote areas), the diversity of fishing opportunities and the diversity of participants.

Starting in 2015, Tidal Waters Sport Fishing Licences (TWSFL) included Conditions of Licence that make catch reporting mandatory. Specifically, the conditions state that "*The licence holder shall provide accurate information regarding their catch and fishing activities upon request of a Creel Surveyor or an on-line surveyor, authorities designated under s.61(5) of the Fisheries Act".* Conditions of Licence also included regulations related to possession limits, size limits and an annual limit.

In response to the IPHC's 2012 request for data collection programs on recreational discards, Fisheries and Oceans Canada reviewed its existing recreational halibut catch and release information and examined options for the estimation of release mortalities. DFO obtains information from anglers on the number of halibut releases through creel surveys, logbooks and internet surveys. In BC, anglers are not required to keep any records of released Halibut. Fishers are not required to record sizes of released Halibut in part because such a practice may increase release mortality and present challenges in terms of angler safety, and provide data of variable quality. Size limits and angler preference are some reasons why released halibut may be a different average size compared to the average size of retained fish. Given these various limitations of the information available, DFO does not currently use recreational release data for the purposes of recreational halibut management or allocation decisions.

In 2020, DFO began using IPHC's estimate of Area 2B recreational release mortality. This resulted in an estimate of 30,000 lbs of release mortality for the 2022 season. This discard mortality is accounted for before the 2B recreational catch limit is established and thus is not included in the calculation of catch relative to the recreational catch limit described elsewhere in this report.

DFO continues to work with the recreational fishery sector in BC to improve recreational fishery monitoring and catch reporting. While the focus remains on strengthening data collection and monitoring for retained catch in recreational fisheries, new reporting tools such as the iREC survey of recreational harvesters include questions about anglers' releases. As the survey continues to be refined and improved, DFO will be exploring how the data gathered on releases may be used to inform management.

2. MANAGEMENT, MONITORING and POLICY DEVELOPMENT

2.1. 2022 Recreational Fishery Management Plan

The current domestic sharing arrangement between commercial and recreational fisheries is 85% of the resource allocated to the commercial sector and 15% to the recreational sector, after accounting for First Nations' Food, Social, and Ceremonial requirements. The 15% recreational share in 2022 equates to a total allowable catch of 1,011,750 net pounds.

The recreational halibut fishery opened on February 1, 2022, with a daily limit of 2 fish per day. The fishery operated under the 2021 recreational licence until March 31. On April 1, the 2022 licence and management measures entered into effect. Current regulations – including daily catch and possession limits, open and closed areas, size limits and gear restrictions – are available online in the BC Sport Fishing Guide: http://www.pac.dfo-mpo.gc.ca/fm-gp/rec/index-eng.html. The 2022 measures included:

- A maximum length of 133cm head-on length
- A daily limit that is set in regulation, is defined in the conditions of licence and can be varied in-season as required. The possession limit is contingent on the daily limit as defined by the *BC Sports Fishing Regulations*, up to maximum of three per day:
    - If the Daily Limit is one (1) or two (2):

        - the Possession Limit is EITHER of: one (1) halibut measuring from 90 cm to 133 cm head-on length - OR - two (2) halibut measuring under 90 cm head-on length.
    - If the Daily Limit is three (3):
        - the Possession Limit is EITHER of: one (1) halibut measuring from 90 cm to 133 cm head-on length – OR - three (3) halibut measuring under 90 cm head-on length.
    - NOTE: If in possession of one (1) Halibut 90cm head-on length or longer, you shall not possess any other Halibut
- An annual limit of ten (10) in aggregate, from April 1, 2022 to March 31, 2023
- All halibut retained must be recorded on the Tidal Waters Licence plus the date and area from which each halibut is caught and its length
- A mandatory Condition of Licence to report catch when surveyed.

The opening was for all Pacific Fishery Management Areas (PFMAs) with the exception of portions of San Juan River Mouth (portion of Area 20-2). Anglers were not permitted to fish for nor retain halibut in this area.

The DFO and Sport Fishing Advisory Board (SFAB) Halibut Committee meets monthly throughout the fishing season to review estimated catches. By mid-summer of 2022, it was determined that the recreational sector would be unlikely to reach their TAC under the existing management conditions. Resultantly, DFO, in consultation with SFAB, proceeded with a change to the daily limit of Halibut measuring under 90cm in length – varying the daily limit from two (2) daily to three (3) daily. By the end of August, it was determined that the estimated harvest to date plus the forecasted catch to December 31 would not exceed the 1,011,750 pound Total Allowable Catch. Resultantly, the fishery will remain open until December 31, 2022.

For 2023, the SFAB is considering various management options they may recommend to DFO in light of existing and/or continuing impacts from the Covid-19 pandemic. These options may include considering changes to:

- Minimum and Maximum size limits
- Individual annual limits
- Daily and total possession limits
- Season length
- Time and area closures

2.2. Halibut Experimental Recreational Fishery Program

In 2011, the Department piloted an experimental fishery program where interested recreational stakeholders, such as individual recreational harvesters, lodges, charters, guides or marinas, could request an experimental licence that would allow them to lease quota from commercial harvesters through a market based transfer mechanism. The experimental licence permits licence holders to fish halibut beyond the limits and times of the regular recreational licence.

In 2012, the Minister of Fisheries and Oceans Canada confirmed that the experimental licence would continue to be available and announced the Department was moving forward with a regulatory proposal to continue the experimental fishery for the long term.

3. RECREATIONAL CATCH MONITORING and REPORTING PROGRAMS

3.1. Background

Marine creel surveys in BC began in 1980. Originally developed to estimate the catch of Chinook and Coho salmon in the Strait of Georgia, the geographical scope expanded to include Barkley Sound and Alberni Inlet in 1984, the entire West Coast of Vancouver Island (WCVI) in 1991, Haida Gwaii and the rest of the North

Coast in 1995, and most recently Johnstone Strait in 1998. The objectives of the creel survey have been expanded to include estimates for most recreationally caught finfish, including halibut. Lodges operating along the coast provide census data to the Department through the logbook program, manifest data or the electronic log (E-log) pilot program. The Department also receives data from some independent guides and avid anglers via logbook programs. These data are combined with the creel survey data to produce estimates of catch for each PFMA by month where traditional monitoring and reporting programs exist.

To address monitoring gaps in the recreational fishery the Department has been using and enhancing an online survey since 2012. The Internet Recreational Effort and Catch (iREC) survey was peer reviewed by the Canadian Scientific Advisory Secretariat (CSAS) in 2015. The iREC survey was developed to provide catch and effort estimates for all areas, months, fishing methods, and species harvested by the recreational sector. To minimize the effect of potential biases in iREC survey estimates, a calibration procedure was developed to relate iREC survey estimates and creel survey estimates in areas and times not covered by a creel survey.

3.2. 2022 Recreational Fishery Catch Monitoring

DFO has been working with the Sport Fishing Advisory Board on an implementation plan to strengthen recreational fishery monitoring and catch reporting in the Pacific Region. For the 2022 recreational halibut fishery, DFO used estimates from three sources; the iREC survey, logbook and lodge manifest program, and creel surveys.

DFO uses data from traditional catch monitoring (e.g. creel, lodge logbooks and manifests) where available, in priority of iREC survey data. As in previous years, traditional monitoring and catch reporting programs such as logbook, lodge manifest and the creel survey were used during peak months and areas of the recreational fishery. In areas and months where traditional programs were not implemented in 2022, DFO used in-season iREC survey catch estimates. In 2022, approximately 85.6% of the catch estimate was derived from traditional catch monitoring sources, and 14.4% from iRec survey estimates.

3.3. Haida Gwaii

Haida Gwaii recreational monitoring and reporting programs include a lodge logbook program and a creel survey. Lodge logbook data accounts for approximately 85% of the estimated halibut catch in Areas 1 and 2.

The Haida Gwaii Creel Survey (HGCS) typically estimates recreational catch from Areas 1 and 2 surrounding Haida Gwaii. Since 1995, the program has conducted creel surveys to estimate catch from recreational anglers in Masset Inlet, Naden Harbour, Langara Island, Skidegate Channel, Cartwright Sound and Rennell Sound. Fish caught in Haida Gwaii by recreational harvesters are also subject to random audits by the Haida Watchmen (Guardians) through the HGCS, which operates in the main fishing months in Area 1 and parts of Area 2.

Information collected from the creel survey is combined with data submitted through the lodge logbook program to generate total catch estimates for Areas 1 and 2.6 In 2022, 9,886 halibut were sampled for either length or weight.

3.4. North Coast Creel Survey

The North Coast Creel Survey program collects catch information from the recreational fishery surrounding Prince Rupert and Port Edward on the North Coast of B.C. It is focused in Areas 3 and 4, comprising the waters of Chatham Sound between the mouths of the Nass and Skeena Rivers. Chatham Sound is bordered by the Alaska/BC border to the north, Dundas and Stephens Island groups to the west and Porcher Island to the south, covering an area of approximately 4,200 km^2.

The North Coast Creel Survey program has a hybrid design with four components: an access point angler interview survey, an aerial effort count survey, a trailer census and a fishing lodge logbook program. The study design is similar to the one used in the South Coast Creel Survey.

Access point angler interview surveys collect catch information, angling activity times and biological samples of selected species from anglers at the completion of the fishing trip. The data is used to calculate species specific Catch per Unit Effort (CPUE) values and create angler activity profiles. Aerial surveys are conducted to capture the 'instantaneous' counts of the number of boats fishing at the time of the flight and are expanded using the angler effort profiles generated from the ground surveys to produce an estimate of total daily effort. Lodges in the area submit logbooks to DFO post-season. Lodge data is treated as a complete census of catch, is summed and added to the creel estimates to get an estimate of total catch. To prevent bias in the effort estimates from lodge boats counted during the aerial surveys, a temporal-spatial analysis is conducted of lodge logbook data for days when the overflight occurs and any boats that were fishing in the survey area during the time of the flight are removed from the final count of boats fishing in the area.

In 2022, 990 halibut were sampled for either length or weight.

3.5. Central Coast

Catch information in Areas 7, 8 and 9 on the Central Coast is primarily collected from lodges and some charter operators operating in these areas, primarily through the logbook program.. Most lodges participated in the logbook program and collected catch, effort and biological data that were submitted to the Department on a monthly basis. There is no creel program to estimate the number of halibut caught by independent anglers or guides in these areas due to challenges with implementing a survey in this remote and geographically dispersed fishery.

In 2022, 1,492 biological samples were reported.

3.6. South Coast Creel Survey

Creel surveys continue to be the main tool to estimate catch of halibut in this area. Surveys are conducted in select fishery strata based on: the highest catch of halibut and chinook, the highest effort, in-season management requirements, and potential impact on stocks of concern. Creel surveys consist of effort surveys and estimation of catch per boat trip based on fishery observers at selected ramps and marinas.

Data collected during angler interviews are recorded in the South Coast Marine Creel Survey form and provide average catch per unit effort by species and fishing times, while aerial counts from chartered aircraft capture 'instantaneous' counts of the number of recreational boats fishing on randomly selected dates. Fishing times obtained from angler interviews are used to generate daily fishing activity profiles which are used to expand the 'instantaneous' aerial counts to estimate the number of boats fishing each day. The estimate of boats fishing is multiplied by the average catch to estimate the total number of halibut caught each day. Estimates are generated monthly, or occasionally for two week periods where samples rates are high. The estimates are stratified by weekend and holidays vs. weekday dates. In addition, logbook catch data submitted by remote fishing lodges, independent guides and expert anglers are incorporated into creel estimates post season. The survey in Kyuquot Sound (PFMA's 26, 126) is entirely logbook-based, as fishing from lodges represents essentially all recreational effort in this remote area; in 2018 estimates were improved through use of iREC survey information on the proportion of guided to unguided trips.

Catch and effort is estimated by creel sub-area and rolled up to DFO PFMAs by month. South Coast waters include PFMAs 11 through 29. The Port Hardy survey also collects information from recreational fishing trips in Area 10. Creel surveys are active during the peak season of recreational angling and vary in duration depending on location. The spatial and temporal coverage of the survey program can vary year to year in response to budget and fishery priorities.

For further details on the methodology and results of the South Coast Creel survey, including catch and effort estimates with level of uncertainty, please visit:
https://science-catalogue.canada.ca/record=4107744~S6

In 2022, 2,005 halibut were sampled for length or weights during the South Coast Creel survey interviews.

4. APPENDICES

The following tables provide detailed catch and biological information collected during the 2022 recreational halibut fishery in BC. Note: these figures are preliminary and subject to change.

Table 5. Summary of the 2022 Recreational Halibut Catch by Pacific Fishery Management Area (PFMA)

Regional Area	PFMA	Piece Count	Total Net Wt. (net lbs.)
North Coast	1	15,795	161,106
	2	2,567	35,719
	3	6,736	87,617
	4	9,697	126,985
	5/6	3,346	46,515
Central Coast	7/8/9	2,481	26,671
South Coast	10/11/111	1,747	20,519
	12	835	19,430
	13/14	177	5,966
	15-18/28/29	1,078	14,132
	19	1,156	26,280
	20	509	13,028
	21/121	6,040	61,692
	23/123	6,856	94,498
	24/124	1,925	36,324
	25/125	1,462	24,556
	26/126	3,128	77,027
	27/127	2,917	51,129
Total Landed in Canada		68,454	929,193
		Recreational TAC	1,011,750
Estimated Balance - END OF OCTOBER -			82,557
			8.16%

Table 6. Recreational Halibut Monthly Catch Estimates (net wt. lbs) for 2019, 2020, 2021 and 2022

	Net Weight (net lbs)				Cumulative Net Weight (net lbs)			
	2019	**2020**	**2021**	**2022**	**2019**	**2020**	**2021**	**2022**
Feb	0	0	954	1,884	0	0	954	1,884
March	8,172	3,814	8,778	6,079	8,172	3,814	9,732	7,964
April	10,259	7,111	12,017	11,285	18,432	10,926	21,749	19,249
May	40,988	26,356	56,775	76,948	59,420	37,282	78,524	96,196
June	152,282	74,348	158,756	201,725	211,702	111,630	237,280	297,921
July	336,520	182,655	287,249	305,539	548,221	294,284	524,529	603,460
Aug	207,866	148,422	224,348	261,459	756,088	442,707	748,877	864,919
Sept	53,956	69,419	49,388	53,225	810,044	512,125	798,265	918,144
Oct	834	4,236	1,317	4,804	810,878	516,361	799,581	922,947
Nov	0	398	2,633	3,327	810,878	516,758	802,214	926,275
Dec	5,761	2,216	52	2,919	816,639	518,974	802,266	929,193
Total	816,639	518,974	802,266	929,193	816,639	518,974	802,266	929,193
							2022 Recreational TAC	1,011,750
							Estimated Total Catch	929,193
								82,557
							Estimated Remaining Balance (end of Dec)	8.16%

Table 7. Estimated 2022 Halibut Catch in Pieces, by Area and Month

PFMA		FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Estimated Total Pieces by PFMA	% of Total Pieces by PFMA
1		-	-	-	393	4,091	4,457	5,297	1,557	-	-	-	15,795	23%
2		-	-	29	84	746	816	853	39	-	-	-	2,567	4%
3		-	131	9	421	2,224	2,039	1,847	63	2	-	-	6,736	10%
4		2	21	177	1,037	2,739	3,594	1,669	450	7	-	4	9,702	14%
5/6		-	-	32	141	763	1,273	1,019	103	15	3	-	3,349	5%
7		-	-	-	55	26	32	28	15	3	-	-	159	0%
8		-	-	-	67	47	235	92	26	-	-	-	467	1%
9		-	-	-	841	110	359	408	137	-	4	-	1,859	3%
10/11		-	-	-	99	524	771	246	68	38	-	-	1,747	3%
12		-	-	36	91	300	236	110	60	2	-	-	835	1%
13/14		66	-	-	6	14	27	20	2	42	-	-	177	0%
15-18/28/29		-	3	37	183	141	292	266	144	14	-	-	1,078	2%
19		32	147	140	318	111	71	196	92	49	7	-	1,162	2%
20		-	33	70	51	141	112	6	38	58	58	-	567	1%
21/121		2	-	70	219	1,686	2,486	1,543	13	22	-	-	6,040	9%
23/123		-	6	25	298	416	1,931	3,508	669	3	-	-	6,856	10%
24/124		-	15	26	131	555	571	512	115	-	-	-	1,925	3%
25/125		-	5	17	196	422	314	478	30	-	68	-	1,531	2%
26/126		-	5	2	300	437	1,440	867	78	-	-	-	3,128	5%
27/127		-	-	18	228	606	1,111	639	315	-	-	-	2,917	4%
2022 Totals	Monthly	102	366	687	5,158	16,099	22,167	19,603	4,016	256	139	4	68,598	
	Cumulative	102	468	1,155	6,313	22,412	44,579	64,182	68,198	68,454	68,593	68,597		

Table 8: Average 2022 Net Weight Estimates of Retained Halibut by Area and Month

PFMA	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
1	10.0	10.0	10.0	9.7	10.4	9.9	10.3	10.3	10.3	10.3	10.3
2	13.9	13.9	13.9	13.9	13.7	14.1	13.9	13.9	13.9	13.9	13.9
3	13.9	13.9	13.9	13.9	13.9	12.9	11.8	12.4	12.4	12.4	12.4
4	13.9	13.9	13.9	13.9	13.9	12.9	11.8	12.4	12.4	12.4	12.4
5/6	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9	13.9
7	17.1	17.1	17.1	19.6	14.7	10.4	9.4	9.9	9.9	9.9	9.9
8	8.2	8.2	8.2	8.2	8.1	8.3	9.3	8.8	8.8	8.8	8.8
9	11.1	11.1	11.1	11.1	10.4	11.8	11.3	9.6	10.5	10.5	10.5
10/11	18.0	18.0	18.0	18.0	19.2	16.9	9.0	12.9	12.9	12.9	12.9
12	23.4	23.4	23.4	23.4	22.9	24.0	16.1	20.0	20.0	20.0	20.0
13/14	18.3	18.3	14.7	18.5	10.9	16.4	13.6	15.0	15.0	15.0	15.0
15-18/28/29	13.0	13.0	13.0	13.0	13.0	14.8	11.9	12.2	12.2	12.2	12.2
19	19.0	19.6	18.5	18.2	16.4	23.3	23.2	23.6	26.5	23.4	23.4
20	15.6	13.3	17.9	18.3	21.9	19.0	20.5	18.4	25.5	18.7	18.7
21/121	16.7	16.7	16.7	16.7	20.4	13.1	13.5	13.3	13.3	13.3	13.3
23/123	16.0	16.0	16.0	16.0	18.1	13.9	13.1	13.4	13.3	13.3	13.3
24/124	19.9	19.9	19.9	19.9	19.5	20.2	20.7	23.1	21.9	21.9	21.9
25/125	16.7	16.7	16.7	16.7	18.5	14.8	16.7	16.7	16.7	16.7	16.7
26/126	26.0	26.0	26.0	26.0	29.9	22.1	26.0	26.0	26.0	26.0	26.0
27/127	15.8	15.8	15.8	15.8	15.0	16.5	21.6	19.1	19.1	19.1	19.1

Table 9. Estimated 2022 Halibut Catch in Net Weight (lbs) by Area and Month

PFMA		FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Estimated Total Catch by PFMA	% of Catch by PFMA
1		-	-	-	3,797	42,623	44,147	54,434	16,106	-	-	-	161,106	17%
2		-	-	398	1,170	10,232	11,510	11,866	543	-	-	-	35,719	4%
3		-	1,822	128	5,852	30,914	26,303	21,795	780	23	-	-	87,617	9%
4		31	298	2,462	14,414	38,072	46,363	19,694	5,563	88	-	-	126,954	14%
5/6		-	-	446	1,961	10,606	17,697	14,160	1,432	211	-	-	46,515	5%
7		-	-	-	1,075	382	332	262	149	33	-	-	2,234	0%
8		-	-	-	548	211	1,941	859	229	-	-	-	3,788	0%
9		-	-	-	9,328	1,139	4,252	4,612	1,319	-	-	-	20,649	2%
10/11		-	-	-	1,786	2,109	13,042	2,202	883	496	-	-	20,519	2%
12		-	-	834	2,132	6,876	5,657	1,774	1,213	38	-	906	19,430	2%
13/14		1,207	-	-	111	3,270	435	273	33	637	-	-	4,759	1%
15-18/28/29		-	34	478	2,382	1,837	4,321	3,161	1,752	166	-	-	14,132	2%
19		609	2,882	2,587	5,779	2,312	1,651	4,538	2,167	1,300	1,985	470	25,671	3%
20		-	439	1,254	934	3,088	2,130	123	699	1,477	1,342	1,543	13,028	1%
21/121		38	-	1,169	3,665	2,872	32,591	20,902	167	288	-	-	61,654	7%
23/123		-	96	392	4,755	7,513	26,810	45,890	8,998	45	-	-	94,498	10%
24/124		-	296	519	2,603	8,132	11,516	10,605	2,653	-	-	-	36,324	4%
25/125		-	88	278	3,265	7,807	4,650	7,961	507	-	-	-	24,556	3%
26/126		-	124	47	7,802	12,636	31,830	22,562	2,027	-	-	-	77,027	8%
27/127		-	-	291	3,589	9,094	18,361	13,786	6,008	-	-	-	51,129	6%
2022 Totals	Monthly	1884	6,079	11,285	76,948	201,725	305,539	261,459	53,225	4,804	3,327	2,919	929,193	
	Cumulative	1,884	7,964	19,249	96,196	297,921	603,460	864,919	918,144	922,947	926,275	929,193		

INTERNATIONAL PACIFIC HALIBUT COMMISSION

Fisheries and Oceans Canada 2022 IPHC Annual Report

PREPARED BY: FISHERIES AND OCEANS CANADA (23 DECEMBER 2022)

Canadian Enforcement Report for IPHC Regulatory Area 2B

(Canada: British Columbia)

2022

CONTACT

Trevor Ruelle

Fishery Officer

Area 2B Groundfish Enforcement Coordinator

Trevor.Ruelle@dfo-mpo.gc.ca

COMPLIANCE AND ENFORCEMENT PRIORITIES

Groundfish, including commercial Halibut, enforcement priorities for 2022 were identified in the Groundfish Integrated Fisheries Management Plan and by the Groundfish Enforcement Coordinator as follows:

- *Closed area fishing in rockfish conservation areas, sponge reef marine protection areas, marine conservation areas, interim sanctuary zones and other permanent and in-season fishing closures.*
- *Retention of groundfish caught, retained or possessed without licence authority. Priority will be placed on occurrences where retention for the purpose of sale is indicated;*
- *Unauthorized commercial/FSC (dual) fishing;*
- *Non-compliance with 100% at-sea and dockside monitoring programs including hails, electronic monitoring systems, incomplete and inaccurate fishing logs, offloading catch without a dockside observer, removing some catch before dockside observer arrives and preventing dockside observer from checking hold, freezers and any other fish storage areas on vessel.*
- *False and misleading statements to DFO designated observers.*
- *Vessel Masters not providing all reasonable assistance to DFO designated observers.*
- *Owner or person in charge or in control of a fishing landing station not providing the dockside observer with such assistance as is reasonably necessary to enable observer to perform their duties. This includes safe access to vessel, fish holds/freezers/other fish storage areas and adequate lighting.*

Link to Pacific Region Groundfish Integrated Fisheries Management Plan – 2022/2023: Groundfish 2022 Integrated Fisheries Management Plan summary | Pacific Region | Fisheries and Oceans Canada (dfo-mpo.gc.ca)

SUMMARY OF THE HALIBUT FISHERY BY USER GROUPS

Commercial

The 2022 commercial halibut fishery opened at 12:00 hours local time on March 6, 2022 and closed at 12:00 hours local time on December 7, 2022. A total of **149** vessels and **604** fishing trips were recorded during the 2022 commercial halibut fishing season.

Table 1. Commercial Halibut Fishing Trips – Trip Type, Number of Fishing Trips, Number of Vessels and Licence Type – March 6, 2022 to December 7, 2022 [Source: DFO Fishery Operations System (FOS)].

Fishing Trip Type	Number of Fishing Trips	Number of Licences	Licence Type
Commercial	290	113	L
Communal Commercial	147	36	FL
Combo (Halibut/Sablefish)	119	16	K/L
Combo (Halibut/Sablefish)	48	4	FK/FL & L/FK
IPHC	10	2	XL
Experimental	7	2	XL

Table 2: ***Commercial Halibut Fishery*** *Occurrences – March 6, 2022 to December 16, 2022*[1]

Occurrence Type (not all are found to be violations)	**Number of Occurrences**
Fishing in Closed Area	14
Dual Fishing Issues	143 (*not included in total*)
Time Gaps	3
Scale Related Incidents	2
Regulatory Issues	10
Catch Related Issues	8
Monitoring Equipment Issues	18
Documentation Related Issues	10
Piece Count Issues	3
Processed Fish On Board	3
Reported Overages	1
Offload Related Incidents	3
Hold Check Not Completed	5
Undersize Fish	2
Prohibited Species	1
No Seabird Avoidance Gear	7
Vessel/Personal Licences issues	4
Total	**94**

[1]Source: DFO *National Enforcement Tracking System (NETS) and Archipelago Marine Research Ltd.(AMR) Portal for Clients*

Recreational

The 2022 recreational halibut fishery opened coast-wide at 00:01 hours February 1, 2022 and closed at 23:59 hours December 31, 2022. Recreational Licences are issued for a fiscal year (April 1 – March 31). A total of **333,473** recreational licences have been issued to date.

Table 3: ***Recreational Halibut Fishery*** *Occurrences - February 1, 2022 to December 16, 2022*[2]

Number of Occurrences	Action Taken	
30	Investigation Initiated	28
	No Action Warranted	1
	Unable to respond	1

[2]Source: DFO *National Enforcement Tracking System (NETS). Occurrence type unavailable.*

Experimental

For halibut, in addition to the regular tidal water sport fishing licence, recreational harvesters may obtain an experimental licence, on a voluntary basis, that will allow the licence holder to lease halibut quota from the commercial sector for use in the recreational fishery. For more information: ***Pacific Region Halibut Experimental Recreational Fishery Program Details***.

The halibut experimental recreational fishery (XRQ) is open from April 1, 2022 to December 31, 2022. There were **218 XRQ** licences issued with 199 of the licences purchasing the minimum 20 pounds of quota. There were 19 XRQ licences issued where fishers did not purchase the minimum required 20 pounds of quota, therefore their licences were not valid.

Commercial, Food, Social and Ceremonial (FSC) and Treaty Fisheries

For all dual fishing (commercial and FSC) halibut trips the vessel master is responsible for following the halibut commercial and/or communal commercial conditions of licence including those specific to dual fishing. All of the fish require 100% monitoring at-sea and 100% monitoring at the dock. In 2022, **53** commercial or communal commercial halibut vessels hailed out for **141** dual fishing trips.

FSC halibut fishing does not have the same monitoring requirements as commercial and dual halibut fishing.

Table 4: ***Aboriginal Halibut Fishery*** *Occurrences - January 1, 2022 to December 7, 2022*[3]

Number Of Occurrences	Action Taken	
7	Investigation Initiated	7

[3]Source: DFO *National Enforcement Tracking System (NETS) Occurrence type unavailable.*

FISHERY OFFICER ENFORCEMENT EFFORT SUMMARY

Commercial Halibut

103 vessels checked
50 people checked
228 hours patrolled by ASP
13 hours patrolled by MPP
21 hours patrolled by vehicle

Recreational Halibut

144 vessels checked
467 people checked
68 hours patrolled by program vessel (local detachment RHIBS)
56 hours patrolled by vehicle
2 hours patrolled by MPP

Aboriginal Halibut

5 vessels checked
13 persons checked
4 hours patrolled by program vessel
0.5 hours patrolled by MPP

AERIAL SURVEILLANCE PATROL SUMMARY

The Fishery Aerial Surveillance Enforcement (FASE) Detachment patrols Canada's EEZ with a Dash 8 Aircraft. Flight reports, photographs, videos and other data collected from the surveillance flights are readily available to departmental managers and fishery officers through an internet-based flight information system. All vessels encountered via radar are visually identified and documented.

Table 5: 2022, 2021, *2020, 2019*, *C&P Aerial Surveillance Patrols – number of missions, total hours spent flying, and number of halibut vessels viewed during missions*[5]

AERIAL SURVEILLANCE PROGRAM (ASP) ACTIVITY			
Air Patrols	***Missions***	***Hours***	***Total Halibut Vessels Recorded Per Year***
January 1, 2022 – December 15, 2022	128	833.7	168 (126 L, 42 FL)
January 1, 2021 – December 31, 2021	136	806.7	225 (214 L, 11 FL)
January 1, 2020 – November 30,2020	184	1107.3	259 (245 L, 14 FL)
January 1, 2019 – November 30, 2019	185	1036.59	146 (130 L, 16 FL)

[5]Source: Provincial Aerospace Limited - Surveillance Information System (SIS)
L = commercial halibut licence; FL= communal commercial halibut licence

VIOLATION SUMMARIES

Table 6: *2019, 2020, 2021 & 2022 Violations for Aboriginal, Commercial, Recreational Halibut and Experimental Halibut – Charges Laid, Charges Pending/Under Review, and Tickets/Warnings Issue*[7]. ***Note:*** *Not all information is in yet.*

VIOLATIONS	2019	2020	2021	2022
ABORIGINAL GROUNDFISH – HALIBUT	**14**	**4**	**4**	**7**
CHARGES LAID				
CHARGES PENDING/UNDER REVIEW	12	2	4	
TICKET ISSUED	1			
WARNING ISSUED		1		
DIVERTED (ALTERNATIVE MEASURES)	1	1		
OPTIONS UNDER CONSIDERATION				7
COMMERCIAL GROUNDFISH - HALIBUT	**4**	**13**	**Information not available**	**23**
CHARGES LAID	2			0
CHARGES PENDING/UNDER REVIEW	2	9		15
TICKET ISSUED		1		3
WARNING ISSUED		3		5
RECREATIONAL GROUNDFISH - HALIBUT	**85**	**55**	**52**	**42**
CHARGES LAID	6			
CHARGES PENDING/UNDER REVIEW	38	8	8	
TICKET ISSUED	25	22	21	11
WARNING ISSUED	16	25	23	31
EXPERIMENTAL GROUNDFISH - HALIBUT				**14**
CHARGES LAID				
CHARGES PENDING/UNDER REVIEW				1
TICKETS ISSUED				
WARNING ISSUED				13
TOTAL FOR ALL HALIBUT FISHERIES	**103**	**72**	**56**	**86**

[7]Source: DFO Departmental Violations System (DVS) and National Enforcement Tracking System (NETS).

COURT RESULTS

On October 19, 2021, a commercial halibut fisher was charge with five counts for failing to comply with halibut COL. This incident occurred June 23, 2020 and the charges are summarized as follows;

1. Fail to deploy SBAG
2. Fail to provide signature/FIN number on validation summary
3. File a late hail out
4. Submit late fish slips (40 days late)
5. Fail to complete accurate and complete record of all fishing activity carried out in logbook

On June 9, 2022, the fisher plead guilty for failing to deploy SBAG and was sentenced to a fine of $7,500.00 with time to pay by July 1, 2023. The remaining counts were stayed as part of the resolution.

LINKS OF INTEREST

DFO Conviction Tables**:** **https://www.dfo-mpo.gc.ca/media/charges-inculpations/pac-eng.htm**

INTERNATIONAL PACIFIC HALIBUT COMMISSION

Province of British Columbia 2022 Annual Report

PREPARED BY: BRITISH COLUMBIA MINISTRY WATER, LAND, AND RESOURCE STEWARDSHIP (23 DECEMBER 2023)

CONTRACTING PARTY: CANADA

AGENCY:

The Province of British Columbia represented by the Ministry of Water, Land, and Resource Stewardship.

CONTACT:

Mike Turner, Director, Policy; Fisheries, Aquaculture and Wild Salmon Branch Michael.R.Turner@gov.bc.ca

Kevin Romanin, Senior Policy Analyst, Kevin.Romanin@gov.bc.ca

FISHERY SECTORS:

All sectors within British Columbia.

IPHC REGULATORY AREA

IPHC Regulatory Area 2B (Canada: British Columbia)

DISCUSSION

The Province of British Columbia (BC) has a long history of involvement with the Pacific halibut fishery and the International Pacific Halibut Commission (IPHC). BC recognizes the importance of Canada working bilaterally with the United States through the Pacific Halibut Treaty as well as the work done by the IPHC to develop and conserve Pacific halibut stocks. The significant history of this Treaty, as one of the first Canadian international agreements and the near century of mutual benefit to both countries, serves as a tremendous example in global fisheries management. BC commends the efforts made by the Commission to reach agreement again during the 98th session of the IPHC Annual Meetings in 2022. Thousands of jobs rely on this continued cooperation, and it is critical that this history of collaboration continues.

The BC Ministry of Agriculture and Food is responsible for collection and reporting of data and statistics for the agri-food sector. An important part of that mandate is to analyze the impact of various sectors, including fisheries and seafood, to the broader provincial economy. BC commercially harvests and reports on over 25 wild fisheries including Pacific halibut which is among BC's top three most valuable wild fishery commodities[1]. The Pacific halibut fishery supports significant commercial harvests in Canada's waters while providing many fishing and processing jobs and is significantly important to small coastal communities and First Nations across Canada's west coast. The Province licences seafood processors and annually collects data on the volumes and values of the various seafood products. In 2021, the survey showed the processing of 3,210 tonnes (7.08M lbs) of Pacific halibut, which includes some imported halibut processed in BC. The survey also showed landed and wholesale values of $43.54M and $89.88M, respectively. In 2021 Pacific halibut accounted for 9.1% of the wholesale value of all BC's wild fisheries including all groundfish, salmon, and shellfish. In 2021, BC exported 1.7M kilograms (3.75M lbs) of halibut products worth $42M[2]. The Province historically conducts a seafood sector employment survey every three years which provides data on jobs, wages, and seafood processing activities. The most recent available data from 2020 show 65 processing facilities that reported processing halibut and generated 210 jobs with an estimated $11.9M paid in wages[3].

In addition, the recreational halibut fishery supports the hundreds of fishing lodges, charter companies, and individuals that contribute tremendously to the economies of coastal communities. Beginning in 2019 and through 2022, there were severe restrictions on salmon fishing in BC which will continue in future years. Recent restrictions on salmon fisheries amplifies the importance of the recreational halibut fishery to the recreational sector. BC will continue to provide available data to the IPHC from provincially licensed seafood processors to advance the IPHC economic report which will help highlight the benefits that Pacific halibut provide. As BC's lead agency responsible for fisheries policy, the Ministry of Water, Land and Natural Resources recognizes the importance of understanding the broader socioeconomic impacts and downstream effects of the Pacific halibut fishery and looks forward to continuing to work together.

First Nations are entitled to a Food, Social and Ceremonial (FSC) allocation of the total allowable catch (TAC), and many jobs within the halibut fishery and halibut processing facilities are held by members of First Nations across BC. In the commercial halibut fishery, approximately 23% of licenses are held by BC First Nations. In 2019, BC became the first province in Canada to introduce legislation aimed at adopting the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). *The Declaration on the Rights of Indigenous Peoples Act* (known as 'DRIPA') mandates that government bring its laws and policies into harmony with the aims of the declaration. The BC government has set Indigenous reconciliation as a top priority and is actively working to ensure that First Nations are meaningfully included in management of all BC fisheries.

The decisions made annually by the IPHC commissioners greatly impact the livelihood of many coastal BC residents and local economies. With the extensive and costly efforts of fisheries monitoring in place to account for all halibut bycatch, BC expects that all fishers who share access to the Pacific halibut stocks should be held to similar standards of catch accounting. BC fishers need to be assured that the decisions made by IPHC commissioners are based on the best data and science possible by ensuring that all contributing data sources are as thorough and reliable as what they contribute.

BC's halibut fishery is part of the Integrated Groundfish Fishery which effectively manages all groundfish species by coordinating the quotas and bycatch allocations between the various groundfish fisheries including trawl, halibut, sablefish, and rockfish. The Integrated Groundfish Fishery operates with 100 percent monitoring and 100 percent bycatch accountability. This includes 100 percent monitoring while on the fishing grounds, and 100 percent dockside monitoring, with auditing programs in place to compare validated landed catch with at-sea catch records. BC's groundfish fisheries monitoring programs are well established with components of at-sea observers and electronic monitoring and is regarded as one of the most well-monitored fisheries in the world. These extensive fisheries monitoring programs come at a direct cost to fishermen and license holders as they are entirely funded by industry. BC fishers respect that monitoring programs level the playing field by keeping all fishery participants compliant with the rules which help to ensure sustainable stocks and the future of their industry. The BC Pacific halibut fishery has held Marine Stewardship Council certification since 2009 for being a sustainable, well-managed fishery.

BC's monitoring programs have also adapted quickly in response to obstacles encountered by the COVID-19 global pandemic to maintain data integrity. In 2020, with the interruption of groundfish observer programs, fisheries were able to implement an Emergency Electronic Monitoring (EEM) program in place of at-sea observers and begin working on alternate methods of estimating halibut bycatch mortality like area-based halibut mortality estimations. Efforts on the EEM program continued through 2022 for improved data accuracy. The long running electronic monitoring programs in BC and the data sets available from these robust programs provided the ability to adapt quickly to the unprecedented changes brought on by the pandemic. As BC's trawl fishery adapts to moving from at-sea observers to electronic monitoring systems, the changes and developments are continuously communicated to the other fisheries within the Integrated Groundfish Fishery, including halibut, to provide opportunity for feedback and to allow for better transparency.

The large trawl fisheries in Alaska experience high volumes of bycatch that impact many species that move between Canadian and US waters. This includes over 571,900 salmon caught as bycatch in Alaskan fleets in 2021, of which 33,000 were vulnerable chinook salmon[4]. Incomplete monitoring and Alaskan bycatch of halibut in trawl fisheries impact recruitment of juvenile halibut to the fishery as many halibut caught in industrial trawl nets do not survive release. These trawl fisheries pose significant threat to mortality of juvenile halibut that might otherwise grow and become available to the fishery and other regulatory areas.

BC remains concerned that bycatch of halibut in Alaska Area 3 remains poorly understood and unaccounted for. The IPHC relies on information supplied by observer programs run by Contracting Party agencies for non-directed commercial discard mortality estimates in most fisheries. In BC, these estimates are reliably provided by the well-established data systems as part of monitoring programs. The Fisheries Data Overview provided by the IPHC for the past several years repeatedly stated that Regulatory Area 3 remains the area where non-directed commercial discard mortality is estimated most poorly, and again for 2022 states that non-directed commercial discard mortality remains challenging. The report outlines several factors contributing to the poor estimation including low coverage, loopholes in trip cancelling, and safety considerations likely result in observed trips not being representative of all trips (observed and unobserved) in many regards (e.g., duration, species composition, etc.)[5]. Low observer coverage in IPHC Regulatory Area 3 leads to increased uncertainty in these non-directed commercial discard mortality estimates and to potential for bias. This section of the IPHC Fisheries Data Overview report has remained consistent despite that as part of the interim agreement, the Commission agreed to continue the development of a workplan to explore methods for improvement of monitoring requirements in directed and non-directed fisheries, and to examine options in each IPHC Regulatory Area for mitigating the impact of bycatch in one IPHC Regulatory Area on available harvest in other IPHC Regulatory Areas. The lack of confidence in the total number of halibut removals in some regulatory areas continues to create issues in the management of this shared resource.

The Province of BC supports the development of monitoring standards to ensure accountability of halibut bycatch, and the development of a robust method of accountability for all halibut mortality within each regulatory area including non-directed commercial discard. BC regulatory area 2B maintains an excellent understanding of total halibut removals across its integrated commercial fishery structure through robust monitoring programs that come at a direct cost to fishers.

RECOMMENDATION

The Government of British Columbia's position is that the IPHC must exercise its authority to regulate the incidental catch of Pacific Halibut in all regulatory areas by:

1. **recommitting to the development of a workplan for addressing the needed improvements of monitoring requirements and developing a monitoring standard to which all regulatory areas must follow; and**
2. **establishing a robust method of accountability for all halibut mortality within each regulatory area including non-directed commercial discard mortality.**

REFERENCES

1. *BC Seafood Production data, 2019 - 2021. British Columbia Ministry of Agriculture and Food.* https://catalogue.data.gov.bc.ca/dataset/bc-seafood-production-2019-2021
2. *Statistics Canada, CATSNET Analytics, accessed September 2022*
3. *2019-2020 British Columbia Seafood Processing Employment Survey Report. British Columbia Ministry of Agriculture and Food.*
4. *NOAA Fisheries Catch and Landings Reports in Alaska (2021).https://www.fisheries.noaa.gov/alaska/commercial-fishing/fisheries-catch-and-landings-reports-alaska*
5. *Fisheries data overview (2022): Preliminary statistics (J. Jannot, H. Tran, T. Kong, K. Magrane & K. Sawyer van Vleck); IPHC-2022-IM098-07 Rev_1)*

National Report:

United State of America

PREPARED BY: NOAA FISHERIES (22 DECEMBER 2022 & 18 JANUARY 2023)

PURPOSE

To provide an overview of the fisheries and removals of Pacific halibut during 2022 from the IPHC Convention waters and the national waters of the United States of America.

This document has been updated to provide final estimates of halibut mortality in Alaska groundfish fisheries.

U.S. West Coast (Oregon, Washington, and California) — IPHC Regulatory Area 2A

The 2022 Area 2A Pacific halibut (halibut) catch limit of 1,490,000 pounds was allocated according to the 2022 Catch Sharing Plan (CSP) for Area 2A as follows:

Treaty Tribes	521,500 lb (35%)
Non-tribal Total	968,500 lb (65%)
Non-tribal Commercial	297,330 lb
Washington Recreational*	344,786 lb
Oregon Recreational*	287,645 lb
California Recreational	38,740 lb

*Includes Columbia River.

All weights in this report are net weight (gutted, head-off, and without ice and slime), unless otherwise noted. The structure of each fishery and the resulting harvests are described below.

Total Tribal and Non-tribal Fisheries

Best estimates of halibut catch for Area 2A indicate harvest of 786,234 pounds of the non-tribal total quota and 497,173 pounds of the tribal quota, with a total preliminary harvest estimate of 1,283,407 pounds, or 86 percent, of the 1,490,000-pound catch limit. A summary of all Area 2A quotas and preliminary harvest estimates for 2022 is provided in Table 2.

Tribal Fisheries

Tribal fisheries were allocated 521,500 pounds (35% of the Area 2A catch limit). The tribes estimated that 23,500 pounds would be used for ceremonial and subsistence (C&S) fisheries and the remaining 498,000 pounds were allocated to the commercial fishery.

- The unrestricted fishery was open 55 hours for each tribe. Tribes agreed on a management period to schedule their fisheries between March 6 and May 31. The unrestricted fishery landed 308,319 pounds.
    - Treaty commercial fishermen may retain all legal sized halibut during the 55-hour fishery opening.

- The restricted fishery was open 122 hours for each tribe. Tribes agreed on a management period to schedule their fisheries between March 6 and May 31. The first restricted fishery landed 121,119 pounds.
    - Treaty commercial fishermen were allowed to land up to 500 lb per calendar for each day that the fishery was open.
- The late season fishery was open June 3 – September 30. Individual tribes were allowed to pick one of the two following options to manage the fishery. The current late season fishery catch is 67,735 pounds.
    - Option 1: Restricted fishery of 48-hour duration with a 2,200-pound cumulative landing limit per vessel for the opening period.
    - Option 2: Restricted fishery of 72-hours duration with a 1,500-pound cumulative landing limit per vessel for the opening period.

The total landings for all tribal fisheries is 497,173 pounds, which is 827 pounds less than the tribal commercial allocation. The C&S fishery will continue through December 31 and catch estimates will be reported by the tribes in January 2023.

Non-tribal Commercial Fisheries

A quota of 297,330 pounds (30.7% of the non-tribal share) was allocated to two commercial fishery components:

1) a directed longline fishery targeting halibut south of Point Chehalis, WA; and
2) an incidental catch fishery during the salmon troll fisheries off Washington, Oregon, and California.

An additional 50,000 pounds were allocated to an incidental catch fishery in the sablefish primary fishery for vessels using longline gear north of Point Chehalis, WA. This allowance for the sablefish primary fishery is taken from the portion of the Washington recreational allocation that is more than 214,110 pounds, as long as it is at least 10,000 pounds more.

Incidental Halibut Catch in the Salmon Troll Fishery

A quota of 44,599 pounds of Pacific halibut (15% of the non-tribal commercial fishery allocation) was allocated to the non-tribal commercial salmon troll fishery in Area 2A as incidental catch during salmon troll fisheries.

- Halibut retention was permitted in the salmon troll fisheries beginning April 1, with the following ratio: one halibut (minimum 32 inches) per two Chinook salmon landed by a salmon troller, except that one halibut could be landed without meeting the ratio requirement, and no more than 35 halibut could be landed per trip.
- On July 1, the fishery was extended at the same ratio and landing limit.
- The fishery is estimated to have taken 22,281 pounds. This fishery closed September 30.

Fishing with salmon troll gear is prohibited within the Salmon Troll Yelloweye Rockfish Conservation Area (YRCA) off the northern Washington coast. Additionally, the "C-shaped" North Coast Recreational YRCA off Washington is designated as an area to be avoided (a voluntary closure) by salmon trollers.

Directed Fishery Targeting Halibut

A quota of 252,730 pounds (85% of the non-tribal commercial fishery allocation) was allocated to the directed longline fishery targeting halibut in southern Washington, Oregon, and California. The fishery was confined to the area south of Point Chehalis, WA (46°53.30' N. lat.).

Fishing periods were 58 hours in duration every other week, starting Tuesday, June 28. In 2022, the fishery was open for three fishing periods: June 28–30, July 12–14, and July 26–28. A 32-inch minimum size limit with the head on was in effect for all openings. Vessel landing limits per

fishing period based on vessel length were imposed by IPHC during all openings as shown in Table 1. Vessels choosing to operate in this fishery could not land halibut as incidental catch in the salmon troll fishery, nor operate in the recreational fishery.

Table 1. 2022 Fishing Period Limits (dressed weight, head-on with ice and slime, in pounds per vessel) by Vessel Size.

Vessel Class/Size (ft)		Jun 28–30	Jul 12–14	Jul 26–28
0–25	A	2,263	2,263	2,206
26–30	B	2,263	2,263	2,206
31–35	C	2,263	2,263	2,206
36–40	D	3,410	3,410	3,325
41–45	E	3,410	3,410	3,325
46–50	F	4,545	4,545	4,431
51–55	G	4,545	4,545	4,431
56+	H	5,113	5,113	4,985

- The three directed commercial open periods resulted in a catch of approximately 241,365 pounds. Final catch amounts will be available in 2023.

Incidental Halibut Catch in the Sablefish Primary Longline Fishery North of Point Chehalis, WA

A quota of 50,000 pounds was allocated to the primary sablefish fishery in Area 2A as incidental catch north of Point Chehalis, WA. This incidental fishery is only available to vessels with a groundfish limited entry permit endorsed for longline gear with a sablefish tier limit and with an IPHC license.

The fishery is confined to an area seaward of a boundary line approximating the 100-fathom depth contour. Fishing is also prohibited in the North Coast Commercial YRCA, an area off the northern Washington coast. In addition, the "C-shaped" North Coast Recreational YRCA off Washington is designated as an area to be avoided (a voluntary closure) by commercial longline sablefish fishermen.

- Starting April 1, the incidental landing limit was 225 pounds (dressed weight) of halibut per 1,000 pounds (dressed weight) of sablefish and up to 2 additional halibut in excess of the landing limit ratio.
- Effective May 9, the incidental landing limit was revised to 150 pounds (dressed weight) of halibut per 1,000 pounds (dressed weight) of sablefish and up to 2 additional halibut in excess of the landing limit ratio.
- Through October 4, this fishery is estimated to have landed 57,061 pounds, having exceeded the incidental halibut allocation for the sablefish fishery by 7,061 pounds. The fishery's season ended on October 31.

Recreational Fisheries (Non-tribal)

A total of 621,171 pounds was allocated between recreational fisheries in Washington (35.6% of non-tribal share, less 50,000 pounds allocated to the incidental catch in the sablefish primary fishery), Oregon (29.7% of the non-tribal share), and California (4.0% of the non-tribal share). The allocations were further subdivided as quotas among six geographic subareas as described below. Unless otherwise noted, the daily bag limit in all subareas was one halibut of any size, per person, per day.

Washington Inside Waters Subarea (Puget Sound and the Strait of Juan de Fuca)

This area was allocated 83,210 pounds (23.5% of the first 130,845 pounds allocated to the Washington recreational fishery, and 32% of the Washington recreational allocation between 130,845 and 224,110 pounds). The fishery in Puget Sound and eastern waters in the Strait of Juan de Fuca was open April 7–9, 14–16, 21–23, 28–30; May 5–7, 12–14, 19–21, 27–29; June 2–4, 9–11, 16–18, 23–25; and Jun 30; and August 11–September 30. The western waters in the Strait of Juan de Fuca were open May 5, 7, 12, 14, 19, 21, 27–29; June 2–4, 9–11, 16–18, 23–25, and 30; and August 11–September 30.

- The estimated total catch in this area is 64,285 pounds, which is 18,925 pounds less than the allocation.

Northern Washington Coastal Waters Subarea (landings in Neah Bay and La Push)

The coastal area off Cape Flattery to Queets River was allocated 133,847 pounds (62.2% of the first 130,845 pounds allocated to the Washington recreational fishery, and 32% of the Washington recreational allocation between 130,945 and 224,110 pounds). The fishery was open May 5, 7, 12, 14, 19, 21, 27, and 29; June 2, 4, 9–11, 16–18, 23–25; June 30; Thursday through Monday August 11–September 5; and 7 days per week September 6–30. The "C-shaped" North Coast Recreational YRCA, southwest of Cape Flattery, was closed to recreational halibut fishing.

- The estimated total catch for this area is 96,209 pounds, which is 37,638 pounds less than the allocation.

Washington South Coast Subarea (landings in Westport)

The area from the Queets River to Leadbetter Point was allocated 68,555 pounds (12.3% of the first 130,845 pounds allocated to the Washington recreational fishery and 32% of the Washington recreational allocation between 130,845 and 224,110 pounds). The all-depth fishery was open May 5, 8, 12, 15, 19, 22, and 26; June 16, 19, 23, 26, 28, and 30; August 19, 25, 28; and September 3, 4, and 23.

- The all-depth fishery estimated catch is 71,203 pounds, which is 2,648 pounds more than the allocation.

Columbia River Subarea (Leadbetter Point to Cape Falcon)

This recreational fishery subarea was allocated 19,037 pounds, consisting of 2.0% of the first 130,845 pounds allocated to the Washington recreational fishery, 4.0% of the Washington recreational allocation between 130,845 and 224,110 pounds, 2.3% of the Oregon recreational allocation, and any allocation over 8,000 pounds in the Southern Oregon subarea. The subarea consists of an all-depth and nearshore fishery. The nearshore fishery is allocated 500 pounds to accommodate incidental halibut retention during groundfish fishing when the all-depth halibut fishery in this area is closed.

- The all-depth fishery was open May 5, 8, 12, 15, 19, 22, and 26; June 2, 5, 9, 12, 13, 16, 19, 20, 23, 26, and 30; August 19, 25, 28; and September 3, 4, and 23. The nearshore fishery opened May 9, and was open Monday–Wednesday until September 30.
- The all-depth fishery estimated catch is 20,211 pounds, which is 1,174 pounds more than the combined subarea quota.
- The nearshore fishery estimated catch is 43 pounds.

Oregon Central Coast Subarea (Cape Falcon to Humbug Mountain)

This recreational fishery subarea was allocated 269,782 pounds (93.79% of the Oregon recreational allocation). Beginning September 1, the daily bag limit was increased from one to two fish.

Three seasons occurred in this subarea:

- Nearshore restricted-depth (inside 40-fathom) fishery, open on May 1, seven days per week until September 4.
- Spring all-depth fishery, open on May 12, seven days per week through June 30, then July 14–16 and 29–30.
- Summer all-depth fishery, open August 4–6, 11–13, 18–20, and 25–27; September 1–October 31, seven days per week.

Harvest in this subarea during these seasons is summarized in the bullets below.

- The Spring all-depth fishery resulted in an estimated catch of 123,359 pounds, which is 46,604 pounds less than the spring allocation.
- The Summer all-depth fishery has an estimated catch of 41,947 pounds, which is 25,498 pounds less than the allocation.
- The inside 40-fathom fishery has an estimated catch of 4,846 pounds, which is 27,528 pounds less than the allocation.

Southern Oregon (Humbug Mountain to the OR/CA Border)

This recreational fishery was allocated 8,000 pounds (3.9% of the Oregon recreational fishery allocation minus the Oregon contribution to the Columbia River subarea). This area has a pre-set season of 7 days per week from May 1 to October 31. Beginning September 1, the daily bag limit was increased from one to two fish.

- This fishery has estimated catch of 8,714 pounds, which is 714 pounds more than the allocation.

California (Off the California Coast)

This recreational fishery was allocated 38,740 pounds (4.0% of the non-tribal share). The fishery was open May 1–August 7, closing once the quota was projected to be taken.

- The fishery has an estimated catch of 48,009 pounds which is 9,269 pounds more than the allocation.

Table 2. Summary of Area 2A Fishery Allocations and Preliminary 2022 Harvest Estimates, Updated with Fishery Information Reported to NMFS through December 16, 2022

IPHC Regulatory Area 2A Fisheries		Allocation (lb)	Landings (lb)	Allocation Taken (%)
Tribal		**521,500**	**497,173**	**95**
Tribal	C&S	23,500	-	-
Tribal	Commercial	498,000	497,173	100
Non-Tribal		**968,500**	**786,234**	**81**
Commercial		**297,330**	**263,646**	**89**
Commercial	Directed	252,730	241,365	96
Commercial	Incid. Salmon Troll	44,599	22,281	50
WA Recreational		**344,786**	**283,501**	**82**
WA Rec.	Incid. Sablefish	50,000	57,061	114
WA Rec.	Puget Sound	83,210	58,957	71
WA Rec.	North Coast	133,847	96,209	72

IPHC Regulatory Area 2A Fisheries			Allocation (lb)	Landings (lb)	Allocation Taken (%)
WA Rec.	South Coast		68,555	71,203	104
WA/OR	Columbia River	All-Depth	18,537	20,211	109
WA/OR	Columbia River	Nearshore	500	43	9
OR Recreational			**287,645**	**178,866**	**62**
OR Rec.	Central OR Coast	Spring all-depth	169,963	123,359	73
OR Rec.	Central OR Coast	Summer all-depth	67,445	41,947	62
OR Rec.	Central OR Coast	Nearshore	32,374	4,846	15
OR Rec.	Southern OR		8,000	8,714	109
CA Recreational			**38,740**	**48,009**	**124**
Total			**1,490,000**	**1,291,378**	87

Law Enforcement — West Coast Area 2A

NOAA's Office of Law Enforcement (OLE) protects marine wildlife and habitat by enforcing domestic laws and international treaty requirements implemented to ensure these global resources are available for future generations. The 2022 IPHC Area 2A Enforcement Report summarizes the collective activities of the IPHC Area 2A cooperating federal and state entities, and includes the individual state enforcement reports to provide more detailed information about their respective enforcement and compliance efforts. Tribal reports are provided separately.

Enforcement of the commercial, tribal, and recreational Pacific halibut fisheries in International Pacific Halibut Commission Area 2A is an ongoing multi-agency effort performed cooperatively by NOAA Fisheries Office of Law Enforcement (OLE) West Coast Division (WCD), the U.S. Coast Guard (USCG), Washington Department of Fish and Wildlife Police (WDFW), Oregon State Patrol Fish and Wildlife Division (OSP), California Department of Fish and Wildlife Enforcement Division (CDFW), and Tribal Enforcement.

Tables 3 through 5 present a consolidated summary of IPHC Area 2A Commercial–Directed, Commercial–Incidental, and Recreational enforcement statistics for 2022 using available data elements provided by OLE, USCG, WDFW, OSP, and CDFW enforcement partners. Table 3 summarizes *Effort*, *Actions* and *Results* data for the directed commercial Pacific halibut fishery south of Point Chehalis, Washington (46°53′30″ N). Tables 4 and 5 summarize general Magnuson-Stevens Act (MSA) fisheries enforcement that broadly include the two other fishing sectors that catch Pacific halibut: Commercial-Incidental, and Recreational. *Effort* data provides a measure of fisheries-related enforcement coverage and capacity. The *Actions* and *Results* sections provide an overview of regulatory compliance and enforcement issues of concern associated with the fishing sectors.

Table 3. 2022 IPHC Area 2A Enforcement Statistics: Commercial Directed

COMMERCIAL — DIRECTED							
	USCG D-13	USCG D-11	NOAA OLE - WCD	WDFW	OSP - ODFW	CDFW	
EFFORT							**CONSOLIDATED EFFORT**
AIR PATROLS							
Number of Air Patrols	26	7					33
Air Patrol Hours	79	14					93
Air Patrol Personnel Hours			30				30
VESSEL PATROLS							
Number of USCG Cutter Patrols	3	4					7
USCG Cutter Patrol Hours	180	106					286
Number of Shore-Based Vessel Patrols	24	3		2	6	1	36
Shore-Based Vessel Patrol Hours	44	5		17	30	3	99
At-Sea Personnel Hours				41	32	6	79
Number of Boardings	25	7		10	4	0	46
SHORESIDE PATROLS							
Number of Shoreside Patrols			22	5	12	2	41
Shoreside Personnel Hours			188	16	44	4	252
Number of Contacts			49	15	33	7	104
OFFICERS/AGENTS/WARDENS							
Number of Assigned Personnel	78	82	5	11	5	4	185
ACTIONS							**CONSOLIDATED ACTIONS**
Written Warnings			7		2		9
Citations				3	3		6
Summary Settlements			3				3
Verbal Warnings				3			3
Compliance Assistance			2				2
NOAA Referral					1		1
RESULTS (Violations)							**CONSOLIDATED RESULTS**
Fail to use Seabird Avoidance Gear*			6				6
Logbook/Record Keeping			1		3		4
Permit/License			1		1		2
Closed Season (early/late fishing)			2				2
Fail to Sell to Wholesale Dealer					1		1
VMS*			1				1

*Groundfish violations that were documented during a combined Directed Halibut/Open Access Groundfish trip.

Table 4. 2022 IPHC Area 2A Enforcement Statistics: Commercial Incidental

COMMERCIAL — INCIDENTAL							
	USCG D-13	**USCG D-11**	**NOAA OLE - WCD**	**WDFW**	**OSP - ODFW**	**CDFW**	
EFFORT							**CONSOLIDATED EFFORT**
AIR PATROLS							
Number of Air Patrols	131	266					397
Air Patrol Hours	530	598					1,128
VESSEL PATROLS							
Number of Cutter Patrols	42	42					84
Cutter Patrol Hours	1,671	1,963					3,634
Number of Shore-Based Boat Patrols	135	39					174
Shore-Based Boat Patrol Hours	309	77					386
Number of Boardings	77	28					105
OFFICERS/AGENTS/WARDENS							
Number of Assigned Personnel	78	82				4	164
ACTIONS							**None**
RESULTS (Violations)							**None**

Table 5. 2022 IPHC Area 2A Enforcement Statistics: Recreational

RECREATIONAL							
EFFORT	USCG D-13	USCG D-11	NOAA OLE - WCD	WDFW	OSP - ODFW	CDFW	Total
AIR PATROLS							
Number of Air Patrols	136	157					293
Air Patrol Hours	478	336					814
VESSEL PATROLS							
Number of Cutter Patrols	81	39					120
Cutter Patrol Hours	4,154	1,742					5,896
Number of Shore-Based Boat Patrols	238	32		29	8	24	331
Shore-Based Boat Patrol Hours	586	66		154	50	50	906
At-Sea Personnel Hours			8	334	67	65	474
Number of Boardings	223	20		329	50	79	701
SHORESIDE PATROLS							
Number of Shoreside Patrols			3	24	17	84	128
Shoreside Personnel Hours			10	102	53	164	329
Number of Contacts			3	324	145	417	889
OFFICERS/AGENTS/WARDENS							
Number of Assigned Personnel	78	82	2	17	8	9	196
ACTIONS							**Total**
Citations				64	15		79
Verbal Warnings				54			54
Compliance Assistance					8	9	17
Other						3	3
RESULTS (Violations)							**Total**
Gear Violation				30	1	1	32
Permit/License				27	3	1	31
Illegal Harvest				12			12
Restricted/Closed Area				10			10
Overage				5	2		7
Fail to Validate Tag					6		6
Closed Season (early/late fishing)				2		1	3
Aiding in Wildlife Violation					2		2
Unlawful Possession of Mutilated Fish					1		1

Washington Department of Fish & Wildlife (WDFW) — Police

WDFW Pacific halibut land-based enforcement activities include conducting dockside patrols to monitor commercial catch off-loads (including incidental catch), ensuring individual and vessel license compliance, coordinating activities related to compliance and verification checks, and carrying out collaborative enforcement efforts. WDFW at-sea responsibilities include patrolling its Pacific Ocean area of responsibility, conducting joint enforcement operations, and inspecting at-sea vessels and personnel for licenses, federal permits, logbooks, marine permits and registrations, and catch, with emphasis on activities within the U.S. Exclusive Economic Zone. Pacific halibut is shared among four user groups in Washington State: recreational, directed non-tribal commercial, non-tribal incidental, and tribal fishermen.

Table 6. Washington Department of Fish and Wildlife Enforcement Statistics: 2020–2022

	2022	2021	2020
Participating WDFW Officers	17	21	20
Dockside Personnel Hours	118	182	219
At-Sea Personnel Hours	375	533	608
Boardings/Contacts Made (Total)	678	1,169	1,680
Commercial — Directed	25	21	N/A
Commercial — Incidental	0	4	N/A
Recreational	653	1,144	N/A
Enforcement Actions	124	349	216

New Coastal Patrol Boat

WDFW acquired a new 41-foot coastal patrol boat that replaces the P/V *Corliss*. This vessel was funded through the Joint Enforcement Agreement and State Funds. Officers put many hours on it enforcing the halibut fisheries this past year.

Figure 1. Washington Department of Fish and Wildlife's new 41-foot coastal patrol boat

WDFW Police and US Coast Guard teamed up in a joint operation named Operation Barn Door for the Puget Sound recreational halibut opener. WDFW patrol boats as well as the USCG Cutter *Wahoo*, Station Port Angeles, and the USCG Air Station in Port Angeles all participated. WDFW Officers patrolled Marine Area 6 on the opener observing and citing anglers for the following violations: fishing with illegal gear, fail to record halibut, and no license. WDFW Officers Wessel

and Davidson patrolling Marine Area 5 for closed-season halibut fishermen boarded one recreational vessel fishing for salmon. The anglers possessed several un-recorded salmon, and salmon in an unlawful condition (no proof of hatchery origin or length). The salmon anglers will be cited through the mail for the violations. The boarding crew of the Cutter *Wahoo* (based in Port Angeles) apprehended two subjects aboard a vessel near Hien Bank who possessed illegal narcotics including two dozen unprescribed opioid pills, and several grams of cocaine. The following day the same boarding team caught an illegal charter vessel targeting halibut. The operator of the vessel did not have a valid USCG license and was not enrolled in a required drug screening program. Special thanks to the USCG Air Station in Port Angeles for getting WDFW Pilot Kimbrel up for a boat effort count of Marine Area 6 on the Thursday opener (the WDFW plane was grounded as logistical issues hampered delivery of repair parts). Sgt. Alexander, Officer Cilk and Baldwin performed a boat patrol in MA 2 and boarded multiple boats; two citations were issued for failing to record halibut.

Figure 2. WDFW Patrol Boat #2 and USCG Cutter *Wahoo* in the Strait of Juan de Fuca

Sgt. Rosenberger and Officer Langbehn patrolled the Ocean on a Saturday halibut opener. One group was cited for failing to record halibut, and another vessel was cited for fishing for halibut within the “C” closure off the north Coast.

Sgt. Rosenberger, Officer Hillman, and SO McOmber patrolled the last day of halibut fishing for May in Marine Areas 4 and 5. Warnings were issued for barbed hooks and no descending devices. Violations included illegal rockfish species retained, failing to record halibut on catch record cards, and 2 undersized lingcod which were seized and later donated. One vessel was contacted and the individuals on board claimed they only caught one rockfish for the day. A halibut harpoon was observed on the side of the vessel. When asked to open a fish well, one individual admitted that they had retained a small halibut. The individual had not purchased their halibut catch record card, and both individuals conveniently appeared baffled that it was required after the halibut was located. Criminal citations were issued for failing to submit and retaining halibut without the required catch record card.

Sgt. Dielman and Officer Garrison conducted a boat patrol for halibut anglers in MA1. Compliance was high with only one verbal warning for untagged halibut aboard a charter boat. Several whales were spotted and entered into Whale Alert.

Sgt. Dielman and Officer Garrison spent time patrolling commercial salmon and recreational halibut fishermen in MA 1 and 2 this week. They cited one commercial fisherman criminally for fishing with barbed hooks.

Officers Garrison, Ariss and Sgt. Dielman travelled to Neah Bay on the new coastal patrol vessel *O’Hagan* to work 3 days halibut fishing along with the opener of coastal salmon in Marine Areas

3 and 4. Numerous tickets were written for fail to record, fishing in a closed area, use of barbed hooks, and expired registration. There were two very notable cases, however. The first involved the overlimit on halibut of a charter boat well known for numerous violations including stowing additional fish in a hidden compartment. Though the additional halibut Officers Garrison and Ariss located were not in a hidden compartment, it was enough to put them over their limit. The second case made by Detachment 3 involved a bottomfishing vessel fishing in a rockfish conservation area. As the officers approached, Sgt. Dielman observed a yelloweye rockfish floating about two feet from the suspect vessel. Sgt. Dielman grabbed it out of the water and realized the fillets had been removed from it. Though there were no other boats within 5 miles, the suspect stated “That is not mine.” Once on board, the group was found to also be overlimit on halibut (they had started to fillet the excess fish), had not recorded any halibut, and did not possess a descending device. In total, all the adults were cited for fishing closed area and fail to record. The Captain received additional citations for the yelloweye rockfish, overlimit halibut, fail to submit catch for inspection, wastage, and descending device. A total of 11 lingcod, 8 halibut, and one canary rockfish were seized and later donated.

Figure 3. Charter boat with an overlimit of halibut being boarded by Officers Garrison and Ariss

Figure 4. Fish seized from one vessel in a rockfish conservation area. Note the filleted yelloweye and partially-filleted overlimit of halibut.

Figure 5. Officer Garrison and Sgt. Dielman onboard a vessel in the rockfish conservation area.

During this 5-day patrol, the crew of DFW #3 covered an average of approximately 120 miles per day. DFW #3 allowed the crew to patrol these great distances in relative comfort even on days when the sea conditions were far from ideal. In total, 32.5 hours of vessel patrol time was completed towards JEA Enforcement Priority #5. This is over half of the remaining time and almost half of the initial time required. In addition, 8 hours of vessel time was coded towards JEA

Enforcement Priority 1. A total of 31 citations, including several criminal charges, were issued along with dozens of verbal warnings. Twenty-three unlawfully possessed fish were seized and later donated.

Officer Hillman, Officer Tupen, and SO McOmber patrolled Marine Area 4 for halibut and bottomfish. One boat was found in violation for possessing rockfish beyond the 120-foot Bottomfish Closure with one black rockfish and one copper rockfish. Another vessel contacted at Shipwreck Point was found with two full bags of fresh bottomfish fillets, and was issued an infraction for the violation.

Officer Hillman and Officer McOmber patrolled the docks at Quileute Harbor Marina for the salmon opener in Marine Areas 3 and 4. One individual was found in possession of a halibut but could not produce a license or catch record card. He claimed he lost it out of his hoodie pocket. After verifying the individual possessed a valid license and catch record card, he was allowed to keep the halibut and issued an infraction notice. Other violations were found for no license on person and a minor lingcod overlimit.

Officer Tupen and Sergeant Rosenberger conducted a boat patrol in Marine Area 5 on Saturday, aboard a 14-foot WDFW Boston whaler. This vessel is low profile allowing the officers to approach anglers without detection. Many violations were encountered with several salmon anglers cited for fail to record catch and unlawful gear. Near Pillar Point the officers contacted a vessel with two anglers aboard fishing for halibut. The officers quickly observed a rope leading from the vessel into the water. The occupants aboard the vessel told the officers that they had retained two halibut. Upon inspection it was observed that the one angler had failed to record his halibut. The other angler had already recorded his season limit of four halibut earlier. The rope was found to have a live halibut tied it below the boat with a quick release knot. The suspect admitted that they were surprised to be contacted by the officers in such a small boat. The halibut was seized, and Officer Tupen will forward charges for over-limit on halibut, and the other subject will be mailed a ticket for fail to record.

Figure 6. Live halibut seized and released by Officer Tupen and Sgt. Rosenberger

The next boat the officers contacted had three anglers with five halibut (limit is one halibut per person) and one closed season lingcod onboard. Additionally, none of the halibut were recorded. Two halibut and the lingcod were seized. Charges will be referred for possessing a closed season lingcod, overlimit of halibut, and failing to record the halibut.

Figure 7. Officer Tupen with overlimit halibut and closed-season lingcod

Officer Tupen worked the La Push docks in Marine Area 3. One contact consisted of three anglers in possession of three halibut, four salmon, and some bottom fish. Officer Tupen discovered one of the men did not have an active fishing license. The angler thought he had an annual license but had only purchased a 1-day fishing license. Additionally, only three of the seven retained fish had been recorded on catch cards. One halibut was seized, and charges will be referred for the angler in possession of a halibut without a valid fishing license.

Officer Baldwin, Officer McOmber, and Sergeant Cilk conducted boat patrols in Marine Area 2 for recreational salmon and halibut. Several violations were addressed for failure to record, fishing with barbed hooks, and fishing for halibut without a valid catch record card.

Figure 8. Detachment 2 officers on boat patrol in Marine Area 2 for halibut and salmon

Officer McOmber patrolled Westport boat launch for recreational halibut and salmon. Violations were addressed for failure to record and retention of halibut without a valid catch record card. Another vessel contacted had four fishermen and four halibut onboard but only two halibut licenses. Two halibut were seized and it was noted each individual had been recording previously-caught halibut on the back of the salmon catch cards.

In September, WDFW created a new detachment in the Forks area. Sgt. Harry Cilk was promoted and will lead the officers up there

Sergeant Cilk worked the docks in La Push shortly after being promoted. While contacting one vessel, Sgt. Cilk noticed halibut had been recorded over a previous date. When pointed out to the fisherman, Sgt. Cilk advised him to fix it. The fisherman then recorded the fish over another previously-marked fish. When asked if he had any prior violations and the fisherman said that he did, Sgt. Cilk issued him a ticket for failing to record a halibut. Sgt. Cilk researched the history of the fisherman and found that Officer Garrison had cited the individual earlier in the year for the violation. Officer Garrison was able to provide a picture of the catch card that was different from the one currently being used. After a short conversation, the subject admitted to buying a duplicate catch card and harvesting more than the annual limit of four halibut. The subject had purchased two duplicate cards this year. Charges will be forwarded. The halibut was seized and donated to the Quileute tribal senior center.

Figure 9. Previously-marked halibut catch card

Oregon State Police (OSP) — Fish & Wildlife Division

Table 7. Oregon State Police Enforcement Statistics: 2020–2022

	2022	2021	2020
Participating OSP Troopers	8	8	17
Dockside Personnel Hours	97	197	264
At-Sea Personnel Hours	99	170	461
Boardings/Contacts Made (Total)	232	303	802
Commercial — Directed	37	21	93
Commercial — Incidental	0	0	N/A
Recreational	195	282	709
Enforcement Actions	123	26	57

Commercial Halibut

OSP Fish and Wildlife Troopers conducted a multi-day ocean and Columbia River patrol focusing on commercial and recreational halibut, salmon, and steelhead. Troopers were on the commercial halibut grounds to ensure boats ceased fishing when the season closed. Troopers contacted a commercial boat that had not been issued the correct halibut permit to allow for fishing in the directed halibut season but had retained halibut and sablefish. The vessel also did not have required VMS tracking for retention of the sablefish. OSP is working with NOAA for enforcement action.

A Fish and Wildlife Trooper contacted a commercial fishing vessel in Charleston. The vessel owner holds a limited fish seller's permit. The vessels log books were not accurately filled out. A records check indicated the permit holder had not submitted multiple fish tickets after 14 days past the landing date with a catch of sablefish and halibut. On submitted fish tickets there were no skate or lingcod listed, but they were listed in the logbook and the captain indicated they were onboard. The Captain was criminally cited for failing to complete a fish ticket and warned for failing to accurately maintain his logbook and Fail to maintain proper fish dealer records.

Fish and Wildlife Troopers participated in a weeklong ocean Guardian patrol hitting ports from Pacific City to the Oregon/California border. The patrol was aimed at commercial and sport fisheries in areas not regularly patrolled. The patrol was successful in contacting commercial fisheries not normally checked at sea. The team contacted a multitude of commercial vessels fishing for whiting, pink shrimp, sablefish, halibut and salmon. Recreational anglers were also a focus, and anglers were contacted who were fishing for halibut, salmon and groundfish. Numerous citations were issued for a variety of violations.

Figure 10. OSP Fish and Wildlife Troopers on Patrol

Recreational Halibut

OSP Fish and Wildlife Troopers from Newport conducted an offshore patrol to focus on recreational halibut. One recreational halibut boat was found fishing just inside the Stonewall Banks RCA and warned.

A Fish and Wildlife Trooper was checking halibut anglers as they came in to the Port of Siuslaw. During the contacts they identified an angler who had not tagged his halibut and was unfamiliar with how to do so on his electronic harvest card. The Trooper showed the angler how to do it and issued him a citation for failing to immediately validate harvest card.

Fish and Wildlife Troopers conducted a boat patrol in the ocean out of Depoe Bay focusing on halibut anglers, ground fish anglers, and salmon anglers. During one contact 3 halibut anglers were contacted and admitted they had not tagged halibut they caught for the last two days. The Troopers discovered one angler did not have a harvest card and one halibut was seized. The anglers were issued citations for no harvest card, failing to validate harvest card, and aiding in a wildlife violation.

Fish and Wildlife Troopers performed a boat patrol on the ocean from Charleston to Winchester Bay checking recreational halibut anglers. The Troopers made contact with a boat on the ocean near Winchester Bay. There were 4 subjects on board the boat. The Troopers gained consent to inspect licenses and catch after the captain offered their licenses. The inspection revealed the subjects had 4 halibut on board, 2 of which had not been tagged. After the subjects stated those were all the fish on board, a consent search of the transom fish hold resulted in the discovery of two additional halibut. The captain of the boat took responsibility for the extra concealed halibut. The captain was criminally cited and released for exceeding daily bag/possession limit - halibut x2 and for failure to immediately validate combined angling harvest card. Additional charges are being referred to the district attorney's office for failure to allow inspection of catch and falsely applying for a resident angling license. A second subject was cited for failure to validate combined angling harvest card and was warned for no valid license in possession. Two halibut were seized.

Figure 11. OSP Fish and Wildlife Troopers with Seized Halibut

Fish and Wildlife Troopers contacted a boat returning from halibut fishing at the South Beach Marina. During the contact, an angler disclosed that in addition to the halibut they had checked, he had another filleted halibut on board from the day before. The angler was cited for Exceeding Possession Limit of Pacific Halibut, and warned for Possession of Mutilated Marine Fish. The filleted halibut was seized and donated to the Newport Senior Center.

A Fish and Wildlife Trooper conducted an ocean patrol from Nehalem to Cannon Beach. Numerous recreational salmon anglers, halibut anglers, rockfish anglers, and commercial salmon fisherman were contacted. Five citations were issued for Angling Prohibited Method - Barbed Hooks for Salmon, one citation was issued for Taking Halibut - No Harvest Card, one citation was issued for Taking Salmon - No Harvest Card, and one citation was issued for Fail to Immediately Validate Harvest Card - Halibut.

Figure 12. OSP Fish and Wildlife Trooper Boarding Vessel

A Fish and Wildlife Trooper conducted dockside patrols in Newport during a high traffic ocean day. The Trooper contacted multiple anglers. A citation was issued for No Angling Tag and one halibut was seized.

A Fish and Wildlife Trooper proceeded to South Beach in Newport in response to an ODFW call regarding an angler who retained a lingcod during an offshore halibut trip. The Trooper contacted the fisherman and he stated that he had not looked at the current fishing regulations online, and did not know he could not retain lingcod while fishing outside the 40-fathom line. The Trooper also checked three legal halibut that were retained during the trip.

California Department of Fish and Wildlife (CDFW) — Law Enforcement Division

Table 8. CDFW Enforcement Statistics: 2020–2022

	2022	2021	2020
Participating CDFW Wardens	9	9	9
Dockside Personnel Hours	168	178	66
At-Sea Personnel Hours	71	116	9
Boardings/Contacts Made (Total)	503	319	161
Commercial — Directed	7	24	14
Commercial — Incidental	0	9	N/A
Recreational	496	286	147
Enforcement Actions	3	9	0

During the 2022 Pacific halibut season, patrols by CDFW Wildlife Officers covered the major ports in Mendocino, Humboldt, and Del Norte Counties, and approximately 15 recreational boat launch ramps. CDFW patrolled, contacted, and regularly checked 12 party boats targeting halibut between Shelter Cove and Crescent City. Offshore halibut patrols were made in combination with salmon and rockfish patrols. Nine CDFW officers were involved in halibut season patrols patrolling from the Gualala River north, working the ports of Pt. Arena, Albion, Noyo Harbor, Shelter Cove, Eureka, Trinidad, and Crescent City.

Fifty near-shore vessel hours were used in support of enforcement of halibut fishing regulations.

Seven commercial contacts and 417 recreational contacts were made enforcing halibut regulations. Three citations were issued this year. One citation was issued for no fishing license. The second citation was issued for fishing for Pacific halibut with too many rods. A third citation was issued for fishing for Pacific halibut after the quota was reached and the season was closed.

Figure 13. CDFW Wildlife Officer issued a citation for retention of Pacific halibut out of season

NOAA Fisheries Office of Law Enforcement — West Coast Division

During 2022, NOAA Fisheries' Office of Law Enforcement (OLE) West Coast Division (WCD) continued to work closely with the USCG D-13/D-11 and state Joint Enforcement Agreement (JEA) partners to monitor activities associated with the Pacific halibut fisheries, pursuant to IPHC regulations. As one of its recurring annual enforcement priorities, the USCG D-13/D-11, OLE - WCD, and JEA partners from WDFW, OSP, and CDFW, conducted air, at-sea, and shore-based patrols, vessel boardings, and monitoring of fish landings to ensure compliance with Area 2A Pacific halibut fishery regulations. Enforcement emphasis was also placed on monitoring commercial groundfish bottom longline vessels landing halibut for compliance with seabird bycatch minimization measures implemented in January, 2020.

IPHC Area 2A 2022 Halibut Openers

The IPHC has set forth the Pacific Halibut fishing periods for Area 2A in Section 9 Part 2 of the 2022 IPHC Halibut Fishery Regulations, and is adopted by U.S. regulation at 50 Code of Federal Regulations §300.62. The fishery is restricted to waters south of Point Chehalis, Washington (46°53′30″ N) under regulations promulgated by the National Marine Fisheries Service (NMFS). Fishing activities occur predominantly along the 100–150-fathom curve off Grays and Astoria Canyons, Heceta and Stonewall Banks, and the Bandon High Spot. Operation Flatfish Frenzy is planned and executed annually in support of the IPHC Area 2A Halibut Openers.

Operation Flatfish Frenzy

Operation Flatfish Frenzy enforcement efforts focused on ensuring commercial fisherman participating in the 2022 directed fishery practiced careful release methods for Pacific halibut, complied with opener start and stop times, adhered to area restrictions, properly recorded offloads, and followed retention requirements. This was also the third year longline fishing vessels landing groundfish were required to use seabird avoidance gear when setting gear.

On April 25, OLE-WCD contacted the Public Affairs Office to coordinate a media release for the upcoming Operation Flatfish Frenzy 2022.

On May 11, OLE contacted JEA partners to assess participation and available assets for the operation. OLE then coordinated with partners to maximize enforcement coverage during the operation. CDFW assigned one of its officers to fly aboard the USCG C-27 tasked with flying over the usual fishing areas to gather real time intelligence that could then be relayed to USCG rotary-wing and surface assets. An OLE Enforcement Officer (EO) was assigned to board the USCG Cutter *Steadfast*, and conduct air operation and subsequent boat operations during the first opener. The operation plan called for EOs to participate in air operations aboard USCG air assets on the first and last days to observe opening and closing times, and verify use of seabird avoidance gear. Additional air operations were planned for midweek as schedules and weather permitted to continue monitoring of the fishery. Dockside patrols were also planned for the duration of each of the openers, and the day after closing. These patrols focused on offload monitoring, permit verification, and logbook review.

Enforcement efforts for the first IPHC opener were conducted from Tuesday June 28th to Thursday June 30th, with follow-up operations on July 1st for additional offload monitoring. An EO was assigned to patrol operations in the Coos Bay, OR, area. Another EO participated in at-sea patrols off the coast of Washington and Oregon. A Special Agent (SA) was assigned to patrols in Newport, OR, and investigative support for potential instances of complex or criminal

investigations occurring in Area 2A during the operations. Due to staffing shortages during the first opener, patrols were limited. In addition, EO participation aboard the USCG Cutter *Steadfast* were canceled due to Covid-19 concerns. Air operations consisted of 5 patrols totaling 21 flight hours with no observed violations. No at-sea patrols were conducted during the first opener. Eight shoreside patrols were conducted totaling 77 hours, and resulting in 17 dockside boardings, and 2 state violations observed that were referred to JEA partners for further handling.

Figure 14. NOAA OLE enforcement officer inspects an offload in Newport, Oregon

IPHC Area 2A enforcement activities for the second opener were conducted from Tuesday July 12th to Thursday July 14th, with follow-up operations on July 15th. An EO was assigned to patrol operations in the areas of Coos Bay and Newport, OR, and Ilwaco, WA. An SA was assigned to provide investigative support for potential instances of complex or criminal investigations arising from any of the operations. Air patrols were considerably hampered by poor weather conditions, and most of the planned flight operations were subsequently canceled. Ultimately, two air patrols totaling 7 flight hours were conducted. NOAA OLE personnel observed two vessels fishing after the designated fishery closing time. No at-sea patrols were conducted during the second opener. Seven shoreside patrols were conducted totaling 42 hours. The patrols resulted in 21 vessels contacted. The outcome of the contacts was 1 compliance assistance provided, 1 written warning issued, 1 violation referred to JEA partner, 2 over catch limits, 1 IPHC permit issue, and 3 failures to utilize seabird avoidance gear.

Figure 15. NOAA OLE Enforcement Officer inspects an offload of halibut in Newport, OR

Enforcement operations for the third and final 2022 IPHC Area 2A opener were conducted from July 26th to July 28th, with follow-up operations on July 29th. An EO was assigned patrol operations in the areas of Coos Bay Newport and Astoria, OR, and Ilwaco, WA. An SA was assigned to provide investigative support for potential instances of complex or criminal investigations arising from any of the operations. Air operations were again considerably hampered by poor weather conditions with most flight operations being canceled due to heavy offshore fog. However, 2 patrols were still conducted for a total of 7 flight hours. The flights focused on the detection of sea bird avoidance gear violations, as well as fishing activity after the designated closing time. No at-sea patrols were conducted during this opener. Six shoreside patrols totaling 52 hours were conducted, and resulted in 14 vessels contacted. These contacts identified 1 logbook violation, 1 VMS violation, 3 fishing without sea bird avoidance gear, and 1 violation referred to JEA partners.

Figure 16. Air operations significantly hampered by poor weather conditions during most of the openers

Alaska – IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4CDE

Charter Halibut Fisheries

The Area 2C and 3A Halibut Catch Sharing Plan was implemented in 2014, and is used to determine the allowable charter halibut harvest in those areas. The Catch Sharing Plan also endorses a process through which the North Pacific Fishery Management Council (NPFMC) recommends annual management measures to the IPHC that are likely to limit charter harvests to their annual catch limits.

In October 2022, the Alaska Department of Fish and Game provided final estimates of the 2021 sport halibut removals and preliminary estimates of the 2022 removals for Areas 2C, 3A, 3B, and 4, including information on estimation methods (King, Webster, et al. 2022).[1] Additional details on estimation methods are available in Webster and Buzzee (2020).[2]

2021 Final Harvest Estimates

The Area 2C charter fishery regulations for 2021 included a one-fish daily bag limit and reverse slot (or "protected slot") limit that allowed harvest of halibut less than or equal to 50 inches and halibut greater than or equal to 72 inches. The Area 3A charter regulations included a two-fish bag limit with a maximum size of one fish of 32 inches, a limit of one trip per charter vessel per day (on which halibut are harvested), a limit of one trip per Charter Halibut Permit (CHP) per day, and a closure of halibut retention on all Wednesdays. Charter fishery regulations in the remainder of the state and unguided fishery regulations statewide included a daily bag limit of two fish of any size.

The 2021 Area 2C estimated sport harvest (excluding release mortality) was 143,167 fish, for a yield of 2.292 million pounds. Area 2C charter removals (including release mortality) were estimated to be 1.163 Mlb, approximately 43.6% over the allocation. Unguided removals were estimated to be 1.185 Mlb. The Area 3A estimated sport harvest was 279,794 fish, for a yield of 3.815 Mlb. Area 3A charter removals were estimated to be 2.455 Mlb, approximately 25.9% over the allocation. Unguided removals were estimated to be 1.398 Mlb. Areas 3B and 4 do not have separate charter allocations. The final harvest estimates for western Areas were 769 halibut in Area 3B and 78 halibut in Area 4. Applying the Kodiak unguided average weight of 14.23 lb resulted in yield estimates of 0.011 Mlb in Area 3B and 0.001 Mlb in Area 4. Additional detail on numbers of fish harvested and released, releases by size category, average weights, and confidence intervals are included in King, Webster, et al. (2022). Information on harvest by subarea and historical harvest can be found in North Pacific Fisheries Management Council (2022).[3]

[1] King, B., Webster, S., M. Jaenicke, D. Tersteeg, M. Ford, and M. Schuster. 2022. Letter from ADF&G to IPHC reporting final 2021 and preliminary 2022 sport halibut harvest estimates, Oct 20, 2022.

[2] Webster, S. R., and B. Buzzee. 2020. Estimation and projection of statewide sport halibut harvest. Alaska Department of Fish and Game, Division of Sport Fish, Regional Operational Plan ROP.SF.4A.2020.04, Anchorage. https://www.adfg.alaska.gov/FedAidPDFs/ROP.SF.4A.2020.04.pdf.

[3] North Pacific Fisheries Management Council. 2022. Area2C3A_Final2021. Retrieved 16 December 2022, from https://meetings.npfmc.org/Meeting/Details/2956.

2022 Preliminary Harvest Estimates

The Area 2C charter fishery allocation for 2022 was 0.82 Mlb. Regulations included a one-fish bag limit with a reverse slot limit of less than or equal to 40 inches or greater than or equal to 80 inches. The Area 3A charter allocation was 2.11 Mlb. Regulations included a two-fish bag limit with a maximum size on one of the fish of 28 inches, a limit of one trip per charter vessel per day and per CHP per day, and a closure to halibut retention on all Wednesdays and two Tuesdays. Charter fishery regulations in the remainder of the state included a bag limit of two fish of any size. Unguided fishery regulations statewide were a bag limit of two fish of any size.

The preliminary estimates for charter harvest and removal in Area 2C were 82,888 halibut and 0.843 Mlb, respectively, approximately 2.9% over the 2022 allocation. Unguided harvest and removal estimates in Area 2C were 63,769 fish and 1.141 Mlb. The preliminary estimates of charter harvest and removal in Area 3A were 167,090 fish and 1.773 Mlb, respectively, approximately 16.0% under the allocation. Unguided harvest and removal estimates in Area 3A were 98,561 fish and 1.201 Mlb. The preliminary harvest estimates for 2022 were 680 halibut in Area 3B and 521 halibut in Area 4. Applying the unguided average weight from Kodiak of 11.04 lb resulted in removal estimates of 0.008 Mlb in Area 3B and 0.006 Mlb in Area 4. Additional detail on numbers of fish harvested and released, releases by size category, average weights, and confidence intervals are included in King, Webster, et al. (2022).[4]

2022 Areas 2C and 3A Charter Halibut Management Measure Analyses

In addition to estimating all recreational halibut harvest in Alaska, the Alaska Department of Fish and Game is responsible for analyzing alternative management measures for the charter halibut fisheries in Areas 2C and 3A. Analyses were requested by the North Pacific Fisheries Management Council's Charter Halibut Management Committee on 21 October 2022. Results were presented at the North Pacific Fisheries Management Council meeting in December. Projected removals in 2022 under status quo regulations are 0.867 Mlb in Area 2C and 2.023 Mlb in Area 3A.Under the suite of management measures recommended by the Council at the December 2021 meeting, removal projections range from 0.564 to 1.121 Mlb for Area 2C and from 1.685 to 2.368 for Area 3A (King, Webster, and Jevons 2022).[5]

Updates to data collection and estimation methods for Alaska's Recreational Fisheries

Electronic logbooks became mandatory for charter operators in Southeast Alaska in 2021. Beginning in 2021, harvest reported through mid-October was used for the preliminary charter estimates in Area 2C, noting that in recent years there was no charter harvest reported in Area 2C after October 15th. There is no mandate to use eLogbook in most of 3A and most operators still use paper logbooks. Preliminary logbook data are available for trips taken through August 31 in Area 3A and used to project harvest for the year in Area 3A. This is an improvement preliminary estimates prior to 2021 that only used logbook data through July 31 in both Areas.

[4] King, B., Webster, S., M. Jaenicke, D. Tersteeg, M. Ford, and M. Schuster. 2022. Letter from ADF&G to IPHC reporting final 2021 and preliminary 2022 sport halibut harvest estimates, Oct 20, 2022.

[5] King, B., Webster, S. and Jevons,B. 2022. Analysis of management options for the Area 2C and 3A charter halibut fisheries for 2023: A report to the North Pacific Fishery Management Council, December 2022. Alaska Department of Fish and Game. Agenda item C6. Unpublished. Retrieved 16 December 2022, from https://meetings.npfmc.org/Meeting/Details/2956.

Starting in 2022 ADF&G began collecting additional biological data from recreationally caught Pacific halibut in 2C, including age (otoliths) and sex data. A total of 834 halibut were sampled for age and sex information in 2C from the ports of Elfin Cove, Ketchikan, and Sitka. Otoliths were shipped to the IPHC at the completion of the season and so age data are not yet available. Age and sex data continued to be collected in 3A as well; prior to 2022these data provided the only source of sex and age information for recreationally caught halibut coastwide for use in the halibut stock assessment.

NPFMC Charter Halibut Fishery actions in 2022

On December 12, 2022, the NPFMC recommended management measures for charter halibut fishing in Areas 2C and 3A for the 2023 fishing season. These recommendations are submitted as Regulatory Proposal B1 to the IPHC for consideration and adoption by the Commission at AM099 in January 2023. The measures approved by the NPFMC were developed by the Charter Halibut Management Committee based on analyses provided by ADF&G as well as the needs of the fishery.[6] These measures are expected to constrain overall charter removals to the final 2023 area allocations, as determined by the IPHC under the Catch Sharing Plan.

Guided Angler Fish Program- 2022 Summary

In 2014, NMFS implemented the guided angler fish (GAF) program to authorize limited annual transfers of commercial halibut IFQ as GAF to qualified charter halibut permit holders for harvest by charter vessel anglers in Areas 2C and 3A. The GAF program allows qualified charter halibut permit holders to offer charter vessel anglers the opportunity to retain halibut up to the limit for unguided anglers when the charter management measure in place limits charter vessel anglers to a more restrictive harvest limit.

In 2022, charter vessel anglers who used GAF in Area 2C and Area 3A could harvest up to two halibut of any size per day, and GAF were not subject to the daily closures in Area 3A. Table 6 summarizes IFQ to GAF transfers for 2017 through 2022. From the outset of the program, GAF has been used much more frequently in Area 2C than 3A, and its use in Area 2C has generally increased each year. For example, in Area 2C in 2022, 128,094 pounds of IFQ was transferred as GAF to the charter fishery; this translated into 1,971 harvestable halibut, which is the highest over the 2014-2022 period. Of the number of harvestable fish, 1,548 (79%) of the Area 2C GAF was taken. This contrasts with Area 3A, where 11,475 pounds of IFQ was transferred as GAF in 2022, resulting in 499 harvestable fish. However, only 56% (277 fish) of the Area 3A GAF was taken.[7]

[6] ADF&G Analysis is available on the December NPFMC meeting agenda under item C6 at: https://meetings.npfmc.org/Meeting/Details/2964.

[7] GAF Program Annual reports are available at: https://www.fisheries.noaa.gov/resource/document/guided-angler-fish-gaf-program-annual-reports.

Table 9 Summary of IFQ to GAF transfers 2018-2022

Year	IPHC Regulatory Area	Number of GAF transferred	Number of GAF Harvested (% of amount transferred)	Actual Net Pounds of IFQ Harvested as GAF	Average Length in Inches (range)	Number of GAF Permits Issued	Number of GAF Permit Holders
2018	2C	1,222	972 (80%)	64,365	54 (22-79)	332	46
	3A	304	215 (71%)	9,052	47 (25-89)	31	17
	Total	1,526	1,187 (78%)	73,417		363	63
2019	2C	1,601	1,237 (77%)	75,039	53 (22-83)	341	56
	3A	338	266 (79%)	10,652	46 (25-66)	29	13
	Total	1,939	1,503 (78%)	85,691		370	69
2020	2C	801	764 (95%)	55,061	56 (23-85)	235	48
	3A	92	38 (41%)	2,147	52 (34-64)	15	7
	Total	893	802 (90%)	57,208		250	55
2021	2C	1,312	1,031 (79%)	76,529	57 (29-75)	407	59
	3A	441	128 (29%)	3,446	39 (19-65)	24	8
	Total	1,753	1,159 (66%)	79,976		431	67
2022	2C	1,971	1,548 (79%)	99,962	55 (24-81)	459	67
	3A	499	277 (56%)	6,487	39 (25-70)	29	12
	Total	2470	1,825 (74%)	106,449		488	79

Commercial Groundfish Fisheries

Halibut Bycatch

Current Halibut Bycatch Amounts and Management

Halibut bycatch mortality in the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) groundfish fisheries is highly regulated and closely managed by the NPFMC and NMFS through the Fishery Management Plans (FMPs) for each management area. Through regulations implementing the FMPs, NMFS manages halibut bycatch by (1) establishing annual halibut prohibited species catch (PSC) limits, (2) apportioning PSC limits to fishery categories and seasons to accommodate halibut PSC needs in specific groundfish fisheries, and (3) managing groundfish fisheries to prevent PSC from exceeding the established limits.

The FMPs specify that halibut bycatch in groundfish fisheries is managed as PSC. Catch of PSC species must be avoided while fishing for groundfish and PSC species may not be retained unless required under the FMP. Halibut PSC limits are an apportioned, non-retainable amount of halibut provided to a groundfish fishery to provide an upper limit on the bycatch of halibut in a fishery. When a halibut PSC limit is reached in an area, further fishing with specific types of gear or modes of operation is prohibited by those types of operations taking halibut PSC in that area.

Although halibut PSC is taken by vessels using all types of gear (trawl, hook-and-line, pot, and jig gear), halibut PSC primarily occurs in the trawl and hook-and-line (non-trawl) groundfish fisheries. The NPFMC and NMFS annually establish halibut PSC limits for vessels in the trawl and non-

trawl groundfish fisheries in the BSAI and GOA. NMFS manages groundfish fisheries to ensure these limits are not exceeded.

The total estimated halibut PSC use for 2021 and 2022 are shown in Table 7.

Table 10 Final Estimates of Non-directed Commercial Fishing Halibut Mortality in the Gulf of Alaska and Bering Sea/Aleutian Islands (nearest metric ton)by Area and Gear (Target). Data generated Jan 3, 2023.

Area	2021 Total		2022 Predicted, 10/4	2022 Actual	Difference, Actual - Predicted
2C	Hook-and-line (non-sablefish)	1	2	1	-1
	Hook-and-Line (sablefish)	14	2	17	15
	Pot	2	4	4	0
	Total	**17**	**8**	**22**	**14**
3A	Trawl	182	266	231	-35
	Hook-and-line (non-sablefish)	44	43	21	-22
	Hook-and-Line (sablefish)	4	1	1	0
	Pot	5	22	19	-3
	Total	**235**	**332**	**272**	**-60**
3B	Trawl	168	141	116	-25
	Hook-and-line (non-sablefish)	18	10	10	0
	Hook-and-Line (sablefish)	4	3	2	-1
	Pot	5	7	7	0
	Total	**195**	**161**	**135**	**-26**
4A	Trawl	173	209	230	21
	Hook-and-line (non-sablefish)	6	6	14	8
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	6	15	15	0
	Total	**185**	**230**	**259**	**29**
4B	Trawl	52	49	78	29
	Hook-and-line (non-sablefish)	31	7	8	1
	Hook-and-Line (sablefish)	1	0	0	0
	Pot	4	7	7	0
	Total	**88**	**63**	**93**	**30**
4CDE	Trawl	544	750	1,006	256
	Hook-and-line (non-sablefish)	55	85	100	15
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	0	1	1	0
	Total	**599**	**836**	**1,107**	**271**
4 – closed	Trawl	668	808	751	-57
	Hook-and-line (non-sablefish)	2	36	42	6
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	8	6	6	0
	Total	**678**	**850**	**799**	**-51**
All Areas	Trawl	1,787	2,223	2,412	189
	Hook-and-line (non-sablefish)	157	189	196	7
	Hook-and-Line (sablefish)	23	6	20	14
	Pot	30	62	59	-3
	Total	**1,997**	**2,480**	**2,687**	**207**

Note: Prepared by NMFS Alaska Region.
Table 1 includes estimates of halibut mortality from groundfish fisheries managed by the State of Alaska, and from federally managed groundfish fisheries. Table 1 estimates the amount of halibut mortality by each gear type using a method of apportioning by IPHC area.

For additional information on halibut bycatch mortality please see the December, 2022 NMFS inseason management reports to the North Pacific Fishery Management Council; specifically slides 46 – 49 of the Bering Sea / Aleutian Islands report[8] and slides 45 – 50 of the Gulf of Alaska report[9].

Halibut Bycatch Management Actions in Progress

This report covers actions that are under development by NMFS.

Exempted fishing permit (EFP) application

NMFS signed and extended an EFP issued to the Alaska Seafood Cooperative (AKSC) in November 2022. The EFP will enable a collaborative study to conduct field testing of potentially improved designs on halibut excluders in the Bering Sea flatfish trawl fishery. Additional information is available on the NMFS Alaska Region webpage under the Halibut Excluder heading at: https://www.fisheries.noaa.gov/alaska/resources-fishing/exempted-fishing-permits-alaska.

NMFS sent a letter to the IPHC in January 2021 to provide notice of this EFP application for review and determination as to whether this action requires further consultation.

BSAI Pacific Cod Trawl Catcher Vessel Cooperative Program

On October 13, 2021, the NPFMC recommended implementation of Amendment 122 to the Fishery Management Plan (FMP) for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI). If approved by the Secretary of Commerce and implemented by NMFS, the Pacific cod Trawl Cooperative Program (PCTC Program) would allocate quota share (QS) to harvesters with an eligible groundfish License Limitation Program (LLP) license based on the harvest of BSAI Pacific cod during qualifying years. This Program would also allocate QS to processors based on processing history during the qualifying years. QS allocated under this program would yield an exclusive harvest privilege to members of a PCTC Program cooperative. The NPFMC's intent in recommending Amendment 122 is to improve the prosecution of the fishery by promoting safety and stability in the harvesting and processing sectors, increasing the value of the fishery, minimizing bycatch to the extent practicable, providing for the sustained participation of fishery dependent communities, and ensuring the sustainability and viability of the Pacific cod resource in the BSAI. Under the management of the PCTC program, halibut PSC limits for the A and B season of the BSAI Pacific cod fishery would be reduced by 25 percent. The Analysis, public comments, and other documents considered by the Council in recommending Amendment 122 are available under item C4 on the October NPFMC meeting agenda at: https://meetings.npfmc.org/Meeting/Details/2352. A proposed rule to Implement Amendment 122 to the BSAI FMP is in development and expected to publish in the Federal Register in early 2023.

Halibut Abundance Based Management

The NPFMC took final action on the draft Environmental Impact Statement (DEIS) for the abundance-based management (ABM) of the Amendment 80 (A80) halibut prohibited species catch (PSC) limit. The Council considered this action iteratively for 6 years. The core concept of the action is linking PSC limits in the A80 commercial groundfish trawl fleet in the Bering Sea and Aleutian Islands (BSAI) to estimated halibut abundance. The current PSC limit is set as a fixed

[8] Available at: https://meetings.npfmc.org/CommentReview/DownloadFile?p=149bc66e-0aa9-4713-9116-841bed9ae5b6.pdf&fileName=B2%20BSAI%202022%20Inseason%20Mgmt%20Report.pdf.

[9] Available at: https://meetings.npfmc.org/CommentReview/DownloadFile?p=5db0dee8-12aa-4a51-94fb-aa2bc1ed8053.pdf&fileName=B2%20GOA%202022%20Inseason%20Mgmt%20Report.pdf.

amount at 1,745 mt, which becomes an increasingly larger proportion of total halibut removals in the BSAI when halibut abundance declines. On Friday, December 9, 2022, NMFS published a proposed rule and notice to extend the comment period on proposed Amendment 123 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands. More information is available here: https://www.fisheries.noaa.gov/media-release/noaa-fisheries-seeks-comment-plan-abundance-based-management-halibut-bering-sea?utm_medium=email&utm_source=govdelivery.

Observer and Electronic Monitoring Coverage Rates

Vessels in the federal fisheries off Alaska fall into one of two categories of monitoring: a full coverage category or a partial coverage category. In the full coverage category, vessels must have an observer onboard on every trip. Vessels in this category include catcher/processors as well as catcher vessels that participate in specific limited access privilege program fisheries. The vast majority of the groundfish catch falls under the full coverage category, and over 93% of the trawl catch is on trips with full coverage

All vessels that are not subject to full coverage are in the partial coverage category and are assigned observer and EM coverage according to a scientific sampling plan described in the NMFS Annual Deployment Plan (ADP). The ADP outlines the science-driven method for deployment of observers and EM systems using established random sampling methods to collect data on a statistically reliable sample of fishing trips in the partial coverage category. Deployments resulting from the sampling plan specified in the ADP are comprehensively evaluated by NMFS and published in formal reports reviewed by the NPFMC. For example, the most recent estimates of variance indicate that the coefficient of variation (CV) of the estimate of total halibut catch by partial coverage trawl vessels in the Gulf of Alaska is less than 5% (AFSC and AKRO Observer Annual Report, 2021, Appendix C).

In 2021, observers collected data on board 296 fixed gear and trawl vessels and at 12 processing facilities for a total of 35,769 observer days (32,672 full coverage days on vessels and in plants; and 3,097 partial coverage days on vessels and plants).

In 2021, EM was deployed according to trip-selection. Due to limitations on transportation and health mandates associated with COVID-19, observers were deployed according to a port-based trip selection model. Under the port-based trip selection model, observers were deployed on randomly selected trips from specific ports. In addition, this method excluded trips from observation if they did not depart and land within a port that was on the list of observable ports. In August 2021, NMFS released an Information Bulletin to announce the expansion of observer deployment for all ports throughout Alaska beginning on 1 September 2021. This change was consistent with the updated NOAA policy on observer waivers, which states that vessels are no longer eligible for release from observer coverage under the Emergency Rule if a fully vaccinated or quarantined/shelter-in-place observer is available.

A summary of the number of vessels and trips in each stratum and realized coverage rates in 2021 were as follows:

Coverage category	Strata		Total vessels	Total trips	Sampled trips	Coverage rate
Full coverage	Full		118	1,849	1,849	100.0
	Trawl EM (BSAI)		46	999	999	100.0
Partial coverage	Hook-and-Line	Jan. 1 - Aug 31	242	853	106	12.4
		Sep. 1 - Dec. 31	173	506	88	17.4
	Pot	Jan. 1 - Aug. 31	119	558	92	16.5
		Sep. 1 - Dec. 31	86	341	70	20.5
	Trawl	Jan. 1 - Aug. 31	64	418	83	19.9
		Sep. 1 - Dec. 31	25	220	62	28.2
	EM Hook-and-Line		119	656	180	27.4
	EM Pot		44	267	76	28.5
	Trawl EM (GOA)		34	432	142	32.9
No selection	Zero Coverage		320	1,555	0	0.0
	Zero Coverage- EM Research		2	20	0	0.0

In December, 2021, NMFS released the final 2022 ADP with the following strata and deployment rates:[10]

- No Selection – 0%
- Trawl vessels not participating in the EM EFP – 30%
- Hook-and-line – 19%
- Pot – 17%
- Fixed-Gear EM – 30%
- Trawl EM EFP–100% at-sea EM; plus: 30% shoreside monitoring in GOA or 100% shoreside monitoring in BS

In December, 2022, NMFS released the final 2023 ADP with the following strata and deployment rates:[11]

[10] The 2022 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska is available at: https://www.fisheries.noaa.gov/resource/document/2022-annual-deployment-plan-observers-and-electronic-monitoring-groundfish-and

[11] The 2023 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska is available at: https://www.fisheries.noaa.gov/resource/document/2023-annual-deployment-plan-observers-and-electronic-monitoring-groundfish-and.

- No Selection – 0%
- Trawl vessels not participating in the EM EFP – 23%
- Hook-and-line – 18%
- Pot – 17%
- Fixed-Gear EM – 30%
- Trawl EM – all vessels 100% at-sea coverage with EM; plus 33% shoreside monitoring in the GOA and 100% shoreside monitoring in the BSAI.

Improvements in Discard Estimates of Halibut in the Directed Halibut Fishery

January 2013 marked the beginning of a new method of deploying at-sea observers into the Federal groundfish and Pacific halibut (*Hippoglossus stenolepis*) fisheries off Alaska. The new program provided for at-sea data collection on longline vessels participating in the Pacific halibut fishery. Previously, data collections on these boats was not authorized and had severely limited the NMFS's ability to estimate incidental catch and at-sea discard of halibut and groundfish species. The Pacific halibut fishery is the only federally managed groundfish fishery off Alaska with a regulatory minimum size limit and any halibut intended for commercial sale must be at least 32 inches (~81 cm) in total length.

The minimum size limit complicates estimation of halibut discard due to the limited amount of disposition-specific data collected by observers available to calculate mean weights. Observers collect fish weights that are used to estimate the mean weight per fish from the unsorted (retained and discarded) catch. They also collect counts of retained fish to estimate the percent of the catch retained. The calculation of the mean weight per fish using observer data may overestimate the mean weight of discarded fish and underestimate the weight of retained fish. While estimates of retained catch are based on landings data and thus are not biased, the haul-specific estimates of at-sea discards of halibut in the halibut fishery are biased. To correct for this bias, NMFS has developed an analytic method to mitigate the bias by adjusting the percentage of halibut retained to reflect the differences in mean weight for retained (and discarded) halibut. NOAA-AKFS Technical Memorandum 432 (2022) describes the methodology.

Commercial Halibut IFQ Program

Effective June 6, 2022 through December 31, 2022, NOAA Fisheries issued a final rule to remove limits on the maximum amount of halibut Individual Fishing Quota (IFQ) that may be harvested by a vessel, commonly known as vessel use caps, in IFQ regulatory areas 4A (Eastern Aleutian Islands), 4B (Central and Western Aleutian Islands), 4C (Central Bering Sea), and 4D (Eastern Bering Sea) for the 2022 IFQ fishing year (87 FR 34215, June 6, 2022).

IFQ Omnibus Analysis

On November 23, 2022, NMFS issued a proposed rule to implement Amendment 124 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (BSAI FMP) and Amendment 112 to the Fishery Management Plan for Groundfish of the Gulf of Alaska (GOA FMP) (87 FR 71559, November 23, 2022). In April 2022, the NPFMC recommended several revisions to the Halibut and Sablefish Individual Fishing Quota (IFQ) Program regulations.[12] First, this proposed rule would amend regulations for the Individual Fishing Quota (IFQ) and Community Development Quota (CDQ) Programs for pot gear configurations,

[12] The NPFMC final motion recommending this action is available under Agenda Item C1 at: https://meetings.npfmc.org/Meeting/Details/2854.

pot gear tending and retrieval requirements, pot limits, and associated recordkeeping and reporting requirements. These changes would increase operational efficiency and flexibility for IFQ holders and CDQ groups. Second, this proposed rule would authorize jig gear as a legal gear type for harvesting sablefish IFQ and CDQ, increasing opportunities for entry-level participants. Third, this proposed rule would temporarily remove the Adak community quota entity (CQE) residency requirement for a period of five years.

Subsistence

Subsistence Harvests of Pacific Halibut in Alaska, 2020

Although this is a 2021 report, the Division of Subsistence collects and analyzes subsistence halibut harvest data biennially. As such, the most recent available data are for 2020 (summarized below); the department will be collecting and analyzing harvest data for the 2022 study year that will be included in next year's report.

Through a grant from the National Marine Fisheries Service (NMFS) (NA18NMF4370086), the Alaska Department of Fish and Game (ADF&G) Subsistence Section conducted a study to estimate the subsistence harvests of Pacific halibut in Alaska in 2020. The full results appear in Technical Paper No. 485, "Subsistence Harvests of Pacific Halibut in Alaska, 2020" (Sill and Koster 2022).

To estimate the 2020 harvests, a one-page survey form was mailed to SHARC holders in early 2021. Staff also remotely administered surveys in four communities using modified methods due to the COVID-19 pandemic. After three mailings and community outreach, 5,127 of 8,135 potential subsistence halibut fishers (63%) responded. Participation in the survey was voluntary.

An estimated 3,777 individuals subsistence fished for halibut in Alaska in 2020, about 8% below the 2018 fishing year and 26% below the long-term average since 2003. The estimated subsistence harvest was 27,241 halibut or 530,757 pounds net weight. This was the lowest harvest estimate since the new regulations were adopted in 2003 and, as expressed in pounds net weight, nearly 14% below 2018 harvests and 41% below the previous 13-year average. It is important to note that the 2020 study year included the unusual circumstances of the COVID-19 global pandemic and it is unclear exactly how this pandemic affected subsistence harvesting activities. Of the 2020 total subsistence halibut harvest, 75% was harvested with setline (stationary) gear (longline or skate) and 25% was harvested with hand-operated gear (handline or rod and reel). This pattern was similar to other study years.

Also similar to all other years, in 2020, the largest subsistence harvests of halibut occurred in Southeast Alaska (Halibut Regulatory Area 2C), with 55% of the total, followed by Southcentral Alaska (Area 3A) at 33%, and East Bering Sea Coast (Area 4E) at 6%. Remaining areas combined accounted for about 6% of the state total.

Based on data from the International Pacific Halibut Commission and the 2020 study year, subsistence harvests accounted for 2% of the 2020 total.

This study was the second year of inclusion of a new question about whether survey respondents had met their needs for halibut; in 2020, 51% of survey respondents said they had and 49% said they had not. Family or personal reasons, lack of effort, inoperative equipment, and time constraints were the most-cited reasons for not meeting needs. As noted above, the effect of the COVID-19 pandemic on subsistence harvesting activities remains unknown; however, approximately 10% of survey respondents who reported that their needs were not met indicated that the pandemic was the reason.

The 2020 data collection effort was a success, with good response rates and a reliable estimate of subsistence halibut harvests in Alaska for 2020. Outreach continues to be necessary to

maximize enrollment of fishers in the SHARC program, as is additional research to understand trends in the fishery. However, section staff were limited in their outreach capacity because of limitations on travel to rural Alaska due to the pandemic. Budget constraints dictate that a survey to estimate subsistence halibut harvests in Alaska in 2021 will not take place. However, preparations for data collection for the 2022 study year are underway and are expected to occur on schedule.

NOAA Fisheries Law Enforcement - Alaska

Alaska Enforcement Division

The Alaska Enforcement Division (AKD) utilizes enforcement officers, special agents, and partnerships with the Alaska Wildlife Troopers and the U.S. Coast Guard to enforce federal fishing regulations in Alaska, covering over 1.4 million square miles of ocean, 66,000 miles of Arctic and Subarctic coastline, and 2,690 named islands. Compliance is achieved by providing outreach and education, conducting patrols, monitoring offloads, and investigating violations of civil and criminal marine resource laws, including the Northern Pacific Halibut Act.

In 2022, there were 3375 Individual Fishing quota (IFQ) halibut permits issued in Alaska and 30 IFQ landing ports. There were 881 charter halibut permits issued (495 for IPHC Area 2C; 386 for IPHC Area 3A), and 6,394 subsistence halibut permits.

Patrol and Boardings

In 2022, AKD personnel spent over 2353 hours conducting patrols to deter potential violators, monitor fishing and other marine activities, detect violations, provide compliance assistance, and provide outreach and education to halibut fishery participants. OLE boarded 790 vessels with 522 of those boardings being related to halibut. Alaska Wildlife Troopers conducted additional boardings and investigations under state authority that are not reported here.

Table 11 Results of NOAA OLE AKD Vessel Boardings

	2020	2021	2022
	Vessel Boardings	Vessel Boardings	Vessel Boardings
Subsistence Halibut	27	14	11
Commercial Halibut	314	334	306
Charter Halibut	136	149	108
Sport Halibut	171	195	97
Total	**648**	**692**	**522**

Compliance Assistance

In 2022, AKD personnel spent over 1499 hours providing outreach and education to marine resource users. The goal of OLE outreach efforts is to ensure the most current and accurate regulatory information is widely distributed and understood.

Incidents

In 2022, AKD opened 1515 halibut-related incidents, including outreach, vessel boardings, dockside monitoring, and compliance assistance. Of those incidents; agents and officers identified 354 halibut-related violations, which were resolved by Compliance Assistance, Summary Settlement, Notice of Volition Assessment, or a Written Warning.

Table 12. NOAA Fisheries OLE Alaska Halibut Violations

	2020	2021	2022
Subsistence Halibut	14	18	6
Commercial Halibut	197	123	287
Charter Halibut	50	133	38
Sport Halibut	51	54	26
Commercial Groundfish involving Halibut	84	52	22
Total	**396**	**380**	**354**

***Not all violations resulted in an enforcement action.**

2022 Halibut-Related Violations documented by NOAA in Alaska:

6 Subsistence halibut fishing violations; most common violations included:

- Unqualified person applied for a SHARC
- Subsistence halibut with sport caught halibut.
- Subsistence halibut fishing without a SHARC
- Subsistence halibut offered for sale.

287 Commercial IFQ/CDQ halibut violations; most common violations included::

- IFQ halibut overages greater than 10%
- Record keeping or reporting violations (PNOL, Landing Report, Logbook, PTR, Production Reports)
- Gear marking violations
- Failure to release undersized halibut with a minimum of injury by allowing fish to hit the crucifier, remain on deck for a prolonged period of time, and other mishandling issues (e.g. lifting fish solely by caudal peduncle).
- Hired master and permit holder violations
- Vessel cap overages
- Misreporting IFQ area fished or fishing in an area with no IFQ available
- Fishing without an FFP
- Unreported halibut found after offloads.
- Class D vessel size limit violations (vessels over 36 ft. LOA fishing D class quota)

22 Commercial groundfish violations involving halibut; most common violations included:

- Failure to carefully release halibut or allow halibut to contact a crucifier or hook stripper
- Puncture halibut with a gaff or other device

26 Sport halibut violations; most common violations included:

- Sale or attempted sale of sport caught halibut
- Exceeding bag and/or possession limits
- Filleting, mutilating or skinning halibut onboard a vessel, other than 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, with a patch of skin on each piece, naturally attached
- Fishing without a license/permit
- Sport caught halibut onboard with commercial caught salmon

38 Charter halibut fishing violations; most common violations included:

- Logbook violations-
- Failure to report GAF in the required time period or submitting inaccurate information
- Illegal guiding - no CHP
- Filleting, mutilating or skinning halibut onboard a vessel, other than 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, with a patch of skin on each piece, naturally attached
- Exceeding bag limit, possession limit, size limits, or annual limits
- Charter fish without a CHP
- Could not produce the original CHP

Partnerships & Patrols Highlights

From April 1, 2022, to September 30, 2022, the Office of Law Enforcement (OLE), Alaska

Division (AKD) conducted extensive patrols for the purposes of enforcement and education. In addition to daily dockside and vessel patrols, AKD conducted several multi-day patrols. Patrols were often coordinated with partners including U.S. Customs and Border Protection (CBP), U.S.

Fish and Wildlife Service (USFWS), U.S. Coast Guard (USCG), Alaska Wildlife Troopers (AWT), and National Park Service (NPS). Partnering with multiple agencies broadens enforcement and outreach opportunities and allows for shared knowledge across agencies.

In April, AKD, AWT, and USCG provided education and outreach, as well as a strong safety and enforcement presence during the annual King Salmon Derby in Homer, AK. The agencies split into several teams to conduct multiple boardings using the State of Alaska and Coast Guard vessels and a Coast Guard aircraft. Teams boarded 172 vessels and discovered several State and Federal violations.

In July a team of Enforcement Officers conducted a patrol from Seward, AK to Kodiak, AK with NPS. The team swapped patrol vessels in Kodiak and then proceeded to patrol back to Seward, up to the Prince William Sound, and back to Seward. The team conducted 17 boardings at sea resulting in eleven violations being discovered.

A Special Agent and an Enforcement Officer conducted a vessel patrol in Southeast Alaska in July. They boarded 19 Vessels, resulting in four violations found, two state violations-for no Sport Fishing License on Person, One Written Warning issued for no logbook, and one fix-it issued for not possessing a legible copy of an IFQ permit.

In July, an Enforcement Officer participated in a two-week patrol on the AWT Large Class patrol vessel P/V ENFORCER throughout southeast Alaska. During the patrol they boarded 107 vessels and found 16 violations (eight state violations, and eight federal). Multiple remote communities were visited and outreach information was provided about the IPHC 2022 regulations. The patrol also focused on the Canadian maritime boundary.

Case Updates

Notice of Violation and Assessment

The NOAA Office of General Counsel, Enforcement Section (GCES) issued Notices of Violation and Assessment (NOVA) in the following civil administrative cases. A NOVA is not evidence of liability; it is only an allegation. A respondent is entitled to a fair hearing before an administrative law judge at which the government must prove liability by a preponderance of the evidence.

AK2102696 and AK2105897; F/V Arlice – In count one, owner Arlice, Inc. and operator Charles Jeffrey Petticrew, Sr. were charged jointly and severally under the Magnuson-Stevens Act with fishing with bottom gear in a Gulf of Alaska Coral Protection Area. In count two, owner Arlice, Inc. and Charles Jeffrey Petticrew, Jr. were charged jointly and severally under the Halibut Act with retaining IFQ halibut in excess of the total amount of IFQ available. A $21,421 NOVA was issued.

AK2100641; F/V Currency – Owner F/V Currency, LLC and operator Ilia N. Kuzmin were charged jointly and severally under the Halibut Act with fishing for, or possessing, Pacific halibut before the authorized fishing period started. A $4,400 NOVA was issued.

AK2200857; F/V Competition – Owner/operator Alexander E. Reutov was charged under the Halibut Act with fishing for, or possessing, Pacific halibut before the authorized fishing period started. A $4,400 NOVA was issued.

AK1708987B; F/V Sovereign Grace – IFQ permit holder Gregory Beam was charged under the Northern Pacific Halibut Act with an IFQ two-area violation and for making false statements. The previously-issued $195,555.34 NOVA was amended to $37,690 as to Beam in June 2022.

Cases Settled

NOAA GCES entered into settlement agreements in the following civil administrative cases:

AK2102696 and AK2105897; F/V Arlice – In count one, owner Arlice, Inc. and operator Charles Jeffrey Petticrew, Sr. were charged jointly and severally under the Magnuson-Stevens Act with fishing with bottom gear in a Gulf of Alaska Coral Protection Area. In count two, owner Arlice, Inc. and Charles Jeffrey Petticrew, Jr. were charged jointly and severally under the Halibut Act with retaining IFQ halibut in excess of the total amount of IFQ available. A $21,421 NOVA was issued and the case settled for $19,278.90.

AK2100641; F/V Currency – Owner F/V Currency, LLC and operator Ilia N. Kuzmin were charged jointly and severally under the Halibut Act with fishing for, or possessing, Pacific halibut before the authorized fishing period started. A $4,400 NOVA was issued, and the case settled for $3,960.

United States Coast Guard Enforcement Report – Alaska Region

I. Coast Guard Resources in Alaska

The U.S. Coast Guard (USCG) 17th District (D17) covers the U.S. waters of Alaska out to 200 nautical miles, and encompasses the IPHC Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. Resources used for fisheries enforcement include cutters, aircraft, and boats from coastal stations.

Cutters:

- 418-foot National Security Cutters (NSCs) in California and Hawaii are assigned to patrol D17 waters throughout the year.
- The 282-foot Medium Endurance Cutter USCGC ALEX HALEY home-ported in Kodiak regularly patrols the Bering Sea and Aleutian Islands.
- Four 225-foot Buoy Tenders conduct law enforcement throughout Alaska and are home-ported in Sitka, Cordova, Kodiak, and Homer.
- Three 154-foot Fast Response Cutters (FRCs) home-ported in Ketchikan conduct routine law enforcement throughout Southeast and South-Central Alaska.
- Three 110-foot patrol boats conduct routine law enforcement in South-Central Alaska and are home-ported in Valdez, Seward, and Homer.
- Two 87-foot Coastal Patrol Boats conduct routine law enforcement patrols in Southeast Alaska and are homeported in Juneau and Petersburg. Additionally, 87-foot Coastal Patrol Boats homeported in Washington make occasional patrols in Southeast Alaska.

Aircraft:

- Fixed wing and rotary wing aircraft are based out of Air Stations in Kodiak and Sitka. Both conduct routine law enforcement patrols throughout Alaska.
    - Five C-130 fixed wing aircraft
    - Nine MH-60 rotary wing aircraft
    - Four MH-65 rotary wing aircraft

Stations:

- The three coastal small boat stations operating 29-foot and 45-foot boats are located in Ketchikan, Juneau, and Valdez.
- D17 routinely deploys Maritime Safety and Security Teams (MSSTs) to specific locations for safety and law enforcement during periods of high commercial, charter, and recreational fishing activity.

The primary at-sea fisheries enforcement assets are our cutters, ranging in size from the 87-foot patrol boats up to 418-foot NSCs. Patrol boats are limited in sea keeping abilities, and conduct the majority of enforcement inside of 50 nautical miles from shore and along the 100-fathom curve. This role is filled by 154-foot FRCs, 110-foot patrol boats, and 87-foot patrol boats. Patrol boats provide regular law enforcement presence in the commercial, charter, subsistence, and recreational fishing fleets closer to shore. By 2025, D17 anticipates the addition of three more 154-foot FRCs to greatly enhance boarding capabilities.

Beyond 50 nautical miles, we rely on our larger cutters to enforce federal fisheries regulations, with USCGC ALEX HALEY and NSCs from throughout the west coast assigned to patrol Alaskan waters. Additionally, 225-foot Buoy Tenders effectively patrol both offshore and inshore waters.

Small boat stations primarily focus on recreational, subsistence, and charter halibut activity in their local regions. This does not preclude them from boarding larger commercial vessels operating closer to shore.

The USCG routinely conducts fisheries law enforcement flights from Air Stations in Kodiak and Sitka using a variety of fixed wing C-130 aircraft and rotary wing MH60 and MH65 helicopters. These flights provide sightings of vessels while fishing and in transit. Additionally, queries by the aircraft record target species, permits, and whether there is catch onboard.

All units involved in fisheries enforcement receive training from the Coast Guard's North Pacific Regional Fisheries Training Center in Kodiak prior to patrolling the region. NOAA's Office of Law Enforcement (OLE) agents and state fisheries enforcement officers routinely participate in the training. The success of USCG fisheries enforcement operations is enhanced by collaboration with our enforcement partners from NOAA OLE and the state of Alaska, ensuring consistent presence on the fishing grounds and at landing sites.

II. Halibut Enforcement

In Calendar Year 2022, the USCG distributed its enforcement assets throughout the Alaska IPHC Areas, with boarding numbers listed in Table 10. The USCG's enforcement focus is to protect the resource in accordance with the Fishery Management Plan, to ensure equal economic opportunity for all participants, and to ensure safety of life at sea.

Table 13 2020, 2021 & 2022 Geographic Distribution of Boardings on Vessels Targeting Halibut

IPHC Area	2020 Boardings	2021 Boardings	2022 Boardings
2C	264	203	413
3A	131	250	112
3B	0	0	0
4A	13	12	1
4B	4	2	1
4C	0	0	0
4D	1	1	0
4E	0	0	0
Total	413	468	527

III. Commercial Halibut Enforcement

D17 law enforcement assets routinely patrolled the fishing grounds, often conducting joint boardings in collaboration with NOAA OLE throughout the season from the Bering Sea to Southeast Alaska. These operations included at-sea boardings, aircraft patrols, and dockside inspections. Joint agency efforts are a regular and important aspect of law enforcement coordination as they enable the broadest contact rate with the fishing fleets in order to ensure compliance with federal regulations while also providing the most accurate and complete picture of fishing activity on the fishing grounds and at catch landing sites.

The lack of a universal requirement for fishing vessels targeting halibut to be equipped with VMS onboard means there is not a centralized means to assess and monitor fishing activity in Areas 2C through 4E. Time intensive patrols by surface and aviation assets are the primary means to identify where vessels are fishing for halibut. The need for patrols is amplified when market forces and/or fair weather conditions cause an increase in fishing activity.

During boardings of the commercial hook and line vessels, USCG enforcement efforts focus on (1) adherence to permit requirements for area and individual quota, (2) safe release of halibut bycatch by other commercial vessels, (3) consistent use of seabird avoidance gear, (4) indicators of high-grading catch, (5) retention of rockfish and Pacific Cod, (6) complete offload of catch, and (7) timely compliance with all recordkeeping requirements.

IV. Recreational and Charter Halibut Enforcement

Recreational activity most often occurs in Areas 2C, 3A, and 3B in the form of individual sport and charter fishing. The season lasts from 01 February to 31 December, but is most prevalent from May through September. USCG assets increase fisheries patrols during this time to focus on popular fishing grounds in Southeast Alaska, Prince William Sound, Cook Inlet, and the Gulf of Alaska. Recreational and charter vessels comprised 85.8% of the halibut boardings in D17.

During recreational and charter boardings, the USCG places emphasis on compliance with licensing and charter operation requirements, size limits, daily catch limits, trip limits, and at-sea processing of halibut.

V. Violations and Enforcement Summary

In 2022, USCG assets boarded a total of 527 vessels and detected 13 violations on 11 vessels. The USCG documented these violations and referred them to NOAA OLE or Alaska Wildlife Troopers for final action as appropriate. Table 11 compares at-sea boardings and violations between 2021 and 2022.

Table 14 2021 & 2022 Boarding and Violation Summaries by Industry Sector

2021 Boardings/Violations	2022 Boardings/Violations
Total At-Sea Boardings.....468	Total At-Sea Boardings.....527
Commercial.....112	Commercial.....75
Charter.....101	Charter.....110
Recreational/Subsistence 255	Recreational/Subsistence 342
Fisheries Violations.....16	Fisheries Violations.....13
Commercial.....14	Commercial.....8
Charter.....0	Charter..... 3 (1 vessel)
Recreational/Subsistence 2	Recreational/Subsistence 2
Fisheries Compliance Rates 96.6%	Fisheries Compliance Rates 97.9%
Commercial..... 87.5%	Commercial..... 89.3%
Charter..... 100%	Charter..... 99.1%
Recreational/Subsistence 99.2%	Recreational/Subsistence 99.4%

In Area 2C:

- One commercial vessel was cited for failing to have an IFQ permit onboard.
- Two commercial vessels were cited for not having a logbook onboard.
- One charter vessel was cited for not having a guided operating license or master's license, clients not having Alaska fishing licenses, and failing to maintain charter halibut logbook. This was considered an illegal charter operation.
- Two recreational vessels were cited for having too many fishing lines in the water for the number of recreational anglers onboard.

In Area 3A:

- One commercial vessel was cited for having 117 lbs. of illegally retained recreational halibut onboard that was not logged, and the halibut was mutilated so that the number of fish retained could not be determined. The catch was seized and transferred to NOAA OLE.
- One commercial vessel fishing for Pacific Cod was cited for having 18 illegally retained halibut onboard with no IFQ permit. The halibut was seized and transferred to NOAA OLE.
- One commercial vessel was cited for improper longline buoy markings.

In Area 4A:

- One commercial vessel was cited for failing to have an IFQ permit onboard..

In Area 4B:

- One commercial vessel was cited for not retaining rockfish bycatch that was required to be retained.

The USCG transferred detected violations to NOAA OLE for disposition, and outcomes included compliance assistance, summary settlements, or catch seizures.

In addition to the IPHC violations summarized in Table 2, USCG assets documented 25 safety violations including insufficient fire extinguishers, expired visual distress signals, and expired hydrostatic releases for survival craft and/or EPIRB. One vessel's voyage was terminated since it was identified as an illegal charter operation, with a second vessel suspected of being an illegal charter operation with no violations cited.

An apparent rise in the number of remote lodges providing guests boats to rent without having a guide onboard led to a significant rise in people operating small boats in Southeast and South-Central Alaska that were both unfamiliar with the area and vessel. Demand for these unguided/bareboat charters result from regulations that allow sport fishers to retain two halibut of any size, rather than one size-restricted halibut per day as a client on a charter.

This trend significantly increases the safety risk in these lodge areas, as one situation provided a perfect example of the hazards involved with this practice. A small boat left a lodge without a guide onboard, the vessel sank, and the individuals were adrift and swam to a beach where they remained overnight without shelter, communications, or means of signaling distress. It was not until the following day that another lodge client contacted the Coast Guard because of the people missing, the stranded clients were located by the Coast Guard, and rescued.

VI. Enforcement Plans for 2023

The USCG continues to pursue increased at-sea boarding opportunities to promote compliance with both safety and fisheries regulations in all IPHC Areas and across all fishery sectors.

The USCG will continue joint pulse operations with NOAA and state partners to focus enforcement efforts across the commercial, charter, subsistence, and sport sectors of the halibut fishery. Additionally, the USCG will examine the practice of unguided/bareboat charters and their effect on boating safety. Charter and recreational halibut regulations incentivize lodges to offer bareboat charters so that clients can retain more halibut per day that are not size-restricted. Considering recent Search and Rescue cases involving the sunken unguided charter vessel, numerous safety violations resulting in voyage terminations, and other safety violations, the USCG will focus boardings in this fishery sector.

The commercial and recreational halibut fisheries in Alaskan waters continue to draw high national and international interest. D17 will continue to actively patrol throughout the season and

emphasize joint operations with our federal and state partners, NOAA OLE, and the Alaska Wildlife Troopers.

By sustaining efforts to monitor and patrol areas where halibut fisheries occur, the USCG will strive to continually promote a level playing field for all participants and enhance safety at sea. Our goal is a consistent and targeted enforcement presence applied fairly across all commercial, charter, subsistence, and recreational fleets. This will encourage compliance across fishing fleets to help management efforts sustain the fisheries.

Point of Contact:
LCDR Jedediah Raskie, USCG
+1 907-463-2223
Jedediah.A.Raskie@uscg.mil

Contacts

NOAA Fisheries Alaska Regional Office

Jon Kurland
Regional Administrator
Jon.kurland@noaa.gov
907-586-7221

Alicia M Miller
Sustainable Fisheries Divisions
Catch Shares Branch Chief
Alicia.m.miller@noaa.gov
907-586-7228

Kurt Iverson
Sustainable Fisheries Division
Recreational Fisheries Coordinator
Kurt.iverson@noaa.gov
907-586-7210

Mason Smith
Sustainable Fisheries Division
Fishery Management Specialist
Mason.smith@noaa.gov
907-586-7459

NOAA Fisheries West Coast Regional Office

Ryan Wulff
Assistant Regional Administrator
Sustainable Fisheries Division
ryan.wulff@noaa.gov
916-930-3733

Frank Lockhart
Sustainable Fisheries Division
Senior Policy Advisor
Frank.lockhart@noaa.gov
206-526-6142

Joshua Lindsay
Sustainable Fisheries Division
Branch Chief, CPS/Ecosystem/Halibut
Joshua.lindsay@noaa.gov
562-980-4034

Katie Davis
Natural Resource Management Specialist
CPS/Ecosystem/Halibut Branch
Katie.davis@noaa.gov

United States Coast Guard

District 17
LCDR Jedediah Raskie, USCG
907-463-2223
Jedediah.A.Raskie@uscg.mil

NOAA Office for Law Enforcement

Alaska Enforcement Division
P.O. Box 21767
Juneau, AK 99802
907-586-7225

West Coast Enforcement Division
7600 Sand Point Way Northeast
Seattle, WA 98115
206-526-6133

Alaska Department of Fish and Game

Division of Sport Fish:
Brianna Bowman King
Fishery Biologist
brianna.king@alaska.gov
907-267-2120

Subsistence Section:
Caroline Brown
Statewide Research Director
caroline.brown@alaska.gov
907-459-7317

Lauren Sill
Subsistence Resource Specialist III
lauren.sill@alaska.gov
907-465-3617

TO REPORT VIOLATIONS:
Call 1-800-853-1964

IPHC Fishery Regulations:

Mortality and Fishery Limits (Sect. 5)

PREPARED BY: IPHC SECRETARIAT (8 DECEMBER 2022)

PURPOSE

To provide clear documentation of mortality and fishery limits within the IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5).

BACKGROUND

The Commission considers new and revised IPHC Fishery Regulations, including proposed changes to mortality and fishery limits, and makes changes as deemed necessary at each Annual Meeting. In the absence of changes being deemed necessary, the existing IPHC Fishery Regulations remain in effect.

In accordance with the IPHC Convention[1], the Contracting Parties may also implement fishery regulations that are more restrictive than those adopted by the IPHC.

This proposal is to amend IPHC Fishery Regulations Section 5, '*Mortality and Fishery Limits,'* to reflect Total Constant Exploitation Yield (TCEY) values adopted by the IPHC and the applicable fishery sector limits resulting from those TCEY values according to existing Contracting Party domestic catch sharing arrangements.

DISCUSSION

Changes to IPHC Fishery Regulations Section 5, '*Mortality and Fishery Limits,'* provide clear documentation of the limits for fishery sectors within defined Contracting Party domestic catch sharing arrangements, which are themselves tied to the mortality distribution (TCEY) decisions of the Commission. This section includes a table of the TCEY values adopted by the Commission for clarity, and to emphasize the role of the TCEY values as the basis for the subsequent setting of sector allocations through the operation of the Contracting Parties' existing catch sharing arrangements. Both the TCEY and the fishery sector allocation table will be populated as TCEY decisions are made for each IPHC Regulatory Area by the Commission during the 99th Session of the IPHC Annual Meeting (AM099) in January 2023.

Benefits/Drawbacks: The benefit is a clear identification of fishery limits resulting from Commission decisions on distributed mortality (TCEY) values for each IPHC Regulatory Area. The potential drawback is a misconception that the resulting catch sharing arrangements and associated fishery limits are within the Commission's mandate, when in fact they are the

[1] The Convention between Canada and the United States of America for the Preservation of the [Pacific] Halibut Fishery of the Northern Pacific Ocean and Bering Sea.

responsibility of the Contracting Parties. The intention is to reinforce that distinction by clarifying which decisions are made by the Commission.

Sectors Affected: This proposal affects all sectors of the Pacific halibut fishery.

Appendix A provides details on the suggested regulatory language.

ADDITIONAL DOCUMENTATION

None

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2023-AM099-PropA1, which provides the Commission with an opportunity to recall the format of the IPHC Fishery Regulations: *Mortality and Fishery Limits* (Sect. 5), to be populated at the 99th Session of the IPHC Annual Meeting (AM099) in January 2023.

APPENDICES

Appendix A: Suggested regulatory language

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

5. Mortality and Fishery Limits

(1) The Commission has adopted the following distributed mortality (TCEY) values:

IPHC Regulatory Area	***Distributed mortality limits (TCEY) (net weight)***	
	Tonnes (t)	**Million Pounds (Mlb)**
Area 2A (California, Oregon, and Washington)		
Area 2B (British Columbia)		
Area 2C (southeastern Alaska)		
Area 3A (central Gulf of Alaska)		
Area 3B (western Gulf of Alaska)		
Area 4A (eastern Aleutians)		
Area 4B (central and western Aleutians)		
Areas 4CDE (Bering Sea)		
Total		

(2) The fishery limits resulting from the IPHC-adopted distributed mortality (TCEY) limits and the existing Contracting Party catch sharing arrangements are as follows, recognising that each Contracting Party may implement more restrictive limits:

IPHC Regulatory Area	***Fishery limits (net weight)***	
	Tonnes (t)	**Million Pounds (Mlb)**
Area 2A (California, Oregon, and Washington)		
Non-tribal directed commercial (south of Pt. Chehalis)		
Non-tribal incidental catch in salmon troll fishery		
Non-tribal incidental catch in sablefish fishery (north of Pt. Chehalis)		
Treaty Indian commercial		
Treaty Indian ceremonial and subsistence (year-round)		
Recreational – Washington		
Recreational – Oregon		
Recreational – California		
Area 2B (British Columbia) (combined commercial and recreational)		
Commercial fishery		
Recreational fishery		
Area 2C (southeastern Alaska) (combined commercial and guided recreational)		

Commercial fishery (includes XX Mlb landings and XX Mlb discard mortality)		
Guided recreational fishery (includes landings and discard mortality)		
Area 3A (central Gulf of Alaska) (combined commercial and guided recreational)		
Commercial fishery (includes XX Mlb landings and XX Mlb discard mortality)		
Guided recreational fishery (includes landings and discard mortality)		
Area 3B (western Gulf of Alaska)		
Area 4A (eastern Aleutians)		
Area 4B (central and western Aleutians)		
Areas 4CDE (Bering Sea)		
Area 4C (Pribilof Islands)		
Area 4D (northwestern Bering Sea)		
Area 4E (Bering Sea flats)		
Total		

* Allocations resulting from the IPHC Regulatory Area 2A Catch Share Plan are listed in *pounds*.

IPHC Fishery Regulations:

Commercial Fishing Periods (Sect. 9)

PREPARED BY: IPHC SECRETARIAT (21 DECEMBER 2022)

PURPOSE

To specify fishing periods for the directed commercial Pacific halibut fisheries within the IPHC Fishery Regulations: Commercial Fishing Periods (Sect. 9).

BACKGROUND

Each year, the International Pacific Halibut Commission (IPHC) selects fishing period dates for the directed commercial Pacific halibut fisheries in each of the IPHC Regulatory Areas. Historically, the first management measures implemented by the IPHC were to limit periods when fishing was allowed. Biological factors considered in the past when setting fishing period dates included migration and spawning considerations, neither of which is now used as a basis for determining fishing periods.

These dates have varied from year to year, and in recent years have allowed directed commercial fishing to begin sometime in March and end sometime in November or December for all IPHC Regulatory Areas with the exception of the IPHC Regulatory Area 2A.

DISCUSSION

The IPHC Secretariat proposes that the commercial fishing periods for all IPHC Regulatory Areas be set at AM099 following stakeholder input.

Moreover, with the transition of management authority of the IPHC Regulatory Area 2A non-tribal directed commercial Pacific halibut fishery from the IPHC to the Pacific Fishery Management Council (PFMC) and NOAA Fisheries (per final rule 87 FR 74322 published on 5 December 2022), the IPHC will no longer need to consider setting dates for the 2A non-tribal directed commercial fishery and the dates would be set by the Contracting Party within the overall commercial fishing period dates. This is consistent with the IPHC Convention[1], which states that the Contracting Parties may implement fishery regulations that are more restrictive than those adopted by the IPHC. In this case, Sect. 9(4) will be replaced with a subsection referring to regulations promulgated by NOAA Fisheries and published in the Federal Register.

More information on the transition of management in the IPHC Regulatory Area 2A can be found in IPHC-2023-AM099-04 and IPHC-2023-AM099-INF03. Final action by the PFMC on 2023 non-tribal directed commercial Pacific halibut fishery regulations for NOAA Fisheries implementation took place on 3 November 2022 (see PFMC November 2022 decision summary document) as follows:

> *"The Council adopted a 2023 season structure for the directed commercial fishery consisting of a series of three-day openings, beginning at 8 a.m. on the fourth Tuesday*

[1] The Convention between Canada and the United States of America for the Preservation of the [Pacific] Halibut Fishery of the Northern Pacific Ocean and Bering Sea.

in June and ending at 6 p.m. on the Thursday of that week. Additional three-day openings would occur every other week (or as soon as practicable), Tuesday through Thursday, until the directed fishery allocation is obtained and, if NMFS implements final regulations transitioning management of the directed commercial Pacific halibut fishery from the International Pacific Halibut Commission (IPHC) to NMFS, administrative edits to the CSP will be made as needed to reflect the final regulations, consistent with Agenda Item E.2, Supplemental Attachment 1, November 2022."

Benefits/Drawbacks: This proposal clearly indicates that the decision on commercial fishing periods is within the Commission's mandate and the season dates can be changed annually. Moreover, it clarifies that more strict fishing periods can be implemented by the Contracting Party.

Sectors Affected: Commercial Pacific halibut fisheries in each IPHC Regulatory Area.

Appendix A provides details on the suggested regulatory language.

ADDITIONAL DOCUMENTATION

None.

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2023-AM099-PropA2, which provides the Commission with an opportunity to recall the format of the IPHC Pacific Halibut Fishery Regulations: *Commercial Fishing Periods* (Sect. 9), to be filled at the 99th Session of the IPHC Annual Meeting (AM099) in January 2023.

APPENDICES

Appendix A: Suggested regulatory language.

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

9. Commercial Fishing Periods

(1) The fishing periods for each IPHC Regulatory Area apply where the fishery limits specified in section 5 have not been taken.

(2) Unless the Commission specifies otherwise, commercial fishing for Pacific halibut in all IPHC Regulatory Areas may begin no earlier in the year than 1200 local time on ~~6 March~~DD MMMM.

(3) All commercial fishing for Pacific halibut in all IPHC Regulatory Areas shall cease for the year at 1200 local time on ~~7 December~~DD MMMM.

~~(4) The first fishing period in the IPHC Regulatory Area 2A non-tribal directed commercial fishery[2] shall begin at 0800 on the fourth Tuesday in June and terminate at 1800 local time on the subsequent Thursday, unless the Commission specifies otherwise. If the Commission determines that the fishery limit specified for IPHC Regulatory Area 2A in Section 5 has not been exceeded, it may announce a second fishing period of up to three fishing days to begin on Tuesday two weeks after the first period, and, if necessary, a third fishing period of up to three fishing days to begin on Tuesday four weeks after the first period.~~

(4) Regulations pertaining to the non-tribal directed commercial fishing periods in the IPHC Regulatory Area 2A will be promulgated by NOAA Fisheries and published in the Federal Register. This fishery will occur between the dates and times listed in paragraphs (2) and (3) of this Section.

(5) Notwithstanding paragraph (4) of this Section~~, and paragraph (6) of section 12~~, an incidental catch fishery[3] is authorized during the sablefish seasons in IPHC Regulatory Area 2A in accordance with regulations promulgated by NOAA Fisheries. This fishery will occur between the dates and times listed in paragraphs (2) and (3) of this section.

(6) Notwithstanding paragraph (4) of this Section~~, and paragraph (6) of section 12~~, an incidental catch fishery is authorized during salmon troll seasons in IPHC Regulatory Area 2A in accordance with regulations promulgated by NOAA Fisheries. This fishery will occur between the dates and times listed in paragraphs (2) and (3) of this section.

[2] The non-tribal directed fishery is restricted to waters that are south of Point Chehalis, Washington, (46°53.30′ N. latitude) under regulations promulgated by NOAA Fisheries and published in the Federal Register.

[3] The incidental fishery during the directed, fixed gear sablefish season is restricted to waters that are north of Point Chehalis, Washington, (46°53.30′ N. latitude) under regulations promulgated by NOAA Fisheries at 50 CFR 300.63. Landing restrictions for Pacific halibut retention in the fixed gear sablefish fishery can be found at 50 CFR 660.231.

IPHC Fishery Regulations:

Fishing Period Limits (Sect. 14) & Licensing Vessels for IPHC Regulatory Area 2A (Sect. 15) – Accommodation of the transition of management in the IPHC Regulatory Area 2A

PREPARED BY: IPHC SECRETARIAT (21 DECEMBER 2022)

PURPOSE

To accommodate the transition of management in the IPHC Regulatory Area 2A from the IPHC to the Pacific Fishery Management Council (PFMC) and NOAA Fisheries. This proposal is mainly related to IPHC Fishery Regulations Sect. 14 & 15, but will have implications on other sections, as detailed below.

BACKGROUND

At its November 2020 meeting, the PFMC took final action to adopt a set of management alternatives accommodating the transition of management of the non-tribal directed commercial fishery in the IPHC Regulatory Area 2A. The PFMC decided to utilize September and November Catch Sharing Plan process to consider the directed commercial fishery framework, including recommendations for vessel catch limits and in-season changes for NOAA Fisheries implementation. Moreover, the decision was made to charge NOAA Fisheries with issuing permits for all 2A Pacific halibut fisheries: non-tribal directed commercial, incidental salmon troll, incidental sablefish, and recreational charter.

The proposed rule (87 FR 44318) implementing the 2A management transition was published on 26 July 2022 and remained open for public comments until 25 August 2022. The final rule (87 FR 74322) was published on 5 December 2022 and is effective on 4 January 2023.

More information on the transition of management in the IPHC Regulatory Area 2A can be found in IPHC-2023-AM099-04 and IPHC-2023-AM099-INF03.

DISCUSSION

NOAA-Fisheries has authority to promulgate Pacific halibut fishing regulations under the Northern Pacific Halibut Act of 1982, 16 U.S.C. 773-773k, provided such regulations are consistent with broader IPHC Fishery Regulations.

With the transition of management authority of the IPHC Regulatory Area 2A non-tribal directed commercial Pacific halibut fishery from the IPHC to the PFMC and NOAA-Fisheries, and management of 2A Pacific halibut fisheries commencing prior to the 2023 fishing period under NOAA Fisheries, there is a need for a number of amendments to the IPHC Fishery Regulations assuring their consistency with the new management regime.

Benefits/Drawbacks: Following the transition, starting in 2023 NOAA-Fisheries will assume responsibility for issuing vessels permits to fish for Pacific halibut in commercial and recreational charter fisheries in Area 2A, and for issuing annual management measures for the non-tribal

directed commercial fishery. These actions would be in addition to actions NOAA-Fisheries already undertakes such as issuing annual management measures for the Area 2A recreational fisheries (applicable to both charter and private anglers), consistent with the recommendations from the PFMC and the framework in the PFMC's Catch Sharing Plan. PFMC is a suitable forum for discussing annual management measures for the non-tribal directed commercial fishery. This action would free a small amount of the Fisheries Data Services Branch (FDSB) resources to be reallocated to other FDSB core activities. The potential drawback is that the IPHC will not have a direct access to the list of vessels licensed to fish Pacific halibut in the IPHC Regulatory Area 2A post-transition. Discussions on data sharing arrangements are ongoing.

Sectors Affected: This proposal affects all sectors of the Pacific halibut fishery in the IPHC Regulatory Area 2A.

Appendix A provides details on the suggested regulatory language.

ADDITIONAL DOCUMENTATION

None

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2023-AM099-PropA3, which accommodates the transition of management in the IPHC Regulatory Area 2A from the IPHC to the Pacific Fishery Management Council (PFMC) and NOAA-Fisheries, as implemented in 50 CFR 300 Subpart E.

APPENDICES

Appendix A: Suggested regulatory language.

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

3. Definitions

(1) In these Regulations, […]

~~(k) "license" means a Pacific halibut fishing license issued by the Commission pursuant to Section 15;~~

(k) "permit" means a Pacific halibut fishing license issued by NOAA Fisheries;

12. Application of Commercial Fishery Limits

(1) Notwithstanding the fishery limits described in Section 5, regulations pertaining to the division of the IPHC Regulatory Area 2A fishery limit between the directed commercial fishery and the incidental catch fishery as described in paragraphs (5) and (6) of Section 9 will be promulgated by NOAA Fisheries and published in the Federal Register.

~~(2) The Commission shall determine and announce to the public the date on which the fishery limit for IPHC Regulatory Area 2A will be taken.~~

(2) Notwithstanding the fishery limits described in Section 5, the IPHC Regulatory Area 2A non-tribal directed commercial fishery will close when NOAA Fisheries determines and announces in the Federal Register that the fishery limit has been or is projected to be reached, or on the date when fishing must cease as specified in Section 9, whichever is earlier.

(3) Notwithstanding the fishery limits described in Section 5, the commercial fishing in IPHC Regulatory Area 2B will close only when all Individual Vessel Quotas (IVQ) and Individual Transferable Quotas (ITQ) assigned by DFO are taken, or on the date when fishing must cease as specified in Section 9, whichever is earlier.

(4) Notwithstanding the fishery limits described in Section 5, IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E will each close only when all Individual Fishing Quotas (IFQ) and all CDQ issued by NOAA Fisheries have been taken, or on the date when fishing must cease as specified in Section 9, whichever is earlier.

~~(5) If the Commission determines that the fishery limit specified for IPHC Regulatory Area 2A in Section 5 would be exceeded in an additional directed commercial fishing period as specified in paragraph (4) of Section 9, the fishery limit for that area shall be considered to have been taken and the directed commercial fishery closed as announced by the Commission.~~

~~(6) When under paragraphs (1), (2), and (5) the Commission has announced a date on which the fishery limit for IPHC Regulatory Area 2A will be taken, no person shall fish for Pacific halibut in that area after that date for the rest of the year, unless the Commission has announced the reopening of that area for Pacific halibut fishing.~~

14. Fishing ~~Period Limits~~ in IPHC Regulatory Area 2A

(1) No person shall fish for Pacific halibut from a vessel, nor land or retain Pacific halibut on board a vessel, used for commercial fishing in IPHC Regulatory Area 2A, unless issued a permit valid for fishing in IPHC Regulatory Area 2A by NOAA Fisheries according to 50 CFR 300 Subpart E.

(2) It shall be unlawful for any vessel to retain more Pacific halibut than authorized by that vessel's ~~license~~ permit in any fishing period for which ~~the Commission has announced~~ a fishing period limit is announced by NOAA Fisheries in the Federal Register.

(3) The operator of any vessel that fishes for Pacific halibut during a fishing period when fishing period limits are in effect must, upon commencing an offload of Pacific halibut to a commercial fish processor, completely offload all Pacific halibut on board said vessel to that processor and ensure that all Pacific halibut is weighed and reported on State fish tickets.

(4) The operator of any vessel that fishes for Pacific halibut during a fishing period when fishing period limits are in effect must, upon commencing an offload of Pacific halibut other than to a commercial fish processor, completely offload all Pacific halibut on board said vessel and ensure that all Pacific halibut are weighed and reported on State fish tickets.

(5) The provisions of paragraph (3) are not intended to prevent retail over-the-side sales to individual purchasers so long as all the Pacific halibut on board is ultimately offloaded and reported.

~~(5) When fishing period limits are in effect, a vessel's maximum retainable catch will be determined by the Commission based on:~~

~~(a) the vessel's overall length in feet and associated length class;~~

~~(b) the average performance of all vessels within that class; and~~

~~(c) the remaining fishery limit.~~

~~(6) Length classes are shown in the following table:~~

~~Overall Length (in feet)~~	~~Vessel Class~~
~~1-25~~	~~A~~
~~26-30~~	~~B~~
~~31-35~~	~~C~~
~~36-40~~	~~D~~
~~41-45~~	~~E~~
~~46-50~~	~~F~~
~~51-55~~	~~G~~
~~56+~~	~~H~~

(6) Fishing period limits in IPHC Regulatory Area 2A will be promulgated by NOAA Fisheries and published in the Federal Register and apply only to the non-tribal directed commercial Pacific halibut fishery referred to in paragraph (4) of Section 9.

~~15. Licensing Vessels for IPHC Regulatory Area 2A~~

~~(1) No person shall fish for Pacific halibut from a vessel, nor possess Pacific halibut on board a vessel, used either for commercial fishing or as a charter vessel in IPHC Regulatory Area 2A, unless the Commission has issued a license valid for fishing in IPHC Regulatory Area 2A in respect of that vessel.~~

~~(2) A license issued for a vessel operating in IPHC Regulatory Area 2A shall be valid only for operating either as a charter vessel or a commercial vessel, but not both.~~

~~(3) A vessel with a valid IPHC Regulatory Area 2A commercial license cannot be used to recreationally (sport) fish for Pacific halibut in IPHC Regulatory Area 2A.~~

~~(4) A license issued for a vessel operating in the commercial fishery in IPHC Regulatory Area 2A shall be valid for one of the following:~~

~~(a) the directed commercial fishery during the fishing periods specified in paragraph (4) of Section 9;~~

~~(b) the incidental catch fishery during the sablefish fishery specified in paragraph (5) of Section 9; or~~

~~(c) the incidental catch fishery during the salmon troll fishery specified in paragraph (6) of Section 9.~~

~~(5) A vessel with a valid license for the IPHC Regulatory Area 2A incidental catch fishery during the sablefish fishery described in paragraph (4)(b) may also apply for or be issued a license for the directed commercial fishery described in paragraph (4)(a).~~

~~(6) A license issued in respect to a vessel referred to in paragraph (1) of this Section must be carried on board that vessel at all times and the vessel operator shall permit its inspection by any authorized officer.~~

~~(7) The Commission shall issue a license in respect to a vessel from its office in Seattle, Washington, upon receipt of a completed "Application for Vessel License for the Pacific Halibut Fishery" form.~~

~~(8) A vessel operating in the directed commercial fishery in IPHC Regulatory Area 2A must have submitted its "Application for Vessel License for the Pacific Halibut Fishery" form no later than 2359 local time on 30 April, or the first weekday in May if 30 April is a Saturday or Sunday.~~

~~(9) A vessel operating in the incidental catch fishery during the sablefish fishery in IPHC Regulatory Area 2A must have submitted its "Application for Vessel License for the Pacific Halibut Fishery" form no later than 2359 local time on 29 May, or the next weekday in May if 29 May is a Saturday or Sunday.~~

~~(10) A vessel operating in the incidental catch fishery during the salmon troll fishery in IPHC Regulatory Area 2A must have submitted its "Application for Vessel License for the Pacific Halibut Fishery" form no later than 2359 local time on 15 March, or the next weekday in March if 15 March is a Saturday or Sunday.~~

~~(11) Applications are submitted on the IPHC Secretariat webpage.~~

~~(12) Information on the "Application for Vessel License for the Pacific Halibut Fishery" form must be accurate.~~

~~(13) The "Application for Vessel License for the Pacific Halibut Fishery" form shall be completed by the vessel owner.~~

~~(14) Licenses issued under this Section shall be valid only during the year in which they are issued.~~

~~(15) A new license is required for a vessel that is sold, transferred, renamed, or for which the documentation is changed.~~

~~(16) The license required under this Section is in addition to any license, however designated, that is required under the laws of the United States of America or any of its States.~~

~~(17) The United States of America may suspend, revoke, or modify any license issued under this Section under policies and procedures in U.S. Code Title 15, CFR Part 904.~~

21. Receipt and Possession of Pacific Halibut

(1) No person shall receive Pacific halibut caught in IPHC Regulatory Area 2A from a United States of America vessel that does not have on board the ~~license~~ permit required by Section ~~15~~14(1) [as amended].

23. Fishing by United States Indian Tribes

(1) Pacific halibut fishing in IPHC Regulatory Area Subarea 2A-1 by members of United States treaty Indian tribes located in the State of Washington shall be regulated under regulations promulgated by NOAA Fisheries and published in the Federal Register:

(a) Subarea 2A-1 includes the usual and accustomed fishing areas for Pacific Coast treaty tribes off the coast of Washington and all inland marine waters of Washington north of Point Chehalis (46°53.30′ N. lat.), including Puget Sound. Boundaries of a tribe's fishing area may be revised as ordered by a United States Federal court;

(b) Section ~~15 (Licensing Vessels for IPHC Regulatory Area 2A)~~ 14(1) [as amended] does not apply to commercial fishing for Pacific halibut in Subarea 2A-1 by Indian tribes; and

(c) ceremonial and subsistence fishing for Pacific halibut in Subarea 2A-1 is permitted with hook and line gear from 1 January through 31 December.

27. Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Area 2A

[…]

(3) No person shall fish for Pacific halibut from a vessel, nor land or retain Pacific halibut on board a vessel, used as a charter vessel in IPHC Regulatory Area 2A, unless issued a permit valid for fishing in IPHC Regulatory Area 2A by NOAA Fisheries according to 50 CFR 300 Subpart E.

Minor edits throughout for consistency in Sections numbering.

IPHC Fishery Regulations: minor amendments

PREPARED BY: IPHC SECRETARIAT (21 DECEMBER 2022 & 11 JANUARY 2023)

PURPOSE

To improve clarity and consistency in the IPHC Fishery Regulations.

BACKGROUND

This proposal would make minor clarifying amendments to the existing IPHC Fishery Regulations. The proposed revisions are a result of a review by the Secretariat and consultations with domestic agencies.

DISCUSSION

Periodically, the IPHC Fishery Regulations are reviewed to ensure they are clear, concise, consistent, and current. The proposed revisions, which are outlined below in detail, are a result of a holistic review performed by the Secretariat, as well as discussions with the domestic agencies. Input from Contracting Parties was sought to streamline the process of adopting the revised regulations at the 99th Session of the IPHC Annual Meeting (AM099).

Proposed amendments to the 2023 IPHC Fishery Regulations:

1. Section 3, Definitions would include a definition of the total constant exploitation yield (TCEY). This term is used throughout the regulations, but no formal definition was included in the document.
2. Consistent use of the definition “authorized representative of the Commission”.
3. Consistent use of “non-tribal directed commercial fishery”.
4. Minor edits throughout for stylistic consistency among Sections.
5. [Rev_1 addition] Unambiguous use of the term “permit”. Withing the IPHC Fishery Regulations, this term will be reserved for permits issued by NOAA Fisheries in accordance with 50 CFR 300 Subpart E. This amendment is conditional on the adoption of IPHC-2023-AM099-PropA3.

Benefits/Drawbacks: The benefit is clearer and more consistent regulations that are easier to use. There are no known drawbacks.

Sectors Affected: This proposal affects all sectors of the Pacific halibut fishery.

Appendix A provides details on the suggested regulatory language. Rev_1 changes are marked with yellow highlight.

ADDITIONAL DOCUMENTATION

None

RECOMMENDATIONS

That the Commission:

1) **NOTE** and **ADOPT** regulatory proposal IPHC-2023-AM099-PropA4 Rev_1, which recommends changes to improve the clarity and transparency of the IPHC Fishery Regulations.

APPENDICES

Appendix A: Suggested regulatory language

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

1. Section 3, Definitions would include a definition of the total constant exploitation yield (TCEY).

3. Definitions

(1) In these Regulations, […]

(u) "total constant exploitation yield (TCEY)" means the mortality comprised of Pacific halibut from directed fisheries and that from non-directed fisheries greater than 26 inches (66 cm) in length;

2. Consistent use of the definition "authorized representative of the Commission".

19. Logs

(7) The log referred to in paragraph (5) shall be: […]

(f) submitted to the Commission within seven days of the final offload if not previously collected ~~by a Commission employee~~an authorized representative of the Commission.

3. Consistent use of "non-tribal directed commercial fishery".

9. Commercial Fishing Periods

(4) Regulations pertaining to the non-tribal directed commercial fishing[2] periods in the IPHC Regulatory Area 2A will be promulgated by NOAA Fisheries and published in the Federal Register. This fishery will occur between the dates and times listed in paragraphs (2) and (3) of this Section.

[2] The non-tribal directed commercial fishery is restricted to waters that are south of Point Chehalis, Washington, (46°53.30′ N. latitude) under regulations promulgated by NOAA Fisheries and published in the Federal Register.

12. Application of Commercial Fishery Limits

(1) Notwithstanding the fishery limits described in Section 5, regulations pertaining to the division of the IPHC Regulatory Area 2A fishery limit between the non-tribal directed commercial fishery and the incidental catch fishery as described in paragraphs (5) and (6) of Section 9 will be promulgated by NOAA Fisheries and published in the Federal Register.

17. Fishing Gear

(7) No person on board a vessel used to fish for any species of fish anywhere in IPHC Regulatory Area 2A during the 72-hour period immediately before the fishing period for the non-tribal directed commercial fishery shall catch or possess Pacific

halibut anywhere in those waters during that Pacific halibut fishing period unless, prior to the start of the Pacific halibut fishing period, the vessel has removed its gear from the water and has either:

(a) made a landing and completely offloaded its catch of other fish; or

(b) submitted to a hold inspection by an authorized officer.

(8) No vessel used to fish for any species of fish anywhere in IPHC Regulatory Area 2A during the 72-hour period immediately before the fishing period for the non-tribal directed commercial fishery may be used to catch or possess Pacific halibut anywhere in those waters during that Pacific halibut fishing period unless, prior to the start of the Pacific halibut fishing period, the vessel has removed its gear from the water and has either:

(a) made a landing and completely offloaded its catch of other fish; or

(b) submitted to a hold inspection by an authorized officer.

4. Minor edits throughout for stylistic consistency among Sections.

8. Retention of Tagged Pacific Halibut

(3) Any Pacific halibut that bears a Commission external tag will not count against commercial fishing period limits, Individual Vessel Quota~~s~~ (IVQ), Individual Transferable Quota (ITQ), Community Development Quota~~s~~ (CDQ), or Individual Fishing Quota~~s~~ (IFQ), and are not subject to size limits in these regulations, but should still be recorded in the landing record.

12. Application of Commercial Fishery Limits

(3) Notwithstanding the fishery limits described in Section 5, the commercial fishing in IPHC Regulatory Area 2B will close only when all ~~Individual Vessel Quotas (~~IVQ~~)~~ and ~~Individual Transferable Quotas (~~ITQ~~)~~ assigned by DFO are taken, or on the date when fishing must cease as specified in Section 9, whichever is earlier.

(4) Notwithstanding the fishery limits described in Section 5, IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E will each close only when all ~~Individual Fishing Quotas (~~IFQ~~)~~ and all CDQ issued by NOAA Fisheries have been taken, or on the date when fishing must cease as specified in Section 9, whichever is earlier.

13. Fishing in ~~Regulatory~~ IPHC Regulatory Areas 4D and 4E

(1) Section 13 applies only to any person fishing for, or any vessel that is used to fish for, IPHC Regulatory Area 4E ~~Community Development Quota (~~CDQ~~)~~ Pacific halibut, IPHC Regulatory Area 4D CDQ Pacific halibut, or IPHC Regulatory Area 4D IFQ received by transfer by a CDQ organization provided that the total annual Pacific halibut catch of that person or vessel is landed at a port within IPHC Regulatory Areas 4E or 4D.

21. Receipt and Possession of Pacific Halibut

(8) The master or operator of a Canadian vessel that was engaged in Pacific halibut fishing must weigh and record all Pacific halibut on board said vessel at the time offloading commences and record on Provincial fish tickets or Federal catch reports: the date; locality; name of vessel; the name(s) of the person(s) from whom the Pacific halibut was purchased; and the scale weight obtained at the time of offloading of all Pacific halibut on board the vessel including the pounds purchased, pounds in excess of IVQ~~s~~ or ITQ~~s~~, pounds retained for personal use, and pounds discarded as unfit for human consumption. All Pacific halibut must be weighed with the head on and the head-on weight must be recorded on the Provincial fish tickets or Federal catch reports as specified in this paragraph, unless the Pacific halibut is frozen at sea and exempt from the head-on landing requirement at Section 19(2).

5. Unambiguous use of the term “permit”.

21. Receipt and Possession of Pacific Halibut

(13) No person shall tag Pacific halibut unless the tagging is authorized by IPHC ~~permit~~ or by a Federal or State agency.

IPHC Fishery Regulation Proposal:

Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) – Charter management measures in IPHC Regulatory Areas 2C and 3A

SUBMITTED BY: UNITED STATES OF AMERICA (NOAA-FISHERIES) (20 DECEMBER 2022)

Directed Commercial ☐ Recreational ☒ Subsistence ☐ Non-directed commercial ☐ All ☐

All Regulatory Areas ☐ All Alaska Regulatory Areas ☐ All U.S. Regulatory Areas ☐

2A ☐ 2B ☐ 2C ☒ 3A ☒ 3B ☐ 4A ☐ 4B ☐ 4C ☐ 4D ☐ 4E ☐

PURPOSE

To propose charter management measures in IPHC Regulatory Areas 2C and 3A reflective of mortality limits adopted by the IPHC and resulting allocations under the North Pacific Fishery Management Council (NPFMC) Pacific halibut Catch Sharing Plan.

EXPLANATORY MEMORANDUM

The North Pacific Fishery Management Council (NPFMC) recommended the following management measures for guided recreational (sport) Pacific halibut fisheries in IPHC Regulatory Areas 2C and 3A for application in 2023, in order to achieve the charter Pacific halibut allocation under the NPFMC Halibut Catch Sharing Plan.

The NPFMC selected these management measures at its December 2022 meeting, following review of the Alaska Department of Fish and Game (ADF&G) analysis of proposed management measures for 2023, and after receiving input from the Charter Halibut Management Committee, which includes stakeholder representatives from both IPHC Regulatory Areas 2C and 3A.

IPHC Area 2C

Management measures for all allocations shown below include a daily bag limit of one Pacific halibut, combined with a progression of size limits, days closed to the retention of Pacific halibut, and an annual limit, in the following order:

1. A daily bag limit of one halibut, with a reverse slot size limit, where the upper limit is fixed at O80 (halibut equal to 80 inches or more may be retained), and a decreasing lower size limit that is applied until the allocation is reached, but no lower than U40 (halibut equal to 40 inches or less may be retained). These measures cover projected charter removals that range from 0.867 up to 1.121 million pounds (Mlb), as provided by **Table 2C.5 (page 21)** of the Alaska Department of Fish and Game (ADF&G) analysis.
2. If the allocation cannot be reached with a lower size limit of U40 and upper size limit of O80, then also prohibit halibut retention on Mondays, beginning with September 18 and all other Mondays through the end of the season; then, if necessary, add consecutive

Monday closures from September 18 working toward the beginning of the season until the allocation is reached. These additional measures cover projected charter removals that range from 0.734 to 0.867 Mlb, as indicated in **Table 2C.8.b (page 25)** of the ADF&G analysis.

3. If the allocation cannot be reached with a lower limit of U40 and all Mondays closed, add an annual limit of three fish per charter angler. If possible, increase the lower size limit to U41 or U42 to reach the allocation. These additional measures cover projected charter removals that range from 0.686 to 0.723 Mlb, as indicated in **Table 2C.10.b (page 30)** of the ADF&G analysis.
4. If the allocation is not reached by closing all Mondays and applying a three-fish annual limit, then allow the lower size limit to decrease from U40 until the allocation is reached. This covers projected charter removals that range from 0.564 to 0.686 Mlb, as indicated in **Table 2C.10.b (page 30)** of the ADF&G analysis.

If an annual limit is adopted in Area 2C, implement a requirement for charter anglers to record, immediately upon retaining a halibut, the following information: the date, location (IPHC Regulatory Area), and species (Pacific halibut) on their harvest record, consistent with the past reporting requirements implemented in IPHC Area 3A.

IPHC Area 3A

Management measures for all allocations shown below include, unless otherwise specified, a daily bag limit of two halibut; one fish of any size and one fish with a maximum size limit; one trip per charter vessel per day with retention of halibut; one trip per charter halibut permit per day.

1. If the allocation is less than 2.37 Mlb, but greater than or equal to 2.075 Mlb, apply:
   - One fish of any size and one fish less than or equal to 28 inches;

   and,
   - Adjust the number of Wednesdays closed to the retention of halibut, so that projected charter removals are within the Area 3A allocation, as indicated in **Table 3A.13 (page 74)** of the ADF&G analysis.
2. If the allocation is less than 2.075 Mlb, but greater than 1.75 Mlb: in addition to all closed Wednesdays and a second halibut 28 inches or less, close as many Tuesdays as needed to keep the charter harvest removals within the Area 3A allocation, as indicated in **Table 3A.5 (page 65)** of the ADF&G analysis.
3. If the allocation is below 1.75 Mlb, in addition to closing all Tuesdays and Wednesdays, lower the size of the second fish to as low as 26 inches, until the projected charter harvest removals meet the allocation. This covers allocations as low as 1.69 Mlb as indicated in **Table 3A.6 (page 65)** of the ADF&G analysis

Supporting information

The December 2022 NPFMC final motion for charter halibut management measures, the minutes of the December 2022 NPFMC Charter Halibut Management Committee, and the ADF&G analysis of the charter halibut management measures for 2023 are available on the

NPFMC website at: https://meetings.npfmc.org/Meeting/Details/2964 (see Agenda Item C6, 2023 Charter Halibut Management Measures – Final Action).

RECOMMENDATIONS

That the Commission:

1) **NOTE** IPHC Fishery Regulation proposal IPHC-2023-AM099-PropB1 which proposes charter management measures in IPHC Regulatory Areas 2C and 3A reflective of mortality limits adopted by the IPHC and resulting allocations under the North Pacific Fishery Management Council (NPFMC) Pacific halibut Catch Sharing Plan.

APPENDICES

Appendix A: Suggested Regulatory Language.

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

29. Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E

(1) …

(2) For guided recreational (sport) fishing (as referred to in 50 CFR 300.65) in IPHC Regulatory Area 2C:

(a) no person on board a charter vessel (as referred to in 50 CFR 300.65) shall catch and retain more than one Pacific halibut per calendar day.

(b) no person on board a charter vessel (as referred to in 50 CFR 300.65) shall catch and retain any Pacific halibut that with head on is greater than 40 inches (101.6 cm) and less than 80 inches (203.2 cm) [as described above, size limits may be adjusted to meet the 2023 Area 2C charter harvest allocation] as measured in a straight line, passing over the pectoral fin from the tip of the lower jaw with mouth closed, to the extreme end of the middle of the tail.

(c) [as described above, this section may be added according to the progressive management measures described in the NPFMC recommendation] no person on board a charter vessel may catch and retain Pacific halibut on the following Mondays: [a list of dates of 2023 Mondays would follow]

(d) [as described above, this section may be added according to the progressive management measures described in the NPFMC recommendation] charter vessel anglers may catch and retain no more than three Pacific halibut per calendar year on board charter vessels in IPHC Regulatory Area 2C. Pacific halibut that are retained as GAF, retained while on a charter vessel fishing trip in other Commission regulatory areas, or retained while fishing without the services of a guide do not accrue toward the three-fish annual limit for Regulatory Area 2C.

(3) For guided recreational (sport) fishing (as referred to in 50 CFR 300.65) in IPHC Regulatory Area 3A:

(a) no person on board a charter vessel (as referred to in 50 CFR 300.65) shall catch and retain more than two Pacific halibut per calendar day;

(b) at least one of the retained Pacific halibut must have a head-on length of no more than 28 inches (71.1 cm) [as described above, the size limit may be adjusted to meet the 2023 harvest allocation in Area 3A] as measured in a straight line, passing over the pectoral fin from the tip of the lower jaw with mouth closed, to the extreme end of the middle of the tail. If a person sport fishing on a charter vessel in IPHC Regulatory Area 3A retains only one Pacific halibut in a calendar day, that Pacific halibut may be of any length;

(c) a "charter halibut permit" (as referred to in 50 CFR 300.67) may only be used for one charter vessel fishing trip in which Pacific halibut are caught and retained per calendar day. A charter vessel fishing trip is defined at 50 CFR 300.61 as the time period between the first deployment of fishing gear into the water by a charter vessel angler (as defined at 50 CFR 300.61) and the

offloading of one or more charter vessel anglers or any Pacific halibut from that vessel. For purposes of this trip limit, a charter vessel fishing trip ends at 2359 (Alaska local time) on the same calendar day that the fishing trip began, or when any anglers or Pacific halibut are offloaded, whichever comes first;

(d) a charter vessel on which one or more anglers catch and retain Pacific halibut may only make one charter vessel fishing trip per calendar day. A charter vessel fishing trip is defined at 50 CFR 300.61 as the time period between the first deployment of fishing gear into the water by a charter vessel angler (as defined at 50 CFR 300.61) and the offloading of one or more charter vessel anglers or any Pacific halibut from that vessel. For purposes of this trip limit, a charter vessel fishing trip ends at 2359 (Alaska local time) on the same calendar day that the fishing trip began, or when any anglers or Pacific halibut are offloaded, whichever comes first; and

(e) no person on board a charter vessel may catch and retain Pacific halibut on any Wednesday, or on the following Tuesdays in 2023: July 25 and August 1. [as described above, Wednesday and Tuesday closures to Pacific halibut retention may be adjusted, to meet the 2023 harvest allocation in Area 3A].

IPHC Fishery Regulation Proposal:

Recreational (Sport) Fishing for Pacific Halibut - IPHC Regulatory Area 2B (Sect. 28) - Daily bag limit in IPHC Regulatory Area 2B

SUBMITTED BY: CANADA (FISHERIES AND OCEANS CANADA) (28 OCTOBER 2022 & 26 JANUARY 2023)

Directed Commercial ☐ Recreational ☒ Subsistence ☐ Non-directed commercial ☐ All ☐

All Regulatory Areas ☐ All Alaska Regulatory Areas ☐ All U.S. Regulatory Areas ☐

2A ☐ 2B ☒ 2C ☐ 3A ☐ 3B ☐ 4A ☐ 4B ☐ 4C ☐ 4D ☐ 4E ☐

PURPOSE

To propose the daily bag limit of up to three fish per day per person in the recreational fishery in IPHC Regulatory Area 2B.

EXPLANATORY MEMORANDUM

Canada is proposing changes to section 28 (Recreational (Sport) Fishing for Pacific Halibut – IPHC Regulatory Area 2B) of the IPHC Fishery Regulations to allow a maximum daily bag limit of three (3) fish per day, per person. The purpose of the proposed change is to align IPHC fishery regulations with Canada's domestic sportfishing regulations, to simplify unnecessary regulatory complexity, and to retain Canada's ability and autonomy to manage its domestic fishery.

The Commission previously supported and approved an increase in the Canadian daily bag limit from two (2) per day, to three (3) per day, on a one-year basis from 1 April 2021 to 31 March 2022, and once again from 1 April 2022 to 31 March 2023. Annually the Sport Fishing Advisory Board (SFAB) works with Fisheries and Oceans Canada (DFO) to model a pre-season fishing plan with the objectives of maintaining a full recreational season (February to December) and supporting the recreational sector's access to the Total Allowable Catch (TAC) it is allocated. Canada used this conditional flexibility and implemented an increase to the daily bag limit from two (2) fish per day to three (3) fish day in both August 2021 and August 2022. This flexibility has increased Canadian domestic benefits, whilst ensuring that the recreational sector fished conservatively early in the season to allow for a full season, and remained well within its TAC.

The IPHC daily bag limit of two (2) fish per day constrains Canada's flexibility to make critical in-season changes to the fishing plan to support meeting TAC goals and Canadian domestic fishery objectives.

The SFAB has a long history of collaborating with DFO in Canada's endeavours to achieve IPHC objectives, while maximizing Canadian domestic objectives. DFO and SFAB meet monthly in-season to review timely and robust recreational catch estimates to consider and evaluate appropriate fishery management measures. Increased regulatory flexibility would augment the existing successful management tool kit to achieve improved fishery performance.

Canada had previously submitted these proposed changes to section 28 (Recreational (Sport) Fishing for Pacific Halibut – IPHC Regulatory Area 2B) for consideration at the 98th Session of the IPHC Annual meeting (AM098). The conditional flexibility that was implemented in 2021 was carried forwarded to the 2022 season, pending further information. A detailed presentation of Canada's Recreational Halibut Fishery management and monitoring measures was delivered at the 12th Special Session of the IPHC (SS012) on 25 February 2022.

Update from 26 January 2023: The Commissioners have discussed the regulatory proposal B2 for the flexibility to a 3/day bag limit for the 2B recreational fishing sector and have come to a compromise that they will debate a revised proposal permitting the flexibility to be implemented (if deemed appropriate) on or after August 1st. They also agreed to have this in effect for the next 3 seasons (2023, 2024, 2025) unless extended by vote by the Commission.

RECOMMENDATIONS

That the Commission:

1) **NOTE** IPHC Fishery Regulation proposal IPHC-2023-AM099-PropB2, which proposes the daily bag limit of up to three fish per day per person in the recreational fishery in IPHC Regulatory Area 2B.

APPENDICES

Appendix A: Suggested Regulatory Language.

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

28. Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Area 2B

(1) In all waters off British Columbia:[6, 7]

(a) the recreational (sport) fishing season will open on 1 February ~~unless more restrictive regulations are in place~~;

(b) the recreational (sport) fishing season will close when the recreational (sport) fishery limit allocated by DFO is taken, or 31 December, whichever is earlier; and

(c) the daily bag limit is two (2) Pacific halibut of any size per day, per person, and may be increased to a daily bag limit of three (3) Pacific halibut per day, per person on or after 1 August. This provision shall remain in effect through 2025, unless extended by a vote of the Commission.

(2) In British Columbia, no person shall fillet, mutilate, or otherwise disfigure a Pacific halibut in any manner that prevents the determination of minimum size or the number of fish caught, possessed, or landed.

(3) The possession limit for Pacific halibut in the waters off the coast of British Columbia is three Pacific halibut.[6, 7]

[6] DFO could implement more restrictive regulations for the recreational (sport) fishery, therefore anglers are advised to check the current Federal or Provincial regulations prior to fishing.

[7] For regulations on the experimental recreational fishery implemented by DFO check the current Federal or Provincial regulations.

IPHC Fishery Regulation Proposal:

Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) – Onboard consumption

SUBMITTED BY: UNITED STATES OF AMERICA (NOAA-FISHERIES) (20 DECEMBER 2022)

Directed Commercial ☐ Recreational ☒ Subsistence ☐ Non-directed commercial ☐ All ☐

All Regulatory Areas ☐ All Alaska Regulatory Areas ☒ All U.S. Regulatory Areas ☐

2A ☐ 2B ☐ 2C ☐ 3A ☐ 3B ☐ 4A ☐ 4B ☐ 4C ☐ 4D ☐ 4E ☐

PURPOSE

To propose adding flexibility to existing recreational (sport) Pacific halibut fishing regulations in Alaska Regulatory Areas and allow limited consumption of recreationally-caught Pacific halibut on board charter vessels and pleasure craft, while retaining existing regulations that provide effective enforcement of daily bag limits and possession limits.

EXPLANATORY MEMORANDUM

This proposal would add flexibility to existing recreational (sport) Pacific halibut fishing regulations in Convention waters in and off Alaska. It would allow limited consumption of recreationally-caught Pacific halibut on board charter vessels and pleasure craft, while also retaining existing regulations that provide effective enforcement of daily bag limits and possession limits.

In order to provide effective enforcement of daily bag limits and possession limits, current IPHC recreational (sport) fishing regulations at §29(1)(d) limit the extent to which Pacific halibut may be filleted on board charter vessels and pleasure craft. The regulations allow each halibut to be cut into no more than 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, and leaving a patch of skin on each piece.

This proposal would amend §29(1)(d) to allow one (1) of either the dorsal or ventral pieces from one (1) halibut to be consumed by persons on board the charter or pleasure vessel.

RECOMMENDATIONS

That the Commission:

1) **NOTE** IPHC Fishery Regulation proposal IPHC-2023-AM099-PropB3, which adds flexibility to existing recreational (sport) Pacific halibut fishing regulations in Alaska Regulatory Areas and allows limited consumption of recreationally-caught Pacific halibut on board charter vessels and pleasure craft, while retaining existing regulations that provide effective enforcement of daily bag limits and possession limits.

APPENDICES

Appendix A: Suggested Regulatory Language.

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

Amend §29(1)(d) (governing IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E) to allow limited consumption of recreational (sport) caught Pacific halibut on charter vessels and pleasure craft, as follows:

29. Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E

(1) In Convention waters in and off Alaska: […]

(d) no person shall possess on board a vessel, including charter vessels and pleasure craft used for fishing, Pacific halibut that have been filleted, mutilated, or otherwise disfigured in any manner, except (i) on charter vessels and pleasure craft used for fishing, ~~that~~ each Pacific halibut may be cut into no more than 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, with a patch of skin on each piece, naturally attached; and (ii) either one dorsal piece or one ventral piece from one Pacific halibut on board may be consumed;

IPHC Fishery Regulation Proposal:
Logs (Sect 20) – Logs requirements

SUBMITTED BY: UNITED STATES OF AMERICA (NOAA-FISHERIES) (22 DECEMBER 2022)

Directed Commercial ☒ Recreational ☐ Subsistence ☐ Non-directed commercial ☐ All ☐

All Regulatory Areas ☐ All Alaska Regulatory Areas ☐ All U.S. Regulatory Areas ☐

2A ☒ 2B ☐ 2C ☐ 3A ☐ 3B ☐ 4A ☐ 4B ☐ 4C ☐ 4D ☐ 4E ☐

PURPOSE

To propose an update to IPHC regulatory language regarding the qualifying logbooks in IPHC Regulatory Area 2A.

EXPLANATORY MEMORANDUM

This proposal would revise the list of logbooks listed in Section 20(1) of IPHC regulations that can fulfill IPHC log requirements in IPHC Regulatory Area 2A. The National Marine Fisheries Service recently published a rule (87 FR 59724; with correction 87 FR 74328) implementing a new federal logbook requirement, effective January 1, 2023, for certain vessels in the Pacific Coast Groundfish fishery. Without adding this new logbook to the list of eligible IPHC Regulatory Area 2A logbooks, operators will be required to fill out two different logbooks. Additionally, the WDFW Voluntary Sablefish logbook is replaced by this new federal logbook and so should be removed from the list. There are no known drawbacks to this revision and would benefit certain vessel operators by relieving the need to produce duplicative logs. The new logbook includes all the data fields required for IPHC reporting and would be readily available to the authorized representatives of the IPHC at the time of landing for inspection.

RECOMMENDATIONS

That the Commission:

1) **NOTE** IPHC Fishery Regulation proposal IPHC-2023-AM099-PropB4, which proposes an update to IPHC regulatory language regarding the qualifying logbooks in IPHC Regulatory Area 2A.
2) should the proposal IPHC-2023-AM099-PropB4 be adopted, **RECOMMEND** that the IPHC work with NOAA Fisheries on data sharing arrangement to retrieve Pacific halibut data submitted via Pacific Coast Groundfish non-trawl logbook.

APPENDICES

Appendix A: Suggested Regulatory Language.

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

20. Logs

(1) The operator of any U.S. vessel fishing for Pacific halibut that has an overall length of 26 feet (7.9 meters) or greater shall maintain an accurate log of Pacific halibut fishing operations. The operator of a vessel fishing in waters in and off Alaska must use one of the following logbooks: the Groundfish/IFQ Longline and Pot Gear Daily Fishing Logbook, in electronic or paper form, provided by NOAA Fisheries; the Alaska hook-and-line logbook provided by Petersburg Vessel Owners Association or Alaska Longline Fishermen's Association; the Alaska Department of Fish and Game (ADFG) longline-pot logbook; or the logbook provided by IPHC. The operator of a vessel fishing in IPHC Regulatory Area 2A must use either the ~~WDFW Voluntary Sablefish Logbook,~~ Oregon Department of Fish and Wildlife (ODFW) Fixed Gear Logbook, Pacific Coast Groundfish non-trawl logbook provided by NOAA Fisheries, or the logbook provided by IPHC.

IPHC Fishery Regulation Proposal:

Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Processing Pacific halibut for eating and preservation

SUBMITTED BY: JOHN FIELDS, RECREATIONAL FISHERMAN (21 DECEMBER 2022)

All ☐ Directed Commercial ☐ Recreational ☒ Subsistence ☐ Non-directed commercial ☐

All Regulatory Areas ☐ All U.S. Regulatory Areas ☐ All Alaska Regulatory Areas ☒

2A ☐ 2B ☐ 2C ☐ 3A ☐ 3B ☐ 4A ☐ 4B ☐ 4C ☐ 4D ☐ 4E ☐

PURPOSE

To propose an exception that allows recreational fishermen in Alaska Regulatory Areas who do not return to port each day to process Pacific halibut for eating and/or preservation, subject to measures to facilitate enforcement of the applicable daily bag limits (Proposal No. 1); or exclude preserved and consumed on board fish from applicable possession limits (Proposal No. 2); or create a narrow exception that allows for limited processing of a single fish per day for consumption only (Proposal No. 3).

EXPLANATORY MEMORANDUM

This proposal is submitted on behalf of John Fields by his counsel, Matthew Krueger of Foley & Lardner LLP and Bryan Schroder of Cashion Gilmore & Lindemuth.

1. Background

Mr. Fields is a life-long recreational angler who has been taking several trips per year to Southeast Alaska with his family and friends for the last 30 years. Mr. Fields maintains his own boat in Sitka, Alaska. During the trips, which typically last about five to six days, Mr. Fields and his guests anchor out on his boat and generally return to port just once, if at all, during the trip to refuel. In all of these trips—well over 50 in total—Mr. Fields and his guests have always complied with the daily bag limits.

On these trips, Mr. Fields and his guests want to catch and eat or freeze meal-sized portions of Pacific halibut that they catch within the daily bag limit. But the International Pacific Halibut Commission's ("IPHC") current regulations effectively prohibit recreational anglers who, like Mr. Fields, do not return to port each day from doing so. Specifically, § 29(1)(d) of the 2022 Fishery Regulations promulgated by the IPHC provides:

> *In Convention waters in and off Alaska … [n]o person shall possess on board a vessel, including charter vessels and pleasure craft used for fishing, Pacific halibut that have been filleted, mutilated, or otherwise disfigured in any manner, except that each Pacific halibut may be cut into no more than 2 ventral pieces, 2 dorsal pieces, and*

> *2 cheek pieces, with a patch of skin on each piece, naturally attached … .*

The National Oceanic and Atmospheric Administration ("NOAA"), which is the agency responsible for enforcement of the Fishery Regulations in Convention waters in and off Alaska, has interpreted this provision as ***prohibiting any consumption*** of sport-caught halibut while on board a vessel. *See Regulations Summary and Frequently Asked Questions for Unguided Pacific Halibut Fishing in Alaska*, NOAA FISHERIES Alaska Region (April 15, 2022), https://media.fisheries.noaa.gov/2022-04/ak-unguided-halibut-faq.pdf ("Eating halibut onboard a vessel in Alaska waters is not allowed because it necessarily involves mutilating or disfiguring halibut other than in a manner allowed by the regulations.").

Further, by limiting the number of pieces into which a fish may be cut and by requiring that a piece of skin remain attached to each piece, the current Fishery Regulations effectively prohibit recreational anglers like Mr. Fields who do not return to port each day from being able to process and preserve halibut in reasonable, meal-sized portions. The Regulations therefore impose an unreasonable hardship on all recreational anglers who, like Mr. Fields, do not return to port each day.

The hardship is not theoretical: Mr. Fields received a Written Warning from a NOAA enforcement officer who boarded his boat on September 1, 2021, and determined that Pacific halibut had been processed in a way that did not comply with 50 C.F.R. § 300.66(m) and § 29(1)(d) of the Fishery Regulations. Mr. Fields and his six guests were each licensed anglers. In total, they had only approximately eight small halibut—an amount that was well within the daily bag limit. Nonetheless, the official issued the Warning on the ground that the halibut were filleted into more than two ventral pieces and two dorsal pieces, with no skin remaining. The enforcement officer issued the Warning even though she had no trouble determining that Mr. Fields and his guests had complied with the applicable daily bag limit.

Mr. Fields filed an appeal with NOAA, asking that the Written Warning be vacated. In his appeal, Mr. Fields demonstrated that § 29(1)(d) of the Fishery Regulations is arbitrary and capricious, and contrary to law. He also proposed several alternative, less restrictive means by which he could demonstrate his compliance with the applicable daily bag limits. While NOAA agreed to vacate the portion of the Written Warning that found a violation of 50 C.F.R. § 300.66(m), it refused to vacate the portion that found a violation of § 29(1)(d). NOAA also refused to consider Mr. Fields' proposed alternative means of demonstrating his compliance with the daily bag limits, and it directed Mr. Fields to propose any such changes to the IPHC:

> *To the extent that Respondent believes the IPHC should consider a change to the Annual Management Measures in this manner, an appeal of a Written Warning is not the appropriate forum to consider such changes. Instead, the respondent is able to submit these alternatives as comments and have IPHC consider the alternatives when publishing the Annual Management Measures.*

Decision on Appeal of Written Warning at 6, Appeal No. AK2106039 (January 20, 2022).

Nor is the hardship limited to Mr. Fields: The 2018 IPHC Annual Meeting received five proposals to allow recreational anglers who do not return to port each day to catch and consume or process halibut. *See* IPHC-2018-AM094-R. Following are excerpts from the proposals, which underscore the unfair burden imposed by the current regulations:

- The regulations "do not allow for proper processing and preservation of the catch" for recreational anglers who do not "return to day for processing their catch. … The result … is that any surplus fish caught and not immediately consumed must be wasted and not kept on board to satisfy the regulations." A. Cooper Proposal, IPHC-2018-AM094-PropC2.
- "While [the regulations] may make sense for the day fisherman who brings their catch back to port for processing and storage at their home ashore, it is impractical for the long term or full time cruiser. To minimize waste the current regulation below should be revised to permit processing and storage aboard the vessel in usable portion sizes with the skin removed." W. Cornell Proposal, IPHC-2018-AM094-PropC12.
- "The result of these [regulations] is that any surplus fish caught and not immediately consumed must be wasted and not kept on board" vessels that do not return to port each day "to satisfy the regulations." M. Cowart Proposal, IPHC-2018-AM094-PropC9.
- "The current IPHC regulation prevents personal use of Halibut on the boat" where the angler does not return to port each day "and prevents the proper preservation of the catch for future use." D. Robertson Proposal, IPHC-2018-AM094-PropC6.
- "The current halibut regulations do not allow for long term preservation and storage of halibut for personal use aboard pleasure vessels. The inability to package and preserve fish in serving size portions will result in waste and therefore increase the number of halibut required to supplement a family's diet." L. Thompson Proposal, IPHC-2018-AM094-PropC7.

The IPHC convened a Working Group to address this issue but took no action, despite the clear and unreasonable burden the regulation places on recreational anglers like Mr. Fields. *See* IPHC-2018-AM094-R.

2. Mr. Fields' Prior Proposal to the IPHC

In December 2021, Mr. Fields submitted a proposal to the IPHC for consideration at its 2022 Annual Meeting that took place on January 24-28, 2022. *See* IPHC-2022-AM098-PropC1. The proposal asked the IPHC (1) to harmonize the Fishery Regulations across areas by eliminating the heightened restrictions that apply only to Alaska, and (2) to create an exception for recreational anglers to process halibut on board their vessels if they comply with certain logging requirements. Under Mr. Fields' proposal, an angler would have to photograph the halibut alongside a measuring device and label any packages with the date, the sequence number of the halibut caught (*e.g.*, 1 of 2 of the daily bag limit), and a sequence letter reflecting the portion of the halibut in the package (*e.g.*, A, B, C, D, etc.). The angler would also have to keep a log recording the same information.

The IPHC considered Mr. Fields' proposal during the January 27, 2022, session of the Annual Meeting. During that session, the commissioners noted that Mr. Fields' proposal was reasonable, and they expressed an interest in modifying the regulations to allow for consumption of halibut while on board a vessel in waters in and off Alaska. However, they emphasized the need for coordination with the agencies tasked with enforcing the regulations and ultimately deferred any action until a later meeting. The final report of the 2022 Annual Meeting reflects that the IPHC "noted and deferred" Mr. Fields' proposal pending "additional discussion with enforcement agencies." Report of the 98th Session of the IPHC Annual Meeting (AM098), IPHC-2022-AM098-R, par. 85-86.

Shortly after the conclusion of the IPHC's 2022 Annual Meeting, Mr. Fields followed up by letter with NOAA's Alaska Regional Office to reiterate his request that the IPHC's regulations be amended to allow for both consumption and processing of halibut while on board a vessel in and off the waters of Alaska. Mr. Fields requested an opportunity for further discussion with NOAA, but he did not receive a meaningful response.

3. The Current Regulation is Arbitrary and Capricious, and Contrary to Law

Section 29(1)(d) of the 2022 Fishery Regulations promulgated by the IPHC prohibits recreational anglers from cutting up Pacific halibut on board their vessels in portions that can be consumed or frozen in reasonable, meal-sized portions. In so doing, § 29(1)(d) imposes restrictions on processing Pacific halibut caught in certain areas beyond the restrictions imposed by § 300.66(m) and far beyond the purpose of the underlying Convention and Northern Pacific Halibut Act. The heightened restrictions are arbitrary and capricious, and contrary to law, both on their face and as applied to someone like Mr. Fields. This is so for several reasons.

First, on their face, the heightened restrictions effectively prohibit a whole category of recreational fishing—*i.e.*, recreational fishing by anglers who do not return to port each day—in a manner that is contrary to the express provisions of the governing Convention. The Convention makes clear in Article I, § 5 that its primary purpose is to regulate "commercial halibut fishing," while allowing "sport fishing for halibut." To be sure, § 5 provides that "sport fishing for halibut" is subject to IPHC "regulations and permit and licensing requirements, including the payment of fees." But § 5 then emphasizes that besides those basic requirements, "sport fishing for halibut and other species by nationals and vessels of each Party may be conducted in Convention waters." Section 5 reiterates: "All provisions of this Convention except this paragraph, refer to commercial halibut fishing."

Read in context, the Convention's main purpose is to regulate commercial fishing, not recreational anglers like Mr. Fields. The Convention contemplates that any regulations created for sport fishing would facilitate responsible sport fishing, not prohibit it. Yet, § 29(1)(d) effectively prohibits fishing by a whole category of recreational anglers—those who like Mr. Fields do not return to port each day, or do not have access to facilities where they can process and store the fish that they catch when they do return to port. Prohibiting halibut fishing by recreational anglers who do not return to port each day is a plain violation of the Convention. And it does not provide a "fair and equitable distribution of access privileges in the fishery." *Cf.* 16 U.S.C. § 1853(b)(6) (setting forth the factors to be considered for creating a fishery management plan under U.S. law).

Second, on their face, the heightened restrictions draw an arbitrary distinction between Pacific halibut caught "[i]n Convention waters in and off Alaska," and Pacific halibut caught in other areas, including California, Oregon, Washington, and British Columbia. Only the former are subject to heightened restrictions on processing. *See* 2021 Fishery Regulations, §§ 27(3) & 28(2). That is, for regulatory areas that include California, Oregon, Washington, and British Columbia, the Fishery Regulations simply provide that "no person shall fillet, mutilate, or otherwise disfigure a Pacific halibut in any manner that prevents the determination of minimum size or the number of fish caught, possessed, or landed." *See* §§ 27(3) & 28(2). Although Mr. Fields had processed the fish in more than six pieces and removed the skin, the NOAA officer was still able to determine that the size and daily bag limits were not exceeded. Thus, the exact same conduct that led to Mr. Fields receiving the Warning would have been perfectly permissible if Mr. Fields had been fishing in waters off of Oregon, for instance, rather than waters off of Alaska.

Third, the heightened restrictions are also arbitrary and capricious, and contrary to law, as applied to a person in Mr. Fields' particular circumstances. The restrictions' obvious purpose is to facilitate enforcement of the daily bag limits for Pacific halibut. But when applied to a recreational angler who has only a small number of Pacific halibut on board his boat at any given time, the restrictions serve no purpose other than effectively to prohibit the recreational angler from either eating or freezing the fish that he has caught without first returning to port. The result is that recreational fishermen who take multi-day trips without returning to port, or who do not have access to facilities for processing and storing fish other than on their vessels, face an unfair choice: They must either forgo fishing for Pacific halibut altogether or know that any halibut they catch will necessarily go to waste. *See* 2018 Regulatory Proposals cited above.

4. Mr. Fields' Renewed Proposals and the Improvements They Offer

As detailed above, Mr. Fields has raised his concerns regarding the hardships that § 29(1)(d) of the IPHC's Fishery Regulations impose with both NOAA and the IPHC. Mr. Fields' concerns echo those that caused the IPHC to convene a working group on this issue more than four years ago, yet § 29(1)(d) remains unchanged, despite the commissioners' stated interest in modifying the Regulations to ease these hardships. To bring renewed attention to this issue, Mr. Fields is resubmitting his previous proposal to amend the Fishery Regulations to remove the unlawful prohibition on the ability of recreational anglers who do not return to port each day to consume and preserve halibut. He is also submitting for consideration a second proposal that offers an alternative means of accomplishing the same goal, and a third proposal that carves out an even narrower exception for consumption only.

A. Proposal No. 1 (Logging of Processed Halibut)

Mr. Fields' first proposal has two features. First, the proposal would amend § 29(1)(d) to make the restrictions on processing fish in Alaska consistent with the processing restrictions in other IPHC regulatory areas. Second, the proposal would further amend § 29(1)(d) to provide a new exception for recreational fishers to further process fish if they comply with certain logging requirements.

i. Harmonize Alaska's Restrictions with Other Regions' Restrictions

The first feature would eliminate the heightened restrictions that apply only to recreational anglers in Convention waters in and off Alaska by amending § 29(1)(d) so it is consistent with the restrictions that apply to recreational anglers in regulatory areas 2A (California, Oregon, and Washington) and 2B (British Columbia). As noted, the provisions that govern regulatory areas 2A and 2B neither specifically limit the number of pieces into which a Pacific halibut may be cut nor require that a patch of skin remains naturally attached to each piece. Instead, the restrictions governing regulatory areas 2A and 2B simply provide that "no person shall fillet, mutilate, or otherwise disfigure a Pacific halibut in any manner that prevents the determination of minimum size or the number of fish caught, possessed, or landed." 2022 Fishery Regulations, §§ 27(3) & 28(2). The proposal would make the same restrictions that apply in areas 2A and 2B also apply in Alaska.

This feature brings appropriate consistency to the IPHC regulations and removes an unreasonable distinction between the enforcement regime in Alaska versus other regions. This feature would also give recreational anglers in Alaska some additional flexibility in how they process Pacific halibut for eating or preserving on board their vessels. At the same time, the proposal would maintain the same safeguards that the IPHC has deemed sufficient to allow effective enforcement of bag and possession limits in other regulatory areas.

Standing alone, however, the proposed restriction still could be read to prohibit recreational anglers like Mr. Fields from cutting halibut into small pieces for eating and meal-sized processing, to the extent doing so prevents authorized officers from determining the number and size of fish caught. Further, standing alone, the proposed restriction does not give clear instructions to recreational anglers like Mr. Fields regarding exactly how much they can process Pacific halibut. We therefore also propose adding the second feature, a limited exception for recreational anglers.

ii. Add a New Exception for Recreational Fishers Who Log Catches

The second feature would add an exception for recreational fishers who are on board a pleasure craft used for fishing that would permit them to cut Pacific halibut into smaller pieces and remove the skin for consumption or preservation, provided they comply with specific procedures. Those procedures would require the angler to take a photograph of the halibut alongside a measuring device so the authorized officer could determine the size of the halibut. The angler would also be required to label any packages with the halibut according to the date, the sequence of the fish caught (*e.g.*, 1 of 2 of the daily bag limit), and with a sequence letter to reflect the portion of the fish in the package (*e.g.*, A, B, C, D, etc.). For example, if an angler processed the first halibut he caught that day into 9 pieces, each package would be labeled with the date, the number “1,” and a letter going from A to I. Finally, the angler would be required to keep a log that recorded the same information.

This proposal would allow an authorized officer easily to compare the required photograph showing the size of the fish to the log and to each portion of packaged fish on board the vessel, quickly determining if the packages correspond to what the log and photograph represent. If the vessel had more fish than what was represented, the authorized officer could determine that the size or daily limits were violated. Critically, this proposal still leaves in place a prohibition on processing fish in ways that prevent the determination of the minimum size or number of fish caught so that if an angler did not comply with each requirement of the exception, the angler could still be held accountable for violating daily bag and size limits. This proposal is also limited in scope, applying only to pleasure craft and not applying to charter vessels.

We considered including with this proposal a reporting requirement for an angler who intends to use the exception. Specifically, the angler could be required to notify an authorized officer before embarking on a trip of the angler’s intended length of trip, areas of travel, and names of licensed anglers. Upon finishing the trip, the angler could be required to submit a copy of the photographs and log to the authorized officer. This reporting requirement would allow the IPHC to track how many recreational anglers are making use of the new exception so that the IPHC could evaluate its impact and make modifications in future years. In addition, the requirement could enhance awareness and increase compliance among anglers who would otherwise face enforcement if they did not report their activities.

We opted not to include the above-described reporting requirement, however, for two reasons. First, we are mindful that implementing such a requirement would impose additional record-keeping burdens on authorized officers. Second, we believe that a reporting requirement is likely unnecessary, given the lack of evidence that recreational anglers who do not return to port each day are responsible for any significant number of violations. Nonetheless, we stand ready to amend our proposal to include a reporting requirement if doing so would give the IPHC additional comfort in adopting a new exception.

By adopting this proposal, the IPHC would be removing an unreasonable hardship that has led to recurring complaints by recreational anglers like Mr. Fields—a hardship that the IPHC

recognized in 2018 by forming a working group. The proposal would give recreational anglers in Alaska who do not return to port each day the ability to enjoy the halibut they catch for consumption and for processing in meal-sized portions. The proposal offered here would also remedy the unlawfully arbitrary and capricious nature of the current regulations.

B. Proposal No. 2 (Exception for Preserved Halibut)

Mr. Fields' second proposal would leave § 29 unchanged while amending § 3 (Definitions) to add a new subsection specifying that, as used in § 29 (governing Recreational (Sport) Fishing for Pacific Halibut in IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4C, 4D, and 4E), the terms "possess," "possession," "possessed," and "possess on board" refer only to unpreserved fish and do not include preserved fish or fish that is consumed on board a vessel. The new subsection would define "preserved fish" as fish prepared in such a manner as to remain fit for human consumption after 15 days. The proposed new subsection would ease the restrictions that § 29 imposes in two narrow but important ways. First, it would allow for both consumption of halibut and processing of halibut for later consumption while leaving intact § 29(1)(d)'s general prohibition against "possess[ing] on board a vessel … Pacific halibut that have been 'filleted, mutilated, or otherwise disfigured in any manner.'" Second, it would allow sport fishermen who do not regularly return to port to possess on their vessels more than two daily bag limits, notwithstanding § 29(1)(c), provided that the fish have been preserved in the manner specified in the new subsection.

Notably, the proposed modifications to § 3 of the Fishery Regulations generally track the language of the Alaska Administrative Code and the provisions of the Code that regulate possession of sport-caught fish. *See* 5 AAC 75.010(b) ("A person may possess only the limit of fish allowed for the water on which that person is fishing."); 5 AAC 75.995(a)(20) & (21) (defining "possession limit" and "preserved fish"). This proposal thus has the benefit of adopting an approach that has already been implemented and proven workable in Alaska.

C. Proposal No. 3 (Exception for Consumption Only)

Mr. Field's third proposal would leave § 29 largely unchanged while adding a narrow exception to allow recreational anglers to process a single Pacific halibut per day for consumption only while on board a pleasure craft. To ensure that authorized officers are able to enforce daily bag limits, the proposal would require a recreational angler who processes a halibut for consumption while on board a pleasure craft to maintain one quarter of the fish with the skin naturally attached. This proposal would not fully eliminate the hardship imposed on recreational anglers who do not return to port each day, in that these anglers would still be prohibited from processing halibut for preservation and later consumption. However, it would mitigate that hardship with minimal changes to the current regulation.

4. Potential Negative Impacts

The above proposals would not create any negative impacts. In explaining its unwillingness to recommend changes, the 2018 IPHC Working Group stated that § 29(1)(d) is "necessary for the enforcement of the bag and possession limits among sport fishermen," and that it had not received "a consistent, easily verifiable option that would … still allow effective enforcement of the bag and possession limits." IPHC-2018-IM094-INFO2, Appendix I, at p. 3.

Each of Mr. Fields' proposals leaves in place the general prohibition against mutilating or disfiguring Pacific halibut in a way that prevents enforcement of the daily bag limits while carving out narrow exceptions for the small class of sport fisherman who, like Mr. Fields, do not return to port each day and want to be able to consume or preserve for later consumption the Pacific

halibut they catch. Mr. Fields' first proposal offers a consistent, easily verifiable method for authorized officers to enforce the size and daily bag limits for recreational anglers who do not return to port each day. Mr. Fields' second proposal adopts an approach that is currently being used in Alaska with no significant issues. Finally, Mr. Field's third proposal takes an even more conservative approach by allowing an exception for consumption only.

Notably, we are not aware of, and the 2018 IPHC Working Group did not cite, any data indicating that fishing by recreational anglers who do not return to port each day contributed to a significant amount of halibut catches or violations of the size or daily bag limits. Indeed, that is highly unlikely to be the case because there are relatively few recreational anglers who do not return to port each day. The current regulations—and the 2018 IPHC Working Committee's position—apply a blunt, broad tool against recreational fishers who, given the lack of evidence, when combined with common sense, appear to have a de minimis effect on the fishery. So far, NOAA has provided no evidence of harm, only unsupported speculation. We offer here a scalpel to address the issue properly, without harming all of the recreational anglers who do not return to port each day and fish responsibly.

RECOMMENDATIONS

That the Commission:

1) **NOTE** fishery regulation proposal IPHC-2023-AM099-PropC1, which adds an exception that allows recreational fishermen in Alaska Regulatory Areas who do not return to port each day to process Pacific halibut for eating and/or preservation, subject to measures to facilitate enforcement of the applicable daily bag limits (Proposal No. 1); excludes preserved and consumed on board fish from possession limits applicable to recreational fishermen in Alaska Regulatory Areas (Proposal No. 2); or adds an exception that allows recreational fishermen in Alaska Regulatory Areas to process a single Pacific halibut per day for consumption while onboard a pleasure craft, so long as they preserve a quarter with skin to allow for verification of bag limits by enforcement officials (Proposal No. 3).

APPENDICES

Appendix A: Suggested Regulatory Language.

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

Proposal No. 1: Amend § 29(1) (governing IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E) to be consistent with § 27(3) (governing IPHC Regulatory Area 2A) and § 28(2) (governing IPHC Regulatory Area 2B), and add an exception that allows recreational fishermen on pleasure craft to process Pacific halibut for eating and/or preservation, subject to measures to facilitate enforcement of the applicable daily bag limits, as follows:

29. Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E

(1) In Convention waters in and off Alaska:

[…]

(d) No person shall possess on board a vessel, including charter vessels and pleasure craft used for fishing, Pacific halibut that have been filleted, mutilated, or otherwise disfigured in any manner~~, except that each Pacific halibut may be cut into no more than 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, with a patch of skin on each piece, naturally attached.~~ that prevents the determination of minimum size or the number of fish caught, possessed, or landed; except that any person who, while on board a pleasure craft used for fishing, may further fillet or otherwise process Pacific halibut for immediate consumption or preservation for later consumption if the person does all of the following:

(i) Maintain on board the pleasure craft and available for inspection by an authorized officer a photograph of each Pacific halibut caught. The Pacific halibut must be photographed alongside a measuring device that allows an authorized officer who inspects the photograph to determine the length of the Pacific halibut. Each photograph must be accompanied with information indicating the date and approximate time at which the Pacific halibut in the photograph was caught.

(ii) For each Pacific halibut processed for later consumption, store the Pacific halibut in a package or packages labeled with (A) the date and approximate time at which the Pacific halibut was caught, (B) the length of the Pacific halibut, (C) a sequence number corresponding to the daily bag limit (i.e. 1 of 2), and (D) a sequence letter corresponding to a portion of the Pacific halibut in the package (i.e., A, B, C, etc.).

(iii) Maintain on board the pleasure craft and available for inspection by an authorized officer a log of each Pacific halibut caught. The log must specify (A) the date and approximate time at which each Pacific halibut was caught, (B) the length of each Pacific halibut, (C) the sequence number corresponding to the daily bag limit (i.e., 1 of 2), and (D) an indication of the portions of the Pacific halibut packaged for later consumption (i.e., A, B, C, etc.).

Proposal No. 2: Amend § 3 (Definitions) to add subsection (o) (all following sections to be re-lettered in order) as follows:

3. Definitions

(1) In these Regulations,

[…]

(o) For Recreational (Sport) Fishing in IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E, governed under §29, "possess," "possession," "possessed," and "possess on board" means unpreserved fish that a person has on a vessel. Preserved fish are not considered possessed or possessed on board. Fish consumed on board are also not considered as possessed or possessed on board. "Preserved fish" means fish prepared in such a manner, and in an existing state of preservation, as to be fit for human consumption after a 15-day period, and does not include unfrozen fish temporarily stored in coolers that contain ice or dry ice or fish that are lightly salted;

Proposal No. 3: Amend § 29(1) (governing IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E) to add an exception that allows recreational fishermen on pleasure craft to process Pacific halibut for consumption, as follows:

29. Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E

(1) In Convention waters in and off Alaska:

[…]

(d) No person shall possess on board a vessel, including charter vessels and pleasure craft used for fishing, Pacific halibut that have been filleted, mutilated, or otherwise disfigured in any manner~~,~~ except that each Pacific halibut may be cut into no more than 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, with a patch of skin on each piece, naturally attached. Notwithstanding the prior sentence, while on board a pleasure craft used for fishing, a person may further fillet or otherwise process one Pacific halibut per day for immediate consumption, provided that the person maintains at least one quarter of that Pacific halibut with a patch of skin, naturally attached.

IPHC Fishery Regulation Proposal:

Mortality and Fishery Limits (Sect. 5) - TCEY floor in IPHC Regulatory Area 2A

SUBMITTED BY: PATRICK DEPOE, MAKAH TRIBE (12 DECEMBER 2022)

All ☒ Directed Commercial ☐ Recreational ☐ Subsistence ☐ Non-directed commercial ☐

All Regulatory Areas ☐ All U.S. Regulatory Areas ☐ All Alaska Regulatory Areas ☐

2A ☒ 2B ☐ 2C ☐ 3A ☐ 3B ☐ 4A ☐ 4B ☐ 4C ☐ 4D ☐ 4E ☐

PURPOSE

To propose a constant TCEY floor in IPHC Regulatory Area 2A.

EXPLANATORY MEMORANDUM

From 2019 to 2022, Regulatory Area 2A has received a fixed TCEY allocation of 1.65M lbs. This allocation, put in place in accordance with the Makah Tribe's 2019 proposal, has provided a consistent and biologically justified TCEY for an Area which has minimal impact on the larger halibut biomass to the north. Regulatory Area 2A represents a small fraction of the Region 2 allocation, and of the overall Pacific halibut stock. As such, a higher IPHC Regulatory Area 2A TCEY than what may be indicated by the biological distribution of the stock estimate which the IPHC Secretariat generates will not create a biological conservation concern. This has been demonstrated in recent years with the 4-year 1.65M lbs agreement resulting in high rates of attainment in various sectors and no observed drop in survey WPUE/NPUE outside of expected variability relating to recent FISS design choices. In addition, prior to the 4-year agreement in 2019, the Commission has set TCEYs higher than the levels suggested by the harvest decision table.

Recent experience suggests that a constant TCEY floor in IPHC Regulatory Area 2A can be sustained by the biomass available in Region 2. Historically, variable TCEY allocations and declines below a certain threshold in fishery limits from year to year created significant uncertainty and hardship for 13 halibut tribes and three coastal states (California, Oregon and Washington) dependent on the Pacific halibut fisheries in IPHC Regulatory Area 2A. A stable TCEY of 1.65M lbs reduces the variability and uncertainty for all fisheries in IPHC Regulatory Area 2A, and should be used as a floor level in annual TCEY decisions.

RECOMMENDATIONS

That the Commission:

1) **NOTE** fishery regulation proposal IPHC-2023-AM099-PropC2, which proposes a constant TCEY floor in IPHC Regulatory Area 2A.

APPENDICES

Appendix A: Suggested Regulatory Language.

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

Adopt a TCEY for IPHC Regulatory Area 2A that supports a TCEY no lower than 1.65M lbs. In years when the distribution would indicate a TCEY higher than 1.65M lbs is available, that number would be adopted.

IPHC Fishery Regulation Proposal:

Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 29) - Onboard consumption in IPHC Regulatory Area 2C

SUBMITTED BY: TIM COOPER, RECREATIONAL FISHERMAN (8 DECEMBER 2022)

All ☐ Directed Commercial ☐ Recreational ☒ Subsistence ☐ Non-directed commercial ☐

All Regulatory Areas ☐ All U.S. Regulatory Areas ☐ All Alaska Regulatory Areas ☐

2A ☐ 2B ☐ 2C ☒ 3A ☐ 3B ☐ 4A ☐ 4B ☐ 4C ☐ 4D ☐ 4E ☐

PURPOSE

To propose adding flexibility to existing recreational (sport) Pacific halibut fishing regulations in IPHC Regulatory Area 2C and allow limited consumption of Pacific halibut on board of unguided recreational vessels.

EXPLANATORY MEMORANDUM

I would like to see a change to the rules for area 2C that would allow for unguided sport catch and consumption of Pacific halibut while living on a boat. As a recreational boater that cruises Alaska waters during the summer months while living on my boat, I cannot have any Pacific halibut on my boat for consumption and still be legal without buying it and having proof of purchase. I would like to see some allowance that would allow me and other live aboard cruisers the ability to catch, possess and consume Pacific halibut while cruising Alaska waters. The Alaska area regulations seem to be much tougher to meet than the requirements stated than in area 2A or 2B. If I interpret the area 2A regulation correctly: I can do whatever I want with the meat as long as I don't destroy the carcass and have it available for inspection.

As noted in the NOAA FAQ below, there is no exception for frozen Pacific halibut today. If there was an exception for properly marked frozen Pacific halibut, that would also allow live aboard cruisers the ability to enjoy the fishery. I don't know what the right wording might be that is better left to the Commission. I cannot imagine that there would be any significant change in the catch numbers. As I follow other cruisers on the internet and Youtube, it is clear that this regulation isn't well known due to all the people I see catching and consuming Pacific halibut. I would like to catch a fish and enjoy eating it without breaking the law. Area 2A: 27. (3) In California, Oregon, or Washington, no person shall fillet, mutilate, or otherwise disfigure a Pacific halibut in any manner that prevents the determination of minimum size or the number of fish caught, possessed, or landed. Area 2C: 1. (d) no person shall possess on board a vessel, including charter vessels and pleasure craft used for fishing, Pacific halibut that have been filleted, mutilated, or otherwise disfigured in any manner, except that each Pacific halibut may be cut into no more than 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, with a patch of skin on each piece, naturally attached; From NOAA regulation summary and FAQ: 6. If I catch Pacific

halibut and freeze the fillets onboard my boat, does that halibut count toward my daily bag limit and possession limit? Generally, yes.

As noted in the regulations summary above, Pacific halibut on a vessel may be filleted into 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, with a patch of skin left on each piece. Each piece may be frozen intact on a vessel, but they are included in the daily bag limit and possession limit. The regulations do not make any exception for frozen fish or fish preserved in any other manner. However, as also noted in the regulations summary above, Pacific halibut may be possessed on a vessel in excess of the daily bag limit and possession limit if there is no sport fishing gear, fishing rods, hand lines, or gaffs onboard. Among other things, this exception helps persons who wish to transport halibut from one location to another using a vessel. 7. Can I eat any sport-caught Pacific halibut while I'm on my boat? No. Eating halibut onboard a vessel in Alaska waters is not allowed because it necessarily involves mutilating or disfiguring Pacific halibut other than in a manner allowed by the regulations. The IPHC regulations are specific with respect to the condition in which halibut may be retained onboard a vessel. Please refer to the regulations and the filleting Pacific halibut summary above.

RECOMMENDATIONS

That the Commission:

1) **NOTE** fishery regulation proposal IPHC-2023-AM099-PropC3, which adds flexibility to existing recreational (sport) Pacific halibut fishing regulations in IPHC Regulatory Area 2C and allows limited consumption of Pacific halibut on board of unguided recreational vessels.

APPENDICES

Appendix A: Suggested Regulatory Language.

APPENDIX A

SUGGESTED REGULATORY LANGUAGE

The proponent deferred development of suggested regulatory language to the Commission should it wish to adopt the proposal.

Comments on IPHC Fishery Regulations or published regulatory proposals

PREPARED BY: IPHC SECRETARIAT (B. HUTNICZAK; 20 DECEMBER 2022 & 20 JANUARY 2023 & 23 JANUARY 2023)

PURPOSE

To provide the Commission with a consolidated document containing comments from stakeholders on IPHC Fishery Regulations or published regulatory proposals submitted to the Commission for its consideration at the 99th Session of the IPHC Annual Meeting (AM099).

BACKGROUND

The IPHC Secretariat has continued to make improvements to the Fishery Regulations portal on the IPHC website, which includes instructions for stakeholders to submit comments to the Commission for its consideration. Specifically:

> "*Informal statements or comments on IPHC Fishery Regulations or published regulatory proposals can be submitted using the form below up until the day before the IPHC Session. Submitted comments will be collated into a single document and provided to the Commissioners at the IPHC Session.*"

Comments may be submitted using the IPHC Stakeholder Comment Form.

DISCUSSION

Table 1 provides a list of the stakeholder comments which are provided in full in the Appendices. The IPHC Secretariat does not provide commentary on the statements, but simply collates them in this document for the Commission's consideration.

Table 1. Statements from stakeholders received by 5pm on 22 January 2023.

Appendix No.	Author	Date received
Appendix I	Elden Hillaire, Lummi Nation Fish Commission Chair	1 December 2022
Appendix II	Samantha Murray, California Fish and Game Commission President	19 January 2023
Appendix III	Heather Hall, Washington Department of Fish and Wildlife, Intergovernmental Ocean Policy Manager	20 January 2023
Appendix IV	Dave Johnson, Puget Sound Anglers Ocean Chapter President	20 January 2023
Appendix V	Kevin Montague, sports fisher	20 January 2023
Appendix VI	Wayne Dey, recreational fisherman	20 January 2023
Appendix VII	John Fields, recreational fisherman	21 January 2023

Appendix VIII	Larry Phillips, Recreational Anglers WA/OR	21 January 2023
Appendix IX	Charles Malmgren, sport fisherman	22 January 2023
Appendix X	Malcolm Milne, North Pacific Fisheries Association	22 January 2023
Appendix XI	Paul A. Mirante, Westport Charter Boat Association and representative for WA coastal charter boat sector on PFMC GAP	22 January 2023

APPENDICES

As listed in Table 1.

APPENDIX I

Statement by Elden Hillaire, Lummi Nation Fish Commission Chair

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Regulatory proposal IPHC-2023-AM099-PropC2
Submitted comment	Lummi Nation would like to register initial concern about Proposal C2 due to the uncertainty around the connectivity between the 2A coastal population and the inside waters of the Salish Sea. By setting the TCEY for 2A too high, catch on the coast may lead to decreased densities within inside waters. This could lead to decreased catch rates for the inside tribes which are limited to fishing within their usual and accustomed fishing areas. More work needs to be conducted by IPHC to understand the migration and connectivity of the halibut population between inside waters and the coast of 2A and 2B.

APPENDIX II

Statement by Samantha Murray, California Fish and Game Commission President

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Regulatory Proposal IPHC-2023-AM099-PropC2
Submitted comment	Dear Chairperson Ryall and members of IPHC: I am writing today on behalf of the California Fish and Game Commission, which supports the subject regulatory proposal submitted by the Makah Tribe to establish a Regulatory Area 2A annual fixed total constant exploitation yield allocation of 1.65 million pounds for Pacific halibut. The proposal is an extension of the previously adopted Makah Tribe request in 2019 (IPHC-2019-AM095-PropC1) which has provided stability to fishery operations while avoiding a conservation risk to the stock. The California coastline plays a unique part in Pacific halibut management as it is located at the southern extent of the population range with what has been an historically minor contribution to harvest levels when compared to other management areas. While relatively small in volume, this fishery is essential to fishing communities on California's rugged north coast, especially when taking into consideration increasingly limited fishing opportunities for salmon and groundfish. Beginning in 2020, and continuing in the 2021 and 2022 seasons, high catch events have occurred in the California recreational Pacific halibut fishery mid-season. The events were monitored dockside by California Department of Fish and Wildlife staff, reaching at one point over 250 fish tallied in a single week. In every year prior to 2020, an average of 250 fish would be sampled over an entire six-month recreational season. Additionally, the California recreational fishery required a mid-season closure in seven of the last eight

seasons due to projected quota attainment. These events demonstrate that California's recreational fishery continues to show greater capacity and growth than previously assumed despite being geographically located at the southern edge of the known population range.

The Regulatory Area 2A Catch Sharing Plan currently allocates four percent of the non-tribal allocation to the California recreational fishery. Under a total constant exploitation yield of 1.65 million net pounds, the California allocation equates to approximately 39,000 net pounds annually for the recreational fishery. The California Fish and Game Commission supports the Makah Tribe proposal as a mechanism to ensure that the Regulatory Area 2A Catch Sharing Plan can continue to operate as designed, avoiding significant disruptions to the fishery sectors dependent on the Pacific halibut resource.

Thank you for considering our input on the regulatory proposal. If you have any questions, please contact Executive Director Melissa Miller-Henson or Marine Advisor Susan Ashcraft at fgc@fgc.ca.gov or (916) 653-4899.

Sincerely,

Samantha Murray, President

cc: Craig Shuman, Regional Manager, Marine Region, California Department of Fish and Wildlife

Marci Yaremko, Environmental Program Manager, Marine Region, California Department of Fish and Wildlife

Susan Ashcraft, Marine Advisor, California Fish and Game Commission

David T. Wilson, Executive Director, International Pacific Halibut Commission

Merrick Burden, Executive Director, Pacific Fishery Management Council

Scott Rumsey, Acting Regional Administrator, West Coast Regional Office, National Marine Fisheries Service

APPENDIX III

Statement by Heather Hall, Washington Department of Fish and Wildlife, Intergovernmental Ocean Policy Manager

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Regulatory Proposal IPHC-2023-AM099-PropC2
Submitted comment	Dear International Pacific Halibut Commission: The Washington Department of Fish and Wildlife (WDFW) would like to express our continued support for an Area 2A TCEY floor of 1.65 M lb. The proposal document submitted by Mr. Patrick Depoe and the Makah Tribe

summarizes the justification well (document reference provided in the subject line).

WDFW first thanks the Commission for setting the consistent 2019-2021 2A TCEY. The COVID-19 pandemic affected attainment in those years, particularly in the Washington recreational sector, yet the 1.65 M lb. TCEY was invaluable for the management flexibility and stability it provided to Washington's halibut fisheries. The value of that flexibility and stability remains in 2023 as fishing activity continues to recover.

We note, however, that not all went according to plan for all sectors. The aim of the 2019 proposal was for a stable FCEY of 1.5 M lb. The expectation was that a TCEY of 1.65 M lb would achieve FCEYs above that level because of the work done throughout Area 2 A to reduce discards. However, in 2019, fluctuations in discards unexpectedly dropped the FCEY to 1.49 M lb. Under the Pacific Fishery Management Council's Pacific Halibut Catch Sharing Plan (CSP), this 0.01 M lb drop had the effect of reducing the non-treaty incidental to sablefish sector allocation from 70,000 lb to 50,000 lb. The increase in discards may have been regulatory in nature, caused to a large degree by the shift toward smaller fish that has been seen across many IPHC regulatory areas over the past two years. We understand that discard projections may have again lowered such that a TCEY of 1.65 M lb would again produce a FCEY of 1.5 M lb or greater in 2023. We have appreciated the effort of IPHC staff to help us begin to grasp discard projections and look forward to continuing those discussions to build our understanding of the projection process.

We also emphasize that WDFW's original support for the Area 2A TCEY floor in 2019 was based on the science and an understanding that the level of harvest in Area 2A would not negatively impact the Pacific halibut stock. In reviewing the summary of the data, stock assessment, and harvest decision table document provided for this meeting (IPHC-2023-AM099-11), our confidence in this view has only grown. Table 2 of that document shows that fishing intensity and stock biomass are performing well relative to the IPHC's interim reference points. And the trends within Area 2A appear to be stable or increasing in both the IPHC Fishery-Independent Setline Survey (FISS) and the commercial and tribal weight per unit effort (WPUE) data. While recognizing the uncertainty inherent in stock assessment, the strong capabilities of IPHC and partners in the monitoring of stock status and trends and the fisheries provides us with much confidence that changes in these trends could be detected and addressed if our understanding of the conservation status of the stock or the effect of the Area 2A TCEY floor were to change.

Science is the foundation for sustainable harvest of Pacific halibut. Therefore, while not directly related to this proposal, we also wish to comment on the IPHC Secretariat's consideration of proposed FISS designs. We understand the primary objective of sampling Pacific halibut sufficiently while achieving revenue neutrality for the survey long-term. However, we are concerned by the information provided in IPHC-2023-AM09-10 related to how ongoing sampling reduction in Area 2A would impact the overall understanding of stock trends and distribution. We are particularly concerned about losing information on the distribution of the 2005 year-class and the 2011 and 2012 year-classes. Understanding the migration of halibut into Area 2A and movement of fish between the Salish Sea and Pacific Ocean areas within Area 2 A is of key management interest

to us and our co-managers. WDFW supports additional research on halibut movement and migration. Yet above all, we urge the Commissioners to support a robust exploration of alternative funding avenues for the FISS that would reduce the gaps in sampling coverage as much as possible for Area 2A.

Finally, we reiterate our support for IPHC-2023-AM099-PropC2 and our appreciation to the Commission for providing stability to Area 2A fisheries. The status of the halibut resource justifies doing so again. If you have any questions, please feel free to contact me at Heather.Hall@dfw.wa.gov.

Sincerely,

Heather Hall

Intergovernmental Ocean Policy Manager

APPENDIX IV

Statement by Dave Johnson, Puget Sound Anglers Ocean Chapter President and Washington Department of Fish and Wildlife advisor for the North Coast, Pacific Fishery Management Council WA Sport Rep

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Regulatory proposal IPHC-2023-AM099-PropC2
Submitted comment	I and Puget Sound Anglers Members are in full support of the proposal submitted by the Makah Tribe and Mr. Patrick Depoe for a TCEY floor of 1.65M lbs for Area 2A. Thank You for letting me comment via the internet. I really wanted to be there in person but logistically it is very tough for me this time. Thank You Dave Johnson

APPENDIX V

Statement by Kevin Montague, sports fisher

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Regulatory proposal IPHC-2023-AM099-PropC2
Submitted comment	Please support the halibut quota of 1.65M lbs. for Area 2A.

APPENDIX VI

Statement by Wayne Dey, recreational fisherman

Section of IPHC Fishery Regulations or regulatory	Regulatory proposal IPHC-2023-AM099-PropC2

proposal reference the comment will refer to	
Submitted comment	I support the proposal as written.

APPENDIX VII

Statement by John Fields, recreational fisherman

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Regulatory proposal IPHC-2023-AM099-PropC1
Submitted comment	I submitted this proposal and provided comments related to it at the November 2023 Interim Meeting. I am sorry I did not get an opportunity at that Interim Meeting to fully express my concerns about the existing and proposed regulations, and I hope now to emphasize the importance of this proposal. As I have previously indicated in earlier correspondence, I have enjoyed boating with family and friends for over 35 years in Southeast Alaska. I typically take five or six trips during the summer; these trips are usually four to ten days and may involve going to port for fuel and supplies perhaps one time. I would certainly hope you can understand my frustration when the regulations: 1. Prohibit legally licensed fisherman from eating legally caught Halibut at any time during these trips. NOAA's proposed revisions do not solve the problem – they would allow consumption of only one quarter section during a whole trip regardless of the number of licensed fisherman. 2. In essence prohibit any retention of useful portions to be kept by any of these licensed fishermen. 3. Do not permit anyone staying on the boat in port to consume Halibut. 4. Do not permit any future guest on the boat to consume any legally caught Halibut from a prior trip. 5. Basically, require a licensed non-resident fisherman to either stay at a lodge or rent a house in order to enjoy catching and consuming Halibut, even though it was caught within the limits proscribed by the regulations. As I have previously indicated, I have never exceeded nor have any interest in exceeding any limits and would certainly be willing to accept reduced limits if that is, for some reason, necessary to ensure enforcement. I would simply love to continue enjoying rights clearly permitted pursuant to obtaining an Alaska fishing license.

I would close by saying that I and my family fully support and have always respected size and quantity limits as set forth and enforced by Alaska Fish and Game. I have tried and tried to understand what abuse has caused enforcement to target recreational boaters; while we may take home one to three boxes among six to eight licensed fishermen, we regularly note lodge guests loading up planes with many more.

APPENDIX VIII

Statement by Larry Phillips, Recreational Anglers WA/OR

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Regulatory proposal IPHC-2023-AM099-PropC2
Submitted comment	I would like to express my support for an Area 2A TCEY floor of 1.65 M lb. Setting the Area 2A floor at this level will be consistent with recent year allocations (2019-2022). The recent year allocations (1.65m lb.) was based on science and an understanding that the level would not negatively impact future recruitment or the existing abundance outside 2A. My understanding is that managers remain confident that the current stock assessment supports a continuation of the current allocation. As the Commission also knows, the recreational halibut fisheries off WA, OR, and CA are extremely popular and, in some cases, the total annual recreational allocation is realized in just a few days. Providing Area 2A with a floor of 1.65 m lb. can help provide some stability and potentially limit in-season emergency closures that can have a significant negative impact of costal economies. I appreciate your consideration of this important decision.

APPENDIX IX

Statement by Charles Malmgren, sport fisherman

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Regulatory proposal IPHC-2023-AM099-PropC2
Submitted comment	I Support a TCEY Floor of 1.65M # for Area 2A Halibut fishery. Please record me as a strong Yes!

APPENDIX X

Statement by Malcolm Milne, North Pacific Fisheries Association

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	IPHC Fishery Regulations, Mortality and Fishery Limits (Section 5)

Submitted comment	The North Pacific Fisheries Association (NPFA) has members who fish halibut throughout Alaska and is a long term member of the IPHC Conference Board. Our members are extremely concerned with the trajectory of the coast wide halibut fishery indices and that we are witnessing the lowest fishery performance/ efficiency in 3 decades. NPFA is urging a precautionary approach in setting the coast wide TCEY for 2023 to address the trend in fishery performance as well as the uncertainties in the modeling. As indicated on slide 50 of IPHC-2023-AM099-11 “Stock is at an unprecedented low population level (actual number/biomass of fish in the water) due to poor recruitment - Low productivity relative to long-term expectations - Less productive response to recent fishing Downward trends, even though fishing intensity has been even lower than we thought Ecosystem/ climate uncertainty remains high” These factors coupled with the high reliance on the 2012 year class in the fishery call for being conservative in our decision making. As the modeling moves even further toward “transparent risk-neutral science” (Slide 28) it becomes more incumbent on the Commissioners to mitigate these risks and uncertainties with precautionary mortality limits. Acknowledging that precaution results in significant hardships across sectors, we suggest a coast wide TCEY around 35 million pounds with a formulaic approach to distribution. Thank you for the consideration. Malcolm Milne

APPENDIX XI

Statement by Paul A. Mirante, Westport Charter Boat Association and representative for WA coastal charter boat sector on PFMC GAP

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Regulatory proposal IPHC-2023-AM099-PropC2
Submitted comment	I support Heather Halls Letter to the I.P.H. C. expressing support for IPHC -2023-AM099-PropC2 and as Heather said "appreciation to the Commission for providing stability to Area 2A fisheries".

The IPHC mortality projection tool for 2023 mortality limits

PREPARED BY: IPHC SECRETARIAT (I. STEWART; 20 JANUARY 2023)

PURPOSE

This document provides a description of the IPHC's web-based mortality projection tool (https://www.iphc.int/data/projection-tool) for setting mortality limits in 2023.

BACKGROUND

Since 2019, IPHC Secretariat has provided an interactive tool in support of the IPHC's process for setting Pacific halibut mortality limits based on the coastwide TCEY and the distribution of that mortality among IPHC Regulatory Areas. The tool has been updated each year to reflect the IPHC's interim management procedure and all associated modifications and agreements in place each year.

THE MORTALITY PROJECTION TOOL

The tool relies on previously calculated stock assessment outputs representing a broad range of total mortality. These include projections of spawning stock size and fishing intensity, such that alternative harvest levels can be evaluated in the context of the harvest decision table as well as relative trends. The tool is divided into five components:

1) Inputs
2) Summary results
3) Biological distribution
4) Detailed sector mortality information
5) Graphics

A brief description of each of these is provided below.

Inputs

The first section of the tool provides the user with two primary inputs:

1) The total distributed mortality limit (TCEY) in millions of net[1] pounds.
2) The percent of the distributed mortality limit (TCEY) assigned to each IPHC Regulatory Area.

Previous versions of this tool have provided default values that reflected the IPHC's interim management procedure, as it was specified at the time. The previous interim agreement was specified to apply for the period from 2019-2022 (AM095; para. 69). As there is no interim agreement currently in place for 2023, there are no default values in the current version of the tool and the user must input both the total coastwide TCEY and the percentage distributed to each IPHC Regulatory Area.

The distribution percentages for each IPHC Regulatory Area are input manually, and are intended to sum to 100%, if they do not, the total will be highlighted in red, and the inputs will be

[1] Net pounds refer to the weight with the head and entrails removed; this is approximately 75% of the round (wet) weight.

automatically rescaled so that the sum of the distributed mortality limits across all IPHC Regulatory Area will exactly match the coastwide total input.

There are two optional inputs, with drop-down menus, specifying:

1) The basis for projecting non-directed discard mortality. The default projection, consistent with the IPHC's recent Interim Management Procedure (specified during AM096 para. 97), is to use the three-year average non-directed discard mortality from the most recent year. Alternatives include the previous year's estimates and the values consistent with full regulatory attainment of domestic non-directed discard mortality limits.
2) The units of mortality measurement. This can either be millions of net pounds (default) or net metric pounds.

Summary results

The second section of the tool provides the projected coastwide SPR for comparison with the harvest decision table. In addition, this section reports the distributed mortality limit (TCEY) for each IPHC Regulatory Area; the total can be compared to the total input above to verify that the calculations are working properly. The total mortality limit (all sizes and sources of mortality, including U26 non-directed discard mortality of Pacific halibut) is also summarized by IPHC Regulatory Area.

Biological and fishery distribution

The third section of the mortality projection tool provides the most current modelled estimates of stock distribution by Biological Region, compared to the distributed mortality limits (TCEY). These two values are then used to project a harvest rate by Biological Region, standardized such that Region 3 (IPHC Regulatory Areas 3A and 3B) is always equal to a value of 1.0 and the other Regions (2, 4 and 4B) are relative to that value.

Detailed sector mortality information

This section provides a full distribution of mortality among IPHC Regulatory Areas and fishery sectors. Calculations are based on catch sharing agreements used by the domestic agencies for IPHC Regulatory Areas 2A, 2B, 2C, 3A, and 4CDE (4CDE allocating among sub-Areas). Static projections are used for non-directed discard mortality (see above), and subsistence mortality (based on the most recent estimates available). Discard mortality in directed fisheries scales with the landings based on the most recently observed rates for each fishery. The total of this section (matching the total in the summary results) provides the best projection of all sizes and sources of Pacific halibut mortality based on the specified mortality limits.

Graphics

The last section of the projection tool provides a series of five graphical results updated to reflect the inputs made by the user. These graphics are similar to those provided in the annual stock assessment and/or presentation material.

The first figure uses previously calculated three-year projections for a range of coastwide TCEY (and corresponding SPR) values to illustrate the coastwide spawning biomass trend associated

with the specified inputs to the tool. Uncertainty is shown as a shaded region, with the projected period highlighted by the brighter color relative to the darker estimated time-series. Importantly, not all possible SPR values are available, so the closest value available is reported. The projected SPR is reported above the figure, and a warning will be returned if the user has specified a coastwide TCEY outside of the range of values available, or if the value lies between the pre-calculated grid.

The second figure provides a bar chart of the time-series of estimated relative fishing intensity with 95% confidence intervals. The inputs to the projection tool provide the basis for the projected fishing intensity, shown as the hatched bar at the end of the series. Values are relative to the IPHC's Interim Management procedure, currently based on an SPR of 43% (see description above), such that values above the target represent higher fishing intensity.

The third figure provides a graphical display of the relative harvest rates by Biological Region as reported in the ***Biological and fishery distribution*** section.

The fourth and fifth figures provided the detailed sector mortality information (allocations) in both absolute values (millions of net pounds) and relative values (percent of the projected mortality) by IPHC Regulatory Area.

DISCUSSION

There may be some alternatives may require additional analyses beyond those available in this tool. Such alternatives will continue to be produced by the Secretariat staff as needed to support all meetings and decision-making.

UPDATE SCHEDULE

The mortality projection tool was updated in early January 2023 for use during the 2023 Annual Meeting (AM099). The update included final end-of-year 2022 mortality estimates from various fisheries, including non-directed discard mortality estimates that affect projections for 2023.

REFERENCES

IPHC. 2020. Report of the 96th Session of the IPHC Annual Meeting (AM096).

Transition of management in the IPHC Regulatory Area 2A: outreach material

PREPARED BY: IPHC SECRETARIAT (13 DECEMBER 2022)

PURPOSE

To provide outreach material intended to inform stakeholders about the transition of management in IPHC Regulatory Area 2A.

BACKGROUND

When deemed helpful, the IPHC Secretariat prepares outreach materials intended to inform the general public about aspects particularly relevant to the state of the Pacific halibut stock and its management.

DISCUSSION

Appendix A includes the outreach material intended to inform stakeholders about the transition of management in IPHC Regulatory Area 2A.

RECOMMENDATIONS

That the Commission:

1) **NOTE** document IPHC-2023-AM099-INF03 providing outreach material informing stakeholders about the transition of management in IPHC Regulatory Area 2A.

APPENDICES

Appendix A: outreach material intended to inform stakeholders about the transition of management in IPHC Regulatory Area 2A.

Transition of Management in the IPHC Regulatory Area 2A

Background

In October 2018, the IPHC provided to the Pacific Fishery Management Council (PFMC) a draft of a regulatory proposal for longer fishing periods in the non-treaty directed commercial Pacific halibut fishery in the IPHC Regulatory Area 2A. This came as a result of safety concerns with the derby-style fishing with only two or three 10-hour openings per season. In response to the IPHC's proposal, the PFMC developed a list of management concerns, noting that it could consider the structure of the directed fishery more broadly. At its April 2019 meeting, the PFMC reviewed the report prepared by its staff which highlighted management considerations that included licensing and in-season management. Further direction by the PFMC was provided and included the PFMC's intent to manage the directed commercial Pacific halibut fishery.

In the discussions following the April 2019 meeting, the IPHC expressed willingness to work with the PFMC to develop a mutually agreeable transition plan. It has been noted that the National Marine Fisheries Service (NMFS) has the authority to enact Pacific halibut fishing regulations under the Northern Pacific Halibut Act of 1982 for the directed commercial fishery provided such regulations are consistent with broader IPHC Fishery Regulations. As such, the fishery could transition to the PFMC/NMFS management with little change to the fishery structure in the immediate future (i.e., it would remain a derby-fishery), while the PFMC could revisit the fishery structure in the future.

At its November 2020 meeting, the PFMC took the final action and adopted a set of management alternatives accommodating the 2A transition. The PFMC decided to utilize September and November Catch Sharing Plan process to consider the **directed fishery framework**, including guidance for **vessel limits and in-season changes** for NMFS implementation. Moreover, the decision was made to charge NMFS with **issuing permits for all 2A Pacific halibut fisheries**: directed commercial, incidental salmon troll, incidental sablefish, and recreational charter. However, the administrative complexity did not allow for accommodation of the transition on time for the 2021 fishing season, as originally planned.

INTERNATIONAL PACIFIC HALIBUT COMMISSION
2320 WEST COMMODORE WAY
SEATTLE, WA 99199-1287
WWW.IPHC.INT

INTERNATIONAL PACIFIC HALIBUT COMMISSION

Status of implementation

The proposed rule (87 FR 44318) implementing the 2A management transition was published on 26 July 2022 and remained open for comments until 25 August 2022. The final rule (87 FR 74322) was published on 5 December 2022 and becomes effective on 4 January 2023. Among notable changes are **new applications deadlines**, two weeks earlier than previously required by the IPHC for the incidental salmon and sablefish fisheries (from 2023, 1 March), and two months earlier than the previous IPHC deadline for directed commercial fishery permit applications (from 2023, 15 February). NMFS is also requiring application information in addition to what the IPHC required; specifically, those applying for directed commercial fishery permits must provide **vessel length documentation. Online permit application form** will be available through the NOAA Fisheries Pacific halibut web page at: https://www.fisheries.noaa.gov/west-coast/commercial-fishing/west-coast-fishing-permits.

Additionally, NMFS is in process of collecting information necessary to issue permits and manage the non-tribal directed commercial fishery beginning in 2023, including in-season actions. In the early stages of the transition, the IPHC Secretariat will be supporting NMFS, offering expertise gained through years of experience in fisheries management in the IPHC Regulatory Area 2A.

Moving forward, annual management alternatives for the 2A Pacific halibut fisheries will be considered through the PFMC process at its September and November meetings. The PFMC and NMFS have stated that maintaining the general season structure with vessels limits consistent with the protocols developed by IPHC for the directed fishery is the most efficient and stable path forward. This will be especially important in the next few years as NMFS navigates the new process and logistics related to management of this fishery.

More information

For more information on implementation by NMFS, contact nmfs.wcr.halibut@noaa.gov. For questions on IPHC Fishery Regulations, contact IPHC Secretariat at secretariat@iphc.int.

Offloading Pacific halibut in Newport, Oregon

Revision of the IPHC length-weight relationship

PREPARED BY: IPHC SECRETARIAT (R. WEBSTER AND I. STEWART; 20 JANUARY 2023)

PURPOSE

To make minor revisions and corrections to IPHC-2022-AM098-INF07, which presented updated length-weight relationships for Pacific halibut by IPHC Regulatory Area with the goal of improving the accuracy of estimates of catch weight from all sources.

BACKGROUND

To monitor the Pacific halibut fisheries and model the population dynamics, the IPHC must be able to accurately and precisely estimate the fishing mortality in terms of the weight of fish removed. For many fisheries, fish can be easily weighed prior to any dressing (e.g., removal of the entrails, gills) taking place. However, for Pacific halibut dressing often occurs at sea. Further, due to their large size, it is frequently easier to measure the length of Pacific halibut than the weight. For these reasons, prediction of weight from measured length and various conversions among weights collected at different times relative to capture (at sea or 'fresh', vs. at the time of landing, which can be up to several days later) and for fish in different states (e.g., round, head-on but entrails removed) have been historically used to determine fishing mortality. As the directed commercial Pacific halibut fishery relied solely on sampling at the time of landing and sale for many decades, the standard weight measurement used for all analyses has been net weight, or the weight of a fresh fish with head and entrails removed. Historically, the accuracy of net weights relied on consistency in how the heads were cut, but since 2017 the definition of net weight represents an arbitrary choice of 0.75 × round weight as IPHC Regulations require weights to be collected prior to removal of the heads (IPHC 2017, para. 48).

Historical length-weight curve

The IPHC's standard length to net weight relationship was used in all Commission work to convert length to net weight of halibut until 2015, when individual weights were added to standard sampling of commercial landings. More recently, the IPHC's Fishery Independent Setline Survey (FISS) began collecting individual weights in 2017 and made such collections comprehensive in 2019. The relationship continues to be used in estimation of catch weight from recreational, non-directed discard mortality (bycatch) and subsistence components of the fishery, and is also used in some agency survey estimation.

The parameters of this historical relationship were estimated in 1926 based on a sample of 454 Pacific halibut collected off Masset in IPHC Regulatory Area 2B. Using 1989 data, Clark (1992) re-estimated the relationship's parameters and found good agreement with the earlier curve, and therefore the IPHC relationship was not revised at the time. While it was recognized that such a calculated relationship will not be consistently accurate when computing total or mean weights from small numbers of Pacific halibut, it was assumed that predictions should be accurate when data come from larger samples of fish (Clark 1992). However, when Courcelles (2012) estimated the relationship from data collected in 2011, she found significant differences between her estimated curve and that derived from the 1989 data, while noting that inference was limited to a relatively small part of Area 3A and to the time of the FISS. Reports from staff working on the FISS, along with other anecdotal reports, suggested that the historical length-net

weight relationship has been overestimating the weight of Pacific halibut on average in recent years.

Adjustments and conversion factors

Various adjustment and conversion factors have been used to account for Pacific halibut measured at different stages of processing following capture (Table 1), in order to convert measured weights of one type into the desired weight measure. The conversion multipliers in Table 1 are for converting measured to net weight, but other conversions can be calculated from these if required. Net weight remains the standard measure for the accounting of mortality of Pacific halibut, however, since 2017 it is no longer a legal weight for catch reporting due to the high variability of head cuts - all landed catch must be weighed head-on, and converted to net weight using a multiplier from Table 1.

Table 1. Definitions of types of weight measures used by the IPHC and multipliers used to convert to net weight.

Weight	Definition	Multiplier to convert to net weight	Notes on multipliers
Round ("fresh")	Head-on, not gutted, no ice and slime[1], no shrinkage[2]	0.75	
Gross (vessel weight)	Head-on, gutted, with ice and slime, no shrinkage	0.8624	Assumes 10% head weight and 2% shrinkage, or 12% head, each with 2% ice and slime
Dressed (vessel weight)	Head-on, gutted, no ice and slime, no shrinkage	0.88	Assumes 10% head weight and 2% shrinkage, or 12% head only
Gross (dock weight)	Head-on, gutted, with ice and slime	0.882 or 0.88	Assumes 10% head weight and 2% ice and slime; deductions either additive (10+2=12% in 2A and 2B) or multiplicative (1-0.9*0.98=0.118 or 11.8% in Alaska)
Dressed (dock weight)	Head-on, gutted, no ice and slime (washed)	0.9	Assumes 10% head weight
Net	Head-off, gutted, no ice and slime (washed)	1	

[1]Ice and slime become attached to the outside of the fish while stored on ice. The 'poke ice', commonly inserted into the body cavity is not included in this conversion as it should always be removed prior to weighing.

[2]Shrinkage is defined as the loss of weight after the fish has died and while it is stored on ice.

The historical relationship between fork length and net weight includes adjustments for the weight of the head, and of ice and slime: gross landed weight (gutted, with head, ice and slime) was assumed to include a proportion of 12% head weight and 2% ice and slime, which combine to give a multiplier of 0.8624 to convert gross to net weight. Clark (1992) noted that subsequent studies showed the head weighed less than 12% of gross weight, but that the adjustment factor worked well anyway, possibly because of additional shrinkage of fish after being weighed at sea (as they were in the 1926 study in which the relationship was estimated). In practice, combined multipliers of 0.88 in IPHC Regulatory Areas 2A and 2B, and 0.882 in Alaska, were applied to

commercial landings to convert from gross to net weight. These both include the 2% deduction for ice and slime assumed in the IPHC length-net weight relationship and use 10% as the proportion for the head. This head deduction has been required as part of IPHC regulations since 2008 (Leaman and Gilroy 2008, Gilroy et al. 2008). The way the two deductions are combined differs among areas. In IPHC Regulatory Areas 2A and 2B, these deductions are added (10+2=12%), while in Alaska, the corresponding multipliers (1 minus the deduction) are multiplied, leading to a multiplier of 0.882, or a deduction of 11.8%.

There is a lack of data to support many of the conversions in Table 1, including conversions from round weight to dressed weight, and the assumed 2% deduction for ice and slime. Regarding shrinkage, a subsample of 550 Pacific halibut from FISS sampling was weighed both on the vessels and later at the dock during the 2016 and 2017 FISS seasons. At-sea weights were recorded as round weights, while dockside weights were of head-on and washed fish (i.e., dockside dressed, Table 1). To estimate shrinkage, round weights must first be converted into at-sea dressed weights, requiring multiplication of round weights by 0.85 (0.75/0.88 from Table 1). Given the assumed 0.85 multiplier, the average % shrinkage across all 550 fish with both weights is 1.9% (SE=0.2%) and is therefore consistent with a shrinkage multiplier of 2% as assumed in Table 1.

Webster (2021) estimated a relationship between round and dressed weight for U32 Pacific halibut (those under 32” or 81.3 cm) from fished weighed twice onboard FISS vessels in 2019. There are currently no contemporary FISS data for estimating such a relationship for larger Pacific halibut.

Revising the length-net weight relationship

The current commercial sampling program and the FISS weight sampling provide us with two independent data sources to use in estimating contemporary length-net weight relationships. While the FISS data are typically collected in a spatially comprehensive manner within each IPHC Regulatory Area, they are temporally restricted to the May-September summer period. Conversely, commercial samples are collected throughout the fishing season, but may be more geographically limited due to the concentration of fishing effort in the most productive habitat.

As proposed at SRB019 (Webster 2021), our approach is to combine data from the commercial sampling with that from the FISS sampling in order to estimate length-net weight relationships that are as broadly applicable as possible. Data from the most recent three years (2019-21) were used in the modelling. Webster (2021) fitted models to commercial and FISS data by area and year, showing general temporal consistency in the estimated length-net weight relationships, but variability among relationships across IPHC Regulatory Areas. We have therefore estimated a revised relationship for each IPHC Regulatory Area using the combined data from 2019-21.

For estimating the relationship between fork length and net weight, only dressed, head-on fish (with the same standard head and ice and slime deductions assumed in the historical IPHC relationship, 10% and 2% respectively) were used due to the high spatial variability in the proportion of the weight removed when cutting heads (see Webster 2021). A 2% shrinkage deduction was also applied to fish weighed onboard.

Parameters were estimated by fitting linear models (on the log scale) using least squares. Let *L* be the fork length of a halibut in centimetres, and *W* be its net weight in kilograms. The historical IPHC length-net weight relationship is

$$W = 3.139 \times 10^{-6} L^{3.24} \quad (1)$$

For weights in pounds, the first parameter is 6.921×10^{-6}. More generally, the relationship between length and weight is assumed to have the following form

$$W = \alpha L^{\beta}$$

With *N* halibut in our sample, each is indexed by *i*, *i* = 1, …, *N*, we fit linear models on the log scale of the form

$$\log(W_i) = \log(\alpha) + \beta \log(L_i) + \varepsilon_i \quad (2)$$

where $\varepsilon_i \sim N(0, \sigma^2)$.

For both FISS and commercial data, several extreme outliers remained in the data even after careful review. To avoid these extreme observations (assumed to be errors in data collection or entry) influencing the estimated relationships, observations with measured weight more than twice or less than half the value predicted by the historical length-weight curve were excluded from the statistical analyses. These represented less than 0.05% of all observations.

Sample sizes often differed greatly between commercial and FISS data sources (Appendix A). This was due to the former having a fixed target of 1500 randomly sampled Pacific halibut per area, while the goal was to obtain a dressed weight for every fish of legal commercial size (O32, or over 32” or 81.3 cm in length) and a subsample of U32 fish (2019 only) on the FISS. To avoid one data source (commercial or FISS) dominating the estimation, we fitted a model that allowed parameters to vary with source, and then averaged the estimates across the two sources for each IPHC Regulatory Area.

Results

The parameter estimates for each IPHC Regulatory Area are given in Table 2, for both net and round weight (using the conversion in Table 1) in kg and lb.

Table 2. Parameter estimates for length-net weight and length-round weight by IPHC Regulatory Area, in kg and lb for length measured in centimetres.

Reg. Area	Parameter estimates: net weight			Parameter estimates: round weight		
	α (kg)	α (lb)	β	α (kg)	α (lb)	β
2A	2.438×10^{-6}	5.375×10^{-6}	3.287	3.251×10^{-6}	7.167×10^{-6}	3.287
2B	3.189×10^{-6}	7.031×10^{-6}	3.231	4.252×10^{-6}	9.375×10^{-6}	3.231
2C	3.719×10^{-6}	8.198×10^{-6}	3.196	4.958×10^{-6}	1.093×10^{-5}	3.196
3A	4.821×10^{-6}	1.063×10^{-5}	3.133	6.428×10^{-6}	1.417×10^{-5}	3.133
3B	2.662×10^{-6}	5.869×10^{-6}	3.271	3.549×10^{-6}	7.825×10^{-6}	3.271
4A	4.762×10^{-6}	1.050×10^{-5}	3.142	6.350×10^{-6}	1.400×10^{-5}	3.142
4B	4.260×10^{-6}	9.391×10^{-6}	3.157	5.680×10^{-6}	1.252×10^{-5}	3.157
4CDE	4.443×10^{-6}	9.796×10^{-6}	3.161	5.925×10^{-6}	1.306×10^{-5}	3.161

Figures 1 to 8 compare the revised length-net weight relationships with the historical relationships by IPHC Regulatory Area. The left panels present the two relationships, while the right panels show the ratio of predicted weights from the revised relationship to those predicted by the historical relationship. With only a couple of exceptions, predicted net weights from revised relationships are consistently lower than historical predictions. For six out of eight IPHC Regulatory Areas, the relative difference between the two curves increases with increasing fork length (Figures 2 to 4 and 6 to 8). The magnitude of the relative difference between the two curves varies by area, with greatest differences for IPHC Regulatory Areas 3A and 4B (Figures 4 and 7) and least for IPHC Regulatory Areas 2B and 3B (Figures 2 and 5).

Tables of net weight for a wide range of Pacific halibut lengths are provided in Appendices B (metric units) and C (Imperial units).

Discussion

The revised length-weight relationships support the observations in the field that Pacific halibut have become lighter than predicted by the historical relationship in recent years. The degree of bias in the historical relationship's predictions of weight depends on fish length and IPHC Regulatory Area, but we expect that the revised relationships will provide improved estimates of Pacific halibut weights across the range of the stock. As new data become available each year, we will evaluate the need to update the length-weight relationships, and further revise as necessary to ensure any ongoing changes are accounted for.

There remain two components to the estimation of weight from length that are not directly estimable from recent FISS and commercial sample data: the conversion from round to dressed (dockside) weight, and the adjustment factors for ice and slime (conversion from unwashed to wash). The latter will be essential for reconciling the currently differing treatments of head weight, ice and slime and shrinkage in Alaska vs BC and the US West Coast. We have previously recommended (Webster 2021) that future FISS sampling include a random sample of O32 fish weighed twice, before and after dressing, and that greater effort should be made to weigh some sampled fish twice dockside, before and after washing.

References

Clark, W. G. 1992. Validation of the IPHC length-weight relationship for halibut. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 1991: 113–116.

Courcelles, D. 2012. Re-evaluation of the length-weight relationship of Pacific halibut (Hippoglossus stenolepis). Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2011: 459-470.

Gilroy, H. L., Hutton, L. M. and MacTavish, K. A. 2009. 2008 commercial fishery and regulation changes. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2008: 37-48.

IPHC 2017. Report of the 93rd Session of the IPHC Annual Meeting (AM093) IPHC-2017-AM093-R.

Leaman, B. M. and Gilroy, H. L. 2008. IPHC staff regulatory proposals: 2008. Int. Pac. Halibut Comm. Annual Meeting Handout: 105-110.

Webster, R. A. and Erikson, L. M. 2017. Analysis of length-weight data from commercial sampling in 2016. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2016: 101-109.

Webster, R. A. 2021. IPHC Fishery-Independent Setline Survey (FISS) and commercial data modelling. IPHC-2021-SRB019-05.

Webster, R. and Stewart, I. 2022. Revision of the IPHC length-weight relationship. IPHC-2022-AM098-INF07.

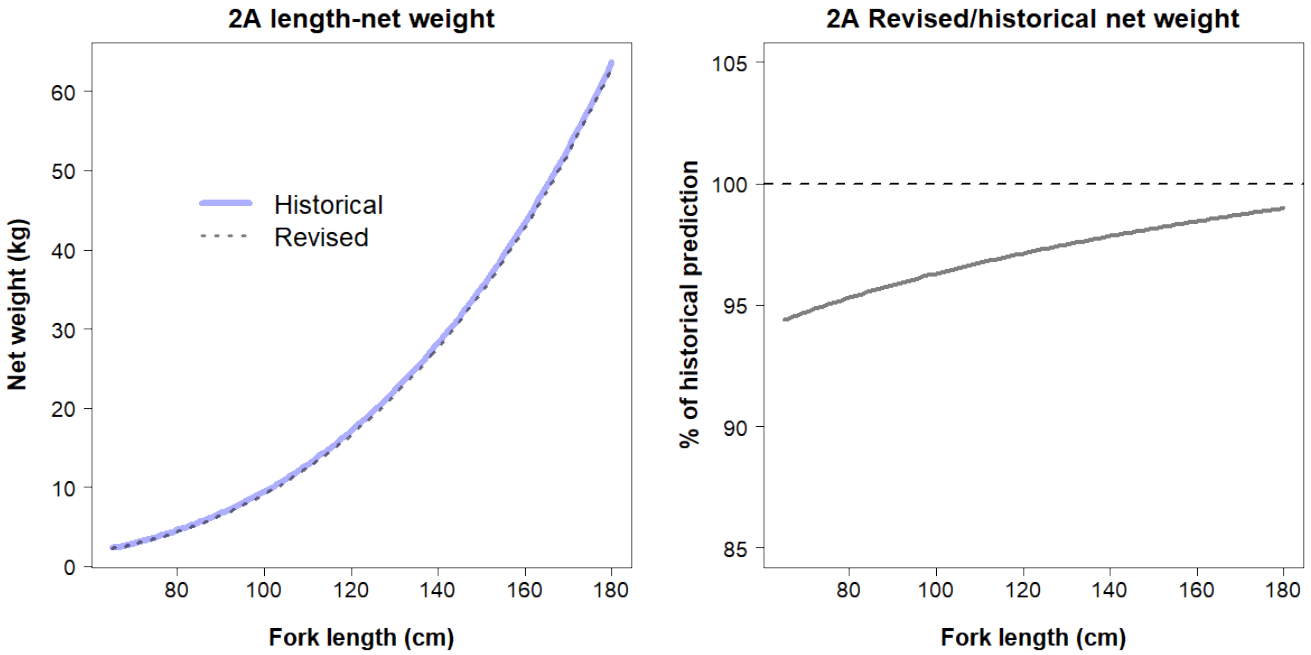


Figure 1. Length-net weight relationship estimated from 2019-21 commercial and FISS sampling data (dashed line) compared with the historical length-net weight relationship (solid blue line) for IPHC Regulatory Area 2A (left panel). The right panel shows the ratio of the predicted weights from the revised and historical relationships: values less than the dashed line at 100% mean the revised relationship predicts lighter Pacific halibut than the historical relationship.

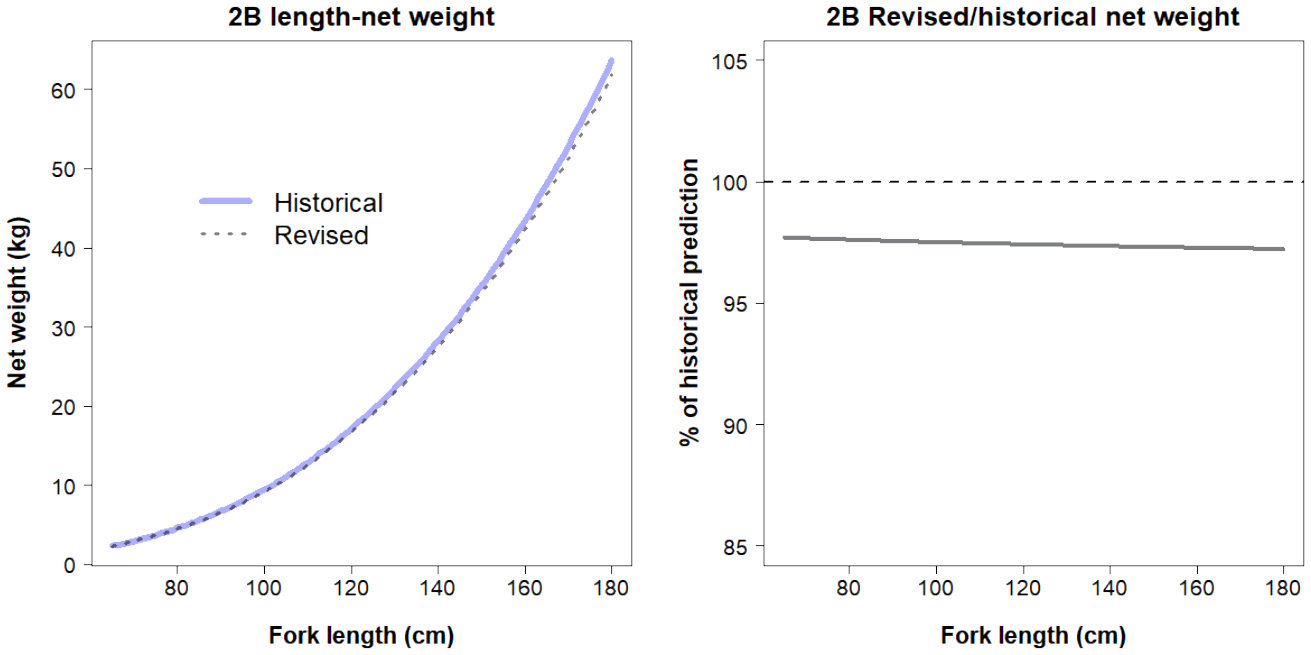


Figure 2. Length-net weight relationship estimated from 2019-21 commercial and FISS sampling data (dashed line) compared with the historical length-net weight relationship (solid blue line) for IPHC Regulatory Area 2B (left panel). The right panel shows the ratio of the predicted weights from the revised and historical relationships: values less than the dashed line at 100% mean the revised relationship predicts lighter Pacific halibut than the historical relationship.

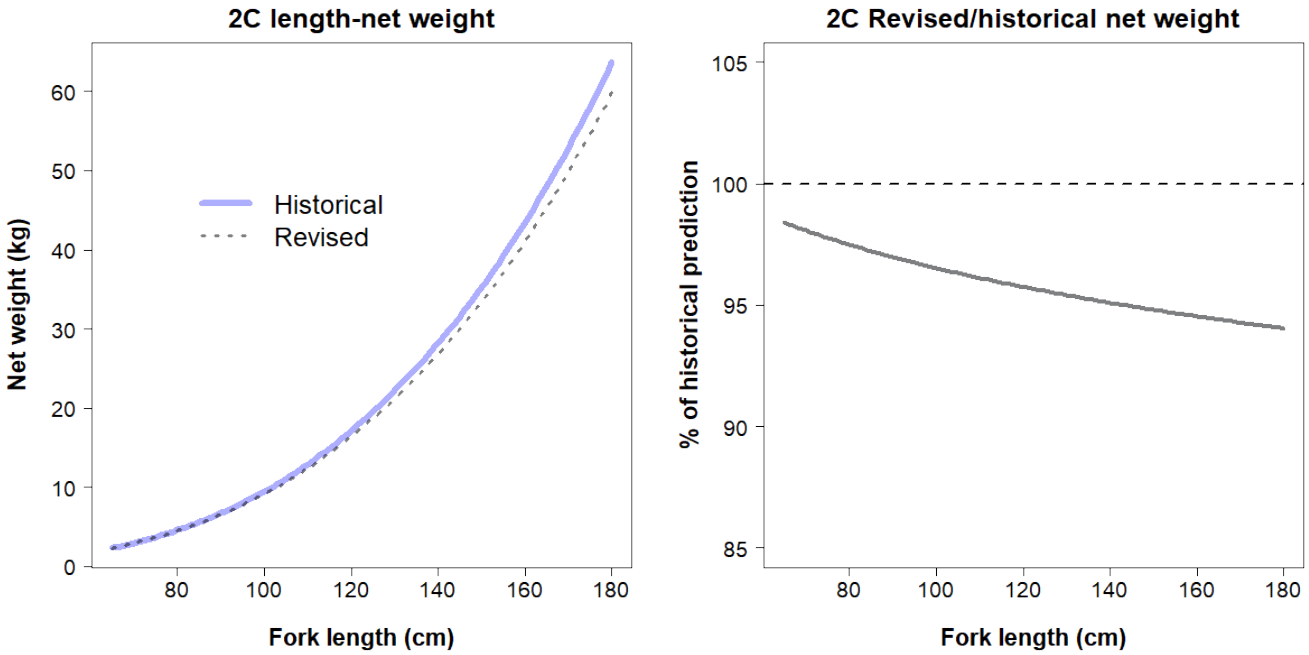


Figure 3. Length-net weight relationship estimated from 2019-21 commercial and FISS sampling data (dashed line) compared with the historical length-net weight relationship (solid blue line) for IPHC Regulatory Area 2C (left panel). The right panel shows the ratio of the predicted weights from the revised and historical relationships: values less than the dashed line at 100% mean the revised relationship predicts lighter Pacific halibut than the historical relationship.

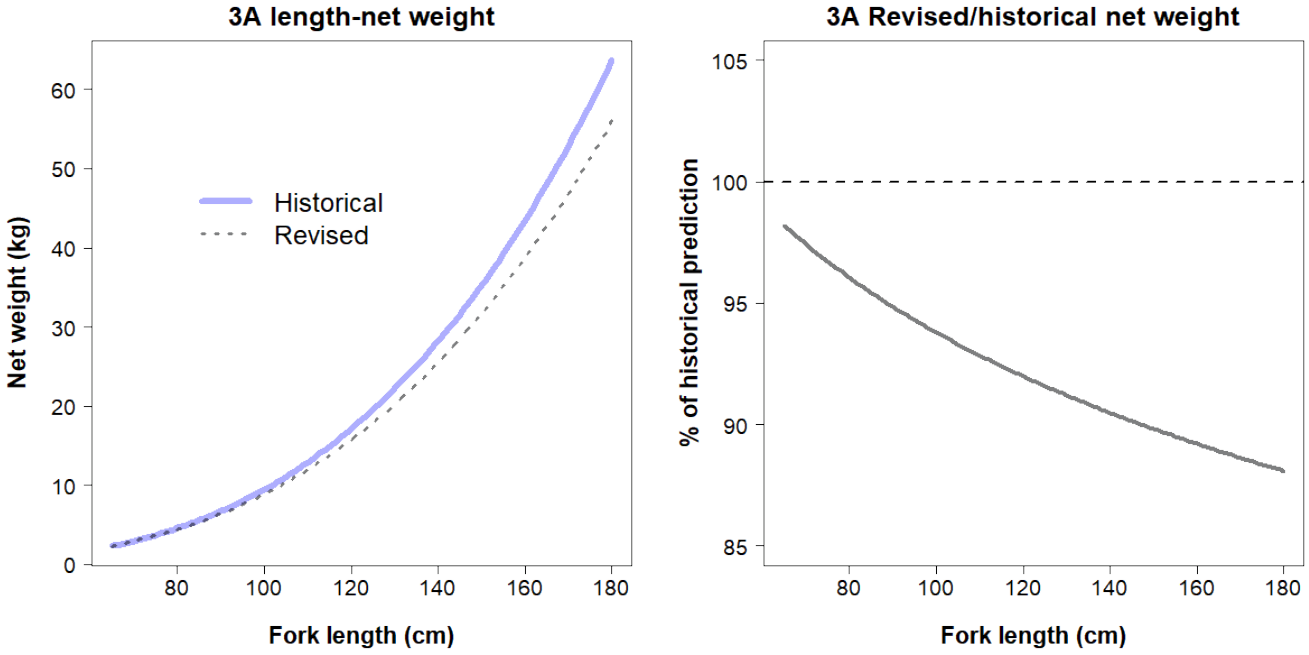


Figure 4. Length-net weight relationship estimated from 2019-21 commercial and FISS sampling data (dashed line) compared with the historical length-net weight relationship (solid blue line) for IPHC Regulatory Area 3A(left panel). The right panel shows the ratio of the predicted weights from the revised and historical relationships: values less than the dashed line at 100% mean the revised relationship predicts lighter Pacific halibut than the historical relationship.

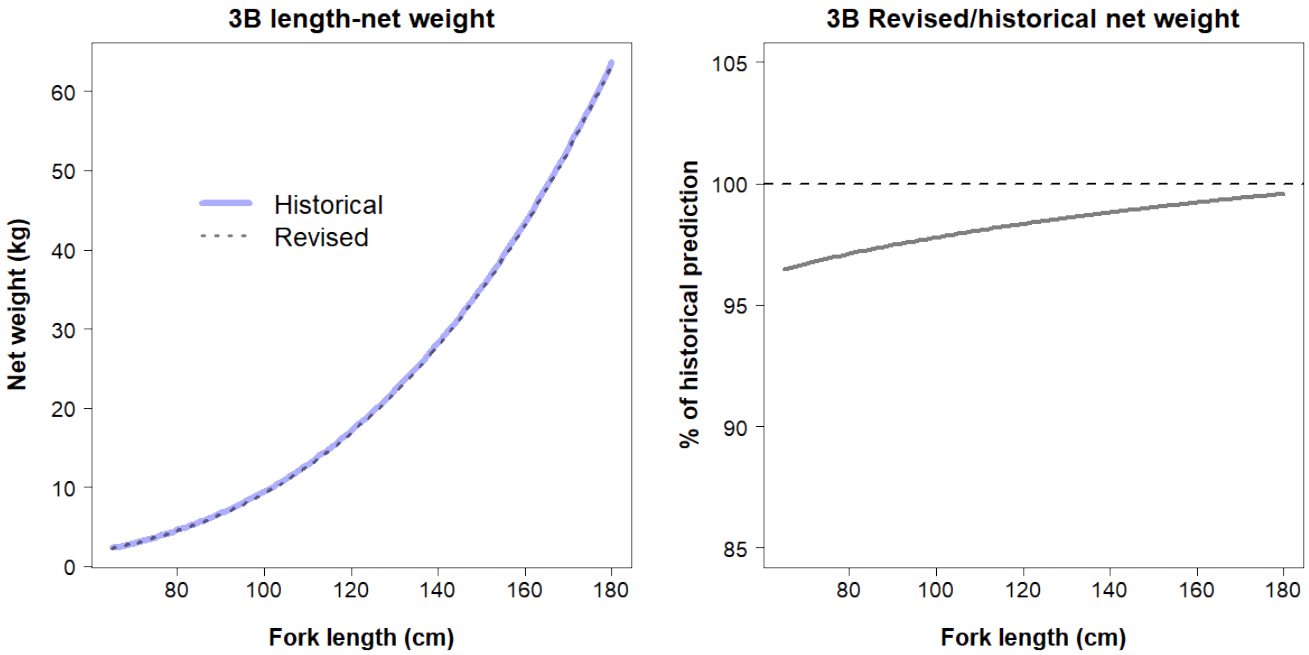


Figure 5. Length-net weight relationship estimated from 2019-21 commercial and FISS sampling data (dashed line) compared with the historical length-net weight relationship (solid blue line) for IPHC Regulatory Area 3B (left panel). The right panel shows the ratio of the predicted weights from the revised and historical relationships: values less than the dashed line at 100% mean the revised relationship predicts lighter Pacific halibut than the historical relationship.

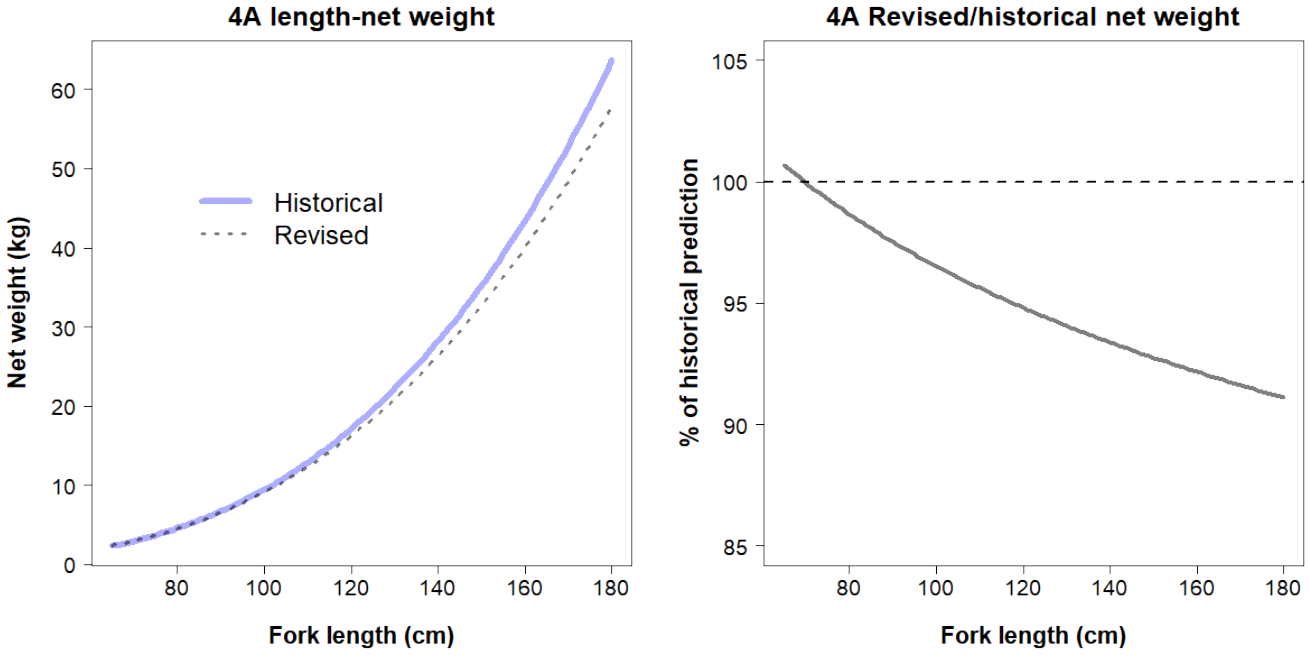


Figure 6. Length-net weight relationship estimated from 2019-21 commercial and FISS sampling data (dashed line) compared with the historical length-net weight relationship (solid blue line) for IPHC Regulatory Area 4A (left panel). The right panel shows the ratio of the predicted weights from the revised and historical relationships: values less than the dashed line at 100% mean the revised relationship predicts lighter Pacific halibut than the historical relationship.

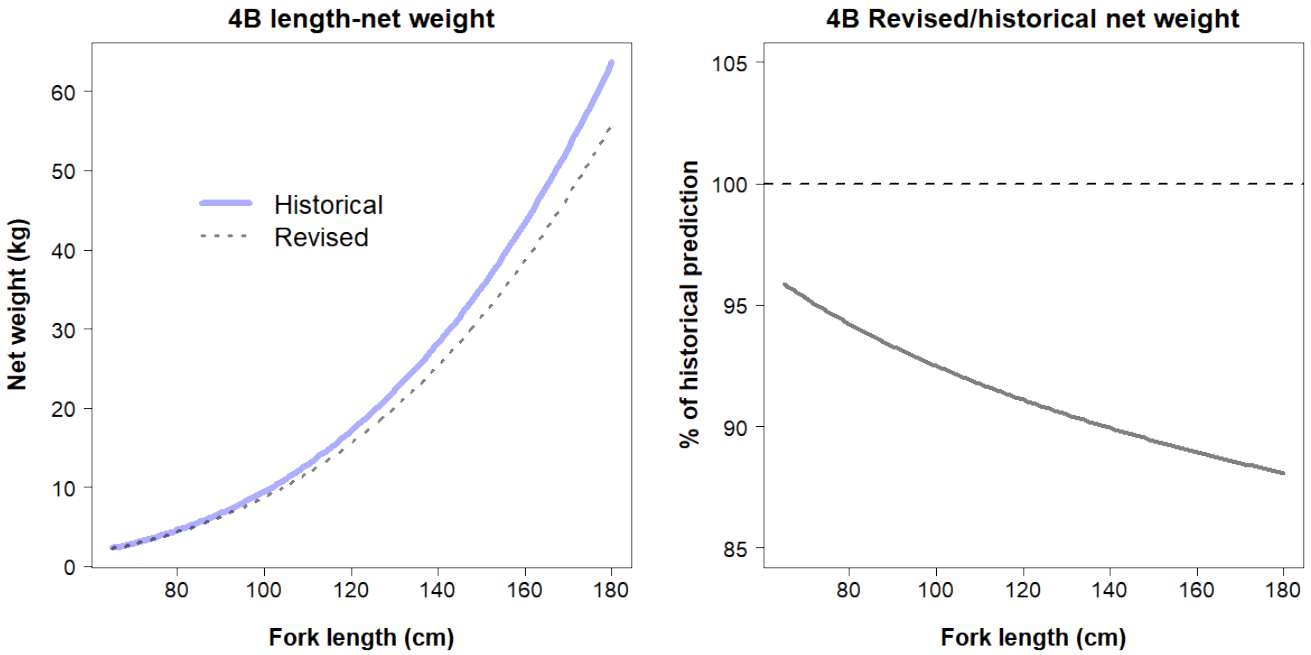


Figure 7. Length-net weight relationship estimated from 2019-21 commercial and FISS sampling data (dashed line) compared with the historical length-net weight relationship (solid blue line) for IPHC Regulatory Area 4B (left panel). The right panel shows the ratio of the predicted weights from the revised and historical relationships: values less than the dashed line at 100% mean the revised relationship predicts lighter Pacific halibut than the historical relationship.

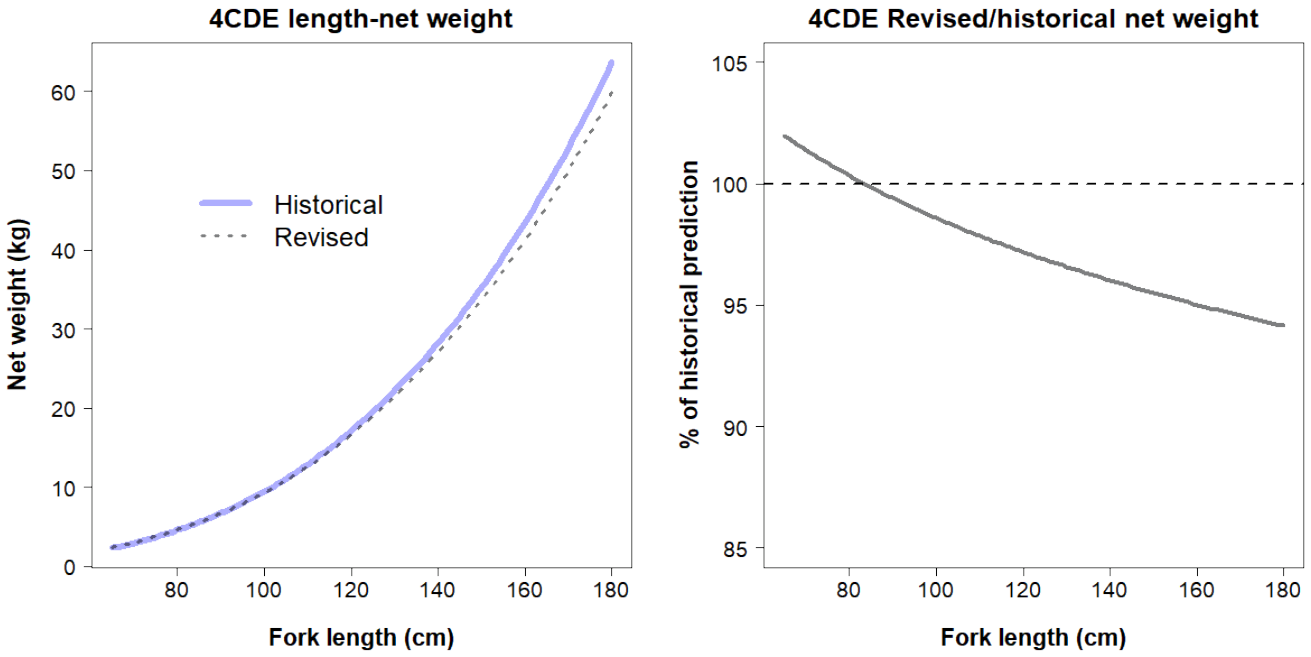


Figure 8. Length-net weight relationship estimated from 2019-21 commercial and FISS sampling data (dashed line) compared with the historical length-net weight relationship (solid blue line) for IPHC Regulatory Area 4CDE (left panel). The right panel shows the ratio of the predicted weights from the revised and historical relationships: values less than the dashed line at 100% mean the revised relationship predicts lighter Pacific halibut than the historical relationship.

Appendix A: Sample sizes of weighed Pacific halibut from commercial and FISS sampling.

Table A.1 Sample sizes of weighed commercial Pacific halibut by year and IPHC Regulatory Area.

Year	2A	2B	2C	3A	3B	4A	4B	4CDE
2015	32	801	1431	1538	1133	798	192	147
2016	303	1943	1673	1470	1492	1574	1466	1270
2017	1118	1376	1367	1453	1381	997	1816	1632
2018	2253	1421	1612	1676	808	925	1307	1494
2019	1731	1076	1573	1751	1751	1322	968	960
2020	1318	1694	1717	1608	1606	937	1264	905
2021	2803	1869	1481	1358	1027	1118	1207	162

Table A.2 Sample sizes of weighed FISS Pacific halibut by year and IPHC Regulatory Area.

Year	2A	2B	2C	3A	3B	4A	4B	4CDE
2019	786	3889	10898	15460	4530	3758	495	1545
2020	0	8101	6392	24813	2642	0	0	0
2021	785	6335	6200	20634	5862	2167	1579	329

Appendix B: Pacific halibut length-net weight tables (metric units)

Table B1. Length-net weight table for IPHC Regulatory Area 2A (metric, 71-230 cm).

Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)
71	3.0	111	12.9	151	35.4	191	76.7
72	3.1	112	13.3	152	36.2	192	78.0
73	3.2	113	13.7	153	37.0	193	79.4
74	3.4	114	14.1	154	37.8	194	80.7
75	3.6	115	14.5	155	38.6	195	82.1
76	3.7	116	14.9	156	39.4	196	83.5
77	3.9	117	15.3	157	40.3	197	84.9
78	4.0	118	15.8	158	41.1	198	86.3
79	4.2	119	16.2	159	42.0	199	87.8
80	4.4	120	16.6	160	42.9	200	89.2
81	4.6	121	17.1	161	43.7	201	90.7
82	4.8	122	17.6	162	44.6	202	92.2
83	5.0	123	18.0	163	45.6	203	93.7
84	5.2	124	18.5	164	46.5	204	95.2
85	5.4	125	19.0	165	47.4	205	96.8
86	5.6	126	19.5	166	48.4	206	98.3
87	5.8	127	20.1	167	49.3	207	99.9
88	6.0	128	20.6	168	50.3	208	101.5
89	6.2	129	21.1	169	51.3	209	103.1
90	6.5	130	21.7	170	52.3	210	104.8
91	6.7	131	22.2	171	53.3	211	106.4
92	7.0	132	22.8	172	54.4	212	108.1
93	7.2	133	23.3	173	55.4	213	109.8
94	7.5	134	23.9	174	56.5	214	111.5
95	7.7	135	24.5	175	57.5	215	113.2
96	8.0	136	25.1	176	58.6	216	114.9
97	8.3	137	25.7	177	59.7	217	116.7
98	8.6	138	26.4	178	60.8	218	118.5
99	8.8	139	27.0	179	62.0	219	120.2
100	9.1	140	27.6	180	63.1	220	122.1
101	9.4	141	28.3	181	64.3	221	123.9
102	9.8	142	28.9	182	65.4	222	125.7
103	10.1	143	29.6	183	66.6	223	127.6
104	10.4	144	30.3	184	67.8	224	129.5
105	10.7	145	31.0	185	69.1	225	131.4
106	11.1	146	31.7	186	70.3	226	133.3
107	11.4	147	32.4	187	71.5	227	135.3
108	11.8	148	33.2	188	72.8	228	137.3
109	12.1	149	33.9	189	74.1	229	139.3
110	12.5	150	34.7	190	75.4	230	141.3

Table B2. Length-net weight table for IPHC Regulatory Area 2B (metric, 71-230 cm).

Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)
71	3.1	111	12.9	151	35.0	191	74.8
72	3.2	112	13.3	152	35.7	192	76.0
73	3.3	113	13.7	153	36.5	193	77.3
74	3.5	114	14.1	154	37.3	194	78.6
75	3.6	115	14.5	155	38.1	195	79.9
76	3.8	116	14.9	156	38.9	196	81.3
77	4.0	117	15.3	157	39.7	197	82.6
78	4.1	118	15.8	158	40.5	198	84.0
79	4.3	119	16.2	159	41.3	199	85.4
80	4.5	120	16.7	160	42.2	200	86.8
81	4.7	121	17.1	161	43.0	201	88.2
82	4.9	122	17.6	162	43.9	202	89.6
83	5.1	123	18.0	163	44.8	203	91.0
84	5.3	124	18.5	164	45.7	204	92.5
85	5.5	125	19.0	165	46.6	205	94.0
86	5.7	126	19.5	166	47.5	206	95.4
87	5.9	127	20.0	167	48.4	207	97.0
88	6.1	128	20.5	168	49.4	208	98.5
89	6.3	129	21.0	169	50.3	209	100.0
90	6.6	130	21.6	170	51.3	210	101.6
91	6.8	131	22.1	171	52.3	211	103.1
92	7.1	132	22.7	172	53.3	212	104.7
93	7.3	133	23.2	173	54.3	213	106.3
94	7.6	134	23.8	174	55.3	214	107.9
95	7.8	135	24.4	175	56.4	215	109.6
96	8.1	136	25.0	176	57.4	216	111.2
97	8.4	137	25.6	177	58.5	217	112.9
98	8.7	138	26.2	178	59.5	218	114.6
99	8.9	139	26.8	179	60.6	219	116.3
100	9.2	140	27.4	180	61.7	220	118.0
101	9.5	141	28.0	181	62.8	221	119.8
102	9.9	142	28.7	182	64.0	222	121.5
103	10.2	143	29.3	183	65.1	223	123.3
104	10.5	144	30.0	184	66.3	224	125.1
105	10.8	145	30.7	185	67.4	225	126.9
106	11.2	146	31.4	186	68.6	226	128.8
107	11.5	147	32.1	187	69.8	227	130.5
108	11.8	148	32.8	188	71.0	228	132.5
109	12.2	149	33.5	189	72.3	229	134.4
110	12.6	150	34.2	190	73.5	230	136.3

Table B3. Length-net weight table for IPHC Regulatory Area 2C (metric, 71-230 cm).

Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)
71	3.1	111	12.8	151	34.2	191	72.5
72	3.2	112	13.2	152	35.0	192	73.8
73	3.4	113	13.6	153	35.7	193	75.0
74	3.5	114	13.9	154	36.5	194	76.3
75	3.7	115	14.3	155	37.2	195	77.5
76	3.8	116	14.7	156	38.0	196	78.8
77	4.0	117	15.1	157	38.8	197	80.1
78	4.1	118	15.6	158	39.6	198	81.4
79	4.3	119	16.0	159	40.4	199	82.7
80	4.5	120	16.4	160	41.2	200	84.0
81	4.7	121	16.9	161	42.0	201	85.4
82	4.9	122	17.3	162	42.9	202	86.8
83	5.1	123	17.8	163	43.7	203	88.1
84	5.3	124	18.2	164	44.6	204	89.5
85	5.5	125	18.7	165	45.4	205	90.9
86	5.7	126	19.2	166	46.3	206	92.4
87	5.9	127	19.7	167	47.2	207	93.8
88	6.1	128	20.2	168	48.1	208	95.3
89	6.3	129	20.7	169	49.1	209	96.7
90	6.5	130	21.2	170	50.0	210	98.2
91	6.8	131	21.7	171	50.9	211	99.7
92	7.0	132	22.3	172	51.9	212	101.3
93	7.3	133	22.8	173	52.9	213	102.8
94	7.5	134	23.4	174	53.9	214	104.3
95	7.9	135	23.9	175	54.8	215	105.9
96	8.0	136	24.5	176	55.9	216	107.5
97	8.3	137	25.1	177	56.9	217	109.1
98	8.6	138	25.7	178	57.9	218	110.7
99	8.9	139	26.3	179	59.0	219	112.3
100	9.2	140	26.9	180	60.0	220	114.0
101	9.5	141	27.5	181	61.1	221	115.6
102	9.8	142	28.1	182	62.2	222	117.3
103	10.1	143	28.8	183	63.3	223	119.0
104	10.4	144	29.4	184	64.4	224	120.7
105	10.7	145	30.1	185	65.5	225	122.5
106	11.0	146	30.7	186	66.6	226	124.2
107	11.4	147	31.4	187	67.8	227	126.0
108	11.7	148	32.1	188	69.0	228	127.8
109	12.1	149	32.8	189	70.1	229	129.6
110	12.4	150	33.5	190	71.3	230	131.4

Table B4. Length-net weight table for IPHC Regulatory Area 3A (metric, 71-230 cm).

Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)
71	3.0	111	12.3	151	32.3	191	67.5
72	3.2	112	12.7	152	33.0	192	68.7
73	3.3	113	13.0	153	33.7	193	69.8
74	3.5	114	13.4	154	34.4	194	70.9
75	3.6	115	13.8	155	35.1	195	72.1
76	3.8	116	14.2	156	35.8	196	73.2
77	3.9	117	14.5	157	36.6	197	74.4
78	4.1	118	14.9	158	37.3	198	75.6
79	4.2	119	15.3	159	38.0	199	76.8
80	4.4	120	15.7	160	38.8	200	78.0
81	4.6	121	16.2	161	39.5	201	79.3
82	4.8	122	16.6	162	40.3	202	80.5
83	5.0	123	17.0	163	41.1	203	81.8
84	5.2	124	17.4	164	41.9	204	83.0
85	5.3	125	17.9	165	42.7	205	84.3
86	5.5	126	18.3	166	43.5	206	85.6
87	5.7	127	18.8	167	44.4	207	86.9
88	6.0	128	19.3	168	45.2	208	88.2
89	6.2	129	19.7	169	46.0	209	89.6
90	6.4	130	20.2	170	46.9	210	90.9
91	6.6	131	20.7	171	47.8	211	92.3
92	6.8	132	21.2	172	48.6	212	93.7
93	7.1	133	21.7	173	49.5	213	95.0
94	7.3	134	22.2	174	50.4	214	96.5
95	7.6	135	22.8	175	51.4	215	97.9
96	7.8	136	23.3	176	52.3	216	99.3
97	8.1	137	23.8	177	53.2	217	100.8
98	8.3	138	24.4	178	54.2	218	102.2
99	8.6	139	25.0	179	55.1	219	103.7
100	8.9	140	25.5	180	56.1	220	105.2
101	9.2	141	26.1	181	57.1	221	106.7
102	9.5	142	26.7	182	58.1	222	108.2
103	9.8	143	27.3	183	59.1	223	109.7
104	10.1	144	27.9	184	60.1	224	111.3
105	10.4	145	28.5	185	61.1	225	112.9
106	10.7	146	29.1	186	62.2	226	114.4
107	11.0	147	29.7	187	63.2	227	116.0
108	11.3	148	30.4	188	64.3	228	117.6
109	11.6	149	31.0	189	65.3	229	119.3
110	12.0	150	31.7	190	66.4	230	120.9

Table B5. Length-net weight table for IPHC Regulatory Area 3B (metric, 71-230 cm).

Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)
71	3.0	111	13.0	151	35.7	191	77.0
72	3.2	112	13.4	152	36.5	192	78.3
73	3.3	113	13.8	153	37.3	193	79.7
74	3.5	114	14.2	154	38.1	194	81.0
75	3.6	115	14.6	155	38.9	195	82.4
76	3.8	116	15.1	156	39.7	196	83.8
77	3.9	117	15.5	157	40.6	197	85.2
78	4.1	118	15.9	158	41.4	198	86.6
79	4.3	119	16.4	159	42.3	199	88.1
80	4.5	120	16.8	160	43.1	200	89.5
81	4.7	121	17.3	161	44.0	201	91.0
82	4.8	122	17.8	162	44.9	202	92.5
83	5.0	123	18.3	163	45.8	203	94.0
84	5.2	124	18.7	164	46.8	204	95.5
85	5.4	125	19.2	165	47.7	205	97.0
86	5.7	126	19.7	166	48.7	206	98.6
87	5.9	127	20.3	167	49.6	207	100.2
88	6.1	128	20.8	168	50.6	208	101.8
89	6.3	129	21.3	169	51.6	209	103.4
90	6.6	130	21.9	170	52.6	210	105.0
91	6.8	131	22.4	171	53.6	211	106.6
92	7.1	132	23.0	172	54.7	212	108.3
93	7.3	133	23.6	173	55.7	213	110.0
94	7.6	134	24.2	174	56.8	214	111.7
95	7.8	135	24.7	175	57.8	215	113.4
96	8.1	136	25.4	176	58.9	216	115.1
97	8.4	137	26.0	177	60.0	217	116.9
98	8.7	138	26.6	178	61.1	218	118.7
99	9.0	139	27.2	179	62.3	219	120.4
100	9.3	140	27.9	180	63.4	220	122.3
101	9.6	141	28.5	181	64.6	221	124.1
102	9.9	142	29.2	182	65.8	222	125.9
103	10.2	143	29.9	183	66.9	223	127.8
104	10.5	144	30.6	184	68.1	224	129.7
105	10.9	145	31.3	185	69.4	225	131.6
106	11.2	146	32.0	186	70.6	226	133.5
107	11.6	147	32.7	187	71.8	227	135.4
108	11.9	148	33.4	188	73.1	228	137.4
109	12.3	149	34.2	189	74.4	229	139.4
110	12.7	150	34.9	190	75.7	230	141.4

Table B6. Length-net weight table for IPHC Regulatory Area 4A (metric, 71-230 cm).

Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)
71	3.1	111	12.7	151	33.4	191	70.0
72	3.3	112	13.1	152	34.1	192	71.1
73	3.4	113	13.4	153	34.8	193	72.3
74	3.6	114	13.8	154	35.6	194	73.5
75	3.7	115	14.2	155	36.3	195	74.7
76	3.9	116	14.6	156	37.0	196	75.9
77	4.0	117	15.0	157	37.8	197	77.1
78	4.2	118	15.4	158	38.5	198	78.3
79	4.4	119	15.8	159	39.3	199	79.6
80	4.5	120	16.2	160	40.1	200	80.8
81	4.7	121	16.7	161	40.9	201	82.1
82	4.9	122	17.1	162	41.7	202	83.4
83	5.1	123	17.5	163	42.5	203	84.7
84	5.3	124	18.0	164	43.3	204	86.0
85	5.5	125	18.5	165	44.2	205	87.4
86	5.7	126	18.9	166	45.0	206	88.7
87	5.9	127	19.4	167	45.9	207	90.1
88	6.1	128	19.9	168	46.7	208	91.4
89	6.3	129	20.4	169	47.6	209	92.8
90	6.6	130	20.9	170	48.5	210	94.2
91	6.8	131	21.4	171	49.4	211	95.6
92	7.0	132	21.9	172	50.3	212	97.1
93	7.3	133	22.4	173	51.3	213	98.5
94	7.5	134	23.0	174	52.2	214	100.0
95	7.8	135	23.5	175	53.1	215	101.6
96	8.1	136	24.1	176	54.1	216	103.0
97	8.3	137	24.6	177	55.1	217	104.5
98	8.6	138	25.2	178	56.1	218	106.0
99	8.9	139	25.8	179	57.0	219	107.5
100	9.2	140	26.4	180	58.1	220	109.1
101	9.4	141	27.0	181	59.1	221	110.6
102	9.7	142	27.6	182	60.1	222	112.2
103	10.0	143	28.2	183	61.2	223	113.8
104	10.4	144	28.8	184	62.2	224	115.4
105	10.7	145	29.4	185	63.3	225	117.0
106	11.0	146	30.1	186	64.4	226	118.7
107	11.3	147	30.7	187	65.5	227	120.3
108	11.7	148	31.4	188	66.6	228	122.0
109	12.0	149	32.1	189	67.7	229	123.7
110	12.4	150	32.7	190	68.8	230	125.4

Table B7. Length-net weight table for IPHC Regulatory Area 4B (metric, 71-230 cm).

Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)
71	3.0	111	12.2	151	32.2	191	67.7
72	3.1	112	12.6	152	32.9	192	68.8
73	3.2	113	12.9	153	33.6	193	70.0
74	3.4	114	13.3	154	34.3	194	71.1
75	3.5	115	13.6	155	35.0	195	72.3
76	3.7	116	14.0	156	35.7	196	73.5
77	3.8	117	14.4	157	36.5	197	74.7
78	4.0	118	14.8	158	37.2	198	75.9
79	4.2	119	15.2	159	38.0	199	77.1
80	4.3	120	15.6	160	38.7	200	78.3
81	4.5	121	16.0	161	39.5	201	79.5
82	4.7	122	16.4	162	40.3	202	80.8
83	4.9	123	16.9	163	41.0	203	82.1
84	5.1	124	17.3	164	41.8	204	83.4
85	5.3	125	17.8	165	42.7	205	84.6
86	5.5	126	18.2	166	43.5	206	86.0
87	5.7	127	18.7	167	44.3	207	87.3
88	5.9	128	19.1	168	45.2	208	88.6
89	6.1	129	19.6	169	46.0	209	90.0
90	6.3	130	20.1	170	46.9	210	91.3
91	6.5	131	20.6	171	47.8	211	92.7
92	6.7	132	21.1	172	48.6	212	94.1
93	7.0	133	21.6	173	49.5	213	95.5
94	7.2	134	22.1	174	50.4	214	96.9
95	7.5	135	22.6	175	51.4	215	98.4
96	7.7	136	23.2	176	52.3	216	99.8
97	8.0	137	23.7	177	53.2	217	101.3
98	8.2	138	24.3	178	54.2	218	102.8
99	8.5	139	24.8	179	55.2	219	104.3
100	8.8	140	25.4	180	56.1	220	105.8
101	9.1	141	26.0	181	57.1	221	107.3
102	9.3	142	26.6	182	58.1	222	108.9
103	9.6	143	27.2	183	59.2	223	110.4
104	9.9	144	27.8	184	60.2	224	112.0
105	10.2	145	28.4	185	61.2	225	113.6
106	10.6	146	29.0	186	62.3	226	115.2
107	10.9	147	29.6	187	63.3	227	116.8
108	11.2	148	30.3	188	64.4	228	118.4
109	11.5	149	30.9	189	65.5	229	120.1
110	11.9	150	31.6	190	66.6	230	121.7

Table B8. Length-net weight table for IPHC Regulatory Area 4CDE (metric, 71-230 cm).

Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)	Length (cm)	Weight (kg)
71	3.2	111	13.0	151	34.3	191	72.1
72	3.3	112	13.3	152	35.0	192	73.3
73	3.4	113	13.7	153	35.8	193	74.5
74	3.6	114	14.1	154	36.5	194	75.8
75	3.8	115	14.5	155	37.3	195	77.0
76	3.9	116	14.9	156	38.0	196	78.3
77	4.1	117	15.3	157	38.8	197	79.5
78	4.3	118	15.7	158	39.6	198	80.8
79	4.4	119	16.2	159	40.4	199	82.1
80	4.6	120	16.6	160	41.2	200	83.4
81	4.8	121	17.0	161	42.0	201	84.7
82	5.0	122	17.5	162	42.9	202	86.1
83	5.2	123	17.9	163	43.7	203	87.4
84	5.4	124	18.4	164	44.5	204	88.8
85	5.6	125	18.9	165	45.4	205	90.2
86	5.8	126	19.4	166	46.3	206	91.6
87	6.0	127	19.9	167	47.2	207	93.0
88	6.2	128	20.4	168	48.1	208	94.4
89	6.5	129	20.9	169	49.0	209	95.9
90	6.7	130	21.4	170	49.9	210	97.3
91	6.9	131	21.9	171	50.8	211	98.8
92	7.2	132	22.4	172	51.8	212	100.3
93	7.4	133	23.0	173	52.7	213	101.8
94	7.7	134	23.5	174	53.7	214	103.3
95	7.9	135	24.1	175	54.7	215	104.8
96	8.2	136	24.6	176	55.7	216	106.4
97	8.5	137	25.2	177	56.7	217	108.0
98	8.7	138	25.8	178	57.7	218	109.5
99	9.0	139	26.4	179	58.7	219	111.1
100	9.3	140	27.0	180	59.8	220	112.7
101	9.6	141	27.6	181	60.8	221	114.4
102	9.9	142	28.3	182	61.9	222	116.0
103	10.2	143	28.9	183	63.0	223	117.7
104	10.6	144	29.5	184	64.1	224	119.3
105	10.9	145	30.2	185	65.2	225	121.0
106	11.2	146	30.8	186	66.3	226	122.7
107	11.5	147	31.5	187	67.4	227	124.5
108	11.9	148	32.2	188	68.6	228	126.2
109	12.2	149	32.9	189	69.8	229	128.0
110	12.6	150	33.6	190	70.9	230	129.7

Appendix C: Pacific halibut length-net weight tables (Imperial units)

Table C1. Length-net weight table for IPHC Regulatory Area 2A (Imperial, 22.5-92 inches).

Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)
22.5	3.2	40.0	21.2	57.5	70.0	75.0	167.6
23.0	3.4	40.5	22.1	58.0	72.0	75.5	171.3
23.5	3.7	41.0	23.0	58.5	74.1	76.0	175.1
24.0	4.0	41.5	24.0	59.0	76.2	76.5	178.9
24.5	4.2	42.0	24.9	59.5	78.3	77.0	182.8
25.0	4.5	42.5	25.9	60.0	80.5	77.5	186.7
25.5	4.8	43.0	26.9	60.5	82.7	78.0	190.7
26.0	5.1	43.5	28.0	61.0	85.0	78.5	194.8
26.5	5.5	44.0	29.0	61.5	87.3	79.0	198.9
27.0	5.8	44.5	30.1	62.0	89.7	79.5	203.0
27.5	6.2	45.0	31.3	62.5	92.1	80.0	207.3
28.0	6.6	45.5	32.4	63.0	94.5	80.5	211.6
28.5	7.0	46.0	33.6	63.5	97.0	81.0	215.9
29.0	7.4	46.5	34.8	64.0	99.5	81.5	220.3
29.5	7.8	47.0	36.1	64.5	102.1	82.0	224.8
30.0	8.2	47.5	37.4	65.0	104.7	82.5	229.3
30.5	8.7	48.0	38.7	65.5	107.4	83.0	233.9
31.0	9.2	48.5	40.0	66.0	110.1	83.5	238.6
31.5	9.7	49.0	41.4	66.5	112.9	84.0	243.3
32.0	10.2	49.5	42.8	67.0	115.7	84.5	248.1
32.5	10.7	50.0	44.2	67.5	118.6	85.0	253.0
33.0	11.3	50.5	45.7	68.0	121.5	85.5	257.9
33.5	11.9	51.0	47.2	68.5	124.4	86.0	262.9
34.0	12.4	51.5	48.7	69.0	127.5	86.5	267.9
34.5	13.1	52.0	50.3	69.5	130.5	87.0	273.1
35.0	13.7	52.5	51.9	70.0	133.6	87.5	278.3
35.5	14.3	53.0	53.6	70.5	136.8	88.0	283.5
36.0	15.0	53.5	55.2	71.0	140.0	88.5	288.8
36.5	15.7	54.0	56.9	71.5	143.3	89.0	294.2
37.0	16.4	54.5	58.7	72.0	146.6	89.5	299.7
37.5	17.2	55.0	60.5	72.5	150.0	90.0	305.3
38.0	17.9	55.5	62.3	73.0	153.4	90.5	310.9
38.5	18.7	56.0	64.2	73.5	156.9	91.0	316.5
39.0	19.5	56.5	66.1	74.0	160.4	91.5	322.3
39.5	20.4	57.0	68.0	74.5	164.0	92.0	328.1

Table C2. Length-net weight table for IPHC Regulatory Area 2B (Imperial, 22.5-92 inches).

Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)
22.5	3.3	40.0	21.4	57.5	69.3	75.0	163.4
23.0	3.6	40.5	22.3	58.0	71.2	75.5	167.0
23.5	3.8	41.0	23.2	58.5	73.2	76.0	170.6
24.0	4.1	41.5	24.2	59.0	75.3	76.5	174.2
24.5	4.4	42.0	25.1	59.5	77.4	77.0	177.9
25.0	4.7	42.5	26.1	60.0	79.5	77.5	181.7
25.5	5.0	43.0	27.1	60.5	81.6	78.0	185.5
26.0	5.3	43.5	28.1	61.0	83.8	78.5	189.4
26.5	5.7	44.0	29.2	61.5	86.1	79.0	193.3
27.0	6.0	44.5	30.3	62.0	88.4	79.5	197.3
27.5	6.4	45.0	31.4	62.5	90.7	80.0	201.3
28.0	6.8	45.5	32.5	63.0	93.0	80.5	205.4
28.5	7.2	46.0	33.7	63.5	95.5	81.0	209.6
29.0	7.6	46.5	34.9	64.0	97.9	81.5	213.8
29.5	8.0	47.0	36.1	64.5	100.4	82.0	218.1
30.0	8.5	47.5	37.4	65.0	102.9	82.5	222.4
30.5	8.9	48.0	38.7	65.5	105.5	83.0	226.8
31.0	9.4	48.5	40.0	66.0	108.1	83.5	231.2
31.5	9.9	49.0	41.3	66.5	110.8	84.0	235.7
32.0	10.4	49.5	42.7	67.0	113.5	84.5	240.3
32.5	11.0	50.0	44.1	67.5	116.3	85.0	244.9
33.0	11.5	50.5	45.5	68.0	119.1	85.5	249.6
33.5	12.1	51.0	47.1	68.5	121.9	86.0	254.3
34.0	12.7	51.5	48.5	69.0	124.8	86.5	259.1
34.5	13.3	52.0	50.1	69.5	127.8	87.0	264.0
35.0	13.9	52.5	51.6	70.0	130.8	87.5	268.9
35.5	14.6	53.0	53.2	70.5	133.8	88.0	273.9
36.0	15.3	53.5	54.9	71.0	136.9	88.5	279.0
36.5	16.0	54.0	56.5	71.5	140.1	89.0	284.1
37.0	16.7	54.5	58.3	72.0	143.2	89.5	289.3
37.5	17.4	55.0	60.0	72.5	146.5	90.0	294.6
38.0	18.2	55.5	61.8	73.0	149.8	90.5	299.9
38.5	19.0	56.0	63.6	73.5	153.1	91.0	305.3
39.0	19.8	56.5	65.4	74.0	156.5	91.5	310.7
39.5	20.6	57.0	67.3	74.5	159.9	92.0	316.3

Table C3. Length-net weight table for IPHC Regulatory Area 2C (Imperial, 22.5-92 inches).

Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)
22.5	3.4	40.0	21.3	57.5	67.8	75.0	158.6
23.0	3.6	40.5	22.1	58.0	69.7	75.5	162.0
23.5	3.9	41.0	23.0	58.5	71.7	76.0	165.4
24.0	4.2	41.5	23.9	59.0	73.7	76.5	168.9
24.5	4.4	42.0	24.9	59.5	75.7	77.0	172.5
25.0	4.7	42.5	25.8	60.0	77.7	77.5	176.1
25.5	5.0	43.0	26.8	60.5	79.8	78.0	179.8
26.0	5.4	43.5	27.8	61.0	81.9	78.5	183.5
26.5	5.7	44.0	28.8	61.5	84.1	79.0	187.2
27.0	6.1	44.5	29.9	62.0	86.3	79.5	191.0
27.5	6.4	45.0	31.0	62.5	88.6	80.0	194.9
28.0	6.8	45.5	32.1	63.0	90.8	80.5	198.8
28.5	7.2	46.0	33.2	63.5	93.2	81.0	202.8
29.0	7.6	46.5	34.4	64.0	95.5	81.5	206.8
29.5	8.0	47.0	35.6	64.5	97.9	82.0	210.9
30.0	8.5	47.5	36.8	65.0	100.4	82.5	215.1
30.5	8.9	48.0	38.1	65.5	102.9	83.0	219.2
31.0	9.4	48.5	39.4	66.0	105.4	83.5	223.5
31.5	9.9	49.0	40.7	66.5	108.0	84.0	227.8
32.0	10.4	49.5	42.0	67.0	110.6	84.5	232.2
32.5	11.0	50.0	43.4	67.5	113.2	85.0	236.6
33.0	11.5	50.5	44.8	68.0	115.9	85.5	241.1
33.5	12.1	51.0	46.2	68.5	118.7	86.0	245.6
34.0	12.7	51.5	47.7	69.0	121.5	86.5	250.2
34.5	13.3	52.0	49.2	69.5	124.3	87.0	254.8
35.0	13.9	52.5	50.7	70.0	127.2	87.5	259.5
35.5	14.5	53.0	52.3	70.5	130.1	88.0	264.3
36.0	15.2	53.5	53.9	71.0	133.1	88.5	269.1
36.5	15.9	54.0	55.5	71.5	136.1	89.0	274.0
37.0	16.6	54.5	57.2	72.0	139.2	89.5	279.0
37.5	17.3	55.0	58.9	72.5	142.3	90.0	284.0
38.0	18.1	55.5	60.6	73.0	145.5	90.5	289.1
38.5	18.8	56.0	62.3	73.5	148.7	91.0	294.2
39.0	19.6	56.5	64.1	74.0	151.9	91.5	299.4
39.5	20.4	57.0	66.0	74.5	155.2	92.0	304.7

Table C4. Length-net weight table for IPHC Regulatory Area 3A (Imperial, 22.5-92 inches).

Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)
22.5	3.4	40.0	20.6	57.5	64.3	75.0	147.7
23.0	3.6	40.5	21.4	58.0	66.0	75.5	150.8
23.5	3.9	41.0	22.3	58.5	67.8	76.0	154.0
24.0	4.2	41.5	23.1	59.0	69.7	76.5	157.2
24.5	4.4	42.0	24.0	59.5	71.5	77.0	160.4
25.0	4.7	42.5	24.9	60.0	73.4	77.5	163.7
25.5	5.0	43.0	25.9	60.5	75.4	78.0	167.0
26.0	5.3	43.5	26.8	61.0	77.3	78.5	170.4
26.5	5.7	44.0	27.8	61.5	79.3	79.0	173.8
27.0	6.0	44.5	28.8	62.0	81.4	79.5	177.3
27.5	6.4	45.0	29.8	62.5	83.4	80.0	180.8
28.0	6.7	45.5	30.9	63.0	85.5	80.5	184.4
28.5	7.1	46.0	31.9	63.5	87.7	81.0	188.0
29.0	7.5	46.5	33.0	64.0	89.9	81.5	191.7
29.5	7.9	47.0	34.2	64.5	92.1	82.0	195.4
30.0	8.4	47.5	35.3	65.0	94.3	82.5	199.1
30.5	8.8	48.0	36.5	65.5	96.6	83.0	202.9
31.0	9.3	48.5	37.7	66.0	99.0	83.5	206.8
31.5	9.8	49.0	38.9	66.5	101.3	84.0	210.7
32.0	10.2	49.5	40.2	67.0	103.7	84.5	214.6
32.5	10.8	50.0	41.5	67.5	106.2	85.0	218.6
33.0	11.3	50.5	42.8	68.0	108.6	85.5	222.7
33.5	11.8	51.0	44.1	68.5	111.2	86.0	226.8
34.0	12.4	51.5	45.5	69.0	113.8	86.5	231.0
34.5	13.0	52.0	46.9	69.5	116.4	87.0	235.2
35.0	13.6	52.5	48.3	70.0	119.0	87.5	239.4
35.5	14.2	53.0	49.8	70.5	121.7	88.0	243.7
36.0	14.8	53.5	51.3	71.0	124.4	88.5	248.1
36.5	15.5	54.0	52.8	71.5	127.2	89.0	252.5
37.0	16.1	54.5	54.3	72.0	130.0	89.5	257.0
37.5	16.8	55.0	55.9	72.5	132.8	90.0	261.5
38.0	17.5	55.5	57.5	73.0	135.7	90.5	266.1
38.5	18.3	56.0	59.1	73.5	138.7	91.0	270.7
39.0	19.0	56.5	60.8	74.0	141.6	91.5	275.4
39.5	19.8	57.0	62.5	74.5	144.7	92.0	280.2

Table C5. Length-net weight table for IPHC Regulatory Area 3B (Imperial, 22.5-92 inches).

Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)
22.5	3.3	40.0	21.5	57.5	70.6	75.0	168.3
23.0	3.5	40.5	22.4	58.0	72.6	75.5	172.0
23.5	3.8	41.0	23.3	58.5	74.7	76.0	175.8
24.0	4.0	41.5	24.3	59.0	76.8	76.5	179.6
24.5	4.3	42.0	25.3	59.5	78.9	77.0	183.4
25.0	4.6	42.5	26.3	60.0	81.1	77.5	187.4
25.5	4.9	43.0	27.3	60.5	83.3	78.0	191.3
26.0	5.3	43.5	28.3	61.0	85.6	78.5	195.4
26.5	5.6	44.0	29.4	61.5	87.9	79.0	199.5
27.0	6.0	44.5	30.5	62.0	90.3	79.5	203.6
27.5	6.3	45.0	31.7	62.5	92.7	80.0	207.9
28.0	6.7	45.5	32.8	63.0	95.2	80.5	212.1
28.5	7.1	46.0	34.0	63.5	97.6	81.0	216.5
29.0	7.5	46.5	35.2	64.0	100.2	81.5	220.9
29.5	8.0	47.0	36.5	64.5	102.8	82.0	225.4
30.0	8.4	47.5	37.8	65.0	105.4	82.5	229.9
30.5	8.9	48.0	39.1	65.5	108.1	83.0	234.5
31.0	9.4	48.5	40.4	66.0	110.8	83.5	239.1
31.5	9.9	49.0	41.8	66.5	113.6	84.0	243.8
32.0	10.4	49.5	43.2	67.0	116.4	84.5	248.6
32.5	10.9	50.0	44.7	67.5	119.2	85.0	253.5
33.0	11.5	50.5	46.2	68.0	122.2	85.5	258.4
33.5	12.1	51.0	47.7	68.5	125.1	86.0	263.3
34.0	12.7	51.5	49.2	69.0	128.1	86.5	268.4
34.5	13.3	52.0	50.8	69.5	131.2	87.0	273.5
35.0	13.9	52.5	52.4	70.0	134.3	87.5	278.7
35.5	14.6	53.0	54.1	70.5	137.5	88.0	283.9
36.0	15.3	53.5	55.7	71.0	140.7	88.5	289.2
36.5	16.0	54.0	57.5	71.5	143.9	89.0	294.6
37.0	16.7	54.5	59.2	72.0	147.3	89.5	300.0
37.5	17.4	55.0	61.0	72.5	150.6	90.0	305.6
38.0	18.2	55.5	62.9	73.0	154.1	90.5	311.2
38.5	19.0	56.0	64.7	73.5	157.5	91.0	316.9
39.0	19.8	56.5	66.6	74.0	161.1	91.5	322.5
39.5	20.7	57.0	68.6	74.5	164.7	92.0	328.3

Table C6. Length-net weight table for IPHC Regulatory Area 4A (Imperial, 22.5-92 inches).

Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)
22.5	3.5	40.0	21.2	57.5	66.4	75.0	153.0
23.0	3.7	40.5	22.1	58.0	68.2	75.5	156.2
23.5	4.0	41.0	22.9	58.5	70.1	76.0	159.5
24.0	4.3	41.5	23.8	59.0	72.0	76.5	162.8
24.5	4.5	42.0	24.7	59.5	73.9	77.0	166.2
25.0	4.8	42.5	25.7	60.0	75.9	77.5	169.6
25.5	5.2	43.0	26.6	60.5	77.9	78.0	173.0
26.0	5.5	43.5	27.6	61.0	79.9	78.5	176.5
26.5	5.8	44.0	28.6	61.5	82.0	79.0	180.1
27.0	6.2	44.5	29.7	62.0	84.1	79.5	183.7
27.5	6.5	45.0	30.7	62.5	86.3	80.0	187.4
28.0	6.9	45.5	31.8	63.0	88.5	80.5	191.1
28.5	7.3	46.0	32.9	63.5	90.7	81.0	194.8
29.0	7.7	46.5	34.1	64.0	92.9	81.5	198.6
29.5	8.2	47.0	35.2	64.5	95.2	82.0	202.5
30.0	8.6	47.5	36.4	65.0	97.6	82.5	206.4
30.5	9.1	48.0	37.6	65.5	100.0	83.0	210.3
31.0	9.5	48.5	38.9	66.0	102.4	83.5	214.3
31.5	10.0	49.0	40.2	66.5	104.8	84.0	218.4
32.0	10.5	49.5	41.5	67.0	107.3	84.5	222.5
32.5	11.1	50.0	42.8	67.5	109.9	85.0	226.7
33.0	11.6	50.5	44.1	68.0	112.4	85.5	230.9
33.5	12.2	51.0	45.5	68.5	115.1	86.0	235.2
34.0	12.7	51.5	47.0	69.0	117.7	86.5	239.5
34.5	13.3	52.0	48.4	69.5	120.4	87.0	243.9
35.0	14.0	52.5	49.9	70.0	123.2	87.5	248.3
35.5	14.6	53.0	51.4	70.5	125.9	88.0	252.8
36.0	15.2	53.5	52.9	71.0	128.8	88.5	257.3
36.5	15.9	54.0	54.5	71.5	131.6	89.0	261.9
37.0	16.6	54.5	56.1	72.0	134.6	89.5	266.6
37.5	17.3	55.0	57.7	72.5	137.5	90.0	271.3
38.0	18.1	55.5	59.4	73.0	140.5	90.5	276.0
38.5	18.8	56.0	61.1	73.5	143.6	91.0	280.9
39.0	19.6	56.5	62.8	74.0	146.7	91.5	285.7
39.5	20.4	57.0	64.6	74.5	149.8	92.0	290.7

Table C7. Length-net weight table for IPHC Regulatory Area 4B (Imperial, 22.5-92 inches).

Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)
22.5	3.3	40.0	20.3	57.5	64.0	75.0	148.0
23.0	3.5	40.5	21.2	58.0	65.8	75.5	151.2
23.5	3.8	41.0	22.0	58.5	67.6	76.0	154.3
24.0	4.1	41.5	22.9	59.0	69.4	76.5	157.6
24.5	4.3	42.0	23.7	59.5	71.3	77.0	160.9
25.0	4.6	42.5	24.6	60.0	73.2	77.5	164.2
25.5	4.9	43.0	25.6	60.5	75.1	78.0	167.5
26.0	5.2	43.5	26.5	61.0	77.1	78.5	171.0
26.5	5.5	44.0	27.5	61.5	79.1	79.0	174.4
27.0	5.9	44.5	28.5	62.0	81.2	79.5	177.9
27.5	6.2	45.0	29.5	62.5	83.2	80.0	181.5
28.0	6.6	45.5	30.6	63.0	85.4	80.5	185.1
28.5	7.0	46.0	31.6	63.5	87.5	81.0	188.7
29.0	7.4	46.5	32.7	64.0	89.7	81.5	192.4
29.5	7.8	47.0	33.9	64.5	92.0	82.0	196.2
30.0	8.2	47.5	35.0	65.0	94.2	82.5	200.0
30.5	8.6	48.0	36.2	65.5	96.5	83.0	203.8
31.0	9.1	48.5	37.4	66.0	98.9	83.5	207.7
31.5	9.6	49.0	38.6	66.5	101.3	84.0	211.7
32.0	10.1	49.5	39.9	67.0	103.7	84.5	215.7
32.5	10.6	50.0	41.2	67.5	106.1	85.0	219.8
33.0	11.1	50.5	42.5	68.0	108.6	85.5	223.9
33.5	11.6	51.0	43.8	68.5	111.2	86.0	228.0
34.0	12.2	51.5	45.2	69.0	113.8	86.5	232.2
34.5	12.8	52.0	46.6	69.5	116.4	87.0	236.5
35.0	13.3	52.5	48.0	70.0	119.1	87.5	240.8
35.5	13.9	53.0	49.5	70.5	121.8	88.0	245.2
36.0	14.6	53.5	51.0	71.0	124.5	88.5	249.6
36.5	15.2	54.0	52.5	71.5	127.3	89.0	254.1
37.0	15.9	54.5	54.0	72.0	130.1	89.5	258.6
37.5	16.6	55.0	55.6	72.5	133.0	90.0	263.2
38.0	17.3	55.5	57.2	73.0	135.9	90.5	267.9
38.5	18.0	56.0	58.9	73.5	138.9	91.0	272.6
39.0	18.8	56.5	60.5	74.0	141.9	91.5	277.3
39.5	19.6	57.0	62.2	74.5	144.9	92.0	282.1

Table C8. Length-net weight table for IPHC Regulatory Area 4CDE (Imperial, 22.5-92 inches).

Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)	Length (in)	Weight (lb)
22.5	3.5	40.0	21.6	57.5	68.1	75.0	157.7
23.0	3.8	40.5	22.5	58.0	70.0	75.5	161.0
23.5	4.0	41.0	23.4	58.5	71.9	76.0	164.4
24.0	4.3	41.5	24.3	59.0	73.9	76.5	167.9
24.5	4.6	42.0	25.2	59.5	75.9	77.0	171.4
25.0	4.9	42.5	26.2	60.0	77.9	77.5	174.9
25.5	5.2	43.0	27.2	60.5	80.0	78.0	178.5
26.0	5.5	43.5	28.2	61.0	82.1	78.5	182.1
26.5	5.9	44.0	29.2	61.5	84.2	79.0	185.8
27.0	6.2	44.5	30.3	62.0	86.4	79.5	189.6
27.5	6.6	45.0	31.4	62.5	88.6	80.0	193.4
28.0	7.0	45.5	32.5	63.0	90.9	80.5	197.2
28.5	7.4	46.0	33.6	63.5	93.2	81.0	201.1
29.0	7.8	46.5	34.8	64.0	95.5	81.5	205.1
29.5	8.3	47.0	36.0	64.5	97.9	82.0	209.1
30.0	8.7	47.5	37.2	65.0	100.3	82.5	213.1
30.5	9.2	48.0	38.5	65.5	102.8	83.0	217.2
31.0	9.7	48.5	39.8	66.0	105.3	83.5	222.4
31.5	10.2	49.0	41.1	66.5	107.8	84.0	225.6
32.0	10.7	49.5	42.4	67.0	110.4	84.5	229.9
32.5	11.2	50.0	43.8	67.5	113.0	85.0	234.2
33.0	11.8	50.5	45.2	68.0	115.7	85.5	238.6
33.5	12.3	51.0	46.6	68.5	118.4	86.0	243.0
34.0	13.0	51.5	48.1	69.0	121.2	86.5	247.5
34.5	13.5	52.0	49.5	69.5	123.9	87.0	252.1
35.0	14.2	52.5	51.1	70.0	126.8	87.5	256.7
35.5	14.9	53.0	52.6	70.5	129.7	88.0	261.4
36.0	15.5	53.5	54.2	71.0	132.6	88.5	266.1
36.5	16.2	54.0	55.8	71.5	135.6	89.0	270.9
37.0	16.9	54.5	57.5	72.0	138.6	89.5	275.7
37.5	17.6	55.0	59.2	72.5	141.7	90.0	280.6
38.0	18.4	55.5	60.9	73.0	144.8	90.5	285.6
38.5	19.2	56.0	62.6	73.5	147.9	91.0	290.6
39.0	20.0	56.5	64.4	74.0	151.1	91.5	295.7
39.5	20.8	57.0	66.2	74.5	154.4	92.0	300.8