INTERNATIONAL PACIFIC
HALIBUT COMMISSION

IPHC-2025-AM101-00
Last Update: 30 January 2025

101st Session of the IPHC Annual Meeting (AM101) – *Compendium of meeting documents*

27-31 January 2025, Vancouver, BC, Canada

Commissioners

Canada	United States of America
Mark Waddell	Jon Kurland
Neil Davis	Robert Alverson
Peter DeGreef	Richard Yamada

Executive Director

David T. Wilson, Ph.D.

DISTRIBUTION: IPHC WEBSITE
LAST UPDATE: 30 January 2025

BIBLIOGRAPHIC ENTRY
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INTERNATIONAL PACIFIC
HALIBUT COMMISSION

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DRAFT: AGENDA & SCHEDULE FOR THE 101st SESSION OF THE IPHC ANNUAL MEETING (AM101)

Date: 27-31 January 2025
Location: Vancouver, BC, Canada
Venue: Pan Pacific Hotel
Time (PST): 27 Jan: **12:30**-17:30;
28-30 Jan: **09:00**-17:00 daily
31 Jan: **09:00**-13:00
Chairperson: Vacant (Canada)
Vice-Chairperson: Mr Jon Kurland (USA)

Notes:
- ***Document deadline***: *28 December 2024 (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 101st SESSION OF THE IPHC ANNUAL MEETING (AM101)

1. OPENING OF THE SESSION (Chairperson and Vice-Chairperson)

2. ADOPTION OF THE AGENDA AND ARRANGEMENTS FOR THE SESSION (Chairperson & Executive Director)
- ***IPHC-2025-AM101-01*** *Agenda & Schedule for the 101st Session of the IPHC Annual Meeting (AM101)*
- ***IPHC-2025-AM101-02*** *List of Documents for the 101st Session of the IPHC Annual Meeting (AM101)*

3. IPHC PROCESS

3.1 Update on actions arising from the 100th Session of the IPHC Annual Meeting (AM100), 2024 Special Sessions, intersessional decisions, and the 100th Session of the IPHC Interim Meeting (IM100) (D. Wilson)
- ***IPHC-2025-AM101-03*** *Update on actions arising from the 100th Session of the IPHC Annual Meeting (AM100), 2024 Special Sessions, intersessional decisions, and the 100th Session of the IPHC Interim Meeting (IM100) (D. Wilson)*

3.2 Report of the IPHC Secretariat (2024) (D. Wilson & B. Hutniczak)
- ***IPHC-2025-AM101-04*** *Report of the IPHC Secretariat (2024) (D. Wilson & B. Hutniczak)*

3.3 2nd IPHC Performance Review (PRIPHC02): Implementation of recommendations (D. Wilson)
- ***IPHC-2025-AM101-05*** *Implementation of the Recommendations from the 2nd IPHC Performance Review (PRIPHC02) (D. Wilson)*

3.4 Reports of the IPHC Management Strategy Advisory Board (MSAB Co-Chairpersons)
- ***IPHC-2024-MSAB019-R*** *Report of the 19th Session of the IPHC Management Strategy Advisory Board (MSAB019)*
- ***IPHC-2024-MSAB020-R*** *Report of the 20th Session of the IPHC Management Strategy Advisory Board (MSAB020)*

3.5 Reports of the IPHC Scientific Review Board (SRB Chairperson)
- ***IPHC-2024-SRB022-R*** *Report of the 24th Session of the IPHC Scientific Review Board (SRB024)*
- ***IPHC-2024-SRB023-R*** *Report of the 25th Session of the IPHC Scientific Review Board (SRB025)*

3.6 Report of the 25th Session of the IPHC Research Advisory Board (RAB025) (RAB Chairperson)
- ***IPHC-2024-RAB025-R*** *Report of the 25th Session of the IPHC Research Advisory Board (RAB025)*

3.7 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)
- ***IPHC-2025-AM101-06*** *International Pacific Halibut Commission 5-Year program of integrated research and monitoring (2022-26): Updates (D. Wilson, J. Planas, I. Stewart, A. Hicks, B. Hutniczak, & R. Webster)*

4. FISHERY MONITORING

4.1 Fishery-dependent data overview (2024)

4.1.1 Port operations
- ***IPHC-2025-AM101-07 Rev_1*** *Fisheries data collection design and implementation in 2024 - Port Operations (M. Thom, I. Stewart, R. Webster)*

4.1.2 Fisheries data
- ***IPHC-2025-AM101-08 Rev_1*** *Fisheries data overview (2024) (B. Hutniczak, H. Tran, T. Kong, K. Sawyer van Vleck. & K. Magrane)*

4.2 Fishery-independent data overview (2024)

4.2.1 IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2024 (T. Jack)
- ***IPHC-2025-AM101-09*** *IPHC Fishery-independent setline survey (FISS) design and implementation in 2024 (K. Ualesi, T. Jack, R. Rillera & K. Coll)*

5. STOCK STATUS OF PACIFIC HALIBUT (2024)

5.1 Space-time modelling of survey data (R. Webster)
- ***IPHC-2025-AM101-10*** *Space-time modelling of survey data (R. Webster)*

5.2 Stock Assessment: Data overview and stock assessment (2024)
- ***IPHC-2025-AM101-11*** *Data overview and stock assessment for Pacific halibut (Hippoglossus stenolepis) at the end of 2024 (I. Stewart, A. Hicks, R. Webster, D. Wilson)*

6. MANAGEMENT STRATEGY EVALUATION

6.1 IPHC Management Strategy Evaluation: update (A. Hicks)

- ***IPHC-2025-AM101-12*** *IPHC Management Strategy Evaluation and Harvest Strategy Policy (A. Hicks, I. Stewart, & D. Wilson)*
- ***IPHC-2025-AM101-17*** *IPHC Interim Harvest Strategy Policy (A. Hicks, I. Stewart, & D. Wilson)*

7. HARVEST DECISION TABLE 2025

7.1 Stock projections and harvest decision table 2025-2027 (I. Stewart & A. Hicks)

- ***IPHC-2025-AM101-13*** *Stock projections and harvest decision table for 2025-2027 (I. Stewart & A. Hicks)*

8. FISS DESIGN EVALUATIONS 2025-2029

8.1 2025-29 FISS design evaluation (R. Webster)

- ***IPHC-2025-AM101-14*** *2025 and 2026-29 FISS designs (R. Webster, I. Stewart, K. Ualesi, T. Jack, & D. Wilson)*

9. BIOLOGICAL AND ECOSYSTEM SCIENCES – PROJECT UPDATES

9.1 Report on Current and Future Biological and Ecosystem Science Research Activities (J. Planas)

- ***IPHC-2025-AM101-15*** *Report on Current and Future Biological and Ecosystem Science Research Activities (J. Planas)*

10. IPHC FISHERY REGULATIONS: PROPOSALS FOR THE 2024-25 PROCESS

- ***IPHC-2025-AM101-16 Rev_1*** *IPHC Fishery Regulations: Proposals for the 2024-25 process (B. Hutniczak)*

10.1 IPHC Secretariat fishery regulation proposals (B. Hutniczak)

- ***IPHC-2025-AM101-PropA1*** *IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5)*
- ***IPHC-2025-AM101-PropA2*** *IPHC Fishery Regulations: Commercial Fishing Periods (Sect. 9)*
- ***IPHC-2025-AM101-PropA3*** *IPHC Fishery Regulations: Minor amendments*

10.2 Contracting Party fishery regulation proposals (Contracting Parties)

- ***IPHC-2025-AM101-PropB1*** *IPHC Fishery Regulations: 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))*

10.3 Stakeholder fishery regulation proposals (Stakeholders)

- ***IPHC-2025-AM101-PropC1*** IPHC Fishery Regulations: Commercial Fishing Periods (Sect. 9) – year-round commercial Pacific halibut fishery in IPHC Regulatory Area 2B (R. Hauknes)
- ***IPHC-2025-AM101-PropC2*** IPHC Fishery Regulations: Application of Commercial Fishery Limits (Sect. 12) – addressing concerns regarding localized depletion around St. Matthew Island (S. McManus)
- ***IPHC-2025-AM101-PropC3*** IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5) - TCEY in Regulatory Area 2A (T. Greene)
- ***IPHC-2025-AM101-PropC4*** Other proposal (Non-IPHC Fishery Regulations): Rebuilding Plan for Pacific halibut (M. Laukitis)

- ***IPHC-2025-AM101-PropC5*** IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5) – definition of reaction to overfishing (M. Milne)

10.4 Stakeholder statements (B. Hutniczak)
- ***IPHC-2025-AM101-INF01 Rev_1*** *Stakeholder Statements on IPHC Fishery Regulations or published regulatory proposals (B. Hutniczak)*

11. CONTRACTING PARTY NATIONAL REPORTS

11.1 Canada (G. Mason)
- ***IPHC-2025-AM101-NR01 Rev_1*** *Canada: National Report (Fisheries and Oceans Canada (DFO))*

11.2 United States of America (K. Iverson)
- ***IPHC-2025-AM101-NR02 Rev_1*** *United States of America: National Report (NOAA Fisheries)*

12. REPORT OF THE 101th SESSION OF THE IPHC FINANCE AND ADMINISTRATION COMMITTEE (FAC101) (D. Wilson)

- ***IPHC-2025-FAC101-R*** *Report of the 101st Session of the IPHC Finance and Administration Committee (FAC101)*

13. REPORT OF THE 95th SESSION OF THE IPHC CONFERENCE BOARD (CB095) (CB Co-Chairpersons)

- ***IPHC-2025-CB095-R*** *Report of the 95th Session of the IPHC Conference Board (CB095)*

14. REPORT OF THE 30th SESSION OF THE IPHC PROCESSOR ADVISORY BOARD (PAB030) (PAB Chairperson and Vice-Chairperson)

- ***IPHC-2025-PAB030-R*** *Report of the 30th Session of the IPHC Processor Advisory Board (PAB030)*

15. OTHER BUSINESS

15.1 IPHC meetings calendar (2025-27) (D. Wilson)
- ***IPHC-2025-AM101-18*** *IPHC 3-year meetings calendar (2025-27) (IPHC Secretariat)*

15.2 Election of Chairperson and Vice-Chairperson for the next year (D. Wilson)

16. REVIEW OF THE DRAFT AND ADOPTION OF THE REPORT OF THE 101st SESSION OF THE IPHC ANNUAL MEETING (AM101) (Chairperson)

SCHEDULE FOR THE 101st SESSION OF THE IPHC ANNUAL MEETING (AM101)

Monday, 27 January 2025		
Time (PST)	**Agenda item**	**Lead (support)**
	101st Session of the IPHC Annual Meeting (AM101)	
Time	**Agenda item**	**Lead (support)**
12:30-13:10	1. Opening of the Session • Welcome • Land acknowledgement	Chairperson and Vice-Chairperson
13:10-13:20	2. Adoption of the agenda and arrangements for the Session ➢ ***IPHC-2025-AM101-01****: Agenda & Schedule for the 101st Session of the IPHC Annual Meeting (AM101)* ➢ ***IPHC-2025-AM101-02****: List of Documents for the 101st Session of the IPHC Annual Meeting (AM101)*	P. Ryall (D. Wilson)
13:20-13:50	3. IPHC Process 3.1 Update on actions arising from the 100th Session of the IPHC Annual Meeting (AM100), 2024 Special Sessions, intersessional decisions, and the 100th Session of the IPHC Interim Meeting (IM100) ➢ ***IPHC-2025-AM101-03:*** *Update on actions arising from the 100th Session of the IPHC Annual Meeting (AM100), 2024 Special Sessions, intersessional decisions, and the 100th Session of the IPHC Interim Meeting (IM100) (D. Wilson)* 3.2 Report of the IPHC Secretariat (2024) ➢ ***IPHC-2025-AM101-04:*** *Report of the IPHC Secretariat (2024) (D. Wilson & B. Hutniczak)* 3.3 2nd IPHC Performance Review (PRIPHC02): Implementation of recommendations ➢ ***IPHC-2025-AM101-05:*** *Implementation of the Recommendations from the 2nd IPHC Performance Review (PRIPHC02) (D. Wilson)*	D. Wilson

13:50-14:10	3.4 Report of the 19th Session of the IPHC Management Strategy Advisory Board (MSAB019) ➢ ***IPHC-2024-MSAB019-R:*** *Report of the 19th Session of the IPHC Management Strategy Advisory Board (MSAB019)* ➢ ***IPHC-2024-MSAB020-R:*** *Report of the 20th Session of the IPHC Management Strategy Advisory Board (MSAB020)*	MSAB Co-Chairpersons
14:10-14:40	3.5 Reports of the IPHC Scientific Review Board ➢ ***IPHC-2024-SRB024-R:*** *Report of the 24th Session of the IPHC Scientific Review Board (SRB024)* ➢ ***IPHC-2024-SRB025-R:*** *Report of the 25th Session of the IPHC Scientific Review Board (SRB025)*	SRB Chairperson
14:40-14:55	3.6 Report of the 25th Session of the IPHC Research Advisory Board (RAB025) ➢ ***IPHC-2024-RAB025-R:*** *Report of the 25th Session of the IPHC Research Advisory Board (RAB025)*	RAB Chairperson
14:55-15:10	3.7 International Pacific Halibut Commission 5-year program of Integrated Research and Monitoring (2022-26) ➢ ***IPHC-2025-AM101-06:*** *International Pacific Halibut Commission 5-Year program of integrated research and monitoring (2022-26): Updates (D. Wilson, J. Planas, I. Stewart, A. Hicks, B. Hutniczak, & R. Webster)*	D. Wilson & B Hutniczak
15:10-15:30	4. Fishery Monitoring 4.1 Fishery-dependent data overview (2024) 4.1.1 Port Operations 4.2 Fisheries data ➢ ***IPHC-2025-AM101-07 Rev_1:*** *Fisheries data collection design and implementation in 2024 - Port Operations (M. Thom, I. Stewart, R. Webster)* 4.1.2 Fisheries data ➢ ***IPHC-2025-AM101-08 Rev_1****: Fishery data overview (2024) (B. Hutniczak, H. Tran, T. Kong, K. Magrane & K. Sawyer van Vleck)*	M. Thom B. Hutniczak
15:30-15:45	Break	
15:45-16:00	4.2 Fishery-independent data overview (2024) ➢ ***IPHC-2025-AM101-09:*** *IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2024 (K. Ualesi, T. Jack, R. Rillera & K. Coll)*	T. Jack
16:00-16:15	5. Stock status of Pacific halibut (2024)	R. Webster

	5.1 Space-time modelling of survey data (R. Webster) ➢ ***IPHC-2025-AM101-10*** Space-time modelling of survey data (R. Webster)	
16:15-17:30	5.2 Stock Assessment: Data overview and stock assessment (2024) ➢ ***IPHC-2025-AM101-11**: Data overview and stock assessment for Pacific halibut (Hippoglossus stenolepis) at the end of 2024 (I. Stewart, A. Hicks, R. Webster, & D. Wilson)*	I. Stewart
19:00-21:30	***101st IPHC RECEPTION** – Cypress Suite (Smart casual or business attire)*	Executive Director
Tuesday, 28 January 2025		
Time	**Agenda item**	**Lead (support)**
	101st Session of the IPHC Annual Meeting (AM101)	
09:00-09:30	*Public comment and questions **(Agenda items 4-5)***	Chairperson
09:30-10:10	6. Management strategy evaluation 6.1 IPHC Management Strategy Evaluation (A. Hicks) ➢ ***IPHC-2025-AM101-12:** IPHC Management Strategy Evaluation and Harvest Strategy Policy (A. Hicks & I. Stewart)* ➢ ***IPHC-2025-AM101-17:** IPHC Interim Harvest Strategy Policy* (A. Hicks, I. Stewart, & D. Wilson)	A. Hicks
10:10-10:30	7. Harvest decision table 2025 ➢ ***IPHC-2025-AM101-13**: Stock projections and harvest decision table for 2025-2027 (I. Stewart & A. Hicks)*	I. Stewart
10:30-10:50	Break	
10:50-11:30	8. FISS design evaluations 2025-2029 8.1 2025-29 FISS design evaluation (R. Webster) ➢ ***IPHC-2025-AM101-14**: 2025 and 2026-29 FISS designs (R. Webster, I. Stewart, K. Ualesi, T. Jack & D. Wilson)*	R. Webster
11:30-12:00	9. Biological and ecosystem sciences – Project updates 9.1 Report on Current and Future Biological and Ecosystem Science Research Activities (J. Planas) ➢ ***IPHC-2025-AM101-15:** Report on Current and Future Biological and Ecosystem Science Research Activities (J. Planas)*	J. Planas

12:00-12:30	10. IPHC Fishery Regulations: Proposals for the 2024-25 process ➢ ***IPHC-2025-AM101-16 Rev_1:*** IPHC Fishery Regulations: Proposals for the 2024-25 process (B. Hutniczak) 10.1 IPHC Secretariat fishery regulation proposals ➢ ***IPHC-2025-AM101-PropA1:*** *IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5) (IPHC Secretariat)* ➢ ***IPHC-2025-AM101-PropA2:*** *IPHC Fishery Regulations: Commercial Fishing Periods (Sect. 9) (IPHC Secretariat)* ➢ ***IPHC-2025-AM101-PropA3:*** *IPHC Fishery Regulations: Minor amendments* 10.2 Contracting Party fishery regulation proposals ➢ ***IPHC-2025-AM101-PropB1:*** *IPHC Fishery Regulations: 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)* 10.3 Stakeholder fishery regulation proposals ➢ ***IPHC-2025-AM101-PropC1*** IPHC Fishery Regulations: Commercial Fishing Periods (Sect. 9) – year-round commercial Pacific halibut fishery in IPHC Regulatory Area 2B (R. Hauknes) ➢ ***IPHC-2025-AM101-PropC2***: IPHC Fishery Regulations: Application of Commercial Fishery Limits (Sect. 12) – addressing concerns regarding localized depletion around St. Matthew Island (S. McManus) ➢ ***IPHC-2025-AM101-PropC3***: IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5) - TCEY in Regulatory Area 2A (T. Greene) ➢ ***IPHC-2025-AM101-PropC4***: Other proposal (Non-IPHC Fishery Regulations): Rebuilding Plan for Pacific halibut (M. Laukitis) ➢ ***IPHC-2025-AM101-PropC5:*** IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5) – definition of reaction to overfishing (M. Milne) 10.4 Stakeholder statements ➢ ***IPHC-2025-AM101-INF01 Rev_1:*** *Stakeholder Statements on IPHC Fishery Regulations or published regulatory proposals (B. Hutniczak)*	B. Hutniczak *USA: NOAA-Fisheries* *Canada: DFO* Stakeholders B. Hutniczak
12:30-12:45	*Public comment and questions **(Agenda Items 6-10)***	Chairperson
12:45-13:45	Lunch	
13:45-14:15	11. Contracting Party: National Reports 11.1 Canada ➢ ***IPHC-2025-AM101-NR01 Rev_1:*** *Canada*	Canada
14:15-14:45	11.2 United States of America ➢ ***IPHC-2025-AM101-NR02 Rev_1:*** *USA*	USA

14:45-15:30	12. Report of the 101st Session of the IPHC Finance and Administration Committee (FAC101) ➢ ***IPHC-2025-FAC101-R:*** *Report of the 101st Session of the IPHC Finance and Administration Committee (FAC101)*	D. Wilson
15:30-15:45	Break	
15:45-17:00	No AM101 Session: Opportunity for delegations to caucus	-
17:00-18:30	***IPHC 2025 FISS Q&A – RFT process and specifications*** – Crystal Pavilion & AM101 Adobe Connect meeting link	T. Jack & R. Rillera
17:00-18:30	***Poster Session: Research and Monitoring*** – Registration area / Foyer	J. Planas
Wednesday, 29 January 2025		
Time	**Agenda item**	**Lead (support)**
09:00-17:00	No AM101 Session: Opportunity for delegations to caucus	-
Thursday, 30 January 2025		
	101st Session of the IPHC Annual Meeting (AM101)	
09:00-12:30	No AM101 Session: Opportunity to caucus CB/PAB report finalisation and publication	-
12:30-13:30	Lunch	
13:30-14:15	13. Report of the 95th Session of the IPHC Conference Board (CB095) ➢ ***IPHC-2025-CB095-R****: Report of the 95th Session of the IPHC Conference Board (CB095)*	CB Co-Chairpersons
14:15-15:30	14. Report of the 30th Session of the IPHC Processor Advisory Board (PAB030) ➢ ***IPHC-2025-PAB030-R****: Report of the 30th Session of the IPHC Processor Advisory Board (PAB030)*	PAB Chairperson
15:30-15:45	Break	
15:45-17:00	Revisit Regulatory proposals for 2025: for decision (Agenda item 10)	B. Hutniczak

Friday, 31 January 2025		
101st Session of the IPHC Annual Meeting (AM101)		
09:00-10:00	Decision summary from AM101 – Final actions	Chairperson (Executive Director)
10:00-10:15	Mortality limits for 2024: For decision/announcement (Agenda Item 10)	Chairperson
10:15-11:00	15. Other business 15.1 IPHC meetings calendar (2025-27) ➢ ***IPHC-2025-AM101-18:*** *IPHC 3-year meetings calendar (2025-27)* 15.2 Election of a Chairperson and Vice-Chairperson for the next year	D. Wilson D. Wilson
11:00-11:30	Break	
11:30-13:00	16. Review of the draft and adoption of the Report of the 101st Session of the IPHC Annual Meeting (AM101)	Chairperson (D. Wilson)

INTERNATIONAL PACIFIC HALIBUT COMMISSION

Last updated: 14 January 2025

LIST OF DOCUMENTS FOR THE 101st SESSION OF THE IPHC ANNUAL MEETING (AM101)

Meeting documents	Title	Availability
IPHC-2025-AM101-01	Agenda & Schedule for the 101st Session of the IPHC Annual Meeting (AM101)	✓ 27 Mar 2024 ✓ 09 Dec 2024 ✓ 14 Jan 2025
IPHC-2025-AM101-02	List of Documents for the 101st Session of the IPHC Annual Meeting (AM101)	✓ 27 Mar 2024 ✓ 31 Oct 2024 ✓ 28 Dec 2024 ✓ 14 Jan 2025
IPHC-2025-AM101-03	Update on actions arising from the 100th Session of the IPHC Annual Meeting (AM100), 2024 Special Sessions, intersessional decisions, and the 100th Session of the IPHC Interim Meeting (IM100) (D. Wilson)	✓ 09 Dec 2024
IPHC-2025-AM101-04	Report of the IPHC Secretariat (2024) (D. Wilson & B. Hutniczak)	✓ 12 Dec 2024
IPHC-2025-AM101-05	Implementation of the Recommendations from the 2nd IPHC Performance Review (PRIPHC02) (D. Wilson)	✓ 09 Dec 2024
IPHC-2025-AM101-06	International Pacific Halibut Commission 5-Year program of integrated research and monitoring (2022-26): Updates (D. Wilson, J. Planas, I. Stewart, A. Hicks, B. Hutniczak, & R. Webster)	✓ 09 Dec 2024
IPHC-2025-AM101-07	Port Operations - Fisheries data collection design and implementation in 2024 (M. Thom, I. Stewart, R. Webster)	✓ 13 Dec 2024
IPHC-2025-AM101-08 Rev_2	Fisheries data overview (2024) (B. Hutniczak, H. Tran, T. Kong, K. Sawyer van Vleck. & K. Magrane)	✓ 12 Dec 2024 ✓ 14 Jan 2025
IPHC-2025-AM101-09	IPHC Fishery-independent setline survey (FISS) design and implementation in 2024 (K. Ualesi, T. Jack, R. Rillera, & K. Coll)	✓ 12 Dec 2024
IPHC-2025-AM101-10	Space-time modelling of survey data (R. Webster)	✓ 12 Dec 2024
IPHC-2025-AM101-11	Data overview and stock assessment for Pacific halibut (*Hippoglossus stenolepis*) at the end of 2024 (I. Stewart, A. Hicks, R. Webster, D. Wilson)	✓ 10 Dec 2024

IPHC-2025-AM101-12	IPHC Management Strategy Evaluation and Harvest Strategy Policy (A. Hicks, I. Stewart, & D. Wilson)	✓ 09 Dec 2024
IPHC-2025-AM101-13	Stock projections and harvest decision table for 2025-2027 (I. Stewart & A. Hicks)	✓ 10 Dec 2024
IPHC-2025-AM101-14	2025 and 2026-29 FISS designs (R. Webster, I. Stewart, K. Ualesi, T. Jack, & D. Wilson)	✓ 12 Dec 2024
IPHC-2025-AM101-15	Report on Current and Future Biological and Ecosystem Science Research Activities (J. Planas)	✓ 10 Dec 2024
IPHC-2025-AM101-16 Rev_1	IPHC Fishery Regulations: Proposals for the 2024-25 process (B. Hutniczak)	✓ 13 Dec 2024 ✓ 28 Dec 2024
IPHC-2025-AM101-17	IPHC Interim: Harvest Strategy Policy (2024) (A. Hicks, I. Stewart, D. Wilson)	✓ 09 Dec 2024
IPHC-2025-AM101-18	IPHC 3-year meetings calendar (2025-27) (IPHC Secretariat)	✓ 09 Dec 2024
Contracting Party National Reports		
IPHC-2025-AM101-NR01 Rev_1	**Canada**: National Report (Fisheries and Oceans Canada (DFO))	✓ 27 Dec 2024 ✓ 7 Jan 2025
IPHC-2025-AM101-NR02 Rev_1	**United States of America**: National Report (NOAA Fisheries)	✓ 24 Dec 2024 ✓ 14 Jan 2025
IPHC Fishery Regulation proposals for 2025		
IPHC Secretariat Fishery Regulation proposals for 2025		
IPHC-2025-AM101-PropA1	IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5)	✓ 09 Dec 2024
IPHC-2025-AM101-PropA2	IPHC Fishery Regulations: Commercial Fishing Periods (Sect. 9)	✓ 09 Dec 2024
IPHC-2025-AM101-PropA3	IPHC Fishery Regulations: Minor amendments	✓ 27 Dec 2024
Contracting Party Fishery Regulation proposals for 2025		
IPHC-2025-AM101-PropB1	IPHC Fishery Regulations: Recreational (Sport) Fishing for Pacific Halibut – IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 28) (Charter Management Measures in IPHC Regulatory Areas 2C and 3A (USA))	✓ 20 Dec 2024
Other Stakeholder Fishery Regulation proposals for 2025		
IPHC-2025-AM101-PropC1	IPHC Fishery Regulations: Commercial Fishing Periods (Sect. 9) – year-round commercial Pacific halibut fishery in IPHC Regulatory Area 2B (R. Hauknes)	✓ 09 Dec 2024

IPHC-2025-AM101-PropC2	IPHC Fishery Regulations: Application of Commercial Fishery Limits (Sect. 12) – addressing concerns regarding localized depletion around St. Matthew Island (S. McManus)	✓ 10 Dec 2024
IPHC-2025-AM101-PropC3	IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5) - TCEY in Regulatory Area 2A (T. Greene)	✓ 23 Dec 2024
IPHC-2025-AM101-PropC4	***Other proposal (Non-IPHC Fishery Regulations)***: Rebuilding Plan for Pacific halibut (M. Laukitis)	✓ 27 Dec 2024
IPHC-2025-AM101-PropC5	IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5) – definition of reaction to overfishing (M. Milne)	✓ 28 Dec 2024
Information papers		
IPHC-2025-AM101-INF01 Rev_2	Stakeholder Statements on IPHC Fishery Regulations or published regulatory proposals (B. Hutniczak)	✓ 13 Dec 2024 ✓ 27 Dec 2024
IPHC-2025-AM101-INF02	The IPHC mortality projection tool for 2025 mortality limits (I. Stewart)	✓ 10 Dec 2024
IPHC-2025-AM101-INF03	Using artificial intelligence (AI) for supplementing Pacific halibut age determination from collected otoliths (B. Hutniczak, J. Forsberg, K. Sawyer Van Vleck, & K. Magrane)	✓ 10 Jan 2025
Reports from IPHC subsidiary bodies (2023-24)		
IPHC-2024-MSAB019-R	Report of the 19th Session of the IPHC Management Strategy Advisory Board (MSAB019)	✓ 3 May 2024
IPHC-2024-SRB024-R	Report of the 24th Session of the IPHC Scientific Review Board (SRB024)	✓ 20 Jun 2024
IPHC-2024-SRB025-R	Report of the 25th Session of the IPHC Scientific Review Board (SRB025)	✓ 26 Sept 2024
IPHC-2024-MSAB020-R	Report of the 20th Session of the IPHC Management Strategy Advisory Board (MSAB020)	✓ 31 Oct 2024
IPHC-2024-RAB025-R	Report of the 25th Session of the IPHC Research Advisory Board (RAB025)	✓ 20 Nov 2024
IPHC-2024-IM100-R	Report of the 100th Session of the IPHC Interim Meeting (IM100)	✓ 26 Nov 2024
IPHC-2025-FAC101-R	Report of the 101st Session of the IPHC Finance and Administration Committee (FAC101)	Expected: 28 Jan 2025
IPHC-2025-PAB030-R	Report of the 30th Session of the IPHC Processor Advisory Board (PAB030)	Expected: 30 Jan 2025

IPHC-2025-CB095-R	Report of the 95th Session of the IPHC Conference Board (CB095)	Expected: 30 Jan 2025

Update on actions arising from the 100th Session of the IPHC Annual Meeting (AM100), 14th Special Session (SS014), and 2024 intersessional decisions

PREPARED BY: IPHC SECRETARIAT (D. WILSON; 9 DECEMBER 2024)

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 100th Session of the IPHC Annual Meeting (AM100), 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 held the 14th Special Session (SS014), and made a number of intersessional decisions, as detailed in Appendix B.

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 **NOTE** paper IPHC-2025-AM101-03, 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 100th Session of the IPHC Annual Meeting (AM100: January 2024)

Appendix B: Update on actions arising from the 14th Special Session (SS014), and 2024 intersessional decisions of the Commission

APPENDIX A

Update on actions arising from the 100th Session of the IPHC Annual Meeting (AM100: January 2024)

100th Session of the IPHC Annual Meeting (AM100)		
Action No.	**Description**	**Update**
	RECOMMENDATIONS	
Nil	Nil	Nil
	REQUESTS	
AM100–Req.01 (para. 8)	***Statement on Climate Change*** The Commission **ADOPTED** the Statement on Climate change and **REQUESTED** that the IPHC Secretariat publish the statement on the website. The Secretariat will provide annual updates to the Commission on how the Statement is being implemented.	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: Completed Published on the IPHC website 26 January 2024: IPHC-2024-PP-05
AM100–Req.02 (para. 116)	***IPHC Financial Regulations (2024)*** The Commission **ADOPTED** the International Pacific Halibut Commission Financial Regulations (2024), as provided in IPHC-2024-FAC100-08, by consensus, and **REQUESTED** that the IPHC Secretariat finalise and publish them accordingly.	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: Completed Published on the IPHC website 23 January 2024: IPHC-2024-FR24
AM100–Req.03 (para. 117)	***IPHC Rules of Procedure (2024)*** The Commission **ADOPTED** the IPHC Rules of Procedure (2024), as provided in IPHC-2024-FAC100-09, by consensus, and **REQUESTED** that the IPHC Secretariat finalise and publish them accordingly.	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: Completed Published on the IPHC website 23 January 2024: IPHC-2024-ROP24
AM100–Req.04 (para. 126)	***Review of the draft and adoption of the report of the 100th Session of the IPHC Annual Meeting (AM100)*** The Commission **REQUESTED** that the IPHC Secretariat finalise and publish the IPHC *Pacific Halibut Fishery Regulations (2024)* as soon as possible, **NOTING** that only minor editorial and formatting changes are permitted beyond the decisions made by the Commission at the AM100.	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: Completed Published on the IPHC website 05 February 2024: IPHC-2024-FISHR24

APPENDIX B

Update on actions arising from 15th Special Session of the Commission and Intersessional Decisions of the Commission

14th Special Session of the Commission (SS014)		
SS014-Req.01 (para. 5)	***2025 AND 2026-29 FISS DESIGNS*** The Commission **REQUESTED** the Secretariat provide an intersessional decision paper no later than 7 November 2024, containing the following elements: a) A 2025 FISS design the combines Options 2 and 3 from paper IPHC-2024-SS014-03 (Table 3; 2A(1), 2B (1), 2C (1), 3A(2), 3B(2), 4A/4B(1)); b) A budget deficit for the FISS in FY2025 of approximately US$1.2 m, while also seeking to reduce FISS costs; c) A proposed decision for the Commission on the movement of funds from Fund 50 – Reserve, to Fund 40 – FISS, for FY2025.	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: Completed See IPHC-2024-CR-030 and IPHC-2024-CR031
SS014-Req.02 (para. 6)	The Commission **REQUESTED** the Secretariat consider other savings in the IPHC budget for consideration by the Commission at FAC101.	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: Completed See paper **IPHC-2025-FAC101-06** and **IPHC-2025-FAC101-07**

Intersessional Decisions (ID)		
IPHC-2024-ID001	***2024 Fishery-Independent Setline Survey*** The Commission: a) **ENDORSED** a 2024 FISS design as follows (map provided at **Appendix I**):	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: Completed The 2024 FISS was successfully implemented from May-September

IPHC Regulatory Area	IPHC Charter Region	No. of Stations
2B	St James	60
2B	Charlotte	89
2C	Ketchikan	43
2C	Ommaney	52
2C	Sitka	52
3A	Albatross	49
3A	Shelikof	64
3B	Trinity	56
4CDE	4CDE South	60
Total number of stations for the 2024 FISS		525

	b) **AGREED** that no oceanographic monitoring will occur in 2024; c) **AGREED** that no Setline Survey Specialists (SSS) will be deployed on the NOAA trawl surveys in 2024	

IPHC-2024-ID002	***MSAB membership***
	The Commission **ENDORSED** the appointment of the following new MSAB members for a four (4) year term commencing on the date of this Circular:
	• **Commercial harvesters:**
	  ○ **USA**: Linda Behnken, Michelle Conrad
	• **Recreational/Sport fisheries:**
	  ○ **Canada**: Michael Fowler
		Lead: IPHC Secretariat (D. Wilson)
		Status/Plan: Completed
		The new MSAB members were notified of their appointments, and 1st term commencement.
		https://www.iphc.int/about/structure-of-the-commission/

IPHC-2024-ID003	***MSE Program of Work*** The Commission **RECOMMENDED** that: a) the Secretariat work with the MSAB and SRB to explore a potential new coastwide objective that uses spawning biomass and/or fishery catch-rates to indicate the status of the resource, potentially replacing the current $B_{36\%}$ objective; b) an ad-hoc working group of the MSAB, to be selected by each Contracting Party, meet in July or August 2024 for this purpose (ref a); c) the MSAB020 be held virtually in October 2024.	**Lead**: IPHC Secretariat (A. Hicks) **Status/Plan**: Completed The Secretariat discussed this with the MSAB and SRB at MSAB020 and SRB025. Recommendations are provided in document IPHC-2025-AM101-12 and will be presented at AM101.
IPHC-2024-ID004	The Commission **RECOMMENDED** that the Secretariat evaluate the following management procedures (MPs) in 2024: a) Multi-year management procedures along with fishing intensity and multiple empirical rules for non-assessment years; b) additional management procedures, such as constraints on the interannual change in the TCEY.	**Lead**: IPHC Secretariat (A. Hicks) **Status/Plan**: Completed These MPs have been evaluated with the assistance of the SRB and MSAB. Results are provided in document **IPHC-2025-AM101-12** and will be presented at AM101.
IPHC-2024-ID005	The Commission **RECOMMENDED** that the Secretariat work with the SRB to: a) define exceptional circumstances (events) using information such as FISS observations, biological observations, and new research; b) recommend the actions to take when an exceptional circumstance occurs; c) incorporate these elements into the draft harvest strategy policy.	**Lead**: IPHC Secretariat (A. Hicks) **Status/Plan**: Completed Following recommendations from SRB024 and SRB025, exceptional circumstances have been updated and incorporated into the draft harvest strategy policy.

IPHC-2024-ID006	The Commission **RECOMMENDED** that the Secretariat draft a revised harvest strategy policy document that will be reviewed at the IPHC Work Meeting in September 2024 (WM2024): a) incorporating the outcomes of ID003, ID004 and ID005 for Commission review; b) clearly identifying the distribution of the TCEY as a component of the decision-making process and not an output of the management procedure.	**Lead**: IPHC Secretariat (A. Hicks) **Status/Plan**: Completed A draft harvest strategy policy was made available for Commission review at WM2024. The draft has been updated following recommendations from the Commission and is available at AM101.
IPHC-2024-ID007	**NOTING** that the investigation of FISS design scenarios: a) is an additional activity of the MSE work; b) is independent of the harvest strategy policy development; c) will extend into 2025; d) will be useful to inform the Commission on management outcomes if implementing reduced FISS designs in the future. the Commission **RECOMMENDED** that the Secretariat evaluate FISS design scenarios using the MSE framework, as recommended by the SRB.	**Lead**: IPHC Secretariat (A. Hicks) **Status/Plan**: Completed Results of FISS design scenarios provided in document **IPHC-2025-AM101-12** and will be presented at AM101.

PHC-2024-ID008	The Commission:
	1) **NOTED** paper IPHC-2024-ID008 that provided the budget estimates for FY2025 (1 October 2024 to 30 September 2025) for approval, and for FY2026 and FY2027 for provisional endorsement (1 October 2025 to 30 September 2026, & 1 October 2026 to 30 September 2027, respectively).
	2) **ADOPTED** the FY2025 budget (1 October 2024 to 30 September 2025) as detailed in Appendix II [of IPHC-2024-ID008], including the contributions from the Contracting Parties to the General Fund for FY2025 as follows:
	• Canada: Contribution to the General Fund: **US$970,606.61** (Canada).
	• U.S.A.: Contribution to the General Fund: **US$4,421,652.32** (subject to appropriations).
	• U.S.A.: Contribution to the headquarters building lease and maintenance costs: **US$$458,608.60**.
	3) **NOTED** the optional extra-budgetary (IFCP Fund deficit) contributions from each Contracting Party for FY2024 as follows:
	• Canada:
	  ○ 50% Contribution to the IFCP Fund deficit (former staff pension plan): **US$150,573**
	• U.S.A.:
	  ○ 50% Contribution to the IFCP Fund deficit (former staff pension plan): **US$150,573**
		Lead: IPHC Secretariat (D. Wilson)
		Status/Plan: Completed
		See Circular 2024-019

	4) Provisionally **ENDORSED** the budgets for FY2026 and FY2027 (1 October 2025 to 30 September 2026, & 1 October 2026 to 30 September 2027, as detailed in Appendix IV and Appendix V [of IPHC-2024-ID008], respectively, that should be used by each Contracting Party for their internal planning and budgeting processes.	
IPHC-2024-ID009	The Commission **RECOMMENDED** the 2025 FISS design as shown in Figure 1 (of IPHC-Circular 2024-30, Appendix I), involving sampling 517 stations in four (4) biological regions, seven (7) IPHC Regulatory Areas, and ten (10) charter regions.	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: In progress Request for Tenders were send out in mid-December 2024 and will be evaluated in early February 2025.
IPHC-2024-ID010	The Commission **APPROVED** the transfer of US$1,000,000 from IPHC Fund 50 – Reserve, to IPHC Fund 40 – FISS for use in FY2025.	**Lead**: IPHC Secretariat (D. Wilson) **Status/Plan**: In progress The fund transfer will occur prior to the 2025 FISS (~April 2025).

Report of the IPHC Secretariat (2024)

PREPARED BY: IPHC SECRETARIAT (D. WILSON & B. HUTNICZAK, 12 DECEMBER 2024 & 16 JANUARY 2025)

1 PURPOSE

To provide the Commission with a report on the IPHC Secretariat activities in 2024 not already contained within other papers before the Commission.

2 IPHC SECRETARIAT 2024

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, 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 currently consists of 29 fulltime positions (FTEs) and ~24-45 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.***

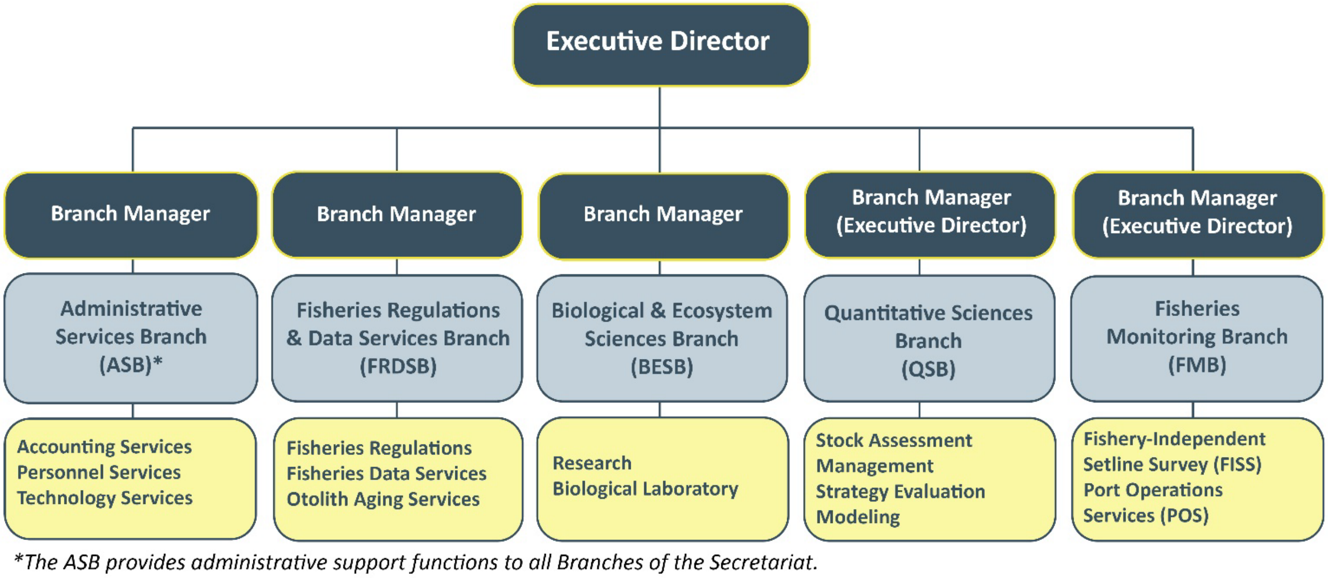
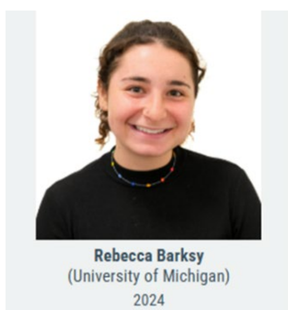
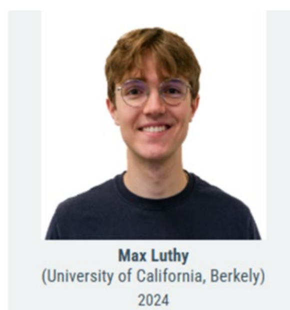


Figure 1. IPHC Secretariat organisation chart (2024).

3 IPHC INTERNSHIP PROGRAM: 2024

The IPHC funds full-time internships each summer. In 2024 the IPHC hosted two (2) undergraduate interns, Ms Rebecca Barsky and Mr Max Luthy, recent graduates of the University of Michigan at Ann Arbor and the University of California at Berkeley, respectively. The two interns have actively participated in IPHC's efforts to genotype the sex of commercial landings and to develop an automatized method for aging of otoliths using artificial intelligence, among other activities. The internship period ran from 20 May through 23 August 2024.





4 IPHC MERIT SCHOLARSHIP FOR 2024-27

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$160,000 in scholarship funds to 20 recipients.

In 2024, 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 four (4) panelists:

- Robert Alverson (USA Commissioner)
- Peter DeGreef (Canadian Commissioner)
- Angel Drobnica (Industry representative)
- Christa Rusel (Industry representative)

The Selection Panel unanimously awarded Mr Shea Davis (Cordova, AK, USA) the 2024 IPHC Merit Scholarship. The current recipients and their expected years of receipt are provided below.

Name	2024	2025	2026	2027
Lucy Hankins (Seward, AK, USA)	$4,000	$4,000	$4,000	.
Shea Davis (Cordova, AK, USA)	$4,000	$4,000	$4,000	$4,000

Shea Davis
2024

Lucy Hankins
2022

5 MEETINGS OF THE COMMISSION AND SUBSIDIARY BODIES DURING 2024

Meeting	No.	Date	Location	Secretariat material
Finance and Administration Committee (FAC)	100th	22 Jan	Anchorage, AK, USA	7 working papers
Annual Meeting (AM)	**100th**	**22-26 Jan**	Anchorage, AK, USA	14 working papers, 7 regulatory proposals
Conference Board (CB)	94th	23-24 Jan	Anchorage, AK, USA	Commission papers
Processor Advisory Board (PAB)	29th	23-24 Jan	Anchorage, AK, USA	Commission papers
Management Strategy Advisory Board (MSAB)	19th	1-3 May	Electronic	5 working papers
Scientific Review Board (SRB)	24th	18-20 June	Seattle, USA & Electronic	7 working papers
Work Meeting (WM)	2024	5-6 Sept	Bellingham, USA	14 working papers
Scientific Review Board (SRB)	25th	24-26 Sept	Seattle, USA & Electronic	8 working papers
Management Strategy Advisory Board (MSAB)	20th	29-30 Oct	Electronic	5 working papers
Research Advisory Board (RAB)	25th	19-20 Nov	Seattle, USA & Electronic	5 working papers

Interim Meeting (IM)	**100th**	**25-26 Nov**	Electronic	15 working papers 3 regulatory proposals

6 IPHC PACIFIC HALIBUT FISHERY REGULATIONS ADOPTED IN 2024

In 2024, the Commission adopted five **(5)** fishery regulations proposals (IPHC-2024-AM100-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)

(par. 86) The Commission **ADOPTED** fishery regulation proposal IPHC-2024-AM100-PropA1, that provided the mortality and fishery limits framework for population at AM100 (Appendix IV).

(par. 87) The Commission **ADOPTED** the distributed mortality limits for each Contracting Party, by IPHC Regulatory Area, (Table 5) and sector, as provided in Appendix IV. [Unanimous]

Table 5. Adopted TCEY mortality limits for 2024

Contracting Party IPHC Regulatory Area	Mortality limit (TCEY) (mlbs)	Mortality limit (TCEY) (metric tonnes)
Canada Total: 2B	**6.47**	**2,934.74**
USA: 2A	1.65	748.43
USA: 2C	5.79	2,626.30
USA: 3A	11.36	5,152.81
USA: 3B	3.45	1,564.89
USA: 4A	1.61	730.28
USA: 4B	1.25	566.99
USA: 4CDE	3.70	1,678.29
United States of America Total	**28.81**	**13,068.00**
Total (IPHC Convention Area)	**35.28**	**16,002.74**

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

(par. 93) The Commission **ADOPTED** fishery regulation proposal IPHC-2024-AM100-PropA2, that provided the framework for setting fishing periods for the commercial Pacific halibut fisheries. [Unanimous]

(par. 94) The Commission **ADOPTED** fishing periods for 2024 as provided below, thereby superseding the relevant portions of Section 9 of the IPHC Pacific halibut fishery regulations (Appendix V) by specifying that commercial fishing for Pacific halibut in all IPHC Regulatory Areas may begin no earlier than **06:00 hrs local time** on **15 March 2024** and must cease at **23:59 hrs local time** on **07 December 2024**. [Unanimous]

IPHC Fishery Regulations: Logs (Sect. 19)

(par. 95) The Commission **ADOPTED** fishery regulation proposal IPHC-2024-AM100-PropA3 Rev_2 that incorporates revisions to IPHC-2024-AM100-PropA3 Rev_1, to para. 5(f), that updated and aligned log requirements for Contracting Parties in the IPHC Fishery Regulations (Appendix VI). [Unanimous]

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. 28) - Charter Management Measures in IPHC Regulatory Areas 2C and 3A (USA)

(par. 96) The Commission **ADOPTED** fishery regulation proposal IPHC-2024-AM100-PropB1 Rev_1, that included 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 Fisheries Management Council's (NPFMC) Pacific halibut Catch Sharing Plan. (Appendix VII). [Unanimous]

IPHC Fishery Regulations: IPHC Fishery Regulations: IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5), and In-Season Actions (Sect. 6) - In-season reallocation of recreational limits in IPHC Regulatory Area 2A (USA)

(par. 97) The Commission **ADOPTED** fishery regulation proposal IPHC-2024-AM0100-PropB2, that made a clarifying modification to IPHC Fishery Regulations, Section 5 (Mortality and Fishery Limits) and Section 6 (In-Season Actions) reflective of changes to the Catch Sharing Plan that allocates the IPHC Regulatory Area 2A Pacific halibut catch limit (Appendix VIII). [Unanimous]

7 INTERACTIONS WITH CONTRACTING PARTIES

7.1 *Contracting Party reports*

The IPHC Secretariat engages annually with agency representatives from both Contracting Parties regarding comprehensive reporting of all forms of Pacific halibut removals. The IPHC Secretariat is working to identify and address data gaps in reporting, as well as enhance data collection processes. In 2024, the focus was on preparing for accepting logbook data from the vessels engaged in commercial fishing in Alaska reported through approved electronic logbooks (eLogs).

7.2 *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.

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).

Memorandum of Understanding/Collective Agreement – Rockfish

This agreement has been put on hold for 2024 by DFO.

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 First Nations. The action plan supports implementation of the Reconciliation Framework Agreements. The MPA Network zones have been organized into three implementation categories with category 1 zones targeted for establishment by 2025. The *What We Heard* report summarizes feedback from the public on the policy direction presented in the Coastal Marine Strategy for British Columbia Policy Intentions Paper.

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. The current zoning consultations include the Area of Interest in the Kitkatla Inlet area that do not have an overlap with FISS (Fig. 3).

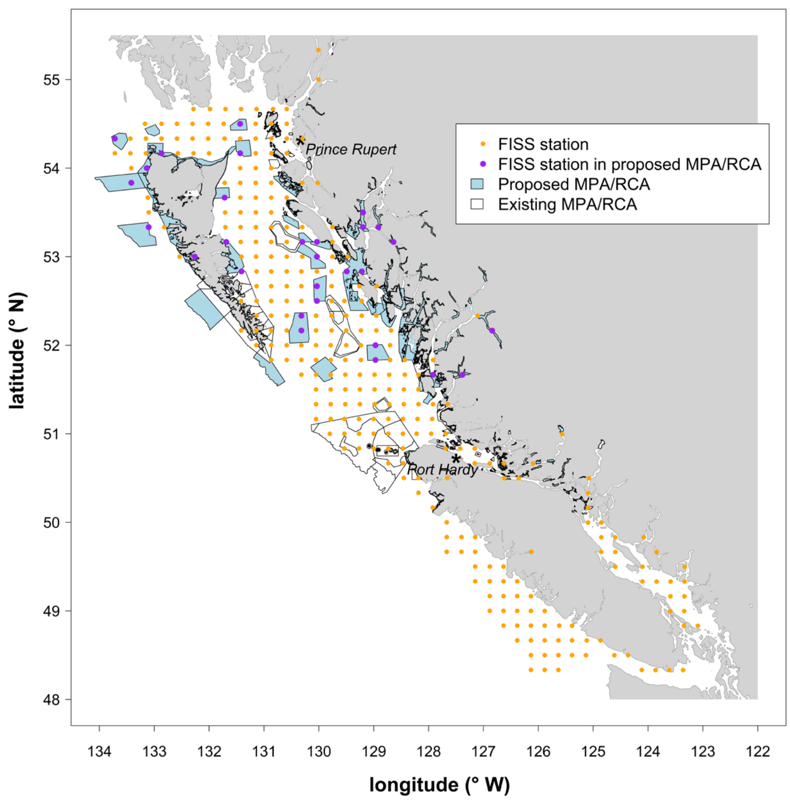


Figure 2: Overlap between locations of FISS stations and proposed area of the Northern Shelf Bioregion.

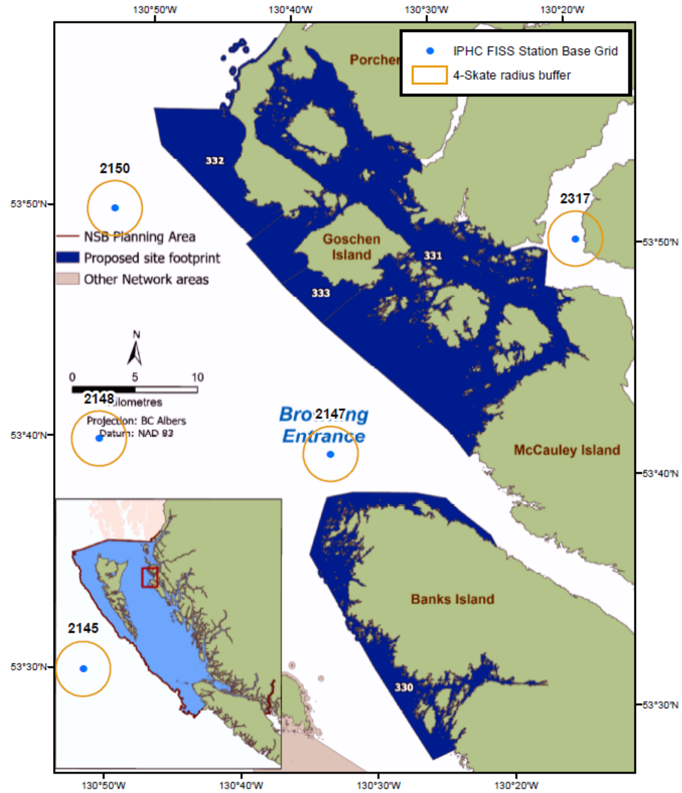


Figure 3: Kitkatla Inlet Area of Interest overlap with IPHC FISS Stations.

Proposed Central Coast National Marine Conservation Area Reserve

Proposed Central Coast National Marine Conservation Area Reserve is a partnership between Parks Canada and six First Nations: Wuikinuxv, Nuxalk, Kitasoo Xai'xais, Heiltsuk, Gitxaala and Gitga'at Nations. The area in question falls within the Northern Shelf Bioregion Network (Fig. 4). At this stage, the government of Canada, through Parks Canada and Fisheries and Oceans Canada, the province of British Columbia, and the Nations are collaboratively assessing the potential conservation benefits and socio-economic implications of establishing a marine reserve in the region.

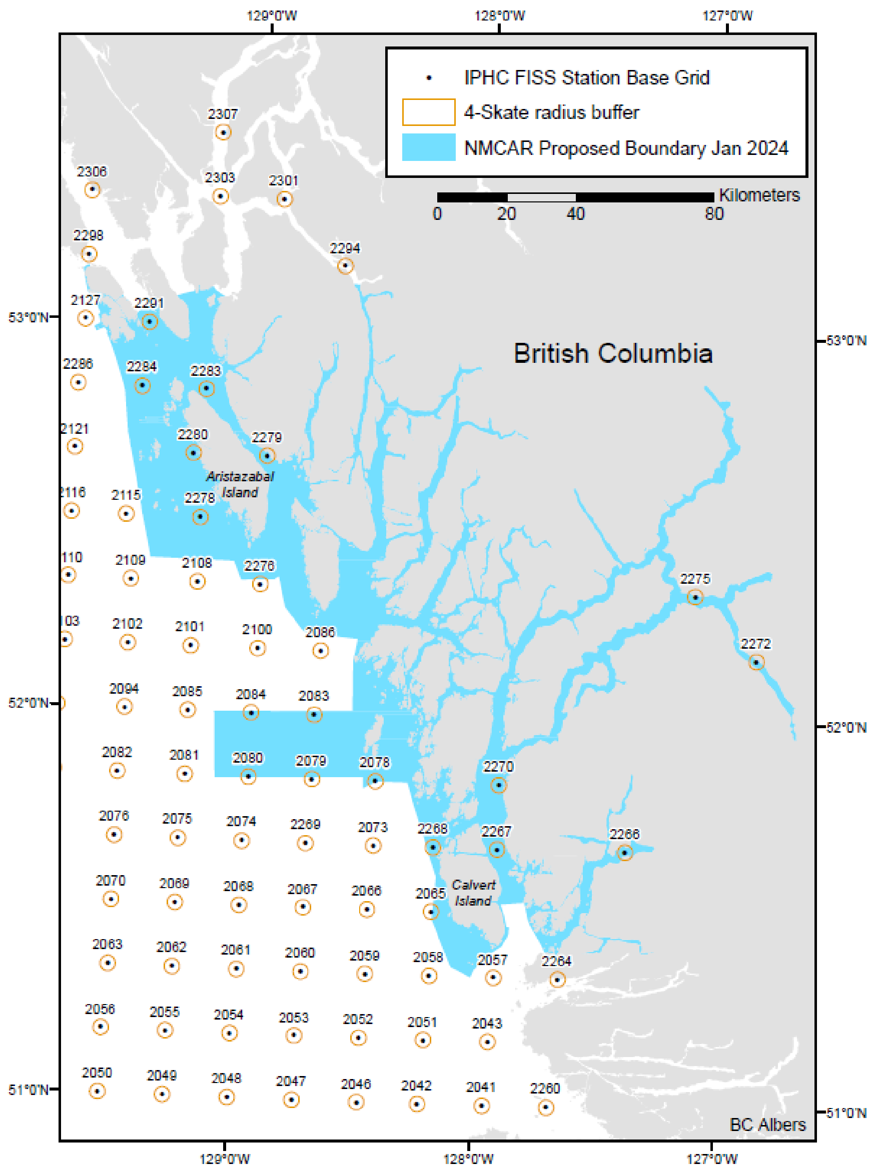


Figure 4: Central Coast National Marine Conservation Area with IPHC Standard Grid Stations

Trawl electronic monitoring

Pacific halibut length sampling protocol was developed in collaboration with industry, AMR, after discussions with IPHC. Pilot began in September 2023 and fleetwide implementation commenced on 15 May 2024.

Halibut Advisory Board (HAB)

The Executive Director (Dr. Wilson) participates as a HAB member, with the Fisheries Regulations and Data Services 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.

7.3 United States of America

NOAA Fisheries

Electronic logbooks in Alaska

Since 2024, the IPHC has been conducting a trial of electronic equivalents of IPHC logbooks in Alaska. These logbooks, based on a system previously approved by NOAA Fisheries as an electronic replacement for the Catcher Vessel Longline and Pot Gear Daily Fishing Logbook (DFL), provide vessels with the option to record fishing activity in electronic format.

The tablets with logbook software are part of a fully operational system that enables direct tablet-to-tablet data transmission, eliminating the need for paper records. Data collected through the tablets are verified by IPHC Fisheries Data Specialists (Field) in ports using custom log verification software. This software is fully compatible with existing DFL logbooks, allowing seamless electronic verification of both IPHC and DFL data.

To support the trial, the IPHC procured eight tablets preloaded with the software and distributed them to participating vessels.

NMFS Proposed Rule on Confidentiality of Information

The IPHC Secretariat is monitoring potential impact on the organization of the NMFS Proposed Rule on Confidentiality of Information published on 11 March 2024. Proposed rule § 600.10 Definitions state that "Fishing effort, catch information, and other forms of vessel-specific information that the United States must provide to a Regional Fishery Management Organization (RFMO) to which the United States is a member in order to satisfy any information sharing obligations of the respective RFMO" is excluded from confidential information definition.

Management in IPHC Regulatory Area 2A

The Secretariat has a data sharing agreement with NOAA Fisheries West Coast Region to access confidential data, including:

- All non-trawl logbook data submissions that include landings or discards of Pacific halibut, either sourced from the electronic application (FishVue Float) or paper logbooks, which are currently located in a data system maintained by the Pacific States Marine Fisheries Commission (PacStates); and
- All permit data for directed commercial fishery, recreational charter fishery, incidental salmon troll, and incidental longline sablefish fishery permits for Pacific halibut, which are currently located in a data system maintained by NOAA Fisheries.

These data are essential for efficient fulfilment of tasks related to collection of biological sampling and compiling log data for IPHC Regulatory Area 2A. Agreement has been signed on 16 October 2023 and is valid for five years.

Nomination of the Alaĝum Kanuux̂ (Heart of the Ocean) for consideration as a new national marine sanctuary

In June 2022, NOAA announced nomination of the Alaĝum Kanuux̂ (Heart of the Ocean) for consideration as a new national marine sanctuary (87 FR 34851), which was the first phase of the of the Pribilof Island Marine Island Ecosystem (PRIME) initiative. The IPHC will monitor the progress of the designation for potential implications for FISS survey.

Abundance-Based Management of Pacific halibut in the Bering Sea

On 24 November 2023, NOAA Fisheries issued a final rule to implement Amendment 123 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands management area (88 FR 82740). The final rule establishes abundance-based management of Amendment 80 (A80) trawl sector prohibited species catch (PSC) limit for Pacific halibut. The rule became effective on 1 January 2024, reducing the A80 PSC limit by 20% from 2023. For determining 2025 Pacific halibut PSC limits IPHC provided an index of abundance from the FISS to the NOAA Alaska Regional Office on 19 November 2024 indicating that this index remains in the "low" category for setting PSC limits in 2025. However, due to a drop in the NOAA Fisheries Eastern Bering Sea trawl survey index, moving it from the high to the low category, the ABM rule will further reduce the A80 sector's PSC limit for a total of a 25% reduction from 2023.

North Pacific Fishery Management Council (NPFMC)

At the meeting in February 2024, the IPHC presented to the Council the outcomes of the 100th Session of the IPHC Annual Meeting (AM100) (B8 PPT).

At the meeting in June 2024, NOAA Fisheries provided an update on the implementation of the Recreational Quota Entity (RQE), including proposed modifications. These include using the eFish platform to collect fees (as opposed to contracting with the RQE to perform this task), issuing electronic stamps to charter operators, and replacing the tiered fee structure with a single-fee approach. The Council will be asked to provide recommendations on these proposals in the subsequent meetings. More details are available in the B2 Discussion paper.

At the same meeting, the Council was presented with an Action Memo on Area 4 vessel caps (C3 Action Memo). The Council moved an action on halibut IFQ vessel use caps in Area 4 on for final review with several changes to the purpose and need statement for action and several revisions to the alternatives considered. This action considers a long-term change for creating new vessel caps specific to halibut IFQ Regulatory Area 4. This action is being considered to increase utilization of quota and fishery revenues in Area 4 by providing additional harvest opportunities for vessels that were constrained by the previous vessel use cap while maintaining the Council's objectives for the IFQ program to provide entry level opportunities and support sustained participation by fishery dependent communities.

During the December 2024 meeting, the Council recommended a suite of management measures (such as bag limits, size restrictions, and day-of-the-week closures) for the charter Pacific halibut fisheries in IPHC Regulatory Areas 2C and 3A (C4 CM). These measures, intended for implementation in 2025, are designed to ensure compliance with the sector's allocation under the NPFMC Catch Sharing Plan following from the final decision by the Commission on the mortality limits. Details are presented in the regulatory proposal B1 (IPHC-2025-AM101-PropB1).

At the same meeting, the Council considered the IFQ Program Review report (D5 IFQ Program Review) and agreed to accept it after revisions recommended by the IFQ Committee, Advisory Panel, and Council discussions where practicable. The Council also recommended further analysis of the economic and management effects of the current IPHC minimum size regulation on participants in the IFQ program.

Pacific Fishery Management Council (PFMC)

At the meeting in March 2024, the IPHC presented to the Council the outcomes of the 100th Session of the IPHC Annual Meeting (AM100) (G.1.a PPT).

Incidental Catch Limits for Fixed Gear Sablefish Fisheries

Adopted in March 2024, the Council's final recommendation for the 2024 incidental Pacific halibut catch restrictions in the fixed gear fishery north of Point Chehalis beginning 1 April was 130 pounds of dressed weight halibut for every 1,000 pounds dressed weight of sablefish, plus 2 additional halibut in excess of the ratio, which was consistent with the Groundfish Advisory Subpanel recommendations.

Incidental Catch Limits for Salmon Troll Fishery

Under the Pacific Halibut Catch Sharing Plan, the salmon troll fishery is provided a portion of the non-tribal commercial Pacific halibut allocation for incidental retention of Pacific halibut. In April 2024, the Council adopted catch ratio and vessel limits for incidental Pacific halibut retention in the salmon troll fishery which are effective from 16 May 2024 through the end of the 2024 salmon troll fishery, and beginning 1 April 2025, until modified through in season action or superseded by the 2025 management measures. License holders may land no more than one Pacific halibut per two Chinook, except one Pacific halibut may be landed without meeting the ratio requirement, and no more than 35 Pacific halibut landed per trip.

2A Pacific Halibut Catch Sharing Plan and the structure of the non-Tribal directed commercial Pacific halibut fishery

At the meeting in December, the Council adopted the 2025 Area 2A Pacific halibut fisheries season structures for the 2025 non-Tribal directed commercial Pacific halibut fishery and Washington, Oregon, and California sport fisheries. Details are available in the Decision Summary Document.

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

On 30 April 2024, the Department of Interior announced proposed auction details and lease terms for two areas offshore the Oregon coast for offshore wind energy development. The IPHC reviewed the revised area in relation to its overlap with FISS (see Fig. 5). While the original Call encompassed eight stations, the currently proposed area does not overlap with any FISS station.

The Bureau of Ocean Energy Management has also received two unsolicited lease proposals for offshore wind farms along Washington's coast. One would cover an area of about 315 square miles about 45 miles off the coast of Grays Harbor and Pacific counties. The other seeks to lease 403 square miles in a nearby area about 17 miles off the coast. This development is [opposed by the Northwest Indian Fisheries Commission](#) (17 July 2024), and the IPHC is monitoring the progress of the proposals with respect to FISS overlap.

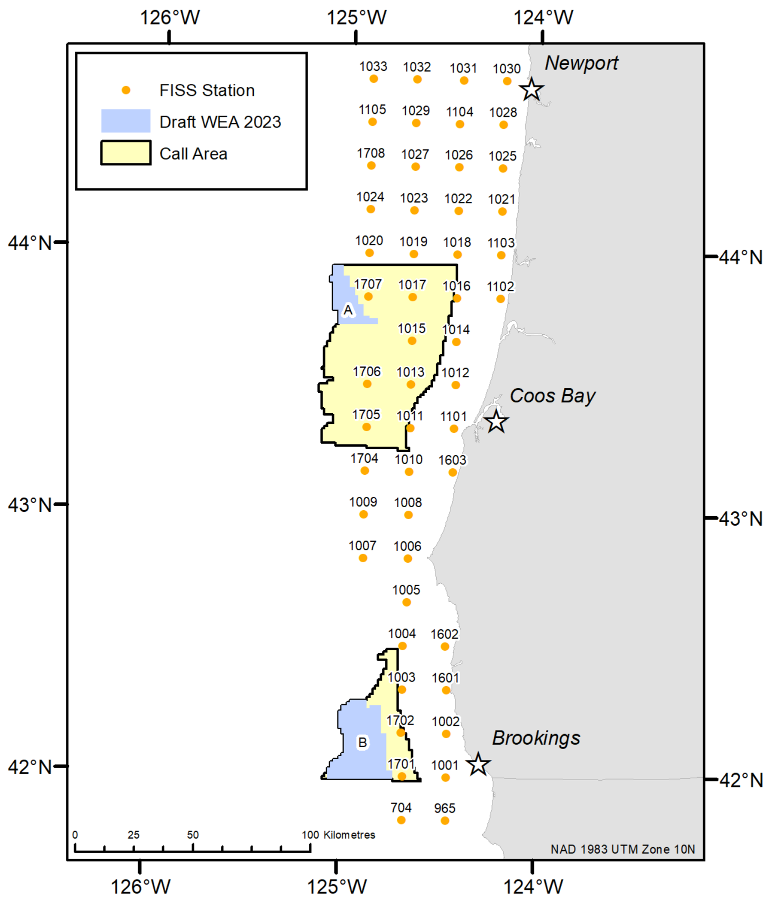


Figure 5. Overlap between locations of FISS stations and proposed area for offshore wind energy development off the Oregon Coast.

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 2024. 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 2024, the IPHC FISS team collected 2,264 lengths of Pacific cod and 958 lengths/sex of Pacific spiny dogfish as a part of this agreement.

Data sharing agreement with the Fisheries Monitoring Division

The Secretariat has a standing data sharing agreement with the NOAA Alaska Fisheries Science Center Fisheries Monitoring Division to obtain confidential information from commercial fisheries observers and electronic monitoring systems, including haul information: fishing gear, location, date and time, lengths of specimens and species composition.

Northwest Fisheries Science Center (NWFSC)

The Secretariat has a standing data sharing agreement with the Northwest Fisheries Science Center to obtain confidential data from commercial fishing vessels observed by the West Coast Groundfish Observer Program (WCGOP) or the At-sea Hake Observer Program (A-SHOP). This includes haul-level observer data: fishing vessel information, gear used, Pacific halibut catch, catch of other species, species biological data (e.g. length, weight, sex), mortality assessments, haul locations, tow or soak time duration, depth, date, and time.

State of Alaska Commercial Fisheries Entry Commission

The Secretariat has an active Memorandum of Understanding with the State of Alaska Commercial Fisheries Entry Commission (CFEC), the objective of which is to provide a framework in which the IPHC's commercial Pacific halibut landing record data may be utilized and published by CFEC.

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.

Surveying rockfish index stations in Washington was put on hold in 2024.

California Department of Fish and Wildlife (CDFW)

Data sharing agreement with California Department of Fish and Wildlife

The IPHC and the CDFW entered into a data sharing agreement for the purpose of tracking all Pacific halibut removals from within Convention waters. The agreement provides the Secretariat with access to commercial landing receipt data from California. The agreement, effective 16 June 2023, is valid for two years.

8 IPHC PUBLICATIONS AND OUTREACH

8.1 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 2023, the IPHC Secretariat migrated our website to a new platform with added and simplified updating and design features and this was expanded in 2024.

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/fisheries/recreational-fisheries/
6) **Time Series Data Sets:**
   https://www.iphc.int/data/time-series-datasets
7) **Subsistence Fisheries:**
   https://www.iphc.int/fisheries/subsistence-fisheries/
8) **Water Column Profiler Data:**
   https://www.iphc.int/datatest/data/water-column-profiler-data

8.2 Annual Report

The 2023 Annual Report (1 January to 31 December 2023) was published on 28 March 2024 and is available for download from the IPHC website at the following link: https://www.iphc.int/uploads/2024/03/IPHC-2024-AR2023-R-2023-Annual-Report.pdf.

The 2024 Annual Report is expected to be published by 1 March 2025.

8.3 IPHC Circulars and Media Releases

2024 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 2024, 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-2024-CR-001	Report of the 100th Session of the IPHC Finance and Administration Committee (FAC100)	23 Jan 2024
IPHC-2024-CR-002	Financial Regulations 2024 and Rules of Procedure 2024	24 Jan 2024
IPHC-2024-CR-003	Report of the 29th Session of the IPHC Processor Advisory	25 Jan 2024
IPHC-2024-CR-004	Report of the 94th Session of the IPHC Conference Board (CB094)	25 Jan 2024
IPHC-2024-CR-005	Report of the 100th Session of the IPHC Annual Meeting (AM100)	26 Jan 2024
IPHC-2024-CR-006	Invitation to the 19th Session of the IPHC Management Strategy Advisory Board (MSAB019)	30 Jan 2024
IPHC-2024-CR-007	For Decision – 2024 Fishery-Independent Setline Survey (FISS)	14 Feb 2024

IPHC-2024-CR-008	For Information – Intersessional Decision 2024-ID001 – 2024 Fishery-Independent Setline Survey (FISS)	15 Feb 2024
IPHC-2024-CR-009	Invitation to the 24th Session of the IPHC Scientific Review Board (SRB024)	21 Mar 2024
IPHC-2024-CR-010	Publication of the IPHC Annual Report 2023 (IPHC-2024-AR2023-R)	28 Mar 2024
IPHC-2024-CR-011	FOR DECISION – MSAB MEMBERSHIP (for approval)	29 Apr 2024
IPHC-2024-CR-012	FOR INFORMATION – Intersessional decision 2024-ID002 – MSAB Membership	1 May 2024
IPHC-2024-CR-013	Report of the 19th Session of the IPHC Management Strategy Advisory Board (MSAB019)	3 May 2024
IPHC-2024-CR-014	Invitation to the 2024 Session of the IPHC Work Meeting (WM2024)	7 Jun 2024
IPHC-2024-CR-015	FOR INFORMATION – Intersessional Decisions 2024-ID003-007 Management Strategy Evaluation Tasks for 2024	11 Jun 2024
IPHC-2024-CR-016	Invitation to the 25th Session of the IPHC Scientific Review Board (SRB025)	12 Jun 2024
IPHC-2024-CR-017	Report of the 24th Session of the IPHC Scientific Review Board (SRB024)	20 Jun 2024
IPHC-2024-CR-018	For Decision – FY2025 Budget (For Approval), FY2026 and FY2027 (For Provisional Endorsement)	3 Jul 2024
IPHC-2024-CR-019	For Information – Intersessional Decision 2024-ID008 FY2025 Budget (Adopted), FY2026 and FY2027 (Provisionally Endorsed)	9 Jul 2024
IPHC-2024-CR-020	Invitation to the 20th Session of the IPHC Management Strategy Advisory Board (MSAB020)	29 Jul 2024
IPHC-2024-CR-021	IPHC Merit Scholarship Recipient	12 Aug 2024
IPHC-2024-CR-022	Invitation to the 25th Session of the IPHC Research Advisory Board (RAB025)	14 Aug 2024
IPHC-2024-CR-023	Invitation to the 100th Session of the IPHC Interim Meeting (IM100)	22 Aug 2024
IPHC-2024-CR-024	Report of the 25th Session of the IPHC Scientific Review Board (SRB025)	26 Sep 2024
IPHC-2024-CR-025	Invitation to the 14th Special Session of the IPHC (SS014)	15 Oct 2024
IPHC-2024-CR-026	Invitation to the 101st Session of the IPHC Finance and Administration Committee (FAC101), and the 101st Session of the IPHC Annual Meeting (AM101)	29 Oct 2024
IPHC-2024-CR-027	Invitation to the 95th Session of the IPHC Conference Board (CB095), and the 30th Session of the IPHC Processor Advisory Board (PAB030)	30 Oct 2024
IPHC-2024-CR-028	Report of the 20th Session of the IPHC Management Strategy Advisory Board (MSAB020)	31 Oct 2024
IPHC-2024-CR-029	Report of the 14th Special Session of the IPHC (SS014)	4 Nov 2024
IPHC-2024-CR-030	For Decision – FISS 2025 Design	5 Nov 2024
IPHC-2024-CR-031	For Information – Intersessional Decisions 2024-ID009 – ID010 FISS 2025 Design	8 Nov 2024
IPHC-2024-CR-032	Report of the 25th Session of the IPHC Research Advisory Board (RAB025)	20 Nov 2024
IPHC-2024-CR-033	Report of the 100th Session of the IPHC Interim Meeting (IM100)	26 Nov 2024

2024 IPHC Media Releases are the primary informal communication with all stakeholders. https://www.iphc.int/library/documents/category/media-releases

Media Release	Title/Subject	Date published
IPHC-2024-MR001	Completion of the 100th Session of the IPHC Annual Meeting (AM100)	26 Jan 2024
IPHC-2024-MR002	Fishery-Independent Setline Survey – 2024	15 Feb 2024
IPHC-2024-MR003	Notification of IPHC Fishery-Independent Setline Survey (FISS) 2024 Contract Awards	16 Feb 2024
IPHC-2024-MR004	Solicitation for the 2024 IPHC Merit Scholarship	28 Feb 2024
IPHC-2024-MR005	IPHC Requests Tenders for the 2024 Catch Protection Study (CPS)	28 Feb 2024
IPHC-2024-MR006	Notification of potential Pacific halibut sales in 2024, seeking buyers interested in fish sales from the IPHC Fishery-Independent Setline Survey (FISS)	6 Mar 2024
IPHC-2024-MR007	Commercial fishing period opening today	15 Mar 2024
IPHC-2024-MR008	Electronic logbooks in Alaska	19 Mar 2024
IPHC-2024-MR009	Ongoing and recent Pacific halibut tagging studies	22 Mar 2024
IPHC-2024-MR010	Open call for expressions of interest: IPHC Management Strategy Advisory Board (MSAB) membership	8 Apr 2024
IPHC-2024-MR011	Fishery-Independent Setline Survey (FISS): 2024	24 May 2024
IPHC-2024-MR012	IPHC Merit Scholarship (2024) APPLICATIONS CLOSING 15 JUNE 2024	4 Jun 2024
IPHC-2024-MR013	Commencement of the electronic logbooks trial in Alaska	16 Jul 2024
IPHC-2024-MR014	IPHC Merit Scholarship (2024) - AWARDED	12 Aug 2024
IPHC-2024-MR015	Attention Salmon Processors – Chum Salmon Needed for the 2025 IPHC Fishery-Independent Setline Survey (FISS)	13 Sept 2024
IPHC-2024-MR016	Call for Proposals: IPHC 2024-25 Fishery Regulations process	19 Sept 2024
IPHC-2024-MR017	Fall IPHC Fecundity Pilot Study Request for Tender	20 Sept 2024
IPHC-2024-MR018	Invitation to the 14th Special Session of the IPHC (SS014)	15 Oct 2024
IPHC-2024-MR019	Invitation to the 101st Session of the IPHC Finance and Administration Committee (FAC101), and the 101st Session of the IPHC Annual Meeting (AM101)	29 Oct 2024
IPHC-2024-MR020	Launch of new mobile-friendly Pacific halibut tag reporting tool	13 Nov 2024
IPHC-2024-MR021	Commercial Fishing Period Closes 0n 7 December 2024	6 Dec 2024
IPHC-2024-MR022	IPHC Requests Tenders for the 2025 Fishery-Independent Setline Survey (FISS)	13 Dec 2024
IPHC-2024-MR023	IPHC Requests Tenders for the 2025 Catch Protection Study (CPS)	13 Dec 2024

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/media-news-subscription/.

8.4 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.

Committees and external organisation appointments

North America:

1) *Canada – U.S. Groundfish Technical Committee* - Dr. Josep Planas

Canada:

1) *Halibut Advisory Board* (Canada) - Dr. David Wilson (Dr. Basia Hutniczak – Alternate)

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) *NPFMC Scientific and Statistical Committee* - Dr. Ian Stewart
4) *North Pacific Research Board Science Panel* - Dr. Josep Planas
5) *Marine Resource Education Program, North Pacific* – Dr. Allan Hicks
6) *Fisheries Monitoring Science Committee (NOAA-Alaska)* – Dr. Ray Webster
7) *Interagency electronic reporting system for commercial fishery landings in Alaska (eLandings) Steering Committee* – Dr. Basia Hutniczak
8) *Benchmark workshop on Mackerel and Norwegian spring-spawning herring (WKBMACNSSH), reviewer.* – Dr. Allan Hicks

Academic affiliations 2024

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

9 IPHC PUBLICATIONS IN 2024

9.1 Published peer-reviewed journal papers

Dykstra, C., Wolf, N., Harris, B.P., **Stewart, I.J., Hicks, A.**, Restrepo. F., **Planas, J.V.** 2024. Relating capture and physiological conditions to viability and survival of Pacific halibut discarded from commercial longline gear. Ocean & Coastal Management. 249: 107018. https://doi.org/10.1016/j.ocecoaman.2024.107018

Sadorus, L. L., **Webster, R. A.** and Sullivan, M. 2024. Environmental conditions on the Pacific halibut fishing grounds obtained from a decade of coastwide oceanographic monitoring, and the potential application of these data in stock analyses. Marine and Freshwater Research. 75: MF23175. https://doi.org/10.1071/MF23175.

Simchick, C., Simeon, A., Bolstad, K., **Planas, J.V.** 2024. Endocrine patterns associated with ovarian development in female Pacific halibut (Hippoglossus stenolepis). General and Comparative Endocrinology. 347: 114425. https://doi.org/10.1016/j.ygcen.2023.114425

Thomas, R.E., Gauthier, S., Grandin, C., **Hicks, A.**, Parker-Stetter, S. 2024 To trawl or not to trawl: Questioning core assumptions of trawl placement choice in fisheries acoustic surveys. Fisheries Research. 270: 106897. https://doi.org/10.1016/j.fishres.2023.106897

Hutniczak, B., Wilson, D., Stewart, I., Hicks, A. 2024. A hundred years of Pacific halibut management in the context of global events. Frontiers in Marine Science. 11:1424002. https://doi.org/10.3389/fmars.2024.1424002

9.2 In press peer-reviewed journal papers

9.3 Submitted peer-review journal papers – In review

McGilliard, C.R., Ianelli, J., Cunningham, C., **Hicks, A**., Hanselman, D., Stram, D., Henry, A. Evaluating Bering Sea Pacific halibut bycatch management options using closed-loop simulations in a dynamic, multi-agency setting. Canadian Journal of Fisheries and Aquatic Sciences.

Ritchie, B., Smeltz, T.S., **Stewart, I.J**., Harris, B., Wolf, N. Exploring spatial and temporal patterns in the size-at-age of Pacific halibut in the Gulf of Alaska. Fisheries Management and Ecology.

Adams, G., Holsman, K., Rovellini, A., **Stewart, I**.J., Privitera-Johnson, K., Wasserman, S.N., Punt, A. Implications of predator-prey dynamics for single species management. Canadian Journal of Fisheries and Aquatic Sciences.

10 RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-04 Rev_1 that provides the Commission with an update on the IPHC Secretariat activities in 2024 not detailed in other papers before the Commission.

11 APPENDICES

Appendix I: IPHC Secretariat positions – Effective 31 December 2024

Appendix I
IPHC Secretariat positions – Effective 31 December 2024

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

Branch	Sub-Section	Position	Current Employee
-	-	Executive Director	Dr Wilson, David
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
Biological and Ecosystem Sciences	-	Branch Manager (Biological and Ecosystem Sciences)	Dr Planas, Josep
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 Monitoring	Port Operations Services	Port Operations Coordinator	Thom, Monica
Fisheries Monitoring	Port Operations Services	Fisheries Data Specialist (Field)	Multiple Employees (9-10)
Fisheries Monitoring	Fishery-Independent Setline Survey	Setline Survey Coordinator	Ualesi, Kayla
Fisheries Monitoring	Fishery-Independent Setline Survey	Setline Survey Specialist (Snr)	Jack, Tyler
Fisheries Monitoring	Fishery-Independent Setline Survey	Setline Survey Specialist	Rillera, Rachel
Fisheries Monitoring	Fishery-Independent Setline Survey	Setline Survey Specialist	Coll, Kevin
Fisheries Monitoring	Fishery-Independent Setline Survey	Setline Survey Specialist (Field)	Multiple Employees (10-35)
Fisheries Regulations and Data Services	-	Branch Manager (FRDS)	Dr Hutniczak, Barbara

Fisheries Regulations and Data Services	Fisheries Data Services	Fisheries Data Coordinator	Tran, Huyen
Fisheries Regulations and Data Services	Fisheries Data Services	Fisheries Data Specialist (HQ-GIS)	Kong, Thomas
Fisheries Regulations and Data Services	Fisheries Data Services	Fisheries Data Specialist (HQ) & Otolith Technician	Sawyer Van Vleck, Kim
Fisheries Regulations and Data Services	Fisheries Data Services	Fisheries Data Specialist (HQ) & Otolith Technician	Magrane, Kelsey
Fisheries Regulations and Data Services	Otolith Aging Services	Otolith Laboratory Technician (Snr)	Forsberg, Joan
Fisheries Regulations and Data Services	Otolith Aging Services	Otolith Laboratory Technician	Johnston, Chris
Administrative Services	-	Branch Manager (Administrative Services Branch)	Vacant
Administrative Services	Personnel Services	Administrative Coordinator	Chapman, Kelly
Administrative Services	Personnel Services	Administrative Specialist / Publications (Snr)	Coluccio, Tara
Administrative Services	Personnel Services	Administrative Specialist	Wietecha, Ola
Administrative Services	Personnel Services	Administrative Specialist (Front Desk)	Wickham, Kenneth
Administrative Services	Accounting Services	Accountants	Sommerville & Associates
Administrative Services	Accounting Services	Administrative Services (Accounting)	Arian, Mohammad
Administrative Services	Technology Services	Systems Administrator	Tynes, Robert
Administrative Services	Technology Services	Information Technology Specialist (Application Developer)	Taheri, Afshin
Administrative Services	Technology Services	Information Technology Specialist (Application Developer)	Outsourced

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

PREPARED BY: IPHC SECRETARIAT (D. WILSON; 9 DECEMBER 2024)

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	23
In Progress	3
Pending	0
Total	**26**

RECOMMENDATION

That the Commission **NOTE** paper IPHC-2025-AM101-05 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	**Completed** (Closed): For the purpose of reporting against the PRIPHC02 recommendations, the Contracting Parties have agreed that they do not wish to commence a process of updating the IPHC Convention. Thus, this Recommendation is considered closed. If/when a 3rd Performance Review is undertaken, the matter may be revisited.
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.	N/A	N/A	N/A	**N/A**
	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.	High	Commission	2020-24	**Completed & annually ongoing**: (2020, 2021, 2022, 2023, 2024): The IPHC Rules of Procedure (ROP) and the IPHC Financial Regulations (FR) will be periodically updated 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	**Completed & annually ongoing**: There are three non-Contracting Parties who exploit Pacific halibut: Russia, Japan, and Rep. of Korea. 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 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 & annually 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 & annually 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. 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 & annually 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 for 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-2024-AM100-10** for the previous iteration, and **IPHC-2025-AM101-10** for the latest.
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.	N/A	N/A	N/A	**N/A**
	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.	High	Contracting Parties	2020-24	**In progress**: The Contracting Parties have yet to engage on this recommendation. See paper: **IPHC-2023-AM099-16.** At IM099 (Dec. 2023) the Commission provided the following update: (IM099, para. 7) The Commission **RECALLED** recommendation 09 from the PRIPHC02 (shown below) and **NOTED** that while there was no current agreement between the Contracting Parties to collectively move this recommendation forward, the Commission would continue discussions to seek common ground. PRIPHC02-Rec.09: *"The Commission RECOMMENDED that the IPHC Secretariat, in consultation with the*

REF#	RECOMMENDATION	PRIORITY	RESPONSIBILITY	TIMELINE	UPDATE/STATUS
					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."
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.
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	2020-24	**In progress**: An Harvest Strategy Policy was presented to IM100 and will be presented at AM101 for potential adoption. See paper **IPHC-2025-AM101-17** ***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	2020-24	**In progress**: An Harvest Strategy Policy will be presented to IM100 and AM101 for potential adoption in 2025. See paper **IPHC-2025-AM101-12** 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	**Completed and annually ongoing**: 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 AM101.

Ref#	**Recommendation**	**Priority**	**Responsibility**	**Timeline**	**Update/Status**
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	**Completed and annually ongoing**: 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 AM101.
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	2022	**Completed**: The IPHC Secretariat passed management of the 2A fishery to NOAA-Fisheries at the end of 2022, following a movement to a longer fishing period. 2023 was the first year that IPHC has not managed the day-to-day operations of the fishery.
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	**Completed & annually 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.
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.

REF#	RECOMMENDATION	PRIORITY	RESPONSIBILITY	TIMELINE	UPDATE/STATUS
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 & annually 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	**Completed & annually ongoing**: There are three non-Contracting Parties who exploit Pacific halibut: Russia, Japan, and Rep. of Korea. The Commission has directed the Secretariat to continue engaging with scientists working on Pacific halibut through PICES (https://meetings.pices.int/).
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	**Completed & annually ongoing**: The IPHC Secretariat is engaging with other countries harvesting Pacific halibut via PICES as a first step. Known harvesters are Russia, Japan, and Rep. of Korea, with the latter two harvesting very minor levels at the extremity of Pacific halibut distribution in the western Pacific. The Commission has directed the Secretariat to continue engaging with scientists working on Pacific halibut through PICES

Ref#	Recommendation	Priority	Responsibility	Timeline	Update/Status
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 & annually ongoing**: 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 & annually 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 & annually 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

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

PREPARED BY: IPHC SECRETARIAT (D. WILSON, J. PLANAS, I. STEWART, A. HICKS, B. HUTNICZAK, AND R. WEBSTER; 9 DECEMBER 2024)

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.

In 2023 and 2024, the plan went through two cycles of review and improvement with the SRB, with amendments being suggested and incorporated accordingly.

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.

Updates: The Secretariat is currently in the process of updating the Plan to meet the request of the SRB at its 24th Session, as per the below text:

> ***International Pacific Halibut Commission 5-year program of integrated research and monitoring (2022-26)***
>
> SRB024–Req.01 (para. 14) *The SRB* ***REQUESTED*** *that the IPHC 5-year Program of Integrated Research and Monitoring be revised by SRB026 to reflect changing priorities in light of major progress on biological research and ongoing monitoring challenges.*

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-06 that provides the latest iteration of the IPHC 5-year program of Integrated Research and Monitoring (2022-26).

APPENDICES

Appendix A: Updated: IPHC 5-year program of Integrated Research and Monitoring (2022-26)

INTERNATIONAL PACIFIC HALIBUT COMMISSION

5-YEAR PROGRAM OF INTEGRATED RESEARCH AND MONITORING

(2022 - 2026)

INTERNATIONAL PACIFIC

HALIBUT COMMISSION

BIBLIOGRAPHIC ENTRY

IPHC 2023. International Pacific Halibut Commission 5-Year program of integrated research and monitoring (2022-26). Seattle, WA, U.S.A. *IPHC–2023-5YPIRM, 58 pp.*

INTERNATIONAL PACIFIC HALIBUT COMMISSION

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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

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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 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 the 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.***

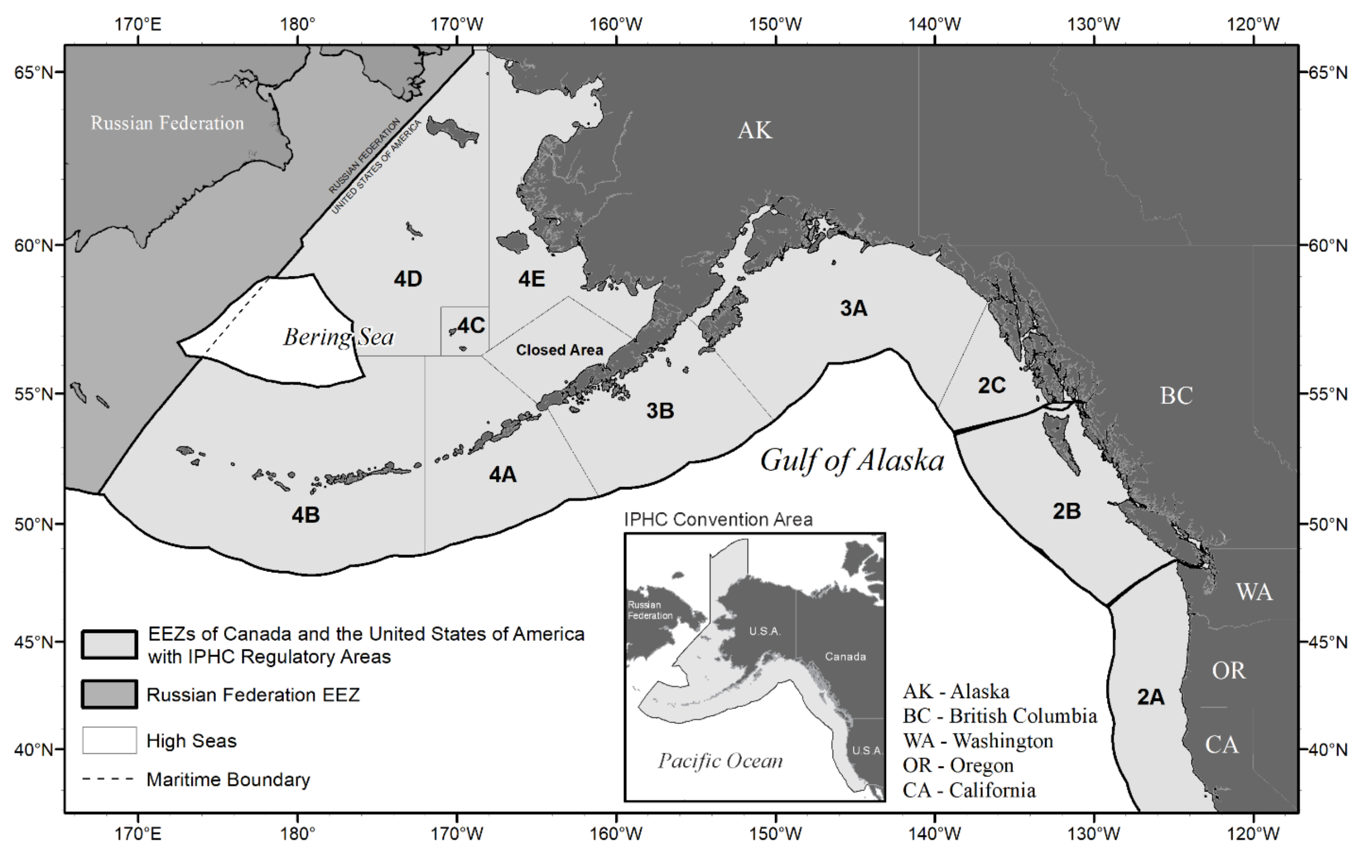

Figure 1. Map of the IPHC Convention Area (map insert) and IPHC Regulatory Areas.

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

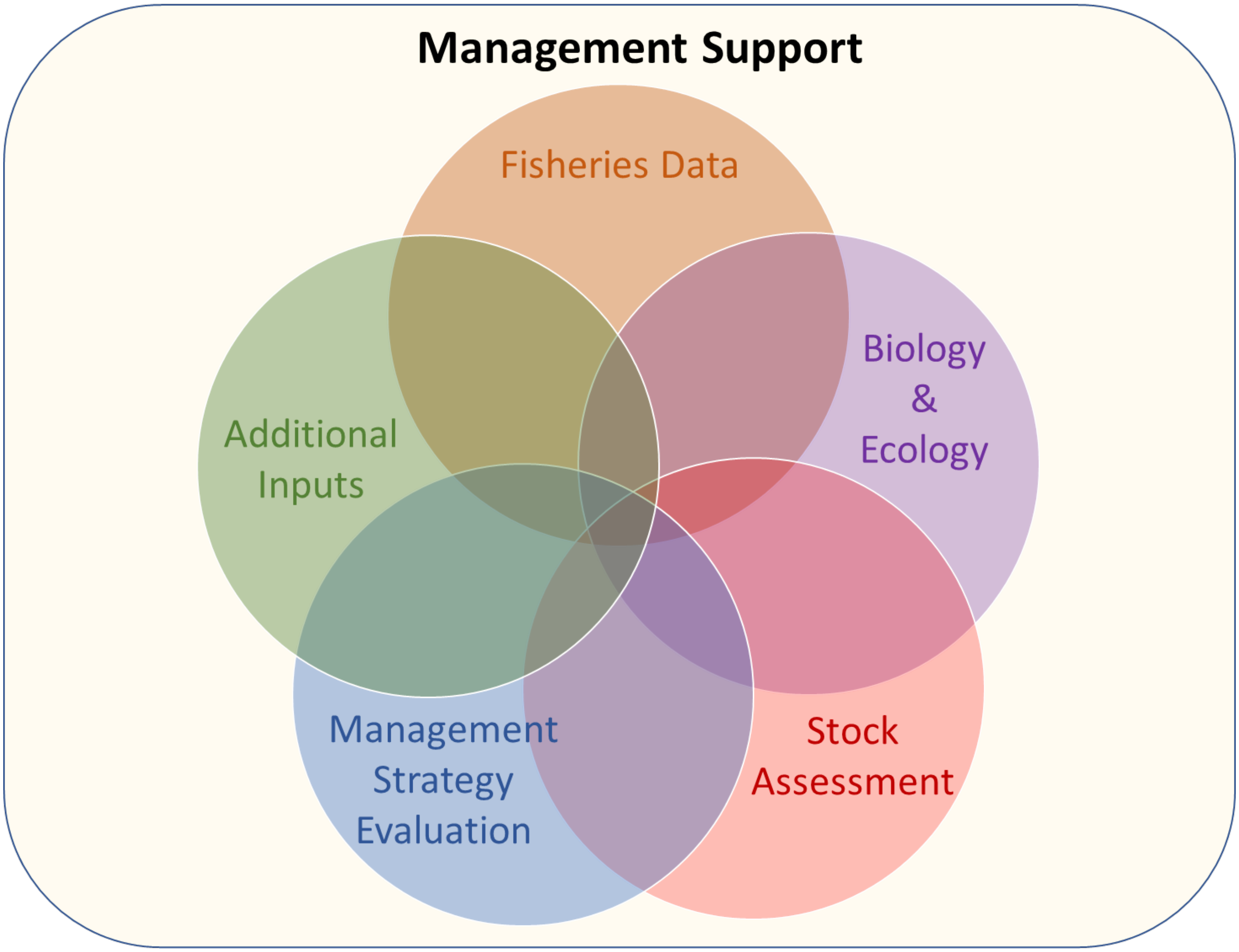

Figure 2. Core areas of the IPHC's program of integrated research and monitoring providing management support.

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.

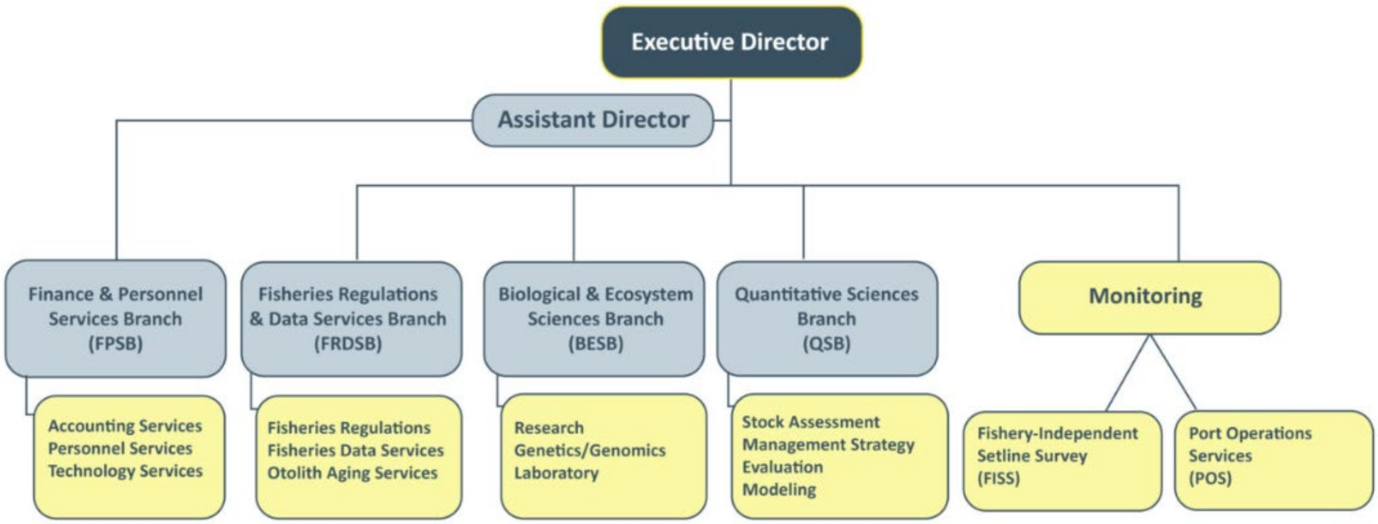

Figure 3. IPHC Secretariat organisation chart (2023).

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 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 and summarized in Appendix V) 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.

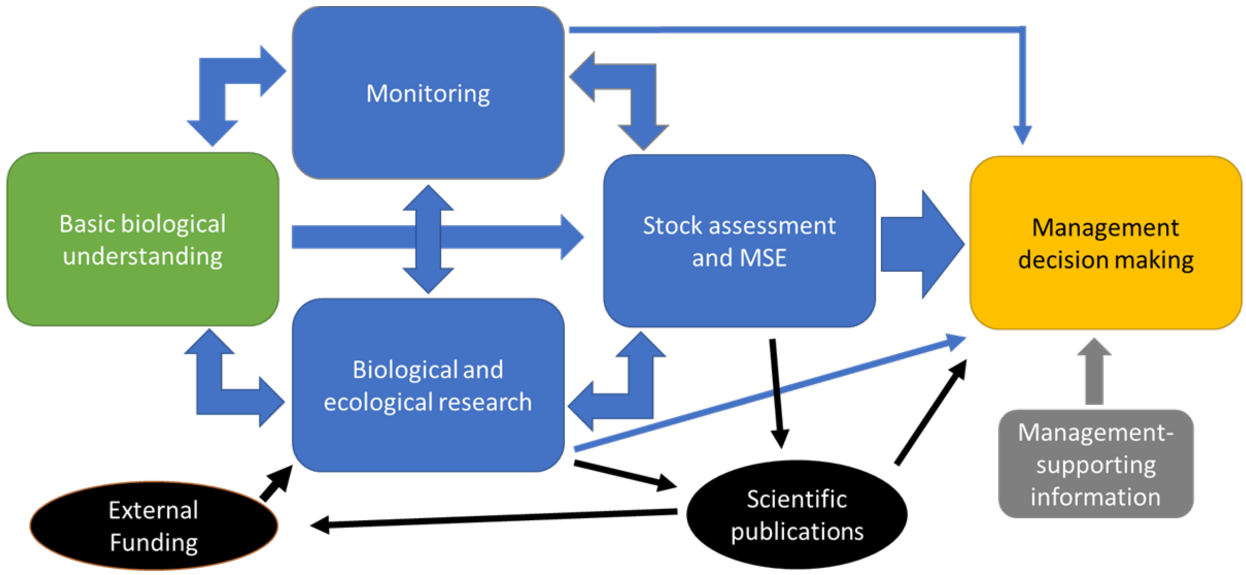

Figure 4. Flow of information from basic biological understanding of the Pacific halibut resource, through IPHC research components (monitoring, biological and ecological research, stock assessment, and MSE) to management decision-making. Management-supporting information (grey) constitute a range of 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 IPHC 5-Year Program of Integrated Research and Monitoring (2022-2026). An overarching goal of the 5-Year Program of Integrated Research and Monitoring (2022-2026) 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 Program of Integrated Research and Monitoring (2022-2026) 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 Program of Integrated Research and Monitoring (2022-2026) 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. The proposed timeline of activities and of staffing and funding indicators are provided in Appendix VI and Appendix VII, respectively.

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/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.

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.

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.

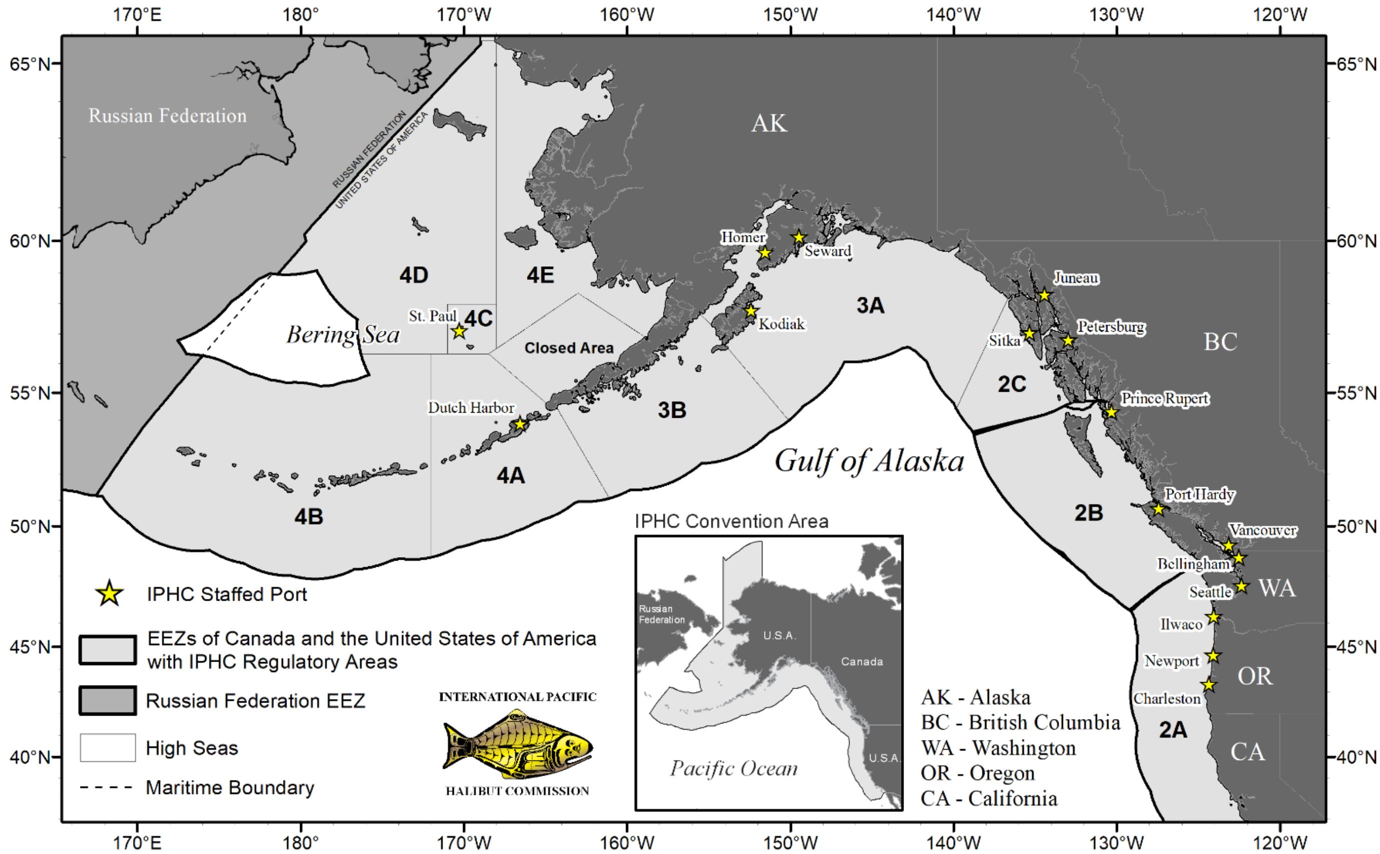

Figure 5. Ports where the IPHC has sampled directed commercial landings throughout the fishing period in recent years (note: ports sampled may change from year-to-year for operational reasons).

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).

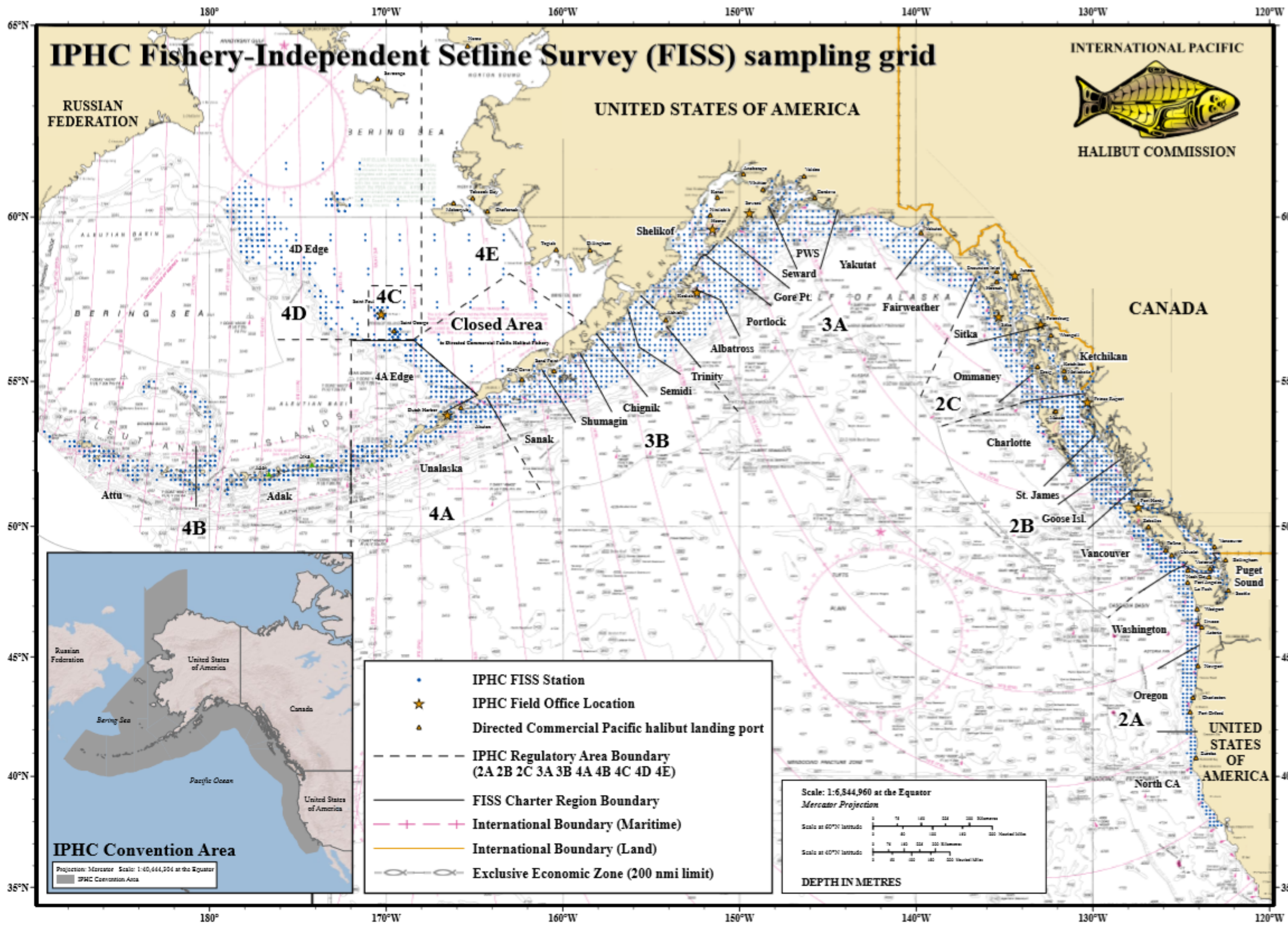

Figure 6. IPHC Fishery-Independent Setline Survey (FISS) with full sampling grid shown.

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.

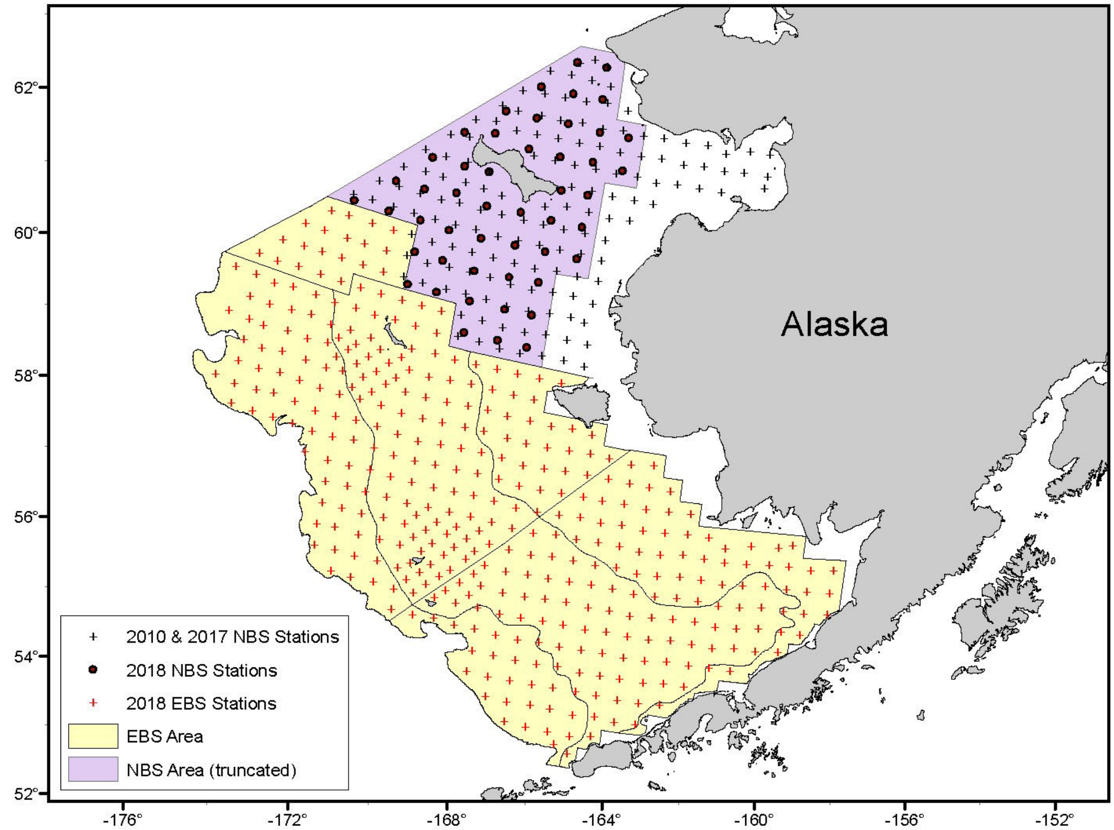

Figure 7. Sampling station design for the 2018 NOAA Bering Sea bottom trawl survey. Black dots are stations sampled in the 2018 "rapid-response" Northern Bering Sea trawl survey and black plus signs are stations sampled in standardized Northern Bering Sea trawl survey.

5.2.2.3 Norton Sound trawl survey

The Alaska Department of Fish and Game's annual Norton Sound trawl survey data contribute to the estimation of Pacific halibut indices of abundance in IPHC Regulatory Area 4E.

5.2.3 Age composition data (both fishery-dependent and fishery-independent)

The annually collected biological samples from commercial fisheries and FISS include otoliths, a crystalline calcium carbonate structure found in the inner ear of fish which growth patterns can be analyzed to estimate the age of fish. Fish age is a key input to stock assessment models that inform management decisions related to fish exploitation. Since inception, the IPHC aged over 1.5 million otoliths manually by trained readers under the stereoscopic microscope.

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 underscores the importance of a holistic understanding of 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.

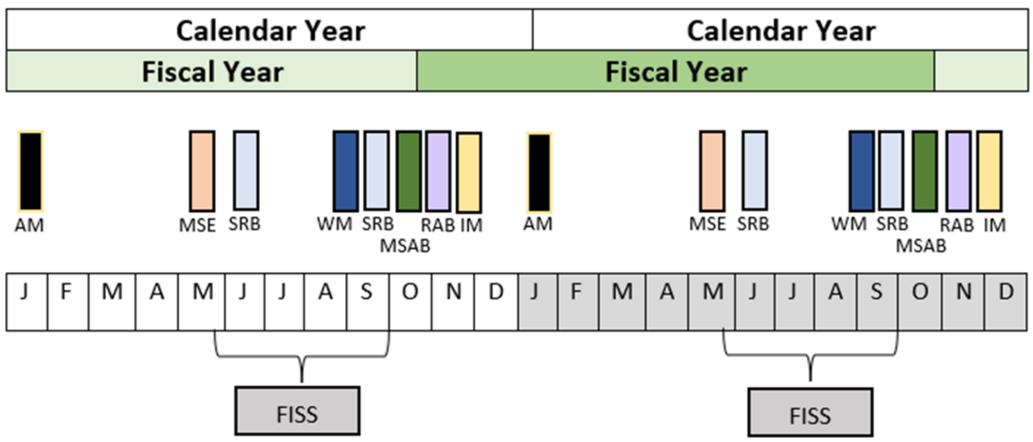

Figure 8. The typical IPHC annual meeting schedule with the calendar year and fiscal year shown. The meetings, shown in the middle row are: Annual Meeting where the Commission makes many final decisions for that year (AM), an MSE informational session (MSE), Scientific Review Board meetings (SRB), the 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 of the five research areas have been identified that integrate with specific needs for stock assessment and MSE processes and that are ranked according to their relevance (Appendix II). To further describe the IPHC Secretariat's rationale for establishing research priorities, a ranked list of biological uncertainties and parameters for stock assessment and the MSE process and their links to research activities and outcomes derived from the IPHC 5-Year Program of Integrated Research and Monitoring (2022-2026) are provided in Appendix III and Appendix IV.

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.

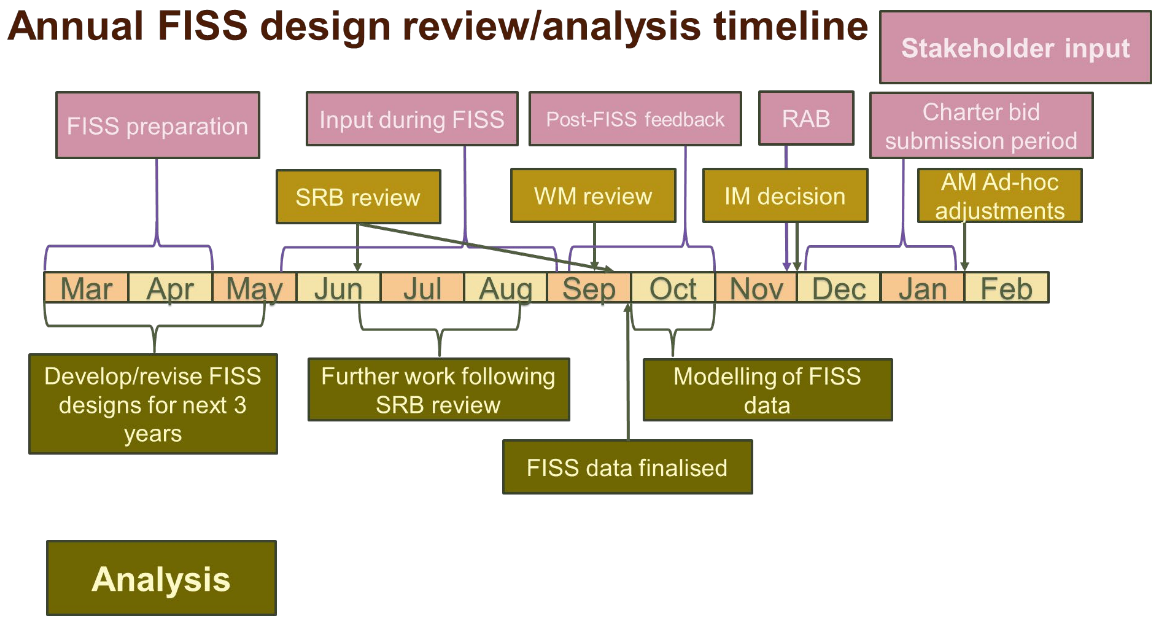

Figure 9. Timeline of annual FISS design review process.

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.

6.2.3 Age composition data (both fishery-dependent and fishery-independent)

The IPHC Secretariat is looking at options for supplementing current Pacific halibut ageing protocol with automatized ageing that does not require extensive otolith-reader training. The IPHC is investigating the potential use of artificial intelligence (AI) for determining the age of Pacific halibut from images of collected otoliths. The Secretariat is in the process of initializing creation of a database of pictures with expert-provided labels, utilizing previously aged otoliths, and assessing the option for the development of a Convolutional Neural Network (CNN) model specifically designed for image classification to determine Pacific halibut age. The goal is to create an AI-based age determination system that complements traditional methods for reliable fish stock assessment and management advice.

6.3 Potential of integrating human dynamics into management decision-making

The evolution of modern fisheries management is taking a transformative turn, emphasizing the integration of human dynamics into decision-making processes. As our world becomes more interconnected through globalization, understanding the intricate human dimension of the fisheries sector is emerging as a critical aspect of sustainable resource management. This forward-looking approach seeks to proactively address challenges while capitalizing on new opportunities.

In a global marketplace where local and imported products compete for consumer attention, vulnerability to disruptions, as evidenced by the COVID-19 pandemic (OECD 2020), has highlighted the need for adaptable strategies embracing the broader picture encompassing external influences. Recent IPHC's socioeconomic study underlines the far-reaching impacts of such dynamics, showcasing the income fluctuations experienced by households dependent on Pacific halibut during the pandemic. Acknowledging these complexities, there is a growing realization of the need for expanding the scope of management-supporting information the IPHC provides beyond stock condition.

The question of how small remote communities can capitalize on the high prices that the final customers are paying for premium seafood products demands innovative thinking. 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 parallel, the accelerating impacts of climate change is placing fisheries at the forefront of environmental challenges. The rapid increase in water temperature off the coast of Alaska in 2014-16, termed *the blob*, exemplifies the changes that disrupt ecosystems and 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 emerges as an avenue for impactful work.

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.

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APPENDICES

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

Appendix II: Biological research areas in the 5-Year Program of Integrated Research and Monitoring (2022-2026) and ranked relevance for stock assessment and management strategy evaluation

Appendix III: List of ranked research priorities for stock assessment

Appendix IV: List of ranked research priorities for management strategy evaluation

Appendix V: Proposed schedule of outputs

Appendix VI: 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:

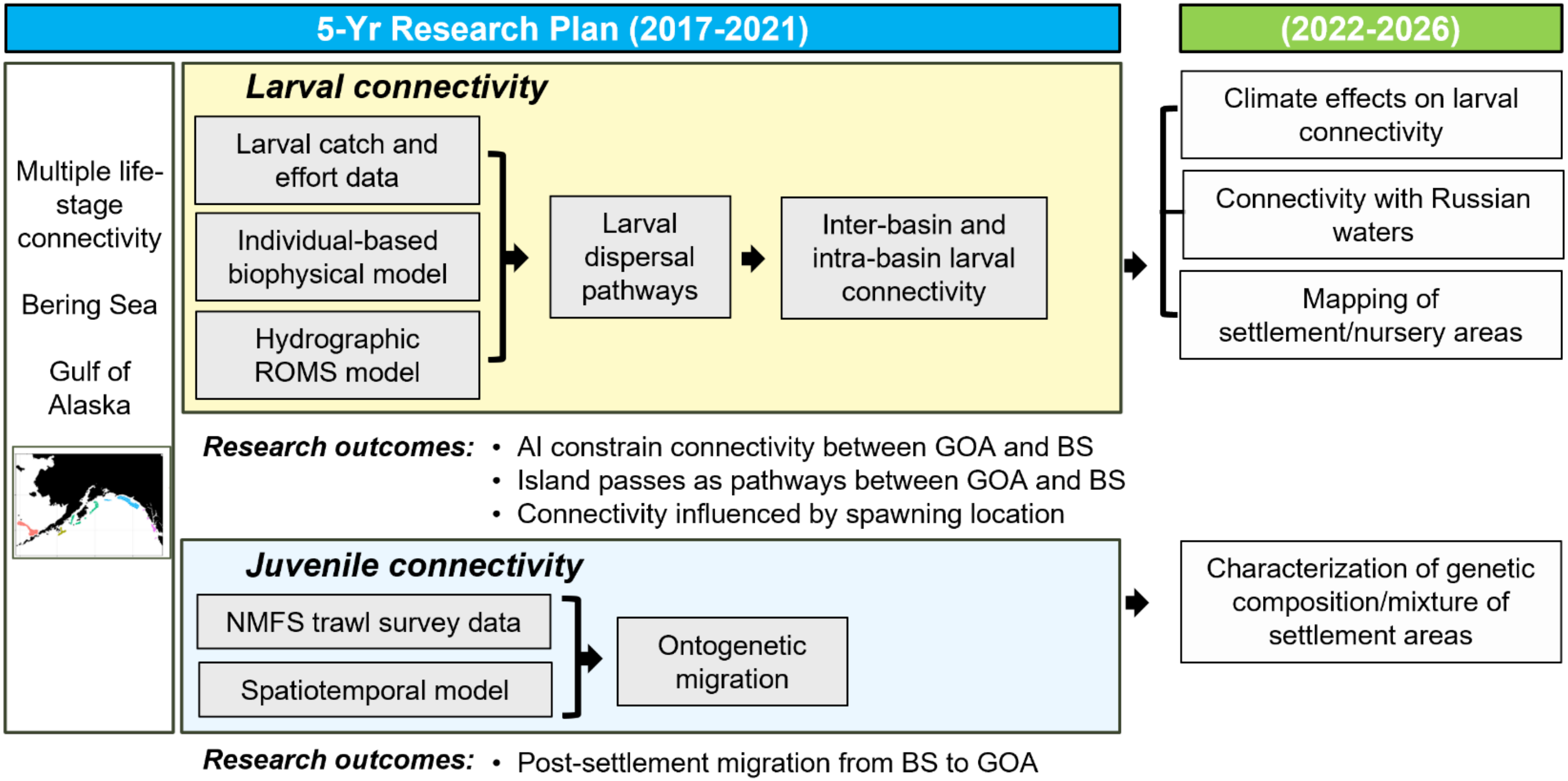
Fish, T., Wolf, N., Smeltz, T. S., Harris, B. P., and Planas, J. V. Reproductive Biology of Female Pacific Halibut (*Hippoglossus stenolepis*) in the Gulf of Alaska. *Frontiers in Marine Science* 2022. 9:801759. doi: 10.3389/fmars.2022.801759.

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.

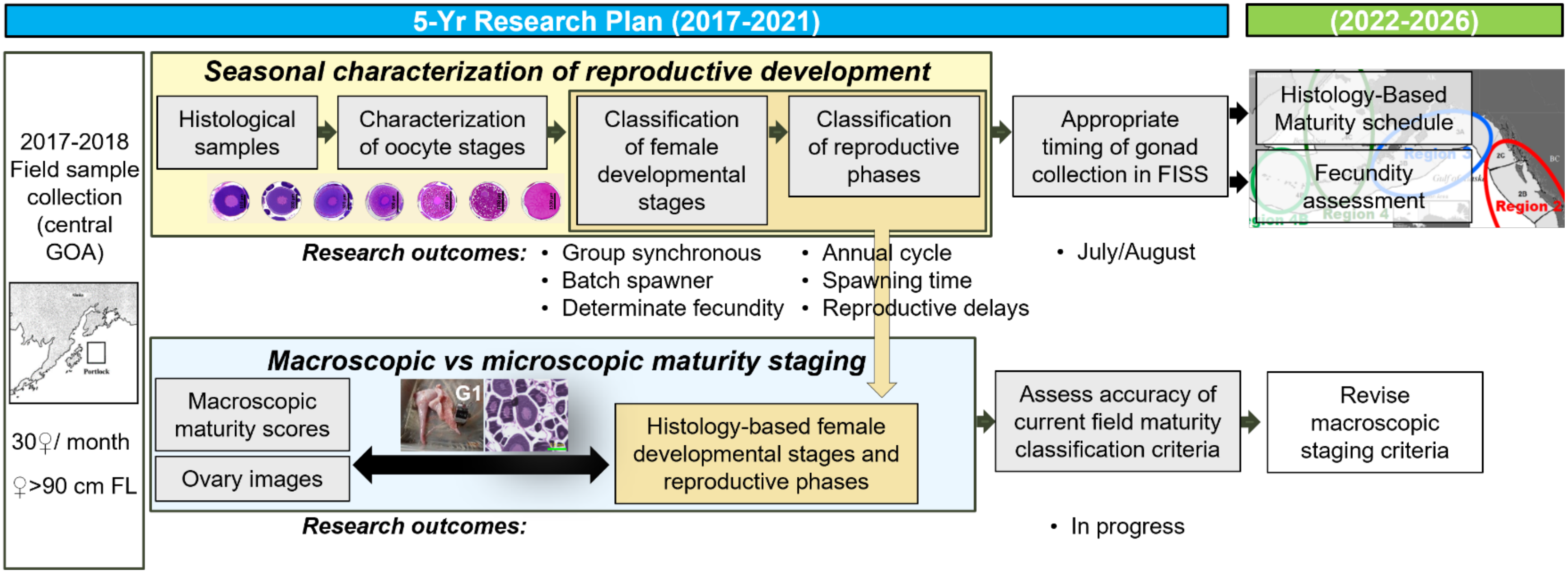
Loher, T., Dykstra, C.L., Hicks, A., Stewart, I.J., Wolf, N., Harris, B.P., Planas, J.V. Estimation of postrelease longline mortality in Pacific halibut using acceleration-logging tags. *North American Journal of Fisheries Management*. 2022. 42: 37-49. DOI: http://dx.doi.org/10.1002/nafm.10711.

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

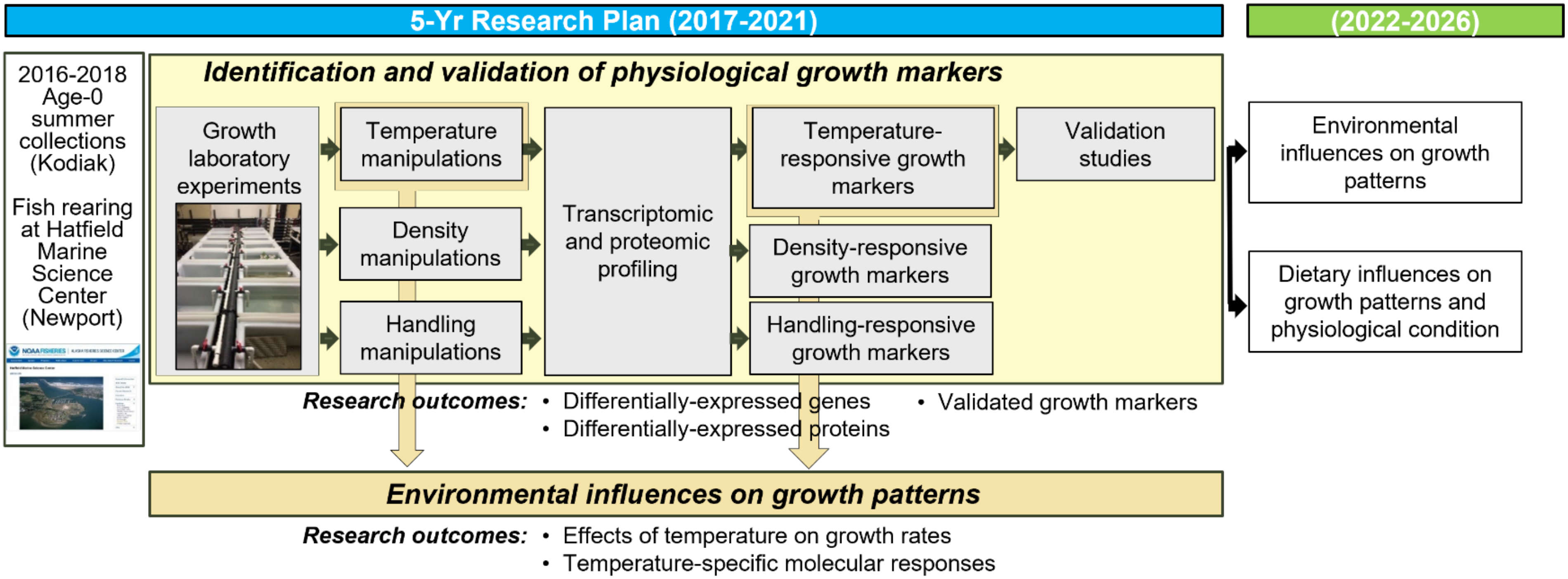


2. Reproduction



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

5-Yr Research Plan (2017-2021) | **(2022-2026)**

Fall 2017 field experiment (GOA)

Discard mortality rate estimation: longline fishery

Capture and handling conditions
- Careful shake
- Gangion cut
- Hook strip

Injury and viability assessment

Physiological condition assessment

Analysis of capture-related variables

Survival assessment by tagging

Best handling practices in longline fishery

Research outcomes:
- Injury and viability profiles of hook release methods
- Physiological profile of fish under different capture and handling conditions
- Longline DMR

Summer 2021 field experiments (Sitka, AK Seward, AK)

Discard mortality rate estimation: charter recreational fishery

Capture and handling conditions
- 12/0 and 16/0 hooks

Injury, viability and physiological assessment

Survival assessment by tagging

Analysis of capture-related variables

Best handling practices in recreational fishery

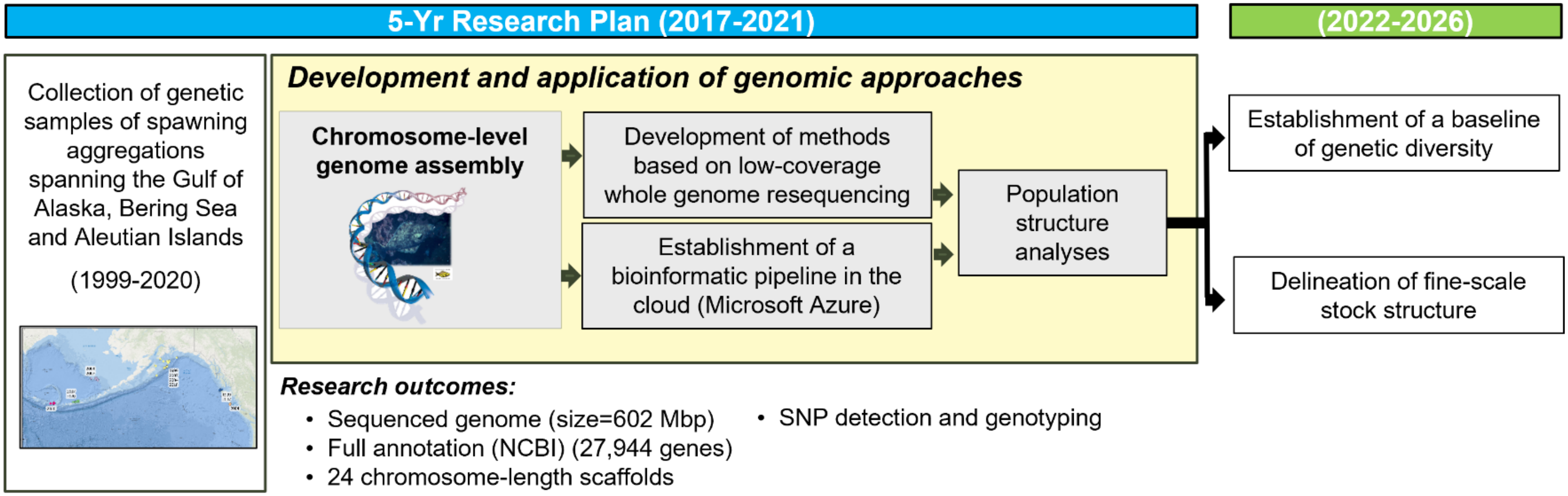
Research outcomes:
- In progress

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



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

APPENDIX II

Biological research areas in the 5-Year Program of Integrated Research and Monitoring (2022-2026) and ranked relevance for stock assessment and management strategy evaluation (MSE)

Research areas	Research activities	Research outcomes	Relevance for stock assessment	Relevance for MSE	Specific analysis input	SA Rank	MSE Rank	Research priorization
Migration and population dynamics	Population structure	Population structure in the Convention Area	Altered structure of future stock assessments	Improve parametization of the Operating Model	If 4B is found to be functionally isolated, a separate assessment may be constructed for that IPHC Regulatory Area	2. Biological input	1. Biological parameterization and validation of movement estimates and recruitment distribution	2
	Distribution	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	3. Biological input		2
	Larval and juvenile connectivity studies	Improved understanding of larval and juvenile distribution	Improve estimates of productivity		Will be used to generate potential recruitment covariates and to inform minimum spawning biomass targets by Biological Region	3. Biological input	1. Biological parameterization and validation of movement estimates	2
Reproduction	Histological maturity assessment	Updated maturity schedule	Scale biomass and reference point estimates	Improve simulation of spawning biomass in the Operating Model	Will be included in the stock assessment, replacing the current schedule last updated in 2006	1. Biological input		1
	Examination of potential skip spawning	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			1
	Fecundity assessment	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			1
	Examination of accuracy of current field macroscopic maturity classification	Revised field maturity classification			Revised time-series of historical (and future) maturity for input to the stock assessment			1
Growth	Evaluation of somatic growth variation as a driver for changes in size-at-age	Identification and application of markers for growth pattern evaluation	Scale stock productivity and reference point estimates	Improve simulation of variability and allow for scenarios investigating climate change	May inform yield-per-recruit and other spatial evaluations of productivity that support mortality limit-setting		3. Biological parameterization and validation for growth projections	5
		Environmental influences on growth patterns			May provide covariates for projecting short-term size-at-age. May help to delineate between effects due to fishing and those due to environment, thereby informing appropriate management response			5
		Dietary influences on growth patterns and physiological condition			May provide covariates for projecting short-term size-at-age. May help to deleineate between effects due to fishing and those due to environment, thereby informing appropriate management response			5
Mortality and survival assessment	Discard mortality rate estimate: longline fishery	Experimentally-derived DMR	Improve trends in unobserved mortality	Improve estimates of stock productivity	Will improve estimates of discard mortality, reducing potential bias in stock assessment results and management of mortality limits	1. Fishery yield	1. Fishery parameterization	4
	Discard mortality rate estimate: recreational fishery				Will improve estimates of discard mortality, reducing potential bias in stock assessment results and management of mortality limits			4
	Best handling and release practices	Guidelines for reducing discard mortality			May reduce discard mortality, thereby increasing available yield for directed fisheries	2. Fishery yield		4
Fishing technology	Whale depredation accounting and tools for avoidance	New tools for fishery avoidance/deterence; improved estimation of depredation mortality	Improve mortality accounting	Improve estimates of stock productivity	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	1. Assessment data collection and processing		3

APPENDIX III

List of ranked research priorities for stock assessment

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	Migration and population dynamics	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		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	Fishing technology	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	Fishing technology	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 IV

List of ranked research priorities for management strategy evaluation (MSE)

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 and population dynamics	Larval and juvenile connectivity studies
	Stock structure of IPHC Regulatory Area 4B relative to the rest of the Convention Area			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 V

List of ongoing and planned research projects (Will be linked to the website)

Research Project #	Project Title	Abstract	Objectives	Deliverables	Progress report	5YPRIM Research area	Management implications	Specific inputs into management	Period of Performance	PI	Funding source	Budget	Research prioritization for SA/MSE
1	Leveraging multiple genomic approaches to investigate population structure and dynamics of Pacific halibut	The Pacific halibut (Hippoglossus stenolepis) is a key flatfish species in the North Pacific Ocean ecosystem that supports important commercial, recreational and subsistence fisheries and that is managed as a single stock by the International Pacific Halibut Commission. The overarching goal of the present study is to advance our understanding of Pacific halibut population structure and dynamics in a changing climate through the use of genomic approaches to inform fishery management. In particular, we seek to improve our current understanding of stock structure among spawning groups of Pacific halibut in the northeast Pacific Ocean by conducting low coverage whole genome resequencing, a method that allows the characterization of genomic variation at the highest resolution possible and with which we will establish a baseline of Pacific halibut genetic diversity. Subsequently, we will leverage the obtained genomic data to identify markers that display high differentiation among the different genetic baseline datasets. The results from this study will inform on the delimitation of management units and provide preliminary information on stock composition in the Pacific halibut fishery, as well as provide a tool to monitor changes in distribution associated with climate change.	1. Investigate fine scale Pacific halibut population structure in the northeast Pacific Ocean using low coverage whole genome resequencing: characterization of neutral and adaptive variation at very high resolution among spawning groups leading to the identification of millions of genome-derived genetic markers. 2. Develop a high-throughput genetic marker panel consisting of a selection of genome-derived, high resolution markers	1.Establishment of a baseline of Pacific halibut genetic diversity. The genomic data produced will represent a detailed baseline of Pacific halibut genetic structure and diversity at neutral and adaptive markers over a large geographical scale (Gulf of Alaska, Aleutian Islands and Bering Sea) and over a broad temporal scale (last 30 years). 2.Delineation of fine-scale Pacific halibut stock structure. 3. Assignment of individuals to source populations and assessment of distribution changes.	IPHC-2023-SRB022-09/NPRB Interim Report July 2023/IPHC-2023-WM2023-12	Migration and Population Dynamics	1. Altered structure of future stock assessments and MSE operating models. 2. Improve estimates of productivity. 3. Improve understanding of population distribution and the effects of distributing fishing effort.	If IPHC Regulatory Area 4B is found to be functionally isolated, a separate assessment may be constructed for that IPHC Regulatory Area. Research outcomes will be used to define management targets for minimum spawning biomass by Biological Region.	12/01/2021-02/16/2024	Josep Planas	External (North Pacific Research Board; Project No. 2110)	$193,685	Priority Rank #2
2	Mapping 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 (Sadorus et al., 2021; https://doi.org/10.1111/fog.12512). Although it is known that Pacific halibut, following the pelagic larval phase, begin their demersal stage as roughly 6-month-old juveniles, settling in shallow nursery (settlement) areas, near or outside the mouths of bays (Carpi et al., 2021; 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, the IPHC Secretariat has initiated studies to identify potential settlement areas for juvenile Pacific halibut throughout IPHC Convention Waters.	1. Collect data sources on juvenile Pacific halibut presence. 2. 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.	Map of juvenile Pacific halibut habitat.	IPHC-2023-SRB022-09/IPHC-2023-WM2023-12	Migration and Population Dynamics	Improve estimates of productivity	Will be used to generate potential recruitment covariates and to inform minimum spawning biomass targets by Biological Region	01/01/2023-12/31/2025	Josep Planas	Internal	$0	Priority Rank #2
3	Female reproductive assessment	In fisheries, understanding the reproductive biology of a species is important for estimating the reproductive potential and spawning biomass of the stock and, consequently, for optimizing management of the species. Recent sensitivity analyses have shown the importance of changes in spawning output in female Pacific halibut due to changes in maturity schedules, in fecundity estimations and/or in skip spawning for stock assessment (Stewart and Hicks, 2020). These results highlight the need for a better understanding of factors influencing reproductive biology and spawning success in Pacific halibut. In order to fill existing knowledge gaps related to the reproductive biology of female Pacific halibut, research efforts are being conducted to characterize female reproductive capacity in this species. Improved knowledge on key aspects of the reproductive physiology of Pacific halibut (e.g., maturity schedules, fecundity, etc.) will provide an updated and more comprehensive description of reproductive capacity and success in this important species.	1.Produce an accurate description of oocyte developmental stages in female Pacific halibut that can be used to classify female maturity stages. 2.Describe changes in female and male maturity stages throughout an entire annual reproductive cycle based on histological assessment and physiological parameters that will be used to revise current estimates of female and male age-at-maturity. 3.Compare macroscopic (based on field observations) and microscopic (based on histological assessment) female and male maturity stages and revise maturity criteria used in FISS. 4.Update maturity schedules based on histological classification of female maturity. 5. Conduct investigations on fecundity and on the incidence of skip-spawning in female Pacific halibut. 6.Conduct investigations on possible temporal and spatial changes in reproductive performance (maturity, fecundity, skip-spawning) in female Pacific halibut.	1. Updated maturity schedule coastwide. 2. Fecundity-at-age and -size estimates. 3. Revised field maturity classification. 4. Information on skip-spawning.	IPHC-2023-SRB022-09/IPHC-2023-WM2023-12	Reproduction	Scale biomass and reference point estimates. Improve estimates of spawning biomass in the stock assessment and improve simulations of spawning biomass in the MSE operating model.	Research outcomes will be included in the stock assessment, replacing the current maturity schedule last updated in 2006. Research outcomes 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. Research outcomes 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. Research outcomes will result in revised time-series of historical (and future) maturity for input to the stock assessment.	01/01/2017-12/31/2026	Josep Planas	Internal	$51,834 (FY2024)	Priority Rank #1
4	Gear-based approaches to catch protection as a means for minimizing whale depredation in longline fisheries	In the north Pacific, both Killer (Orcinus orca) and Sperm (Physeter macrocephalus) whales are involved in depredation behavior in Pacific halibut (Hippoglossus stenolepis). In 2011 and 2012 fisheries observers estimated that 6.9% of Pacific halibut sets were affected by whale depredation in the Bering Sea. Reductions in catch per unit effort (CPUE) when whales were present ranged across geographic regions from 5 15-57% for Pacific halibut. These impacts also incur significant time, fuel, and personnel costs to fishing operations. From a fisheries management perspective, depredation creates an additional and highly uncertain source of mortality, loss of data (e.g. compromised survey activity), and reduces fishery efficiency. Stock assessments of both Pacific halibut (Stewart et al. 2020) and sablefish (Goethel et al. 2020) have adjusted their analysis of fishery independent data to account for the effects of whale depredation on catch rates. In the sablefish assessment, fishery limits are also adjusted downward to reflect expected depredation during the commercial fishery. Meanwhile, potential risks to the whales include physical injury due to being near vessels and gear, disruption of social structure , and developing an artificial reliance on food items that can be affected by fishery dynamics. Many efforts have been made over the years to mitigate this problem, with fishers generally limited to simple methods that can be constructed, deployed, or enacted without significantly disrupting normal fishing operations, or without violating gear regulations. Existing approaches include catch protection, physical and auditory deterrents, and spatial or temporal avoidance. These approaches have had variable degrees of success and ease of adoption in each fishery but none have provided a long-term solution. There are increasing data sources supporting the notion that technologies which reduce initial contact between gear and depredators will reduce the likelihood of foraging attempts around the gear, thereby sustaining levels of target catch while simultaneously reducing risk of depredator mortality and gear damage. Recent studies using physical catch protection methods include the development of underwater shuttles that unhook, and transport catch to the surface (Patagonian toothfish), light and expandable 'slinky' pots (sablefish), and flashers or mesh panels attached to the gear to obscure catch (tuna) (IPHC 2022). While slinky pots had quick uptake in the sablefish longline fishery, depredation occurring with this gear has been reported (Goethel et al. 2022), demonstrating the urgency of ongoing challenges to interrupting the reward cycle underpinning this problem.	1. Identify potential methods for protecting hook captured fish from whale depredation. 2. Develop and field-test several simple low-cost catch-protection designs that can be deployed effectively using current longline fishing techniques.	1. Cost effective prospective terminal gear modifications designed to protect longline catch from whale depredation. 2. Demonstration of the functionality of these proof-of-concept catch protection devices in field tests and provide direction for further modifications and larger scale experimental testing.	IPHC-2023-SRB022-09/IPHC-2023-WM2023-12/BREP Interim Report May 2023	Fishing technology	Improve mortality accounting. Improve estimates of stock productivity.	Research outcomes 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.	11/01/2021-10/30/2023	Claude Dykstra/Ian Stewart	External (Bycatch Reduction Engineering Program - NOAA: Project NA21NMF4720534)	$99,700	Priority Rank #3
5	Use of artificial intelligence (AI) for determining the age of Pacific halibut from images of collected otoliths	The IPHC Secretariat is looking at options for supplementing current Pacific halibut ageing protocol with automatized ageing that does not require extensive otolith-reader training. The IPHC is investigating the potential use of artificial intelligence (AI) for determining the age of Pacific halibut from images of collected otoliths. The Secretariat is in the process of initializing creation of a database of pictures with expert-provided labels, utilizing previously aged otoliths, and assessing the option for the development of a Convolutional Neural Network (CNN) model specifically designed for image classification to determine Pacific halibut age. The goal is to create an AI-based age determination system that complements traditional methods for reliable fish stock assessment and management advice.	1. Develop a labeled image database from previously aged otoliths 2.Train and validate a CNN model for automated ageing 3. Verify the accuracy of the CNN model against traditional ageing methods	1. Predictive CNN model for ageing Pacific halibut complementing traditional methods 2. A report comparing CNNI model performance to traditional ageing techniques	N/A	Age composition data (both fishery-dependent and fishery-independent)	Age data is a critical input for stock assessment.	AI-driven age determination offers a critical enhancement to stock assessment methodologies, aiding in the estimation of growth rates, maturity, and population structure of Pacific halibut.	09/2023-12/2024+	Barbara Hutniczak	Internal	$0	Priority Rank #1

Proposed

Research Project #	Project Title	Abstract	Objectives	Deliverables	Progress report	5YPRIM Research area	Management implications	Specific inputs into management	Requested period of performance	PI	Targeted funding source	Requested budget	Research prioritization for SA/MSE
1	Genomic analyses of Pacific halibut in Washington State waters to inform population structure and dynamics affecting coastal communities	Current studies at the IPHC, with funding from a grant from the North Pacific Research Board (Project #2110; 2022-2024), are devoted to the application of genome-based approaches (i.e. low coverage whole genome resequencing, lcWGR) to investigate stock structure among known spawning groups of Pacific halibut in the Gulf of Alaska (as far South as Haida Gwaii), Bering Sea and Aleutian Islands. By leveraging the recently sequenced and annotated reference Pacific halibut genome (Jasonowicz et al., 2022; GCF_022539355.2), the IPHC has conducted lcWGR for a total of 600 individual samples from the above-mentioned spawning groups at a coverage of 3X. This effort has so far resulted in the identification of 11.5 million autosomal single nucleotide polymorphisms (SNPs), of which 4 million SNPs have a minor allele frequency higher than 0.05. Considerable progress is currently being made towards using genome approaches to establish a genetic baseline for the available spawning groups, and towards the development of genomic tools aimed at addressing important ecological, environmental, and management-related issues with respect to Pacific halibut in the Gulf of Alaska, Bering Sea and Aleutian Islands. However, the lack of genetic samples from spawning groups off the WA coast limits the application of the above-mentioned genomic tools to advance our understanding of population structure, movement, connectivity, adaptive characteristics, and environmental responses of Pacific halibut in Convention waters. Although no major spawning ground has been mapped south of Cape St. James in the southern tip of Haida Gwaii (St. Pierre, 1984), archeological records along with traditional and ecological knowledge from Indian Tribes (e.g., Makah tribe, etc.) that fished Pacific halibut in the winter off the WA coast indicate that Pacific halibut, at least historically, spawned in what is now IPHC Regulatory Area 2A (Salmen-Hartley, 2018). Additionally, contemporary reports of spawning Pacific halibut south of Cape Flattery and the existence of suitable spawning habitat for Pacific halibut (i.e., deep areas off the continental slope, 200-600 m) are strongly indicative of the presence of spawning grounds for Pacific halibut off the WA coast. Therefore, the identification of potential winter spawning groups of Pacific halibut in WA waters and their biological (i.e., genetic and reproductive) characterization are important for addressing key issues related to Pacific halibut that impact coastal communities within Convention Waters. The overarching goal of this proposal is to characterize the genetic composition of Pacific halibut found off the WA coast using state-of-the-art genomic approaches. The results of this proposal will improve our understanding	1. To identify winter spawning groups of Pacific halibut off the WA coast with the use of traditional and ecological knowledge and collect biological samples. 2. To characterize the reproductive condition of female and male Pacific halibut off the WA coast during the winter spawning season. 3. To generate and incorporate genomic data from winter spawning groups off the WA coast to existing data from winter spawning groups in other geographic areas in the northeastern Pacific Ocean to establish an expanded baseline of Pacific halibut genetic diversity.	1. Information on Pacific halibut spawning groups off the WA coast: location information, spawning time and collection of biological (genetic and reproductive) samples. 2. Extended baseline of Pacific halibut genetic diversity and delineation of fine-scale Pacific halibut stock structure in WA waters and coastwide.	N/A	Migration and Population Dynamics	Altered structure of future stock assessments and MSE operating models. Improved estimates of productivity coastwide.	Information of stock structure of the Pacific halibut population in Convention waters will inform management actions by validating management units. Research outcomes will be used to define management targets for minimum spawning biomass by Biological Region.	02/01/2024-1/31/2026	Josep Planas	External (Washington Sea Grant). Full proposal submitted in May 2023. Proposal not selected for funding.	$288,652	Priority Rank #2
2	Full scale testing of devices to minimize whale depredation in longline fisheries	In the north Pacific, both Killer (Orcinus orca) and Sperm (Physeter macrocephalus) whales are involved in depredation behavior in Pacific halibut (Hippoglossus stenolepis). In 2011 and 2012 fisheries observers estimated that 6.9% of Pacific halibut sets were affected by whale depredation in the Bering Sea (Peterson et al. 2014). Reductions in catch per unit effort (CPUE) when whales were present ranged across geographic regions from 5 15-57% for Pacific halibut (Peterson et al. 2014). These impacts also incur significant time, fuel, and personnel costs to fishing operations. From a fisheries management perspective, depredation creates an additional and highly uncertain source of mortality, loss of data (e.g. compromised survey activity), and reduces fishery efficiency. Stock assessments of both Pacific halibut (Stewart et al. 2020) and sablefish (Goethel et al. 2020) have adjusted their analysis of fishery independent data to account for the effects of whale depredation on catch rates. In the sablefish assessment, fishery limits are also adjusted downward to reflect expected depredation during the commercial fishery. Meanwhile, potential risks to the whales include physical injury due to being near vessels and gear, disruption of social structure (e.g., Chilvers and Corkeron 2001), and developing an artificial reliance on food items that can be affected by fishery dynamics. Many efforts have been made over the years to mitigate this problem, with fishers generally limited to simple methods that can be constructed, deployed, or enacted without significantly disrupting normal fishing operations, or without violating gear regulations. Existing approaches include catch protection, physical and auditory deterrents, and spatial or temporal avoidance. These approaches have had variable degrees of success and ease of adoption in each fishery (Werner et al. 2015) but none have provided a long-term solution. There are increasing data sources supporting the notion that technologies which reduce initial contact between gear and depredators will reduce the likelihood of foraging attempts around the gear, thereby sustaining levels of target catch while simultaneously reducing risk of depredator mortality and gear damage. Recent studies using physical catch protection methods include the development of underwater shuttles that unhook, and transport catch to the surface (Patagonian toothfish), light and expandable 'slinky' pots (sablefish), and flashers or mesh panels attached to the gear to obscure catch (tuna) (IPHC 2022). While slinky pots had quick uptake in the sablefish longline fishery, depredation occurring with this gear has been reported (Goethel et al. 2022), demonstrating the	1. Assess the performance of catch protection devices to effectively reduce depredation of longline captured fish in the presence of toothed whales. 2. Assess the performance metrics of catch protection devices on the size, number, and condition of fish successfully entrained in the devices	1. Further define and develop previously identified high priority work that can break the reward cycle of depredation behavior and thereby suppress its prevalence. 2. Build on strategies to protect already captured fish in cost effective manners that are compatible with currently employed hook and line fishing practices in the North Pacific halibut fishery.	N/A	Fishing technology	Improved accuracy of mortality estimates. Improve estimates of productivity	Will be used to generate potential recruitment covariates and to inform minimum spawning biomass targets by Biological Region	11/1/2023-04/30/2025	Claude Dykstra/Ian Stewart	External (Bycatch Reduction Engineering Program - NOAA). Full proposal submitted in March 2023. Awarded.	$199,870	Priority Rank #3
3	Development of a non-lethal genetic-based method for aging Pacific halibut	Robust methods to estimate the ages of commercially exploited fish species are critical for stock assessment. Furthermore, when combined with data on other biological characteristics; such as length/weight, maturity, movement, and distribution; the age distribution or age structure of a fish population provides essential information on population dynamics related to age, predicted reproductive status, life history stage, etc. For Pacific halibut; an ecologically, economically and culturally important fish species in Alaska; age estimations are critical to our understanding of the composition of the stock for sustainable management, of historical changes in size-at-age, maturity-at-age, year class strength, mortality, etc., as well as of the response of the Pacific halibut stock to current and future climate variability. For many managed groundfish species, such as Pacific halibut, age has been traditionally estimated by manually counting the number of annuli or concentric lamellae present in sagittal otoliths (i.e. calcified structures located in the head that are used for balance and hearing) under a compound microscope. The International Pacific Halibut Commission (IPHC) has used sagittal otoliths for aging Pacific halibut since 1914, employing a method referred to as "surface aging" until 2002 and switching to a methodological variation known as "break-and-burn" thereafter (Forsberg, 2001). However, for various reasons, alternative methods to traditional otolith age estimations are being explored, developed and applied in fisheries. One of these is a genetic method for aging based on the known observation that the methylation patterns on genomic DNA change predictably with age. DNA methylation (DNAm) is an epigenetic modification of the DNA that consists in the covalent modification of cytosine, one of the four nucleobases found in DNA, and that regulates the expression of genes. Therefore, age-associated DNA methylation patterns can be modelled to generate molecular (i.e., epigenetic) age predictors capable of estimating chronological age with high accuracy. These are referred to as "epigenetic clocks" and can be developed from DNA isolated from any tissue, including non-lethal biological samples, such as a fin clip. Epigenetic clocks have been developed for many vertebrate species, including fish, with high accuracy (r between 0.84 and 0.99) and an average MAE of 0.87 years, that corresponds to 3.5% of the total lifespan of the species examined. Since DNA sequencing for measuring methylation levels is becoming cost effective and is a high throughput technique with little or no inherent human error or bias, epigenetic clocks have moved to the forefront among the alternative methods for aging that are currently available for fish species. The	1. To identify DNA methylation signals in Pacific halibut fin tissue. 2. To develop an age prediction model based on DNA methylation patterns: an epigenetic clock for Pacific halibut. 3. To develop a targeted DNA methylation assay for larger scale age estimations.	1. Reduced representation genome-wide map of DNA methylation at single base-pair resolution for Pacific halibut fin tissue. 2. Age predicting model for Pacific halibut using fin tissue.	N/A	Migration and Population Dynamics/Female Reproductive Assessment/Growth	Age is a critical input for stock assessment.	Age is a key biological input into stock assessment as it is used for estimating fish growth, fish maturity and fecundity-at-age, and mortality rates as well as population structure. Age distribution of Pacific halibut captured in the different fisheries and surveys is used in stock assessment.	02/01/2024-1/31/2026	Josep Planas	External (Alaska Sea Grant). Full proposal submitted in May 2023. Decision expected January 2024.	$60,374	Priority Rank #1

APPENDIX VI

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 VII

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)

IPHC Fisheries Dependent Data Collection Design and Implementation in 2024 – Port operations

PREPARED BY: IPHC SECRETARIAT (M. THOM, I. STEWART, R. WEBSTER 13 DECEMBER 2024 & 16 JANUARY 2025)

PURPOSE

To provide the Commission with the design and implementation of the IPHC fishery-dependent data collection activities in 2024 – Port Operations.

BACKGROUND

The International Pacific Halibut Commission (IPHC) undertakes fishery-dependent data collection activities coastwide to collect Pacific halibut biological data and catch per unit effort data in the form of vessel logbooks. The IPHC fishery-dependent data collection is the IPHC's primary data source providing extensive information on both spatial and temporal variation of commercial landings for Pacific halibut on an annual basis. With sampled ports receiving landings from across the spatial range of the fishery throughout the commercial fishing period, the IPHC is able to obtain representative data that allow us to characterize spatio-temporal patterns in Pacific halibut size, age, sex and genetic information. The commercial fishery data are also an essential input into the estimation of contemporary length-weight relationships which are widely used to estimate the weight of removals outside of the IPHC (e.g. recreational and non-target removals).

Historical logbooks have been provided to the IPHC dating back to 1888. Biological data collection from the commercial sector began in 1933 and continues to the present day. The sampling design and implementation of these data collections has changed in line with the changing fishery regulations, fleet behaviour and best scientific practices.

The Canadian and U.S.A. governments implemented an Individual Vessel Quota (IVQ) in Canada, and an Individual Fishing Quota (IFQ) program in Alaska, in 1991 and 1995, respectively. As a result of this change, the Pacific halibut fishery along the Canadian and USA Alaskan coasts went from a 'derby style race for fish' open from 1-22 days to a nearly year-round fishery lasting 245 days with a winter closure. The length of the fishing period has extended further to present day and in 2024 is 267 days. Prior to the implementation of IVQ/IFQ, the fishery-dependent data collection was accomplished by one or more Secretariat stationed in landing ports for up to a week. After implementation, it became necessary to station Secretariat in major ports throughout the fishery's extended duration (8-9 months) to meet the spatio-temporal data objectives.

In addition to collecting data directly, the IPHC coordinates with other entities for standardised collection of fishery-dependent data. This includes provided training and materials for IPHC Regulatory Area 2A Tribal Commercial fishery stakeholders, California Department of Fish and Wildlife (CDFW), Oregon Department of Fish and Wildlife (ODFW), Washington Department of Fish and Wildlife (WDFW), and Alaska Department of Fish and Game (ADF&G).

FISHERIES DEPENDENT DATA COLLECTION DESIGN

The primary goal and objective of the IPHC port operations is to collect representative samples from Pacific halibut offloads from across the geographical range of the commercial fishery and throughout the commercial fishing period:

- To provide biological input data for the annual IPHC stock assessment;
- To ensure accurate estimation of quantities such as mean commercial weights, size at age, and length-weight relationships used for understanding stock dynamics and estimating non-commercial removals of Pacific halibut;

- To provide data in support of the IPHC research goals, including the collection of biological samples for genetics;
- To maintain field-based points of contact between the fishing industry and the IPHC Headquarters Secretariat.

These goals are achieved through staffing major ports for Pacific halibut landings throughout the commercial fishing period and collaborating with other entities as mentioned above.

Methods for Pacific halibut data collection

The IPHC Secretariat collects data from commercial Pacific halibut landings in major ports. Individual fish are randomly sampled from each landing using prescribed sampling rates for each port and IPHC Regulatory Area, with the goal of sampling a constant proportion of the landed catch over the entire fishing period within each IPHC Regulatory Area. Sampling Pacific halibut consists of the collection of fish lengths, weights, otoliths, and fin clips as well as Pacific halibut logbook data. Biological sampling targets are established by IPHC Regulatory Area to ensure sample sizes are sufficient for the needs of the stock assessment modelers. Prior to the start of each fishing period, landing patterns from each port (for the previous fishing period) are reviewed to ensure proportional sampling (by weight landed) by IPHC Regulatory Area and to ensure minimum data goals are met.

Canada 2024: The IPHC staffed two (2) ports in Canada (Port Hardy and Prince Rupert, BC) with Fisheries Data Specialists (Field, FDS(F)) (Fig. 1).

USA 2024: The IPHC staffed eight (8) ports in Alaska, (Dutch Harbor, St. Paul, Kodiak, Homer, Seward, Juneau, Sitka, Petersburg) with Fisheries Data Specialists (Field, FDS(F)) (Fig. 1). In addition, Pacific halibut landings in Bellingham, WA and Newport, OR were sampled by headquarters-based Secretariat. In 2024 assistance was also provided by IPHC Secretariat for sampling IPHC Regulatory Area 2A Tribal commercial landings in Neah Bay, Washington. Training was conducted for 2A Tribal commercial fishery stakeholders, and nine (9) Washington Treaty Tribes were represented at training.

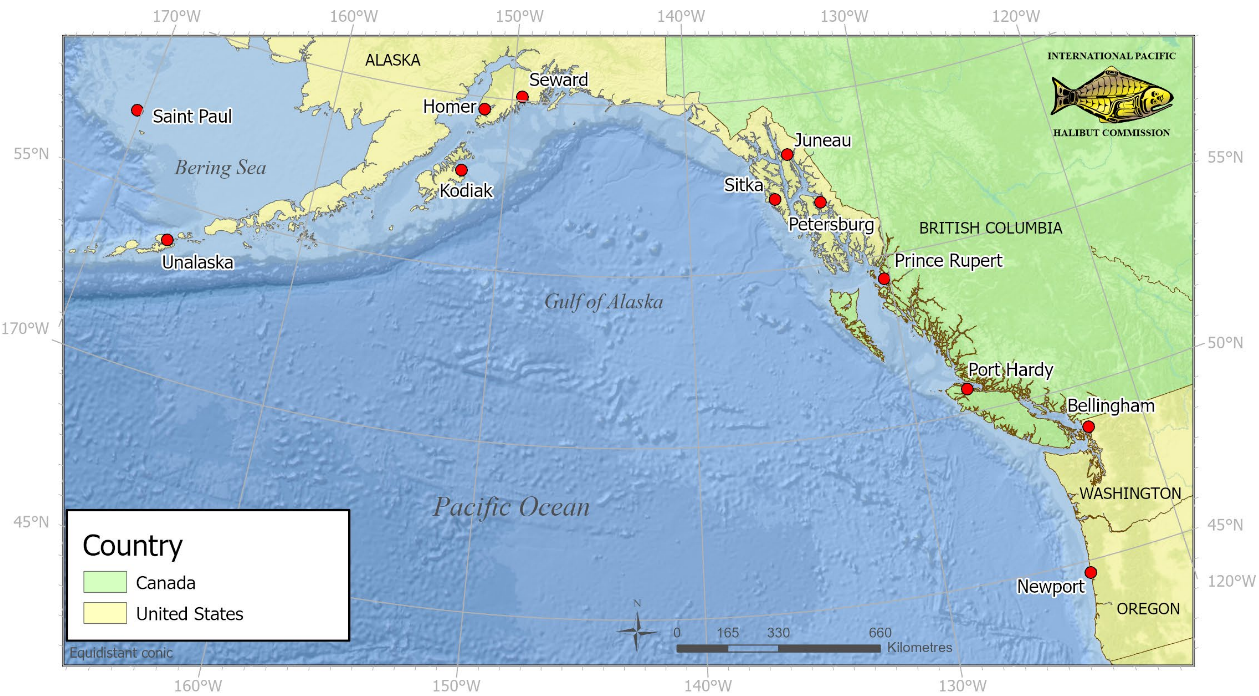


Figure 1. IPHC Fishery-Dependent Data Collection Ports 2024.

Sampling protocols

The IPHC Secretariat collect data according to protocols established in the 2024 International Pacific Halibut Commission Manual for Sampling Directed Commercial Landings (IPHC-2024-PSM01).

DATA COLLECTED IN 2024

Biological data were collected from randomly selected Pacific halibut during the 2024 fishing period. The following metrics were recorded for each sampled fish: left (blind side) sagittal otolith for age determination, fork length measured to the nearest centimeter, weight documented to the nearest tenth of a pound, and fin clip collected for genetic sex determination.

Minimum sampling targets were established to ensure adequate representation of the halibut population across all IPHC Regulatory Areas. The targets were set at 1,500 samples from each of the IPHC Regulatory Areas 2B, 2C, 3A, 3B, 4A, and the combined Areas 4CDE, and 1,000 samples from IPHC Regulatory Area 2A. Port- and IPHC Regulatory Area-specific sampling rates were determined based on access to catch, spatial and temporal goals, and the need to meet minimum sampling target numbers. Rationalisation for these targeted minimums are detailed in Appendix I. The summary of biological sampling can be found in Table 1.

Table 1: Biological samples collected during the 2024 Pacific halibut commercial fishing period.

IPHC Regulatory Area	Fish Sampled	Percent of Target Minimum	Percent Landed
2A	776	78%	94%
2B	1,774	118%	94%
2C	1,759	117%	88%
3A	1,481	99%	91%
3B	1,713	114%	88%
4A	1,185	79%	55%
4B	826	55%	26%
4CDE	930	62%	39%
Total	**10,444**	-	-

As seen in Table 1, IPHC Regulatory Areas 2B, 2C, and 3B surpassed the target minimum, achieving 118%, 117%, and 114%, respectively. These areas benefitted from high landing percentages and sufficient staffing to allow access to catch. Area 3A reached 99% of its target, nearly achieving the sampling goal. Conversely, IPHC Regulatory Areas 4A, 4B, and 4CDE fell below the target minimum, achieving 79%, 55%, and 62%, respectively. Lower landing percentages in these areas, particularly 4B (26.3%) and 4CDE (39.4%), reflect limited access to catch as percent landed was lower than expected as well as logistical challenges such as insufficient staffing. IPHC Regulatory Area 2A data collections did not meeting the minimum due to access to catch cause by staffing shortages.

Table 2 summarizes fishery logbook and biological data collection, as well as associated costs, by port for the 2024 fishing period. A total of 2007 logbooks and 10,444 biological samples were collected across all ports, with a program-wide cost of $687,300, excluding costs of IPHC Secretariat staff based in Seattle as well as indirect costs associated such at technology, and administrative staff time.

Table 2: Fishery logbook and biological data collected by port during the 2024 fishing period and estimated program costs for FY 2024 by port. Costs do not include IPHC Secretariat based at the headquarters office in Seattle which directly assist with and manage IPHC fishery dependent data collection, or indirect costs such as technology or administrative staffing.

Port	Logbooks	Biological samples	Total Cost (USD)	Total Cost/Month (USD)	Operational Costs (USD)
Dutch Harbor	94	2110	$90,500	$11,700	$37,900
Homer	246	1811	$72,700	$7,800	$11,700
Juneau	84	334	$68,200	$7,400	$7,200
Kodiak	207	873	$78,900	$8,500	$17,900
Petersburg	289	1101	$72,800	$8,100	$13,600
Seward	296	687	$81,900	$9,100	$15,000
Sitka	204	568	$72,800	$7,900	$5,900
St. Paul	125	396	$31,100	$12,100	$13,700
Prince Rupert	169	786	$57,200	$6,400	$13,800
Port Hardy	203	988	$49,400	$5,300	$4,800
2ATribal	91	664	$1,100	N/A	$1,100
Bellingham*	N/A	42	$6,800	N/A	$6,800
Newport*	N/A	84	$3,900	N/A	$3,900
TOTAL	2008		**$687,300**		

Data from IPHC Regulatory Areas 4A, 4B, and 4CDE were collected nearly solely from Dutch Harbor and St. Paul. These data were prioritized due to their critical role in understanding Pacific halibut stocks in this region. These areas experience variable sampling coverage by the IPHC Fishery-Independent Setline Survey, further emphasizing the importance of data collected through fishery-dependent programs. The higher monthly costs of sampling in Dutch Harbor and St. Paul reflect the high cost of living, elevated travel expenses, and the shorter fishing periods compared to other ports. For example, St. Paul was staffed for only 2.5 months, meaning travel costs were divided over a much shorter period than ports staffed for nine or more months. Despite its smaller sample size, St. Paul remains a critical port for stock assessment due to its operational focus on Area 4CDE fisheries.

Costs in the two Canadian ports, Prince Rupert and Port Hardy, were lower than those in Alaska ports, largely due to the reduced cost of employee benefits in Canada compared to the United States. Costs in other ports varied based on factors such as employee turnover, travel expenses, and intermittent staffing requirements.

Sampling in IPHC Regulatory Area 2A was concentrated in Bellingham, Newport, and 2A Tribal locations. While logbook data were collected in Bellingham and Newport, these were handled by IPHC Secretariat staff based in Seattle and are not included in the table. The collection of IPHC Regulatory Area 2A data was largely facilitated through collaboration with Washington State Treaty Tribes, which contributed significantly to the sampling effort. Treaty Tribes were responsible for 664 out of the total 776 biological samples collected in the region—86% of the total—as well as 91 logbooks.

CHALLENGES

While sampling goals were met or exceeded in most areas, challenges remain in achieving adequate sampling coverage in IPHC Regulatory Areas 2A, 4A, 4B, and 4CDE due to lower landings and limited access to catch. To address these challenges, increased staffing or alternative data collection strategies such collaboration with more external entities should be considered. Additional resources may be needed to support sampling in regions with historically low access.

RESULTS

Fishery-dependent data collected and verified prior to 30 October of this year were used in 2024 the Pacific halibut stock assessment. Data collected and processed after 30 October will be used in the following year's stock assessment.

Commercial biological and catch data interactives including 2024 fishery limits reports which are updated bi-monthly can be found at this link https://www.iphc.int/data/.

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-07 Rev_1 that provides the Commission with a summary of the IPHC fishery-dependent data collection design and implementation in 2024.

APPENDICES

APPENDIX I – FISHERY DEPENDENT DATA SAMPLING TARGETS

Appendix I
Fishery Dependent Data Sampling Targets

PURPOSE

To provide clarification of IPHC's rationalised biological data collection minimum goals.

INTRODUCTION

Biological sampling by the IPHC provides the primary source of biological information used for the annual stock assessment and management supporting analyses for Pacific halibut. Biological samples are collected by two primary resources; the Secretariat on the IPHC's Fishery-Independent Setline Survey (FISS) and from commercial fishery landings in major fishing ports coastwide.

In addition, the Alaska Department of Fish & Game (ADFG) collects data from the recreational fishery in Alaska, and both Secretariat [subject to funding] and National Oceanographic and Atmospheric Administration Fisheries (NOAA) staff collect data from a subset of fish captured on the fishery-independent NOAA trawl surveys conducted in Alaska.

This total comprises approximately:

1) 10,000-12,000 otoliths from the FISS (target collections include 2,000 per IPHC Regulatory Area, but are often lower due to actual vs projected catch rates and generally insufficient overall catch in Biological Region 4 even at a 100% sampling rate);
2) 11,500 otoliths from the directed commercial fishery landings (1,500 targeted per IPHC Regulatory Area 2B, 2C, 3A, 3B, 4A, 4B and 4CDE combined, and 1000 from IPHC Regulatory Area 2A);
3) 1,500-2,000 from the recreational sector (collected in the previous year); and
4) 1,500-3,000 from the NOAA trawl surveys (collected in the previous year).

Ideally, all Pacific halibut landings would have the same probability of being sampled and therefore our sampling frame would be random with regard to the entire fishery. This is not feasible, so only the ports with the largest amount of landings have been prioritized for sampling, except for St. Paul which is the primary source of information from IPHC Regulatory Area 4CDE.

The Secretariat has undertaken a review and analysis of the IPHC capacity for sampling, aging and annual needs for stock assessment and provides the following information for general awareness.

ASSESSMENT OF THE EFFECTIVE SAMPLE SIZE FOR 2024

To evaluate current and future data collection priorities, we use the concept of effective sample size (Hulson et al. 2023; Stewart and Hamel 2014) to investigate how reducing the number of otolith ages determined from the biological samples collected would reduce the 'information content' of the fish age data set. Briefly, calculation of effective sample size entails bootstrapping (resampling) the observed ages thousands of times and comparing the simulated data sets to the full data set across the entire range of ages. Generally, effective sample size is much lower than the number of actual fish sampled, because it reflects the fact that fish from a single trip are generally more similar to each other than to fish from different trips and thus not independent samples (Pennington and Volstad 1994). This generally means that the number of trips (or logs) sampled is much more important for statistical power than the number of individual otoliths. The number of otoliths becomes important as the data are portioned for further analyses by IPHC Regulatory Area, by sex and into other important categories (e.g., recent minimum size limit analyses of legal and sublegal fish), Effective sample size is also an appropriate measure for this type of analysis because it is used as the starting point for weighting the age data in the IPHC's stock assessment models.

We first summarized commercial fishery age reading over the most recent five years (2017-2021; the 2022 data was still pending genetic sex assignment). Table A1 reports the average annual number of commercial fishery trips sampled, the annual average number of otoliths read from those trips and the effective sample size that resulted. As expected, the effective sample size is considerably lower than the number of fish because multiple fish are sampled from each unique trip. We then repeated the effective sample size calculation, but randomly subsampled the number of fish to 50% of the actual number. Comparing these results allows us to answer the question: If in recent years we had read only 50% of the ages, how large would the reduction in effective sample size have been? We can speculate that a similar pattern is likely for future sampling yet to be undertaken.

Table A1. Summary of recent (2017-2021) commercial fishery fish ages by Biological Region and possible reductions for 2024. Values reported for effective sample size are the simulated sample size and percentage reduction from the actual effective sample sizes.

Biological Region	Average number of trips sampled	Average number of ages	Effective sample size	Effective sample size from 50% subsampling	Percentage reduction from actual
Region 2	366	4,436	1,525	1,069	30%
Region 3	169	2,552	905	646	29%
Region 4	81	1,866	629	478	24%
Region 4B	13	1,148	57	54	5%

Results showed that the largest effective sample sizes have been coming from the commercial fishery in Biological Region 2; we use Biological Regions here as this is the finest spatial scale at which the data are used directly in the stock assessment. Region 2 is followed by Regions 3, 4 and 4B in descending order of actual effective sample size. When subsampling at a rate of 75% or 50% for age reading was simulated, there was only a 1-11% or 5-30% loss respectively in effective sample size. Specifically, Biological Regions 2 and 3 could be subsampled at a rate of 50% and would only lose approximately 30% of the effective sample size, still resulting in larger effective sample sizes than Regions 4 and 4B. Due to similar analyses conducted during 2022, the target number of fish sampled per trip in Biological Region 4B was reduced for 2023 (not included in this summary), so effectively these fish are already being subsampled with the expectation that this may lead to more trips sampled and therefore a higher effective sample size despite fewer individual fish. Due to the capacity at which IPHC can read otoliths given current staffing, otoliths that are selected for age-reading represent a subsample of those collected.

Table A2. Biological sampling rates in commercial fisheries for 2024, otolith ageing subsampling rates, and the target size of the sample for ageing by IPHC Regulatory Area.

Regulatory Area	Rate	Ageing subsample
2A	0.5	500
2B	0.5	750
2C	0.5	750
3A	0.5	750
3B	0.5	750
4A	1	1,500

4B	1	1,500
4C	1	750
4D	1	750
4E	1	NA
TOTAL		**8,000**

The remaining 50% of the 2024 Region 2 and 3 market sample and the 2023 trawl and recreational samples are planned to be aged with alternative methods when these are available.

Commercial fishery ages are read as they arrive at the IPHC HQ during the fishing season, therefore it is important to set the subsampling rate in advance and apply it consistently across the entire season to ensure representative aging samples. Changing the biological sampling or the ageing subsample rate during the season could lead to bias if the fishery encounters a differing demographic of fish early or late in the year. The results presented here suggest that commercial fishery data from Biological Regions 2 and 3 subsampled at a rate of 50% still result in effective sample sizes only modestly reduced from recent levels.

In the long-term, it is preferable to continue the field sampling of otoliths at current rates even if age reading is subsampled. There is little to no additional cost savings of collecting fewer otoliths in each port once the IPHC has placed Secretariat in that location for the season. By maintaining current sampling rates, we maintain the potential for the IPHC read the unaged otoliths to increase sample sizes if evidence suggests that the existing age data from certain years might not be adequately reflecting population demographics. Thus, any changes in age reading subsample rates do not translate into permanently compromised data sets in the same manner that reductions in field sampling could.

DISTRIBUTION OF THE FISHERY SAMPLES BY PORT

In recent years, the IPHC has sampled biological information from the directed commercial fishery in eight primary Alaskan ports, with a small number of samples also collected from deliveries made into ports in the state of Washington (Table A3). Two ports are nearly the sole source of samples for entire IPHC Regulatory Areas: 96% of the 4B samples are from Dutch Harbor, 85% of the 4A samples are from Dutch Harbor, and 52% of the 4CDE samples are from St. Paul (this increases to 76% in years when the local fleet in St. Paul does not participate in the fishery). Each of 2C, 3A and 3B have landings spread over three primary ports: Juneau, Petersburg, and Sitka for 2C, and Homer, Kodiak, and Seward for 3A and 3B.

Table A3. Distribution among ports of complete directed commercial fishery biological samples collected from each IPHC Regulatory Area in Alaska over 2017-2022.

Port	2C	3A	3B	4A	4B	4CDE
Dutch	0	0	95	5,236	6,005	1,709
Homer	0	2,293	3,074	415	177	394
Juneau	1,694	820	0	0	0	0
Kodiak	0	1,840	2,301	376	101	383
Petersburg	4,064	121	0	0	0	0
Seward	0	2,276	1,312	128	0	114
Sitka	2,709	643	0	0	0	0
St. Paul	0	0	0	0	0	2,783
Washington	153	661	0	0	0	0

DISTRIBUTION OF FISHERY-DEPENDENT SAMPLES BY MONTH

To evaluate the potential loss of samples if FDS(F) coverage was reduced over certain time-periods during the fishing season the distribution of all samples collected into each port was summarized by month (Table A4). Some ports have fewer landings at the beginning of the season (e.g. Homer, Kodiak, Seward), the end of the season (most ports) or months during the summer when fishing/processing focuses on other species (e.g. Juneau in July, Petersburg in July, Sitka in August). These months may be the best candidates for some of the options that reduce or eliminate sampling for a portion of the fishing season, though they may not lead to much cost savings due to increased travel costs for mid-year reductions (July, August).

Table A4. Samples collected from 2017-2022 by port and month

Port	March	April	May	June	July	August	September	October	November
Dutch	-	214	749	2,352	2,113	2,687	3,227	1,173	530
Homer	98	584	1,102	976	784	1,075	768	842	124
Juneau	359	495	563	254	77	241	258	177	90
Kodiak	38	484	951	377	595	630	667	840	419
Petersburg	389	704	789	530	173	553	591	353	103
Seward	86	655	640	447	447	716	418	274	147
Sitka	381	703	673	406	308	156	283	335	107
St. Paul	-	-	-	241	986	1,556	-	-	-
Washington	-	13	27	42	16	130	229	174	183

DIFFERENCES IN AGE COMPOSITIONS BY PORT, SEASON AND MONTH

In addition to maintaining adequate sample sizes overall, by IPHC Regulatory Area, and by Biological Region, it is critical that landings with different demographic characteristics (age, length, weight, sex) are characterized such that the commercial fishery data accurately represents the aggregate characteristics of the entire fishery in Alaska. Several examples of patterns in the age composition data for a given IPHC Regulatory Area are provided below to illustrate how bias would be introduced if sampling were eliminated in a port or entire season. For IPHC Regulatory Area 3A, landings into ports in Southeast Alaska (Juneau and Sitka) have fewer males than landings into 3A ports (Figure A1). Fish sampled in Kodiak tend to be younger than those in other ports, and the relative strength of certain ages also differs among ports. Female halibut from IPHC Regulatory Area 3B landed into Seward tend to be slightly older than those fish landed into Homer and Kodiak (Figure A2). Differences in the relative strength of specific age-classes by port become even more pronounced when individual years are considered. For example, in 2017 landings in Sitka showed a much stronger 2002 year-class (age-15) than those in Petersburg or Juneau (Figure A4). These systematic differences are likely to arise based on spatial patterns in the biology interacting with the specific locations within the larger IPHC Regulatory Area that fishing took place.

Some IPHC Regulatory Areas also show strong seasonal patterns in the age compositions (e.g. very few males in the summer fishery in IPHC Regulatory Area 4CDE; Figure A4), but these generally persist across several months (fewer older fish in IPHC Regulatory Area 2C landings until August; Figure A5), so adjusting effort for a single month by port combination may not be problematic. Because Pacific halibut are highly migratory, fisheries in specific areas may be encountering fish during spawning migrations and/or during summer feeding areas and thus the age- and sex- composition of the landings may differ in important ways over the course of the fishery.

In aggregate, these spatial and seasonal patterns indicate that further cuts to biological port sampling would likely introduce bias in the estimation of the sex and ages captured by the directed commercial fishery. Potential effects of such bias on the stock assessment and other management supporting analyses will depend on the quality of other input data (e.g. the FISS) and the degree to which reductions are temporary or continued for multiple years.

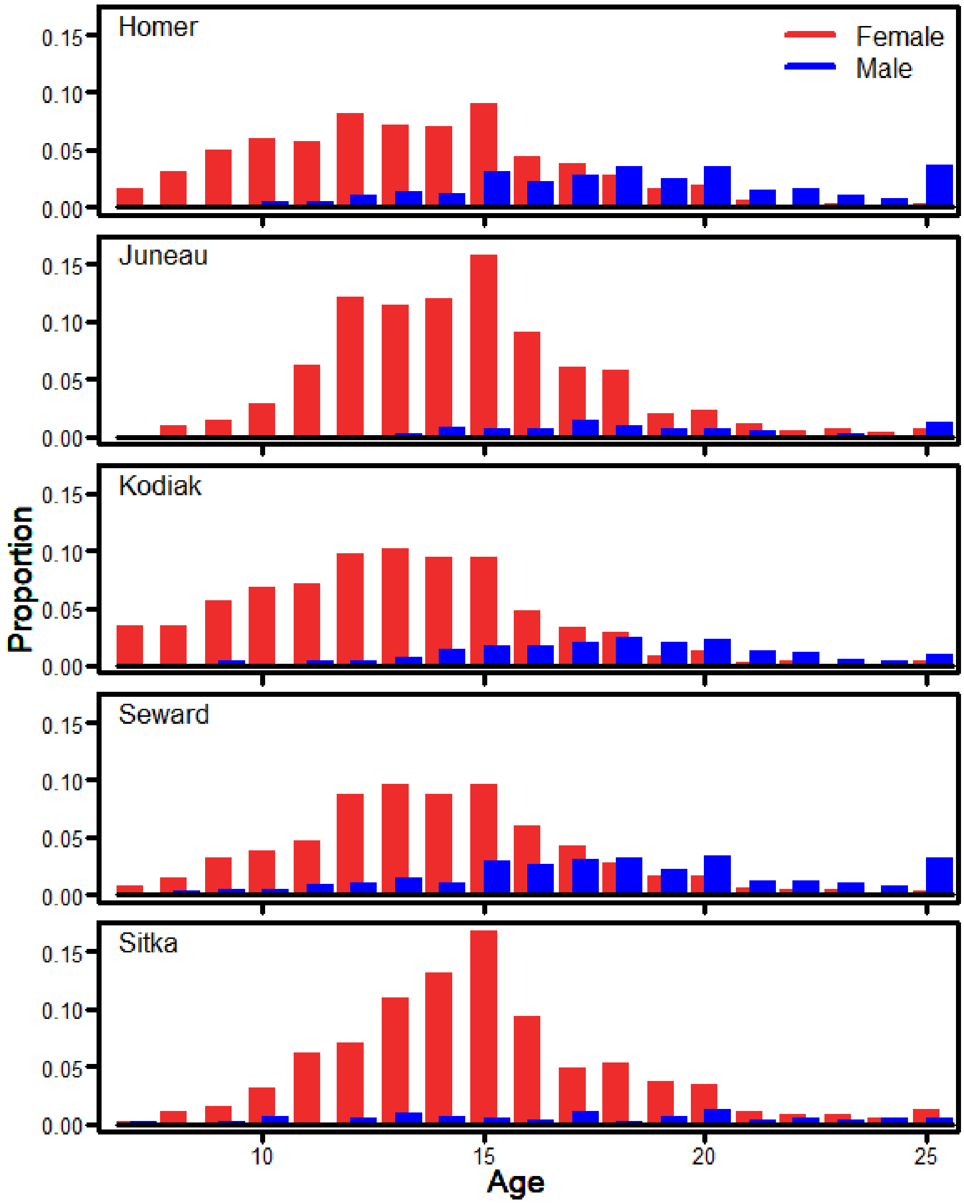


Figure A1. Age frequency distributions for 2017-2022 from IPHC Regulatory Area 3A landings by the port in which they were sampled. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

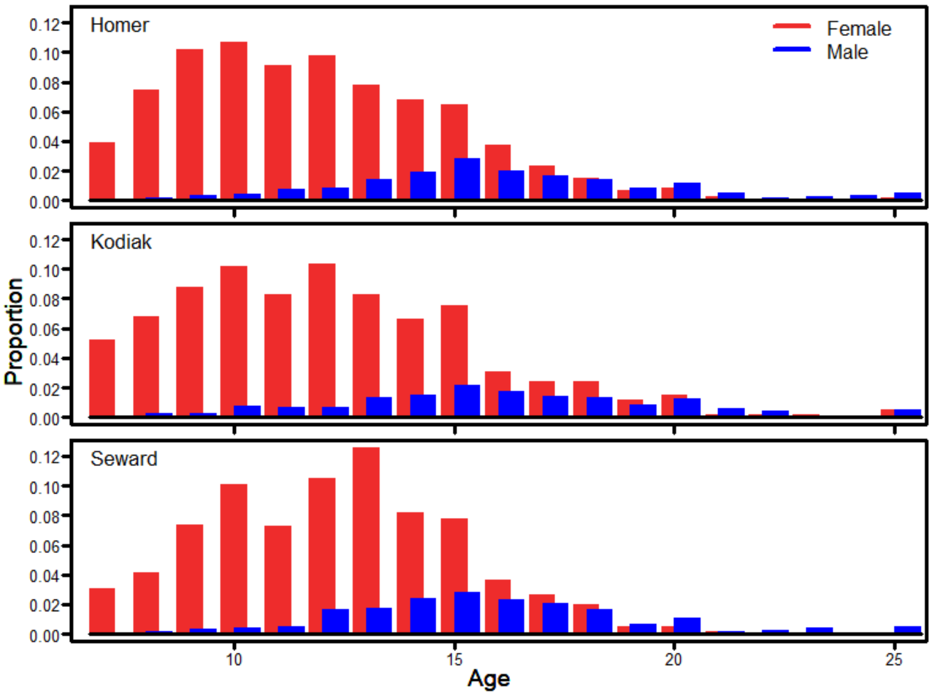


Figure A2. Age frequency distributions for 2017-2022 from IPHC Regulatory Area 3B landings by the port in which they were sampled. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

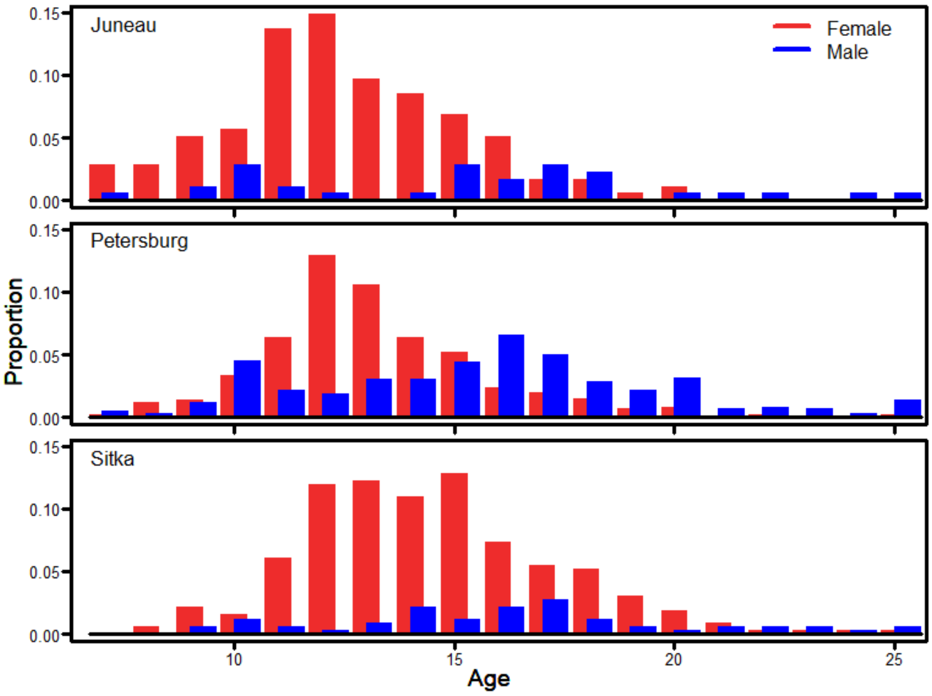


Figure A3. Age frequency distributions from IPHC Regulatory Area 2C landings in 2017 by the port in which they were sampled. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

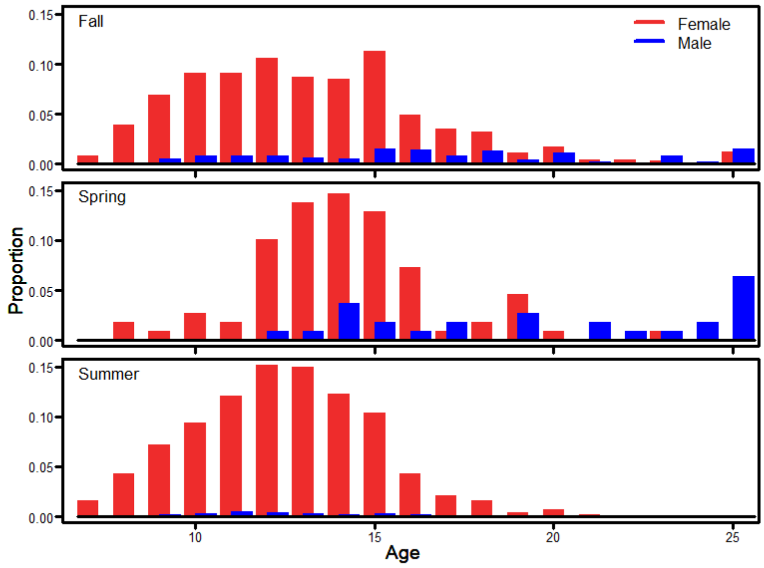


Figure A4. Age frequency distributions for 2017-2022 from IPHC Regulatory Area 4CDE by season in which they were sampled. Spring indicates March-May, Summer June-August, and Fall September-December. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

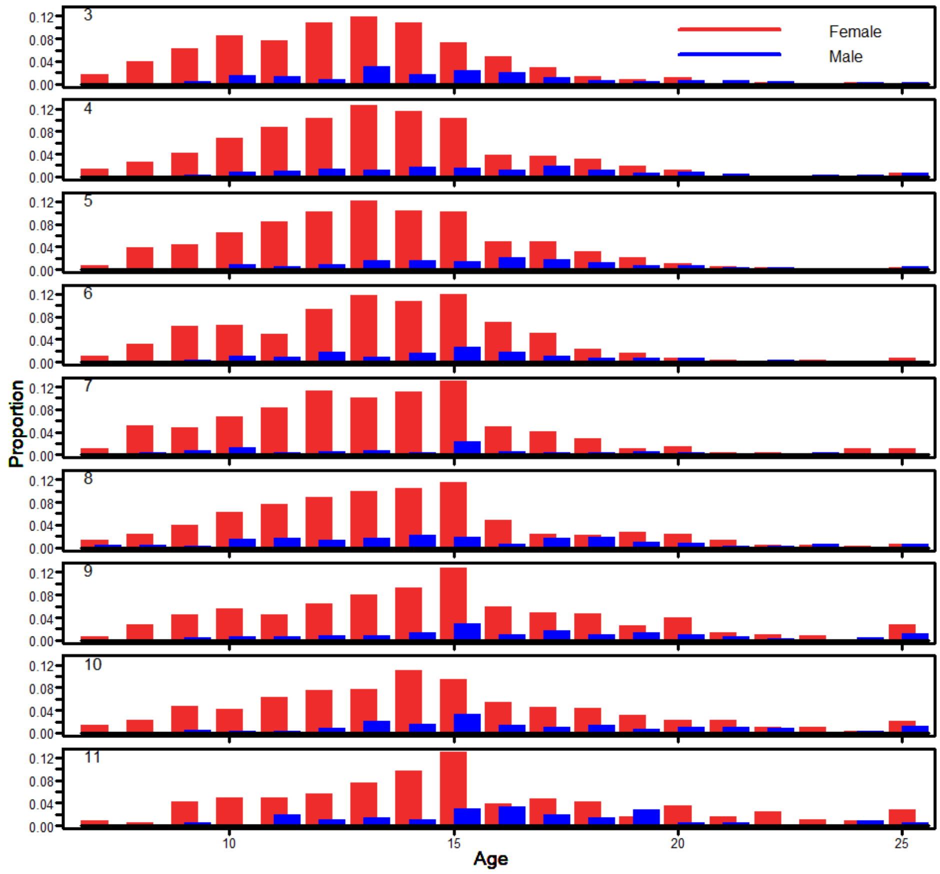


Figure A5. Age frequency distributions for 2017-2022 from IPHC Regulatory Area 2C by the month in which they were sampled. Red bars represent the proportion of the landings (by number of fish) that were female at each age (age-7 includes all fish up to age-7 and age-25 includes all fish 25 or older), and blue bars represent the proportion of males at each age.

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Fisheries Data Overview (2024)

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PURPOSE

To provide an overview of the 2024 Pacific halibut removals, including the status of mortality reported against fishery limits adopted by the Commission and outlined in the IPHC Fishery Regulations (2024). Data provided in this paper include current and end-of-year projections as of 8 January 2025.

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-2025-AM101-11) and other analyses. The data are compiled by the IPHC Secretariat and include data from federal and state agencies of each Contracting Party. All 2024 data are in net weight (head-off, dressed, ice and slime deducted) and considered preliminary at this time. The IPHC Regulatory Areas are provided in Figure 1.

The report provides a preliminary summary of removals in Tables 1 and 2. Table 2 provides estimates of mortality reported against the fishery limits (FCEY) resulting from the IPHC-adopted distributed mortality (TCEY) limits and the existing Contracting Party catch sharing arrangements, as well as non-FCEY mortality projections, by IPHC Regulatory Area. Figure 2 provides cumulative percentage of directed commercial Pacific halibut limit landed by week.

DEFINITIONS

Directed commercial fisheries include commercial landings and discard mortality. Directed commercial discard mortality includes estimates of sub-legal Pacific halibut (under 81.3 cm or 32 inches, also called 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:

i) ceremonial and subsistence (C&S) removals in the IPHC Regulatory Area 2A treaty Indian fishery,
ii) the sanctioned First Nations Food, Social, and Ceremonial (FSC) fishery conducted in British Columbia,
iii) federal subsistence fishery in Alaska that uses Alaska Subsistence [Pacific] Halibut Registration Certificate (SHARC), and
iv) U32 Pacific halibut retained for personal use by the Community Development Quota (CDQ) fishery in IPHC Regulatory Areas 4D and 4E.

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

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

Table 1. Estimates of 2024 mortality reported against mortality limits (TCEYs) by IPHC Regulatory Area and U26 non-directed discards (as of 8 January 2025).

IPHC Regulatory Area	Mortality limits (net weight)		Mortality (net weight)		Percent
	Tonnes (t)	Pounds (lb)	Tonnes (t)	Pounds (lb)	(%)
IPHC Regulatory Area 2A	748	1,650,000	652	1,438,391	87.2
IPHC Regulatory Area 2B	2,935	6,470,000	2,874	6,336,801	97.9
IPHC Regulatory Area 2C	2,626	5,790,000	2,585	5,698,709	98.4
IPHC Regulatory Area 3A	5,153	11,360,000	4,740	10,448,832	92.0
IPHC Regulatory Area 3B	1,565	3,450,000	1,398	3,081,758	89.3
IPHC Regulatory Area 4A	730	1,610,000	461	1,016,132	63.1
IPHC Regulatory Area 4B	567	1,250,000	181	399,490	32.0
IPHC Regulatory Area 4CDE and Closed Area	1,678	3,700,000	926	2,042,120	55.2
Subtotal (TCEY)	**16,003**	**35,280,000**	**13,817**	**30,462,233**	86.3
Non-directed commercial discard mortality (U26)	708	1,560,000	884	1,948,000	124.9
Total	**16,710**	**36,840,000**	**14,701**	**32,410,233**	88.0

Table 2. Estimates of 2024 mortality reported against fishery limits (FCEY) and mortality projections by IPHC Regulatory Area (as of 8 January 2025).

IPHC Regulatory Area	Fishery limit / projection[1] (net weight)		Mortality to date[1] (net weight)		Pct (%) attained
	Tonnes (t)	Pounds (lb)	Tonnes (t)	Pounds (lb)	(%)
Area 2A (California, Oregon, and Washington)	**748.43**	**1,650,000**	**652.44**	**1,438,391**	**87.2**
Domestic mortality limits (FCEY)					
Non-treaty directed commercial fishery	113.10	249,338	107.58	237,164	95.1
Non-treaty incidental catch in salmon troll fishery	19.96	44,001	13.77	30,363	69.0
Non-treaty incidental catch in sablefish fishery[2]	22.68	50,000	15.70	34,624	69.2
Treaty Indian commercial fishery	224.20	494,280	220.24	485,554	98.2
Treaty Indian ceremonial and subsistence (year-round)	9.17	20,220	9.17*	20,220*	100.0
Recreational – Washington	131.61	290,158	132.67	292,482	100.8
Recreational – Oregon	128.72	283,784	91.49	201,695	71.1
Recreational – California	17.34	38,220	9.27	20,427	53.4
Projections (non-FCEY)[3]					
Directed commercial discard mortality	49.90	110,000	26.01	57,335	52.1
Recreational discard mortality	--	--	2.05	4,528	--
Non-directed commercial discard mortality (O26)	36.29	80,000	24.49	54,000	67.5
IPHC fishery-independent setline survey and research[4]	--	--	0.00	0	--
Non-TCEY mortality					
Non-directed commercial discard mortality (U26)	0.00	0	3.18	7,000	--
Area 2B (British Columbia)	**2,934.74**	**6,470,000**	**2,874.32**	**6,336,801**	**97.9**
Domestic mortality limits (FCEY)					
Directed commercial fishery landings	2,145.49	4,730,000	2,008.12	4,427,154	93.6
Recreational fishery	376.48	830,000	378.46	834,358	100.5
Recreational fishery (XRQ - Experimental Quota)[5]	--	--	8.75	19,281	--
Projections (non-FCEY)[3]					
Directed commercial discard mortality	81.65	180,000	89.05	196,324	109.1
Recreational discard mortality	13.61	30,000	15.15	33,400	111.3
Subsistence	185.97	410,000	183.70	405,000	98.8
Non-directed commercial discard mortality (O26)	131.54	290,000	134.26	296,000	102.1
IPHC fishery-independent setline survey and research[4]	--	--	56.83	125,284	--
Non-TCEY mortality					
Non-directed commercial discard mortality (U26)	18.14	40,000	19.05	42,000	105.0

IPHC Regulatory Area	Fishery limit / projection[1] (net weight)		Mortality to date[1] (net weight)		Pct (%) attained
	Tonnes (t)	Pounds (lb)	Tonnes (t)	Pounds (lb)	(%)
Area 2C (southeastern Alaska)	**2,626.30**	**5,790,000**	**2,584.89**	**5,698,709**	**98.4**
Domestic mortality limits (FCEY)					
Directed commercial fishery landings	1,587.57	3,500,000	1,391.20	3,067,067	87.6
Directed commercial discard mortality	49.90	110,000	63.57	140,149	127.4
Metlakatla (Annette Island Reserve)	--	--	17.36	38,274	--
Guided recreational fishery	367.41	810,000	382.11	842,402	104.0
Guided recreational fishery (GAF)[5]	--	--	67.01	147,739	--
Projections (non-FCEY)[3]					
Unguided recreational fishery	485.34	1,070,000	457.94	1,009,578	94.4
Subsistence	113.40	250,000	114.53	252,492	101.0
Non-directed commercial discard mortality (O26)	27.22	60,000	19.05	42,000	70.0
IPHC fishery-independent setline survey and research[4]	--	--	72.12	159,008	--
Non-TCEY mortality					
Non-directed commercial discard mortality (U26)	--	--	0.00	0	--
Area 3A (central Gulf of Alaska)	**5,152.81**	**11,360,000**	**4,739.51**	**10,448,832**	**92.0**
Domestic mortality limits (FCEY)					
Directed commercial fishery landings	3,429.16	7,560,000	3,115.77	6,869,106	90.9
Directed commercial discard mortality	244.94	540,000	271.71	599,025	110.9
Guided recreational fishery	857.29	1,890,000	729.26	1,607,735	85.1
Guided recreational fishery (GAF)[5]	--	--	2.50	5,509	--
Projections (non-FCEY)[3]					
Unguided recreational fishery	449.06	990,000	397.89	877,191	88.6
Subsistence	54.43	120,000	55.18	121,642	101.4
Non-directed commercial discard mortality (O26)	113.40	250,000	146.06	322,000	128.8
IPHC fishery-independent setline survey and research[4]	--	--	21.15	46,624	--
Non-TCEY mortality					
Non-directed commercial discard mortality (U26)	81.65	180,000	162.39	358,000	198.9
Area 3B (western Gulf of Alaska)	**1,564.89**	**3,450,000**	**1,397.86**	**3,081,758**	**89.3**
Domestic mortality limits (FCEY)					
Directed commercial fishery landings	1,351.71	2,980,000	1,193.89	2,632,077	88.3
Projections (non-FCEY)[3]					
Directed commercial discard mortality	108.86	240,000	110.02	242,556	101.1
Recreational fishery	4.54	10,000	2.15	4,729	47.3
Subsistence	4.54	10,000	4.75	10,475	104.8
Non-directed commercial discard mortality (O26)	99.79	220,000	77.56	171,000	77.7
IPHC fishery-independent setline survey and research[4]	--	--	9.49	20,921	--
Non-TCEY mortality					
Non-directed commercial discard mortality (U26)	40.82	90,000	60.33	133,000	147.8
Area 4A (eastern Aleutians)	**730.28**	**1,610,000**	**460.91**	**1,016,132**	**63.1**
Domestic mortality limits (FCEY)					
Directed commercial fishery landings	580.60	1,280,000	320.52	706,622	55.2
Projections (non-FCEY)[3]					
Directed commercial discard mortality	18.14	40,000	17.14	37,790	94.5
Recreational fishery	4.54	10,000	2.97	6,556	65.6
Subsistence	0.00	0	1.89	4,164	--
Non-directed commercial discard mortality (O26)	122.47	270,000	118.39	261,000	96.7
IPHC fishery-independent setline survey and research[4]	--	--	0.00	0	--
Non-TCEY mortality					
Non-directed commercial discard mortality (U26)	58.97	130,000	50.80	112,000	86.2

IPHC Regulatory Area	Fishery limit / projection[1] (net weight)		Mortality to date[1] (net weight)		Pct (%) attained
	Tonnes (t)	Pounds (lb)	Tonnes (t)	Pounds (lb)	(%)
Area 4B (central and western Aleutians)	**566.99**	**1,250,000**	**181.21**	**399,490**	**32.0**
Domestic mortality limits (FCEY)					
Directed commercial fishery landings	494.42	1,090,000	130.08	286,784	26.3
Projections (non-FCEY)[3]					
Directed commercial discard mortality	4.54	10,000	1.58	3,488	34.9
Recreational fishery	--	--	0.00	0	--
Subsistence	--	--	0.10	218	--
Non-directed commercial discard mortality (O26)	63.50	140,000	49.44	109,000	77.9
IPHC fishery-independent setline survey and research[4]	--	--	0.00	0	--
Non-TCEY mortality					
Non-directed commercial discard mortality (U26)	4.54	10,000	5.44	12,000	120.0
Areas 4CDE and Closed Area	**1,678.29**	**3,700,000**	**926.29**	**2,042,120**	**55.2**
Domestic mortality limits (FCEY)					
Directed commercial fishery landings	934.40	2,060,000	368.21	811,769	39.4
Projections (non-FCEY)[3]					
Directed commercial discard mortality	36.29	80,000	13.99	30,834	38.5
Recreational fishery	--	--	0.00	0	--
Subsistence[6]	4.54	10,000	5.82	12,828	--
Non-directed commercial discard mortality (O26)	703.07	1,550,000	535.24	1,180,000	76.1
IPHC fishery-independent setline survey and research[4]	--	--	3.03	6,689	--
Non-TCEY mortality					
Non-directed commercial discard mortality (U26)	503.49	1,110,000	582.41	1,284,000	115.7
Total	**16,002.74**	**35,280,000**	**13,817.43**	**30,462,233**	**86.3**
Directed commercial fishery landings	11,498.56	25,350,000	9,495.53	20,934,059	82.6
Recreational fishery	2,825.88	6,230,000	2,679.65	5,907,610	94.8
Subsistence	376.48	830,000	375.14	827,039	99.6
Non-directed commercial discard mortality (O26)	1,297.27	2,860,000	1,104.50	2,435,000	85.1
IPHC fishery-independent setline survey and research[4]	--	--	162.62	358,526	--
Non-directed commercial discard mortality (U26)	707.60	1,560,000	883.60	1,948,000	124.9

** Subject to update in January 2025.*

[1] Totals by IPHC Regulatory area include all TCEY components, i.e. exclude non-directed commercial discard mortality (U26).
[2] North of Pt. Chehalis; non-treaty incidental to sablefish fishery limit allocated from Washington sport allocation in accordance with the Pacific halibut Catch Sharing Plan for IPHC Regulatory Area 2A.
[3] Fishery projection is value used in setting the TCEY for each IPHC Regulatory Area (i.e., non-FCEY components of TCEY).
[4] Includes U32 Pacific halibut landed during FISS.
[5] XRQ and GAF leased from commercial quota.
[6] Includes U32 CDQ landings retained for personal consumption and not accounted as commercial CDQ landings in IPHC Regulartory Areas 4D and 4E.

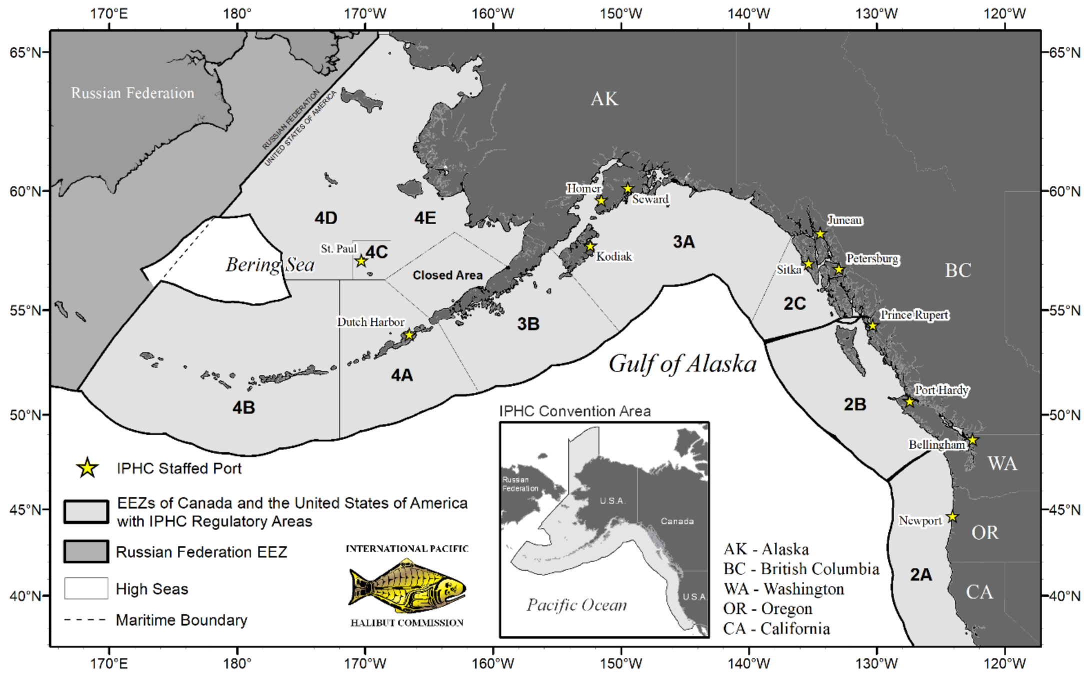


Figure 1. IPHC Convention Area and associated IPHC Regulatory Areas.

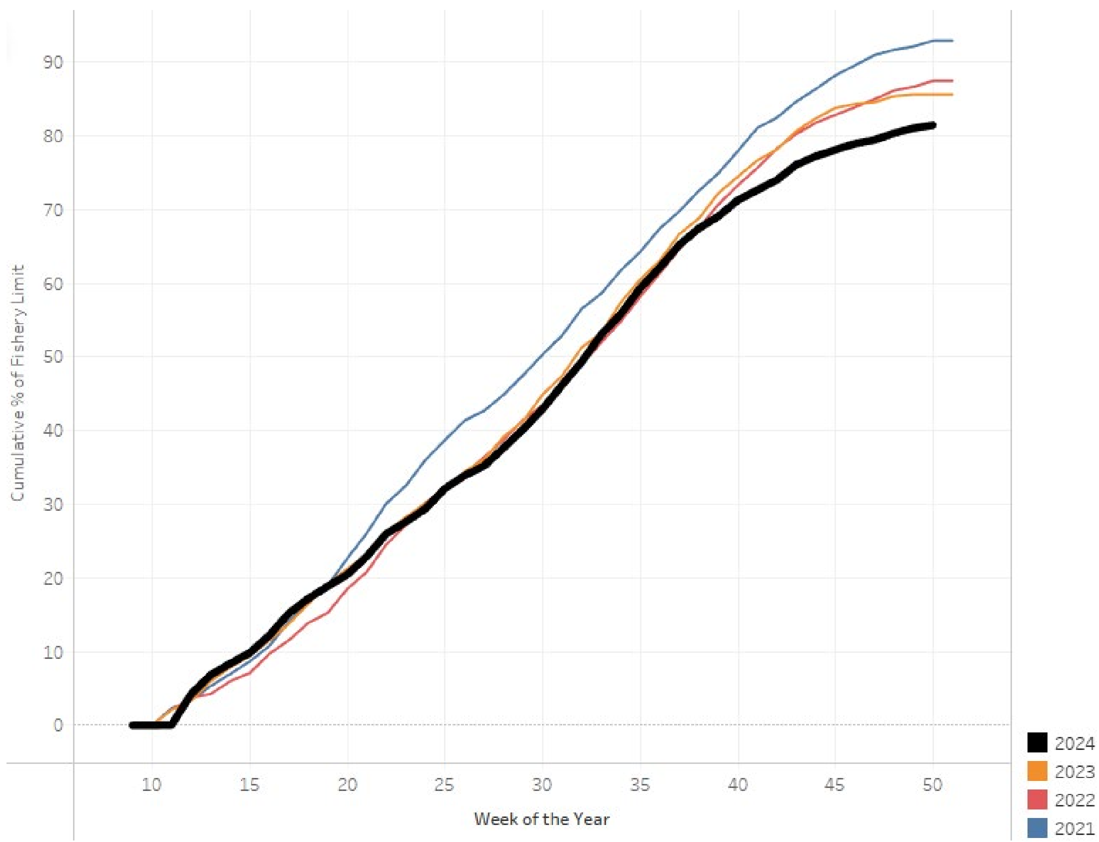


Figure 2. Cumulative percentage of directed commercial Pacific halibut limit landed by week.

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 CDQ fisheries in IPHC Regulatory Areas 4B and 4CDE.

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 6:00 local time on 15 March and closed at 23:59 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 (15 March to 7 December 2024). In IPHC Regulatory Area 2A, the non-treaty directed commercial fishery operated under 58-hour fishing periods beginning on the fourth Tuesday in June. Each fishing period began on the Tuesday at 08:00 and ended on the following Thursday at 18:00 local time and was further restricted by fishing period limits. The fishery closed for the remainder of the year after the fifth opening that commenced on 24 September, 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, 2019-2024 (d = days; h = hours).

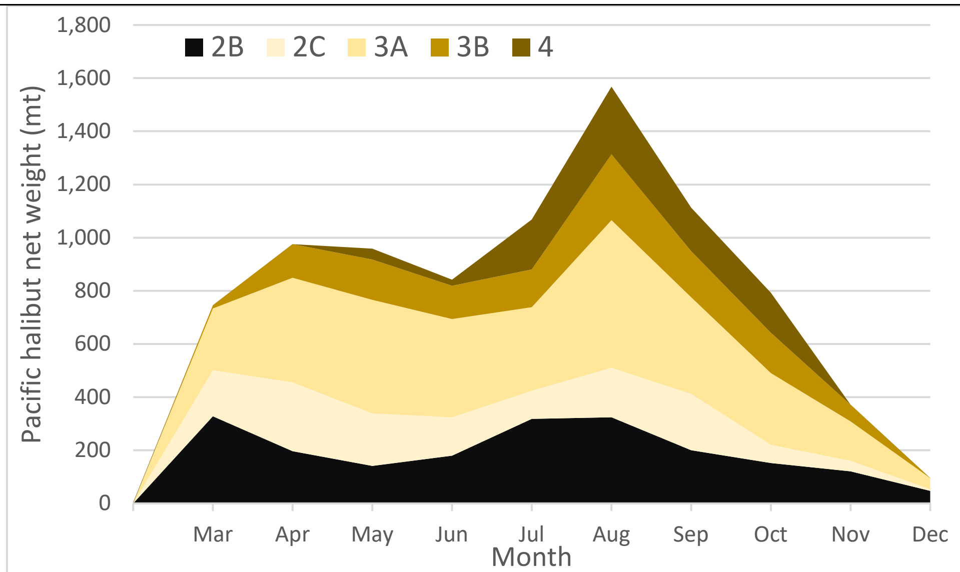
IPHC Regulatory Area	**Year**					
	2024	2023	2022	2021	2020	2019
Canada: 2B	15 Mar-7 Dec (267 d)	10 Ma-7 Dec (272 d)	6 Mar-7 Dec (276 d)	6 Mar-7 Dec (276 d)	14 Mar-7 Dec (268 d)	15 Mar-14 Nov (244 d)
USA: 2A Treaty Indian	15 Mar-19 Jun (24 h) (Unrestricted) 15 Mar-19 Jun (93.5 h) (Restricted) 24 Jun-31 Jul (2x 41 h) (Restricted) 24 Jun-31 Jul (24 h) (Unrestricted) 9 Aug-30 Sep (6x24 h) (Restricted)	10 Mar-10 Jun (55 h) (Unrestricted) 10 Mar-31 May (122 h) (Restricted) 1 Jun-31 Jul (2x 24 h) (Restricted) 17 Jun-31 Jul (20 h) (Unrestricted) 1 Sep-15 Oct (2x24 h) (Restricted)	6 Mar-31 May (55 h) (Unrestricted) 6 Mar-31 May (122 h) (Restricted) 3 Jun-30 Sep (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)
USA: 2A Commercial Directed	25-27 Jun 9-11 Jul 6-8 Aug 27-29 Aug 24-26 Sep (58 h each)	27-29 Jun 11-13 Jul 1-3 Aug (58 h each)	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)

USA: 2A Commercial Incidental	Salmon 1 Apr-30 Sept (182 d) Sablefish 1 Apr-7 Dec (250 d)	Salmon 1 Apr-31 Oct (213 d) Sablefish 1 Apr-7 Dec (250 d)	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 WA: 15 Apr-30 Sep (168 d) OR: 15 Apr-31 Oct (199 d) CA: 1 Aug-30 Sep (60 d) Sablefish 1 Apr- 15 Nov (228 d)	Salmon WA, CA: 20 Apr- 30 Sep (163 d) OR: 20 Apr- 31 Oct (194 d) Sablefish 1 Apr-31 Oct (213 d)
USA: Alaska (2C, 3A, 3B, 4A, 4B, 4CDE)	15 Mar-7 Dec (267 d)	10 Mar-7 Dec (272 d)	6 Mar-7 Dec (276 d)	6 Mar-7 Dec (276 d)	14 Mar-15 Nov (246 d)	15 Mar-14 Nov (244 d)

Directed Commercial Landings

Directed commercial fishery limits and landings by IPHC Regulatory Area for the 2024 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, as defined in the Pacific Region Integrated Fisheries Management Plan – Groundfish are also not presented. Historical landings and fishery limits are available on the IPHC website (https://www.iphc.int/data).

The 2024 directed commercial fishery landings were spread over ten months (March – December) of the year in Canada and the USA (Figure 3). On a month-to-month comparison, March took the lead as the busiest month for total poundage (16%) landed from IPHC Regulatory Area 2B. On a month-to-month comparison, August was the busiest month for total poundage (19%) from Alaska, USA. A year-to-date visualization is also available on the IPHC website.



IPHC Regulatory Area 2B landings from DFO Fishery Operations System (FOS).
IPHC Regulatory Areas 2C, 3, and 4 landings from NOAA Fisheries Restricted Access Management (RAM) Program.
IPHC Regulatory Area 3B: December landings combined with and shown above in November to preserve confidentiality.
IPHC Regulatory Area 4: April landings combined with and shown above in May to preserve confidentiality.

Figure 3. 2024 directed commercial landings (tonnes, net weight, preliminary) of Pacific halibut for individual quota fisheries by IPHC Regulatory Area and month.

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

The 2024 IPHC Regulatory Area 2A fisheries and respective fishery limits are listed in Table 2. The total IPHC Regulatory Area 2A commercial landings (directed and incidental to salmon troll sablefish, and Treaty Indian) of 357 tonnes (787,705 pounds) was 6% below the fishery limit. The total non-treaty directed commercial landings of 108 tonnes (237,164 pounds) was 5% under of the fishery limit of 113 tonnes (249,338 pounds) after five 58-hour openers. The fishing period limits by vessel size class for each opening in 2024 are listed in Table 4.

The salmon troll fishery season was open from 1 April to 30 September in Oregon and Washington (CA closed) with an allowable incidental landing ratio of one Pacific halibut per two Chinook (*Onchorhynchus tshawytscha*), plus an additional Pacific halibut per landing, and a vessel trip limit of 35 fish. Total landings of 14 tonnes (30,363 pounds) were 31% under the fishery limit of 20 tonnes (44,001 pounds).

Incidental Pacific halibut retention during the limited-entry sablefish fishery was open from 1 April to 7 December. The initial allowable landing ratio was 0.06 tonnes (130 pounds) of Pacific halibut to 0.45 tonnes (1,000 pounds) of sablefish, with an allowance for up to two additional Pacific halibut in excess of the ratio limit. On 22 October, an in-season action increased the allowable ratio to 0.07 tonnes (150 pounds) of Pacific halibut to 0.45 tonnes (1,000 pounds) of sablefish, still permitting up to two additional Pacific halibut in excess of the ratio limit. The total landings of 16 tonnes (34,624 pounds) were 31% under 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:

- The unrestricted fishery occurred between 15 March and 19 June. A total of 101 tonnes (222,216 pounds) were landed.

- The restricted fishery occurred between 15 March and 19 June. A total of 44 tonnes (96,414 pounds) were landed.
- There were two late-season openers: one from 24 June to 31 July and another from 9 August to 30 September. A total of 76 tonnes (166,924 pounds) were landed.

Estimated overall total landings of 220 tonnes (485,554 pounds) were 2% under the fishery limit 224 tonnes (494,280 pounds).

Table 4. The fishing periods and limits (tonnes, dressed, head-on with ice/slime) by vessel class used in the 2024 directed commercial fishery in IPHC Regulatory Area 2A.

Vessel Class		Commercial fishing periods (dates) & limits (t)				
Letter	**Feet**	**25-27 Jun**	**9-11 Jul**	**6-8 Aug**	**27-29 Aug**	**24-26 Sep**
A, B and C	1-35	0.8	0.8	0.45	0.64	0.82
D and E	36-45	1.4	1.4	0.45	0.64	0.82
F and G	46-55	1.7	1.7	0.45	0.64	0.82
H	56+	2.0	2.0	0.45	0.64	0.82

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 133 in 2024. In addition, Pacific halibut can be landed as incidental catch in other licensed groundfish fisheries. In 2024, this occurred from a total of 58 licences from other fisheries. The 2024 directed commercial landings represented 2,008 tonnes (4,427,154 pounds) of Pacific halibut. Additionally, 9 tonnes (19,281 pounds) were leased from commercial quota to the recreational sector.

Directed commercial trips from IPHC Regulatory Area 2B were delivered into 12 different ports in 2024. The ports of Port Hardy (including Coal Harbour and Port McNeill) and Prince Rupert/Port Edward received the highest volume accounting for 96% of the commercial landings. Prince Rupert and Port Hardy each received 48% of the directed commercial landings. All IVQ deliveries were landed in IPHC Regulatory Area 2B. In 2024, a total of 20 Canadian vessels landed frozen, head-off Pacific halibut for a total of 18 tonnes (40,197 pounds) over 30 landings. Live landings resulted in a total landed weight of <1 tonne (657 pounds).

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

In Alaska, the National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) Restricted Access Management (RAM) Program allocated Pacific halibut quota shares (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 2024, RAM reported that 2,219 persons/entities held QS.

The total 2024 landings from the IFQ/CDQ Pacific halibut fishery for the waters off Alaska through 7 December 2024 were 6,520 tonnes (14,373,425 pounds), 22% under the directed commercial fishery landings limit. By IPHC Regulatory Area, the directed commercial landings were under the fishery limit by 12% for Area 2C, 9% for Area 3A, 12% for Area 3B, 45% for Area 4A, 74% for Area 4B (IFQ/CDQ), and 61% for 4CDE (IFQ/CDQ).

Homer received approximately 25% (1,620 tonnes or 3,570,994 pounds) of the Alaskan directed commercial landings, making it the port that received the greatest landed volume in 2024. Kodiak received the second largest landing volume at 12% (768 tonnes or 1,693,109 pounds) of the Alaskan commercial landings. In Southeast Alaska, the two largest landing volumes were received in Petersburg and Sitka, with their combined landings representing 15% of the directed commercial Alaskan landings (943 tonnes or 2,079,003 pounds). The Alaskan QS catch that was landed in Bellingham, WA was less than 2%.

Directed commercial sector mortality was 21% under the commercial sector limit (includes directed commercial discard mortality in IPHC Regulatory Areas 2C and 3A).

In Alaska, 7 tonnes (16,000 pounds) of Pacific halibut were caught with pot gear and landed within the directed commercial fishery, representing 0.1% 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 14 two-day openings between 5 April and 4 October for total landings of 17 tonnes (38,274 pounds). The fishery closed on 6 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 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 vessel's 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 an estimated 16% mortality rate and Pacific halibut mortality from lost gear is assumed 100%.

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

RECREATIONAL FISHERIES

The 2024 recreational removals of Pacific halibut, including discard mortality, was estimated at 2,680 tonnes (5,907,610 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.

Recreational Landings

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

The 2024 IPHC Regulatory Area 2A recreational allocation was 278 tonnes (612,162 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 132 tonnes (290,158 pounds) being allocated to Washington subareas, 129 tonnes (283,784 pounds) to Oregon subareas and 17 tonnes (38,220 pounds) to California.[1] The IPHC Regulatory Area 2A recreational harvest totaled 233 tonnes (WA, OR and CA; 514,604 pounds), 16% under the recreational fishery limit. Recreational fishery harvest

[1] Since 2024, in IPHC Regulatory Area 2A, the USA (NOAA Fisheries) may take in-season action to reallocate the recreational fishery limits between Washington, Oregon, and California after determining that such action will not result in exceeding the overall IPHC Regulatory Area 2A recreational fishery limit and that such action is consistent with any domestic catch sharing plan.

seasons by subareas varied and were managed in season with fisheries open in Washington from 4 April to 30 September, in Oregon from 1 May to 31 October, and in California from 1 May to 15 November.

Canada – IPHC Regulatory Area 2B (British Columbia)

IPHC Regulatory Area 2B operated under a 126 cm (49.6 inch) maximum size limit and one Pacific halibut had to be between 90 and 126 cm (35.4 - 49.6 inches) or two under 90 cm (35.4 inch) when attaining the two fish possession limit, with an annual limit of ten per licence holder (FN0084). Effective 1 April, the maximum size limit remained unchanged; however, the daily possession limit was updated to allow either one fish between 85 and 126 cm (33.5 - 49.6 inch) or two fish under 85 cm (33.5 inch) (FN0238). The fishery closed on 9 October (FN1042). The IPHC Regulatory Area 2B recreational harvest was 1% over the recreational fishery limit of 376 tonnes (830,000 pounds).

Recreational landings in British Columbia are also allowed under Pacific Region Experimental Recreational [Pacific] Halibut Program (XRQ).

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

In IPHC Regulatory Area 2C, charter anglers were permitted to retain one Pacific halibut per day. From 1 February to 14 July, retained Pacific halibut had to be either 40 inches or smaller, or 80 inches or larger. From 15 July to 31 December, retained Pacific halibut had to be 36 inches or smaller, or 80 inches or larger. Pacific halibut retention was not allowed on Fridays from 19 July to 13 September.

In IPHC Regulatory Area 3A, charter anglers were allowed to retain two Pacific halibut per day, with only one fish exceeding 28 inches. If only one Pacific halibut was retained, it could be any size. Charter vessels were limited to one fishing trip per day when retaining Pacific halibut, and Pacific halibut retention was prohibited on Wednesdays.

In addition, a Guided Angler Fish (GAF) program allows recreational harvesters to land fish that are leased from commercial fishery quota shareholders for the current season.

Recreational Discard Mortality

Pacific halibut discarded for any reason experience some level of mortality and impacts more of the stock with the increasing use of size restrictions, such as reverse slot limits. Current year estimates from USA agencies of recreational discard mortality have been received and are provided in Table 2. Canada has not provided recreational discard mortality estimates; therefore, the discard mortality rate from IPHC Regulatory Area 2C is applied to the estimated landings from IPHC Regulatory Area 2B.

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, the First Nations Food, Social, and Ceremonial (FSC) fishery in British Columbia, and the subsistence fishery by rural residents and federally recognized native tribes in Alaska documented via Subsistence [Pacific] Halibut Registration Certificates (SHARC).

The coastwide subsistence estimate for 2024 was 375 tonnes (827,039 pounds) (Table 2). This includes U32 fish retained for personal consumption in the Alaskan CDQ fishery (excluded from commercial CDQ landings statistics), reported directly to the IPHC in accordance with Section 14 of the IPHC Fishery Regulations (2024). Historical subsistence removals are also available at the IPHC website.

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, with exception of U32 fish retained by CDQ groups, are accounted for as commercial catch and are not included here.

USA - IPHC Regulatory Area 2A (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 C&S fisheries. It is estimated that 9 tonnes (20,220 pounds) were retained as C&S.

Canada - IPHC Regulatory Area 2B (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).

USA - IPHC Regulatory Areas 2C, 3, and 4 (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 applicants must obtain a SHARC license. The Division of Subsistence at Alaska Department of Fish and Game (ADF&G) was contracted by NOAA Fisheries to estimate the subsistence harvest in Alaska through a data collection program. A voluntary survey of fishers is conducted by mail or phone, with some onsite visits. Since 2018, this survey has been conducted on a biennial schedule rather than annually. The 2023 estimates have been carried forward for 2024, except for Regulatory Area 4CDE, which has been updated. Estimates for all Regulatory Areas are provided in Table 2.

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 2024 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).

CDQ – Bristol Bay Economic Development Corporation (BBEDC)

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 in Naknek. BBEDC reported the landing of one U32 Pacific halibut <1 tonne (12 pounds).

CDQ – Coastal Villages Regional Fund (CVRF)

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

CDQ – Norton Sound Economic Development Corporation (NSEDC)

NSEDC reported 24 U32 Pacific halibut weighing <1 tonne (179 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 2024 are provided in Table 2. Historical data are also available on the IPHC website.

Estimating Non-Directed Commercial Discard Mortality

Non-directed commercial discard mortality (CDM)

Estimates of non-directed CDM of Pacific halibut are provided by Contracting Party agencies. The amounts are estimates because not all fisheries are monitored at 100%, and it is not assumed that all discarded Pacific halibut fail to survive. The IPHC relies upon information supplied by observer programs run by Contracting Party agencies for non-directed CDM estimates in most fisheries. Non-IPHC research survey information is used to generate estimates of non-directed CDM in the few cases where fishery observations are unavailable.

Non-directed Commercial Discard Mortality by Area

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, which operates observer programs off the USA West Coast.

Canada – IPHC Regulatory Area 2B (British Columbia)

In Canada, Pacific halibut non-directed commercial discard mortality in trawl fisheries are monitored and capped at 454 tonnes round weight by DFO. Non-trawl non-directed CDM is handled under the IVQ system within the directed Pacific halibut fishery cap. Non-directed CDM information is provided to IPHC by DFO.

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, only non-directed commercial discard mortality by hook-and-line vessels fishing in the outside waters were reported by NOAA Fisheries. These vessels are primarily targeting Pacific cod (*Gadus macrocephalus*) 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 CDM include pot fisheries for red and golden king crab (*Paralithodes camtschaticus*, *Lithodes aequispinus*), and tanner crab (*Chionoecetes bairdi*). Information is provided periodically by ADF&G, and the estimate was rolled forward from 2022 to 2024.

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 CDM 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 CDM, but data from these state-managed fisheries are currently unavailable.

Estimates of non-directed CDM in IPHC Regulatory Area 3 reflect different levels of observer coverage by gear and type of fishing trip. 2023 coverage rates varied from 100% to 15% of the estimated discarded groundfish pounds by gear and fishery (Table 4-4 in AFSC 2024). Trawl vessels in the Gulf of Alaska non-pelagic trawl fisheries have a high likelihood of encountering Pacific halibut and are responsible for the majority of the Pacific halibut bycatch. There are three general categories for these trawl vessels, which receive varying rates of catch monitoring. In 2023 in the Gulf of Alaska, 100% of the non-pelagic catcher/processor catch was monitored; 100% of the catch by non-pelagic catcher vessels in the Central Gulf Rockfish Program was monitored; and 42% of the remaining catch of non-pelagic catcher vessels was monitored. In total, 87% of the non-pelagic trawl catch in the Gulf of Alaska was monitored for bycatch in 2023.

There has long been concern that non-directed CDM estimates for non-pelagic trawl catcher vessels in IPHC Regulatory Area 3 have greater uncertainty and potential bias compared to those from other areas and sectors with higher coverage rates (e.g., catcher/processors). However, this concern has now diminished and applies only to the remaining 13% of the unobserved portion of the non-pelagic trawl fleet in the Gulf of Alaska.

In July 2024, NMFS adopted rules to implement an electronic monitoring (EM) program for pelagic trawl pollock catcher vessels and tender vessels delivering to processors in the Gulf of Alaska (Amendment 114). EM essentially monitors the catch from trawl nets which may not be handled until delivery to a processor where observers monitor and record 100% of the catch. NOAA Fisheries indicated that the program evaluation improved Pacific halibut non-directed discards accounting, specifically in the Western Gulf of Alaska pollock fishery. NOAA Fisheries intends to expand the EM program to the Central Gulf of Alaska Rockfish Program in the near future.

IPHC Regulatory Area 4 (Bering Sea and Aleutian Islands)

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) and other IPHC research

In 2024, 163 tonnes (358,526 pounds) of Pacific halibut were landed from the FISS and other IPHC research, including the fecundity study. Totals landed from each IPHC Regulatory Area are provided in Table 2.

Non-IPHC Research Removals

In 2024, four IPHC research permits were issued to NOAA to allow the harvest of Pacific halibut while conducting their Aleutian Islands and Eastern Bering Sea standardised bottom trawl surveys. A fifth research permit was issued to the Makah Tribe (Makah Fisheries Management) for tag research. A total of 10 Pacific halibut were reported captured and released.

REMOVALS OUTSIDE THE IPHC CONVENTION AREA

The latest Food and Agriculture Organization (FAO) statistics for Pacific halibut capture production outside the IPHC Convention Area (2022) indicate catches by Russia amounting to 2,004 tonnes (live weight), or 12% of the global total.

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-08 Rev_2 that provides the Commission with an overview of the 2024 Pacific halibut removals, including the status of mortality reported against fishery limits adopted by the Commission and outlined in the IPHC Fishery Regulations (2024).

INTERNATIONAL PACIFIC HALIBUT COMMISSION

IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2024

PREPARED BY: IPHC SECRETARIAT (K. UALESI , T. JACK, R. RILLERA, K. COLL; 12 DECEMBER 2024)

PURPOSE

To provide a summary of the IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2024.

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 (Figure 1), within the prescribed depth range of 18 to 732 metres (10 to 400 fathoms).

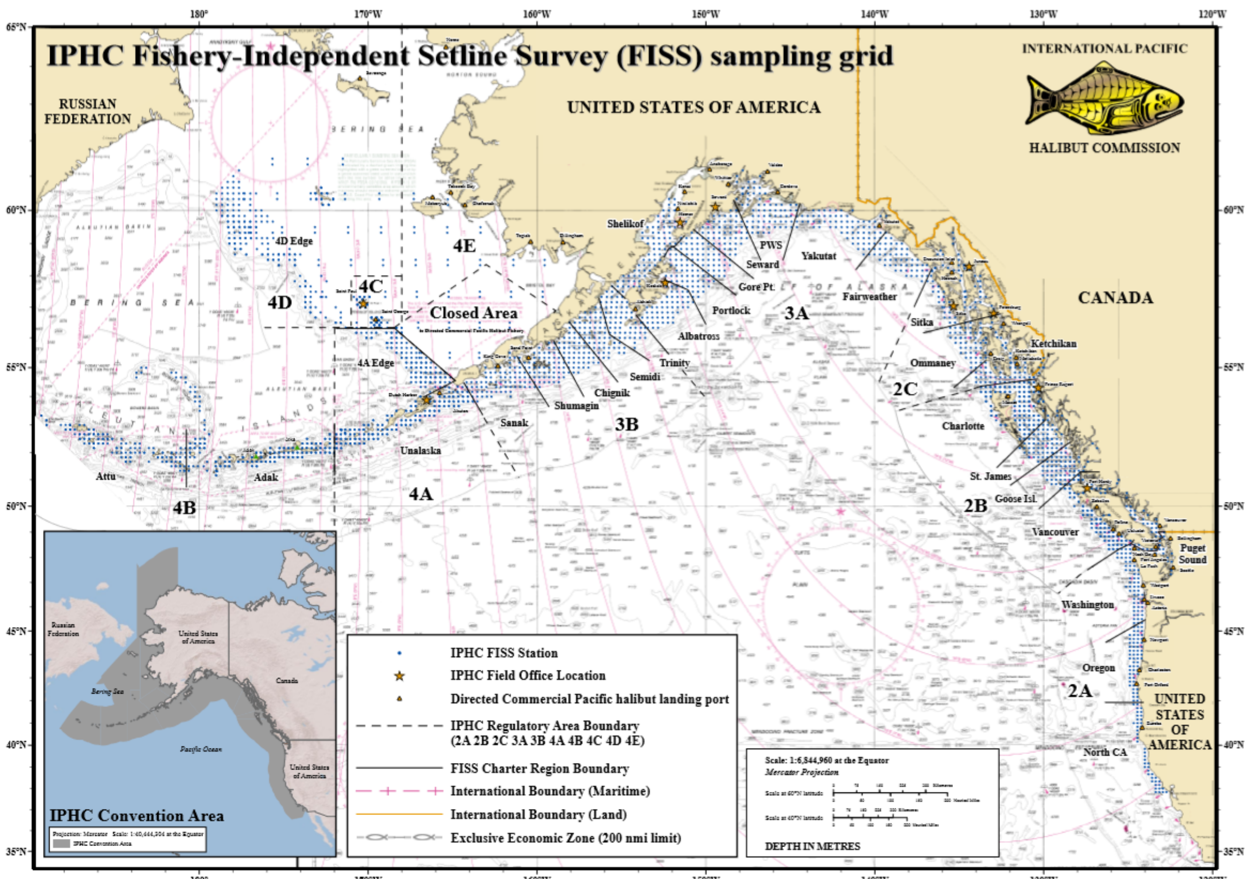


Figure 1. IPHC Fishery-Independent Setline Survey (FISS) with full sampling grid shown.

Prior to 2019, only fixed gear was used to sample FISS stations. 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 recognized the increased use of snap gear and integrated snap gear into the FISS tender specifications for 2023 and 2024.

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.

2024 FISS design

At IM099, the Commission agreed on an optimized version of the revenue positive design:

> IPHC-2023-IM099-R, para. 51: *The Commission **AGREED** on an optimized design for the 2024 FISS as provided at Appendix IV, that balances the Commission's primary and secondary objectives for the FISS. Specifically, the 2024 design shall include Options 1, 2, and 3…. In addition, Option 4 shall be included in the RFT process but is not yet endorsed. Once bids are received and evaluated in February 2024, the Commission will make a final decision on whether to proceed or not with Option 4, based on bids and logistical constraints at that time and potentially a new option* [Option 9] *for IPHC Regulatory Area 4CDE.*

On 22 December 2023, the 2024 FISS Tender Specifications were published to the IPHC website with a deadline of 4 February 2024 for tenders.

At IM099 the Commission **AGREED** on a 2024 design that included Options 1, 2 and 3. In the 2024 FISS tender specifications, Option 4 and Option 9 were also included as tentative design additions for the Commission's review in February 2024. A special session was held on 13 February where the final 2024 FISS design was **ENDORSED**.

The design (Figure 2) comprised sampling of subareas within IPHC Regulatory Areas 2B, 3A, 3B, and 4CDE, intended to balance the Commission's primary and secondary objectives for the FISS. In 2024, sampling in IPHC Regulatory Area 2C included 100% of the full FISS design.

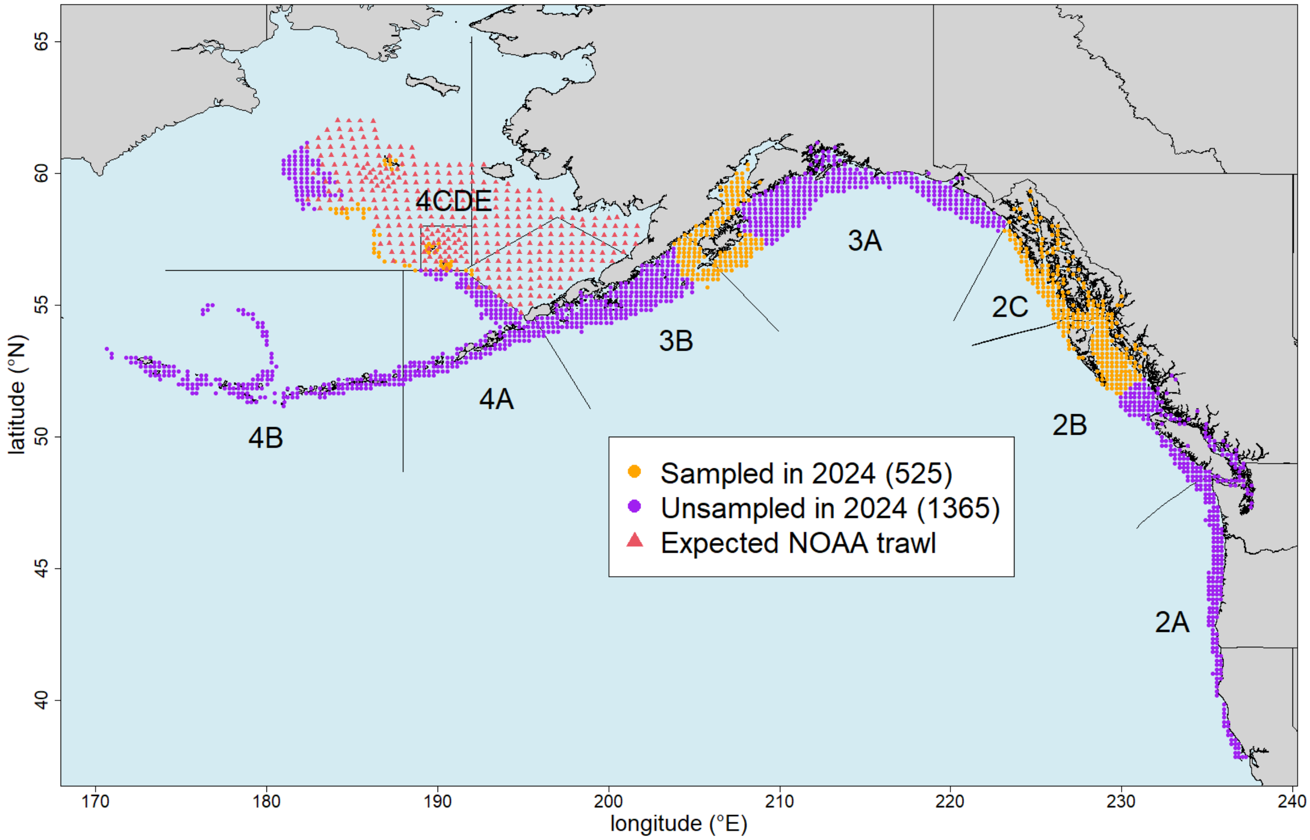


Figure 2. Map of the 2024 FISS design endorsed by the Commission on 13 February 2024 (IPHC-2024-MR-002). Purple circles were not sampled in 2024.

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 2024 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 8-15 vessels are chosen. In 2024, the process was clearly documented on the IPHC website for accountability and transparency purposes: Vessel Recruiting - IPHC.

In 2024, five (5) vessels were chartered to complete the FISS, as detailed in IPHC-2024-MR-003 Notification of IPHC Fishery-Independent Setline Survey (FISS) 2024 Contract Awards - IPHC.

Sampling protocols

IPHC Setline Survey Specialists (Field) collected data according to protocols established in the 2024 FISS Sampling Manual (IPHC-2024-VSM01).

Sampling challenges - 2024

Of the 525 FISS stations planned for the 2024 season, 419 were effectively sampled on the FISS design grid, and 88 were effectively fished as vessel captain stations. This brings the total number of effectively sampled stations to 507, representing 97% of the planned stations (Fig.

3).

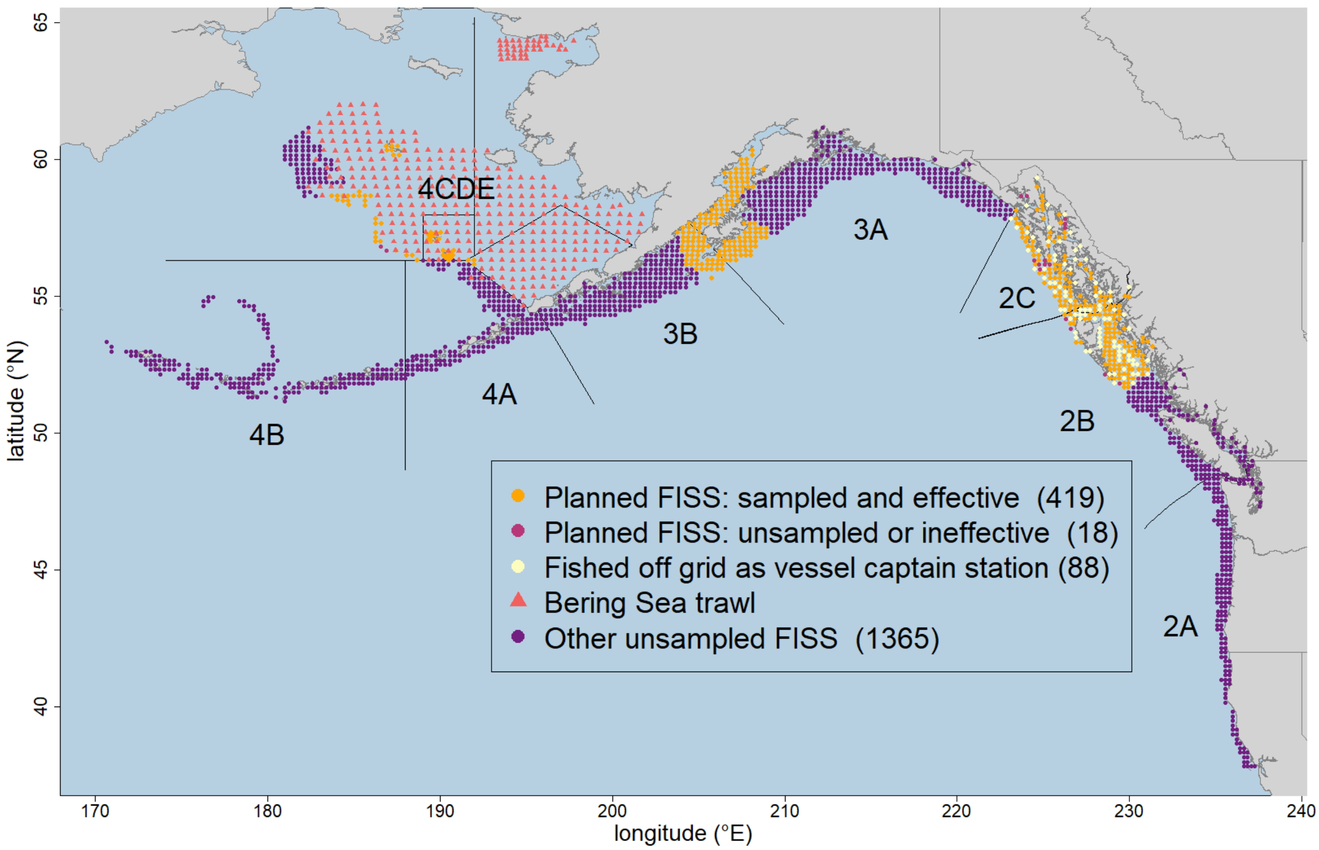


Figure 3. Map of the 2024 FISS design endorsed by the Commission on 15 February 2024 (IPHC-2024- CR-008). Ineffective and planned unsampled stations are identified with red circles, while purple circles were not to be sampled in 2024.

Not sampled: A total of three (3) initially planned stations were not sampled in 2024. Two stations in the Sitka charter region were unsampled as they were within Glacier Bay National Park, and we were not permitted to complete these stations within the park this year. There was also one station in the St James charter region that was unsampled as it was located in the Hecate Marine Protected Area.

Ineffective stations: Coastwide, fifteen (15) stations were deemed ineffective due to orca depredation (n=2), sperm whale depredation (n=9), sand fleas (n=3), and setting and gear issues (n=1) (Fig. 3).

Bait (Chum salmon & Pink 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 or pink 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 October 2023 (IPHC Media Release 2023-014), the Secretariat made pre-season bait purchases of approximately 30 tonnes (66,000 lbs) of chum salmon and 30 tonnes (66,000 lbs) of pink salmon to ensure a smooth start to the 2024 FISS.

RESULTS

Interactive views of the FISS results are provided via the IPHC website here:

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

As in previous years, legal-sized (O32) Pacific halibut caught on the FISS were sacrificed in order to obtain biological data and were retained for sale. In addition, beginning in 2020, sub-legal (U32) Pacific halibut randomly selected for otolith sampling were also retained and sold. This helped to offset costs of the FISS. FISS vessels also retained for sale incidentally captured rockfish (*Sebastes spp*.) and Pacific cod (*Gadus macrocephalus*) as these species 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 2024 FISS chartered 5 commercial longline vessels (three Canadian and two USA) during a combined 29 trips and 275 charter days (Tables 1). Otoliths were removed from 5,771 fish coastwide. Approximately 153 tonnes (337,674 pounds) of Pacific halibut, 22 tonnes (48,993 pounds) of Pacific cod, and 27 tonnes (60,044 pounds) of rockfish were landed from the FISS stations.

Table 1a. Effort and landing summary by FISS charter region and vessel for all 2024 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]
2B	Charlotte	*Bold Pursuit*	20875	41	89	88	31	68,361	$15.88	$7.20
2B	St. James	*Vanisle*	21912	35	60	57	16	36,071	$16.27	$7.38
2C	Ketchikan	*Pender Isle*	27282	22	43	43	18	39,170	$11.88	$5.39
2C	Ommaney	*Pender Isle*	27282	26	52	46	36	78,604	$13.97	$6.34
2C	Sitka	*Vanisle*	21912	33	52	47	19	41,234	$12.72	$5.77
3A	Albatross	*Kema Sue*	41033	25	49	49	10	21,325	$11.98	$5.43
3A	Shelikof	*Kema Sue*	41033	32	64	64	11	23,970	$12.52	$5.68
3B	Trinity	*Kema Sue*	41033	28	56	56	10	22,250	$12.03	$5.45
4CDE	4CDE South	*Saint Peter*	76769	33	60	58	3	6,689	$6.81	$3.09
Total		**5 Vessels**		**275**	**525**	**507**	**153**	**337,674**	**$13.71**	**$6.22**

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 2024 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]
2B	Charlotte	*Bold Pursuit*	20875	41	89	88	30	66,960	$15.90	$7.21
2B	St. James	*Vanisle*	21912	35	60	57	16	35,293	$16.28	$7.39
2C	Ketchikan	*Pender Isle*	27282	22	43	43	17	38,217	$11.89	$5.39
2C	Ommaney	*Pender Isle*	27282	26	52	46	35	77,088	$14.02	$6.36
2C	Sitka	*Vanisle*	21912	33	52	47	18	39,652	$12.81	$5.81
3A	Albatross	*Kema Sue*	41033	25	49	49	9	19,684	$11.99	$5.44
3A	Shelikof	*Kema Sue*	41033	32	64	64	10	22,756	$12.58	$5.70
3B	Trinity	*Kema Sue*	41033	28	56	56	9	20,796	$12.12	$5.50
4CDE	4CDE South	*Saint Peter*	76769	33	60	58	2	4,692	$7.66	$3.47
Total		**5 Vessels**		**275**	**525**	**507**	**147**	**325,138**	**$13.82**	**$6.27**

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 2024 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]
2B	Charlotte	*Bold Pursuit*	20875	35	89	88	1	1,401	$14.82	$6.72
2B	St. James	*Vanisle*	21912	41	60	57	0	778	$15.56	$7.06
2C	Ketchikan	*Pender Isle*	27282	22	43	43	0	953	$11.27	$5.11
2C	Ommaney	*Pender Isle*	27282	26	52	46	1	1,516	$11.46	$5.20
2C	Sitka	*Vanisle*	21912	33	52	47	1	1,582	$10.41	$4.72
3A	Albatross	*Kema Sue*	41033	25	49	49	1	1,641	$11.87	$5.38
3A	Shelikof	*Kema Sue*	41033	32	64	64	1	1,214	$11.41	$5.17
3B	Trinity	*Kema Sue*	41033	28	56	56	1	1,454	$10.65	$4.83
4CDE	4CDE South	*Saint Peter*	76769	33	60	58	1	1,997	$4.81	$2.18
Total		**5 Vessels**		**275**	**525**	**507**	**6**	**12,536**	**$10.84**	**$4.92**

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 nine (9) 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 $13.31/kg in 2023 to $13.71/kg in 2024 (Tables 3). This represents a 2.9% increase in price.

Table 2a. FISS Pacific halibut landings by port for all Pacific halibut (sampled U32 and all O32), 2024[1,2].

Offload Port	Trips	Tonnes	Pounds	Total USD	Average Price (USD/kg)	Average Price (USD/lb)
Dutch Harbor	1	1.33	2,930	$8,143.80	$6.13	$2.78
Homer	4	14.65	32,297	$180,104.77	$12.29	$5.58
Ketchikan	2	17.00	37,487	$201,573.05	$11.85	$5.38
Kodiak	4	15.99	35,248	$193,256.64	$12.09	$5.48
Petersburg	1	6.75	14,889	$89,416.45	$13.24	$6.01
Port Hardy	3	14.18	31,265	$226,385.03	$15.96	$7.24
Prince Rupert	8	55.23	121,755	$879,730.37	$15.93	$7.23
St. Paul	2	1.71	3,759	$12,508.33	$7.34	$3.33
Sitka	4	26.33	58,044	$308.603.90	$11.72	$5.32
Grand Total	**29**	**153**	**337,674**	**$2,099,722.34**	**$13.71**	**$6.22**

[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, 2024[1,2].

Offload Port	Trips	Tonnes	Pounds	Total USD	Average Price (USD/kg)	Average Price (USD/lb)
Dutch Harbor	1	0.89	1,970	$5,791.80	$6.48	$2.94
Homer	4	13.87	30,573	$171,261.09	$12.35	$5.60
Ketchikan	2	16.58	36,549	$196,775.80	$11.87	$5.38
Kodiak	4	14.82	32,663	$179,960.03	$12.15	$5.51
Petersburg	1	6.41	14,138	$86,036.95	$13.42	$6.09
Port Hardy	3	14.02	30,903	$223,860.54	$15.97	$7.24
Prince Rupert	8	54.06	119,192	$862,641.97	$15.96	$7.24
St. Paul	2	1.23	2,722	$10,506.92	$8.51	$3.86
Sitka	4	0	56,428	$301,264.90	$11.77	$5.34
Grand Total	**29**	**147**	**325,138**	**$2,038,100.00**	**$13.82**	**$6.27**

[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, 2024[1,2].

Offload Port	Trips	Tonnes	Pounds	Total USD	Average Price (USD/kg)	Average Price (USD/lb)
Dutch Harbor	1	0.44	960	$2,352.00	$5.40	$2.45
Homer	4	0.78	1,724	$8,843.68	$11.31	$5.13
Ketchikan	2	0.43	938	$4,797.25	$11.28	$5.11
Kodiak	4	1.17	2,585	$13,296.61	$11.34	$5.14
Petersburg	1	0.34	751	$3,379.50	$9.92	$4.50
Port Hardy	3	0.16	362	$2,524.49	$15.37	$6.97
Prince Rupert	8	1.16	2,563	$17,088.40	$14.70	$6.67
St. Paul	2	0.47	1,037	$2,001.41	$4.25	$1.93
Sitka	4	0.73	1,616	$7,339.00	$10.01	$4.54
Grand Total	**29**	**6**	**12,536**	**$61,622.34**	**$10.84**	**$4.92**

[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 2024[1].

IPHC Regulatory Area	2B	2C	3A	3B	4CDE	Total Weight and Average Price
Tonnes	47	72	21	10	3	153
Pounds	104,432	159,008	45,295	22,250	6,689	337,674
Price USD/kg	$16.01	$13.13	$12.26	$12.02	$6.81	$13.71
Price USD/lb	$7.26	$5.96	$5.56	$5.45	$3.09	$6.22

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

Table 3b. FISS landings (total pounds and price) of O32 Pacific halibut by IPHC Regulatory Area in 2024[1].

IPHC Regulatory Area	2B	2C	3A	3B	4CDE	Total Weight and Average Price
Tonnes	46	70	20	9	2	147
Pounds	102,253	154,957	42,440	20,796	4,692	325,138
Price USD/kg	$16.03	$13.19	$12.30	$12.12	$7.66	$13.82
Price USD/lb	$7.27	$5.98	$5.58	$5.50	$3.47	$6.27

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 2024[1].

IPHC Regulatory Area	2B	2C	3A	3B	4CDE	Total Weight and Average Price
Tonnes	1	2	1	1	1	6
Pounds	2,179	4,051	2,855	1,4054	1,997	12,536
Price USD/kg	$15.08	$11.00	$11.67	$10.65	$4.81	$10.84
Price USD/lb	$6.84	$4.99	$5.29	$4.81	$2.18	$4.92

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

FISS timing

The months of June, July, and August are targeted for FISS sampling every year. In 2024, this activity took place from 24 May through 15 August. On a coastwide basis, FISS vessel activity was highest in intensity at the beginning of the FISS season and declined in early August as boats finished their charter regions (Figure 3). All FISS activity was completed by mid-August.

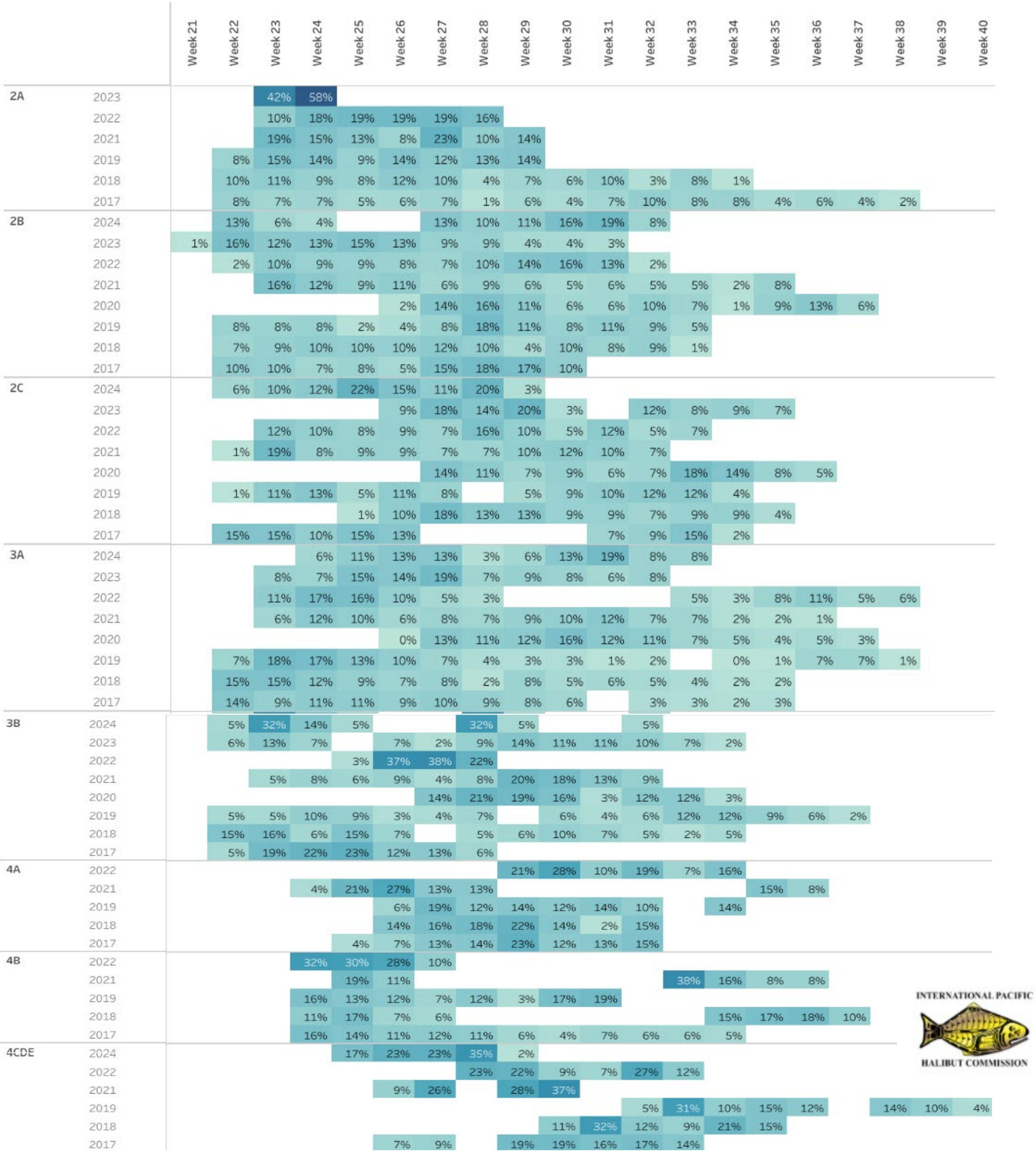


Figure 3. Percent of the total FISS stations completed by IPHC Regulatory Area during each week of the year (2017-2024). Week 21 begins in late May or early June depending on the year.

RECOMMENDATION/S

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-09 that provides a summary of the IPHC Fishery-Independent Setline Survey (FISS) design and implementation in 2024.

APPENDICES

Nil.

Space-time modelling of survey data

PREPARED BY: IPHC SECRETARIAT (R. A. WEBSTER; 12 DECEMBER 2024)

PURPOSE

To provide results of the space-time modelling of Pacific halibut survey data for the period 1993-2024.

BACKGROUND

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, 2024), but in the Bering Sea also integrates data from the National Oceanic and Atmospheric Administration (NOAA) - Fisheries annual trawl survey and the Alaska Department of Fish and Game's (ADFG) 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.

In 2024, 50% of sets used pink salmon as bait, with the remaining sets using the standard chum salmon bait. Models therefore accounted for bait differences and output was standardized to chum baits. In IPHC Regulatory Areas 2B and 2C, "vessel captain stations" were allowed, in which vessel captains could choose to fish up to one third of their sets at a location that is optimal in terms of catch rates or revenue. Models were fitted with and without these stations to determine if their inclusion in the modelling was likely to lead to biased estimates.

Data inputs to the space-time modelling were updated with 2024 data from the IPHC's FISS along with data from NOAA and ADFG's Bering Sea trawl surveys. As in 2023, the FISS was implemented with reduced spatial coverage (Figure 1), with sampling only in high-catch rate regions in IPHC Regulatory Areas 2B, 2C, 3A and 3B, along with sampling along the central Bering Sea shelf edge and Bering Sea island stations. The NOAA trawl survey also had a reduced footprint in 2024 relative to recent years, with no sampling in the northern Bering Sea.

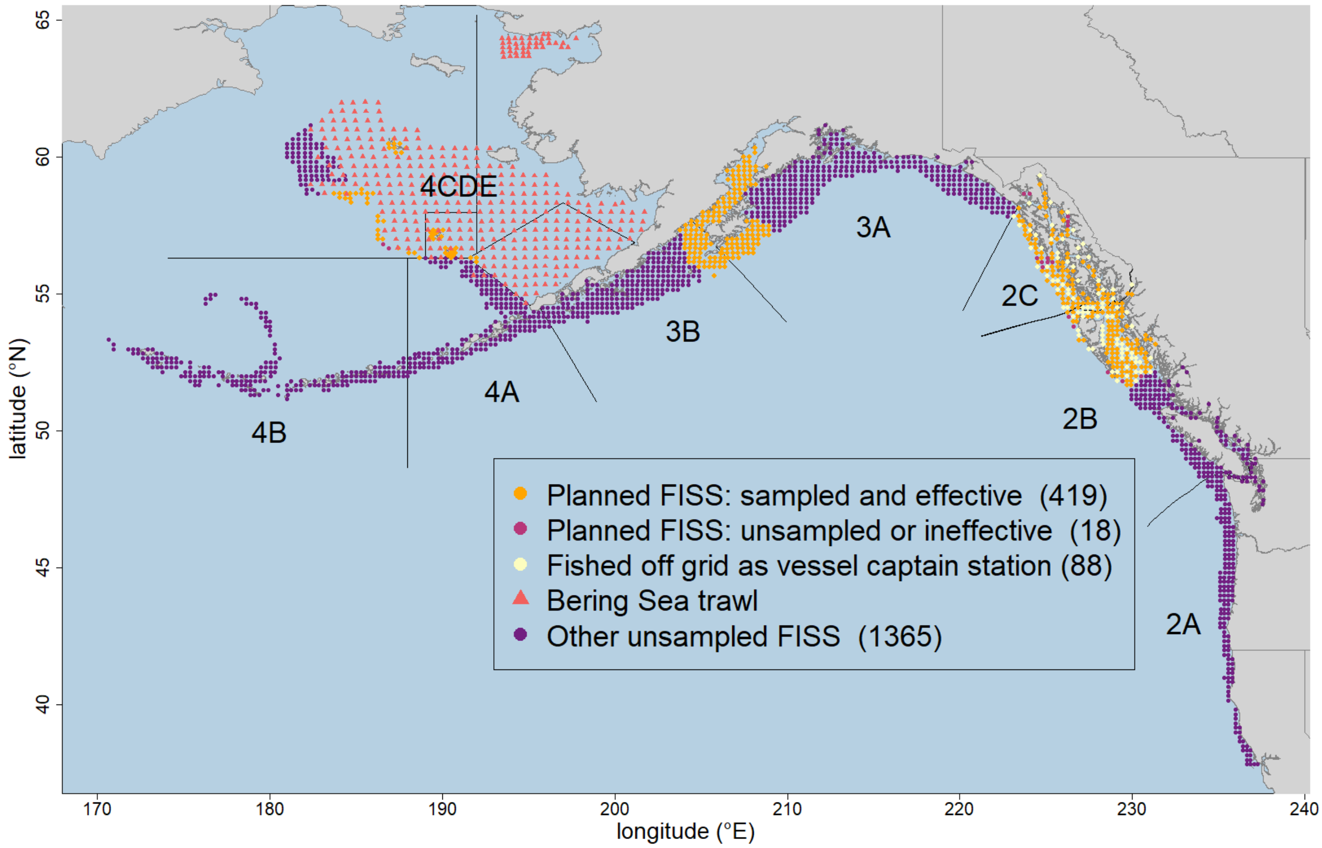


Figure 1. Map of 2024 sampled survey stations with data used in the space-time modelling (orange circles for FISS, red triangles for trawl), along with planned but ineffective FISS stations, FISS grid stations fished off grid as vessel captain stations (see text) and other unsampled FISS stations.

RESULTS OF SPACE-TIME MODELLING IN 2024

Figure 2 shows the time series estimates of O32 WPUE (most comparable to fishery catch-rates) over the 1993-2024 period included in the 2024 space-time modelling. Coastwide, we estimate a decline in the index since 2023 of 9% (95% credible interval: −17% to −1%), largely due to a 19% estimated decline in IPHC Biological Region 3. Coastwide indices of all sizes WPUE (Figure 3) and all sizes NPUE (Figure 4) were estimated to be relatively stable, with changes of −2% (−11% to +7%) and +3% (−7% to +14%) from 2023-24. Note Biological Region 4B has had no sampling since 2022: the degree of change in the index is highly uncertain and the estimated changes presented in Figures 2-4 are likely to be biased. Results for IPHC Regulatory Areas are shown 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.

Ratios of the catch rate of pink salmon to chum salmon were estimated within the models for all sampled IPHC Regulatory Areas in 2024. These values are presented in Table 1. Except for O32 WPUE in IPHC Regulatory Area 2C, these ratios are all estimated to be less than 1, implying lower catch rates for pink salmon than the standard chum salmon baits. Ratios varied spatially, with western IPHC Regulatory Areas having lower values than eastern areas. Note that these ratios are based on modelling of data incorporating hook competition adjustments and do not necessarily reflect differences in raw catch rates of Pacific halibut between baits.

Table 1. Posterior estimates of the ratio of pink salmon to chum salmon catch rates for O32 and all sizes WPUE, and all sizes NPUE, by IPHC Regulatory Area (with 95% posterior credible intervals in parentheses).

IPHC Regulatory Area	O32 WPUE	All sizes WPUE	All sizes NPUE
2B	0.87 (0.68, 1.13)	0.80 (0.62, 1.02)	0.72 (0.57, 0.92)
2C	1.01 (0.81, 1.27)	0.89 (0.72, 1.11)	0.83 (0.66, 1.03)
3A	0.74 (0.59, 0.93)	0.71 (0.57, 0.87)	0.68 (0.55, 0.83)
3B	0.64 (0.49, 0.94)	0.62 (0.49, 0.78)	0.58 (0.46, 0.73)
4CDE	0.48 (0.29, 0.81)	0.32 (0.08, 1.22)	0.36 (0.10, 1.27)

Modelling showed that the inclusion of data from vessel captain stations had a large effect on estimates of indices of density for O32 WPUE and all sizes WPUE, with greater values when vessel captain station data were included (Table 2). Mean values of all sizes NPUE indices were similar with and without vessel captain station data, implying the vessels captains were able to target locations with larger Pacific halibut rather than locations with greater numbers of fish. The results imply that inclusion of data from vessel captain stations would lead to positive bias in estimated indices from the space-time model. Therefore, all model output used for stock assessment and management purposes is based on modelling that excludes data from such stations.

Table 2. Posterior means (with 95% credible intervals) for indices of density from modelling with and without vessel captain stations for O32 and all sizes WPUE, and all sizes NPUE, by IPHC Regulatory Area.

IPHC Reg. Area	O32 WPUE (lb/skate)		All sizes WPUE (lb/skate)		All sizes NPUE (halibut/skate)	
	With vessel captain stations	Without vessel captain stations	With vessel captain stations	Without vessel captain stations	With vessel captain stations	Without vessel captain stations
2B	70.5 (59.4, 82.6)	62.2 (51.5, 74.7)	97.7 (82.1, 116.0)	89.4 (74.7, 108.0)	6.8 (5.7, 8.2)	6.7 (5.4, 8.1)
2C	170.8 (147.1,195.7)	156.4 (134.0,181.5)	216.5 (188.3,248.2)	206.5 (176.7,238.4)	12.8 (11.0, 14.8)	12.9 (11.0, 15.3)

RECOMMENDATION

That the Commission **NOTE** paper IPHC-2025-AM101-10 that provides results of the space-time modelling of Pacific halibut survey data for 1993-2024.

Reference

Ualesi, K., Rillera, R., Jack, T. and Coll, K. (2024) IPHC Fishery-independent setline survey (FISS) design and implementation in 2024. IPHC-2024-IM100-09.

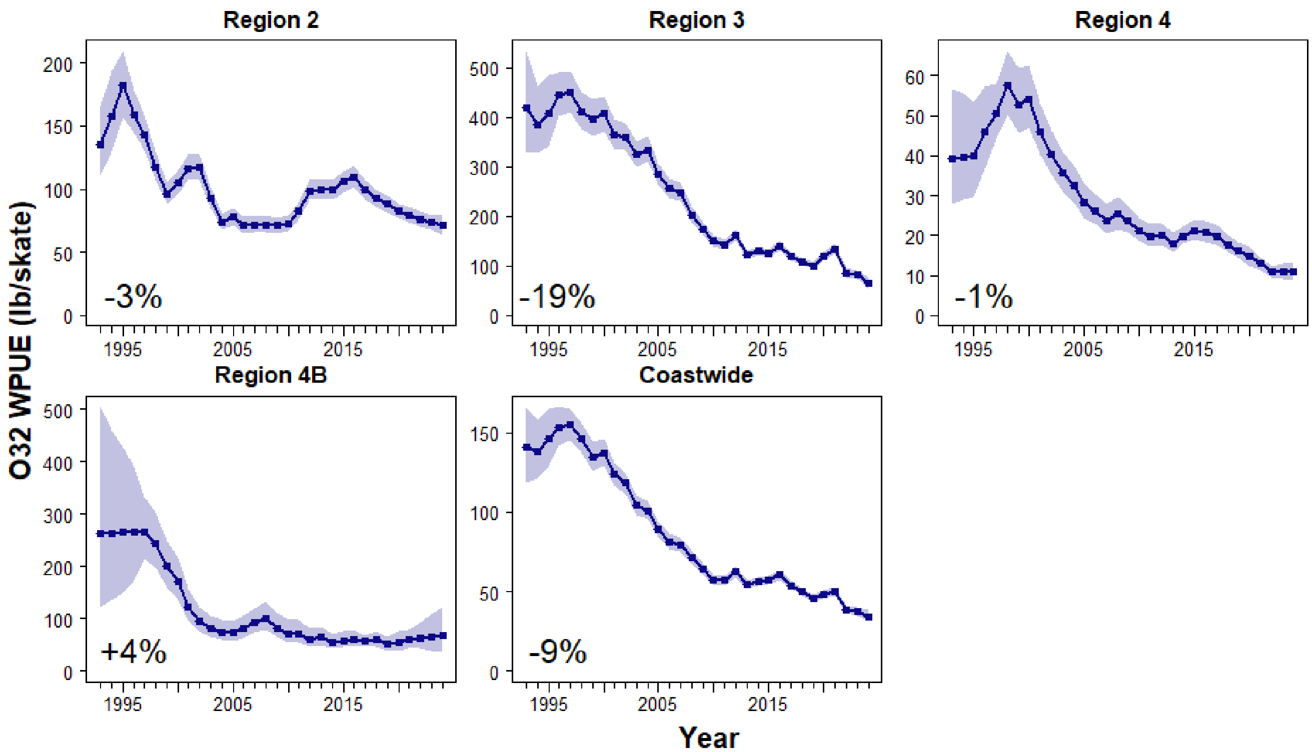


Figure 2. Space-time model output for O32 WPUE for 1993-2024 for Biological Regions. Filled circles denote the posterior means of O32 WPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean O32 WPUE from 2023 to 2024.

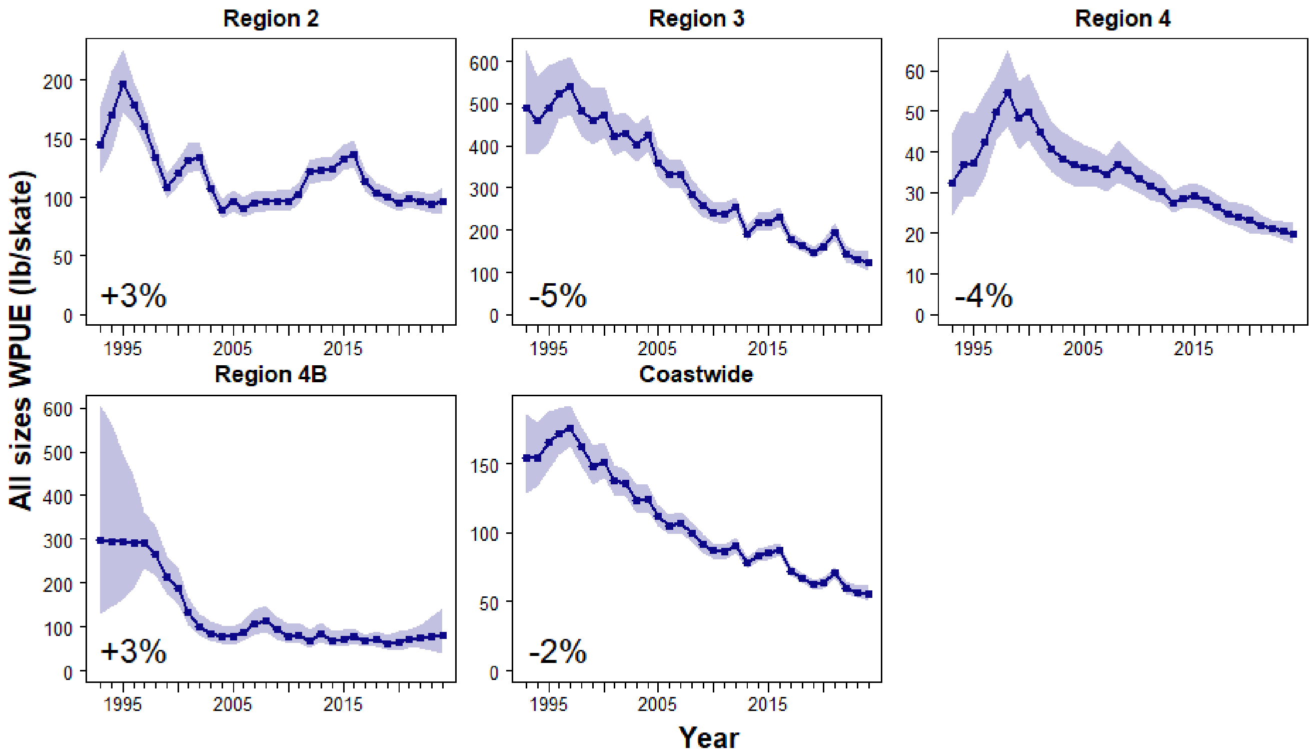


Figure 3. Space-time model output for all sizes WPUE for 1993-2024 for Biological Regions. Filled circles denote the posterior means of all sizes WPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean all sizes WPUE from 2023 to 2024.

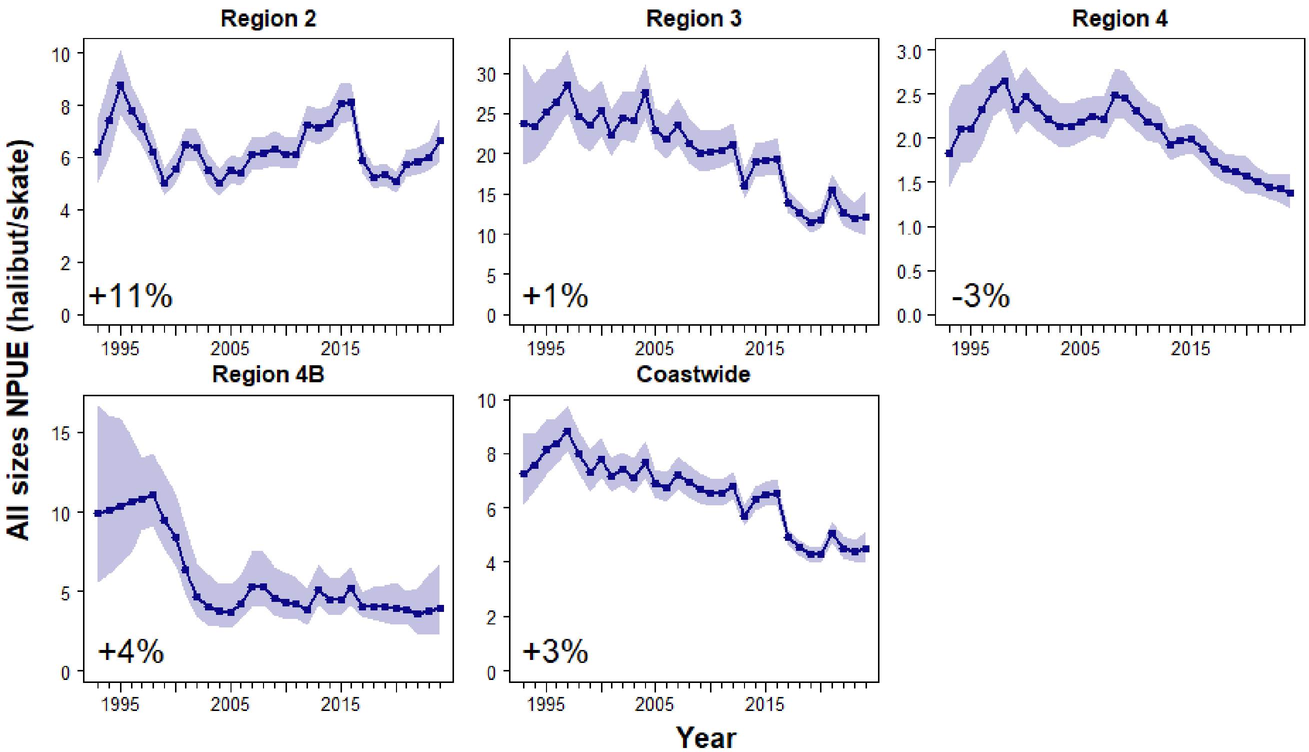


Figure 4. Space-time model output for all sizes NPUE for 1993-2024 for Biological Regions. Filled circles denote the posterior means of all sizes NPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean all sizes NPUE from 2023 to 2024.

APPENDIX A
Space-time modelling results by IPHC Regulatory Area

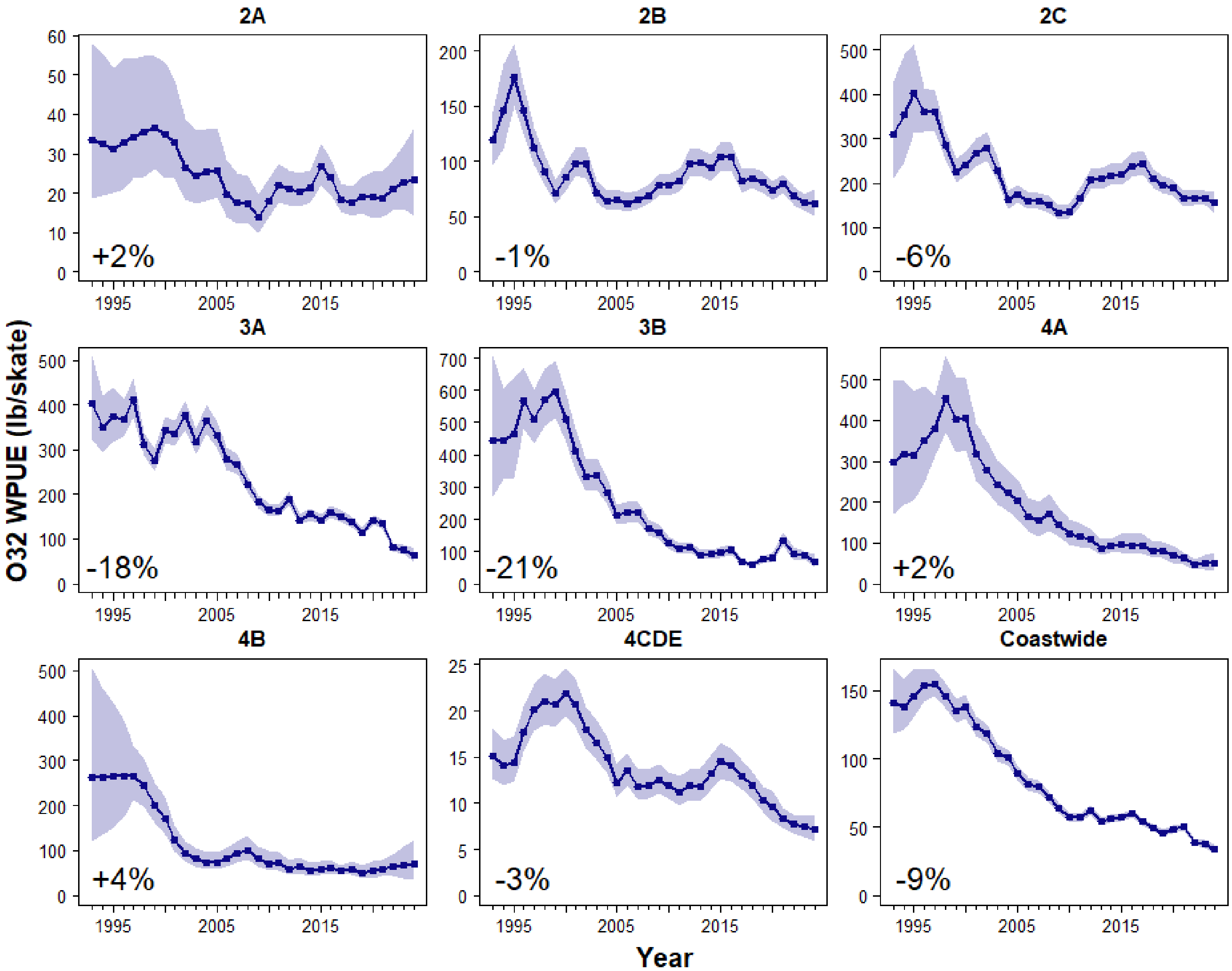


Figure A.1. Space-time model output for O32 WPUE for 1993-2024. Filled circles denote the posterior means of O32 WPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean O32 WPUE from 2023 to 2024.

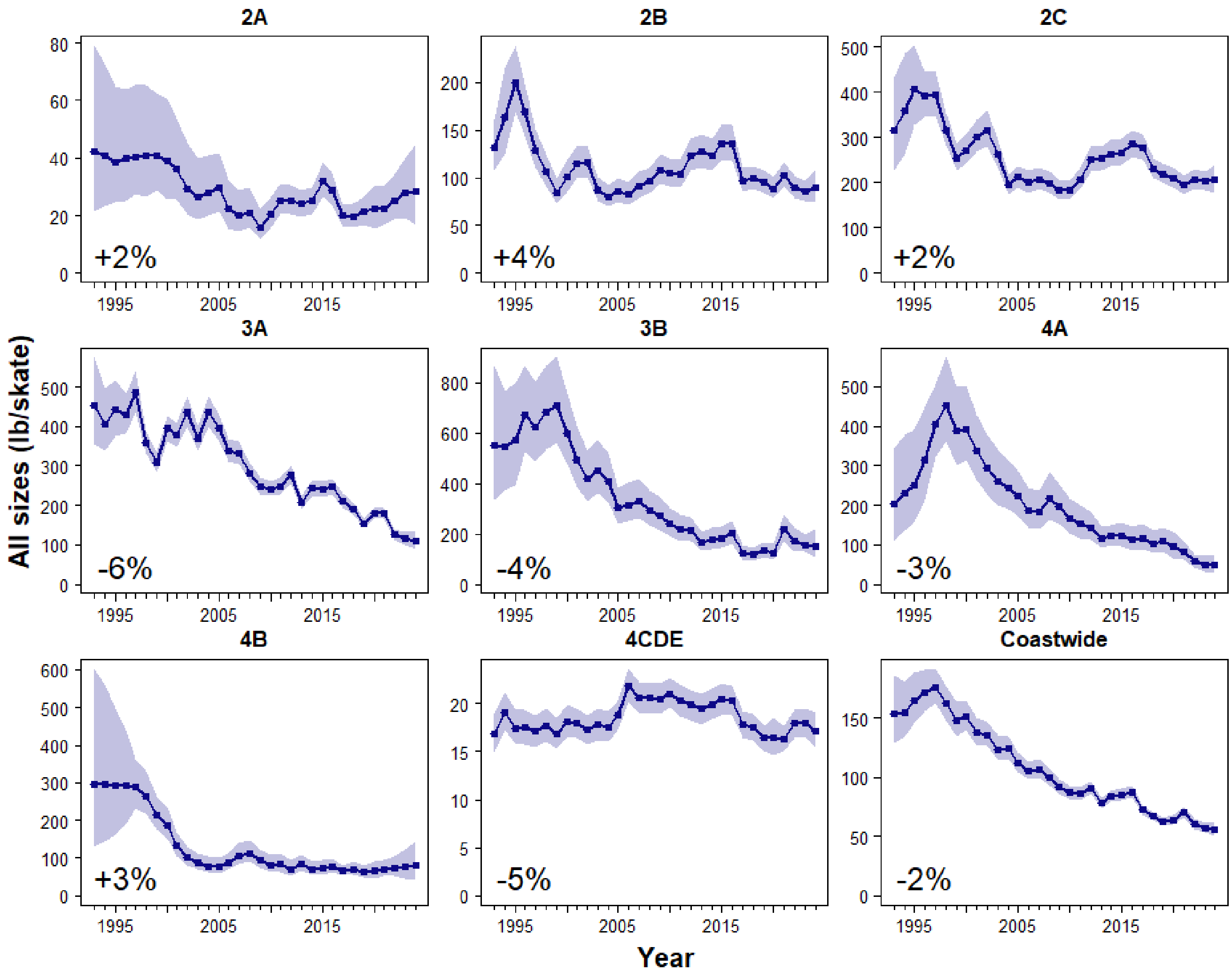


Figure A.2. Space-time model output for all sizes WPUE for 1993-2024. Filled circles denote the posterior means of all sizes WPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean all sizes WPUE from 2023 to 2024.

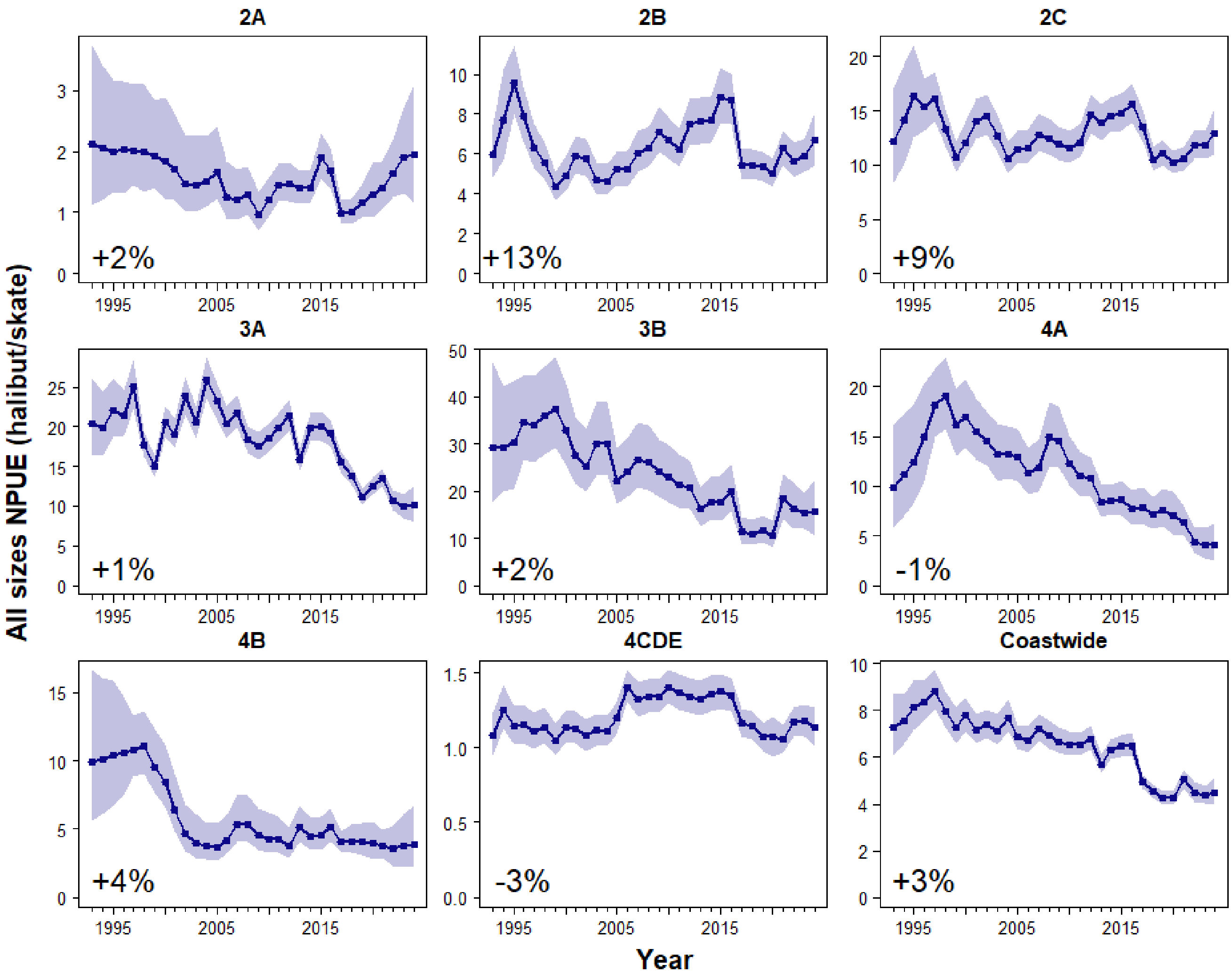


Figure A.3. Space-time model output for all sizes NPUE for 1993-2024. Filled circles denote the posterior means of all sizes NPUE for each year. Shaded regions show posterior 95% credible intervals, which provide a measure of uncertainty: the wider the shaded interval, the greater the uncertainty in the estimate. Numeric values in the lower left-hand corners are estimates of the change in mean all sizes NPUE from 2023 to 2024.

Data overview and stock assessment for Pacific halibut (*Hippoglossus stenolepis*) at the end of 2024

PREPARED BY: IPHC SECRETARIAT (I. STEWART, A. HICKS, R. WEBSTER, AND D. WILSON; 10 DECEMBER 2024)

PURPOSE

To provide the Commission with a summary of the data, stock assessment at the end of 2024. Note that this document reflects a revision to the projected landings and directed commercial fishery discards for 2024, including updated stock assessment results.

INTRODUCTION

In 2024 the International Pacific Halibut Commission (IPHC) undertook its annual coastwide stock assessment of Pacific halibut (*Hippoglossus stenolepis*). This stock assessment represents a second update, following the full assessment conducted in 2022. There are no structural changes to the assessment methods for 2023 or 2024. Supporting analyses were reviewed by the IPHC's Scientific Review Board (SRB) in June (SRB024; IPHC-2024-SRB024-08, IPHC-2024-SRB024-R) and September 2024 (SRB025; IPHC-2024-SRB025-06, IPHC-2024-SRB025-R).

This document provides an overview of the data sources available for the 2024 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. All standard data sources have been updated with new information available from 2024 for this analysis, which includes updates to data collected in previous years.

Overall, recent spawning biomass (SB) estimates are lower than those in last year's stock assessment; however, the recent estimated trend is nearly flat. Year-classes estimated for 2012 and 2016 are both larger than those occurring from 2006-2011, but well below the average observed over the last 30 years. Stock distribution trends continue to show an increasing proportion of the stock in Biological Region 2 and a decreasing proportion in Biological Region 3.

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 Puget Sound, but excludes known extremities in the western Bering Sea within the Russian Exclusive Economic Zone (Figure 1).

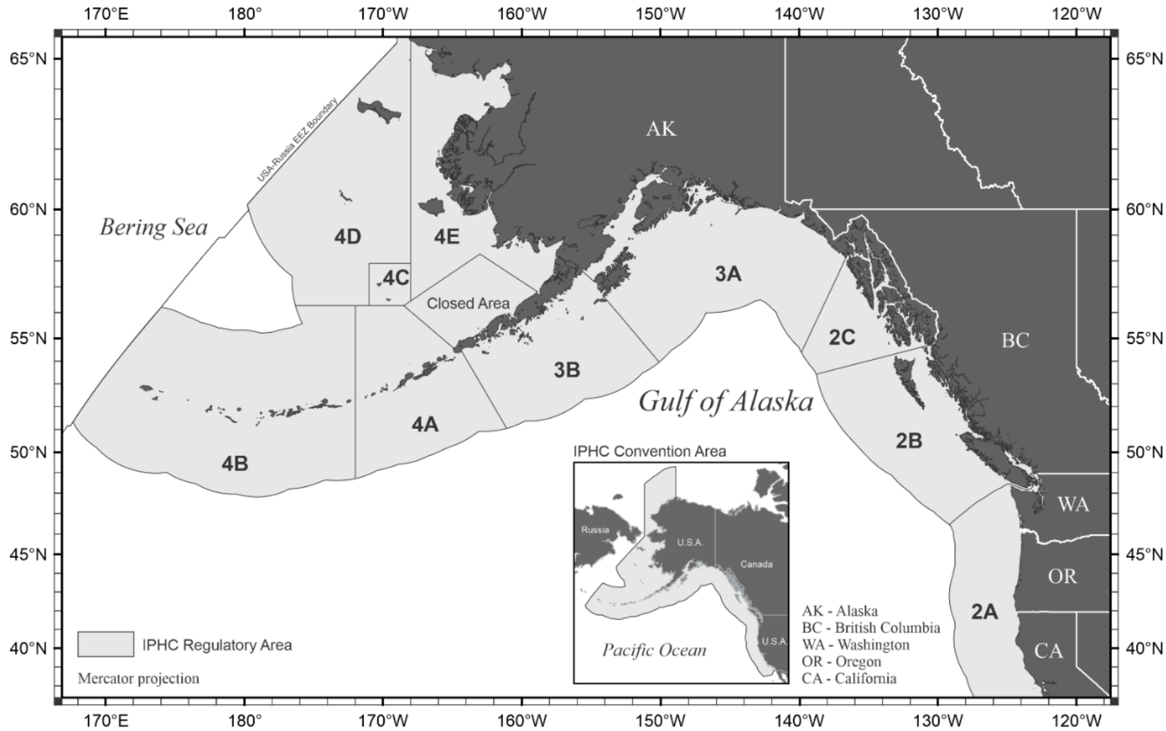


Figure 1. IPHC Convention Area (insert) and IPHC Regulatory Areas.

The Pacific halibut fishery has been managed by the IPHC since 1924. Catch 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. Short-term projections and the harvest decision table for 2025 are reported in a separate document (IPHC-2025-AM101-13).

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 1888-2024, mortality from all sources has totaled 7.4 billion pounds (~3.4 million metric tons, t). Since 1925, the fishery has ranged annually from 33 to 100 million pounds (15,000-45,000 t) with an annual average of 63 million pounds (~28,000 t; Figure 2). Annual mortality was above this 100-year average from 1985 through 2010 and has averaged 35.7 million pounds (~16,200 t) from 2020-24.

2024 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 mostly spatially complete since the late-1990s. Primary sources of information for this assessment include mortality estimates from all sources (IPHC-2025-AM101-08), modelled

[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.

indices of abundance (IPHC-2024-IM100-10 Rev_1) 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).

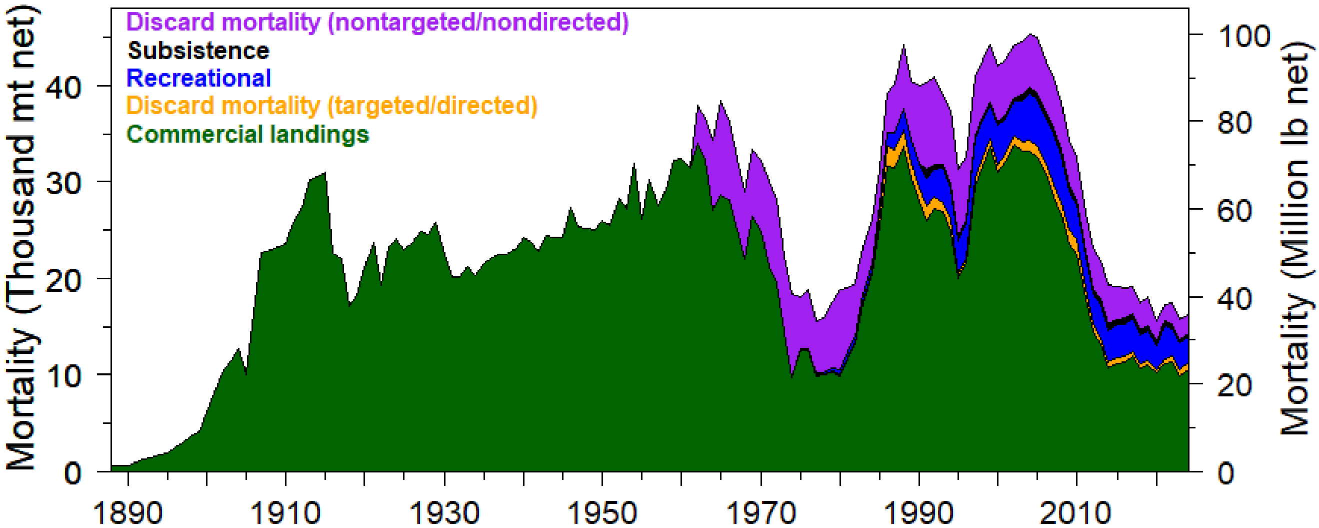


Figure 2. Summary of estimated historical mortality by source (colors), 1888-2024.

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. Routine updates of logbook records from the 2024 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 from the 2023 fishery were genetically analyzed and made available for this assessment. Mortality estimates (including changes to the existing time-series where new estimates have become available) from all sources were extended to include 2024. Available information was finalized on 31 October 2024 in order to provide adequate time for analysis and modeling. However, directed commercial landings and discards were updated in late November to better reflect the fishery performance in 2024. As has been the case in all years, some data remain 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 2024 were approximately 20.5 million pounds (~9,300 t), down 6% from 2023[2]. Discard mortality in non-directed fisheries was estimated to be 4.1 million pounds in 2024 (~1,900 t)[3], down 5% from 2023 and remaining below all recent estimates prior to 2021. The total recreational mortality (including estimates of discard mortality) was estimated to be 5.9 million pounds (~2,700 t) down 5% from 2023. Mortality from all sources decreased by 5% to an estimated 32.7 million pounds

[2] The mortality estimates reported in this document and used in the assessment analysis were updated in late November 2024; 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 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 the total mortality from ongoing fisheries through the end of the calendar year. Further updates are anticipated in January 2025.

(~14,800 t) in 2024, the lowest value in 100 years, based on preliminary information available for this assessment.

The 2024 modelled FISS results detailed an estimated coastwide aggregate Numbers-Per-Unit-Effort (NPUE) which increased by 3% from 2023 to 2024, remaining at a level similar to those observed in 2018-2020 (Figure 3). Biological Region 3 increased by 1%, while Biological Region 2 increased by 11% and Biological Region 4 decreased by 3%. Biological Region 4B is estimated to have increased by 4%; however, this area has not been sampled since 2022 (and then only partially) and credible intervals reflect a wide plausible range of potential trends, both increasing and decreasing, from 2022 to 2024. The modelled coastwide Weight-Per-Unit-Effort (WPUE) of legal (O32) Pacific halibut, the most comparable metric to observed commercial fishery catch rates, decreased by 9% from 2023 to 2024. Individual IPHC Regulatory Areas varied from an estimated 4% increase (Regulatory Area 4B; noting high uncertainty and high likelihood of bias due to lack of recent sampling) to a 21% decrease (Regulatory Area 3B) in O32 WPUE (Figure 4).

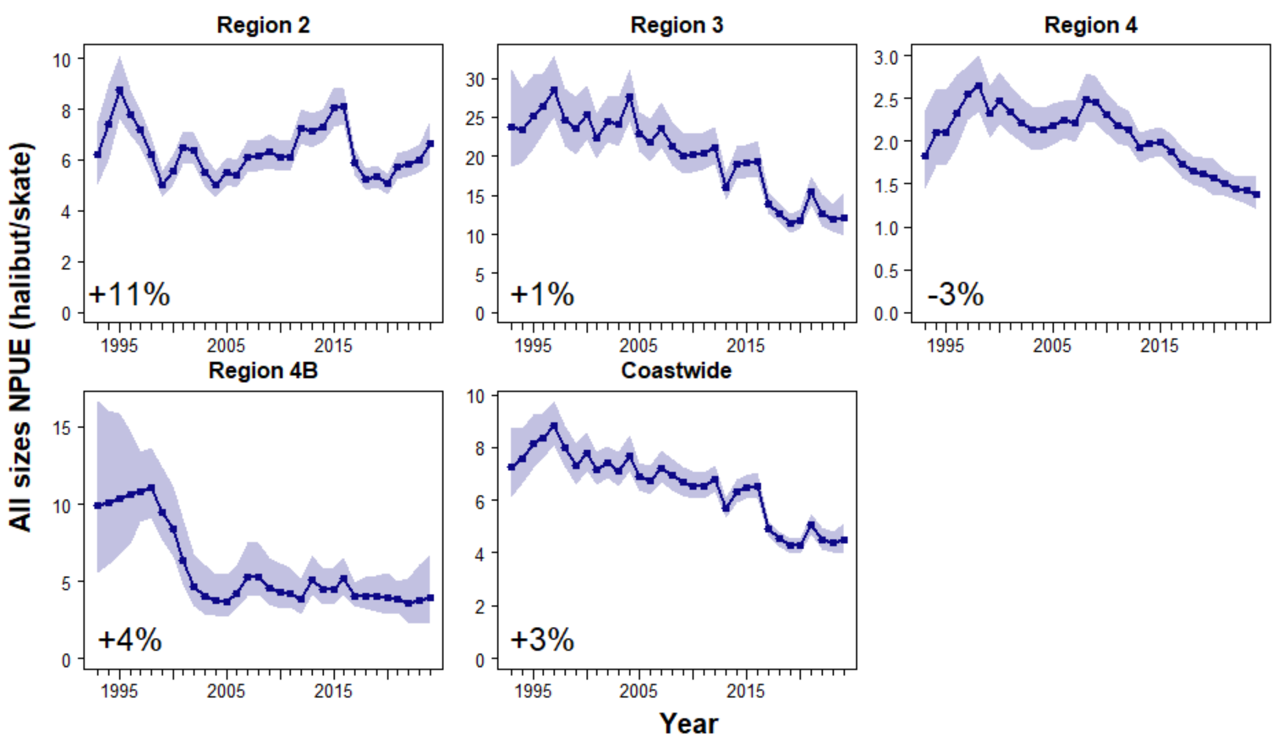


Figure 3. Trends in modelled FISS NPUE by Biological Region, 1993-2024. Percentages indicate the estimated change from 2023 to 2024. Shaded zones indicate 95% credible intervals.

Preliminary commercial fishery WPUE estimates from 2024 logbooks showed a 2% decrease from 2023 to 2024 at the coastwide level (Figure 5). However, based on recent updates to in-season preliminary estimates, after accounting for additional logbooks compiled after the fishing season this drop is expected to increase to 7%. Trends varied among IPHC Regulatory Areas, fisheries, and gears; however, all areas showed decreased CPUE in one or more index, with the largest decreases occurring in IPHC Regulatory Area 3B, corresponding to those observed in the FISS.

Biological information (ages and lengths) from the commercial fishery landings showed that in 2024 the 2012 year-class (now 12 years old) was again the largest coastwide contributor (in number) to the fish landed. This follows the same patterns observed in 2022-23, after the fishery transitioned from the previously most-abundant 2005 year-class. The FISS also observed the 2012 year-class as a large proportion of the total catch, but the largest proportion comprised the 2016 year-class (age-8 in 2024) also observed in the commercial fishery and recent recreational fisheries. Recent trawl surveys suggest the potential for one or more strong year-classes in 2016-2018; however, the most recent age-length key available is from 2022, so it is difficult to identify specifically which of these year-classes are present in appreciable numbers. Individual size-at-age trends appear mixed through 2024 with previously observed increases for younger ages (<14) reversing in some cases.

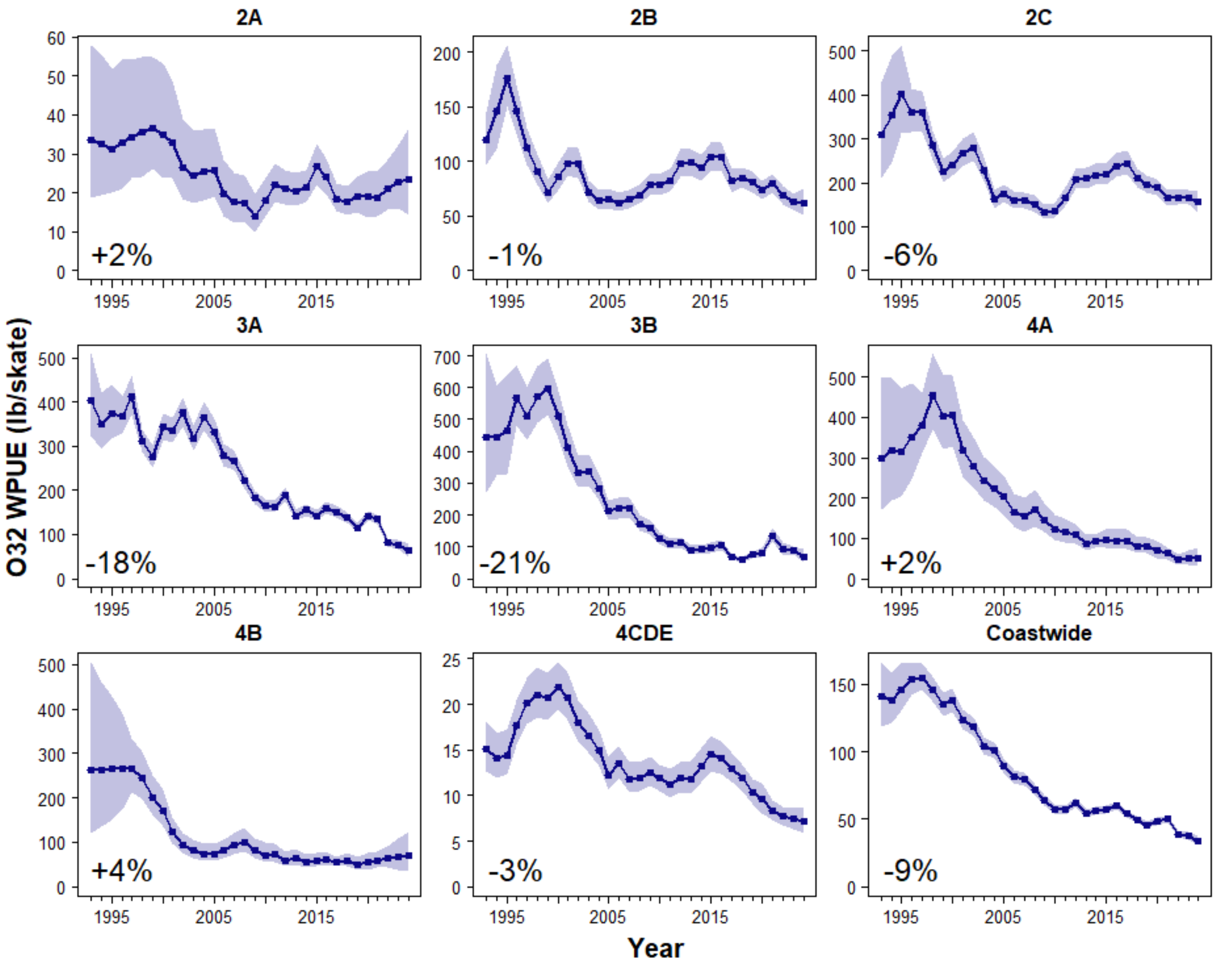


Figure 4. Trends in modelled FISS legal (O32) WPUE by IPHC Regulatory Area, 1993-2024. Percentages indicate the estimated change from 2023 to 2024. Shaded zones indicate 95% credible intervals.

Biological stock distribution

The population distribution (measured via the modelled FISS catch in weight of all Pacific halibut) showed a continuation of the 20-year decrease in Biological Region 3 to the lowest proportion of the coastwide stock in the time-series (Figure 6; recent years in Table 1). Biological Region 2 increased to the highest proportion observed. Due to the lack of FISS sampling in Biological Region 4B and generally reduced designs in 2023-24. the credible intervals for stock distribution are wide. For Biological Region 4B, the credible stock distribution in 2024 ranges from 4 to 12%. Survey data are insufficient to estimate stock distribution prior to 1993. It is therefore unknown how historical distributions may compare with recent observations.

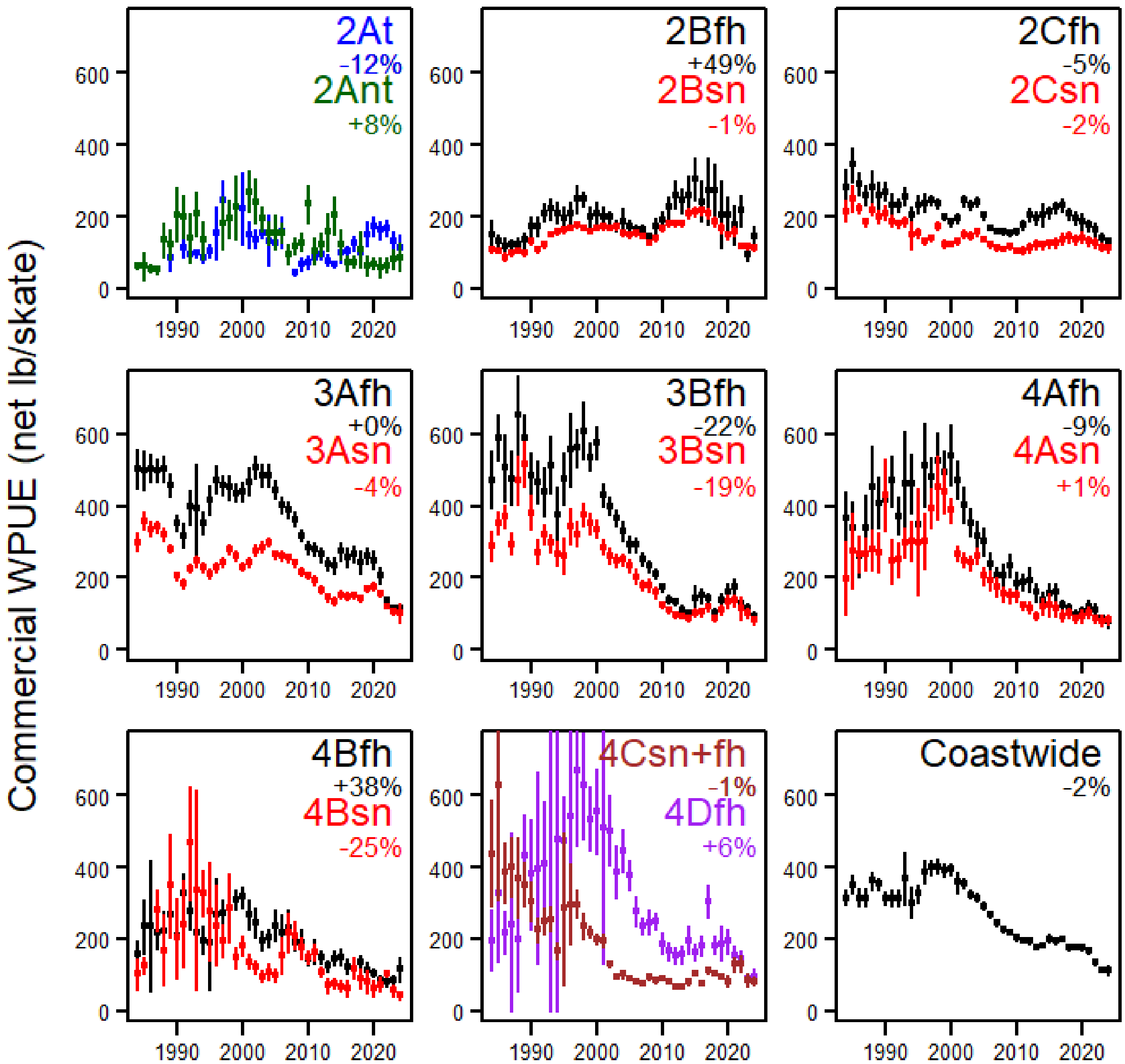


Figure 5. Trends in commercial fishery WPUE by IPHC Regulatory Area and fishery or gear, 1984-2024. The tribal fishery in 2A is denoted by "2At", non-tribal by "2Ant", fixed-hook catch rates by "fh" and snap-gear catch rates by "sn" for IPHC Regulatory Areas 2B-4D. Percentages indicate the change from 2023 to 2024 uncorrected for bias due to incomplete logbooks (see text above). Vertical lines indicate approximate 95% confidence intervals.

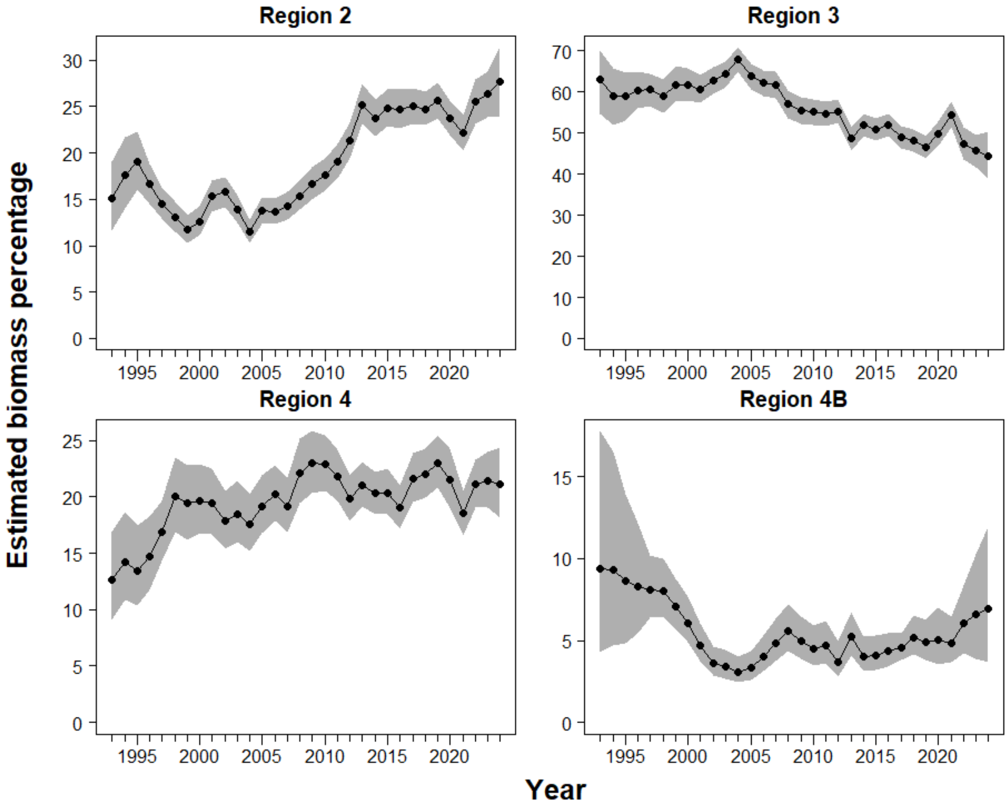


Figure 6. Estimated stock distribution (1993-2024) based on modelled survey catch weight per unit effort of all sizes of Pacific halibut. Shaded zones indicate 95% credible intervals.

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
2020	23.8%	49.7%	21.5%	5.0%
2021	22.2%	54.5%	18.5%	4.8%
2022	25.6%	47.2%	21.1%	6.1%
2023	26.3%	45.6%	21.5%	6.6%
2024	27.7%	44.3%	21.1%	7.0%

STOCK ASSESSMENT

This stock assessment continues to be implemented using the generalized Stock Synthesis software (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 fisheries (1888), 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), selectivity, 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.

This stock assessment represents a second update, following the full assessment conducted in 2022 (IPHC-2023-SA01), and the update in 2023 (IPHC-2024-SA01). There are no structural changes to the assessment methods for 2024. Supporting analyses were reviewed by the IPHC's Scientific Review Board (SRB) in June (SRB024; IPHC-2024-SRB024-08, IPHC-2024-SRB024-R) and September 2024 (SRB025; IPHC-2024-SRB025-06, IPHC-2024-SRB025-R).

For the second year in a row, the most influential source of new information in this assessment was the directed commercial fishery logbook trend, including the updated (and lower) 2023 estimate as well as the estimate of the catch-rate in 2024. The addition of just this information resulted in an 17% decrease in the 2024 spawning biomass estimate, compared to that in the 2023 stock assessment. This is partly a result of the decline in the 2024 fishery WPUE and a lower 2023 fishery WPUE when adding additional logbooks to the analysis this year. Although differences in trend between the FISS and commercial fishery are not uncommon in the historical time-series, the sensitivity of this and last year's assessment to these data highlights the importance of both time-series in estimating the stock size and trend.

BIOMASS, RECRUITMENT, AND FISHING INTENSITY TRENDS

The results of the 2024 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 lower recruitment than observed during the 1980s. The spawning biomass increased gradually to 2016, and then decreased to an estimated 145 million pounds (~65,700 t) at the beginning of 2024. At the beginning of 2025 the spawning biomass is estimated to have increased slightly due to the continued maturation of the 2012 year-class and the onset of maturity of the 2016 year-class. The current spawning biomass estimate is 149 million pounds (67,500 t), with an approximate 95% credible interval ranging from 97 to 216 million pounds (~44,100-98,200 t; Figure 8). The recent spawning biomass estimates from the 2024 stock assessment are very consistent with previous assessments up 2019, and below subsequent estimates for 2020 to 2024 from more recent assessments (Figure 9).

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 relative spawning biomass limit of 20%, directed fishing is halted due to the critically low biomass condition. This calculation is based on recent biological conditions currently influencing the stock and therefore measures only the effect of fishing on the spawning biomass, and not natural fluctuations due to recruitment variability and weight-at-age. The relative spawning biomass at the beginning of 2025 was estimated to be 38% (credible interval: 18-55%) slightly higher than the estimate for 2024 (37%). The probability that the stock is below the $SB_{30\%}$ level is estimated to be 30% at the beginning of 2025, with a 11% 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 (41%), and the coastwide model above (143%). The relative differences among models reflect both the uncertainty in historical dynamics (there was very little data available from IPHC Regulatory Areas 4A-4CDE prior to the 1970s) as well as the importance of spatial patterns in the data and population processes, for which all of the models represent only simple approximations.

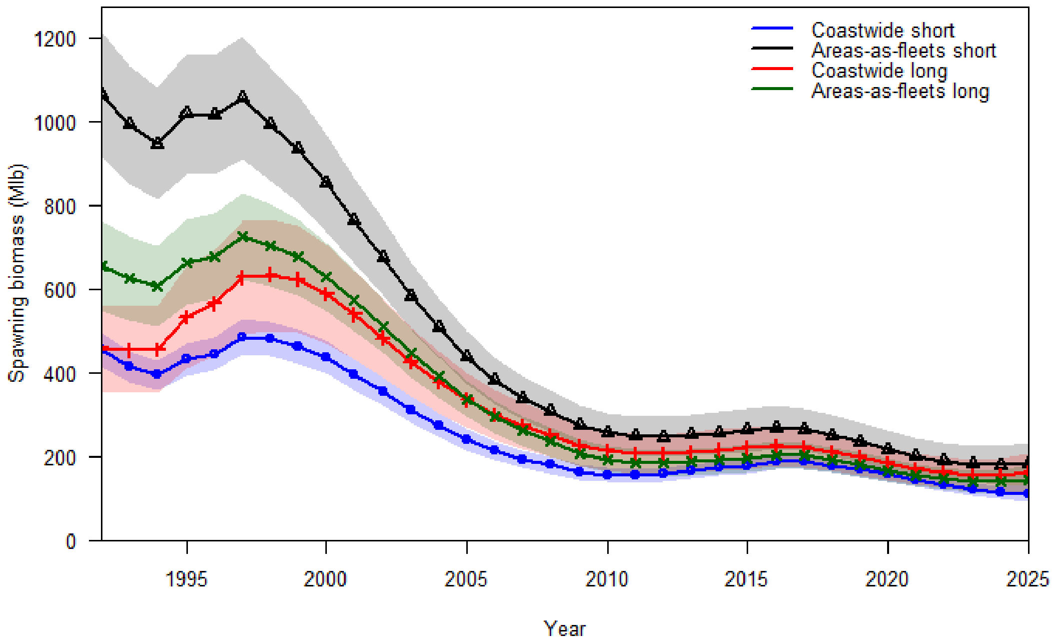


Figure 7. Estimated spawning biomass trends (1992-2025) based on the four individual models included in the 2024 stock assessment ensemble. Series indicate the maximum likelihood estimates; shaded intervals indicate approximate 95% credible intervals.

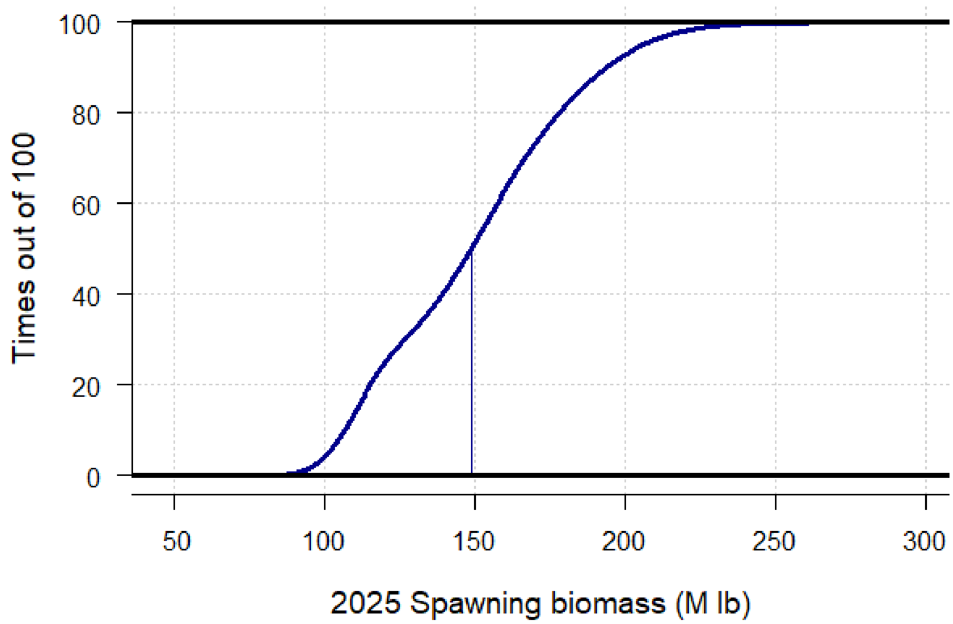


Figure 8. Cumulative distribution of the estimated spawning biomass at the beginning of 2025. Curve represents the estimated probability that the biomass is less than or equal to the value on the x-axis; vertical line represents the median (149 million pounds, ~64,500 t).

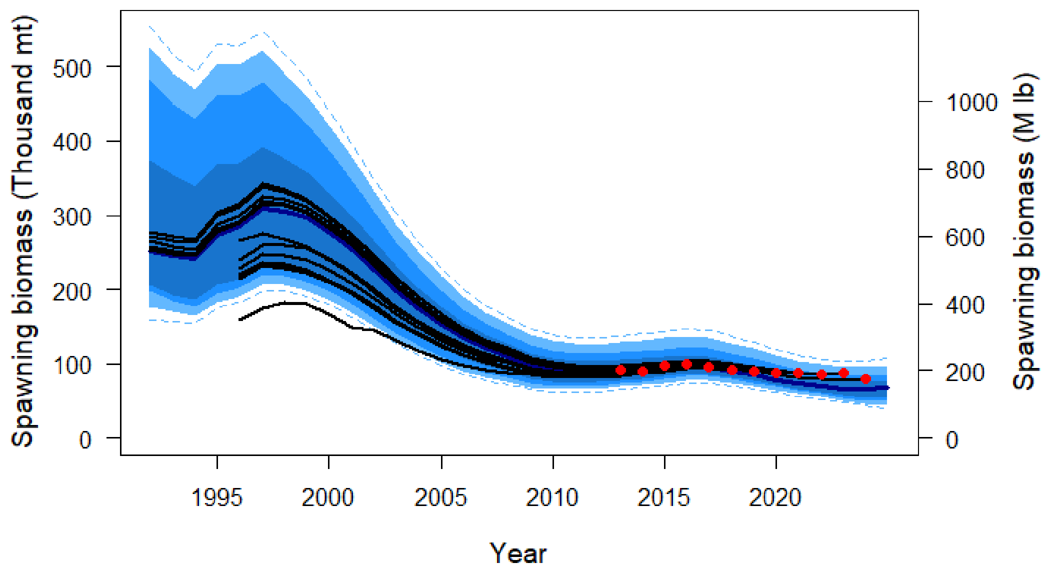


Figure 9. Retrospective comparison of female spawning biomass among recent IPHC stock assessments. Black lines indicate estimates from assessments conducted in 2012-2023 with the terminal estimate shown as a red point. The shaded distribution denotes the 2024 ensemble: the dark blue line indicates the 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.

Average Pacific halibut recruitment is estimated to be higher (59 and 53% 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, from 1976-2006 and from 2014-2019, with poor conditions from 1947-1975, 2007-2013 and after 2020 (through September

2024). 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 largest recent cohorts to have been born in 1999 and 2005 (Figure 10). 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 now comprise the majority of the spawning biomass. Based on age data through 2024, individual models in this assessment produced estimates of the 2012 year-classes that were similar to the average level observed over 1994-2005. Of the fish comprising the 2012 year-class, 56% are estimated to be mature as of 2024 and the continued maturation of this cohort has a strong effect on the short-term projections. The 2024 data indicate a reduction in the 2014 year-class compared to earlier data, placing it on a similar scale to 2006-2008. The 2016 year-class (age-8 in 2024) may be of a similar magnitude to the 2012 cohort but remains very uncertain. There is little information on recruitments after 2016 in the data currently available.

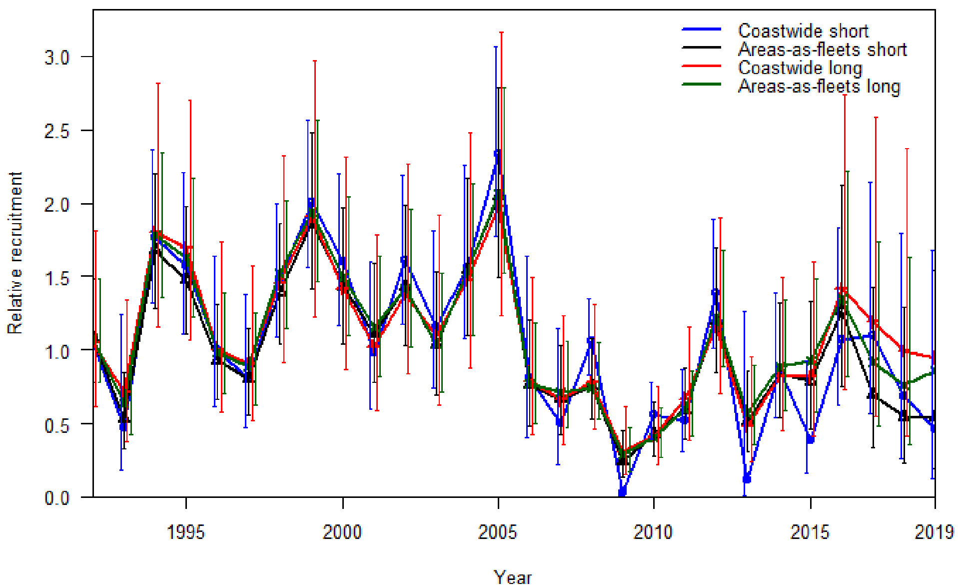


Figure 10. Estimated trends in age-0 relative recruitment (standardized to the mean for each model) from 1992-2019, based on the four individual models included in the 2024 stock assessment ensemble. Series indicate the maximum likelihood estimates; vertical lines indicate approximate 95% credible intervals.

The IPHC's interim management procedure specifies a reference level of fishing intensity of $F_{43\%}$ (SPR=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 historical time-series of fishing intensity is estimated to have peaked in the period from 2004-2011 (Figure 11). Since approximately 2014 previous and current estimates have fluctuated around reference levels. The 2024 fishing intensity is estimated to be $F_{49\%}$ (credible interval: 30-64%; Table 2), below both the current and previous ($F_{46\%}$) reference levels and the value estimated for 2023 (47%). 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 as fishing intensity was reduced (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 seven years (2017-23) 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 future stock size estimates. 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.

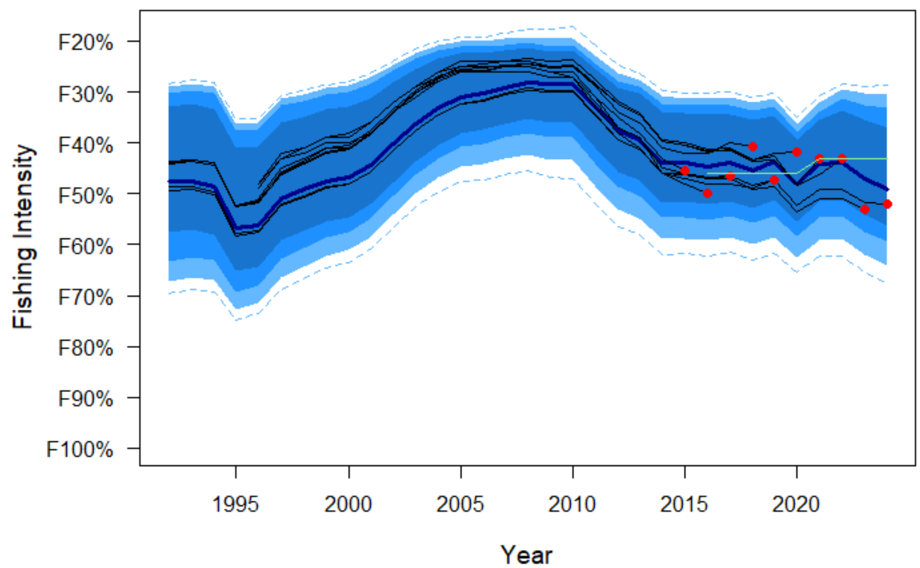


Figure 11. Retrospective comparison of fishing intensity (measured as $F_{xx\%}$, where xx% indicates the Spawning Potential Ratio (SPR) or the reduction in the lifetime reproductive output (due to fishing) among recent IPHC stock assessments. Black lines indicate estimates of fishing intensity from assessments conducted in 2014-2023 with the projection for the mortality limit adopted based on that assessment shown as a red point. The shaded distribution denotes the 2024 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 green 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 $F_{43\%}$ thereafter).

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. 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 along with fishing mortality.

The reduction in estimated commercial fishery catch rates from the time the data sets for the stock assessment are closed until the data are relatively complete (sometime the following year) has been previously identified. Concern over the potential for incomplete fishery CPUE to bias the assessment results led to the recommendation to 'down-weight' the terminal year via doubling the estimated variance in the index (IPHC-2017-SRB11-R). However, when the CPUE and other data provide differing information on the recent stock scale and/or trend this approach of inflating the variance may make subsequent analyses more sensitive to the change in CPUE rather than less. Historically this has not been an issue, however in both the 2023 and 2024 stock assessments it has. An alternative analysis was conducted this year using the estimated variance without any inflation and applying an additional 5% decrease from the observed (now updated) 2023 value to the preliminary 2024 estimate. This resulted in an additional 2% decrease in the estimated 2025 spawning biomass. An alternative projection is also provided based on this approach (IPHC-2025-AM101-13).

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.

Table 2. Status summary of the Pacific halibut stock and fishery in the IPHC Convention Area at beginning of 2025.

Indicators	Values	Trends	Status
Biological			
SPR_{2024}: P(SPR<43%): P(SPR<limit):	49% (30-64%)[2] 33% Limit not specified	Fishing intensity decreased from 2023 to 2024	**Fishing intensity below reference level[3]**
SB_{2025} (Mlbs): SB_{2025}/SB_0: $P(SB_{2025}<SB_{30})$: $P(SB_{2025}<SB_{20})$:	149 (97–216) Mlbs 38% (18-55%) 30% 11%	SB increased 3% from 2024 to 2025	**Not overfished[4]**
Biological stock distribution:	See Tables and Figures	Region 3 decreased, Region 2 increased from 2023 to 2024	**Region 3 at the lowest observed proportion**
Fishery context			
Total mortality 2024: Percent retained 2024: Average mortality 2020-24:	32.70 Mlbs, 14,832 t[1] 83% 35.66 Mlbs, 16,174 t	Mortality decreased from 2023 to 2024	**2024 mortality at 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 $SB_{20\%}$.

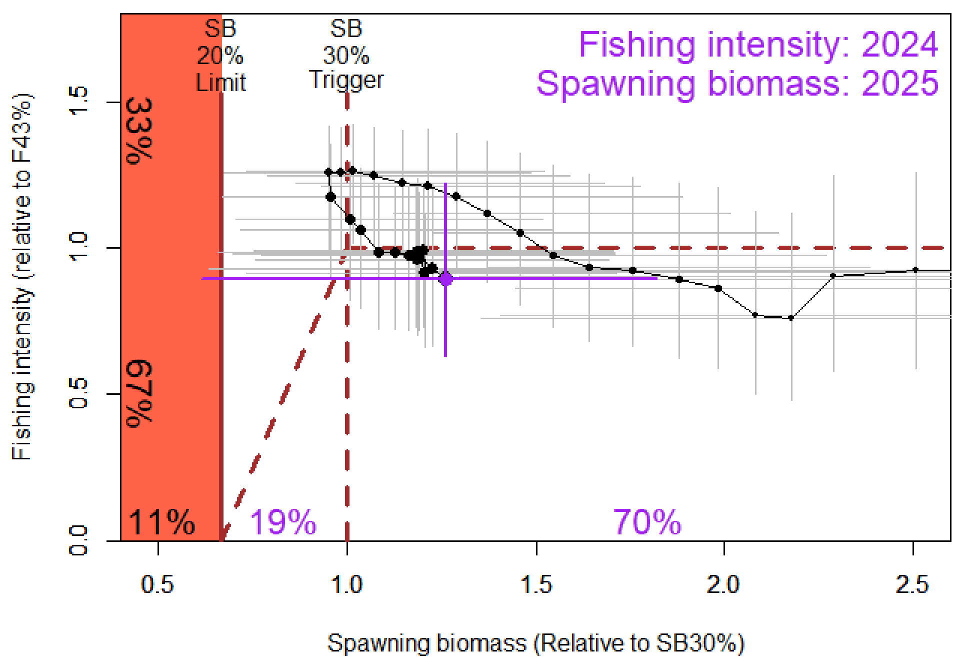


Figure 12. Phase plot showing the estimated time-series (1992-2025) of spawning biomass and fishing intensity relative to the reference points specified in the IPHC's interim management procedure. Dashed lines indicate the current $F_{43\%}$ (horizontal) reference fishing intensity, with

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 2024 and spawning biomass at the beginning of 2025 shown as the largest point (purple). Percentages along the y-axis indicate the probability of being above and below $F_{43\%}$ in 2024; 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 2025.

Summary of Scientific Advice

Sources of mortality: In 2024, total Pacific mortality due to fishing decreased to 32.70 million pounds (14,832 t), below the 5-year average of 35.66 million pounds (16,174 t) and representing the lowest value in over 100 years, due to a TCEY reduction of 4.6% from 2023 to 2024. Of that total mortality, 83% was retained and utilized in one of the fishery sectors (Table 2); this was below to the percent utilized in 2023 (84%) and equal to that observed in 2022.

Fishing intensity: The 2024 fishing mortality corresponded to a point estimate of SPR = 49%; there is a 33% 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 2025) female spawning biomass is estimated to be 149 million pounds (67,500 t), which corresponds to a 30% chance of being below the IPHC trigger reference point of $SB_{30\%}$, and an 11% chance of being below the IPHC limit reference point of $SB_{20\%}$. The stock is estimated to have declined 32% from 2016 to 2024, then increased by 3% to the beginning of 2025. The relative spawning biomass (compared to the biomass projected to be present at the beginning of 2025 in the absence of any fishing) is currently estimated to be 38%, after reaching the lowest point in the recent time series (28%) in 2011. Therefore, the stock is considered to be '**not overfished**'.

Stock distribution: After increases in 2020-2021, the proportion of the coastwide stock represented by Biological Region 3 has decreased in 2022-24 to the lowest estimate in the time-series, (Figure 6, Table 1). This trend occurs in tandem with increases in Biological Region 2. The lack of FISS sampling in Biological Region 4B in 2023-24 has resulted in increased uncertainty in both the trend and scale of the stock distribution in this Region.

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 absolute level of spawning biomass is also estimated to be near the lowest observed since the 1970s. The directed commercial fishery transitioned from the 2005 year-class to the 2012 year-class in 2022, with the 2012 year-class again the most numerous in the landed catch in 2023-24. This shift from older to younger (and smaller fish) has contributed to observed reduced catch rates. The current spawning stock is heavily reliant on the 2012 and now 2016 year-classes. Environmental conditions continue to be unpredictable, with important deviations from historical patterns in both oceanographic and biological processes observed across the stock range in the last decade.

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-2025-AM101-06).

Outlook

Short-term projections and the harvest decision table for 2025-2027 are reported in a separate document (IPHC-2025-AM101-13).

Additional information

A more detailed description of the stock assessment (IPHC-2025-SA-01) and the data sources (IPHC-2025-SA-02), will be published directly to the stock assessment page on the IPHC's website. That page also includes all 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-2025-AM101-11 that provides a summary of the data and the results of the 2024 stock assessment.

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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**: 86-99. doi:http://dx.doi.org/10.1016/j.fishres.2012.10.012.

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IPHC Management Strategy Evaluation and Harvest Strategy Policy

PREPARED BY: IPHC SECRETARIAT (A. HICKS, I. STEWART, & D. WILSON; 09 DECEMBER 2024)

PURPOSE

To provide the Commission with an update on Management Strategy Evaluation (MSE) progress in 2024 and work supporting the development of the Harvest Strategy Policy (HSP), and to provide a path forward to adopt a HSP in 2025.

EXECUTIVE SUMMARY AND DECISION POINTS

A 2024 MSE workplan was provided by the Commission through intersession decisions ID003 to ID007 (IPHC Circular 2024-015). This included investigating a new objective, evaluating management procedures (MPs), defining exceptional circumstances, drafting a harvest strategy policy, and investigating different FISS design scenarios.

Objectives

The IPHC Secretariat have been discussing two objectives with the Management Strategy Advisory Board (MSAB) and Scientific Review Board (SRB). These are the $B_{36\%}$ threshold objective and the optimise yield objective. Recent adopted TCEYs have been less than the TCEY determined from the reference interim SPR of 43%, and there are concerns of low spawning biomass and low catch-rates within the fishery. The continued departure from the current interim MP and reduction in coastwide TCEY suggests that there may be an additional objective. An objective to maintain the absolute spawning biomass above a threshold may be a useful objective, which could be added as a new objective in addition to the current $B_{36\%}$ threshold objective or replace it. The MSAB noted that a new objective to maintain the coastwide TCEY above a threshold may also be useful (IPHC-2024-MSAB020-R, para 16). A new objective related to fishery performance could be phrased as:

> Maintain the coastwide female absolute spawning biomass (or FISS WPUE) above the level estimated for 2023.

The SRB made a recommendation to quantify the objective "optimise yield" (see IPHC-2024-SRB024-R, para 22) so that it is meaningful and can have a performance metric that identifies the best performing MP. Optimising yield may include multiple specific objectives, such as maximising yield and minimising variability in yield, and evaluation may include examining trade-offs between multiple objectives. The MSAB recommended that 'optimise' be changed to 'maximise' and this objective be given equal consideration along with minimising interannual variability in yield (IPHC-2024-MSAB020-R, para 14). The general objective of the Commission to optimise yield would remain.

I. **Decision Point:** Consider adding an objective to maintain the female absolute spawning biomass above a threshold, such as the level estimated in 2023.

II. **Decision Point:** Noting that optimise yield remains a general objective of the Commission, consider the recommendation from MSAB020 to redefine the measurable objective “optimise yield” to “maximise yield”, and evaluate this measurable objective equally with the measurable objective to minimise interannual variability in yield.

Evaluation of management procedures

Three elements of an MP were evaluated using the MSE: assessment frequency fishing intensity, and constraints. These simulations showed that reducing the fishing intensity (i.e. higher SPR) would achieve a higher spawning biomass, slightly lower interannual variability in the TCEY, and improve a potential new objective to avoid low absolute spawning biomass. However, yield would be reduced, on average. Biennial and triennial assessments would likely improve yield and lower the interannual variability in the TCEY, while also allowing more time to improve assessment and MSE methods, but at the cost of not providing detailed annual information such as stock status and decision tables. The SRB accepted this at SRB025.

IPHC-2024-SRB025-R, para 29: *The SRB* ***ACCEPTED*** *that*

1) *there are significant benefits of moving to a triennial assessment frequency in terms of freeing Secretariat resources to conduct other quantitative analyses (see para. 22); and*
2) *the MSE analysis showed no apparent cost of triennial assessment in terms of lost yield or increased interannual variability in TCEY*

There are trade-offs between the yield, the variability of yield, and the probability that the spawning biomass reaches levels below what has been observed in recent years. The largest effect on yield was due to changes in the fishing intensity, with a reduction of about 1.3 Mlbs in the TCEY, on average, for every 1% increase in the SPR. Interannual variability in the TCEY did not change much across fishing intensities lower than $F_{SPR=46\%}$, but increased more rapidly at $F_{SPR=43\%}$ and greater. The interannual variability in the TCEY was reduced when moving to less frequent assessments and determining the reference TCEY from the change in the O32 FISS WPUE. The chance that spawning biomass would be less than what was observed in recent years is also reduced with a reduction in fishing intensity. The MSAB made a recommendation to update the interim reference management procedure to a triennial stock assessment frequency using the change in the O32 FISS WPUE in non-assessment years and an SPR of 46% in assessment years to determine the reference TCEY:

IPHC-2024-MSAB020-R, para 41: *The MSAB* ***RECOMMENDED*** *updating the reference MP for one three-year cycle on a trial basis using a triennial stock assessment frequency (synchronised with the full stock assessment scheduled in 2025 to inform 2026 mortality limits). The coastwide TCEY would be based on SPR=46% in assessment years and based on the proportional change in the FISS O32 WPUE index in non-assessment years. The triennial stock assessment frequency may increase the median coastwide TCEY and reduce the interannual variability in the coastwide TCEY. A lower fishing intensity would also reduce the probability that the spawning biomass is less than the 2023 spawning biomass in the short- and long-term, and result in lower interannual variability as noted in paragraph 26.*

III. **Decision Point:** Consider updating the current interim reference MP with a new SPR value (currently 43%), a longer period between stock assessments (currently annual), and possibly adding a constraint on the annual change in the TCEY.

IV. **Decision Point:** Recommend further MSE work to support modifications to the management procedure determining the reference coastwide TCEY.

Three different FISS designs were also evaluated using an annual assessment frequency, a fishing intensity with SPR=43%, and no constraint. Reducing the FISS to the core areas, and occasionally surveying non-core areas would reduce yield and increase uncertainty and interannual variability in the TCEY. Yield was reduced by approximately 450,000 pounds on average moving from a base block design to a core design, and another approximate 450,000 pounds on average moving to a reduced core design. At US$6.00/lb, a 450,000 lb drop in the TCEY would equate to a US$2.7 million reduction in economic value.

V. **Decision Point:** Recommend further MSE analyses to evaluate FISS designs and methods to present outcomes of these analyses.

Analyses to support further development of the Harvest Strategy Policy

This work supports the development of a harvest strategy policy (HSP). A draft HSP is provided as a separate document for the 101st Annual Meeting of the IPHC (IPHC-2025-AM101-17).

VI. **Decision Point:** Recommend any updates and edits to the draft Harvest Strategy Policy.

VII. **Decision Point:** Recommend further analyses to support the development of the harvest strategy policy.

1 INTRODUCTION

A 2024 MSE workplan was provided by the Commission through intersession decisions ID003 to ID007 (IPHC Circular 2024-015). This included investigating a new objective, evaluating management procedures (MPs), defining exceptional circumstances, drafting a harvest strategy policy, and investigating different FISS design scenarios. Many of these tasks were developed from past Management Strategy Advisory Board (MSAB) and Scientific Review Board (SRB) recommendations, including recommendations related to MSE work made at the 19th session of the MSAB (IPHC-2024-MSAB019-R), the 24th session of the SRB (IPHC-2024-SRB024-R), and the 25th Session of the SRB (IPHC-2024-SRB025-R).

This document reports progress on MSE topics and simulations, and how they support the development of a harvest strategy policy.

2 HARVEST STRATEGY POLICY

A Harvest Strategy Policy (HSP) provides a framework for applying a science-based approach to setting harvest levels. At the IPHC, this is specific to the TCEY for each IPHC Regulatory Area throughout the Convention Area where allocation among IPHC Regulatory Areas is part of the decision-making process. Currently, the IPHC has not formally adopted a harvest strategy policy but has set harvest levels under an SPR-based framework with elements adopted at multiple Annual Meetings of the IPHC since 2017. The MSE work and guidance from the MSAB and SRB have been a very important part of developing the HSP.

A management procedure (MP) determines the coastwide TCEY which is an input to the decision-making process (Figure 1). The management procedure is an agreed upon method to determine the coastwide TCEY that best meets all conservation and fishery objectives. The MP must be reproducible and include elements such as how to collect data, how often to conduct a stock assessment, and a harvest control rule that determines the fishing intensity (i.e. SPR). A harvest strategy extends the MP to encompass objectives and other procedures such as exceptional circumstances. The harvest strategy policy further includes decision-making, where Commissioners determine the distribution and the TCEY among IPHC Regulatory Areas and may deviate from the outputs of the MP to account for other objectives not considered in the harvest strategy. This may be, for example, to modify the coastwide TCEY to account for economic factors or other current conditions. The decision-making component mostly occurs at the Annual Meeting of the IPHC where stakeholder input is considered along with scientific information. Decision-making variability is one of many sources of uncertainty included in the MSE simulations to ensure that the HSP is robust to all sources of variability and uncertainty.

The interim HSP (IPHC-2024-IM100-17) is a complete document that may be endorsed by the Commission, understanding that it may be updated based on recent and continuing MSE work and recommendations from the SRB and MSAB. The MSE work presented here supports the continued development of the harvest strategy policy. More specifically, the following areas of the HSP may be updated given work completed in 2024.

- Update the Commission's priority objectives based on recommendations of the SRB and MSAB.
- Update the following elements of the coastwide management procedure based on recent MSE work. For example, the reference SPR and assessment frequency.
- Edits to the HSP text.

Outcomes of work related to objectives and results from evaluations of MPs are provided in this document.

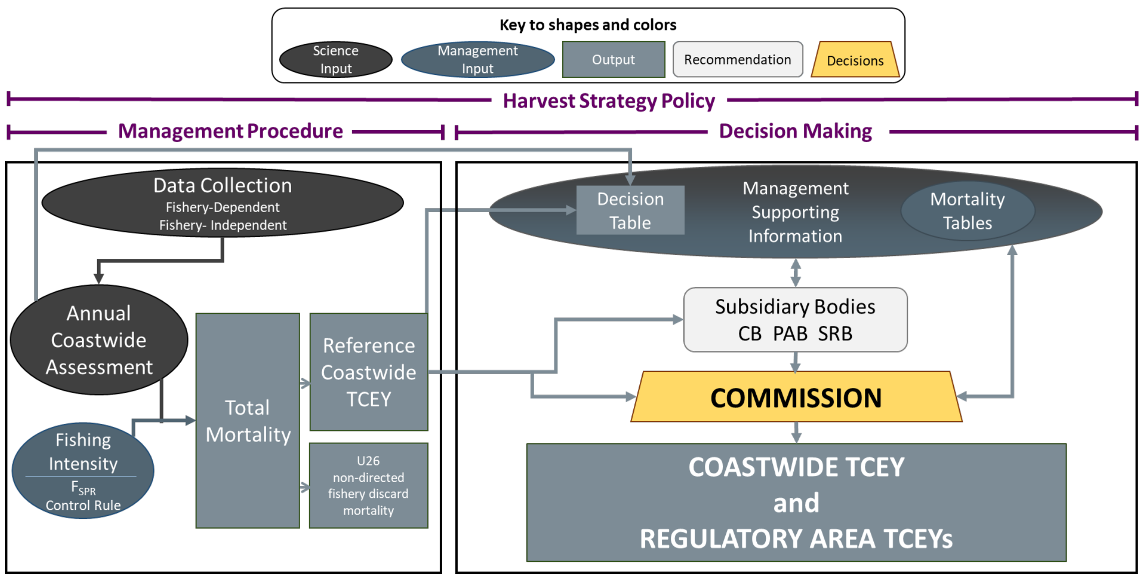

Figure 1. Illustration of the interim harvest strategy policy for the IPHC showing the determination of the coastwide TCEY (the management procedure at the coastwide scale) and the decision-making component that mainly occurs at the Annual Meeting.

2.1 Exceptional Circumstances

An exceptional circumstance is an event that is beyond the expected range of the MSE. Exceptional circumstances, which trigger specific actions to be taken if one is met, define a process for deviating from an adopted harvest strategy (de Moor, Butterworth, and Johnston 2022). It is important to ensure that the adopted harvest strategy is retained unless there are clear indications that the MSE may not be accurate. The IPHC interim harvest strategy policy (Figure 1) has a decision-making step after the MP, thus the Commission may deviate from an adopted MP as part of the harvest strategy policy, and this decision-making variability is included in the MSE simulations. However, if the MSE simulations are not representative of the realized outcomes, exceptional circumstances may be declared.

The Secretariat, with the assistance of the SRB and MSAB, has defined exceptional circumstances and the response that would be initiated, as well as potential triggers in a management procedure that would result in a stock assessment being done (if time allows) in a year that would normally not have one scheduled (e.g. in multi-year MPs). Triggers for an exceptional circumstance have been updated following further discussions with the SRB.

IPHC-2024-SRB024-R, para 25. ***RECALLING*** *paper IPHC-2024-SRB024-03, Appendix A, SRB023-Rec.08 (para. 27), the SRB* ***RECOMMENDED****:*

a) removing "exceptional circumstance" item c because the expected timeline of stock assessments and OM updates will automatically revise biological parameters and processes;

b) removing "exceptional circumstance" item b because:

• even though the operating model is an adequate representation of the coastwide dynamics and is useful for development of a coastwide MP, additional work on the regional stock dynamics needs to be done to improve correspondence with regional observations;

• improving estimation of regional stock dynamics is a longer-term project that the Secretariat will continue to work on with input from the SRB;

• as per paragraph 21, the SRB suggests that the annual TCEY distribution should not be included in a MP.

Therefore, one trigger, using coastwide WPUE or NPUE, for an exceptional circumstance has been defined.

The coastwide all-sizes FISS WPUE or NPUE from the space-time model falls above the 97.5th percentile or below the 2.5th percentile of the simulated FISS index for two or more consecutive years.

The MSAB was also interested in developing exceptional circumstances using fishery-dependent data.

IPHC-2024-MSAB019-R, para. 53: *The MSAB* ***NOTED*** *that the FISS is conducted to measure the population and that it may not be an accurate depiction of the fishery, and that fishery-dependent data may provide insights into fishery concerns that the FISS may not capture.*

IPHC-2024-MSAB019-R, para. 54: *The MSAB* ***REQUESTED*** *that the SRB and Secretariat work together to consider different ways to incorporate fishery-dependent data into an exceptional circumstance.*

The MSE simulations predict many types of fishery-dependent data (e.g. WPUE, age-compositions) which may be used to develop additional exceptional circumstances. It will be important to delineate between changes in fishery-dependent data that should fall within the scope of the MSE predictions and those that may be caused by management actions not reflective of Pacific halibut stock dynamics (e.g. change in catch rates due to avoidance/targeting of other species). The response in these two cases may be different. Further consideration of exceptional circumstances incorporating fishery-dependent data will continue.

Potentially useful fishery-dependent metrics to base an exceptional circumstance on relate to the adopted TCEY or realized fishing mortality. These are important sources of uncertainty to simulate and using them to define an exceptional circumstance would ensure that the simulations are appropriately capturing future realizations. The SRB made the following recommendations related to this topic.

IPHC-2024-SRB025-R, para. 26: *The SRB strongly **RECOMMENDED** against using MSE (a strategic tool) in the annual TCEY setting process. Exceptional circumstances checks (on WPUE and CATCH) are used to judge whether management procedures are generating appropriate recommendations in a given year.*

IPHC-2024-SRB025-R, para. 30: *The SRB **RECOMMENDED** adopting realised coastwide catch as a fishery-dependent indicator for testing exceptional circumstances. Realised coastwide catch each year can be compared to the projected distribution of future TCEY for that year to determine whether biological or management processes (e.g. decision variability) are leading to unexpected TCEY.*

Therefore, a second exceptional circumstance could be:

> The realized coastwide fishing mortality is above the 97.5th percentile or below the 2.5th percentile of the simulated realized coastwide fishing mortality for two or more consecutive years.

This exceptional circumstance would capture both the decision-making process and the implementation variability of the fisheries (e.g. not realizing the exact adopted TCEY).

3 GOALS AND OBJECTIVES

The Commission defined four priority coastwide objectives and associated performance metrics for evaluating MSE simulations.

IPHC-2023-AM099-R, para. 76. *The Commission **RECOMMENDED** that for the purpose of a comprehensive and intelligible Harvest Strategy Policy (HSP), four coastwide objectives should be documented within the HSP, in priority order:*

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 at or above a biomass reference point (B36%) 50% or more of the time.

c) Optimise average coastwide TCEY.

d) Limit annual changes in the coastwide TCEY.

IPHC-2023-AM099-R, para. 77. *The Commission **AGREED** that the performance metrics associated with the objectives in Paragraph 76 are:*

a) P(RSB): Probability that the long-term Relative Spawning Biomass (RSB) is less than the Relative Spawning Biomass Limit, failing if the value is greater than 0.05.

b) P(RSB<36%): Probability that the long-term RSB is less than the Relative Spawning Biomass Reference Point, failing if the value is greater than 0.50.

c) Median TCEY: the median of the short-term average TCEY over a ten-year period, where the short-term is 4-14 years in the future.

d) Median AAV TCEY: the average annual variability of the short-term TCEY determined as the average difference in the TCEY over a ten-year period.

These priority objectives and performance metrics come from a larger list of objectives which includes objectives specific to Biological Regions and IPHC Regulatory Areas (Appendix A).

The SRB recommended reconsidering two of these objectives.

> **IPHC-2024-SRB024-R, para 22**. *The SRB* ***RECOMMENDED*** *that the Commission develop a more specific and quantifiable catch objective to replace Objective c) (from AM099–Rec.02) "Optimize average coastwide TCEY".*

> **IPHC-2024-SRB024-R, para 23**. *The SRB* ***RECOMMENDED*** *that the Commission consider revising Objective b) (from AM099–Rec.02) "Maintain the long-term coastwide female spawning stock biomass at or above a biomass reference point (B36%) 50% or more of the time" to utilise a lower percentile than the 50th (median) to reflect concerns associated with the implications of low CPUE for the fishery at the 36% target for relative spawning biomass. A lower percentile better captures the role of uncertainty in this performance measure.*

3.1 Considering the $RSB_{36\%}$ objective

The MSAB made a similar recommendation at MSAB019 to discuss a new objective, which was discussed at the 20th Session of the MSAB (MSAB020).

> **IPHC-2024-MSAB019-R, para 51.** ***NOTING*** *paragraph 48, the MSAB* ***RECOMMENDED*** *developing an objective and identifying a management procedure that addresses the current circumstances and differences in perception of the stock status.*

Pacific halibut have seen large changes in average weight-at-age and high variability in recruitment, which have changed the stock dynamics considerably. Figure 2 shows the dynamic unfished spawning biomass, the current spawning biomass, and the relative spawning biomass (RSB) since 1993, as estimated in the 2023 stock assessment for Pacific halibut (IPHC-2024-SA-01). Estimated dynamic unfished spawning biomass is currently lower than in the late 1990's because weight-at-age has decreased considerably, and because of a recent period of low recruitment. The current estimated spawning biomass trajectory (with fishing) has been stable in recent years, resulting in an increasing RSB and an estimated 2024 stock status of 42%. Therefore, the Pacific halibut stock is likely to be above the RSB_{lim} (20%), $RSB_{trigger}$ (30%), and RSB_{thresh} (36%) reference points.

However, the coastwide FISS O32 WPUE and coastwide commercial WPUE has been declining in recent years (Figure 3), causing concern about the absolute stock size and fishery catch-rates. The coastwide FISS index of O32 WPUE was at its lowest value observed in the time-series, declining by 3% from 2022 to 2023 and coastwide commercial WPUE was also at its lowest value in the recent time-series, declining by 10% from the 2022 to 2023 (and likely more as additional logbook information has been obtained). The stock assessment for 2023 also estimated a high probability of further decline in spawning biomass at the reference fishing intensity (SPR=43%).

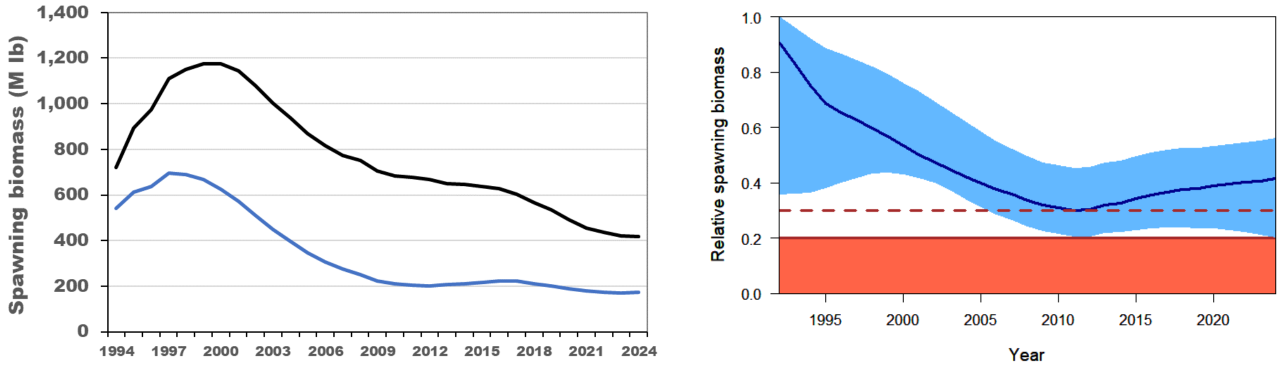

Figure 2. Dynamic unfished spawning biomass (black line) and current spawning biomass (blue line) from the 2023 stock assessment (left) and dynamic relative spawning biomass (right) with an approximate 95% credible interval in light blue and the control rule limit ($B_{20\%}$) and trigger ($B_{30\%}$) in red. Figures from IPHC-2024-SA-01. Management decisions in 2024 were based on these results.

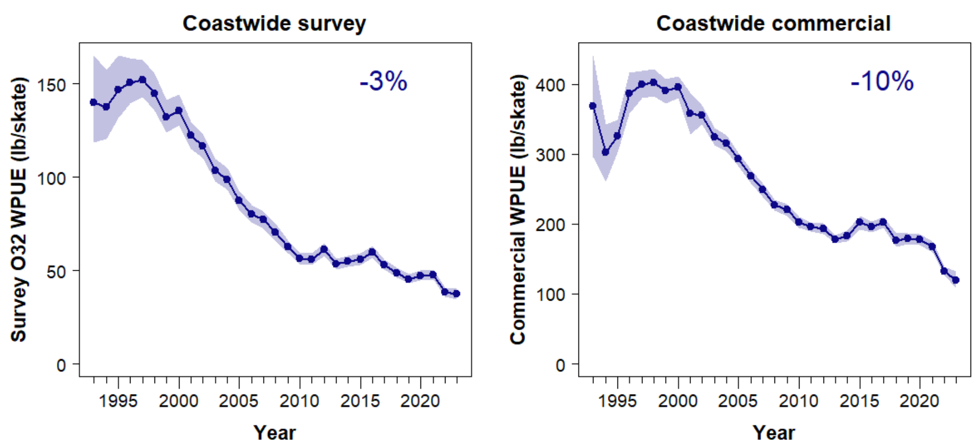

Figure 3. The coastwide FISS O32 WPUE index (left) and coastwide commercial WPUE (right) through 2023 showing the percent change in the last year (from IPHC-2024-SA-02). Based on past calculations, additional logbooks collected in 2024 will likely further reduce the decline in commercial WPUE.

Recent Commission decisions (2023 and 2024) have set coastwide TCEYs less than the reference TCEY estimated by the stock assessment and current interim management strategy. Main concerns noted by the Commission include 1) low absolute spawning biomass, 2) low catch-rates in the commercial fishery, 3) high probability of decline in absolute spawning biomass at a fishing mortality above 39 Mlbs, and 4) a large amount of uncertainty in the projections.

The continued departure from the current interim MP and reduction in coastwide TCEY suggests that there may be an additional objective. Related to these concerns, the SRB initially made a recommendation to re-evaluate what they called the target objective (IPHC-2023-SRB023-R, para. 25), followed by the recommendation at SRB024 to further modify this objective (IPHC-2024-SRB024-R, para 23). Most recently, the SRB made the following recommendation.

> **IPHC-2024-SRB025-R, para. 31.** The SRB **RECOMMENDED** adding a measurable objective related to absolute spawning biomass under the general objective 2.1 “maintain spawning biomass at or above a level that optimises fishing activities” to be included in the priority Commission objectives after, or in place of, the current relative biomass threshold objective

An objective to maintain the absolute spawning biomass above a threshold may be a useful objective for several reasons. First, the level of spawning biomass likely correlates with catch-rates in the fishery, and a higher spawning biomass would likely result in a more efficient and economically viable fishery. Second, current priority conservation objectives use dynamic relative spawning biomass which may result in a low absolute spawning biomass with a satisfactory stock status. Third, a minimum absolute coastwide spawning biomass may be necessary to ensure successful reproduction (such a level is currently unknown for Pacific halibut). Lastly, an observed reference stock level may have concrete meaning to stakeholders. For example, the recent estimated spawning biomass may be near or below the lowest spawning biomass estimated since the mid-1970’s and observed fishery catch rates were historically low in 2022 and 2023.

One way to implement this new objective is to continue the use of a conservation limit reference point for relative spawning biomass ($RSB_{20\%}$) and add a fishery biomass threshold reference point for which dropping below would result in serious hardships to the fishery. The fishery biomass threshold reference point could be defined using an absolute metric in units of spawning biomass or simply a TCEY value. A fishery threshold differs importantly from a conservation limit reference point, where a fishery threshold is used to maintain catch-rates and a conservation limit is used to indicate an overfished stock. A fishery absolute spawning biomass threshold may also add extra protection for the stock by further reducing the probability of breaching existing limit and threshold reference points ($RSB_{20\%}$ and $RSB_{36\%}$, respectively). A new objective related to fishery performance could be phrased as:

> Maintain the coastwide female spawning stock biomass (or FISS WPUE) above a threshold.

The metric, the threshold value, and the tolerance for being below that threshold are not obvious choices. Clark and Hare (2006) used the estimated spawning biomass in 1974, which subsequently produced recruitment resulting in an increase in the stock biomass. However, there is a high uncertainty in the estimates of historical absolute spawning biomass before the 1990’s. Recent estimates of spawning biomass may be reasonable as they are relevant to concerns of low catch-rates, but it is unknown how and if the stock will quickly recover from this current state.

3.2 Considering the optimise yield objective

The SRB made a recommendation to quantify the objective to “optimise yield” (see IPHC-2024-SRB024-R, para 22 above) so that it is meaningful and can have a performance metric that identifies the best performing MP. Optimising yield may include multiple objectives, such as maximising yield and minimising variability in yield, and evaluation may include examining trade-offs between multiple objectives.

The MSAB recommended that 'optimise' be changed to 'maximise' and this objective be given equal consideration along with minimising interannual variability in yield

> **IPHC-2024-MSAB020-R, para 14**. *The MSAB* ***RECOMMENDED*** *that the Commission priority objective "optimise average coastwide TCEY" (c in paragraph 12) be changed to "maximise average coastwide TCEY" and that this objective along with the variability in yield objective (d in paragraph 12) be given equal consideration to allow for the evaluation of trade-offs between these two objectives.*

Changing this objective from 'optimise' to 'maximise' would not change the overall goal of the Commission to optimise yield. In fact, the two objectives "maximise yield" and "minimizer interannual variability in yield" are both a part of optimising yield. Giving equal consideration to both objectives would better meet the general goal of the Commission to optimise yield.

4 Management Procedures Evaluated

The MSAB made two requests at MSAB019, which coincide with SRB and Commission recommendations, providing guidance on management procedures (MPs) to evaluate. The investigation of these MPs will support the development of the harvest strategy policy.

> **IPHC-2024-MSAB019-R, para. 39**. The MSAB **REQUESTED** that the evaluation of annual, biennial, and triennial assessments include, but is not limited to, the following concepts.
>
> - Annual changes in the coastwide TCEY is driven by an empirical rule in non-assessment years of a multi-year MP;
> - A constraint on the coastwide TCEY to reduce inter-annual variability and the potential for large changes in every year or only assessment years. This may be a 10%, 15%, or 20% constraint, a slow-up fast-down approach, or similar approach;
> - SPR values ranging from 35% to 52%.

Elements of MPs that were evaluated included assessment frequency, fishing intensity, and constraints on the interannual change in the TCEY. Additionally, different FISS designs were simulated to evaluate the impacts of reduced sampling including eliminating non-core areas. Distribution of the TCEY to IPHC Regulatory Areas is not under evaluation and is implemented as a source of variability.

4.1 Assessment frequency and an empirical management procedure

The frequency of conducting the stock assessment is a priority element of the MP to be investigated. This includes conducting assessments annually (every year), biennially (every second year), or triennially (every third year) to determine the status of the Pacific halibut stock and the coastwide TCEY for that year. In years with no assessment, the coastwide TCEY would be determined using a simpler approach and the estimated status of the stock would not be updated.

The mortality limits in a year with a stock assessment can be determined using an SPR-based approach, and in years without a stock assessment, the mortality limits would use an empirical rule. The only empirical rule evaluated in 2024 was to update the coastwide TCEY proportionally to the recent change in the coastwide FISS O32 WPUE. Notating *y* as year, the TCEY in a non-assessment year would be determined as follows.

$$TCEY_y = TCEY_{y-1} \times \frac{WPUE_{y-1}}{WPUE_{y-2}}$$

Another option, currently not being considered, is to use a simple statistical model, tuned to meet the objectives, that would determine the coastwide TCEY. Stock assessments would be completed periodically to update the status of the stock and verify that the management procedure is working appropriately.

4.2 Fishing intensity

The fishing intensity is determined by finding the fishing rate (F) that would result in a defined equilibrium spawning potential ratio (F_{SPR}). Because the fishing rate changes depending on the stock demographics and distribution of yield across fisheries, SPR is a better indicator of fishing intensity and its effect on the stock than a single F. A range of SPR values between 35% and 52% (the interim reference SPR is currently 43%) were investigated.

4.3 Constraints

One of the priority objectives (Appendix A) is to limit annual changes in the coastwide TCEY. Due to variability in many different processes (e.g. population, estimation, and decision making) the interannual variability of the TCEY from MSE simulations is typically higher than 15%. Over the past ten years (2015–2024), the interannual variability (average annual variability or AAV) in the adopted coastwide TCEY was 5.4% and the AAV of the reference coastwide TCEY was 14.5%. Across those years, the percent change in the adopted coastwide TCEY ranged from -10% to 8% and the coastwide reference TCEY ranged from -21% to 29% (Table 1). This was a period of relatively stable spawning biomass and higher variability is expected when the stock is increasing or decreasing.

Decision-making since 2015 has reduced the interannual variability in the coastwide TCEY, compared to the reference. The adopted TCEYs have a smaller range than the reference TCEYs and tend to cluster around 39 million pounds. The adopted TCEYs also tend to be closer to the status quo (i.e. the TCEY from the previous year) than the reference TCEYs when the reference TCEY difference from status quo was not near zero (Table 1). This is akin to saying the change from one year to the next is less for the adopted TCEYs than the reference TCEYs. The spawning biomass has been relatively stable during the last ten years, and it is not known how the recent decision-making process would react to a rapidly increasing or decreasing spawning biomass. Therefore, decision-making variability was modelled as a normal random process in the OM with a fixed standard deviation of 7Mlbs. This is more variability than recently observed but ensures that the evaluations are robust to potential variability in the future.

This interannual variability in the coastwide reference TCEY can be reduced by adding a constraint in the MP, mimicking recent decision patterns. The MSAB has suggested many different constraints including a 15% constraint on the change in the coastwide TCEY from one year to the next, and a slow-up/fast-down approach (TCEY increases by one-third of the increase suggested by the unconstrained MP or decreases by one-half of the decrease suggested by the unconstrained MP). The MSAB has requested further investigating constraints on the coastwide TCEY.

Table 1. Percent change in the adopted TCEY from the previous year (2015–2024) for each IPHC Regulatory Area and coastwide, and for the coastwide reference TCEY determined from the interim management procedure in place for that year.

Year	2A	2B	2C	3A	3B	4A	4B	4CDE	Coastwide Adopted	Coastwide Reference
2015	-4.5%	3.5%	13.3%	7.9%	-0.3%	25.6%	2.7%	19.3%	8.1%	6.0%
2016	18.9%	4.2%	5.5%	-1.9%	-8.3%	-0.5%	-10.5%	-4.7%	-0.1%	2.3%
2017	16.7%	1.0%	7.6%	1.6%	16.7%	-7.7%	-2.2%	-5.7%	2.9%	7.7%
2018	-10.2%	-14.7%	-9.9%	-3.2%	-17.8%	-3.3%	-4.5%	-5.7%	-8.7%	-20.7%
2019	25.0%	-3.8%	0.0%	7.7%	-11.3%	11.5%	13.3%	10.5%	3.8%	29.0%
2020	0.0%	0.0%	-7.7%	-9.6%	7.6%	-9.8%	-9.7%	-2.5%	-5.2%	-20.3%
2021	0.0%	2.5%	-0.9%	14.8%	0.0%	17.1%	6.9%	2.1%	6.6%	22.3%
2022	0.0%	8.0%	1.9%	3.9%	25.0%	2.4%	3.6%	3.0%	5.7%	5.7%
2023	0.0%	-10.3%	-1.0%	-17.0%	-5.9%	-17.6%	-6.2%	-6.1%	-10.3%	26.0%
2024	0.0%	-4.6%	-1.0%	-6.0%	-6.0%	-6.9%	-8.1%	-3.9%	-4.6%	-5.9%

Constraints simulated in this round of MSE analyses included the following:

- A maximum 15% change in the coastwide TCEY in either direction from one year to the next (15% up/down).
- A maximum 15% change in the coastwide TCEY only when the TCEY is increasing from one year to the next (15% up).

4.4 FISS designs

An element of the management procedure that can be evaluated is the collection of data from the FISS. The recently implemented FISS design was reduced from the proposed scientific designs in 2022, 2023, and 2024 to maintain revenue neutrality and future reductions may be necessary. The SRB made two recommendations to evaluate FISS designs using the MSE framework:

> **IPHC-2024-SRB024-R, para** 35. *The SRB **REQUESTED** that the Secretariat present preliminary (at SRB025) and final (at SRB026) results of MSE runs with different FISS designs to better understand the actual net cost of the survey after accounting for potential reductions in TCEY associated with the increased uncertainty from reduced FISS designs.*

> **IPHC-2024-SRB024-R, para** 43. *The SRB **REQUESTED** that the Secretariat integrate FISS design considerations into the annual MSE workplan and 5-Year Program of Integrated Research and Monitoring to better quantify the value provided by the FISS.*

There are three sources of variability and uncertainty in the simulations, all of which may be affected by the FISS design.

- **FISS uncertainty** affects the estimates of FISS WPUE and NPUE directly. This is used in the empirical rule and affects the stock assessment estimates. It may have some feedback into decision-making variability.
- **Estimation error** is from the stock assessment and is influenced by FISS uncertainty. Estimation error is also influenced by the variability in the population and fishery-dependent data.
- **Decision-making variability** is the variability resulting from decisions made by the Commission to depart from the MP. This could be affected by bias in the FISS and assessment estimates because the Commission may respond similarly based on the trends they perceive (e.g. autocorrelation in the deviations from the MP). It is possible to correlate decision-making with the FISS estimate, but this may mimic a control rule (i.e. element of the MP) and would conflate the estimation error with the decision-making variability, possibly making performance metrics, such as the probability that the spawning biomass is less than the 2023 spawning biomass, less meaningful. Decision-making variability is currently modelled independently of FISS uncertainty.

The MSE framework is capable of examining FISS designs, given the necessary inputs. Projections of estimated uncertainty of FISS O32 WPUE (see document IPHC-2024-SRB024-06) and simulations investigating the outcomes of the stock assessment given different FISS design assumptions (see IPHC-2024-SRB025-06) informed the inputs to the MSE simulations. Unlike the stock assessment simulations, where specific trends in the population are investigated, the MSE simulations have emergent trends influencing uncertainty and bias. The MSE is also able to determine the long-term effects on yield and population status.

Three FISS designs were simulated, representing increasing observation and assessment error (Table 2). The Base Block FISS design includes sampling in all Biological Regions and IPHC Regulatory Areas each year. It relies on a rotating selection of entire charter regions where individual charter regions are sampled every 1-5 years. The Core FISS design samples charter regions in IPHC Regulatory Areas 2B, 2C, 3A, and 3B every year and other areas are not surveyed. The Reduced Core FISS design samples a subset of higher catch-rate charter regions in areas 2B, 2C, 3A, and 3B. Bias is expected in the Core and Reduced Core FISS designs because some areas are not surveyed. It would not be expected that either of these core designs would be implemented in perpetuity without occasionally surveying other areas.

The Core FISS and Reduced Core FISS designs have additional details in how bias is modelled. Bias is assumed to be additive depending on the trend in spawning biomass, and is halved when a survey is done in non-core areas. When the spawning biomass is large, the survey is more likely to be revenue neutral increasing the ability to survey non-core areas. Further details are provided in IPHC-2024-SRB025-07.

The MSE analysis of FISS designs will not capture the stakeholder perception and possible lack of confidence in the FISS as a tool for management. FISS observations have been important for the stock assessment, distribution of the TCEY, general understanding of the trends in each IPHC Regulatory Area, and in negotiations of the coastwide and area-specific TCEYs.

Table 2. Assumptions of observation and estimation error for four FISS designs.

FISS Design	Frequency	Coastwide WPUE CV	Coastwide WPUE Bias	Assessment Uncertainty	Assessment Bias
Base Block	Every year	4%	None	18%	None
Core	2-4 years	6%	Increases annually up to 3%	19%	Increases annually up to 2%
Reduced Core	2-4 years	8%	Increases annually up to 4%	20%	Increases annually up to 2.5%

5 RESULTS

5.1 Assessment frequency, fishing intensity, and constraints

Assessment frequency, different fishing intensities (SPR), and a constraint were simulated assuming a Base Block FISS design with estimation error and decision-making variability. Performance metrics associated with the four priority objectives are shown in Table 3. The probability of being below a relative spawning biomass (RSB) of 36% was similar for each assessment frequency at the same fishing intensity, and an SPR of 40% resulted in an RSB near 36%. The short-term median TCEY increased and the AAV decreased as the assessment frequency increased; this is opposite of the expected pattern that a greater TCEY results in a higher AAV. The AAV was lowest with the triennial assessment frequency but was greater than 15% (a past benchmark defined by the MSAB) for all fishing intensities and assessment frequencies. For the annual and biennial assessment frequencies, the AAV was lowest (but above 22%) for a fishing intensity of 46% and increased with lower and higher fishing intensities. This may be a consequence of how decision-making variability was modelled (i.e. constant standard deviation).

Short- and long-term performance metrics for the probability that the spawning biomass is less than the spawning biomass in 2023 provide insight into the chance of being at spawning biomass levels seen in recent years (Table 4). There is a greater than 25% (1 in 4) chance that the spawning biomass is less than the spawning biomass in 2023 when fishing at an SPR=40% and a near 20% (1 in 5) chance when fishing at an SPR=49% in the long-term. These probabilities increase to 51% and 34% in the short-term (projections of 4–13 years) for those same SPR values.

Including a constraint of 15% when the TCEY goes up or down in the MP reduced the AAV, although the AAV remained above 15% with decision-making variability, and also reduced the yield (Table 5). This resulted in a smaller probability of the RSB being less than 36%. The 15% constraint resulted in a lower potential range of TCEYs with the 5^{th} percentile of the TCEY as low as 14.7 M lbs. The constraint of 15% only when the TCEY is increasing (15% up) showed similar results, but with a slightly higher yield. The yield was less with a constraint because increases from small TCEYs were smaller given a maximum percent change resulting in small absolute changes.

Table 3. Performance metrics associated with priority objectives for various fishing intensities (SPR) and an annual, biennial, or triennial assessment with an empirical rule proportional to FISS O32 WPUE used to determine the TCEY in non-assessment years. All simulations assumed the Base Block FISS design, estimation error, and decision-making variability. No constraints are applied to the interannual change in the TCEY. Relative spawning biomass (RSB) performance metrics are long-term and yield based performance metrics (TCEY and AAV) are short-term metrics.

Assessment Frequency	**Annual**				
SPR	**40**	**43**	**46**	**49**	**52**
P(RSB<20%)	<0.001	<0.001	<0.001	<0.001	<0.001
P(RSB<36%)	0.453	0.247	0.090	0.014	0.001
Median TCEY	64.26	60.11	56.08	52.03	47.87
AAV	25.3%	24.2%	23.5%	23.5%	23.7%
Assessment Frequency	**Biennial**				
SPR	**40**	**43**	**46**	**49**	**52**
P(RSB<20%)	<0.001	<0.001	<0.001	<0.001	<0.001
P(RSB<36%)	0.464	0.291	0.129	0.040	0.007
Median TCEY	64.96	60.38	56.28	52.27	48.17
AAV	23.3%	22.6%	22.5%	22.8%	23.5%
Assessment Frequency	**Triennial**				
SPR	**40**	**43**	**46**	**49**	**52**
P(RSB<20%)	<0.001	<0.001	<0.001	<0.001	<0.001
P(RSB<36%)	0.473	0.288	0.134	0.052	0.009
Median TCEY	65.50	61.04	56.96	53.57	49.11
AAV	20.7%	20.1%	20.0%	20.5%	21.0%

Table 4. The probability that the spawning biomass is less than the spawning biomass in 2023 for various fishing intensities (SPR) and an annual, biennial, or triennial assessment with an empirical rule proportional to FISS O32 WPUE used to determine the TCEY in non-assessment years. All simulations assumed the Base Block FISS design, estimation error, and decision-making variability. No constraints are applied to the interannual change in the TCEY. Short-term performance metrics are 4-13 years into the projection period.

Assessment Frequency	**Annual**				
SPR	**40**	**43**	**46**	**49**	**52**
Long-term $P(SB < SB_{2023})$	0.308	0.272	0.230	0.196	0.164
Short-term $P(SB < SB_{2023})$	0.490	0.428	0.362	0.316	0.282
Assessment Frequency	**Biennial**				
SPR	**40**	**43**	**46**	**49**	**52**
Long-term $P(SB < SB_{2023})$	0.322	0.278	0.248	0.212	0.168
Short-term $P(SB < SB_{2023})$	0.488	0.442	0.372	0.322	0.288
Assessment Frequency	**Triennial**				
SPR	**40**	**43**	**46**	**49**	**52**
Long-term $P(SB < SB_{2023})$	0.316	0.282	0.232	0.202	0.172
Short-term $P(SB < SB_{2023})$	0.510	0.484	0.394	0.340	0.292

Table 5. Performance metrics associated with priority objectives for an SPR of 43% and an annual assessment with and without a 15% constraint on the change in the TCEY (up/down or only up). All simulations assumed the Base Block FISS design. Relative spawning biomass (RSB) performance metrics are long-term and yield based performance metrics (TCEY and AAV) are short-term metrics.

Constraint	None	15% up/down	15% up
P(RSB<20%)	<0.001	<0.001	<0.001
P(RSB<36%)	0.2466	0.0506	0.0528
Median TCEY	60.11	49.51	51.55
AAV	24.2%	16.6%	16.7%

Overall, the range of SPR values investigated and the three assessment frequencies met the conservation objective and the objective to remain above an RSB of 36% at least 50% of the time. The TCEY increased with higher fishing intensity and was slightly higher with a longer interval between assessments. The interannual variability in the TCEY was greater than 15% but lowest with a triennial assessment frequency. The triennial assessment frequency showed potential increases in the TCEY but larger potential change in an assessment year. AAV was lowest with an SPR between 43% and 46%, and unexpectedly increased at lower fishing intensities, which is likely due to decision-making variability.

5.2 FISS Designs

The three FISS designs were compared across multiple fishing intensities, but with the annual assessment frequency only. Decision-making variability was present in all simulations.

The conservation objective of remaining above an RSB of 20% was met for all fishing intensities and FISS designs (Table 6). The probability that the RSB was less than 36% decreased with the reduced FISS designs, indicating that the population size was slightly larger when the non-core areas were not sampled. This occurred because the median TCEY was less when using the Core FISS design compared to the Base Block FISS design, and was less again when using the Reduced Core FISS design compared to the Core FISS design. The AAV increased with the Core and Reduced Core FISS designs (Figure 4).

With an SPR of 43%, the median TCEY declined by 450,000 lbs when moving to the Core FISS design from the Base Block FISS design, and another 450,000 lbs when moving to the Reduced Core FISS design. At US$6.00/lb, a 450,000 lb drop in the TCEY would equate to a US$2.7 million reduction in economic value. A similar drop occurred for an SPR of 52%. This metric includes the long-term, multi-year result where a reduction in the TCEY may provide fish for future years to spawn or be caught at a larger size. This may be why this value is less than the value determined from the stock assessment simulation results reported in document IPHC-2024-SRB025-06. As also discussed in document IPHC-2024-SRB025-06, there is a non-economic value to the FISS in that it is used for decision-making, comparisons, and to have a better understanding of the population trends.

Table 6. Performance metrics associated with priority objectives for various fishing intensities (SPR) and different FISS designs. All simulations assumed an annual assessment and decision-making variability. No constraints were applied to the interannual change in the TCEY. Relative spawning biomass (RSB) performance metrics are long-term and yield based performance metrics (TCEY and AAV) are short-term metrics.

FISS design	**Base Block**			
SPR	**43%**	**46%**	**49%**	**52%**
P(RSB<20%)	<0.002	<0.002	<0.002	<0.002
P(RSB<36%)	0.2466	0.0896	0.0144	0.0012
Median TCEY	60.11	56.08	52.03	47.87
AAV	24.2%	23.5%	23.5%	23.7%
FISS design	**Core**			
SPR	**43%**	**46%**	**49%**	**52%**
P(RSB<20%)	<0.002	<0.002	<0.002	<0.002
P(RSB<36%)	0.2308	0.0856	0.0164	0.0010
Median TCEY	59.66	55.30	51.23	47.32
AAV	24.9%	24.0%	24.0%	24.4%
FISS design	**Reduced Core**			
SPR	**43%**	**46%**	**49%**	**52%**
P(RSB<20%)	<0.002	<0.002	<0.002	<0.002
P(RSB<36%)	0.2256	0.0860	0.0180	0.0012
Median TCEY	59.21	55.10	50.88	47.07
AAV	26.4%	25.5%	25.0%	25.3%

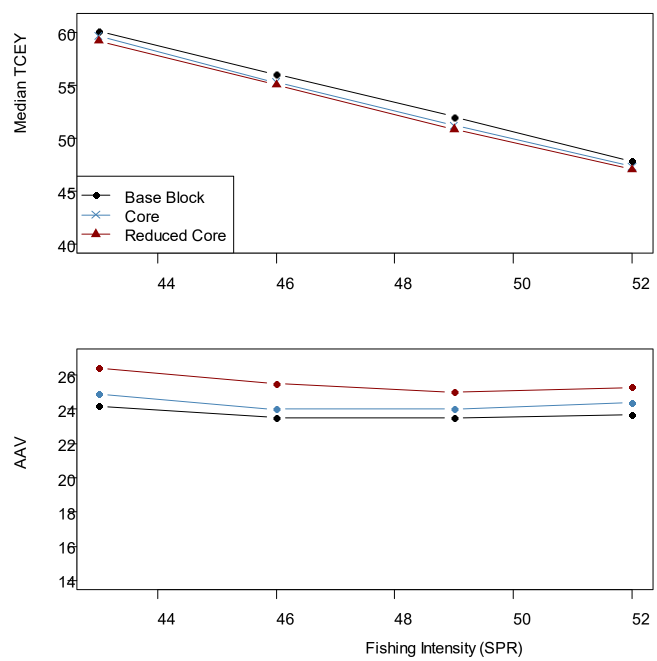

Figure 4. Median TCEY (top) and AAV (bottom) for different fishing intensities (SPR) and FISS designs.

6 CONCLUSIONS

Three elements of an MP were evaluated using the MSE: assessment frequency fishing intensity, and constraints. These simulations showed that reducing the fishing intensity (i.e. higher SPR) would achieve a higher spawning biomass, slightly lower interannual variability in the TCEY, and move towards a potential new objective of avoiding low absolute spawning biomass. However, yield would be reduced, on average. Biennial and triennial assessments may improve yield and lower the interannual variability in the TCEY, also allowing more time to improve assessment and MSE methods, but at the cost of not providing detailed annual information such as stock status. The SRB noted this at SRB025.

IPHC-2024-SRB025-R, para 29: *The SRB **ACCEPTED** that*

1) *there are significant benefits of moving to a triennial assessment frequency in terms of freeing Secretariat resources to conduct other quantitative analyses (see para. 22); and*
2) *the MSE analysis showed no apparent cost of triennial assessment in terms of lost yield or increased interannual variability in TCEY*

Furthermore, three different FISS designs were evaluated with an annual assessment frequency, a fishing intensity with SPR=43%, and no constraint. Reducing the FISS to the core areas, and occasionally surveying non-core areas would reduce yield and increase uncertainty and interannual variability in the TCEY.

There are trade-offs between the yield, the variability of yield, and the probability that the spawning biomass reaches levels below what has been observed in recent years. The largest effect on yield was the fishing intensity with a reduction of about 1.3 Mlbs in the TCEY, on average, for every 1% increase in the SPR. Variability did not change much across fishing intensities, but was greatly affected by the assessment frequency and the FISS design. The chance that spawning biomass would be less than what was observed in recent years is reduced with a reduction in fishing intensity. The usefulness of the MSE is to highlight these trade-offs for decision-makers.

Based on these results, the MSAB made a recommendation to modify the current interim management procedure.

IPHC-2024-MSAB020-R, para 41. *The MSAB **RECOMMENDED** updating the reference MP for one three-year cycle on a trial basis using a triennial stock assessment frequency (synchronised with the full stock assessment scheduled in 2025 to inform 2026 mortality limits). The coastwide TCEY would be based on SPR=46% in assessment years and based on the proportional change in the FISS O32 WPUE index in non-assessment years. The triennial stock assessment frequency may increase the median coastwide TCEY and reduce the interannual variability in the coastwide TCEY. A lower fishing intensity would also reduce the probability that the spawning biomass is less than the 2023 spawning biomass in the short- and longterm, and result in lower interannual variability as noted in paragraph 26.*

This work supports the development of the harvest strategy policy (IPHC-2025-AM101-17). A draft Harvest Strategy Policy is available for consideration at the 101st Annual Meeting of the IPHC.

RECOMMENDATION/S

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-12 presenting recent MSE work including exceptional circumstances; goals and objectives; evaluating assessment frequency, a constraint and fishing intensity; and investigating the effects of reduced FISS designs.
2) **RECOMMEND** adding a measurable objective related to absolute female spawning biomass under the general objective 2.1 “maintain spawning biomass at or above a level that optimizes fishing activities” to be included in the priority Commission objectives after, or in place of, the current biomass threshold objective.
3) **NOTING** that optimising yield remains a general objective of the Commission, **RECOMMEND** to redefine the measurable objective “optimise yield” to “maximise yield”, and evaluate this measurable objective equally with the measurable objective to minimise interannual variability in yield.
4) **RECOMMEND** updating the current interim reference MP with a new SPR value (currently 43%), a longer period between stock assessments (currently annual), and possibly a constraint on the annual change in the TCEY.
5) **RECOMMEND** further MSE work to support modifications to the management procedure determining the reference coastwide TCEY.
6) **RECOMMEND** further MSE analyses to evaluate FISS designs and methods to present outcomes of these analyses.
7) **RECOMMEND** any updates and edits to the draft Harvest Strategy Policy.
8) **RECOMMEND** further analyses to support the development of the harvest strategy policy.

REFERENCES

de Moor, C. L., D. Butterworth, and S. Johnston. 2022. "Learning from three decades of Management Strategy Evaluation in South Africa." *ICES Journal of Marine Science* 79: 1843-1852.

APPENDICES

Appendix A: Primary objectives used by the Commission for the MSE

APPENDIX A
PRIMARY OBJECTIVES USED BY THE COMMISSION FOR THE MSE EVALUATIONS

Table A1. Primary objectives, evaluated over a simulated ten-year period, accepted 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. Priority objectives are shown in green text.

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 the long-term coastwide female relative spawning biomass above a biomass limit reference point ($RSB_{20\%}$) at least 95% of the time	*RSB* < Spawning Biomass Limit (RSB_{Lim}) RSB_{Lim}=20% unfished spawning biomass	Long-term	0.05	$P(RSB < RSB_{Lim})$ Fail if greater than 0.05
	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	$P\left(p_{SB,R} < p_{SB,R,min}\right)$
2.1 MAINTAIN SPAWNING BIOMASS AT OR ABOVE A LEVEL THAT OPTIMIZES FISHING ACTIVITIES	Maintain the long-term coastwide female relative spawning biomass at or above a biomass reference point ($RSB_{36\%}$) 50% or more of the time	*RSB*<Spawning Biomass Reference (RSB_{Thresh}) $RSB_{Thresh}=RSB_{36\%}$ unfished spawning biomass	Long-term	0.50	$P(RSB < RSB_{Thresh})$ Fail if greater than 0.5
2.2. 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)*
2.3. 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

$$AAV_t = \frac{\sum_{t+1}^{t+9} |TCEY_t - TCEY_{t-1}|}{\sum_{t}^{t+9} TCEY_t}$$

$$AC_t = \frac{|TCEY_t - TCEY_{t-1}|}{TCEY_{t-1}}$$

Stock projections and the harvest decision table for 2025-2027

PREPARED BY: IPHC SECRETARIAT (I. STEWART AND A. HICKS; 10 DECEMBER 2024)

PURPOSE

To provide the Commission with short-term (3 year) stock projections and the harvest decision table for 2025-2027.

METHODS

Short-term tactical stock projections under varying levels of mortality are conducted using the results from the 2024 stock assessment (IPHC-2025-AM101-11). Standard projections are based on existing Catch Sharing Agreements/Plans (CSPs) for directed commercial and recreational fisheries where they exist, as well as summaries of the 2024 and earlier directed and non-directed fisheries.

Specifically, the projected mortality levels are based on the three-year running average non-directed discard mortality[1] through the most recent year (2024), per the decision made during AM096 para. 97). Subsistence harvest is assumed to be constant at the most recent year's estimates. The discard mortality for the directed commercial fisheries is assumed to occur at the same rate observed in the most recent year, and to scale up or down with the projected landings.

The harvest decision table provides a comparison of the relative risk (in times out of 100), using stock and fishery metrics (rows), against a range of coastwide alternative harvest levels for 2025 (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)
- The mortality consistent with repeating the coastwide TCEY set for 2024 (the *status quo*)
- Bracketing alternatives 5 and 10% above and below the *status quo*

[1] The North Pacific Fishery Management Council adopted a new method for setting the Prohibited Species Catch (PSC) limit for Pacific halibut mortality in the Amendment 80 (A80) trawl sector in 2024. This approach adjusts PSC limits based on the NOAA Fisheries Eastern Bering Sea trawl survey and the modelled FISS index of abundance for IPHC Regulatory Areas 4A, 4B, and 4CDE. This new approach resulted in a 20% reduction to the A80 sector's PSC limit in 2024 and an additional 5% reduction for 2025. However, the actual halibut mortality has been far below the aggregate PSC limit for all sectors in the Bering Sea and Aleutian Islands (52% in 2024). Therefore, it is unclear whether any future adjustments to the 3-year running average approach might be warranted, as actual mortality could still go up or down from the three year-average under current conditions. Recent actual non-directed discard mortality estimates in both IPHC Regulatory Areas 2A and 2B and in the Gulf of Alaska are similarly far below full regulatory limits (29% in 2024).

- Alternatives of 15% and 25% below the *status quo* requested by the Commission at IM100 (IPHC-2024-IM100-R)
- The mortality at which there is less than or equal to a 50% chance that the spawning biomass will be smaller in 2028 than in 2025 ("*3-year surplus*")
- The mortality consistent with the current "Reference" SPR ($F_{43\%}$) level of fishing intensity
- The mortality consistent with the Maximum Economic Yield (*MEY*) proxy SPR ($F_{40\%}$) level of fishing intensity
- The mortality consistent with the Maximum Sustainable Yield (*MSY*) proxy SPR ($F_{35\%}$) level of fishing intensity
- Other levels of mortality spaced between the above alternatives to provide for continuous evaluation of the change in risk across alternative yields

For each column of the decision table, the projected total fishing mortality (including all sizes and sources), the coastwide TCEY and the associated level of estimated fishing intensity projected for 2025 (median value with the 95% credible interval below) are reported.

RESULTS

Spawning biomass estimates in 2024 from the 2024 stock assessment are lower (17%) than those in last year's stock assessment, but the recent estimated trend is nearly flat (+3% from 2024 to 2025). Updated estimates of the 2012 and 2016 year-classes (both larger than all those occurring from 2006-2011) show that these two year-classes will be highly important in the short-term stock projections as both will be maturing over the next several years. However, these two year-classes are insufficient to support short-term fishing mortality appreciably higher than the *status quo* without a decrease in spawning biomass. Risks are similar over the three-year projection period as both year-classes continue to mature.

Projections indicate that the spawning biomass would increase in the absence of any fishing mortality, with risks of stock decline over one and three years both less than 1/100 (Table 1, Figure 1). At the *status quo* coastwide TCEY (35.28 million pounds; Table 2, Figure 2), risks of stock decrease over one and three years are 43/100 and 45/100. For all harvest levels that exceed the three-year surplus (37.4 million pounds) risks of stock decline are larger than 50/100, and reaching 88/100 for the coastwide TCEY that is projected to correspond to the $F_{35\%}$ *MSY* proxy harvest level in 2025. Alternative harvest levels around the *status quo* (+/- 5 and 10%) are projected to result in levels of fishing intensity ranging from $F_{50\%}$ to $F_{44\%}$, similar to those estimated in recent years. For larger reductions to the status quo (-15% and -25%) risk of one year stock decrease drops to 26/100 and 16/100 respectively. The alternatives around the status quo span a range of stock trajectories from increasing (all alternatives up to the *status quo*) to decreasing (*status quo* +10%). At the reference level of fishing mortality ($F_{43\%}$) the 2025 coastwide TCEY is projected to be 39.8 million pounds (41.7 million pounds of total mortality including U26 non-directed discard mortality). Stock decline over the next three years is projected to be likely (57/100 to 58/100) at this level of fishing intensity. The probability of a reduction in the coastwide TCEY in order to maintain a fishing intensity no greater than $F_{43\%}$ over the next three years is projected to be 49/100.

All projections result in a probability of the relative spawning biomass dropping below the $SB_{30\%}$ threshold over the next three years of 17-28/100. The probability of dropping below the $SB_{20\%}$ limit is estimated to be <1-21%.

Table 1. Harvest decision table for 2025-2027 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.

2025 Alternative					*Status quo -25%*	*Status quo -15%*	*Status quo -10%*	*Status quo -5%*	*Status quo*	$F_{46\%}$	3-Year Surplus	*Status quo +10%*	*Reference $F_{43\%}$*	*MEY proxy*	*MSY proxy*	
		Total mortality (M lb)	0.0	21.8	28.3	31.8	33.6	35.4	37.1	37.8	39.0	40.7	41.7	46.1	55.1	
		TCEY (M lb)	0.0	20.0	26.5	30.0	31.8	33.5	35.3	35.9	37.2	38.8	39.8	44.3	53.2	
		2025 fishing intensity	$F_{100\%}$	$F_{63\%}$	$F_{55\%}$	$F_{51\%}$	$F_{50\%}$	$F_{48\%}$	$F_{47\%}$	$F_{46\%}$	$F_{45\%}$	$F_{44\%}$	$F_{43\%}$	$F_{40\%}$	$F_{35\%}$	
		Fishing intensity interval	--	41-75%	33-69%	30-66%	28-65%	27-63%	26-62%	25-62%	25-61%	24-60%	23-59%	21-56%	17-51%	
Stock Trend (spawning biomass)	in 2026	is less than 2025	<1	5	16	26	31	37	43	45	49	54	57	70	88	a
		is 5% less than 2025	<1	<1	2	4	6	8	11	12	14	17	19	29	50	b
	in 2027	is less than 2025	<1	7	21	30	35	40	45	47	50	55	58	69	86	c
		is 5% less than 2025	<1	2	8	14	18	22	26	27	30	34	37	48	70	d
	in 2028	is less than 2025	<1	8	20	30	35	40	45	47	50	55	58	70	87	e
		is 5% less than 2025	<1	3	11	18	22	26	30	32	36	40	43	55	77	f
Stock Status (Spawning biomass)	in 2026	is less than 30%	26	26	27	27	27	27	27	27	28	28	28	28	29	g
		is less than 20%	1	5	7	8	9	10	10	11	11	12	12	14	18	h
	in 2027	is less than 30%	25	25	26	26	26	26	26	26	26	26	26	27	28	i
		is less than 20%	<1	2	4	6	7	8	9	9	10	11	12	15	20	j
	in 2028	is less than 30%	17	25	25	25	25	26	26	26	26	26	26	27	28	k
		is less than 20%	<1	1	3	5	6	7	8	9	10	11	12	16	21	l
Fishery Trend (TCEY)	in 2026	is less than 2025	0	7	24	28	31	34	38	39	42	46	49	60	80	m
		is 10% less than 2025	0	4	22	26	27	29	32	33	35	38	39	48	67	n
	in 2027	is less than 2025	0	6	23	27	30	33	37	38	41	46	48	60	81	o
		is 10% less than 2025	0	4	20	25	27	29	31	32	34	37	39	49	69	p
	in 2028	is less than 2025	0	5	21	26	29	33	37	38	41	46	49	61	82	q
		is 10% less than 2025	0	3	18	23	26	28	31	32	34	37	40	50	71	r
Fishery Status (Fishing intensity)	in 2025	is above $F_{43\%}$	0	7	25	29	32	35	39	41	44	47	50	59	78	s

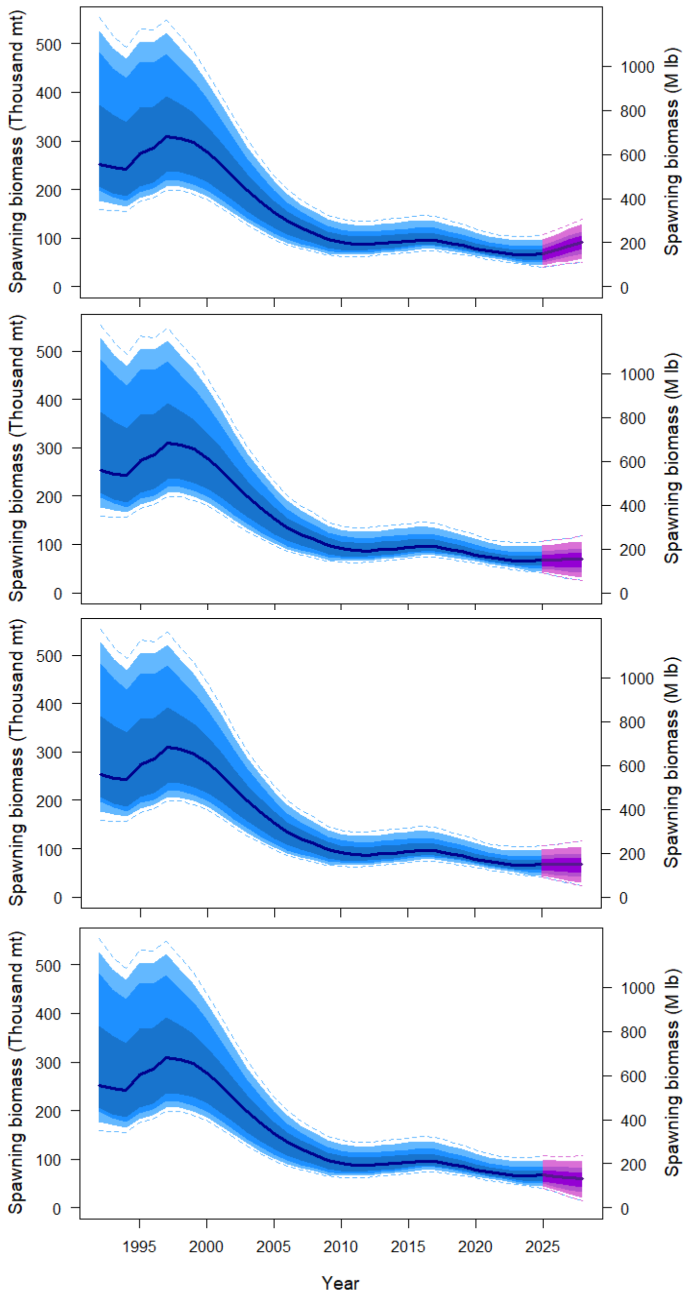

Figure 1. Three-year projections of stock trend under alternative levels of mortality corresponding to various reference points: no fishing mortality (upper panel), the 3-year surplus (37.2 million pounds; second panel), and the TCEY projected for the $F_{43\%}$ reference level of fishing intensity (39.8 million pounds, third panel) and the TCEY projected for the $F_{35\%}$ MSY proxy level of fishing intensity (53.2 million pounds, bottom panel).

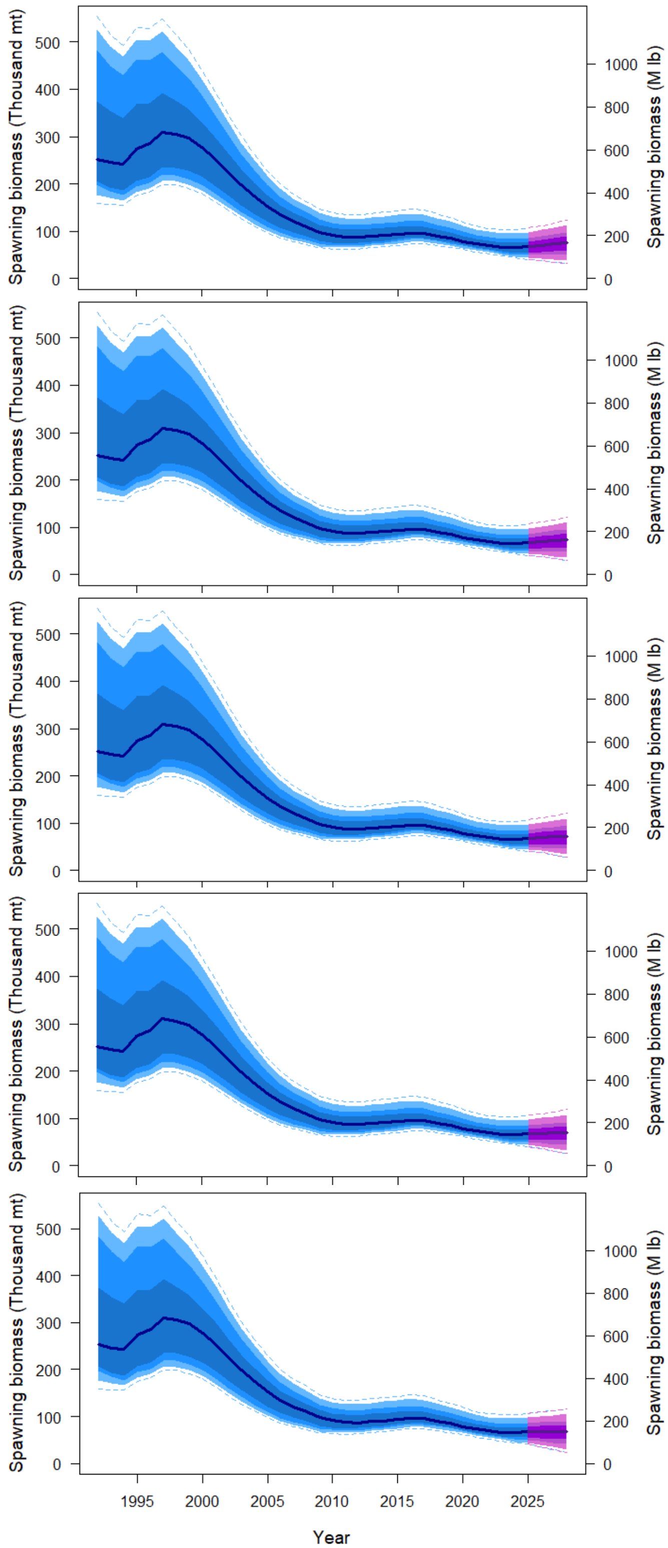

Figure 2. Three-year projections of stock trend under alternative levels of mortality corresponding to alternative harvest levels around the *status quo* coastwide TCEY from 2024: the *status quo* coastwide TCEY -25% (26.5 million pounds; upper panel), the *status quo* coastwide TCEY -15% (30.0 million pounds; second panel), the *status quo* coastwide TCEY -10% (31.8 million pounds; third panel), the *status quo* coastwide TCEY set in 2024 (35.28 million pounds; fourth panel) and the *status quo* coastwide TCEY +10% (38.8 million pounds; bottom panel).

Table 2. Recent adopted TCEYs by IPHC Regulatory Area and coastwide (million pounds net).

Year	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
2013	1.11	7.78	5.02	17.07	5.87	2.43	1.93	4.28	45.48
2014	1.11	7.64	5.47	12.05	3.73	1.56	1.49	3.58	36.65
2015	1.06	7.91	6.20	13.00	3.72	1.96	1.53	4.27	39.63
2016	1.26	8.24	6.54	12.75	3.41	1.95	1.37	4.07	39.59
2017	1.47	8.32	7.04	12.96	3.98	1.80	1.34	3.84	40.74
2018	1.32	7.10	6.34	12.54	3.27	1.74	1.28	3.62	37.21
2019	1.65	6.83	6.34	13.50	2.90	1.94	1.45	4.00	38.61
2020	1.65	6.83	5.85	12.20	3.12	1.75	1.31	3.90	36.60
2021	1.65	7.00	5.80	14.00	3.12	2.05	1.40	3.98	39.00
2022	1.65	7.56	5.91	14.55	3.90	2.10	1.45	4.10	41.22
2023	1.65	6.78	5.85	12.08	3.67	1.73	1.36	3.85	36.97
2024	1.65	6.47	5.79	11.36	3.45	1.61	1.25	3.70	35.28

RISKS NOT INCLUDED IN THE HARVEST DECISION TABLE

The IPHC's current management procedure uses threshold and limit reference points in relative spawning biomass (current estimate compared to the spawning biomass estimated to have occurred in that year in the absence of any fishing mortality). This calculation measures the effects of fishing on the stock. Other factors affecting the spawning biomass (i.e., trends in recruitment and weight-at-age) have resulted in the absolute spawning biomass in 2022-2024 estimated to be lower than at any time in the last 34 years. Although this does not represent a conservation concern at this time, low stock size results in additional risks to the IPHC's Fishery Independent Setline Survey (FISS) design objective of revenue neutrality and to fishery efficiency and economic viability. Further, the modelled FISS index in 2024 extends the 20-year trend in the stock distribution shifting from Biological Region 3 toward Biological Region 2. Finally, increased environmental/climate-related variability in the marine ecosystems comprising the Pacific halibut species range in Convention waters lead to little expectation that historical productivity patterns may be relevant for future planning. Specifically, it is unclear whether long-term productivity levels are likely to occur under continued climate change, or whether increases or decreases may be likely for critical life-history stages of Pacific halibut. Recent poor recruitment (2006+) seems to suggest that the stock is in a state of low productivity with no indication of when this prevailing condition may change. Finally, the extremely important role of the directed commercial fishery data in informing reductions in the estimated scale of recent biomass in the stock assessment is a new phenomenon observed only in the last two stock assessments. To the degree that the FISS designs have been limited in those years there is an ongoing uncertainty about why these two time-series are providing different or lagged signals.

An alternative projection was conducted, using 2024 commercial fishery catch rates corrected for the magnitude of changes observed in the 2023 data after additional logs had been collected through 2024. This projection used the status quo mortality for 2025 and resulted in an estimated SPR of 46%, compared to the value of 47% using preliminary commercial fishery data available through October 2024. Based on this result, if commercial data updates in 2025 are similar to those in recent years, it seems likely that the 2025 stock assessment may estimate a higher fishing intensity for a given management alternative than is reflected in the current decision table.

ADDITIONAL INFORMATION

Estimate of non-directed discard mortality based on end-of-year information for 2024 will be available in early Janaury 2025. At that time, detailed mortality projection tables (reporting allocations to specific fishing sectors within individual IPHC Regulatory Areas) will be available on request and the mortality projection tool will be updated for 2025.

Detailed stock assessment (IPHC-2025-SA-01) and data overview (IPHC-2025-SA-02) documents will be published directly to the stock assessment page on the IPHC's website.

RECOMMENDATION/S

That the Commission:

a) **NOTE** paper IPHC-2025-AM101-13, which provides a summary of projections and the harvest decision table for 2025-2027.
b) **REQUEST** any additional harvest decision table alternatives.
c) **REQUEST** any additional detailed mortality projections for 2025 (by IPHC Regulatory Area and fishery sector).

REFERENCES

IPHC. 2020. Report of the 96th Session of the IPHC Annual Meeting (AM096). Anchorage, Alaska, USA, 3-7 February 2020. IPHC-2020-AM096-R. 51 p.

IPHC. 2024. Report of the 100th session of the IPHC Interim Meeting (IM100). Electronic meeting, 25-26 November 2024. IPHC-2024-IM100-R. 28 p.

2025 and 2026-29 FISS designs

PREPARED BY: IPHC SECRETARIAT (R. WEBSTER, I. STEWART, K. UALESI, T. JACK, D. WILSON; 12 DECEMBER 2024)

PURPOSE

To present an optimal long-term FISS design, the approved 2025 FISS design, and discuss the potential for biases that may result from non-optimal FISS designs.

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 81.3 cm 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. Annual FISS designs are developed by selecting a subset of stations for sampling from the full 1890-station FISS footprint (Figure 1).

In recent years, financial constraints due to reduced catch rates, lower sales prices and higher costs have led to the implementation of FISS designs with reduced spatial footprints (IPHC-2024-SRB024-06). Effort has been concentrated in IPHC Regulatory Areas 2B, 2C, 3A and 3B, with limited sampling in other areas in 2023-24. In 2024, only a relatively small proportion of stations were fished in IPHC Regulatory Areas 3A and 3B.

The Base Block Design (described below) was presented to the Commission at the September 2024 Work Meeting and the 14th Special Session of the IPHC (SS014, IPHC-2024-SS014-03) as a more efficient approach to annual sampling in the core of the stock compared to recent designs based on random selection of FISS stations. For 2025, high projected financial costs for this design meant that it was not viable to undertake without substantial supplementary funding. Therefore, IPHC Secretariat staff developed a "fiscally viable" design for 2025 that would have reduced spatial coverage for the third year in a row but at a projected loss that could be covered by revenue, supplementary funding and (if necessary) IPHC reserve funds. Following SS014, the final 2025 FISS design was approved via inter-sessional agreement (IPHC-2024-CR-030, IPHC-2024-CR-031). This design included sampling of FISS charter regions in IPHC Regulatory Areas 3A and 3B that were unsampled in either 2023, 2024 or both, and were not part of the initial fiscally viable design. Both the Base Block Design and the Commission-approved 2025 FISS design are presented in this document.

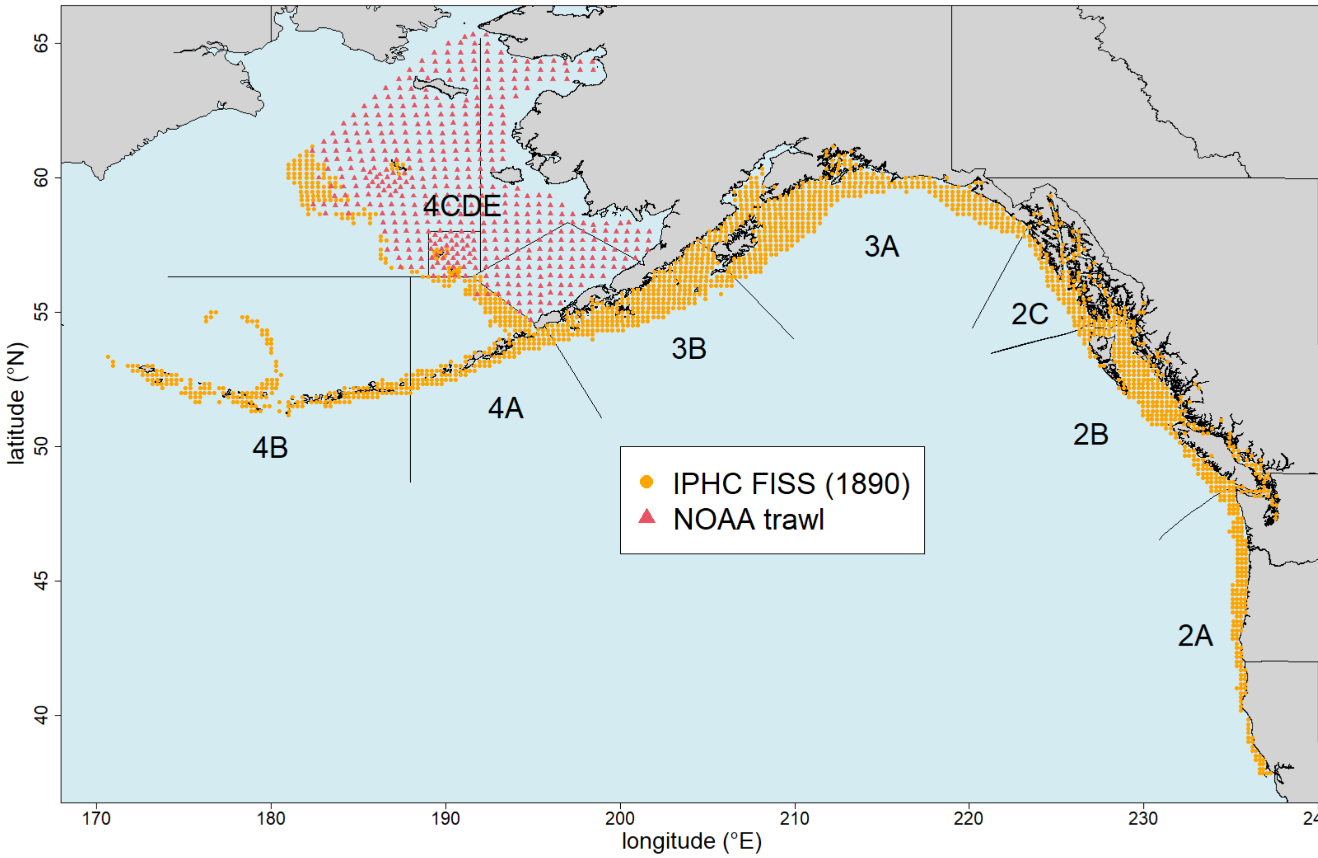

Figure 1. Map of the full 1890 station FISS design, with orange circles representing stations available for inclusion in annual sampling designs. Red triangles represent the locations of NOAA trawl stations used to provide complementary data for Bering Sea modelling (not all are sampled each year).

FISS DESIGN OBJECTIVES (Table 1)

Primary objective: *To sample Pacific halibut for stock assessment and stock distribution estimation.*

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 to inform spatial management decisions. 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.

Secondary objective: *Long-term revenue neutrality.*

The FISS is intended to have long-term revenue neutrality, and therefore any implemented design must consider both logistical and cost considerations.

Tertiary objective: *Minimize removals and assist others where feasible on a cost-recovery basis.*

Consideration is also given to the total expected FISS removals (impact on the stock), data collection assistance for other agencies, and IPHC policies.

Table 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

OPTIMAL FIVE-YEAR ROTATIONAL FISS DESIGN (BASE BLOCK DESIGN)

The **Base Block design** when undertaken on an annual basis ensures that all charter regions in the core areas are sampled over a three-year period, while prioritizing coverage in other areas based on minimising the potential for bias and maintaining CVs below 25% for each IPHC Regulatory Area. The **Base Block design** also includes some sampling in all IPHC Biological Regions in each year, ensuring that both trend and biological data from across the spatial range of Pacific halibut in Convention waters are available to the stock assessment and for stock distribution estimation. From the perspective of meeting the Primary Objective of the FISS (Table 1), the **Base Block design** can be considered the optimal rotational design.

Using samples generated from the fitted 2023 space-time models as simulated data for 2024-27, we projected the coefficient of variation (CV, a relative measure of precision) for mean O32 WPUE for each year of the design by IPHC Regulatory Area and Biological Region. As CVs are generally greater in the terminal year of the time series and that year is the most relevant for informing management, the CV values in Table 2 are for the final year of the modelled time series. For example, the values for 2026 were found by fitting the model to the data for 1993-2026 (with simulated data used for 2024-26).

With uncertainty in future designs, it is expected that by 2027 implemented designs will vary significantly from those in the Base Block design and the other designs (Core Block and Reduced Core) presented at WM2024. Nevertheless, to compare potential levels of uncertainty five years from now under designs with similar sampling coverage, we also projected CVs for IPHC Regulatory Areas 2A, 3B and 4B for 2029. The Base Block design would lead to CVs of 21%, 14% and 14% for 2A, 3B and 4B respectively in 2029.

Table 2. Projected coefficients of variation (CVs, %) for mean O32 WPUE for the FISS **Base Block design**, terminal year of time series, and IPHC Regulatory Area or Biological Region.

Regulatory Area	**Base Block**		
	2025	2026	2027
2A	17	22	23
2B	8	10	7
2C	6	6	6
3A	9	7	7
3B	13	12	15
4A	19	13	20
4B	15	20	18
4CDE	8	8	8
Biological Region			
Region 2	5	6	5
Region 3	7	7	8
Region 4	8	7	9
Region 4B	15	20	18
Coastwide	4	4	4

Projected terminal year CVs for the Base Block design for 2025-27 are all 25% or less for all IPHC Regulatory Areas. In the core areas (2B, 2C, 3A and 3B), CVs are at 15% or less (Table 2). All Biological Region CVs except Region 4B are below 10% while the coastwide CV is projected to be 4% in all years. The Base Block design is therefore projected to maintain precise estimates of indices of Pacific halibut density and abundance across the range of the stock, and to provide a strong basis for estimating trends, demographics, and the distribution of the stock. At the same time, the rotating nature of the sampled blocks means that almost all FISS stations are sampled within a 5-year period (2-3 years within the core areas) resulting in low risk of missing important stock trends and therefore a low risk of large bias in estimates of trend and stock distribution. The consistent nature of the sampling design means that CVs will be maintained at comparable values beyond 2027.

For context, average research survey CVs[1] have been estimated to be approximately ~20%; however, this value includes both estimated observation and process error (based on lack of fit in the stock assessments), and so is larger than the survey-only observation CVs projected in this report (Francis et al. 2003). In NOAA Fisheries trawl survey results in the Bering Sea (roughly analogous to one Biological Region for Pacific halibut), commercially important species showed a range of average annual model-based CVs, including: Pacific cod (5%), Walleye pollock (7%), Northern rock sole (6%), and yellowfin sole (5%) over 1982-2019 (DeFilippo et al. 2023). These values are comparable to the projected 5-9% CVs for IPHC Biological Regions that would be expected from the **Base Block design** (with the exception of Biological Region 4B), but lower than corresponding values for the Core Block and Reduced Core designs.

The **Base Block design** shown in Figures 2 to 6 for 2025-29 were presented to the Commission at IM099 as potential designs for 2024-28, although the **Base Block design** was not considered for adoption for 2024 due to high projected costs and low catch rates. These block designs ensure that all charter regions in the core areas are sampled over a three-year period, while prioritizing coverage in other areas based on minimising the potential for bias and maintaining CVs below 25% for each IPHC Regulatory Area. The **Base Block design** also include some sampling in all IPHC Biological Regions in each year, ensuring that data from across the spatial

[1] Based on a meta-analysis of 18 trawl survey and species combinations.

range of Pacific halibut are available to the stock assessment and for stock distribution estimation. We note that paragraph 72 of the AM100 report (IPHC-2024-AM100-R) states:

> *The Commission NOTED that the use of the base block design (Figures 7 to 11 of paper IPHC-2024-AM100-13) will be the focus of future planning and annual FISS proposals from the Secretariat.*

The Base Block design for the 2025 FISS (Figure 2) was projected to result in a net loss of around US$2 million and was therefore not considered fiscally viable (IPHC-2024-SS014-03).

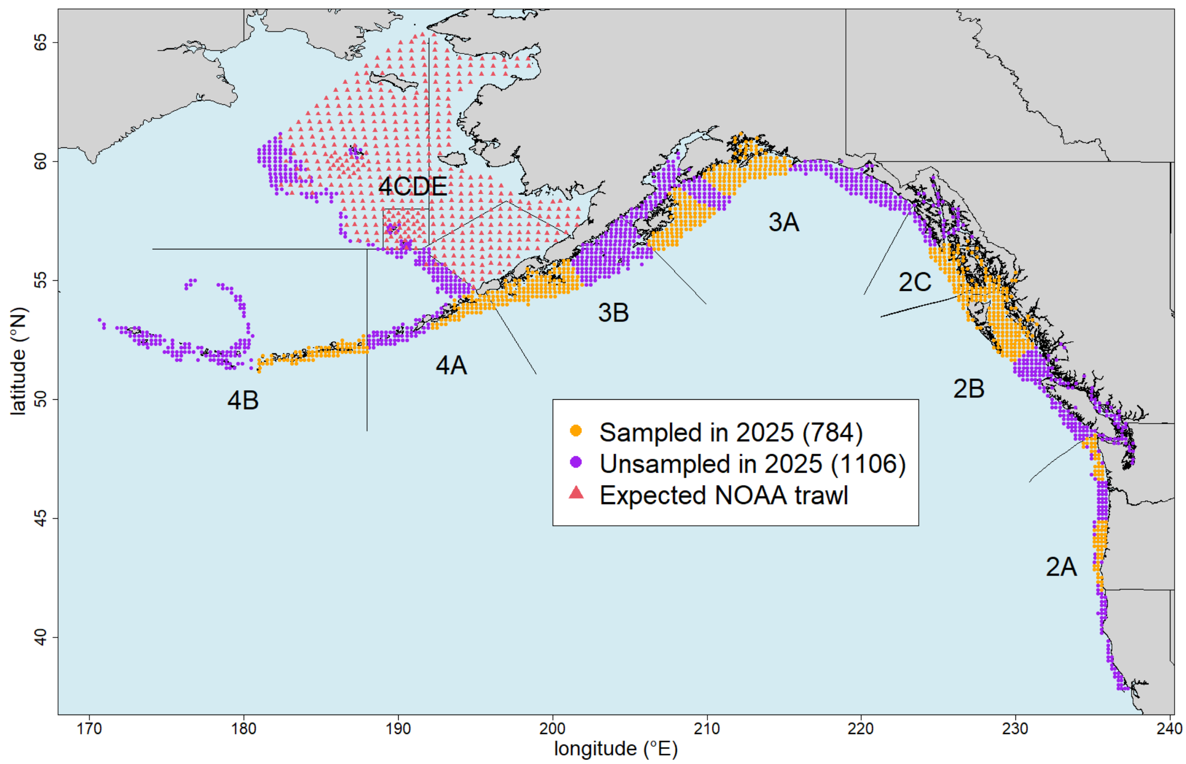

Figure 2. Base Block design for 2025 (orange circles). Design is based on fishing 2-4 complete blocks of stations (charter regions) in the core areas (2B, 2C, 3A and 3B) and previously implemented subareas elsewhere.

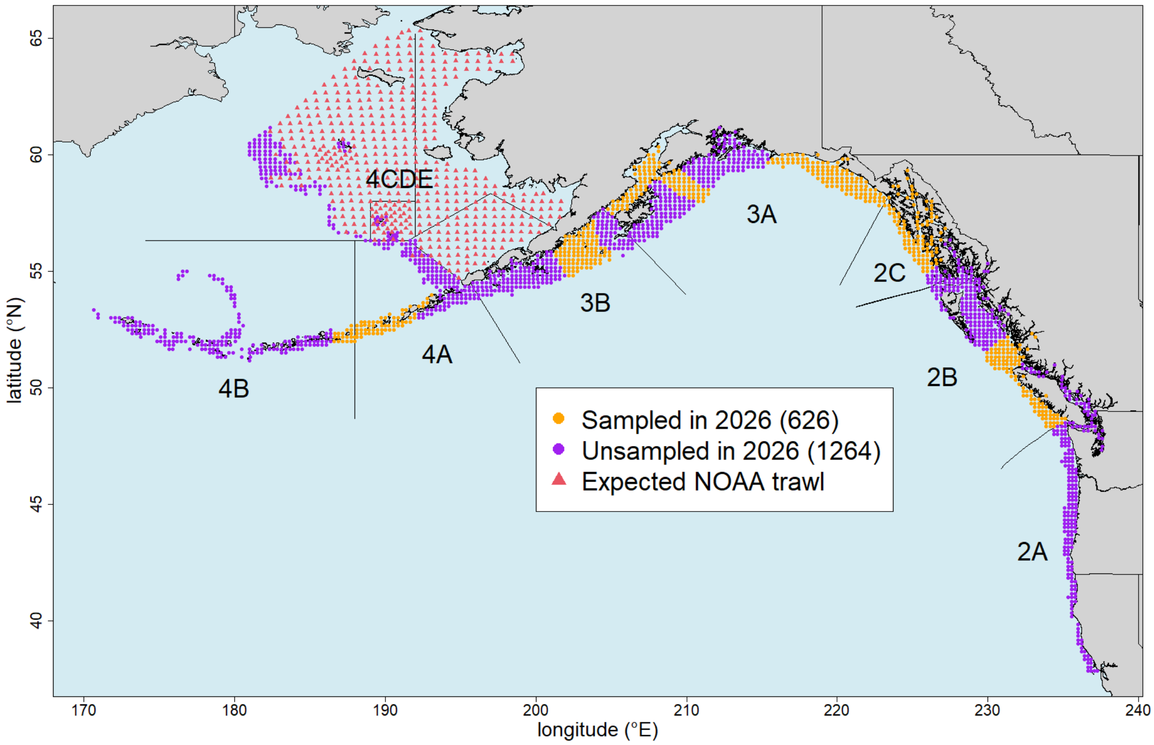

Figure 3. Base Block design for 2026 (orange circles) – indicative only. Design is based on fishing 2-4 complete blocks of stations (charter regions) in the core areas (2B, 2C, 3A and 3B) and previously implemented subareas elsewhere.

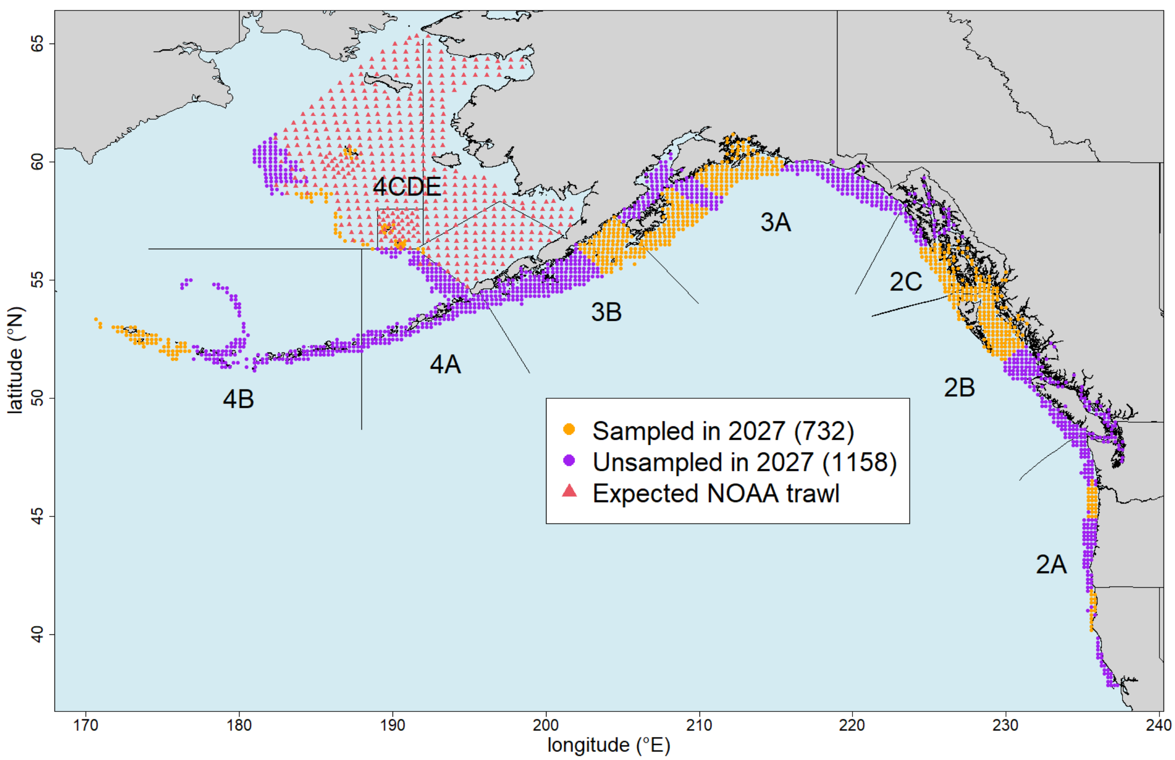

Figure 4. Base Block design for 2027 (orange circles) – indicative only. Design is based on fishing 2-4 complete blocks of stations (charter regions) in the core areas (2B, 2C, 3A and 3B) and previously implemented subareas elsewhere.

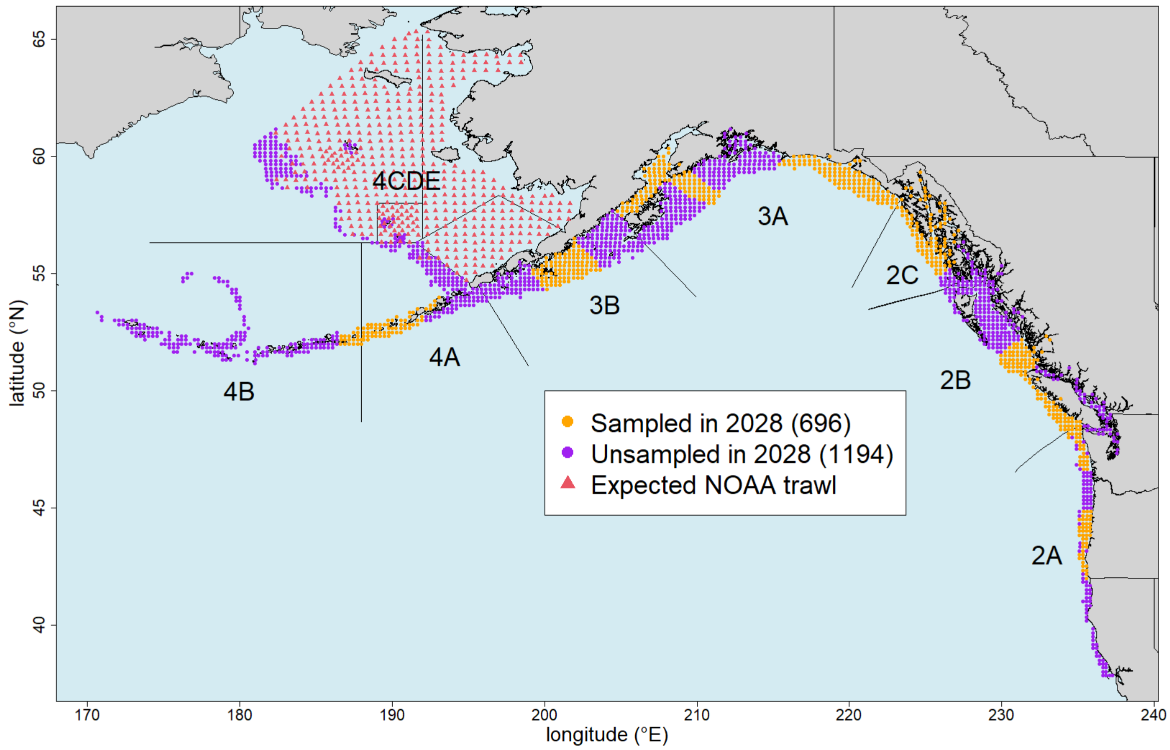

Figure 5. Base Block design for 2028 (orange circles) – indicative only. Design is based on fishing 2-4 complete blocks of stations (charter regions) in the core areas (2B, 2C, 3A and 3B) and previously implemented subareas elsewhere.

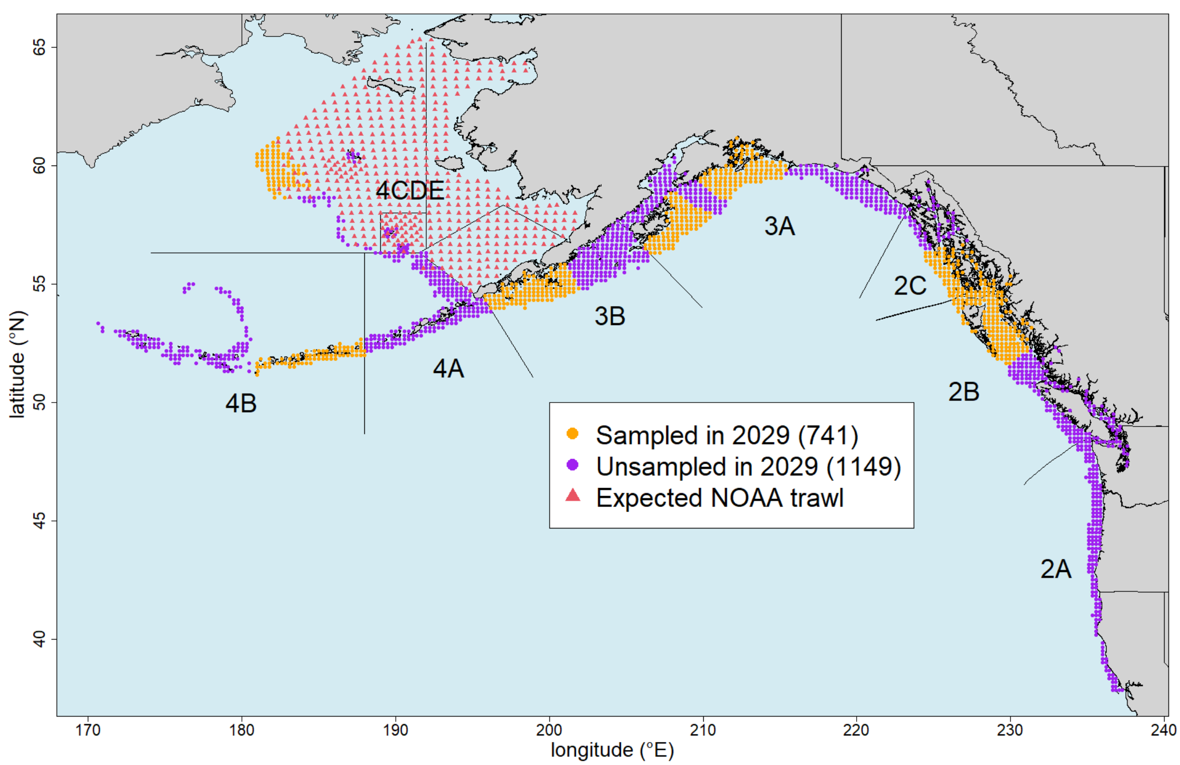

Figure 6. Base Block design for 2029 (orange circles) – indicative only. Design is based on fishing 2-4 complete blocks of stations (charter regions) in the core areas (2B, 2C, 3A and 3B) and previously implemented subareas elsewhere.

THE APPROVED 2025 FISS DESIGN

At SS014 (IPHC-2024-SS014-03), the Commission tentatively decided on a 2025 FISS design (Figure 7) that included the following:

- One charter region in each of 2B and 2C
- 60 stations in each of 2A and 4A/4B, covered by supplementary funding
- Two charter regions in each of 3A and 3B, each last sampled in 2022-23, and selected to reduce the bias risk over the short term

Implementation of this design is projected to result in a net loss to the FISS, with the projected deficit to be covered by a transfer from the IPHC Reserve Fund of $1,000,000. This design was approved via inter-sessional agreement (IPHC-2024-CR-030, IPHC-2024-CR-031).

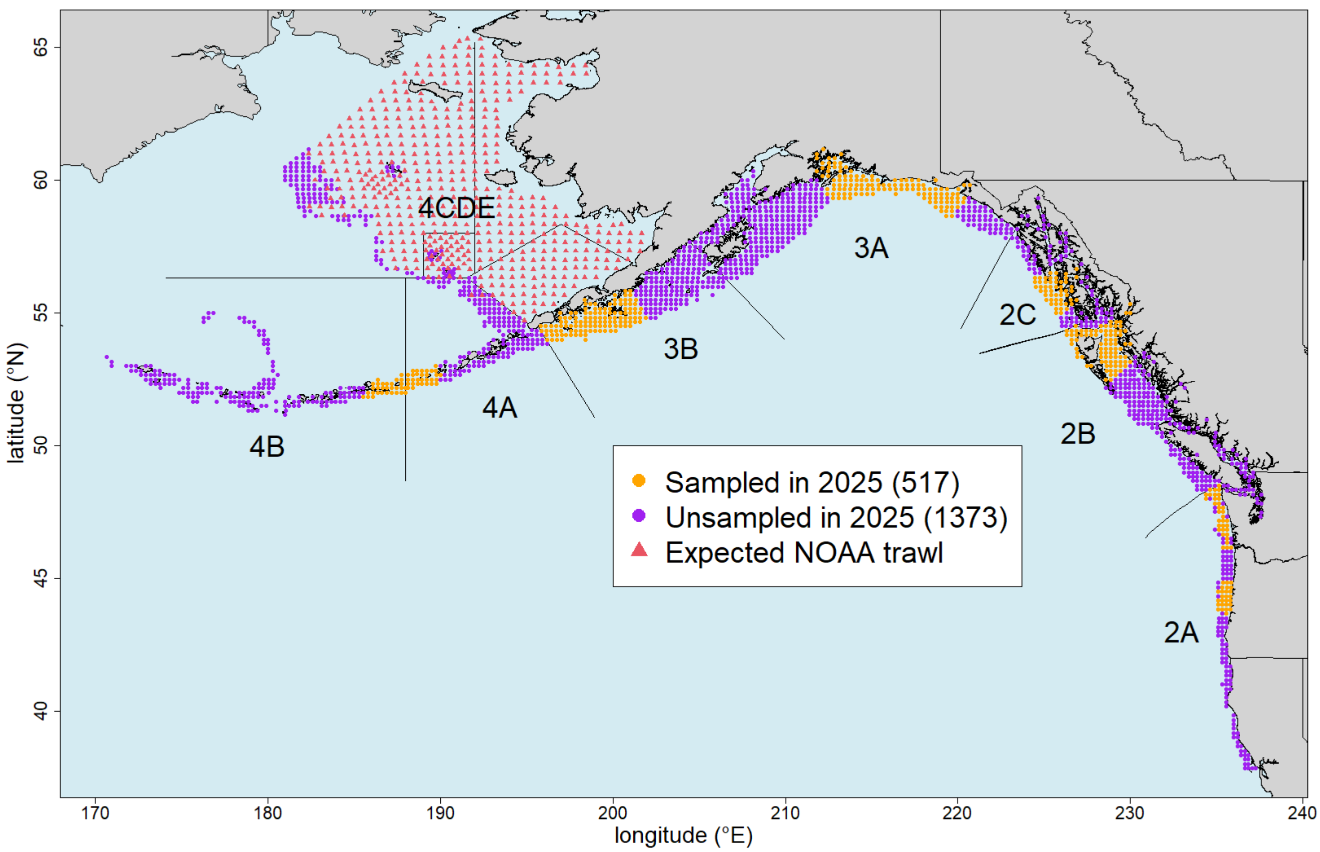

Figure 7. The approved 2025 FISS design (orange circles).

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THE POTENTIAL FOR BIAS RESULTING FROM REDUCED FISS DESIGNS

Indices of Pacific halibut density can change by large amounts over short periods, with annual changes of 15% or more regularly observed at the level of Biological Region (Figure 8) and Regulatory Area (Figure 9). Over a three-year period, large changes in indices of density are the norm (Figures 10 and 11), including at the coastwide level. Lack of sampling or low spatial coverage in an area or region means such changes are fully or largely unobserved, leading to biased estimates of indices, stock trends, and stock distribution. The greater the unobserved change, the greater the bias. Designs such as that implemented in 2024 and the approved 2025 FISS design (Figure 7) therefore have high potential for bias in area, regional and coastwide estimates, particularly as 2025 would be the second or third year with reduced coverage for much of the stock.

The risk of bias is lowest in Biological Region 2, which has had good spatial coverage over the last three years (2022-24; Figure 12). The planned 2025 sampling in the highest density habitat in IPHC Regulatory 2A means that bias risk in 2025 will be low throughout this region. While some sampling in Biological Regions 3, 4 and 4B mitigates the bias potential, persistent large coverage gaps means that 73% of habitat covered by the full FISS design will be unsampled next year and the risk of not observing the large changes that often occur in much of the stock remains high.

Including the habitat covered by the NOAA trawl survey in the Bering Sea, implementation of approved 2025 FISS design means that either FISS or trawl sampling covers 51% and 63% of habitat in each of 2024 and 2025 respectively. Based on this level of sampling coverage and observed levels of change shown in Figures 8 to 11, we would expect coastwide indices of abundance to have bias of up to +/-13% following the 2025 FISS. However, bias could be much higher in Biological Regions 3 and 4B, which would have had lower levels of sampling than the coast as a whole for two or more years following completion of the 2025 FISS.

Recently completed simulation analyses explored the effect on stock assessment results of a cumulative bias in the FISS index of 15% over the upcoming period from 2025-2027 (IPHC-2024-SRB025-06). If the true FISS trend were going down by 15%, but due to a reduced design the FISS index was estimated to be flat over this same period, the estimates of spawning biomass, fishing intensity (SPR) and probability of stock decline in 2028 at the same harvest level would be biased. The simulation results indicated that this bias correspond to a 2-3% overestimate of spawning biomass, a 1% overestimate of SPR (underestimate of fishing intensity) and a 9% underestimate of the probability of stock decline in 2028. Based on recent harvest decision tables, to account for a 9% underestimate of the probability of stock decline the coastwide TCEY would need to be reduced by approximately 4 million pounds, equating to approximately US$24 million in landed catch. Thus, under significantly reduced FISS designs accounting for potential bias in management decisions could have a significant impact on short-term fishery yields and revenue. While the true degree of bias would be unknown (at least until the next comprehensive FISS design was completed), this level of bias (15%) is possible in the reduced designs evaluated here.

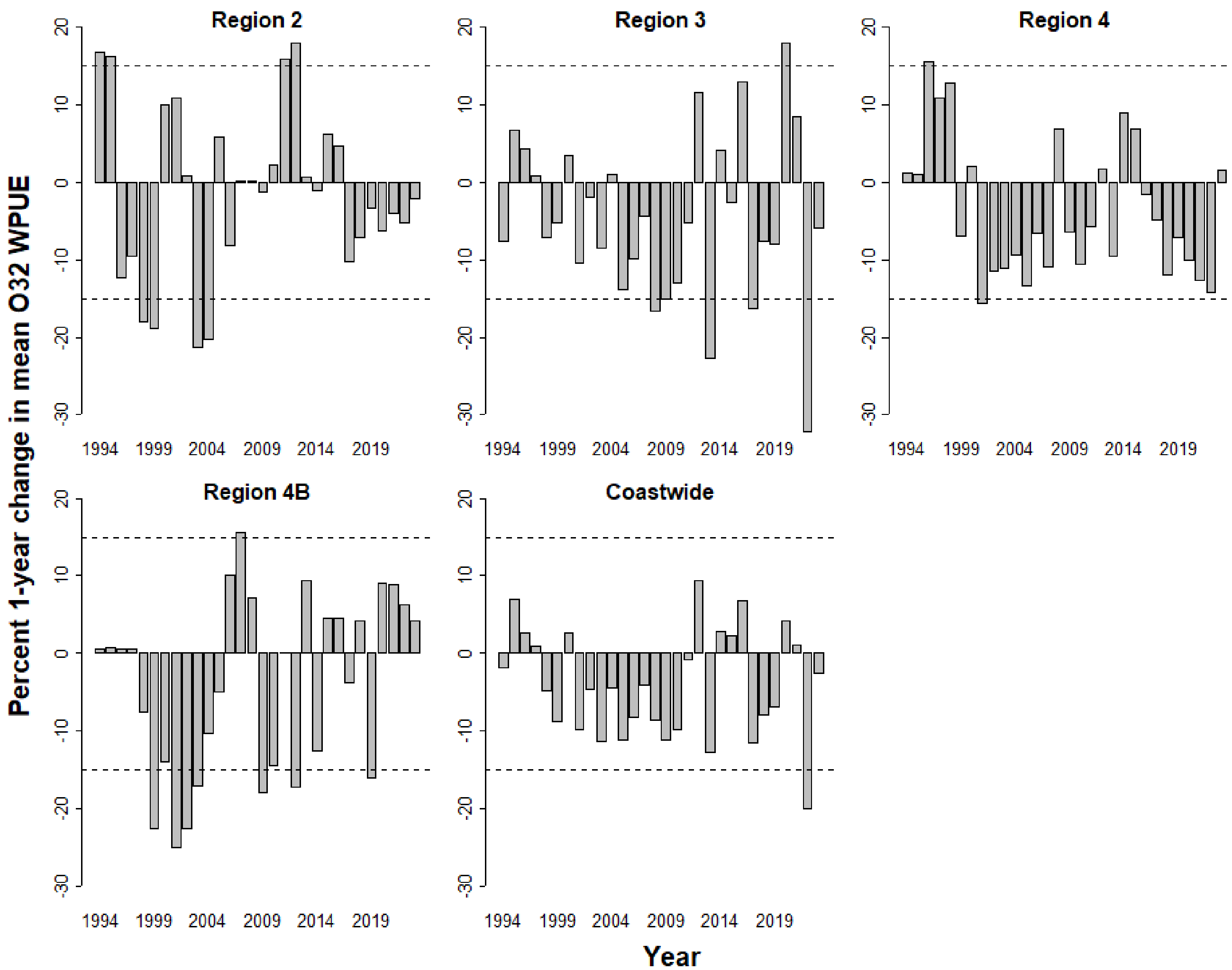

Figure 8. Estimated 1-year changes in mean O32 WPUE by IPHC Biological Region. Dashed lines mark changes of +/-15%.

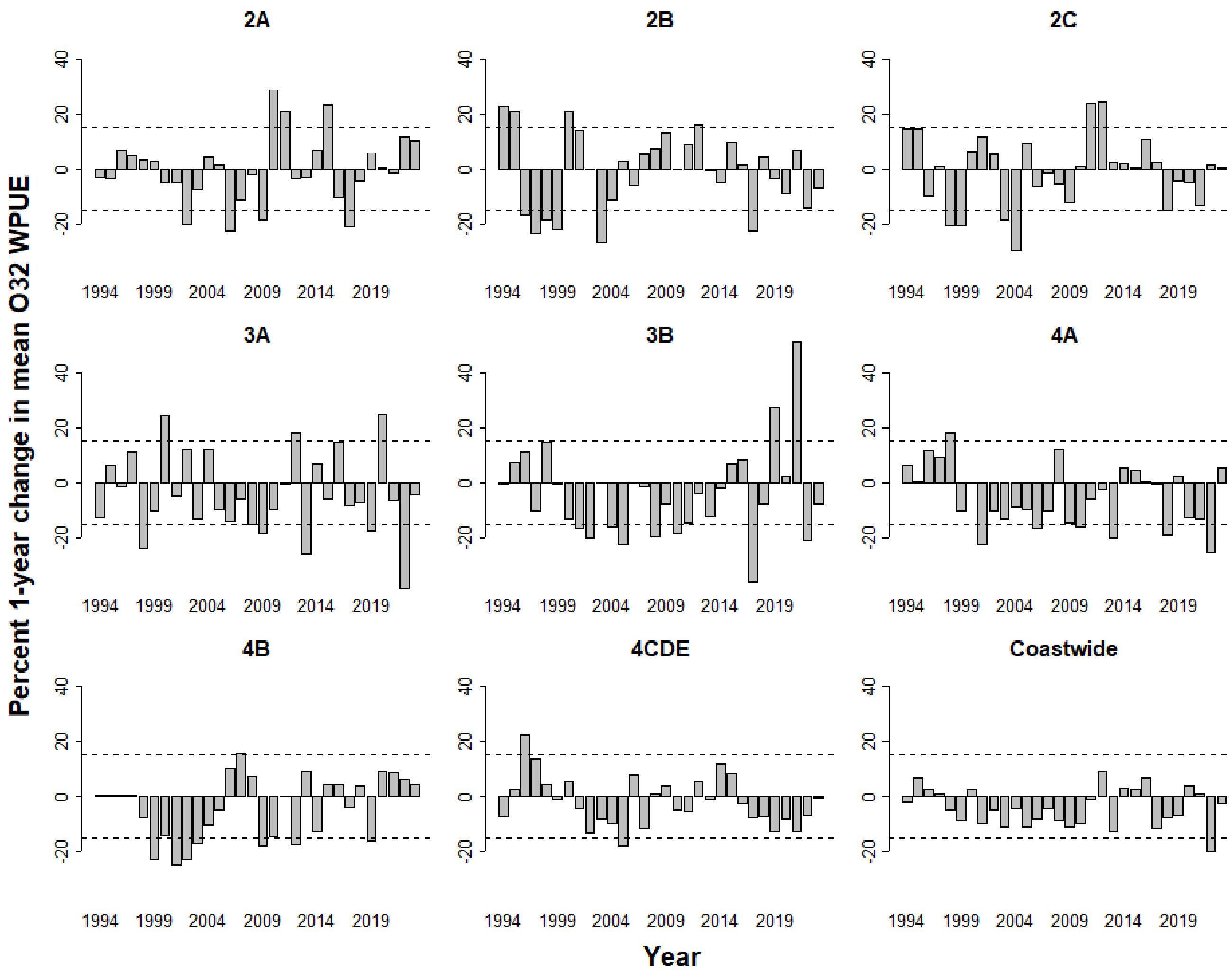

Figure 9. Estimated 1-year changes in mean O32 WPUE by IPHC Regulatory Area. Dashed lines mark changes of +/-15%.

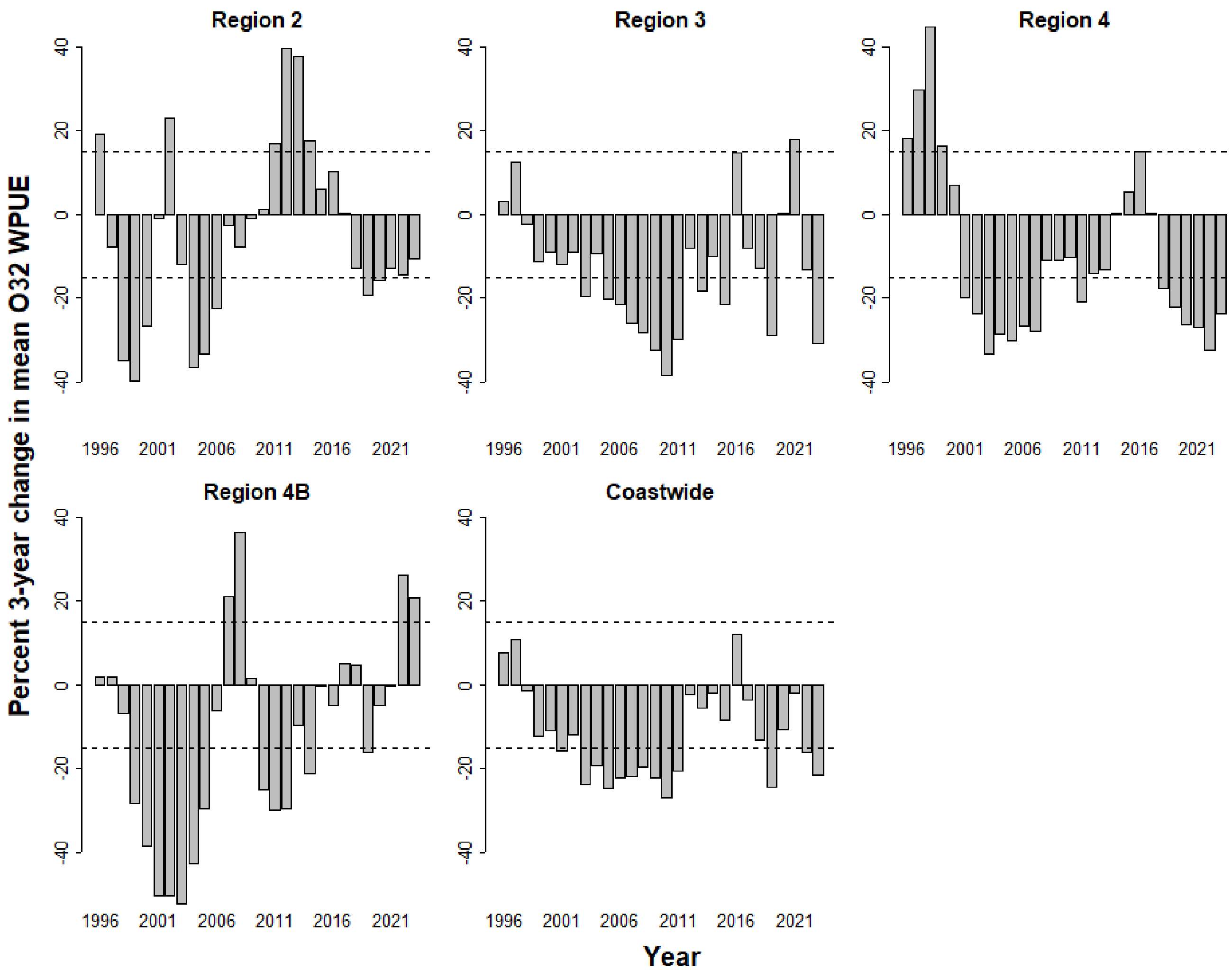

Figure 10. Estimated 3-year changes in mean O32 WPUE by IPHC Biological Region. Dashed lines mark changes of +/-15%.

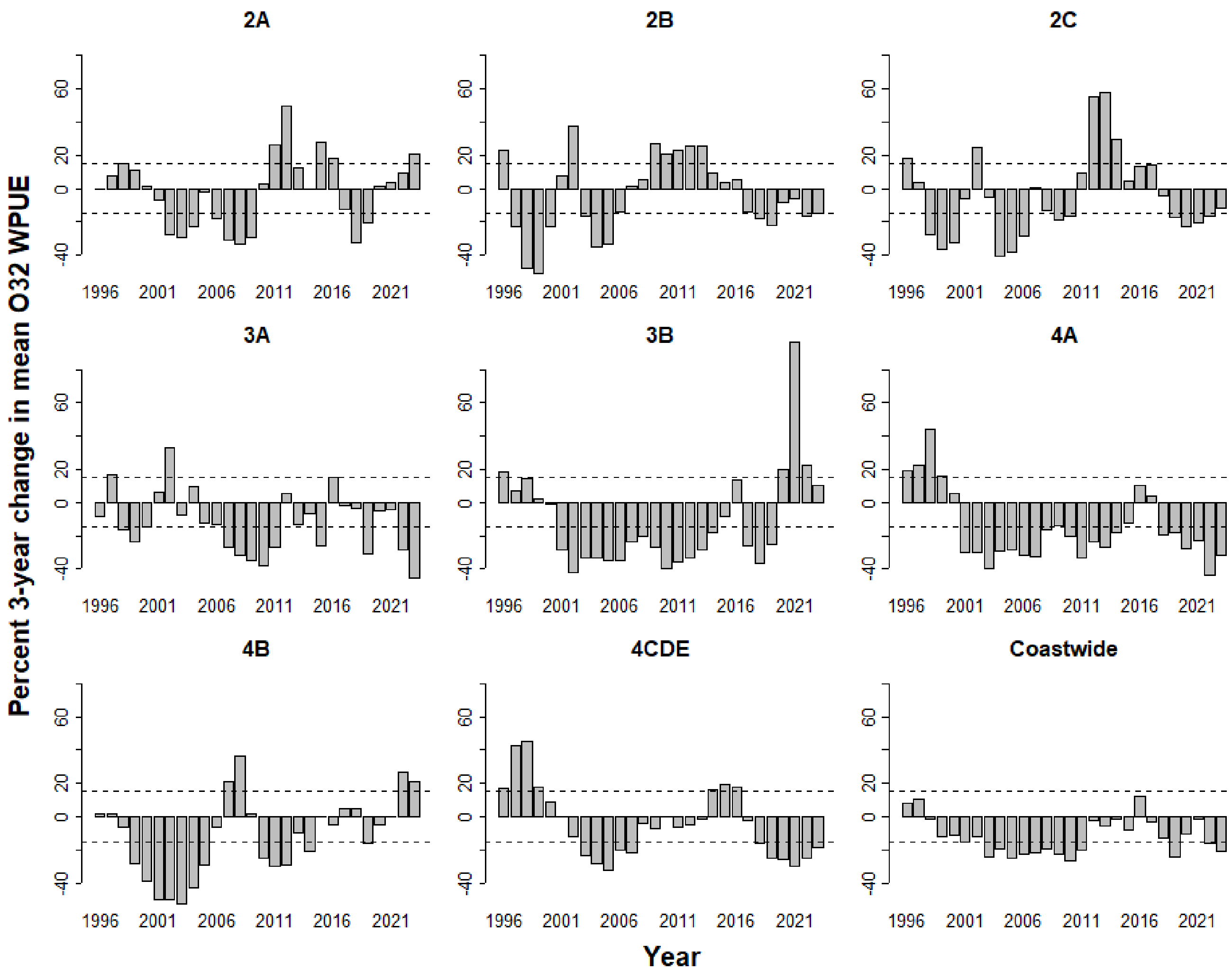

Figure 11. Estimated 3-year changes in mean O32 WPUE by IPHC Regulatory Area. Dashed lines mark changes of +/-15%.

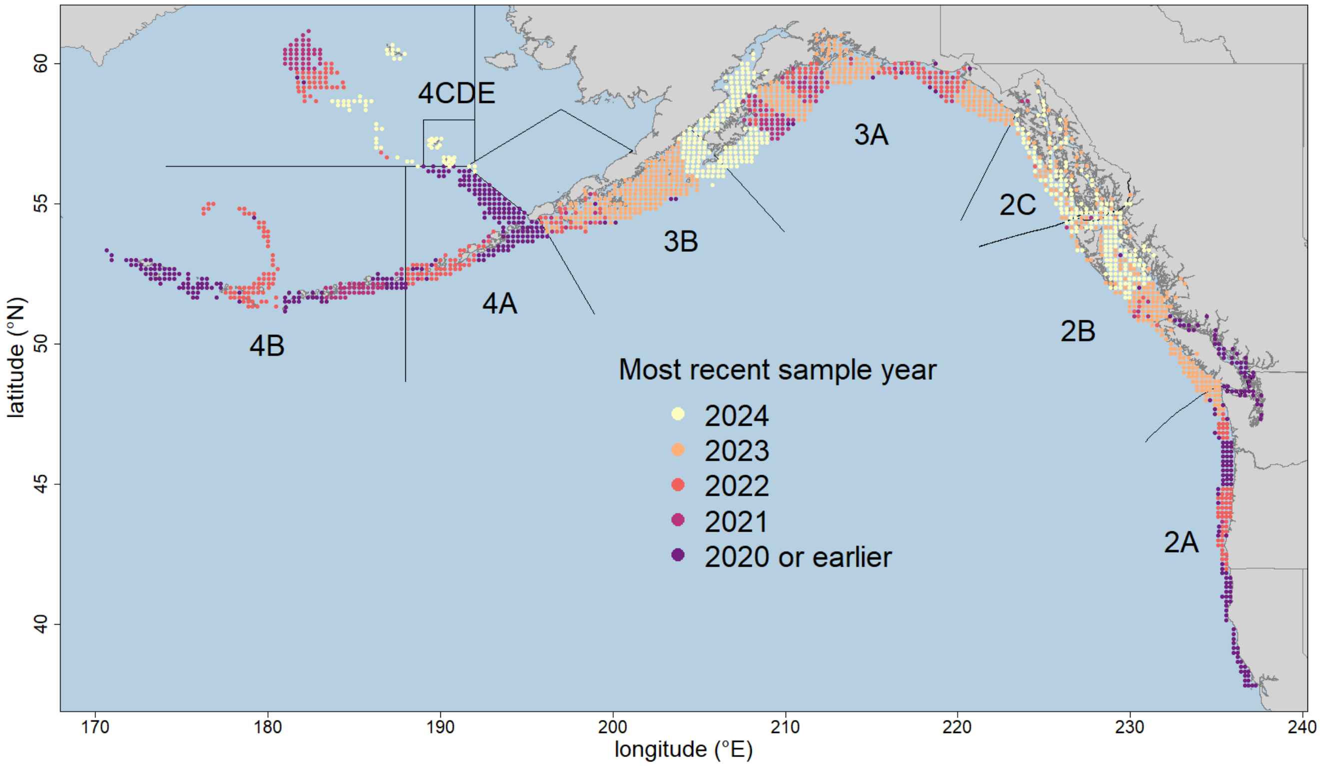

Figure 12. Map of FISS grid stations with coloured circles showing the most recent year each station was fished effectively.

Recommendation

That the Commission **NOTE** paper IPHC-2025-AM101-14 that reviews an optimal long-term FISS design, the approved 2025 FISS design, and discusses the potential for biases that may result from non-optimal designs.

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Report on Current and Future Biological and Ecosystem Science Research Activities

PREPARED BY: IPHC SECRETARIAT (J. PLANAS, 10 DECEMBER 2024)

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 Five-year Program of Integrated Research and Monitoring (2022-2026).

BACKGROUND

The main objectives of the Biological and Ecosystem Science Research at the IPHC are to:

1) identify and assess critical knowledge gaps in the biology of the Pacific halibut;
2) understand the influence of environmental conditions; and
3) apply the resulting knowledge to reduce uncertainty in current stock assessment models.

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 and the management strategy evaluation processes (Appendix I), 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.
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 II) and the MSE process (Appendix III) and their links to research activities and outcomes derived from the five-year research plan are provided.

Discussion on the Main Research Activities

1. Migration and Population Dynamics.

   The IPHC Secretariat is currently focusing on 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 II). Furthermore, the relevance of these research outcomes for the management strategy evaluation (MSE) process is in biological parameterization and validation of movement estimates, on one hand, and of recruitment distribution, on the other hand (Appendix III).

   1.1. Population genomics. Understanding population structure is imperative for sound management and conservation of natural resources. Pacific halibut in US and Canadian waters are managed as a single, panmictic population on the basis of tagging studies and historical (pre-2010) analyses of genetic population structure that failed to demonstrate significant differentiation in the eastern Pacific Ocean. While genetic techniques previously employed in fisheries management have generally used a small number of markers (i.e. microsatellites, ~10-100), whole-genome scale approaches can now be conducted with lower cost and are able to provide orders of magnitude more data (millions of markers) that allow investigating genetic variation in fish populations at an unprecedented resolution.

   The main purpose of the present study is to conduct an analysis of Pacific halibut population structure in IPHC Convention waters using state-of-the-art low-coverage whole genome resequencing (lcWGR) methods. For this purpose, the IPHC Secretariat used genetic samples from male and female adult Pacific halibut collected during the spawning (winter) season from known spawning grounds in five geographic areas: Western and Central Aleutian Islands, Bering Sea, Central Gulf of Alaska and British Columbia (Figure 1). Furthermore, temporal replicates at many of these locations are available and have enabled the IPHC Secretariat to evaluate the stability of genetic structure over time, ensuring confidence in the results. As a requisite for the lcWGR approach used, the IPHC Secretariat first produced a high-quality reference genome (Jasonowicz et al., 2022) that has been used to generate genomic sequences from 570 individual Pacific halibut collected from the five above-mentioned geographic areas (Figure 1).

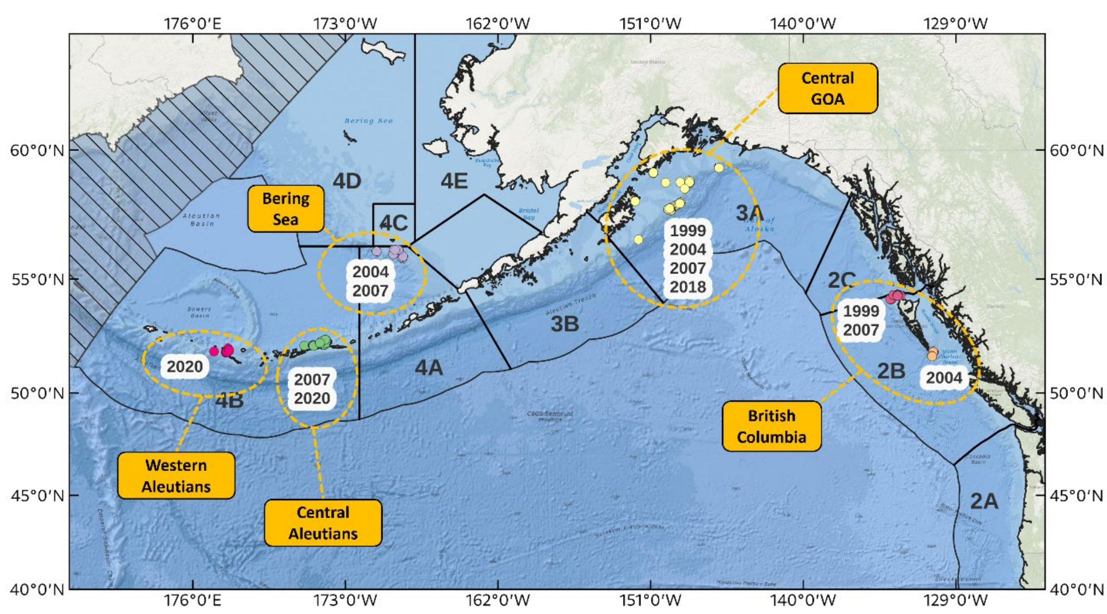


Figure 1. Map of sample collections made during the spawning season used for genomic analysis of population structure in Pacific halibut in the northeast Pacific Ocean.

Using the lcWGR approach, the IPHC Secretariat has identified approximately 10.2 million single nucleotide polymorphisms (SNPs) that have been used to evaluate population structure at the highest resolution possible. Despite the use of a very high-resolution genomic approach, preliminary analyses of population structure using a genome-wide subset of 4.7 million SNPs, indicated that distinct genetic groups were not apparent in the dataset. Multiple methods were used to characterize population structure: principal component analysis revealed a considerable degree of genetic similarity between samples collected in different geographic areas (Figure 2), and unsupervised clustering methods (K-means clustering and the estimation of admixture proportions) also failed to detect discrete genetic groups. These results suggest that there is very little spatial structure among the five spawning groups sampled in different geographic areas within IPHC Convention Waters. Furthermore, assignment testing was carried out to assess our ability to accurately assign samples back to their location in which they were collected. Cross-validation was used to evaluate assignment accuracy and indicated a limited ability (34.7%) to accurately assign samples back to the geographic location in which they were collected from. We hypothesize that the absence of distinct genetic groups among our sample collections is due to a considerable degree of geneflow among the geographic areas sampled in this study and, consequently, to the genetically panmictic nature of the Pacific halibut population sampled for this study.

The lack of structure observed aligns with our current knowledge and understanding of Pacific halibut biology. Annual migration rates estimated from tag recovery data suggest that there is ample opportunity for individuals to move among IPHC Regulatory Areas throughout their lives (Webster et al. 2013). Analysis of tag recovery data has shown that approximately 11% of Pacific halibut tags are recovered in a different IPHC

Regulatory Area than they are released (Carpi et al. 2021). This varies by Regulatory Area but for most IPHC Regulatory Areas, the percentage of migrants observed exceeds 10% (Carpi et al. 2021). Substantial rates of movement extend to very early life stages of Pacific halibut as well. Oceanographic connectivity between the Bering Sea and Gulf of Alaska has been linked to a considerable degree of larval exchange between these areas. It has been estimated that 47%-58% of larvae originating from spawning grounds in the Western Gulf of Alaska are transported to the Bering Sea (Sadorus et al. 2021). Furthermore, these rates can still be as high as 4.5%-8.6% for larvae originating from spawning grounds in the Eastern Gulf of Alaska (Sadorus et al. 2021).

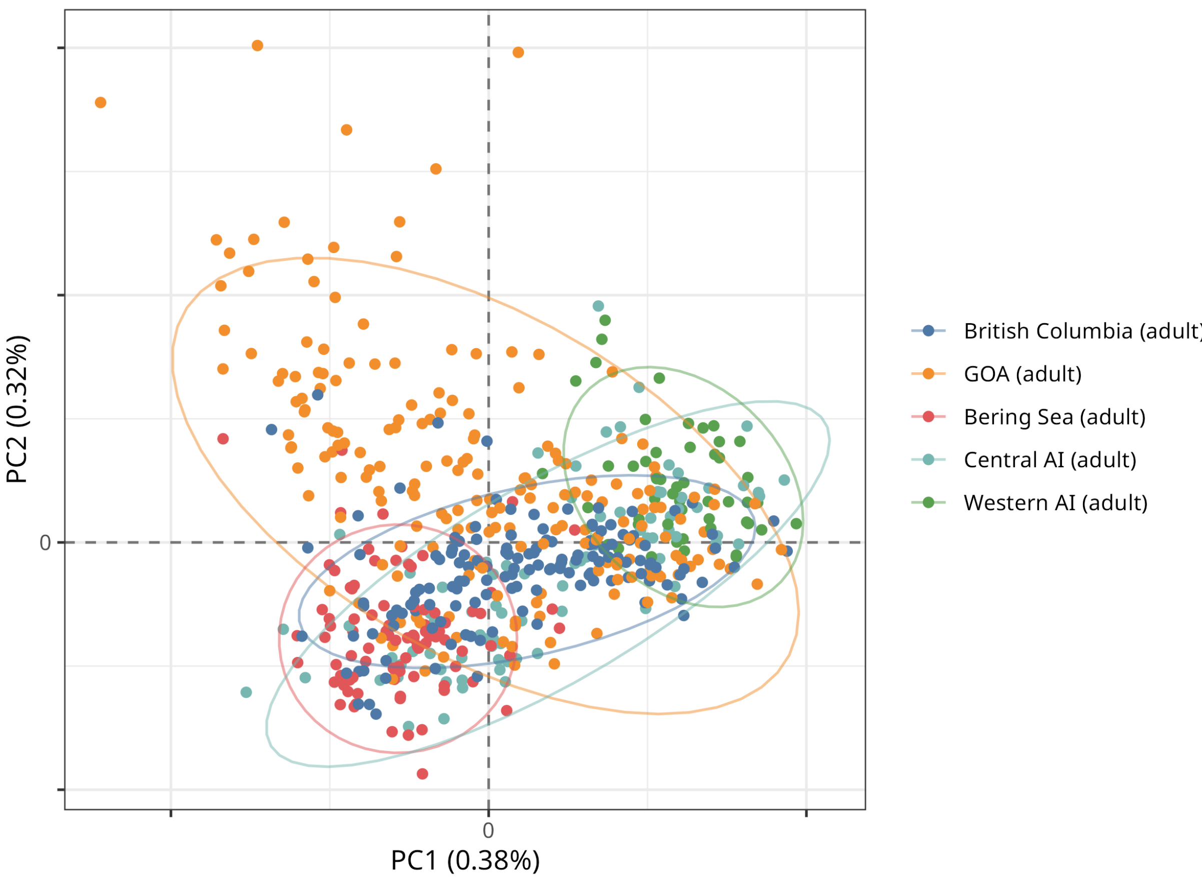


Figure 2. Principal Component Analysis (PCA) biplot of the first two PC axes for 570 Pacific halibut. Samples are colored by geographic area. Circles represent 95% confidence ellipses.

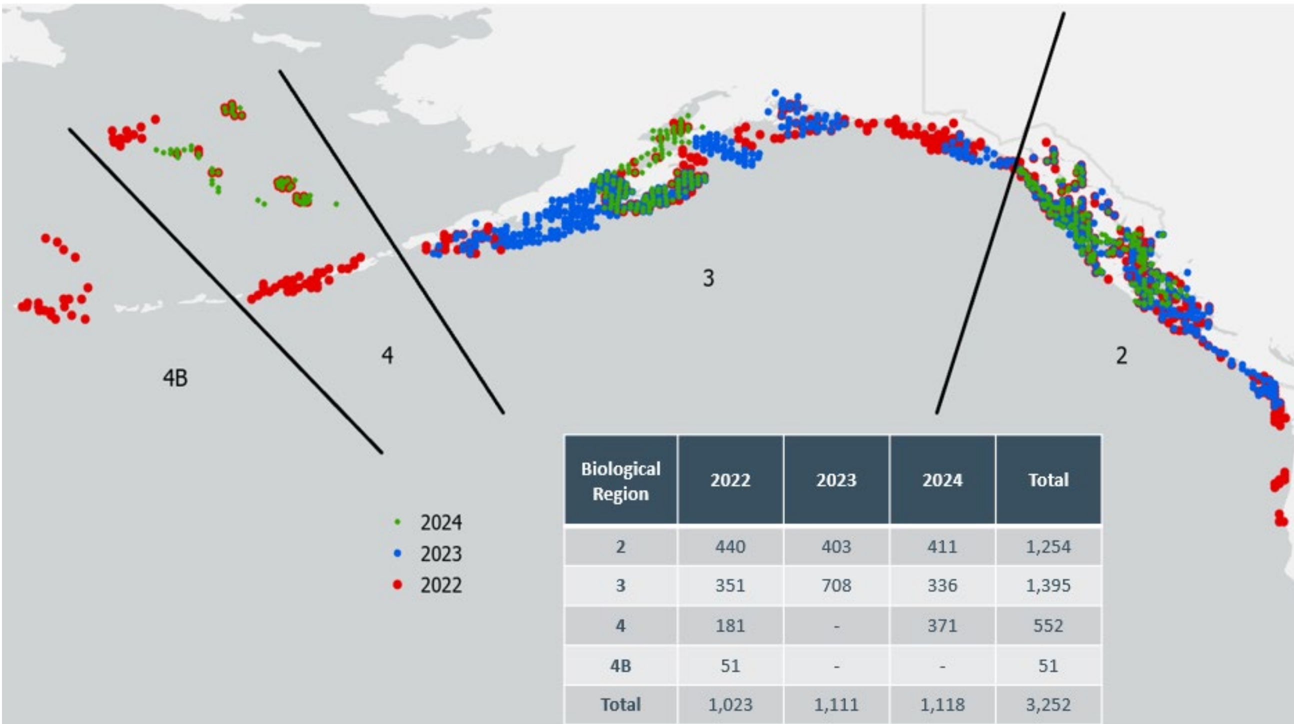
The concept of a stock and the ability to define management units is central to sound management of marine fishes (Begg et al. 1999; Cadrin 2020). Advances in genomic technology have led to the development of useful and powerful tools that can aid in the delineation of management units (Bernatchez et al. 2017). Despite using very high-resolution genomic methods to characterize genomic variation in spawning groups of Pacific halibut collected over large spatial and temporal scales, the results presented here are consistent with genetic panmixia. However, while it is important to note that we cannot simply prove that panmixia exists by failing to reject it, the results presented here are consistent with the current assessment practices of the IPHC which considers Pacific halibut in IPHC Convention Waters as a single coastwide stock (Stewart and Hicks 2024).

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 II) as they represent the most important biological inputs for SA. The relevance of these research outcomes for the management strategy evaluation process is in the improvement of the simulation of spawning biomass in the Operating Model (Appendix III).

Recent sensitivity analyses have shown the importance of changes in spawning output due to changes in maturity schedules and/or skip spawning and fecundity for SA (Stewart and Hicks, 2018). Information on these key reproductive parameters provides direct input to the SA. For example, information on fecundity-at-age and -size could be used to replace spawning biomass with egg output as the metric of reproductive capability in the 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 characterizing female reproduction in this species. Specific objectives of current studies include: 1) update of maturity schedules based on histological-based data; and 2) fecundity estimations.

2.1. Update of maturity schedules based on histological-based data. The coastwide maturity schedule (i.e. the proportion of mature females by age) that is currently used in SA is based on visual (i.e. macroscopic) maturity data collected in IPHC's Fishery-Independent Setline Survey (FISS). However, the coastwide maturity schedule has not been revised in recent years and it may have an undetermined degree of uncertainty. For this reason, the IPHC Secretariat is undertaking studies to revise the female maturity schedule coastwide and in all four IPHC Biological Regions through histological (i.e. microscopic) characterization of maturity. To accomplish this objective, the IPHC Secretariat started collecting ovarian samples for histology during the 2022 and 2023 FISS seasons. The 2022 FISS sampling resulted in a total of 1,023 ovarian samples collected in Biological Regions 2, 3, 4 and 4B. Due to a reduced FISS design, in 2023 sampling only occurred in Biological Regions 2 and 3 and 1,111 ovarian samples were collected (Figure 3). Ovarian samples from 2022 and 2023 were processed for histology and scored for maturity using histological maturity classifications, as previously described in Fish et al. (2020, 2022). Following this maturity classification criteria, all sampled Pacific halibut females were assigned to either the mature or immature categories. Mature female Pacific halibut are deemed to have at least reached the early vitellogenic (Vtg1) female developmental stage (Fish et al., 2020).



Biological Region	2022	2023	2024	Total
2	440	403	411	1,254
3	351	708	336	1,395
4	181	-	371	552
4B	51	-	-	51
Total	1,023	1,111	1,118	3,252

Figure 3. Map of 2022, 2023 and 2024 maturity samples for histology collected on FISS. Red dots (2022), blue dots (2023) and green dots (2024) indicate a distinct FISS station in which a sample was collected.

Maturity ogives (i.e., the relationships between the probability of maturity determined by histological assessments and variables including IPHC Biological Region, age, and year) were estimated by fitting generalized additive models (GAM) with logit link (i.e., logistic regression) to the 2022 and 2023 data using year as a factor (Figure 4). When comparing Biological Regions 2 and 3 (the only two Biological Regions with two consecutive years of data) spatial and temporal differences in maturity ogives become apparent. First, the maturity ogive for Biological Region 2 shows lower steepness than that for Biological Region 3 in both years, indicating that Biological Region 2 has a lower proportion of mature females from ages 7 to 25 than Biological Region 3 over the period of ovarian sample collection during the FISS. Second, the maturity ogive in Biological Region 2 increased markedly in steepness between 2022 and 2023, indicating an increase in the proportion of mature females at younger ages, whereas the maturity ogive in Biological Region 3 was very similar across the two years. Future collection of ovarian samples in additional years will be required to establish any potential temporal and/or spatial differences in maturity ogives. For this reason, the IPHC Secretariat continued to collect ovarian samples in the 2024 FISS. A total of 1,118 ovarian samples were collected during 2024, with 411 samples in Biological Region 2, 336 samples in Biological Region 3, and 371 samples in Biological Region 4.

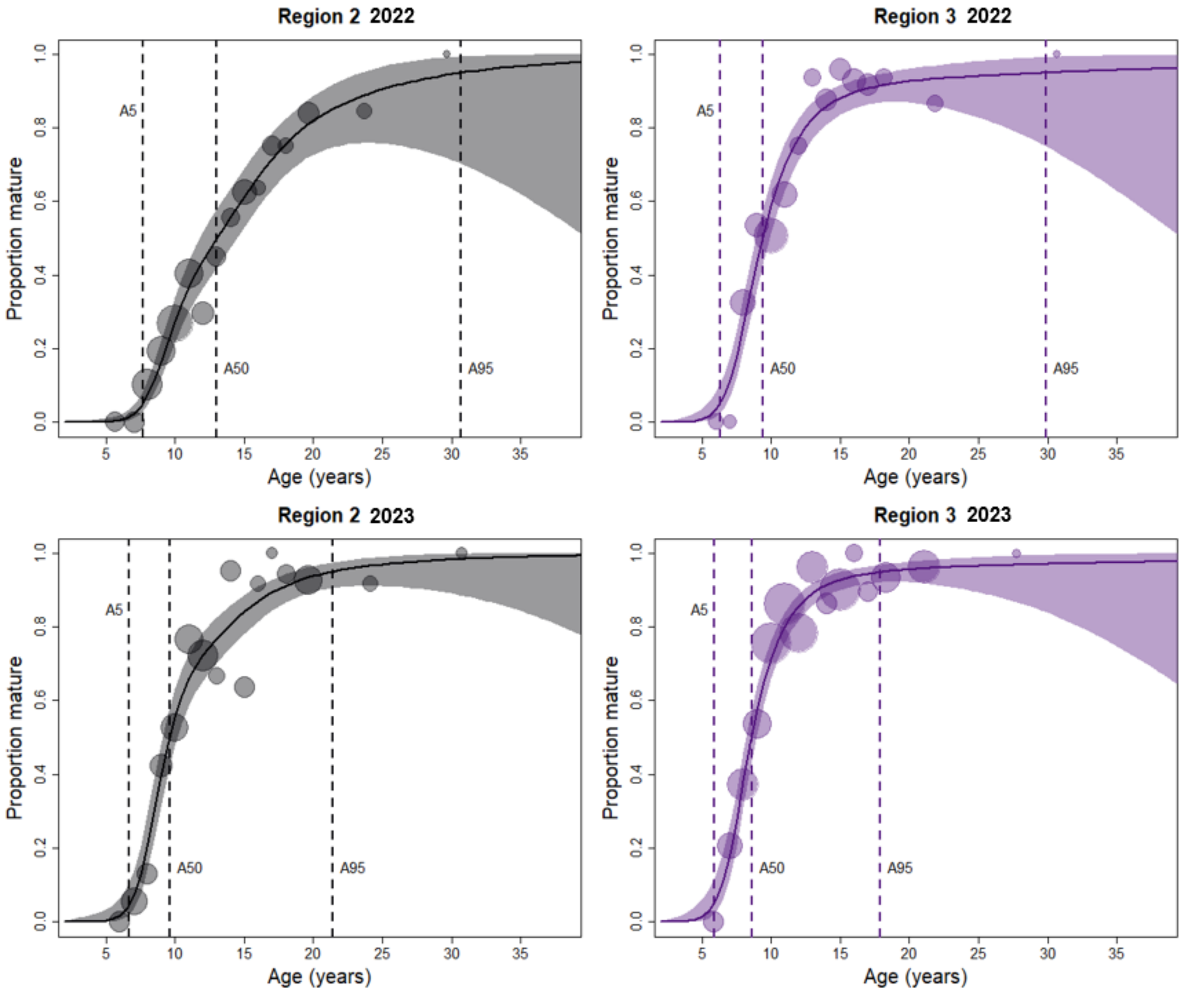


Figure 4. Female Pacific halibut age-at-maturity by IPHC Biological Region (BR2, left; BR3, right) and year (2022, top; 2023, bottom) using best-fit GAM. Color shading indicates 95% confidence intervals for each IPHC Biological Region. Vertical dash lines indicate age at 5% (A5), 50% (A50), and 95% (A95) maturity.

To generate a coastwide maturity ogive, the estimated regional abundance proportions from IPHC's most recent FISS space-time model were used as weights given that sample size was not proportional to population size for each Biological Region. The value of the coastwide ogive at each age was calculated as the abundance proportion at age multiplied by the proportion of mature females at age summed across the Biological Regions. The modeled coastwide ogive for maturity-at-age appears to fall between the maturity ogives for Biological Regions 2 and 3 (Figure 5). This result was expected because Biological Regions 2 and 3 currently have the highest estimated abundance. Using the histology-based coastwide maturity ogive, age at 50% maturity (A50; i.e., age at which half of the females are considered to be mature) was calculated to be at 10.3 years of age, a A50 value that is 1.3 years younger than that from currently used maturity estimates obtained from macroscopic (field) data (A50 at 11.6 years;

Clark and Hare, 2006). These results strongly suggest that a higher proportion of female Pacific halibut are maturing at a younger age than previously indicated, with potential implications for overall spawning stock biomass (SSB) estimates.

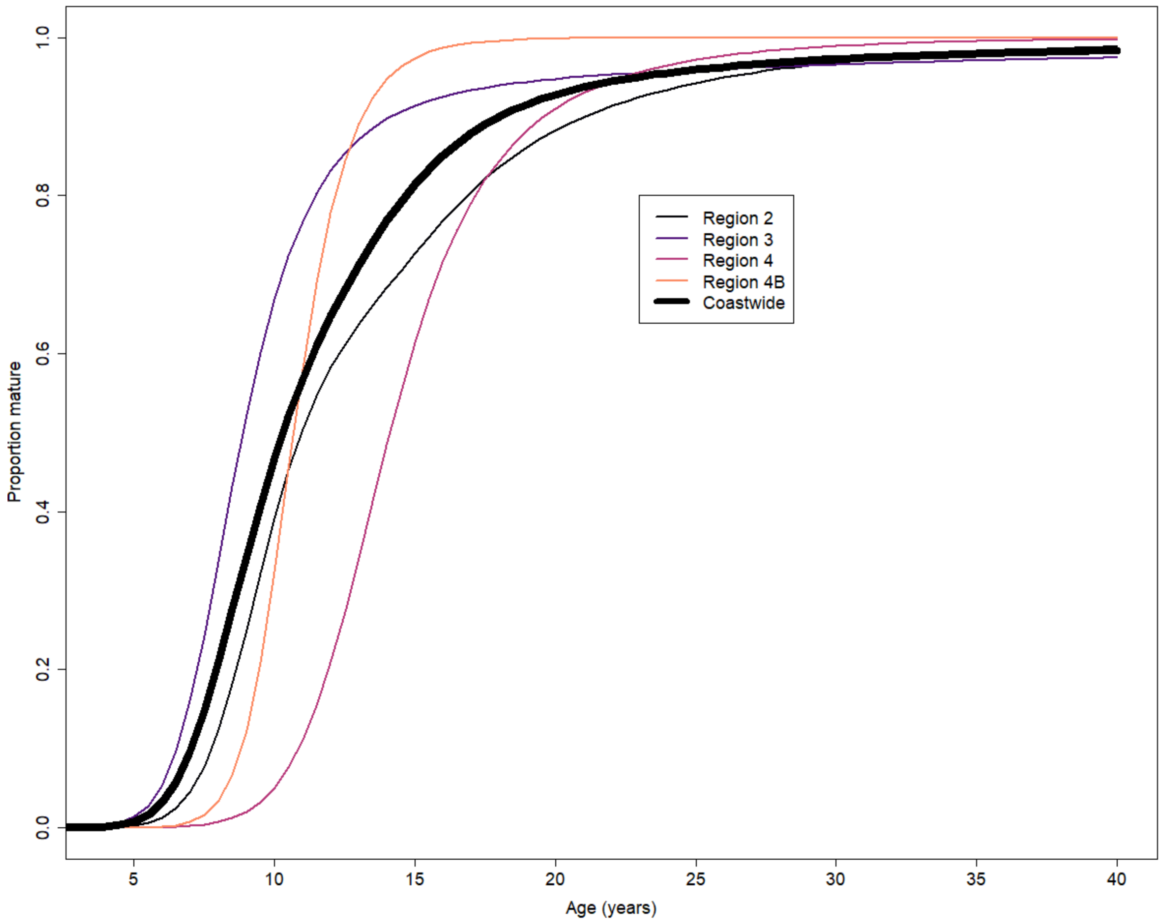


Figure 5. Coastwide maturity-at-age ogive (thick black line) generated from estimated regional abundance proportions. Shown without confidence intervals to better visualize differences between the coastwide and Biological Region ogives.

The IPHC Secretariat has also conducted preliminary analyses to examine maturity-at-length and maturity-at- weight. Using the same best-fit GAM model as for maturity-at-age, coastwide maturity ogives for length and net weight were estimated. Length at 50% maturity (L50) was calculated to be at 87.04 cm fork length. This preliminary L50 value is approximately 10 cm smaller than maturity estimates obtained from macroscopic (field) data (L50 of 85.8 cm; Clark and Hare, 2006). Preliminary results also showed that net weight at 50% maturity (W50) was calculated to be at 5.46 kg.

2.2. Fecundity estimations. The IPHC Secretariat has initiated studies that are aimed at improving our understanding of Pacific halibut fecundity. This will allow us to estimate fecundity-at-size and -age and could be used to replace spawning biomass with egg output as the metric for reproductive capability in stock assessment and management reference points. Fecundity determinations will be conducted using the auto-diametric method (Thorsen and Kjesbu 2001; Witthames et al., 2009) and IPHC Secretariat staff received training on this method by experts in the field (NOAA Fisheries, Northeast Fisheries Science Center, Wood Hole, MA) in May 2023. Ovarian samples for the development and application of the auto-diametric method to estimate fecundity in female Pacific halibut were collected during the IPHC's FISS in 2023 and 2024. In 2023, sampling was conducted only in Biological Region 3, with a total of 456 fecundity samples collected. In 2024, sampling was conducted in Biological Regions 2 and 4, with 149 and 359 fecundity samples collected, respectively. In the Fall of 2024, 273 additional fecundity samples targeting large females (85-200+ cm in fork length) were collected in Biological Region 2. This large collection of ovarian samples will be used initially for the development of the auto-diametric method, followed by actual fecundity estimations by age and by size (length and weight).

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 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 II). The relevance of these research outcomes for the management strategy evaluation process is in the improvement of the simulation of variability and to allow for scenarios investigating climate change (Appendix III).

The IPHC Secretariat completed a study funded by the North Pacific Research Board (NPRB Project No. 1704; 2017-2020) to identify relevant physiological markers for somatic growth. This study resulted in the identification of 23 markers in skeletal muscle that were indicative of temperature-induced growth suppression and 10 markers in skeletal muscle that were indicative of temperature-induced growth stimulation. These markers represented genes and proteins that changed both their mRNA expression levels and protein abundance levels in skeletal muscle, respectively, in parallel with changes in the growth rate of Pacific halibut. A manuscript describing the results of this study is currently in preparation (Planas et al., in preparation).

In addition to temperature-induced growth manipulations, the IPHC Secretariat has conducted similar studies as part of NPRB Project No. 1704 to identify physiological growth markers that respond to density- and stress-induced growth manipulations. The respective justifications for these studies are that (1) population dynamics of the Pacific halibut stock could be affected by fish density, and (2) stress responses associated with capture and release of discarded Pacific halibut may affect subsequent feeding behavior and growth. Investigations related to the effects of density and stress exposure are still underway.

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 for 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 the 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 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 II). The relevance of these research outcomes for the management strategy evaluation process is in fishery parameterization (Appendix III).

For this reason, the IPHC Secretariat recently conducted two research projects to investigate the effects of capture and release on survival and to improve estimates of DMRs in the directed longline (completed) and guided recreational Pacific halibut fisheries:

4.1. Discard mortality rates of Pacific halibut in the directed longline fishery. This project is completed and the results on survival estimates and their relationship to capture and release conditions have been published in the journals *North American Journal of Fisheries Management* (Loher et al. 2022) and *Ocean and Coastal Management* (Dykstra et al. 2024).

4.2. Discard mortality rates of Pacific halibut in the charter recreational fishery. Results from this study yielded an estimated discard mortality rate of 1.35% (95% CI 0.00-3.95%) for Pacific halibut released in Excellent viability category that were captured and released from circle hooks and tagged with acceleration-logging pop-up archival transmitting tags (sPATs). These results represent the first experimentally-derived estimate of mortality of Pacific halibut recreational discards, and is consistent with the notion 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 fish released in Excellent viability by the commercial fishery (Meyer, 2007). Results on the relationship of injury types, viability categories and survival of discarded fish with capture (e.g., environmental parameters, time on deck, hooking time, etc.) and physiological (e.g., stress) conditions are currently being analyzed and subsequently a manuscript will be prepared for publication in the peer-reviewed literature.

5. Fishing Technology.
The IPHC Secretariat is conducting 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 1) investigating new methods for whale avoidance and/or deterrence for the reduction of Pacific halibut depredation by whales (i.e., catch protection methods), and 2) investigating behavioral and physiological responses of

Pacific halibut to fishing gear in order to reduce bycatch. Important management implications of these studies reside in improving estimations of mortality of Pacific halibut in the directed commercial fishery that will lead to improved estimates of stock productivity (Appendix II). Depending on the estimated magnitude of whale depredation, this may be included as another explicit source of mortality in the SA and mortality limit setting process.

5.1. Gear-based approaches to catch protection to minimize whale depredation in longline fisheries. The IPHC Secretariat has conducted investigations on gear-based approaches to catch protection as a means for minimizing whale depredation in the Pacific halibut longline fisheries with funding from NOAA's Bycatch Research and Engineering Program (BREP) (NOAA Award NA21NMF4720534; 2021-2023). The objectives of this study were to 1) work with fishermen and gear manufacturers, via direct communication and through a virtual International Workshop (link), to identify effective methods for protecting hook-captured flatfish from depredation; and 2) develop and pilot test simple, low-cost catch-protection designs that can be deployed effectively using current longline fishing techniques and on vessels currently operating in IPHC Convention Waters.

From the outcomes of the first objective, two different types of catch protection devices were selected for further development and field testing: 1) an underwater shuttle based on a modification of a commercial catch protection device (Figure 6), and 2) a branch gear with a sliding shroud system based on a modification of a slinky pot deployed on branchline gear. The two different devices were tested off Newport, OR in May of 2023 on a 56' (17m) chartered fishing vessel with an open deck design and typical boom and winch capacity. The focus of the testing was to investigate (a) the logistics of setting, fishing, and hauling of the two pilot catch protection designs, and (b) the basic performance of the gear on catch rates and fish size compared to non-protected gear in the absence of whales.

A) B) C)

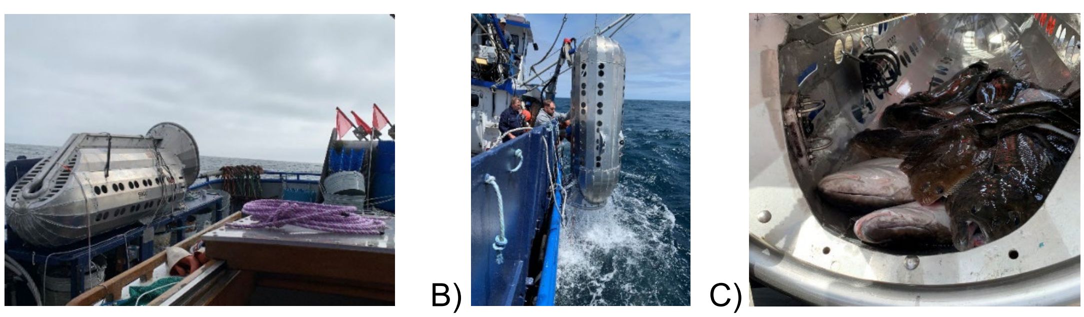


Figure 6. Shuttle unit stowed on vessel (A), shuttle being hoisted onto vessel during retrieval (B), and fish contained within the shuttle before emptying on deck (C).

The results from the field testing conducted in May 2023 indicated that the underwater shuttle was a safe and effective gear type which entrained comparable quantities, sizes, and types fish as the control gear (Figure 7), whereas the sliding shroud and branch gear had substantial logistical issues that require to be addressed before scaling up to a fishery level.

In a third phase of this project, the IPHC Secretariat has recently received an additional research grant from the Bycatch Reduction Engineering Program-NOAA program entitled “Full scale testing of devices to minimize whale depredation in longline fisheries” (NA23NMF4720414; Appendix IV) to refine effective methods for protecting longline captured fish from depredation using the shuttle device, and to complete replicates in the presence of toothed whales in known depredation hotspots to demonstrate the efficacy and safety of the gear. Requests for tenders to conduct the work during 2025 are being prepared for submission.

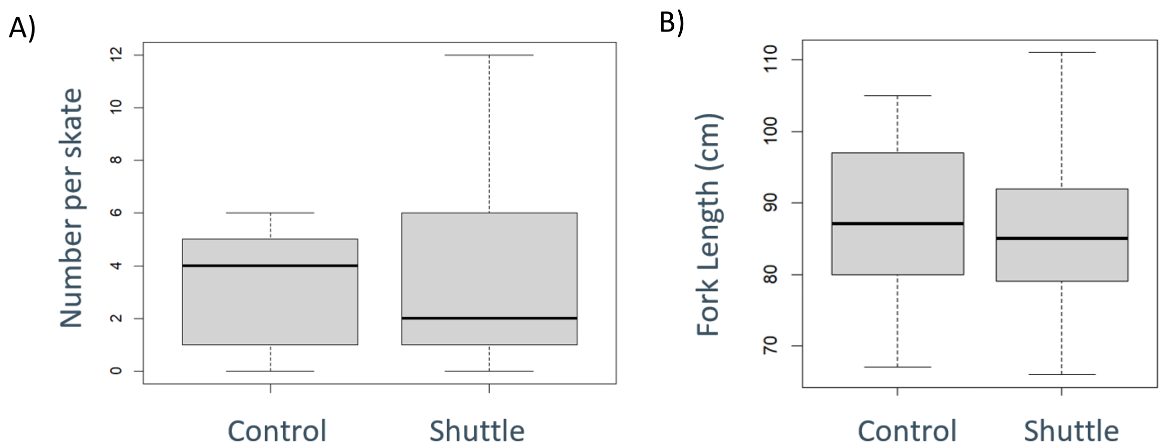


Figure 7. Number of individuals (A) and fork length (B; in cm) of Pacific halibut recovered per skate of control gear or retrieved by the underwater shuttle depicted in Figure 6.

Recommendation/s

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-15, that provides a report on current and planned biological and ecosystem science and research activities contemplated in the IPHC’s Five-Year Program of Integrated Research and Monitoring (2022-2026).

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APPENDICES

Appendix I: Biological research areas in the 5-Year Program of Integrated Research and Monitoring (2022-2026) and ranked relevance for stock assessment and management strategy evaluation (MSE).

Appendix II: List of ranked research priorities for stock assessment

Appendix III: List of ranked research priorities for management strategy evaluation (MSE)

Appendix IV: Summary of current competitive research grants awarded to IPHC

APPENDIX I

Biological research areas in the 5-Year Program of Integrated Research and Monitoring (2022-2026) and ranked relevance for stock assessment and management strategy evaluation (MSE)

Research areas	Research activities	Research outcomes	Relevance for stock assessment	Relevance for MSE	Specific analysis input	SA Rank	MSE Rank	Research priorization
Migration and population dynamics	Population structure	Population structure in the Convention Area	Altered structure of future stock assessments	Improve parametization of the Operating Model	If 4B is found to be functionally isolated, a separate assessment may be constructed for that IPHC Regulatory Area	2. Biological input	1. Biological parameterization and validation of movement estimates and recruitment distribution	2
	Distribution	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	3. Biological input		2
	Larval and juvenile connectivity studies	Improved understanding of larval and juvenile distribution	Improve estimates of productivity		Will be used to generate potential recruitment covariates and to inform minimum spawning biomass targets by Biological Region	3. Biological input	1. Biological parameterization and validation of movement estimates	2
Reproduction	Histological maturity assessment	Updated maturity schedule	Scale biomass and reference point estimates	Improve simulation of spawning biomass in the Operating Model	Will be included in the stock assessment, replacing the current schedule last updated in 2006	1. Biological input		1
	Examination of potential skip spawning	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			1
	Fecundity assessment	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			1
	Examination of accuracy of current field macroscopic maturity classification	Revised field maturity classification			Revised time-series of historical (and future) maturity for input to the stock assessment			1
Growth	Evaluation of somatic growth variation as a driver for changes in size-at-age	Identification and application of markers for growth pattern evaluation	Scale stock productivity and reference point estimates	Improve simulation of variability and allow for scenarios investigating climate change	May inform yield-per-recruit and other spatial evaluations of productivity that support mortality limit-setting		3. Biological parameterization and validation for growth projections	5
		Environmental influences on growth patterns			May provide covariates for projecting short-term size-at-age. May help to delineate between effects due to fishing and those due to environment, thereby informing appropriate management response			5
		Dietary influences on growth patterns and physiological condition			May provide covariates for projecting short-term size-at-age. May help to deleineate between effects due to fishing and those due to environment, thereby informing appropriate management response			5
Mortality and survival assessment	Discard mortality rate estimate: longline fishery	Experimentally-derived DMR	Improve trends in unobserved mortality	Improve estimates of stock productivity	Will improve estimates of discard mortality, reducing potential bias in stock assessment results and management of mortality limits	1. Fishery yield	1. Fishery parameterization	4
	Discard mortality rate estimate: recreational fishery				Will improve estimates of discard mortality, reducing potential bias in stock assessment results and management of mortality limits			4
	Best handling and release practices	Guidelines for reducing discard mortality			May reduce discard mortality, thereby increasing available yield for directed fisheries	2. Fishery yield		4
Fishing technology	Whale depredation accounting and tools for avoidance	New tools for fishery avoidance/deterence; improved estimation of depredation mortality	Improve mortality accounting	Improve estimates of stock productivity	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	1. Assessment data collection and processing		3

APPENDIX II

List of ranked research priorities for stock assessment

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	Migration and population dynamics	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		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	Fishing technology	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	Fishing technology	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 III

List of ranked research priorities for management strategy evaluation (MSE)

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 and population dynamics	Larval and juvenile connectivity studies
	Stock structure of IPHC Regulatory Area 4B relative to the rest of the Convention Area			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 IV

Summary of current competitive research grants awarded to IPHC

Project #	Grant agency	Project name	PI	Partners	IPHC Budget ($US)	Grant period	Research area	Management implications	Research prioritization
1	**Bycatch Reduction Engineering Program- NOAA**	Full scale testing of devices to minimize whale depredation in longline fisheries (NOAA Award Number NA23NMF4720414)	IPHC	Alaska Fisheries Science Center- NOAA	$199,870	November 2023 – April 2026	Fishing technology	Mortality estimations due to whale depredation	3
2	**Alaska Sea Grant (pending award)**	Development of a non-lethal genetic-based method for aging Pacific halibut (R/2024-05)	IPHC APU	Alaska Fisheries Science Center- NOAA (Juneau)	$60,374	January 2025- December 2026	Population dynamics	Stock structure	2
Total awarded ($)					**$260,244**				

IPHC Fishery Regulations: Proposals for the 2024-25 process

PREPARED BY: IPHC SECRETARIAT (B. HUTNICZAK; 13 & 28 DECEMBER 2024)

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 101st Session of the IPHC Annual Meeting (AM101).

BACKGROUND

Recalling the IPHC Fishery Regulations proposals submission and review process instituted in 2017, this paper is intended to provide an indication of the fishery regulations proposals being submitted to the Commission in the 2024-25 process.

The Commission had an opportunity for a preliminary review of the majority of the proposals during the 100th Session of the IPHC Interim Meeting (IM100). The deadline for submission of regulatory proposals for consideration by the Commission at the 101st Session of the IPHC Annual Meeting (AM101) is 28 December 2024.

DISCUSSION

A list of titles, subjects, and sponsors for IPHC Fishery Regulations proposals submitted as part of the 2024-25 process is provided in **Appendix I**.

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-16 Rev_1 that 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 at the 101st Session of the IPHC Annual Meeting (AM101).

APPENDICES

Appendix I: Titles, subjects, and sponsors for IPHC Fishery Regulations proposals submitted for consideration in the 2024-25 process.

APPENDIX I

Titles, subjects, and sponsors for IPHC Fishery Regulations proposals submitted for consideration in the 2024-25 process.

Ref. No.	Title	Brief description
IPHC Secretariat		
IPHC-2025-AM101-PropA1	IPHC Fishery Regulations: 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-2025-AM101-PropA2	IPHC Fishery Regulations: 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-2025-AM101-PropA3	IPHC Fishery Regulations: Minor amendments	To improve consistency in the IPHC Fishery Regulations.
Contracting Parties		
IPHC-2025-AM101-PropB1	IPHC Fishery Regulations: Recreational (Sport) Fishing for Pacific Halibut - IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 28): Charter Management Measures in IPHC Regulatory Areas 2C and 3A	**Proponent:** USA (NOAA Fisheries) 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.

Stakeholders		
IPHC-2025-AM101-PropC1	IPHC Fishery Regulations: Commercial Fishing Periods (Sect. 9) – year-round commercial Pacific halibut fishery in IPHC Regulatory Area 2B	**Proponent:** Robert Hauknes (commercial fisher) Originally published: 26 September 2024 To propose year-round commercial Pacific halibut fishery in IPHC Regulatory Area 2B.
IPHC-2025-AM101-PropC2	IPHC Fishery Regulations: Application of Commercial Fishery Limits (Sect. 12) – addressing concerns regarding localized depletion around St. Matthew Island	**Proponent:** Shawn McManus (commercial fisher) To propose closing the one-way door for halibut IFQ/CDQ holders from halibut Area 4C into Area 4D North of 60 degrees North latitude and East of 174 degrees West longitude.
IPHC-2025-AM101-PropC3	IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5) - TCEY in Regulatory Area 2A	**Proponent:** Timothy Greene (Makah Tribe) To propose a TCEY for IPHC Regulatory Area 2A of 1.65Mlb for 2025.
IPHC-2025-AM101-PropC4	***Other proposal (Non-IPHC Fishery Regulations):*** Rebuilding Plan for Pacific halibut	**Proponent:** Buck Laukitis (commercial fisher) To propose a Rebuilding Plan for Pacific halibut.
IPHC-2025-AM101-PropC5	Mortality and Fishery Limits (Sect. 5) – definition of reaction to overfishing	**Proponent:** Malcolm Milne (North Pacific Fisheries Association) To propose a reaction to the Pacific halibut stock overfishing.

Interim: IPHC Harvest Strategy Policy

PREPARED BY: IPHC SECRETARIAT (A. HICKS, I. STEWART, & D. WILSON; 09 DECEMBER 2024)

PURPOSE

To provide the Commission with a draft of the interim Harvest Strategy Policy (HSP) for further consideration, and adoption in 2025.

INTRODUCTION

A draft Harvest Strategy Policy (HSP) has been developed for consideration by the Commission. The HSP provides a framework for applying a consistent and transparent science-based approach to setting mortality limits for Pacific halibut (*Hippoglossus stenolepis*) fisheries throughout the Convention Area while ensuring sustainability of the Pacific halibut population. This draft contains principles developed during the Management Strategy Evaluation (MSE) process at IPHC. This document may be updated based on decisions at the 101st Session of the IPHC Annual Meeting (AM101).

POTENTIAL UPDATES TO THE DRAFT INTERIM HSP

In its current state, the HSP is a complete document describing the management framework for Pacific halibut. However, ongoing discussions with the Scientific Review Board (SRB) and the Management Strategy Advisory Board (MSAB), and recent MSE work, may provide useful information for updating the HSP following the AM101. The following areas may be updated given work completed in 2024 (see IPHC-2025-AM101-12), should the Commission direct the Secretariat to do so:

- Update the Commission's priority objectives based on recommendations of the SRB and MSAB (see IPHC-2025-AM101-12).
- Update the following elements of the coastwide management procedure based on recent MSE work: reference SPR, assessment frequency, and a constraint on the interannual change in the TCEY (see IPHC-2025-AM101-12).
- A more complete definition of overfishing.
- Any edits to the HSP.

The HSP may be updated in the future, with the Commission's endorsement, when research or recommendations from subsidiary bodies suggest that improvements are warranted.

RECOMMENDATION/S

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-17 that provides an updated draft interim Harvest Strategy Policy.
2) **RECOMMEND** any further updates and edits to the draft interim Harvest Strategy Policy for incorporation prior to endorsement in 2025.

APPENDICES

Appendix A: International Pacific Halibut Commission Interim: Harvest Strategy Policy (2024)

APPENDIX A

INTERNATIONAL PACIFIC HALIBUT COMMISSION

INTERIM: HARVEST STRATEGY POLICY

(2024)

INTERNATIONAL PACIFIC

HALIBUT COMMISSION

Commissioners

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NOTE: The following is an interim document based on an amalgamation of current IPHC practices and best practices in harvest strategy policy. Current research is ongoing and it is expected that this policy document will then be updated accordingly.

ACRONYMS

CB	Conference Board
HCR	Harvest Control Rule
HSP	Harvest Strategy Policy
IPHC	International Pacific Halibut Commission
LIM	Limit
MEY	Maximum Economic Yield
MP	Management Procedure
MSAB	Management Strategy Advisory Board
MSE	Management Strategy Evaluation
NER	Net Economic Returns
OM	Operating Model
PAB	Processor Advisory Board
RAB	Research Advisory Board
RSB	Relative Spawning Biomass
SB	Spawning Biomass (female)
SPR	Spawning Potential Ratio
SRB	Scientific Review Board
TCEY	Total Constant Exploitable Yield
THRESH	Threshold
U.S.A.	United States of America

DEFINITIONS

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

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EXECUTIVE SUMMARY

The *IPHC Harvest Strategy Policy* (HSP) provides a framework for applying a consistent and transparent science-based approach to setting mortality limits for Pacific halibut (*Hippoglossus stenolepis*) fisheries throughout the Convention Area while ensuring sustainability of the Pacific halibut population. It defines biological and economic objectives that apply to the development of a harvest strategy for Pacific halibut. It also identifies a management procedure and reference points for use in the harvest strategy to achieve the Commission's stated objectives. This policy, together with the *Protocol amending 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 (1979)*[1], provides the basis to manage the risk to Pacific halibut fisheries and the Pacific halibut population.

The IPHC is responsible for determining the coastwide mortality limit and the allocation of this limit among eight (8) IPHC Regulatory Areas. The mortality limit in each IPHC Regulatory Area consists of all fishing mortality of all sizes and from all sources, except for discard mortality of under 26-inch (U26) Pacific halibut from non-directed commercial (e.g. trawl) fisheries, which is accounted for at the coastwide level. The distribution of the mortality limit to each sector within an IPHC Regulatory Area is determined by Contracting Party domestic agencies. Therefore, this Harvest Strategy Policy is specific to the mortality limit in each IPHC Regulatory Area, across all sectors (i.e. TCEY).

Being a framework, the harvest strategy policy encompasses the entire process of the management procedure and decision-making process to determine mortality limits as well as other important considerations such as objectives, key principles, and responses to specific events. A harvest strategy, which may also be referred to as a management strategy, is the decision framework necessary to achieve defined biological and economic objectives for Pacific halibut.

> **Management Procedure (MP)**: A formulaic procedure to determine a management outcome (e.g. mortality limit) that has been simulation tested and produces a repeatable outcome.
>
> **Harvest Strategy**: The framework for managing a fish stock, including the MP and objectives.
>
> **Harvest Strategy Policy (HSP)**: The harvest strategy and decision-making process that results in endpoint management outcomes.

A goal of the IPHC Harvest Strategy Policy is the long-term sustainable and profitable use (optimum yield) of Pacific halibut through the implementation of a harvest strategy that maintains the stock at sustainable levels while maximising economic returns. The Commission's current priority objectives to achieve this goal, which may be updated, are to:

- maintain Pacific halibut female spawning biomass, above a female spawning biomass limit where the risk to the stock is regarded as unacceptable (SB_{LIM}), at least 95% of the time;
- maintain Pacific halibut female spawning biomass, at least 50% of the time, at or above a threshold reference (fixed or dynamic) female spawning biomass that optimises fishing activities on a spatial and temporal scale relevant to the fishery;

[1] https://www.iphc.int/uploads/pdf/basic-texts/iphc-1979-pacific-halibut-convention.pdf

- optimise average coastwide yield given the constraints above;
- limit annual changes in the coastwide mortality limit (TCEY) given the constraints above.

The harvest strategy will ensure fishing is conducted in a manner that does not lead to *overfishing*. Overfishing is defined as where the stock is subject to a level of fishing that would move it to an *overfished* state or prevent it from rebuilding to a 'not overfished' state, within a specific time-frame and probability.

Overfished: when the estimated probability that female spawning stock biomass is below the limit reference point (SB_{LIM}) is greater than 50%.

Overfishing: where the stock is subject to a level of fishing that would move it to an overfished state, or prevent it from rebuilding to a 'not overfished' state, within a specific time-frame and probability, to be determined.

A transparent and systematic approach to meet the objectives of the Harvest Strategy Policy is supported by a number of requirements. These include accounting for all mortality of all sizes and from all sources; accounting for multiple sources of uncertainty including environmental and biological; balancing risk, cost, and catch; developing threshold and limit reference points as indicators for managing Pacific halibut; robust simulation testing of management procedures; and identifying circumstances when the harvest strategy may be reconsidered and possibly updated. One threshold reference point and one biological limit reference point are currently defined.

Reference point	**Definition**	**Proxy**
Threshold reference point SB_{THRESH}	The female dynamic spawning biomass level at maximum economic yield (SB_{MEY}).	36% of the unfished spawning biomass ($SB_{36\%}$).
Biological limit reference point SB_{LIM}	The female dynamic spawning biomass level where the ecological risk to the population is regarded as unacceptable.	20% of the unfished female spawning biomass ($SB_{20\%}$).

The coastwide reference mortality limit from the management procedure is currently determined using the stock assessment and a fishing intensity ($F_{SPR=43\%}$). The reference SPR is linearly reduced when the stock status is estimated below 30% and is set to 100% (no fishing for directed fisheries) when the stock status is estimated at or below 20% (SB_{LIM}). A rebuilding strategy must be developed if the stock is estimated to be below SB_{LIM}.

The management of Pacific halibut is an annual process with a coastwide mortality limit and allocation to each IPHC Regulatory Area decided upon by the Commission at each Session of the IPHC Annual Meeting with the input of management supporting information including mortality tables, the harvest decision table, stakeholder input, and any other requests by the Commission. A mortality table shows the resulting allocation of mortality limits to each sector within each IPHC Regulatory Area. The harvest decision table is a stock assessment output that provides an estimate of risk relative to stock trend, stock status, fishery trends, and fishery status for a range of short-term (3-year) coastwide mortality levels including the coastwide reference fishing mortality.

Chapter 1 INTRODUCTION

The *IPHC Harvest Strategy Policy* (HSP) provides a framework for applying a consistent and transparent science-based approach to setting mortality limits for Pacific halibut (*Hippoglossus stenolepis*) fisheries throughout the Convention Area while ensuring sustainability of the Pacific halibut population.

It defines biological and economic objectives that apply to the development of a harvest strategy for Pacific halibut. It also identifies a management procedure and reference points for use in the harvest strategy to achieve the Commission's stated objectives. This policy, together with the *Protocol amending 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 (1979)*[2], provides the basis to manage the risk to Pacific halibut fisheries and the Pacific halibut population.

A harvest strategy developed under this policy will take available information about the Pacific halibut resource and apply a consistent and transparent science-based approach to setting mortality limits. A harvest strategy consistent with this policy will provide all interested sectors with confidence that the Pacific halibut fisheries are being managed for long-term economic viability while ensuring long-term ecological sustainability of the Pacific halibut population. The implementation of a clearly specified harvest strategy will also provide the fishing industry with a more certain operating environment.

1.1 SCOPE

The IPHC Harvest Strategy Policy applies to the Pacific halibut population managed by the IPHC, and where overlap with domestic jurisdictional management exists (e.g. coordinated management between the IPHC and Contracting Party domestic agencies) the IPHC will seek to apply and encourage the adoption of this policy in negotiating and implementing cooperative management arrangements.

The IPHC is responsible for determining the coastwide mortality limit and the allocation of this limit among eight (8) IPHC Regulatory Areas (Figure 1). The mortality limit in each IPHC Regulatory Area consists of all fishing mortality of all sizes and from all sources, except for discard mortality of under 26-inch (U26) Pacific halibut from non-directed commercial (e.g. trawl) fisheries, which is accounted for at the coastwide level. This mortality limit without U26 non-directed commercial discard mortality has been termed the Total Constant Exploitation Yield, or the TCEY, but mortality limit is used here.

The distribution of the mortality limit to each sector within an IPHC Regulatory Area is determined by Contracting Party domestic agencies. Therefore, this Harvest Strategy Policy is specific to the mortality limit in each IPHC Regulatory Area, across all sectors (i.e. TCEY).

[2] https://www.iphc.int/uploads/pdf/basic-texts/iphc-1979-pacific-halibut-convention.pdf

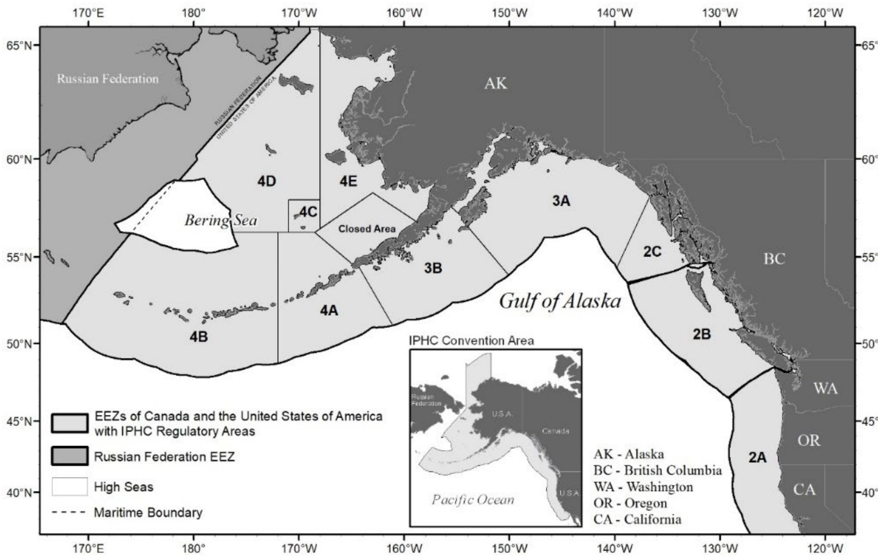

Figure 1. IPHC Regulatory Areas, where 4C, 4D, 4E, and the closed area are considered one IPHC Regulatory Area (4CDE). The IPHC Convention Area is shown in the inset.

1.2 WHAT IS A HARVEST STRATEGY POLICY (HSP)?

Being a framework, the harvest strategy policy encompasses the entire process of the management procedure and decision-making process to determine mortality limits (Figure 2) as well as other important considerations such as objectives, key principles, and responses to specific events. To determine mortality limits, the process begins with determining the coastwide scale of fishing mortality (the Management Procedure or MP). The decision-making process then occurs at the Annual Meeting of the IPHC where various forms of supporting information are used by subsidiary bodies to provide a recommendation to the Commission of the coastwide mortality limit and allocation to each IPHC Regulatory Area. The Commission uses all this information to arrive at a final decision defining mortality limits for that year. Due to many considerations in this decision-making process, the final coastwide mortality limit may deviate from the coastwide reference mortality limit determined from the management procedure.

1.3 WHAT IS A HARVEST STRATEGY?

A harvest strategy, which may also be referred to as a management strategy, is the decision framework necessary to achieve defined biological and economic objectives for Pacific halibut. A harvest strategy will outline:

- Objectives and key principles for the sustainable and profitable use of Pacific halibut.
- Reference points and other quantities used when applying the harvest strategy.
- Processes for monitoring and assessing the biological conditions of the Pacific halibut population and economic conditions of Pacific halibut fisheries in relation to biological and fishery reference levels (reference points).
- Pre-determined rules that adjust fishing mortality according to the biological status of the Pacific halibut stock and economic conditions of the Pacific halibut fishery (as defined by monitoring and/or assessment). These rules are referred to as harvest control rules or decision rules.

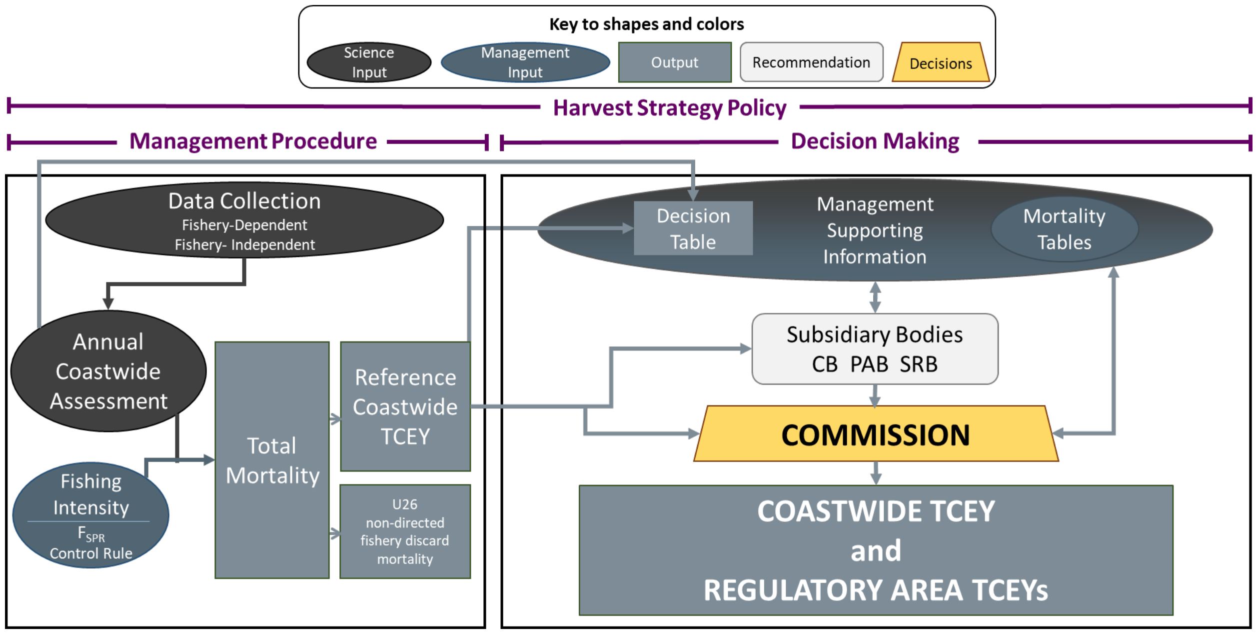

Figure 2. Illustration of the interim IPHC harvest strategy policy process to determine mortality limits showing the management procedure affecting the coastwide scale and the decision-making component, that considers inputs from many sources to distribute the coastwide TCEY to IPHC Regulatory Areas and may result in the coastwide TCEY deviating from the reference coastwide scale management procedure.

A management procedure (MP) contains many of the components of a harvest strategy and is sometimes synonymous with harvest strategy. Here, we define an MP as the formulaic procedure that defines data collection, assessment, and harvest rules to determine the coastwide reference mortality limit. The MP has been shown to meet the objectives through simulation testing while also being robust to uncertainty and variability. Harvest strategy is a more general concept containing the MP as well as objectives. Simulation testing of MPs is done using Management Strategy Evaluation (MSE) models with decision-making variability to ensure that a harvest strategy policy is robust to this uncertainty as well as other sources of uncertainty.

Management Procedure (MP): A formulaic procedure to determine a management outcome (e.g. mortality limit) that has been simulation tested and produces a repeatable outcome.

Harvest Strategy: The framework for managing a fish stock, including the MP and objectives.

Harvest Strategy Policy (HSP): The harvest strategy and decision-making process that results in endpoint management outcomes.

Chapter 2 OBJECTIVES AND KEY PRINCIPLES

A goal of the IPHC Harvest Strategy Policy is the long-term sustainable and profitable use (optimum yield) of Pacific halibut through the implementation of a harvest strategy that maintains the stock at sustainable levels while maximising economic returns.

To achieve this goal the IPHC will implement a harvest strategy that minimises risk to the stock and pursues maximum economic yield (MEY) for the directed Pacific halibut fisheries. Maximising the net economic returns (NER) from the fishery may not always equate with maximising the profitability of the fishery. Net economic returns may consider inter-annual stability to maintain markets, and economic activity may also arise from recreational and Indigenous fishing. The need to share the resources appropriately will also be considered where necessary. The Commission's current priority objectives to achieve this goal, which may be updated, are:

- maintain Pacific halibut female spawning biomass, above a female spawning biomass limit where the risk to the stock is regarded as unacceptable (SB_{LIM}), at least 95% of the time;
- maintain Pacific halibut female spawning biomass, at least 50% of the time, at or above a threshold reference (fixed or dynamic) female spawning biomass that optimises fishing activities on a spatial and temporal scale relevant to the fishery;
- optimise average coastwide yield given the constraints above;
- limit annual changes in the coastwide mortality limit (TCEY) given the constraints above.

The harvest strategy will ensure fishing is conducted in a manner that does not lead to *overfishing*. Overfishing is defined as where the stock is subject to a level of fishing that would move it to an *overfished* state or prevent it from rebuilding to a '*not overfished*' state, within a specific time-frame and probability. Where it is identified that overfishing of the stock is occurring, action will be taken immediately to cease that overfishing to ensure long-term sustainability and productivity to maximise NER.

The harvest strategy will also ensure that if the stock is overfished, the fishery must be managed such that, with regard to fishing impacts, there is a high degree of probability the stock will recover. In this case, a stock rebuilding strategy will be developed to rebuild the stock, with high certainty, to the limit female spawning biomass level, whereby the harvest control rules would then take effect to build the stock further to the threshold reference female spawning biomass level.

Overfished: when the estimated probability that female spawning stock biomass is below the limit reference point (SB_{LIM}) is greater than 50%.

Overfishing: where the stock is subject to a level of fishing that would move it to an overfished state, or prevent it from rebuilding to a '*not overfished*' state, within a specific time-frame and probability, to be determined.

Chapter 3 DEVELOPMENT OF THE HARVEST STRATEGY

The following requirements provide the basis for a transparent and systematic approach used when developing the harvest strategy to assist in meeting the objectives of the Harvest Strategy Policy.

3.1 ACCOUNTING FOR FISHING MORTALITY ON ALL SIZES AND FROM ALL SOURCES

The harvest strategy accounts for all known sources of fishing mortality on the stock and all sizes of Pacific halibut mortality, including directed commercial, recreational, subsistence, and fishing mortality from fisheries targeting species other than Pacific halibut and may be under the management of another jurisdiction, such as non-directed fishing mortality. Discard mortality of released fish is accounted for using best available knowledge.

3.2 VARIABILITY IN THE ENVIRONMENT AND BIOLOGICAL CHARACTERISTICS

The productivity of Pacific halibut is affected by variability in the environment and by changes in biological characteristics. The environment fluctuates naturally and is altered due to climate change and other factors, which may affect biological characteristics such as size-at-age and recruitment of age-0 fish. The following types of variability were considered when developing the harvest strategy for Pacific halibut:

- Variability in recruitment of age-0 Pacific halibut due to unknown causes
- Variability in average recruitment of age-0 Pacific halibut due to the environment (e.g. indexed by the Pacific Decadal Oscillation, PDO).
- Variability in the geographical distribution of age-0 recruits linked to the PDO.
- Changes in weight-at-age due to unknown causes
- Variability in movement throughout the Convention Area due to the environment (e.g. linked to the PDO).

Some potential impacts of climate change were taken into account when developing the harvest strategy policy and future research on additional effects of climate change on Pacific halibut fisheries and stocks will be incorporated as knowledge improves.

3.3 MONITORING

The harvest strategy includes best practices for monitoring the stock and fisheries and the collection of fishery-dependent and fishery-independent data on the distribution, abundance, and demographics of Pacific halibut, as well as other key biological data. These observations are used in the stock assessment and inform other management supporting information. Fisheries-dependent data include observations from the fisheries and should be collected across the entire geographical range and across all sectors, including landed catch and discards. Fishery-independent data include observations collected from scientifically designed surveys providing standardised biological and ecological data that are independent of the fishing fleet.

3.4 ESTABLISHING AND APPLYING DECISION RULES

The harvest strategy developed under this policy specifies all required management actions or considerations for Pacific halibut, at the stock or IPHC Regulatory Area level, necessary to achieve the ecological and economic management objectives for the fishery. Specifics are provided in Chapter 4.

3.5 BALANCING RISK, COST AND CATCH

This policy establishes a risk-based management approach, which provides for an increased level of caution when establishing control rules in association with increasing levels of uncertainty about stock status.

In the context of this policy, the risk, cost, and catch trade-off, refers to a trade-off between the amount of resources invested in data collection, analysis and management of Pacific halibut, and the level of catch (or fishing mortality) applied. Fishing mortality should always be constrained to levels at which scientific assessment indicates Pacific halibut is not exposed to an 'unacceptable ecological risk' (that is the risk that stocks will fall below the limit reference point).

The management decision to be taken in this context is whether investment of more resources in data collection and analyses and/or additional management will increase the understanding of the risk to the stock from fishing and provide confidence in the sustainability of a higher level of fishing pressure or catch. In the absence of this additional information–and associated improved understanding of a stock, it may be necessary to reduce the fishing effort to manage the risk. Decisions about investment in managing risk versus the economic return of the catch taken will be transparently made, clearly documented and publicly available.

3.6 REFERENCE POINTS AND PROXIES

A reference point is a specified level of an indicator used as a basis for managing Pacific halibut. A reference point will often be based on indicators of the female spawning stock size (relative or absolute spawning biomass), the amount of harvest (fishing mortality), or on other factors such as economic return from the fishery.

A harvest strategy for Pacific halibut shall be based on 'threshold' reference points and 'limit' reference points. A threshold reference point is a level that achieves the policy objectives (e.g. acceptable levels of biological impact on the stock and desired economic outcomes from the fishery) if the indicator is at or above that level. When the stock is at or above a threshold reference point, optimal yield is possible. A limit reference point indicates a point beyond which the long-term biological health of the stock or the performance of the commercial fishery is considered unacceptable and should be avoided. Fishing when the Pacific halibut population is below the biological limit reference point places the Pacific halibut stock at a range of biological risks, including an unacceptable risk to recruitment and productivity, and an increased risk that the stock will fail to maintain its ecological function, although risk of extinction is not a major concern. A fishery limit reference point indicates a stock level below which the fishery is unlikely to remain profitable. Proxy reference points are described in Table 1.

Spawning biomass reference points may be dynamic or absolute calculations. A dynamic calculation pertains to relative spawning biomass (RSB) being the estimated value relative to the estimated spawning biomass that would have occurred without any fishing given natural variability (e.g. recruitment deviations, changes in size-at-age, etc). This measures the effect of only fishing, rather than the effect of fishing and the environment. Absolute spawning biomass is not relative to another value and is typically presented as a number or a value estimated in a particular year. Absolute spawning biomass may be useful as a threshold reference point where being below would result in low catch rates and possibly other concerns. Currently there are no absolute spawning biomass reference points, but they may be a useful addition to dynamic reference points.

Table 1. Proxy reference points

Reference point	Definition	Proxy
Threshold reference point SB_{THRESH}	The female dynamic spawning biomass level at maximum economic yield (SB_{MEY}).	36% of the unfished spawning biomass ($RSB_{36\%}$).
Biological limit reference point SB_{LIM}	The female dynamic spawning biomass level where the ecological risk to the population is regarded as unacceptable.	20% of the unfished female spawning biomass ($RSB_{20\%}$).

3.7 TECHNICAL EVALUATION OF THE HARVEST STRATEGY

A harvest strategy should be formally tested to demonstrate that it is highly likely to meet the objectives and key principles of this policy, and outcomes of that testing should be made publicly available. Management strategy evaluation (MSE), a procedure where alternative management strategies are tested and compared using simulations of stock and fishery dynamics, is one of the best options to test harvest strategies. MSE involves determining objectives, identifying MPs to evaluate, simulating those MPs with a closed-loop simulation framework, evaluating the MPs to determine which one best meets the objectives (Chapter 2) , and finally adopting that MP as part of the harvest strategy. This process receives input from stakeholders through meetings of the Management Strategy Advisory Board (MSAB) and is reviewed by the IPHC Scientific Review Board (SRB).

The MSE supporting this HSP incorporates variability and uncertainty, such as described in Section 3.2, structural uncertainty in an operating model (OM), and implementation variability from decision-making and realized fishing mortality. The MSE also represents all fishing sectors as necessary to appropriately remove different cohorts from the population and to determine if objectives are met for each sector. An important component to this HSP is the decision-making component (Figure 2) where the Commission considers management inputs and additional relevant factors when deciding on the coastwide TCEY and distribution of the TCEY to IPHC Regulatory Areas to balance risk, cost, and catch (Section 3.5). The MSE uses historical decisions to determine how to simulate decision-making variability, ensuring that an MP is robust to that variability as well as other sources of uncertainty.

3.8 RE-EVALUATING THE HARVEST STRATEGY AND MANAGEMENT PROCEDURE

A harvest strategy is a transparent and science-based approach to determining mortality limits and is meant to remain in place for many years. Frequent modifications or departures from the harvest strategy reduce the transparency and science-based approach. Therefore, it is important to specify, as part of the harvest strategy, time periods for re-evaluation of management procedures and to identify exceptional circumstances that would trigger a re-evaluation before that time period.

The IPHC currently operates of a schedule of three-years for full stock assessments, with update stock assessments in the intervening two years, and the MSE OM is updated following each full stock assessment to maintain consistent approaches and paradigms. Therefore, MPs are re-evaluated at a minimum of three years after implementation. An exceptional circumstance may trigger a re-evaluation before then and are defined as follows.

- The coastwide all-sizes FISS WPUE or NPUE from the space-time model is above the 97.5^{th} percentile or below the 2.5th percentile of the simulated FISS index for two or more consecutive years.

Exceptional circumstances would be reviewed by the SRB to determine if one should be declared.

In the event that an exceptional circumstance is declared, the following actions are to be completed.

- Review the MSE simulations to determine if the OM can be improved and MPs should be re-evaluated.
- Consult with the SRB and MSAB to identify why the exceptional circumstance occurred, what can be done to resolve it, and determine a set of MPs to evaluate with an updated OM.
- Further consult with the SRB and MSAB after simulations are complete to identify whether a new MP is appropriate.

MSE work is currently ongoing to supplement this interim harvest strategy policy. Current elements of MPs being investigated include conducting a stock assessment every second or third year and using an empirical rule based on the FISS WPUE in years without a stock assessment to determine the coastwide TCEY. With the harvest strategy currently being evaluated, updates to this interim harvest strategy policy may occur before three years.

Chapter 4 APPLYING THE HARVEST STRATEGY

4.1 COORDINATED MANAGEMENT OF DOMESTIC STOCKS

Consistent with the *Protocol amending 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* (1979), the IPHC will pursue the sustainable use of Pacific halibut within fisheries managed by other jurisdictions.

4.2 COORDINATED MANAGEMENT OF INTERNATIONAL STOCKS

The IPHC Harvest Strategy Policy does not prescribe management arrangements in the case of fisheries that are managed by a Party external to the IPHC Convention. This includes management arrangements for commercial and traditional fishing in the US Treaty Tribes and Canadian First Nations, that are governed by provisions within relevant Treaties. However, it does articulate the IPHC preferred approach.

4.3 STOCK ASSESSMENT

A full stock assessment occurs triennially and incorporates all available data through the current year, investigates all data and modelling aspects, and potentially makes changes to any of these components as needed. In the intervening years, an update stock assessment is completed to include all available data through the most current year. The stock assessment includes a summary of the data available for analysis, estimates of current stock size, recent trends of stock size relative to reference points, and uncertainty in the estimates of stock size.

The stock assessment also produces a harvest decision table containing short-term projections of various risk metrics under different levels of future harvest (input as a specific amount of fishing mortality, e.g. TCEY). Risk metrics include the probability of a decline in spawning biomass for the next 1 to 3 years, the probability of a decline in spawning biomass that is greater than 5% for the next 1 to 3 years, the probability that the spawning biomass is less than 20% or 30% of unfished spawning biomass in the next 1 to 3 years, the probability that the TCEY is less than the selected TCEY in the next 1 to 3 years, the probability that the TCEY is at least 10% less than the selected TCEY in the next 1 to 3 years, and the probability that the fishing intensity in the upcoming year is greater than the reference fishing intensity as specified in the MP (currently $F_{SPR=43\%}$). The harvest levels including the reference fishing mortality (i.e. TCEY determined from the MP), a range less than and greater than the reference fishing mortality , no fishing mortality (to assess short-term maximum biological productivity), various levels based on status quo (the previous year's coastwide mortality), a 3-year surplus that would maintain the spawning biomass at the same level in three years with a 50% probability, fishing mortality based on the SPR proxy for MEY, and the fishing mortality based on the SPR proxy for MSY.

4.4 COASTWIDE REFERENCE MORTALITY LIMIT

The coastwide reference mortality limit is determined using the stock assessment and a fishing intensity (i.e. F_{SPR}) defined by a harvest control rule (Figure 3). The stock assessment estimates the stock status (dynamic RSB) which is used in the harvest control rule to determine if fishing intensity should be reduced from the reference SPR (currently 43%). The reference SPR is linearly reduced when the stock status is estimated below 30% and is set to 100% (no fishing for directed fisheries) when the stock status is estimated at or below 20% (SB_{LIM}).

This management procedure determining the coastwide reference mortality limit (TCEY) is brought into the decision-making step as a reference value from which the Commission uses additional management supporting information to account for other relevant factors during the annual decision-making process on the coastwide TCEY and the distribution of the coastwide TCEY to IPHC Regulatory Areas. The MP provides a reference value in the decision table (see Section 4.3). The MSE simulations account for this decision-making variability (see Section 3.7).

The decision table represents short-term projections that are useful for tactical decision-making and are an important item in the management supporting information. Longer-term strategic implications of the choices in the decision table could be determined from the MSE simulations. If available, performance metrics associated with the four priority objectives (Chapter 2) determined from the most recent MSE simulations should be presented for, at a minimum, some F_{SPR} values associated with the fishing mortality options presented in the decision table.

4.5 Rebuilding if the Stock Becomes Overfished

If Pacific halibut is determined to be overfished (when the probability that female spawning stock biomass is below the limit reference point (SB_{LIM}) is greater than 50%), immediate action is required to constrain directed fishing and rebuild the stock to levels that will ensure long-term sustainability and productivity, i.e. at or above SB_{LIM}. A rebuilding strategy must be developed to rebuild the stock to above its limit reference point, for agreement by the Commission. A rebuilding strategy will be required until the stock is above the limit reference point with a reasonable level of certainty (at least a 70% probability that the stock has rebuilt to or above the limit reference point). It must ensure adequate monitoring and data collection is in place to assess the status of the stock and rebuilding progress.

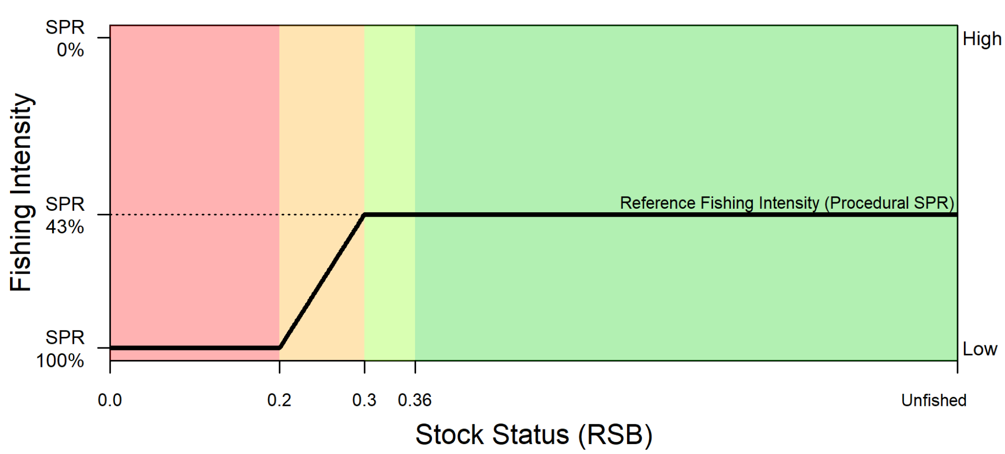

Figure 3. Harvest control rule for the fishing intensity (i.e. F_{SPR}) to determine the coastwide total mortality limit. The stock status is the dynamic relative spawning biomass (RSB) determined from the stock assessment. The reference fishing intensity is $F_{SPR=43\%}$, and is applied when stock status is above the trigger of 30%. SPR is linearly reduced between a stock status of 30% and 20%, and set to 100% when at or below

20% (no directed fishing). A stock status of 20% is also the reference point SB_{LIM}. The threshold RSB, 36%, is related to an objective to maintain the relative spawning biomass at or above $SB_{36\%}$ at least 50 percent of the time. Colours show the area below B_{LIM}, the area 'on the ramp', the area above the trigger and below SB_{THRESH}, and the area above SB_{THRESH}.

Directed fishing and incidental mortality of Pacific halibut, if determined to be overfished, should be constrained as much as possible to levels that allow rebuilding to the limit reference point (SB_{LIM}) within the specified timeframe. Once a stock has been rebuilt to above the limit reference point with a reasonable level of certainty, it may be appropriate to increase directed fishing, and increase incidental mortality in line with the harvest strategy, noting that the usual harvest strategy requirements regarding the application of the harvest control rule and risk of breaching the limit reference point will apply.

The rebuilding strategy should note where sources of mortality exist that cannot be constrained by the IPHC, and must take this mortality into account. Where practical and appropriate, the IPHC will coordinate with other jurisdictions to ensure other sources of mortality from fishing are reasonably constrained consistent with any catch sharing arrangement.

When a rebuilding strategy is being developed, it must include performance measures and details on how and when these measures will be reported. Where there is no evidence that a stock is rebuilding, or is going to rebuild in the required timeframe and probability, the IPHC will review the rebuilding strategy and make the result of the review public. If changes to the rebuilding strategy are considered necessary, such changes should be made in a timely manner.

Rebuilding timeframes

Rebuilding timeframes are explicitly related to the minimum timeframe for rebuilding in the absence of fishing. Rebuilding timeframes should take into account Pacific halibut productivity and recruitment; the relationship between spawning biomass and recruitment; and the stock's current level of depletion.

4.6 MORTALITY LIMITS FOR EACH IPHC REGULATORY AREA

The final outputs of the harvest strategy policy before domestic management is applied are mortality limits for each IPHC Regulatory Area. These are decided upon by the Commission at the Annual Meeting with the input of management supporting information (Figure 2) requested by the Commission including mortality tables and the harvest decision table (see Section 4.3).

Mortality table: A mortality table shows the resulting allocation of mortality limits to each sector within each IPHC Regulatory Area. Domestic catch-sharing plans and Commission agreements on projecting non-directed discard mortality are used to fill out the details. This table can be produced for any projected year but is commonly presented for only the first projected year. Mortality limits for each IPHC Regulatory Area are defined by the Commission as part of the decision-making process.

4.7 STAKEHOLDER AND SCIENTIFIC INPUT

Stakeholder and scientific input into the application of the harvest strategy is an important process to support the sustainable and profitable management of the Pacific halibut fishery. Input from both sources occurs at meetings throughout the year.

Stakeholder input

Stakeholder input can occur via public testimony at any public IPHC meeting or at meetings of various IPHC subsidiary bodies. In particular, the MSAB, Research Advisory Board (RAB), Conference Board (CB), and Processor Advisory Board (PAB) are populated by individuals representing various interests related to Pacific halibut. Terms of reference and rules of procedure are provided for each subsidiary body.

MSAB: The Management Strategy Advisory Board suggests topics to be considered in the MSE process, provide the IPHC Secretariat with direct input and advice on current and planned MSE activities, and represent constituent views in the MSE process. The MSAB meets at least once per year and makes recommendations to the Commission regarding the MSE analyses.

CB: The Conference Board consists of individuals representing Pacific halibut harvesters, organisations, and associations. The CB provides a forum for the discussion of management and policy matters relevant to Pacific halibut and provides advice to the Commission on these matters. This subsidiary body also reviews regulatory proposals received by the Commission and IPHC Secretariat reports and recommendations, and provides its advice concerning these items to the Commission at its Annual Meeting, or on other occasions as requested. The CB meets during the week of the Annual Meeting.

PAB: The Processor Advisory Board represents the commercial Pacific halibut processing industry from Canada and the United States of America and advises the Commission on issues related to the management of the Pacific halibut resource in the Convention Area. The PAB meets during the week of the Annual Meeting.

RAB: The Research Advisory Board, composed of members of the Pacific halibut community, provides the IPHC Secretariat staff with direct input and advice from industry on current and planned research activities contemplated for inclusion in the IPHC 5-year program of integrated research and monitoring. This subsidiary body suggests research topics to be considered and comments upon operational and implementation considerations of those research and monitoring activities. The RAB meets once per year, typically before the Interim Meeting.

Scientific input

Scientific input occurs through independent, external reviews, including, but not limited to, semi-annual meetings of the SRB. The SRB reviews science/research proposals, programs, products, strategy, progress, and overall performance, as well as the recommendations arising from the MSAB and RAB.

4.8 ANNUAL PROCESS

A series of meetings occurs throughout the year, leading up the Annual Meeting in January when mortality limit decisions are made. The MSAB meets at least once a year in spring to provide guidance on the MSE and may also meet in autumn if necessary. The SRB meets in June and September to peer review IPHC science products, including the stock assessment and MSE. The CB and the PAB meet during the week of the Annual Meeting to advise the Commission on issues related to the management of the Pacific halibut resource in the Convention Area.

An Interim Meeting, typically late November, precedes the Annual Meeting and is when the stock assessment, stock projections, and harvest decision table are first publicly presented. The final stock assessment, stock projections, and harvest decision table are presented at the Annual Meeting, typically in late January, to support mortality limit decisions.

IPHC 3-year meetings calendar (2025-27)

PREPARED BY: IPHC SECRETARIAT (09 DECEMBER 2024)

PURPOSE

To provide the Commission with an opportunity to consider the tentative IPHC 3-year meetings calendar (2025-27) (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) has historically met twice during the course of the year. The Management Strategy Advisory Board (MSAB) will meet in the first half of the year. The Research Advisory Board (RAB) meets in November, prior to the Interim Meeting (IM), when its members are best able to convene and consider the IPHC's research activities. The RAB has agreed to a 1.5-day meeting immediately prior to the Fish Expo in Seattle moving forward.

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 102nd Session of the IPHC Annual Meeting (AM102) is scheduled for 19-23 January 2026.

RECOMMENDATIONS

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-18, that provides the Commission with an opportunity to consider the IPHC 3-year meetings calendar (2025-27).
2) **APPROVE** the IPHC 3-year meetings calendar (2025-27), while also noting date and venue changes may occur based on the individual circumstances of each subsidiary body.
3) **NOTE** the USA's host city selection of Bellevue, WA, USA, for the 102nd Session of the IPHC Annual Meeting (AM102), to be held in January 2026.

APPENDICES

Appendix I: IPHC 3-year meetings calendar (2025-27)

APPENDIX I

IPHC 3-year meetings calendar (2025-27)

	2025			2026			2027		
Meeting	**No.**	**Dates**	**Location**	**No.**	**Proposed Dates**	**Location**	**No.**	**Proposed Dates**	**Location**
Annual Meeting (AM)	**101st**	**27-31 Jan**	Vancouver, **Canada**	**102nd**	**19--23 Jan**	Bellevue, WA, **USA**	**103rd**	**19--23 Jan**	Bellevue, WA, **USA**
Finance and Administration Committee (FAC)	**101st**	27 Jan	Vancouver, Canada	**102nd**	19 Jan	Bellevue, WA, **USA**	**103rd**	19 Jan	Bellevue, WA, **USA**
Conference Board (CB)	95th	28-29 Jan	Vancouver, Canada	96th	20-22 Jan	Bellevue, WA, **USA**	97th	20-22 Jan	Bellevue, WA, **USA**
Processor Advisory Board (PAB)	30th	28-29 Jan	Vancouver, Canada	31st	20-22 Jan	Bellevue, WA, **USA**	32nd	20-22 Jan	Bellevue, WA, **USA**
Management Strategy Advisory Board (MSAB)	20th	May	Seattle or Juneau, USA	21st	TBD May	Seattle or Vancouver, USA	22nd	TBD May	Seattle or Juneau, USA
Scientific Review Board (SRB)	26th	10-12 June	Seattle, USA	28th	TBD June	Seattle, USA	30th	TBD June	Seattle, USA
	27th	23-25 Sept	Seattle, USA	29th	TBD Sept	Seattle, USA	31st	TBD Sept	Seattle, USA
Work Meeting (WM)	--	4-5 Sept	Bellingham, USA	--	3-4 Sept	Bellingham, USA	--	2-3 Sept	Bellingham, USA
Research Advisory Board (RAB)	26th	TBD Nov	Seattle, USA	27th	TBD Nov	Seattle, USA	28th	TBD Nov	Seattle, USA
Interim Meeting (IM)	**101st**	**24-25 Nov**	**Online**	**102nd**	**23-24 Nov**	**Online**	**103rd**	TBD **Nov**	**Online**

National Report: Canada

PREPARED BY: FISHERIES AND OCEANS CANADA (27 DECEMBER 2024 & 7 JANUARY 2025)

PURPOSE

To provide an overview of the Pacific halibut fisheries in 2024 in the IPHC Convention waters and the national waters of Regulatory Area 2B (Canada, British Columbia).

Contracting party: Canada

Reporting agency: Fisheries and Oceans Canada

Contact person: Gwyn Mason, Halibut Coordinator, Gwynhyfar.Mason@dfo-mpo.gc.ca

SUMMARY

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 analyse 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 223 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.

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

Compliance and Enforcement Priorities

The enforcement priorities for groundfish, including commercial Halibut, for 2024 are outlined in the Groundfish Integrated Fisheries Management Plan. These priorities are set by the Groundfish Enforcement Coordinator and remain unchanged from 2023. Here are the key points:

1. **Closed Area Fishing**: Enforcement in rockfish conservation areas, sponge reef marine protection areas, marine conservation areas, interim sanctuary zones, and other permanent and in-season fishing closures.
2. **Retention Without Licence**: Focus on groundfish caught, retained, or possessed without proper licence authority, especially when intended for sale.
3. **Unauthorized Commercial/FSC Fishing**: Addressing unauthorized dual fishing activities.
4. **Monitoring Program Compliance**: Ensuring compliance with 100% at-sea and dockside monitoring programs, including hails, electronic monitoring systems, accurate fishing logs, and proper offloading procedures.
5. **False Statements**: Preventing false and misleading statements to DFO designated observers.
6. **Assistance to Observers**: Ensuring vessel masters and landing station personnel provide all reasonable assistance to DFO designated observers.
7. **Rockfish Release**: Prohibiting the release of rockfish at sea.
8. **Registration**: Ensuring all persons on board a commercial fishing vessel are registered, especially those aged sixteen or older.
9. **Prohibited Species**: Preventing the retention of prohibited species.
10. **Seabird Avoidance Gear**: Ensuring the deployment of seabird avoidance gear.
11. **Fish Slips**: Requiring vessel masters to submit fish slips within thirty days after landing.

COMMERCIAL FISHERIES OVERVIEW

Summary/Regulatory Framework

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 2024, the CTAC was 5,970,000 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 2024 Commercial and Recreational catch limit for allocation purposes was 5,775,000 net pounds (table 1).

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 2024 commercial TAC. As of December 17, 2024, 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 5,239,182 net pounds (table 1).

In 2024, the Canadian commercial Pacific halibut catch totalled 4,386,271 net pounds (table 1). 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 2024 Halibut catch until February 20, 2025, after which released at-sea mortality will be attributed to the 2025 TAC. As such the 2024 commercial catch is current as of December 17, 2024.

The 2025/2026 commercial groundfish fishing season will commence February 21, 2025, 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

Monitoring

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 (via at-sea observers, or electronic monitoring) and 100% dockside monitoring for all groundfish vessels.

Groundfish hook and line fisheries have almost exclusively utilized electronic monitoring (EM) systems for at-sea monitoring for nearly two decades. In April 2020, electronic monitoring was formally launched on groundfish trawl vessels, when at-sea observers were removed due to the Covid-19 pandemic. EM systems were configured on a vessel-by-vessel basis to ensure that groundfish fish trawls vessels met the 100% at-sea monitoring requirements that were previously completed by at-sea observers. Details regarding the trawl EM system requirements can be found in section 14 of appendix 8 in the Groundfish Integrated Fisheries Management Plan.

During the 2023/24 groundfish fishing season, a pilot program for collecting Halibut length samples in the trawl sector using EM technology was developed in collaboration with industry representatives and Archipelago Marine Research (AMR) in the Option A groundfish trawl fishery. The pilot ran for approximately 7 months and was implemented fleetwide in May 2024.

While Pacific Halibut remains a prohibited species in the trawl fishery and must be released in accordance with existing requirements, the purpose of this program is to facilitate the collection of Pacific halibut length information using a representative sampling design. Vessel crew are responsible for placing Pacific halibut on a specialized measuring board in view of the vessel's electronic monitoring (EM) camera so AMR EM program video reviewers can estimate lengths and weight using the International Pacific Halibut Commission's (IPHC) current length-weight table. Information collected from the program will be used to meet Canada's international commitments to support IPHC data requirements for stock assessment purposes.

Fishery statistics

Table 1. Halibut allocations in Canada as of December 17, 2024. All values in net pounds.

Commercial / recreational TAC for allocation [A]		5,775,000
Commercial allocation	x 85%	
O26 wastage	- 180,000	
Research (use of fish)	- 60,000	
Commercial TAC for allocation purposes		4,668,750
Recreational allocation		X 15%
O26 wastage	- 30,000	
Recreational TAC	836,250	
Total commercial catch [B]	4,386,271	
2B commercial and recreational catch [C]	5,239,182	

A Value does not include underage carried forward from 2023/24 fishing season.

B Catch includes all landed fish from the commercial hook and line sector, as well as the mortality associated with legal-sized released fish in the hook and line sector.

C Catch includes all landed fish from both the commercial and recreational sectors, as well as the mortality associated with legal-sized released fish in the commercial trawl fishery.

Compliance with Regulations and Enforcement

Below is a comparison of the commercial halibut fishery statistics between 2023 and 2024:

- **2024 Season**:
  - **Opening Date**: March 15, 2024, at 06:00 Pacific Daylight Time
  - **Closing Date**: December 07, 2024, at 23:59 Pacific Standard Time
  - **Total Vessels**: 136
  - **Total Fishing Trips**: 492

- **2023 Season**:
  - **Opening date**: March 7, 2023, at 12:00 Pacific Standard Time
  - **Closing date:** December 10, 2023, at 12:00 Pacific Standard Time
  - **Total Vessels**: 139
  - **Total Fishing Trips**: 535

The 2024 season saw a slight decrease in both the number of vessels (from 139 to 136) and fishing trips (from 535 to 492). This reduction could be attributed to the 11-day shorter fishing season in 2024.

Marine Patrol Program

The Marine Patrol Program (MPP) is a dedicated enforcement initiative that contracts the Canadian Coast Guard for support.

- The MPP operates two 140-foot ships: the CCGS Captain Goddard and the CCGS M Charles.
- The MPP vessels are staffed 24 hours a day with nine Coast Guard employees and have 2-3 Fishery Officers permanently on board
- The Fishery Officers use a 7.53-meter rigid hull inflatable for at-sea patrols.
- The primary purpose of the MPP is to support land-based detachment operations by patrolling the marine components of the land-based detachments' areas of responsibility.
- The MPP Detachment Commander (DC) collaborates closely with other Detachment Commanders and Area Chiefs to determine regional priorities and develop general patrol plans to best utilize the MPP.
- Once plans are developed, the shipboard crews work closely with the land-based detachment field staff to implement strategic daily patrols based on the priorities set by Regional Headquarters and supervisory staff.

In 2024, the MPP conducted 26 two-week patrols across the two ships. Of these, four patrols were specifically dedicated to groundfish. The primary patrol areas spanned from north of Cape Caution to the Alaskan border (North Coast).

- Fishery Officers conducted inspections on 12 commercial halibut vessels (L) and 5 (five) commercial/communal vessels (FL).
- Common violations included:
    - Undersized halibut
    - Lack of seabird avoidance gear
    - No personal fishing licences
    - Failure to mark FSC-caught fish in the logbook
    - Fishing outside the FSC area
    - Turning off Electronic Monitoring Equipment prior to landing
    - Failure to produce licensing paperwork

Aerial Surveillance Patrol

The Fishery Aerial Surveillance Enforcement (FASE) Detachment primarily patrols Canada’s EEZ with a Dash 8 Aircraft.

- The FASE unit is a dedicated team comprised of three Fishery Officers whose primary responsibility is flying.
- The FASE unit uses a variety of aerial surveillance resources throughout the year to ensure compliance with the Fisheries Act, regulations, licence conditions, and other relevant acts and regulations.
- Flight reports, photographs, videos, and other data collected from 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.

In 2024, FASE conducted 108 missions, patrolled 752.49 hours, and encountered 209 halibut (L) vessels and 3 commercial/communal (FL) vessels.

In 2023, FASE conducted 101 missions, patrolled 757.77 hours, and encountered 426 commercial halibut (L) vessels and 29 commercial/communal (FL) vessels.

The number of halibut vessels encountered in 2023 is an anomaly, and the reasons for this increase are unclear. The 2024 data aligns with the typical number of missions, patrol hours, and encountered halibut vessels seen in previous years.

Third Party Service Provider Reporting: Archipelago Marine Research Ltd.

Archipelago Marine Research Ltd (AMR) is a DFO-designated at-sea observer and dockside monitoring company.

- All observers employed by AMR are designated under section 39(1) of the Fishery General Regulations.
- All commercial groundfish fishing trips are required to be validated by a designated AMR observer.
- All commercial groundfish fishing trips also require an at-sea observer or 100% electronic monitoring.
- The BC Commercial Integrated Groundfish Society (BCCIGS) represents the commercial groundfish sectors covered in the Integrated Fisheries Management Plan, including Lingcod, ZNO, ZNI, Dogfish, Halibut, Sablefish, and Trawl, as well as the Trawl and Hand Line Processors.
- The BCCIGS makes decisions about service providers that support the Commercial Industry Caucus process (such as web office, facilitation, etc.) and administers the contracting process for the provision of Hook and Line electronic monitoring (currently provided by AMR).
- AMR provides cameras, GPS sensors, and hydraulic sensors to commercial fishers as part of their contract.
- Members of the BCCIGS use AMR to hail in and out for commercial fishing.
- AMR also provides all dockside validations as part of their contract with the BCCIGS.
- AMR manages the commercial hook and line logbook data and validation records, and uploads this information into FOS.
- AMR has checks and balances in place to ensure that the information entered into FOS is true and accurate.
- AMR produces occurrence reports based on thresholds identified by DFO which are stored in AMR's portal

AMR Generated Occurrence Reports

AMR generated 276 halibut-related occurrence reports (OR) and 72 combination halibut/sablefish occurrence reports in 2024, compared to 197 halibut-related occurrence reports and 36 combination halibut/sablefish occurrence reports in 2023. This represents an increase of 115 occurrence reports (49.4%) in 2024.

ELECTRONIC MONITORING RELATED – 3% decrease from 2023

2024 – 22.4% of OR	2023 – 23.1 % of OR
Time Gaps – 18 OR	Time Gaps – 12 OR
Monitoring Equipment – 60 OR	Monitoring Equipment – 42 OR

RELEASED ROCKFISH – 44% increase from 2023

2024 – 19.2 % of OR	2023 – 13.3% of OR
67 OR	31 OR

UNDERSIZED HALIBUT – 172% increase from 2023

2024 – 4.9 % of OR	2023 – 1.8% of OR
17 OR	4 OR

CLOSED AREA – 32.4% decrease from 2023

2024 – 2.3% of OR	2023 – 3.4% or OR
GHLSP protection Zone – 3 OR	MPA – 1 OR
RCA – 5 OR	RCA – 6 OR
	USA – 1 OR

PROHIBITED SPECIES – 30.8% decrease from 2023

2024 – 0.9% of OR	2023 – 1.3% of OR
3 OR	3 OR

NO COMMERCIAL HALIBUT LICENCE

2024	2023
1 vessel	1 vessel

Notable Management Updates

The commercial groundfish fisheries, including the Halibut sector, saw several notable management changes for the 2024 season. These changes include:

- A rollover of the seasonal expansion (November 1, 2024 – April 30, 2025) 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 will be re-evaluated during the 2025/2026 fishing season.
- The continued engagement regarding the Marine Protected Area (MPA) Network Action Plan (NAP) for the Northern Shelf Bioregion (NSB) by the trilateral partnership of the Government of Canada, the Province of BC and 17 First Nations. Trilateral partners are focused on network coordination and implementation, including establishing governance and development of a network workplan that will focus on monitoring, cumulative impacts, reporting and engagement on Network implementation.
- Engagement regarding reforms in the licensing and management of Canada's west coast commercial fishing industry commenced in July 2024. Termed West Coast Commercial Fisheries Modernization (WCCFM), this initiative aims to engage with a broad spectrum of people involved in commercial fisheries. The Standing Committee on Fisheries and Oceans (FOPO) held hearings in 2019 and 2023 on west coast fisheries licensing, foreign ownership and corporate concentration. DFO has been undertaking broad engagement with First Nations, Indigenous groups and industry stakeholders on five overarching topics: inclusive representation on fishery advisory boards, transparency of licence and quota holdings,

strengthened and more transparent socio-economic data, foreign ownership and concentration of access, and modernizing licensing and management rules to better support economic sustainability. DFO is seeking detailed input at a series of workshops in February 2025.

RECREATIONAL FISHERIES OVERVIEW

Summary

The recreational halibut fishery had a TAC of 836,250 net lbs for the 2024 season. However, an overage of 30,571 net lbs was incurred in the 2023 season prior to its early closure on September 30, 2023. The Canadian recreational halibut sector has a overage provision, which indicates that, in addition to an early closure of the fishery, if recreational catch exceeds the TAC for a given season, catch exceeding the TAC would be deducted from the following year's TAC. As such, the overage incurred in the 2023 season was deducted from the 2024 TAC prior to the season's opening, resulting in a fishable TAC of 805,679 net lbs (table 2).

The 2024 recreational halibut fishery opened on February 3, 2024, with a daily limit of 1 fish per day. The fishery operated under the 2023 recreational licence until March 31. On April 1, the 2024 licence and management measures entered into effect, with a daily limit of 1 fish per day. 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 2024 measures included:

- A maximum length of 126 cm 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 85 cm to 126 cm head-on length - OR - two (2) halibut measuring under 85 cm head-on length.
    - If the Daily Limit is three (3):
        - the Possession Limit is EITHER of: one (1) halibut measuring from 85 cm to 126 cm head-on length – OR - three (3) halibut measuring under 85 cm head-on length.
    - NOTE: If in possession of one (1) Halibut 85 cm head-on length or longer, you shall not possess any other Halibut
- An annual limit of ten (10) in aggregate, from April 1, 2024 to March 31, 2025
- 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 met monthly throughout the fishing season to review estimated catches. By August of 2024, 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 85 cm in length – varying the daily limit from one (1) daily to two (2) daily on August 21, 2024. The daily limit was reduced back to one (1) daily on September 20, 2024. As the season progressed catch estimates for summer months showed higher than forecasted catch. Catch information indicated that the recreational share of the Total Allowable Catch for halibut was going to be achieved by mid-fall 2024. The committee voted to close the recreational fishing for halibut under the BC Tidal Waters Sport Fishing Licence at 23:59 hours on October 9, 2024.

Experimental Recreational Halibut 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. 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, if they are in good standing. 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.

In 2024, 256 XRQ licences were issued and 7,663 net lbs of uncaught quota was carried forward from the previous season. As of December 17, 2024, estimated catch from the XRQ program was 18,553 net lbs (table 2).

Monitoring

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 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 2024 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 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 2024 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 2024, DFO used in-season iREC survey catch estimates. In 2024, approximately 86% of the catch estimate was derived from traditional catch monitoring sources, and 14% from iREC survey estimates.

Biological data received as length is converted to net weight using the following formula developed by the IPHC, approved by the Commission at AM098, and adopted for use in the Canadian fishery beginning in the 2023 season:

$$\textbf{Net weight} = (7.031 * 10^{-6}) * \textbf{length (cm)})^{3.231}$$

Biological data received as round weight is converted to net weight, head off and dressed, using a 75% conversion factor. The conversion to net weight via length instead of round weight is prioritized when both biological metrics are provided.

Final estimates are anticipated to be available by the spring of 2025. Estimated harvest in pieces and net weight by regional areas are noted below.

Fishery statistics

Table 2. Halibut for 2B recreational and the Halibut Experimental Recreational pilot program (XRQ) fisheries as of as of December 17, 2024. All values in net pounds.

Initial Recreational TAC	836,250
2023 Recreational Overage	30,571
Fishable Recreational TAC	805,679
Recreational catch [A]	834,358
XRQ TAC	20,432
XRQ catch	18,553 [B]
Fishable Recreational and XRQ TAC [C]	826,111
Recreational and XRQ catch [D]	852,911

A This is an in-season catch estimate. The final estimate is anticipated to be available by Spring 2025.

B Effective December 17, 2024.

C 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.

D Catch includes all landed fish.

Table 3. Summary of the 2024 Recreational Halibut Catch by Pacific Fishery Management Area (PFMA)

Regional Area	PFMA	Piece Count	Total Net Wt. (net lbs)
Haida Gwaii	1	15,009	133,589
	2	2,440	31,015
North Coast	3	7,084	125,064

	4	10,032	122,195
	5/6	2,863	34,610
Central Coast	7/8/9	3,734	35,019
South Coast	10/11/111	1,397	18,740
	12	1,203	11,430
	13/14	71	615
	15-18/28/29	2	30
	19	1,999	30,098
	20	657	7,821
	21/121	3,455	47,600
	23/123	5,789	72,971
	24/124	3,740	64,589
	25/125	2,006	28,673
	26/126	2,320	37,335
	27/127	2,476	32,964
Total Landed Catch		66,277	834,358
2023 Recreational Overage			30,571
2024 Fishable Recreational TAC			805,679
Estimated Remaining Balance (end of September)			-28,679
			-3.56%

Table 4. Recreational Halibut Monthly Catch Estimates (net weight, lbs) for 2020, 2021, 2022, 2023 and 2024.

	Net Weight (net lbs)					Cumulative Net Weight (net lbs)				
	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
FEB	0	0	1,448	2,266	3,657	0	0	1,448	2,266	3,657
MAR	3,814	13,466	5,371	5,211	6,867	3,814	13,466	6,818	7,478	10,523
APR	7,111	10,923	12,057	15,808	12,226	10,926	24,389	18,876	23,286	22,749
MAY	26,356	55,931	62,298	39,193	60,143	37,282	80,320	81,174	62,479	82,893
JUN	74,348	153,858	196,453	169,935	167,072	111,630	234,179	277,627	232,414	249,964
JUL	182,655	289,479	314,871	351,683	247,450	294,284	523,657	592,499	584,097	497,414
AUG	148,422	202,856	275,558	275,390	281,775	442,707	726,513	868,057	859,487	779,189
SEP	69,419	45,733	53,776	49,036	55,169	512,125	772,246	921,833	908,523	834,358
OCT	4,236	1,021	3,654	1,276	-	516,361	773,267	925,486	909,799	-
NOV	398	2,041	1,009	0	-	516,758	775,307	926,496	909,799	-
DEC	2,216	40	2,348	1,022	-	518,974	775,347	928,844	910,821	-
Total	518,974	775,347	928,844	910,821	834,358	518,974	775,347	928,844	910,821	497,414

2023 Recreational Overage	30,571
2024 Fishable Recreational TAC	805,679
Estimated Total Catch	834,358
Estimated Remaining Balance (end of September)	-28,679
	-3.56%

A This is an in-season catch estimate. The final estimate is anticipated to be available by Spring 2025**.**

Compliance with Regulations and Enforcement

Below is a comparison of the recreational halibut fishery between 2023 and 2024:

- **2024 Season**:
    - **Opening Date**: February 3, 2024, at 00:01 Pacific Standard Time Fishery Notice (FN) FN0084
    - **Daily Limit**: 1 (one) halibut per day
    - **Possession Limit**: one (1) halibut measuring 90 cm to 126 cm in length (69 cm to 97 cm head-off), OR two (2) halibut, each measuring under 90 cm in length (69 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
    - **In Season Change**: April 1, 2024, at 00:01 Pacific Daylight Time FN0238
    - **Daily Limit:** 1 (one) halibut per day
    - **Possession Limit:** one (1) halibut measuring 85 cm to 126 cm in length (65 cm to 97 cm head-off), OR two (2) halibut, each measuring under 85 cm in length (65 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
    - **In Season Change**: August 21, 2024, at 00:01 Pacific Daylight Time FN0838
    - **Daily and Possession Limit**: one (1) Halibut measuring 85 cm to 126 cm in length (65 cm to 97 cm head-off), OR two (2) Halibut, each measuring under 85 cm in length (65 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
    - **In Season Change**: September 20, 2024, at 00:01 Pacific Daylight Time FN0971
    - **Daily Limit**: 1 (one) halibut per day
    - **Possession Limit**: one (1) halibut measuring 85 cm to 126 cm in length (65 cm to 97 cm head-off), OR two (2) halibut, each measuring under 85 cm in length (65 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
    - **Closing Date**: October 9, 2024, at 00:01 Pacific Daylight Time FN1042
    - **Annual limit**: 10 (ten) halibut
    - **Total Licences**: 352,701

- **2023 Season**:
    - **Opening date**: February 1, 2023, at 00:01 Pacific Standard Time FN0100
    - **Daily Limit**: 1 (one) halibut per day
    - **Possession Limit**: one (1) halibut measuring 90 cm to 133 cm in length (69 cm to 102 cm head-off), OR two (2) halibut, each measuring under 90 cm in length (69 cm head-off). No person shall retain a Halibut greater than 133 cm head-on length (102 cm head-off).
    - **In Season Change**: April 1, 2023, at 00:01 Pacific Daylight Time FN0264
    - **Daily Limit:** 1 (one) halibut per day
    - **Possession Limit:** one (1) halibut measuring 90 cm to 126 cm in length (69 cm to 97 cm head-off), OR two (2) halibut, each measuring under 90 cm in length (69 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
    - **In Season Change**: July 8, 2023, at 00:01 Pacific Daylight Time FN0628

- **Daily and Possession Limit**: one (1) Halibut measuring 90 cm to 126 cm in length (69 cm to 97 cm head-off), OR two (2) Halibut, each measuring under 90 cm in length (69 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
- **Closing date:** September 30, 2023, at 23:59 Pacific Daylight Time FN1049
- **Annual Limit:** 10 (ten) halibut
- **Total Licences**: 350,548

Recreational Licences are issued for a fiscal year (April 1 – March 31).

The main change in recreational halibut regulations from 2023 to 2024 was the adjustment of the daily limit.

- From February 3, 2024, to August 20, 2024, the daily limit for halibut was set at 1 (one).
- The daily limit increased to 2 (two) halibut from August 21, 2024, to September 19, 2024, but this only applied to halibut less than 85 cm.
- The daily limit was reduced back to 1 (one) halibut on September 20, 2024.

Experimental Recreational Halibut Program

The Experimental Recreational Halibut Program (XRQ) provides an opportunity for recreational harvesters to retain halibut in excess of the size and daily/possession limits.

- In addition to the Tidal Waters Sport Fishing Licence, recreational harvesters may apply for the experimental licence on a voluntary basis. This licence allows the holder to purchase halibut quota from the commercial sector for use in the recreational fishery. A minimum of 20 pounds of quota is required to be purchased to activate the licence.
- It was introduced in response to feedback from harvesters, who indicated that additional opportunities for recreational halibut fishing would increase stability and certainty.
- Through this program, approved recreational harvesters can fish until December 31st, even if the regular recreational halibut fishery under the Tidal Waters Sport Fishing Licence is closed.

The XRQ fishery was open from April 1, 2024, to December 31, 2024.

- There were 256 XRQ licences issued in 2024, compared to 225 in 2023.
- In 2024, only 6 experimental licence holders failed to purchase the minimum 20 pounds of halibut quota to activate their licence, compared to 28 in 2023.
- This improvement is attributed to the education and warning letters issued in 2023.

Indigenous Fisheries Overview

Summary

The estimated Food, Social, and Ceremonial (FSC) halibut catch in area 2B is 405,000 net pounds. Since 2009, 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 2024, approximately 29,548 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, an activity known as dual fishing. 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 49,283 net pounds in 2024). 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.

In order to advance reconciliation efforts, consultations with Indigenous Peoples and the implementation of Reconciliation Framework Agreements, Treaties and rights-based fisheries as they pertain to groundfish have occurred throughout 2024 and will be ongoing throughout the 2025/26 fishing season.

Compliance with Regulations and Enforcement

For all dual fishing (commercial and FSC) halibut trips (FL Licences) the vessel master is responsible for following the halibut commercial/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 2024, 35 commercial/communal commercial halibut vessels completed 132 dual fishing trips, compared to 49 vessels completing 128 dual fishing trips in 2023.

Directed FSC halibut fishing does not have electronic monitoring or the dockside validation requirements.

RECOMMENDATIONS

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-NR01 Rev_1 which provides the Commission with an overview from Fisheries and Oceans Canada of the Pacific halibut fisheries in 2024 in the IPHC Convention waters and the national waters of Canada.

APPENDICES

Appendix I

Province of British Columbia 2024 Annual Report

PROVINCE OF BRITISH COLUMBIA 2024 ANNUAL REPORT

PREPARED BY: British Columbia Ministry Water, Land, and Resource Stewardship

DATE: 12/DEC/2024

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 now over a 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 100th session of the IPHC Annual Meetings in 2024. 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 BCs top 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 2023, the survey showed the processing of 3,160 tonnes (6.97M lbs) of Pacific halibut, which includes some imported halibut processed in BC. The survey also showed landed and wholesale values of $53.6M and $60.8M, respectively. In 2023, BC exported $53.3M worth of halibut products[1]. The Province historically conducts a seafood sector employment survey which provides data on jobs, wages, and seafood processing activities. The most recent available data from 2022 show that the fish and seafood processing in BC provided 2,465 jobs with related labour income estimated at $138.3 million[2].

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. In 2022, revenue associated with spending by sport fishers was estimated at $1.1 billion, accounting for 33.0% of total revenue in the fisheries and aquaculture sector. Additionally, there were 4,866 jobs in industries benefitting from spending by sport fishers, representing nearly half of the employment in all BC fisheries and aquaculture sectors in 2022[2]. Beginning in 2019, there were severe restrictions on salmon fishing in BC which will continue in future years, which have amplified the importance of the halibut fishery to the recreational sector.

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 priority and is working to ensure that First Nations are meaningfully included in management of all BC fisheries.

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.

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.

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, 100 percent dockside monitoring, and auditing programs in place to compare validated landed catch with at-sea catch records from both the vessel and the third party contracted source. 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 remains concerned with levels of bycatch in Alaskan fisheries and the uncertainty in the data that comes along with fisheries that are only partially monitored. The IPHC secretariat annually releases the Fisheries Data Overview report that summarizes the total annual removals by regulatory area and fishery[4]. Data in these tables for the non-directed commercial discard mortalities are supplied by observer programs run by Contracting Party agencies in most fisheries. In BC, these estimates are reliably provided by the well-established data systems as part of the 100 percent monitoring programs outlined above. Every year, the Fisheries Data Overview contains statements regarding how Regulatory Area 3 remains the area where non-directed commercial discard mortality is estimated most poorly, where the lowest coverage rates are realized for the non-pelagic trawl fishery, which also has the highest likelihood of encountering Pacific halibut. The report outlines an analysis showing how observed trips are not representative of all trips in many regards (e.g., duration, species composition, etc.)[4]. The report concludes that non-directed commercial discard mortality estimates for the Gulf of Alaska (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 and unobserved trips. Alaska's annual deployment plan for observers and electronic monitoring report[5] outlines the expected number of total trips and expected number of observed trips by area and gear types. For the 2024 fishing season this report estimated a total of around 4,100 trips across all fisheries would take place in Area 3, with around 3,200 of those trips to be unobserved (this does not include the anticipated 1,400 additional trips in Area 3 that will be unobserved due to monitoring not being available on smaller vessels under 40ft). The report outlines the increased monitoring efforts in the Bering Sea Aleutian Islands, and the advancements in monitoring efforts in Alaska in general. While B.C. appreciates the increased efforts in Alaskan catch monitoring, the remaining expected number of unobserved trips combined with IPHC secretariat's analysis that in Area 3 observed trips are not representative of all trips, leaves serious concerns for the accuracy of bycatch numbers and the total mortality of halibut in these areas.

BC's concerns also include the high volumes of bycatch in Alaskan fisheries that impact other species, and the impacts that Alsakan removals have on BC fisheries of all species that move between Canadian and US waters. This bycatch includes over 87,000 salmon caught as bycatch in Alaskan fleets in 2024, of which over 38,800 were vulnerable chinook salmon[4]. For halibut, IPHC research has shown a historic migration from Alaskan waters to eastern and southern regulatory areas, making Alaskan fisheries directly impact the fish moving down to BC waters. High levels of U26 bycatch poses a significant threat to recruitment with mortality of juvenile halibut that might otherwise grow and become available to the fishery and other regulatory areas. The Fisheries Data Overview report also annually shows the high levels of U26 bycatch mortality in Areas 4CDE, where in 2024, 1.16M lbs of the total coastwide 1.79M lbs of U26 bycatch mortality was reported. These high levels of U26 bycatch mortality in 4CDE combined with the data uncertainties in total U26 bycatch mortality in area 3, leave BC concerned of the impacts to the migration of halibut into area 2B and to the recurring pattern of poor recruitment years.

The Non-directed Commercial Discard Mortality by Area section of the IPHC Fisheries Data Overview report has continuously outlined the lack of reliability in the bycatch estimates from Areas in Alaska year after year. As part of the 2019 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 Province of BC is advocating for a continued catch share and U26 mitigation strategy that reflects and accounts for the reliability and accuracy of the data being provided from Area 2B relative to the uncertainties in data and total removals in other IPHC Areas. Having confidence in the total number of halibut removals for all regulatory areas should be a priority for the IPHC commission to effectively manage this shared resource and better understand the impacts of fishing activities on the stock and the low recruitment levels seen in recent history.

Recommendations

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. **establishing minimum data requirements for more accurate estimates of non-directed commercial discard mortality which could inform monitoring standards; and**
2. **ensure that the differences in data integrity between Canadian and US regulatory areas is mitigated through catch share agreements and U26 bycatch mortality.**

References

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3. *NOAA Fisheries Catch and Landings Reports in Alaska (2024). https://www.fisheries.noaa.gov/alaska/commercial-fishing/fisheries-catch-and-landings-reports-alaska*
4. *Fisheries data overview (2024): Preliminary statistics (B. Hutniczak, H. Tran, T. Kong, K. Sawyer van Vleck, & K. Magrane) IPHC-2024-IM100-08 Rev_2. https://www.iphc.int/uploads/2024/11/IPHC-2024-IM100-08-Rev_2-2024-fisheries-data-overview.pdf*
5. *2024 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska (Nov 2023). https://www.fisheries.noaa.gov/s3//2023-11/Final-2024-ADP.pdf*

National Report: United States of America

PREPARED BY: NOAA FISHERIES (23 DECEMBER 2024 & 14 JANUARY 2025)

PURPOSE

To provide an overview of the fisheries and removals of Pacific halibut during 2024 from the IPHC Convention waters and the national waters of the United States of America.

Contracting party: United States of America

Reporting agency: NOAA Fisheries; Alaska and West Coast Regions

Contact person: Kurt Iverson, Fishery Management Specialist; kurt.iverson@noaa.gov

RECOMMENDATIONS

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-NR02 Rev_1 which provides the Commission with an overview from the United States of the Pacific halibut fisheries in 2024 in the IPHC Convention waters and the national waters of the United States of America.

U.S. West Coast (Oregon, Washington, and California) – IPHC Regulatory Area 2A

Summary

The 2024 Area 2A Pacific halibut (halibut) Fishery Constant Exploitation Yield (FCEY) of 1,470,000 pounds (lb) was divided among sectors according to the Pacific Fishery Management Council's Catch Sharing Plan for Area 2A (Table 1). The preliminary Area 2A harvest estimate is 1,302,308 lb (as of December 9, 2024). The preliminary non-Tribal harvest estimate is 816,754 lb and the Tribal harvest was 485,554 lb (not including the Tribal customary and subsistence (C&S) fishery).

All weights in this report are net weight (gutted, head-off, and without ice and slime), unless otherwise noted.

Table 1. Area 2A allocations and harvest by sector (pounds), 2024.

			Allocation	Harvest	Percent Harvested
Tribal 35%	C&S[1]		20,220	NA	0.0%
	Commercial		494,280	485,554	98.2%
	Total		**514,500**	**485,554**	**94.4%**
Non-Tribal 65%	**Commercial**	Directed	249,338	237,164	95.1%
		Incidental to salmon troll	44,001	30,363	69.0%
		Total	**293,339**	**267,527**	**91.2%**
		Incidental to sablefish[2]	50,000	34,624	69.2%
		Total (including incid. to sablefish)	**343,339**	**302,151**	**88.0%**
	Recreational	Washington[2,3]	290,158	292,482	100.8%
		Oregon[3]	283,784	201,695	71.1%
		California	38,220	20,427	53.4%
		Total	**612,162**	**514,603**	**84.1%**
	Total		**955,500**	**816,754**	**85.5%**
Total			**1,470,000**	**1,302,308**	**88.6%**

[1] The 2024 C&S projected harvest, based on the 2023 C&S harvest, was adjusted after allocations were adopted by the IPHC. The adjusted C&S projection was 21,305 lb, leaving 493,196 lb for the Tribal commercial fishery. The 2024 C&S harvest estimate will be available in January 2025.

[2] The allocation for the commercial fishery incidental to sablefish is derived from the Washington recreational fishery allocation. In this table, the incidental fishery is not included with the Washington recreational fishery.

[3] On September 20, 2024, 12,000 lb were reallocated from Oregon to Washington. Initial allocations are shown.

Enforcement Overview

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. 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. The 2024 Pacific Halibut Area 2A Enforcement Report summarizes the collective effort, actions, and results of the IPHC Area 2A cooperating federal and state entities. Tribal enforcement activities and compliance data are not provided in this report.

Tables 3 through 5 (pages 7, 8, and 10) present a consolidated summary of IPHC Area 2A Commercial-Directed, Commercial- Incidental and Recreational enforcement statistics for 2024 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 fisheries enforcement that broadly include the two other fishing sectors that catch Pacific halibut: Commercial-Incidental (incidental to the salmon troll fishery and the primary sablefish fishery north of Point Chehalis), and Recreational. Effort data provides a measure of fisheries-related enforcement presence and capacity. The Actions and Results sections presents an overview of regulatory compliance and enforcement issues of concern associated with the fishing sectors.

AREA 2A TRIBAL FISHERIES OVERVIEW

Regulatory framework

The Tribal allocation was set at 35% of the Area 2A FCEY. There were two components of the Tribal fishery:

1) a commercial fishery, which was managed as an unrestricted fishery, a restricted fishery, and a late season fishery; and
2) a ceremonial and subsistence (C&S) fishery

The Tribal commercial fishery allocation was set by subtracting the projected C&S fishery projection, which was based on the prior year C&S harvest, from the total Tribal allocation.

Fishery statistics

The Tribal allocation was 514,500 lb. The preseason projected C&S harvest was 20,220[1] lb and the remaining 494,280 lb were available to the commercial fishery.

- The unrestricted fishery was open 55 hours for all Tribes between March 15 and June 19. Inside Tribes could choose to convert some or all of their hours to restricted fishing (24 hours unrestricted and 52.7 hours restricted fishing with a 500-pound daily limit, or 93.5 hours restricted fishing with a 500-pound daily limit). The unrestricted fishery landed 222,216 lb.
- The restricted fishery was open between March 15 and June 19 for 122 hours (not to exceed 6 days), with a 500-pound daily limit. The restricted fishery landed 96,414 lb.
- The first late fishery was open between June 24 and July 31, and Tribes could choose to fish 24 hours unrestricted or 41 hours (not to exceed 2 days) with a 500-pound daily limit. The first late fishery landed 105,794 lb.
- The second late fishery was open between August 9 and September 30 and 61,130 lb were landed. Tribes could choose between three options:
    - One 24-hour opener with a 2,000-pound limit
    - Three 24-hour openers with a 1,000-pound daily limit
    - Six 24-hour openers with a 500-pound daily limit
- The total landings for all Tribal commercial fisheries was 485,554 lb, or 98 percent of the Tribal commercial allocation.
- The C&S fishery closed on December 31, harvest estimates are compiled at the end of the year and will be available in January 2025.

[1] The C&S projected harvest, based on the 2023 C&S harvest, was adjusted after allocations were adopted by the International Pacific Halibut Commission. The adjusted C&S projection is 21,305 lb, leaving 493,196 lb for the Tribal commercial fishery.

AREA 2A NON-TRIBAL COMMERCIAL FISHERIES OVERVIEW

Regulatory framework

There were three components of the non-Tribal commercial fishery:

1) a directed longline fishery targeting halibut south of Point Chehalis, Washington (46°53.30' N. lat.); and
2) an incidental catch fishery during the salmon troll fisheries off Washington, Oregon, and California; and
3) an incidental catch fishery during the primary sablefish fishery north of Point Chehalis.

The allocations for the directed commercial fishery and the incidental catch fishery during salmon troll fisheries were set at 85 percent and 15 percent, respectively, of the non-Tribal commercial fishery allocation (30.7% of the non-Tribal allocation). The allocation for the incidental catch fishery during the primary sablefish fishery north of Point Chehalis, WA came from the portion of the Washington recreational allocation over 214,110 lb, with a 10,000-pound minimum and 70,000-pound maximum allocation.

Vessels permitted in the directed commercial fishery were prohibited from landing halibut as incidental catch in the salmon troll fishery and from participating as a charter vessel in the recreational fishery.

Closed Areas

Vessels in the directed fishery were prohibited from fishing within closed areas as defined in 50 CFR 300.63(f), including the non-trawl Rockfish Conservation Areas (RCAs). RCAs are depth-based areas closed to fishing with certain gear types. The RCA boundaries are lines that connect a series of latitude and longitude coordinates and are intended to approximate particular depth contours. Coordinates that define the RCA boundary lines are listed at 50 CFR 660.71(e), 50 CFR 660.73(a), and 50 CFR 660.72(j). All vessels were required to comply with halibut RCA regulations regardless of groundfish retention. Vessels that retained groundfish in state waters of California were also subject to California RCA regulations.

Vessels that incidentally caught halibut while fishing in the salmon troll fishery were prohibited from fishing within a closed area known as the Salmon Troll Yelloweye Rockfish Conservation Area (YRCA), defined in the groundfish regulations at 50 CFR 660.70 and in the salmon regulations at 50 CFR 660.405(c). Vessels that incidentally caught halibut while fishing in the primary sablefish fishery north of Point Chehalis, Washington were required to comply with groundfish closed area regulations.

See Pacific halibut regulations and the NOAA Fisheries West Coast Groundfish Closed Areas page for more information on closed areas, including Essential Fish Habitat Conservation areas and Yelloweye RCAs.

Changes for 2024

The Pacific Fishery Management Council recommended that the third fishing period occur no sooner than three weeks after the second fishing period in order to provide sufficient advance notice.

Fishery statistics

Directed Fishery Targeting Halibut (South of Pt. Chehalis)

- The allocation was 249,338 lb.
- The estimated harvest was 237,164 lb.
- The fishery was open for five, 58-hour fishing periods: June 25-27, July 9-11, August 6-8, August 27-29, and September 24-26.
- Catch limits by fishing period, based on vessel length / size class are listed in Table 2.

Table 2. 2024 fishing period limits (dressed weight, head-on with ice and slime, in pounds per vessel) by vessel size class.

Vessel Length	Size Class	Jun 25–27	Jul 9–11	Aug 6–8	Aug 27-29	Sept 24-26
0–25	A	1,800	1,800	1,000	1,400	1,800
26–30	B	1,800	1,800	1,000	1,400	1,800
31–35	C	1,800	1,800	1,000	1,400	1,800
36–40	D	3,000	3,000	1,000	1,400	1,800
41–45	E	3,000	3,000	1,000	1,400	1,800
46–50	F	3,800	3,800	1,000	1,400	1,800
51–55	G	3,800	3,800	1,000	1,400	1,800
56+	H	4,500	4,500	1,000	1,400	1,800

Incidental Catch during the Salmon Troll Fishery

- The allocation was 44,001 lb.
- The estimated harvest was 30,363 lb.
- Halibut retention during salmon troll fisheries was allowed beginning in April until the end of the salmon season on September 30.
- The landing limit was one halibut per two Chinook salmon, except that one halibut could be possessed or landed without meeting the ratio requirement, and no more than 35 halibut could be possessed or landed per trip.

Incidental Catch during the Primary Sablefish Fishery (North of Pt. Chehalis)

- The allocation was set at 50,000 lb.
- The estimated harvest was 34,624 lb.
- Halibut retention was allowed during the primary sablefish fishery, from the primary sablefish season opening date of April 1 until the commercial halibut season closure on December 7.
- The landing limit was 130 lb of halibut (in dressed weight, meaning eviscerated, head on) for every 1,000 lb of sablefish (dressed weight), plus up to 2 additional halibut. At the September 2024 Council meeting, the Council increased the landing limit to 150 lb of halibut for every 1,000 lb of sablefish, plus up to 2 additional halibut.

Area 2A Commercial Fisheries Compliance with Regulations and Enforcement

Table 3. 2024 IPHC Area 2A Enforcement Statistics – Directed Commercial Fisheries.

2024 IPHC AREA 2A ENFORCEMENT STATISTICS							
COMMERCIAL - DIRECTED							
	USCG D-13	USCG D-11	NOAA OLE	WDFW	OSP - ODFW	CDFW	
EFFORT							CONSOLIDATED EFFORT
AIR PATROLS							
Number of Air Patrols	20	8	2	2			32
Air Patrol Hours	45	32	5	5			87
Air Patrol Personnel Hours			5	5			10
VESSEL PATROLS							
Number of Vessel Patrols	28	7	4	5	25	15	84
Vessel Patrol Hours	487	67	17	31	92	43	737
At-Sea Personnel Hours			33	61	92	91	277
Number of Boardings	8	1	7	12	68	45	141
SHORESIDE PATROLS							
Number of Shoreside Patrols			24	1	30	3	58
Shoreside Personnel Hours			174	1	88	10	273
Number of Contacts			24		66	6	96
OFFICERS/AGENTS/WARDENS							
Number of Assigned Personnel	56	38	9	12	8	9	132
ACTIONS							CONSOLIDATED ACTIONS
Compliance Assistance			2				2
Written Warnings			1		4		5
Referral to OLE				1		*2	3
Criminal Citations					2		2
RESULTS (Violations)							CONSOLIDATED RESULTS
Logbook/Record Keeping					6	2	8
Restricted/Closed Area				1		2	3
Vessel Marking			1				1
Boarding Ladder			1				1
**Seabird Avoidance Gear			1				1
*2 violations for each OLE referral.							
**Groundfish violation that was documented during a combined Directed Halibut/Open Access groundfish trip.							

Table 4. 2024 IPHC Area 2A Enforcement Statistics – Commercial-Incidental.

2024 IPHC AREA 2A ENFORCEMENT STATISTICS							
COMMERCIAL - INCIDENTAL							
	USCG D-13	USCG D-11	NOAA OLE	WDFW	OSP - ODFW	CDFW	
EFFORT							**CONSOLIDATED EFFORT**
AIR PATROLS							
Number of Air Patrols	164	125					289
Air Patrol Hours	361	214					575
Air Patrol Personnel Hours							
VESSEL PATROLS							
Number of Vessel Patrols	275	52				15	342
Vessel Patrol Hours	4371	972				43	5,386
At-Sea Personnel Hours						91	91
Number of Boardings	24	18				45	87
SHORESIDE PATROLS							
Number of Shoreside Patrols						3	3
Shoreside Personnel Hours						10	10
Number of Contacts						6	6
OFFICERS/AGENTS/WARDENS							
Number of Assigned Personnel	56	38				9	103
ACTIONS							**CONSOLIDATED ACTIONS**
							None
RESULTS (Violations)							**CONSOLIDATED RESULTS**
							None

AREA 2A RECREATIONAL FISHERIES OVERVIEW

Recreational Fishery Regulatory Framework

The recreational fishery allocation was divided among the three states: Washington, Oregon, and California.

1) The Washington allocation was 35.6 percent of the non-Tribal allocation, minus the allocation made available for incidental harvest in the primary sablefish fishery;
2) The Oregon allocation was 29.7 percent of the non-Tribal allocation;
3) The California allocation was set at 4 percent of the non-Tribal allocation.

State allocations were further divided into subareas and season dates were established preseason for each subarea, with additional dates added inseason for some subareas. Oregon and Washington allocations both contributed to the Columbia River subarea allocation.

Closed Areas

The "C-shaped" North Coast Recreational YRCA, southwest of Cape Flattery, was closed to recreational halibut fishing.

Changes for 2024

The California recreational fishery was split into two subareas, divided at Point Arena (38°57.5’ N lat.).

Recreational Fishery Statistics

Washington

- The allocation was 290,158 lb (not including the allocation for the commercial fishery incidental to the primary sablefish fishery).
- The estimated harvest was 292,482 lb.
- Discard mortality was estimated to be 2,858 lb.
- The bag limit was one halibut per person per day.
- Season dates varied by subarea. The earliest open date was April 4 and the last open date was September 30.
- The Washington portion of the Columbia River subarea allocation and harvest estimates are included above.
- This fishery is closed; however, catch estimates are not yet finalized.

Oregon

- The allocation was 283,784 lb.
- The estimated harvest was 201,695 lb.
- Discard mortality was estimated to be 1,617 lb.
- The bag limit was two halibut in the Central Coast and Southern Oregon subareas and one halibut in the Columbia River subarea.
- Season dates varied by subarea. The earliest open date was May 1 and the last open date was October 31.
- The Oregon portion of the Columbia River subarea allocation and harvest estimates are included above.
- This fishery is closed and catch estimates are final.

California

- The allocation was 38,220 lb.
- The estimated harvest to-date was 20,427 lb.
- Discard mortality was estimated to be 53 lb.
- The bag limit was 1 halibut per person per day.
- Season dates varied by subarea. The earliest open date was May 1 and the last open date was December 31.
- Catch estimates are preliminary as the fishery was ongoing when this report was finalized.

Recreational Fisheries Compliance with Regulations and Enforcement

Table 5. 2024 IPHC Area 2A Enforcement Statistics – Recreational.

2024 IPHC AREA 2A ENFORCEMENT STATISTICS							
RECREATIONAL							
	USCG D-13	USCG D-11	NOAA OLE	WDFW	OSP - ODFW	CDFW	
EFFORT							CONSOLIDATED EFFORT
AIR PATROLS							
Number of Air Patrols	125	86					211
Air Patrol Hours	296	159					455
Air Patrol Personnel Hours							
VESSEL PATROLS							
Number of Vessel Patrols	201	47	7	23	19	15	312
Vessel Patrol Hours	3116	895	73	124	81	43	4,332
At-Sea Personnel Hours			83	284	81	91	539
Number of Boardings	136	4	15	181	107	45	488
SHORESIDE PATROLS							
Number of Shoreside Patrols			6	56	13	64	139
Shoreside Personnel Hours			12	235	28	139	414
Number of Contacts				990	35	206	1,231
OFFICERS/AGENTS/WARDENS							
Number of Assigned Personnel	56	38	3	7		9	113
ACTIONS							CONSOLIDATED ACTIONS
Written Warnings			8		9		17
Citations				65	29	2	96
Verbal Warnings				15		5	20
RESULTS (Violations)							CONSOLIDATED RESULTS
Permit/License			8	9	10	6	33
Gear Violation				17	1	1	19
Fail to Validate Tag					19		19
Illegal Harvest					1		1
Restricted/Closed Area				4	6		10
State Violations - Halibut Fishery				46			46

AREA 2A NON-DIRECTED COMMERCIAL DISCARD MORTALITY OVERVIEW

Pacific Halibut Bycatch in U.S. West Coast Groundfish Fisheries, 2002 – 2023, was reported to the Pacific Fishery Management Council in November 2024 and can be accessed online at: https://www.pcouncil.org/documents/2024/10/i-1-b-nwfsc-report-1-pacific-halibut-bycatch-in-u-s-west-coast-groundfish-fisheries-2002-2023.pdf/.

ALASKA – IPHC REGULATORY AREAS 2C, 3A, 3B, 4A, 4B, 4CDE

ALASKA DIRECTED HALIBUT FISHERIES OVERVIEW

The Pacific Halibut and Sablefish Individual Fishing Quota (IFQ) Program is the largest catch share program in the U.S., and was implemented for the 1995 fishing season. Participation in the IFQ Program is limited to persons (natural persons or non-individual entities) that hold Quota Share (QS), although there are several very limited provisions for "leasing" of annual IFQ. Quota Share is issued as a transferable permit that was initially issued to persons who owned or leased vessels that made legal commercial fixed-gear landings of Pacific halibut or sablefish in the waters off Alaska during 1988-1990.

NMFS annually issues eligible QS holders an IFQ fishing permit that authorizes participation in the IFQ fisheries. Persons with IFQ permits may harvest their annual allocation at any time during the eight plus-month IFQ halibut and sablefish seasons. QS are assigned to a specific species (either halibut or sablefish), management area, and vessel class. For halibut, IFQ management areas correspond to the IPHC regulatory areas. Vessel classes assigned to QS are based upon the overall length of the vessel that the qualifying person used for harvesting during the qualifying years. A catch sharing plan allocates the fishery limits among Areas 4C, 4D, and 4E

Table 6 provides a summary of the 2024 halibut IFQ catch in the respective management areas and vessel classes. Note the table breaks out the portions of the commercial harvest allocated to the IFQ program and to the Western Alaska Community Development (CDQ) Program.

The CDQ Program was established in 1992 for the purpose of developing the economy in western Alaska. Some 65 coastal communities in western Alaska are organized into six CDQ groups and are allocated shares of allowable harvests in the major Bering Sea and Aleutian Islands (BSAI) groundfish and crab fisheries. Among other things, the program provides the opportunity for the CDQ communities to participate and invest in the BSAI fisheries and to support economic and social benefits to the region. CDQ groups are allocated the following percentages of the halibut fishery limits: 20% in Area 4B, 50% of the Area 4C, 30% in Area 4D, and 100% in Area 4E.

Section 303A(c)(1)(G) of the Magnuson-Stevens Fishery Conservation and Management Act requires period reviews of all limited access programs in the U.S., specifically to evaluate the programs' performance in meeting its goals and objectives. In November 2024, the North Pacific Fishery Management Council issued a program report for Sablefish and Halibut IFQ fisheries. The report provides abundant information on the program, including time-series data on a wide range of topics. The report is available on the Council's web site; see: 2024 IFQ Program Review Report.

Table 6. 2024 Alaska Halibut IFQ and CDQ Catch and Allocations by Area

IFQ Area	Vessel Class	Vessel Count	Landing Count	Total Catch in Net (H&G) Weight (lb)	IFQ Allocation
2C	A C/P	19	30	72,275	
2C	B > 60’	27	57	133,794	
2C	C 35 – 60’	261	816	2,529,664	
2C	D <= 35’	86	311	331,334	
	Total	**331**	**1,137**	**3,067,067**	**3,500,000**
3A	A C/P	27	47	187,739	
3A	B > 60’	183	532	2,605,742	
3A	C 35 – 60’	275	1,017	3,654,665	
3A	D <= 35’	63	250	420,960	
	Total	**349**	**1,567**	**6,869,106**	**7,560,000**
3B	A C/P	14	19	73,146	
3B	B > 60’	96	200	1,496,426	
3B	C 35 – 60’	101	188	984,883	
3B	D <= 35’	22	30	77,622	
	Total	**141**	**328**	**2,632,077**	**2,980,000**
4A	A C/P	10	14	42,766	
4A	B > 60’	31	73	415,952	
4A	C 35 – 60’	24	44	218,666	
4A	D <= 35’	4	13	29,238	
	Total	**37**	**109**	**706,622**	**1,280,000**
4B	A C/P	1	**	**	
4B	B > 60’	9	17	235,600	
4B	C 35 – 60’	2	**	**	
4B	D <= 35’	1	**	**	
	Total	**9**	**18**	**273,449**	**872,000**
4C/4D	A C/P	1	**	**	
4C/4D	B > 60’	16	24	333,426	
4C/4D	C 35 – 60’	4	**	**	
4C/4D	D <= 35’	7	29	82,936	
	Total	**18**	**48**	**473,792**	**1,104,000**
Total		**639**	**3,133**	**14,022,113**	**17,296,000**

CDQ Area	Total Catch in Net (H&G) Weight (lb)	CDQ Allocation
4B	**	**218,000**
4C	**	**460,000**
4D	143,391	**276,000**
4E	**	**220,000**
Total	**351,312**	**1,174,000**

1) Source: NMFS Alaska Region IFQ System; Data as of 12/17/2024.
2) IFQ from Area 4C may be fished in Area 4D.
3) Total vessel count reflects unique vessels; individual vessels may record IFQ landings from separate vessel categories
4) Summaries flagged as confidential (**) reflect <3 vessels.

ALASKA RECREATIONAL FISHERIES OVERVIEW

In October 2024, the Department provided final estimates of the 2023 sport halibut removals and preliminary estimates of the 2024 removals for Areas 2C, 3A, 3B, and 4, including information on estimation methods. Additional details on estimation methods are available in Webster and Buzzee (2020).

2023 Regulations Overview and Final Harvest Estimates; Charter and unguided fishing

The Area 2C charter fishery Regulations included a one-fish bag limit, a reverse slot limit of less than or equal to 40 inches or greater than or equal to 80 inches, and Monday closures beginning July 24. The Area 3A charter regulations included a two-fish bag limit with a maximum size of one fish of 28 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, a closure of halibut retention on all Wednesdays, and nine closed Tuesdays. 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 2023 Area 2C estimated sport harvest (excluding release mortality) was 162,821 fish, for a yield of 2.050 Mlb (million pounds). The Area 3A estimated sport harvest was 238,538 fish, for a yield of 2.479 Mlb. The final harvest estimates for western Areas were 254 halibut in Area 3B and 585 halibut in Area 4. Applying the Kodiak unguided average weight of 11.36 lb resulted in yield estimates of 0.003 Mlb in Area 3B and 0.007 Mlb in Area 4 (Table 7).

Area 2C charter removals (including release mortality) were estimated to be 0.832 Mlb, approximately 4.0% over the allocation. Area 3A charter removals were estimated to be 1.588 Mlb, approximately 16.0% under the allocation. Areas 3B and 4 do not have separate charter allocations.

Unguided harvest and removal estimates in Area 2C were 77,910 fish and 1.277 Mlb. Unguided harvest and removal estimates in Area 3A were 83,892 fish and 0.922 Mlb.

Table 7. Final estimates of the 2023 sport halibut harvest (numbers of fish), average net weight (pounds), and yield (millions of pounds net weight) in Areas 2C, 3A, 3B, and 4. "NA" indicates no estimate is available.

IPHC Area	Sector	Harvest (no. fish)	Average Net Wt. (lb)[a]	Yield (Mlb)	95% CI for Yield (Mlb)	
					Lower	Upper
Area 2C	Charter	84,911	9.41	0.799	0.751	0.846
	Unguided	77,910	16.06	1.251	1.071	1.432
	Total	162,821	12.59	2.050	1.822	2.278
Area 3A	Charter	154,646	10.17	1.572	1.418	1.727
	Unguided	83,892	10.81	0.907	0.716	1.098
	Total	238,538	10.39	2.479	2.134	2.824
Area 3B	Total	254	11.36 [a]	0.003	NA	NA
Area 4	Total	585	11.36 [a]	0.007	NA	NA

[a] – No size data were available from Areas 3B and 4, so the unguided average weight from Kodiak was substituted.

2024 Regulations Overview and Preliminary Harvest Estimates: Charter and unguided fishing

The Area 2C charter fishery allocation for 2024 was 0.810 Mlb. Regulations included a one-fish daily bag limit and reverse slot (or "protected slot") limit that allowed harvest of halibut less than or equal to 40 inches and halibut greater than or equal to 80 inches, February 1 through July 14. From July 15 through December 31, the slot limit was less than or equal to 36 inches and halibut greater than or equal to 80 inches. Fridays were closed July 19 and through September 13. The Area 3A charter allocation was 1.89 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. 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 89,303 halibut and 0.843 Mlb, respectively, 4.0% over the 2024 allocation. The preliminary estimates of charter harvest and removal in Area 3A were 161,439 fish and 1.607 Mlb, respectively, approximately 15% under the allocation. The preliminary harvest estimates for 2024 were 340 halibut in Area 3B and 488 halibut in Area 4. Applying the unguided average weight from Kodiak of 13.25 lb resulted in removal estimates of 0.005 Mlb in Area 3B and 0.006 Mlb in Area 4 (Table 8).

Unguided harvest and removal estimates in Area 2C were 71,658 fish and 1.010 Mlb. Unguided harvest and removal estimates in Area 3A were 85,638 fish and 0.878 Mlb.

Table 8. Preliminary estimates of the 2024 sport halibut harvest (numbers of fish), average net weight (pounds), and yield (millions of pounds net weight) in Areas 2C, 3A, 3B, and 4. "NA" indicates no estimate is available.

IPHC Area	Sector	Harvest (no. fish)	Average Net Wt. (lb)[a]	Yield (Mlb)	95% CI for Yield (Mlb) Lower	95% CI for Yield (Mlb) Upper
Area 2C	Charter	89,303	9.07	0.810	0.781	0.840
	Unguided	71,658	13.85	0.992	0.830	1.154
	Total	160,961	11.20	1.803	1.611	1.994
Area 3A	Charter	161,439	9.85	1.591	1.333	1.848
	Unguided	85,638	10.06	0.862	0.604	1.119
	Total	247,077	9.93	2.452	1.938	2.967
Area 3B	Total	340	13.25[a]	0.005	NA	NA
Area 4	Total	488	13.25[a]	0.006	NA	NA

[a] – No size data were available from Areas 3B and 4, so the unguided average weight from Kodiak was substituted.

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. This analysis is a key component of the Area 2C and 3A Halibut Catch Sharing Plan, which 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.

Analyses were requested by the North Pacific Fisheries Management Council's Charter Halibut Management Committee on 25 October 2024. Results were presented at the North Pacific Fisheries Management Council meeting in December. Projected removals in 2025 under status quo regulations are 0.862 Mlb in Area 2C and 1.764 Mlb in Area 3A. Under the suite of management measures recommended by the Council at the December 2024 meeting, removal projections range from 0.608 to 1.013 Mlb for Area 2C and from 1.425 to 2.079 Mlb for Area 3A.

Updates to Data Collection and Estimation Methods for Alaska's Recreational Fisheries

Electronic logbooks became mandatory for charter operators in Southeast Alaska in 2021, and will become mandatory in Area 3A in 2025. 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 15. Preliminary logbook data for trips taken through August 31 were used to project harvest for the year in Area 3A. Starting in 2025, electronic logbooks will be mandatory for all businesses and vessels operating in salt water in Alaskan waters.

Starting in 2022, ADF&G began collecting additional biological data from recreationally caught Pacific halibut in 2C, including age (otoliths) and sex data. In 2024, halibut were sampled for age and sex information in 2C from the ports of Elfin Cove, Ketchikan, and Sitka. Age and sex data continued to be collected in 3A. Otoliths were shipped to the IPHC at the completion of the season for aging. Removal estimates and biological data were provided to the IPHC for the stock assessment.

Other Updates

In March 2023, NMFS approved a collaborative multi-agency effort led by the Marine Recreational Information Program (MRIP) to develop an implementation plan designed to support and improve upon Alaska recreational fisheries data collection programs. Later in 2023 and through 2024, agency partners have focused on key areas of focus to modernize the statewide harvest survey, which is the tool used to estimate all freshwater and unguided saltwater recreational fisheries harvests. Fundamental planning objectives for the modernization include converting from paper to electronic data collection, increase the frequency of data collections to address several issues, including recall and prestige bias, improve the timeliness of data estimates, evaluate the estimation procedures and/or any changes to the sampling design, increase the response rate, and reduce costs through greater efficiencies.

In October 2024, NMFS issued a proposed rule to implement a charter (guided sport) halibut stamp program that will be used as a funding mechanism for the Recreational Quota Entity (RQE). The new program would require a daily stamp for charter halibut anglers who intend to catch and retain halibut. The fees for the stamps would be paid by charter halibut permit holders. Funds collected under the stamp program will be issued to the RQE, which is a non-profit entity authorized to purchase and hold commercial halibut quota shares. The poundage from these shares will be added to the annual halibut allocation that the charter sector currently receives in IPHC Areas 2C and 3A under a domestic catch sharing plan.

Guided Angler Fish Program- 2024 Summary

In 2014, NMFS implemented the guided angler fish (GAF) program to authorize limited annual transfers of commercial halibut Individual Fishing Quota (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 operators an opportunity for their client anglers to retain up to two halibut of any size per day, and to retain GAF halibut on days that are closed to halibut retention.

Table 9 summarizes IFQ to GAF transfers for 2018 through 2024. 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 2024, 175,070 pounds of IFQ was transferred as GAF to the charter fishery; this translated into 2,870 harvestable halibut, which is the highest over the 2014-2024 period. Of the number of harvestable halibut in 2024, 2,504 (87%) of the Area 2C GAF was taken. This contrasts with Area 3A, where 20,677 pounds of IFQ was transferred as GAF in 2024, resulting in 899 harvestable fish. However, only 39% (337 fish) of the Area 3A GAF was taken.[2]

Table 9. Summary of IFQ to GAF transfers 2019-2024

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
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	2,470	1,825 (74%)	106,449		488	79
2023	2C	2,208	1,794 (81%)	109,952	54 (17-83)	560	77
	3A	743	364 (50%)	8,430	39 (22-76)	40	19
	Total	2,951	2,158 (73%)	118,382		600	96
2024	2C	2,870	2,504 (87%)	147,739	53 (21-87)	732	106
	3A	899	337 (39%)	5,509	35 (22-69)	37	16
	Total	3,769	2,851 (76%)	153,248		769	122

[2] GAF Program annual reports are available at: https://www.fisheries.noaa.gov/resource/document/guided-angler-fish-gaf-program-annual-reports.

ALASKA NON-DIRECTED COMMERCIAL FISHERIES OVERVIEW

Current Halibut Non-Directed Catch 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 (i.e. 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 current (Jan. 6, 2025) estimated halibut PSC use for 2023 and 2024 is shown in Table 10;

Halibut Bycatch Management Actions in Progress

BSAI Pacific Cod Trawl Catcher Vessel Cooperative Program

In January 2024, new regulations became effective for the Pacific cod Trawl Catcher Vessel Cooperative Program (PCTC) Program, which created a new limited access program for the directed Pacific cod trawl fishery in the Bering Sea and Aleutian Islands (BSAI). Among other things, the program allocates Pacific cod harvest quota shares to qualifying groundfish trawl license holders and to qualifying processors. It requires participants to form cooperatives to harvest the quota in two of the three regulatory Pacific cod trawl seasons. The third trawl season (C season) remains a limited access fishery without assigned quota or mandatory cooperatives, and is open to all trawl catcher vessels with BSAI license endorsements to harvest Pacific cod.

Some benefits of the PCTC program include more efficient coordination of fishing operations, potential to reduce operational expenses, and increased quality and revenue from the product. Cooperatives are responsible for tracking the cooperative quota and prohibited species catch among their vessels. Catch is monitored through required recordkeeping, reporting, and observer monitoring. Participating vessels are required to have 100% fishery observer coverage. The PCTC program also reduces the halibut prohibited species catch limit by 25 percent; there is a 12.5 percent reduction in the halibut PSC limit in each of the first two years of the program.

More information on the PCTC Program may be found at: Amendment 122, PCTC Program.

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 January 6. 2025.

Area	2023 Total (as of 10/8/24)		2024 Projected, 10/8/24	2024 Actual	Difference, Actual - Projected
2C	Hook-and-line (non-sablefish)	0	1	0	-1
	Hook-and-Line (sablefish)	2	2	1	-1
	Pot	2	2	4	2
	Total	**4**	**5**	**5**	**0**
3A	Trawl	179	293	371	78
	Hook-and-line (non-sablefish)	19	23	12	-11
	Hook-and-Line (sablefish)	1	3	3	0
	Pot	11	8	5	-3
	Total	**210**	**327**	**391**	**64**
3B	Trawl	99	140	131	-9
	Hook-and-line (non-sablefish)	12	12	10	-2
	Hook-and-Line (sablefish)	1	1	0	-1
	Pot	3	3	4	1
	Total	**115**	**156**	**145**	**-11**
4A	Trawl	205	197	173	-24
	Hook-and-line (non-sablefish)	25	24	27	3
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	6	12	10	-2
	Total	**236**	**233**	**210**	**-23**
4B	Trawl	94	65	70	5
	Hook-and-line (non-sablefish)	0	1	2	1
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	1	1	0	-1
	Total	**95**	**67**	**72**	**5**
4CDE	Trawl	862	557	529	-28
	Hook-and-line (non-sablefish)	90	87	89	2
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	1	1	0	0
	Total	**953**	**645**	**618**	**-27**
4 – closed	Trawl	562	632	795	163
	Hook-and-line (non-sablefish)	38	42	54	12
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	2	2	1	-1
	Total	**602**	**676**	**850**	**174**
All Areas	Trawl	2,001	1,884	2,069	185
	Hook-and-line (non-sablefish)	184	190	194	4
	Hook-and-Line (sablefish)	4	6	4	-2
	Pot	26	29	24	-5
	Total	**2,215**	**2,109**	**2,291**	**182**

Note: Prepared by NMFS Alaska Region.
Table 10 includes estimates of Pacific halibut mortality from Federally managed groundfish fisheries and also for the groundfish fisheries managed by the State of Alaska. Pacific Halibut mortality is estimated for each gear type and is apportioned by IPHC Regulatory Area.

Halibut Bycatch Management Actions in Progress (cont.)

Trawl Electronic Monitoring

In July 2024, NMFS adopted rules to implement an electronic monitoring (EM) program for pelagic trawl pollock catcher vessels and tender vessels delivering to processors in the Bering Sea and Aleutian Islands and the Gulf of Alaska. The EM systems use cameras, video storage devices, and associated sensors to record and monitor at-sea fishing activities. This information provides a means to monitor vessels for compliance with management objectives designed to achieve maximized retention and to electronically report catch and discard information. Shoreside observers monitor the bycatch and collect biological information.

This program expands upon the EM program established by NMFS and the North Pacific Fishery Management Council (Council) in 2018 in the partial coverage category for fixed gear vessels. Trawl EM program development was been guided by the Council's Trawl EM Working Group, which developed a collaborative research program to evaluate multiple EM design options and consider various approaches to achieve management needs. The program evolved through pilot projects in 2018 and 2019 and under an Exempted Fishing Permit (EFP) from 2020 through 2024.

Ultimately, the EFP data indicated the objectives for trawl EM were met by: (1) improved salmon and halibut bycatch accounting, specifically in the Western Gulf of Alaska pollock fishery; (2) reduced monitoring costs; (3) improved quality of monitoring data; and (4) improved retention with limited changes in catcher vessel activities. In addition, it was also clear that EM is effective in capturing at-sea discard events to support catch accounting and may capture marine mammal incidents. Finally, EFP data showed some biological sampling can be accomplished at processing plants by observers with effective communication from vessels and processors.

More information for this program, which implemented Amendment 126 and Amendment 114 to the respective Fishery Management Plans for Groundfish in the Bering Sea and Aleutian Islands and the Gulf of Alaska are available online.[3]

Additional Information on 2024 Non-directed Commercial Halibut Mortalities

For additional information on halibut PSC mortality in the Alaska groundfish fisheries, please refer to the December 2024 NMFS inseason management reports to the North Pacific Fishery Management Council; specifically: slides 47 – 50 of the Bering Sea / Aleutian Islands report[4] and slides 45 – 51 of the Gulf of Alaska report.[5]

Detailed information on current observer coverage and electronic monitoring of the Federal fisheries off Alaska, please reference the 2025 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska[6] and the North Pacific Observer Program 2023 Annual Report.[7]

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[3] See: Amendment 126 and Amendment 114 to the Grounfish FMPs in the BSAI and GOA
[4] Available at: NMFS 2024 Inseason Management Report: Bering Sea / Aleutian Islands
[5] Available at: NMFS 2024 Inseason Management Report: Gulf of Alaska [6] Available at: 2025 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska
[6] Available at: 2025 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska
[7] Available at: The North Pacific Observer Program 2023 Annual Report

ALASKA SUBSISTENCE HALIBUT FISHERY OVERVIEW

Subsistence Harvests of Pacific Halibut in Alaska, 2022

Through a grant from the National Marine Fisheries Service (NMFS) (NA22NMF4370240), 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 2022. This project occurs biennially; as a result there are no updated data for 2023. However, data will be collected for the 2024 year. The full results from 2022 will appear in a forthcoming technical paper with a planned publication date of December 2024.

To estimate the 2022 harvests, a one-page survey form was mailed to holders of NMFS Subsistence Halibut Registration Certificates (SHARC) in early 2023. ADF&G staff and local contractors also administered surveys in person in three communities: Nightmute and Tununak in western Alaska and Ketchikan in Southeast Alaska. Additionally, researchers conducted comprehensive household harvest surveys in Port Lions, Ouzinkie, Kake, and Unalaska for the 2022 study year; for each community, federal subsistence halibut harvest questions were asked of responding households. After three mailings and community visits, 3,727 of 6,712 potential subsistence halibut fishers (56%) responded. Participation in the survey was voluntary.

An estimated 2,968 individuals subsistence fished for halibut in Alaska in 2022, about 21% lower than the 2020 fishing year and 41% lower than the long-term average since 2003. The estimated subsistence harvest was 20,896 halibut or 401,603 pounds net weight. This harvest estimate continues a generally decreasing trend in estimated harvests and was the lowest harvest estimate since the federal regulations were adopted in 2003. As expressed in pounds net weight, the 2022 harvest was 24% below 2020 harvests and 54% below the previous 14-year average. It remains unclear whether this decrease is due to actual harvest declining or a decrease in participation in the SHARC program or reporting, or some other factor.

Of the 2022 total subsistence halibut harvest, 73% was harvested with setline (stationary) gear (longline or skate) and 27% was harvested with hand-operated gear (handline or rod and reel). A total of 30 hooks was the most common number of hooks set by halibut fishers who used setline gear (43% of fishers). This pattern was similar to other, earlier study years.

Also similar to all other years, in 2022, the largest subsistence harvests of halibut occurred in Southeast Alaska (Halibut Regulatory Area 2C), with 63% of the total, followed by Southcentral Alaska (Area 3A) at 30%, and East Bering Sea Coast (Area 4E) and Alaska Peninsula (Area 3B) each at 3%. The remaining areas combined accounted for less than 1% of the state total. The majority harvest in Southeast Alaska (63%) in 2022 was an increase from 2020 estimates of 55% of the statewide total.

Based on data from the International Pacific Halibut Commission and the 2022 study year, subsistence harvests accounted for 1% of the 2022 total Alaska halibut removals.

This study was the third year of inclusion of a new question about whether survey respondents had met their needs for halibut; in 2022, there was nearly an even split between those that reported meeting their needs and those that did not, with 49% and 51% respectively. Lack of effort, lack of equipment, and family or personal reasons were the most-cited reasons for not meeting needs.

The 2022 data collection effort was a success, with acceptable response rates and a reliable estimate of subsistence halibut harvests in Alaska for 2022. However, additional outreach and in-person surveys could not be conducted in Sitka, which has historically been one of the communities with the largest population of SHARC holders and highest subsistence halibut harvests. The lack of outreach in the community is evident in the reduced response rate in 2022 (56% compared to >70% in prior study years). Outreach continues to be necessary to maximize enrollment of fishers in the SHARC program and participation in the voluntary harvest survey. Additional research continues to be needed to understand trends in the fishery. Budget constraints dictate that a survey to estimate subsistence halibut harvests in Alaska in 2023 will not take place.

NOAA FISHERIES LAW ENFORCEMENT - ALASKA

NOAA Fisheries Office of Law Enforcement - Alaska Enforcement Division

The Alaska Enforcement Division (AKD) utilizes Enforcement Officers (EOs), Special Agents (SAs), 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 2024, there were 3,300 Individual Fishing Quota (IFQ) halibut permits issued in Alaska and 31 IFQ landing ports. There were 955 charter halibut permits issued, 104 Charter Halibut Permit – Community Quota Entity (CQE), 7 Charter Halibut Permit - Issued to Military Welfare/ Recreational Programs, and 4,538 Subsistence Halibut Registration Certificates (SHARCs).

Patrol and Boardings

In 2024, AKD personnel spent over 3,628 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. AKD boarded 653 vessels with 443 of those boardings being related to halibut.

Table 11. Results of Vessel Boardings

	2022	2023	2024
	Vessel Boardings	Vessel Boardings	Vessel Boardings
Subsistence Halibut	11	14	12
Commercial Halibut	306	361	256
Charter Halibut	108	169	114
Sport Halibut	97	62	61
Total	**522**	**606**	**443**

Compliance Assistance, Outreach, and Education

In 2024, AKD personnel spent over 670 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. In addition to providing on-the-water and dockside outreach to stakeholders through daily interactions, OLE attended and presented at eight community and industry education and outreach events in 2025, focused on informing the public about commercial, charter, and recreational halibut fishing in Alaska.

Incidents

In 2024, AKD opened 748 halibut-related incidents, including outreach, vessel boardings, dockside monitoring, and compliance assistance. Of those incidents, agents and officers identified 394 halibut-related violations, which were resolved by the following action levels, in order from least to most punitive: Compliance Assistance, Summary Settlement, Notice of Violation Assessment (NOVA).

Table 12. Alaska Halibut Violations

	2022	2023	2024
Subsistence Halibut	6	4	5
Commercial Halibut	287	129	255
Charter Halibut	38	65	86
Sport Halibut	26	10	29
Commercial Groundfish Involving Halibut	22	19	19
Total	**354**	**303**	**394**

***Several cases are waiting for NOAA Fisheries General Counsel Enforcement Section to issue NOVAs.**

2024 Halibut-Related Violations documented by NOAA in Alaska:

5 Subsistence halibut fishing violations; most common violations include:
- Unqualified person applied for a SHARC
- Subsistence halibut with sport-caught halibut
- Subsistence halibut fishing without a SHARC
- Gear marking

255 Commercial IFQ/CDQ halibut violations; most common violations include:
- IFQ halibut overages greater than 10%
- Recordkeeping and reporting violations (fail to submit/timely submit a Prior Notice Of Landing (PNOL), Landing Report, Logbook, PTR, or Production Reports)
- Gear marking violations

(cont.)

2024 Halibut-Related Violations documented by NOAA in Alaska (cont.)

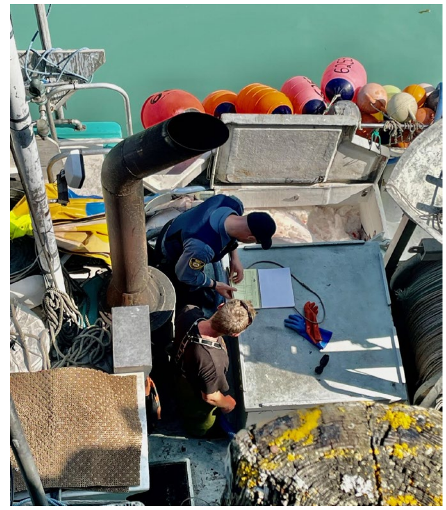
- Failure to release undersized halibut with a minimum of injury by allowing fish to hit the crucifier, remain on deck for a prolonged period of time, and other mishandling issues (e.g., lifting fish solely by caudal peduncle).
- Hired master and permit holder violations
- Vessel cap overages
- Misreporting 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).

19 Commercial groundfish violations involving halibut; most common violations include:
- Failure to carefully release halibut or allow halibut to contact a crucifier or hook stripper
- Puncture halibut with a gaff or other device

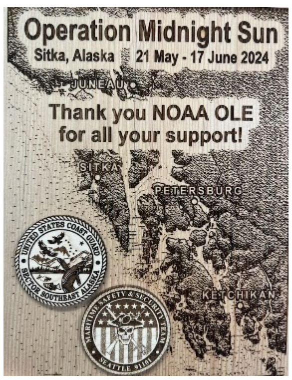
29 Sport halibut violations; most common violations include:
- Sale or attempted sale of sport-caught halibut
- Exceeding bag and/or possession limits
- Filleting, mutilating or skinning halibut onboard a vessel, other than 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, with a patch of skin on each piece, naturally attached
- Sport-caught halibut onboard with commercial caught salmon

86 Charter halibut fishing violations; most common violations include:
- Failure to report GAF in the required time period or submitting inaccurate information
- Logbook violations
- Fishing on closed days
- Unreported halibut
- Illegal guiding - no CHP or Guide permits
- 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
- Not retaining carcasses for size restricted halibut
- Exceeding bag limit, possession limit, size limits, or annual limits
- Charter fish without a CHP/without an original copy of CHP
- Halibut retained not within slot limit size

2024 Partnerships & Patrols Highlights



The Office of (OLE) and Alaska Division (AKD) conducts 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 May and June, EOs partnered with the USCG Maritime Safety and Security Team (MSST)-Seattle for a joint operation focused on halibut. During operation Midnight Sun, there were 16 individual joint patrols conducted. They deployed multiple assets, including the NOAA P/V OOXJA, USCGC KUKUI, and two 29ft Metal Sharks, with rotary-winged aerial support. During the course of the operation, 120 commercial, Charter, and recreational vessels were boarded. Ten North Pacific Halibut Act violations were discovered related to recordkeeping and reporting (logbook), improper permit/license, and mutilated halibut, in addition to many maritime safety infractions.

In June and July, EOs conducted four multi-vessel and multi-day patrols. The first, along the Canadian border in Southeast Alaska, concentrated on foreign and domestic recreational and commercial fishing vessels adjacent to and within disputed zones. Twenty charter halibut and recreational halibut vessels were boarded throughout the week, and ten violations were discovered. Multiple violations were found on foreign and domestic vessels, including illegal harvest in US waters. During the second, two EOs and an SA conducted a patrol in southeast Alaska, boarding eight vessels and discovered three violations related to recordkeeping and reporting. On the third, a joint patrol between OLE and the USCG MSST, 13 vessels were boarded and found to be in compliance, with a single violation referred to another agency. In July, two EOs and a SA conducted a patrol in Southeast Alaska. During the fourth, two EOs and one SA boarded five vessels and found two violations related to recordkeeping and reporting.

In August, OLE conducted multiple patrols. In one, two EOs conducted a multiday patrol in Southeast Alaska. During the patrol, 40 vessels were boarded, and 22 violations were found, including recordkeeping and reporting (charter logbook) and chunked halibut. They contacted four lodges, stopped in seven small communities, and visited one processor, providing regulatory outreach and education to stakeholders. In the second, two EOs patrolled Southcentral Alaska, boarding eight commercial, charter, and recreational vessels, documenting five violations of improperly marked gear, failure to produce required documents (permits, Vessel Monitoring Plans), and recordkeeping and reporting issues.

UNITED STATES COAST GUARD ENFORCEMENT REPORT – ALASKA REGION

Coast Guard Resources in Alaska

The U.S. Coast Guard (USCG) 17th District (D17) encompasses the U.S. waters of Alaska out to 200 nautical miles, and includes the IPHC Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. Resources used for fisheries enforcement include cutters, aircraft, boats from coastal stations, and remote sensing platforms.

Cutters:

- 418-foot National Security Cutters (NSCs) homeported in California and Hawaii are assigned to patrol D17 waters throughout the year.
- The 282-foot Medium Endurance Cutter USCGC ALEX HALEY homeported 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) homeported 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 homeported 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 across the Alaska Exclusive Economic Zone.
    - Five C-130 fixed wing aircraft
    - Nine MH-60 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 most 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.These flights provide sightings of vessels while fishing and in transit. Additionally, queries by the aircraft record target species, permits, and status of 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.

Halibut Enforcement

In Calendar Year 2024, the USCG distributed its enforcement assets throughout the Alaska IPHC Areas, with boarding numbers listed in Table 13. 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. 2022, 2023 & 2024 Geographic Distribution of Boardings on Vessels Targeting Halibut

IPHC Area	2022 Boardings	2023 Boardings	2024 Boardings
2C	413	307	370
3A	112	68	177
3B	0	0	0
4A	1	6	5
4B	1	0	1
4C	0	7	0
4D	0	0	0
4E	0	0	1
Total	527	388	554

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 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.

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. Recreational fishing activity is most prevalent from May to 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% of the halibut boardings in D17.

During recreational and charter boardings, the USCG places emphasis on (1) compliance with licensing and charter operation requirements, (2) size limits, (3) daily catch and trip limits, and (4) at-sea processing of halibut.

Violations and Enforcement Summary

In 2024, USCG assets boarded a total of 554 vessels and detected 15 violations on 6 vessels. The USCG documented these violations and referred them to NOAA OLE or Alaska Wildlife Troopers for final action as appropriate. Table 14 compares at-sea boardings and violations between 2023 and 2024.

Table 14. 2023 & 2024 Boarding and Violation Summaries by Industry Sector

2023 Boardings/Violations		2024 Boardings/Violations	
Total At-Sea Boardings	388	Total At-Sea Boardings	554
Commercial	97	Commercial	84
Charter	64	Charter	132
Recreational/Subsistence	227	Recreational/Subsistence	338
Fisheries Violations	15	Fisheries Violations	16
Commercial	12	Commercial	15
Charter	3	Charter	0
Recreational/Subsistence	0	Recreational/Subsistence	0
Fisheries Compliance Rates	96.9%	Fisheries Compliance Rates	98.9%
Commercial	89.7%	Commercial	92.9%
Charter	96.9%	Charter	100%
Recreational/Subsistence	100%	Recreational/Subsistence	100%

In Area 3A:

- One commercial vessel was cited for improper logbooks and failure to retain incidental rockfish while fishing for halibut.
- One commercial vessel was cited for not keeping a logbook.

In Area 4A:

- One commercial vessel was cited for failure to retain incidental Pacific Cod while fishing for halibut, failure to maintain proper logbooks, improper buoy markings, and failure to retain incidental rockfish.
- One commercial vessel was cited for improper logbooks and improper buoy markings.
- One commercial vessel was cited for failure to retain incidental Pacific Cod while fishing for halibut and failure to retain incidental rockfish.

In Area 4E:

- One commercial vessel was cited for not having a Limited License Permit (LLP) onboard and not having a hired master permit while commercially fishing for halibut.

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 14, USCG assets documented 95 safety violations on 65 vessels including insufficient fire extinguishers, expired visual distress signals, and expired hydrostatic releases for survival craft and/or EPIRB. Two commercial vessels' voyages, three charter vessels' voyages, and 13 recreational vessels' voyages were terminated for safety.

Enforcement Plans for 2025

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 continue to examine the practice of unguided/bareboat charters and their effect on boating safety.

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.

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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.

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

Compliance and Enforcement Priorities

The enforcement priorities for groundfish, including commercial Halibut, for 2024 are outlined in the Groundfish Integrated Fisheries Management Plan. These priorities are set by the Groundfish Enforcement Coordinator and remain unchanged from 2023. Here are the key points:

1. **Closed Area Fishing**: Enforcement in rockfish conservation areas, sponge reef marine protection areas, marine conservation areas, interim sanctuary zones, and other permanent and in-season fishing closures.
2. **Retention Without Licence**: Focus on groundfish caught, retained, or possessed without proper licence authority, especially when intended for sale.
3. **Unauthorized Commercial/FSC Fishing**: Addressing unauthorized dual fishing activities.
4. **Monitoring Program Compliance**: Ensuring compliance with 100% at-sea and dockside monitoring programs, including hails, electronic monitoring systems, accurate fishing logs, and proper offloading procedures.
5. **False Statements**: Preventing false and misleading statements to DFO designated observers.
6. **Assistance to Observers**: Ensuring vessel masters and landing station personnel provide all reasonable assistance to DFO designated observers.
7. **Rockfish Release**: Prohibiting the release of rockfish at sea.
8. **Registration**: Ensuring all persons on board a commercial fishing vessel are registered, especially those aged sixteen or older.
9. **Prohibited Species**: Preventing the retention of prohibited species.
10. **Seabird Avoidance Gear**: Ensuring the deployment of seabird avoidance gear.
11. **Fish Slips**: Requiring vessel masters to submit fish slips within thirty days after landing.

COMMERCIAL FISHERIES OVERVIEW

Summary/Regulatory Framework

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 2024, the CTAC was 5,970,000 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 2024 Commercial and Recreational catch limit for allocation purposes was 5,775,000 net pounds (table 1).

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 2024 commercial TAC. As of December 17, 2024, 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 5,239,182 net pounds (table 1).

In 2024, the Canadian commercial Pacific halibut catch totalled 4,386,271 net pounds (table 1). 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 2024 Halibut catch until February 20, 2025, after which released at-sea mortality will be attributed to the 2025 TAC. As such the 2024 commercial catch is current as of December 17, 2024.

The 2025/2026 commercial groundfish fishing season will commence February 21, 2025, 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

Monitoring

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 (via at-sea observers, or electronic monitoring) and 100% dockside monitoring for all groundfish vessels.

Groundfish hook and line fisheries have almost exclusively utilized electronic monitoring (EM) systems for at-sea monitoring for nearly two decades. In April 2020, electronic monitoring was formally launched on groundfish trawl vessels, when at-sea observers were removed due to the Covid-19 pandemic. EM systems were configured on a vessel-by-vessel basis to ensure that groundfish fish trawls vessels met the 100% at-sea monitoring requirements that were previously completed by at-sea observers. Details regarding the trawl EM system requirements can be found in section 14 of appendix 8 in the Groundfish Integrated Fisheries Management Plan.

During the 2023/24 groundfish fishing season, a pilot program for collecting Halibut length samples in the trawl sector using EM technology was developed in collaboration with industry representatives and Archipelago Marine Research (AMR) in the Option A groundfish trawl fishery. The pilot ran for approximately 7 months and was implemented fleetwide in May 2024.

While Pacific Halibut remains a prohibited species in the trawl fishery and must be released in accordance with existing requirements, the purpose of this program is to facilitate the collection of Pacific halibut length information using a representative sampling design. Vessel crew are responsible for placing Pacific halibut on a specialized measuring board in view of the vessel’s electronic monitoring (EM) camera so AMR EM program video reviewers can estimate lengths and weight using the International Pacific Halibut Commission's (IPHC) current length-weight table. Information collected from the program will be used to meet Canada's international commitments to support IPHC data requirements for stock assessment purposes.

Fishery statistics

Table 1. Halibut allocations in Canada as of December 17, 2024. All values in net pounds.

Commercial / recreational TAC for allocation [A]	5,775,000
Commercial allocation	x 85%
O26 wastage	- 180,000
Research (use of fish)	- 60,000
Commercial TAC for allocation purposes	4,668,750
Recreational allocation	X 15%
O26 wastage	- 30,000
Recreational TAC	836,250
Total commercial catch [B]	4,386,271
2B commercial and recreational catch [C]	5,239,182

A Value does not include underage carried forward from 2023/24 fishing season.

B Catch includes all landed fish from the commercial hook and line sector, as well as the mortality associated with legal-sized released fish in the hook and line sector.

C Catch includes all landed fish from both the commercial and recreational sectors, as well as the mortality associated with legal-sized released fish in the commercial trawl fishery.

Compliance with Regulations and Enforcement

Below is a comparison of the commercial halibut fishery statistics between 2023 and 2024:

- **2024 Season**:
    - **Opening Date**: March 15, 2024, at 06:00 Pacific Daylight Time
    - **Closing Date**: December 07, 2024, at 23:59 Pacific Standard Time
    - **Total Vessels**: 136
    - **Total Fishing Trips**: 492

- **2023 Season**:
    - **Opening date**: March 7, 2023, at 12:00 Pacific Standard Time
    - **Closing date:** December 10, 2023, at 12:00 Pacific Standard Time
    - **Total Vessels**: 139
    - **Total Fishing Trips**: 535

The 2024 season saw a slight decrease in both the number of vessels (from 139 to 136) and fishing trips (from 535 to 492). This reduction could be attributed to the 11-day shorter fishing season in 2024.

Marine Patrol Program

The Marine Patrol Program (MPP) is a dedicated enforcement initiative that contracts the Canadian Coast Guard for support.

- The MPP operates two 140-foot ships: the CCGS Captain Goddard and the CCGS M Charles.
- The MPP vessels are staffed 24 hours a day with nine Coast Guard employees and have 2-3 Fishery Officers permanently on board
- The Fishery Officers use a 7.53-meter rigid hull inflatable for at-sea patrols.
- The primary purpose of the MPP is to support land-based detachment operations by patrolling the marine components of the land-based detachments' areas of responsibility.
- The MPP Detachment Commander (DC) collaborates closely with other Detachment Commanders and Area Chiefs to determine regional priorities and develop general patrol plans to best utilize the MPP.
- Once plans are developed, the shipboard crews work closely with the land-based detachment field staff to implement strategic daily patrols based on the priorities set by Regional Headquarters and supervisory staff.

In 2024, the MPP conducted 26 two-week patrols across the two ships. Of these, four patrols were specifically dedicated to groundfish. The primary patrol areas spanned from north of Cape Caution to the Alaskan border (North Coast).

- Fishery Officers conducted inspections on 12 commercial halibut vessels (L) and 5 (five) commercial/communal vessels (FL).
- Common violations included:
    - Undersized halibut
    - Lack of seabird avoidance gear
    - No personal fishing licences
    - Failure to mark FSC-caught fish in the logbook
    - Fishing outside the FSC area
    - Turning off Electronic Monitoring Equipment prior to landing
    - Failure to produce licensing paperwork

Aerial Surveillance Patrol

The Fishery Aerial Surveillance Enforcement (FASE) Detachment primarily patrols Canada's EEZ with a Dash 8 Aircraft.

- The FASE unit is a dedicated team comprised of three Fishery Officers whose primary responsibility is flying.
- The FASE unit uses a variety of aerial surveillance resources throughout the year to ensure compliance with the Fisheries Act, regulations, licence conditions, and other relevant acts and regulations.
- Flight reports, photographs, videos, and other data collected from 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.

In 2024, FASE conducted 108 missions, patrolled 752.49 hours, and encountered 209 halibut (L) vessels and 3 commercial/communal (FL) vessels.

In 2023, FASE conducted 101 missions, patrolled 757.77 hours, and encountered 426 commercial halibut (L) vessels and 29 commercial/communal (FL) vessels.

The number of halibut vessels encountered in 2023 is an anomaly, and the reasons for this increase are unclear. The 2024 data aligns with the typical number of missions, patrol hours, and encountered halibut vessels seen in previous years.

Third Party Service Provider Reporting: Archipelago Marine Research Ltd.

Archipelago Marine Research Ltd (AMR) is a DFO-designated at-sea observer and dockside monitoring company.

- All observers employed by AMR are designated under section 39(1) of the Fishery General Regulations.
- All commercial groundfish fishing trips are required to be validated by a designated AMR observer.
- All commercial groundfish fishing trips also require an at-sea observer or 100% electronic monitoring.
- The BC Commercial Integrated Groundfish Society (BCCIGS) represents the commercial groundfish sectors covered in the Integrated Fisheries Management Plan, including Lingcod, ZNO, ZNI, Dogfish, Halibut, Sablefish, and Trawl, as well as the Trawl and Hand Line Processors.
- The BCCIGS makes decisions about service providers that support the Commercial Industry Caucus process (such as web office, facilitation, etc.) and administers the contracting process for the provision of Hook and Line electronic monitoring (currently provided by AMR).
- AMR provides cameras, GPS sensors, and hydraulic sensors to commercial fishers as part of their contract.
- Members of the BCCIGS use AMR to hail in and out for commercial fishing.
- AMR also provides all dockside validations as part of their contract with the BCCIGS.
- AMR manages the commercial hook and line logbook data and validation records, and uploads this information into FOS.
- AMR has checks and balances in place to ensure that the information entered into FOS is true and accurate.
- AMR produces occurrence reports based on thresholds identified by DFO which are stored in AMR's portal

AMR Generated Occurrence Reports

AMR generated 276 halibut-related occurrence reports (OR) and 72 combination halibut/sablefish occurrence reports in 2024, compared to 197 halibut-related occurrence reports and 36 combination halibut/sablefish occurrence reports in 2023. This represents an increase of 115 occurrence reports (49.4%) in 2024.

ELECTRONIC MONITORING RELATED – 3% decrease from 2023

2024 – 22.4% of OR	2023 – 23.1 % of OR
Time Gaps – 18 OR	Time Gaps – 12 OR
Monitoring Equipment – 60 OR	Monitoring Equipment – 42 OR

RELEASED ROCKFISH – 44% increase from 2023

2024 – 19.2 % of OR	2023 – 13.3% of OR
67 OR	31 OR

UNDERSIZED HALIBUT – 172% increase from 2023

2024 – 4.9 % of OR	2023 – 1.8% of OR
17 OR	4 OR

CLOSED AREA – 32.4% decrease from 2023

2024 – 2.3% of OR	2023 – 3.4% or OR
GHLSP protection Zone – 3 OR	MPA – 1 OR
RCA – 5 OR	RCA – 6 OR
	USA – 1 OR

PROHIBITED SPECIES – 30.8% decrease from 2023

2024 – 0.9% of OR	2023 – 1.3% of OR
3 OR	3 OR

NO COMMERCIAL HALIBUT LICENCE

2024	2023
1 vessel	1 vessel

Notable Management Updates

The commercial groundfish fisheries, including the Halibut sector, saw several notable management changes for the 2024 season. These changes include:

- A rollover of the seasonal expansion (November 1, 2024 – April 30, 2025) 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 will be re-evaluated during the 2025/2026 fishing season.
- The continued engagement regarding the Marine Protected Area (MPA) Network Action Plan (NAP) for the Northern Shelf Bioregion (NSB) by the trilateral partnership of the Government of Canada, the Province of BC and 17 First Nations. Trilateral partners are focused on network coordination and implementation, including establishing governance and development of a network workplan that will focus on monitoring, cumulative impacts, reporting and engagement on Network implementation.
- Engagement regarding reforms in the licensing and management of Canada's west coast commercial fishing industry commenced in July 2024. Termed West Coast Commercial Fisheries Modernization (WCCFM), this initiative aims to engage with a broad spectrum of people involved in commercial fisheries. The Standing Committee on Fisheries and Oceans (FOPO) held hearings in 2019 and 2023 on west coast fisheries licensing, foreign ownership and corporate concentration. DFO has been undertaking broad engagement with First Nations, Indigenous groups and industry stakeholders on five overarching topics: inclusive representation on fishery advisory boards, transparency of licence and quota holdings,

strengthened and more transparent socio-economic data, foreign ownership and concentration of access, and modernizing licensing and management rules to better support economic sustainability. DFO is seeking detailed input at a series of workshops in February 2025.

RECREATIONAL FISHERIES OVERVIEW

Summary

The recreational halibut fishery had a TAC of 836,250 net lbs for the 2024 season. However, an overage of 30,571 net lbs was incurred in the 2023 season prior to its early closure on September 30, 2023. The Canadian recreational halibut sector has a overage provision, which indicates that, in addition to an early closure of the fishery, if recreational catch exceeds the TAC for a given season, catch exceeding the TAC would be deducted from the following year's TAC. As such, the overage incurred in the 2023 season was deducted from the 2024 TAC prior to the season's opening, resulting in a fishable TAC of 805,679 net lbs (table 2).

The 2024 recreational halibut fishery opened on February 3, 2024, with a daily limit of 1 fish per day. The fishery operated under the 2023 recreational licence until March 31. On April 1, the 2024 licence and management measures entered into effect, with a daily limit of 1 fish per day. 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 2024 measures included:

- A maximum length of 126 cm 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 85 cm to 126 cm head-on length - OR - two (2) halibut measuring under 85 cm head-on length.
    - If the Daily Limit is three (3):
        - the Possession Limit is EITHER of: one (1) halibut measuring from 85 cm to 126 cm head-on length – OR - three (3) halibut measuring under 85 cm head-on length.
    - NOTE: If in possession of one (1) Halibut 85 cm head-on length or longer, you shall not possess any other Halibut
- An annual limit of ten (10) in aggregate, from April 1, 2024 to March 31, 2025
- 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 met monthly throughout the fishing season to review estimated catches. By August of 2024, 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 85 cm in length – varying the daily limit from one (1) daily to two (2) daily on August 21, 2024. The daily limit was reduced back to one (1) daily on September 20, 2024. As the season progressed catch estimates for summer months showed higher than forecasted catch. Catch information indicated that the recreational share of the Total Allowable Catch for halibut was going to be achieved by mid-fall 2024. The committee voted to close the recreational fishing for halibut under the BC Tidal Waters Sport Fishing Licence at 23:59 hours on October 9, 2024.

Experimental Recreational Halibut 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. 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, if they are in good standing. 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.

In 2024, 256 XRQ licences were issued and 7,663 net lbs of uncaught quota was carried forward from the previous season. As of December 17, 2024, estimated catch from the XRQ program was 18,553 net lbs (table 2).

Monitoring

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 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 2024 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 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 2024 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 2024, DFO used in-season iREC survey catch estimates. In 2024, approximately 86% of the catch estimate was derived from traditional catch monitoring sources, and 14% from iREC survey estimates.

Biological data received as length is converted to net weight using the following formula developed by the IPHC, approved by the Commission at AM098, and adopted for use in the Canadian fishery beginning in the 2023 season:

$$\textbf{Net weight} = (7.031 * 10^{-6}) * \textbf{length (cm)})^{3.231}$$

Biological data received as round weight is converted to net weight, head off and dressed, using a 75% conversion factor. The conversion to net weight via length instead of round weight is prioritized when both biological metrics are provided.

Final estimates are anticipated to be available by the spring of 2025. Estimated harvest in pieces and net weight by regional areas are noted below.

Fishery statistics

Table 2. Halibut for 2B recreational and the Halibut Experimental Recreational pilot program (XRQ) fisheries as of as of December 17, 2024. All values in net pounds.

Initial Recreational TAC	836,250
2023 Recreational Overage	30,571
Fishable Recreational TAC	805,679
Recreational catch [A]	834,358
XRQ TAC	20,432
XRQ catch	18,553 [B]
Fishable Recreational and XRQ TAC [C]	826,111
Recreational and XRQ catch [D]	852,911

A This is an in-season catch estimate. The final estimate is anticipated to be available by Spring 2025.

B Effective December 17, 2024.

C 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.

D Catch includes all landed fish.

Table 3. Summary of the 2024 Recreational Halibut Catch by Pacific Fishery Management Area (PFMA)

Regional Area	PFMA	Piece Count	Total Net Wt. (net lbs)
Haida Gwaii	1	15,009	133,589
	2	2,440	31,015
North Coast	3	7,084	125,064

	4	10,032	122,195
	5/6	2,863	34,610
Central Coast	7/8/9	3,734	35,019
South Coast	10/11/111	1,397	18,740
	12	1,203	11,430
	13/14	71	615
	15-18/28/29	2	30
	19	1,999	30,098
	20	657	7,821
	21/121	3,455	47,600
	23/123	5,789	72,971
	24/124	3,740	64,589
	25/125	2,006	28,673
	26/126	2,320	37,335
	27/127	2,476	32,964
Total Landed Catch		66,277	834,358
2023 Recreational Overage			30,571
2024 Fishable Recreational TAC			805,679
Estimated Remaining Balance (end of September)			-28,679
			-3.56%

Table 4. Recreational Halibut Monthly Catch Estimates (net weight, lbs) for 2020, 2021, 2022, 2023 and 2024.

	Net Weight (net lbs)					Cumulative Net Weight (net lbs)				
	2020	**2021**	**2022**	**2023**	**2024**	**2020**	**2021**	**2022**	**2023**	**2024**
FEB	0	0	1,448	2,266	3,657	0	0	1,448	2,266	3,657
MAR	3,814	13,466	5,371	5,211	6,867	3,814	13,466	6,818	7,478	10,523
APR	7,111	10,923	12,057	15,808	12,226	10,926	24,389	18,876	23,286	22,749
MAY	26,356	55,931	62,298	39,193	60,143	37,282	80,320	81,174	62,479	82,893
JUN	74,348	153,858	196,453	169,935	167,072	111,630	234,179	277,627	232,414	249,964
JUL	182,655	289,479	314,871	351,683	247,450	294,284	523,657	592,499	584,097	497,414
AUG	148,422	202,856	275,558	275,390	281,775	442,707	726,513	868,057	859,487	779,189
SEP	69,419	45,733	53,776	49,036	55,169	512,125	772,246	921,833	908,523	834,358
OCT	4,236	1,021	3,654	1,276	-	516,361	773,267	925,486	909,799	-
NOV	398	2,041	1,009	0	-	516,758	775,307	926,496	909,799	-
DEC	2,216	40	2,348	1,022	-	518,974	775,347	928,844	910,821	-
Total	518,974	775,347	928,844	910,821	834,358	518,974	775,347	928,844	910,821	497,414

2023 Recreational Overage	30,571
2024 Fishable Recreational TAC	805,679
Estimated Total Catch	834,358
Estimated Remaining Balance (end of September)	-28,679
	-3.56%

A This is an in-season catch estimate. The final estimate is anticipated to be available by Spring 2025**.**

Compliance with Regulations and Enforcement

Below is a comparison of the recreational halibut fishery between 2023 and 2024:

- **2024 Season**:
  - **Opening Date**: February 3, 2024, at 00:01 Pacific Standard Time Fishery Notice (FN) FN0084
  - **Daily Limit**: 1 (one) halibut per day
  - **Possession Limit**: one (1) halibut measuring 90 cm to 126 cm in length (69 cm to 97 cm head-off), OR two (2) halibut, each measuring under 90 cm in length (69 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
  - **In Season Change**: April 1, 2024, at 00:01 Pacific Daylight Time FN0238
  - **Daily Limit:** 1 (one) halibut per day
  - **Possession Limit:** one (1) halibut measuring 85 cm to 126 cm in length (65 cm to 97 cm head-off), OR two (2) halibut, each measuring under 85 cm in length (65 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
  - **In Season Change**: August 21, 2024, at 00:01 Pacific Daylight Time FN0838
  - **Daily and Possession Limit**: one (1) Halibut measuring 85 cm to 126 cm in length (65 cm to 97 cm head-off), OR two (2) Halibut, each measuring under 85 cm in length (65 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
  - **In Season Change**: September 20, 2024, at 00:01 Pacific Daylight Time FN0971
  - **Daily Limit**: 1 (one) halibut per day
  - **Possession Limit**: one (1) halibut measuring 85 cm to 126 cm in length (65 cm to 97 cm head-off), OR two (2) halibut, each measuring under 85 cm in length (65 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
  - **Closing Date**: October 9, 2024, at 00:01 Pacific Daylight Time FN1042
  - **Annual limit**: 10 (ten) halibut
  - **Total Licences**: 352,701

- **2023 Season**:
  - **Opening date**: February 1, 2023, at 00:01 Pacific Standard Time FN0100
  - **Daily Limit**: 1 (one) halibut per day
  - **Possession Limit**: one (1) halibut measuring 90 cm to 133 cm in length (69 cm to 102 cm head-off), OR two (2) halibut, each measuring under 90 cm in length (69 cm head-off). No person shall retain a Halibut greater than 133 cm head-on length (102 cm head-off).
  - **In Season Change**: April 1, 2023, at 00:01 Pacific Daylight Time FN0264
  - **Daily Limit:** 1 (one) halibut per day
  - **Possession Limit:** one (1) halibut measuring 90 cm to 126 cm in length (69 cm to 97 cm head-off), OR two (2) halibut, each measuring under 90 cm in length (69 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
  - **In Season Change**: July 8, 2023, at 00:01 Pacific Daylight Time FN0628

- **Daily and Possession Limit**: one (1) Halibut measuring 90 cm to 126 cm in length (69 cm to 97 cm head-off), OR two (2) Halibut, each measuring under 90 cm in length (69 cm head-off). No person shall retain a Halibut greater than 126 cm head-on length (97 cm head-off).
- **Closing date:** September 30, 2023, at 23:59 Pacific Daylight Time FN1049
- **Annual Limit:** 10 (ten) halibut
- **Total Licences**: 350,548

Recreational Licences are issued for a fiscal year (April 1 – March 31).

The main change in recreational halibut regulations from 2023 to 2024 was the adjustment of the daily limit.

- From February 3, 2024, to August 20, 2024, the daily limit for halibut was set at 1 (one).
- The daily limit increased to 2 (two) halibut from August 21, 2024, to September 19, 2024, but this only applied to halibut less than 85 cm.
- The daily limit was reduced back to 1 (one) halibut on September 20, 2024.

Experimental Recreational Halibut Program

The Experimental Recreational Halibut Program (XRQ) provides an opportunity for recreational harvesters to retain halibut in excess of the size and daily/possession limits.

- In addition to the Tidal Waters Sport Fishing Licence, recreational harvesters may apply for the experimental licence on a voluntary basis. This licence allows the holder to purchase halibut quota from the commercial sector for use in the recreational fishery. A minimum of 20 pounds of quota is required to be purchased to activate the licence.
- It was introduced in response to feedback from harvesters, who indicated that additional opportunities for recreational halibut fishing would increase stability and certainty.
- Through this program, approved recreational harvesters can fish until December 31st, even if the regular recreational halibut fishery under the Tidal Waters Sport Fishing Licence is closed.

The XRQ fishery was open from April 1, 2024, to December 31, 2024.

- There were 256 XRQ licences issued in 2024, compared to 225 in 2023.
- In 2024, only 6 experimental licence holders failed to purchase the minimum 20 pounds of halibut quota to activate their licence, compared to 28 in 2023.
- This improvement is attributed to the education and warning letters issued in 2023.

INDIGENOUS FISHERIES OVERVIEW

Summary

The estimated Food, Social, and Ceremonial (FSC) halibut catch in area 2B is 405,000 net pounds. Since 2009, 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 2024, approximately 29,548 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, an activity known as dual fishing. 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 49,283 net pounds in 2024). 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.

In order to advance reconciliation efforts, consultations with Indigenous Peoples and the implementation of Reconciliation Framework Agreements, Treaties and rights-based fisheries as they pertain to groundfish have occurred throughout 2024 and will be ongoing throughout the 2025/26 fishing season.

Compliance with Regulations and Enforcement

For all dual fishing (commercial and FSC) halibut trips (FL Licences) the vessel master is responsible for following the halibut commercial/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 2024, 35 commercial/communal commercial halibut vessels completed 132 dual fishing trips, compared to 49 vessels completing 128 dual fishing trips in 2023.

Directed FSC halibut fishing does not have electronic monitoring or the dockside validation requirements.

RECOMMENDATIONS

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-NR01 Rev_1 which provides the Commission with an overview from Fisheries and Oceans Canada of the Pacific halibut fisheries in 2024 in the IPHC Convention waters and the national waters of Canada.

APPENDICES

Appendix I

Province of British Columbia 2024 Annual Report

PROVINCE OF BRITISH COLUMBIA 2024 ANNUAL REPORT

PREPARED BY: British Columbia Ministry Water, Land, and Resource Stewardship

DATE: 12/DEC/2024

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 now over a 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 100th session of the IPHC Annual Meetings in 2024. 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 BCs top 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 2023, the survey showed the processing of 3,160 tonnes (6.97M lbs) of Pacific halibut, which includes some imported halibut processed in BC. The survey also showed landed and wholesale values of $53.6M and $60.8M, respectively. In 2023, BC exported $53.3M worth of halibut products[1]. The Province historically conducts a seafood sector employment survey which provides data on jobs, wages, and seafood processing activities. The most recent available data from 2022 show that the fish and seafood processing in BC provided 2,465 jobs with related labour income estimated at $138.3 million[2].

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. In 2022, revenue associated with spending by sport fishers was estimated at $1.1 billion, accounting for 33.0% of total revenue in the fisheries and aquaculture sector. Additionally, there were 4,866 jobs in industries benefitting from spending by sport fishers, representing nearly half of the employment in all BC fisheries and aquaculture sectors in 2022[2]. Beginning in 2019, there were severe restrictions on salmon fishing in BC which will continue in future years, which have amplified the importance of the halibut fishery to the recreational sector.

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 priority and is working to ensure that First Nations are meaningfully included in management of all BC fisheries.

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.

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.

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, 100 percent dockside monitoring, and auditing programs in place to compare validated landed catch with at-sea catch records from both the vessel and the third party contracted source. 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 remains concerned with levels of bycatch in Alaskan fisheries and the uncertainty in the data that comes along with fisheries that are only partially monitored. The IPHC secretariat annually releases the Fisheries Data Overview report that summarizes the total annual removals by regulatory area and fishery[4]. Data in these tables for the non-directed commercial discard mortalities are supplied by observer programs run by Contracting Party agencies in most fisheries. In BC, these estimates are reliably provided by the well-established data systems as part of the 100 percent monitoring programs outlined above. Every year, the Fisheries Data Overview contains statements regarding how Regulatory Area 3 remains the area where non-directed commercial discard mortality is estimated most poorly, where the lowest coverage rates are realized for the non-pelagic trawl fishery, which also has the highest likelihood of encountering Pacific halibut. The report outlines an analysis showing how observed trips are not representative of all trips in many regards (e.g., duration, species composition, etc.)[4]. The report concludes that non-directed commercial discard mortality estimates for the Gulf of Alaska (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 and unobserved trips. Alaska's annual deployment plan for observers and electronic monitoring report[5] outlines the expected number of total trips and expected number of observed trips by area and gear types. For the 2024 fishing season this report estimated a total of around 4,100 trips across all fisheries would take place in Area 3, with around 3,200 of those trips to be unobserved (this does not include the anticipated 1,400 additional trips in Area 3 that will be unobserved due to monitoring not being available on smaller vessels under 40ft). The report outlines the increased monitoring efforts in the Bering Sea Aleutian Islands, and the advancements in monitoring efforts in Alaska in general. While B.C. appreciates the increased efforts in Alaskan catch monitoring, the remaining expected number of unobserved trips combined with IPHC secretariat's analysis that in Area 3 observed trips are not representative of all trips, leaves serious concerns for the accuracy of bycatch numbers and the total mortality of halibut in these areas.

BC's concerns also include the high volumes of bycatch in Alaskan fisheries that impact other species, and the impacts that Alsakan removals have on BC fisheries of all species that move between Canadian and US waters. This bycatch includes over 87,000 salmon caught as bycatch in Alaskan fleets in 2024, of which over 38,800 were vulnerable chinook salmon[4]. For halibut, IPHC research has shown a historic migration from Alaskan waters to eastern and southern regulatory areas, making Alaskan fisheries directly impact the fish moving down to BC waters. High levels of U26 bycatch poses a significant threat to recruitment with mortality of juvenile halibut that might otherwise grow and become available to the fishery and other regulatory areas. The Fisheries Data Overview report also annually shows the high levels of U26 bycatch mortality in Areas 4CDE, where in 2024, 1.16M lbs of the total coastwide 1.79M lbs of U26 bycatch mortality was reported. These high levels of U26 bycatch mortality in 4CDE combined with the data uncertainties in total U26 bycatch mortality in area 3, leave BC concerned of the impacts to the migration of halibut into area 2B and to the recurring pattern of poor recruitment years.

The Non-directed Commercial Discard Mortality by Area section of the IPHC Fisheries Data Overview report has continuously outlined the lack of reliability in the bycatch estimates from Areas in Alaska year after year. As part of the 2019 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 Province of BC is advocating for a continued catch share and U26 mitigation strategy that reflects and accounts for the reliability and accuracy of the data being provided from Area 2B relative to the uncertainties in data and total removals in other IPHC Areas. Having confidence in the total number of halibut removals for all regulatory areas should be a priority for the IPHC commission to effectively manage this shared resource and better understand the impacts of fishing activities on the stock and the low recruitment levels seen in recent history.

Recommendations

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. **establishing minimum data requirements for more accurate estimates of non-directed commercial discard mortality which could inform monitoring standards; and**
2. **ensure that the differences in data integrity between Canadian and US regulatory areas is mitigated through catch share agreements and U26 bycatch mortality.**

References

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3. *NOAA Fisheries Catch and Landings Reports in Alaska (2024). https://www.fisheries.noaa.gov/alaska/commercial-fishing/fisheries-catch-and-landings-reports-alaska*
4. *Fisheries data overview (2024): Preliminary statistics (B. Hutniczak, H. Tran, T. Kong, K. Sawyer van Vleck, & K. Magrane) IPHC-2024-IM100-08 Rev_2. https://www.iphc.int/uploads/2024/11/IPHC-2024-IM100-08-Rev_2-2024-fisheries-data-overview.pdf*
5. *2024 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska (Nov 2023). https://www.fisheries.noaa.gov/s3//2023-11/Final-2024-ADP.pdf*

National Report: United States of America

PREPARED BY: NOAA FISHERIES (23 DECEMBER 2024 & 14 JANUARY 2025)

PURPOSE

To provide an overview of the fisheries and removals of Pacific halibut during 2024 from the IPHC Convention waters and the national waters of the United States of America.

Contracting party: United States of America

Reporting agency: NOAA Fisheries; Alaska and West Coast Regions

Contact person: Kurt Iverson, Fishery Management Specialist; kurt.iverson@noaa.gov

RECOMMENDATIONS

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-NR02 Rev_1 which provides the Commission with an overview from the United States of the Pacific halibut fisheries in 2024 in the IPHC Convention waters and the national waters of the United States of America.

U.S. WEST COAST (OREGON, WASHINGTON, AND CALIFORNIA) – IPHC REGULATORY AREA 2A

Summary

The 2024 Area 2A Pacific halibut (halibut) Fishery Constant Exploitation Yield (FCEY) of 1,470,000 pounds (lb) was divided among sectors according to the Pacific Fishery Management Council's Catch Sharing Plan for Area 2A (Table 1). The preliminary Area 2A harvest estimate is 1,302,308 lb (as of December 9, 2024). The preliminary non-Tribal harvest estimate is 816,754 lb and the Tribal harvest was 485,554 lb (not including the Tribal customary and subsistence (C&S) fishery).

All weights in this report are net weight (gutted, head-off, and without ice and slime), unless otherwise noted.

Table 1. Area 2A allocations and harvest by sector (pounds), 2024.

			Allocation	Harvest	Percent Harvested
Tribal 35%	C&S[1]		20,220	NA	0.0%
	Commercial		494,280	485,554	98.2%
	Total		**514,500**	**485,554**	**94.4%**
Non-Tribal 65%	**Commercial**	Directed	249,338	237,164	95.1%
		Incidental to salmon troll	44,001	30,363	69.0%
		Total	**293,339**	**267,527**	**91.2%**
		Incidental to sablefish[2]	50,000	34,624	69.2%
		Total (including incid. to sablefish)	**343,339**	**302,151**	**88.0%**
	Recreational	Washington[2,3]	290,158	292,482	100.8%
		Oregon[3]	283,784	201,695	71.1%
		California	38,220	20,427	53.4%
		Total	**612,162**	**514,603**	**84.1%**
	Total		**955,500**	**816,754**	**85.5%**
Total			**1,470,000**	**1,302,308**	**88.6%**

[1] The 2024 C&S projected harvest, based on the 2023 C&S harvest, was adjusted after allocations were adopted by the IPHC. The adjusted C&S projection was 21,305 lb, leaving 493,196 lb for the Tribal commercial fishery. The 2024 C&S harvest estimate will be available in January 2025.

[2] The allocation for the commercial fishery incidental to sablefish is derived from the Washington recreational fishery allocation. In this table, the incidental fishery is not included with the Washington recreational fishery.

[3] On September 20, 2024, 12,000 lb were reallocated from Oregon to Washington. Initial allocations are shown.

Enforcement Overview

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. 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. The 2024 Pacific Halibut Area 2A Enforcement Report summarizes the collective effort, actions, and results of the IPHC Area 2A cooperating federal and state entities. Tribal enforcement activities and compliance data are not provided in this report.

Tables 3 through 5 (pages 7, 8, and 10) present a consolidated summary of IPHC Area 2A Commercial-Directed, Commercial- Incidental and Recreational enforcement statistics for 2024 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 fisheries enforcement that broadly include the two other fishing sectors that catch Pacific halibut: Commercial-Incidental (incidental to the salmon troll fishery and the primary sablefish fishery north of Point Chehalis), and Recreational. Effort data provides a measure of fisheries-related enforcement presence and capacity. The Actions and Results sections presents an overview of regulatory compliance and enforcement issues of concern associated with the fishing sectors.

AREA 2A TRIBAL FISHERIES OVERVIEW

Regulatory framework

The Tribal allocation was set at 35% of the Area 2A FCEY. There were two components of the Tribal fishery:

1) a commercial fishery, which was managed as an unrestricted fishery, a restricted fishery, and a late season fishery; and
2) a ceremonial and subsistence (C&S) fishery

The Tribal commercial fishery allocation was set by subtracting the projected C&S fishery projection, which was based on the prior year C&S harvest, from the total Tribal allocation.

Fishery statistics

The Tribal allocation was 514,500 lb. The preseason projected C&S harvest was 20,220[1] lb and the remaining 494,280 lb were available to the commercial fishery.

- The unrestricted fishery was open 55 hours for all Tribes between March 15 and June 19. Inside Tribes could choose to convert some or all of their hours to restricted fishing (24 hours unrestricted and 52.7 hours restricted fishing with a 500-pound daily limit, or 93.5 hours restricted fishing with a 500-pound daily limit). The unrestricted fishery landed 222,216 lb.
- The restricted fishery was open between March 15 and June 19 for 122 hours (not to exceed 6 days), with a 500-pound daily limit. The restricted fishery landed 96,414 lb.
- The first late fishery was open between June 24 and July 31, and Tribes could choose to fish 24 hours unrestricted or 41 hours (not to exceed 2 days) with a 500-pound daily limit. The first late fishery landed 105,794 lb.
- The second late fishery was open between August 9 and September 30 and 61,130 lb were landed. Tribes could choose between three options:
  - One 24-hour opener with a 2,000-pound limit
  - Three 24-hour openers with a 1,000-pound daily limit
  - Six 24-hour openers with a 500-pound daily limit
- The total landings for all Tribal commercial fisheries was 485,554 lb, or 98 percent of the Tribal commercial allocation.
- The C&S fishery closed on December 31, harvest estimates are compiled at the end of the year and will be available in January 2025.

[1] The C&S projected harvest, based on the 2023 C&S harvest, was adjusted after allocations were adopted by the International Pacific Halibut Commission. The adjusted C&S projection is 21,305 lb, leaving 493,196 lb for the Tribal commercial fishery.

AREA 2A NON-TRIBAL COMMERCIAL FISHERIES OVERVIEW

Regulatory framework

There were three components of the non-Tribal commercial fishery:

1) a directed longline fishery targeting halibut south of Point Chehalis, Washington (46°53.30' N. lat.); and
2) an incidental catch fishery during the salmon troll fisheries off Washington, Oregon, and California; and
3) an incidental catch fishery during the primary sablefish fishery north of Point Chehalis.

The allocations for the directed commercial fishery and the incidental catch fishery during salmon troll fisheries were set at 85 percent and 15 percent, respectively, of the non-Tribal commercial fishery allocation (30.7% of the non-Tribal allocation). The allocation for the incidental catch fishery during the primary sablefish fishery north of Point Chehalis, WA came from the portion of the Washington recreational allocation over 214,110 lb, with a 10,000-pound minimum and 70,000-pound maximum allocation.

Vessels permitted in the directed commercial fishery were prohibited from landing halibut as incidental catch in the salmon troll fishery and from participating as a charter vessel in the recreational fishery.

Closed Areas

Vessels in the directed fishery were prohibited from fishing within closed areas as defined in 50 CFR 300.63(f), including the non-trawl Rockfish Conservation Areas (RCAs). RCAs are depth-based areas closed to fishing with certain gear types. The RCA boundaries are lines that connect a series of latitude and longitude coordinates and are intended to approximate particular depth contours. Coordinates that define the RCA boundary lines are listed at 50 CFR 660.71(e), 50 CFR 660.73(a), and 50 CFR 660.72(j). All vessels were required to comply with halibut RCA regulations regardless of groundfish retention. Vessels that retained groundfish in state waters of California were also subject to California RCA regulations.

Vessels that incidentally caught halibut while fishing in the salmon troll fishery were prohibited from fishing within a closed area known as the Salmon Troll Yelloweye Rockfish Conservation Area (YRCA), defined in the groundfish regulations at 50 CFR 660.70 and in the salmon regulations at 50 CFR 660.405(c). Vessels that incidentally caught halibut while fishing in the primary sablefish fishery north of Point Chehalis, Washington were required to comply with groundfish closed area regulations.

See Pacific halibut regulations and the NOAA Fisheries West Coast Groundfish Closed Areas page for more information on closed areas, including Essential Fish Habitat Conservation areas and Yelloweye RCAs.

Changes for 2024

The Pacific Fishery Management Council recommended that the third fishing period occur no sooner than three weeks after the second fishing period in order to provide sufficient advance notice.

Fishery statistics

Directed Fishery Targeting Halibut (South of Pt. Chehalis)

- The allocation was 249,338 lb.
- The estimated harvest was 237,164 lb.
- The fishery was open for five, 58-hour fishing periods: June 25-27, July 9-11, August 6-8, August 27-29, and September 24-26.
- Catch limits by fishing period, based on vessel length / size class are listed in Table 2.

Table 2. 2024 fishing period limits (dressed weight, head-on with ice and slime, in pounds per vessel) by vessel size class.

Vessel Length	Size Class	Jun 25–27	Jul 9–11	Aug 6–8	Aug 27-29	Sept 24-26
0–25	A	1,800	1,800	1,000	1,400	1,800
26–30	B	1,800	1,800	1,000	1,400	1,800
31–35	C	1,800	1,800	1,000	1,400	1,800
36–40	D	3,000	3,000	1,000	1,400	1,800
41–45	E	3,000	3,000	1,000	1,400	1,800
46–50	F	3,800	3,800	1,000	1,400	1,800
51–55	G	3,800	3,800	1,000	1,400	1,800
56+	H	4,500	4,500	1,000	1,400	1,800

Incidental Catch during the Salmon Troll Fishery

- The allocation was 44,001 lb.
- The estimated harvest was 30,363 lb.
- Halibut retention during salmon troll fisheries was allowed beginning in April until the end of the salmon season on September 30.
- The landing limit was one halibut per two Chinook salmon, except that one halibut could be possessed or landed without meeting the ratio requirement, and no more than 35 halibut could be possessed or landed per trip.

Incidental Catch during the Primary Sablefish Fishery (North of Pt. Chehalis)

- The allocation was set at 50,000 lb.
- The estimated harvest was 34,624 lb.
- Halibut retention was allowed during the primary sablefish fishery, from the primary sablefish season opening date of April 1 until the commercial halibut season closure on December 7.
- The landing limit was 130 lb of halibut (in dressed weight, meaning eviscerated, head on) for every 1,000 lb of sablefish (dressed weight), plus up to 2 additional halibut. At the September 2024 Council meeting, the Council increased the landing limit to 150 lb of halibut for every 1,000 lb of sablefish, plus up to 2 additional halibut.

Area 2A Commercial Fisheries Compliance with Regulations and Enforcement

Table 3. 2024 IPHC Area 2A Enforcement Statistics – Directed Commercial Fisheries.

2024 IPHC AREA 2A ENFORCEMENT STATISTICS							
COMMERCIAL - DIRECTED							
	USCG D-13	USCG D-11	NOAA OLE	WDFW	OSP - ODFW	CDFW	
EFFORT							CONSOLIDATED EFFORT
AIR PATROLS							
Number of Air Patrols	20	8	2	2			32
Air Patrol Hours	45	32	5	5			87
Air Patrol Personnel Hours			5	5			10
VESSEL PATROLS							
Number of Vessel Patrols	28	7	4	5	25	15	84
Vessel Patrol Hours	487	67	17	31	92	43	737
At-Sea Personnel Hours			33	61	92	91	277
Number of Boardings	8	1	7	12	68	45	141
SHORESIDE PATROLS							
Number of Shoreside Patrols			24	1	30	3	58
Shoreside Personnel Hours			174	1	88	10	273
Number of Contacts			24		66	6	96
OFFICERS/AGENTS/WARDENS							
Number of Assigned Personnel	56	38	9	12	8	9	132
ACTIONS							CONSOLIDATED ACTIONS
Compliance Assistance			2				2
Written Warnings			1		4		5
Referral to OLE				1		*2	3
Criminal Citations					2		2
RESULTS (Violations)							CONSOLIDATED RESULTS
Logbook/Record Keeping					6	2	8
Restricted/Closed Area				1		2	3
Vessel Marking			1				1
Boarding Ladder			1				1
**Seabird Avoidance Gear			1				1
*2 violations for each OLE referral.							
**Groundfish violation that was documented during a combined Directed Halibut/Open Access groundfish trip.							

Table 4. 2024 IPHC Area 2A Enforcement Statistics – Commercial-Incidental.

2024 IPHC AREA 2A ENFORCEMENT STATISTICS							
COMMERCIAL - INCIDENTAL							
	USCG D-13	USCG D-11	NOAA OLE	WDFW	OSP - ODFW	CDFW	
EFFORT							**CONSOLIDATED EFFORT**
AIR PATROLS							
Number of Air Patrols	164	125					289
Air Patrol Hours	361	214					575
Air Patrol Personnel Hours							
VESSEL PATROLS							
Number of Vessel Patrols	275	52				15	342
Vessel Patrol Hours	4371	972				43	5,386
At-Sea Personnel Hours						91	91
Number of Boardings	24	18				45	87
SHORESIDE PATROLS							
Number of Shoreside Patrols						3	3
Shoreside Personnel Hours						10	10
Number of Contacts						6	6
OFFICERS/AGENTS/WARDENS							
Number of Assigned Personnel	56	38				9	103
ACTIONS							**CONSOLIDATED ACTIONS**
							None
RESULTS (Violations)							**CONSOLIDATED RESULTS**
							None

AREA 2A RECREATIONAL FISHERIES OVERVIEW

Recreational Fishery Regulatory Framework

The recreational fishery allocation was divided among the three states: Washington, Oregon, and California.

1) The Washington allocation was 35.6 percent of the non-Tribal allocation, minus the allocation made available for incidental harvest in the primary sablefish fishery;
2) The Oregon allocation was 29.7 percent of the non-Tribal allocation;
3) The California allocation was set at 4 percent of the non-Tribal allocation.

State allocations were further divided into subareas and season dates were established preseason for each subarea, with additional dates added inseason for some subareas. Oregon and Washington allocations both contributed to the Columbia River subarea allocation.

Closed Areas

The "C-shaped" North Coast Recreational YRCA, southwest of Cape Flattery, was closed to recreational halibut fishing.

Changes for 2024

The California recreational fishery was split into two subareas, divided at Point Arena (38°57.5’ N lat.).

Recreational Fishery Statistics

Washington

- The allocation was 290,158 lb (not including the allocation for the commercial fishery incidental to the primary sablefish fishery).
- The estimated harvest was 292,482 lb.
- Discard mortality was estimated to be 2,858 lb.
- The bag limit was one halibut per person per day.
- Season dates varied by subarea. The earliest open date was April 4 and the last open date was September 30.
- The Washington portion of the Columbia River subarea allocation and harvest estimates are included above.
- This fishery is closed; however, catch estimates are not yet finalized.

Oregon

- The allocation was 283,784 lb.
- The estimated harvest was 201,695 lb.
- Discard mortality was estimated to be 1,617 lb.
- The bag limit was two halibut in the Central Coast and Southern Oregon subareas and one halibut in the Columbia River subarea.
- Season dates varied by subarea. The earliest open date was May 1 and the last open date was October 31.
- The Oregon portion of the Columbia River subarea allocation and harvest estimates are included above.
- This fishery is closed and catch estimates are final.

California

- The allocation was 38,220 lb.
- The estimated harvest to-date was 20,427 lb.
- Discard mortality was estimated to be 53 lb.
- The bag limit was 1 halibut per person per day.
- Season dates varied by subarea. The earliest open date was May 1 and the last open date was December 31.
- Catch estimates are preliminary as the fishery was ongoing when this report was finalized.

Recreational Fisheries Compliance with Regulations and Enforcement

Table 5. 2024 IPHC Area 2A Enforcement Statistics – Recreational.

2024 IPHC AREA 2A ENFORCEMENT STATISTICS							
RECREATIONAL							
	USCG D-13	USCG D-11	NOAA OLE	WDFW	OSP - ODFW	CDFW	
EFFORT							**CONSOLIDATED EFFORT**
AIR PATROLS							
Number of Air Patrols	125	86					211
Air Patrol Hours	296	159					455
Air Patrol Personnel Hours							
VESSEL PATROLS							
Number of Vessel Patrols	201	47	7	23	19	15	312
Vessel Patrol Hours	3116	895	73	124	81	43	4,332
At-Sea Personnel Hours			83	284	81	91	539
Number of Boardings	136	4	15	181	107	45	488
SHORESIDE PATROLS							
Number of Shoreside Patrols			6	56	13	64	139
Shoreside Personnel Hours			12	235	28	139	414
Number of Contacts				990	35	206	1,231
OFFICERS/AGENTS/WARDENS							
Number of Assigned Personnel	56	38	3	7		9	113
ACTIONS							**CONSOLIDATED ACTIONS**
Written Warnings			8		9		17
Citations				65	29	2	96
Verbal Warnings				15		5	20
RESULTS (Violations)							**CONSOLIDATED RESULTS**
Permit/License			8	9	10	6	33
Gear Violation				17	1	1	19
Fail to Validate Tag					19		19
Illegal Harvest					1		1
Restricted/Closed Area				4	6		10
State Violations - Halibut Fishery				46			46

AREA 2A NON-DIRECTED COMMERCIAL DISCARD MORTALITY OVERVIEW

Pacific Halibut Bycatch in U.S. West Coast Groundfish Fisheries, 2002 – 2023, was reported to the Pacific Fishery Management Council in November 2024 and can be accessed online at: https://www.pcouncil.org/documents/2024/10/i-1-b-nwfsc-report-1-pacific-halibut-bycatch-in-u-s-west-coast-groundfish-fisheries-2002-2023.pdf/.

ALASKA – IPHC REGULATORY AREAS 2C, 3A, 3B, 4A, 4B, 4CDE

ALASKA DIRECTED HALIBUT FISHERIES OVERVIEW

The Pacific Halibut and Sablefish Individual Fishing Quota (IFQ) Program is the largest catch share program in the U.S., and was implemented for the 1995 fishing season. Participation in the IFQ Program is limited to persons (natural persons or non-individual entities) that hold Quota Share (QS), although there are several very limited provisions for "leasing" of annual IFQ. Quota Share is issued as a transferable permit that was initially issued to persons who owned or leased vessels that made legal commercial fixed-gear landings of Pacific halibut or sablefish in the waters off Alaska during 1988-1990.

NMFS annually issues eligible QS holders an IFQ fishing permit that authorizes participation in the IFQ fisheries. Persons with IFQ permits may harvest their annual allocation at any time during the eight plus-month IFQ halibut and sablefish seasons. QS are assigned to a specific species (either halibut or sablefish), management area, and vessel class. For halibut, IFQ management areas correspond to the IPHC regulatory areas. Vessel classes assigned to QS are based upon the overall length of the vessel that the qualifying person used for harvesting during the qualifying years. A catch sharing plan allocates the fishery limits among Areas 4C, 4D, and 4E

Table 6 provides a summary of the 2024 halibut IFQ catch in the respective management areas and vessel classes. Note the table breaks out the portions of the commercial harvest allocated to the IFQ program and to the Western Alaska Community Development (CDQ) Program.

The CDQ Program was established in 1992 for the purpose of developing the economy in western Alaska. Some 65 coastal communities in western Alaska are organized into six CDQ groups and are allocated shares of allowable harvests in the major Bering Sea and Aleutian Islands (BSAI) groundfish and crab fisheries. Among other things, the program provides the opportunity for the CDQ communities to participate and invest in the BSAI fisheries and to support economic and social benefits to the region. CDQ groups are allocated the following percentages of the halibut fishery limits: 20% in Area 4B, 50% of the Area 4C, 30% in Area 4D, and 100% in Area 4E.

Section 303A(c)(1)(G) of the Magnuson-Stevens Fishery Conservation and Management Act requires period reviews of all limited access programs in the U.S., specifically to evaluate the programs' performance in meeting its goals and objectives. In November 2024, the North Pacific Fishery Management Council issued a program report for Sablefish and Halibut IFQ fisheries. The report provides abundant information on the program, including time-series data on a wide range of topics. The report is available on the Council's web site; see: 2024 IFQ Program Review Report.

Table 6. 2024 Alaska Halibut IFQ and CDQ Catch and Allocations by Area

IFQ Area	Vessel Class	Vessel Count	Landing Count	Total Catch in Net (H&G) Weight (lb)	IFQ Allocation
2C	A C/P	19	30	72,275	
2C	B > 60’	27	57	133,794	
2C	C 35 – 60’	261	816	2,529,664	
2C	D <= 35’	86	311	331,334	
	Total	**331**	**1,137**	**3,067,067**	**3,500,000**
3A	A C/P	27	47	187,739	
3A	B > 60’	183	532	2,605,742	
3A	C 35 – 60’	275	1,017	3,654,665	
3A	D <= 35’	63	250	420,960	
	Total	**349**	**1,567**	**6,869,106**	**7,560,000**
3B	A C/P	14	19	73,146	
3B	B > 60’	96	200	1,496,426	
3B	C 35 – 60’	101	188	984,883	
3B	D <= 35’	22	30	77,622	
	Total	**141**	**328**	**2,632,077**	**2,980,000**
4A	A C/P	10	14	42,766	
4A	B > 60’	31	73	415,952	
4A	C 35 – 60’	24	44	218,666	
4A	D <= 35’	4	13	29,238	
	Total	**37**	**109**	**706,622**	**1,280,000**
4B	A C/P	1	**	**	
4B	B > 60’	9	17	235,600	
4B	C 35 – 60’	2	**	**	
4B	D <= 35’	1	**	**	
	Total	**9**	**18**	**273,449**	**872,000**
4C/4D	A C/P	1	**	**	
4C/4D	B > 60’	16	24	333,426	
4C/4D	C 35 – 60’	4	**	**	
4C/4D	D <= 35’	7	29	82,936	
	Total	**18**	**48**	**473,792**	**1,104,000**
Total		**639**	**3,133**	**14,022,113**	**17,296,000**

CDQ Area	Total Catch in Net (H&G) Weight (lb)	CDQ Allocation
4B	**	**218,000**
4C	**	**460,000**
4D	143,391	**276,000**
4E	**	**220,000**
Total	**351,312**	**1,174,000**

1) Source: NMFS Alaska Region IFQ System; Data as of 12/17/2024.
2) IFQ from Area 4C may be fished in Area 4D.
3) Total vessel count reflects unique vessels; individual vessels may record IFQ landings from separate vessel categories
4) Summaries flagged as confidential (**) reflect <3 vessels.

ALASKA RECREATIONAL FISHERIES OVERVIEW

In October 2024, the Department provided final estimates of the 2023 sport halibut removals and preliminary estimates of the 2024 removals for Areas 2C, 3A, 3B, and 4, including information on estimation methods. Additional details on estimation methods are available in Webster and Buzzee (2020).

2023 Regulations Overview and Final Harvest Estimates; Charter and unguided fishing

The Area 2C charter fishery Regulations included a one-fish bag limit, a reverse slot limit of less than or equal to 40 inches or greater than or equal to 80 inches, and Monday closures beginning July 24. The Area 3A charter regulations included a two-fish bag limit with a maximum size of one fish of 28 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, a closure of halibut retention on all Wednesdays, and nine closed Tuesdays. 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 2023 Area 2C estimated sport harvest (excluding release mortality) was 162,821 fish, for a yield of 2.050 Mlb (million pounds). The Area 3A estimated sport harvest was 238,538 fish, for a yield of 2.479 Mlb. The final harvest estimates for western Areas were 254 halibut in Area 3B and 585 halibut in Area 4. Applying the Kodiak unguided average weight of 11.36 lb resulted in yield estimates of 0.003 Mlb in Area 3B and 0.007 Mlb in Area 4 (Table 7).

Area 2C charter removals (including release mortality) were estimated to be 0.832 Mlb, approximately 4.0% over the allocation. Area 3A charter removals were estimated to be 1.588 Mlb, approximately 16.0% under the allocation. Areas 3B and 4 do not have separate charter allocations.

Unguided harvest and removal estimates in Area 2C were 77,910 fish and 1.277 Mlb. Unguided harvest and removal estimates in Area 3A were 83,892 fish and 0.922 Mlb.

Table 7. Final estimates of the 2023 sport halibut harvest (numbers of fish), average net weight (pounds), and yield (millions of pounds net weight) in Areas 2C, 3A, 3B, and 4. "NA" indicates no estimate is available.

IPHC Area	Sector	Harvest (no. fish)	Average Net Wt. (lb)[a]	Yield (Mlb)	95% CI for Yield (Mlb)	
					Lower	Upper
Area 2C	Charter	84,911	9.41	0.799	0.751	0.846
	Unguided	77,910	16.06	1.251	1.071	1.432
	Total	162,821	12.59	2.050	1.822	2.278
Area 3A	Charter	154,646	10.17	1.572	1.418	1.727
	Unguided	83,892	10.81	0.907	0.716	1.098
	Total	238,538	10.39	2.479	2.134	2.824
Area 3B	Total	254	11.36 [a]	0.003	NA	NA
Area 4	Total	585	11.36 [a]	0.007	NA	NA

[a] – No size data were available from Areas 3B and 4, so the unguided average weight from Kodiak was substituted.

2024 Regulations Overview and Preliminary Harvest Estimates: Charter and unguided fishing

The Area 2C charter fishery allocation for 2024 was 0.810 Mlb. Regulations included a one-fish daily bag limit and reverse slot (or “protected slot”) limit that allowed harvest of halibut less than or equal to 40 inches and halibut greater than or equal to 80 inches, February 1 through July 14. From July 15 through December 31, the slot limit was less than or equal to 36 inches and halibut greater than or equal to 80 inches. Fridays were closed July 19 and through September 13. The Area 3A charter allocation was 1.89 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. 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 89,303 halibut and 0.843 Mlb, respectively, 4.0% over the 2024 allocation. The preliminary estimates of charter harvest and removal in Area 3A were 161,439 fish and 1.607 Mlb, respectively, approximately 15% under the allocation. The preliminary harvest estimates for 2024 were 340 halibut in Area 3B and 488 halibut in Area 4. Applying the unguided average weight from Kodiak of 13.25 lb resulted in removal estimates of 0.005 Mlb in Area 3B and 0.006 Mlb in Area 4 (Table 8).

Unguided harvest and removal estimates in Area 2C were 71,658 fish and 1.010 Mlb. Unguided harvest and removal estimates in Area 3A were 85,638 fish and 0.878 Mlb.

Table 8. Preliminary estimates of the 2024 sport halibut harvest (numbers of fish), average net weight (pounds), and yield (millions of pounds net weight) in Areas 2C, 3A, 3B, and 4. “NA” indicates no estimate is available.

IPHC Area	Sector	Harvest (no. fish)	Average Net Wt. (lb)[a]	Yield (Mlb)	95% CI for Yield (Mlb)	
					Lower	Upper
Area 2C	Charter	89,303	9.07	0.810	0.781	0.840
	Unguided	71,658	13.85	0.992	0.830	1.154
	Total	160,961	11.20	1.803	1.611	1.994
Area 3A	Charter	161,439	9.85	1.591	1.333	1.848
	Unguided	85,638	10.06	0.862	0.604	1.119
	Total	247,077	9.93	2.452	1.938	2.967
Area 3B	Total	340	13.25[a]	0.005	NA	NA
Area 4	Total	488	13.25[a]	0.006	NA	NA

[a] – No size data were available from Areas 3B and 4, so the unguided average weight from Kodiak was substituted.

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. This analysis is a key component of the Area 2C and 3A Halibut Catch Sharing Plan, which 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.

Analyses were requested by the North Pacific Fisheries Management Council's Charter Halibut Management Committee on 25 October 2024. Results were presented at the North Pacific Fisheries Management Council meeting in December. Projected removals in 2025 under status quo regulations are 0.862 Mlb in Area 2C and 1.764 Mlb in Area 3A. Under the suite of management measures recommended by the Council at the December 2024 meeting, removal projections range from 0.608 to 1.013 Mlb for Area 2C and from 1.425 to 2.079 Mlb for Area 3A.

Updates to Data Collection and Estimation Methods for Alaska's Recreational Fisheries

Electronic logbooks became mandatory for charter operators in Southeast Alaska in 2021, and will become mandatory in Area 3A in 2025. 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 15. Preliminary logbook data for trips taken through August 31 were used to project harvest for the year in Area 3A. Starting in 2025, electronic logbooks will be mandatory for all businesses and vessels operating in salt water in Alaskan waters.

Starting in 2022, ADF&G began collecting additional biological data from recreationally caught Pacific halibut in 2C, including age (otoliths) and sex data. In 2024, halibut were sampled for age and sex information in 2C from the ports of Elfin Cove, Ketchikan, and Sitka. Age and sex data continued to be collected in 3A. Otoliths were shipped to the IPHC at the completion of the season for aging. Removal estimates and biological data were provided to the IPHC for the stock assessment.

Other Updates

In March 2023, NMFS approved a collaborative multi-agency effort led by the Marine Recreational Information Program (MRIP) to develop an implementation plan designed to support and improve upon Alaska recreational fisheries data collection programs. Later in 2023 and through 2024, agency partners have focused on key areas of focus to modernize the statewide harvest survey, which is the tool used to estimate all freshwater and unguided saltwater recreational fisheries harvests. Fundamental planning objectives for the modernization include converting from paper to electronic data collection, increase the frequency of data collections to address several issues, including recall and prestige bias, improve the timeliness of data estimates, evaluate the estimation procedures and/or any changes to the sampling design, increase the response rate, and reduce costs through greater efficiencies.

In October 2024, NMFS issued a proposed rule to implement a charter (guided sport) halibut stamp program that will be used as a funding mechanism for the Recreational Quota Entity (RQE). The new program would require a daily stamp for charter halibut anglers who intend to catch and retain halibut. The fees for the stamps would be paid by charter halibut permit holders. Funds collected under the stamp program will be issued to the RQE, which is a non-profit entity authorized to purchase and hold commercial halibut quota shares. The poundage from these shares will be added to the annual halibut allocation that the charter sector currently receives in IPHC Areas 2C and 3A under a domestic catch sharing plan.

Guided Angler Fish Program- 2024 Summary

In 2014, NMFS implemented the guided angler fish (GAF) program to authorize limited annual transfers of commercial halibut Individual Fishing Quota (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 operators an opportunity for their client anglers to retain up to two halibut of any size per day, and to retain GAF halibut on days that are closed to halibut retention.

Table 9 summarizes IFQ to GAF transfers for 2018 through 2024. 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 2024, 175,070 pounds of IFQ was transferred as GAF to the charter fishery; this translated into 2,870 harvestable halibut, which is the highest over the 2014-2024 period. Of the number of harvestable halibut in 2024, 2,504 (87%) of the Area 2C GAF was taken. This contrasts with Area 3A, where 20,677 pounds of IFQ was transferred as GAF in 2024, resulting in 899 harvestable fish. However, only 39% (337 fish) of the Area 3A GAF was taken.[2]

Table 9. Summary of IFQ to GAF transfers 2019-2024

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
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	2,470	1,825 (74%)	106,449		488	79
2023	2C	2,208	1,794 (81%)	109,952	54 (17-83)	560	77
	3A	743	364 (50%)	8,430	39 (22-76)	40	19
	Total	2,951	2,158 (73%)	118,382		600	96
2024	2C	2,870	2,504 (87%)	147,739	53 (21-87)	732	106
	3A	899	337 (39%)	5,509	35 (22-69)	37	16
	Total	3,769	2,851 (76%)	153,248		769	122

[2] GAF Program annual reports are available at: https://www.fisheries.noaa.gov/resource/document/guided-angler-fish-gaf-program-annual-reports.

ALASKA NON-DIRECTED COMMERCIAL FISHERIES OVERVIEW

Current Halibut Non-Directed Catch 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 (i.e. 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 current (Jan. 6, 2025) estimated halibut PSC use for 2023 and 2024 is shown in Table 10;

Halibut Bycatch Management Actions in Progress

BSAI Pacific Cod Trawl Catcher Vessel Cooperative Program

In January 2024, new regulations became effective for the Pacific cod Trawl Catcher Vessel Cooperative Program (PCTC) Program, which created a new limited access program for the directed Pacific cod trawl fishery in the Bering Sea and Aleutian Islands (BSAI). Among other things, the program allocates Pacific cod harvest quota shares to qualifying groundfish trawl license holders and to qualifying processors. It requires participants to form cooperatives to harvest the quota in two of the three regulatory Pacific cod trawl seasons. The third trawl season (C season) remains a limited access fishery without assigned quota or mandatory cooperatives, and is open to all trawl catcher vessels with BSAI license endorsements to harvest Pacific cod.

Some benefits of the PCTC program include more efficient coordination of fishing operations, potential to reduce operational expenses, and increased quality and revenue from the product. Cooperatives are responsible for tracking the cooperative quota and prohibited species catch among their vessels. Catch is monitored through required recordkeeping, reporting, and observer monitoring. Participating vessels are required to have 100% fishery observer coverage. The PCTC program also reduces the halibut prohibited species catch limit by 25 percent; there is a 12.5 percent reduction in the halibut PSC limit in each of the first two years of the program.

More information on the PCTC Program may be found at: Amendment 122, PCTC Program.

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 January 6. 2025.

Area	2023 Total (as of 10/8/24)		2024 Projected, 10/8/24	2024 Actual	Difference, Actual - Projected
2C	Hook-and-line (non-sablefish)	0	1	0	-1
	Hook-and-Line (sablefish)	2	2	1	-1
	Pot	2	2	4	2
	Total	**4**	**5**	**5**	**0**
3A	Trawl	179	293	371	78
	Hook-and-line (non-sablefish)	19	23	12	-11
	Hook-and-Line (sablefish)	1	3	3	0
	Pot	11	8	5	-3
	Total	**210**	**327**	**391**	**64**
3B	Trawl	99	140	131	-9
	Hook-and-line (non-sablefish)	12	12	10	-2
	Hook-and-Line (sablefish)	1	1	0	-1
	Pot	3	3	4	1
	Total	**115**	**156**	**145**	**-11**
4A	Trawl	205	197	173	-24
	Hook-and-line (non-sablefish)	25	24	27	3
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	6	12	10	-2
	Total	**236**	**233**	**210**	**-23**
4B	Trawl	94	65	70	5
	Hook-and-line (non-sablefish)	0	1	2	1
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	1	1	0	-1
	Total	**95**	**67**	**72**	**5**
4CDE	Trawl	862	557	529	-28
	Hook-and-line (non-sablefish)	90	87	89	2
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	1	1	0	0
	Total	**953**	**645**	**618**	**-27**
4 – closed	Trawl	562	632	795	163
	Hook-and-line (non-sablefish)	38	42	54	12
	Hook-and-Line (sablefish)	0	0	0	0
	Pot	2	2	1	-1
	Total	**602**	**676**	**850**	**174**
All Areas	Trawl	2,001	1,884	2,069	185
	Hook-and-line (non-sablefish)	184	190	194	4
	Hook-and-Line (sablefish)	4	6	4	-2
	Pot	26	29	24	-5
	Total	**2,215**	**2,109**	**2,291**	**182**

Note: Prepared by NMFS Alaska Region.
Table 10 includes estimates of Pacific halibut mortality from Federally managed groundfish fisheries and also for the groundfish fisheries managed by the State of Alaska. Pacific Halibut mortality is estimated for each gear type and is apportioned by IPHC Regulatory Area.

Halibut Bycatch Management Actions in Progress (cont.)

Trawl Electronic Monitoring

In July 2024, NMFS adopted rules to implement an electronic monitoring (EM) program for pelagic trawl pollock catcher vessels and tender vessels delivering to processors in the Bering Sea and Aleutian Islands and the Gulf of Alaska. The EM systems use cameras, video storage devices, and associated sensors to record and monitor at-sea fishing activities. This information provides a means to monitor vessels for compliance with management objectives designed to achieve maximized retention and to electronically report catch and discard information. Shoreside observers monitor the bycatch and collect biological information.

This program expands upon the EM program established by NMFS and the North Pacific Fishery Management Council (Council) in 2018 in the partial coverage category for fixed gear vessels. Trawl EM program development was been guided by the Council's Trawl EM Working Group, which developed a collaborative research program to evaluate multiple EM design options and consider various approaches to achieve management needs. The program evolved through pilot projects in 2018 and 2019 and under an Exempted Fishing Permit (EFP) from 2020 through 2024.

Ultimately, the EFP data indicated the objectives for trawl EM were met by: (1) improved salmon and halibut bycatch accounting, specifically in the Western Gulf of Alaska pollock fishery; (2) reduced monitoring costs; (3) improved quality of monitoring data; and (4) improved retention with limited changes in catcher vessel activities. In addition, it was also clear that EM is effective in capturing at-sea discard events to support catch accounting and may capture marine mammal incidents. Finally, EFP data showed some biological sampling can be accomplished at processing plants by observers with effective communication from vessels and processors.

More information for this program, which implemented Amendment 126 and Amendment 114 to the respective Fishery Management Plans for Groundfish in the Bering Sea and Aleutian Islands and the Gulf of Alaska are available online.[3]

Additional Information on 2024 Non-directed Commercial Halibut Mortalities

For additional information on halibut PSC mortality in the Alaska groundfish fisheries, please refer to the December 2024 NMFS inseason management reports to the North Pacific Fishery Management Council; specifically: slides 47 – 50 of the Bering Sea / Aleutian Islands report[4] and slides 45 – 51 of the Gulf of Alaska report.[5]

Detailed information on current observer coverage and electronic monitoring of the Federal fisheries off Alaska, please reference the 2025 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska[6] and the North Pacific Observer Program 2023 Annual Report.[7]

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[3] See: Amendment 126 and Amendment 114 to the Grounfish FMPs in the BSAI and GOA
[4] Available at: NMFS 2024 Inseason Management Report: Bering Sea / Aleutian Islands
[5] Available at: NMFS 2024 Inseason Management Report: Gulf of Alaska [6] Available at: 2025 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska
[6] Available at: 2025 Annual Deployment Plan for Observers and Electronic Monitoring in the Groundfish and Halibut Fisheries off Alaska
[7] Available at: The North Pacific Observer Program 2023 Annual Report

ALASKA SUBSISTENCE HALIBUT FISHERY OVERVIEW

Subsistence Harvests of Pacific Halibut in Alaska, 2022

Through a grant from the National Marine Fisheries Service (NMFS) (NA22NMF4370240), 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 2022. This project occurs biennially; as a result there are no updated data for 2023. However, data will be collected for the 2024 year. The full results from 2022 will appear in a forthcoming technical paper with a planned publication date of December 2024.

To estimate the 2022 harvests, a one-page survey form was mailed to holders of NMFS Subsistence Halibut Registration Certificates (SHARC) in early 2023. ADF&G staff and local contractors also administered surveys in person in three communities: Nightmute and Tununak in western Alaska and Ketchikan in Southeast Alaska. Additionally, researchers conducted comprehensive household harvest surveys in Port Lions, Ouzinkie, Kake, and Unalaska for the 2022 study year; for each community, federal subsistence halibut harvest questions were asked of responding households. After three mailings and community visits, 3,727 of 6,712 potential subsistence halibut fishers (56%) responded. Participation in the survey was voluntary.

An estimated 2,968 individuals subsistence fished for halibut in Alaska in 2022, about 21% lower than the 2020 fishing year and 41% lower than the long-term average since 2003. The estimated subsistence harvest was 20,896 halibut or 401,603 pounds net weight. This harvest estimate continues a generally decreasing trend in estimated harvests and was the lowest harvest estimate since the federal regulations were adopted in 2003. As expressed in pounds net weight, the 2022 harvest was 24% below 2020 harvests and 54% below the previous 14-year average. It remains unclear whether this decrease is due to actual harvest declining or a decrease in participation in the SHARC program or reporting, or some other factor.

Of the 2022 total subsistence halibut harvest, 73% was harvested with setline (stationary) gear (longline or skate) and 27% was harvested with hand-operated gear (handline or rod and reel). A total of 30 hooks was the most common number of hooks set by halibut fishers who used setline gear (43% of fishers). This pattern was similar to other, earlier study years.

Also similar to all other years, in 2022, the largest subsistence harvests of halibut occurred in Southeast Alaska (Halibut Regulatory Area 2C), with 63% of the total, followed by Southcentral Alaska (Area 3A) at 30%, and East Bering Sea Coast (Area 4E) and Alaska Peninsula (Area 3B) each at 3%. The remaining areas combined accounted for less than 1% of the state total. The majority harvest in Southeast Alaska (63%) in 2022 was an increase from 2020 estimates of 55% of the statewide total.

Based on data from the International Pacific Halibut Commission and the 2022 study year, subsistence harvests accounted for 1% of the 2022 total Alaska halibut removals.

This study was the third year of inclusion of a new question about whether survey respondents had met their needs for halibut; in 2022, there was nearly an even split between those that reported meeting their needs and those that did not, with 49% and 51% respectively. Lack of effort, lack of equipment, and family or personal reasons were the most-cited reasons for not meeting needs.

The 2022 data collection effort was a success, with acceptable response rates and a reliable estimate of subsistence halibut harvests in Alaska for 2022. However, additional outreach and in-person surveys could not be conducted in Sitka, which has historically been one of the communities with the largest population of SHARC holders and highest subsistence halibut harvests. The lack of outreach in the community is evident in the reduced response rate in 2022 (56% compared to >70% in prior study years). Outreach continues to be necessary to maximize enrollment of fishers in the SHARC program and participation in the voluntary harvest survey. Additional research continues to be needed to understand trends in the fishery. Budget constraints dictate that a survey to estimate subsistence halibut harvests in Alaska in 2023 will not take place.

NOAA FISHERIES LAW ENFORCEMENT - ALASKA

NOAA Fisheries Office of Law Enforcement - Alaska Enforcement Division

The Alaska Enforcement Division (AKD) utilizes Enforcement Officers (EOs), Special Agents (SAs), 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 2024, there were 3,300 Individual Fishing Quota (IFQ) halibut permits issued in Alaska and 31 IFQ landing ports. There were 955 charter halibut permits issued, 104 Charter Halibut Permit – Community Quota Entity (CQE), 7 Charter Halibut Permit - Issued to Military Welfare/ Recreational Programs, and 4,538 Subsistence Halibut Registration Certificates (SHARCs).

Patrol and Boardings

In 2024, AKD personnel spent over 3,628 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. AKD boarded 653 vessels with 443 of those boardings being related to halibut.

Table 11. Results of Vessel Boardings

	2022	2023	2024
	Vessel Boardings	Vessel Boardings	Vessel Boardings
Subsistence Halibut	11	14	12
Commercial Halibut	306	361	256
Charter Halibut	108	169	114
Sport Halibut	97	62	61
Total	**522**	**606**	**443**

Compliance Assistance, Outreach, and Education

In 2024, AKD personnel spent over 670 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. In addition to providing on-the-water and dockside outreach to stakeholders through daily interactions, OLE attended and presented at eight community and industry education and outreach events in 2025, focused on informing the public about commercial, charter, and recreational halibut fishing in Alaska.

Incidents

In 2024, AKD opened 748 halibut-related incidents, including outreach, vessel boardings, dockside monitoring, and compliance assistance. Of those incidents, agents and officers identified 394 halibut-related violations, which were resolved by the following action levels, in order from least to most punitive: Compliance Assistance, Summary Settlement, Notice of Violation Assessment (NOVA).

Table 12. Alaska Halibut Violations

	2022	2023	2024
Subsistence Halibut	6	4	5
Commercial Halibut	287	129	255
Charter Halibut	38	65	86
Sport Halibut	26	10	29
Commercial Groundfish Involving Halibut	22	19	19
Total	**354**	**303**	**394**

***Several cases are waiting for NOAA Fisheries General Counsel Enforcement Section to issue NOVAs.**

2024 Halibut-Related Violations documented by NOAA in Alaska:

5 Subsistence halibut fishing violations; most common violations include:
- Unqualified person applied for a SHARC
- Subsistence halibut with sport-caught halibut
- Subsistence halibut fishing without a SHARC
- Gear marking

255 Commercial IFQ/CDQ halibut violations; most common violations include:
- IFQ halibut overages greater than 10%
- Recordkeeping and reporting violations (fail to submit/timely submit a Prior Notice Of Landing (PNOL), Landing Report, Logbook, PTR, or Production Reports)
- Gear marking violations

(cont.)

2024 Halibut-Related Violations documented by NOAA in Alaska (cont.)

- 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).

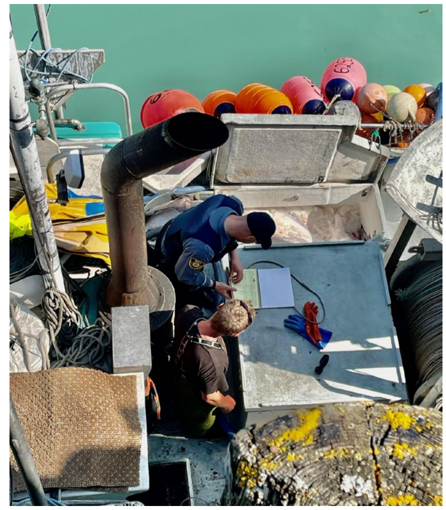
19 Commercial groundfish violations involving halibut; most common violations include:
- Failure to carefully release halibut or allow halibut to contact a crucifier or hook stripper
- Puncture halibut with a gaff or other device

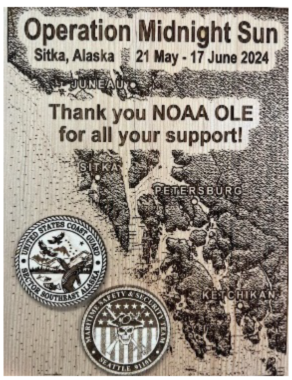
29 Sport halibut violations; most common violations include:
- Sale or attempted sale of sport-caught halibut
- Exceeding bag and/or possession limits
- Filleting, mutilating or skinning halibut onboard a vessel, other than 2 ventral pieces, 2 dorsal pieces, and 2 cheek pieces, with a patch of skin on each piece, naturally attached
- Sport-caught halibut onboard with commercial caught salmon

86 Charter halibut fishing violations; most common violations include:
- Failure to report GAF in the required time period or submitting inaccurate information
- Logbook violations
- Fishing on closed days
- Unreported halibut
- Illegal guiding - no CHP or Guide permits
- 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
- Not retaining carcasses for size restricted halibut
- Exceeding bag limit, possession limit, size limits, or annual limits
- Charter fish without a CHP/without an original copy of CHP
- Halibut retained not within slot limit size

2024 Partnerships & Patrols Highlights

The Office of (OLE) and Alaska Division (AKD) conducts 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 May and June, EOs partnered with the USCG Maritime Safety and Security Team (MSST)-Seattle for a joint operation focused on halibut. During operation Midnight Sun, there were 16 individual joint patrols conducted. They deployed multiple assets, including the NOAA P/V OOXJA, USCGC KUKUI, and two 29ft Metal Sharks, with rotary-winged aerial support. During the course of the operation, 120 commercial, Charter, and recreational vessels were boarded. Ten North Pacific Halibut Act violations were discovered related to recordkeeping and reporting (logbook), improper permit/license, and mutilated halibut, in addition to many maritime safety infractions.

In June and July, EOs conducted four multi-vessel and multi-day patrols. The first, along the Canadian border in Southeast Alaska, concentrated on foreign and domestic recreational and commercial fishing vessels adjacent to and within disputed zones. Twenty charter halibut and recreational halibut vessels were boarded throughout the week, and ten violations were discovered. Multiple violations were found on foreign and domestic vessels, including illegal harvest in US waters. During the second, two EOs and an SA conducted a patrol in southeast Alaska, boarding eight vessels and discovered three violations related to recordkeeping and reporting. On the third, a joint patrol between OLE and the USCG MSST, 13 vessels were boarded and found to be in compliance, with a single violation referred to another agency. In July, two EOs and a SA conducted a patrol in Southeast Alaska. During the fourth, two EOs and one SA boarded five vessels and found two violations related to recordkeeping and reporting.

In August, OLE conducted multiple patrols. In one, two EOs conducted a multiday patrol in Southeast Alaska. During the patrol, 40 vessels were boarded, and 22 violations were found, including recordkeeping and reporting (charter logbook) and chunked halibut. They contacted four lodges, stopped in seven small communities, and visited one processor, providing regulatory outreach and education to stakeholders. In the second, two EOs patrolled Southcentral Alaska, boarding eight commercial, charter, and recreational vessels, documenting five violations of improperly marked gear, failure to produce required documents (permits, Vessel Monitoring Plans), and recordkeeping and reporting issues.

UNITED STATES COAST GUARD ENFORCEMENT REPORT – ALASKA REGION

Coast Guard Resources in Alaska

The U.S. Coast Guard (USCG) 17th District (D17) encompasses the U.S. waters of Alaska out to 200 nautical miles, and includes the IPHC Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, and 4E. Resources used for fisheries enforcement include cutters, aircraft, boats from coastal stations, and remote sensing platforms.

Cutters:

- 418-foot National Security Cutters (NSCs) homeported in California and Hawaii are assigned to patrol D17 waters throughout the year.
- The 282-foot Medium Endurance Cutter USCGC ALEX HALEY homeported 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) homeported 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 homeported 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 across the Alaska Exclusive Economic Zone.
    - Five C-130 fixed wing aircraft
    - Nine MH-60 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 most 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.These flights provide sightings of vessels while fishing and in transit. Additionally, queries by the aircraft record target species, permits, and status of 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.

Halibut Enforcement

In Calendar Year 2024, the USCG distributed its enforcement assets throughout the Alaska IPHC Areas, with boarding numbers listed in Table 13. 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. 2022, 2023 & 2024 Geographic Distribution of Boardings on Vessels Targeting Halibut

IPHC Area	2022 Boardings	2023 Boardings	2024 Boardings
2C	413	307	370
3A	112	68	177
3B	0	0	0
4A	1	6	5
4B	1	0	1
4C	0	7	0
4D	0	0	0
4E	0	0	1
Total	527	388	554

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 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.

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. Recreational fishing activity is most prevalent from May to 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% of the halibut boardings in D17.

During recreational and charter boardings, the USCG places emphasis on (1) compliance with licensing and charter operation requirements, (2) size limits, (3) daily catch and trip limits, and (4) at-sea processing of halibut.

Violations and Enforcement Summary

In 2024, USCG assets boarded a total of 554 vessels and detected 15 violations on 6 vessels. The USCG documented these violations and referred them to NOAA OLE or Alaska Wildlife Troopers for final action as appropriate. Table 14 compares at-sea boardings and violations between 2023 and 2024.

Table 14. 2023 & 2024 Boarding and Violation Summaries by Industry Sector

2023 Boardings/Violations		2024 Boardings/Violations	
Total At-Sea Boardings	388	Total At-Sea Boardings	554
Commercial	97	Commercial	84
Charter	64	Charter	132
Recreational/Subsistence	227	Recreational/Subsistence	338
Fisheries Violations	15	Fisheries Violations	16
Commercial	12	Commercial	15
Charter	3	Charter	0
Recreational/Subsistence	0	Recreational/Subsistence	0
Fisheries Compliance Rates	96.9%	Fisheries Compliance Rates	98.9%
Commercial	89.7%	Commercial	92.9%
Charter	96.9%	Charter	100%
Recreational/Subsistence	100%	Recreational/Subsistence	100%

In Area 3A:

- One commercial vessel was cited for improper logbooks and failure to retain incidental rockfish while fishing for halibut.
- One commercial vessel was cited for not keeping a logbook.

In Area 4A:

- One commercial vessel was cited for failure to retain incidental Pacific Cod while fishing for halibut, failure to maintain proper logbooks, improper buoy markings, and failure to retain incidental rockfish.
- One commercial vessel was cited for improper logbooks and improper buoy markings.
- One commercial vessel was cited for failure to retain incidental Pacific Cod while fishing for halibut and failure to retain incidental rockfish.

In Area 4E:

- One commercial vessel was cited for not having a Limited License Permit (LLP) onboard and not having a hired master permit while commercially fishing for halibut.

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 14, USCG assets documented 95 safety violations on 65 vessels including insufficient fire extinguishers, expired visual distress signals, and expired hydrostatic releases for survival craft and/or EPIRB. Two commercial vessels' voyages, three charter vessels' voyages, and 13 recreational vessels' voyages were terminated for safety.

Enforcement Plans for 2025

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 continue to examine the practice of unguided/bareboat charters and their effect on boating safety.

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.

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

PREPARED BY: IPHC SECRETARIAT (09 DECEMBER 2024)

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 outlines a framework for amending IPHC Fishery Regulations Section 5, '*Mortality and Fishery Limits,'* to reflect Total Constant Exploitation Yield (TCEY) values adopted by the Commission and the corresponding fishery sector limits resulting from those TCEY values, as determined by the existing domestic catch sharing arrangements of the Contracting Parties.

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 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 101st Session of the IPHC Annual Meeting (AM101) in January 2025.

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 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.

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[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.

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2025-AM101-PropA1, that 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 101st Session of the IPHC Annual Meeting (AM101) in January 2025.

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*.

** In IPHC Regulatory Area 2A, the USA (NOAA Fisheries) may take in-season action to reallocate the recreational fishery limits between Washington, Oregon, and California after determining that such action will not result in exceeding the overall IPHC Regulatory Area 2A recreational fishery limit and that such action is consistent with any domestic catch sharing plan. Any such reallocation will be announced by the USA (NOAA Fisheries) and published in the Federal Register.

IPHC Fishery Regulations:

Commercial Fishing Periods (Sect. 9)

PREPARED BY: IPHC SECRETARIAT (09 DECEMBER 2024)

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.

The Commission may also decide to change the start or end time of the fishing period.

DISCUSSION

The IPHC Secretariat proposes that the commercial fishing periods for all IPHC Regulatory Areas be set at AM101 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 Commission no longer needs to consider setting dates for the 2A non-tribal directed commercial fishery and the dates will 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.

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 Parties.

Sectors Affected: Commercial Pacific halibut fisheries in each IPHC Regulatory Area.

Appendix A provides details on the suggested regulatory language.

[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.

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2025-AM101-PropA2, that provides the Commission with an opportunity to recall the format of the IPHC Pacific Halibut Fishery Regulations: *Commercial Fishing Periods* (Sect. 9), to be populated at the 101st Session of the IPHC Annual Meeting (AM101) in January 2025.

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 06:00 local time on ~~15 March~~DD MMMM.

(3) All commercial fishing for Pacific halibut in all IPHC Regulatory Areas shall cease for the year at 23:59 local time on ~~7 December~~DD MMMM.

(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.

(5) Notwithstanding paragraph (4) of this Section, 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, 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:

minor amendments

PREPARED BY: IPHC SECRETARIAT (27 DECEMBER 2024)

PURPOSE

To improve consistency in the IPHC Fishery Regulations.

BACKGROUND

This proposal makes minor clarifying amendments to the existing IPHC Fishery Regulations.

DISCUSSION

Periodically, the IPHC Fishery Regulations are reviewed to ensure they remain clear, concise, consistent, and up-to-date. The proposed revisions, outlined in detail below, result from a review conducted by the Secretariat in collaboration with domestic agencies.

Proposed amendments to the 2025 IPHC Fishery Regulations:

1. Consistent use of the term *commercial fishing period* to refer to the timeframe during which the commercial fishery is accessible to fishers, as defined in Section 9 of the IPHC Fishery Regulations. The term *fishing season* has previously been used more broadly and applied to other fisheries, including the recreational (sport) fishery.

Note: The Secretariat intends to offer an extended version of this proposal for discussion (as IPHC-2025-AM101-PropA3 Rev_1) in January 2025 providing additional edits that would apply consistent use of fishing period to all fishing sectors. These changes will be subject to review conducted in collaboration with domestic agencies.

Benefits/Drawbacks: The benefit of this proposal is to create clearer, more consistent regulations that are easier to understand and apply. No known drawbacks have been identified.

Sectors Affected: This proposal updates the language pertaining to the commercial Pacific halibut fishery sector but does not directly impact fishery management practices.

[Appendix A] provides details on the suggested regulatory language.

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2025-AM101-PropA3, which improves consistency in the IPHC Fishery Regulations.

IPHC Fishery Regulation Proposal:

Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 28): Charter management measures in IPHC Regulatory Areas 2C and 3A

SUBMITTED BY: UNITED STATES OF AMERICA (NOAA-FISHERIES) (20 DECEMBER 2024)

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 NPFMC recommended management measures for guided recreational (sport) Pacific halibut fisheries in IPHC Regulatory Areas 2C and 3A for application in 2025. The purpose of the management measures is to achieve the Pacific halibut charter allocation under the NPFMC Halibut Catch Sharing Plan. NPFMC selected these management measures at its December 2024 meeting, following a review of the Alaska Department of Fish and Game (ADF&G) Analysis of Management Options for the Area 2C and 3A Charter Halibut Fisheries for 2025 (ADF&G analysis) and after receiving input from the NPFMC Charter Halibut Management Committee, which is comprised of stakeholder representatives from both IPHC Regulatory Areas 2C and 3A.

The proposed annual management measures for 2025 are as follows:

IPHC Area 2C

Management measures for all allocations shown below include a daily bag limit of one Pacific halibut, and a reverse slot size limit where the upper limit is fixed at O80 (*i.e.*, Pacific halibut 80 inches or over in length may be retained), a restriction of one charter vessel fishing trip per day with retention of Pacific halibut, and one charter vessel fishing trip per charter halibut permit (CHP) per day.

1) If the allocation falls within the range of 0.897 Mlb and 1.013 Mlb:
    - Begin with a lower size limit of U38 (retained halibut must be less than or equal to 38 inches in length) and increase this limit until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

2) If the allocation is less than 0.897 Mlb but greater than or equal to 0.752 Mlb:

- Begin with a lower size limit of U38 (retained halibut must be less than or equal to 38 inches in length) closing Tuesdays starting September 9 working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

3) If the allocation is less than 0.752 Mlb but greater than or equal to 0.715 Mlb:
   - Begin with a lower size limit of U37 (retained halibut must be less than or equal to 37 inches in length) closing Tuesdays from Sept 9 to June 24, and closing additional Tuesdays working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

4) If the allocation is less than 0.715 Mlb but greater than or equal to 0.691 Mlb:
   - Begin with a lower size limit of U36 (retained halibut must be less than or equal to 36 inches in length) closing Tuesdays from Sept 9 to June 24, and closing additional Tuesdays working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

5) If the allocation is less than 0.691 Mlb but greater than or equal to 0.651 Mlb:
   - Begin with a lower size limit of U35 (retained halibut must be less than or equal to 35 inches in length) closing Tuesdays from Sept 9 to July 8, and closing additional Tuesdays working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

6) If the allocation is less than 0.651 Mlb but greater than or equal to 0.627 Mlb:
   - Begin with a lower size limit of U34 (retained halibut must be less than or equal to 34 inches in length) closing Tuesdays from Sept 9 to June 24, and closing additional Tuesdays working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

7) If the allocation is less than 0.627 Mlb but greater than or equal to 0.608 Mlb:
   - Begin with a lower size limit of U33 (retained halibut must be less than or equal to 33 inches in length) closing Tuesdays from Sept 9 to July 1, and closing additional Tuesdays working to June 10 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

<u>IPHC Area 3A</u>

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 of 28 inches (one retained halibut must be less than or equal to 28 inches in length); one charter vessel fishing trip per charter vessel per day with retention of Pacific halibut; one charter vessel fishing trip per charter halibut permit (CHP) per day.

1) If the allocation is less than or equal to 2.079 Mlb, but greater than or equal to 1.762 Mlb:
   - Close Wednesdays as needed to keep charter harvest removals within the Area 3A allocation, as indicated in **Table 3A.13** (page 33) of the ADF&G analysis.

2) If the allocation is less than 1.762 Mlb, but greater than 1.497 Mlb:

- In addition to closing all Wednesdays, close as many Tuesdays as needed to keep the charter harvest removals within the Area 3A allocation, as indicated in **Table 3A.14** (page 34) of the ADF&G analysis.

3) If the allocation is below 1.497 Mlb, but greater than 1.425 Mlb:
    - In addition to closing all Tuesdays and Wednesdays, lower the maximum size of the second fish to as low as 26 inches (one retained halibut must be as less than or equal to 26 inches in length), until the projected charter harvest removals meet the allocation, as indicated in **Table 3A.16** (page 36) of the ADF&G analysis.

Supporting information

The December 2024 NPFMC final motion for Charter Halibut Management Measures, the minutes of the December 2024 NPFMC Charter Halibut Management Committee, and the ADF&G analysis are available on the NPFMC website at:

- https://meetings.npfmc.org/Meeting/Details/3066 (see Agenda Item C4, 2025 Charter Halibut Management Measures – Final Action).

RECOMMENDATIONS

That the Commission:

1) **NOTE** IPHC Fishery Regulation proposal IPHC-2025-AM101-PropB1, that 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

28. Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E

(1) […]

[omit "and" at the end of paragraph (1)(g) and add semicolon followed by "and" (rather than a period) at the end of paragraph (1)(h)]

(i) in IPHC Regulatory Areas 2C and 3A:

(1) a "charter halibut permit" as defined at 50 CFR 300.61 may only be used for one charter vessel fishing trip in which Pacific halibut are caught and retained per calendar day;

(2) a "charter vessel" as defined at 50 CFR 300.61 may only be used for one charter vessel fishing trip in which Pacific halibut are caught and retained per calendar day; and

(3) for purposes of subsections (1) and (2) of this paragraph, a "charter vessel fishing trip" is defined as the time period between: (a) the first time Pacific halibut are caught and retained on a charter vessel by a charter vessel angler (as defined at 50 CFR 300.61); and (b) whichever comes first: 2359 (Alaska local time) on the same calendar day that the charter vessel fishing trip began; when any charter vessel angler is offloaded from the charter vessel; or when Pacific halibut are offloaded from the charter vessel.

(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; and [omit this "and" if paragraph 2(c) is added to this Section as described below]

(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 [x] inches ([x.x cm) and less than 80 inches (203.2 cm) [as described above, the lower size limit may be adjusted to meet the 2025 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; and [omit this "and" and end this paragraph with a period (rather than a semicolon) if paragraph (2)(c) is not added to this Section as described below]

(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 Tuesdays in 2025: [a list of dates of 2025 Tuesdays would follow].

(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; and [omit this "and" if paragraph (2)(c) is added to this Section as described below]

(b) at least one of the retained Pacific halibut must have a head-on length of no more than [x] inches (x.x cm) [as described above, the size limit may be adjusted to meet the 2025 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; and [omit this "and" and end this paragraph with a period (rather than a semicolon) if paragraph (2)(c) is not added to this Section as described below]

(c) no person on board a charter vessel may catch and retain Pacific halibut on the following Wednesdays, or on the following Tuesdays, in 2025: [as described above, some Wednesday closures and some Tuesday closures may be necessary to meet the 2025 harvest allocation in Area 3A, a list of dates of Wednesday closures and Tuesday closures to Pacific halibut retention would follow].

APPENDICES

Appendix A: Suggested regulatory language.

APPENDIX A
SUGGESTED REGULATORY LANGUAGE

6. In-Season Actions

(1) The Commission is authorized to establish or modify regulations during the fishing season or commercial fishing period after determining that such action:
- (a) will not result in exceeding the fishery limit established pre-season for each IPHC Regulatory Area;
- (b) is consistent with the Convention between Canada and the United States of America for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea, and applicable domestic law of either Canada or the United States of America; and
- (c) is consistent, to the maximum extent practicable, with any domestic catch sharing plans or other domestic allocation programs developed by the governments of Canada or the United States of America.

9. Commercial Fishing Periods

(1) The commercial fishing periods for each IPHC Regulatory Area apply where the fishery limits specified in Section 5 have not been taken.

17. Fishing Gear

[…]

(9) No person on board a vessel used to fish for any species of fish anywhere in IPHC Regulatory Areas 2B, 2C, 3A, 3B, 4A, 4B, 4C, 4D, or 4E during the 72-hour period immediately before the opening of the Pacific halibut ~~fishing season~~ commercial fishing period shall catch or possess Pacific halibut anywhere in those areas until the vessel has removed all of its gear from the water and has either:
- (a) made a landing and completely offloaded its entire catch of other fish; or
- (b) submitted to a hold inspection by an authorized officer.

(10) No vessel used to fish for any species of fish anywhere in IPHC Regulatory Areas 2B, 2C, 3A, 3B, 4A, 4B, 4C, 4D, or 4E during the 72-hour period immediately before the opening of the Pacific halibut ~~fishing season~~ commercial fishing period may be used to catch or possess Pacific halibut anywhere in those areas until the vessel has removed all of its gear from the water and has either:
- (a) made a landing and completely offloaded its entire catch of other fish; or
- (b) submitted to a hold inspection by an authorized officer.

19. Logs

[..]

(5) The logbooks referred to in paragraphs (2) and (3) shall be:
- (a) maintained on board the vessel;
- (b) updated not later than 24 hours after 0000 (midnight) local time for each day fished and prior to the offloading or sale of Pacific halibut taken during that fishing trip;
- (c) retained for a period of two years by the owner or operator of the vessel;
- (d) open to inspection by an authorized officer or an authorized representative of the Commission upon demand;
- (e) kept on board the vessel when engaged in Pacific halibut fishing, during transits to port of landing, and until the offloading of all Pacific halibut is completed; and

(f) submitted to the Commission within 30 days of the ~~season~~ commercial fishing period closing date if not previously collected by an authorized representative of the Commission or otherwise made available to the Commission.

26. Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Area 2A

[…]

(2) When the Commission has determined that a subquota under paragraph (8) of this Section is estimated to have been taken, and has announced a date on which the fishing season will close, no person shall recreational (sport) fish for Pacific halibut in that area after that date for the rest of the year, unless a reopening of that area for recreational (sport) Pacific halibut fishing is scheduled in accordance with the Catch Sharing Plan for IPHC Regulatory Area 2A, or announced by the Commission.

IPHC Fishery Regulation Proposal:

Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E (Sect. 28): Charter management measures in IPHC Regulatory Areas 2C and 3A

SUBMITTED BY: UNITED STATES OF AMERICA (NOAA-FISHERIES) (20 DECEMBER 2024)

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 NPFMC recommended management measures for guided recreational (sport) Pacific halibut fisheries in IPHC Regulatory Areas 2C and 3A for application in 2025. The purpose of the management measures is to achieve the Pacific halibut charter allocation under the NPFMC Halibut Catch Sharing Plan. NPFMC selected these management measures at its December 2024 meeting, following a review of the Alaska Department of Fish and Game (ADF&G) Analysis of Management Options for the Area 2C and 3A Charter Halibut Fisheries for 2025 (ADF&G analysis) and after receiving input from the NPFMC Charter Halibut Management Committee, which is comprised of stakeholder representatives from both IPHC Regulatory Areas 2C and 3A.

The proposed annual management measures for 2025 are as follows:

IPHC Area 2C

Management measures for all allocations shown below include a daily bag limit of one Pacific halibut, and a reverse slot size limit where the upper limit is fixed at O80 (*i.e.*, Pacific halibut 80 inches or over in length may be retained), a restriction of one charter vessel fishing trip per day with retention of Pacific halibut, and one charter vessel fishing trip per charter halibut permit (CHP) per day.

1) If the allocation falls within the range of 0.897 Mlb and 1.013 Mlb:
   - Begin with a lower size limit of U38 (retained halibut must be less than or equal to 38 inches in length) and increase this limit until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

2) If the allocation is less than 0.897 Mlb but greater than or equal to 0.752 Mlb:

- Begin with a lower size limit of U38 (retained halibut must be less than or equal to 38 inches in length) closing Tuesdays starting September 9 working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

3) If the allocation is less than 0.752 Mlb but greater than or equal to 0.715 Mlb:
   - Begin with a lower size limit of U37 (retained halibut must be less than or equal to 37 inches in length) closing Tuesdays from Sept 9 to June 24, and closing additional Tuesdays working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

4) If the allocation is less than 0.715 Mlb but greater than or equal to 0.691 Mlb:
   - Begin with a lower size limit of U36 (retained halibut must be less than or equal to 36 inches in length) closing Tuesdays from Sept 9 to June 24, and closing additional Tuesdays working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

5) If the allocation is less than 0.691 Mlb but greater than or equal to 0.651 Mlb:
   - Begin with a lower size limit of U35 (retained halibut must be less than or equal to 35 inches in length) closing Tuesdays from Sept 9 to July 8, and closing additional Tuesdays working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

6) If the allocation is less than 0.651 Mlb but greater than or equal to 0.627 Mlb:
   - Begin with a lower size limit of U34 (retained halibut must be less than or equal to 34 inches in length) closing Tuesdays from Sept 9 to June 24, and closing additional Tuesdays working to May 13 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

7) If the allocation is less than 0.627 Mlb but greater than or equal to 0.608 Mlb:
   - Begin with a lower size limit of U33 (retained halibut must be less than or equal to 33 inches in length) closing Tuesdays from Sept 9 to July 1, and closing additional Tuesdays working to June 10 until the allocation is reached, as indicated in **Table 2C.7.2a** (page 44) of the ADF&G analysis.

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 of 28 inches (one retained halibut must be less than or equal to 28 inches in length); one charter vessel fishing trip per charter vessel per day with retention of Pacific halibut; one charter vessel fishing trip per charter halibut permit (CHP) per day.

1) If the allocation is less than or equal to 2.079 Mlb, but greater than or equal to 1.762 Mlb:
   - Close Wednesdays as needed to keep charter harvest removals within the Area 3A allocation, as indicated in **Table 3A.13** (page 33) of the ADF&G analysis.

2) If the allocation is less than 1.762 Mlb, but greater than 1.497 Mlb:

- In addition to closing all Wednesdays, close as many Tuesdays as needed to keep the charter harvest removals within the Area 3A allocation, as indicated in **Table 3A.14** (page 34) of the ADF&G analysis.

3) If the allocation is below 1.497 Mlb, but greater than 1.425 Mlb:
    - In addition to closing all Tuesdays and Wednesdays, lower the maximum size of the second fish to as low as 26 inches (one retained halibut must be as less than or equal to 26 inches in length), until the projected charter harvest removals meet the allocation, as indicated in **Table 3A.16** (page 36) of the ADF&G analysis.

Supporting information

The December 2024 NPFMC final motion for Charter Halibut Management Measures, the minutes of the December 2024 NPFMC Charter Halibut Management Committee, and the ADF&G analysis are available on the NPFMC website at:

- https://meetings.npfmc.org/Meeting/Details/3066 (see Agenda Item C4, 2025 Charter Halibut Management Measures – Final Action).

RECOMMENDATIONS

That the Commission:

1) **NOTE** IPHC Fishery Regulation proposal IPHC-2025-AM101-PropB1, that 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

28. Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E

(1) […]

[omit "and" at the end of paragraph (1)(g) and add semicolon followed by "and" (rather than a period) at the end of paragraph (1)(h)]

(i) in IPHC Regulatory Areas 2C and 3A:

(1) a "charter halibut permit" as defined at 50 CFR 300.61 may only be used for one charter vessel fishing trip in which Pacific halibut are caught and retained per calendar day;

(2) a "charter vessel" as defined at 50 CFR 300.61 may only be used for one charter vessel fishing trip in which Pacific halibut are caught and retained per calendar day; and

(3) for purposes of subsections (1) and (2) of this paragraph, a "charter vessel fishing trip" is defined as the time period between: (a) the first time Pacific halibut are caught and retained on a charter vessel by a charter vessel angler (as defined at 50 CFR 300.61); and (b) whichever comes first: 2359 (Alaska local time) on the same calendar day that the charter vessel fishing trip began; when any charter vessel angler is offloaded from the charter vessel; or when Pacific halibut are offloaded from the charter vessel.

(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; and [omit this "and" if paragraph 2(c) is added to this Section as described below]

(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 [x] inches ([x.x cm) and less than 80 inches (203.2 cm) [as described above, the lower size limit may be adjusted to meet the 2025 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; and [omit this "and" and end this paragraph with a period (rather than a semicolon) if paragraph (2)(c) is not added to this Section as described below]

(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 Tuesdays in 2025: [a list of dates of 2025 Tuesdays would follow].

(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; and [omit this "and" if paragraph (2)(c) is added to this Section as described below]

(b) at least one of the retained Pacific halibut must have a head-on length of no more than [x] inches (x.x cm) [as described above, the size limit may be adjusted to meet the 2025 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; and [omit this "and" and end this paragraph with a period (rather than a semicolon) if paragraph (2)(c) is not added to this Section as described below]

(c) no person on board a charter vessel may catch and retain Pacific halibut on the following Wednesdays, or on the following Tuesdays, in 2025: [as described above, some Wednesday closures and some Tuesday closures may be necessary to meet the 2025 harvest allocation in Area 3A, a list of dates of Wednesday closures and Tuesday closures to Pacific halibut retention would follow].

INTERNATIONAL PACIFIC HALIBUT COMMISSION

IPHC Fishery Regulations:

Commercial Fishing Periods (Sect. 9) – year-round commercial Pacific halibut fishery in IPHC Regulatory Area 2B

PREPARED BY: ROBERT HAUKNES (COMMERCIAL FISHER) (09 DECEMBER 2024)

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 year-round commercial Pacific halibut fishery in IPHC Regulatory Area 2B.

EXPLANATORY MEMORANDUM

This is a proposal to have a year-round commercial halibut fishery in Canadian waters, IPHC Regulatory Area 2B. This proposal would allow the retention and sale of Pacific halibut year-round in Canadian waters.

Date requested: 21 February to 20 February 20 of the following year. These proposed dates coincide with the other groundfish fisheries in Canada.

This proposal was originally submitted on 26 September 2024.

Appendix A provides details on the suggested regulatory language, as provided by the proponent.

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2025-AM101-PropC1 that proposes year-round commercial Pacific halibut fishery in IPHC Regulatory Area 2B.

APPENDICES

Appendix A: Suggested regulatory language, as provided by the proponent**.**

APPENDIX A
SUGGESTED REGULATORY LANGUAGE, AS PROVIDED BY THE PROPONENT

9. Commercial Fishing Periods

[…]

(2) Unless the Commission specifies otherwise, commercial fishing for Pacific halibut in all USA IPHC Regulatory Areas may begin no earlier in the year than 06:00 local time on 15 March.

(3) All commercial fishing for Pacific halibut in all USA IPHC Regulatory Areas shall cease for the year at 23:59 local time on 7 December.

(4) Unless the Commission specifies otherwise, commercial fishing for Pacific halibut in IPHC Regulatory Area 2B may be permitted from 20 February 00:01 hours to 20 February 23:59 hours of the following year on an annual basis.

IPHC Fishery Regulations:

Application of Commercial Fishery Limits (Sect. 12) – addressing concerns regarding localized depletion around St. Matthew Island

PREPARED BY: SHAWN MCMANUS (COMMERCIAL FISHER) (10 DECEMBER 2024)

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 ☐ 4CDE ☒

PURPOSE

To propose closing the one-way door for halibut IFQ/CDQ holders from halibut Area 4C into Area 4D North of 60 degrees North latitude and East of 174 degrees West longitude.

EXPLANATORY MEMORANDUM

Through several years of recent fishing experience as well as supporting IPHC data, I feel that St. Matthew Island waters are facing localized depletion.

Beginning in 2005, the North Pacific Fishery Management Council (NPFMC) made a recommendation to change the IPHC Regulatory Area 4 Catch Sharing Plan and the IFQ/CDQ regulations to incorporate the NPFMC's recommendation that IPHC Regulatory Area 4C Pacific halibut IFQ or CDQ may be harvested in either IPHC Regulatory Area 4C or in IPHC Regulatory Area 4D.

At that time, the NPFMC based its decision(s) on presentations such as "*Area 4D has approximately ten times more fishing grounds at 5,605 square nautical miles than Area 4C at 561 square nautical miles*". However, recent IPHC data (see Appendix A) shows that nearly 70% or one million pounds of all 4CDE landings are occurring each year just off the 28 mile long (138 square mile) island of St. Matthew. Keep in mind that for the most part, only half of the 28-mile-long island supports Pacific halibut abundance.

In 2005, the IPHC noted "*that the ratio of halibut harvest to available fishing grounds would remain much lower in Area 4D than Area 4C. Therefore, the likelihood that the localized depletion problem in Area 4C would simply be transposed to Area 4D would remain low*". Given this quoted assumption, I feel the IPHC is more than culpable in what I feel is the localized depletion of halibut in St. Matthew Island waters. Therefore, I implore the IPHC to take responsibility in this matter by pushing for regulatory change at both the IPHC and NPFMC bodies with feverish haste. A lot of environmental changes have occurred in the 20 years since this assumption. Killer whale depredation has exploded exponentially to the point where the vast majority of fishing on the IPHC Regulatory Area 4D edge is nothing more than a lesson in futility. This proposal will spread some fishing concentration away from the island of St. Matthew thus reducing the amount of localized depletion.

Proposed regulatory language

This proposal would remove the provision under Section 12 (Application of Commercial Fishery Limits), par. 6:

12. Application of Commercial Fishery Limits

[…]

(6) Notwithstanding the fishery limits described in Section 5, the total allowable catch of Pacific halibut that may be taken in the IPHC Regulatory Area 4D directed commercial fishery is equal to the combined annual fishery limits specified for IPHC Regulatory Areas 4C and 4D. The annual IPHC Regulatory Area 4C fishery limit will decrease by the equivalent amount of Pacific halibut taken in IPHC Regulatory Area 4D in excess of the annual IPHC Regulatory Area 4D fishery limit.

Supporting data and other information

Appendix A provides supplementary data provided by the proposal proponent.

Link to Federal Register, Proposed Rule from 5 May 2025:

- https://www.federalregister.gov/documents/2005/05/05/05-9003/pacific-halibut-fisheries-fisheries-of-the-exclusive-economic-zone-off-alaska-individual-fishing

Recommendations

That the Commission:

1) **NOTE** regulatory proposal IPHC-2025-AM101-PropC2 that proposes closing the one-way door for halibut IFQ/CDQ holders from halibut Area 4C into Area 4D North of 60 degrees North latitude and East of 174 degrees West longitude.

Appendices

Appendix A: Supplementary data provided by the proposal proponent.

APPENDIX A

SUPPLEMENTARY DATA PROVIDED BY THE PROPOSAL PROPONENT.

Year	4C landings	4C vessels fishing	4D total landings	4D vessels fishing	St Matthew landings	St. Matthew vessels fishing	4E landings	4E vessels fishing	4CDE landings (summed)
2018	492,845	24	824,964	34	597,486	17	95,000	27	1,412,809
2019	482,048	24	1,035,691	39	803,219	20	120,000	31	1,637,739
2020	103,803	7	1,411,823	36	1,194,025	19	93,000	18	1,608,626
2021	197,226	7	1,145,724	29	1,010,631	18	41,000	16	1,383,950
2022	374,754	7	1,176,727	29	1,049,660	19	20,000	7	1,571,481
2023	319,149	10	930,563	32	836,235	19	5,000	4	1,254,712

Year	4C Regulatory limit	4D Regulatory limit	4E Regulatory limit	4CDE Combined limit	% of Total limit landed 4CDE	% of all vessels fishing in 4D fishing at St Matthew	% of all 4D landings occurring at St. Matthew	% of all 4CDE landings occurring at St. Matthew
2018	752,000	752,000	196,000	1,700,000	83%	50%	72%	42%
2019	910,000	910,000	220,000	2,040,000	80%	51%	78%	49%
2020	766,000	766,000	198,000	1,730,000	93%	53%	85%	74%
2021	738,000	738,000	194,000	1,670,000	83%	62%	88%	73%
2022	920,000	920,000	220,000	2,060,000	76%	66%	89%	67%
2023	900,000	900,000	220,000	2,020,000	62%	59%	90%	67%

Source: IPHC. 2024. Table IPHC-2024-TSD-038: Commercial landings from St. Matthew Island and IPHC Regulatory Areas 4C/4D, Accessed [9 December 2024].

Notes:

- See metadata for description of St. Matthew area and other details. All commercial landings and limits in net lbs; 2023 landings preliminary as of January 2024.
- 4D CDQ and IFQ quota can be shifted to 4E CDQ, 4C quota can be shifted to 4D.

IPHC Fishery Regulations:

Mortality and Fishery Limits (Sect. 5) - TCEY in Regulatory Area 2A

PREPARED BY: TIMOTHY GREENE (MAKAH TRIBE) (23 DECEMBER 2024)

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 a TCEY for IPHC Regulatory Area 2A of 1.65Mlb for 2025.

EXPLANATORY MEMORANDUM

Recalling Rule 8, para 6 of the IPHC Rules of Procedure (2024) that states:

> "*6. New regulatory proposals or amendments to existing regulations (including catch limit proposals) shall be submitted to the Executive Director no less than 30 days before the date fixed for the opening of the Session at which they are to be considered. The Executive Director shall make the proposals available on the public access area of the IPHC website no later than two (2) business day after receipt.*"

From 2019 to 2024, Regulatory Area 2A has received a constant TCEY allocation of 1.65Mlb. This allocation, initially put in place in 2019, has provided a consistent TCEY for Area 2A while posing no conservation concern on the coastwide Pacific halibut biomass, as acknowledged by the Secretariat at each Commission meeting since. The Makah Tribe is submitting this proposal for the 2025 annual IPHC process in support of a continued TCEY of 1.65 Mlb for Area 2A.

Additionally, the Makah Tribe is submitting this proposal to ensure that the IPHC Secretariat speaks to a continued TCEY allocation of 1.65 Mlb for Area 2A, in terms of whether there are any conservation concerns with this proposal for 2025, and the impacts this may have had on the stock from 2019-2024.

SUGGESTED REGULATORY LANGUAGE

Adopt a TCEY for IPHC Regulatory Area 2A in 2025 of 1.65Mlb.

Appendix A provides details on the suggested regulatory language.

Other proposal (Non-IPHC Fishery Regulations): Rebuilding Plan for Pacific halibut

PREPARED BY: MICHAEL LAUKITIS (COMMERCIAL FISHER) (27 DECEMBER 2024)

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 a Rebuilding Plan for Pacific halibut.

EXPLANATORY MEMORANDUM

My proposal for a Pacific Halibut Rebuilding Plan consists of three parts: 1) changes to control rule policies, 2) an alternative risk adverse model, 3) and needed research. As a fisherman I have strong conviction we are fishing on a depleted stock and biomass estimates are far too optimistic for status quo management to result in any recovery. We need more precautionary management. I am a fisherman. I am not a scientist. Don't judge the proposals by my mistakes or errors or misunderstandings. Judge the proposal by my intention to help to further the IPHC's mission to provide long-term optimum yield to the fisheries and to conserve the resource. Hopefully this starts the discussion.

1) Proposal for a Spatially Explicit Control Rule for Pacific Halibut Management with specific minimum biomass levels (Or don't chase the stock down proposal)

Title:

A Spatially Differentiated Control Rule for Rebuilding Pacific Halibut Across Its Northern Pacific Range

Rationale:

The Pacific halibut (*Hippoglossus stenolepis*) spans a vast geographic range from Oregon to northern Alaska and extends to Russian waters along the Aleutian chain. This wide distribution presents unique management challenges:

- **Disproportionate Spawning Biomass Loss**: Different regions might experience disproportionate declines in spawning biomass due to localized fishing pressures, environmental changes, or biological factors. A control rule that treats the entire range uniformly could fail to address these disparities, potentially leading to localized depletion or collapse.
- **Migration and Connectivity**: Pacific halibut are known to migrate across regulatory areas, meaning that fishing in one area can impact stock in others. An area-specific decline could affect recruitment and spawning in adjacent regions due to the interconnected nature of Pacific halibut populations.

- **Variable Productivity**: Productivity can vary significantly by area due to different environmental conditions, leading to different recovery rates and resilience across the range.

Proposed Control Rule:

1. **Spatial Subdivision:**

- Management by Regulatory Areas: Utilize the existing International Pacific Halibut Commission (IPHC) regulatory areas (e.g. Area 2, Area 3, Area 4) as management units. This approach acknowledges that different areas might require different management strategies based on local conditions.

2. **Biomass Thresholds and Dynamic Adjustments:**

- Area-Specific Biomass Thresholds: Establish specific biomass thresholds for each regulatory area based on historical data and current assessments. When the biomass in any area falls below this threshold:

- Immediate Reduction in Fishing Mortality: Implement a substantial reduction in fishing mortality, potentially up to 30-50% or more, depending on the severity of the decline. This could mean shorter seasons, lower catch limits, or increased minimum sizes.

- Adaptive Management: Use a 5-year review cycle to assess the effectiveness of these measures. If an area isn't showing signs of recovery, further reductions or area closures might be necessary. Conversely, if recovery is evident, fishing mortality could be cautiously increased.

3. **Inter-Regional Considerations:**

- Migration and Recruitment: Recognize that halibut from one area can contribute to the spawning stock in another. Therefore, if one area is overfished, adjacent areas might also need to reduce fishing to support broader stock recovery.

- Cross-Regional Quotas: If one area is nearing collapse, it might be prudent to redistribute quotas from areas with healthier stocks to support recovery, although this must be balanced with local economic impacts.

4. **Long-Term Rebuilding Strategy:**

- Rehabilitation Zones: Designate certain areas as "rehabilitation zones" where fishing is severely restricted or prohibited if spawning biomass is critically low, aiming to rebuild these areas as sources of recruitment.

- Scientific Monitoring: Increase monitoring efforts in areas with low biomass to gather more precise data on stock recovery, including juvenile survival, migration patterns, and local environmental impacts.

5. **Community and Economic Considerations:**

- **Stakeholder Engagement**: Regular consultations with local communities, fishers, and other stakeholders to discuss the implications of management changes, ensuring buy-in and addressing economic impacts.

- Economic Support: Implement support mechanisms for communities heavily dependent on halibut fishing during periods of reduced fishing activity, like retraining or alternative income sources.

Implementation:

- Legislation and Policy: Work with the IPHC, national fisheries management agencies (like NMFS for U.S. waters and DFO in Canada), and international bodies to enact these rules through regulation.

- Education and Compliance: Conduct outreach to ensure fishers understand the new rules and their rationale, emphasizing the long-term benefits of stock recovery.

- Adaptive Learning: Continuously refine the control rule based on new scientific data, ensuring it remains responsive to the dynamic nature of the Pacific halibut population.

Conclusion:

This control rule aims to balance the ecological needs of Pacific halibut with the socio-economic realities of the fishing communities across its vast range. By managing halibut in distinct areas, we can tailor our response to the specific conditions of each region, promoting a more robust and sustainable recovery of the stock while acknowledging the complex migratory behaviors and varying productivity of this species.

2. **Proposal for an Enhanced Spatially Explicit Control Rule for Pacific Halibut Management: Addressing Additional Factors**

Title:

Refined Spatially Explicit Control Rule for Sustainable Management of Pacific Halibut.

Narrative:

The current control rules for managing Pacific halibut by the International Pacific Halibut Commission (IPHC) rely on fixed percentages of spawning biomass to adjust fishing mortality. However, these rules have limitations that can compromise the sustainability of the fishery. This proposal seeks to refine these control rules by incorporating spatial considerations, addressing the shortcomings of fixed percentages, and providing a more dynamic and responsive management approach.

Additional Factors to Address:

1. Fixed Percentage vs. Absolute Biomass:

- Issue: Using a fixed percentage (e.g. 20% or 30% of spawning biomass) doesn't account for the absolute numbers needed for a viable population. This can lead to overly optimistic management if the baseline biomass is overestimated or if there's significant inter-annual variability in stock assessments.

- **Rationale**: An absolute biomass threshold ensures that there's a minimum viable population regardless of historical highs or lows. For instance, setting a minimum absolute biomass floor could prevent fishing from continuing at levels that might not support population recovery.

2. Unspecified Reduction at 30% Biomass:

- Issue: The current control rule at 30% does not specify the extent or duration of fishing reductions, leading to potential inconsistency in management responses. Making up prescriptive policies as you go does not lead to sound decision making.

- Rationale: Clearly defining the reduction (e.g. a 30-50% cut in ALL fishing mortality) and its duration (e.g., at least 5 years or until biomass recovery is observed) provides consistency and clarity. This would help in calculating the biological and economic impacts more accurately and aid in long-term planning.

3. Retrospective Triggering of Control Rules:

- Issue: In scenarios like the 2011 biomass reassessment where the stock was retrospectively found to be below thresholds, there's no clear protocol for immediate management response.

- Rationale: Introducing a retrospective adjustment mechanism is crucial. When a significant revision in biomass estimates occurs, the following should be enacted:

- Immediate Review: Conduct an emergency review to assess the new data's implications.

- Retroactive Management: If the stock was below critical thresholds, apply the control rule's reduction measures retroactively for the current season or implement them for the next season with adjustments like emergency closures or quota reductions.

4. Handling Large Biomass Revisions:

- Issue: The IPHC has experienced significant year-to-year changes in biomass estimates (2015), which can lead to abrupt changes in management measures, causing confusion and economic disruption.

- Rationale:

- Smoothing Over Time: Use a multi-year average for biomass estimates to smooth out annual fluctuations, providing a more stable basis for management decisions.

- Uncertainty Buffers: Incorporate buffers into the biomass estimates to account for assessment uncertainty. If there's a large revision, management actions might be phased in over several years to allow for adjustment by stakeholders.

Conclusion:

By addressing these additional factors, the IPHC can foster a more resilient and sustainable Pacific halibut fishery. This proposal moves away from overly simplistic percentage-based thresholds towards a nuanced, spatially aware, and temporally adaptive management strategy that better reflects the biology and ecology of this valuable species.

Weakness of this proposal: Incentives equal outcomes. If there are enough incentives to not hit the B30 control rule, then it is easy to see how the stock assessment will always remain above that value.

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2025-AM101-PropC4, which proposes a Rebuilding Plan for Pacific halibut.

APPENDICES

IPHC Secretariat comment: Not applicable.

Specific regulatory language has not been developed for this proposal as none currently exists to amend.

Adoption would require MSAB and SRB input throughout 2025 as part of the Harvest Strategy Policy finalisation.

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2025-AM101-PropC3, that proposes a TCEY for IPHC Regulatory Area 2A of 1.65Mlb for 2025.

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)	748	1.65

IPHC Fishery Regulations: Mortality and Fishery Limits (Sect. 5) – definition of reaction to overfishing

PREPARED BY: MALCOLM MILNE (NORTH PACIFIC FISHERIES ASSOCIATION) (28 DECEMBER 2024)

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 a reaction to the Pacific halibut stock overfishing.

EXPLANATORY MEMORANDUM

The North Pacific Fisheries Association has grave concerns that the current trigger points of SB20 and SB30 are a percentage of Unfished Biomass estimates that are re-estimated annually, do not represent estimates of long-term potential yield, and can be expected to respond very slowly, if at all, to continued stock declines.

We are proposing that the IPHC establish a measurable objective related to absolute spawning biomass as an additional trigger to invoke a rebuilding strategy.

"*Mortality from all sources decreased by 5% to an estimated 32.7 million pounds (~14,800 t) in 2024, the lowest value in 100 years, based on preliminary information available for this assessment.*" (Page 3,4 IPHC-2025-AM101-11).

We are building on the following Scientific Review Board recommendation:

SRB025–Rec.08 (para. 31) The SRB **RECOMMENDED** adding a measurable objective related to absolute spawning biomass under the general objective 2.1 “maintain spawning biomass at or above a level that optimises fishing activities” to be included in the priority Commission objectives after, or in place of, the current relative biomass threshold objective.

Para. 32: **NOTING** that the definitions of “overfished” and “overfishing” are consistent with the use of these terms in the USA federal fishery management systems under the Magnuson-Stevens Act, but differ from the terms and definitions elsewhere, the SRB **REQUESTED** a broader investigating of terms and definitions related to B and F reference points used by fishery managements organisations throughout the world.

Appendix A provides details on the suggested regulatory language.

RECOMMENDATIONS

That the Commission:

1) **NOTE** regulatory proposal IPHC-2025-AM101-PropC5, which proposes a reaction to the Pacific halibut stock overfishing.

APPENDICES

Appendix A: Suggested regulatory language.

APPENDIX A
SUGGESTED REGULATORY LANGUAGE

3. Definitions

(1) In these Regulations,

[…]

(w) "overfished" means the probability that the female spawning biomass is below the limit reference point (SB_{LIM}) is greater than 50%. SB_{LIM} is the lowest absolute SB the stock is known to have recovered from or 20% of the unfished female spawning biomass (SB20%);

(x) "overfishing" means the probability that the stock will move into an "overfished" state within 3 years is greater than 50%.

5. Mortality and Fishery Limits

[…]

(3) If the stock is in a state of "overfishing", the mortality and fishery limits defined in this Section, paragraph (1) and (2), would be reduced to achieve a 'not overfished' state within 5 years.

Stakeholder comments on IPHC Fishery Regulations or published regulatory proposals

PREPARED BY: IPHC SECRETARIAT (B. HUTNICZAK; 13, 27 DECEMBER 2024 & 26 JANUARY 2025)

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 101st Session of the IPHC Annual Meeting (AM101).

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 noon on 13 December 2024.

Appendix No.	Title and author	Date received
Appendix I	James Kearns, Halibut Forever	24 October 2024
Appendix II	Buck Laukitis, commercial fisher	27 December 2024
Appendix III	Eric Wickham, retired commercial fisher	28 December 2024
Appendix IV	Buck Laukitis, commercial fisher	23 January 2025
Appendix V	Malcolm Milne, president, North Pacific Fisheries Association	24 January 2025

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-INF01 Rev_2 that provides the Commission with a consolidated list of comments from stakeholders on IPHC Fishery Regulations or published regulatory proposals submitted to the Commission for its consideration at the 101st Session of the IPHC Annual Meeting (AM101).

APPENDICES

As listed in Table 1.

APPENDIX I

Statement by James Kearns (Halibut Forever)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	Section 28: Recreational (Sport) Fishing for Pacific Halibut—IPHC Regulatory Areas 2C, 3A, 3B, 4A, 4B, 4C, 4D, 4E
Submitted comment	There are three kinds of halibut fishermen: 1 commercial, 2 recreational, 3 subsistence. Commercial fishermen do it to make a living by selling their catch. Recreational fishermen do it for fun, for entertainment, and to enjoy some of the bounty of the sea. Subsistence fishermen do it to feed their families Because of the different reasons that these 3 groups fish for halibut, I encourage this body to set three different allocations for the halibut resource, one for each group. A commercial allocation (currently the only one); a recreational allocation that includes all recreational fishermen (both guided and unguided recreational halibut anglers); and a subsistence allocation that provides for those who depend on halibut to feed their families. I propose that you determine the percentage of the annual TCEY that should be allocated to each of those three groups and manage the halibut fishery within those allocations. Further I propose that the recreational only allocation be set at the average of the last 24 years combined guided/unguided halibut removals for each area. Then manage the recreational fishery for each area within that allocation with a 1 fish of any size daily bag limit (to help reduce handling mortality), an annual limit, and a requirement that any recreational halibut kept that is 60 inches or greater in length be counted as two fish on the fishermen's annual limit. Additionally, provide that the RQE stamp be required for every recreational halibut fisherman and that it be used as a monitoring mechanism with a requirement to fill in the size, gender, and location of every halibut kept. That means that the RQE stamp fee would be based annually on the annual limit. And since it will most likely be a $20 per day flat fee-it would be one stamp per fish and the stamp would have to be turned in when used or by Dec 1 of each year. This proposal will give an accurate accounting of annual recreational halibut removals. It will give size, gender, and location data for halibut abundance studies. It will treat all recreational halibut fishermen equally and fairly-the old idea of "same license same rules" unless there is a resident/nonresident application. It will support the RQE concept of no uncompensated re-allocation of the resource. It will not promote killing the larger fecund halibut.

It will simplify enforcement.

And it will totally solve the concerns of the expanding removals for the rental unguided recreational halibut fishery.

And finally, while it is true that resident Alaskan unguided halibut fishermen will have to also abide an annual limit, it is imperative that all recreational halibut fishermen participate in helping maintain the resource. I am an Alaskan resident and I eat a lot of halibut, but I can certainly get enough halibut to enjoy eating within an annual limit. And if an Alaskan resident lives in a rural area or is an indigenous Alaskan who relies on wild meat resources to provide for their family, they would be eligible for a subsistence permit and be able to harvest under the subsistence allocation.

Now there may be some who are still concerned about the charter boat operators who make a living by taking recreational halibut fishermen out to the fishing areas. The whole guided vs unguided issue came about trying to control the increasing fleet of such operators and the resulting increase of recreational halibut removals. Because of the commercial nature of the business (taking money in trade for services), those operators were put into a catch sharing plan with commercial fishermen. Most of you know that I have always felt like that was inappropriate because the charter boat operators were not paid by the pound of fish taken, but rather by the number of persons who paid for their Coast Guard licensed expertise to safely pilot a charter vessel. Definitely not commercial fishing.

But that has already been managed by limiting the entry into that occupation, the CHP program.

I propose that the IPHC recommend to the NPFMC that Alaska halibut fishermen be given an allocation that is not a CSP (Catch Sharing Program) with the commercial sector. I further propose that you recommend that all recreational halibut anglers who fish in Alaska participate in maintaining a healthy halibut stock by establishing a daily bag limit of just 1 halibut of any size with an annual limit that will keep the recreational removals within their allocation. Additionally, that any halibut retained that is 60 inches or more in length be counted as 2 fish on the angler's annual limit.

APPENDIX II

Statement by Buck Laukitis (commercial fisher)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	NA
Submitted comment	**Proposal for Implementing a Risk-Averse Model for Pacific Halibut Stock Assessment** Title: Enhancing Pacific Halibut Management with a Risk-Averse Stock Assessment Model Introduction: The International Pacific Halibut Commission (IPHC) currently employs an ensemble model for assessing the stock of Pacific halibut across its extensive range. While this approach has served to integrate various sources of uncertainty, there are concerns that current risk assessments might underestimate conservation challenges. This

proposal suggests the development and implementation of a supplementary, risk-averse model to coexist with the existing assessment framework, offering a more precautionary perspective to guide management decisions.

Rationale for Risk-Averse Modeling:

- Conservation Over Economic Yield: With the Pacific halibut facing pressures from climate change, habitat alteration, and potentially underestimated natural threats, a risk-averse model focuses on long-term sustainability rather than short-term economic gains.
- Public Trust and Transparency: Providing an alternative, more conservative model can enhance public trust by demonstrating a commitment to precautionary management. It also offers decision-makers a spectrum of scenarios to consider, fostering more informed decision-making.

Proposed Risk Factors and Their Implications:

1. High Harvest Rate:

- Current Issue: The use of a 20% harvest rate might be too aggressive for a long-lived species like halibut, especially considering that over 80% of the commercial catch has been female for over a decade.

- Risk: This could lead to a decline in spawning biomass, as the removal of a large number of mature females might disrupt reproductive success.

- Proposal: Incorporate a model scenario where the harvest rate is reduced to 10% or less, examining the impacts on stock recovery and population structure.

2. Underestimated Natural Mortality:

- Current Issue: The natural mortality rate used in assessments might not account for significant but unmeasured factors like:

- Whale Depredation: Killer whales and other predators might be taking a larger share of halibut than currently estimated.

- Bycatch: Unreported or underestimated bycatch in other fisheries could be higher, especially in non-target fisheries like trawling.

- Habitat Loss: Fishing activities might degrade habitat, reducing juvenile survival rates and overall productivity.

- Risk: Overlooking these can lead to an overestimation of stock resilience and productivity.

- Proposal: Increase the natural mortality rate in model scenarios to reflect these potential increases, perhaps by 20-30%, to simulate these additional pressures and assess their impact on stock forecasts.

3. Poorly Understood Factors:

- Current Issue: There are likely many factors affecting halibut populations that are not well understood or quantified, such as: changes in oceanographic conditions, fecundity, maturation schedule, Russian fishery impacts, etc.

- Risk: Without accounting for these, the stock assessment might be overly optimistic about recovery and sustainability.

- Proposal: Establish a comprehensive research program focusing on:

    - Environmental impacts on halibut life stages.

    - Disease prevalence and impact.

    - Interactions with other marine species and ecosystems.

4. Recruitment and growth rates. The slow growth of halibut (compared to previous epochs) is pretty well understood, but perhaps the risks of slow growth, a minimum size limit and having a predominantly female commercial fishery vs. a predominantly u26 bycatch fishery are not well understood.

- more precaution is needed because of the lag time between spawning and maturity

5.In addition: this approach may require modeling of broad separate geographic management areas

    -separate risk adverse models for area 2, area 3 and, area 4.

Differentiation from Current IPHC Risk Assessment:

- Scope of Risk: While the IPHC's risk table considers various management scenarios and their probabilities of leading to overfishing or stock decline, this proposal expands the scope by incorporating risks that are currently less emphasized or quantified, such as those related to sex-specific harvest and natural mortality.

- Precautionary Principle: This model would be explicitly designed to prioritize conservation outcomes, potentially recommending lower catch limits or more restrictive management measures than the current ensemble model.

- This risk adverse model could be used by the public and decision makers and applied to the risk tables to show alternative probabilities of stock decline or growth.

Implementation:

- Parallel Use: Continue using the current ensemble model but introduce the risk-averse model as a parallel assessment tool during annual reviews and management meetings.

- Education and Communication: Clearly communicate to stakeholders how this model complements rather than replaces the current model, emphasizing its role in precautionary management.

- Research Investment: Allocate funds for the research program to better understand and quantify the proposed risk factors, ensuring that the model's assumptions are as robust as possible.

Conclusion:

By adopting a risk-averse model alongside the existing ensemble approach, the IPHC can provide a broader spectrum of management options that prioritize the long-term health of the Pacific halibut stock. This proposal does not seek to discount the current model but rather to enhance the management framework with a more conservative lens, ensuring sustainable fishing practices in the face of uncertainty and environmental change.

Research Proposal: Assessing the Impact of Fishing Intensity on Pacific Halibut Spawning Success in the Bering Sea

Title:

Evaluating the Effects of Year-Round Fishing on Spawning Success of Pacific Halibut in the Bering Sea

Background:

The Pacific halibut (*Hippoglossus stenolepis*) in the Bering Sea is subject to fishing pressure from various fleets under a predominantly rationalized, cooperative, year-round fishing regime. This continuous fishing intensity might disrupt the natural spawning behavior and success of halibut, potentially preventing them from schooling up in sufficient numbers to spawn effectively.

Hypothesis:

The constant fishing activity throughout the year, particularly in spawning months, does not allow Pacific halibut in the Bering Sea to aggregate in sufficient numbers for successful reproduction.

Objectives:

1. Historical Analysis of IPHC Longline Fleet Activity:

- Examine changes in the length of the fishing season over time, focusing on the intensity of fishing during the spawning months (March, November, December).

- Map and analyze where and how much harvest occurs across all months, U26 and O32.

2. Impact of NMFS Fleets on Pacific halibut:

- Assess fishing intensity by other National Marine Fisheries Service (NMFS) fleets (trawl, longline, pot) during the spawning season using observer data and other sources. U26 and O32.

- Evaluate encounter rates, assigned mortality rates, and identify areas with high CPUE (catch per unit effort) for halibut bycatch - all 12 months, U26 and O32.

3. Whale Interactions and Bycatch Mortality:

- Investigate the interaction rates between halibut and whales, especially during the spawning season, using data from both the directed halibut fleet and other NMFS fleets.

- Special emphasis should be on comparing assigned observer mortality rates at the time of release from the vessel when killer whales are in the proximity. Are viable halibut eaten by whales before they get to the bottom? Are estimated mortality values correct?

- Conduct a mark-recapture tagging study to reassess halibut bycatch mortality rates, with a focus on the catcher-processor vessels and the A80 trawl fleet's deck sorting practices.

Methods:

- Data Collection:

    - Historical Data: Compile data from IPHC on fishing seasons, areas, and harvest amounts from 1990 to present, with emphasis on spawning months.

    - Observer Data: Use NMFS observer programs data to analyze halibut bycatch in other fisheries, focusing on mortality rates, encounter rates, and CPUE.

    - Tagging Study: Implement a mark-recapture study where halibut are tagged during bycatch events, with special attention to those sorted on the deck of A80 trawlers. Monitor tag returns to estimate true survival rates post-capture.

- Analysis:

    - Spatial and Temporal Analysis: Map and analyze the spatial distribution and temporal patterns of fishing activities, correlating these with spawning grounds.

    - Bycatch and Interaction Analysis: Use statistical models to assess the relationship between fishing intensity, whale interactions, and halibut mortality.

    - Survival Rate Revision: Use mark-recapture data to revise existing estimates of halibut mortality from bycatch, considering deck sorting practices.

Expected Outcomes:

- Understanding of how extended fishing seasons impact halibut spawning aggregations.

- Quantification of the effects of bycatch and whale predation on halibut during critical spawning periods.

- Recommendations for fishery management adjustments, potentially including changes to season lengths or area restrictions to protect spawning.

Significance:

This research will provide critical insights into whether current management practices are sustainable for Pacific halibut in the Bering Sea, potentially guiding policy changes to enhance spawning success and stock recovery. It will also contribute to the broader understanding of how cooperative, rationalized fisheries can affect long-lived species.

Budget and Timeline:

- Budget: Estimated at $xxxx, covering data acquisition, tagging, analysis, and personnel.

- Timeline: 2 years - Year 1 for data collection and initial tagging; Year 2 for data analysis, fieldwork continuation, and report compilation.

Deliverables:

- A comprehensive report detailing findings and policy recommendations.

- Scientific publications on the impact of fishing regimes on halibut spawning success.

- Data sets and models that can be used for future research or management decisions.

Footnote: Please stop all cost recovery/ fund raising research projects.

APPENDIX III

Statement by Eric Wickham (retired commercial fisher)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	NA
Submitted comment	**Reflections on a Persistent Challenge: A Study on the Impact of Draggers on Halibut Grounds**

I am a retired halibut fisherman from British Columbia, though my early years of fishing—about 40 years ago—were spent in Alaska.

I retired early and sold my Pacific halibut quota out of frustration with the lack of political will, both in the USA and Canada, to address the issue of draggers operating on halibut grounds. Unfortunately, this problem persists, and there seems to be little resolve among fishermen to apply meaningful pressure to tackle it.

From what I understand, there are now only a few remaining locations in British Columbia where halibut can be commercially fished at sustainable levels. Yet, draggers continue to operate in these areas, causing significant damage to the ecosystem—and seemingly, no one is taking action to address it.

I recognize that different terms are used to describe these bottom-trawling vessels that devastate marine habitats, but the issue remains critical regardless of terminology. As someone who has long respected the Commission, I am left wondering why the Commission has yet to address this long-standing and pressing challenge

APPENDIX IV

Statement by Buck Laukitis (commercial fisher)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	IPHC-2025-AM101-PropC4 IPHC-2025-AM101-PropC5
Submitted comment	**A Spatially Differentiated Control Rule for Rebuilding Pacific Halibut Across its Northern Pacific Region**

Considering that the stock status is at one of its lowest levels in the history of the fishery, the logical first step in stock conservation would be to adopt an absolute lower limit on coastwide spawning stock biomass, below which all directed fishery removals would cease. (See comments to proposal C5 by NPFA IPHC-2025-AM101-PropC5) Using unfished biomass as the primary indicator of the health of the stock, while allowing that metric to be estimated over very short periods of time (annually) allows the stock to be fished down without any changes in target exploitation rates, as long as the models estimate that incoming recruitment has been low. In other words, as long as the models conclude that the primary reason for current poor stock status is the environment (“we’re just going through a period of low productivity”), then this policy places no burden on fisheries to reduce their impacts.

First, this seems somewhat inconsistent with the basic philosophy of fishery management, which is typically designed to respond most strongly when stock status is poor. Second, it also rests on what may be a flawed assumption: that declining recruitment has little or nothing to do with declining stock status. Specifically, the assumption behind this policy is that there is no stock-recruitment relationship at any as-yet observed stock size and there will not be at the level to which the stock will be reduced (or held) at current harvest rates. For Pacific halibut, this has been suggested as a hypothesis. But, it would be an exaggeration to suggest that this is a known reality, especially at historically low spawning stock abundances. And, if this hypothesis is wrong, then continuing to fish the stock even lower could result in reduced recruitment potential from which the stock may not be able to easily recover.

The danger of damaging the stock’s recruitment potential only increases when all sources of pre-recruit mortality are not known or cannot be accurately estimated in the models: that is, when the models have difficulty properly gaging early-age abundance and therefore have increased potential to errantly assume environmental causes as the reason for low recruitment at first fishable (or, surveyable) ages.

For Pacific halibut, true abundance on nursery grounds is simply unknown, causes of early natural mortality are not well understood, and juvenile mortality from bycatch fisheries is not easy to quantify. The latter has likely become more difficult with the adoption of expedited release in trawl fisheries (Deck sorting… see research needs), reducing the amount and quality of data on fish condition prior to release, and therefore associated discard mortality rates.

Again: the logical solution for preventing the spawning stock from being fished to critical levels – and for buffering assessment recommendations and underlying harvest policy against uncertainty about pre-recruit mortality – would be to adopt an absolute-abundance “floor” on spawning stock biomass.

This would be consistent with the SRB's recommendation. Below this floor, all targeted fishing should cease. At some level above that floor, fishing at "full" exploitation rates could resume. The IPHC once used such an approach. The model for doing this was developed by Bill Clark and Steven Hare, and could easily be adapted for current use: 1) use the current assessment ensemble to estimate the lowest coastwide spawning stock that has been observed during the history of the fishery; 2) close the fishery if and when the stock reaches that level in the future; 3) allow fishing to resume at full target exploitation rate at 1.5 times that level (or some other reasonable multiple of the minimum, as MSE exercises might suggest); 4) apply a sloping harvest control rule between those two points.

No allocation procedures should allow for removals that are forgone in one region (for example, as a result of reduced fishing pressure) to be reallocated to another region. In other words, the "zero sum game" should be prohibited. Moving removals from one area to another – on paper, after stock distribution has been determined via the assessment models – is not consistent with actual movement of fish among areas and should be expected to result in harvest rates in excess of target in the areas to which quota is "moved", potentially leading to local depletion. The intent of the proposed measure is to relieve the spawning stock from excessive directed fishing pressure, not simply move that pressure from one region to another.

Additionally, it would be helpful to take a closer look at stock demographics – perhaps by Regulatory Area or Bioregion – to look for additional signs of reduced stock health beyond simply biomass. For example, has there been an erosion of age structure or sex ratio in any region over the last decade or so? Reduced age structure can be a sign of having harvested at levels that are higher than optimal. Similarly, skewed sex ratios represent unnatural conditions in most stocks and tracking the amount of skew as cohorts progress can provide a logical check on the effects of harvest rates and the degree to which they may be mis-specified. Perhaps these analyses have already been conducted and their results simply need to be shared with the fleet? Simple plots of these types of information used to be part of stock assessment presentations (they were routinely presented by Bill Clark and Steven Hare) but seem largely absent in recent history.

Once a lower limit on spawning stock biomass has been established, then take a harder look at spatial stock structure and how best to account for that. Halibut are known to occupy distinct spawning grounds along the shelf edge – generally in submarine canyons – and larvae settle into and are reared in specific nursery grounds that are located in shallow water along the coast. The pelagic larval phase connects spawning grounds to specific nurseries, which can only be populated by the limited number of spawning grounds that are "within reach of them" with respect to coastal currents. Because of this, not all spawning stock is equal in terms of its contribution to recruitment. And the loss of any spawning ground might result in the loss of an unknown number of nursery grounds. Throughout the history of the IPHC, a basic objective of the harvest policy has been to maintain spawning stock distribution over time, and one of the best reasons to pursue that objective is to make sure that recruitment potential – defined as nursery output – is maintained throughout the entire range of the stock. Calculating spawning stock biomass metrics based on a single, coastwide value cannot ultimately achieve this objective and should be reviewed and modified as soon as possible; after a coastwide minimum spawning stock biomass limit has been adopted.

Action:

The proposer requests that the Commission direct staff to develop spatial control rules by bioregion as well as an absolute overall minimum spawning biomass amount as NPFA proposes.

As a stakeholder we do not want to see SSB fall any further. We are willing to sacrifice the economics of the fishery to protect future spawning potential. We request the Commission adopt this as a policy:

"Maintain the coastwide female absolute spawning biomass above the level estimated for 2023."

"The MSAB noted that a new objective to maintain the coastwide TCEY above a threshold may also be useful" (IPHC-2024-MSAB020-R, para 16) A new objective related to fishery performance could be phrased as:

Maintain the coastwide female absolute spawning biomass (or FISS WPUE) above the level estimated for 2023."

https://www.iphc.int/uploads/2024/12/IPHC-2025-AM101-12-MSE-and-HSP.pdf

APPENDIX V

Statement by Malcolm Milne (President, North Pacific Fisheries Association)

Section of IPHC Fishery Regulations or regulatory proposal reference the comment will refer to	IPHC-2025-AM101-PropC5

North Pacific Fisheries Association, NPFA
P.O. Box 796 Homer, AK 99603
npfahomer@gmail.com

Established 1955

January 23, 2025

International Pacific Halibut Commissioners and Subsidiary Bodies,

The North Pacific Fisheries Association (NPFA) is a commercial fishing industry group based in Homer, Alaska. NPFA is comprised of around 70 members who fish multiple gear types for a variety of species throughout Alaska, many of whom are directed halibut fishermen. NPFA has a long history of participation on the IPHC Conference and at least two former Commissioners, Drew Scalzi and Don Lane, were members of our association.

NPFA introduced regulatory proposal C5 in response to our serious concerns with the state of the pacific halibut fishery.

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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 absolute level of spawning biomass is also estimated to be near the lowest observed since the 1970s. The directed commercial fishery transitioned from the 2005 year-class to the 2012 year-class in 2022, with the 2012 year-class again the most numerous in the landed catch in 2023-24. This shift from older to younger (and smaller fish) has contributed to observed reduced catch rates. The current spawning stock is heavily reliant on the 2012 and now 2016 year-classes. Environmental conditions continue to be unpredictable, with important deviations from historical patterns in both oceanographic and biological processes observed across the stock range in the last decade.

The anecdotal information from NPFA fishermen corroborates these concerns. Where a bad set used to be measured by a few hundred pounds it's now a few fish. IPHC-2025-AM101-08 Rev_1 Table 2 shows that Directed commercial fishery landings were only 82.6% compared to 95% in 2019 (iphc-2020-am096-05 Table 2). Red flags abound.

At these low levels and uncertain times we urge the IPHC to be precautionary and adopt an absolute spawning biomass threshold to protect the Pacific halibut stock from unknown consequences.

Established 1955

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On the dangers of using "Dynamic B_0"as an SSB reference value, with no lower biomass bound:

The IPHC employs harvest control rules in which pre-established harvest rates are applied regionally if female spawning stock biomass (SSB) is above a specified reference level (i.e., "threshold"), then decline to zero as SSB approaches a critical minimum value (i.e., the "limit") below which fishery closure would occur. The rule is sound in principle. However, its real-time application is dependent upon the definition of an appropriate SSB reference level, the nature of which has changed over the last ~20 years. At one point threshold and limit levels were established as empirical values that referenced the lowest historically observed SSB, based on the logic that (Clark and Hare 2006): "*We can have some confidence … of stock dynamics at those spawning biomass levels, but not at lower levels. There is no compelling reason to allow spawning biomass to drop below the minimum limit. … If a stock has been monitored long enough to observe a descent to, and recovery from, a low point then that low point may be a "safe' minimum limit.*"

The minimum historical SSB level and yearly estimates were calculated solely within IPHC Regulatory Areas 2B+2C+3A (i.e., the "Core Areas"; Clark and Hare 2006). The limit (fishery closure) based on minimum observed Core Area SSB was estimated to be 64 million pounds of mature females (Clark and Hare 2006) and the threshold (i.e., resulting in reduced harvest rates) was set at 1.5 times the minimum observed SSB. From what we can tell, with the development of a coastwide stock assessment, the SSB reference level was broadened to be an estimate of coastwide "Unfished Biomass" (B_0): i.e., the estimated coastwide biomass of mature females that would theoretically occur in the absence of fishing mortality. Initially, this was calculated as a long-term average (Hare and Clark 2008), thereby representing an SSB equivalent of using Maximum Sustainable Yield (MSY) to estimate long-term stock productivity. The change to coastwide B_0 would theoretically achieve the same management result as the use of Core Area SSB; but, allow for the entire distribution of SSB in IPHC Convention Waters to be considered and conserved. In 2007, coastwide B_0 of mature females was estimated to be ~750 million pounds, with a "30-20" rule applied to derive the threshold and limit values (Hare and Clark 2008). That is, the threshold was defined as 30% of coastwide long-term B_0 (i.e., ~225M pounds) and the limit set at 20% of B_0 (i.e., ~150M pounds). By 2018, Management Strategy Evaluation included calculation of B_0 as a "dynamic" value that was annually recomputed, as opposed to simply representing a long term "static" average (Hicks and Stewart 2018). Since 2019 the reference points have "*been based on recent biological conditions rather than a long-term static average*" (Stewart and Hicks 2022). In theory, the use of static B_0 should work well in stocks that demonstrate at least some degree of stock-recruitment relationship, because reductions in fishing effort should then be expected to result in increases in spawning biomass that will translate into increased recruitment and stock productivity. Alternatively, in stocks whose recruitment levels and productivity are driven exclusively by environmental conditions, and in cases where changes in the ecosystem alter average productivity to such a degree that long-term averages (of both yield and SSB) do not reflect current conditions, static B_0 may not reflect the stock's current functioning. Using dynamic B_0 reference points in cases where stock status is governed by environmental drivers may improve management responses to changing biomass (Bessel-Browne et al 2022). However, "*where environmental drivers are not responsible for stock decline, the stock may be overfished to collapse as the limit reference point is allowed to decrease to low levels*" (Bessel-Browne et al. 2022). Prior analyses (Clark and Hare 2002) have suggested that recruitment variability in Pacific halibut may be governed by prevailing environmental conditions, such that dynamic B_0 may represent a logical choice for this species across at least some range of absolute abundances.

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However, the use of dynamic reference points while a stock is trending downward, or using assessment models whose recruitment estimates rely on abundance data that are collected at ages that are older than the those at which the species is first subjected to fisheries-induced mortality (including non-directed fishing mortality), may fail to respond to fisheries-induced stock declines by continually downgrading the expectation of stock health: that is, by ratcheting B_0 downward every year, along with its associated threshold and limit values, and therefore assuming that further reductions in biomass would be inconsequential. Ultimately, stock failure can be expected even in stocks for which empirical stock-recruitment relationships cannot be defined, once spawning biomass is reduced to some, generally unknown, level. For example, the failure of Atlantic cod stocks in New England and eastern Canada to fully recover from accidentally prescribed overfishing in the 1980s is thought to have been the result of having depressed that stock below a critical level, at which recruitment potential remained chronically depressed due to a variety of ecological processes that the depleted stock could not overcome (for example, see: Lilly 2008, Sguotti et al. 2019). Additionally, continually fishing SSB downward in populations that are spatially structured (for example, are composed of a series of spawning grounds connected to distinct nursery areas; for Pacific halibut, see: St. Pierre 1984, Norcross et al. 1997, and Sadorus et al. 2020) runs the risk of eliminating spawning components and behavioral contingents to such a degree that stock components are eventually taken “off line” and recruitment is reduced to a greater degree than the observed decline in SSB (for example, see: Bui et al. 2011, Guan et al. 2018). **Unless it is clear that further declines in spawning biomass will have no impacts on recruitment potential or yield, then using dynamic B_0 in conjunction with no empirical lower limits may amount to an experiment whose result is to determine at what point the harvest strategy will fail, by causing recruitment and yield to decrease to a level from which the stock should not be expected to recover.**

<u>On use and computation of a fixed threshold and limit:</u>

It is unclear whether the reduction in coastwide halibut biomass over the last ~15 years represents a shift in the ecosystem that no longer supports high abundance, or the decrease is the result of having persistently fished the spawning biomass to a point where recruitment has finally been compromised. To account for the possibility of the latter, it would make sense to establish an empirical lower limit for coastwide spawning stock biomass (SSB), below which directed removals would cease, and above which the sloping harvest control rule (HCR) would be applied. The low-biomass HCR could take the same form as the current rule but would reference an empirical lower limit instead of short-term B_0. The existing ensemble of assessment models produces estimates of historical and current SSB (See: IPHC-2025-AM101-11, Figure 7) that should be appropriate for generating an empirical lower limit and the associated threshold above which harvests would return to maximum target levels. Using the logic of Clark and Hare (2006), the coastwide lower limit would be set at the coastwide SSB from the current ensemble (e.g., average the four models) that is estimated to have occurred in approximately 1974 (IPHC-2022-sa-01.pdf, Figure 5), noting that the even lower values estimated to have occurred around 1930 are likely to be imprecise due to lack of abundance data and directed halibut fisheries having not yet expanded westward. To account for uncertainty in the models, this empirical lower limit would be “buffered” (i.e., increased to become more conservative) by a proportion that is equivalent to no less than the magnitude of any retrospective bias currently observed in the recent models. For example, IPHC-2025-AM101-11, Figure 7, demonstrates that the SSB that was estimated for 2023 was downgraded in both the 2024 and 2025 assessments.

Established 1955

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The minimum proportional buffer (increase) to the lower limit, based on these observations, would then be the percentage that the estimated 2023 value decreased between the 2023 and 2025 model runs. This buffer might be increased further to account for additional uncertainties in stock status, such as current relative status of directed fishery CPUE, harvested age structure, shifts in spatial distribution of the stock, and concerns over the potential for “hyperstability” in model estimates due to incomplete survey coverage that is biased toward high-CPUE stations. Following Clark and Hare (2006), the threshold at which full target harvest levels would resume would be set at 1.5 times the buffered empirical lower limit. Harvest rates would decline linearly between that threshold and the empirical lower limit. When B_0 is estimated to be above the empirical lower limit, current harvest control rules (i.e., based on B_0) would apply.

Sincerely,

G Malcolm Milne

President, North Pacific Fisheries Association

The IPHC mortality projection tool for 2025 mortality limits

PREPARED BY: IPHC SECRETARIAT (I. STEWART; 10 DECEMBER 2024)

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 2025.

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 2025 (as in 2023-24), 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 for all

[1] Net pounds refer to the weight with the head and entrails removed; this is approximately 75% of the round (wet) weight.

IPHC Regulatory Areas will be 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 will be updated and posted to the IPHC's website in early January 2025 for use during the 2025 Annual Meeting (AM100). The update includes final end-of-year 2024 mortality estimates from various fisheries, including non-directed discard mortality estimates that affect projections for 2025.

References

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Using artificial intelligence (AI) for supplementing Pacific halibut age determination from collected otoliths

PREPARED BY: IPHC SECRETARIAT (B. HUTNICZAK, J. FORSBERG, K. SAWYER VAN VLECK, & K. MAGRANE; 10 JANUARY 2025)

PURPOSE

This document summarizes the information available on the use of artificial intelligence (AI) for determining the age of fish from images of collected otoliths and provides an update on the exploratory work of implementing an AI-based age determination model for Pacific halibut.

The purpose of this document is twofold. First, to provide a background in support of developing a protocol for creating a database of pictures with expert-provided labels for ageing use. Second, to propose an AI-based modeling approach for supplementing current Pacific halibut ageing protocol.

BACKGROUND

Otoliths are crystalline calcium carbonate structures, mostly in the form of aragonite, found in the inner ear of fish. They contain growth rings, that are often compared to tree growth rings. By analyzing the growth patterns in otoliths, scientists estimate the age of fish (Campana, 1999; Campana & Neilson, 1985), supporting the estimation of fish population demographics and population dynamics (Campana & Thorrold, 2001). In turn, fish age is a key input to stock assessment models that inform management decisions related to fish exploitation (Methot & Wetzel, 2013). It is estimated that the number of otoliths from captured fish that are read annually worldwide is on the order of one million (Campana & Thorrold, 2001).

The current method for determining ages of most fish species relies on manually extracting, preparing (embedding, sectioning), and reading otoliths. The simplest approach to reading the otolith is to immerse it in a clear liquid, such as water or alcohol solution, illuminate it from above, and view it against a dark background, using a stereo microscope. This method is suitable only for otoliths that are relatively thin with all annual bands visible from the surface. For species such as Pacific halibut, as the growth rate of the fish slows down, the outer growth bands become increasingly compressed and difficult to read from the surface of the whole otolith. To correctly determine the number of annual bands in such cases, otoliths are typically viewed in cross section which allows viewing the bands that are not visible from the surface view. In addition, the contrast between the growth rings can be enhanced through the baking process. Pacific halibut otoliths are aged using the 'break and bake' technique.

This manual ageing process is expensive, time-consuming,[1] and can be subject to bias[2] as well as imprecision due to variations in age estimations between readers and within readers over

[1] While the actual reading may account only for a fraction of the total cost and time required to process the otolith from collection to age determination, skilled readers require years of training, which should be considered when conducting a cost-benefit analysis.
[2] While the count of annual rings on Pacific halibut otoliths was found to provide unbiased age estimate using validation against bomb radiocarbon isotopes (Piner & Wischniowski, 2004), an earlier oxytetracycline (OTC) mark-

time. Recent advances in imaging technologies and machine learning suggest that AI can assist in this process by automating the analysis of otolith images[3] and identifying and measuring the growth rings to determine age. AI algorithms can be trained on a large dataset of otolith images with known ages to learn the patterns and variations in growth rings. Once trained, the AI model can analyze new otolith images and predict the age of the fish based on the identified patterns in the image.

Using AI for age determination of Pacific halibut could improve consistency and replicability of age estimates, as well as provide time and cost savings to the organization, providing age data for reliable management advice. However, it's important to note that the AI model's accuracy depends on the quality and diversity of the training data, as well as the expertise of the scientists involved in training and validating the model. Regular validation and calibration with manual age determinations is necessary to ensure the accuracy and reliability of the AI predictions. Thus, the proposed approach integrates AI-based age determination and traditional ageing methods for maximum accuracy of the estimates.

MODEL

The model framework (Figure 1) includes a continuous process of training the model using available labelled data (aged otoliths), querying the model to select the next sample, labeling or relabeling the selected sample, and enriching the model with newly labelled samples.

This model relies on automatized ageing that is supplementing the expert-derived age estimates continuously improving the model in the *Label* phase and the *Enrich* phase.

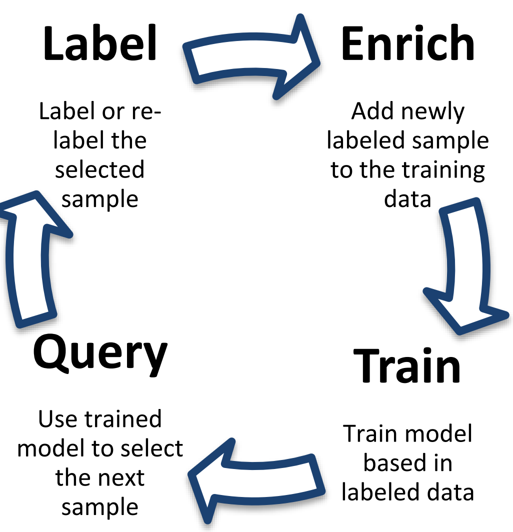

Figure 1: Model framework.

recapture study indicated biases among age readers (Blood, 2003). In the 1980s, the IPHC applied injections with the antibiotic oxytetracycline (OTC) during routine tagging operations to evaluate validity of ageing method (IPHC, 1985). Upon injection, the OTC is absorbed by the fish's bony structure, including the otoliths, and leaves a mark that is easily seen when viewed under an ultraviolet light. When an OTC-injected tagged fish is recovered, the otoliths are removed and examined under the ultraviolet light. By comparing the number of annuli laid since the OTC mark to the fish recovery, the accuracy of the age readings can be determined.

[3] Although the idea of taking pictures of Pacific halibut otoliths is not new. See 1960 report by G. Morris Southward, *Photographing Halibut Otoliths for Measuring Growth Zones* (Southward, 1962).

Modeling approach

Previous literature (see perspective piece by Malde et al., 2020) suggests adapting a pre-trained convolutional neural network (CNN) designed for image classification to estimate age using otolith images obtained via microscope camera. This type of model is trained on a large collection of images of otoliths previously aged by human readers. Moen et al. (2018) presents the first case of the use of deep learning and CNN to estimate age from images of whole otoliths of Greenland halibut (*Reinhardtius hippoglossoides*).[4]

Artificial neural networks (ANNs) are computational structures inspired by biological neural networks. They consist of simple computational units referred to as neurons, organized in layers. The neuron parameters (or weights) are estimated by training the model using supervised learning. This process consists of two steps: forward propagation, where the network makes a prediction based on the input; and back propagation, where the network learns from its mistake by calculating the gradient of a loss function, and then uses the gradient to update the neuron weights. The ANNs approach has been used for fish ageing by Robertson & Morison (1999) and Fablet & Le Josse (2005) with a limited success.

The neural networks approach significantly improved in recent years with the increase in the number of layers, applying an approach often referred to as deep learning. Deep learning neural networks are known for their generality. With sufficient training data, they can be used to classify raw data (e.g., an array of pixels) directly, without explicit design of low-level features. The deep learning algorithm lower layers learn to distinguish between primitive features automatically, typically identifying sharp edges or color transitions. Subsequent layers then learn to recognize more abstract features as combinations of lower layer features, and finally merge this information to provide a high-level classification.

In CNNs (LeCun et al., 1998; Simonyan & Zisserman, 2015), the layers are structured as stacks of filters, each recognizing increasingly abstract features in the data. Convolutional layers may be understood as an efficient way to transform an input image into another image, highlighting meaningful patterns, learned from data during training. The training is sequential, meaning the output of each layer is the input of the next layer, and the useful features are learned in the various layers during training. This approach is very effective for many image analysis problems, where objects are often recognized independent of their location. During network training, the performance is monitored over sequential epochs. Epochs represent the number of times that the training dataset is passed forward and backward through the network to refine model weights. Whenever the validation loss decreases, the trained model is saved, ending up with the network that corresponds to the minimum loss and highest accuracy on the validation set. The trained network is then evaluated on the testing set.

In the CNN model, prediction of age can be defined as a classification task (age as a class category) or image regression, that is a task of predicting a continuous variable from an image, in this case prediction of age as a numeric value from an otolith image. Both approaches can be tested for devising a method better suited for Pacific halibut. Considering fish age as a discrete parameter is a common approach used to identify the individual year class, i.e. grouping fish originating from the spawning activity in a given year (Moen et al., 2018), although this may be

[4] CNN was also applied for other tasks related to fisheries management, e.g. fish species identification (Allken et al., 2019).

less appropriate for long-living species with a larger number of age categories in the sample. The oldest Pacific halibut on record were aged at 55 years (Keith et al., 2014).

Software options

The proposed approach follows that of Moen et al. (2018) and Moore et al. (2019) who chose TensorFlow and Keras libraries to implement and train the model. TensorFlow is currently the largest and most popular library available for deep learning. Keras is a high-level API which runs on top of TensorFlow and simplifies implementation of TensorFlow models.

The approach uses a transfer-learning technique to develop a CNN for otolith age estimation. Transfer learning is the process of repurposing a machine learning model that has been pre-trained for another, related, task. Specifically, it starts with the Inception v3 model from Google, pre-trained on the ImageNet database. ImageNet database contains over 14 million (14,197,122) annotated images classified intro 1000 categories. The CNN layers are loaded with pre-trained (with ImageNet data) and publicly available weights, as opposed to using random initialization. Various training meta-parameters contribute substantially to final accuracy by using a stochastic gradient descent (SGD) optimizer and by leaving all network layers as trainable.

For the application to otolith ageing for Pacific halibut, the input layer was scaled to match the images' resolution.[5] The output layer was changed from a multi-dimensional output vector representing class probabilities to a single numeric output, effectively transforming it to a new regression layer.[6] This design follows the following pattern: Input → InceptionV3 (feature extractor) → Classifier/Regressor → Output. At this point, the neural network is trained to minimize the mean squared error (MSE) between predicted ages and human expert age estimates,[7] using the otolith images as inputs.

A similar approach, although adopting classification approach, was applied for ageing Greek Red Mullet (*Mullus barbatus*) (Politikos et al., 2022) and the associated code is available on GitHub (github.com/dimpolitik/DeepOtolith). The available open-source code was adapted for testing the approach for Pacific halibut.

Use of auxiliary data

Precision of age predictions of otoliths using neural networks from geometric features could be potentially improved by using auxiliary data, for example, fish size or date and location of capture (Moen et al., 2018). Past IPHC work suggests a good deal of spatial variation in Pacific halibut growth ring patterns. This points to the importance of good spatial coverage in the training sample. Additionally, the project plans to explore the use of additional spatial covariates for better

[5] Resolution is the total number of pixels along an image's width and height, expressed as pixels per inch (PPI). The Inception v3 model processes images that are 299 x 299 pixels in size. The original images, which were 2548 x 2548 pixels, were resized to 400 x 400 pixels.

[6] Alternatively, Politikos et al. (2021) replaced the last layer with a feed-forward network with two hidden layers replacing the default 1000-categories output layer with a fully-connected layer with six hidden nodes, corresponding to a limited number of age categories [Age-0 – Age-5+], with the last one representing fish of age 5 and older, In this case, the network outputs probabilities using the softmax function, a function that performs multi-class classification and transforms the outputs to represent the probability distributions over a list of potential outcomes. The IPHC uses in its stock assessment bins Age-2 – Age 25+ for the current age data and Age-2 - Age-20+ for the historical surface read ages. The adoption of a larger number of age categories prompted the decision to incorporate a regression layer in place of class probabilities.

[7] In practice, the neural network minimizes the MSE of normalized age values, i.e., age values divided by the maximum age provided as input.

age prediction. Other available auxiliary data include year collected, which could be applied to account for variation between cohorts and prevalent environmental conditions throughout the aged fish life histories, and the collection dates, which provides insights into seasonal variation to the interpretation of the otolith edge.

Database

The IPHC annually ages a considerable number of otoliths (see *Appendix* for details). Since 1925, over 1.5 million otoliths have been aged and stored for potential future use. Otoliths collected by the IPHC for ageing purposes undergo additional processing. Otoliths are sectioned (broken in half) and baked to enhance the contrast between the growth rings. These stored and previously aged otoliths serve as a valuable resource for creating a database of images for training purposes. To optimize model training, the selection of otoliths included in the model covers a broad spectrum of fish sizes, ages, sexes, and collection locations.

Before photographing, processed otoliths were placed in a monochrome tray featuring an elongated groove designed to keep the otolith upright and immersed in water. The pictures were taken with AmScope 8.5MP eyepiece cameras,[8] under consistent lighting conditions and magnification. The input database includes images of standardized size, 2548 by 2548 pixels, which are later resized to the desired resolution based on the model's specification.[9]

It is important to note that it may not be necessary to image the otoliths at resolutions sufficient for human viewers to resolve, because the CNN may be able to arrive at an age estimate without directly counting bands (Moore et al., 2019).

Figure 2 shows an example of a range of images used in the CNN training dataset.

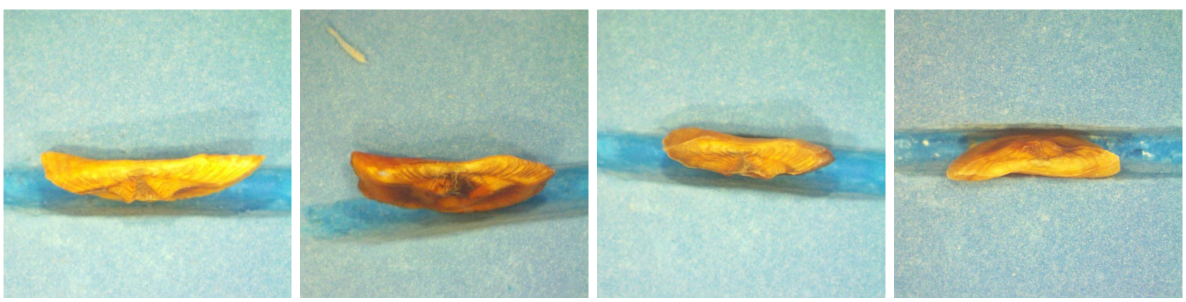

Figure 2: Examples of Pacific halibut otolith images taken for inclusion in the training set.

Note: In due course, the IPHC will create a database comprising labelled images of otoliths both pre- and post-processing and conduct a cost-benefit analysis of processing the otoliths for ageing using AI. The analysis will look at the accuracy improvement when using an image database containing images of processed (broken and baked) otoliths with enhanced contrast vs. those captured prior to processing (i.e. surface pictures). In their research, Politikos et al. (2022) utilized digital images of otoliths that were not subject to any additional processing in the

[8] The camera fits in one of the microscope eyepieces, eliminating the need to purchase a separate camera mount for the microscope.

[9] Moen et al. (2018) used images 400 by 400 pixels, which required the input layer to be scaled to match the images size as Inception v3 classifies by default images with a size of 299 by 299 pixels. Ordoñez et al. (2020), using the same set of images, built a CNN with images resized to 224 by 224 pixels, the default input of the VGG-19 model. Higher resolution images offer the flexibility to adapt the model in the future to more detailed and complex image analysis tasks, potentially improving the accuracy and effectiveness of image recognition capabilities.

laboratory, immersed in water and placed under a stereomicroscope on a white background with transmitted light. However, it is important to note that even if results indicate that breaking and baking is not necessary for age determination using AI, a subsample chosen for the Label and Enrich phases would have to be fully processed for age determination with traditional methods by an expert reader.

Presorting otoliths

The adopted procedure excludes broken otoliths, applying manual presorting at the image-taking stage. Presorting has also occurred at the collection stage when crystalized otoliths[10] are omitted when collecting samples.

Image collection

The image collection is associated with labels storing:

1. Otolith reference number – using referencing system already in place;
2. Image name and location – exact path for image access;
3. Resolved age – human reader derived age (**rsvage**);
4. Year collected – to account for variation between cohorts and prevalent environmental conditions;
5. Date collected – to account for the 'edge effect' reflecting seasonal changes;
6. Geospatial characteristics (latitude and longitude) – to capture regional variation;
7. Resolved sex – to determine whether otolith characteristics (possibly not directly visible to human eye) could be used for sex determination.[11]

PRELIMINARY RESULTS

The current model run utilized 2,682 images of otoliths collected during the 2019 IPHC fishery-independent setline survey (FISS). The 2019 FISS provides an ideal foundation for creating an image database, as its extensive coverage is expected to capture regional variations in otoliths, offering a robust dataset for initial modeling efforts.

The images were divided into training, validation, and test datasets. The training set (1,595) was used for training purposes. The validation set (282) was used to evaluate the model during the training process, allowing for adjustments without using the test set, which was reserved for the final evaluation. The test dataset (30%, 805) was used to assess the performance of the model after training, providing an unbiased evaluation of its generalization capability to new, unseen data. Additional set of 91 images (referred to as secondary test set) was used to compare the results between different model configurations. All images were resized to 400x400 pixels. Images of broken otoliths were excluded. The number of epochs was set to 1000, with EarlyStopping applied and patience set to 100. Learning rate was set to 0.0002 and batch size to 16.

Normalized age MSE in training set was 0.000198 and 0.0015 in validation set. The model was trained for 417 epochs (i.e., 317 effective epochs with patience=100). The model achieved RMSE in the test set of 1.90, and 1.94 when applied to rounded results. Correct age was

[10] Crystalized otoliths have an altered composition – specifically, where the aragonite in the otolith is partially or mostly replaced by vaterite, a phenomenon known as otolith crystallization. Crystallized otoliths are not suitable for ageing.
[11] IPHC is currently using genotyping for Pacific halibut sex determination.

predicted for 30.3% individuals, with an additional 40.7% being within 1 year of error. Figure 3 shows accuracy adjustment over the training process, while Figure 4 compares manually-derived age with AI predicted age. Figure 5 compares age composition derived manually with model predictions.

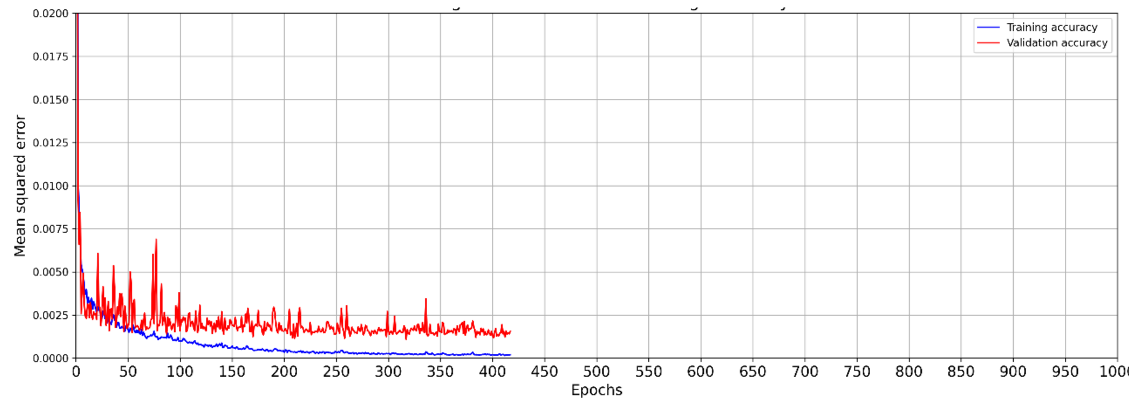

Figure 3: Age accuracy (measured as normalized age MSE) throughout the training process.

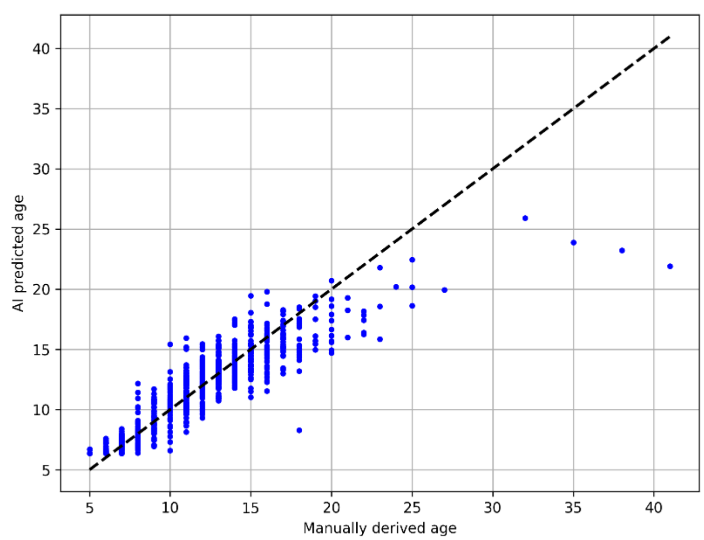

Figure 4: Comparison between manually derived age with AI predicted age.

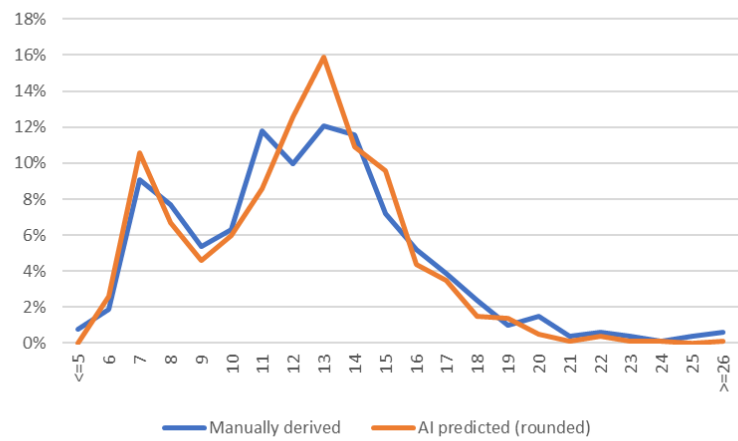

Figure 5: Comparison between manually derived age with AI predicted age – age composition.

CONCLUSIONS

In conclusion, the ongoing advancement of AI technologies in the field of marine science offers considerable potential to enhance the efficiency of age determination of Pacific halibut using otolith images. Preliminary results presented here suggest that AI could serve as a promising alternative to the current ageing protocol, which relies entirely on manual age reading. AI is also evolving rapidly, and adapting to new developments may further improve results over time However, it is important to continue verifying whether achieved accuracy of CNN-based predictions do not learn biased prediction rules based on changes in the relationship between age and covariates used by the model, noise or other irrelevant imaging artefacts present in the data (Ordoñez et al., 2020). Therefore, it is key to continuously diagnose performance problems and find ways to fix them (Belcher et al., 2023; Norouzzadeh et al., 2018). Moreover, the automated ageing process will still depend on trained readers for training the model with inputs that capture temporal changes, which is increasingly important in the face of changing environmental conditions and climate change.

RECOMMENDATION

That the Commission:

1) **NOTE** paper IPHC-2025-AM101-INF03 that summarizes the information available on the use of artificial intelligence (AI) for determining the age of fish from images of collected otoliths and provides an update on the exploratory work of implementing an AI-based age determination model for Pacific halibut.

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APPENDIX
COUNTS OF OTOLITHS AGED BY THE IPHC

Collection year	Ageing method	IPHC FISS*	Commercial (Market Sample)*	NOAA Trawl survey*	Tag recovery*	ADF&G recreational*	Clean collection
pre-1960	surface	70,984			10,068		
1960	surface	6,606			681		
1961	surface	4,727		4,576	842		
1962	surface	2,605		1,692	594		
1963	surface	8,257		2,209	440		
1964	surface	10,295	27,828	1,001	353		
1965	surface	5,169	27,252	1,186	493		
1966	surface	3,750	24,638	1,777	796		
1967	surface	6,325	29,797	2,271	1,151		
1968	surface	2,314	29,772	1,887	1,813		
1969	surface	1,510	23,361	1,019	1,869		
1970	surface	1,138	24,686	1,184	867		
1971	surface	2,702	16,374	2,294	732		
1972	surface	2,597	23,381	1,180	490		
1973	surface	1,747	16,683	893	244		
1974	surface	1,021	11,569	1,189	128		
1975	surface	1,212	14,128	1,136	131		
1976	surface	1,843	14,103	969	72		
1977	surface	1,853	13,514	1,102	83		
1978	surface	1,933	11,434	1,309	61		
1979	surface	2,021	7,219	730	93		
1980	surface	5,022	10,317	717	168		
1981	surface	7,942	8,267	460	129		
1982	surface	5,720	9,644	443	208		
1983	surface	5,822	9,262	1,355	286		
1984	surface	6,508	10,233	1,089	455		
1985	surface	5,872	12,986	1,192	778		
1986	surface	5,139	12,426	1,120	1,020		
1987	surface	42	16,137		859		
1988	surface	1,179	17,154	98	761		
1989	surface	6,130	14,122		710		
1990	surface	2,201	14,800	4,802	397		
1991	surface	1,315	13,461	2,598	280		
1992	surface/BB	7,530	14,564	222	182		
1993	surface/BB	3,384	13,747		147		
1994	surface/BB	2,618	13,311		99		
1995	surface/BB	4,512	12,297	433			
1996	surface/BB	10,893	13,452	2,211			
1997	surface/BB	14,784	15,501	834	148		

1998	surface/BB	8,587	14,395	1,145	98		
1999	surface/BB	11,971	12,858	3,029	70	3,672	
2000	surface/BB	14,122	13,982	1,209	46	2,706	
2001	surface/BB	14,731	13,181	2,952	27	2,609	
2002	BB	13,635	17,932	761	24	2,349	
2003	BB	12,626	13,915	3,876	79	2,754	
2004	BB	14,474	11,798	897	450	3,288	
2005	BB	12,651	14,650	2,028	643	3,183	
2006	BB	14,976	13,399	2,621	679	3,179	
2007	BB	16,285	13,964	3,930	455	3,026	
2008	BB	15,545	13,460	1,527	304	1,500	
2009	BB	15,706	13,583	4,922	276	1,500	
2010	BB	14,080	16,106	1,915	21	1,500	625
2011	BB	14,451	11,391	4,592	26	1,500	676
2012	BB	17,896	12,902	1,639	9	1,500	1164
2013	BB	12,717	11,039	2,044	19	1,503	1020
2014	BB	16,194	12,606	1,476	22	1,500	1096
2015	BB	15,815	12,312	2,133	24	1,500	1072
2016	BB	15,113	11,618	742	21	1,502	902
2017	BB	12,565	10,821	1,384	15	1,500	756
2018	BB	12,935	11,013	576	39	1,499	798
2019	BB	17,716	10,711	1,640	34	1,497	925
2020	BB	10,323	10,568		34	1,413	577
2021	BB	12,253	11,051	1,444	38	1,500	547
2022	BB	9,702	10,942	1,902	39	2,334	519
2023	BB	8,506	10,968	(3,147)	(48)	(1,958)	462
2024	BB	5,771	(10,377)	(1,058)	(61)	(1,542)	458

Notes:

- Star (*) indicates blind side otolith.
- BB stands for ‘break and bake’ approach.
- All otoliths reported in this table were aged with the exception of the clean collection.
- All aged otoliths are stored in glycerol/thymol solution.
- Some small fish from trawl survey collection are still aged by surface method; otoliths with surface age>4 are broken and baked.
- Sample data not entered prior to 1960 for FISS, 1964 for commercial, 1961 for NOAA trawl survey.
- Clean collection is not aged, stored dry, and include paired otoliths.
- Tribal otoliths are included in the Market Sample series.
- Additionally, there are 144 not aged 2A recreational otoliths, all from Hein Bank collected between 2004 and 2009.
- Trawl and recreational otoliths lag one year in ageing.
- In brackets, otoliths available for ageing but ageing not completed.

Using Management Strategy Evaluation to Investigate the Effects of Fishing and the Environment on Pacific Halibut

PREPARED BY: IPHC SECRETARIAT (A. HICKS; 26 JANUARY 2025)

PURPOSE

This document provides an electronic version of a brochure presenting Management Strategy Evaluation (MSE) simulations to examine environmental and fishing effects on Pacific halibut.

BACKGROUND

After presenting to the MSAB at MSAB019 the results of simulations examining the effects of low and high average recruitment tied to environmental conditions, they requested that outreach materials be developed.

> **IPHC-2024-MSAB019-R, para 32:** The MSAB **REQUESTED** that outreach materials be developed by the Secretariat that synthesize the effect of the PDO (e.g. via recruitment) on the coastwide and regional stock dynamics and the relative effect of fishing in simple terms with interpretation and consequences of the outcomes.

Appendix I shows an electronic version of a brochure describing these results. The simulations hold average recruitment constant at low or high values while weight-at-age is allowed to vary randomly over the projection period.

APPENDICES

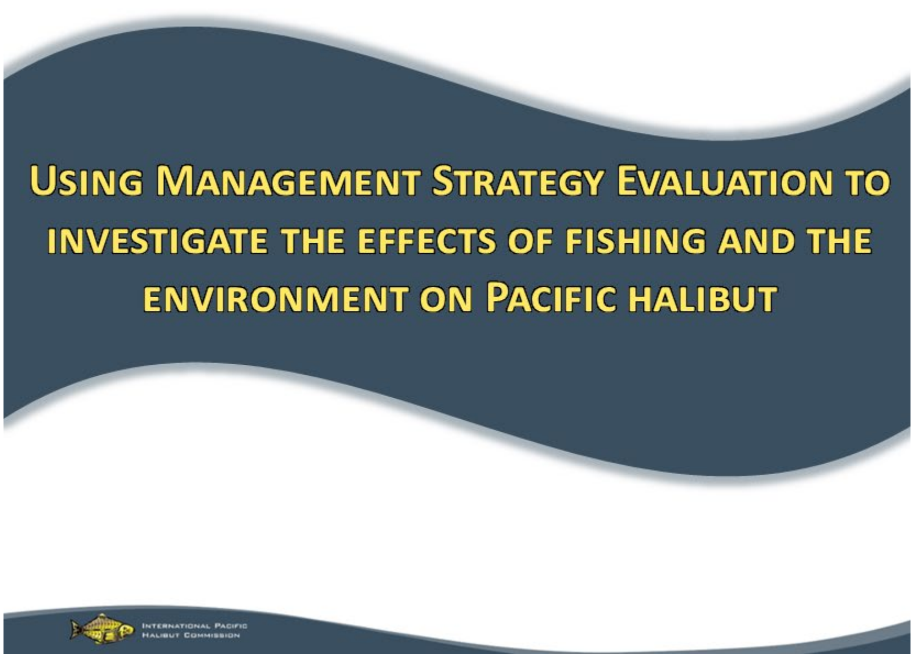
Appendix I: An electronic version of a brochure presenting Management Strategy Evaluation simulations to investigate the effects of fishing and the environment on Pacific halibut.

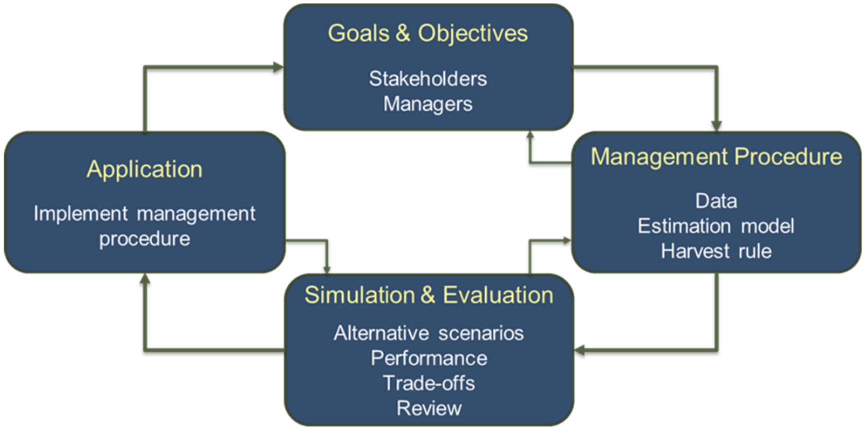
Appendix I

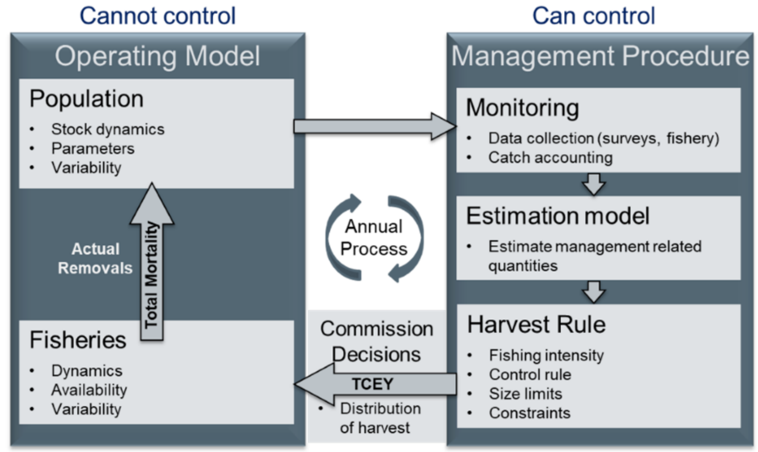
An electronic version of a brochure presenting Management Strategy Evaluation simulations to investigate the effects of fishing and the environment on Pacific halibut.

INTERNATIONAL PACIFIC

HALIBUT COMMISSION







What is MSE?

Management Strategy Evaluation (MSE) is a process to evaluate the consequences of alternative management procedures. MSE uses a simulation tool to determine how alternative management procedures perform given a set of pre-defined fishery and conservation objectives, taking into account the uncertainties in the system. Processes that cannot be controlled, such as environmental effects, can be included as a source of variability, or by simulating specific scenarios to understand how different levels of the process affect the outcomes.

Undertaking an MSE requires scientists, managers, and stakeholders to be involved throughout the process. While the scientists do the modelling, managers must offer extensive input. Because of the many steps and the iterative process, communication among parties is critical for achieving buy-in on the results of the management strategy evaluation. The MSE is an essential part of the process of developing and agreeing to a harvest strategy policy.

THE MSE PROCESS

DEFINE FISHERY & CONSERVATION OBJECTIVES

IDENTIFY MANAGEMENT PROCEDURES (MPs) TO EVALUATE

SIMULATE THE PACIFIC HALIBUT POPULATION USING THOSE MPs

EVALUATE RESULTS TO EXAMINE TRADE-OFFS

IMPLEMENT THE CHOSEN HARVEST STRATEGY WITH THE TESTED MP

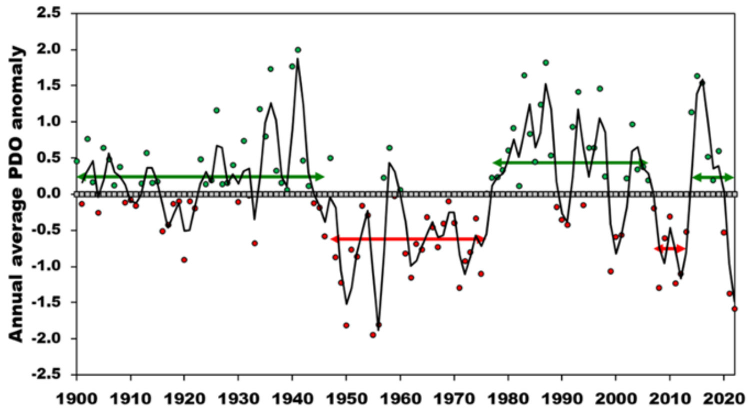
An MSE for Pacific Halibut

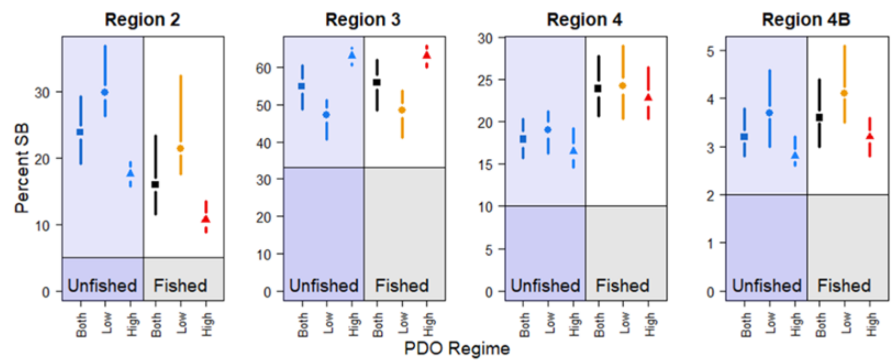
An operating model for Pacific halibut simulates the population dynamics within and between four regions across the Northeast Pacific Ocean. Fishing, movement, reproduction, and growth are modelled and simulated forward in time assuming a consistent harvest strategy. Variability in age-0 recruitment and growth are included. Outputs aggregated across all four regions (coastwide) include the future expected stock size, the expected fishery mortality limits (i.e. TCEY), and the interannual variability in the fishery mortality limits. These outputs are also available at the regional level. The IPHC Management Strategy Advisory Board (MSAB) provides input into the MSE process and the Commission uses the results in the development of a Harvest Strategy Policy.

MSE SIMULATION ELEMENTS

AN OPERATING MODEL SIMULATES THE PACIFIC HALIBUT POPULATION INTO THE FUTURE

A MANAGEMENT PROCEDURE DETERMINES THE FISHING MORTALITY LIMITS AND FEEDS BACK INTO THE OPERATING MODEL





THE EFFECTS OF THE ENVIRONMENT ON PACIFIC HALIBUT

A strong correlation between the environmental conditions in the northeast Pacific Ocean, specifically the Pacific Decadal Oscillation (PDO), and recruitment of Pacific halibut to the commercial fishery during the 1900s has been identified. For Pacific halibut, the positive 'phase' of the PDO (years up to and including 1947, 1977-2006, and 2014-19) appears to have resulted in typically higher average recruitment. Additional work suggests that movement and the distribution of age-0 Pacific halibut are also different depending on the phase of the PDO.

Since the late 1800's the PDO has oscillated between warm and cold phases at least 4 times. Recent research, however, shows many other environmental indicators were highly anomalous in recent years, and it is unclear whether these years represent comparable conditions to previous PDO observations.

INFLUENCES OF THE PDO ON PACIFIC HALIBUT

LOW PDO
Low average recruitment
Typically, less recruitment in Region 4
Less movement from Region 4 to 3
More movement from Region 3 to 2

HIGH PDO
High average recruitment
Typically, more recruitment in Region 4
More movement from Region 4 to 3
Less movememtn from Region 3 to 2

A CHANGING ENVIRONMENT AND THE MANAGEMENT OF PACIFIC HALIBUT

The Pacific halibut population was simulated forward in time, with fishing mortality similar to what has occurred recently, assuming that the PDO was either always low or always high. The environment has a modest effect on the coastwide fishing mortality limits with the expected TCEY being 1.6 times greater in a high PDO regime when compared to a low PDO regime, although the interannual variability is the same. This is because the population size is smaller, thus fewer fish can be harvested in a persistent low PDO regime. Fishing and the environment affect the proportion of spawning biomass in each Biological Region in different ways. Region 2 (CA, OR, WA, BC, and SE AK) is affected by both the PDO and fishing. Region 3 (central Gulf of Alaska) is mostly affected by the PDO regime and fishing has little effect on the proportion of spawning biomass because fish move into this region at different rates depending on the PDO regime. Region 4 (western Gulf of Alaska and the Bering Sea) is mainly affected by fishing as fish generally move out of this region. Region 4B (Aleutian Islands) is affected by both fishing and the PDO regime because few fish move in or out of this region, but recruitment of Pacific halibut is dependent on the PDO regime.

RESULTS OF THE SIMULATIONS

THE COASTWIDE TCEY IS 1.6 TIMES GREATER, ON AVERAGE, WITH A PERSISTENT HIGH PDO

AREAS ARE AFFECTED DIFFERENTLY BY FISHING AND BY THE ENVIRONMENT

Long-Term Performance Metrics			
PDO	Both	Low	High
Median RSB	38.8%	37.6%	39.2%
P(RSB<20%)	<0.001	<0.001	<0.001
P(RSB<36%)	0.238	0.329	0.157
Median TCEY (Mlbs)	65.6	51.4	83.0
Median AAV of TCEY	5.2%	4.5%	4.5%
Median TCEY Region 2 (Mlbs)	20.5	19.1	21.2
Median TCEY Region 3 (Mlbs)	33.7	23.0	48.7
Median TCEY Region 4 (Mlbs)	8.1	6.6	9.4
Median TCEY Region 4B (Mlbs)	2.4	2.2	2.6

Importance to Decision Making

Even though we cannot "manage" the PDO regime, it is useful to understand the effects of the PDO regime on the Pacific halibut population and fisheries, separating the effect of fishing from the effects of the environment. In some cases, the environment may have a bigger effect on yield and the distribution of spawning biomass than fishing at a specific rate does. The environment is certainly influential on management outcomes and investigating the effects of a single regime on the management of Pacific halibut helps to understand the variability and uncertainty in the potential management outcomes.

In reality though, the environment is variable and often unpredictable. Therefore, the MSE simulations informing Commissioners, and the development of a Harvest Strategy Policy, oscillate randomly between PDO regimes and integrate the uncertainty of the environmental regime into the results. Including this variability provides the assurance that a chosen harvest strategy meets management objectives and is robust to uncertainty in the environment.

EFFECTS OF THE ENVIRONMENT AND FISHING

THE ENVIRONMENT IS VARIABLE AND OFTEN UNPREDICTABLE

THE ENVIRONMENT SCALES THE PRODUCTIVITY OF THE STOCK AND CHANGES THE DISTRIBUTION AMONG BIOLOGICAL REGIONS

UNDERSTANDING THE EFFECTS OF THE ENVIRONMENT IS USEFUL, BUT THE GOAL IS TO FIND A MANAGEMENT PROCEDURE THAT IS ROBUST TO THE VARIABILITY IN THE ENVIRONMENT

For More Information

https://www.iphc.int/research/management-strategy-evaluation/

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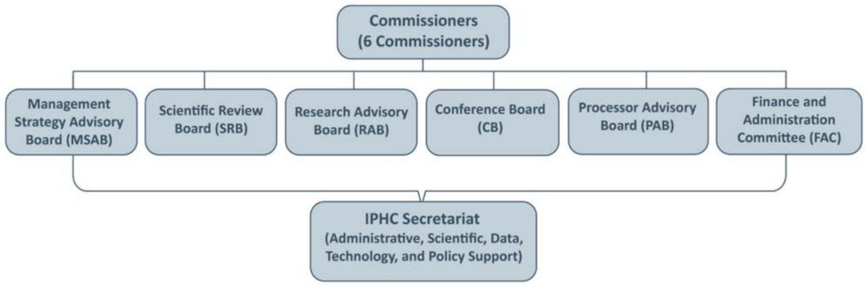
Structure of the Commission



The Commission

The IPHC currently consists of six members, three appointed by each Contracting Party (the Governor General of Canada and the President of the United States of America), who serve their terms at the pleasure of the Contracting Party.

Canada


Mark Waddell


Neil Davis


Peter DeGreef

United States of America


Jon Kurland


Richard Yamada


Robert Alverson