



IPHC Annual Meeting (AM094) – A Collection of Published Meeting Presentations

22-26 January 2018, Portland, OR

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INTERNATIONAL PACIFIC
HALIBUT COMMISSION

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A large pile of fish, likely salmon, on a boat deck. The fish are piled together, with some showing signs of being cut or processed. The background is a light, hazy sky.

Reports of the Management Strategy Advisory Board

Agenda Item 7.2

IPHC-2017-MSAB09-R

IPHC-2017-MSAB10-R

Management Strategy Advisory Board

- 2017 Co-Chairpersons
 - Adam Keizer (Canada, DFO)
 - Rachel Baker (U.S.A., NOAA-Fisheries)

- MSAB met twice in 2017
 - MSAB09: 9-11 May
 - MSAB10: 23-26 October



Recommendations and Requests

- Objectives
- Simulation framework – scenario uncertainty, management procedures, performance metrics timeframe
- Program of Work: timelines



A review of the goals and objectives of the IPHC MSE process

MSAB10–Rec.01 ([para. 11](#)) *The MSAB **AGREED** to further revise the goals, objectives, and performance metrics, as detailed at [Appendix IV](#), at MSAB11, and also **RECOMMENDED** that the Commission review and provide guidance on them at the 94th Session of the Commission, thereby providing clear direction for the IPHC Secretariat and MSAB for action in 2018.*



Objectives

- Maintain a minimum of number of mature female Pacific halibut coast-wide
- Avoid very low stock sizes
- Mostly avoid low stock sizes
- When $\text{Limit} < \text{Estimated Biomass} < \text{Threshold}$, limit the probability of declines



Objectives

- Maintain directed fishing opportunity
- Maximize yield in each regulatory area
- Maintain median catch
- Maintain average catch
- Limit annual changes in TAC, coast-wide and/or by Regulatory Area
- Minimize discard mortality in the longline fishery



Discussion of the performance metrics reported

MSAB10–Rec.02 ([para. 32](#)) *The MSAB **RECOMMENDED** that future iterations of the simulations focus on the reduced range of SPR targets (greater than 40%, less than 55%) based on preliminary interpretation of results, and that 2% intervals between SPR values is sufficient to interpret future results.*



MSAB Program of Work 2018-22

MSAB10–Rec.03 ([para. 41](#)) *The MSAB **RECOMMENDED** the updated Program of Work provided at [Appendix VI](#), for the Commission’s further consideration.*



3 year schedule

May 2018 Meeting
Review Goals
Look at results of SPR
Review Performance Metrics
Identify Scale MP's
Review Framework
Identify Preliminary Distribution MP's
October 2018 Meeting
Review Goals
Complete results of SPR
Review Performance Metrics
Identify Scale MP'S
Verify Framework
Identify Distribution MP's
Annual Meeting 2019
Recommendation on Scale
Present possible distribution MP's

May 2019 Meeting
Review Goals
Spatial Model Complexity
Identify MP's (Distn Scale)
Review Framework
October 2019 Meeting
Review Goals
Spatial Model Complexity
Identify MP's (Distn Scale)
Review Framework
Review multi-area model development
Annual Meeting 2020
Update on progress
May 2020 Meeting
Review Goals
Review multi-area model
Review preliminary results
October 2020 Meeting
Review Goals
Review preliminary results
Annual Meeting 2021
Recommendations on Scale and Distribution



Recommendations x3

A review of the goals and objectives of the IPHC MSE process

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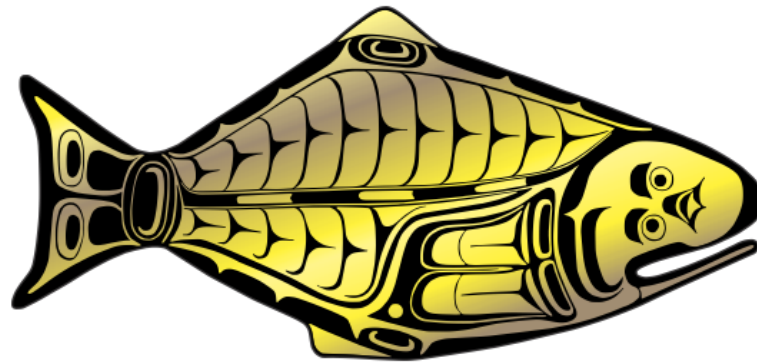


Requests x 7 (3 areas)

- IPHC meetings calendar (2018-20): MSAB
- Performance metrics
 - Connecting to fishery objectives
 - Time periods for evaluation
- Simulation framework
 - Interim coast-wide model
 - Variability and examining additional management procedures to evaluate fishing intensity



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Report of the IPHC Secretariat (2017)

Agenda Item 4

IPHC-2018-AM094-04

L. Boitor



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Staffing changes during 2017

FT Departures	Type	Hire Date	Departure Date	Position Title	Status
Melissa Knapp	Full time regular	1 June 2001	15 January 2017	Administrative Coordinator	Retired
Kelly McElligott	Full time regular	17 January 2017	27 December 2017	Data transcriber	Departed
FT Arrivals	Type	Hire Date	Departure Date	Position Title	Status
Kelly Chapman	Full time regular	1 January 2017	-	Front office assistant	Active
Kelly McElligott	Full time regular	17 January 2017	-	Data transcriber	Active



Meetings of the Commission and Subsidiary Bodies during 2017

	2017			
Meeting	No.	Original Date	Changes	Location
Annual Meeting (AM)	93 rd	23-27 Jan	-	Victoria, Canada
Conference Board (CB)	87 th	24-25 Jan	-	Victoria, Canada
Processor Advisory Board (PAB)	22 nd	24-25 Jan	-	Victoria, Canada
Finance and Administration Committee (FAC)	--	23, 26 Jan, during AM	-	Victoria, Canada
Scientific Review Board (SRB)	10 th	20-21 June	3d; 14-16 June	Seattle, USA
	11 th	26-28 Sept	-	Seattle, USA
Management Strategy Advisory Board (MSAB)	9 th	9-11 May	-	Seattle, USA
	10 th	25-26 Oct	4d; 23-26 Oct	Seattle, USA
Scholarship Committee (SC)	(no meeting in 2017)			
Work Meeting (WM)	--	20-21 Sept	-	Bellingham, USA
Research Advisory Board (RAB)	19 th	15 Nov	28 Feb 2018	Seattle, USA
Interim Meeting (IM)	93 rd	28-29 Nov	-	Seattle, USA



IPHC FISHERY REGULATIONS (2017)

In 2017, the Commission adopted **four (4)** fishery regulations in accordance with Article III of the Convention, as follows:

IPHC Pacific halibut fishery regulations, Section 13. Size Limits

- IPHC-2017-AM093-R, para. 48: The Commission **ADOPTED** a proposal aimed at eliminating a recently identified bias in Pacific halibut removal estimates (net weight), by **requiring all commercial Pacific halibut to be landed and weighed with their heads attached** for data reporting purposes and to be subject to the 32-inch minimum size limit (IPHC-2017-AM093-PropA), which supersedes Section 13 of the IPHC Pacific halibut fishery regulations. An **exemption was agreed upon** whereby **vessels that freeze Pacific halibut** at sea may possess and land their frozen fish with the head removed subject to the 24-inch minimum size limit if possessed or landed with the head removed (Appendix VI).

2017 Exemption resulted in 31.9 t (~70K lbs) being landed with head-off by 28 vessels (in 56 landings)



IPHC FISHERY REGULATIONS (2017)

IPHC Pacific halibut fishery regulations, Section 18. Fishing Multiple Regulatory Areas

- IPHC-2017-AM093-R, para. 54: The Commission **ADOPTED** a proposal aimed at harmonising IPHC and NMFS regulations regarding fishing in multiple regulatory areas in Alaska (Appendix VII), which supersedes Section 18 of the IPHC Pacific halibut fishery regulations.

2017 Catch limits

- IPHC-2017-AM093-R, para. 71: The Commission **ADOPTED** catch limits for 2017 as provided at Appendix VIII.

Fishing periods

- IPHC-2017-AM093-R, para. 72: The Commission **ADOPTED** fishing periods for 2017 as provided at Appendix IX, thereby superseding Section 8 of the IPHC halibut fishery regulations.



Fisheries and Oceans Canada (DFO)

IPHC-2018-AM094-AR09

Fisheries and Oceans Canada 2017: IPHC Annual Report

IPHC-2018-AM094-AR10_Rev1

2017 Canadian Recreational Fishery Halibut Catch Report

IPHC-2018-AM094-AR11

Canadian report to the International Pacific Halibut Commission on 2017 halibut fishery enforcement activities

- 2018 Setline Survey expansion in IPHC Reg. Area 2B
 - Areas of concern (MPAs, RCAs)
 - Species of concern (yelloweye, bocaccio)
- Identification of concerns with the current process of estimating Pacific halibut biological distribution
 - *[Paper IPHC-2018-AM094-12, discussion at agenda item 7]*



NOAA Fisheries (NMFS)

IPHC-2018-AM094-AR02

NMFS Report: Report on the 2017 Pacific halibut fisheries in Area 2A

IPHC-2018-AM094-AR13

Annual Report to the International Pacific Halibut Commission from the Alaska Region, National Marine Fisheries Service

- Regulatory proposals for 2018
 - *[Papers IPHC-2018-AM094-PropB1 – PropB3, discussion at agenda item 8]*



North Pacific Fishery Management Council (NPFMC)

IPHC-2018-AM094-AR12

North Pacific Fishery Management Council (NPFMC): Annual management letter

- Halibut Management Framework actions
 - Abundance-based management (ABM) of Pacific halibut bycatch
 - Discard mortality rates (DMR) for Pacific halibut bycatch
- Joint IPHC-NPFMC meeting June 2017
- Management measures under consideration



Pacific Fishery Management Council (PFMC)

IPHC-2018-AM094-AR01

Pacific Fishery Management Council (PFMC) update

- IPHC Regulatory Area 2A Catch Sharing Plan
 - Small changes to recreational sector in WA approved for 2018
- Commercial derby fishery
 - Discussed at June, Sept, and Nov PFMC meetings
 - General agreement to move past derby, open to changes that are better for fish and fishers
 - No changes recommended for 2018
 - Council will discuss how to proceed at June 2018 meeting



ANNUAL REPORT (2016 & 2017)

The **2016** Annual Report is available for download from the IPHC website at the following link:
<http://iphc.int/library/documents/category/annual-reports>

Previously, the IPHC Annual Report was published late in the following year, or even early in the subsequent year (13-14 months after the end of the year being reported on). Unfortunately, this decreased the utility of the report for user groups and led to confusion about the state of the fishery and resource, as well as the current decisions of the Commission.

In **2017**, we undertook an accelerated production timeline for the IPHC 2016 Annual Report, which the IPHC Secretariat staff produced some six months ahead of schedule. It is our intention to further accelerate the 2017 Annual Report production process, thereby ensuring users of the report receive the summary information as close to the relevant year as possible. Your continued feedback on the content, format and presentation of the Annual Report is welcome.

In **2018**, the Annual Report for 2017 is expected to be published by the end of February 2018.





L. Boitor

IPHC Website
www.iphc.int



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New IPHC Website

- The IPHC Secretariat launched our new website on Friday, 15 December 2017: <http://iphc.int/>.
- The new website is the culmination of a year long project by IPHC Secretariat staff which commenced on 15 September 2016, when the IPHC Secretariat chartered a website improvement team with members from the Seattle-based staff.
- The team's focus was on improving the distribution of public domain information.
- In November 2016, support for the team's efforts were enhanced by ensuring funding was available to hire a professional website designer.
- Our new website has five categories of content which include 'The Commission, Science and Research, Fisheries, Data, Meetings, and Documents'.
- The Seattle-based staff will continue to develop different ways to publish data and statistics for our stakeholders.



INTERNATIONAL PACIFIC HALIBUT COMMISSION

The Commission | Science & Research | Fisheries | Data | Meetings | Documents

QUICK LINKS

- ▶ Stock Status and Biology
- ▶ Fishery Regulations
- ▶ Performance Monitoring
- ▶ Circulars
- ▶ Seminar Series
- ▶ Meetings Calendar
- ▶ Glossary of Terms
- ▶ Contact Us

Providing research & stock management of Pacific Halibut within the U.S. & Canada

News Releases

- 19 DECEMBER 2017
IPHC-2017-NR033 IPHC NEWS RELEASE 2017-33
New IPHC Website Launched
- 4 DECEMBER 2017
IPHC-2017-NR032 IPHC NEWS RELEASE 2017-32
Outcomes of Interim...
- 21 NOVEMBER 2017
IPHC-2017-NR031 IPHC News Release 2017-31
Pacific Halibut Landing...
- 21 SEPTEMBER 2017
IPHC-2017-NR026 IPHC News Release 2017-30
Central Oregon All-depth...

Upcoming Meetings

- 22 JAN 94th Session of the IPHC Annual Meeting (AM094)
- 23 JAN 88th Session of the IPHC Conference Board (CB088)
- 23 JAN 23rd Session of the IPHC Processor Advisory Board (PAB023)
- 28 FEB 19th Session of the IPHC Research Advisory Board (RAB19)

Recent Reports

- 1 DECEMBER 2017
IPHC-2017-IM093-R Report of the 93rd Session of the IPHC Interim Meeting...
- 29 OCTOBER 2017
IPHC-2017-MSAB10-R Report of the 10th Session of the IPHC Management...
- 29 SEPTEMBER 2017
IPHC-2017-SRB11-R Report of the 11th Session of the IPHC Scientific Review...
- 11 JULY 2017
IPHC-2017-SRB10-R Report of the 10th Session of the IPHC Scientific Review...





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Interactive Maps and Data



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Interactive Maps and Data

Goal:

To share raw FISS data in a way that makes it **easier**

- **to see trends**
- **to dive deeper** into survey data



Interactive Maps and Data

2017 IPHC Stock Assessment Survey
All Regions

3 of 23

Station	Reg Area	Region	Date Fished	Latitude	Longitude	Depth (m)	Skates		U32 Halibut		U32 Halibut Bycatch (numbers) ³			
							Set ¹	Lbs. ²	#'s	Lbs. ²	#'s	Sablefish	P. Cod	Rockfish
1105	2A	Oregon	8/7	44° 30.03'	-124° 54.01'	240	6.0	0	0	0	0	15	0	0
1107	2A	Washington	8/2	46° 10.05'	-124° 10.00'	31	6.1	27	1	0	0	0	0	0
1108	2A	Washington	8/1	46° 10.00'	-124° 24.00'	67	6.1	29	2	0	0	0	0	0
1115	2A	Washington	8/8	47° 29.97'	-124° 38.00'	36	6.0	0	0	0	0	0	0	0
1116	2A	Puget Sound	9/7	47° 20.12'	-122° 27.77'	45	6.0	0	0	0	0	0	0	0
1117	2A	Puget Sound	9/7	47° 29.05'	-122° 26.16'	81	6.0	0	0	0	0	0	0	0
1118	2A	Puget Sound	9/6	47° 50.77'	-122° 25.00'	91	6.0	0	0	0	0	0	0	0
1119	2A	Puget Sound	9/6	47° 50.60'	-122° 38.30'	38	6.0	0	0	0	0	0	0	0
1121	2A	Puget Sound	9/5	48° 10.05'	-122° 53.83'	44	6.1	37	1	0	0	0	0	0
1122	2A	Puget Sound	9/4	48° 11.01'	-123° 19.94'	50	6.1	63	3	0	0	0	0	0
1123	2A	Puget Sound	9/4	48° 10.02'	-123° 37.90'	34	6.0	160	4	0	0	0	0	0
1124	2A	Puget Sound	9/5	48° 20.00'	-122° 54.92'	51	6.0	100	4	0	0	0	0	0
1125	2A	Puget Sound	9/5	48° 20.02'	-123° 07.88'	64	5.9	176	7	9	1	0	0	0
1126	2A	Washington	8/20	48° 18.90'	-124° 22.53'	33	6.0	62	2	0	0	0	0	0
1127	2A	Puget Sound	9/3	48° 41.01'	-123° 07.82'	45	6.0	0	0	0	0	0	0	0
1128	2A	Puget Sound	9/2	48° 49.97'	-122° 52.98'	40	4.6	0	0	0	0	0	0	0
1509	2A	Washington	8/26	48° 05.04'	-125° 16.00'	129	6.0	184	10	105	12	16	0	2
1513	2A	Washington	8/29	48° 14.99'	-125° 16.00'	65	5.4	384	20	83	9	1	0	6
1515	2A	Washington	8/28	48° 14.97'	-125° 31.00'	76	6.0	37	2	11	1	2	0	0
1517	2A	Washington	8/22	48° 20.02'	-124° 53.00'	112	6.0	134	6	0	0	11	0	1
1519	2A	Washington	8/25	48° 19.98'	-125° 07.98'	72	6.0	49	3	37	4	1	0	0
1522	2A	Washington	8/22	48° 25.04'	-125° 01.00'	117	6.0	54	2	0	0	19	0	0
1525	2A	Washington	8/22	48° 30.00'	-124° 52.92'	61	6.0	11	1	0	0	3	0	0
1601	2A	Oregon	8/12	42° 20.04'	-124° 27.21'	16	6.0	29	1	0	0	0	0	0
1602	2A	Oregon	8/12	42° 29.95'	-124° 30.97'	21	6.0	53	2	0	0	0	0	0
1603	2A	Oregon	8/17	43° 10.09'	-124° 26.25'	13	6.0	0	0	0	0	0	0	0
1615	2A	Washington	9/16	46° 20.08'	-124° 10.00'	14	6.0	33	1	0	0	0	0	0
1616	2A	Washington	9/16	46° 29.95'	-124° 09.00'	15	6.0	0	0	0	0	0	0	0
1617	2A	Washington	9/17	46° 50.05'	-124° 09.00'	7	6.0	0	0	0	0	0	0	0
1618	2A	Washington	9/18	47° 20.03'	-124° 23.99'	16	6.0	0	0	0	0	0	0	0
1619	2A	Washington	9/18	47° 30.04'	-124° 23.00'	6	6.0	0	0	0	0	0	0	0



Interactive Maps and Data

- What is available and where to find it
- Usage and orientation tips
- Data exploration example



Interactive Maps and Data

What is available?

Raw FISS catch per unit effort (CPUE)

Numbers per unit effort (count/skate) **NPUE**

Weight per unit effort (lbs/skate) **WPUE**

Aggregated by

U32 – Sub-legal size; < 32”

O32 – Legal size; \geq 32”

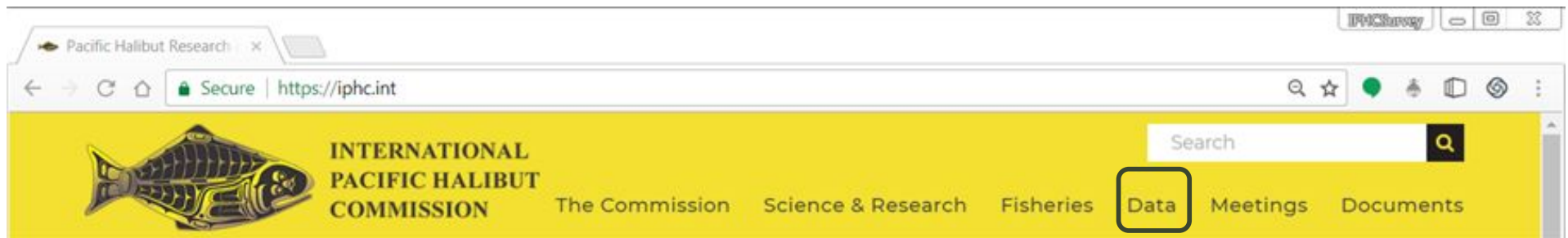
All sizes



Interactive Maps and Data

Where? IPHC's new website

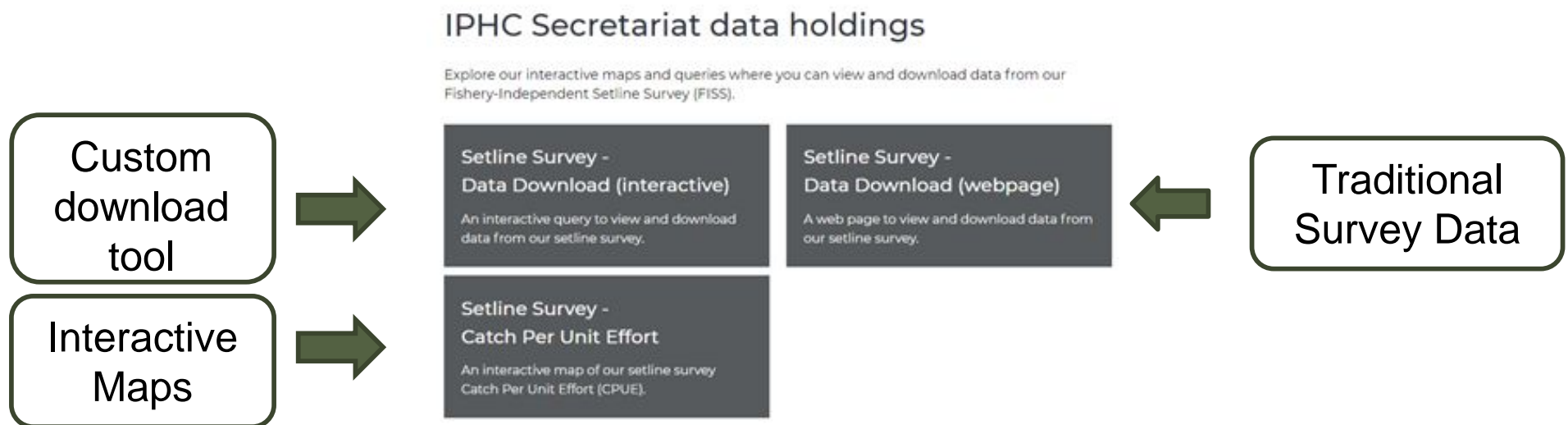
- <http://iphc.int/data/setline-survey-catch-per-unit-effort>



Interactive Maps and Data

Where? IPHC's new website

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Interactive Maps and Data



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
1	YearHead	Station	Purpose	Date	Stlkey	Year	O32 count	O32 weigh	U32 weigh	U32 count	Effective s	Max depth	Min depth	Avg no. ho	No. skates	Statarea	Year Creat	Total halib	Total net v	Lat - Grid t	Lon - Grid	Lat - fishes	Lon - fishes
2	2014	3083	Standard g	1-Jul-14	20141007	2014	45	1,101	771	119	7.03	71	56	100	7	160	1998	164	1,872	56.5	-135.25	56 29.99	135 15.23
3	2014	3113	Extra stati	22-Jun-14	20140987	2014	80	1,771	487	61	6.96	89	36	99	7	181	1998	141	2,258	58	-136.667	58 00.00	136 39.91
4	2014	3092	Standard g	29-Jun-14	20141002	2014	29	1,077	557	81	6.96	60	53	100	7	170	1998	110	1,634	57	-136	57 00.02	136 00.48
5	2014	3110	Standard g	25-Jun-14	20140995	2014	75	2,058	560	69	6.96	60	42	99	7	181	1998	144	2,618	57.833	-136.567	57 49.83	136 33.98
6	2014	3103	Standard g	26-Jun-14	20140998	2014	57	1,248	596	83	6.96	98	91	99	7	170	1998	140	1,844	57.333	-136.217	57 19.99	136 12.80
7	2014	3119	Extra stati	21-Jun-14	20140984	2014	29	634	642	87	6.96	66	51	100	7	182	1998	116	1,276	58.25	-135.667	58 15.01	135 40.06
8	2014	3079	Standard g	2-Jul-14	20141010	2014	58	1,569	479	66	6.96	90	86	99	7	160	1998	124	2,048	56.333	-135.233	56 20.02	135 14.48
9	2014	3086	Standard g	30-Jun-14	20141005	2014	37	1,345	380	52	6.96	77	73	99	7	160	1998	89	1,724	56.667	-135.567	56 39.97	135 34.07
10	2014	3106	Standard g	26-Jun-14	20140997	2014	24	515	458	68	6.96	63	44	99	7	170	1998	92	973	57.5	-136.233	57 30.00	136 14.18
11	2014	3108	Standard g	25-Jun-14	20140996	2014	64	1,219	377	48	6.96	95	83	99	7	170	1998	112	1,595	57.667	-136.55	57 40.22	136 32.96
12	2014	3089	Standard g	30-Jun-14	20141003	2014	39	795	436	58	6.96	106	100	99	7	160	1998	97	1,231	56.833	-135.867	56 50.20	135 52.05
13	2014	3080	Standard g	2-Jul-14	20141009	2014	45	1,155	306	42	6.96	115	108	99	7	160	1998	87	1,461	56.333	-135.533	56 20.03	135 31.63
14	2014	3097	Standard g	29-Jun-14	20141000	2014	8	279	299	43	6.96	51	32	99	7	170	1998	51	578	57.167	-135.9	57 10.01	135 54.22
15	2014	3084	Standard g	1-Jul-14	20141008	2014	52	2,081	350	43	6.96	96	76	99	7	160	1998	95	2,431	56.5	-135.55	56 30.00	135 33.02
16	2014	3098	Standard g	29-Jun-14	20141001	2014	28	466	153	17	6.96	133	109	99	7	170	1998	45	619	57.167	-136.2	57 10.00	136 11.82
17	2014	3120	Extra stati	22-Jun-14	20140985	2014	60	2,540	333	46	7.03	143	72	100	7	182	1998	106	2,872	58.25	-136.433	58 15.07	136 26.08
18	2014	3078	Standard g	3-Jul-14	20141012	2014	49	1,846	263	34	6.96	79	46	99	7	160	1998	83	2,109	56.333	-134.933	56 19.89	134 56.04
19	2014	3087	Standard g	30-Jun-14	20141004	2014	45	1,060	257	33	6.96	138	126	100	7	160	1998	78	1,317	56.667	-135.867	56 40.06	135 52.02
20	2014	3123	Standard g	17-Jun-14	20140980	2014	30	817	219	27	6.96	177	87	100	7	183	1998	57	1,036	58.5	-135.033	58 29.85	135 01.72
21	2014	3115	Standard g	21-Jun-14	20140983	2014	24	382	211	29	7.03	111	85	100	7	182	1998	53	593	58.167	-135.333	58 10.02	135 19.71
22	2014	3114	Standard g	21-Jun-14	20140982	2014	57	1,382	305	41	6.96	217	64	99	7	171	1998	98	1,686	58.167	-135.017	58 10.00	135 01.80
23	2014	3111	Standard g	25-Jun-14	20140994	2014	3	85	12	2	7.03	201	196	100	7	181	1998	5	97	57.833	-136.883	57 49.77	136 52.86
24	2014	3116	Standard g	22-Jun-14	20140986	2014	64	2,379	61	8	7.03	172	50	100	7	181	1998	72	2,440	58.167	-136.6	58 09.12	136 36.34
25	2014	3122	Standard g	17-Jun-14	20140979	2014	13	368	13	2	6.96	325	120	99	7	171	1998	15	381	58.333	-135.033	58 20.05	135 01.92
26	2014	3085	Standard g	1-Jul-14	20141006	2014	48	1,970	48	6	6.96	35	20	99	7	160	1998	54	2,018	56.667	-135.25	56 39.78	135 15.00
27	2014	3102	Standard g	26-Jun-14	20140999	2014	38	1,519	43	6	6.96	105	21	100	7	170	1998	44	1,561	57.333	-135.917	57 20.04	135 54.97
28	2015	3083	Standard g	4-Jul-15	20150927	2015	56	1,520	533	76	7.03	62	57	100	7	160	1998	132	2,052	56.5	-135.25	56 30.01	135 15.35
29	2015	3113	Extra stati	25-Jun-15	20151347	2015	131	2,380	715	90	7.03	85	37	100	7	181	1998	221	3,094	58	-136.667	58 00.00	136 39.64
30	2015	3092	Standard g	29-Jun-15	20151359	2015	68	1,390	889	109	6.96	60	53	99	7	170	1998	177	2,279	57	-136	56 59.99	136 00.42
31	2015	3110	Standard g	27-Jun-15	20151352	2015	77	1,498	675	85	6.96	63	46	100	7	181	1998	162	2,173	57.833	-136.567	57 50.01	136 34.51

download_preview_crosstab (6)

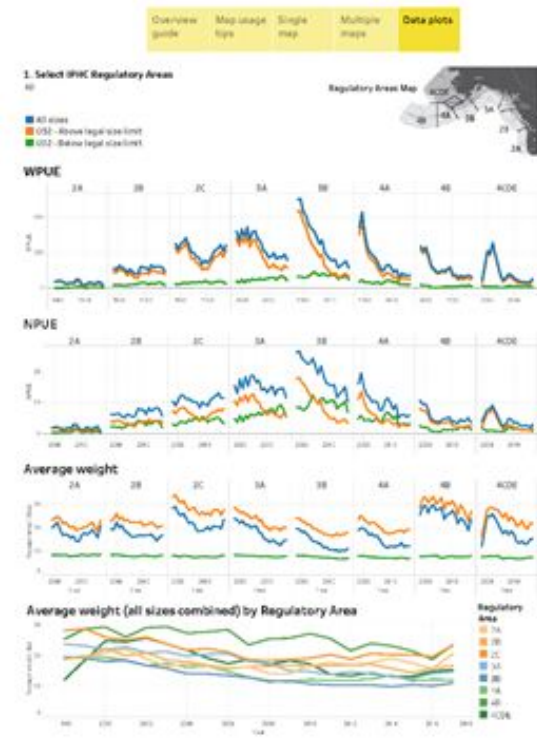
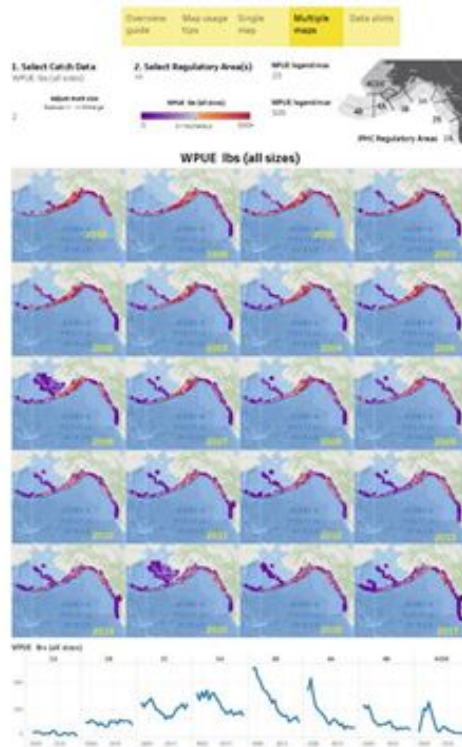
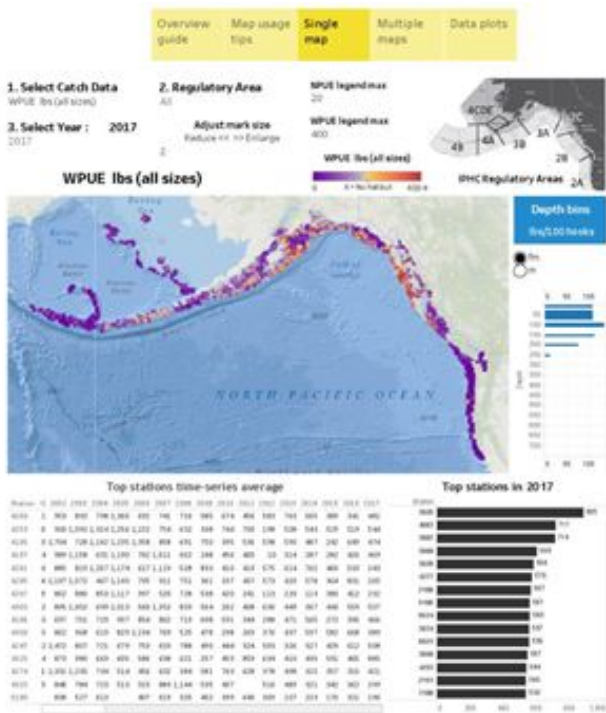
- Meetings Calendar
- Glossary of Terms

An interactive map of our secure survey Catch Per Unit Effort (CPUE).

Fishing vessels, Pacific Halibut, and IPHC historical photos.



Interactive Maps and Data



Interactive Maps and Data



Overview guide

- Definitions
- Description of components
- Tips for getting started
- How to adjust custom controls

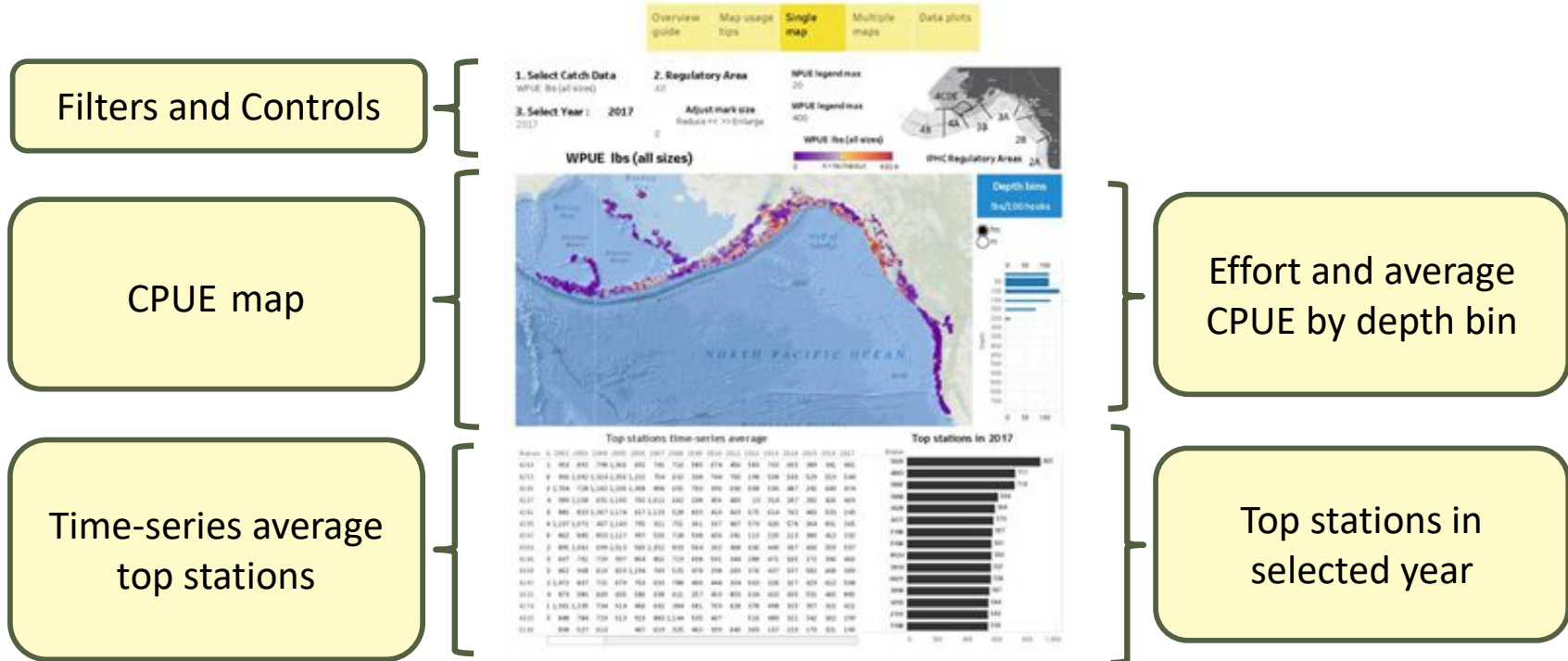
Map usage tips

- To avoid frustration
- Map controls
- Navigating and panning
- Selecting stations and regions
- Adjusting mark size



Interactive Maps and Data

Single Map Components



Interactive Maps and Data

Filters and Controls

1. Select Catch Data

WPUE lbs (all sizes) ▾

- NPUE total (all sizes)
- NPUE < 32" (81.3 cm)
- NPUE >= 32" (81.3 cm)
- WPUE lbs (all sizes)
- WPUE lbs < 32" (81.3 cm)
- WPUE lbs >= 32" (81.3 cm)

2. Regulatory Area

(All) ▾

×

- (All)
- 2A
- 2B
- 2C
- 3A
- 3B
- 4A
- 4B
- 4CDE

Cancel Apply

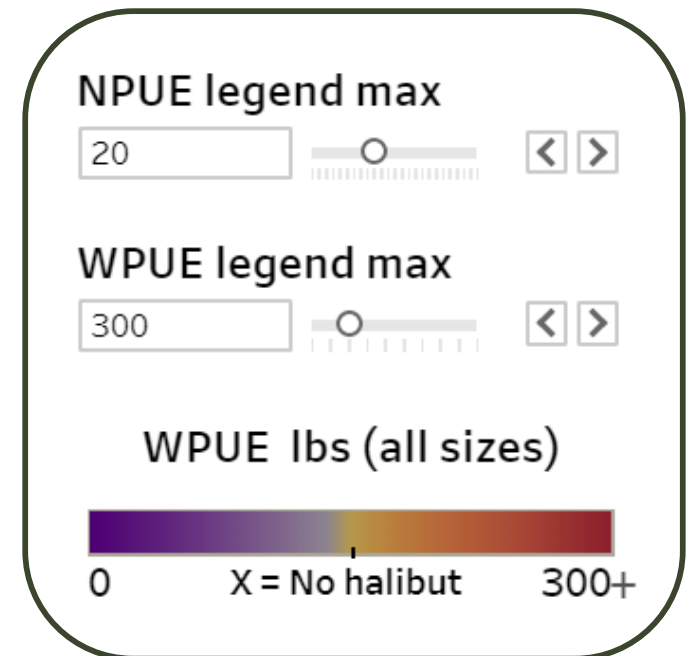
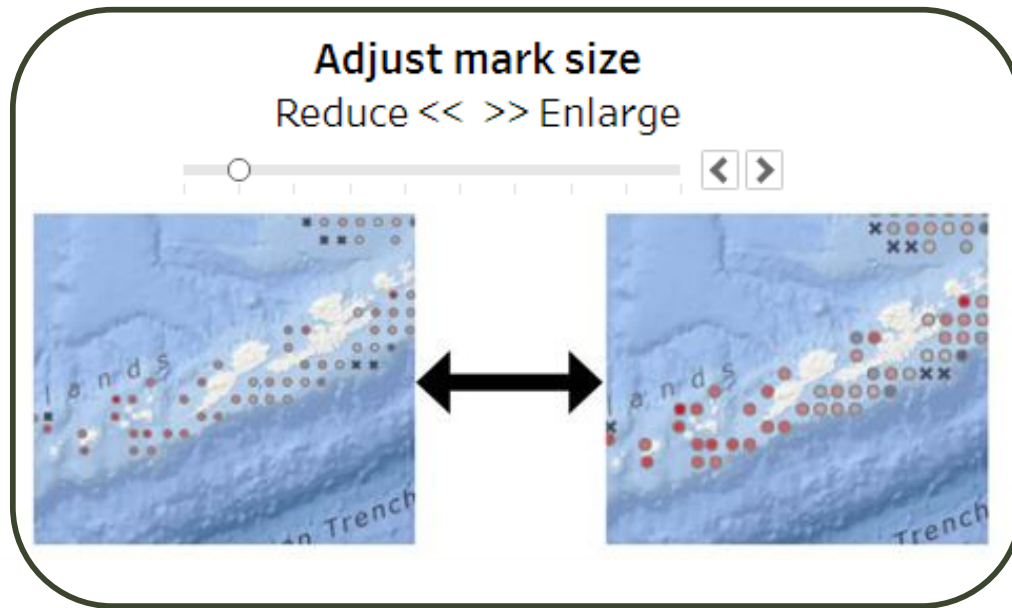
3. Select Year : 2017

○ < >



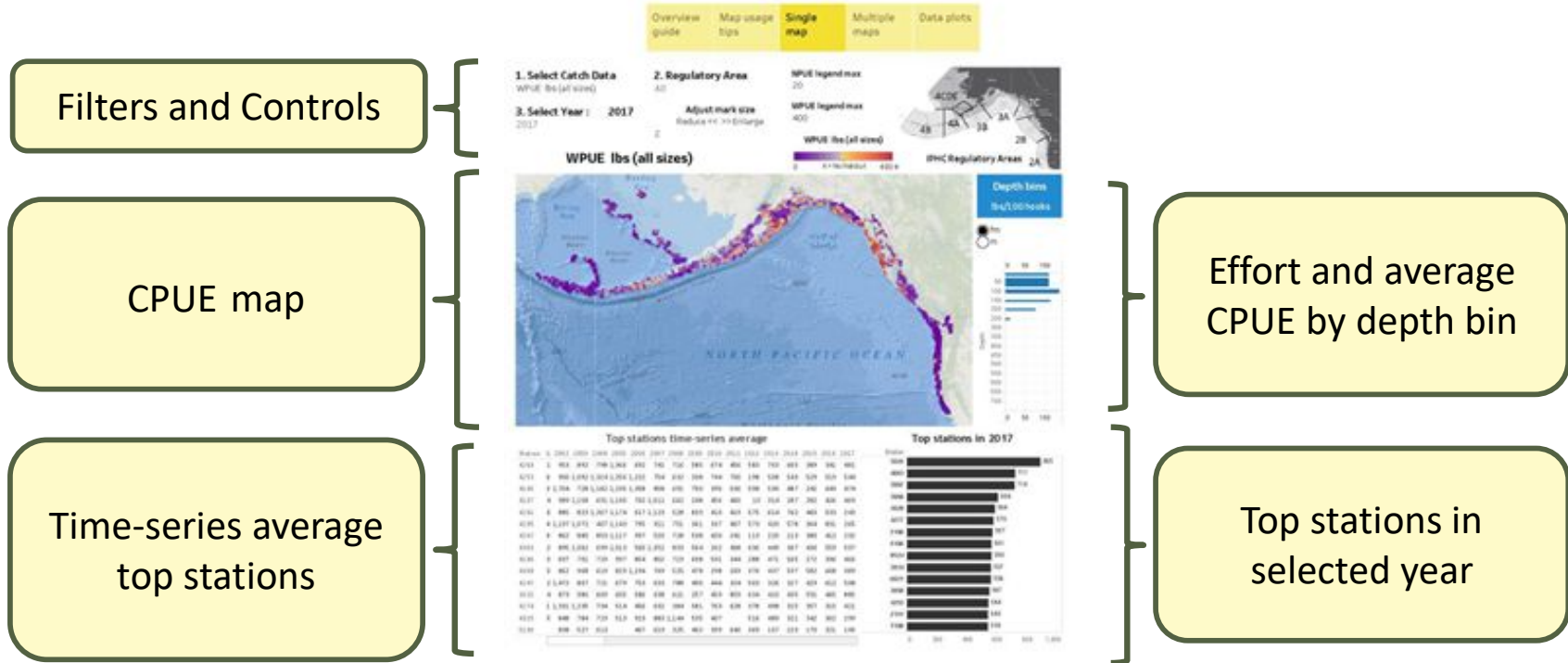
Interactive Maps and Data

Filters and Controls



Interactive Maps and Data

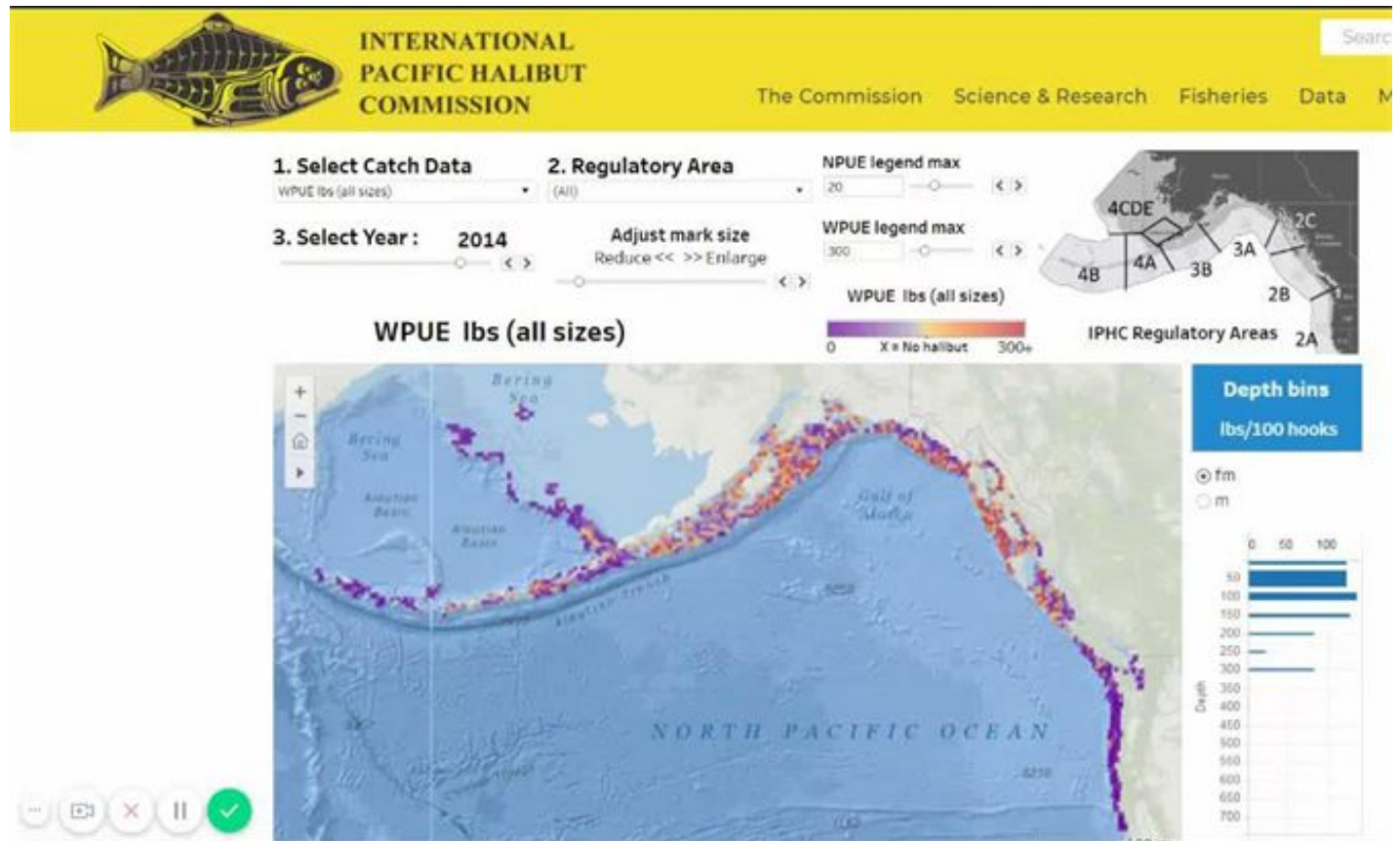
Single Map Components



Interactive Maps and Data

CPUE Map

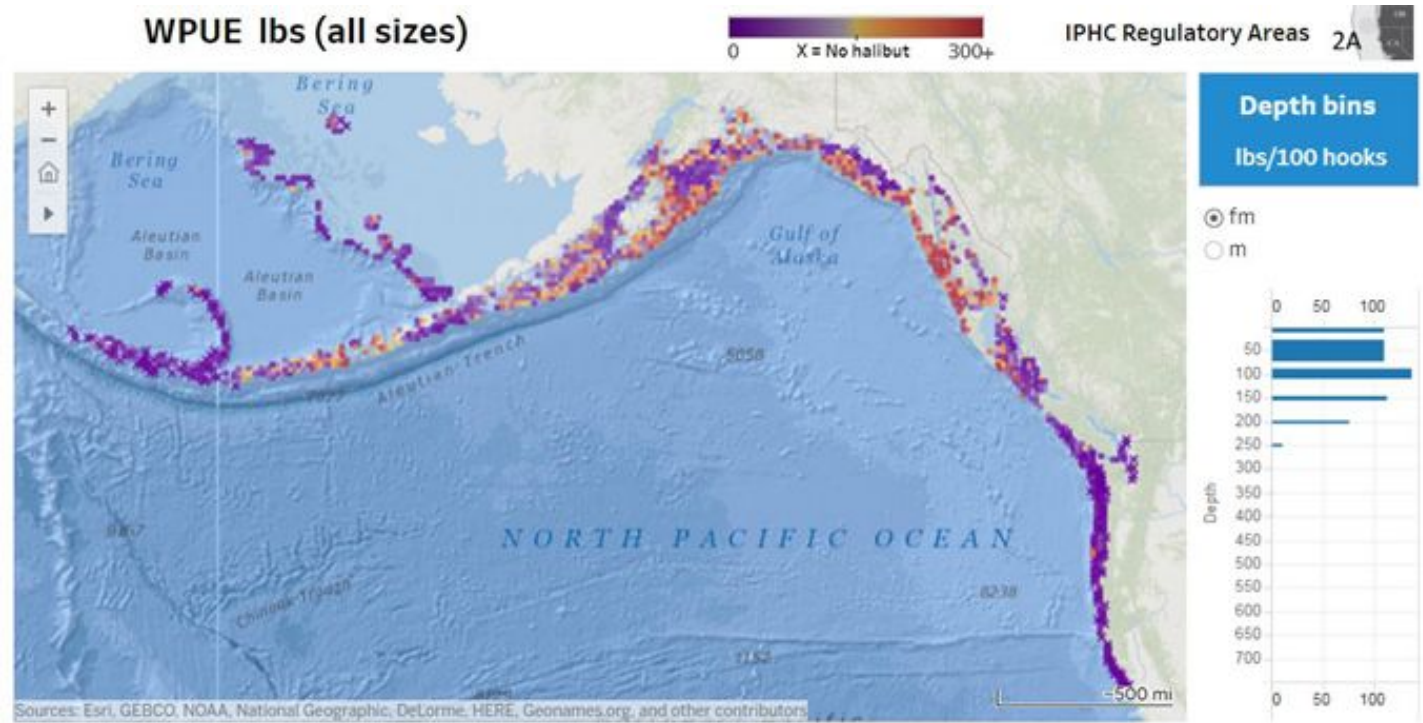
Dynamic
Tooltips



Interactive Maps and Data

Depth bins

Highlighting



Interactive Maps and Data - Example

Data exploration journey

One question leads to another,
which leads to another....

...and reaches a deeper understanding



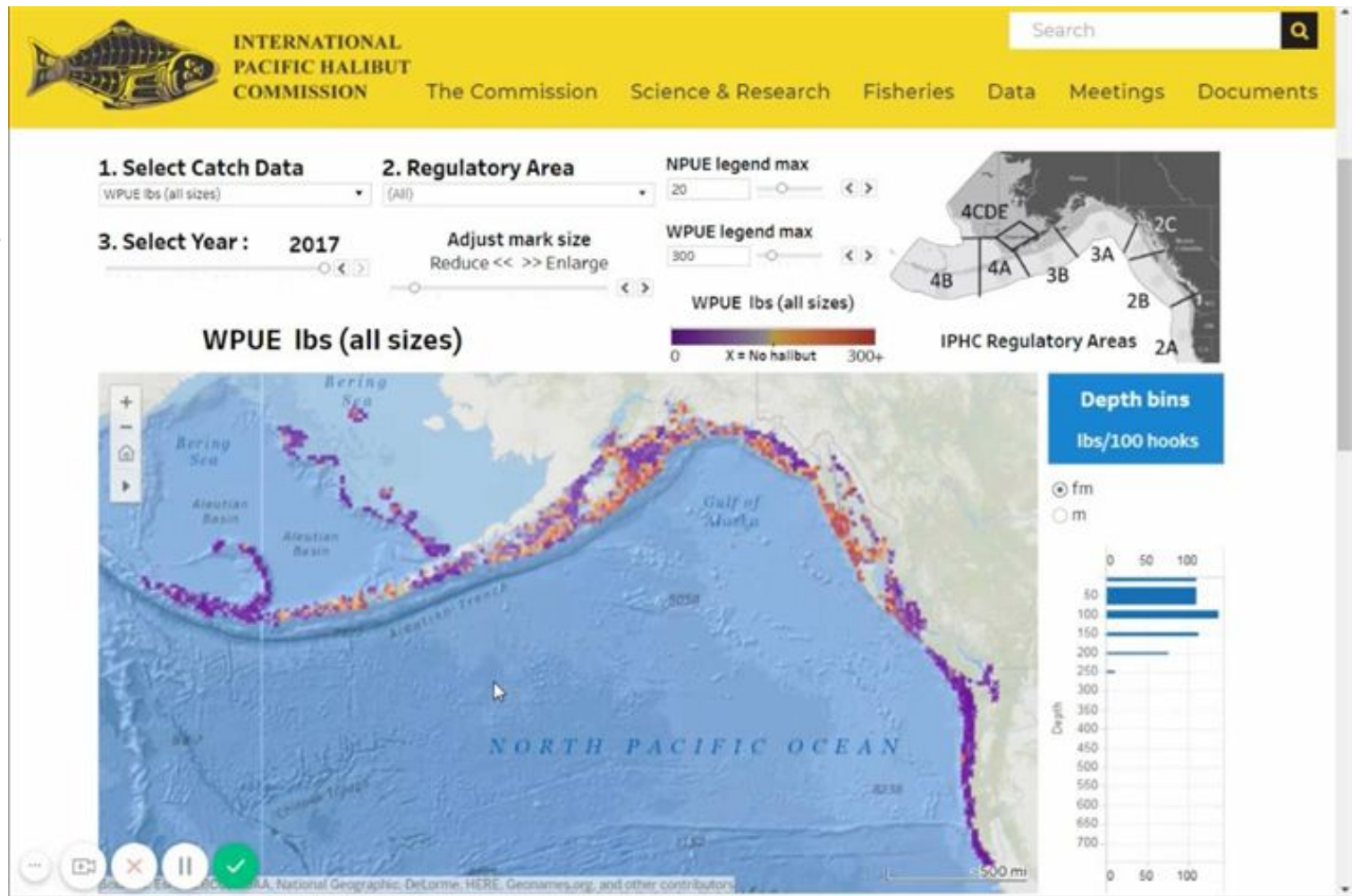
Interactive Maps and Data - Example

In 2017, commercial fishers in 2C reported that catch rates were better this year than in recent memory.

- Did the Fishery-Independent Setline Survey experience high catches there as well?



Example

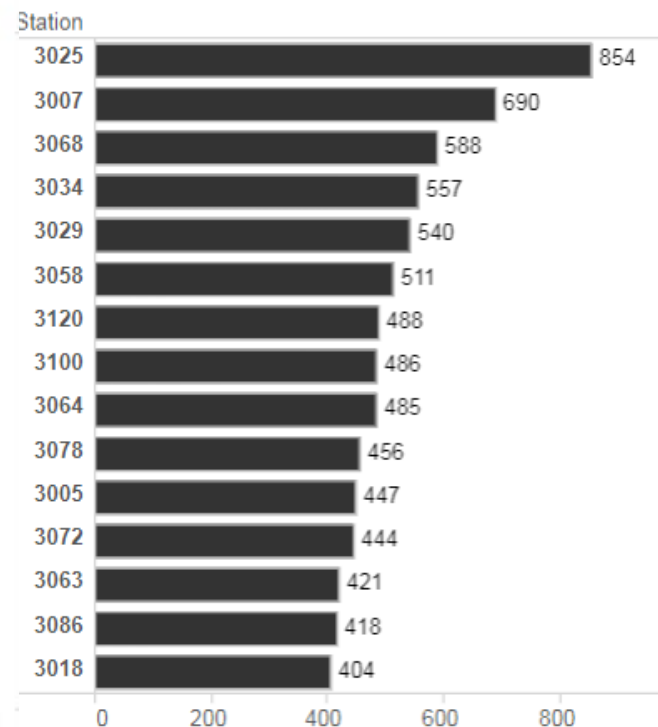


Interactive Maps and Data - Example

Top stations time-series average

Station	1	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
3058	9	660	602	331	562	407	276	63	146	218	195	525	237	543	499	207	511
3025	0	857	884	625	546	565	530	439	131	210	798	553	260	327	435	305	854
3053	3	535	557	432	480	382	278	72	163	46	146	272	300	357	256	434	303
3063	4	246	342	387	443	143	365	30	143	85	69	202	429	384	497	201	421
3120	0	672	489	265	411	155	265	193	295	240	269	470		361	544	275	488
3067	2	504		325	391	213	52	104	178	176	201	261	432	353	454	320	309
3074	6	521	879	440	386	360	389	210	133	227	56	674	428	419	394	387	395
3068	5	495	263	463	364	259	241	194	519	478	290	368	554	235	558	384	588
3057	2	624	273	400	348	200	401	202	170	123	166	79	396	499	305	310	312
3019	9	623	688	153	323	162	253	201	317	198	210	332	244	189	255	225	319
3064	0	670	497	205	299	107	320	71	317	71	146	295	283	409	828	79	485
3072	1	150	563	324	235	162	146	191	148	96	174	190	371	324	503	508	444
3018	9	337	329	92	221	346	267	208	158	131	130	186	226	301	157	248	404
3050	7	978	532	693	139	324	575	140	123	229	261	241	210	209	348	421	272
3007	8	773	758	120	125	619	434	184	265	309	242	286	246	254	356	160	690

Top stations in 2017



Interactive Maps and Data - Example

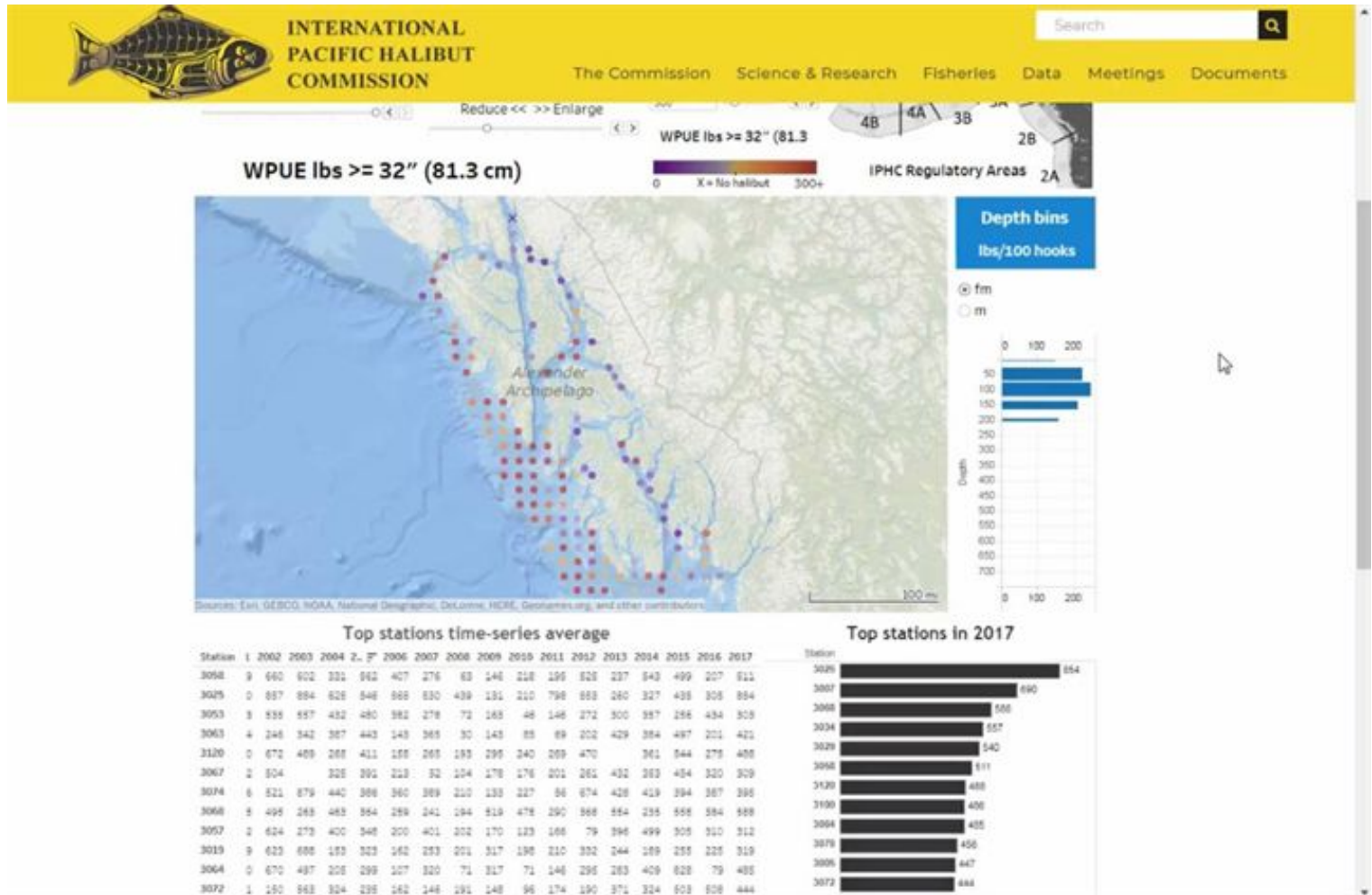
Legal-sized catch on survey was also high in 2017.

Where was the top station in 2C?

How were catches at nearby stations?



Example

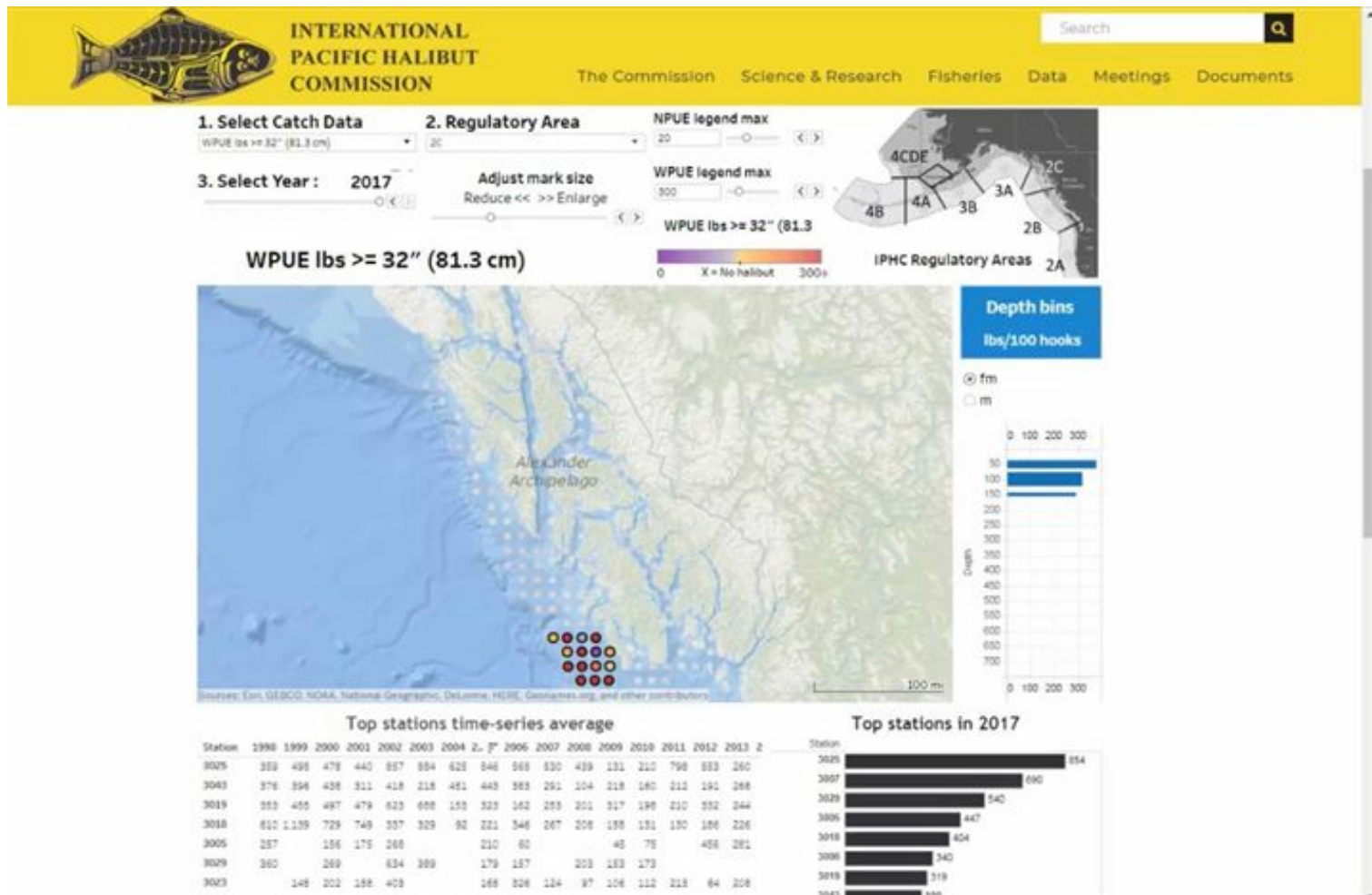


Interactive Maps and Data - Example

How was the FISS catch rate of sublegal-sized halibut (U32)?



Example

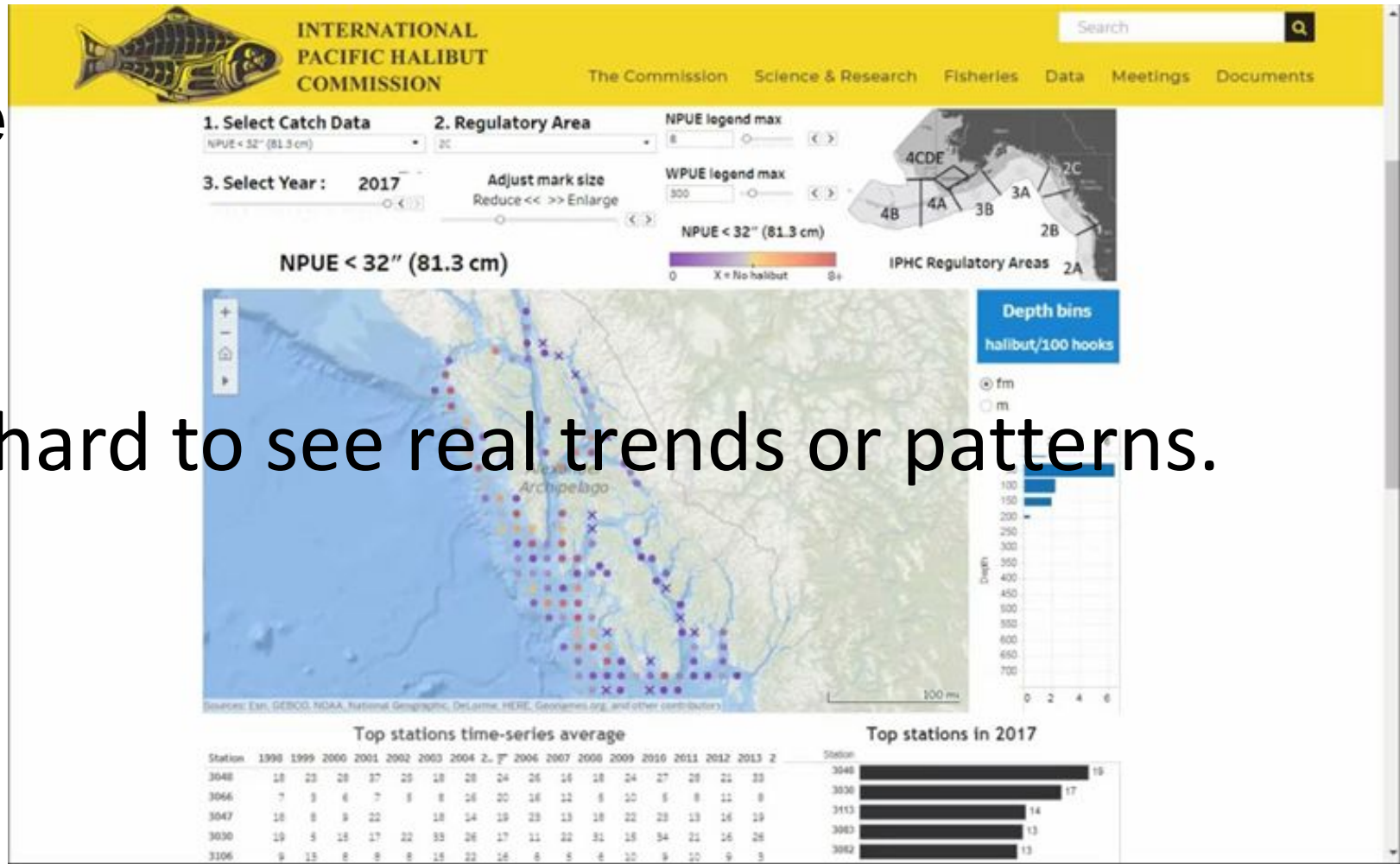


Interactive Maps and Data - Example

Now, I want to see how the RAW
FISS CPUE changes over time in 2C.



Example



It's hard to see real trends or patterns.

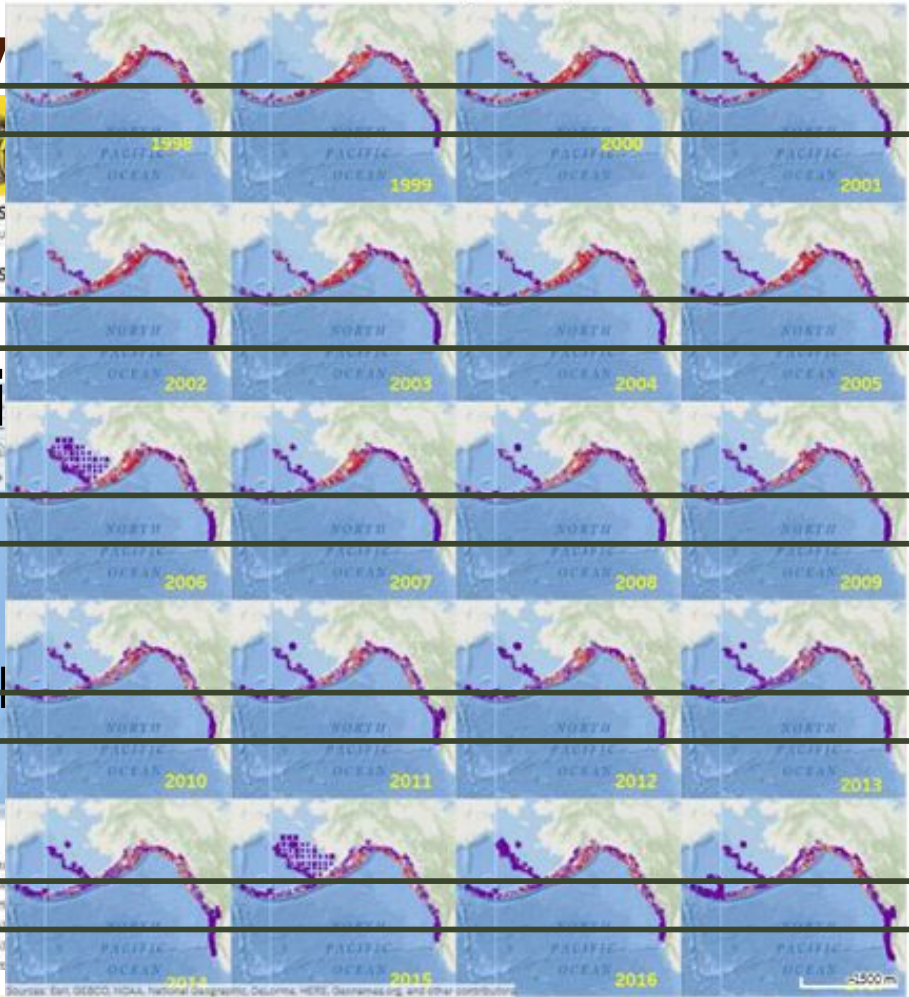


Interactive

sample

1998

2001



2002

2005

Multi

2006

2009

Small

ter for

2010

2013

obse

2014

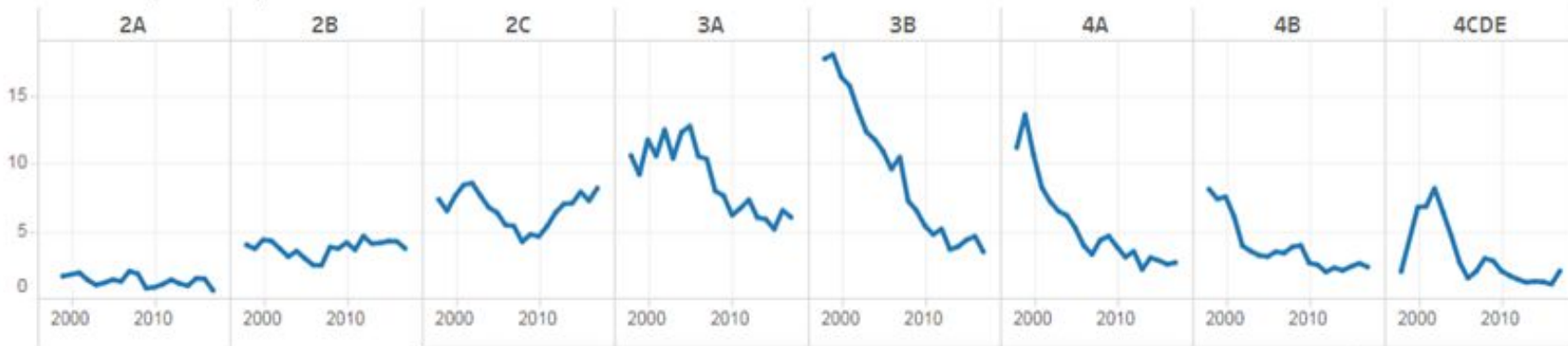
2017



Interactive Maps and Data - Example



NPUE ≥ 32 " (81.3 cm)



What's Tableau Public?
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Crosstab
Data
Image

+ a b l e a u



Interactive Maps and Data - Example

Now, let's explore the interplay between U32 and O32 and combined CPUE over the time series.



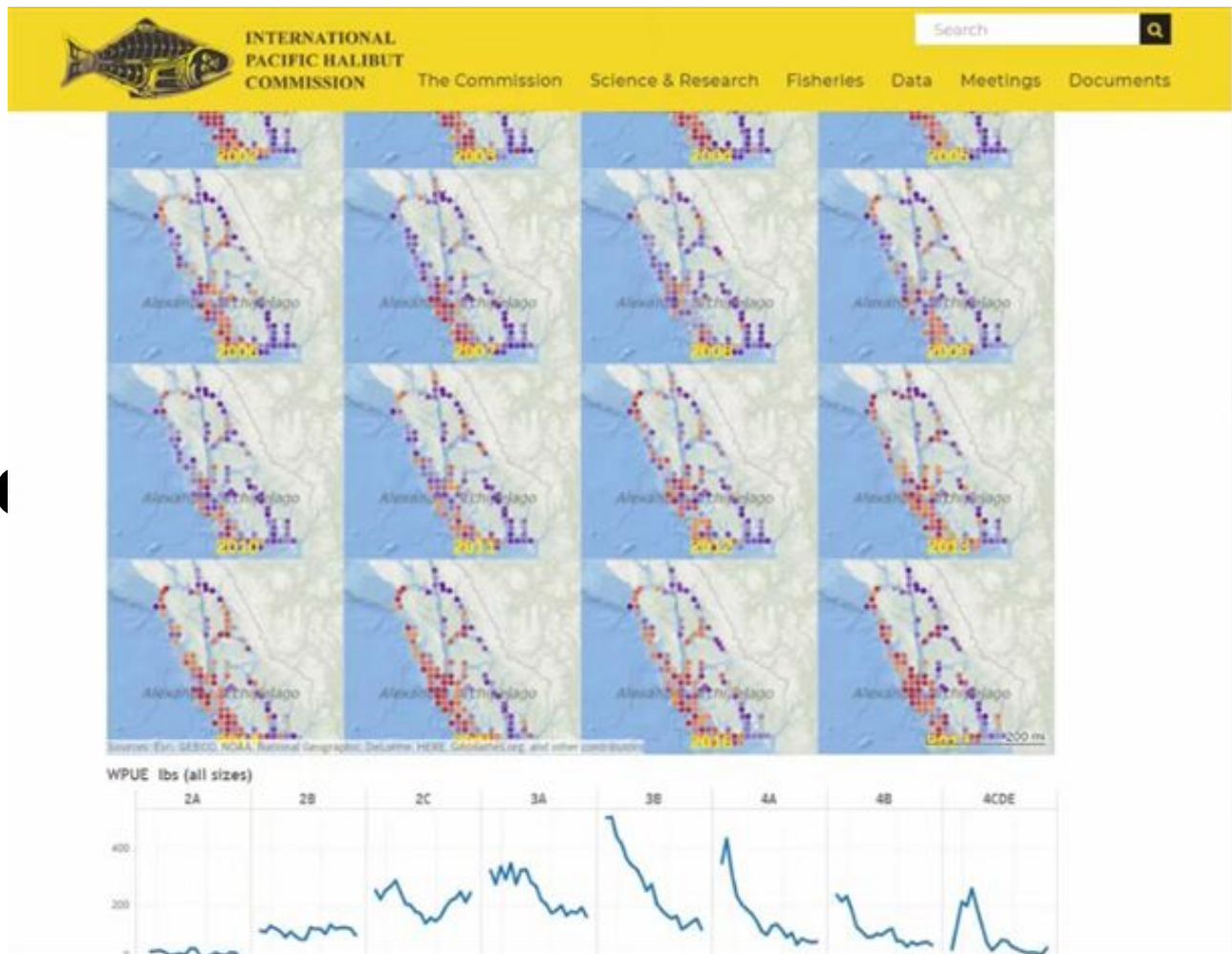
Interactive Maps and Data - Example

Data Plots Panel

- NPUE
- WPUE
- Average weight



Example



Interactive Maps and Data

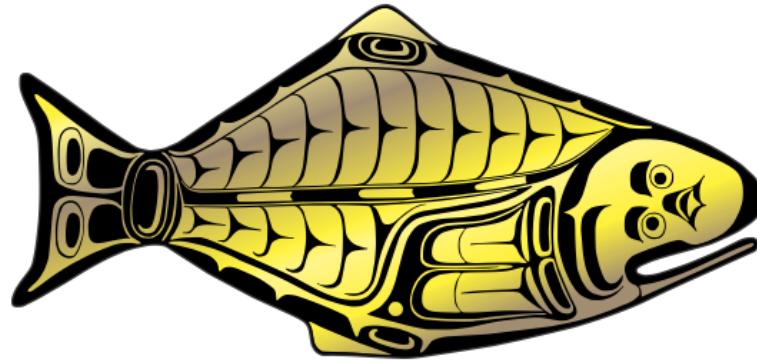
Have questions?
Want a demonstration?

Find me today near registration in the
Ballroom Foyer.

eric@iphc.int



INTERNATIONAL PACIFIC



HALIBUT COMMISSION





Fishery Statistics (2017)

preliminary until late 2018

Agenda Item 5
IPHC-2018-AM094-05

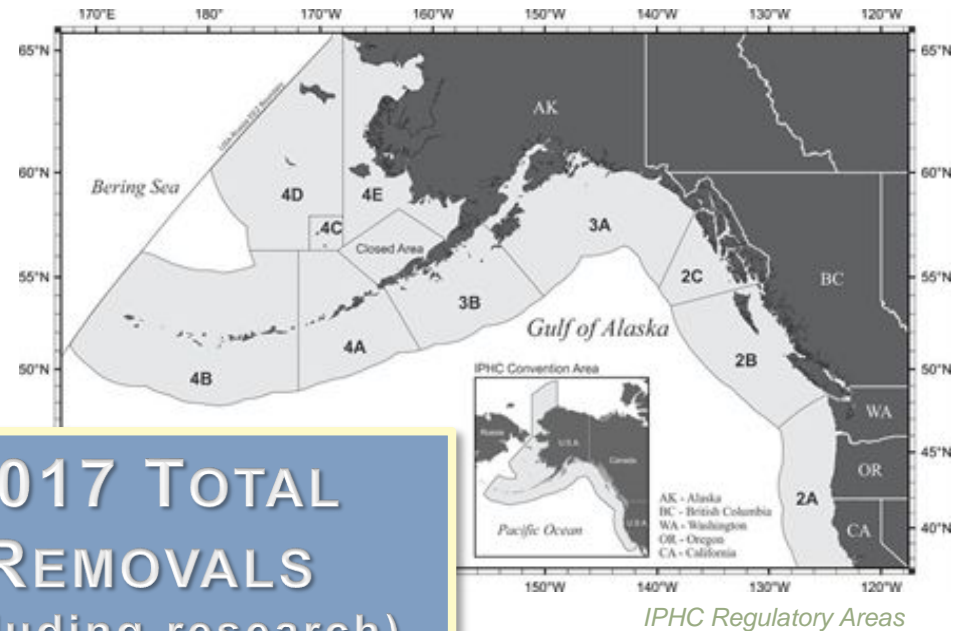
L. Boitor



INTERNATIONAL PACIFIC
HALIBUT COMMISSION

Overview

- Preliminary estimates
- Net weight
- Full year accounting
- Overall removals fairly static over last several years
- Commercial & Recreational - landings up
- Bycatch - down



**2017 TOTAL
REMOVALS**
(including research)

42.5 Mib
19,278 t



Terminology (underlined terms are new)

Commercial

- Commercial landings
- Commercial discard mortality (formerly commercial wastage)
Still includes estimates of: U32, lost gear, some regulatory discards

Recreational (formerly sport)

- Recreational landings (including landings from commercial leasing)
- Recreational discard mortality

Subsistence (formerly personal use/subsistence)

Still includes 2A Ceremonial and Subsistence (C&S) fishery; 2B Food, Social, and Ceremonial (FSC); Alaska Subsistence Halibut Registration Certificate (SHARC); 4D/4E Community Development Quota (CDQ) U32

Bycatch

Incidentally caught fish by fisheries targeting other species and that cannot legally be retained. Bycatch mortality, or bycatch removals, refers only to those fish that subsequently die due to capture.

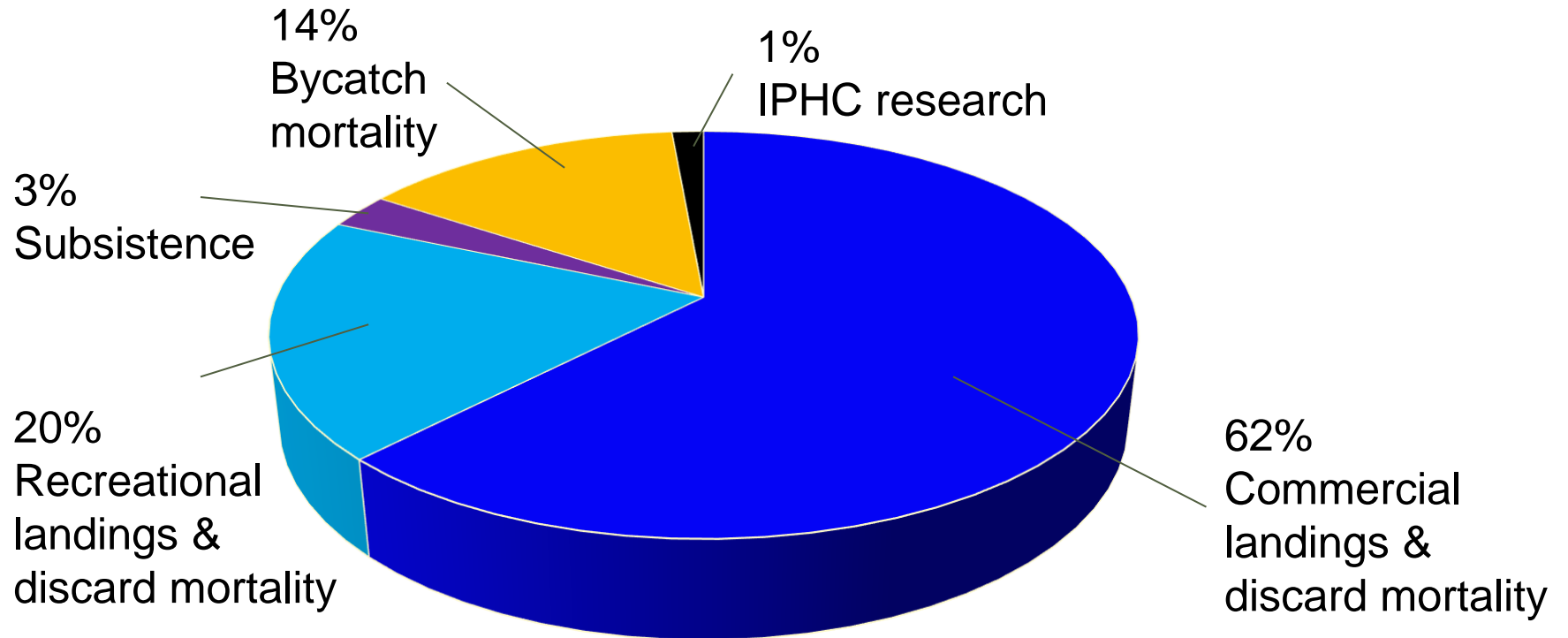


Total Pacific Halibut Removals

	2016			2017		
	Mlb	t	%	Mlb	t	%
Commercial landings	24.3	11,022	58%	25.6	11,605	60%
Commercial discard mortality	1.2	544	3%	1.0	448	2%
Recreational landings	7.1	3,221	17%	7.9	3,587	19%
Recreational landings leasing	0.1	45	<1%	0.1	24	<1%
Recreational discard mortality	0.2	91	<1%	0.2	71	<1%
Subsistence	1.2	544	3%	1.2	530	3%
Bycatch mortality	7.0	3,175	17%	6.1	2,745	14%
IPHC Research landings	0.7	318	2%	0.6	259	1%
Total	41.8	18,960	100%	42.5	19,278	100%



Total Pacific Halibut Removals



Commercial: Reg. Area 2A Fisheries (WA, OR, CA)

Directed commercial

- Catch limit = 0.23 Mlb (102 t)
- Three 10-hr fishing periods (28 Jun, 12 Jul, 26 Jul)
- 2% over catch limit (0.23 Mlb, 104 t)

Incidental commercial catch with salmon troll fishery

- Catch limit = 0.04 Mlb (18 t)
- Open 1 Apr –3 Aug
- One in-season action changing landing ratio and trip maximum
 - 1:3 plus 1, max 20 → 1:4 plus 1, max 10
- 3% under catch limit (0.04 Mlb, 18 t)

Incidental commercial catch with sablefish fishery

- Catch limit = 0.07 Mlb (32 t)
- Open 1 Apr – 31 Oct
- 49% under catch limit (0.04 Mlb, 16 t)



Treaty Indian commercial

- Catch limit = 0.44 Mlb (198 t)
- Several openers from 20 Mar – 22 Jul
 - *Unrestricted fishery*
Open 20 Mar (11 hrs), and 15-16 Apr (39 hrs)
 - *Restricted fishery*
Open 1-2 May (35 hrs) 500 lb
 - *Mop up fishery*
Open 19-20, 22-23 May (34 hrs) 2,500 lb
Open 18-19 Jun, 21-22 Jul (34 hrs) 1,000 lb
- 1% under catch limit (0.43 Mlb, 196 t)



Commercial: Reg. Area 2A Fisheries (WA, OR, CA)



- Pilot year of observer coverage on non-tribal directed commercial fishery
- Through NMFS NWFSC West Coast Groundfish Observer Program
- 21 trips on 12 unique vessels
- Data not yet available



Commercial: Reg. Area 2A Fisheries (WA, OR, CA)

Commercial Fishing Licences

2018

final year preprinted applications mailed

Deadlines

15 March Incidental salmon and sablefish

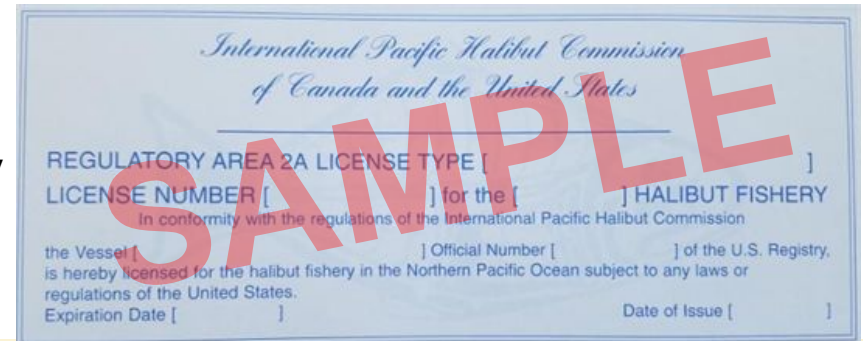
30 April Directed Commercial

2019

no preprinted applications mailed

all applications must be submitted electronically

licensing@iphc.int



Commercial: Reg. Area 2B and Alaska Fisheries

11 March to 7 November

Quota Share Fisheries

BRITISH COLUMBIA – catch limit = 6.3 Mlb (2,845 t)

- **99% landed (6.2 Mlb, 2,809 t)**
- 98% of CL (4.6 Mlb) landed in 2016

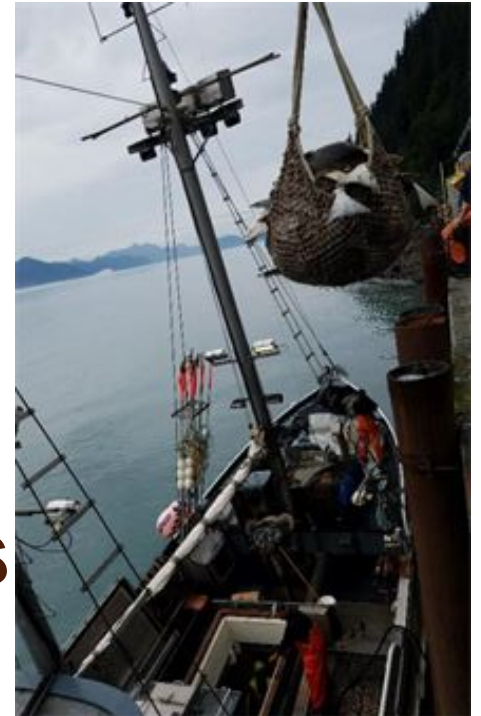
ALASKA – catch limit = 19.8 Mlb (8,988 t)

- **94% landed (18.6 Mlb, 8,433 t)**
- 97% of CL (15.6 Mlb) landed in 2016

Annette Island Reserve Fisheries

ALASKA – IN AREA 2C

- no catch limit
- **0.06 Mlb (29 t) landed**
- 13 two-day openings between 14 April and 8 October



Recreational Fishery: Reg. Area 2A

Allocation = 0.53 Mlb (240 t)
Landed catch = 0.51 Mlb (97%)



Washington

0.24 Mlb (107 t)

Oregon

0.25 Mlb (112 t)

California

0.03 Mlb (15 t)

Overall, 3% under allocation (0.51 Mlb, 234 t)



Recreational Fishery: Reg. Area 2A

Recreational Charter Vessel Fishing Licences

2019

all applications must be submitted electronically

licensing@iphc.int

*International Pacific Halibut Commission
of Canada and the United States*

REGULATORY AREA 2A LICENSE TYPE []

LICENSE NUMBER [] for the [] HALIBUT FISHERY

In conformity with the regulations of the International Pacific Halibut Commission

the Vessel [] Official Number [] of the U.S. Registry,
is hereby licensed for the halibut fishery in the Northern Pacific Ocean subject to any laws or
regulations of the United States.

Expiration Date [] Date of Issue []



Recreational Fishery – British Columbia



Allocation = 1.06 Mlb (481 t)

Tidal license fishery (1 Feb to 6 Sep):

- Max length of 133 cm
- Daily limit of 1 Pacific halibut; possession limit 2 Pacific halibut, only 1 may be over 83 cm
- Annual limit 6 per license holder
- **Catch limit attained – 6 Sep**

Experimental license available to recreational harvesters on voluntary basis

10% over allocation (1.17 Mlb, 532 t)



Recreational Fishery – Alaska

All areas open 1 Feb - 31 Dec – projected values

Private anglers (unguided) in all areas

- 2 fish daily bag limit
- No size restrictions
- No annual limit
- 3.31 Mlb (1,501 t) - no allocation
- Area 2C – 1.43 Mlb (649 t)
- Area 3A – 1.86 Mlb (841 t)

Reg. Area 2C - charter sector (guided)

- Allocation = 0.92 Mlb (415 t)
- Daily bag limit of 1 fish
- Reverse slot limit
 - total length ≤ 44 inches or ≥ 80 inches
- 0.8% over allocation (not including GAF, 0.92 Mlb, 418 t)



Recreational Fishery – Alaska (con't)

Reg. Area 3A – charter sector (guided)

- Allocation = 1.89 Mlb (857 t)
- Daily bag limit of 2 fish
- Max size limit for 2nd fish of 28 inches
- Each vessel limited to 1 trip per day
- Closed Wednesdays
and 18 Jul, 25 Jul, and 1 Aug
- Annual limit of 4 fish
- 10.7% over allocation
(not including GAF, 2.09 Mlb, 953 t)



Recreational Fishery – Leased from Commercial Quota Share Fisheries

BRITISH COLUMBIA – XRQ

- leased from the Commercial Quota Fishery
 - **4,000 lb (1.7 t) landed**

ALASKA – GAF

- leased from the Commercial Quota Fishery
 - **Area 2C – 41,000 lb (18.5 t) landed**
 - **Area 3A – 7,000 lb (3.1 t) landed**



Subsistence Fisheries

1 January to 31 December
2016 estimates carried over for 2017

TOTAL – 1.17 Mlb (530 t)
– 1.20 Mlb (546 t) in 2015

AREA 2A
– **0.030 Mlb (13.4 t)**
– 0.034 Mlb (15.4 t) in 2015

BRITISH COLUMBIA
– **0.405 Mlb (183.7 t)**
– 0.405 Mlb (183.7 t) in 2015

ALASKA
– **0.733 Mlb (332.5 t)**
– 0.765 Mlb (347.0 t) in 2015



Bycatch Mortality – All Areas

1 January to 31 December

Preliminary estimates and projections for October through December

TOTAL – 6.1 Mlb (2,745 t)
– 7.0 Mlb (3,185 t) in 2016
• 14% decrease

AREA 2A
– 0.1 Mlb (51 t)

BRITISH COLUMBIA
– 0.3 Mlb (114 t)

ALASKA
– 5.7 Mlb (2,580 t)
– 6.7 Mlb (3,018 t) in 2016



Total Pacific Halibut Removals

Removals	IPHC Regulatory Area								Total (,000 lb)	Total (t)
	2A	2B	2C	3A	3B	4A	4B	4CDE		
Commercial landings	737	6,193	4,108	7,587	3,022	1,270	1,048	1,620	25,585	11,605
Commercial discard mortality	19	175	87	347	234	67	31	28	988	448
Recreational landings	515	1,172	2,294	3,904	8	15	-	-	7,908	3,587
Recreational landings from commercial leasing	-	4	41	7	-	-	-	-	52	24
Recreational discard mortality	4	42	59	52	-	-	-	-	157	71
Bycatch mortality	111	251	19	1,426	890	400	207	2,747	6,051	2,745
Subsistence	30	405	436	222	14	8	0	53	1,168	530
IPHC Research landings	16	65	124	198	72	28	44	24	571	259
Total Removals	1,432	8,307	7,168	13,743	4,240	1,788	1,330	4,472	42,480	19,269
2017 Catch Limits	1,330	7,450	5,250	10,000	3,140	1,390	1,140	1,700	31,400	14,243
2017 Catch Sharing Plan Total	1,286	7,411	6,589	11,897	3,022	1,270	1,048	1,620	34,143	15,487



2017 IPHC PORT SAMPLERS



Lynn Collier
St. Paul



Jessica Marx
Homer



Jaelee Vanidestine
Seward



Michele Drummond
Juneau



Darlene Haugan
Prince Rupert



Tachi Sopow
Sitka



Levy Boitor
Petersburg



Bryna Mills
Vancouver/Bellingham



Jenni Rogge
Dutch Harbor



Dave Jackson
Kodiak



Chelsea Hutton
Port Hardy



Port Highlights

Sex-Marking Coastwide

- Fleets cooperation invaluable
- 2018 - No sex-marking while working up assays to re-evaluate program

Pot Gear – First year

- Pot gear for Pacific halibut in the IFQ sablefish fishery
 - Seward and Sitka predominately
 - Regulation clarifications
 - State waters versus federal waters
 - Under 60' fleet new to NMFS logbook
 - requested training



Port Highlights

Collections

- Tissue samples collected

Canadian electronic logs (FLOAT)

- FLOAT logs collected in field via bluetooth from captains device to IPHC port sampler's device (19 participants)
- Continued Coordination with DFO and AMR staff



Port Highlights



Marine Mammal Sightings

- Species and number sighted while hauling (Alaska)

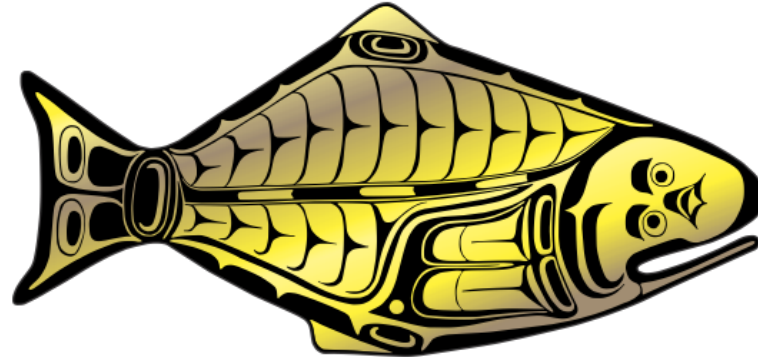
Damaged Fish and Gear (Hooks)

- Species and numbers by set (Alaska)

Working to extend coastwide in 2018



INTERNATIONAL PACIFIC



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IPHC Fishery-independent setline survey (FISS)

Agenda Item 6.1
IPHC-2018-AM094-06

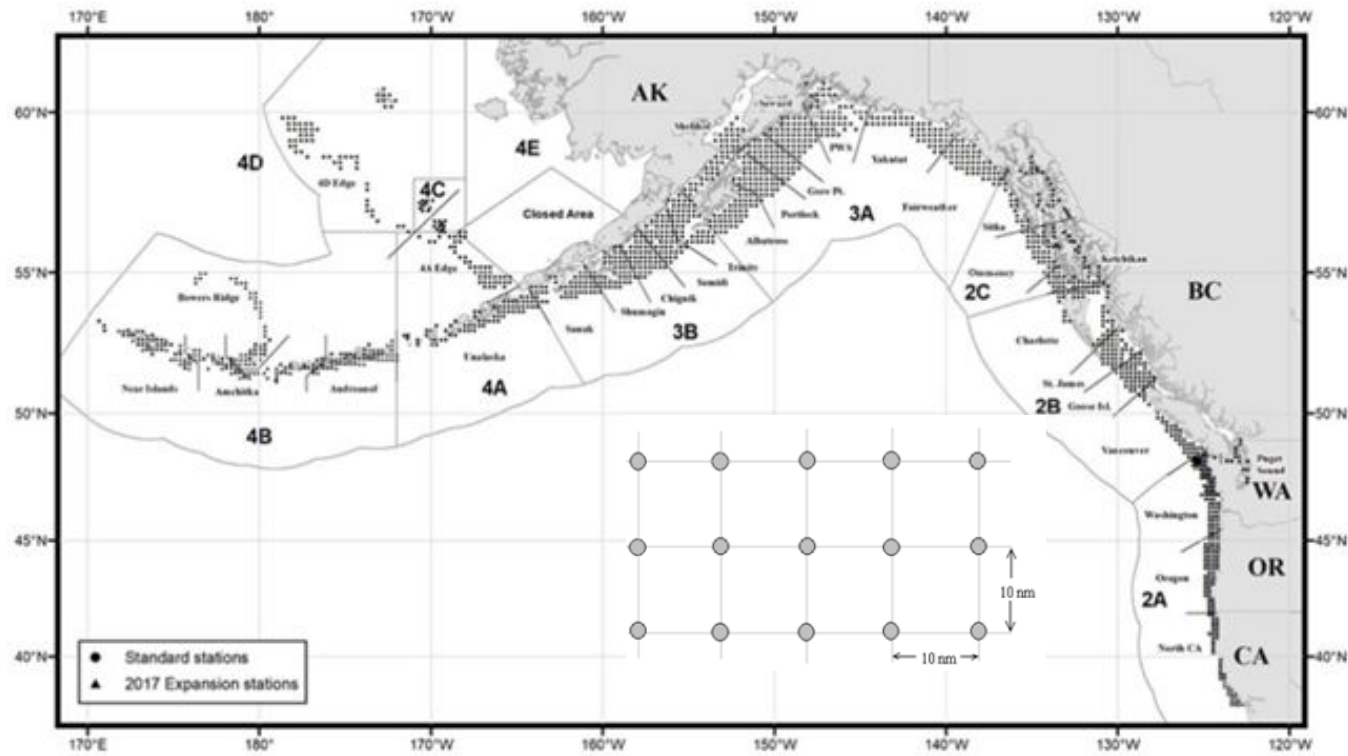
L. Boitor



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Standardization

Fixed FISS station positions



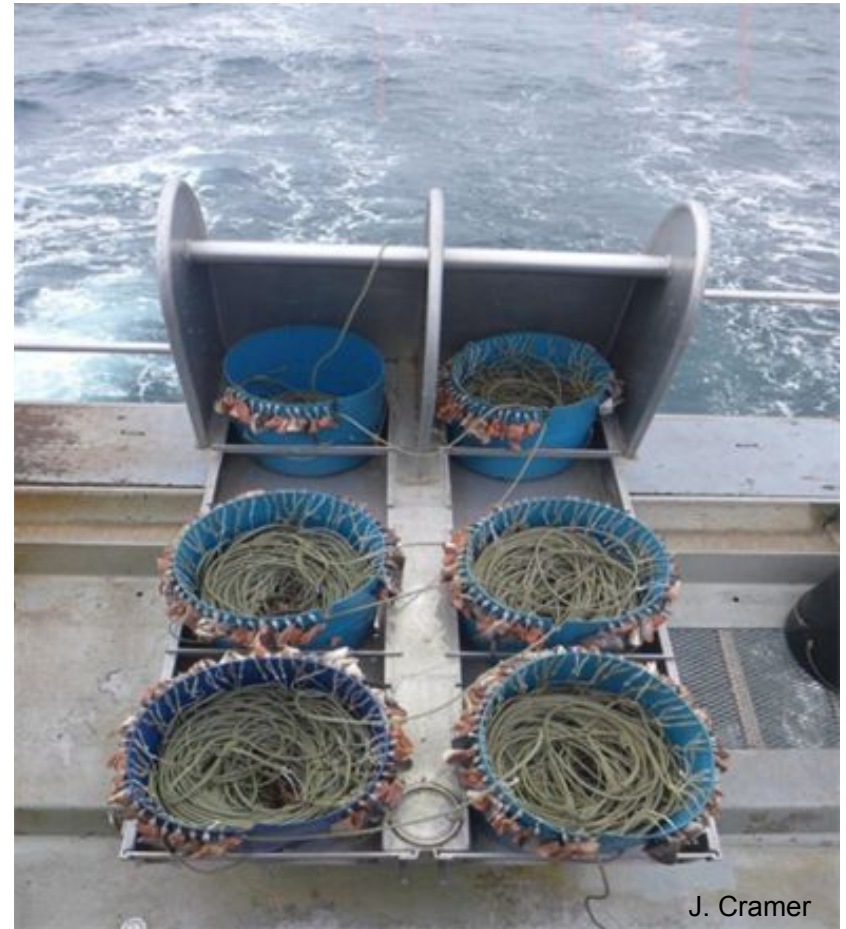
Standardization

Gear

- Fixed gear
- 1,800 foot skates

Each skate

- 100 #3 (16/0) circle hooks threaded through the front of the hook on 24"-18" gangions
- 18' spacing
- 5-10 lb weights between skates



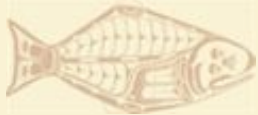
J. Cramer



Standardization

Bait

- Frozen chum salmon
- Number 2 semi bright or better
- Cut 1/4 to 1/3 pound

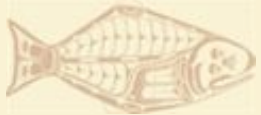


Primary objective

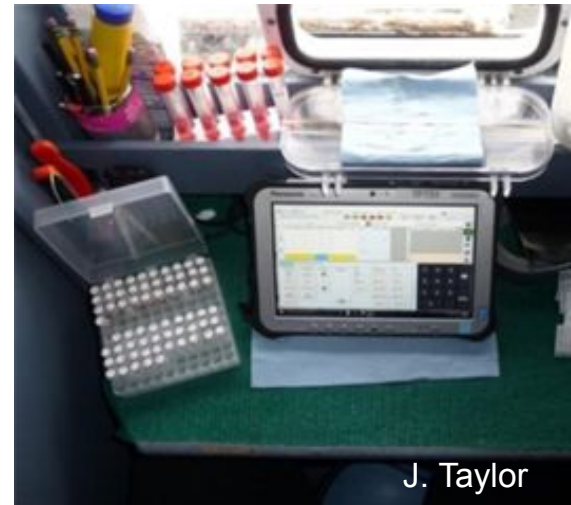
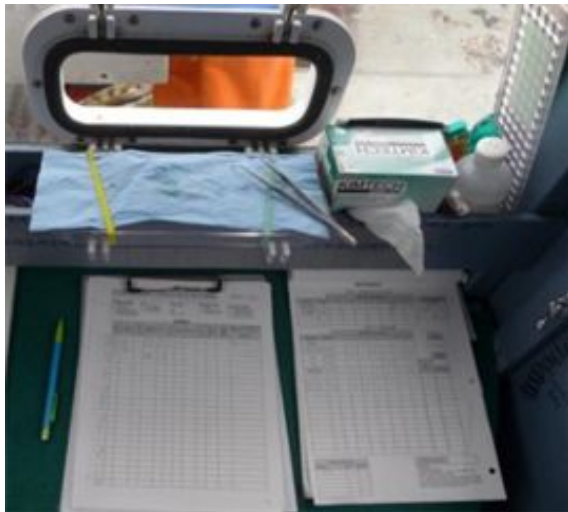
Standardized, fishery-independent data for Pacific halibut stock assessment

- WPUE, sex specific length-at-age, age composition
- Data on undersized Pacific halibut
- Pacific halibut distribution and abundance trends (changes in sex, length, maturity, and age over the grounds)





New in 2017: Electronic data recording coastwide



- First year tablets coastwide (all areas except Reg. Area 2A, 2016 pilot year with 6 vessels)
- Improved data quality, timeliness of data availability, redirect Secretariat time from data entry/verification
- IPHC continuing to take feedback and refine



Secondary objectives

Platform for specialized data collection projects

- Oceanographic data
- Genetics, condition factor
- Prior hooking injuries
- Marine mammal / Seabird occurrence / interactions
- Environmental Contamination (ADEC)
- *Ichthyophonous*
- Archive otolith collection
- Tagging: Pop-up Archival Transmitting (PAT) tags, wire tags, internal tags



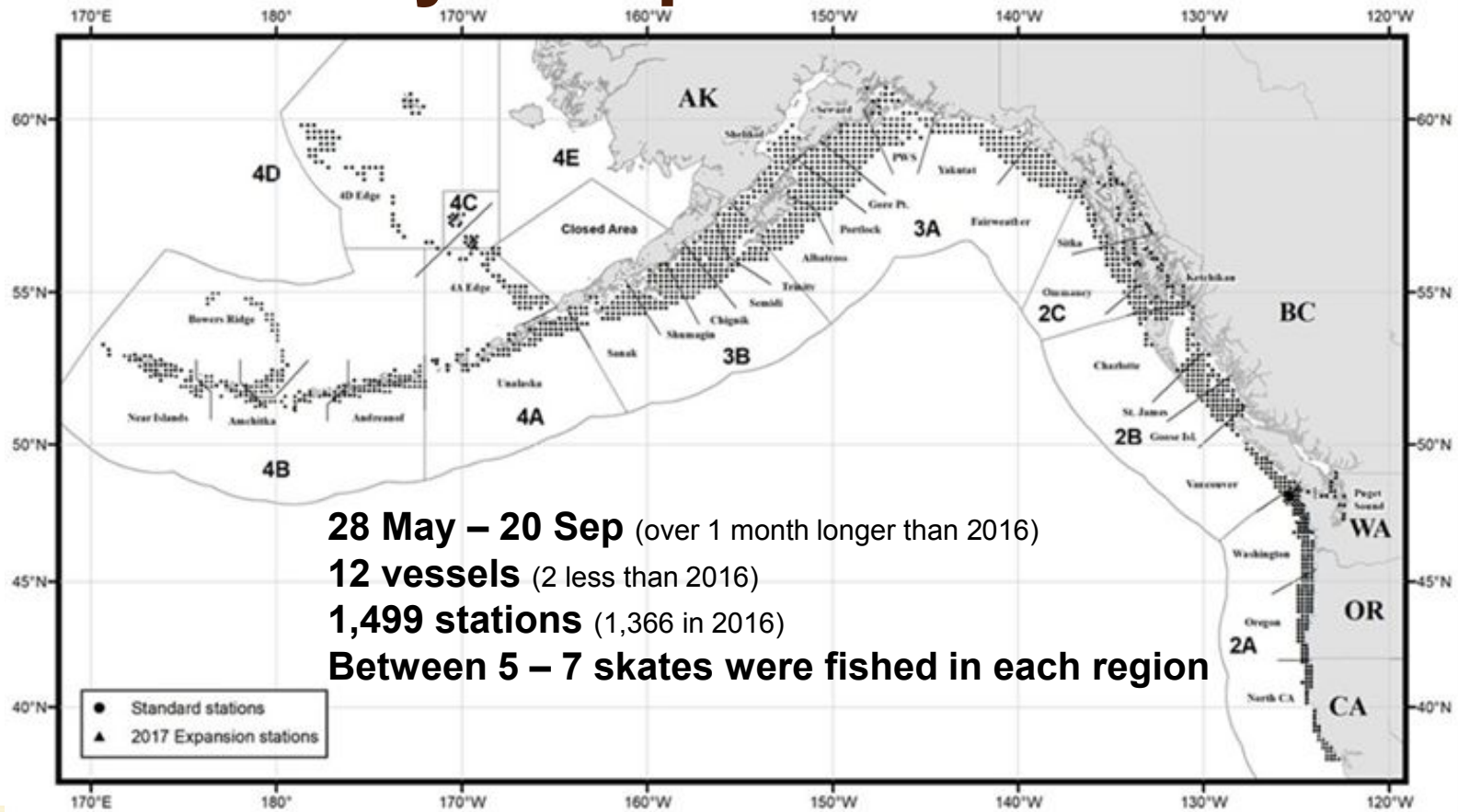
Secondary objectives

Platform for specialized data collection projects

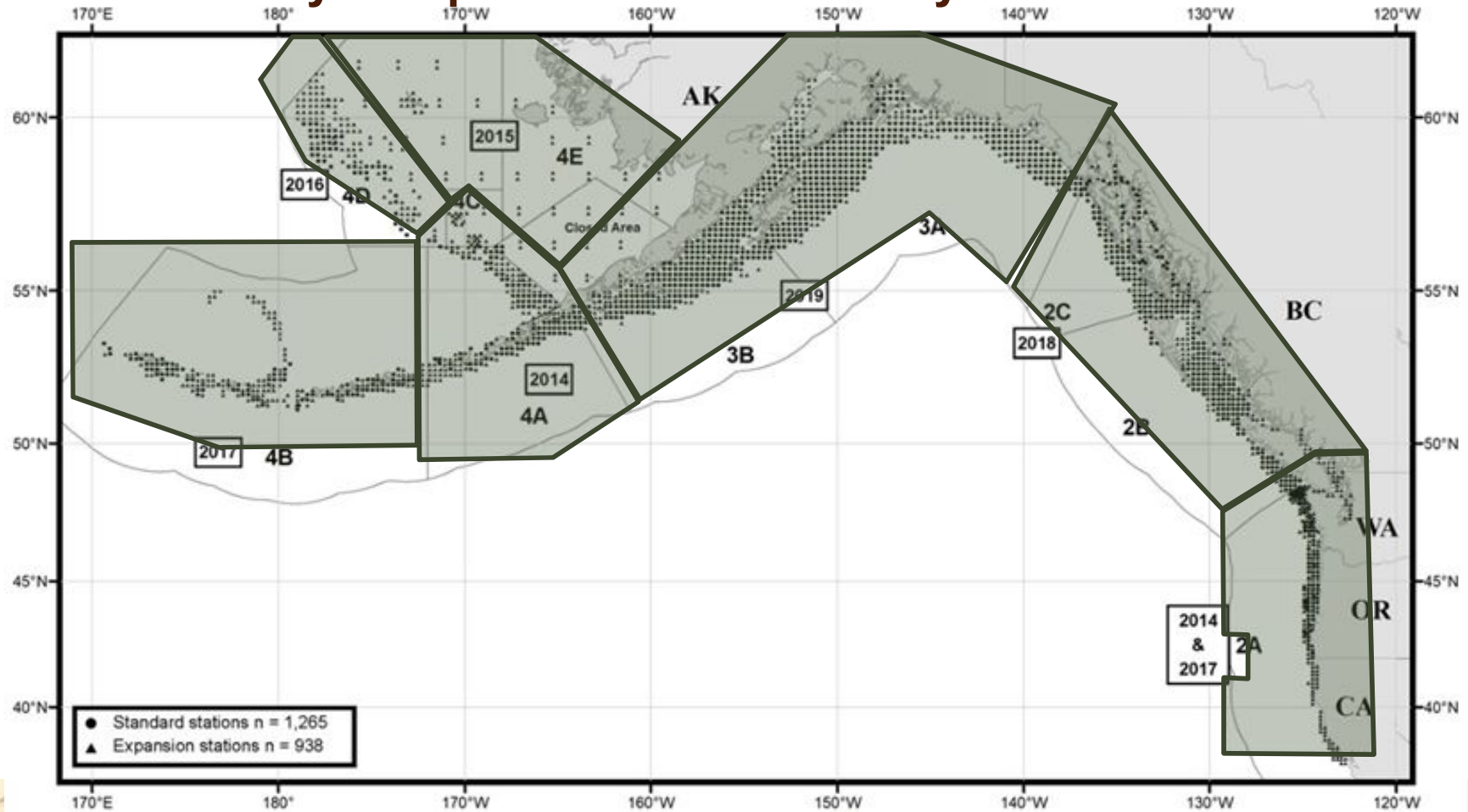
- NMFS
 - Pacific cod sampling
 - Electronic monitoring system tests
 - Shark sampling (Spiny dogfish, Six gill, Sleeper shark)
 - IPHC on NMFS trawl survey
- DFO
 - Rockfish biological samples
 - 100% hook occupancy
 - Shark sampling
- CDFW, ODFW, WDFW
 - Rockfish sampling cooperation



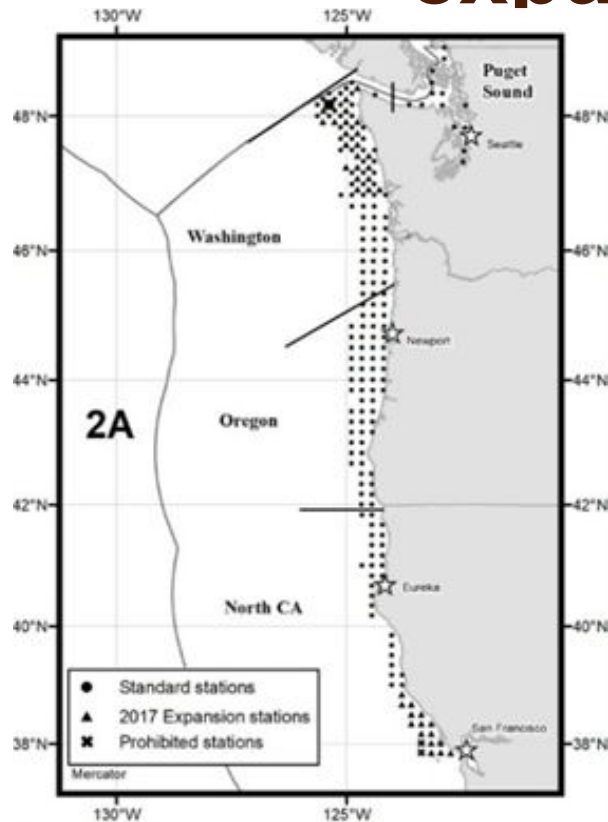
2017 Fishery-independent setline survey



Fishery-independent setline survey stations 2014-19



2017 Fishery-independent setline survey expansion in 2A



212 Total setline survey stations with 81 Expansions

Puget Sound – 14 expansion

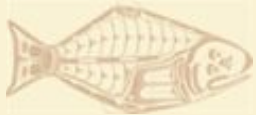
WA – 49 standard grid stations
8 rockfish index

13 expansion stations
26 new dense grid

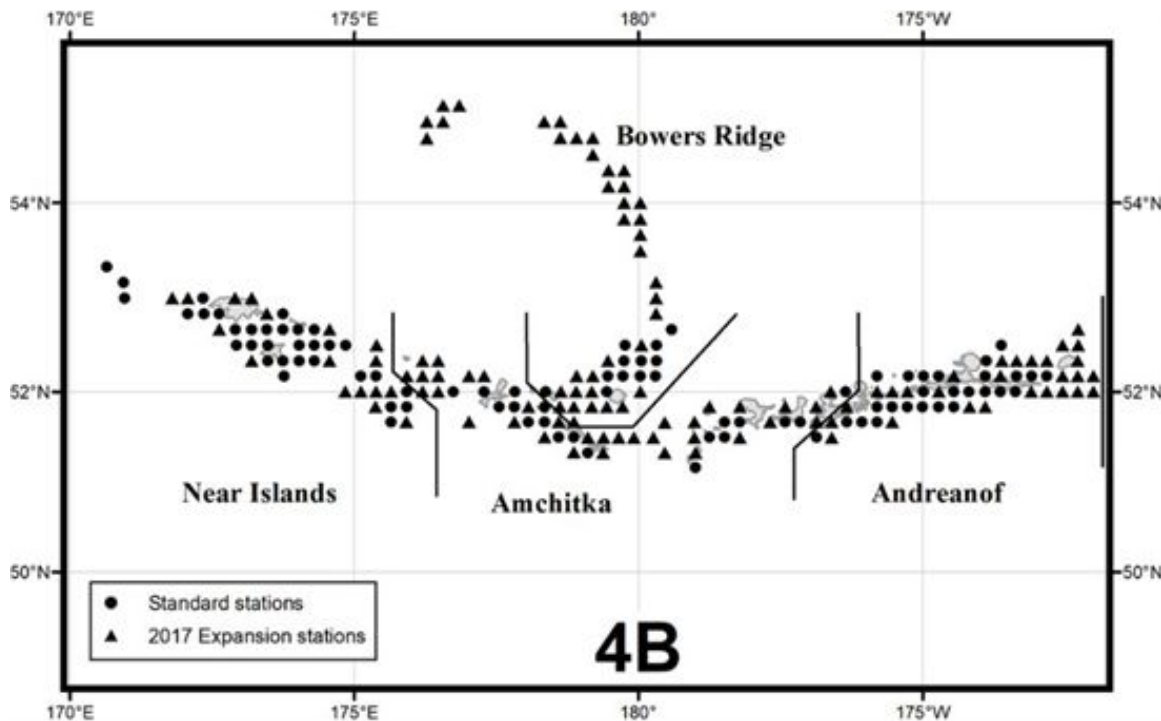
OR – 47 standard grid
13 expansion stations

N. CA -27 previously fished expansion
15* new expansion

(*2 not permitted because of habitat closures)



2017 Fishery-independent setline survey expansion in 4B



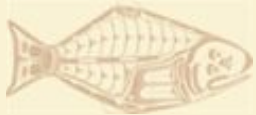
113 NEW stations, 202 total

Near Islands - 49 (17 new)

Amchitka - 49 (31 new)

Bowers Ridge - 50 (37 new)

Andreanof - 54 (28 new)



2018 Fishery-independent setline survey expansion & station vetting

Reg. Area 2B expansion (103 expansion stations proposed)

- Areas of concern (MPAs, RCAs)
- Species of concern (yelloweye, bocaccio)

DFO/IPHC coordination

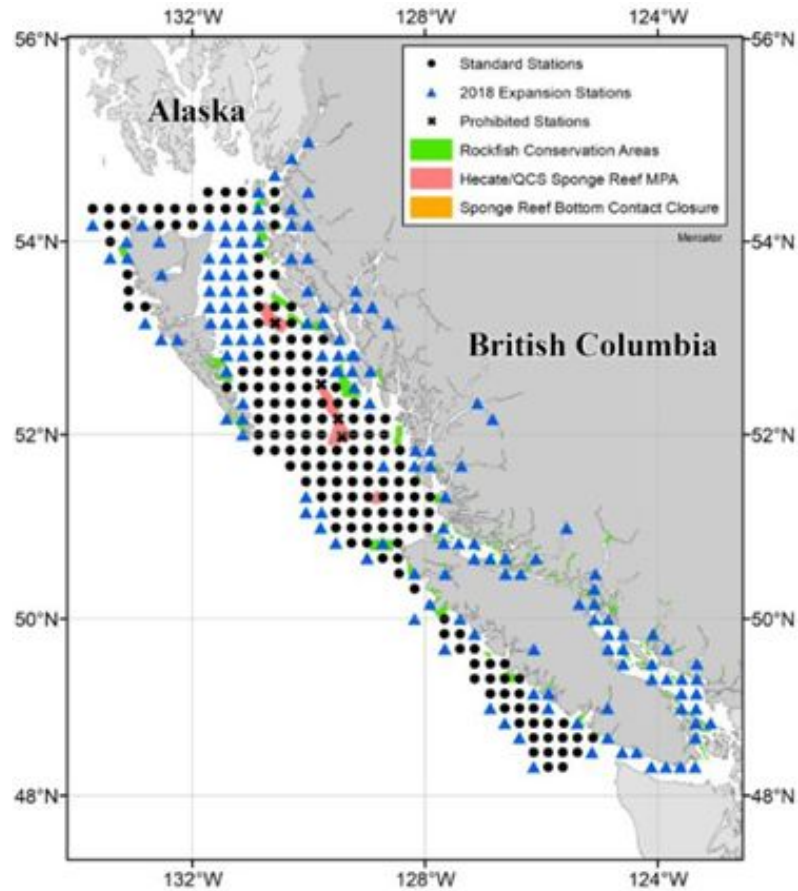
- Staff met in Mar, May, Aug (re: MPA decision), and Nov 2017 for planning and to outline information needs

Reg. Area 2C expansion (55 expansions proposed)

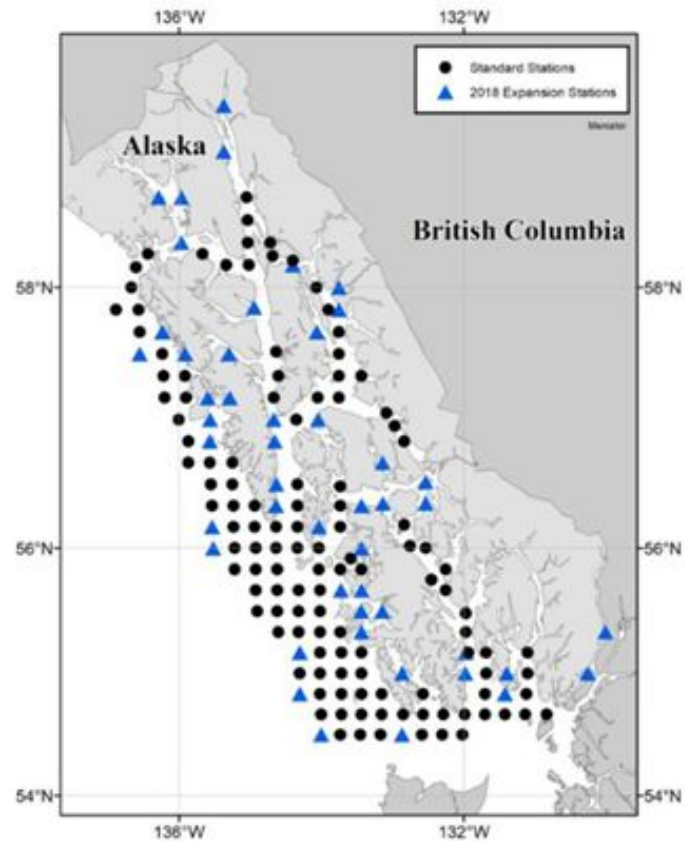
- Working with Glacier Bay National Park on stations within boundaries



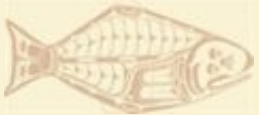
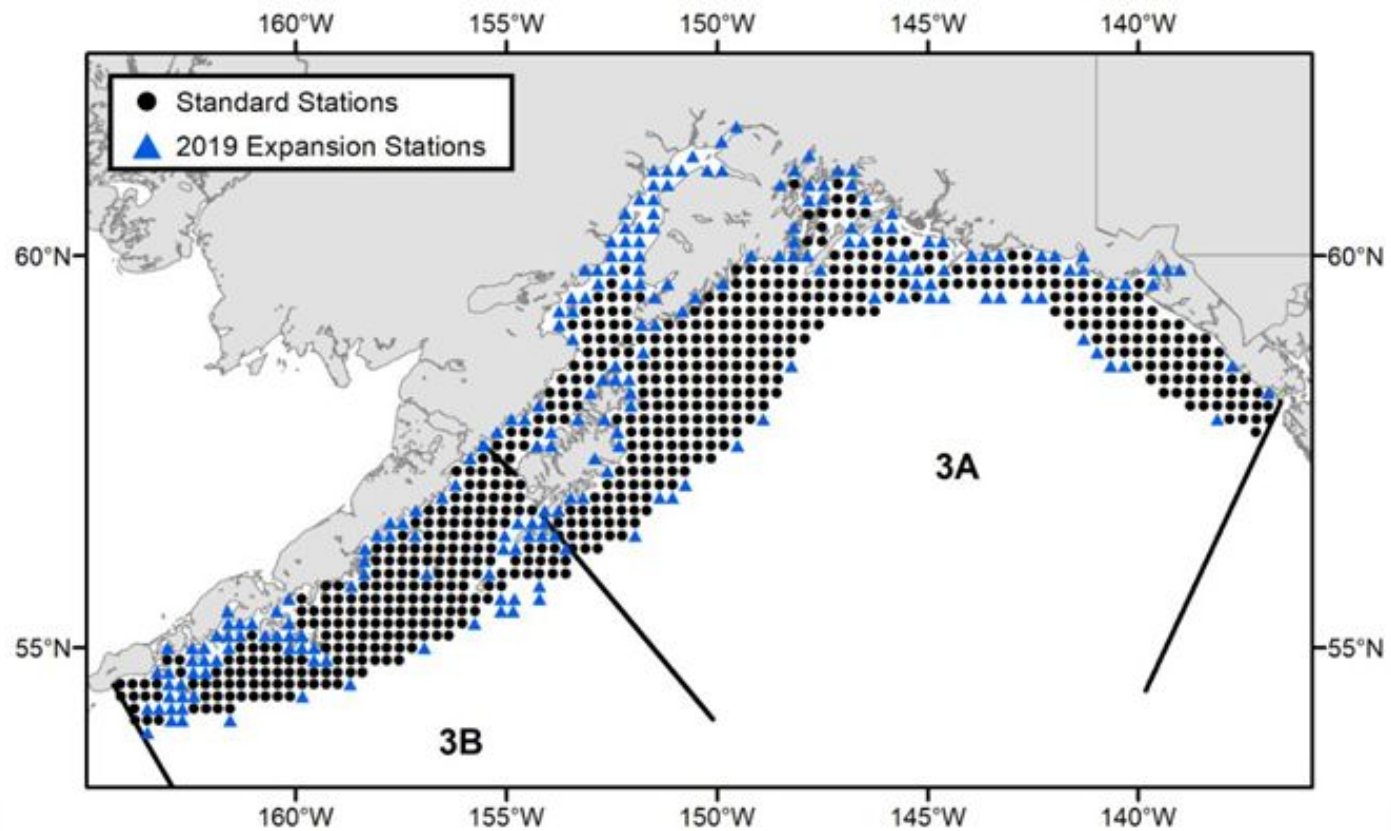
Proposed 2018 stations in IPHC Regulatory Area 2B



Proposed 2018 FISS stations in IPHC Regulatory Area 2C



Proposed 2019 FISS stations in IPHC Regulatory Areas 3A/3B





INTERNATIONAL PACIFIC



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Space-time modelling of fishery-independent setline survey data

Agenda Item 6.1
IPHC-2018-AM094-07

L. Boitor



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HALIBUT COMMISSION

Outline

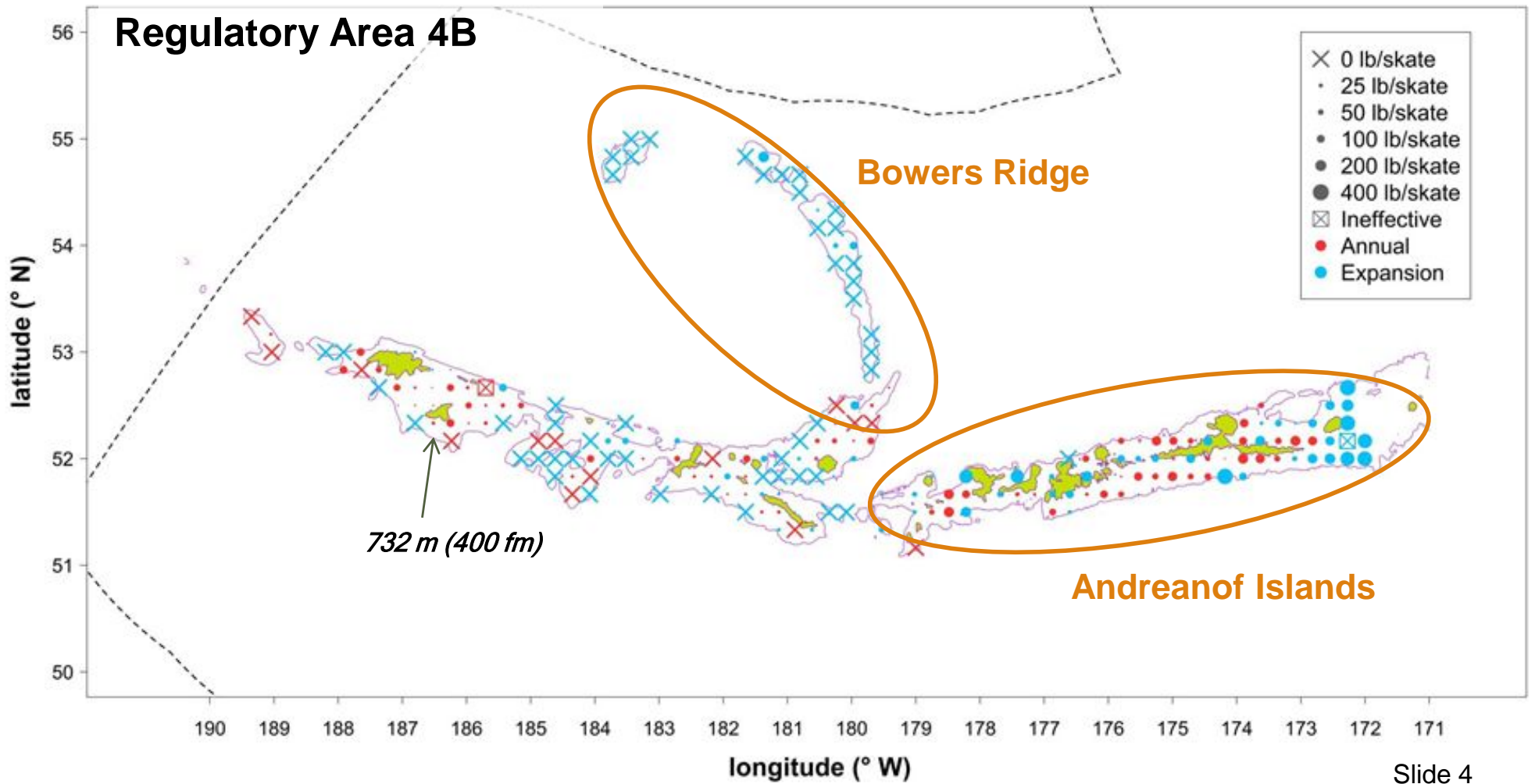
- Setline survey expansion results
 - IPHC Regulatory Areas 4B and 2A
- Output of space-time modelling
 - O32 WPUE, total WPUE and NPUE
- Evaluation of the need for future setline survey expansions
 - IPHC Regulatory Areas 2A and 4A



Setline survey expansion results

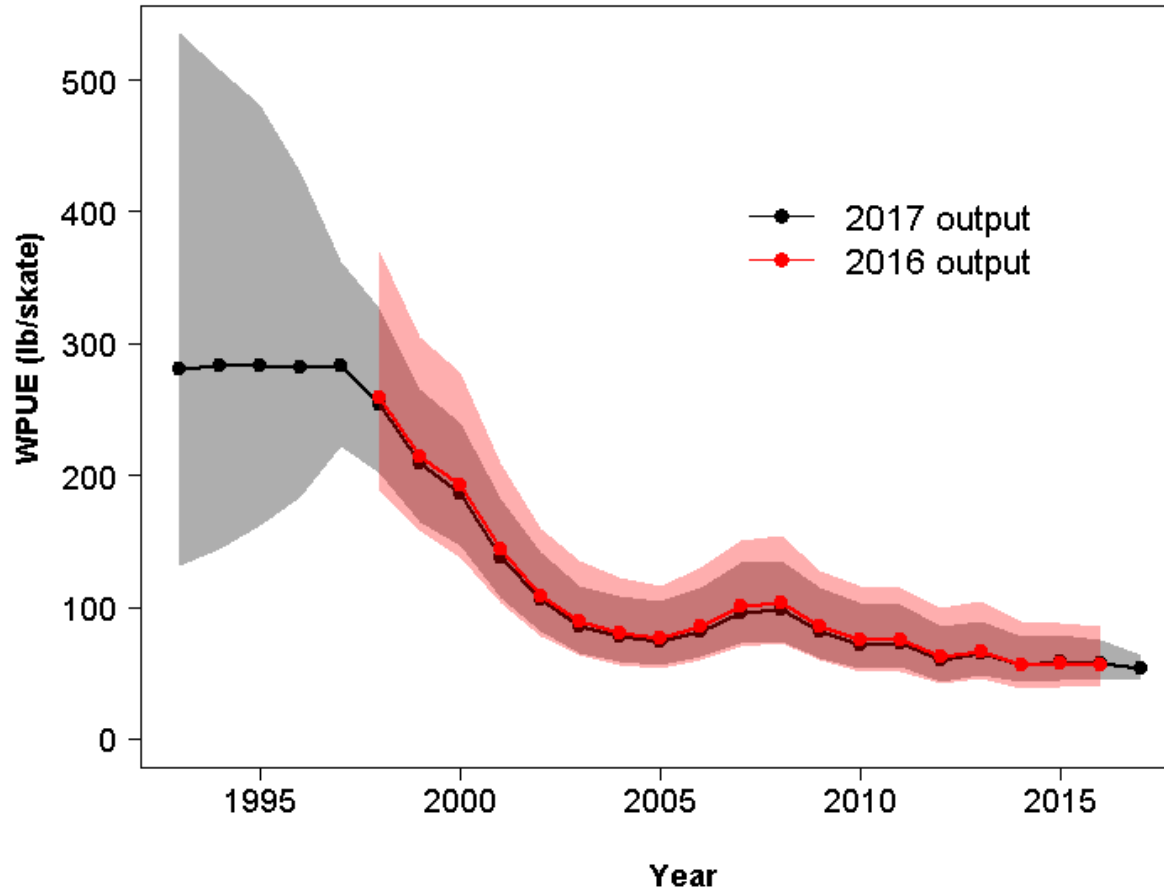
- Regulatory Area 4B
 - Addition of deep (> 503m, >275 fm) and shallow (18-37 m, 10-20 fm) stations
 - Large coverage gaps surveyed for first time:
 - Bowers Ridge
 - East Andreanof Islands
 - Around Amchitka I. and between Attu and Kiska Is.
- Regulatory Area 2A
 - Expansion in CA to 37.75°N
 - Repeat of deep, shallow and Salish Sea expansions (done previously in 2011 and 2014)
 - Dense grid off the north WA coast





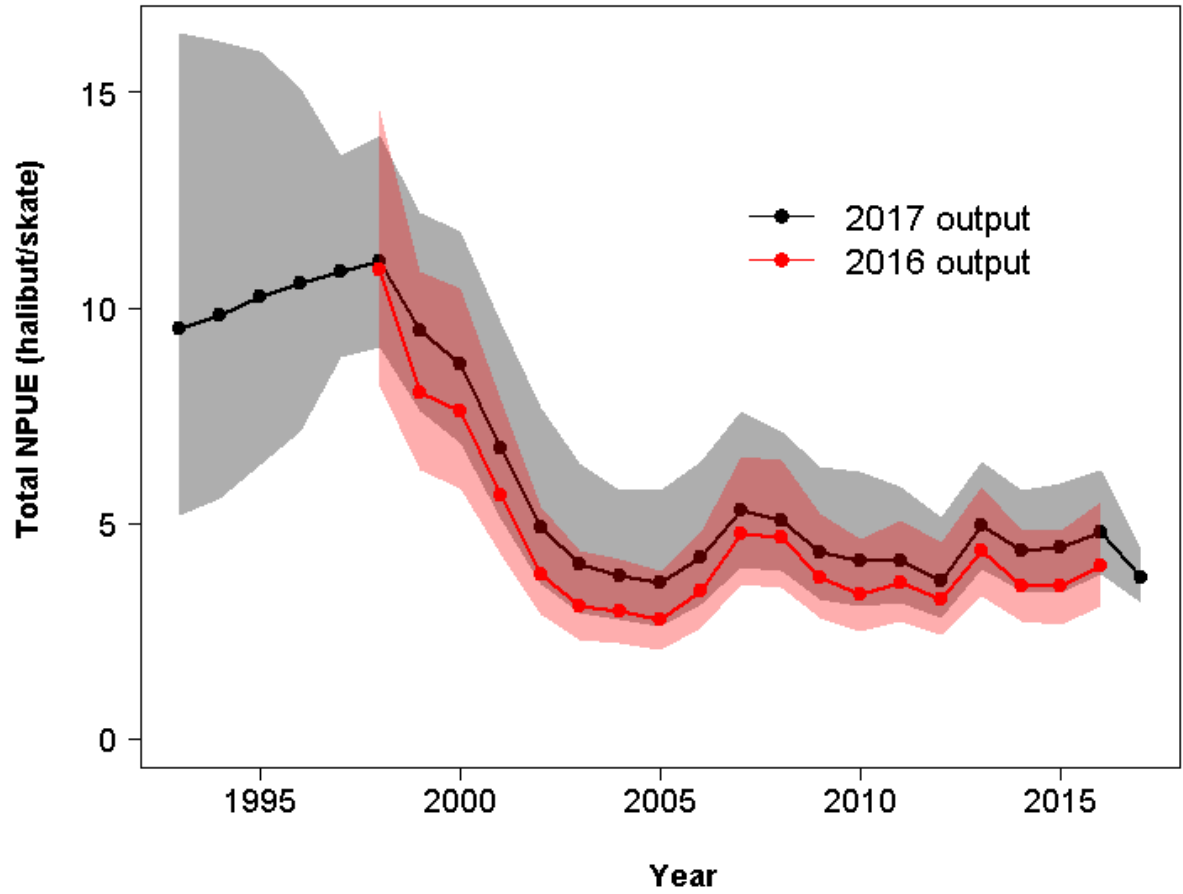
O32 WPUE

4B

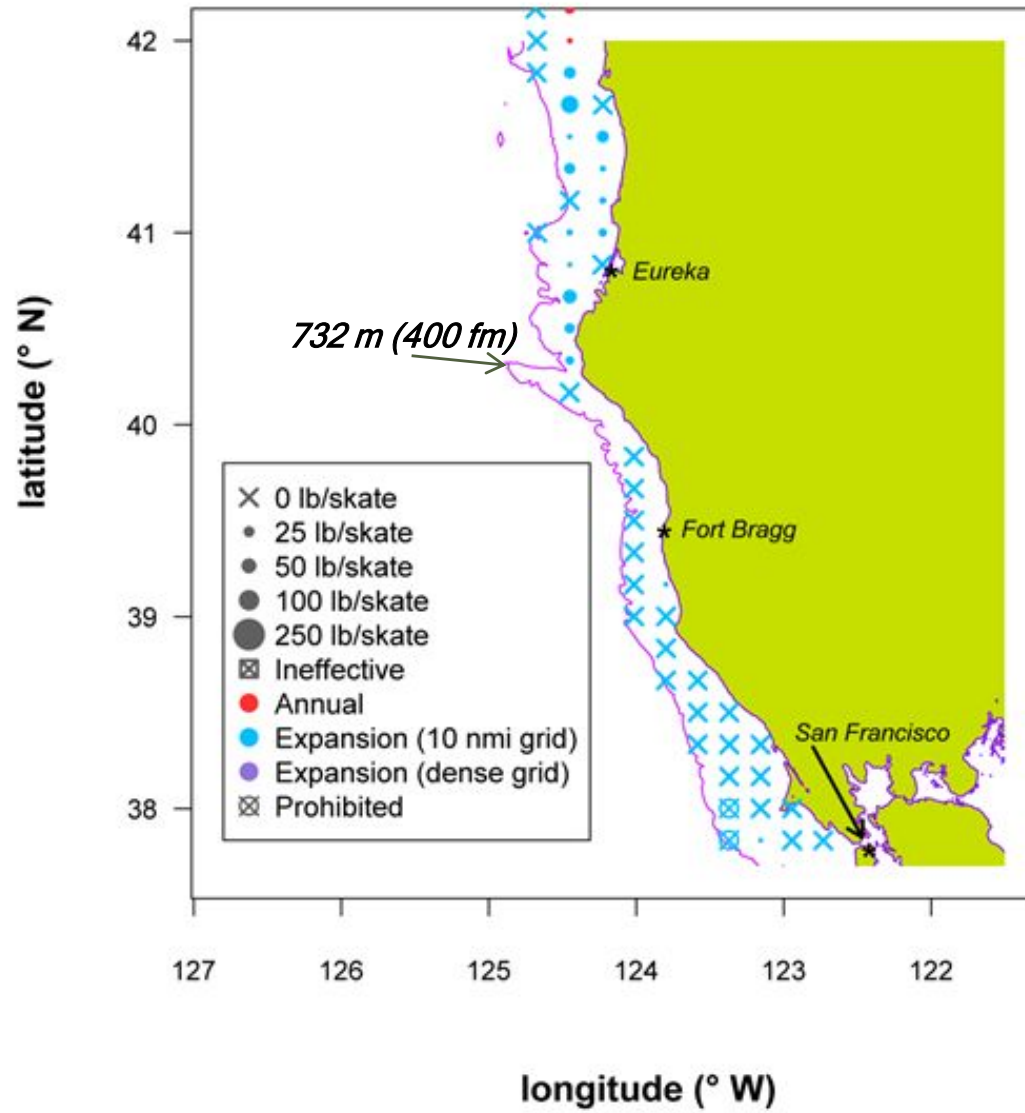


Total NPUE

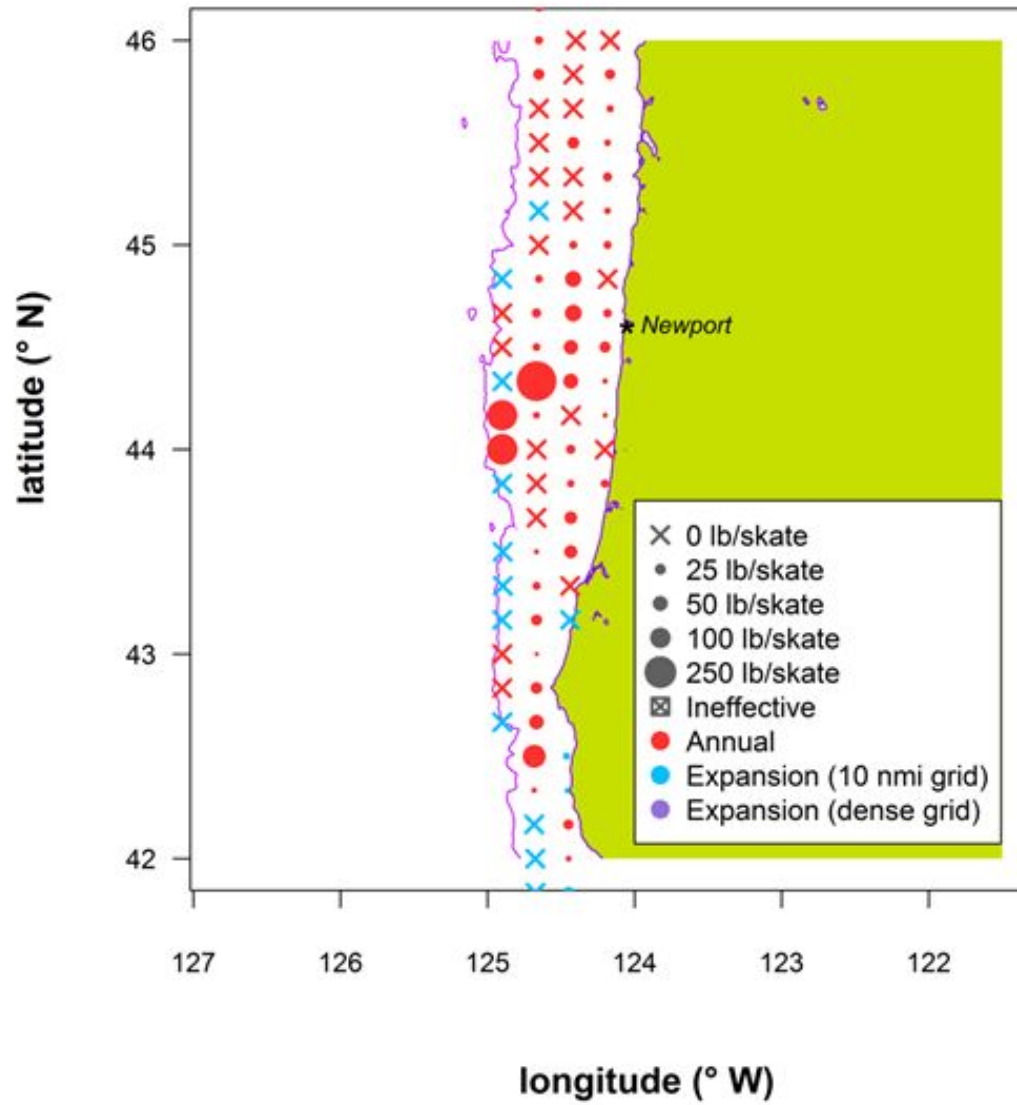
4B



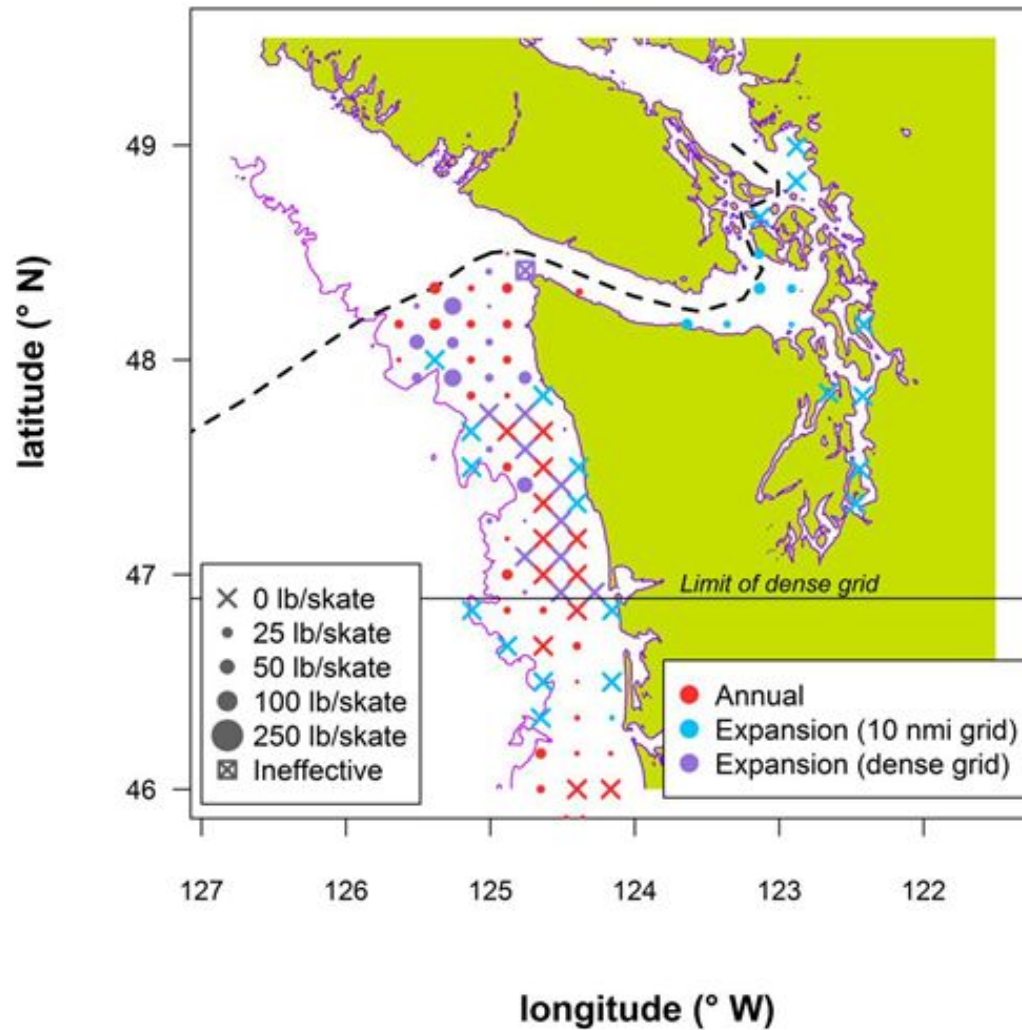
Area 2A California



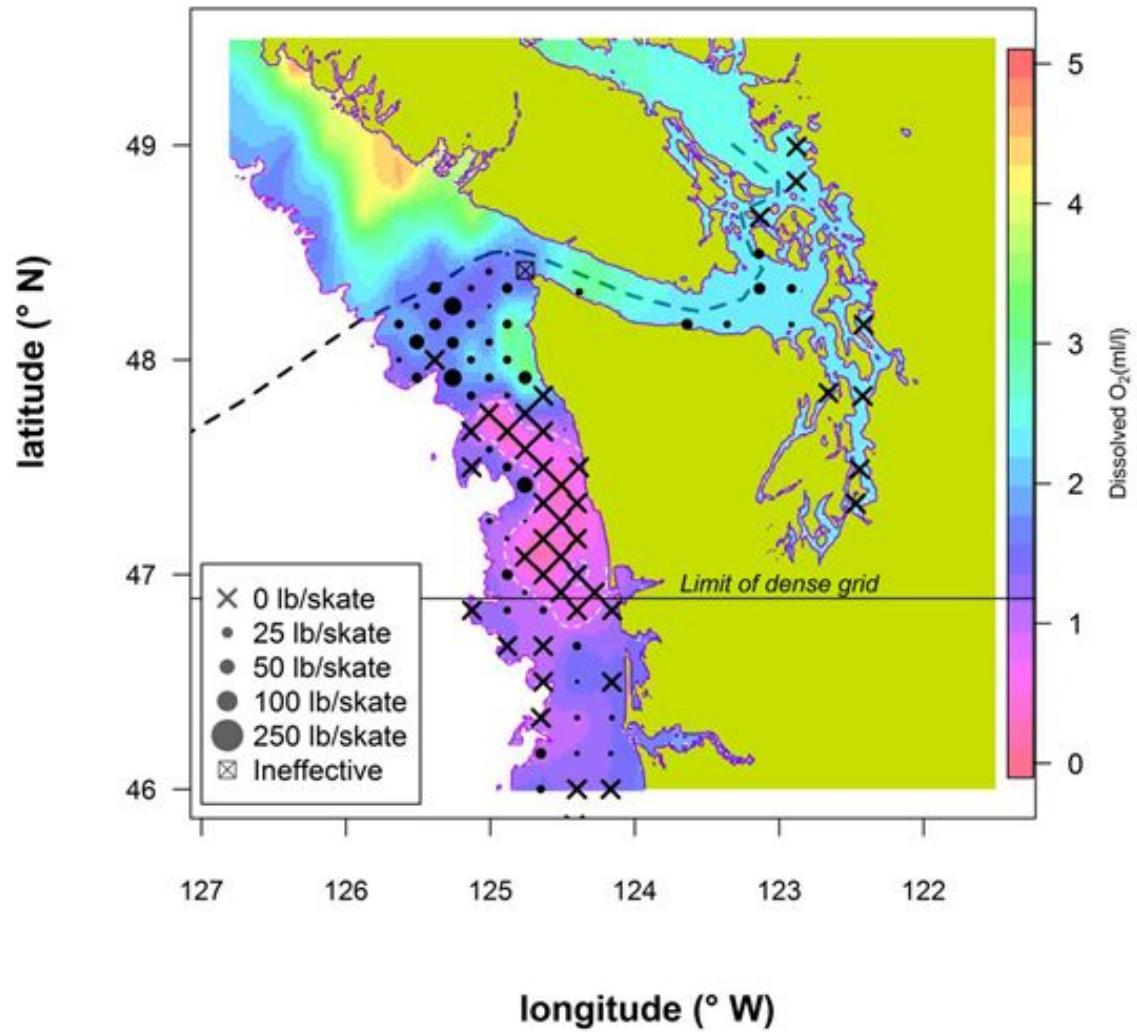
Area 2A
Oregon



Area 2A Washington

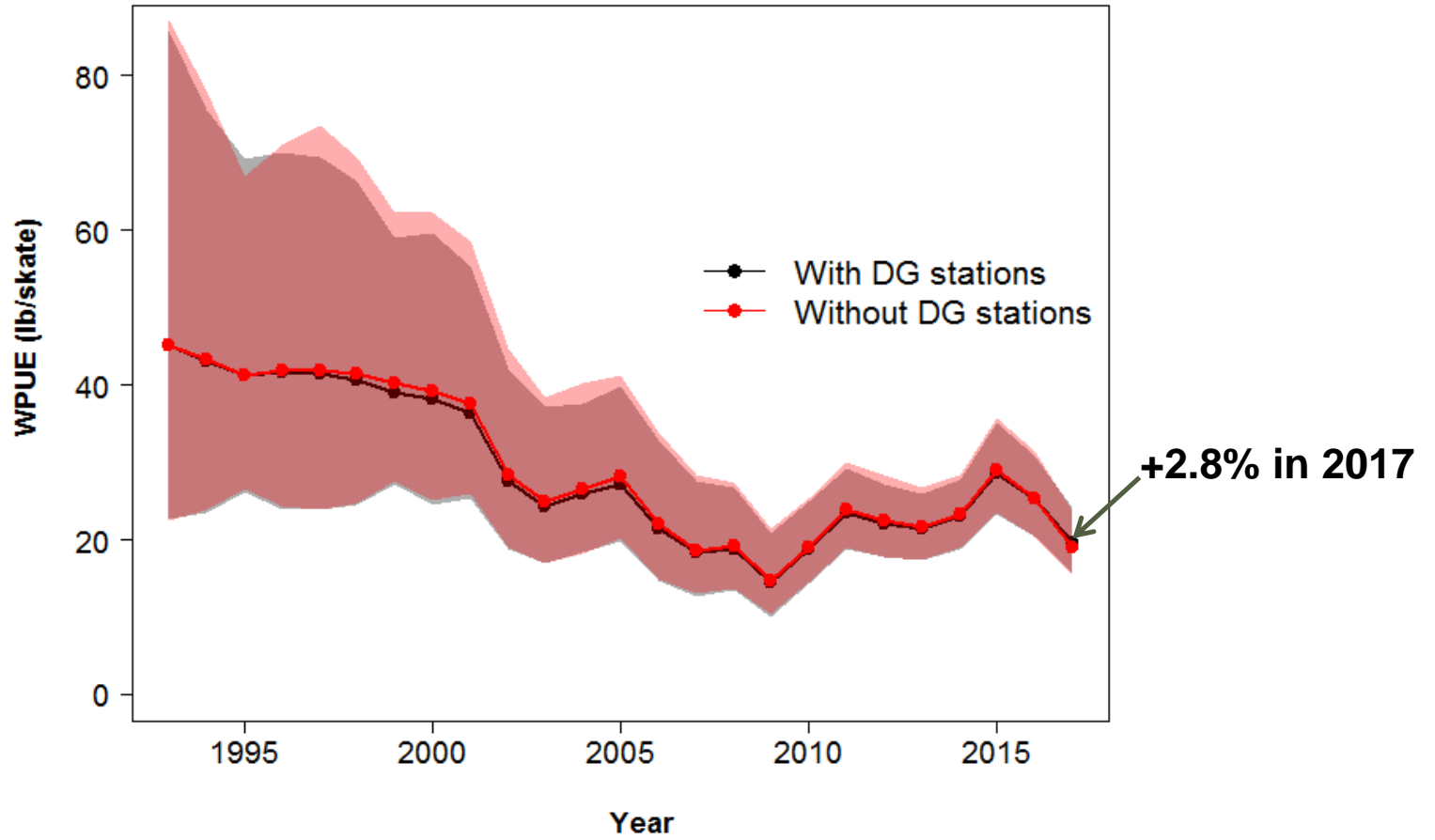


Area 2A
Washington
+ dissolved O₂



O32 WPUE

2A



Space-time modelling

- In 2016, a space-time modelling approach was adopted to estimate WPUE and NPUE indices
 - Previously we had used an approach based on direct calculations from observed data
 - Method was approved for adoption by Scientific Review Board
- Space-time models can make use of information about the patchiness of Pacific halibut distribution to:
 - Reduce random variation in the indices
 - Improve how we deal with incomplete setline survey coverage
 - Improve estimates of uncertainty

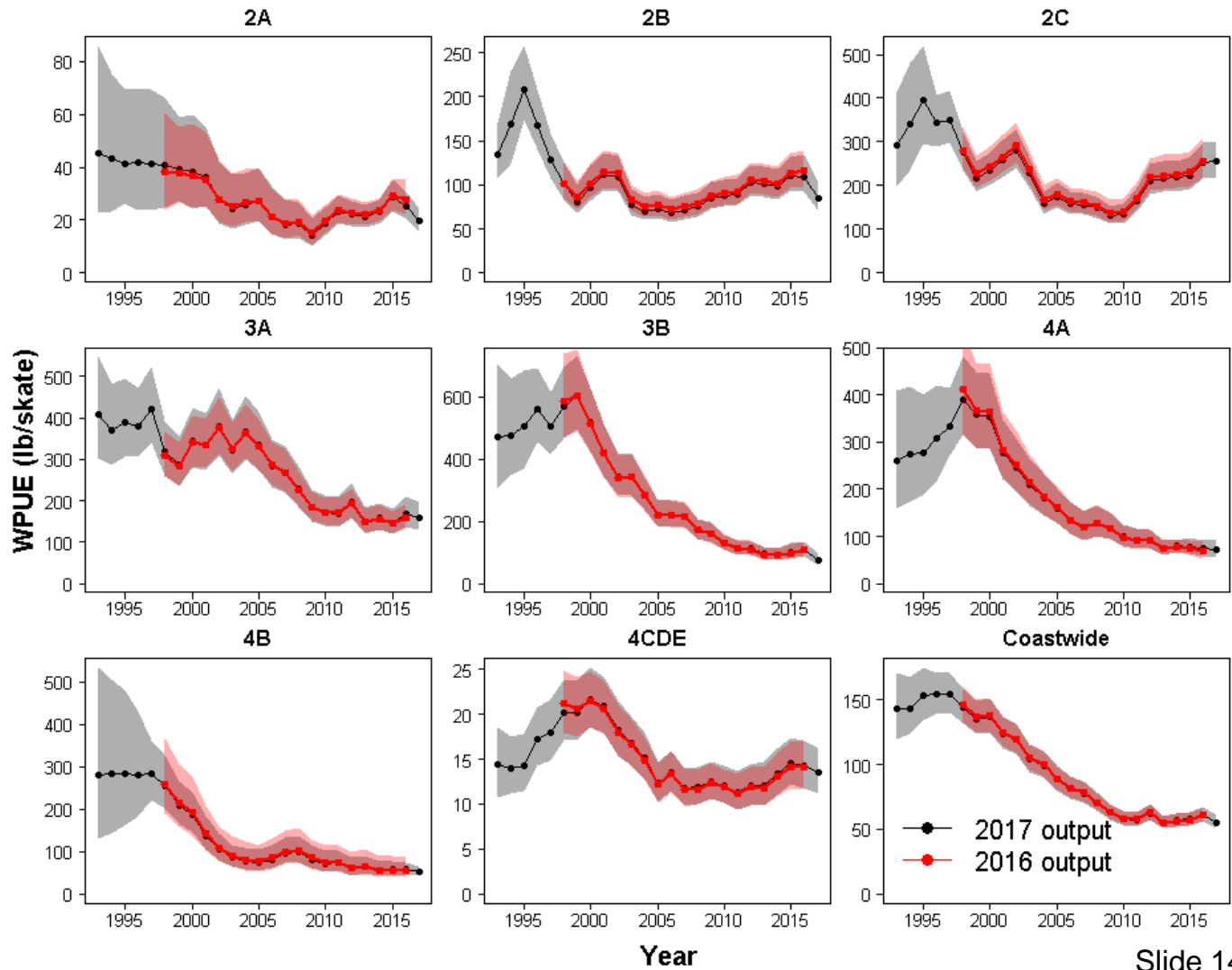


Space-time modelling updates in 2017

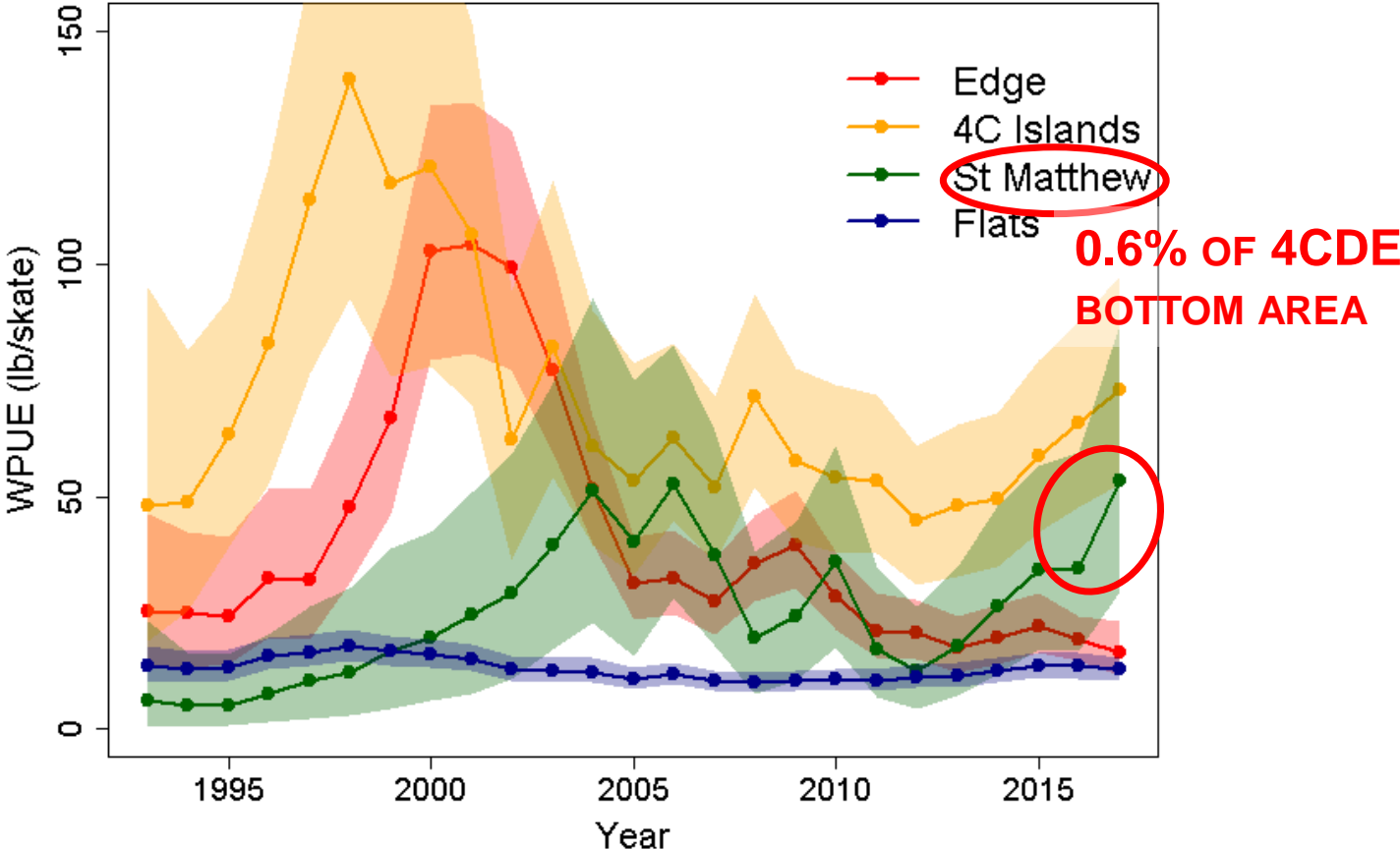
- Inclusion of data from 1993-1997 IPHC setline surveys
- In Area 2A, use of a covariate to indicate north and south of 40°N
 - Very low densities south of 40°N
 - Inclusion of this covariate improves prediction in this southern region in unsurveyed years
- Total WPUE modelled in 2017
 - Only O32 WPUE and total NPUE were modelled in 2016
- Bottom area estimates were updated for all IPHC Regulatory Areas



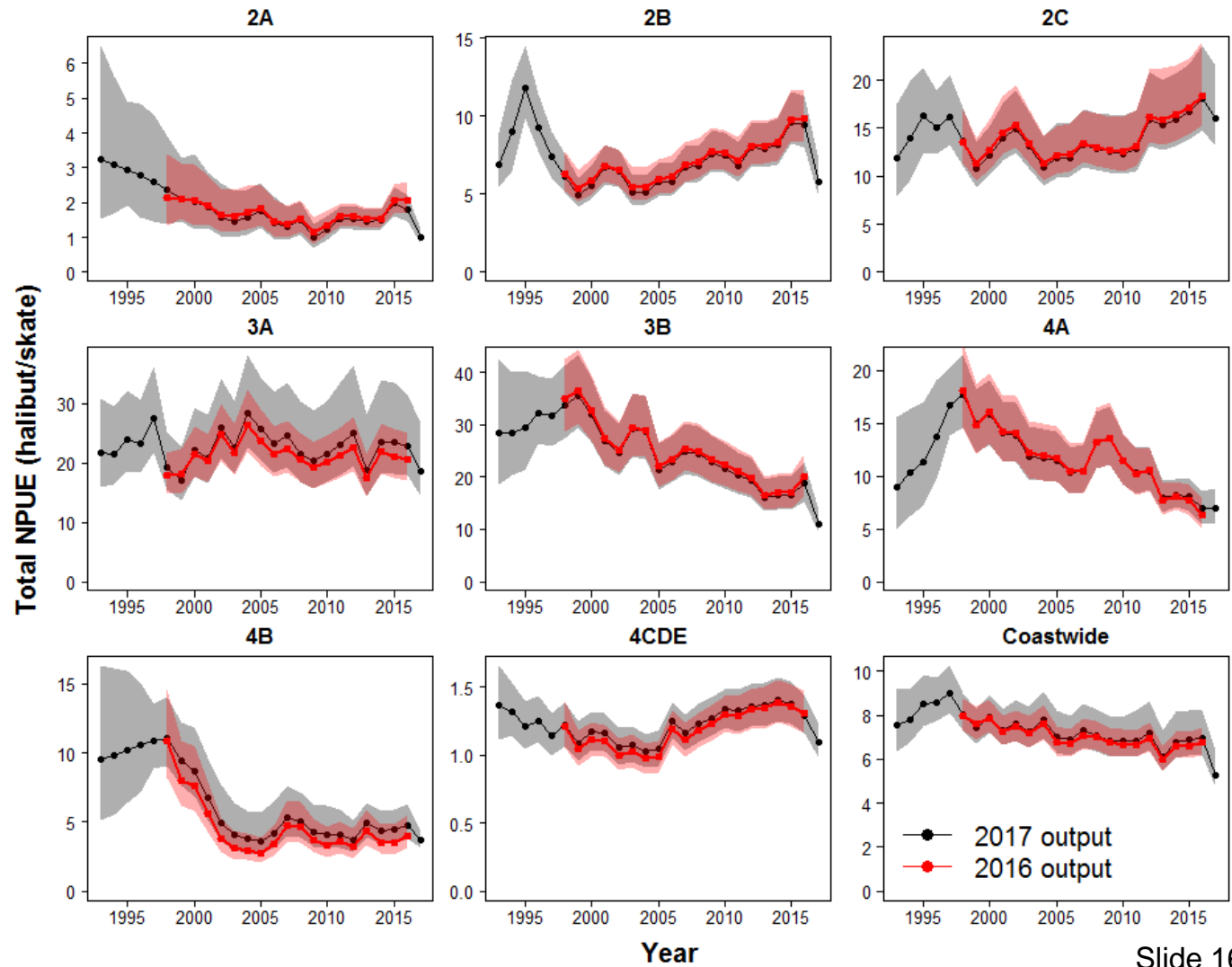
O32 WPUE 2016 and 2017 modelling



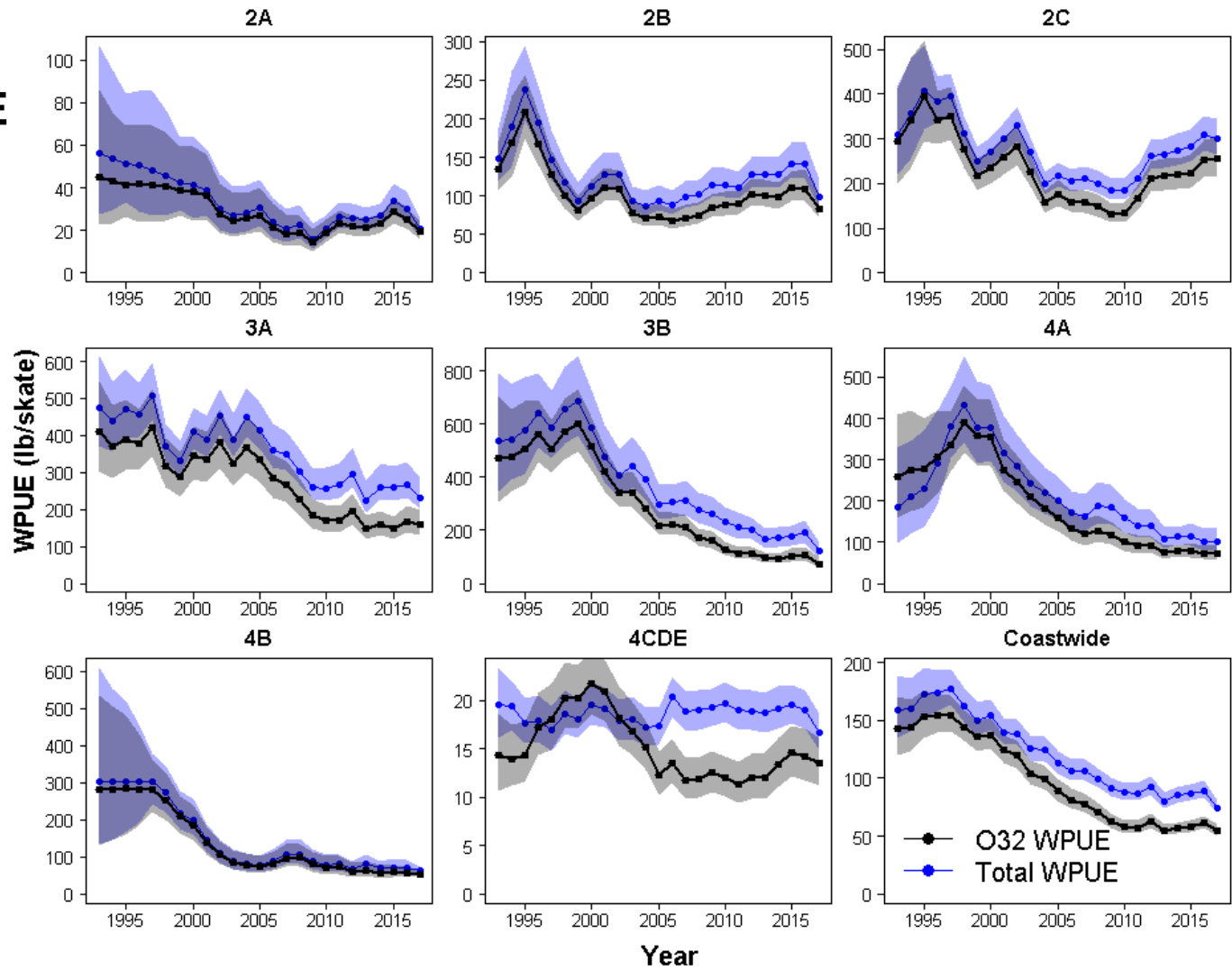
O32 WPUE
Area 4CDE split



Total NPUE 2016 and 2017 modelling



O32 & Total WPUE 2017 modelling



Evaluation of future expansion frequency

Commissioners requested we evaluate how frequently IPHC setline survey expansions should be repeated in the future:

*“The Commission **RECOMMENDED** that the IPHC Staff develop an information paper associated with the survey expansion, which details the likely implications of periodic survey expansion on the stock assessment and apportionment, taking into consideration potential population variability of Pacific halibut in expansion areas which are infrequently surveyed.” (IM092, para. 38)*



Evaluation of future expansion frequency

- Evaluation requires expansion to have already been completed in a Regulatory Area.
- It also helps for some time to have passed since the expansion.
- Here we use the space-time modelling to evaluate the effect of expansions in survey coverage on mean WPUE estimates in IPHC Regulatory Areas 2A and 4A.



Evaluation approach

- We compare models fitted to the data excluding subsets of setline survey expansion stations with the model fitted to the full data set.
- Allows us to:
 - assess the benefits in terms of relative error and precision of having expansion data available
 - to examine how error and precision change with time since the expansion took place
 - For Regulatory Area 2A, examine whether there is an additional benefit of having the 2014 expansion data along with the original 2011 expansion data



Recommendations

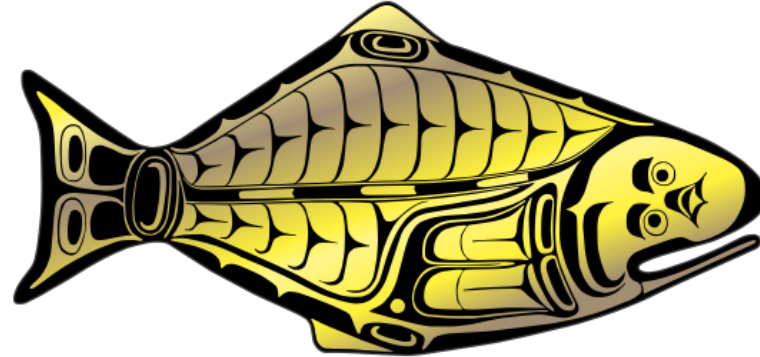
Reg Area	Expansion region	Density †	Variability (spatial/ temporal)	Recommend FISS frequency	Cost ‡
2A	Deep and shallow waters	Low	Low	≥ 10 years	Low
2A	Salish Sea	Low-average	High	5 years	Low
2A	N. California	Average 40-42°N; Low 39-40°N	Average 40-42°N; Low 39-40°N	3-5 years 40-42°N	Medium
4A	Aleutian Islands	High	High	3-5 years	High
4A	Shelf edge	Average	Low	≥ 10 years	Medium

† Density relative to annually surveyed parts of the Regulatory Area

‡ Cost relative to annually surveyed parts of the Regulatory Area



INTERNATIONAL PACIFIC



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Review of fishery goals and objectives

Agenda Item 7.3



INTERNATIONAL PACIFIC
HALIBUT COMMISSION

93rd Interim Meeting (IM093)

IPHC-2017-IM093-R

37. **NOTING** the current fishery goals, objectives, and performance metrics identified by the MSAB for the MSE process, ..., the Commission **AGREED** to provide guidance to the IPHC Secretariat and the MSAB on goals and objectives at the 94th Annual Meeting in January 2018.

38. **NOTING** the goals and objectives related to distributing the TCEY presented during the meeting by the U.S.A. (Table 3), the Commission **RECOMMENDED** that they be considered at the 94th Annual Meeting in January 2018 after soliciting input from stakeholders.

39. The Commission **REQUESTED** the IPHC Secretariat to consolidate the objectives related to TCEY distribution (Table 3) with the current goals, objectives and performance metrics provided as Appendix IV of the MSAB10 Report, for presentation at the 94th Annual Meeting in January 2018.

40. The Commission **NOTED** that providing guidance on the MSE process to the IPHC Secretariat and the MSAB at the Interim and Annual meetings would be an efficient and effective method to ensure the guidance is incorporated into the annual MSAB work plan.



Circular IPHC-2017-CR022

- Present the Commission objectives
- Soliciting stakeholder feedback
- Made available on 18 December 2017



MSAB Goals

1. Biological sustainability
2. Fishery sustainability, access, and stability
3. Minimize discard mortality
4. Minimize bycatch and bycatch mortality
5. Serve consumer needs
6. Preserve biocomplexity



Biological Sustainability

Measurable Objectives defined by MSAB

Maintain a minimum of number of mature female halibut coast-wide

Avoid low spawning stock biomass

Avoid very low spawning stock biomass

When Limit < Est. Biomass < Trigger, limit the probability of declines

Measurable Objectives defined by Commission (related to distribution)

Maintaining diversity in the population across IPHC Reg. Areas

Prevent local depletion at IPHC Regulatory Area scale

Minimize impact on downstream migration area



Fishery Sustainability and access

Measurable Objectives defined by MSAB

Maintain directed fishing opportunity

Maximize yield in each IPHC Regulatory Area

Maintain a median catch within 10% of 1993-2012 average

Maintain average catch greater than 70% of 1993-2012 average

Measurable Objectives defined by Commission (related to distribution)

Maintain commercial, recreational, and subsistence fishing opportunities in each IPHC Regulatory Area



Fishery Stability

Measurable Objectives defined by MSAB

Limit annual changes in TAC, coast-wide and/or by IPHC Reg. Area

Measurable Objectives defined by Commission (related to distribution)

Limit annual TCEY variability due to stock distribution in both time and scale



Minimize discard mortality

Measurable Objectives defined by MSAB

Discard mortality is less than 10% of annual catch limit

Measurable Objectives defined by Commission (related to distribution)

Minimize discard mortality by IPHC Regulatory Area



Minimize bycatch and bycatch mortality

Measurable Objectives defined by MSAB

Measurable Objectives defined by Commission (related to distribution)

Minimize bycatch by IPHC Regulatory Area



Serve consumer needs

Measurable Objectives defined by MSAB

Measurable Objectives defined by Commission (related to distribution)

Maintain processing opportunities in each IPHC Regulatory Area



Preserve biocomplexity

Measurable Objectives defined by MSAB

- This may be better suited as an objective under Biological Sustainability

Measurable Objectives defined by Commission (related to distribution)

See Biological Sustainability



Other Commission concepts

- Distribution is responsive to IPHC Regulatory Area abundance trends and stock characteristics (ex. Fishery WPUE, age structure, size at age, etc.)
 - Distribution is responsive to management precision in each IPHC Regulatory Area
 - Avoid zero sum distribution policy
-
- These do not have a measurable component and are better suited as objectives to consider when designing management procedures

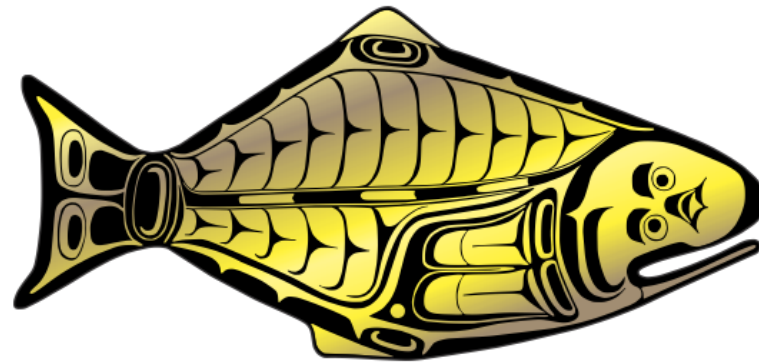


Recommendations

- **ENDORSE** the current MSAB goal and objectives as a working set of objectives for the evaluation of management strategies, but they may be refined in the future
- **AGREE** that the Commission objectives fit within the goals defined by the MSAB, as presented here
- **RECOMMEND** to present the Commission objectives at MSAB11 for stakeholder feedback
 - Very little stakeholder feedback between the Interim Meeting and Annual Meeting
 - The CB and PAB have the opportunity to provide feedback at AM094
- **CLARIFY** the intent of “other Commission concepts” and how they should be incorporated into the MSAB process
- **RECOMMEND** that the MSAB develop measurable outcomes and performance metrics associated with these Commission objectives
 - For MSAB Performance Metrics see IPHC-2017-MSAB10-08



INTERNATIONAL PACIFIC



HALIBUT COMMISSION



Biological Sustainability

Measurable Outcome	Outcome	Performance Metrics
Maintain a minimum of number of mature female halibut coast-wide	Number of mature female halibut less than a threshold	The probability of being below the threshold
Avoid very low stock sizes	RSB < 20% of unfished biomass	The probability that relative spawning biomass is less than 20%
Avoid low stock sizes	RSB < 30% of unfished biomass	The probability that relative spawning biomass is less than 30%
When Limit < Estimated Biomass < Threshold, limit the probability of declines	SSB declines when $20\% < \text{RSB} < 30\%$	The probability that the biomass declines when relative spawning biomass is less than 30% but greater than 20%
Spawning Biomass	An absolute measure	The median relative spawning biomass



Fishery Sustainability, Stability, and Access

Measurable Outcome	Outcome	Performance Metrics
Maintain directed fishing opportunity	Fishery is open	The probability that the FCEY is zero
Maximize yield in each regulatory area		
Maintain median catch	Within $\pm 10\%$ of 1993-2012 average (72Mlbs)	The probability that the FCEY is greater than 79Mlbs and less than 65Mlbs
Maintain average catch	> 70% of historical 1993-2012 average (72Mlbs)	The probability that the FCEY is less than 51 Mlbs
Limit annual changes in TAC, coast-wide and/or by Regulatory Area	Change in FCEY < 15%	The probability that the FCEY next year changes by more than 15% from the FCEY in this year
FCEY	An absolute measure	The median FCEY
Variability in FCEY	An absolute measure	The Average Annual Variability (AAV)



Minimize Discard Mortality (Wastage)

Measurable Outcome	Outcome	Performance Metrics
Discard Mortality in the longline fishery	<10% of annual catch limit	The probability that discard mortality is greater than 10% of the FCEY
Discard Mortality	An absolute measure	Median discard mortality



Minimize Bycatch and Bycatch Mortality

Measurable Outcome	Outcome	Performance Metrics

Serve Consumer Needs

Measurable Outcome	Outcome	Performance Metrics

Preserve biocomplexity

Measurable Outcome	Outcome	Performance Metrics



The 2017 stock assessment and final catch tables

Agenda items: 6.3 & 6.4

Papers: IPHC-2018-AM094-08
IPHC-2018-AM094-09
IPHC-2018-AM094-10
IPHC-2018-AM094-11



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Outline

- Coastwide stock assessment
 - Data sources
 - Modelling and results
- Catch tables
 - Regulatory Area-specific projections

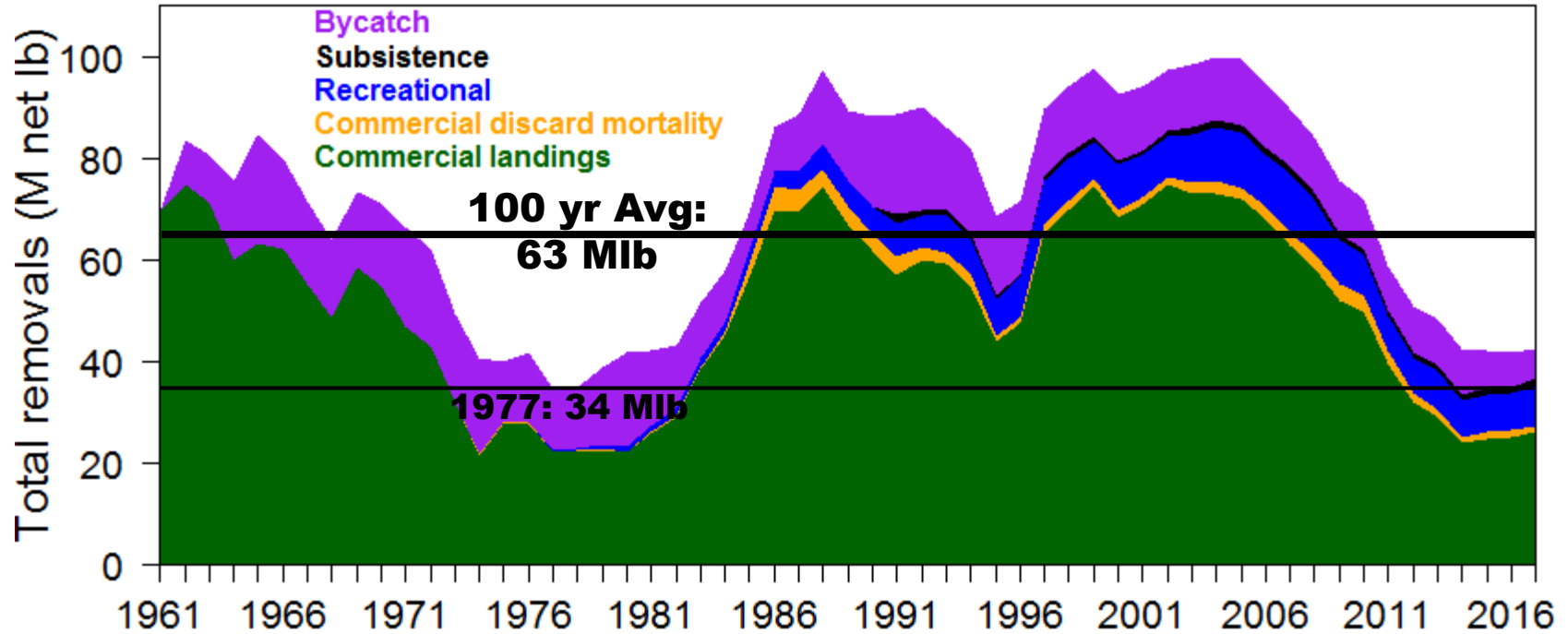


Summary

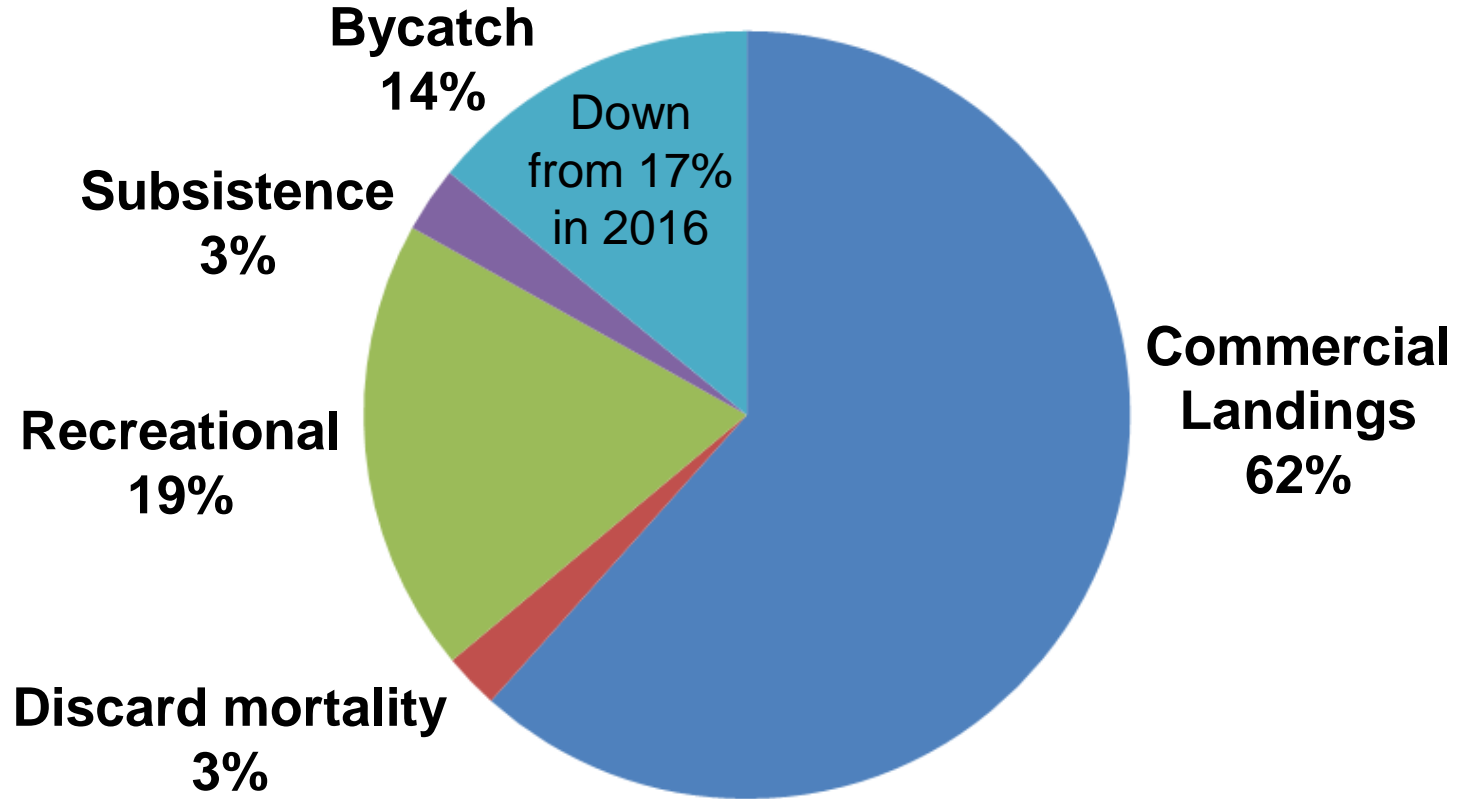
- Large drop in coastwide survey numbers (24%) and weight (10%) observed in 2017
- Fishery WPUE stable coastwide, but down in most Regulatory Areas
- 2017 spawning biomass estimates close to last assessment (down only 2%)
- Projections indicate much less yield available in the near future



Sources of mortality



2017 Mortality (weight): 42.49 Mlb

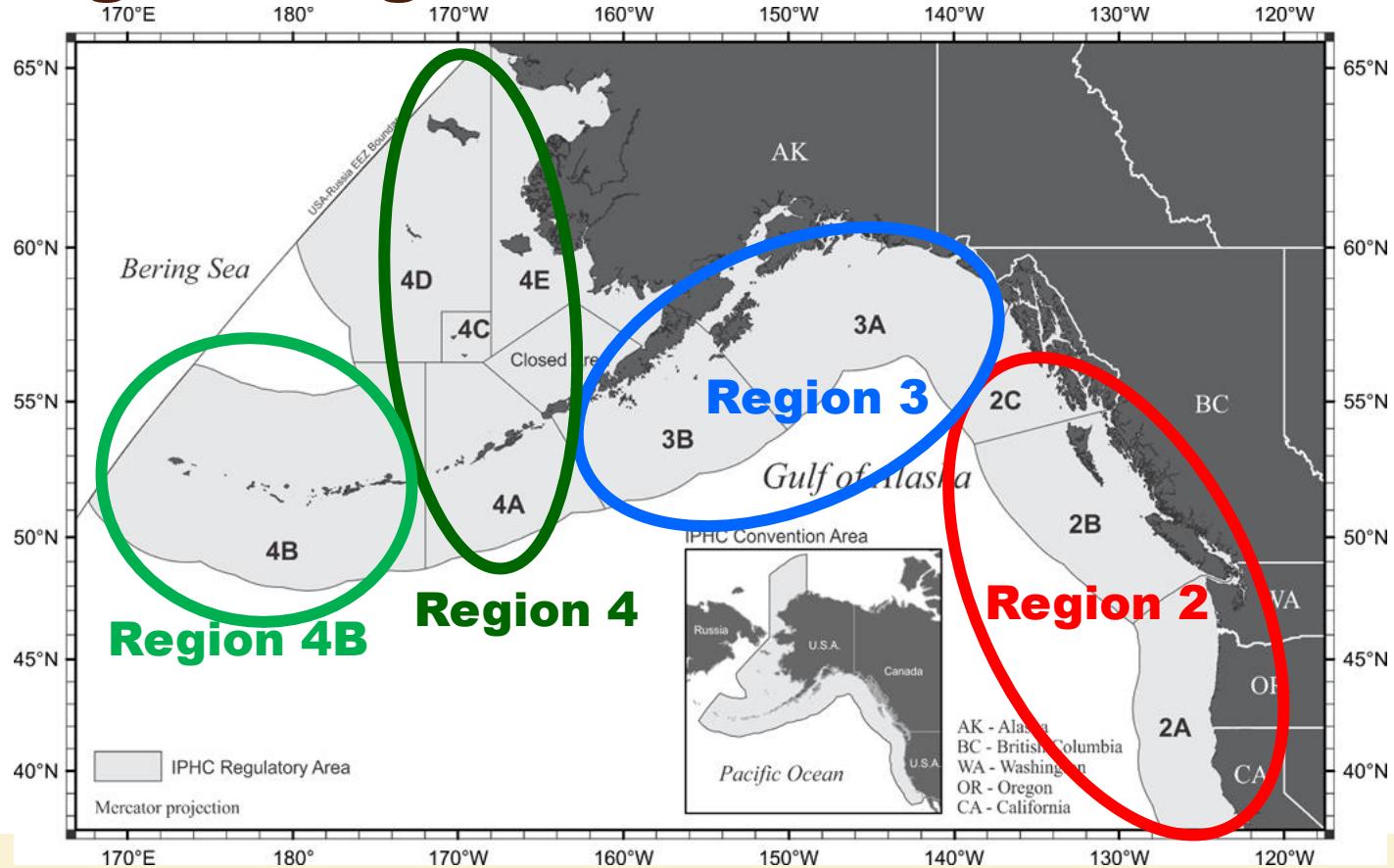


Recent mortality (M lbs net)

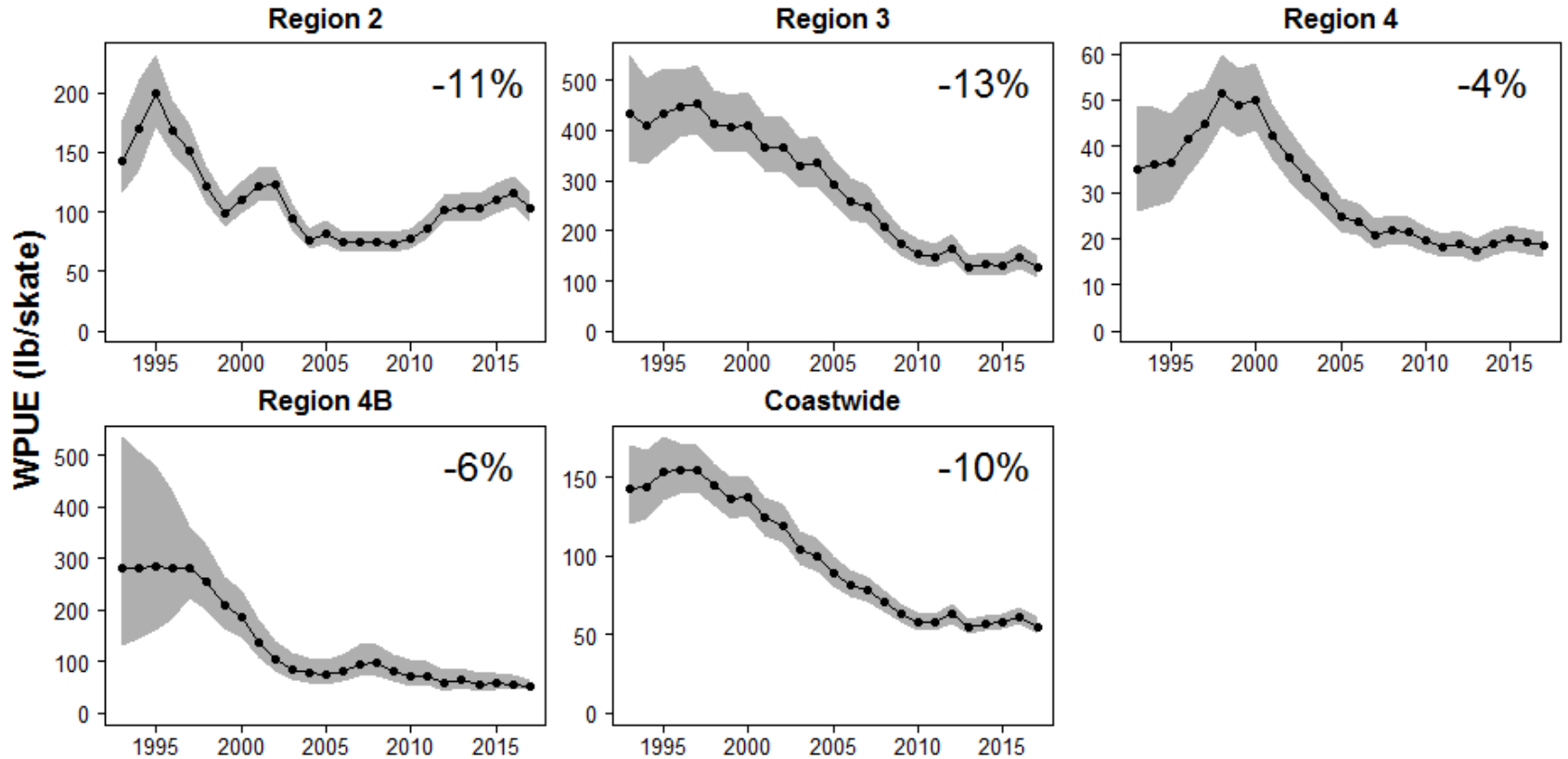
Year	Commercial Landings	Discard mortality	Recreational	Subsistence	Bycatch	Total
2013	29.04	1.43	7.63	1.13	8.83	48.07
2014	23.70	1.30	7.18	1.20	8.93	42.31
2015	24.67	1.29	7.46	1.20	7.47	42.10
2016	25.05	1.18	7.38	1.17	7.02	41.79
2017	26.16	0.99	8.13	1.17	6.00	42.44
				<u>January update:</u>	6.01	42.49



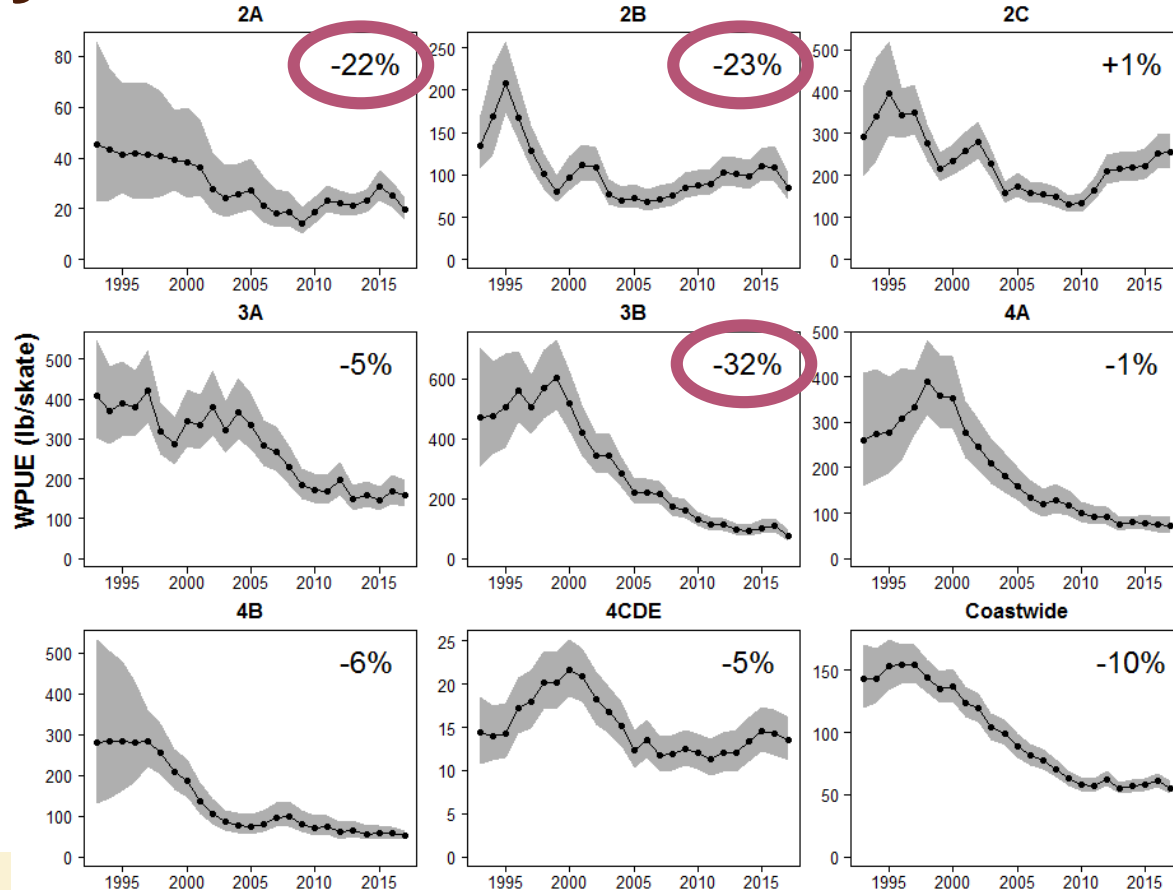
Biological regions



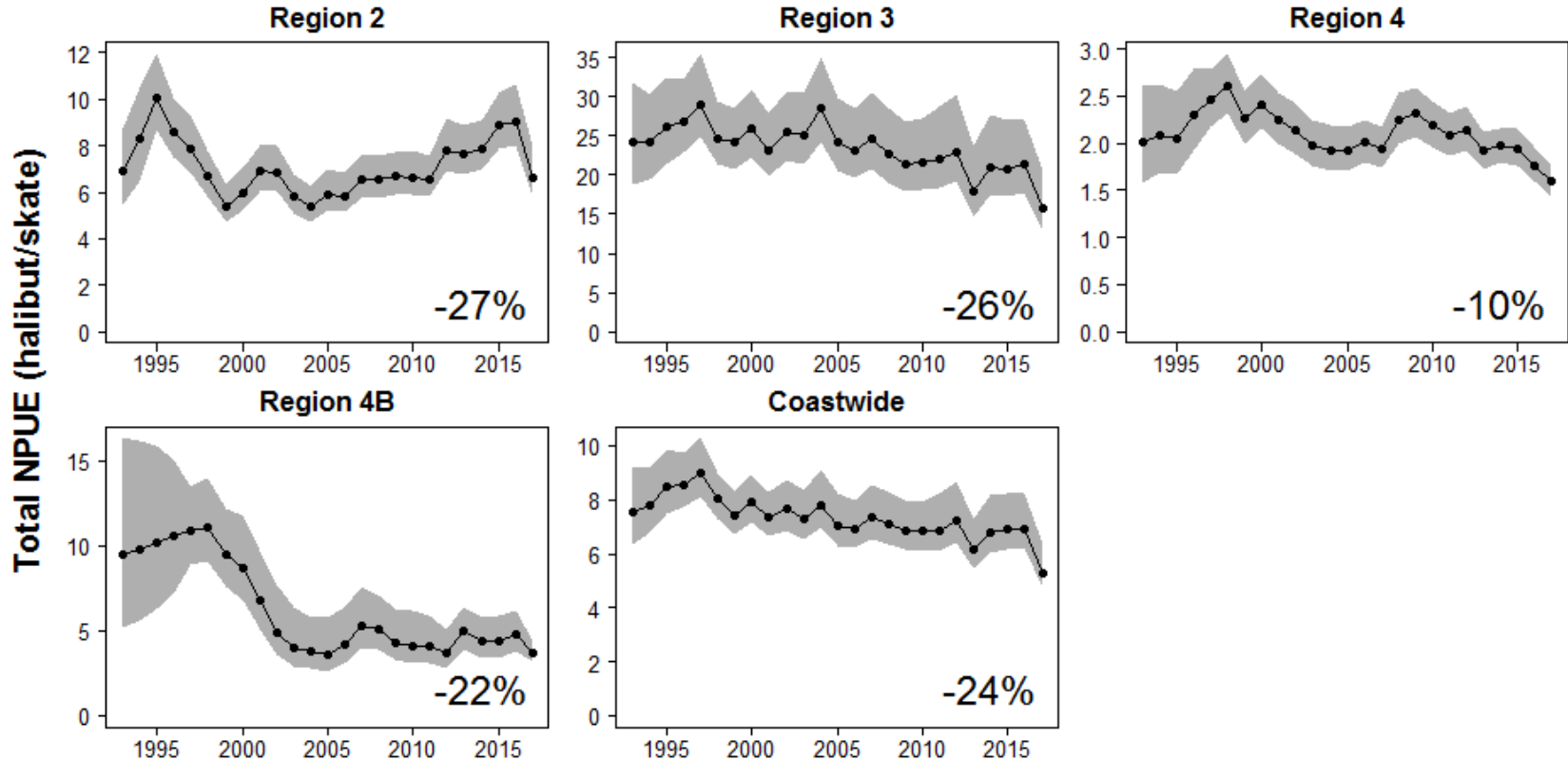
Survey O32 WPUE



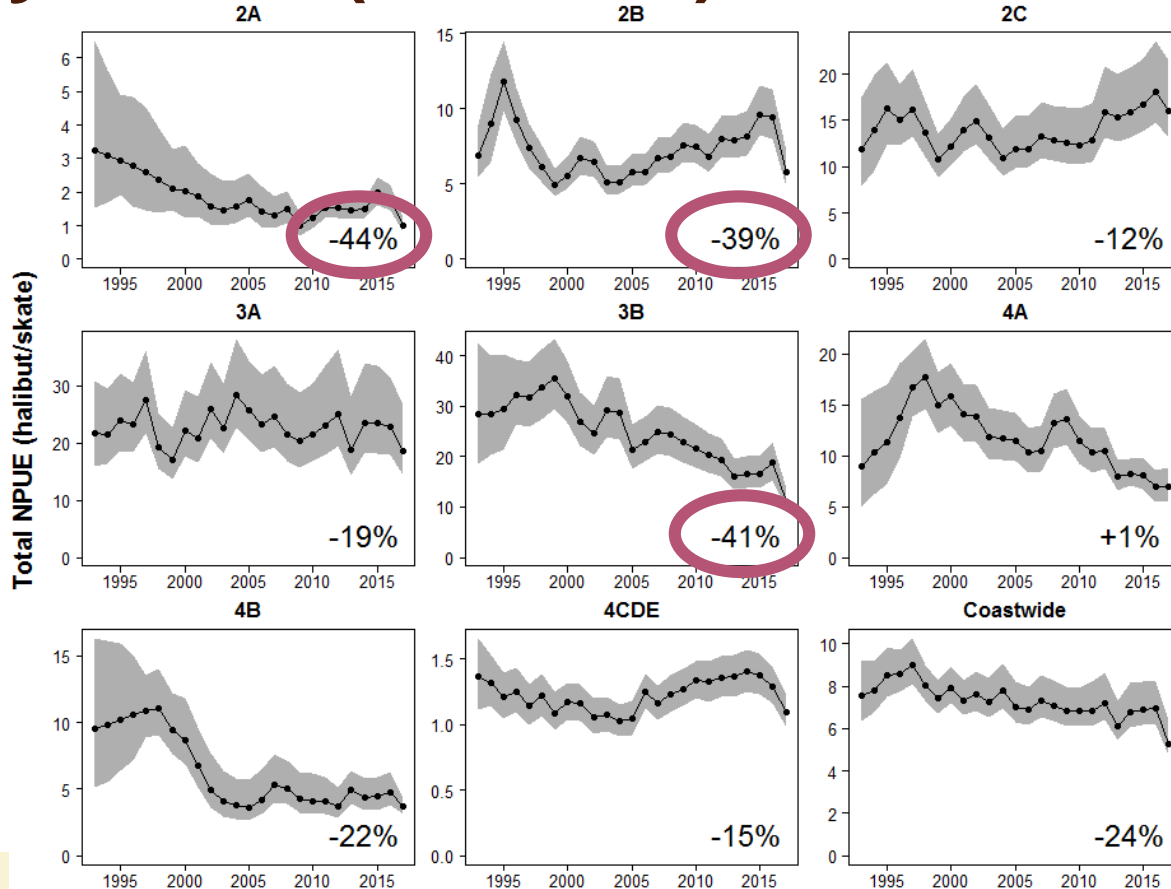
Survey O32 WPUE



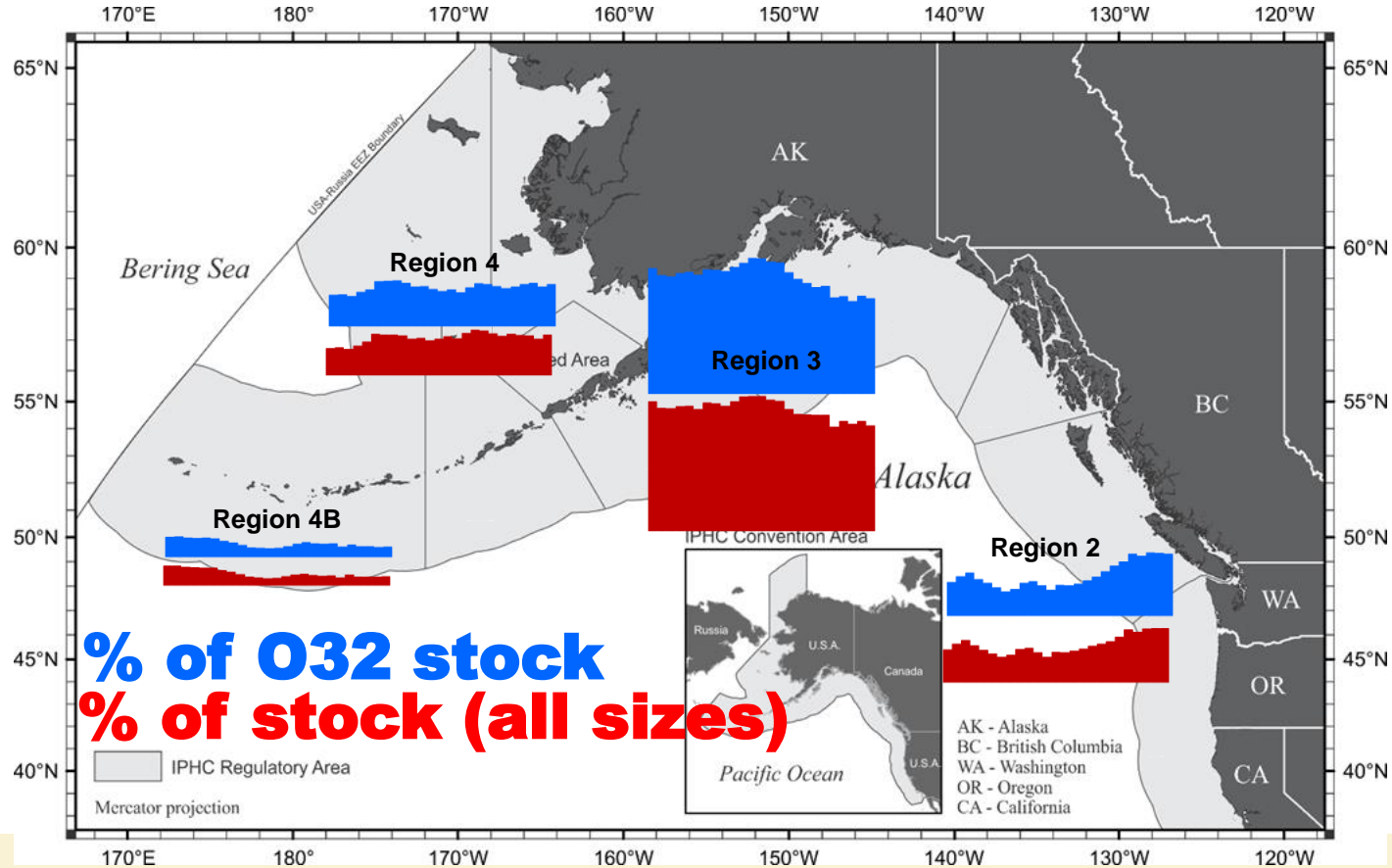
Survey NPUE (all sizes)



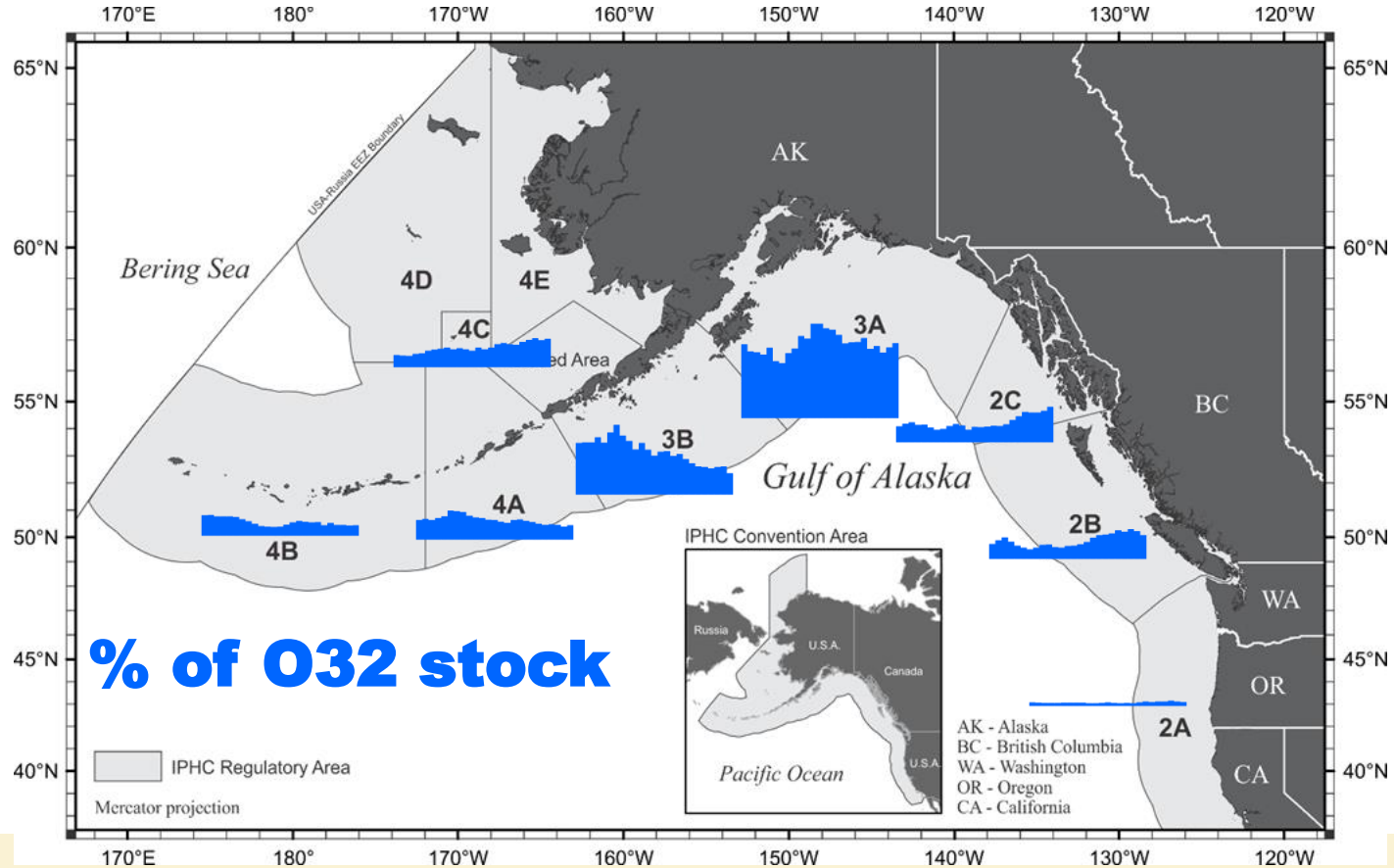
Survey NPUE (all sizes)



Stock distribution: 1993-2017

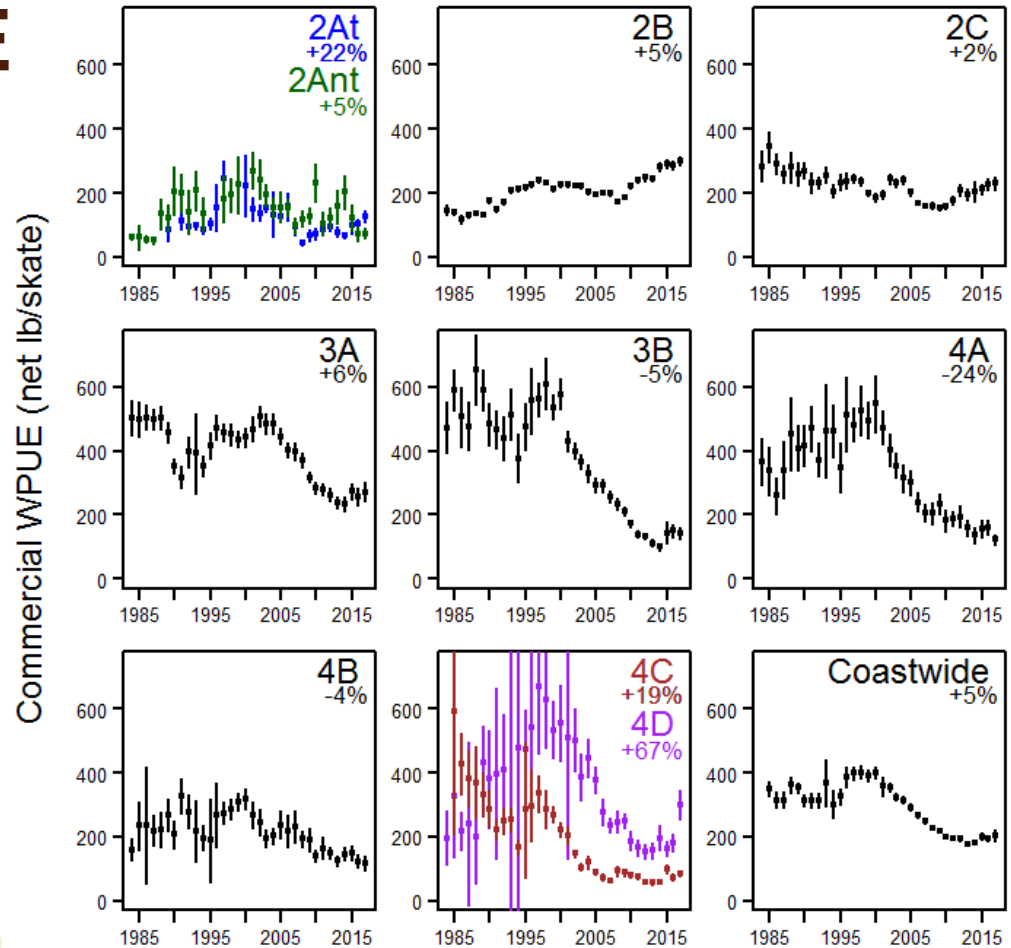


Stock distribution: 1993-2017



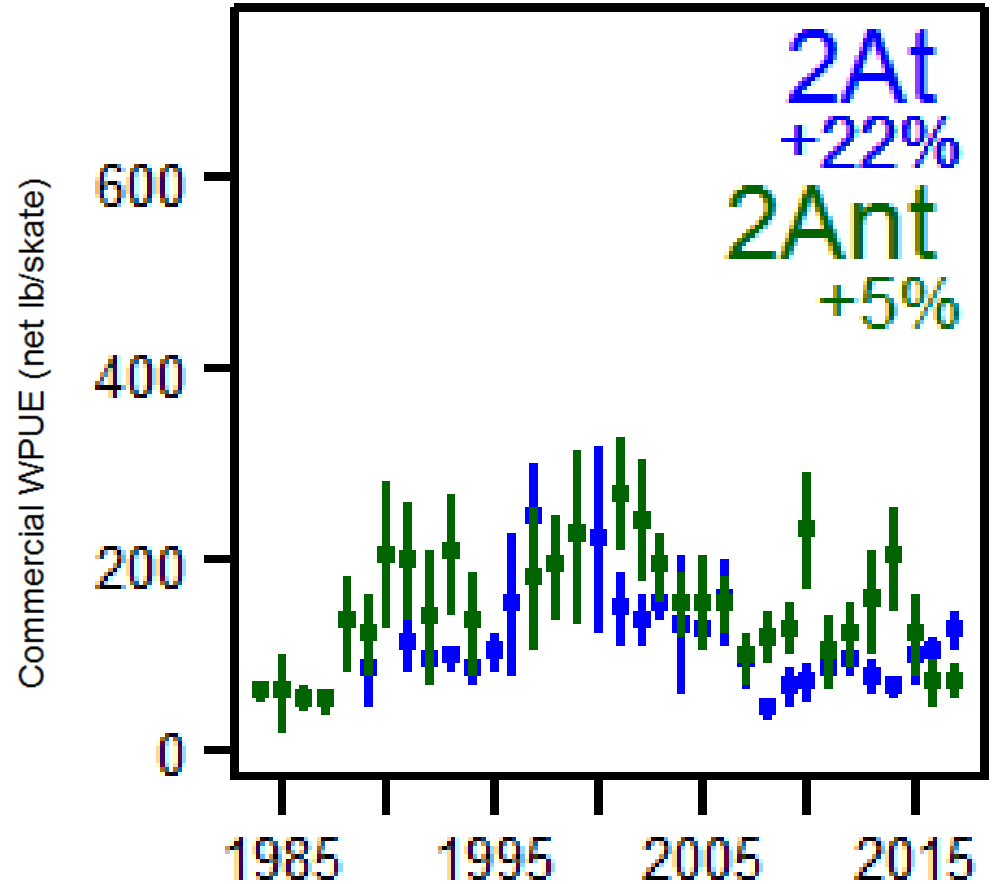
Commercial WPUE

- 2A: separating **tribal** and **non-tribal** trends
- **4D**: change in spatial distribution (+25% of catch to St. Matthew)
- Bias correction for incomplete logbooks



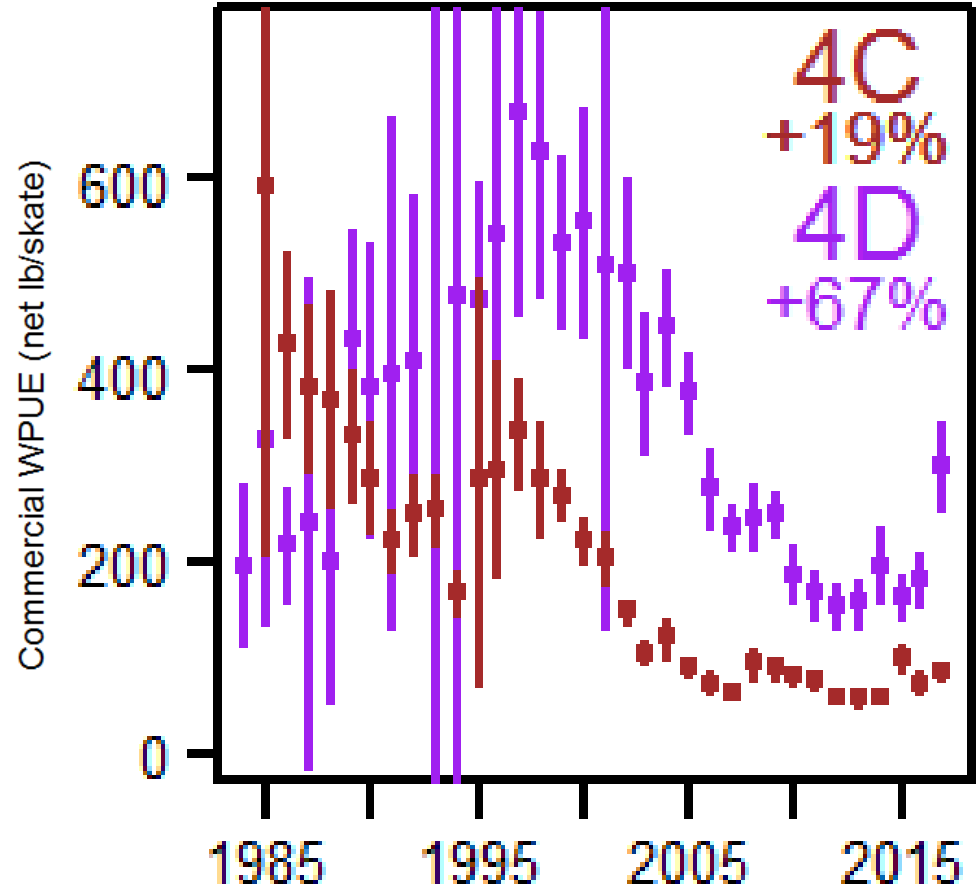
Commercial WPUE

- 2A: separating **tribal** and **non-tribal** trends



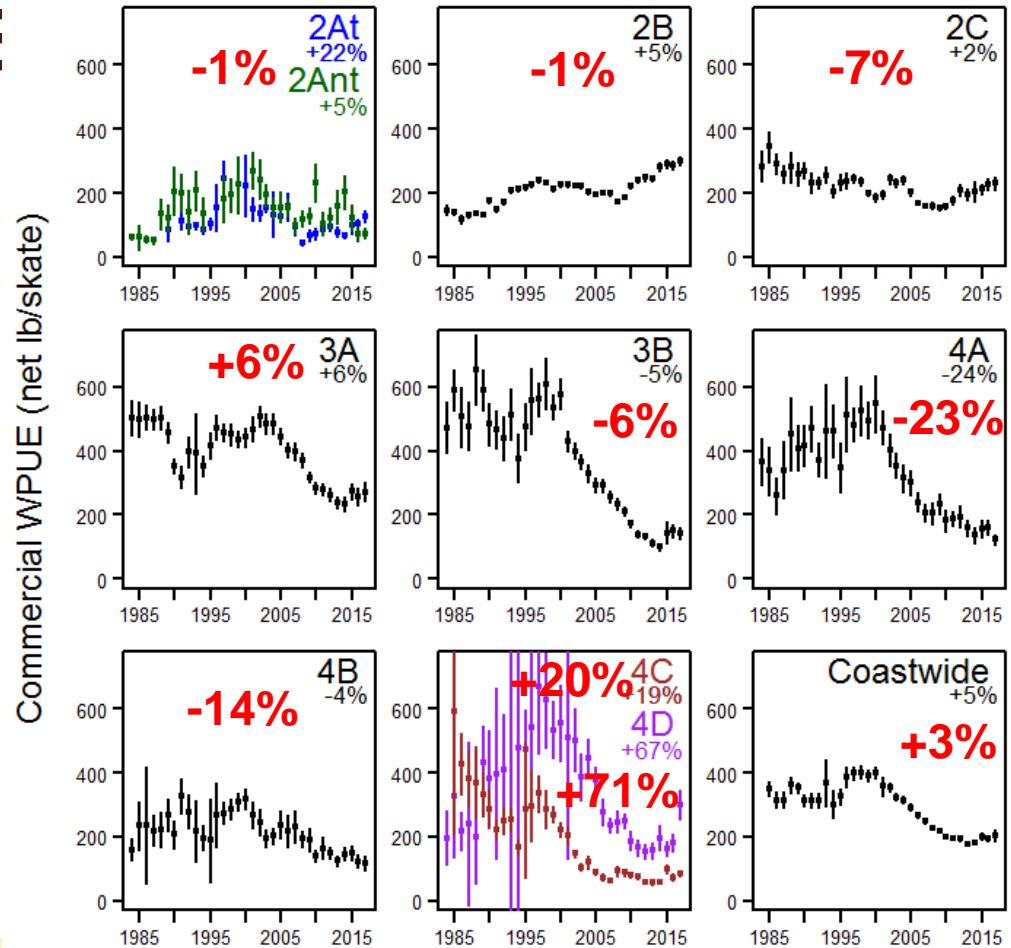
Commercial WPUE

- 4D: change in spatial distribution: 25% of catch shifted to St. Matthew

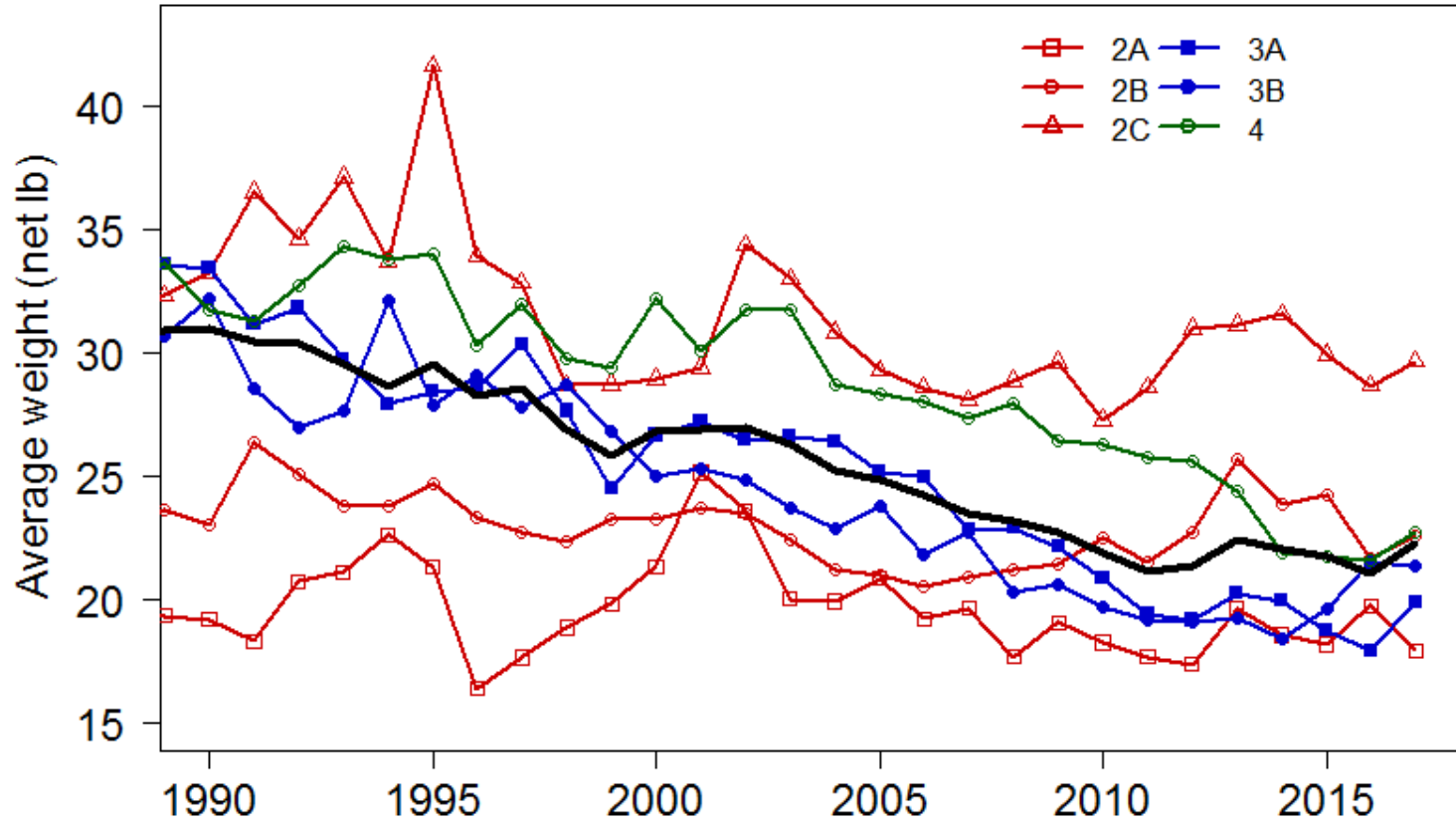


Commercial WPUE

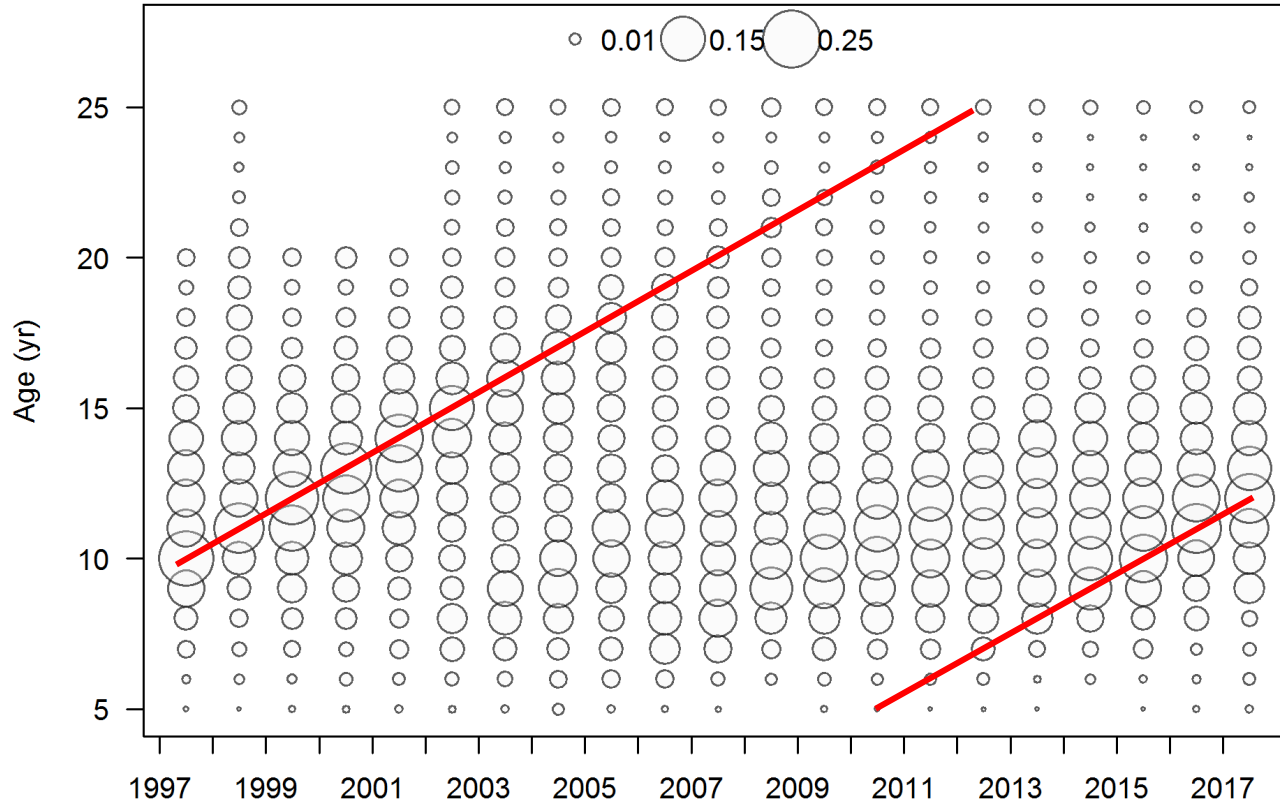
- 2A: separating **tribal** and **non-tribal** trends
- 4D: change in spatial distribution (+25% of catch to St. Matthew)
- Bias correction for incomplete logbooks



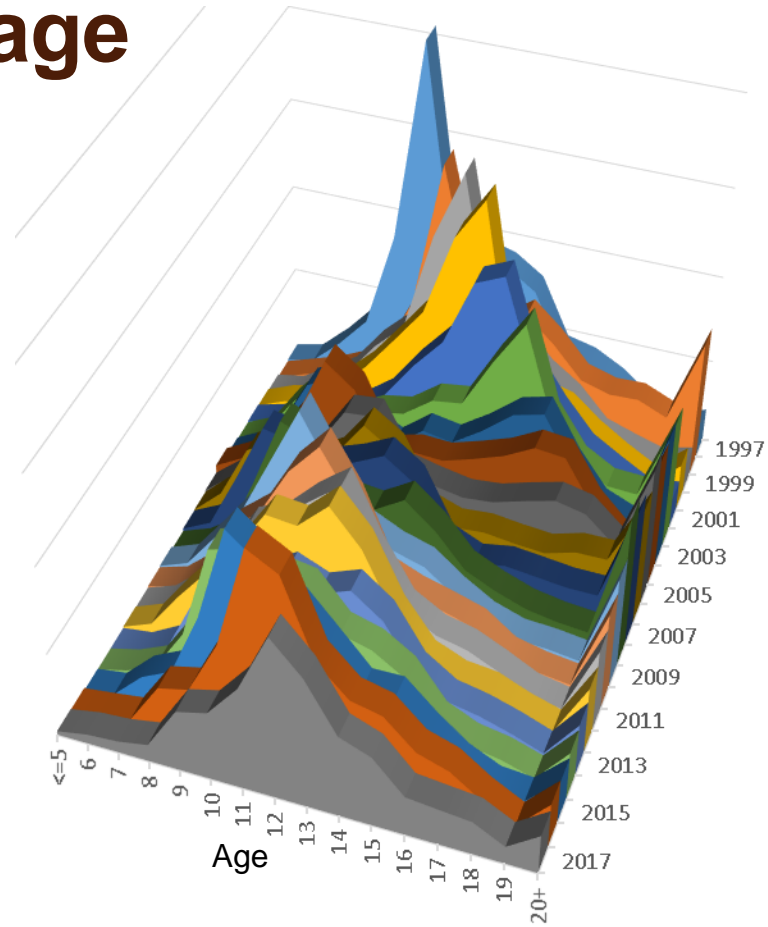
Fishery average fish weight



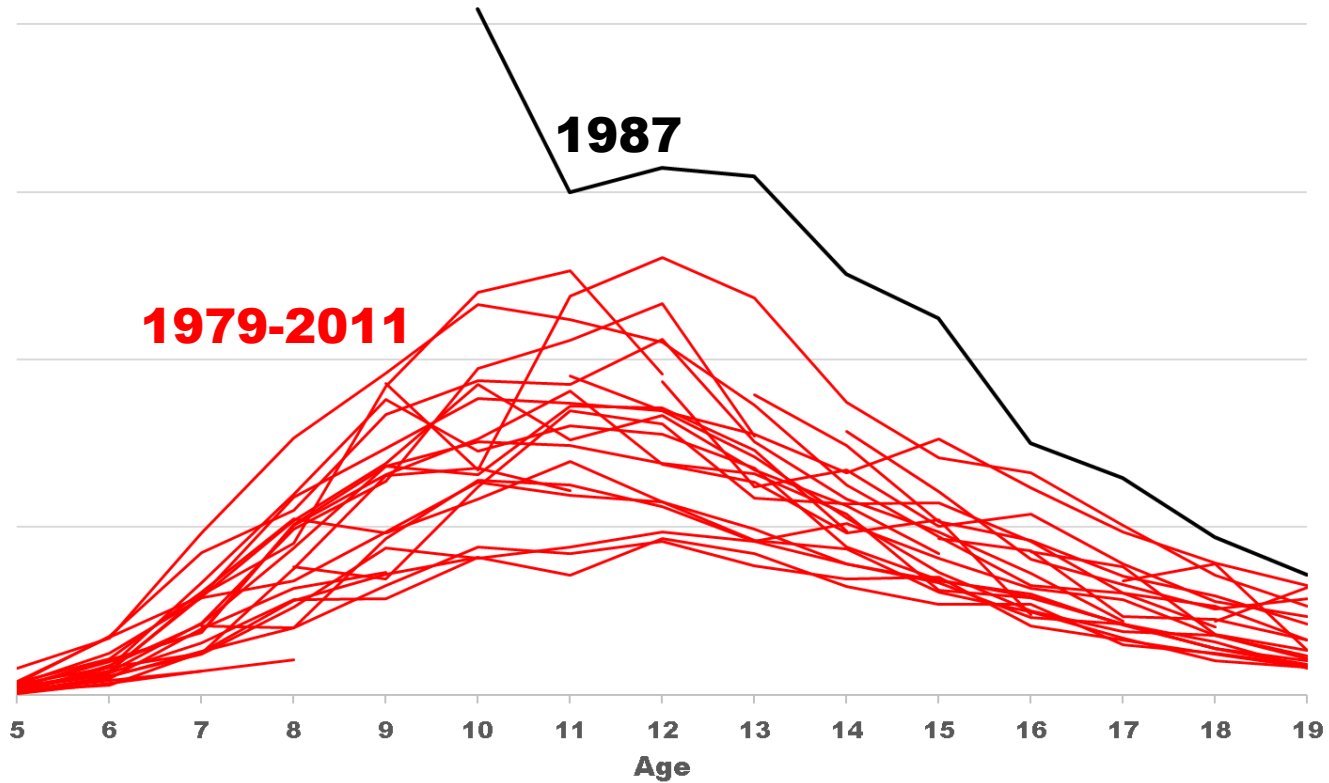
Survey proportions at age: coastwide



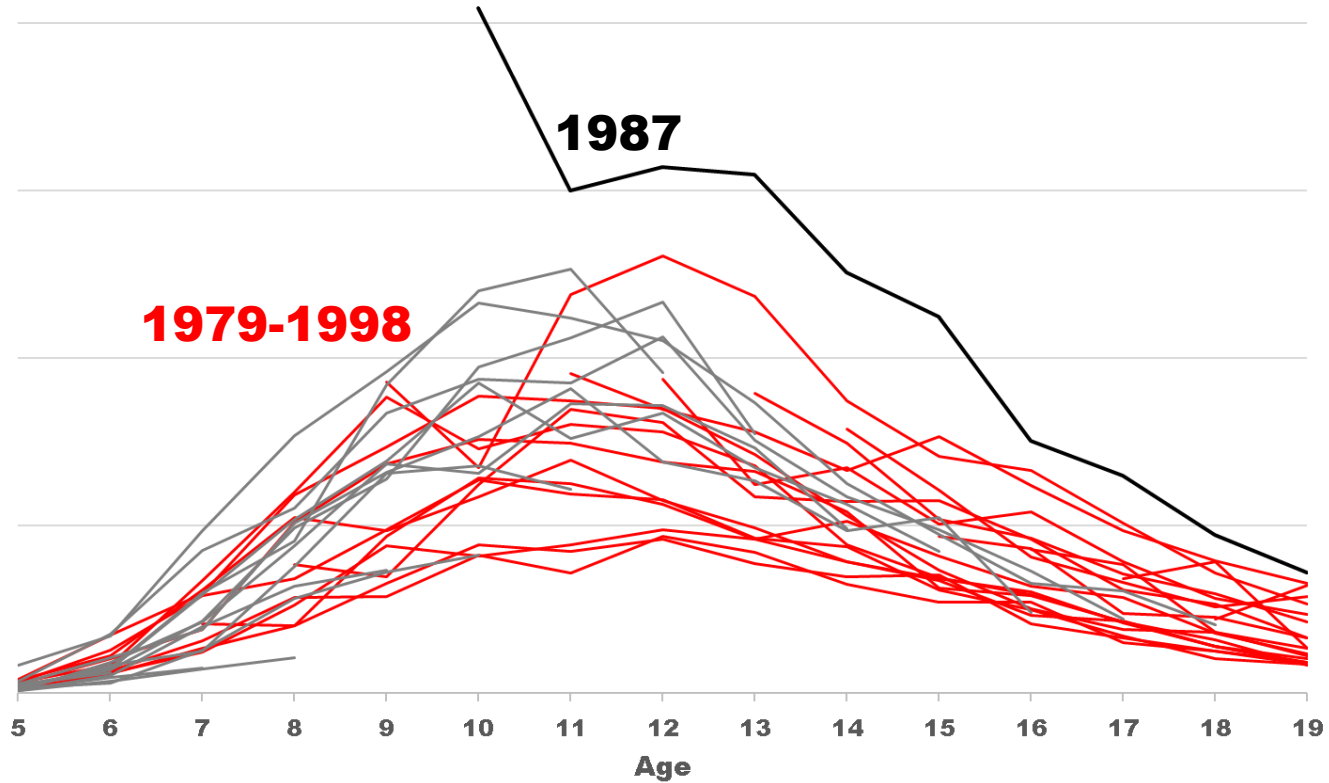
Survey NPUE at age



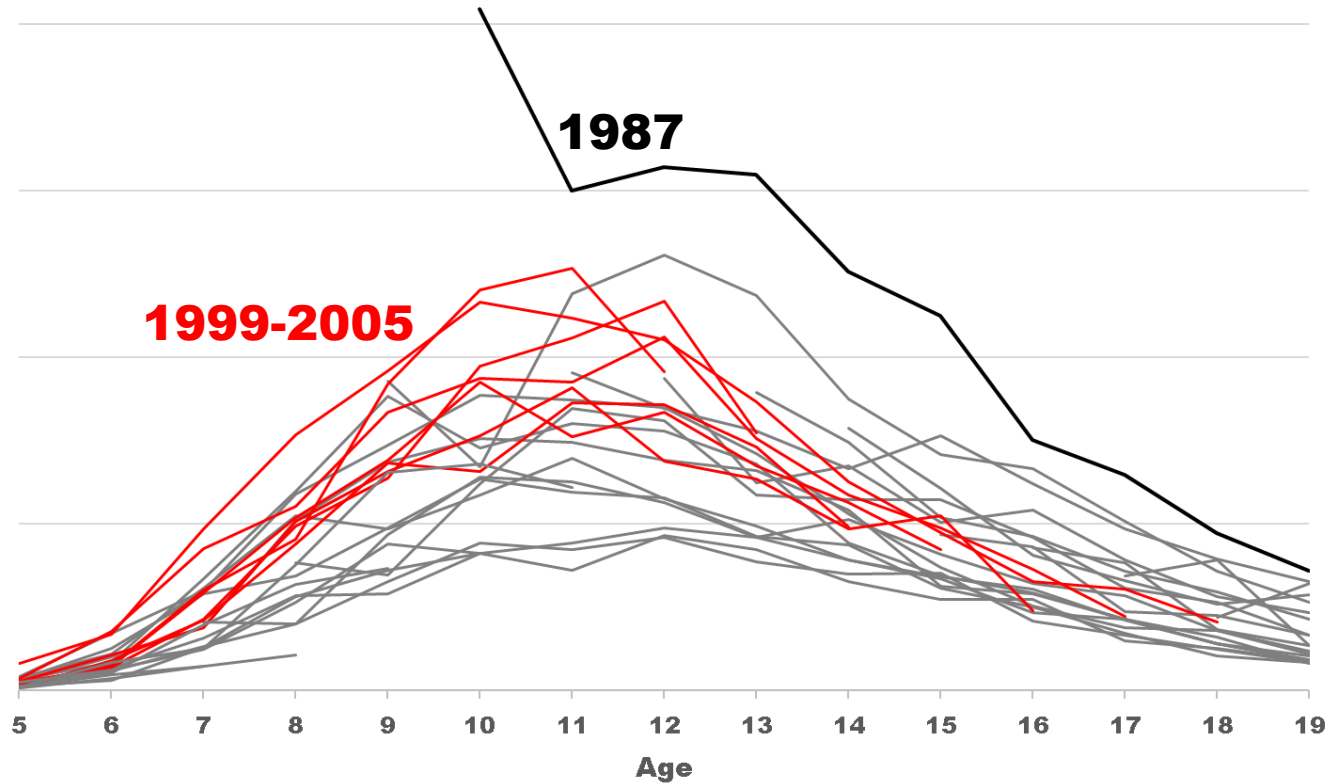
Survey NPUE at age – by cohort



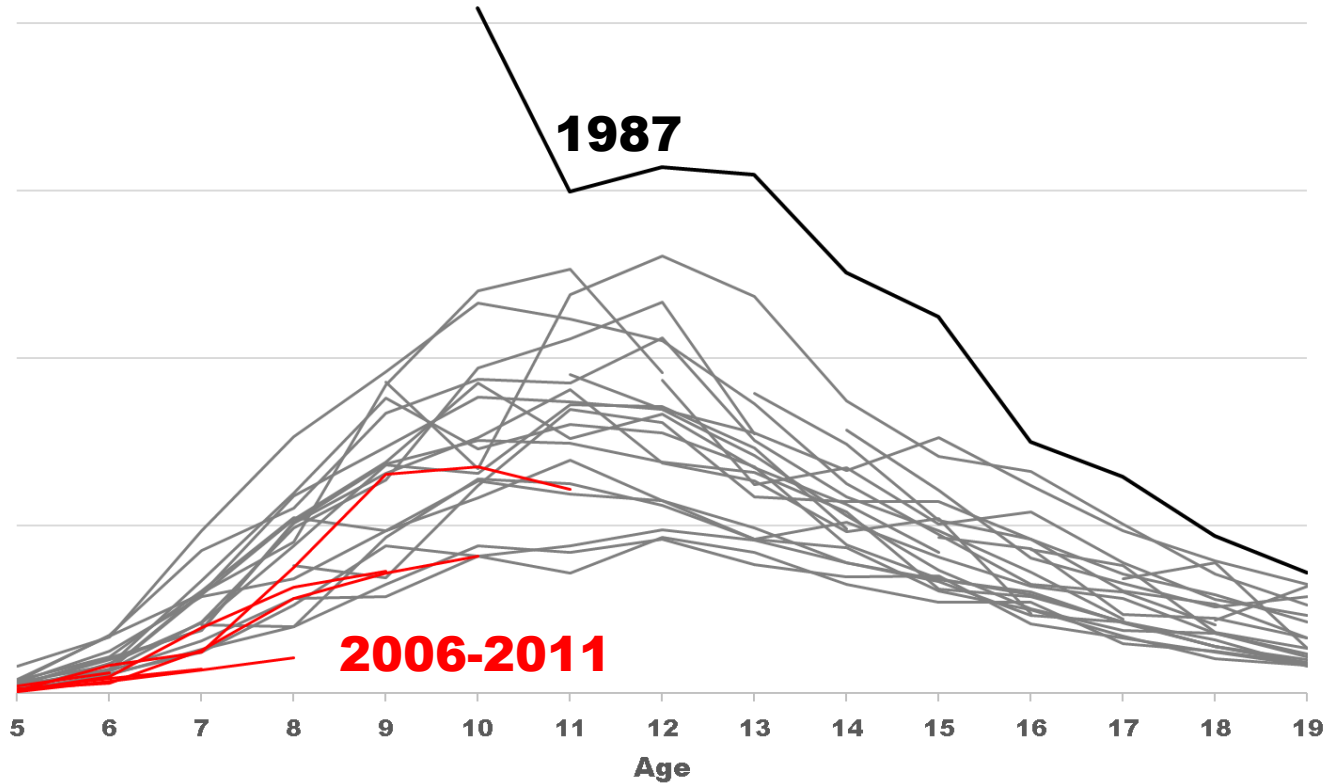
Survey NPUE at age – by cohort



Survey NPUE at age – by cohort



Survey NPUE at age – by cohort



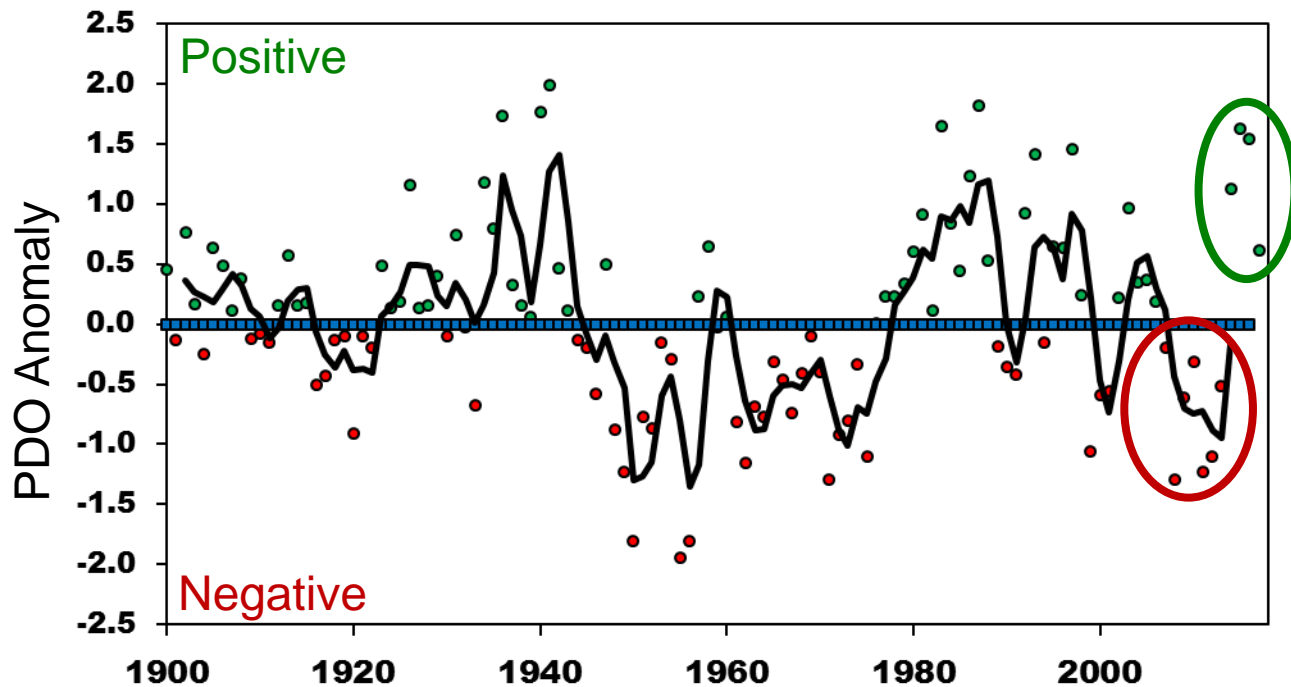
Ecosystem conditions

- Warm “blob” and other abnormal conditions 2014-2016+
 - Warm even into deeper waters of the Gulf of Alaska (GOA)
 - Pyrosomes (gelatinous zooplankton) observed in the NE Pacific
 - Seabird die-offs
 - Whale strandings
- GOA Pacific cod
 - Poor fish condition 2014 through 2017
 - Trawl survey down 58%: 2015 to 2017, 83%: 2013 -2017
- GOA arrowtooth flounder
 - Trawl survey biomass down by 36% (2015 to 2017)
- Sablefish
 - 2014 estimated to be a very large year-class (but still uncertain)

References: AFSC Ecosystem considerations reports, GOA Pacific cod stock assessment, GOA arrowtooth flounder stock assessment



Ecosystem conditions (PDO)



Annual averages through September 2017; <http://research.jisao.washington.edu/pdo/>



Outline

- Coastwide stock assessment
 - Data sources
 - **Modelling and results**
- Catch tables
 - Regulatory Area-specific projections



Stock assessment development

- 2012 - Stock assessment ensemble developed
- 2013 - Models improved
- 2014 - Expanded to four models
 - Two treatments of spatial data and two treatments of historical data
- 2015 – Independent scientific review
(Reference document: <http://www.iphc.int/publications/rara/2015>)
- 2016, 2017 - Updated/improved data sources only



Data improvements for 2017

- Additional ages from survey expansions (2A, 4A, 4D, 4B)
- Measured fish weights (all port samples)
- Prior year's logbooks (all areas)

Result:

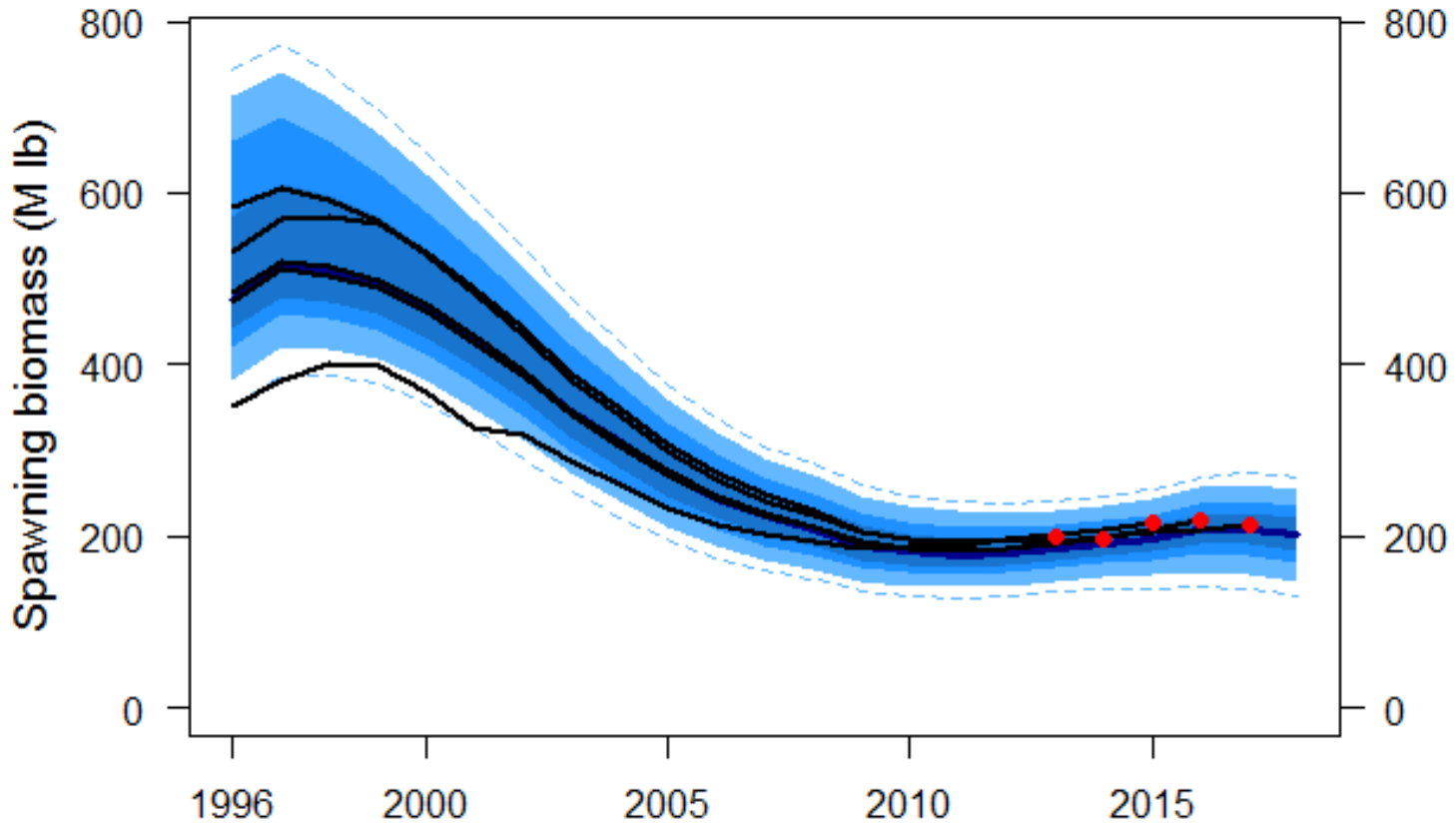
Small positive effect on stock estimates (+3.6%)

(Reference document: ***IPHC-2017-SRB11-06***)

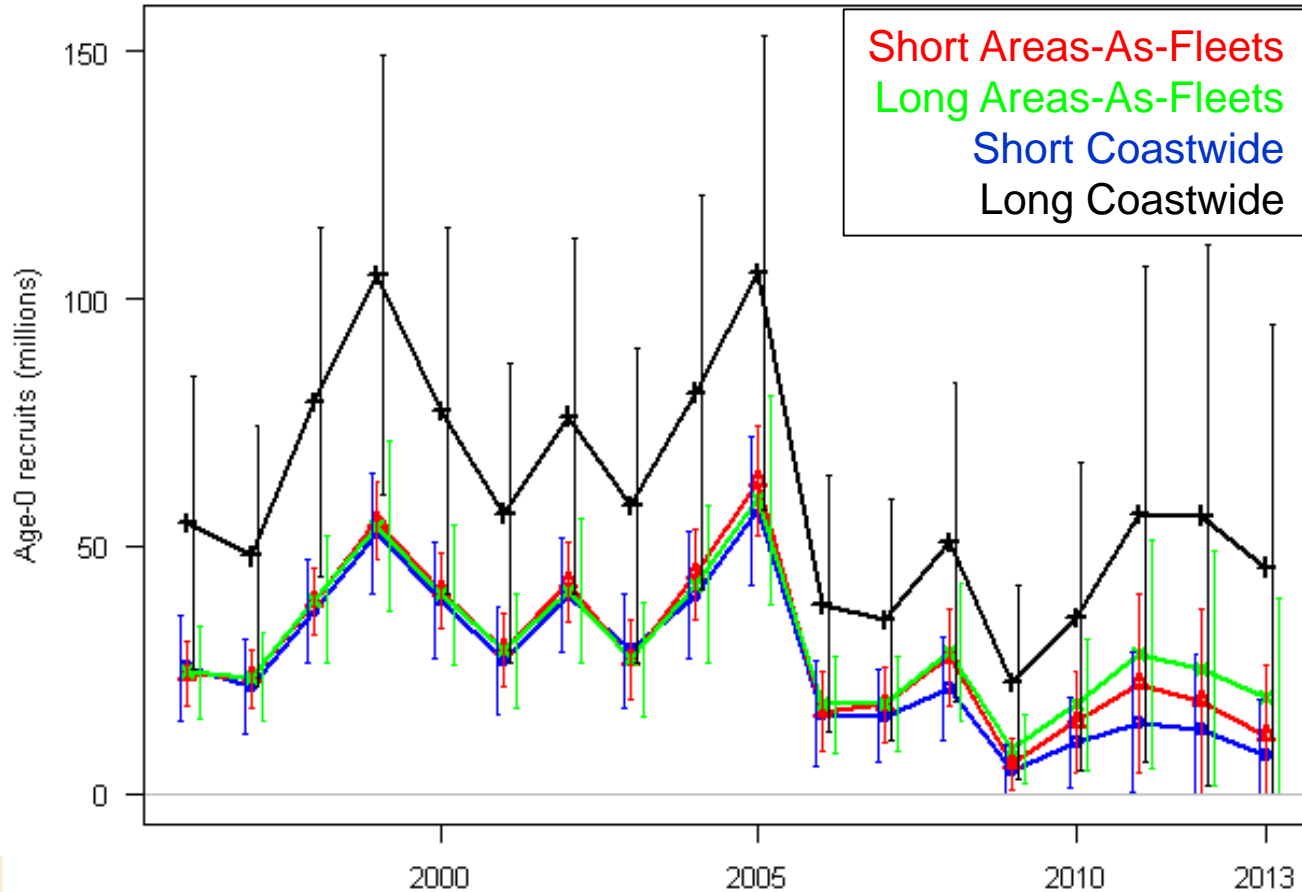
- 1993-1997 included in survey modelling
- All available 2017 data (and 2016 updates) included



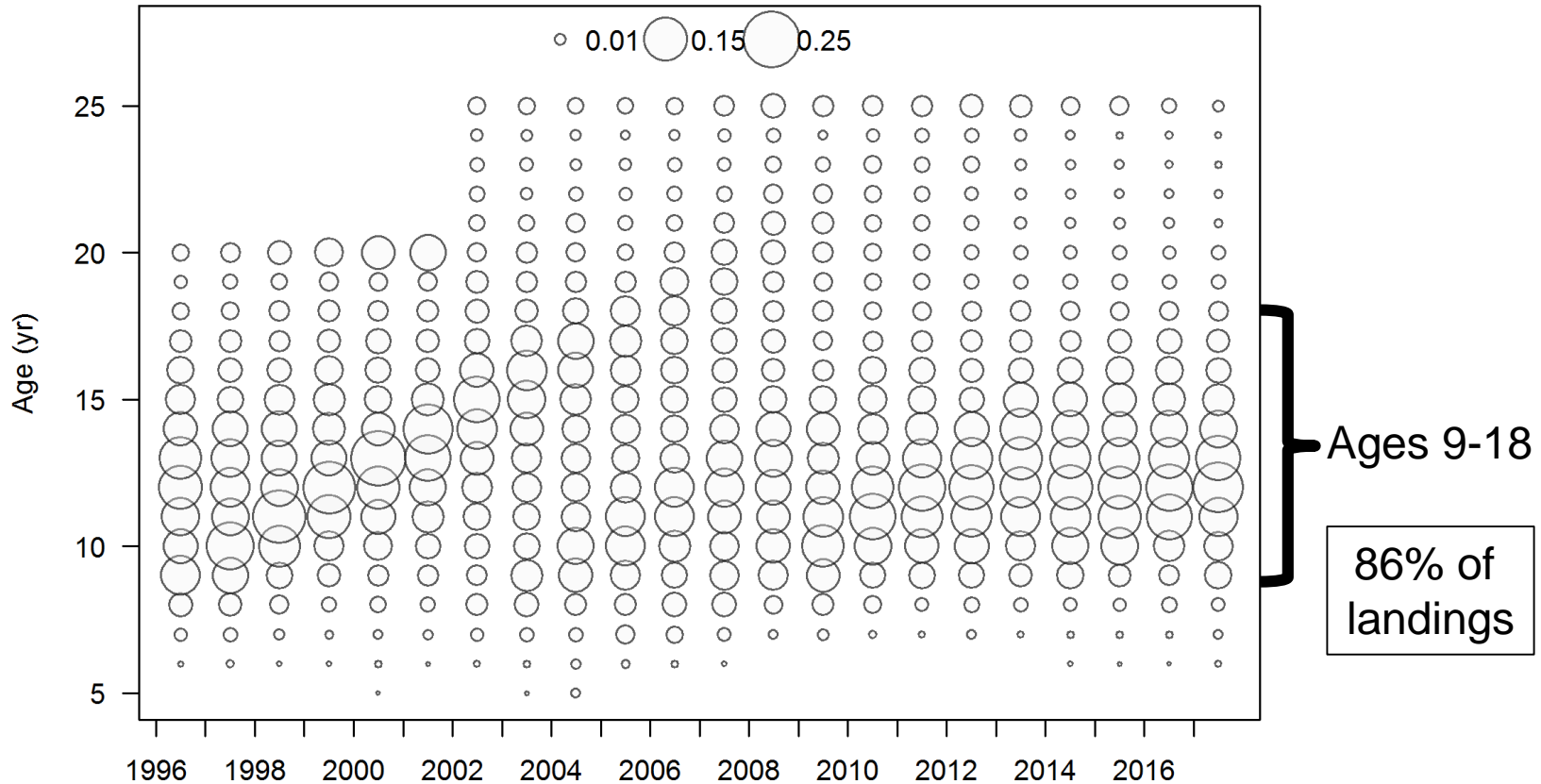
Retrospective comparison



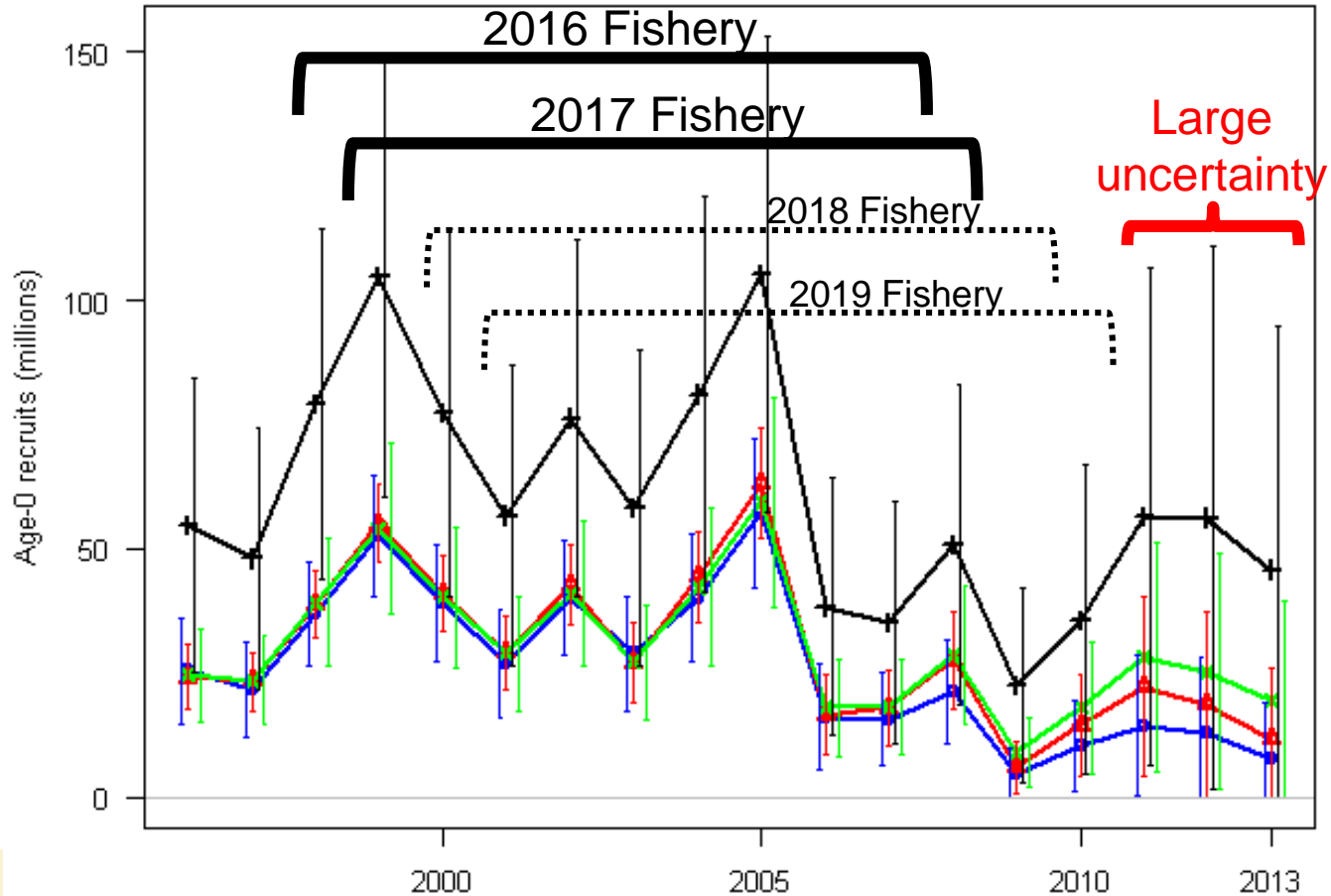
Individual models - recruitment



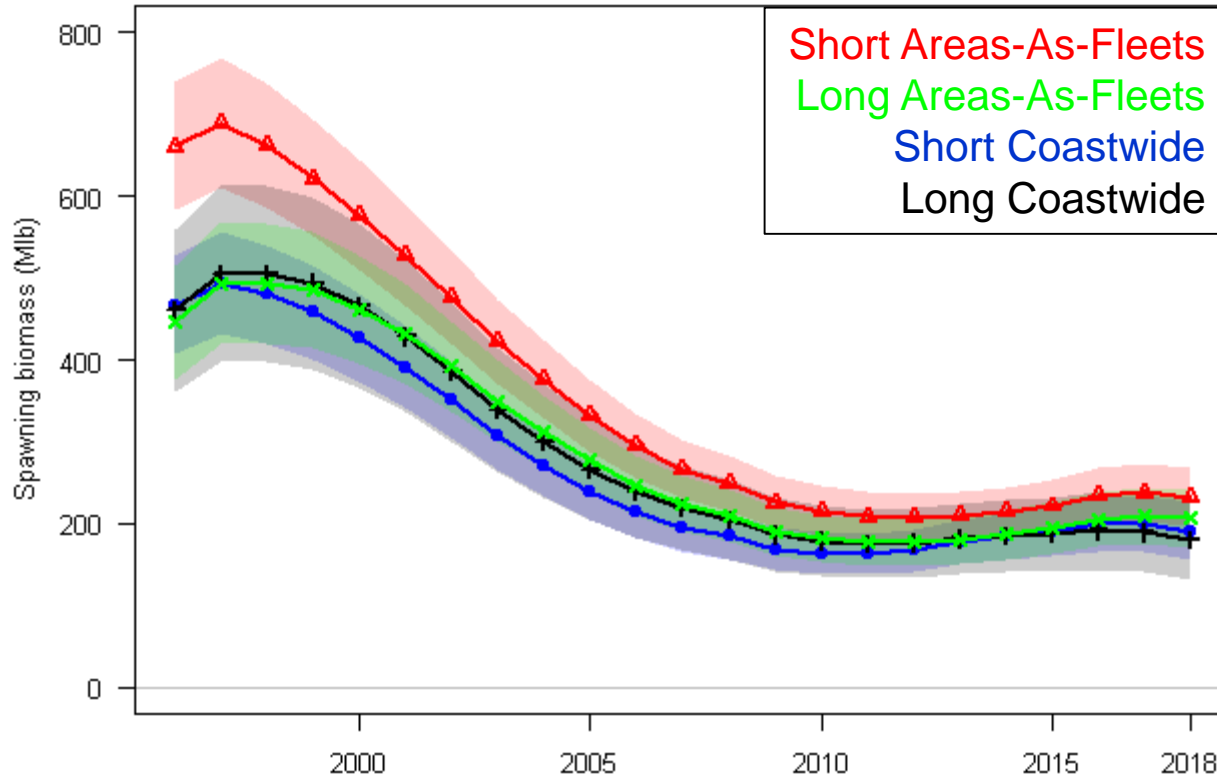
Fishery ages: coastwide



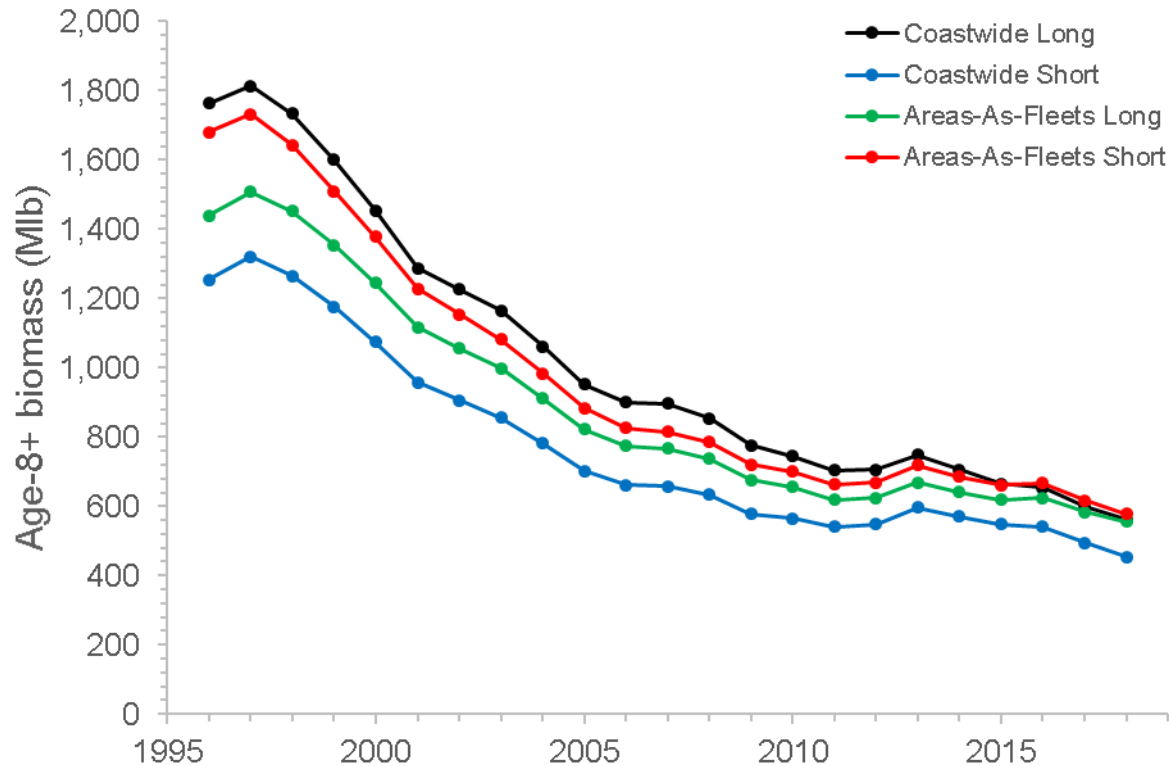
Individual models - recruitment



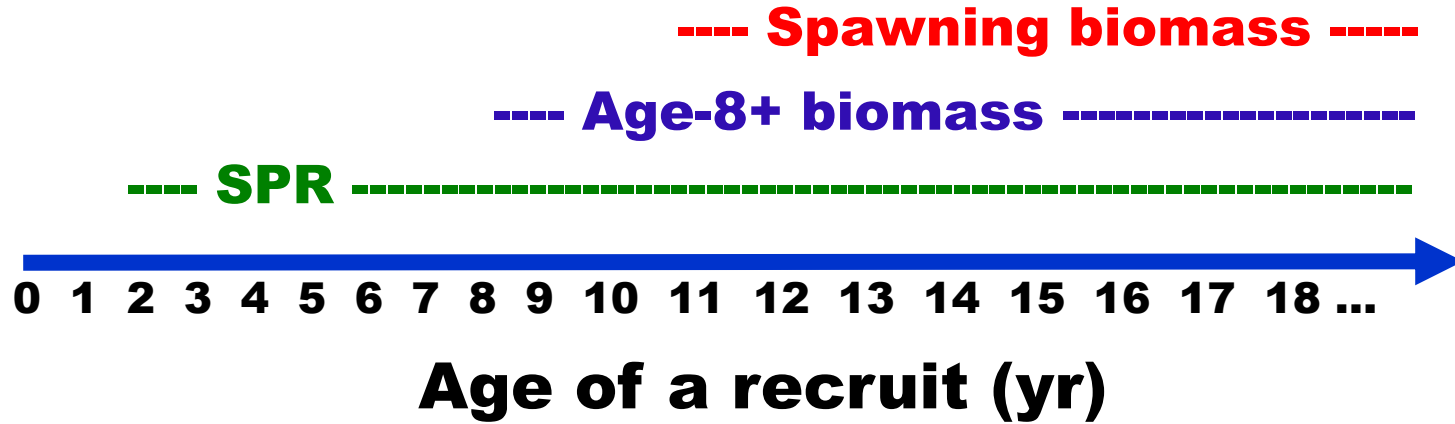
Individual models



Trend in Age-8+ biomass



Comparing trends



Assessment summary table

Indicators	Values	Trends	Status
Total removals 2017: Retained catch 2017: Average removals 2013–17:	42.44 Mlbs, 19,250 t 35.29 Mlbs, 11,864 t 43.34 Mlbs, 19,659 t	Mortality stable 2014-17	2017 MORTALITY BELOW 100-YEAR AVERAGE
SPR ₂₀₁₇ : P(SPR<46%): P(SPR<limit):	40% (29-58%) 75% Limit not specified	Fishing intensity increased from 2016 to 2017	FISHING INTENSITY HIGHER THAN REFERENCE LEVEL
SB ₂₀₁₈ (Mlb): SB ₂₀₁₈ /SB ₀ : P(SB₂₀₁₈<SB₃₀): P(SB ₂₀₁₈ <SB ₂₀):	202 Mlbs (148–256) 40% (26-60%) 6% <1%	SB decreased from 2017 to 2018	NOT OVERFISHED
O32 stock distribution: All stock distribution:	See Table and Figure	Distribution stable 2013-17	REGION 2 ABOVE, REGION 3 BELOW HISTORICAL VALUES



The 2017 harvest decision table

- Revised to include:
 - Easier format for risk metrics (vertical vs. horizontal)
 - Comparable to MSE results
 - Reference SPR instead of Blue Line
 - More detail: catch levels, projection years
 - TCEY for comparability with catch tables
- No other changes to projection methods



The 2017 harvest decision table

2018 Alternative		No removals	Reference: SPR=46%
		Benefits	
		RISK	
Stock Trend (spawning biomass)	In 2019	is less than 2018	
		is 5% less than 2018	
	In 2020	is less than 2018	
		is 5% less than 2018	
	In 2021	is less than 2018	
		is 5% less than 2018	
Stock Status (Spawning biomass)	In 2019	is less than 30%	
		is less than 20%	
	In 2020	is less than 30%	
		is less than 20%	
	In 2021	is less than 30%	
		is less than 20%	
Fishery Trend (TCEY)	In 2019	is less than 2018	
		is 10% less than 2018	
	In 2020	is less than 2018	
		is 10% less than 2018	
	In 2021	is less than 2018	
		is 10% less than 2018	
Fishery Status (Fishing intensity)	In 2018	is above $F_{46\%}$	

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The harvest decision table

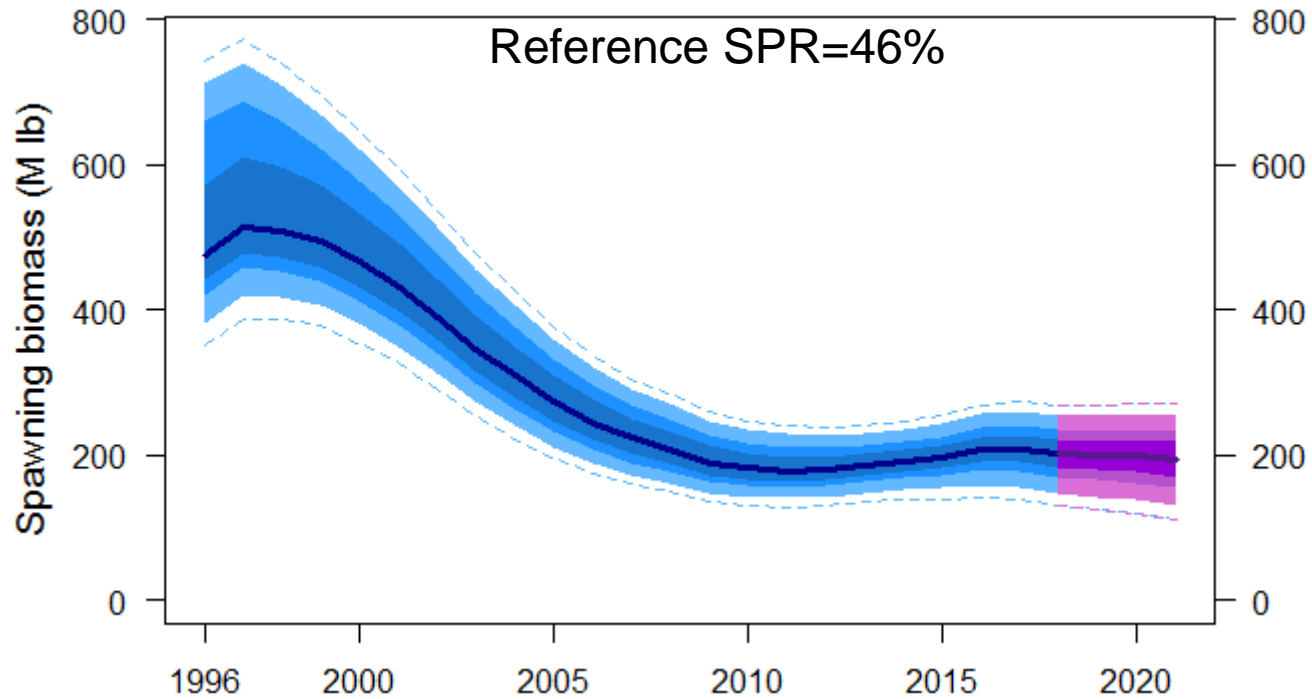
2018 Alternative	No removals		Reference: SPR=46%												
	Total removals (M lb)	0.0	11.8	21.8	28.8	29.8	30.8	31.8	32.8	33.8	34.8	35.8	37.3	41.8	51.8
TCEY (M lb)	0.0	10.0	20.0	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.5	40.0	50.0	60.0
Fishing Intensity	F _{100%}	F _{73%}	F _{58%}	F _{50%}	F _{49%}	F _{48%}	F _{47%}	F _{46%}	F _{45%}	F _{44%}	F _{43%}	F _{42%}	F _{39%}	F _{32%}	F _{27%}
Fishing intensity interval	--	61-84%	45-73%	37-67%	36-66%	36-65%	35-65%	34-64%	33-63%	32-63%	32-62%	31-61%	28-58%	23-53%	19-48%



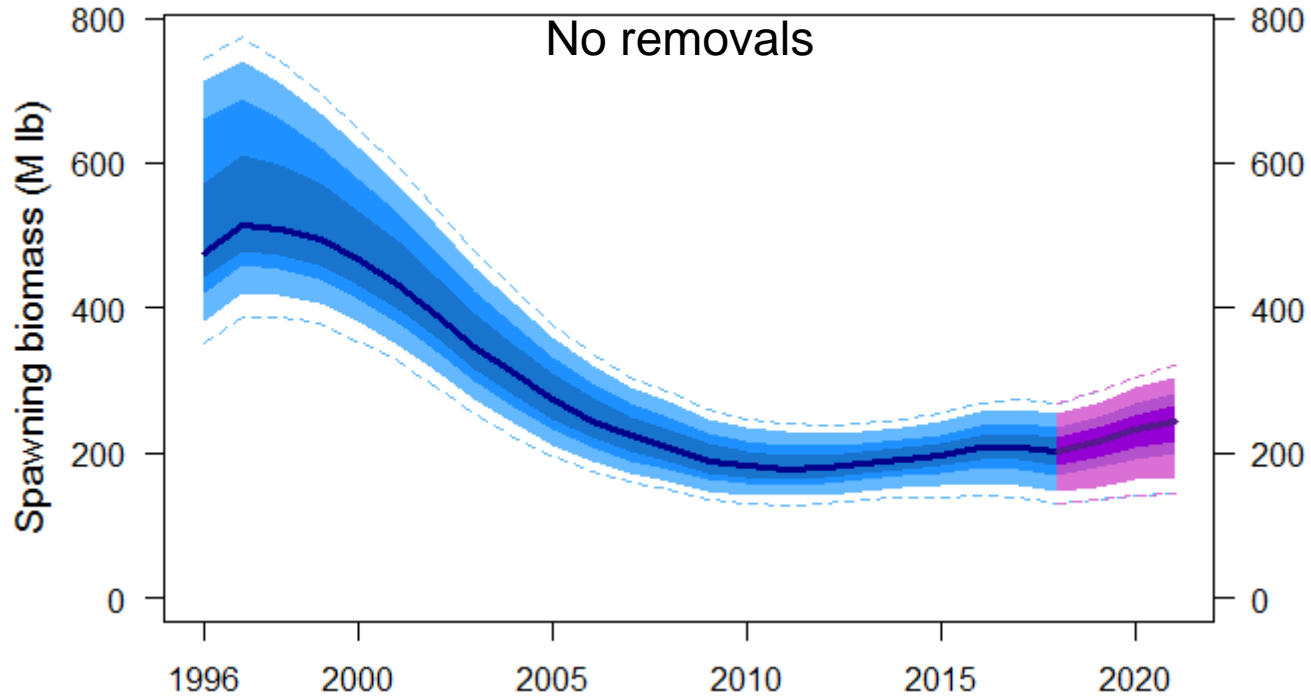
Reference line down the center of the table



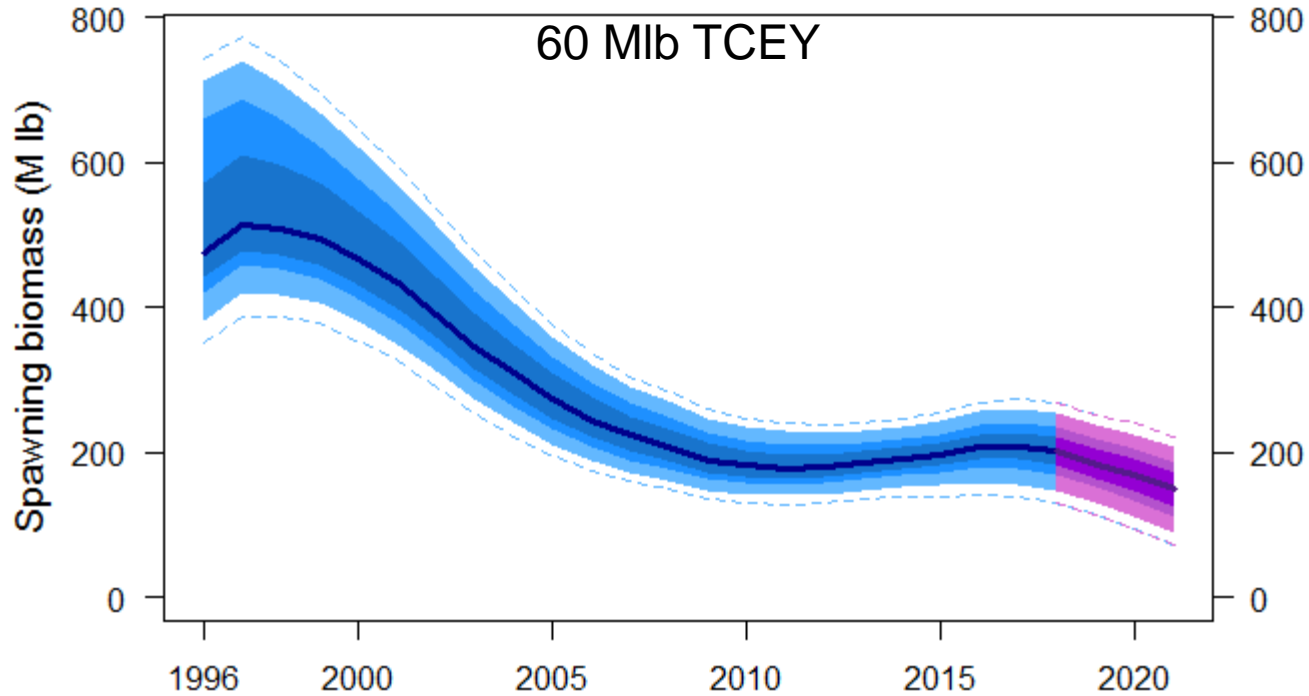
The harvest decision table



The harvest decision table



The harvest decision table



The harvest decision table

2018 Alternative

Total removals (M lb)

TCEY (M lb)

Fishing intensity

Fishing intensity interval

Reference:
SPR=46%

21.8	28.8	29.8	30.8	31.8	32.8	33.8	34.8	35.8	37.3	41.8
20.0	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.5	40.0
F _{58%}	F _{50%}	F _{49%}	F _{48%}	F _{47%}	F _{46%}	F _{45%}	F _{44%}	F _{43%}	F _{42%}	F _{39%}
45-73%	37-67%	36-66%	36-65%	35-65%	34-64%	33-63%	32-63%	32-62%	31-61%	28-58%

Stock Trend (spawning biomass)	in 2019	is less than 2018	24	59	64	69	74	78	81	85	87	91	98
		is 5% less than 2018	<1	2	2	3	4	5	7	9	11	14	29
	in 2020	is less than 2018	14	46	52	57	62	67	71	76	80	85	95
		is 5% less than 2018	1	9	11	14	18	21	25	29	34	41	61
	in 2021	is less than 2018	23	59	63	68	72	76	79	83	86	90	97
		is 5% less than 2018	5	27	32	36	41	46	50	55	59	66	83



The harvest decision table

2018 Alternative

Reference:
SPR=46%

Total removals (M lb)	21.8	28.8	29.8	30.8	31.8	32.8	33.8	34.8	35.8	37.3	41.8
TCEY (M lb)	20.0	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.5	40.0
Fishing intensity	F_{58%}	F_{50%}	F_{49%}	F_{48%}	F_{47%}	F_{46%}	F_{45%}	F_{44%}	F_{43%}	F_{42%}	F_{39%}
Fishing intensity interval	45-73%	37-67%	36-66%	36-65%	35-65%	34-64%	33-63%	32-63%	32-62%	31-61%	28-58%

Stock Status (Spawning biomass)	in 2019	is less than 30%	5	6	6	7	7	7	7	7	7	8	9
		is less than 20%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	in 2020	is less than 30%	4	6	6	6	7	7	8	8	9	9	12
		is less than 20%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
	in 2021	is less than 30%	4	7	8	8	9	10	11	12	13	15	21
		is less than 20%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1



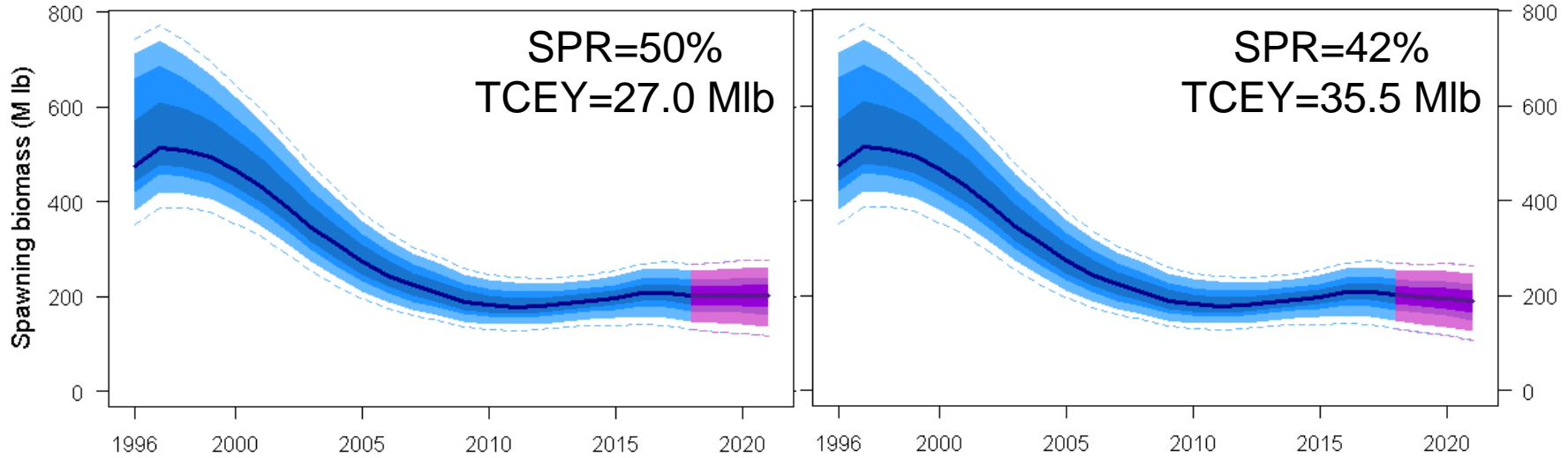
The harvest decision table

2018 Alternative						Reference:					
	↓					SPR=46%	↓				
Total removals (M lb)	21.8	28.8	29.8	30.8	31.8	32.8	33.8	34.8	35.8	37.3	41.8
TCEY (M lb)	20.0	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.5	40.0
Fishing intensity	F _{58%}	F _{50%}	F _{49%}	F _{48%}	F _{47%}	F _{46%}	F _{45%}	F _{44%}	F _{43%}	F _{42%}	F _{39%}
Fishing intensity interval	45-73%	37-67%	36-66%	36-65%	35-65%	34-64%	33-63%	32-63%	32-62%	31-61%	28-58%

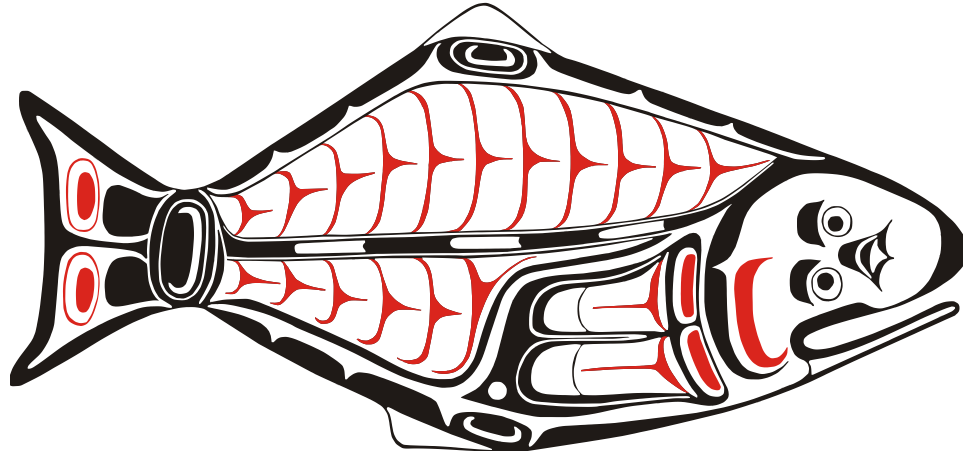
Fishery Trend (TCEY)	in 2019	is less than 2018	7	33	38	43	49	55	60	64	68	71	78
		is 10% less than 2018	3	23	26	30	34	38	43	48	53	59	72
	in 2020	is less than 2018	10	38	43	49	54	59	63	67	70	73	79
		is 10% less than 2018	6	27	31	36	40	45	50	54	59	64	74
	in 2021	is less than 2018	14	44	50	55	59	63	67	69	72	74	81
		is 10% less than 2018	9	34	38	43	48	52	56	60	63	67	75
Fishery Status (Fishing intensity)	in 2018	is above F_{46%}	4	29	33	38	43	50	54	60	64	69	77



Alternative SPRs



Break



Outline

- Coastwide stock assessment
 - Data sources
 - Modelling and results
- Catch tables
 - **Regulatory Area-specific projections**



Catch tables

- TCEY-based catch-limits

“AM093–30. NOTING that the Commission has indicated its interest in clearer accounting for all mortality, and that Canada has put forward catch limit allocation principles proposing that catch limits include all sources of mortality for each regulatory area, the Commission RECOMMENDED that the presentation of harvest advice be changed to be based on the TCEY, which includes all O26 commercial, sport, personal use/subsistence, bycatch and wastage removals, for the 2018 Annual Meeting cycle, as a step towards more comprehensive and responsible management of the resource that will result in the negotiation of Regulatory Area-specific catch limits based on TCEYs.”



Catch tables based on TCEY

- Projections remain the same (2017 adopted table)

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
O26 Non-FCEY									
Commercial disc. mort.	0.05	0.23	NA	NA	0.23	0.05	0.06	0.08	0.69
Bycatch	0.10	0.24	0.03	1.17	0.58	0.34	0.14	1.98	4.57
Non CSP Recreational	NA	NA	1.33	1.56	0.01	0.01	0.00	0.00	2.91
Subsistence	NA	0.41	0.43	0.23	0.02	0.01	0.00	0.08	1.17
Total O26 non-FCEY	0.14	0.87	1.79	2.96	0.84	0.41	0.20	2.14	9.34
O26 FCEY									
Commercial disc. mort.	NA	NA	0.12	0.37	NA	NA	NA	NA	0.49
CSP Recreational	0.53	1.15	0.92	1.89	NA	NA	NA	NA	4.49
Subsistence	0.03	NA	NA	NA	NA	NA	NA	NA	0.03
Commercial landings	0.77	6.30	4.21	7.74	3.14	1.39	1.14	1.70	26.39
Total FCEY	1.33	7.45	5.25	10.00	3.14	1.39	1.14	1.70	31.40
TCEY (Total O26)	1.47	8.32	7.04	12.96	3.98	1.80	1.34	3.84	40.74
U26									
Commercial disc. Mort.	0.00	0.00	0.00	0.01	0.03	0.01	0.00	0.00	0.07
Bycatch	0.00	0.02	0.00	0.62	0.29	0.23	0.01	1.27	2.44
Total U26	0.00	0.02	0.00	0.63	0.33	0.24	0.01	1.27	2.51
Total mortality	1.48	8.35	7.04	13.60	4.30	2.04	1.35	5.11	43.25

(FCEYs still used for catch allocation agreements within IPHC Regulatory Areas)



Catch table projections

- **Scale** from:
 - Reference SPR = 46%
 - *Or other coastwide level*
- **Distribution** from:
 - Stock distribution (O32 survey)
 - Relative harvest rates (1.0 in 2A-3A, 0.75 in 3B-4CDE)
 - These are exactly analogous to the historical 21.5% and 16.125%
 - *Or other TCEY distributions*



Recent TCEYs

	<u>2A</u>	<u>2B</u>	<u>2C</u>	<u>3A</u>	<u>3B</u>	<u>4A</u>	<u>4B</u>	<u>4CDE</u>	<u>Total</u>
2017 Reference	0.96	6.08	6.47	13.84	4.39	1.84	1.46	4.06	39.10
2017 Adopted	1.47	8.32	7.04	12.96	3.98	1.80	1.34	3.84	40.74
2018 Reference	0.59	3.84	5.65	12.07	2.56	1.69	1.21	3.39	31.00

Reflects changes in both scale and distribution

Example:

2B O32 stock

distribution:

2016: 14.1%

2017: 11.3%

Region 2 O32 stock

distribution:

2016: 31.4%

2017: 29.7%



2018 Reference (SPR=46%) full catch table

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
<u>O26 Non-FCEY</u>									
Commercial discard mort.	0.01	0.07	NA	NA	0.13	0.06	0.03	0.02	0.32
Bycatch	0.11	0.23	0.02	1.01	0.45	0.29	0.20	1.96	4.26
Recreational (+discard mort.)	NA	NA	1.43	1.86	0.01	0.02	0.00	0.00	3.31
Subsistence	NA	0.41	0.44	0.22	0.01	0.01	0.00	0.05	1.14
Total Non-FCEY	0.12	0.71	1.89	3.09	0.61	0.37	0.22	2.04	9.04
<u>O26 FCEY</u>									
Commercial discard mort.	NA	NA	0.06	0.30	NA	NA	NA	NA	0.36
Recreational (+discard mort.)	0.21	0.48	0.69	1.70	NA	NA	NA	NA	3.08
Subsistence	0.03	NA	NA	NA	NA	NA	NA	NA	0.03
Commercial landings	0.23	2.65	3.01	6.99	1.95	1.32	0.99	1.36	18.49
Total FCEY	0.47	3.14	3.76	8.98	1.95	1.32	0.99	1.36	21.96
TCEY	0.59	3.84	5.65	12.07	2.56	1.69	1.21	3.39	31.00
<u>U26</u>									
Commercial discard mort.	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.04
Bycatch	0.00	0.02	0.00	0.42	0.44	0.11	0.01	0.79	1.79
Total U26	0.00	0.02	0.00	0.43	0.45	0.12	0.01	0.79	1.82
Total Mortality	0.59	3.87	5.65	12.50	3.01	1.81	1.22	4.18	32.82

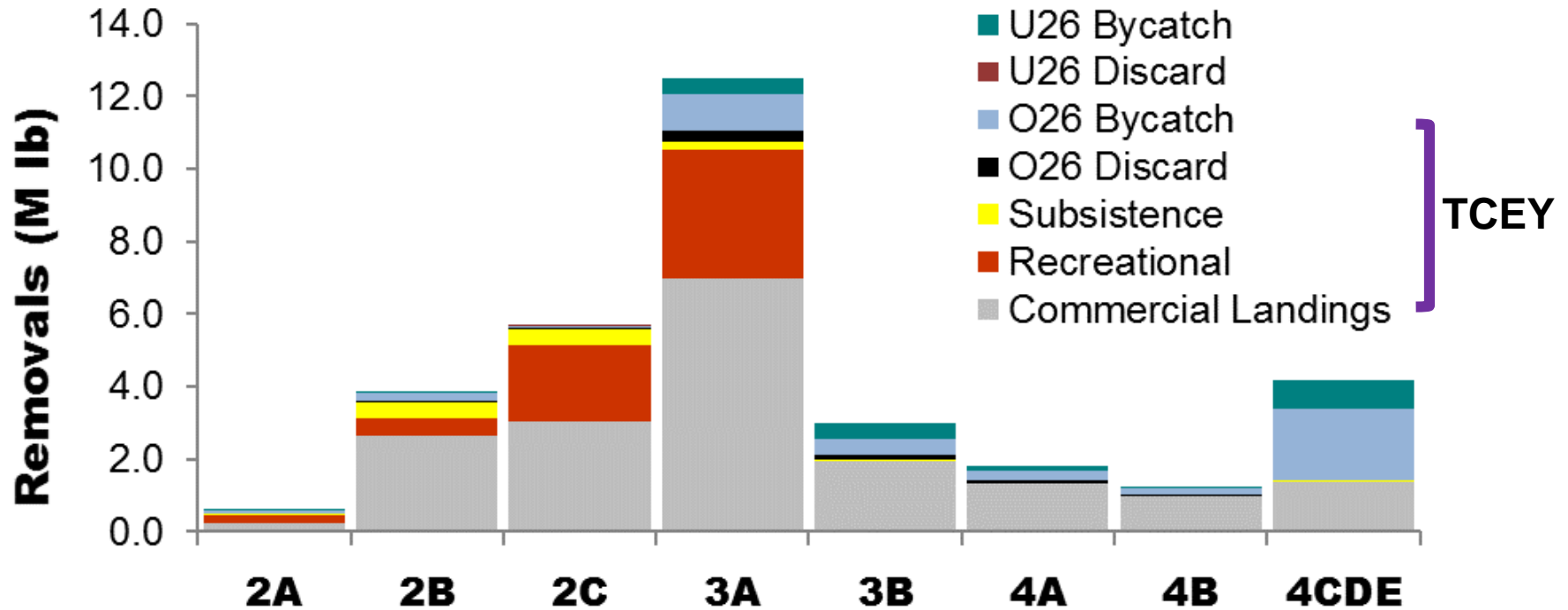


2018 Reference (SPR=46%) summary

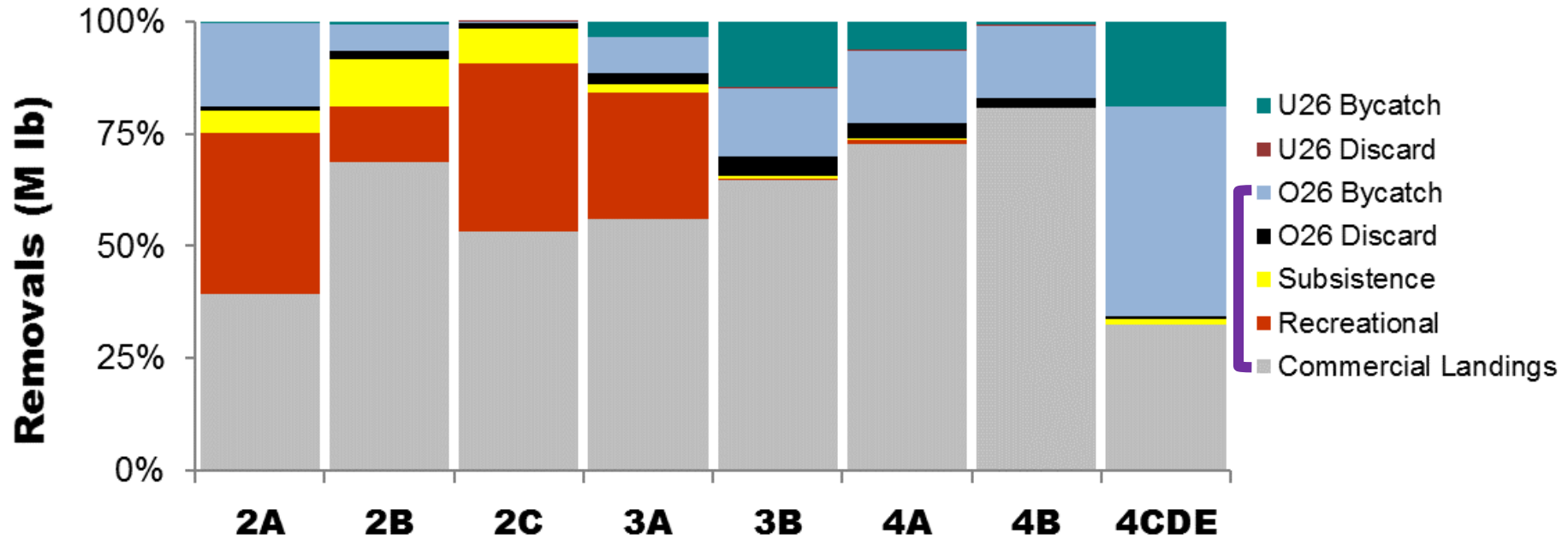
	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
<u>O26</u>									
Commercial	0.24	2.73	3.07	7.29	2.08	1.38	1.01	1.38	19.18
Recreational	0.21	0.48	2.12	3.55	0.01	0.02	0.00	0.00	6.39
Subsistence	0.03	0.41	0.44	0.22	0.01	0.01	0.00	0.05	1.17
Bycatch	0.11	0.23	0.02	1.01	0.45	0.29	0.20	1.96	4.26
TCEY → Total O26	0.59	3.84	5.65	12.07	2.56	1.69	1.21	3.39	31.00
<u>U26</u>									
Include in TCEY? → Commercial	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.04
Bycatch	0.00	0.02	0.00	0.42	0.44	0.11	0.01	0.79	1.79
Total U26	0.00	0.02	0.00	0.42	0.45	0.12	0.01	0.79	1.81
Total	0.59	3.87	5.65	12.50	3.01	1.81	1.22	4.18	32.82



2018 Reference (SPR=46%) summary



2018 Reference (SPR=46%) summary



Additional 2018 Catch tables

- Detailed results (full tables) can be created for all alternatives under consideration during AM



Alternative: SPR=46%, Full regulatory bycatch in all Areas

	2A ¹	2B	2C	3A	3B	4A	4B	4CDE	Total
O26 Non-FCEY									
Commercial discard mort.	0.00	0.05	NA	NA	0.11	0.05	0.02	0.00	0.24
Bycatch	0.22	0.91	0.02	1.40	0.64	0.50	0.32	3.41	7.43
Recreational (+discard mort.)	NA	NA	1.43	1.86	0.01	0.02	0.00	0.00	3.31
Subsistence	NA	0.41	0.44	0.22	0.01	0.01	0.00	0.05	1.14
Total Non-FCEY	0.22	1.37	1.89	3.48	0.77	0.57	0.35	3.46	12.11
O26 FCEY									
Commercial discard mort.	NA	NA	0.05	0.26	NA	NA	NA	NA	0.32
Recreational (+discard mort.)	0.15	0.34	0.63	1.49	NA	NA	NA	NA	2.60
Subsistence	0.03	NA	NA	NA	NA	NA	NA	NA	0.03
Commercial landings	0.15	1.90	2.74	6.12	1.63	1.02	0.79	0.00	14.34
Total FCEY	0.33	2.24	3.42	7.87	1.63	1.02	0.79	0.00	17.29
TCEY	0.55	3.61	5.31	11.34	2.40	1.58	1.14	3.46	29.40
U26									
Commercial discard mort.	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.03
Bycatch	0.00	0.09	0.00	0.58	0.62	0.20	0.02	1.37	2.87
Total U26	0.00	0.09	0.00	0.59	0.63	0.20	0.02	1.37	2.90
Total Mortality	0.56	3.70	5.31	11.93	3.03	1.79	1.16	4.83	32.30

¹2x bycatch

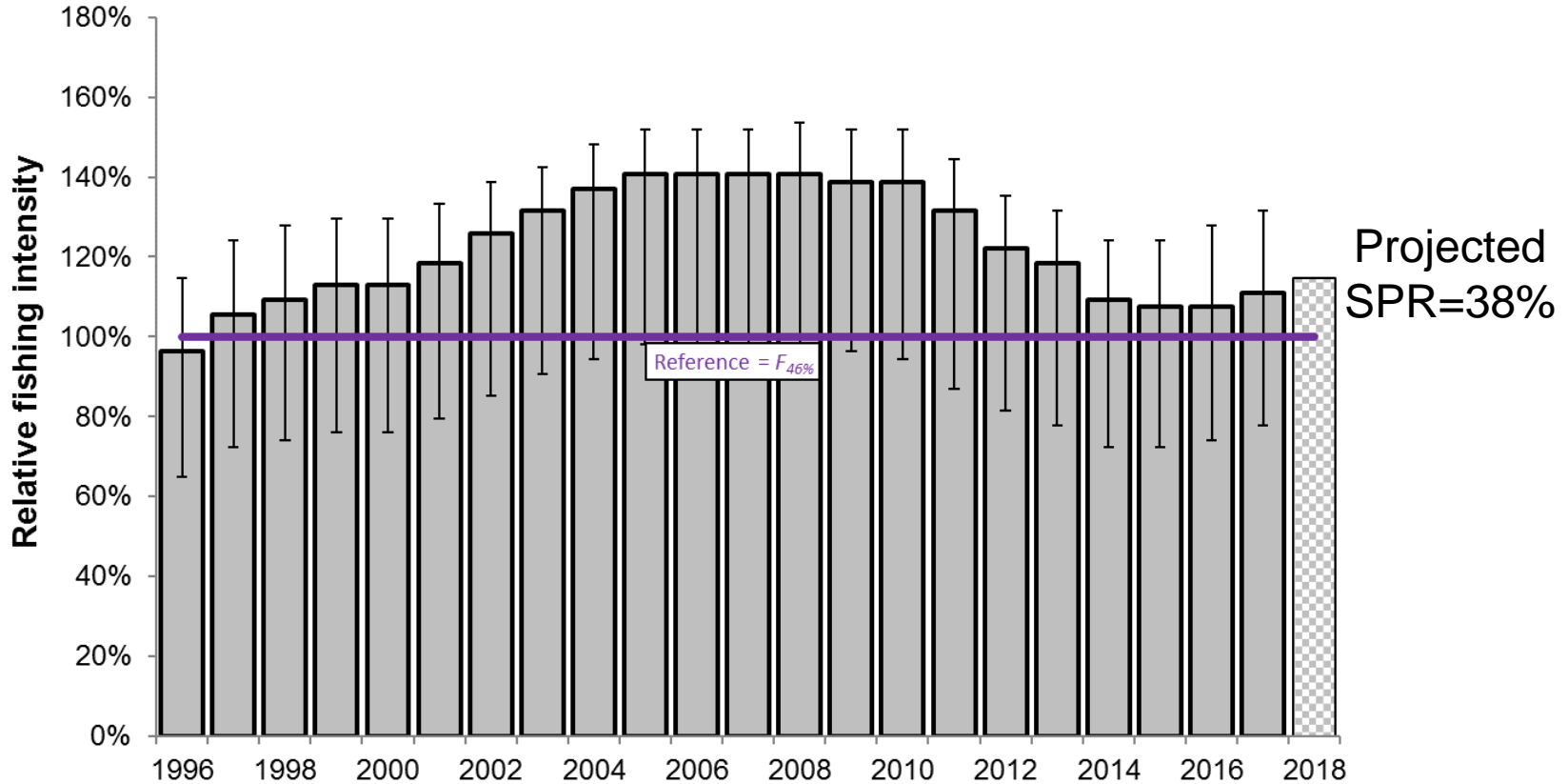


Alternative: Last year's (2017) catch limits

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
O26 Non-FCEY									
Commercial discard mort.	0.02	0.17	NA	NA	0.23	0.07	0.03	0.03	0.54
Bycatch	0.11	0.23	0.02	1.01	0.45	0.29	0.20	1.96	4.26
Recreational (+discard mort.)	NA	NA	1.43	1.86	0.01	0.02	0.00	0.00	3.31
Subsistence	NA	0.41	0.44	0.22	0.01	0.01	0.00	0.05	1.14
Total Non-FCEY	0.13	0.81	1.89	3.09	0.70	0.38	0.23	2.04	9.26
O26 FCEY									
Commercial discard mort.	NA	NA	0.08	0.33	NA	NA	NA	NA	0.41
Recreational (+discard mort.)	0.54	1.15	0.92	1.87	NA	NA	NA	NA	4.47
Subsistence	0.03	NA	NA	NA	NA	NA	NA	NA	0.03
Commercial landings	0.78	6.36	4.15	7.68	3.28	1.42	1.11	1.79	26.57
Total FCEY	1.34	7.52	5.15	9.88	3.28	1.42	1.11	1.79	31.48
TCEY	1.47	8.32	7.04	12.96	3.98	1.80	1.34	3.84	40.74
U26									
Commercial discard mort.	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.00	0.05
Bycatch	0.00	0.02	0.00	0.42	0.44	0.11	0.01	0.79	1.79
Total U26	0.00	0.03	0.00	0.43	0.46	0.12	0.01	0.79	1.84
Total Mortality	1.47	8.35	7.04	13.39	4.44	1.92	1.35	4.62	42.58



Alternative: Last year's (2017) catch limits



The full decision table

		2018 Alternative		Reference: SPR=46%													
		No removals		21.8	28.8	29.8	30.8	31.8	32.8	33.8	34.8	35.8	37.3	41.8	51.8	61.9	
Total removals (M lb)		0.0	11.8	21.8	28.8	29.8	30.8	31.8	32.8	33.8	34.8	35.8	37.3	41.8	51.8	61.9	
TCEY (M lb)		0.0	10.0	20.0	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.5	40.0	50.0	60.0	
Fishing Intensity		F _{100%}	F _{73%}	F _{58%}	F _{50%}	F _{49%}	F _{48%}	F _{47%}	F _{46%}	F _{45%}	F _{44%}	F _{43%}	F _{42%}	F _{39%}	F _{32%}	F _{27%}	
Fishing Intensity Interval		--	61-84%	45-73%	37-67%	36-66%	36-65%	35-65%	34-64%	33-63%	32-63%	32-62%	31-61%	28-58%	23-53%	19-48%	
Stock Trend (spawning biomass)	In 2019	is less than 2018	1	3	24	59	64	69	74	78	81	85	87	91	98	>99	>99
		is 5% less than 2018	<1	<1	<1	2	2	3	4	5	7	9	11	14	29	69	96
	In 2020	is less than 2018	<1	1	14	46	52	57	62	67	71	76	80	85	95	>99	>99
		is 5% less than 2018	<1	<1	1	9	11	14	18	21	25	29	34	41	61	94	>99
	In 2021	is less than 2018	<1	2	23	59	63	68	72	76	79	83	86	90	97	>99	>99
		is 5% less than 2018	<1	<1	5	27	32	36	41	46	50	55	59	66	83	99	>99
Stock Status (Spawning biomass)	In 2019	is less than 30%	3	4	5	6	6	7	7	7	7	7	8	9	11	15	
		is less than 20%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	
	In 2020	is less than 30%	2	2	4	6	6	6	7	7	8	8	9	9	12	21	32
		is less than 20%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	1	
	In 2021	is less than 30%	1	1	4	7	8	8	9	10	11	12	13	15	21	37	54
		is less than 20%	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	7	
Fishery Trend (TCEY)	In 2019	is less than 2018	<1	<1	7	33	38	43	49	55	60	64	68	71	78	89	97
		is 10% less than 2018	<1	<1	3	23	26	30	34	38	43	48	53	59	72	82	92
	In 2020	is less than 2018	<1	<1	10	38	43	49	54	59	63	67	70	73	79	91	98
		is 10% less than 2018	<1	<1	6	27	31	36	40	45	50	54	59	64	74	84	95
	In 2021	is less than 2018	<1	<1	14	44	50	55	59	63	67	69	72	74	81	93	>99
		is 10% less than 2018	<1	<1	9	34	38	43	48	52	56	60	63	67	75	86	99
Fishery Status (Fishing Intensity)	In 2018	is above F _{46%}	0	<1	4	29	33	38	43	50	54	60	64	69	77	87	95

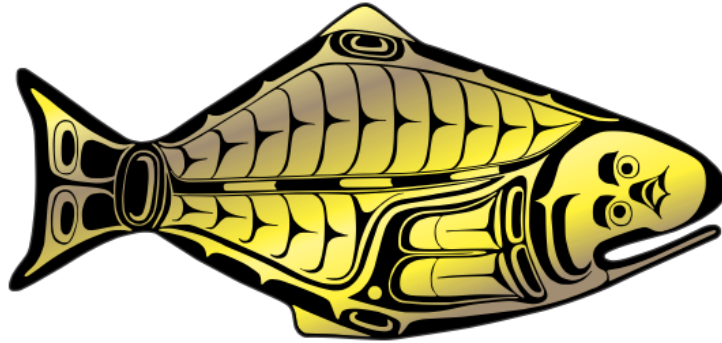


Recommendations

- **NOTE** papers IPHC-2018-AM094-8, 9, 10, 11 which provide the data, stock assessment, harvest decision table, and catch tables.
- **REQUEST** any further analyses required for decision making during AM094.
- **REQUEST** any changes to the presentation of these analyses to be considered by the Secretariat during 2018.



INTERNATIONAL PACIFIC



HALIBUT COMMISSION





IPHC Management Strategy Evaluation (MSE)

An update

Agenda Item 7.1 & 7.3

IPHC-2018-AM094-12

L. Boïtor



INTERNATIONAL PACIFIC
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Management Strategy Evaluation

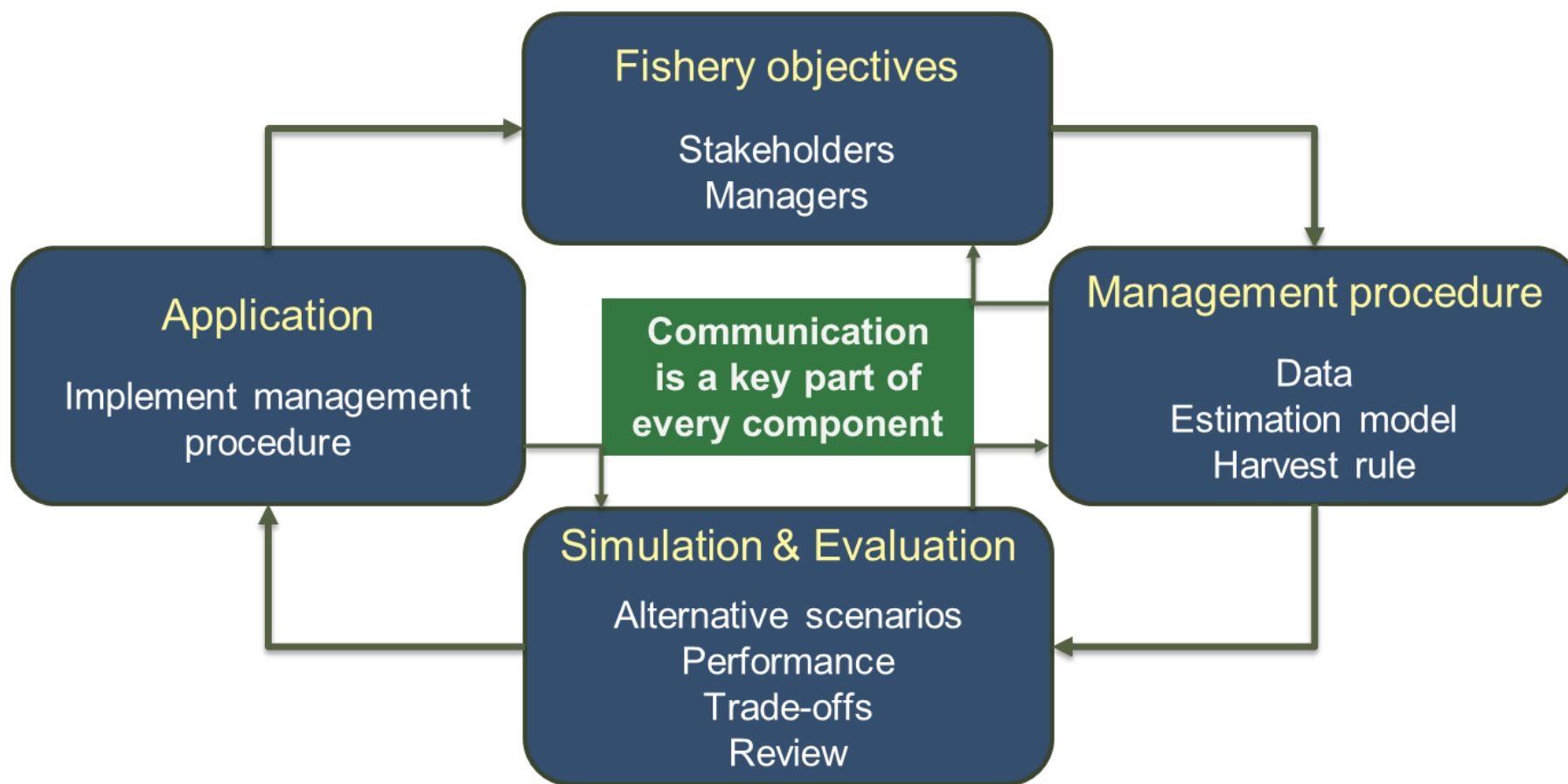
MSE is a process to evaluate the harvest strategy policy and develop a management procedure that is robust to uncertainty

Why MSE?

- Develop a harvest strategy that will provide a long-term sustainable fishery
- Determine a reference level for fishing intensity
- Understand the trade-offs of different management procedures and components of a harvest rule



Management Strategy Evaluation



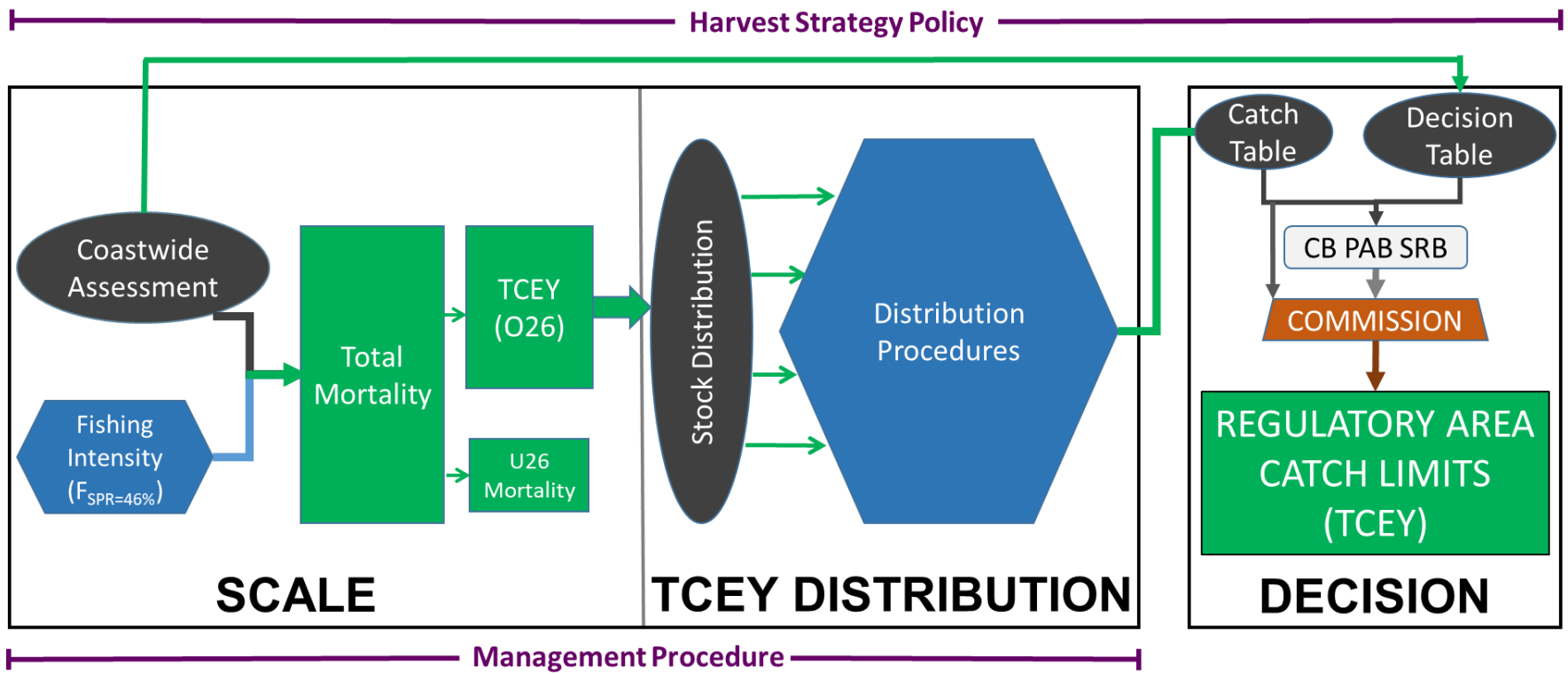
Six goals

1. Biological sustainability
2. Fishery sustainability, access, and stability
3. Minimize discard mortality
4. Minimize bycatch and bycatch mortality
5. Serve consumer needs
6. Preserve biocomplexity



Harvest Strategy Policy

Management procedure
Data
Estimation model
Decision-rule



Spawning Potential Ratio (SPR)

Spawning Output Per Recruit with fishing

divided by

Spawning Output Per Recruit with no fishing

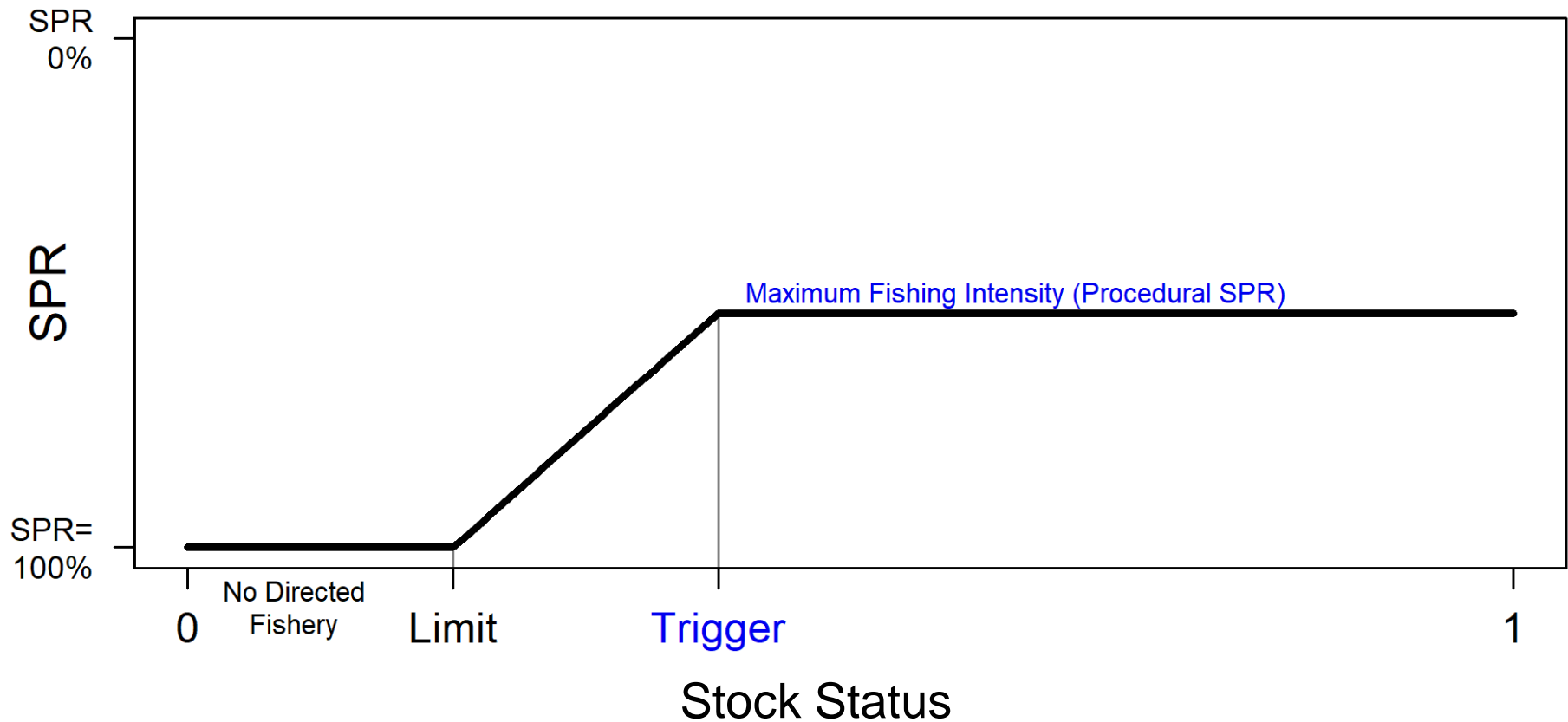
- A measure of the reduction in spawning potential due to fishing at a constant rate (F_{SPR})
- A long-term, average concept
- SPR=100% means no fishing
- SPR=40% means a 60% reduction in spawning potential

Coastwide Fishing Intensity



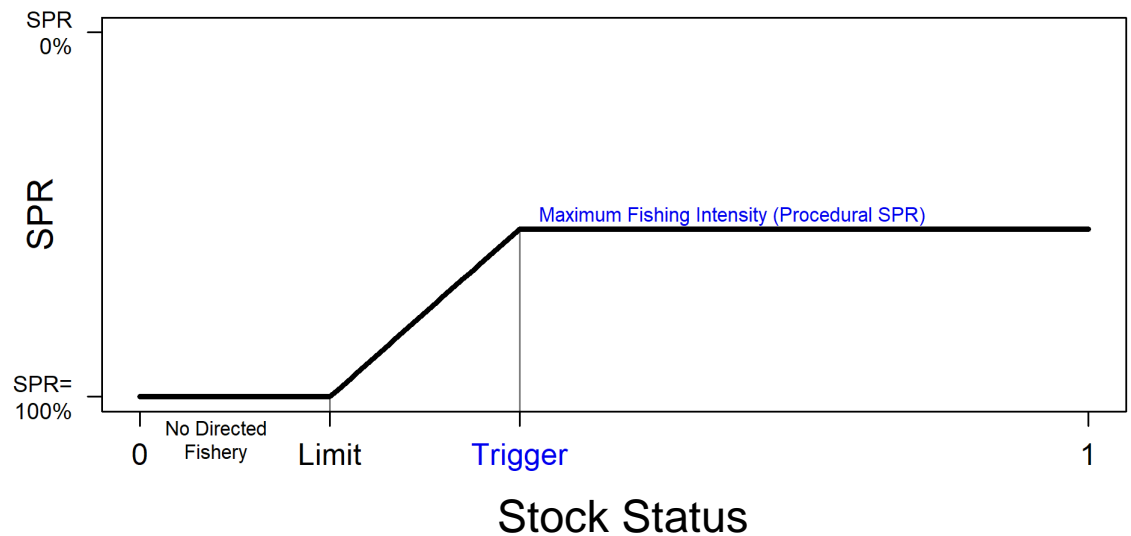
Fishing Intensity

- Determined from a harvest control rule



Investigating fishing intensity (scale)

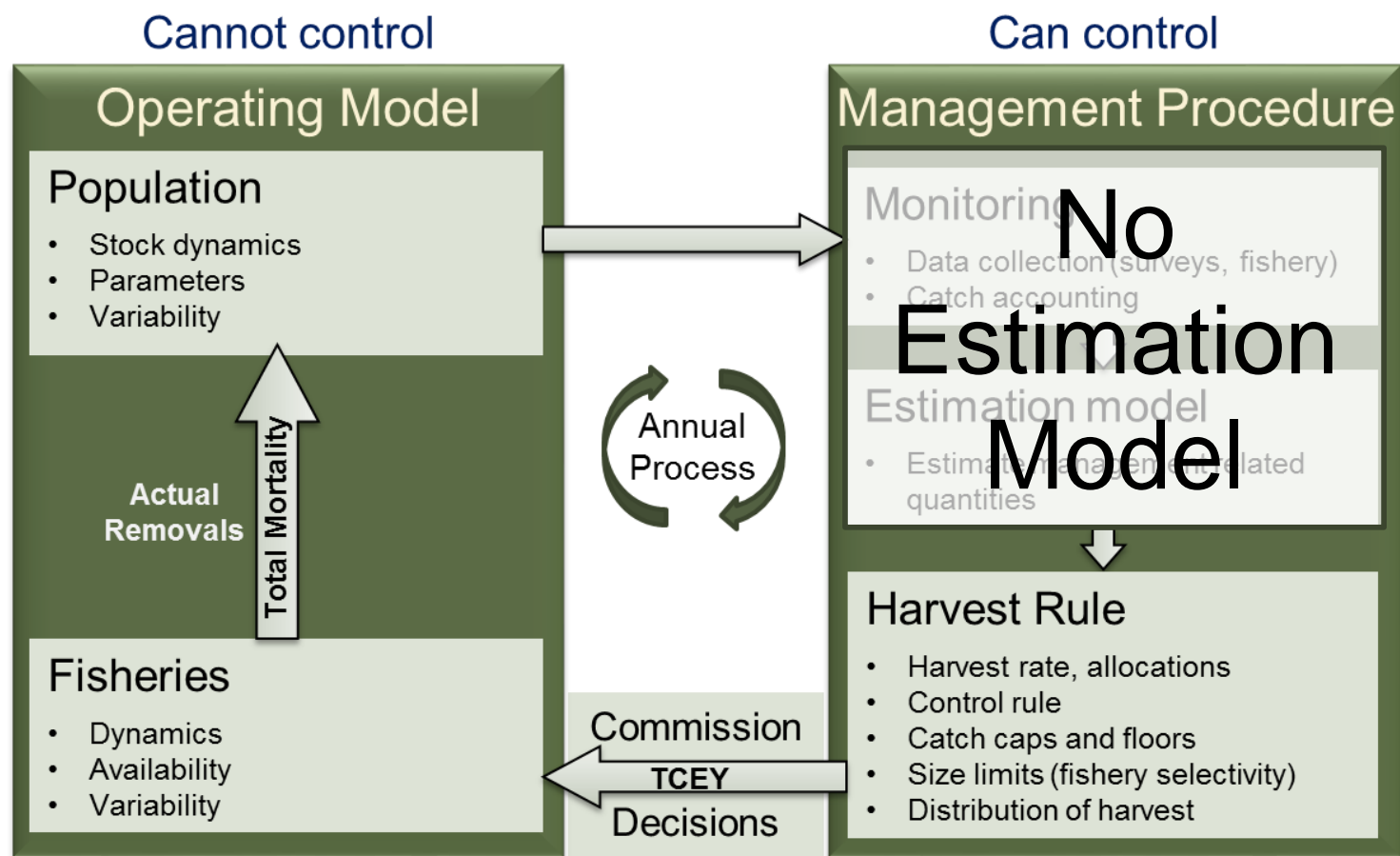
- Procedural SPR
 - ranging from 25% to 60%
- Trigger
 - 30% or 40%



MSAB09 requested more than this, but I only report the salient results



Simulation framework



Simulation & Evaluation

Alternative scenarios
Performance
Trade-offs
Review



Equilibrium results

- Long-term, equilibrium results
 - Not predicting what may happen in 100 years
 - Instead, evaluating how the Management Procedure may generally behave given the uncertainty
 - A long-term strategy
- The assessment (3 year projection) is useful for short-term tactical decision making

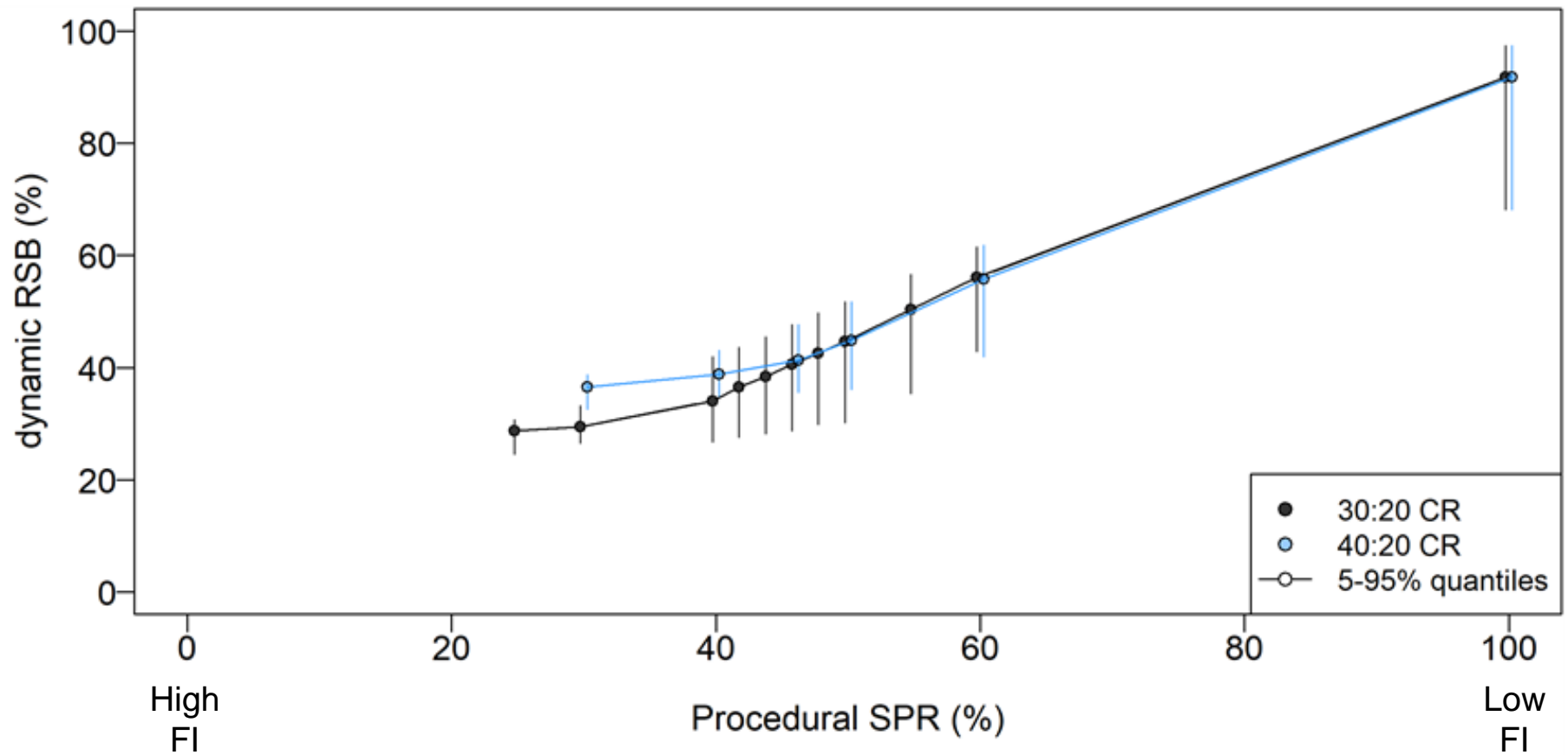


Results: Four Metrics

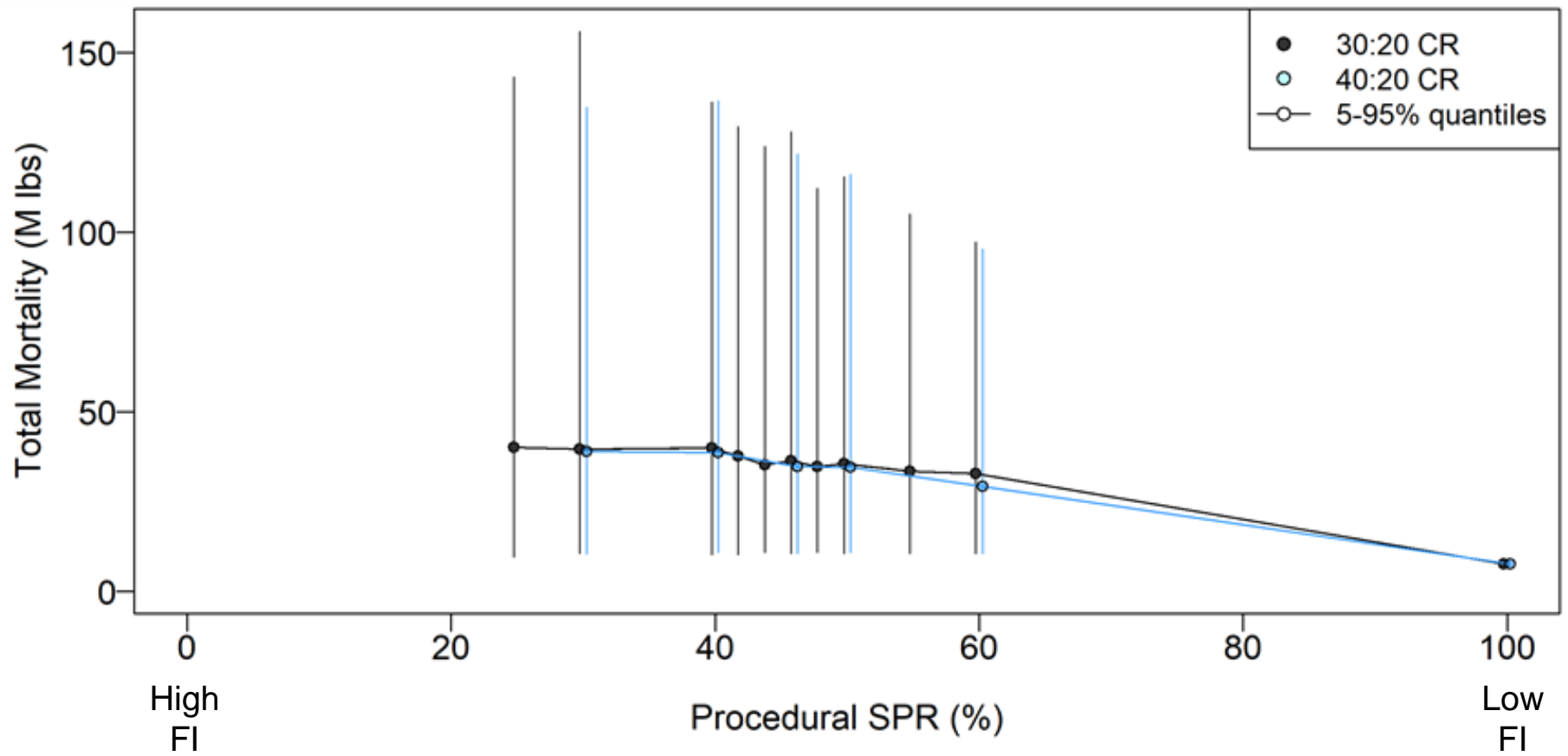
1. dRSB (*biological sustainability*)
 - dynamic relative spawning biomass
2. Total Mortality (*fishery yield*)
 - total removals from all sources
3. AAV (*fishery stability*)
 - average annual variability (in total mortality)
4. Relative SPR
 - actual SPR accounting for adjustments in harvest control rule



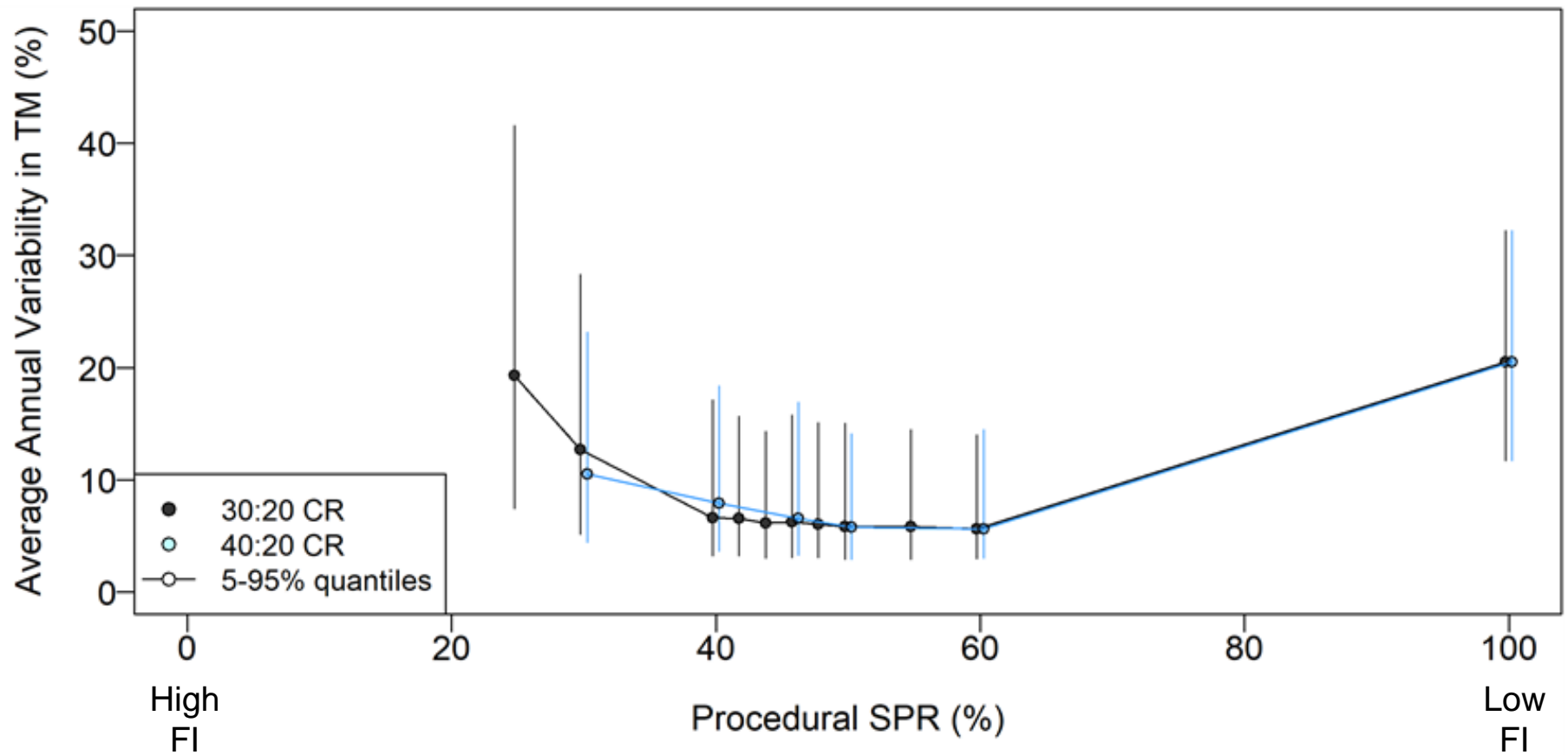
Dynamic relative spawning biomass



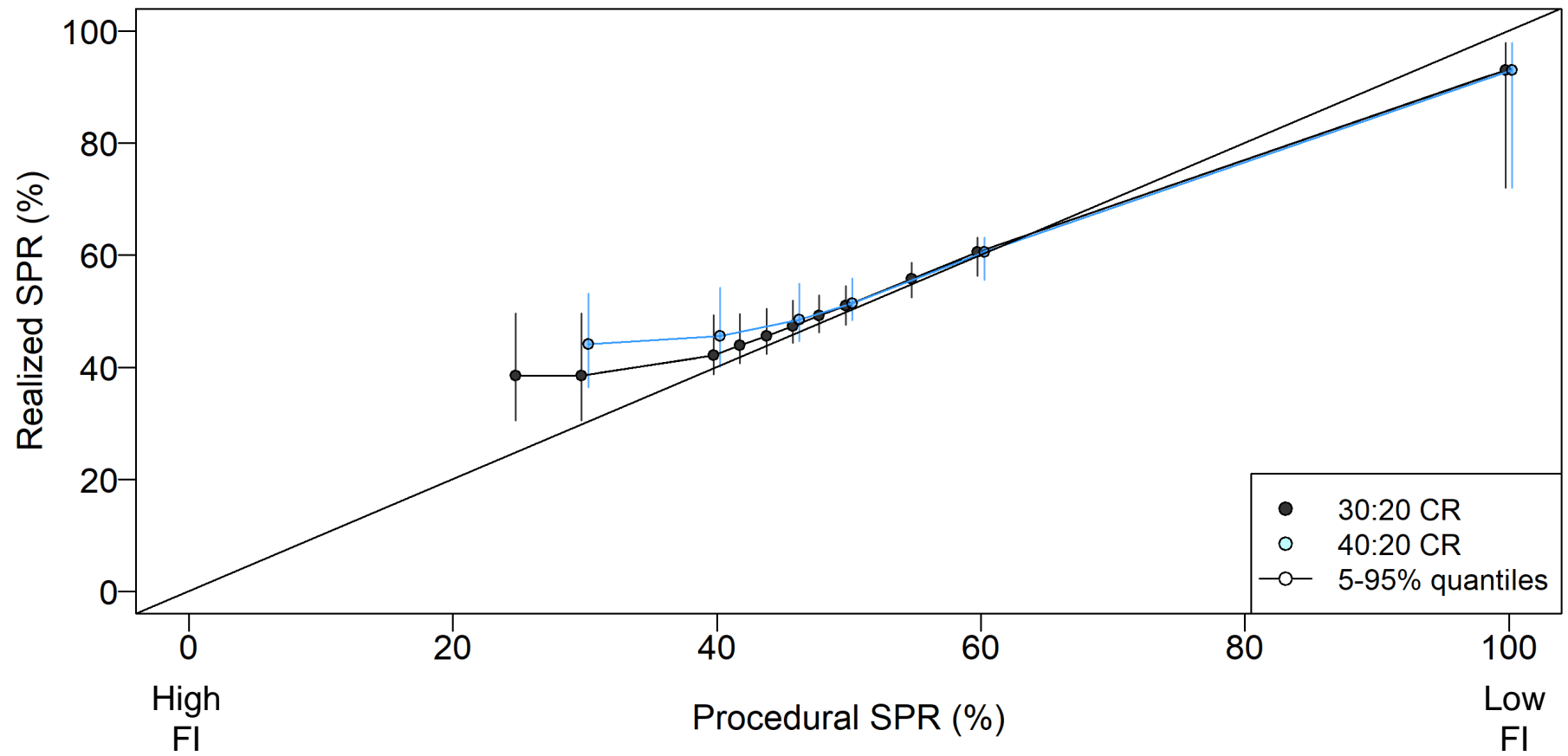
Total Mortality



Average Annual Variability (AAV)



Realized SPR



Summary of results

- **Stock status** declines with SPR, but the reduction in fishing intensity, when below the trigger, lessens the decline
 - The 40% trigger lessens the decline sooner
- **Average Total mortality** increases with lower SPR
- **Variability in total mortality** increases at low SPR
- **Realized SPR** is lower than the procedural SPR because ramping down fishing intensity when below trigger

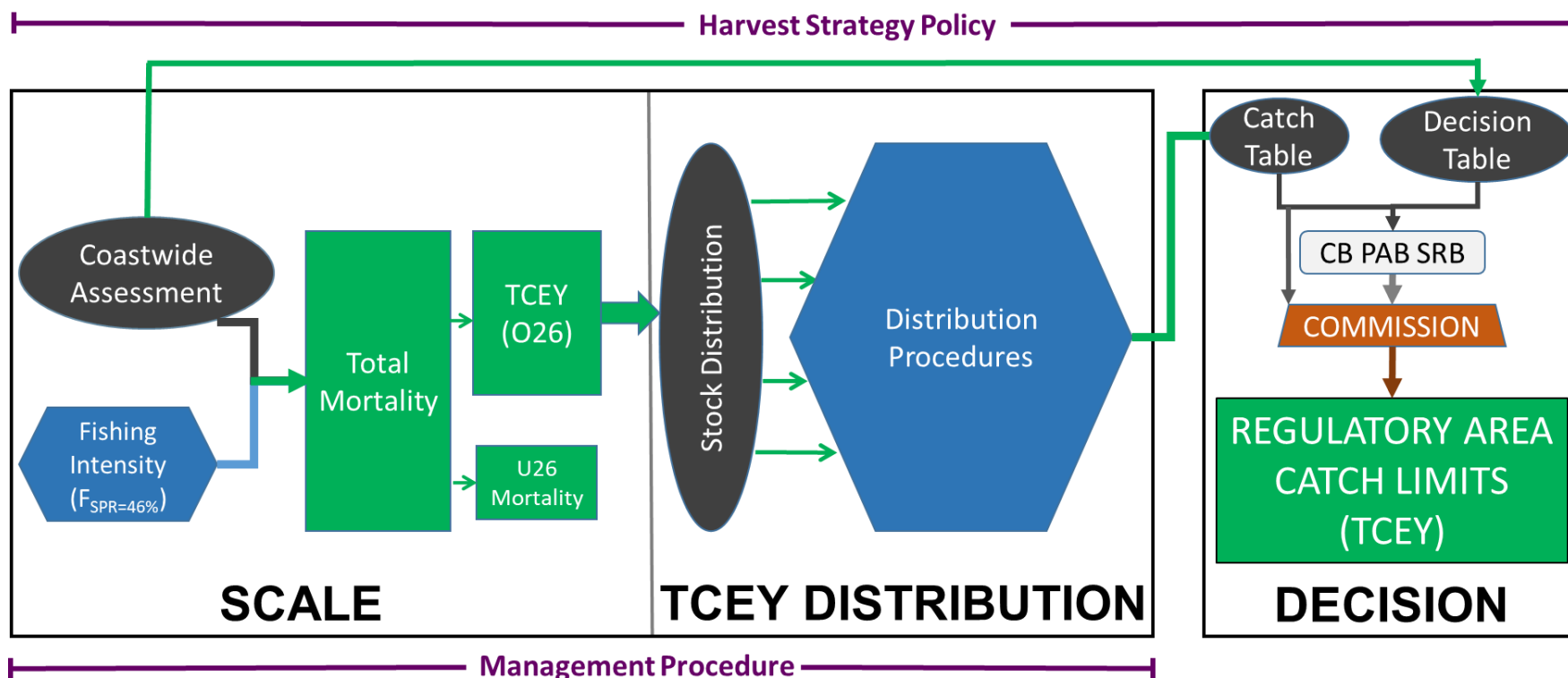


Conclusions (for 30% trigger)

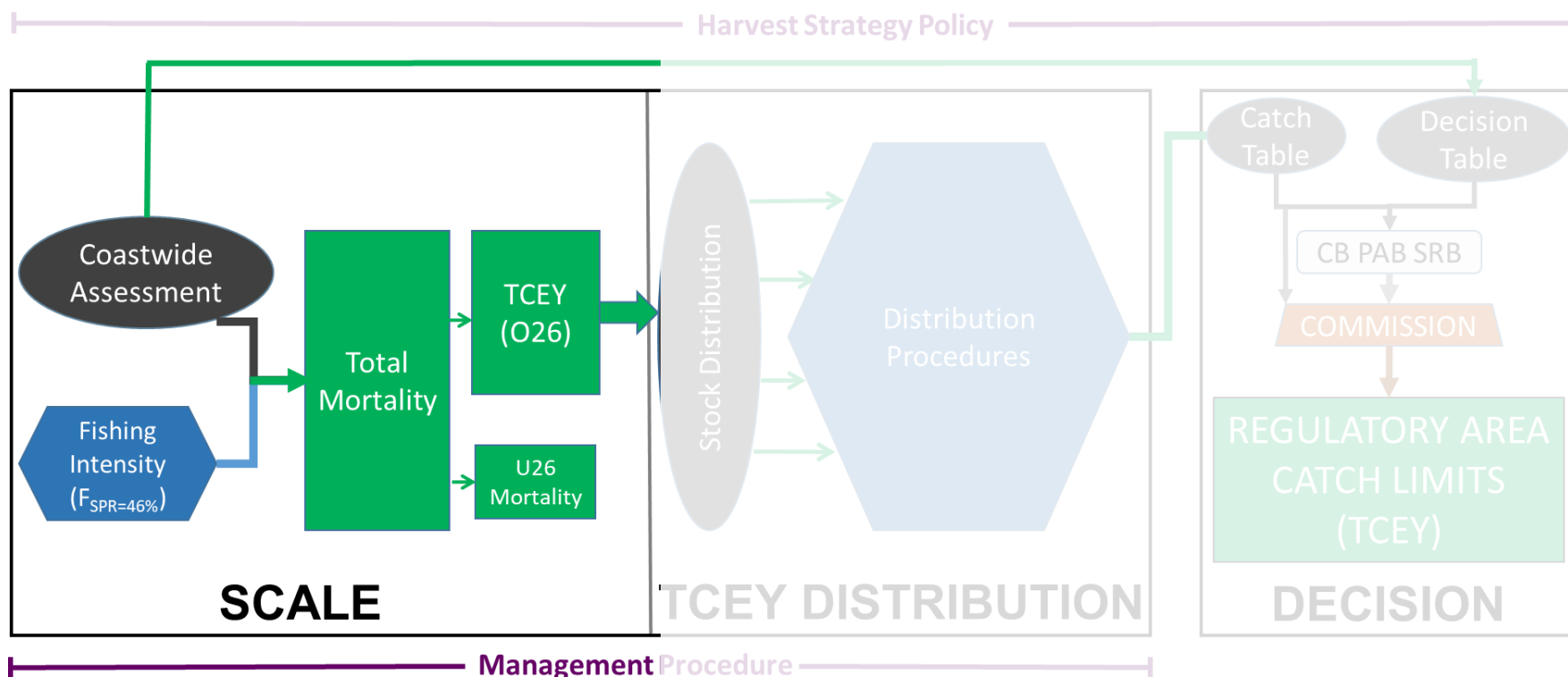
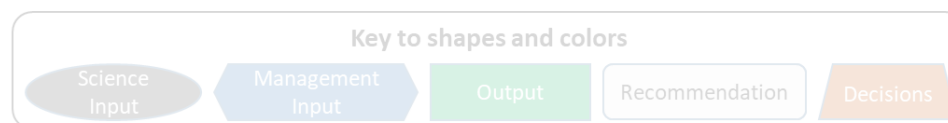
- Stock status reductions lessened at SPR values less than 40%
- Average Total Mortality increases very little at SPR values less than 40%
- Average Annual Variability shows a large increase at and below an SPR of 30%
- These conclusions are “best case” because not incorporating uncertainty from an estimation model
 - More comprehensive simulations will be done in 2018



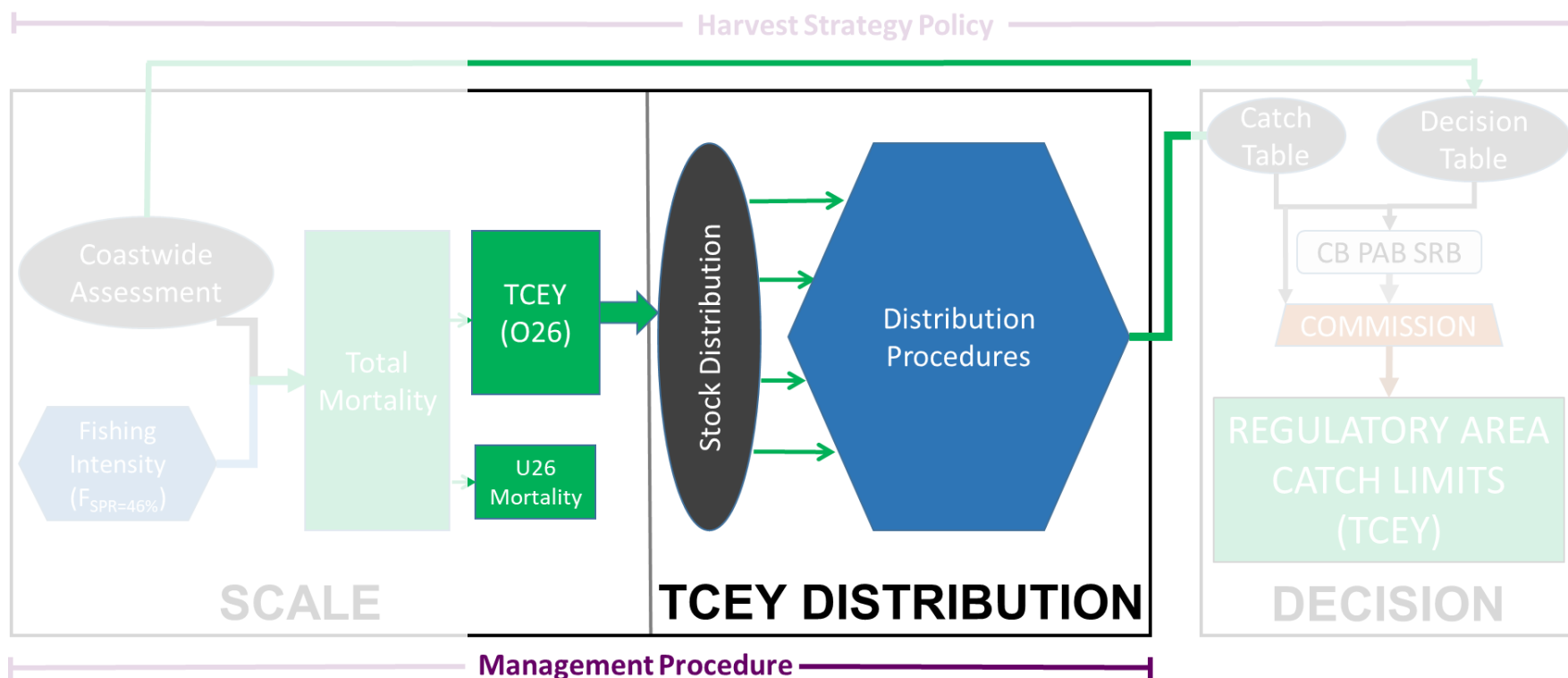
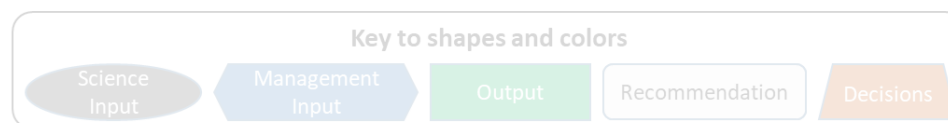
Harvest Strategy Policy



Harvest Strategy Policy



Harvest Strategy Policy



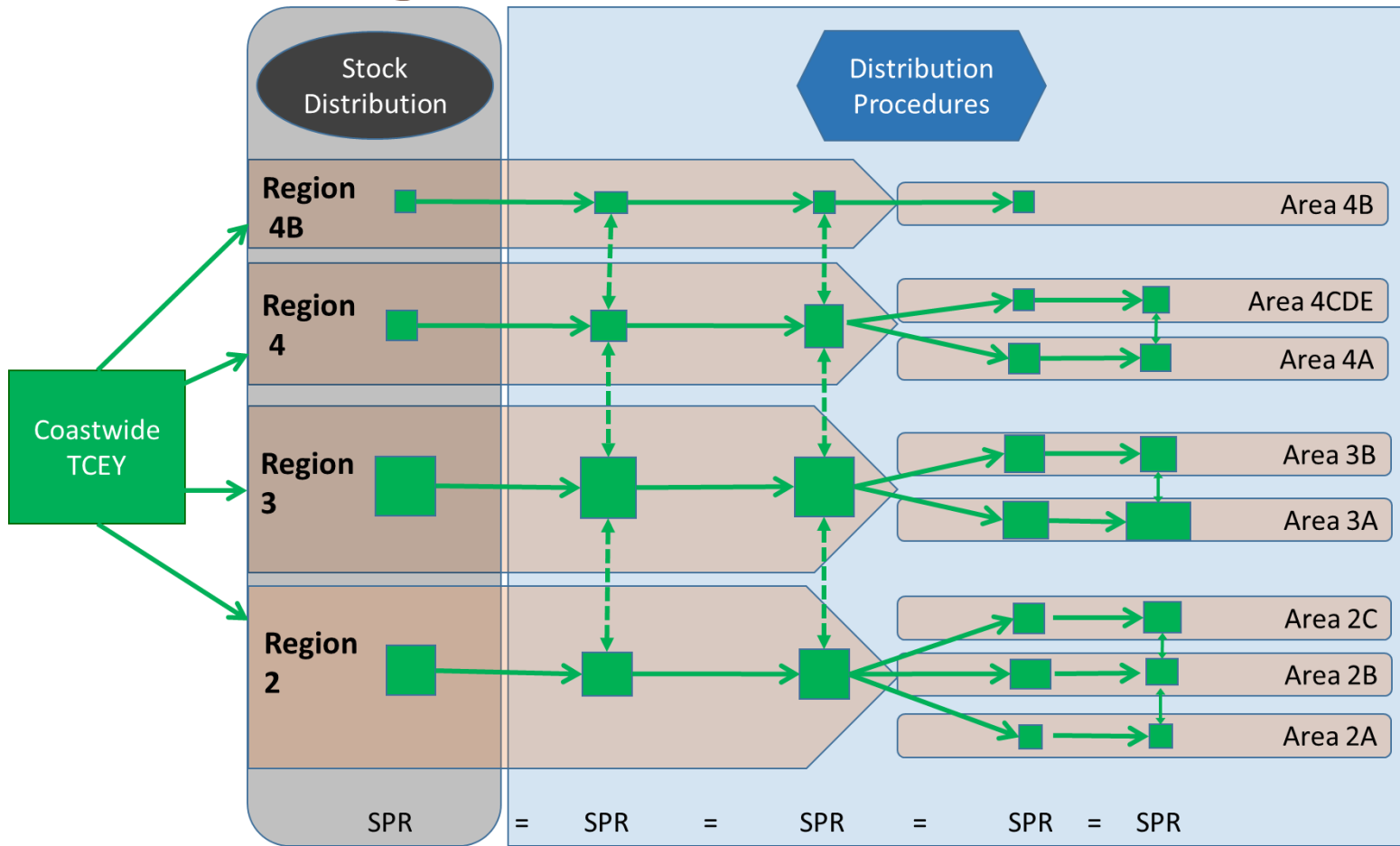
Recommendations from AM093

38. **NOTING** that the term “apportionment” has connotations broader than stock distribution that are not reflective of its meaning in the IPHC context, the Commission **RECOMMENDED** that it be replaced with the terms “stock distribution” or “stock distribution model(ing)”.

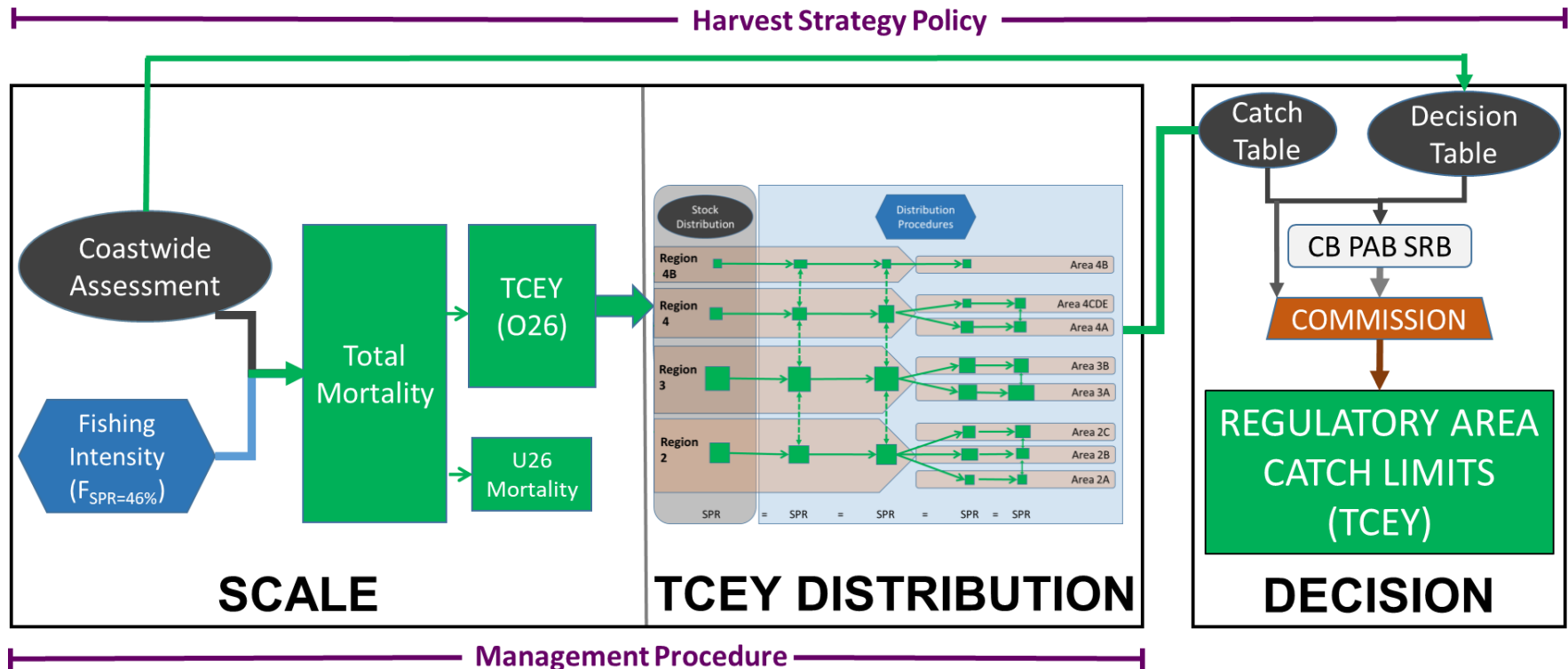
40. The Commission **REQUESTED** that the IPHC Secretariat initiate a process to develop alternative, biologically based stock distribution strategies for consideration by the Commission and its subsidiary bodies. This should also be incorporated into the MSE Program of Work.



Distributing the TCEY



Harvest Strategy Policy

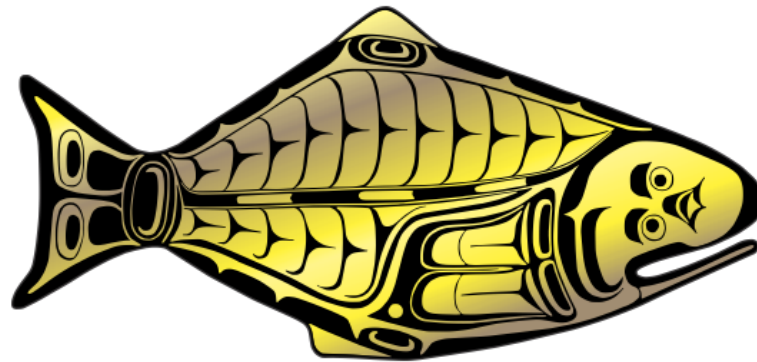


Recommendations

- **NOTE** paper IPHC-2018-AM094-12
- **CONSIDER** the simulation framework and results
- **RECOMMEND** management procedures of interest to evaluate
- **AGREE** whether the clear separation of stock distribution, and distribution procedures satisfies the Commission's recommendation (38) to replace *apportionment* with a more suitable term.
- **ENDORSE** the concept of distributing the TCEY to biological regions defined here as a method to satisfy the Commission's request (40) to "*initiate a process to develop alternative, biologically based stock distribution strategies.*"



INTERNATIONAL PACIFIC



HALIBUT COMMISSION





Review of fishery goals and objectives

Agenda Item 7.3



INTERNATIONAL PACIFIC
HALIBUT COMMISSION

93rd Interim Meeting (IM093)

IPHC-2017-IM093-R

37. **NOTING** the current fishery goals, objectives, and performance metrics identified by the MSAB for the MSE process, ..., the Commission **AGREED** to provide guidance to the IPHC Secretariat and the MSAB on goals and objectives at the 94th Annual Meeting in January 2018.

38. **NOTING** the goals and objectives related to distributing the TCEY presented during the meeting by the U.S.A. (Table 3), the Commission **RECOMMENDED** that they be considered at the 94th Annual Meeting in January 2018 after soliciting input from stakeholders.

39. The Commission **REQUESTED** the IPHC Secretariat to consolidate the objectives related to TCEY distribution (Table 3) with the current goals, objectives and performance metrics provided as Appendix IV of the MSAB10 Report, for presentation at the 94th Annual Meeting in January 2018.

40. The Commission **NOTED** that providing guidance on the MSE process to the IPHC Secretariat and the MSAB at the Interim and Annual meetings would be an efficient and effective method to ensure the guidance is incorporated into the annual MSAB work plan.



Circular IPHC-2017-CR022

- Present the Commission objectives
- Soliciting stakeholder feedback
- Made available on 18 December 2017



MSAB Goals

1. Biological sustainability
2. Fishery sustainability, access, and stability
3. Minimize discard mortality
4. Minimize bycatch and bycatch mortality
5. Serve consumer needs
6. Preserve biocomplexity



Biological Sustainability

Measurable Objectives defined by MSAB

Maintain a minimum of number of mature female halibut coast-wide

Avoid low spawning stock biomass

Avoid very low spawning stock biomass

When Limit < Est. Biomass < Trigger, limit the probability of declines

Measurable Objectives defined by Commission (related to distribution)

Maintaining diversity in the population across IPHC Reg. Areas

Prevent local depletion at IPHC Regulatory Area scale

Minimize impact on downstream migration area



Fishery Sustainability and access

Measurable Objectives defined by MSAB

Maintain directed fishing opportunity

Maximize yield in each IPHC Regulatory Area

Maintain a median catch within 10% of 1993-2012 average

Maintain average catch greater than 70% of 1993-2012 average

Measurable Objectives defined by Commission (related to distribution)

Maintain commercial, recreational, and subsistence fishing opportunities in each IPHC Regulatory Area



Fishery Stability

Measurable Objectives defined by MSAB

Limit annual changes in TAC, coast-wide and/or by IPHC Reg. Area

Measurable Objectives defined by Commission (related to distribution)

Limit annual TCEY variability due to stock distribution in both time and scale



Minimize discard mortality

Measurable Objectives defined by MSAB

Discard mortality is less than 10% of annual catch limit

Measurable Objectives defined by Commission (related to distribution)

Minimize discard mortality by IPHC Regulatory Area



Minimize bycatch and bycatch mortality

Measurable Objectives defined by MSAB

Measurable Objectives defined by Commission (related to distribution)

Minimize bycatch by IPHC Regulatory Area



Serve consumer needs

Measurable Objectives defined by MSAB

Measurable Objectives defined by Commission (related to distribution)

Maintain processing opportunities in each IPHC Regulatory Area



Preserve biocomplexity

Measurable Objectives defined by MSAB

- This may be better suited as an objective under Biological Sustainability

Measurable Objectives defined by Commission (related to distribution)

See Biological Sustainability



Other Commission concepts

- Distribution is responsive to IPHC Regulatory Area abundance trends and stock characteristics (ex. Fishery WPUE, age structure, size at age, etc.)
 - Distribution is responsive to management precision in each IPHC Regulatory Area
 - Avoid zero sum distribution policy
-
- These do not have a measurable component and are better suited as objectives to consider when designing management procedures

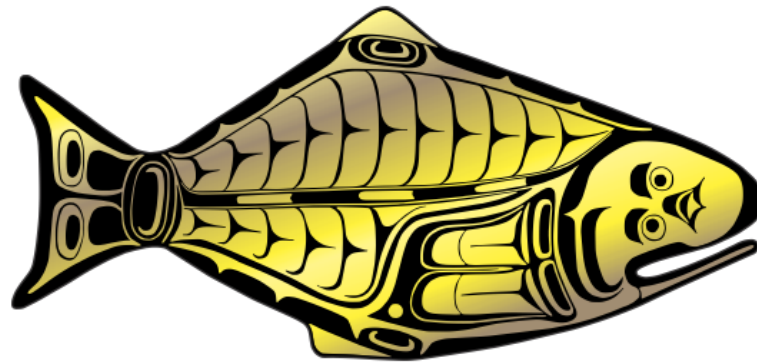


Recommendations

- **ENDORSE** the current MSAB goal and objectives as a working set of objectives for the evaluation of management strategies, but they may be refined in the future
- **AGREE** that the Commission objectives fit within the goals defined by the MSAB, as presented here
- **RECOMMEND** to present the Commission objectives at MSAB11 for stakeholder feedback
 - Very little stakeholder feedback between the Interim Meeting and Annual Meeting
 - The CB and PAB have the opportunity to provide feedback at AM094
- **CLARIFY** the intent of “other Commission concepts” and how they should be incorporated into the MSAB process
- **RECOMMEND** that the MSAB develop measurable outcomes and performance metrics associated with these Commission objectives
 - For MSAB Performance Metrics see IPHC-2017-MSAB10-08



INTERNATIONAL PACIFIC



HALIBUT COMMISSION





IPHC 5-year Biological and Ecosystem Science Research Program: Update

Agenda Item 10.3
IPHC-2018-AM094-13
IPHC-2017-RARA27-R

L. Boitor



INTERNATIONAL PACIFIC
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Outline of the presentation



- **Update on the research activities of the Biological and Ecosystem Science Branch**
- **Outcome of external funding applications**
- **Proposed research projects for 2018**
- **Revised research project development and selection process**



Outline of the presentation



- **Update on the research activities of the Biological and Ecosystem Science Branch**
- Outcome of external funding applications
- Proposed research projects for 2018
- Revised research project development and selection process

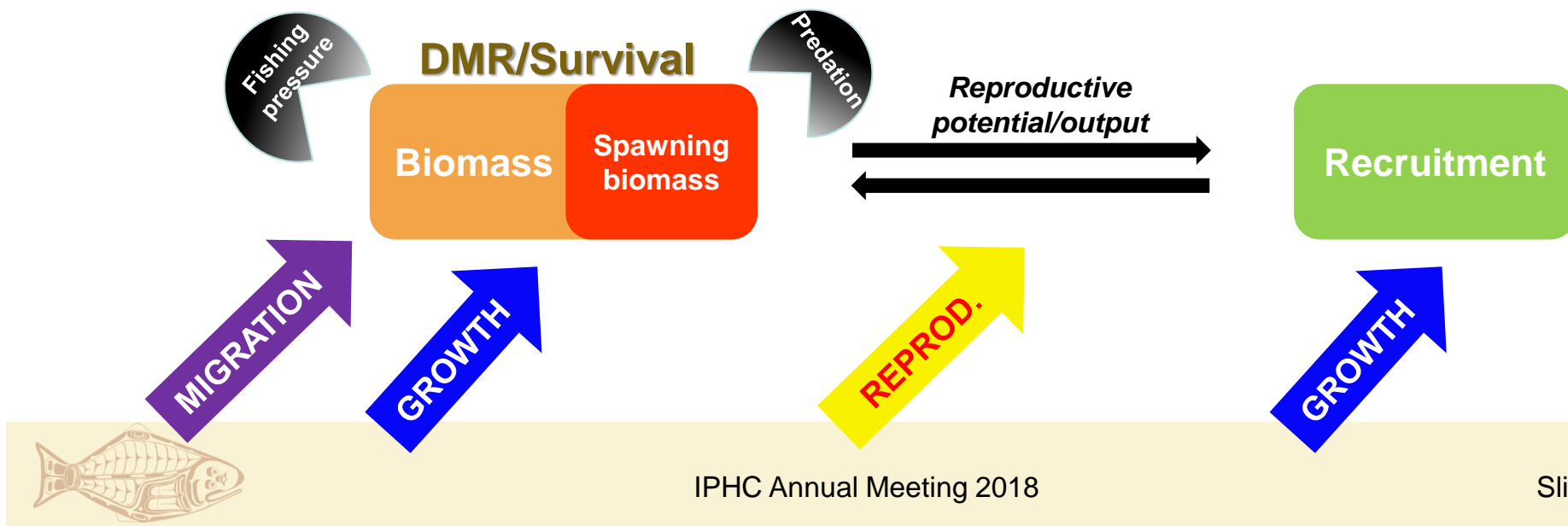


Primary research activities at IPHC



Primary objectives

- Identify and address *critical knowledge gaps* in the biology of the Pacific halibut
- Understand the influence of *environmental conditions* on Pacific halibut biology
- Apply resulting knowledge to reduce *uncertainty* in current stock assessment models



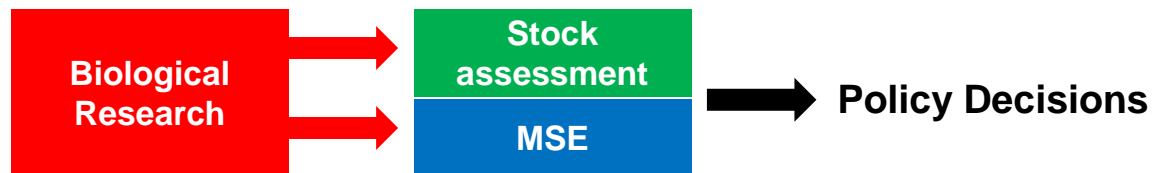
Primary research areas at IPHC



- 1. Reproduction**
 - SEX RATIO OF COMMERCIAL CATCH
 - IMPROVED MATURATION ESTIMATES OF SPAWNING BIOMASS
- 2. Growth**
 - CHANGES IN SIZE AT AGE/BIOMASS
 - TOOLS TO ASSESS FISH CONDITION
- 3. DMRs and post-release survival assessment**
 - BYCATCH/DISCARD SURVIVAL ESTIMATES
- 4. Migration**
 - ADULT FEEDING AND REPRODUCTIVE MIGRATION
 - LARVAL DISPERSAL
- 5. Genetics and genomics**
 - GENETIC STRUCTURE OF THE POPULATION
 - GENOMIC TOOLS (e.g. GENOME)



Integration of biological research, stock assessment and policy



Research areas	Research outcomes	Relevance for stock assessment	Inputs to reduce stock assessment uncertainty	MSE development	Inputs to inform MSE development	MSE goals
Reproduction	Sex ratio Spawning output Age at maturity	Spawning biomass scale and trend Stock productivity Recruitment variability	Sex ratio Maturity schedule Fecundity	Operating Model Management Procedures	Sex ratio Maturity schedule Fecundity	Biological sustainability
Growth	Identification of growth patterns Environmental effects on growth Growth influence in size-at-age variation	Temporal and spatial variation in growth Yield calculations Effects of ecosystem conditions Effects of fishing	Predicted weight-at-age	Operating Model Management Procedures	Predicted weight-at-age Mechanisms for changes in weight-at-age	Biological sustainability
Discard Survival	Bycatch survival estimates Discard mortality rate estimates	Scale and trend in mortality Scale and trend in productivity	Bycatch and discard mortality estimates	Operating Model Management Procedures	Bycatch and discard mortality estimates Variability in bycatch and uncertainty in discard mortality estimates	Minimize bycatch mortality Minimize discard mortality
Migration	Juvenile and adult migratory behavior and distribution Larval distribution	Stock distribution Geographical selectivity	Information for structural choices Recruitment indices	Operating Model Management Procedures	Information for structural choices Migration pathways and rates Timing of migration	Biological sustainability Preserve biocomplexity
Genetics and Genomics	Genetic structure of the population Sequencing of the Pacific halibut genome	Spatial dynamics Management units	Information for structural choices	Operating Model Management Procedures	Information for structural choices	Biological sustainability Preserve biocomplexity



Update of research activities at IPHC



1. Reproduction

- SEX RATIO OF COMMERCIAL CATCH
- IMPROVED MATURATION ESTIMATES OF SPAWNING BIOMASS

2. Growth

3. DMRs and post-release survival assessment

4. Migration

5. Genetics and genomics



1. Reproduction

There are important knowledge gaps on the reproductive biology of the species

- SEX RATIO OF COMMERCIAL CATCH
- IMPROVED MATURATION ESTIMATES OF SPAWNING BIOMASS

Projects:

1. *Sex marking and identification of genetic sex (Projects 621.15 and 621.16)*
2. *Full characterization of the annual reproductive cycle (Project 674.11)*
3. *Identification of genetic reproductive markers*

Objectives:

- Identification of genetic markers of sex and information on sex ratios.
- Knowledge on reproductive development, maturation, fecundity, environmental and hormonal control of reproduction.
- Scientific-based criteria to identify reproductive status and potential.
- Updated estimates of age and size at maturation.
- Information on skipped spawning.

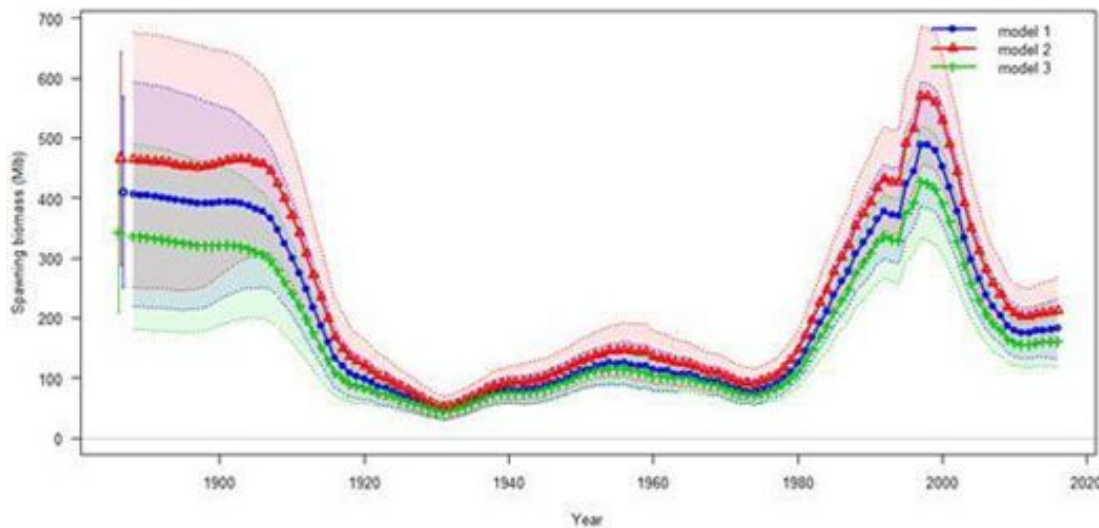


1. Reproduction

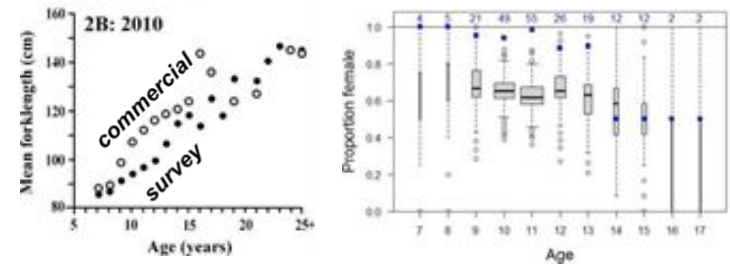
- **Sex marking at sea and validation using genetic sex (Project 621.15)**

Objectives: To establish a method for the commercial fleet to mark the sex of their catch so that collection of sex data can be incorporated into Port Sampling

Commercial sex ratio influences estimation of SSB



- Commercial sex ratios must be estimated from survey data



- Evidence suggests that commercial catch may be larger at age than survey and result in more female bias than survey would estimate



1. Reproduction

- **Sex marking at sea and validation using genetic sex (Project 621.15)**

Objectives: To establish a method for the commercial fleet to mark the sex of their catch so that collection of sex data can be incorporated into Port Sampling



Dorsal Cut (Female) Gill Plate Cut (Male)

- 2016 (Area 2B; 16 offloads; 317 samples)

79% marking accuracy (validated genetically)

- 2017 (Coastwide; 84 offloads; 929 samples)

Marking accuracy not yet validated

2017

Reg Area	Sampled offloads	Number of fish
2A	36	70
2B	5	84
2C	16	116
3A	10	113
3B	9	292
4A	2	77
4B	2	95
4C	4	86
4D	1	19
TOTAL	84	929

- 79 in the US
- 5 in BC
- Wide participation of WA Tribes



1. Reproduction

- **Development of genetic markers for sex identification (Project 621.16)**

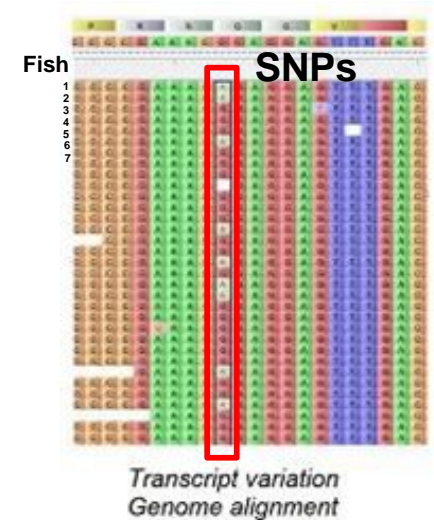
Objective: Allow for direct determination of sex in samples from the commercial catch

- Restriction site-associated DNA sequencing (RADseq) approach
 - 95 fish sequenced (40 male, 55 female)
 - 40,308 loci (SNPs) identified: 56 linked to sex
 - Females are the heterozygous sex (ZW): 3 SNPs found only in females
 - TaqMan assays developed for 2 sex-linked loci: Hs10183, Hs23885

Assay accuracy (based on 199 morphologically-sexed fish): $\geq 97.5\%$



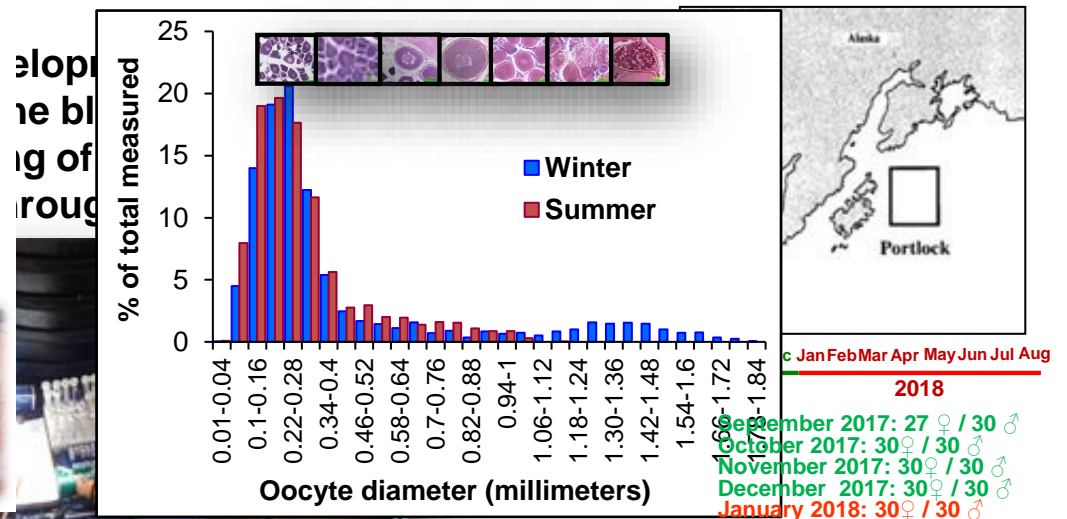
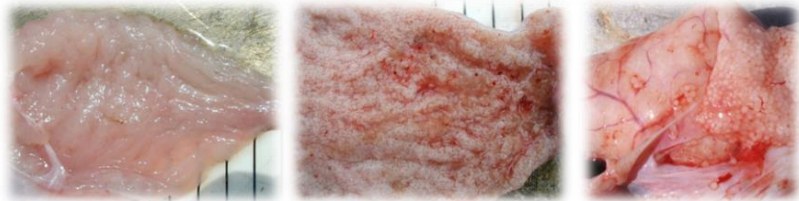
Drinan, Loher and Hauser (2017) *J. Heredity*.



1. Reproduction

- **Full characterization of the annual reproductive cycle (Project 674.11)**

Objective: Understand temporal changes in reproductive development throughout an entire annual reproductive cycle in male and female Pacific halibut



- Comprehensive reproductive development of the population in order to improve our estimate of effective spawning biomass



1. Reproduction

- Identification of genetic reproductive markers by RNA sequencing

Ovarian genes

Sample transcript ID	Length (nt)	Database	Database ID	Identity (%)	Gene_symbol	Annotation	Function
TRINITY_DN13531_c0_g1_i1	3754	Danio rerio	ENSDARP0000004431	89,31	acv1ba	activin A receptor, type 1Ba	Oogenesis
TRINITY_DN31883_c0_g1_i1	585	Danio rerio	ENSDARP00000121689	74,74	adams2	ADAM metalloproteinase with thrombospondin type 1 motif, 2	Ovulation
TRINITY_DN14738_c0_g1_i1	3062	Danio rerio	ENSDARP00000088795	82,07	ar	androgen receptor	Hormone signaling
TRINITY_DN18096_c0_g1_i1	1654	Danio rerio	ENSDARP00000076033	76,81	aqp10b	aquaporin 10b	Oocyte hydration
TRINITY_DN18849_c1_g1_i1	1680	Danio rerio	ENSDARP00000112455	94,97	bmp1a	bone morphogenetic protein 1a	Oogenesis
TRINITY_DN16877_c1_g1_i1	976	Danio rerio	ENSDARP00000111604	70,78	cyp19a1a	cytochrome P450, family 19, subfamily A, polypeptide 1a	Aromatase (estrogen production)
TRINITY_DN16252_c0_g1_i1	2580	Danio rerio	ENSDARP00000124026	76,09	ddx4	DEAD (Asp-Glu-Ala-Asp) box polypeptide 4	Oogonia marker
TRINITY_DN23892_c0_g1_i1	232	Danio rerio	ENSDARP00000073932	71,62	EGFR	epidermal growth factor receptor	Maturation signaling
TRINITY_DN4356_c0_g1_i1	4620	Uniprot	Q4JK73	66,67	HSD17B11	Estradiol 17-beta-dehydrogenase 11	Steroidogenesis
TRINITY_DN21356_c3_g1_i2	209	Uniprot	Q9W6M2	80,88	esr2	Estrogen receptor beta	Hormone signaling
TRINITY_DN6202_c1_g1_i1	287	Danio rerio	ENSDARP00000096529	79,79	fshr	follicle stimulating hormone receptor	Hormone signaling
TRINITY_DN9106_c0_g1_i1	2006	Danio rerio	ENSDARP00000061827	80,39	foxl2	forkhead box L2	Female sex differentiation
TRINITY_DN21868_c0_g1_i1	306	Danio rerio	ENSDARP00000055566	70,83	gnrhr4	gonadotropin releasing hormone receptor 4	Hormone signaling
TRINITY_DN16738_c0_g1_i1	1391	Danio rerio	ENSDARP00000059752	71,32	inhibb	inhibin, beta B	Oogenesis
TRINITY_DN21305_c0_g1_i1	1466	Uniprot	Q90674	62,65	LHCR	Lutropin-choriogonadotropic hormone receptor	Hormone signaling
TRINITY_DN12886_c1_g1_i1	771	Danio rerio	ENSDARP00000109370	82,1	pgr	progesterone receptor	Maturation signal
TRINITY_DN15432_c0_g1_i1	2592	Danio rerio	ENSDARP00000003684	80,26	ptgs2b	prostaglandin-endoperoxide synthase 2b	Prostaglandin synthesis
TRINITY_DN14537_c0_g1_i1	3164	Danio rerio	ENSDARP00000006091	77,49	mmp2	matrix metalloproteinase 2	Ovulation
TRINITY_DN24972_c0_g1_i1	292	Uniprot	P41245	76,92	Mmp9	Matrix metalloproteinase-9	Ovulation



Testicular genes

Sample transcript ID	Length (nt)	Database	Database ID	Identity (%)	Gene_symbol	Annotation	Function
TRINITY_DN28811_c1_g1_i2	2574	Danio rerio	ENSDARP00000088795.3	71,15	ar	androgen receptor	Spermatogenesis
TRINITY_DN37544_c0_g1_i1	248	Uniprot	sp C6K189 CTSG2_MOUSE	68,75	Catsperg2	Cation channel sperm-associated protein subunit gamma 2	Sperm activation
TRINITY_DN32484_c1_g1_i1	1411	Danio rerio	ENSDARP00000123870.1	78,57	ddx4	DEAD (Asp-Glu-Ala-Asp) box polypeptide 4	PGC marker
TRINITY_DN34322_c0_g1_i1	2573	Uniprot	sp Q801F8 DMRT1_ORYLA	65,77	dmrt1	Doublesex- and mab-3-related transcription factor 1	Male sex differentiation factor
TRINITY_DN23128_c0_g1_i1	2126	Danio rerio	ENSDARP00000136983.1	89,68	fstl1	folliculin 1	Hormone
TRINITY_DN46346_c0_g1_i1	624	Danio rerio	ENSDARP00000130239.1	80,56	INHBB	inhibin beta B	Hormone receptor
TRINITY_DN49968_c0_g1_i1	310	Danio rerio	ENSDARP00000131027.1	79,61	gnrhr1	gonadotropin releasing hormone receptor 1	Hormone receptor
TRINITY_DN15829_c0_g2_i1	2899	Danio rerio	ENSDARP00000089386.3	82,09	nanos3	nanos homolog 3	Spermatogonial marker
TRINITY_DN32323_c1_g1_i1	2763	Danio rerio	ENSDARP00000109370.2	83,42	pgr	progesterone receptor	Hormone receptor
TRINITY_DN6999_c1_g1_i1	345	Danio rerio	ENSDARP00000104772.2	74,56	ptgs1	prostaglandin-endoperoxide synthase 1	Prostaglandin production
TRINITY_DN20678_c0_g1_i1	234	Danio rerio	ENSDARP00000136548.1	97,83	RSBN1	round spermatid basic protein 1	Spermatid marker
TRINITY_DN33366_c1_g1_i5	3258	Danio rerio	ENSDARP00000104616.2	89,27	strbp	spermatid perinuclear RNA binding protein	Spermatid marker
TRINITY_DN34579_c8_g1_i1	635	Danio rerio	ENSDARP00000106978.2	92,67	sox9a	SRY (sex determining region Y)-box 9a	Male sex differentiation factor
TRINITY_DN6843_c0_g1_i1	235	Danio rerio	ENSDARP00000023907.6	79,49	star	steroidogenic acute regulatory protein	Testicular steroidogenesis



Primary research areas at IPHC



1. Reproduction

2. Growth

- CHANGES IN SIZE AT AGE/BIOMASS
- TOOLS TO ASSESS FISH CONDITION

3. DMRs and post-release survival assessment

4. Migration

5. Genetics and genomics



2. Growth

Little is known regarding what factors influence growth in this species

- CHANGES IN SIZE AT AGE/BIOMASS
- TOOLS TO ASSESS FISH CONDITION

Projects:

1. *Identification and validation of physiological markers for growth (Project 673.14)*
2. *Evaluation of growth patterns and effects of environmental influences (NPRB 1704)*

Objectives:

- Knowledge on growth patterns and environmental influences.
- Improved understanding in the possible role of growth alterations in the observed decrease in size at age.



2. Growth

1. Mass identification

Objective: Identify

- Identification of genes
- Develop molecular assays

Annotation	Gene symbol	Length (nt)	Identity (%)	Function
Androgen receptor	<i>ar</i>	4426	81.48	Protein synthesis
Calcium/calmodulin-dependent protein kinase II alpha	<i>camk2a</i>	2342	87.27	Force transmission
Creatine kinase, muscle a	<i>ckma</i>	2256	89.76	Energy metabolism
Carnitine palmitoyltransferase 1B	<i>cpt1b</i>	762	87.8	Lipid metabolism
Dystrophin	<i>dmd</i>	1282	82.3	Force transmission
Eukaryotic translation initiation factor 4eb	<i>eif4eb</i>	1168	85.19	Protein synthesis
F-box protein 32	<i>fbxo32</i>	695	86.25	Protein atrophy
Glycogen synthase 1	<i>gys1</i>	2033	89.47	Energy metabolism
Histone deacetylase 1	<i>hdac1</i>	2490	96.35	Muscle repressor
Insulin-like growth factor 2 receptor	<i>igt2r</i>	511	90.62	Growth regulator
Insulin-like growth factor binding protein 5b	<i>igfbp5</i>	1372	81.5	Growth regulator
Lipoprotein lipase	<i>llpl</i>	1789	60.48	Lipid metabolism
Myocyte enhancer factor 2cb	<i>mef2cb</i>	504	79.8	Muscle growth
Myostatin b	<i>mstnb</i>	189	95.71	Growth regulator
Mechanistic target of rapamycin	<i>mtor</i>	1153	97.92	Protein synthesis
Myogenic factor 6	<i>myf6</i>	819	81.19	Muscle growth
Myosin, heavy polypeptide 1.3, skeletal muscle	<i>myh11.3</i>	246	86.42	Muscle growth
Myoblast determination protein 1 homolog	<i>myod</i>	2407	72.67	Muscle development
Myozenin 1a	<i>myoz1a</i>	796	74.6	Force transmission
Nuclear factor of activated T-cells, cytoplasmic 3	<i>nfatc3</i>	1587	62.96	Muscle activity
Paired box 3a	<i>pax3</i>	269	75	Muscle development
Paired box 7b	<i>pax7b</i>	297	85.71	Muscle development
Peroxisome proliferator-activated receptor gamma, coactivator 1 alpha	<i>ppargc1a</i>	519	88.7	Energy metabolism
Protein phosphatase 3, catalytic subunit, alpha isozyme	<i>ppp3ca</i>	3407	83.69	Muscle activity
Protein kinase, AMP-activated, alpha 1 catalytic subunit	<i>prkaa1</i>	1925	70.96	Energy metabolism
Phosphorylase, glycogen, muscle	<i>pygma</i>	5514	90.91	Energy metabolism
Serum response factor	<i>srf</i>	4393	63.81	Muscle development
Transforming growth factor, beta 1a	<i>tgfb1a</i>	561	77.04	Growth regulator
Tripartite motif containing 63b	<i>trim63b</i>	2117	81.16	Protein atrophy

Deliverables:

- Establishment of a growth-related gene sequence dataset
- Molecular assays to monitor growth patterns based on growth-markers



2. Growth

2. Evaluation of growth patterns and effects of environmental influences

Objective: Identify physiological profiles characteristic of specific growth patterns and evaluate potential effects of environmental influences.

- Establishment of different growth trajectories in juvenile fish in captivity to identify molecular and biochemical signatures of growth patterns.
 - *Manipulating growth rates (ration, density, thermal- or fasting-induced compensation, etc.):*



- Evaluation of different growth patterns in the *wild*.

Samples collected in NMFS trawl survey
In 2016 and 2017 from 3 size categories:
- < 40 cm length
- 40-60 cm length
- 60-80 cm length



Characterization of growth markers in muscle samples from age-matched individuals

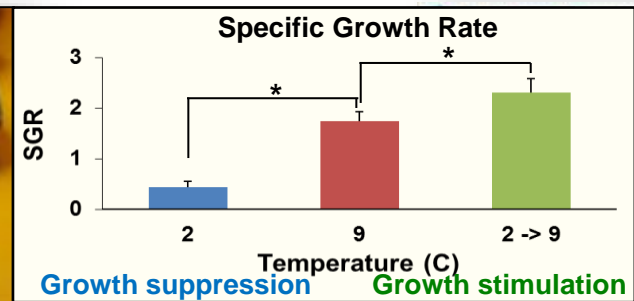
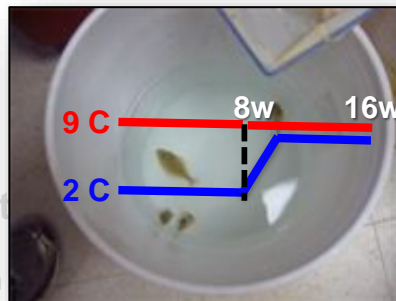


2. Growth

- **Evaluation of growth patterns and effects of environmental influences**

Objective: Identify physiological profiles characteristic of specific growth patterns and evaluate potential effects of environmental influences.

- Establishment of different growth trajectories in juvenile fish in captivity to identify molecular and biochemical signatures of growth patterns.



- Evaluation

- - 75 fish <40 cm length
 - - 75 fish 40-60 cm length
 - - 75 fish 60-80 cm length
- Continued in 2017

Characterization of molecular and biochemical growth markers in muscle samples from age-matched individuals

- Isotopic tissue turnover to trace dietary and/or habitat shifts

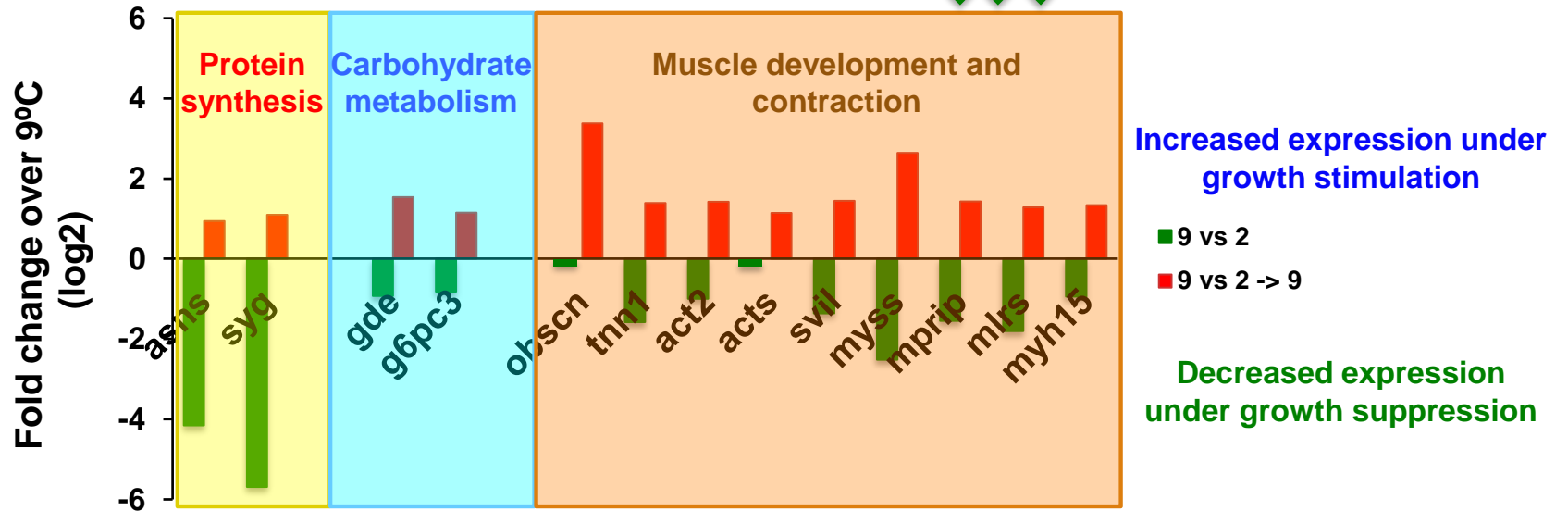
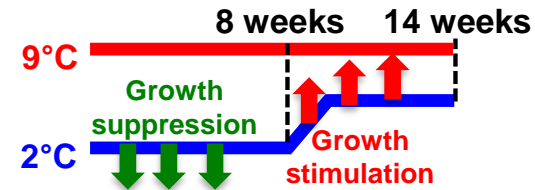
^{13}C , ^{15}N



2. Growth

- Evaluation of growth patterns and effects of environmental influences

Identification of genes that respond to temperature-induced growth alterations



Potential molecular markers for temperature-regulated growth



2. Growth



- **NPRB Grant 1704 (2017-2019):** “Somatic growth processes in the Pacific halibut (*Hippoglossus stenolepis*) and their response to temperature, density and stress manipulation effects”. IPHC / AFSC – Newport, OR

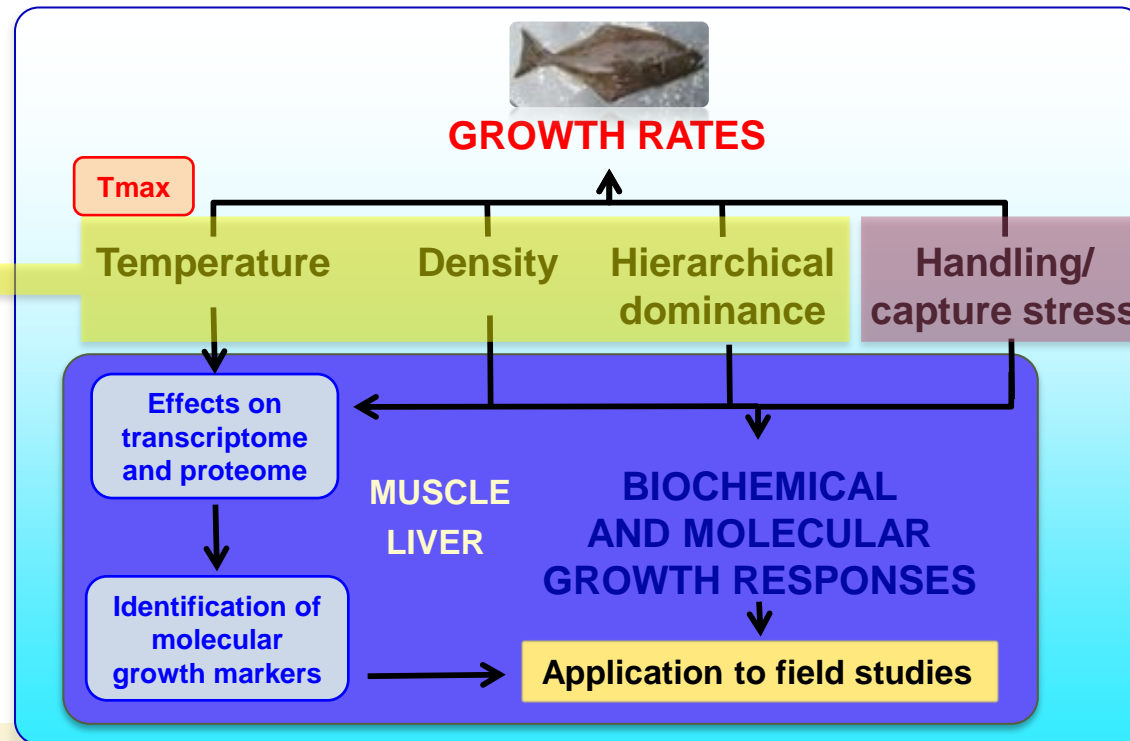
Dr. Josep Planas (PI)



Dr. Thomas Hurst



Environmental / ecological conditions (i.e. nursery areas)



Discard survival / fitness



2. Growth

- **Evaluation of growth patterns and effects of environmental influences**

Objective: Identify physiological profiles characteristic of specific growth patterns and evaluate potential effects of environmental influences.

- Evaluation of different growth patterns in the *wild*.

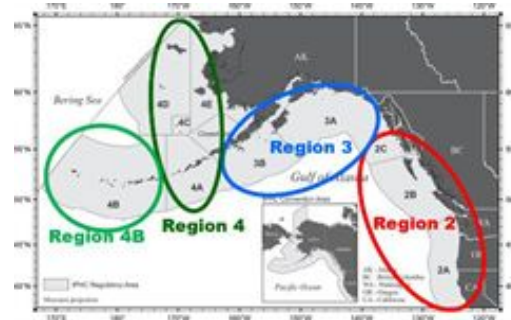
Samples collected in NMFS trawl survey
In 2016 and 2017 from 3 size categories:

- <40 cm length
- 40-60 cm length
- 60-80 cm length



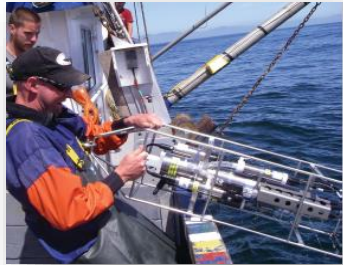
Characterization of molecular and biochemical growth markers in muscle samples from age-matched individuals

- Phase 2: Regional monitoring of growth patterns



2. Growth

- Investigate the effects of other **environmental factors** on growth performance.
 - *Effects of ocean **temperature, dissolved oxygen and pH** on growth.*



Relate to catch effort in FISS to the time and space model

- *Identify the optimal environmental conditions for growth.*

Deliverables:

- Identification and validation of growth markers for field studies
- Characterization of molecular and biochemical growth signatures
- Environmental effects on somatic growth
- Improved biological inputs on biomass estimates



Primary research areas at IPHC



1. Reproduction
2. Growth
3. **DMRs and post-release survival assessment**
4. Migration
5. Genetics and genomics

• **BYCATCH/DISCARD
SURVIVAL ESTIMATES**



3. DMRs and survival assessment

Little is known regarding the factors that influence bycatch or discard survival

- BYCATCH/DISCARD SURVIVAL ESTIMATES

Research components:

1. *Evaluate post-release survival of **trawl** discards and relate mortality to co-variates (e.g., time on deck, temperature, species targets)
(NPRB and S-K Grants to FishNext Research: IPHC as collaborator)*
2. *Evaluate fish handling practices, physiological condition, electronic monitoring, and post-release vitality in directed **longline** discards
(Project 672.13, S-K Grant)*

Objectives:

- Introduce quantitative measures to allow expedited release in trawl fisheries and improve longline DMR estimates



3. DMRs and survival assessment

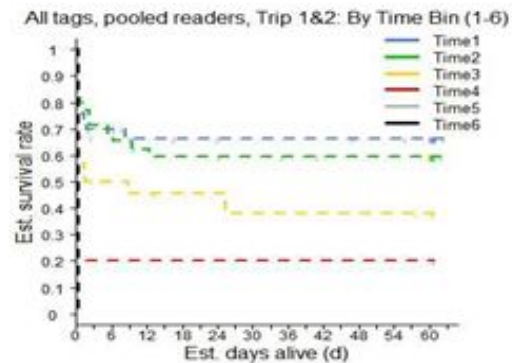
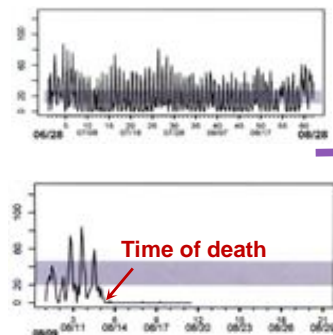
- **Trawl:** Moving toward DMR estimates based on measurable covariates

Objective: Reduce total discard mortality through expedited release, while still allowing for DMR estimation

- Field work is **completed**; expected to complete analysis and reporting in 2018

Accelerometer-logging pop-up tags were used to distinguish live from likely-dead fish

Cox Proportional Hazards Models and Multiple Regression used to relate mortality to condition and covariates



Dr. Craig Rose (PI), *FishNext Research*
Julie Nielsen, *Kingfisher Marine Research*
John Gauvin, *Alaska Seafood Cooperative*
Dr. Tim Loher, *International Pacific Halibut Commission*
Paige Drobny, *Spearfish Research*
Dr. Andrew Seitz & Michael Courtney, *U. Alaska Fairbanks*
Dr. Suresh Sethi, *Alaska Pacific University*

Funded by grants from the North Pacific Research Board and NOAA's Saltonstall-Kennedy program



3. DMRs and survival assessment

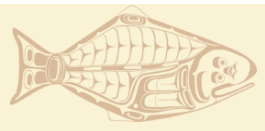
- **Longline I: Evaluate effects of handling practices on injuries and the physiological condition of captured Pacific halibut**



- Objectives:**
- Assess injury levels
 - Determine physiological condition after different handling practices
 - Measure levels of **stress and physiological disturbance indicators** in the blood of all captured fish
 - Track effect of **capture and handling conditions** (depth, H₂O temp, salinity, air T, light intensity, sea state, fish T, time from hook removal to tagged fish release)

Deliverables:

- Injury profile for different handling practices
- Physiological assessment of fish
- Water temperature loggers
- Fish temperature loggers
- Condition index post-capture



3. DMRs and survival assessment

- **Longline II: Investigate the relationship between physiological condition post-capture and survival as assessed by tagging**

Objective: Measure post-release survival in Pacific halibut and relate it to physiological condition and capture-related events

- Tag fish exposed to different handling practices and of varied conditions with conventional tags (wire); and fish in Excellent Condition with accelerometers.
- Assess survival of fish according to size and physiological condition.

Deliverables

- Info on physiological condition
- Info on survival



3. DMRs and survival assessment

- **Longline III: Applicability of electronic monitoring in DMR estimation**

Objective: Test the ability of electronic monitoring to capture fish handling events and fish condition and relate it to survival

- Deploy electronic monitoring (EM) system on a longline vessel.
- Video record fish handling events during capture.
- Determine injury profile by release method.



Deliver

- Determine injury profile by release method and associated injury levels and projected survival.

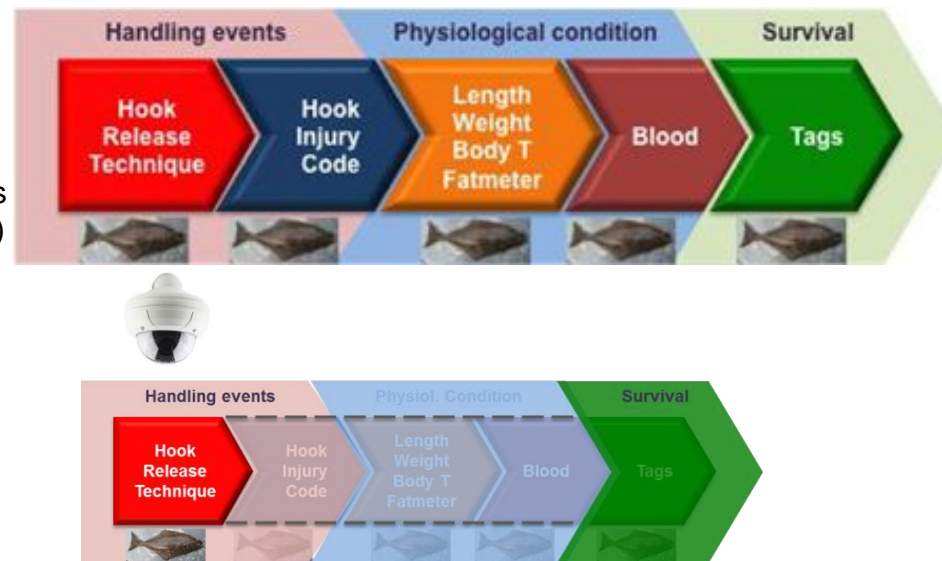


3. DMRs and survival assessment

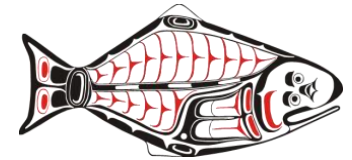
- **Saltonstall – Kennedy Grant NA17NMF4270240 (2017-2019):** “Improving discard mortality rate estimates in the Pacific halibut by integrating handling practices, physiological condition and post-release survival”. IPHC / APU – Anchorage, AK

November 2017

- 2 6-day trips (GOA, F/V Kema Sue)
- 38 sets (8 standard skates/set)
- 3 randomized treatments/skate
- 1,048 fish sampled and wire tagged
- 79 fish tagged with accelerometer tags (mini satellite tags; 96 days recording)
- EM on each haul



Dr. Josep Planas (PI)
Claude Dykstra
Dr. Tim Loher
Dr. Ian Stewart
Dr. Allan Hicks



Dr. Brad Harris
Dr. Nathan Wolf



Primary research areas at IPHC



1. Reproduction
2. Growth
3. DMRs and post-release survival assessment
4. **Migration**
 - ADULT FEEDING AND REPRODUCTIVE MIGRATION
 - LARVAL DISPERSAL
5. Genetics and genomics



4. Migration

- ADULT FEEDING AND REPRODUCTIVE MIGRATION
- LARVAL DISPERSAL

Projects:

1. *Juvenile and adult feeding migrations (Project 670.11)*
2. *Tail pattern recognition (Project 675.11)*
3. *Adult dispersal on Bowers Ridge (Reg. Area 4B) (Project 650.21)*
4. *Larval migration and connectivity*

Objectives:

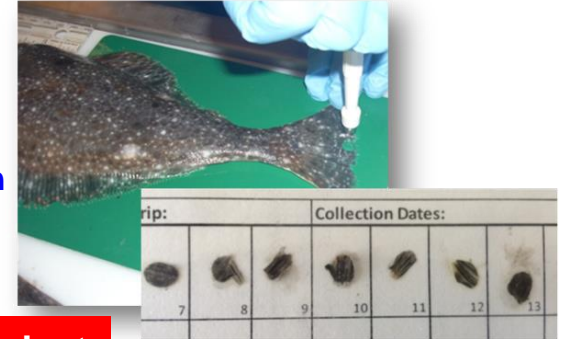
- To improve our understanding on larval, juvenile, and reproductive migration.



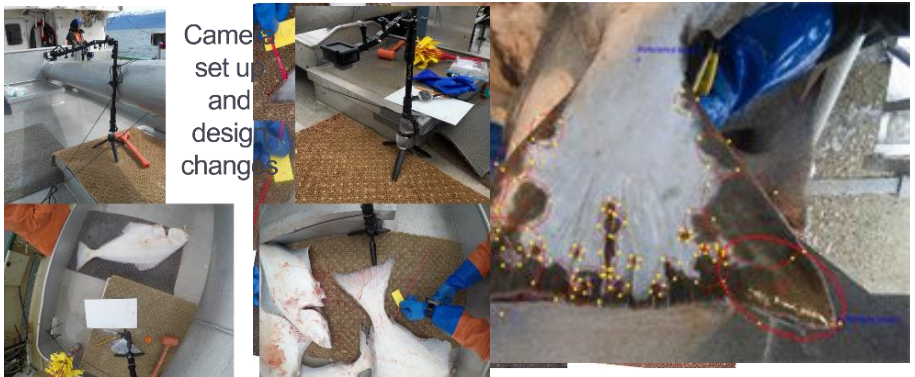
4. Migration

- **Juvenile and adult migration studies (Project 670.11)**
 - Juvenile wire tagging:
 - NMFS trawl tagging project: **1,469 fish**
 - 713 fish in GOA and 756 fish in BS
 - Adult wire tagging:
 - IPHC survey tagging project
 - 2016 pilot study in area 4D (U32)
 - 2017 coast-wide study (U32): **1,927 fish**

Fin clips are collected for future genetic analyses.

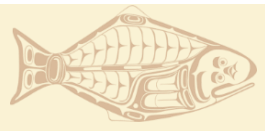


- **Tail pattern recognition (Project 675.11)** 2017 Intern Project



Came set up and design changes

- Blind side of tail is preferable for imaging.
- Spots and patterns appear to be unique.
- Tail markings could be used to identify individuals with image recognition software.
- Promising for implementation in FISS.



4. Migration

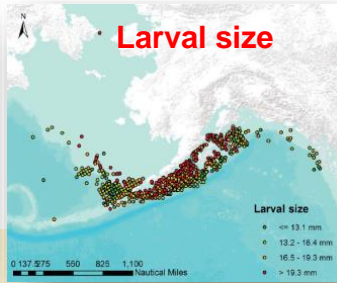
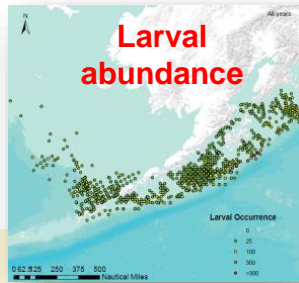
- **Reproductive and annual migration (Project 650.21)**

- In 2017: 22 adult fish tagged with miniPAT tags at Bowers Ridge (4B) expansion stations
- Continuation of work that began in 2002, studying seasonal and interannual migrations in the Bering Sea/Aleutian Islands region (210 PAT tags to-date)
- 14 tags have reported winter data: 13 from Bowers/Petrel; one large female on the 4D Edge



- **Larval migration and connectivity**

Objective: Understand the mechanisms of larval connectivity between GOA and BS.



Collaboration with Janet Duffy-Anderson, Esther Goldstein, William Stockhausen (NOAA-AFSC-Seattle)



Primary research areas at IPHC



1. Reproduction
2. Growth
3. DMRs and post-release survival assessment
4. Migration
5. **Genetics and genomics**
 - GENETIC STRUCTURE OF THE POPULATION
 - GENOMIC TOOLS (e.g. GENOME)



5. Genetics and genomics

- GENETIC STRUCTURE OF THE POPULATION
- GENOMIC TOOLS (e.g. GENOME)

Projects:

1. *Sequencing of the Pacific halibut genome (Project 673.13)*

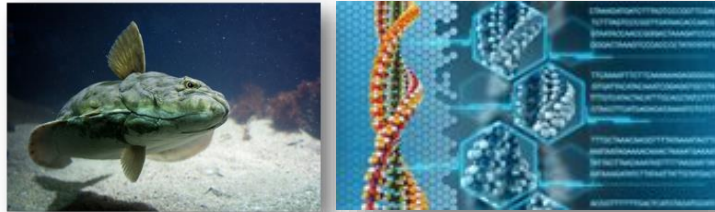
Objectives:

- Improve knowledge on the genetic composition of the population
- Establish genomic resources for the species
- Evaluate effects of fishery-dependent and fishery-independent influences on growth, reproduction, nutrition, etc.



5. Genetics and genomics

- *Pacific halibut genome sequencing (Project 673.13)*



Objective: Generate a first draft sequence of the Pacific halibut genome

- Genomic DNA sequenced from one Pacific halibut female (WZ).
- Conducted first genome assembly:
 - Full genome sequenced. Genome size: 700 Mb
 - Non-continuous genome sequence.
- Additional sequencing is required to complete assembly.



Dr. Yann Guiguen



Dr. Lorenz Hauser






Outline of the presentation



- Update on the research activities of the Biological and Ecosystem Science Branch
- **Outcome of external funding applications**
- Proposed research projects for 2018
- Revised research project development and selection process



Research proposals submitted for external funding in 2017

Project #	Grant agency	Project name	Partners	IPHC Budget (US\$)	PI	Management implications	Submission status
1	 Saltonstall-Kennedy NOAA	Improving discard mortality rate estimates in the Pacific halibut by integrating handling practices, physiological condition and post-release survival	Alaska Pacific University	223,220	Planas (lead PI) Dykstra Loher Stewart Hicks	Bycatch estimates	Awarded
2	 NPRB	Somatic growth processes in the Pacific halibut (<i>Hippoglossus stenolepis</i>) and their response to temperature, density and stress manipulation effects	AFSC-NOAA-Newport	122,264	Planas (lead PI)	Changes in biomass/size-at-age	Awarded
3	 NPRB	Larval transport, supply, and connectivity of Pacific halibut between the Gulf of Alaska and the Bering Sea	AFSC-NOAA-Seattle UAF	8,000	Sadorus Planas Stewart	Biomass distribution	Rejected
4	 Essential Fish Habitat NOAA	Validating biochemical markers of growth for habitat assessment in flatfishes	AFSC-NOAA-Newport	35,000	Hurst (lead PI) Planas	Changes in biomass/recruitment	Rejected
5	 NFWF	Evaluating virtual vitality assessments of discarded Pacific halibut	AFSC-NOAA, APU, NFR	-	Harris (APU), Dykstra	Bycatch estimates	Rejected



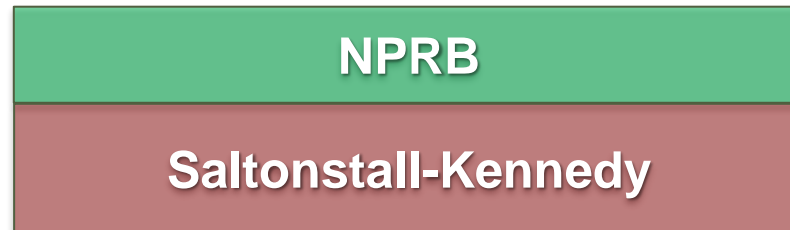
Outcome of external funding applications

Project #	Grant agency	Project name	Partners	IPHC Budget (\$US)	PI/IPHC Staff	Management implications	Submission status
1	Saltonstall-Kennedy NOAA	Improving discard mortality rate estimates in the Pacific halibut by integrating handling practices, physiological condition and post-release survival	Alaska Pacific University	\$223,220	Planas (lead PI) Dykstra Loher Stewart Hicks	Discard mortality estimates	Awarded Started in September 2017
2	NPRB	Somatic growth processes in the Pacific halibut (<i>Hippoglossus stenolepis</i>) and their response to temperature, density and stress manipulation effects	AFSC-NOAA-Newport	\$131,891	Planas (lead PI) Rudy	Changes in biomass/size-at-age	Awarded Started in September 2017
Total awarded (\$US)				\$355,111			



Temporal chart of activities

	2016	2017	2018	2019	2020	2021
Reproduction		Annual reproductive cycle				
		Sex determination mechanisms				
	Sex identification					



Outline of the presentation



- Update on the research activities of the Biological and Ecosystem Science Branch
- Outcome of external funding applications
- **Proposed research projects for 2018**
- Revised research project development and selection process



Research projects proposed for 2018

Project #	Project Name	Priority	Budget (\$US)	External funding for FY2018 (\$US)	Management implications
New Projects					
2018-01	Influence of thermal history on growth	High	\$136,004	-	Changes in biomass / size-at-age
2018-02	Adult captive holding studies	High	\$53,395	-	Changes in biomass / size-at-age / larval distribution
2018-03	Whale detection methods	High	\$37,511	-	Mortality estimation
2018-04	Larval connectivity modeling	High	\$20,000	-	Larval distribution
Continuing Projects					
621.16	Development of genetic sexing techniques	High	\$33,928	-	Sex composition of the catch
642.00	Assessment of Mercury and other contaminants	Medium	\$8,400	-	Environmental effects
650.18	Archival tags: tag attachment protocols	High	\$800	-	Adult distribution
650.21	Investigation of Pacific halibut dispersal in Regulatory Area 4B	High	\$6,800	-	Spawning areas
661.11	Ichthyophonous Incidence Monitoring	Medium	\$8,755	-	Environmental effects
669.11	At-sea Collection of Pacific Halibut Weight to Reevaluate Conversion Factors	High	\$7,645	-	Length-weight relationship
670.11	Wire tagging of Pacific halibut on NMFS trawl and setline surveys	High	\$12,840	-	Juvenile and adult distribution
672.12	Condition factors for tagged U32 Fish	High	\$9,116	-	DMR estimates
672.13	Discard mortality rates and injury classification profile by release method	High	\$1,037	\$255,402	DMR estimates
673.13	Sequencing the Pacific halibut genome	High	\$32,500	-	Environmental/Fishery effects
673.14	Identification and validation of markers for growth	High	\$25,681	\$57,773	Changes in biomass / size-at-age
674.11	Full characterization of the annual reproductive cycle	High	\$121,488	-	Maturity assessment
675.11	Tail pattern recognition	High	\$3,900	-	Juvenile and adult distribution
	Total - New Projects		\$251,910		
	Total - Continuing Projects		\$273,090		
	Overall Total (all projects for FY2018)		\$525,000		
	External Funding (for FY2018) (\$US)			\$313,175	

New research projects proposed for 2018

- **Influence of thermal history on growth**

- Tag U32 fish with electronic archival tags recording temperature and depth.
- Relate temperature histories to individual growth as assessed by archival tagging.
- Compare archival data with otolith microchemistry (O^{18}).
- Extend thermal analyses to untagged fish via otolith analysis.

- **Adult captive holding studies**

- Test permanence of individual tail markings (Tail Pattern Recognition)
- Conduct diet manipulation experiments: fat meter validation, stable isotope studies on growth (N^{15}/C^{13})
- Conduct temperature manipulation experiments for growth and O^{18} calibration studies
- Perform larval swimming performance tests
- Test transgenerational marking approaches through broodstock labeling

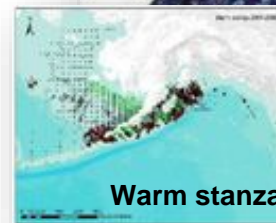
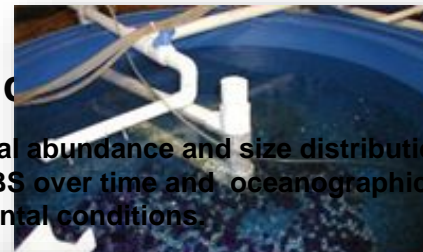
- **Whale**

- Test acoustics technologies for whale detection
- Relate visual capture technologies for Pacific halibut

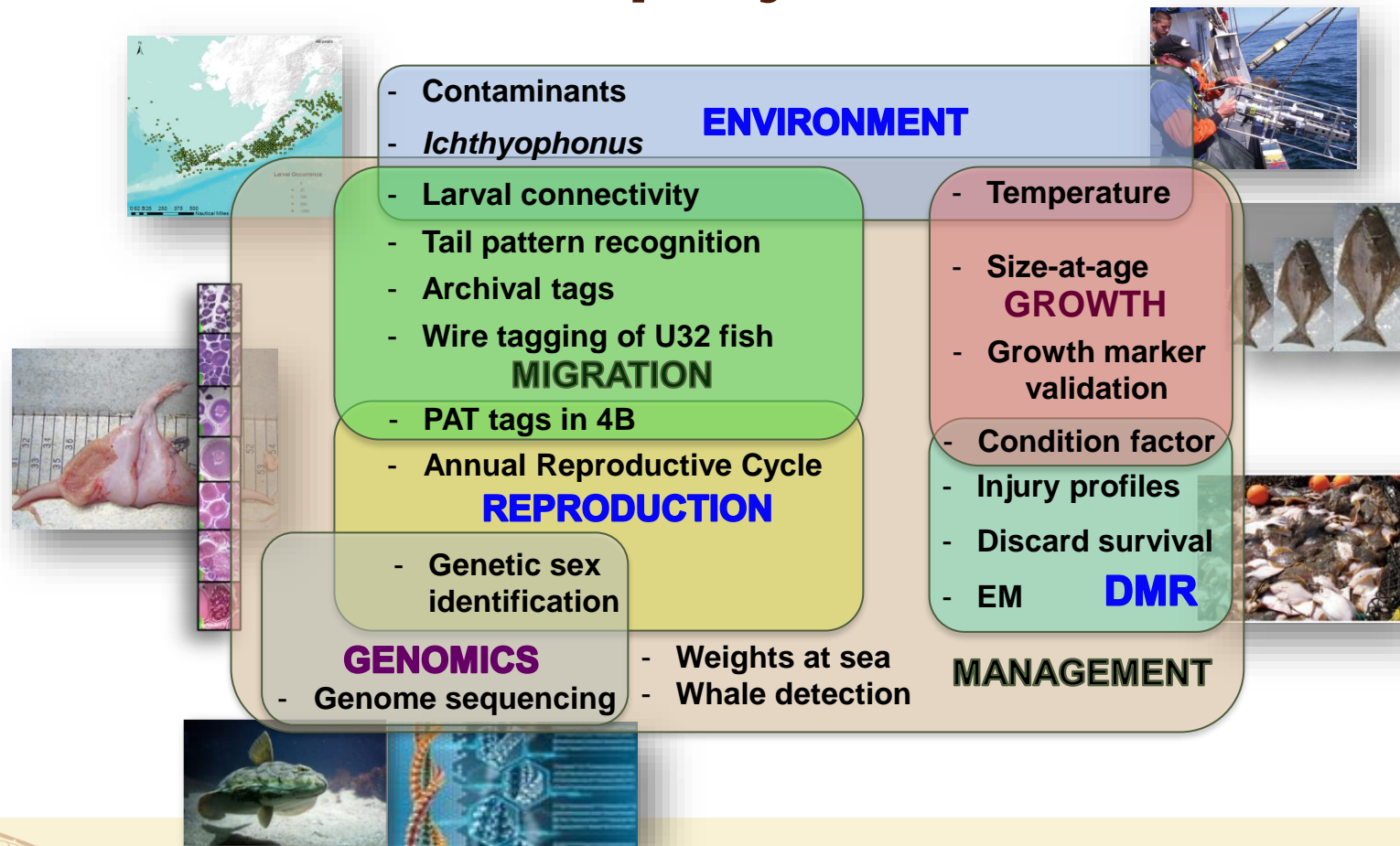


- **Larval**

- Model larval abundance and size distribution in the GOA and BS over time and oceanographic and environmental conditions.



Research projects for 2018



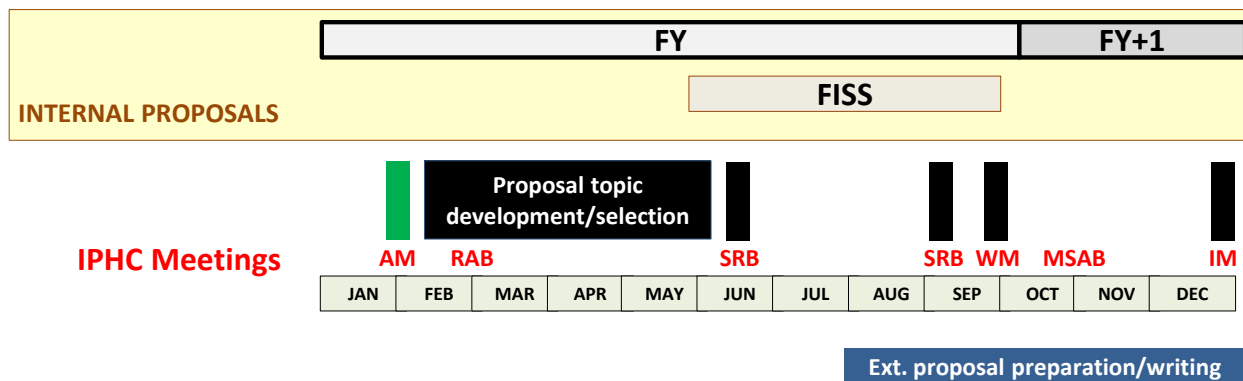
Outline of the presentation



- Update on the research activities of the Biological and Ecosystem Science Branch
- Outcome of external funding applications
- Proposed research projects for 2018
- **Revised research project development and selection process**



Revised Research Project Selection Process



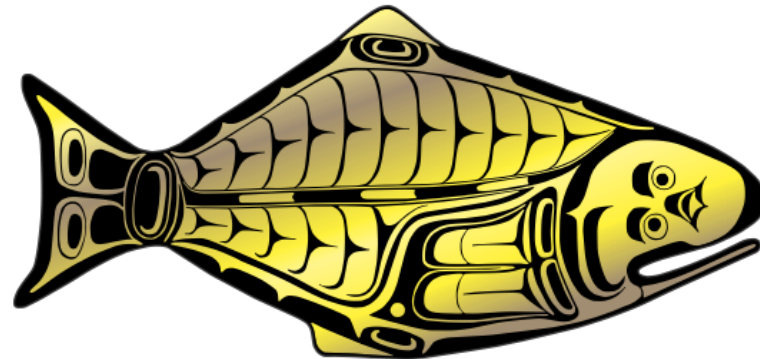
Integration of biological research, stock assessment and policy



Research areas	Research outcomes	Relevance for stock assessment	Inputs to reduce stock assessment uncertainty	MSE development	Inputs to inform MSE development	MSE goals
Reproduction	Sex ratio Spawning output Age at maturity	Spawning biomass scale and trend Stock productivity Recruitment variability	Sex ratio Maturity schedule Fecundity	Operating Model Management Procedures	Sex ratio Maturity schedule Fecundity	Biological sustainability
Growth	Identification of growth patterns Environmental effects on growth Growth influence in size-at-age variation	Temporal and spatial variation in growth Yield calculations Effects of ecosystem conditions Effects of fishing	Predicted weight-at-age	Operating Model Management Procedures	Predicted weight-at-age Mechanisms for changes in weight-at-age	Biological sustainability
Discard Survival	Bycatch survival estimates Discard mortality rate estimates	Scale and trend in mortality Scale and trend in productivity	Bycatch and discard mortality estimates	Operating Model Management Procedures	Bycatch and discard mortality estimates Variability in bycatch and uncertainty in discard mortality estimates	Minimize bycatch mortality Minimize discard mortality
Migration	Juvenile and adult migratory behavior and distribution Larval distribution	Stock distribution Geographical selectivity	Information for structural choices Recruitment indices	Operating Model Management Procedures	Information for structural choices Migration pathways and rates Timing of migration	Biological sustainability Preserve biocomplexity
Genetics and Genomics	Genetic structure of the population Sequencing of the Pacific halibut genome	Spatial dynamics Management units	Information for structural choices	Operating Model Management Procedures	Information for structural choices	Biological sustainability Preserve biocomplexity



INTERNATIONAL PACIFIC



HALIBUT COMMISSION





Size limit evaluation

Agenda item: 10.4
IPHC-2018-AM094-14

L. Boitor



INTERNATIONAL PACIFIC
HALIBUT COMMISSION

Outline

- Background
- Scope
- Survey analysis
- Observer data
- Yield
- Summary



Background

- 1940: 5 lb MSL
- 1944: 26" MSL
- 1960s: YPR → 26" near-optimal age at entry
- 1973: 32" MSL
- 1974: Supported 32" if discard mortality rates low, DMRs above 25% suggested a lower MSL



Background

- 1995: YPR, SBPR → 32” MSL near optimal
- 1999: YPR → smaller MSL, SBPR → some decrease with smaller MSL; ‘reproductive refuge’ concept.
- 2012: Small reductions in MSL → small yield gain; however, SBPR_{ratio} based on long-term conditions. Spatial dynamics important. ‘Management buffer’ introduced.
- 2015: Equilibrium models → higher yield for reduced MSL. DMRs, selectivity important.



Background

- Historical studies all focused on equilibrium yield rather than short-term yield
- Results have generally tracked size-at-age
- The perceived importance of discard mortality has increased over time
- *Reproductive refuge* and *management buffer* concepts are well documented benefits of an MSL



Reproductive refuge

- Reducing mortality of immature fish may provide for more spawning biomass for a given level of harvest
 - Requires a stock-recruitment relationship to provide a benefit
 - Also depends on fishing intensity, Control Rules, etc.



Management buffer

- Flatter yield curves
 - Errors in stock size and/or fishing intensity estimates have a smaller effect
- Also depends on Control Rules, fishing intensity, etc.



Scope - terms

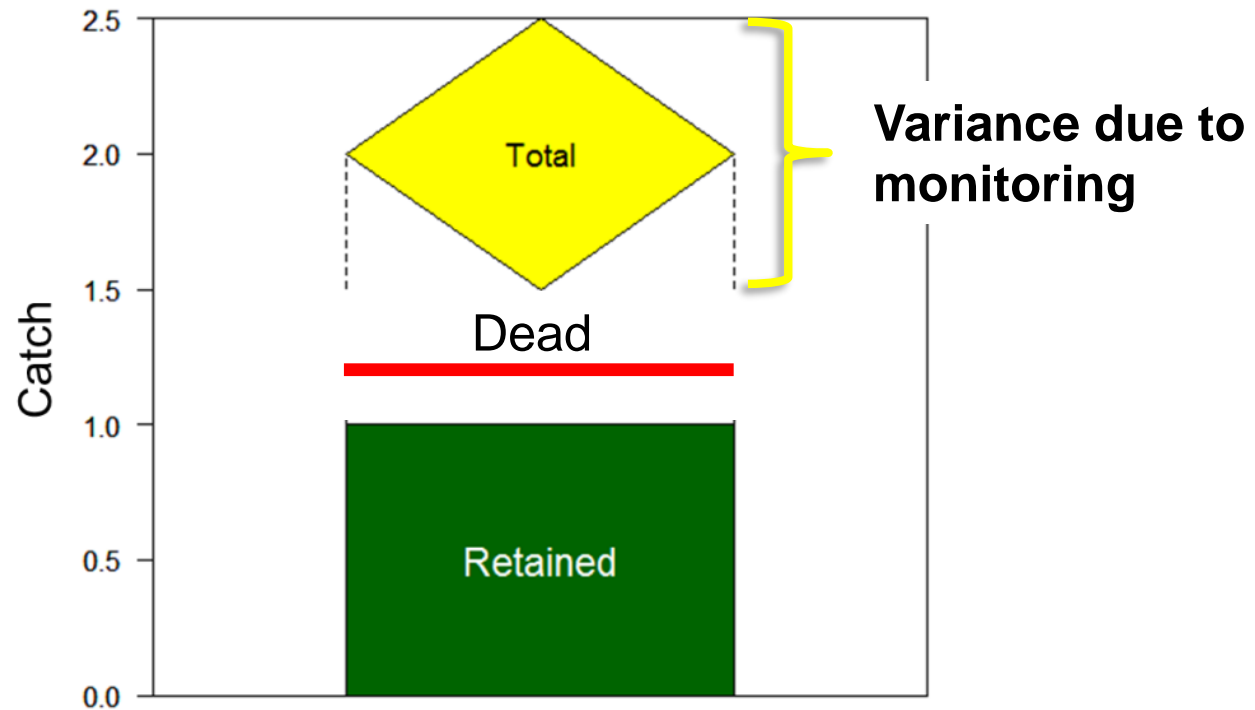
- Catch: All fish that were captured
- Retained catch: All fish landed
- Discards: All fish captured but not retained. Can be either *dead* or *surviving*.
- Mortality: Dead fish. Synonymous with removals.



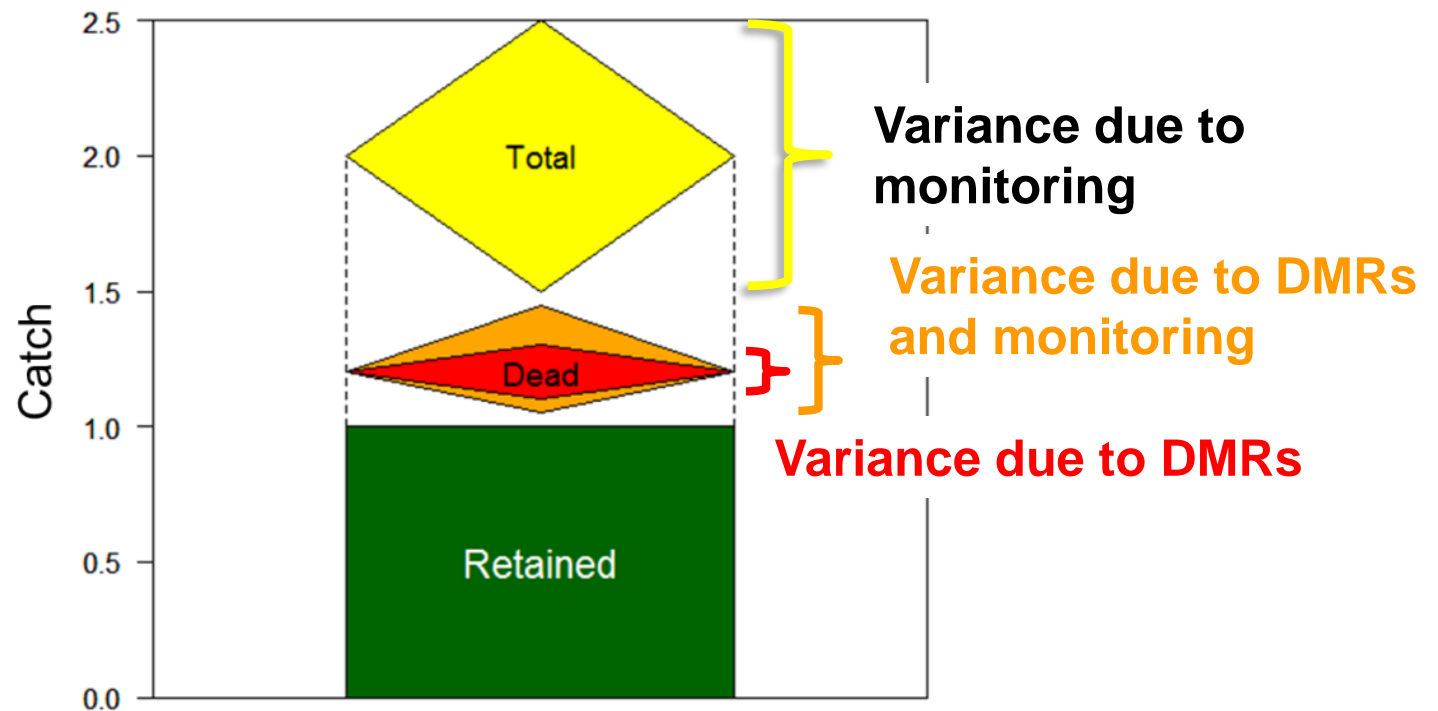
Scope - example



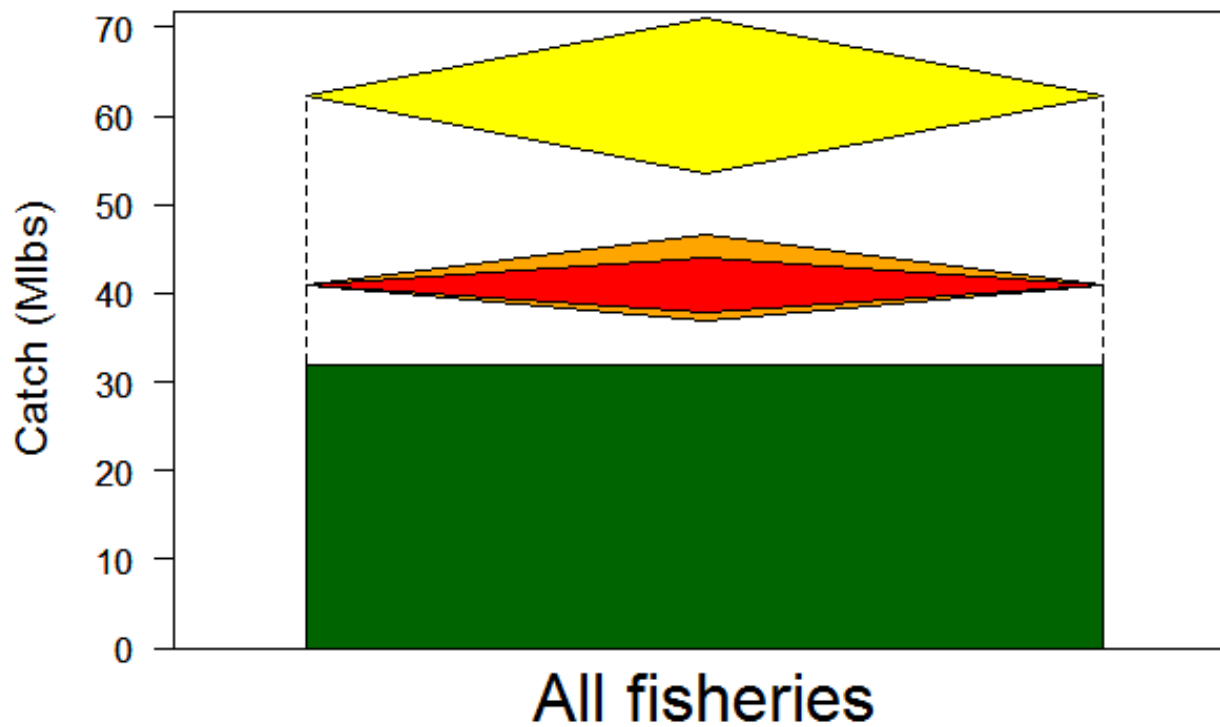
Scope - example



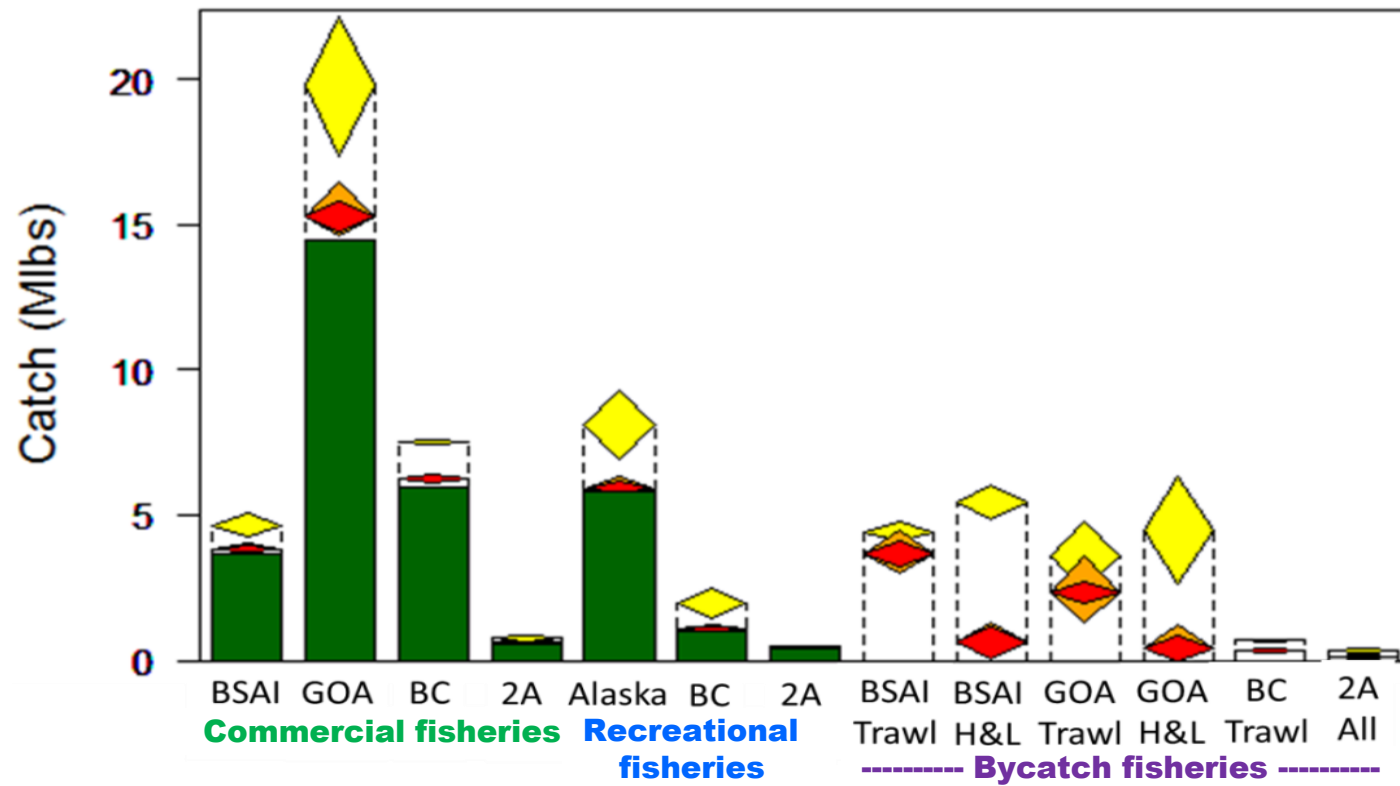
Scope - example



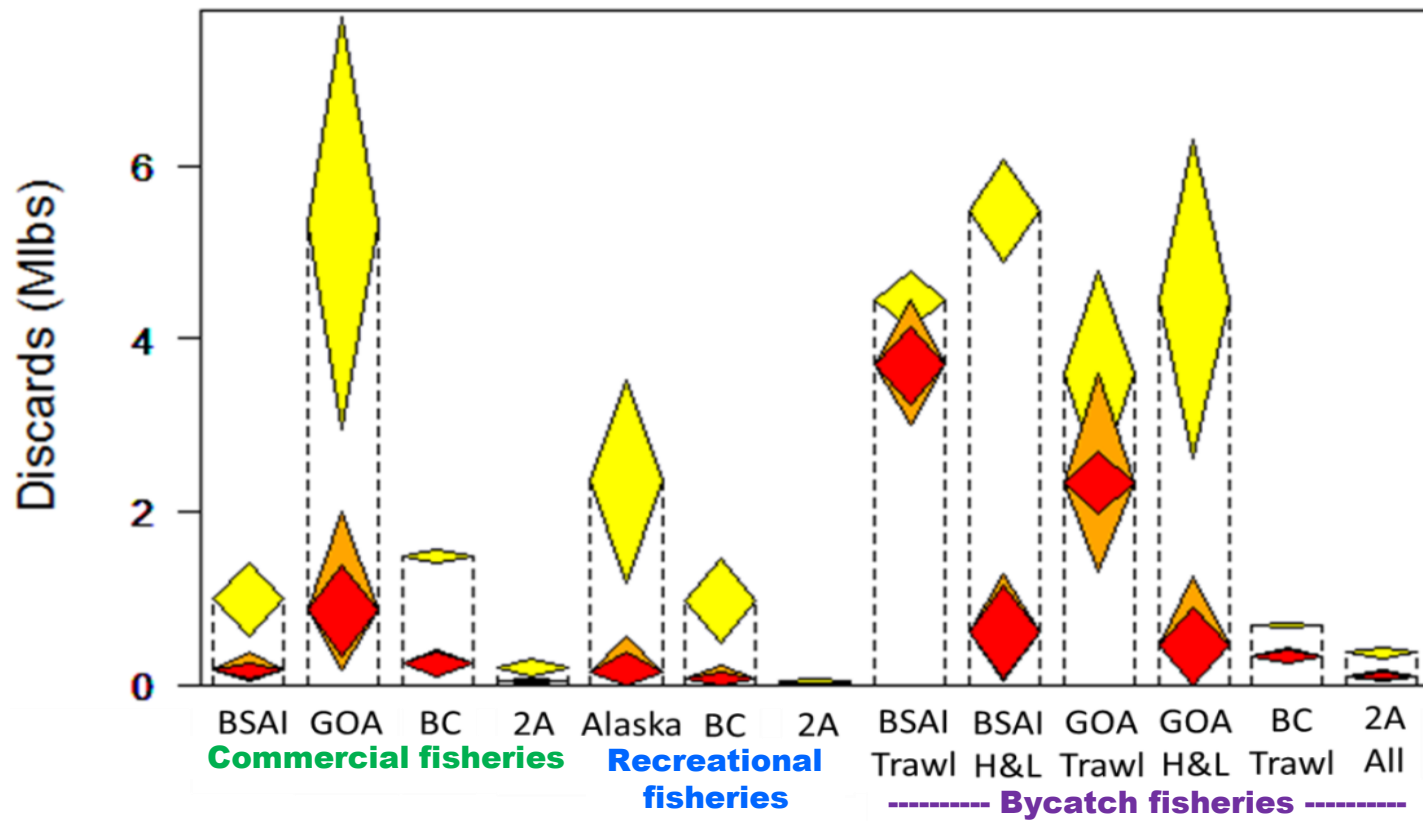
Scope – All catch



Scope – All catch



Scope - Discards



Scope

- Roughly 1 additional pound of Pacific halibut is handled for every pound landed
- Directed fisheries (commercial and sport) are handling a substantial quantity of Pacific halibut
- Commercial discard mortality is estimated to be 1.28 out of 8.97 M lb total discard mortality
 - This is generated mainly via the MSL



Survey data

- The fishery-independent setline survey provides the broadest view of size structure across all areas
- It is only a proxy for the fishery which targets areas of high catch-rate, and operates over a much broader portion of the year
- Summarizing setline survey catch by size-category may still provide a useful population comparison

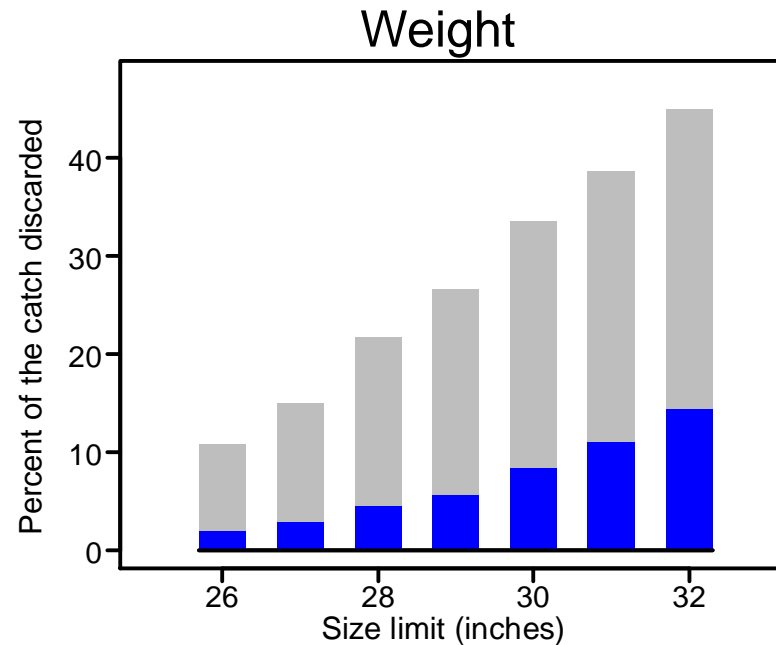
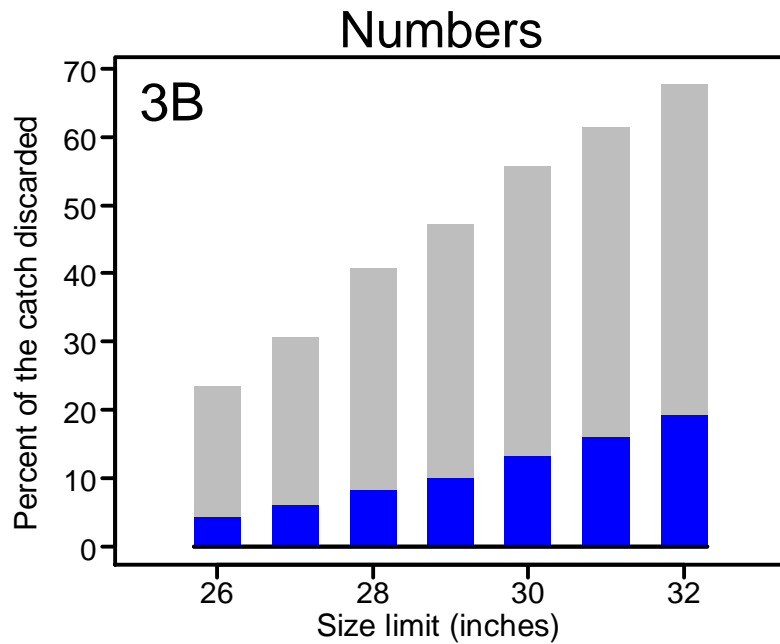


Setline survey – Catch (weight) discarded by MSL

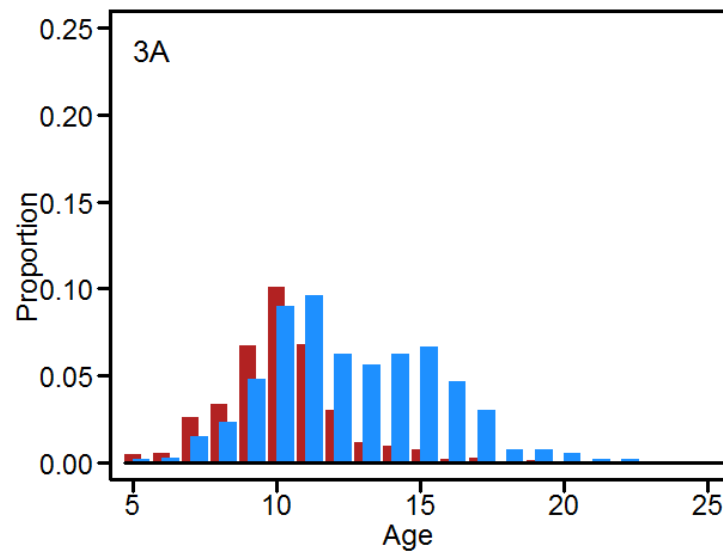
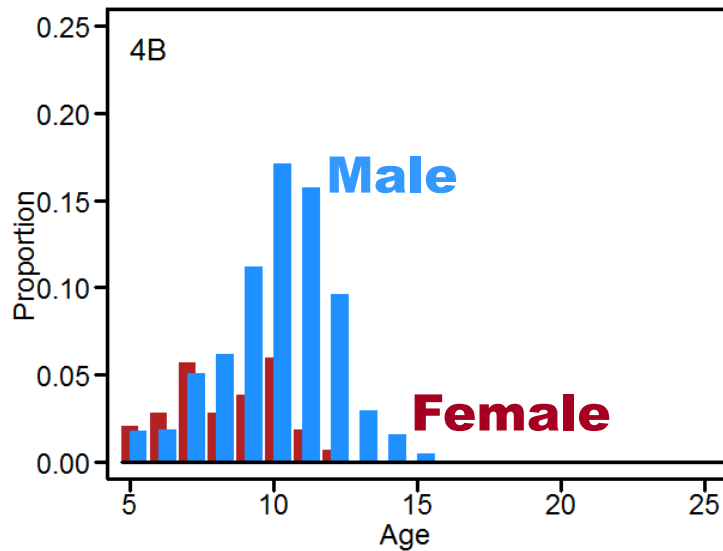
	Size limit (inches)							
	26	27	28	29	30	31	32	
2A	0.3	0.9	3.0	5.1	10.4	13.9	20.4	
2B	0.7	1.8	4.7	7.4	12.7	17.0	22.9	
2C	0.6	1.2	2.8	4.2	6.8	9.4	13.5	- 12.9%
3A	2.5	3.9	6.9	10.5	16.9	20.6	26.7	
3B	10.7	15.0	21.7	26.5	33.6	38.7	45.0	- 34.3%
4A	6.3	8.3	11.8	14.0	18.2	21.4	26.1	
4B	2.5	4.0	7.4	10.4	16.4	20.7	26.0	
4CDE	2.4	4.1	7.6	11.0	17.3	21.2	27.3	



Setline survey – Catch discarded by MSL



Age distributions of Pacific halibut <32''



(Figures and tables for all Areas in Appendix B)



Setline survey – Percent female by MSL

	Size limit (inches)								
	None	26	27	28	29	30	31	32	
2A	81.3	81.4	81.8	83.0	84.1	86.1	87.3	89.3	
2B	75.9	76.4	76.9	78.5	79.8	82.3	83.6	85.9	
2C	82.9	83.3	83.6	84.3	84.9	85.7	86.2	87.2	- 4.3%
3A	73.7	75.1	75.7	77.0	78.6	81.5	83.2	85.9	
3B	58.1	62.9	64.9	68.5	71.4	74.8	76.8	79.6	- 21.5%
4A	70.3	73.3	74.2	75.7	76.5	78.1	79.1	80.9	
4B	45.7	46.2	46.6	47.5	48.3	49.9	51.1	52.4	
4CDE	81.0	81.8	82.3	83.1	84.0	86.0	86.8	87.8	



Setline survey

- Important differences among IPHC Regulatory Areas
- Aggregate coastwide result depends on the distribution of catch



Observer data

- No sex-specific information
- All IFQ fishing included (Pacific halibut and sablefish)
- Low observer coverage for >40' LOA, no coverage for < 40' LOA (~ 50% of vessels, 15-18% of catch)
 - Evidence of bias in properties of observer data (larger vessels, shorter trips landing more catch, more species)

→ Also just a proxy for actual fishery catch



Observer data – Catch discarded by MSL

	Size limit (inches)							Survey
	26	27	28	29	30	31	32	32
2A	NA	NA	NA	NA	NA	NA	NA	20.4
2B	NA	NA	NA	NA	NA	NA	NA	22.9
2C	0.7	1.1	2.0	2.8	4.6	5.8	9.1	13.5
3A	1.6	2.5	4.6	6.9	11.1	14.6	21.7	26.7
3B	4.4	5.8	9.1	11.2	15.0	17.6	22.0	45.0
4A	2.5	3.4	5.2	6.4	8.6	10.1	13.4	26.1
4B	0.7	1.1	2.6	3.9	6.9	8.9	12.2	26.0
4CDE	1.1	1.4	2.6	3.9	6.7	8.6	13.2	27.3



Yield calculations

- This approach differs from historical analyses, in that it considers current change in yield, not equilibrium performance
- Equilibrium calculations are better addressed via the MSE/MSAB process (but we need data on selectivity)

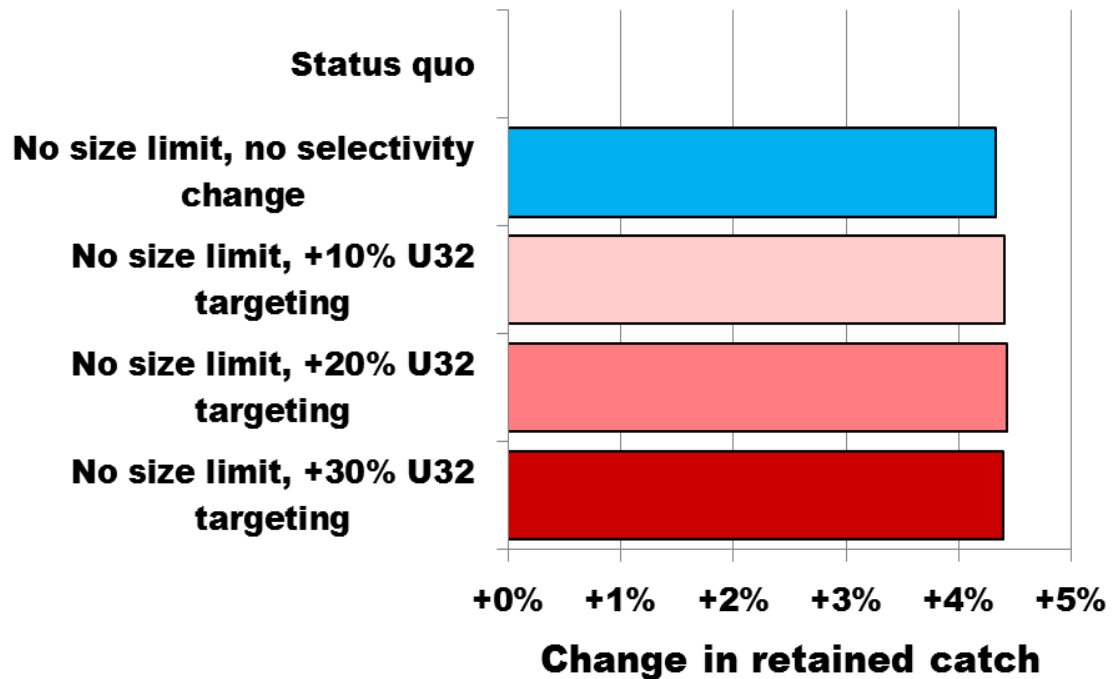


Yield

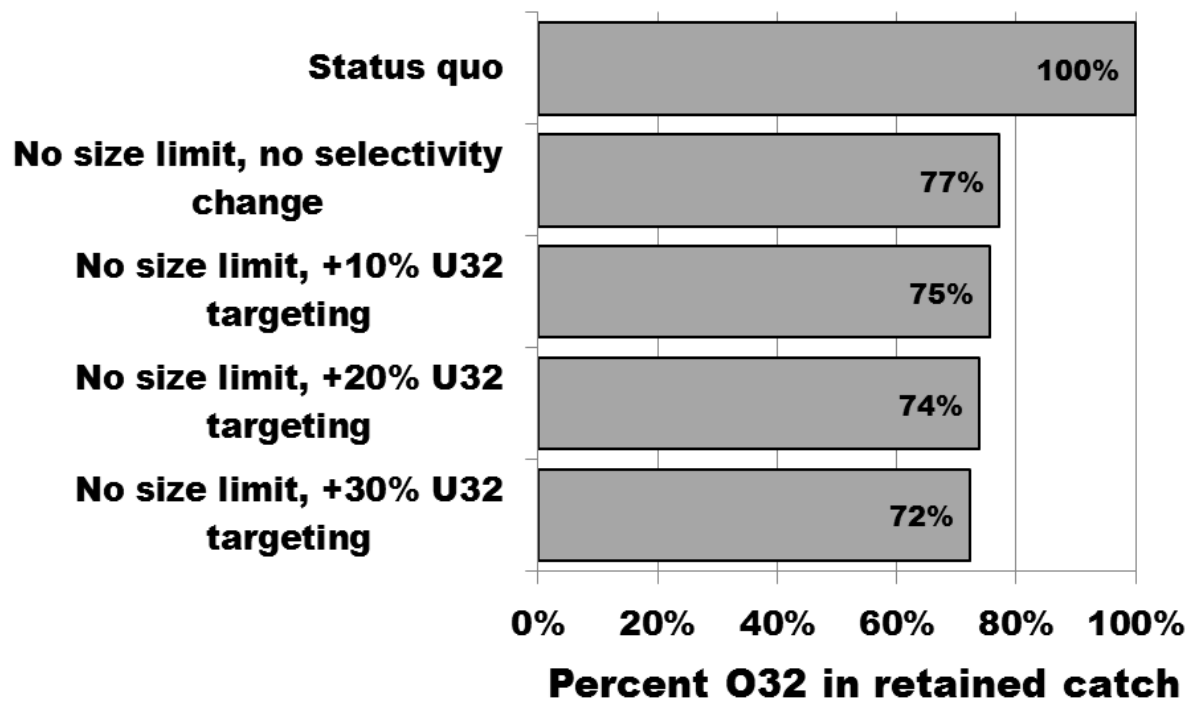
- The change to an SPR-based harvest policy for 2017 provides the basis for yield comparisons:
 - SPR_{46%} 2017 yield as baseline
 - Compare to no size limit
 - Repeat for 10, 20, 30% increases in removals of Pacific halibut less than 32” to mimic additional targeting



Yield – Net change



Yield – Catch composition



Summary

- Biological considerations
 - Management robustness
 - Recruitment refuge
- Operational considerations
 - Fishery efficiency (retained catch-rate)
 - Price for fish < 32”
 - Fishery value

(Full list in Table 5)



Summary of MSL considerations

	Reduced MSL
Discard mortality	unknown
Total yield	Up
Harvest of males	Up
Selectivity	unknown
Biological data on total catch	Incomplete
Management robustness	Down
Recruitment refuge	Down
Fishery efficiency (retained catch-rate)	Up
Price	Emergent
Fishery value	Depends on price



Summary of MSL considerations

	No MSL	
Discard mortality	Down	
Total yield	Up	
Harvest of males	Up	
Selectivity	unknown	
Biological data on total catch	Sampled in port	←
Management robustness	Down	
Recruitment refuge	Down	
Fishery efficiency (retained catch-rate)	Up	
Price	Emergent	←
Fishery value	Depends on price	←



Adaptive management approach

- A decision that is made in order to learn specific information that will improve future management.
 - Approach recommended for evaluation by the SRB in June
 - Draft options in Appendix E

“SRB11–Req.05 (para. 21) NOTING the thoughtful and detailed presentation on the potential impacts of changing the minimum size limit presented in Appendix E (Evaluation of adaptive management approaches) of paper IPHC-2017-SRB11-07, the SRB REQUESTED that the IPHC Secretariat, between now and SRB12, seek feedback from the Commissioners, Conference Board, Processors Advisory Board, and the Management Strategy Advisory Board, on a modified version of Appendix E. In particular, a modified version would include (i) a process for starting and possibly ending an experiment, (ii) performance metrics, and (iii) criteria for making conclusions based on the experimental outcomes.”



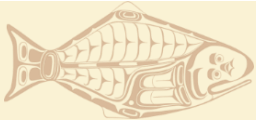
IM093 (IPHC-2017-IM093-R)

- “59. The Commission **AGREED** that the MSL discussion would benefit greatly from additional stakeholder input and should be presented at the 94th Annual Meeting of the Commission in January 2018.
- 60. The Commission **AGREED** that the current MSL does not restrict the landed catch to only mature Pacific halibut: the majority of the catch is estimated to be female, and the age at 50% maturity is very close to the average age in the commercial landings. Therefore, the MSL may be providing a limited benefit in the form of a ‘recruitment refuge’. If that were the management goal, then it could be debated that a higher MSL would be warranted”.

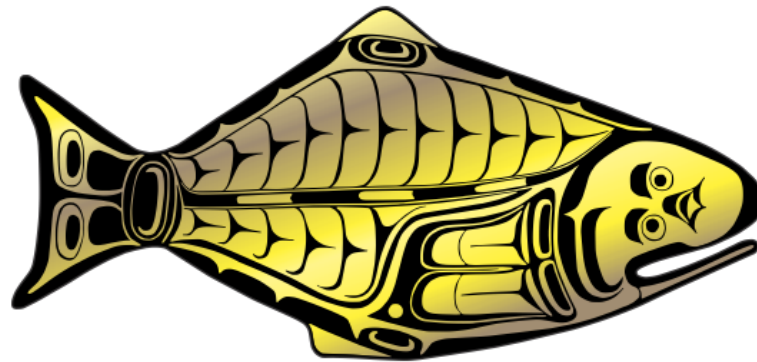


Recommendations

- **NOTE** paper IPHC-2018-AM094-14 which provides an evaluation of the '*effectiveness*' of a range of size limits in the directed commercial Pacific halibut fishery
- **RECOMMEND** whether there is a need for further evaluation of the MSL by the IPHC Secretariat, or whether the current evaluation meets the Commission's needs.



INTERNATIONAL PACIFIC



HALIBUT COMMISSION





FY2017 Financials – Annual Meeting

Agenda Item 12.1

IPHC-2018-AM094-17

L. Boitor



INTERNATIONAL PACIFIC
HALIBUT COMMISSION

Financial Items for FY2017

(1 October 2016 – 30 September 2017)

- ▶ Consolidated Income & Expense
- ▶ Types of Income
 - ▶ Canadian & USA Contributions
 - ▶ Grants & Contracts
 - ▶ Setline Survey Income
- ▶ Expenses
 - ▶ Comparison by Expense category
 - ▶ Personnel Overview
 - ▶ Headquarters Expenses
 - ▶ Catch Effort Program
 - ▶ Other Research Program
 - ▶ Setline Survey Program



Consolidated Income & Expenses (Page 1)

IPHC Income and Expenses

FY2017 Actuals
1 Oct. 2016 to 30 Sept. 2017

General & Supplemental Accounts

Income				Expenses			
	Actual	Budget	% Budget		Actual	Budget	% Budget
Contributions				Core IPHC Activities			
United States	\$ 4,160,000	\$ 4,150,000	100%	Administration	\$ 1,780,653	\$ 1,911,806	93%
Canada	\$ 944,228	\$ 944,228	100%	Scientific	\$ 2,841,974	\$ 3,050,610	93%
				Catch Sampling	\$ 547,010	\$ 663,064	82%
Fish Sales				Vessel Activity			
F.I.S.S. Program	\$ 3,845,400	\$ 3,853,654	100%	F.I.S.S. Program	\$ 5,106,587	\$ 5,488,335	93%
Other Research	\$ -	\$ 125,000	0%				
Other Income				Research Activities			
Grants & Contracts	\$ 589,631	\$ 672,984	88%	Other Research	\$ 480,397	\$ 625,000	77%
Interest Income	\$ 14,884	\$ 16,125	92%	Field Experiments	\$ -	\$ -	0%
Misc. Income	\$ -	\$ -	n/a				
Normal FY2017 Income	\$ 9,554,143	\$ 9,761,992	98%	Normal FY2017 Expenses	\$ 10,756,620	\$ 11,738,816	92%
Extraordinary Income				Associated Expenses			
Canada - Pension Liability	\$ 563,476	\$ -	n/a	Canada - Pension Liability	\$ 563,476	\$ -	n/a
Total FY2017 Income	\$ 10,117,619	\$ 9,761,992	104%	Total FY2012 Expenses	\$ 11,320,096	\$ 11,738,816	96%

Net Normal FY2017	\$ (1,202,477)
Net Normal as % of Income	-12.6%
Unrestricted Funds Balance	\$ 3,922,332



IPHC Income Types

- ▶ Member Contributions – Canada & United States of America
- ▶ Interest Income – Savings Interest, Certificates of Deposit, and Treasuries
- ▶ Grants & Contracts
 - ▶ Federal Grants
 - ▶ Federal Contracts
 - ▶ Other Grants & Contracts
- ▶ Generated Income – Setline Survey Sales



Income Sources (Page 1)

IPHC Income and Expenses

FY2017 Actuals
1 Oct. 2016 to 30 Sept. 2017

General & Supplemental Accounts

Income					Expenses			
	Actual	Budget	% Budget		Actual	Budget	% Budget	
Contributions					Core IPHC Activities			
United States	\$ 4,160,000	\$ 4,150,000	100%	Administration	\$ 1,780,653	\$ 1,911,806	93%	
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Misc. Income	\$ -	\$ -	n/a					
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Extraordinary Income					Associated Expenses			
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Net Normal FY2017	\$ (1,202,477)
Net Normal as % of Income	-12.6%
Unrestricted Funds Balance	\$ 3,922,332



Member Contributions (Page 3)

INCOME	Actual	Budget	% of Budget
General			
Carry over from Prior FY	\$ 249,936	\$ 249,936	100%
US Contribution - General	\$ 4,160,000	\$ 4,150,000	100%
CDN Contribution - General	\$ 848,720	\$ 848,720	100%
CDN Contribution - Pension	\$ 95,508	\$ 95,508	100%
CDN Contribution - Pension Suppl.	\$ 563,476	\$ -	0%
Interest	\$ -	\$ 5,000	0%
Other income	\$ -	\$ -	0%
FY Income Sub-total	\$ 5,667,704	\$ 5,099,228	111%
TOTAL GENERAL FUND INCOME	\$ 5,917,640	\$ 5,349,164	111%



Grants & Contracts (Page 4)

Income	Actual	Budget	%	Notes
Supplemental				
Carryover from prior FY	\$ 4,864,061	\$ 4,864,061	100%	
Fish Sales				
Sale of Halibut - SSA	\$ 3,791,447	\$ 3,795,257	100%	
Sale of Bycatch - SSA	\$ 53,953	\$ 58,397	92%	
Sale of Halibut - DMR Project	\$ -	\$ 125,000	0%	
Grants and Contracts				
NMFS - Sampling Grant	\$ 541,966	\$ 541,966	100%	Annual port sampling grant
NMFS - Sablefish logbooks	\$ -	\$ 81,761	0%	Deferred and integrated into Sampling Grant
DFO Rockfish Contract	\$ 35,735	\$ 37,079	96%	Area 2B rockfish sampling
WDFW - Bycatch Sampling	\$ 11,930	\$ 12,178	98%	Area 2A rockfish sampling



Cost Recovery – Fish Sales (Page 4)

Income	Actual	Budget	%	Notes
Supplemental				
Carryover from prior FY	\$ 4,864,061	\$ 4,864,061	100%	
Fish Sales				
Sale of Halibut - SSA	\$ 3,791,447	\$ 3,795,257	100%	
Sale of Bycatch - SSA	\$ 53,953	\$ 58,397	92%	
Sale of Halibut - DMR Project	\$ -	\$ 125,000	0%	
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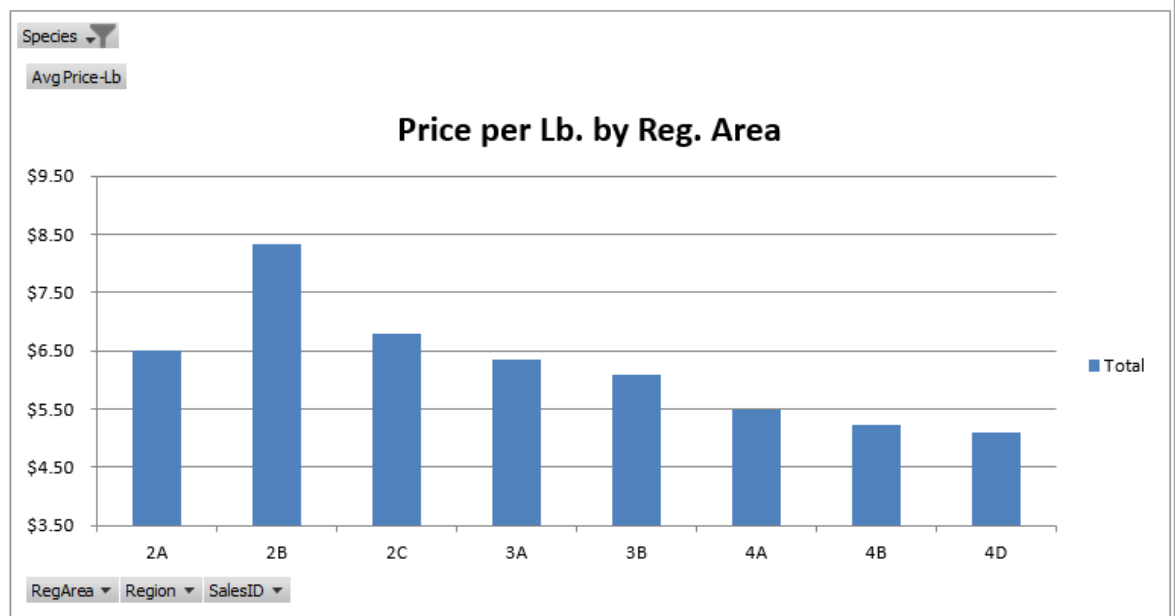


Fishery-Independent Setline Survey – Sales by Region

Landings by IPHC Reg. Area

Species Pacific Halibut

Region	Avg Price-Lb	2017 Budget	% of Budget
2A	\$ 6.50	\$ 7.06	92%
2B	\$ 8.34	\$ 7.72	108%
2C	\$ 6.79	\$ 6.50	104%
3A	\$ 6.36	\$ 6.59	96%
3B	\$ 6.09	\$ 5.75	106%
4A	\$ 5.50	\$ 5.46	101%
4B	\$ 5.24	\$ 4.53	116%
4D	\$ 5.09	\$ 5.11	100%
Grand Total	\$ 6.47	\$ 6.38	101%



Impacts of Price/WPUE

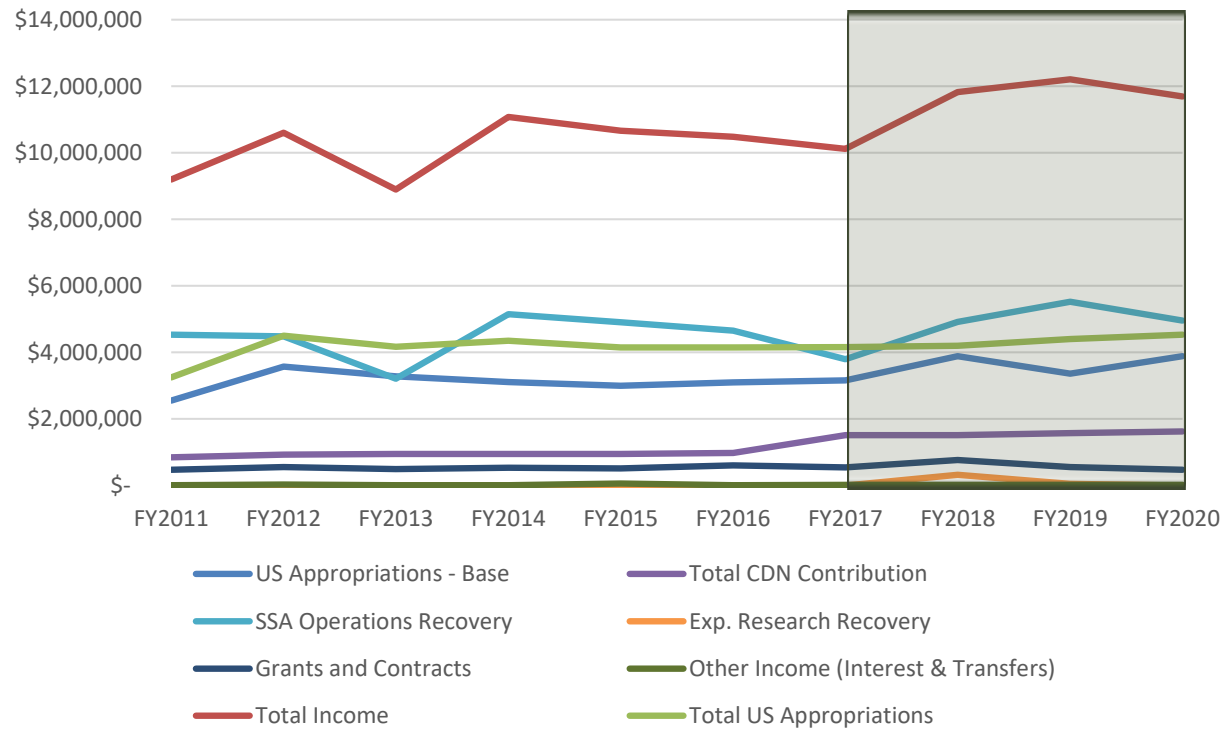
FIS Program Totals

	Actual	Budget	% of Budget
Total Pounds Landed	573,420	594,466	96%
Average Net Price	\$6.47	\$6.38	101%
Net Halibut Proceeds	\$3,707,822	\$3,795,257	98%
WPUE (Landed Fish)	73	75	98%
Net Bycatch Proceeds	\$53,331	\$57,494	93%
Vessel Expenses	(\$4,762,514)	(\$5,086,518)	94%
Office Expenses	(\$281,734)	(\$345,111)	82%
Trawl Survey	(\$58,818)	(\$56,706)	104%
Net Proceeds	(\$1,341,913)	(\$1,635,583)	



IPHC Income FY2011 – FY2020

IPHC Income Sources (7 years)
FY2011-FY2017



Expense Categories (Page 1)

IPHC Income and Expenses

FY2017 Actuals
1 Oct. 2016 to 30 Sept. 2017

General & Supplemental Accounts

Income	Actual	Budget	% Budget
Contributions			
United States	\$ 4,160,000	\$ 4,150,000	100%
Canada	\$ 944,228	\$ 944,228	100%
Fish Sales			
F.I.S.S. Program	\$ 3,845,400	\$ 3,853,654	100%
Other Research	\$ -	\$ 125,000	0%
Other Income			
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Interest Income	\$ 14,884	\$ 16,125	92%
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Extraordinary Income			
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Total FY2017 Income	\$ 10,117,619	\$ 9,761,992	104%

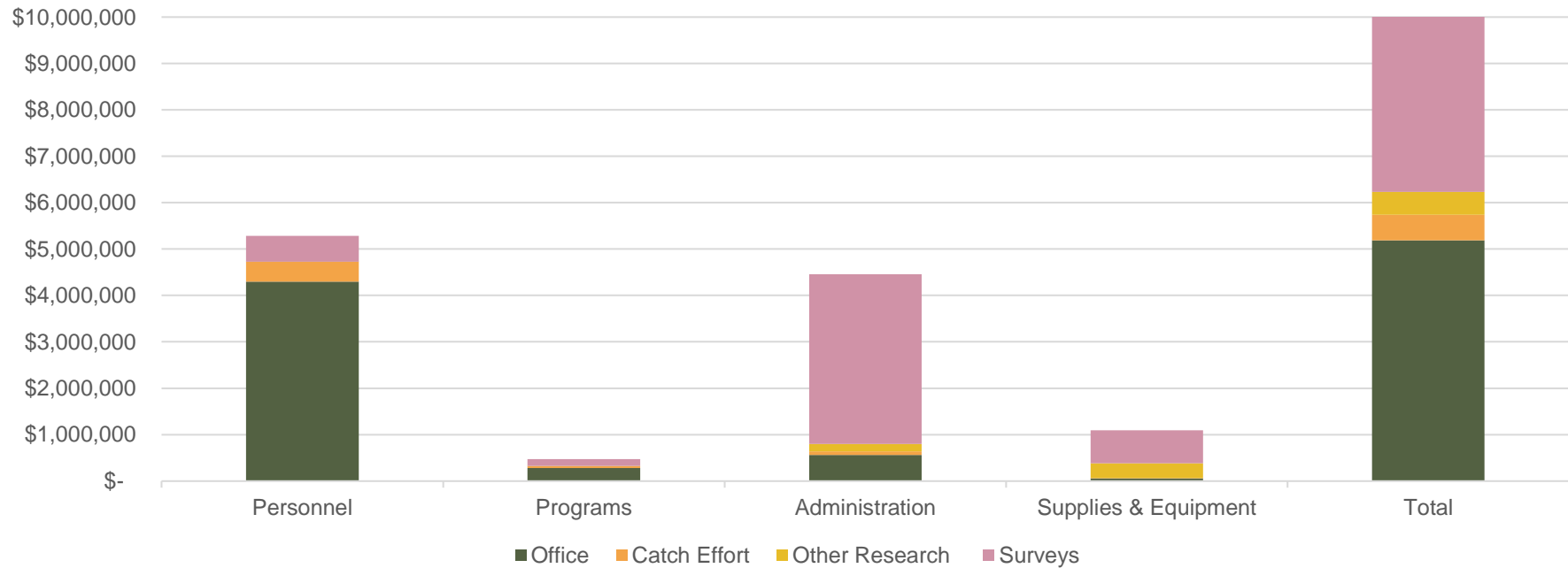
Expenses	Actual	Budget	% Budget
Core IPHC Activities			
Administration	\$ 1,780,653	\$ 1,911,806	93%
Scientific	\$ 2,841,974	\$ 3,050,610	93%
Catch Sampling	\$ 547,010	\$ 663,064	82%
Vessel Activity			
F.I.S.S. Program	\$ 5,106,587	\$ 5,488,335	93%
Research Activities			
Other Research	\$ 480,397	\$ 625,000	77%
Field Experiments	\$ -	\$ -	0%
Normal FY2017 Expenses	\$ 10,756,620	\$ 11,738,816	92%
Associated Expenses			
Canada - Pension Liability	\$ 563,476	\$ -	n/a
Total FY2017 Expenses	\$ 11,320,096	\$ 11,738,816	96%

Net Normal FY2017	\$ (1,202,477)
Net Normal as % of Income	-12.6%
Unrestricted Funds Balance	\$ 3,922,332



FY2017 Expenses by Type and Program

FY2017 Expenses



Headquarter Expenses

TABLE 6. Operations

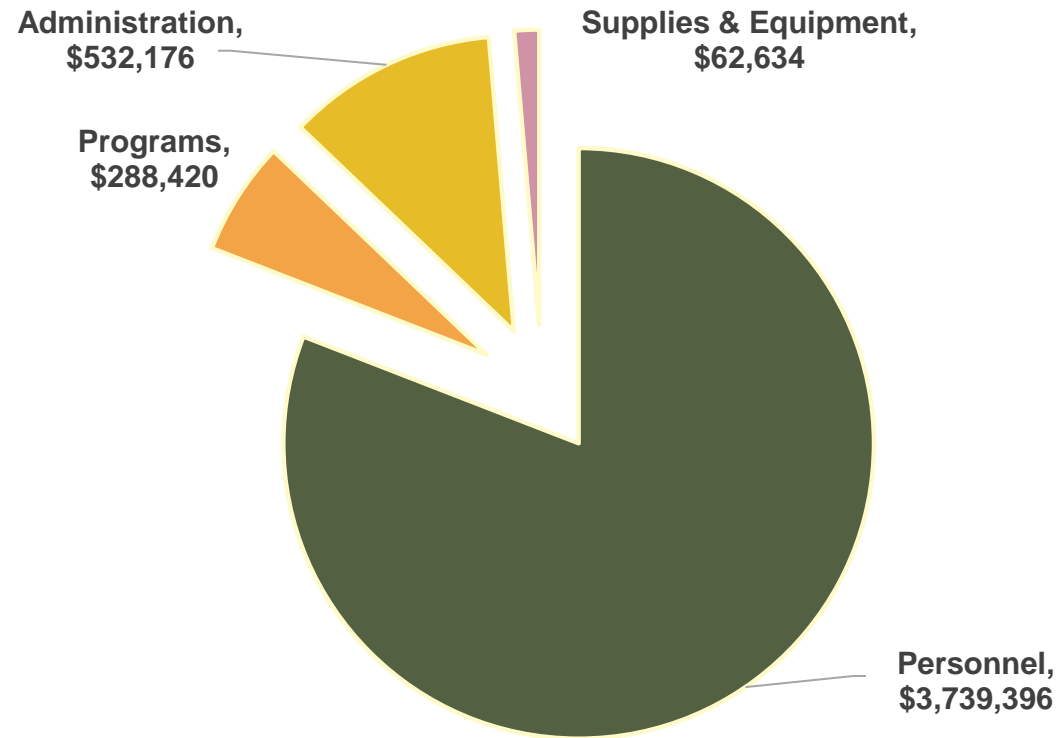
International Pacific Halibut Commission
Fiscal Year Actuals and Budgets

Period	[12-2017]
% of Year	100%

Personnel	10		30	40		60	Sub-Total	50	Actuals	Budget	% of Budget
	Administration	Scientific		Statistics	Field Experiments						
Salaries	\$ 607,724	\$ 2,018,801	\$ 356,023	\$ -	\$ 4,076	\$ 2,986,624	\$ 530,082	\$ 3,516,706	\$ 3,526,190	100%	
Benefits	\$ 343,732	\$ 566,661	\$ 52,044	\$ -	\$ -	\$ 962,437	\$ 41,406	\$ 1,003,844	\$ 1,077,146	93%	
Taxes	\$ 40,927	\$ 151,539	\$ 20,805	\$ -	\$ -	\$ 213,272	\$ 28,879	\$ 242,151	\$ 256,723	94%	
Other	\$ 7,182	\$ -	\$ -	\$ -	\$ -	\$ 7,182	\$ -	\$ 7,182	\$ 15,200	47%	
Hiring/Separation	\$ 2,830	\$ -	\$ 47	\$ -	\$ -	\$ 2,877	\$ 1,437	\$ 4,314	\$ 51,000	8%	
Subtotal	\$ 1,002,395	\$ 2,737,001	\$ 428,919	\$ -	\$ 4,076	\$ 4,172,392	\$ 601,804	\$ 4,774,196	\$ 4,926,259	97%	
Programs											
Meetings & Conferences	\$ 160,843	\$ 17,434	\$ -	\$ -	\$ -	\$ 178,277	\$ -	\$ 178,277	\$ 200,250	89%	
Travel	\$ 23,995	\$ 18,402	\$ 32,706	\$ -	\$ 10,800	\$ 85,903	\$ 67,960	\$ 153,863	\$ 210,797	73%	
Communications	\$ 28,146	\$ -	\$ 4,140	\$ -	\$ 2,495	\$ 34,781	\$ 83,176	\$ 117,957	\$ 163,054	72%	
Publications	\$ 37,055	\$ 2,544	\$ -	\$ -	\$ -	\$ 39,600	\$ -	\$ 39,600	\$ 61,000	65%	
Subtotal	\$ 250,040	\$ 38,380	\$ 36,846	\$ -	\$ 13,294	\$ 338,561	\$ 151,135	\$ 489,696	\$ 635,101	77%	
Administration											
Contracts	\$ 76,256	\$ 12,525	\$ 43,399	\$ -	\$ 138,417	\$ 270,598	\$ 3,114,861	\$ 3,385,459	\$ 3,907,292	87%	
Maintenance	\$ 92,384	\$ 3,748	\$ -	\$ -	\$ -	\$ 96,132	\$ 33,775	\$ 129,907	\$ 145,316	89%	
Facility Rentals	\$ 269,807	\$ -	\$ 3,205	\$ -	\$ -	\$ 273,012	\$ 16,361	\$ 289,373	\$ 298,358	97%	
Training & Education	\$ 38,500	\$ 9,733	\$ 24,870	\$ -	\$ 400	\$ 73,504	\$ 58,379	\$ 131,883	\$ 186,400	71%	
Fees	\$ 29,222	\$ -	\$ 6,359	\$ -	\$ -	\$ 35,581	\$ 416,466	\$ 452,047	\$ 527,325	86%	
Subtotal	\$ 506,169	\$ 26,007	\$ 77,833	\$ -	\$ 138,817	\$ 748,826	\$ 3,639,842	\$ 4,388,669	\$ 5,064,690	87%	
Supplies & Equipment											
Equipment	\$ -	\$ 37,359	\$ -	\$ -	\$ 1,407	\$ 38,766	\$ -	\$ 38,766	\$ 116,020	33%	
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Grand Total	\$ 1,780,653	\$ 2,841,974	\$ 547,010	\$ -	\$ 480,397	\$ 5,650,033	\$ 5,106,587	\$ 10,756,620	\$ 11,738,566	92%	
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% of Budget	93%	93%	82%	n/a	77%	90%	93%				



Headquarters Expenses



Catch Effort Expenses

TABLE6. Operations

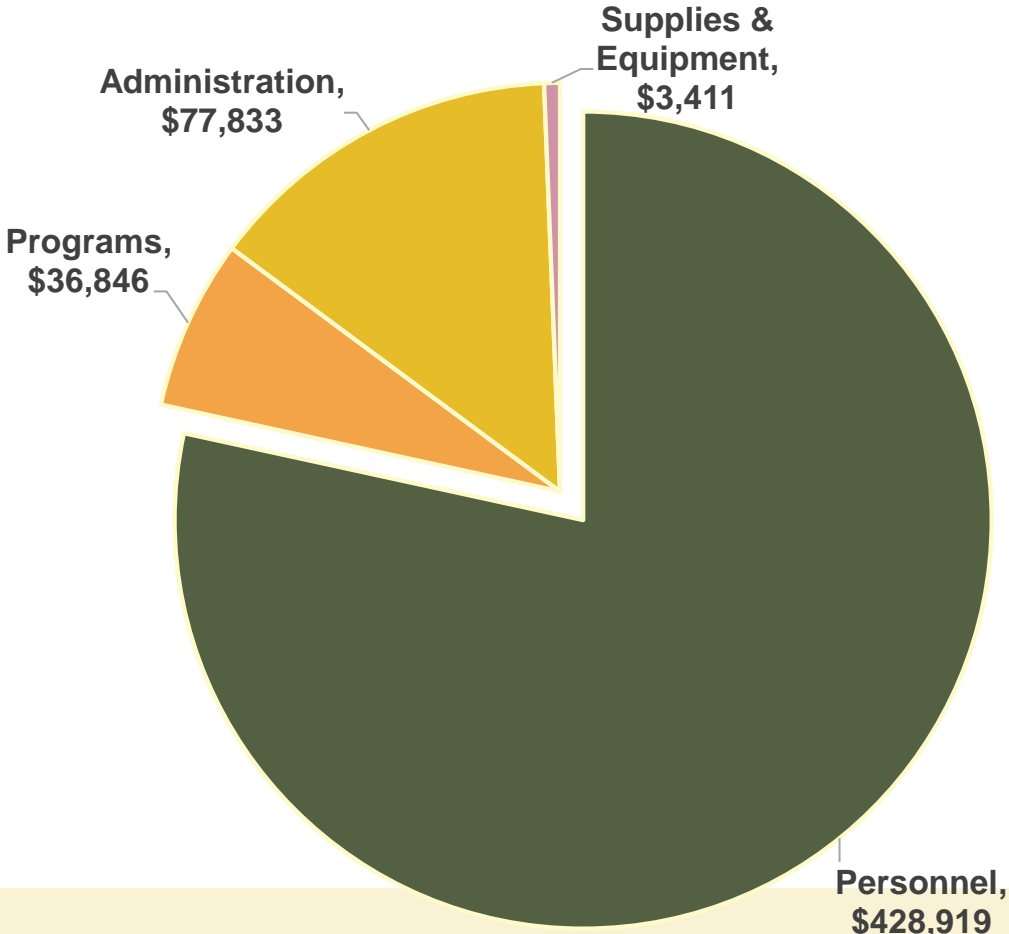
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Period	[12-2017]
% of Year	100%

Personnel	10 Administration	20 Scientific	30 Statistics	40 Field Experiments	60 Other Research	Sub-Total	50 SSA Surveys	Actuals	Budget	% of Budget
Salaries	\$ 607,724	\$ 2,018,801	\$ 356,023	\$ -	\$ 4,076	\$ 2,986,624	\$ 530,082	\$ 3,516,706	\$ 3,526,190	100%
Benefits	\$ 343,732	\$ 566,661	\$ 52,044	\$ -	\$ -	\$ 962,437	\$ 41,406	\$ 1,003,844	\$ 1,077,146	93%
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Budget	\$ 1,911,556	\$ 3,050,610	\$ 663,064	\$ -	\$ 625,000	\$ 6,250,231	\$ 5,488,335			
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Catch Effort Expenses



94th IPHC Annual Meeting (AM094)

Slide 17



Other Research Expenses

TABLE6. Operations

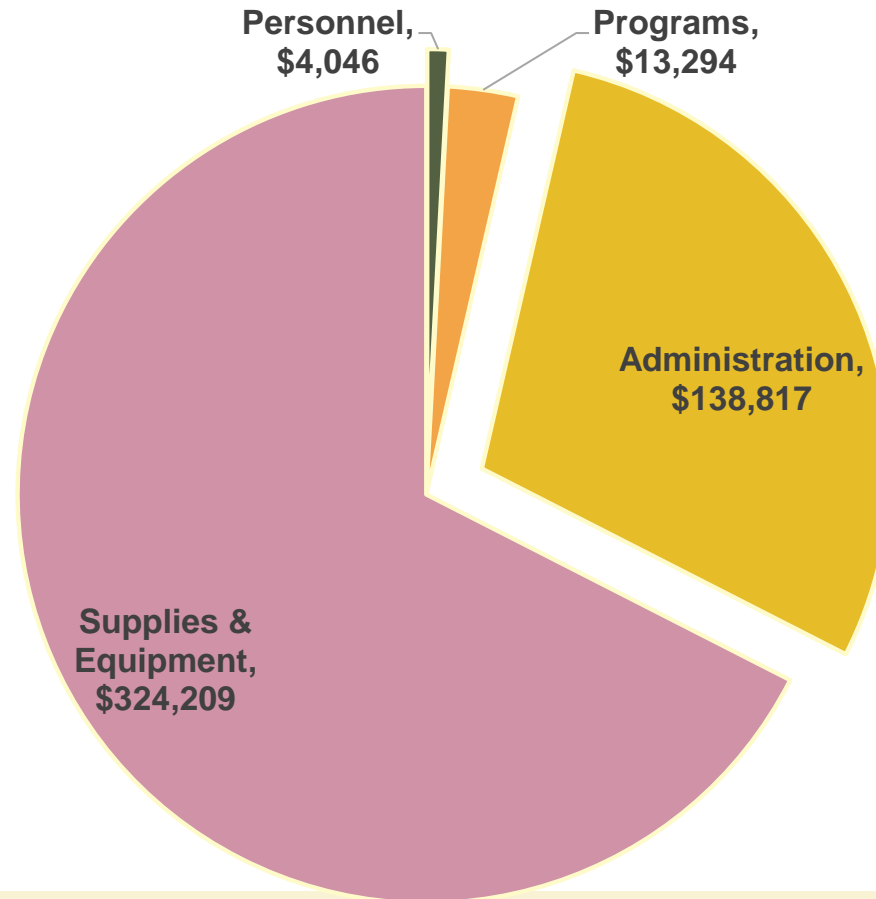
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Budget	\$ 1,911,556	\$ 3,050,610	\$ 663,064	\$ -	\$ 625,000	\$ 6,250,231	\$ 5,488,335			
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Other Research Expenses



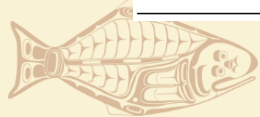
FISS Expenses

TABLE6. Operations

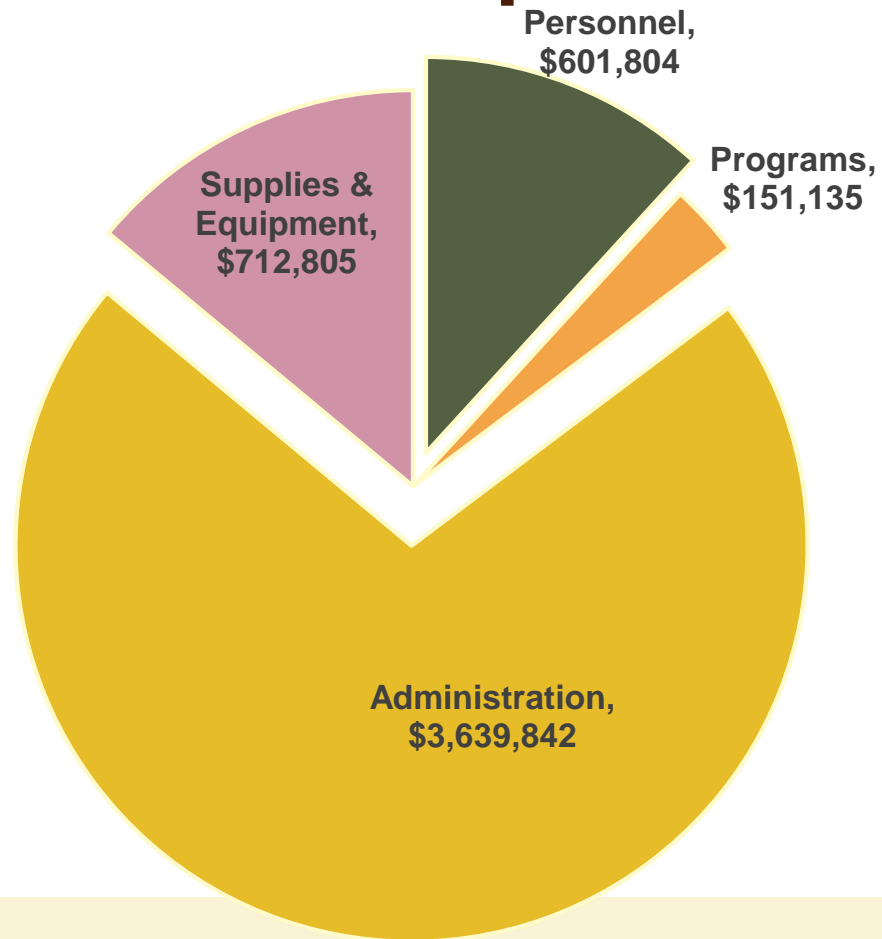
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Fiscal Year Actuals and Budgets

Period	[12-2017]
% of Year	100%

	10	20	30	40	60		50			% of
Personnel	Administration	Scientific	Statistics	Field Experiments	Other Research	Sub-Total	SSA Surveys	Actuals	Budget	Budget
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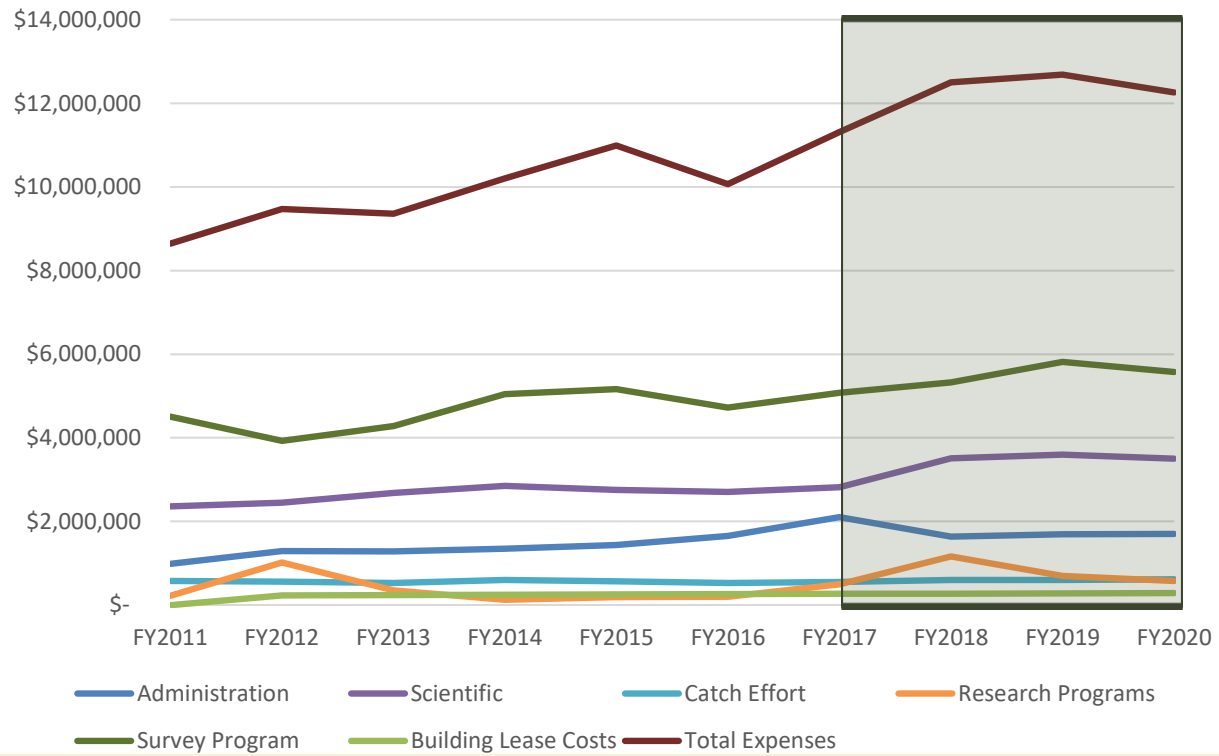


FISS Expenses



FY2011 – FY2017 Expense Trends

IPHC Expense Types (7 years)
FY2011-FY2017



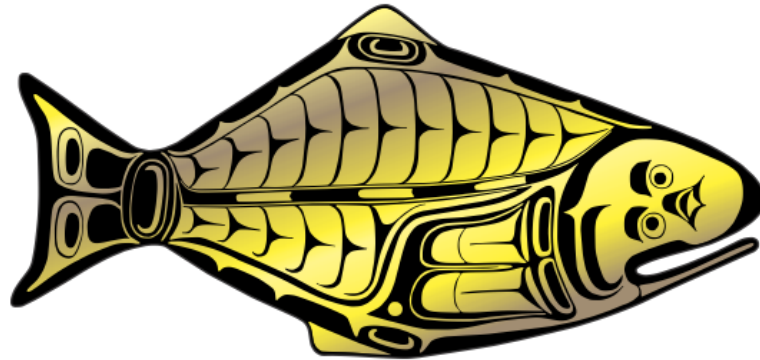
RECOMMENDATION/S

That the Commission:

- **NOTE** paper IPHC-2018-AM094-17 which includes the Financial Statement and supporting documentation for the financial period 01 October 2016 to 30 September 2017



INTERNATIONAL PACIFIC



HALIBUT COMMISSION





Initial Budget Proposals FY2018-FY2020

Agenda Item 12.4
IPHC-2018-AM094-20

L. Boitor



INTERNATIONAL PACIFIC
HALIBUT COMMISSION

FY2018-FY2020 Proposed Budget

- Consolidated Income & Expense
- Income Sources
 - U.S. & Canadian Contributions
 - Grants & Contracts
 - Survey Income
- Expenses
 - Personnel
 - Pension Update (FY2018)
 - Key Elements & Programmatic Changes
 - Survey Income & Expenses
 - Research Overview
- Summary
 - Income & Expense Summary



FY2018 Consolidated Income & Expense

IPHC Income and Expenses

Consolidated General & Supplemental

FY2018 Budget

1 Oct. 2017 to 30 Sept. 2018

Income		Expenses	
Contributions		Core IPHC Activities	
United States	\$ 4,200,000	Administration	\$ 1,937,121
Canada	\$ 1,511,508	Scientific	\$ 3,525,190
		Catch Sampling	\$ 598,244
Fish Sales Income		Survey Expenses	
FISS Program	\$ 5,017,097	FISS Program	\$ 5,381,265
Other Research	\$ 320,428		
Other Income		Research Activities	
Grants & Contracts	\$ 811,672	Field Research	\$ -
Interest Income	\$ 16,125	Other Research	\$ 1,158,603
Misc. Income	\$ -		
		Transfer to Restricted Accounts	\$ -
Total FY2018 Income	\$ 11,876,830	Total FY2018 Expenses	\$ 12,600,423

Total General & Supplemental FY2018 \$ (723,593)

Total as % of Income -6.1%

Unrestricted Funds Balance \$ 3,194,788



Contributions: Contracting Parties

- Canada - Two separate contributions
 - Contribution - **\$1,457,508** (3% increase)
 - Pension Liability - \$83,439 (updated)
- United States of America – Currently **\$4.20M** in committee report.
 - Options include:
 - Budget Approval
 - Omnibus
 - Continuing Resolution



Grants & Contracts

- General Account
 - NMFS Sampling Grant –\$452,397
 - Saltonstall-Kennedy Grant – DMR Classification - \$255,402
 - NPRB Grant - \$57,773
- Supplemental
 - Reimbursed Survey Expenses
 - Canadian Rockfish Sampling - \$34,520
 - Washington Rockfish Sampling - \$11,580



Overall Personnel Expenses

- Cost of Living
 - 2.11% (1.4% general increase + locality)
- Benefits
 - Health care costs +11.5%
 - Addition of Cancer Care benefit (AFLAC)
 - Other benefit costs stable



Office Personnel Changes

Current Positions

- Administrative Personnel – evaluating job duties

Temporary Positions

- Laboratory Technician – hiring Jan. 2018 for 2 yr. position
- MSE Programmer – hiring March 2018 for 2 yr. position
- Post-Doctoral – Hiring July 2018 for 2 yr. position



Office Personnel Changes (cont.)

New/Restructured Position proposals

- MSE Expert (Termed) – Position Description for consideration & decision
- Fisheries Coordinator (ongoing) – In development. For intersessional decision
- Communications Officer (ongoing) – In development. For intersessional decision



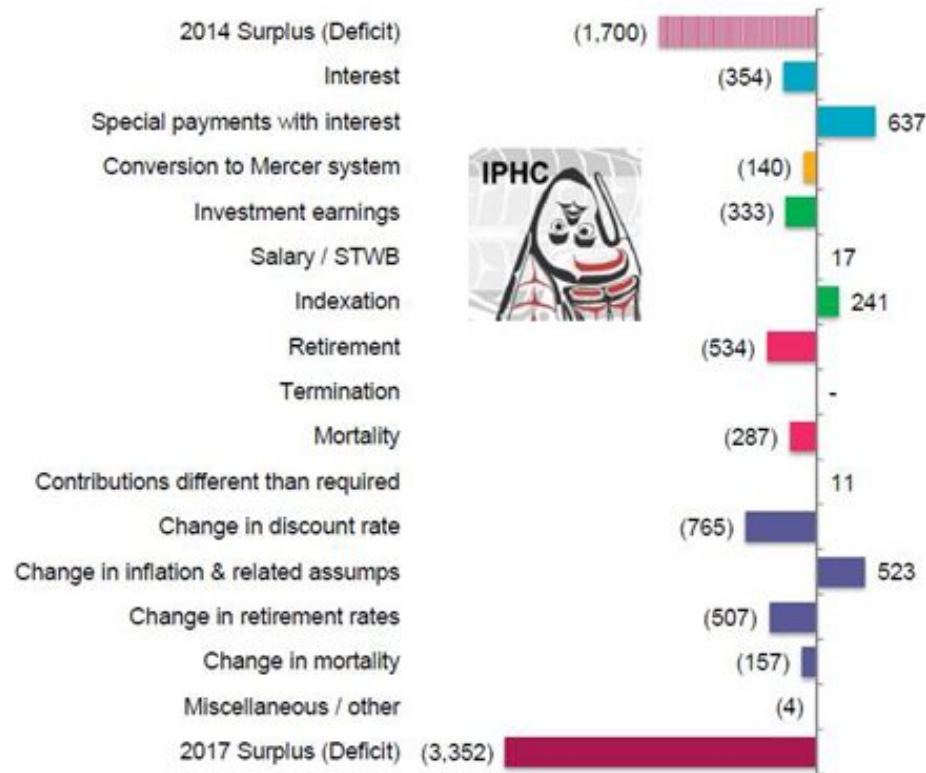
Pension Valuation

- Managed through the International Fisheries Commissions Pension Society (IFCPS)
- Closed plan for U.S. Commissions.
- IPHC - 6 employees and 25 pensioners
- Plan valuation every three years
- Assumptions updated with each valuation
- Current fund value of \$7.9M



IPHC Valuation Details

VALUATION RESULTS – HALIBUT
GAINS AND LOSSES ON GOING CONCERN BASIS



Valuation – Deficit Payments

- Deficit of \$3.352M (Jan. 2018)
- Payment of prior deficit
 - Canada - \$563,476
- 10-year deficit schedule
 - United States - \$167,598 annually
 - Canada - \$111,252 annually
- Future Valuations



Key Budget Items (General Budget)

- Port Sampling Personnel – elimination of dedicated Bellingham/Vancouver port sampler
- Administrative Contracts
 - IT Initiatives - \$206K
 - Continued website development: functionality
 - Managed IT Services
 - Data Warehouse Development
 - Network & Data Security Analysis
 - Software Development Framework
 - Performance Review (\$30K)
 - ERP Integration (\$35K)
- Capital Equipment & Improvements
 - Lab Buildout & Scientific Equipment (\$50K)



Research Program – Continuing Projects

APPENDIX I

Summary of research projects proposed for 2018

Project #	Project Name	Priority	Budget (\$US)	External funding for FY2018 (\$US)	Management implications
<i>Continuing Projects</i>					
621.16	Development of genetic sexing techniques	High	33,928	-	Sex composition of catch
642.00	Assessment of mercury and other contaminants	Medium	8,600	-	Environmental effects
650.18	Archival tags: tag attachment protocols	High	800	-	Adult distribution
650.21	Investigation of halibut dispersal in Area 4B	High	6,800	-	Spawning areas
661.11	<i>Ichthyophonus</i> incidence monitoring	Medium	8,755	-	Environmental effects
669.11	At-sea collection of halibut weight to reevaluate conversion factors	High	7,645	-	Length-weight relationship
670.11	Wire tagging of halibut on NMFS trawl and setline surveys	High	12,840	-	Juvenile and adult distribution
672.12	Condition factors for tagged U32 Fish	High	9,116	-	DMR estimates
672.13	Discard mortality rates and injury classification profile by release method	High-Medium	1,037	255,402	DMR estimates
673.13	Sequencing the Pacific halibut genome	High	32,500	-	Environmental effects
673.14	Identification and validation of markers for growth	High	25,681	57,773	Changes in biomass/size-at-age
674.11	Full characterization of the annual reproductive cycle	High	121,488	-	Maturity assessment
675.11	Tail pattern recognition	High	3,900	-	Juvenile and adult distribution



Research Program – New Projects

APPENDIX I

Summary of research projects proposed for 2018

Project #	Project Name	Priority	Budget (\$US)	External funding for FY2018 (\$US)	Management implications
<i>New Projects</i>					
2018-01	Influence of thermal history on growth	High	136,004	-	Changes in biomass/size-at-age
2018-02	Adult captive holding studies	High-Medium	58,395	-	Changes in biomass/size-at-age/distribution
2018-03	Whale detection methods	High	37,511	-	Mortality estimation
2018-04	Larval connectivity	High	20,000	-	Larval distribution
Total - New Projects (\$US)			\$251,910		
Total - Continuing Projects (\$US)			\$273,090		
Overall Total (all projects) (\$US)			\$525,000		
External Funding (for FY2018) (\$US)				\$313,175	



Research Program – Grant Research

Project #	Grant agency	Project name	Partners	IPHC Budget (\$US)	PI	Management implications	Grant period
1	S-K NOAA	Improving discard mortality rate estimates in the Pacific halibut by integrating handling practices, physiological condition and post-release survival (Award No. NA17NMF4270240)	Alaska Pacific University, Anchorage, AK	\$286,121	Planas (lead PI) Dykstra Loher Stewart Hicks	Bycatch estimates	September 2017 – August 2019
2	NPRB	Somatic growth processes in the Pacific halibut (<i>Hippoglossus stenolepis</i>) and their response to temperature, density and stress manipulation effects (Award No. 1704)	AFSC-NOAA-Newport, OR	\$131,891	Planas (lead PI) Rudy Loher	Changes in biomass/size-at-age	September 2017 – August 2019
Total awarded (\$)				\$418,012			

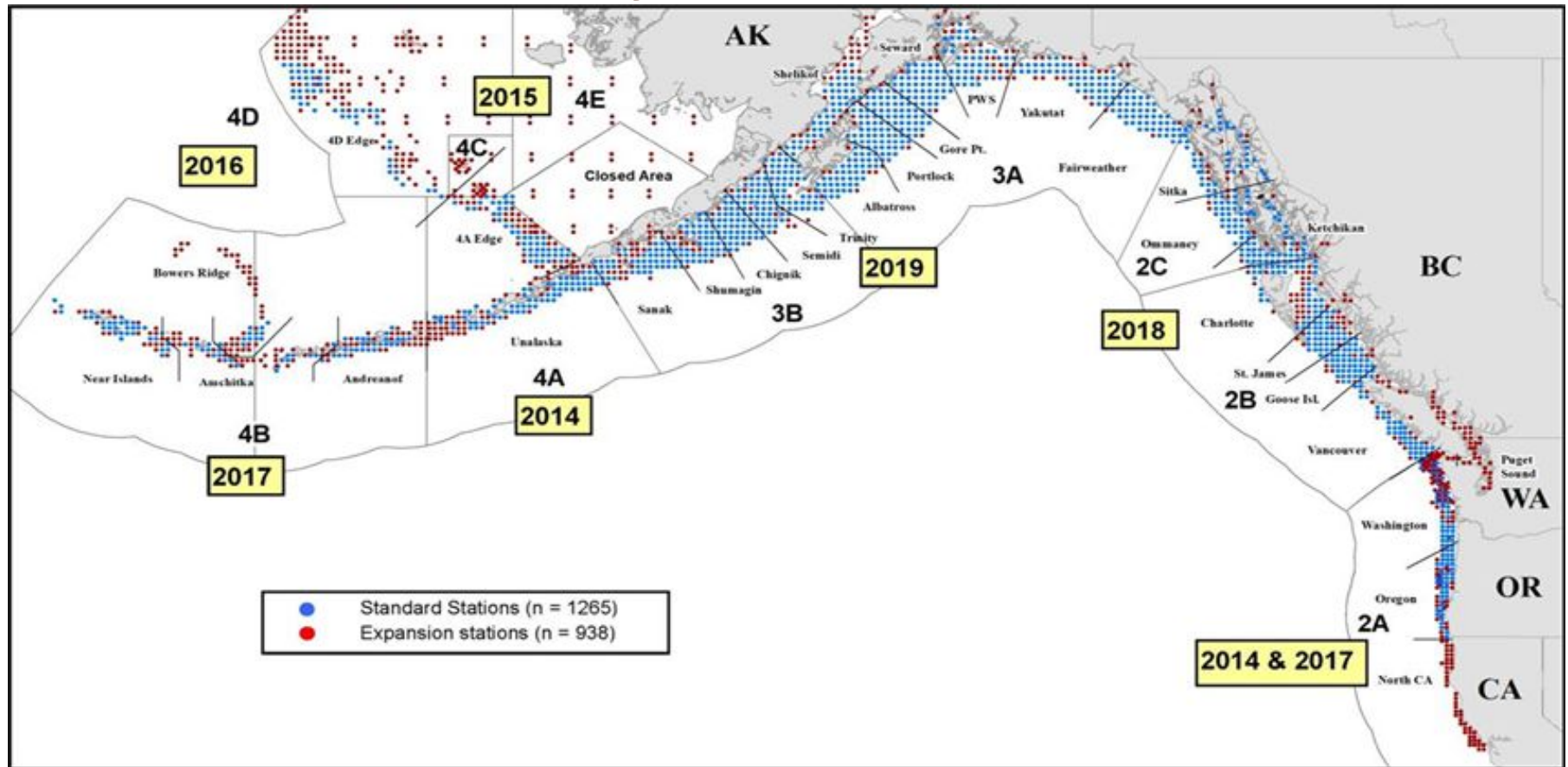


Key Budget Items (Supplemental)

- Area 2A Densified Survey Expansion (new)
 - Total of 14 expansion stations
- Area 2B Setline Survey Expansion
 - Total of 103 expansion stations
 - Final composition of stations pending
- Area 2C Setline Survey Expansion
 - Total of 55 expansion stations
 - Final composition of stations pending



Setline Survey Expansion Overview



Setline Survey Income & Expenses

FIS Cost/Revenue Projections

<i>FIS Program Totals</i>		Assumptions	Rate/Amt	% Prior Yr. Actual
Total Pounds Landed	779,272	Price	\$6.31	93%
Net Halibut Proceeds	\$4,915,249	WPUE	87	103%
Net Bycatch proceeds	\$56,351	Vessel Costs	\$4,971,741	110%
Vessel Expenses	(\$4,971,741)	Personnel COLA	2.64%	
Office Expenses	(\$300,869)			
Trawl Survey	(\$56,706)			
Net Proceeds	(\$357,717)			



FY2018 Consolidated Income & Expense

IPHC Income and Expenses

Consolidated General & Supplemental

FY2018 Budget

1 Oct. 2017 to 30 Sept. 2018

Income		Expenses	
Contributions		Core IPHC Activities	
United States	\$ 4,200,000	Administration	\$ 1,937,121
Canada	\$ 1,511,508	Scientific	\$ 3,525,190
		Catch Sampling	\$ 598,244
Fish Sales Income		Survey Expenses	
FISS Program	\$ 5,017,097	FISS Program	\$ 5,381,265
Other Research	\$ 320,428		
Other Income		Research Activities	
Grants & Contracts	\$ 811,672	Field Research	\$ -
Interest Income	\$ 16,125	Other Research	\$ 1,158,603
Misc. Income	\$ -		
		Transfer to Restricted Accounts	\$ -
Total FY2018 Income	\$ 11,876,830	Total FY2018 Expenses	\$ 12,600,423

Total General & Supplemental FY2018 \$ (723,593)

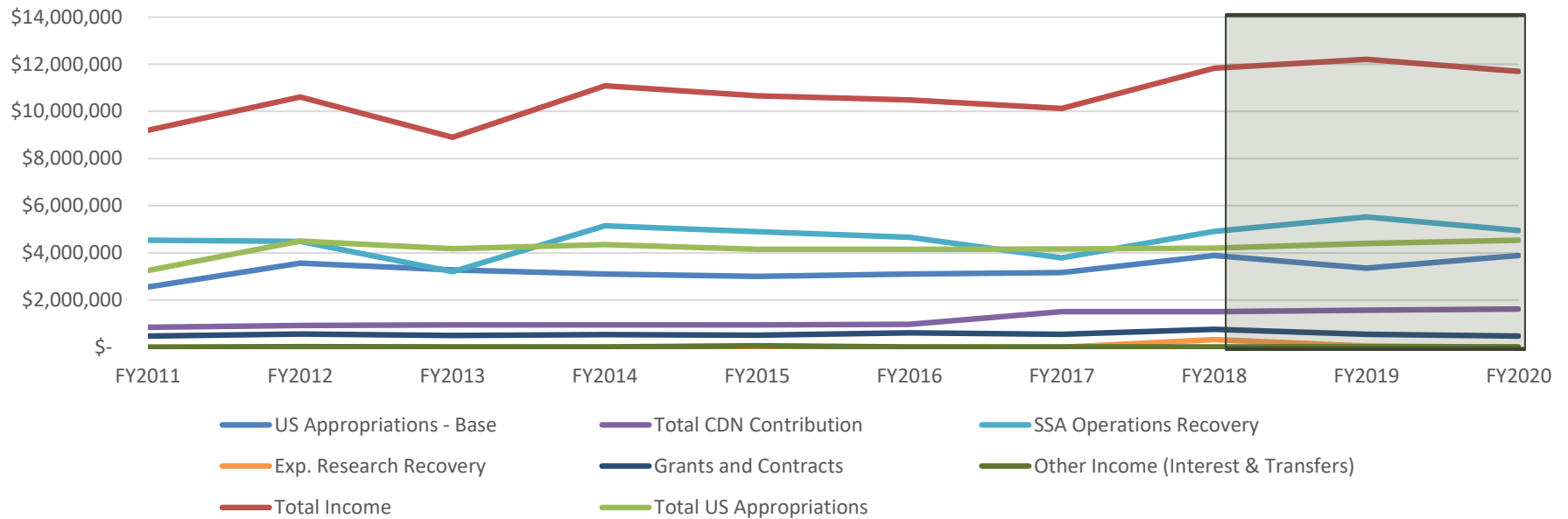
Total as % of Income -6.1%

Unrestricted Funds Balance \$ 3,194,788



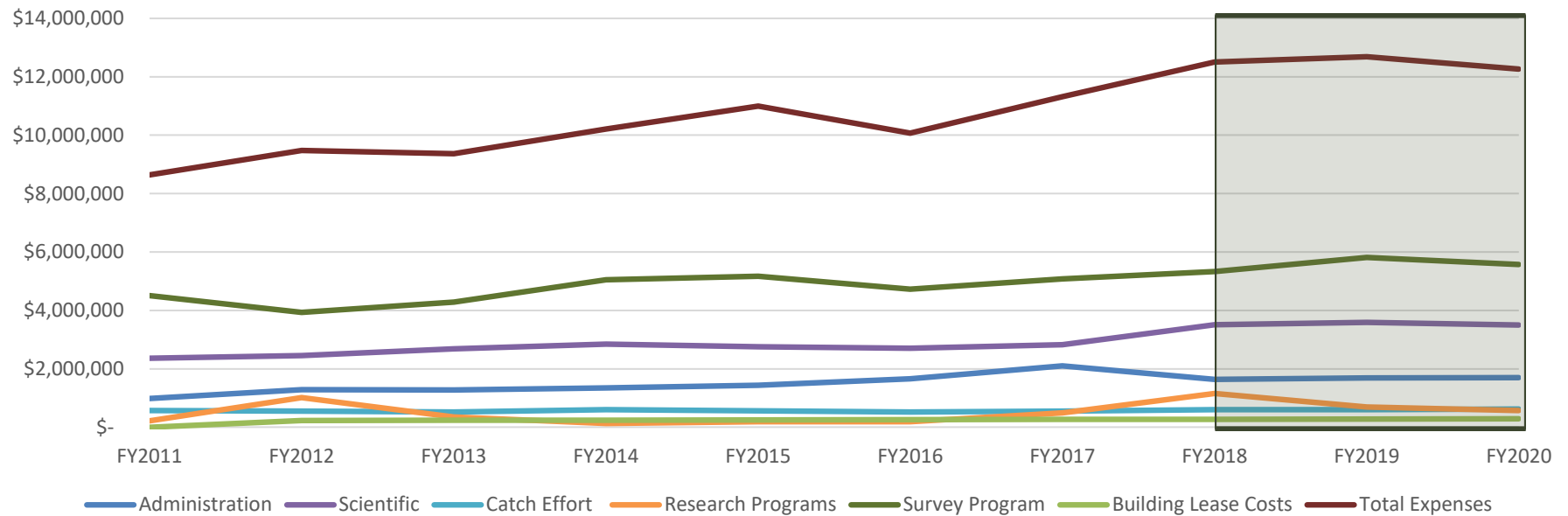
IPHC Income - Time Series

IPHC Income Sources (8 years)
FY2011-FY2018

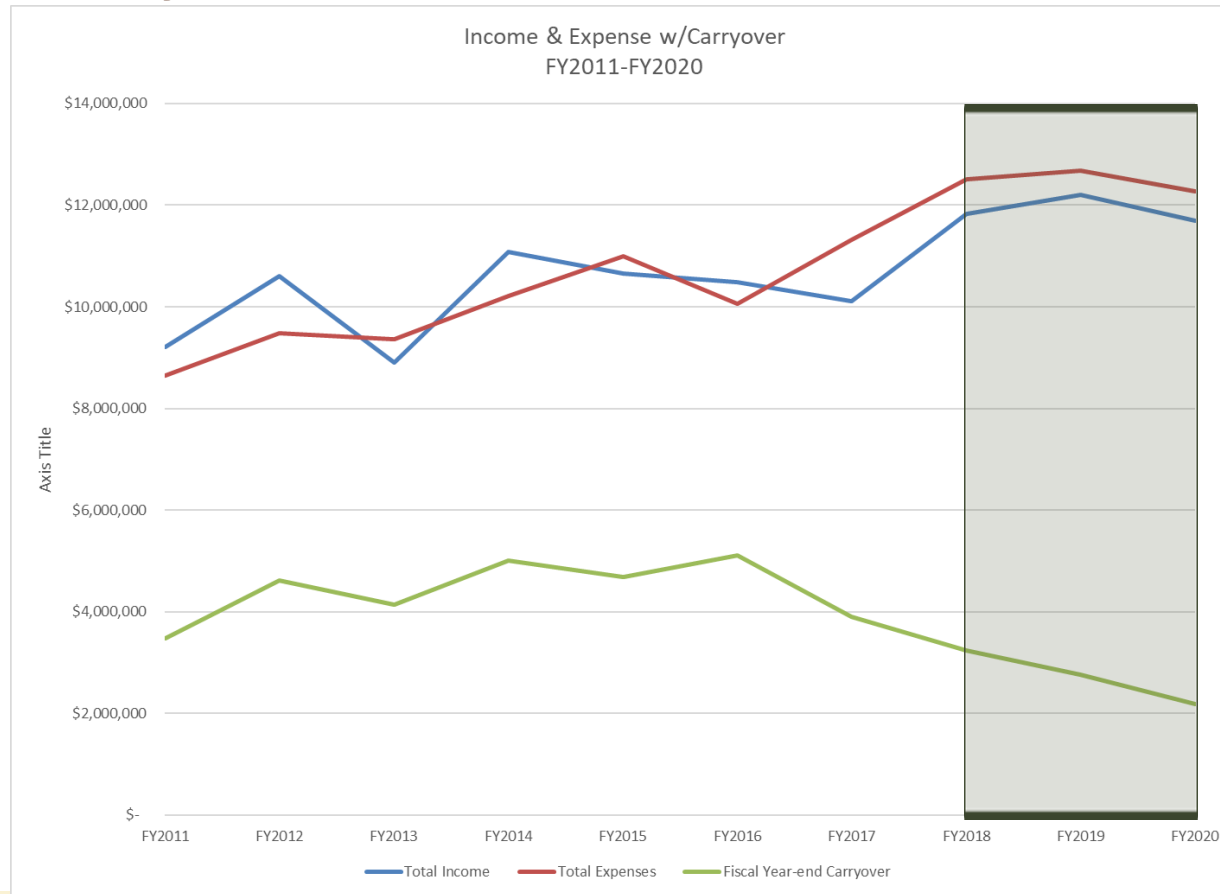


IPHC Expenses - Time Series

IPHC Expense Types (8 years)
FY2011-FY2018



IPHC Carryover – Time Series



FY2019 Consolidated Income & Expense

IPHC Income and Expenses

Consolidated General & Supplemental

FY2019 Budget

Oct. 1, 2018 to Sept. 30, 2019

<i>Income</i>		<i>Expenses</i>	
Contributions		Core IPHC Activities	
United States	\$ 4,400,000	Administration	\$ 1,974,546
Canada	\$ 1,573,233	Scientific	\$ 3,595,200
		Catch Sampling	\$ 603,313
Fish Sales Income		Survey Expenses	
FIS Program	\$ 5,575,086	SSA Expenses	\$ 5,813,748
Other Research	\$ 43,428		
Other Income		Research Activities	
Grants & Contracts	\$ 598,488	Field Research	\$ -
Interest Income	\$ 16,125	Other Research	\$ 698,265
Misc. Income	\$ -		
		Transfer to Restricted Accounts	\$ -
Total FY2019 Income	\$ 12,206,360	Total FY2019 Expenses	\$ 12,685,073

Total General & Supplemental FY2019 \$ (478,713)

Total as % of Income -3.9%

Unrestricted Funds Balance \$ 2,767,029



Contributions: Contracting Parties

- Canada - Two separate contributions
 - Contribution - \$1,501,233 (3% increase)
 - Pension Liability - \$111,252 (updated)
- United States of America – Request of \$4.40M



Grants & Contracts

- General Fund
 - NMFS Sampling Grant –\$447,551
 - Saltonstall-Kennedy Grant – DMR Classification - \$30,520
 - NPRB Grant - \$74,118
- Supplemental Fund
 - Reimbursed Setline Survey Expenses
 - Canadian Rockfish Sampling - \$34,520
 - Washington Rockfish Sampling - \$11,580



Overall Personnel Expenses

- Cost of Living
 - 2.5% estimate
- Benefits
 - Health care cost estimate +5%
 - Other benefit costs stable



Office Personnel Changes

Current Positions

- No changes

Temporary Positions (continued)

- Laboratory Technician – hiring Jan. 2018 for 2 yr. position - **continued**
- MSE Programmer – hiring March 2018 for 2 yr. position - **continued**
- Post-Doctoral – Hiring July 2018 for 2 yr. position - **continued**



Key Budget Items (General Budget)

- Administrative Contracts
 - Building Lease Negotiations (legal fees)
 - IT Initiatives (continued)
 - Website Redesign
 - Managed IT Services
 - Data Warehouse Development
 - Network & Data Security Analysis
 - Performance Review
- Capital Equipment & Improvements
 - New Office Copier (tentative)
 - Office reorganization (tentative)



Key Budget Items (Supplemental)

- Area 3A Setline Survey Expansion
 - Total of 95 expansion stations
 - Final composition of stations pending
- Area 3B Setline Survey Expansion
 - Total of 68 expansion stations
 - Final composition of stations pending



Setline Survey Income & Expenses

FIS Cost/Revenue Projections

<i>FIS Program Totals</i>	
Total Pounds Landed	859,946
Net Halibut Proceeds	\$5,518,734
Net Bycatch proceeds	\$56,351
Vessel Expenses	(\$5,423,773)
Office Expenses	(\$333,269)
Trawl Survey	(\$56,706)
Net Proceeds	(\$238,663)

Assumptions	% Prior Yr.	
	Rate/Amt	Actual
Price	\$6.42	94%
WPUE	86	102%
Vessel Costs	\$5,423,773	110%



FY2019 Consolidated Income & Expense

IPHC Income and Expenses

Consolidated General & Supplemental

FY2019 Budget

1 Oct. 2018 to 30 Sept. 2019

Income		Expenses	
Contributions		Core IPHC Activities	
United States	\$ 4,400,000	Administration	\$ 1,974,546
Canada	\$ 1,573,233	Scientific	\$ 3,595,200
		Catch Sampling	\$ 603,313
Fish Sales Income		Survey Expenses	
FISS Program	\$ 5,575,086	FISS Program	\$ 5,813,748
Other Research	\$ 43,428		
Other Income		Research Activities	
Grants & Contracts	\$ 598,488	Field Research	\$ -
Interest Income	\$ 16,125	Other Research	\$ 698,265
Misc. Income	\$ -		
		Transfer to Restricted Accounts	\$ -
Total FY2019 Income	\$ 12,206,360	Total FY2019 Expenses	\$ 12,685,073

Total General & Supplemental FY2019 \$ (478,713)

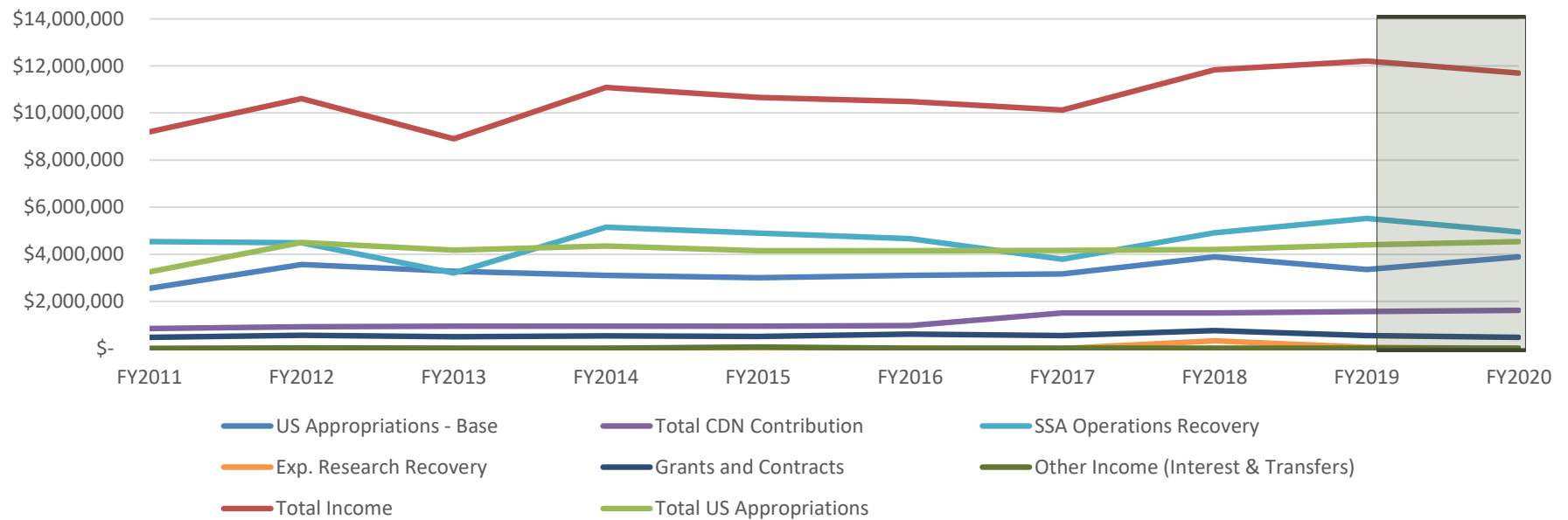
Total as % of Income -3.9%

Unrestricted Funds Balance \$ 2,716,075



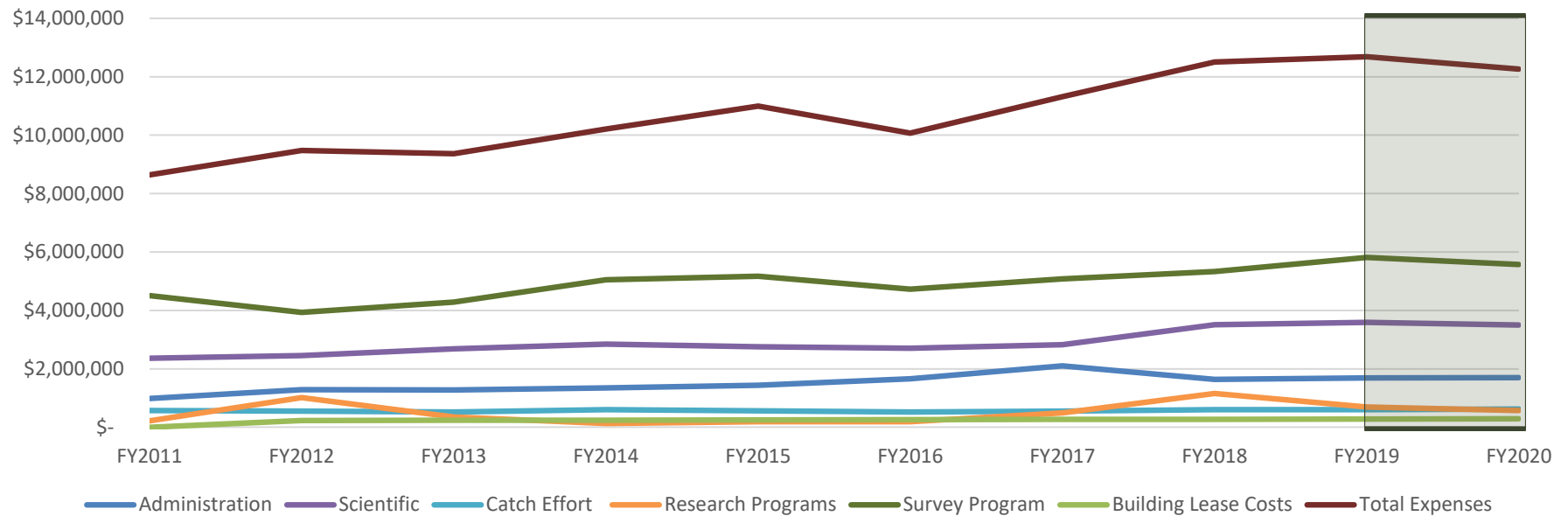
IPHC Income - Time Series

IPHC Income Sources (9 years)
FY2011-FY2019

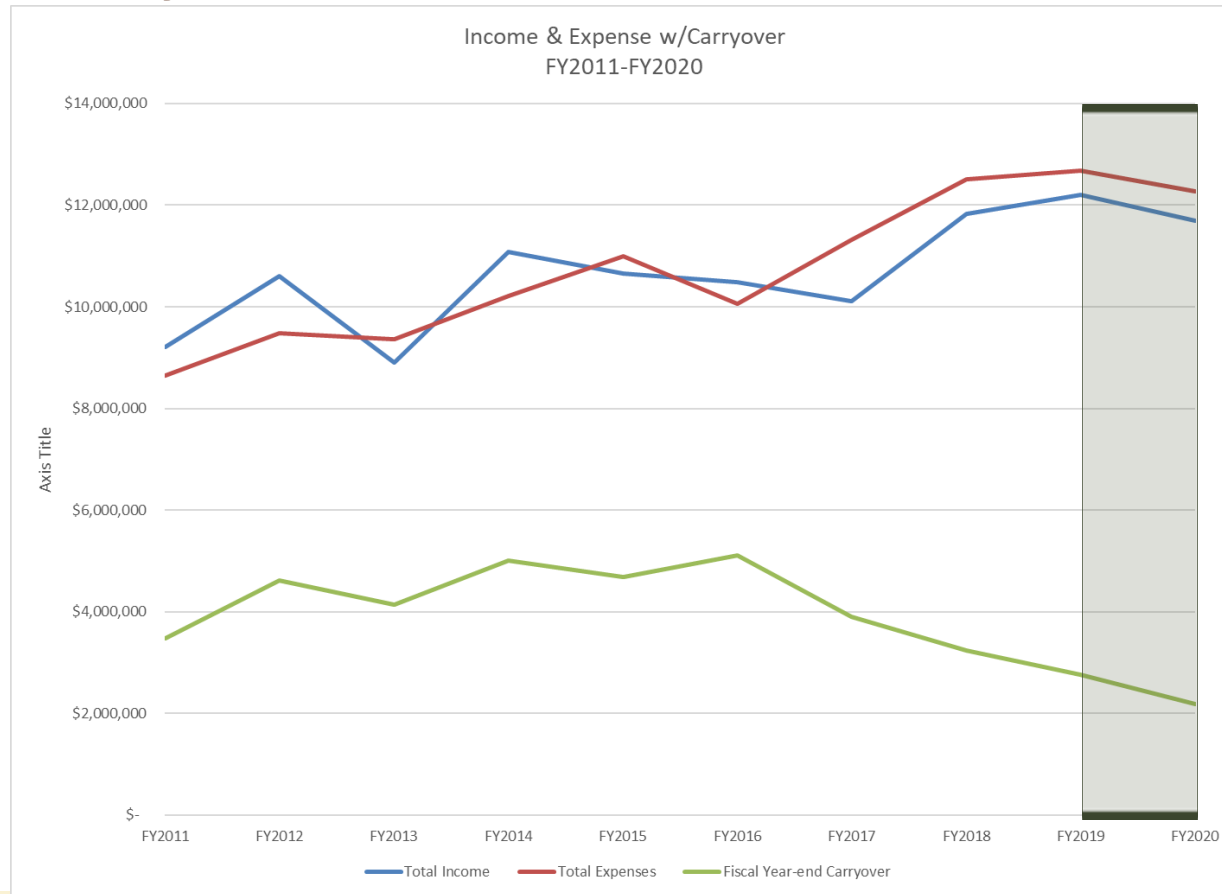


IPHC Expenses - Time Series

IPHC Expense Types (9 years)
FY2011-FY2019



IPHC Carryover – Time Series



FY2020 Consolidated Income & Expense

IPHC Income and Expenses

Consolidated General & Supplemental

FY2020 Budget

Oct. 1, 2019 to Sept. 30, 2020

Income		Expenses	
Contributions		Core IPHC Activities	
United States	\$ 4,532,000	Administration	\$ 1,988,967
Canada	\$ 1,618,270	Scientific	\$ 3,504,831
		Catch Sampling	\$ 618,082
Fish Sales Income		Survey Expenses	
FIS Program	\$ 5,010,861	SSA Expenses	\$ 5,576,617
Other Research	\$ -		
Other Income		Research Activities	
Grants & Contracts	\$ 516,029	Field Research	\$ -
Interest Income	\$ 16,125	Other Research	\$ 575,000
Misc. Income	\$ -		
		Transfer to Restricted Accounts	\$ -
Total FY2020 Income	\$ 11,693,285	Total FY2020 Expenses	\$ 12,263,497

Total General & Supplemental FY2020 \$ (570,212)

Total as % of Income -4.9%

Unrestricted Funds Balance \$ 2,196,817



Contributions: Contracting Parties

- Canada - Two separate contributions
 - Contribution - \$1,547M (3% increase)
 - Pension Liability - \$72,000
- United States of America
 - Request of \$4.53M (3% increase)



Overall Personnel Expenses

- Cost of Living
 - 2.5% estimate
- Benefits
 - Health care cost estimate +5%
 - Other benefit costs stable



Office Personnel Changes

Current Positions

- No changes

Temporary Positions (continued)

- Laboratory Technician – hiring Jan. 2018 for 2 yr. position – **ending w/o additional funding**
- MSE Programmer – hiring March 2018 for 2 yr. position – **ending Feb. 2020**
- Post-Doctoral – Hiring July 2018 for 2 yr. position – **ending June 2020**



Key Budget Items (Supplemental)

- Survey redesign/rationalization
 - Full suite of expansions completed
 - Redesign survey to meet key goals
 - Scientific- best design for informing stock assessment
 - Operational – functional design while minimizing impacts (catch/bycatch)
 - Financial – Design for long-term cost neutrality



FY2020 Consolidated Income & Expense

IPHC Income and Expenses

Consolidated General & Supplemental

FY2020 Budget

Oct. 1, 2019 to Sept. 30, 2020

Income		Expenses	
Contributions		Core IPHC Activities	
United States	\$ 4,532,000	Administration	\$ 1,988,967
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FIS Program	\$ 5,010,861	SSA Expenses	\$ 5,576,617
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Total FY2020 Income	\$ 11,693,285	Total FY2020 Expenses	\$ 12,263,497

Total General & Supplemental FY2020 \$ (570,212)

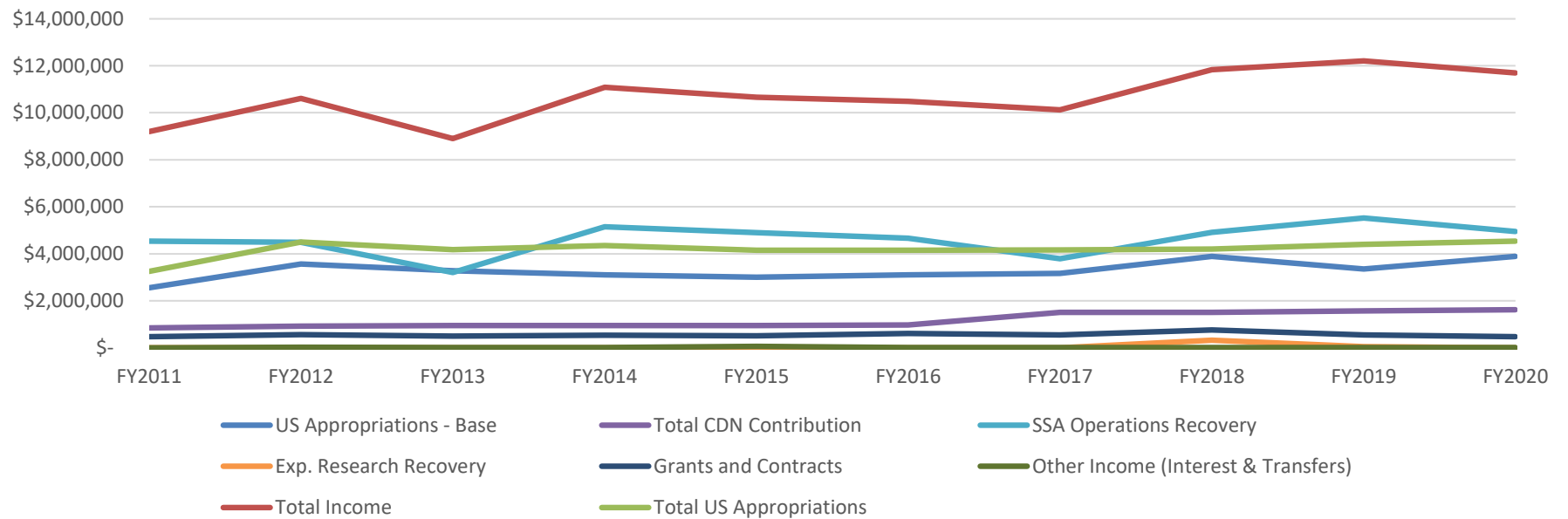
Total as % of Income -4.9%

Unrestricted Funds Balance \$ 2,196,817



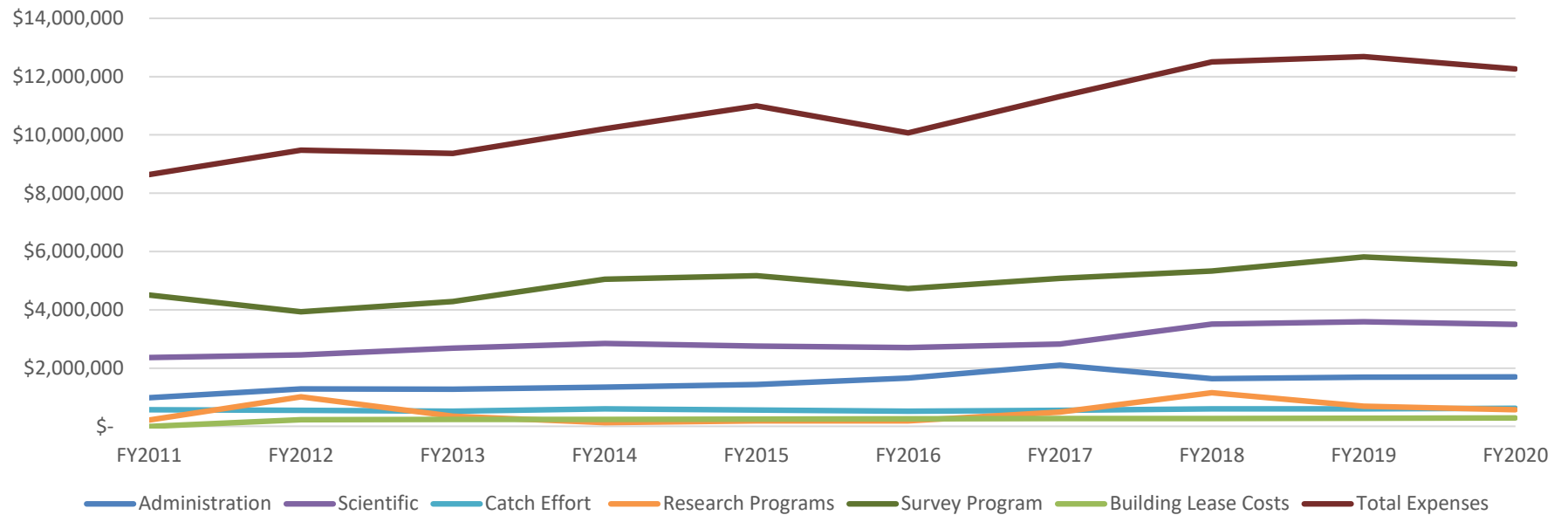
IPHC Income - Time Series

IPHC Income Sources (10 years)
FY2011-FY2020

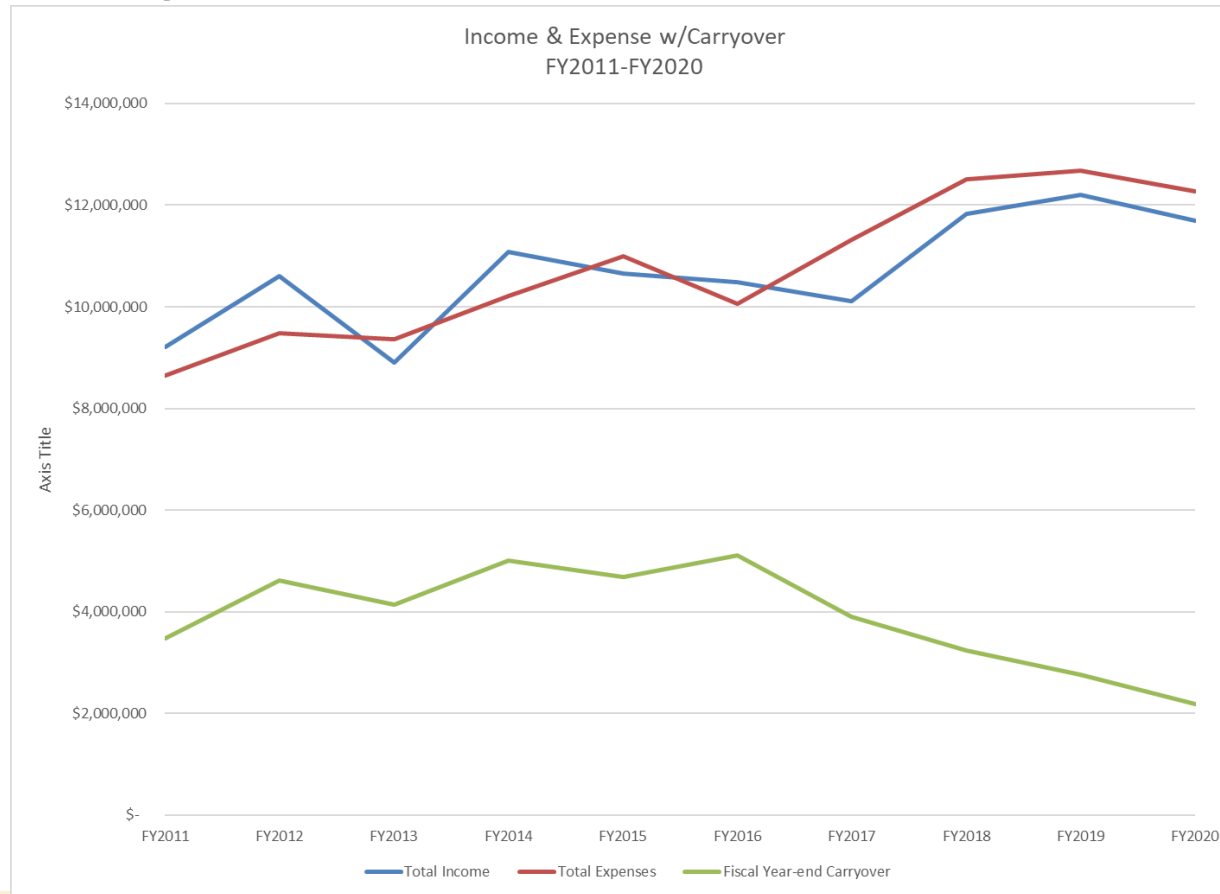


IPHC Expenses - Time Series

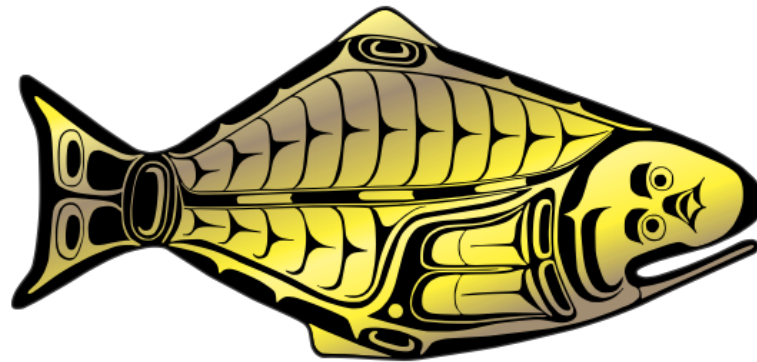
IPHC Expense Types (10 years)
FY2011-FY2020



IPHC Carryover – Time Series



INTERNATIONAL PACIFIC



HALIBUT COMMISSION



U.S. Coast Guard 17th District Enforcement Report

26 January— Portland, OR



LT Jeff Schoknecht
Response & Enforcement Division

2016 and 2017 Boardings by IPHC Area



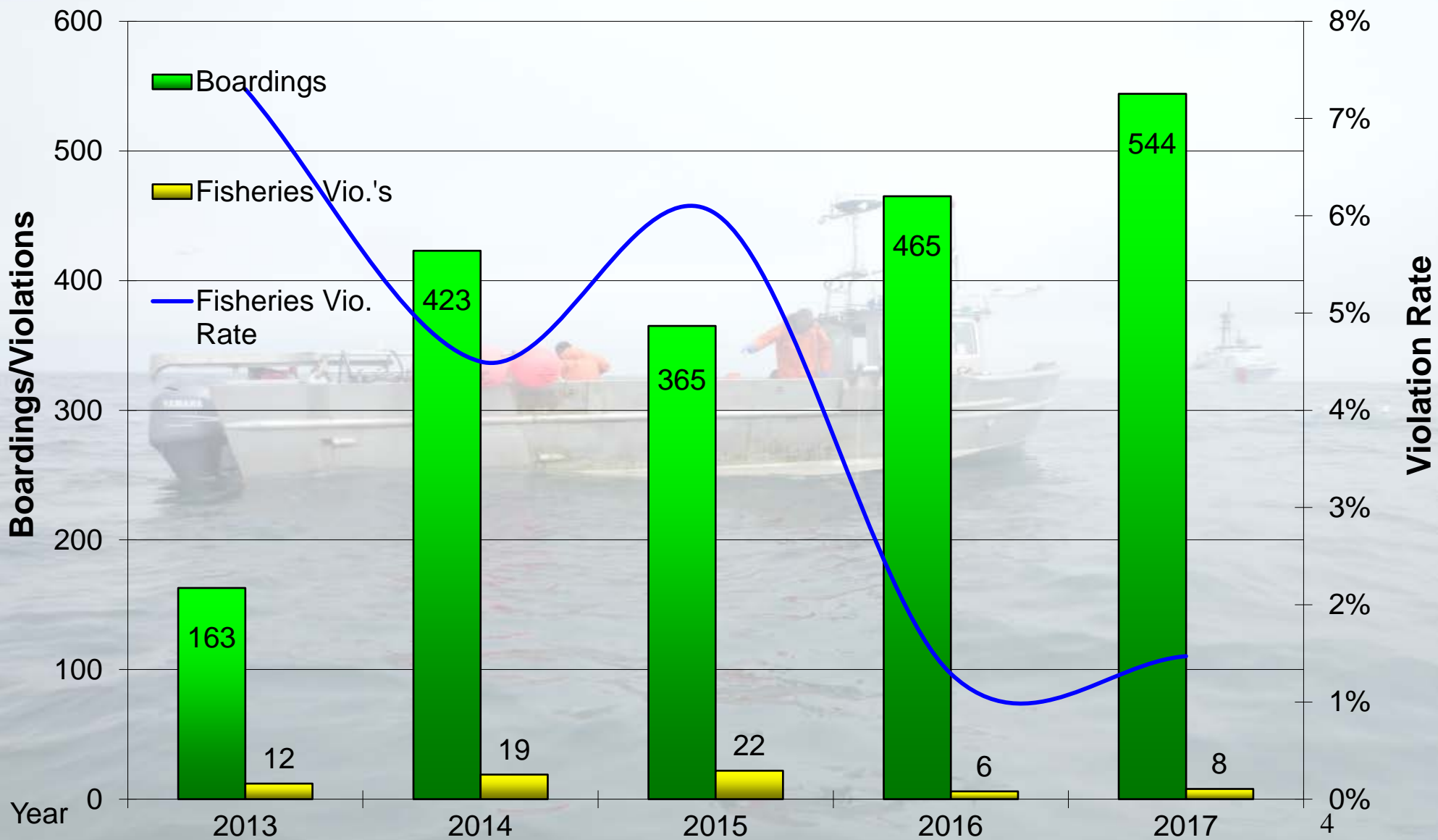
IPHC Area	2016 Boardings	2017 Boardings
2C	256	330
3A	178	195
3B	2	2
4A	17	11
4B	8	4
4C	1	0
4D	3	1
4E	0	1



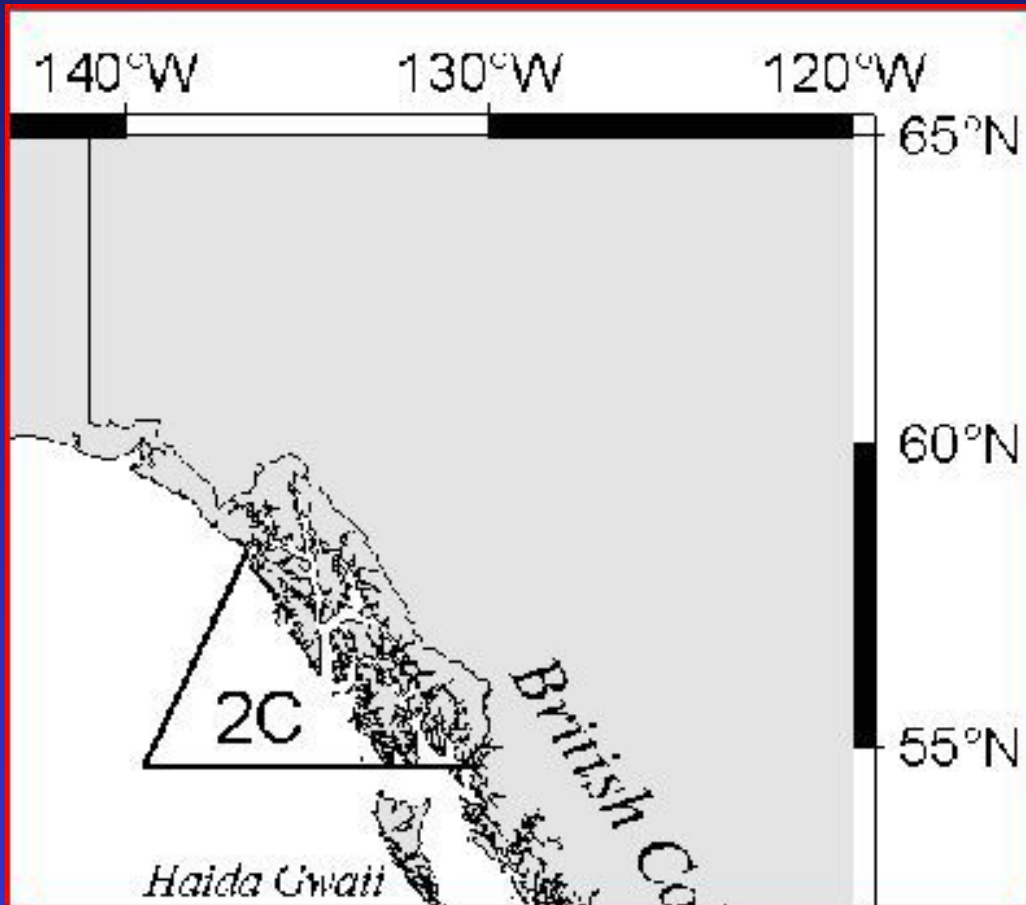
Boarding and Violation Summaries by Industry Sector

2016 Boardings/Violations (D17)		2017 Boardings/Violations (D17)	
Total At-Sea Boardings	465	Total At-Sea Boardings	544
Commercial	66	Commercial	92
Charter	55	Charter	97
Recreational/Subsistence	344	Recreational/Subsistence	355
Fisheries Violations	6	Fisheries Violations	8
Commercial	2	Commercial	5
Charter	2	Charter	1
Recreational/Subsistence	2	Recreational/Subsistence	2
Fisheries Violation Rates	98.7%	Fisheries Violation Rates	98.5%
Commercial	97.0%	Commercial	94.5%
Charter	96.4%	Charter	99.0%
Recreational/Subsistence	99.4%	Recreational/Subsistence	99.4%

IFQ Boarding Statistics



IPHC Area 2C



330 Boardings

– 46 IFQ

- 1 violation

– 37 Charter

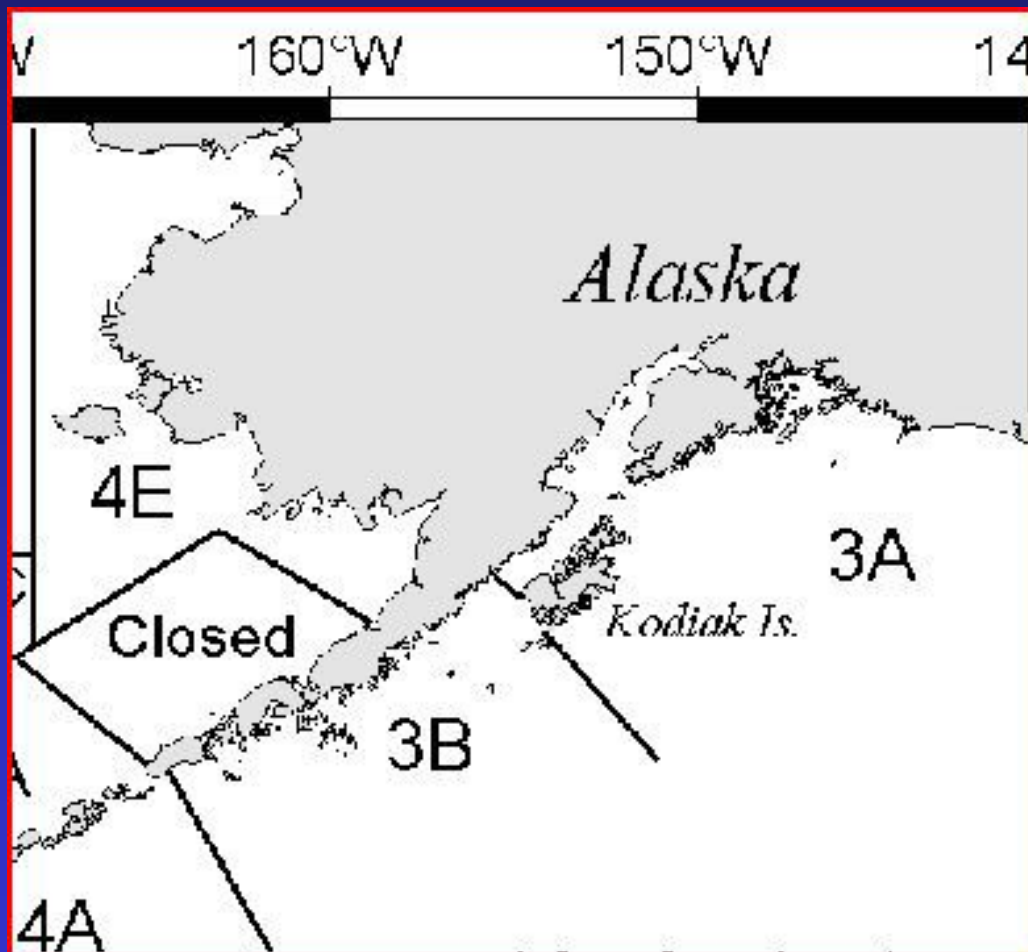
- 0 violations

- 247 Recreational/
Subsistence

- 0 violations



IPHC Areas 3A/3B

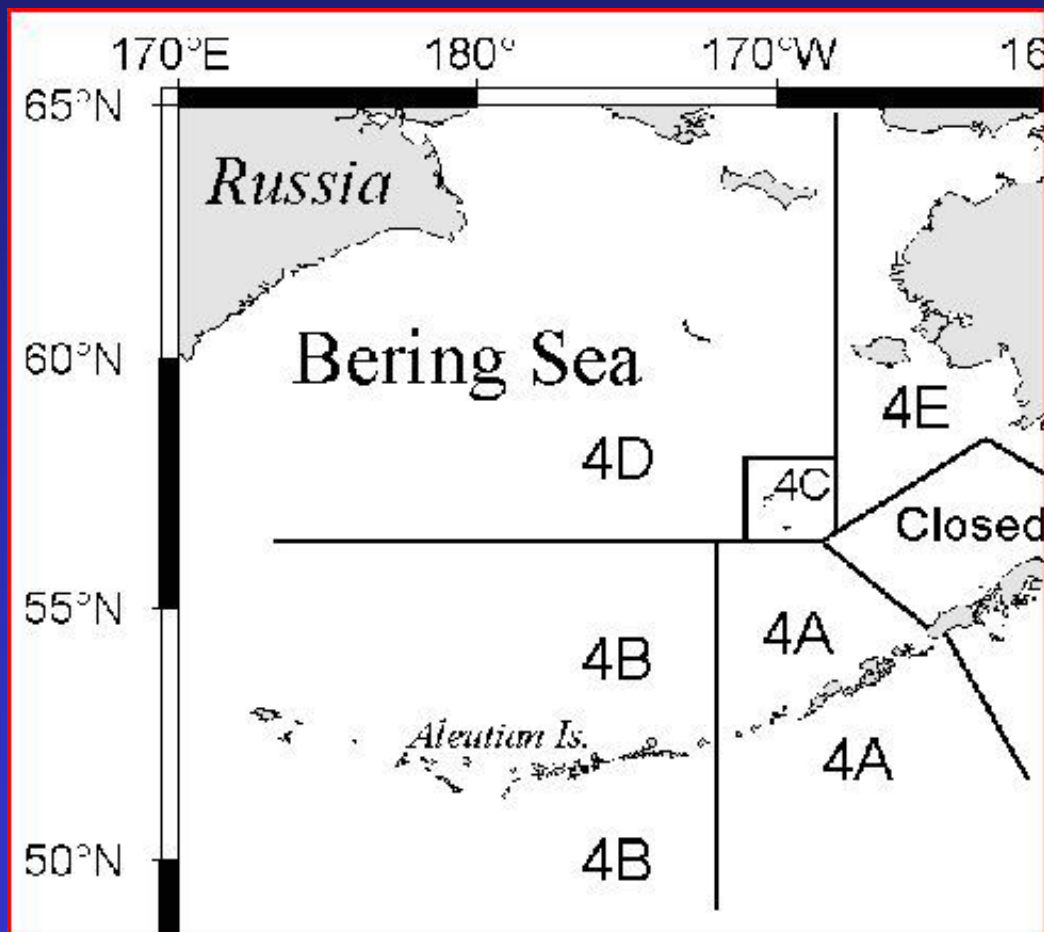


197 Boardings

- 29 IFQ
 - 1 violation
- 60 Charter
 - 1 violation
- 108 Recreational/
Subsistence
 - 2 violations



IPHC Areas 4A, B, C, D, & E



17 Boardings

- 17 IFQ/CDQ
 - 3 violations
- 0 Charter
- 0 Recreational/
Subsistence



Fisheries Violations in All Industry Sectors

2017

Failure to use careful release methods	(1)
Mutilation of catch	(1)
Failure to maintain IFQ logbook	(2)
Failure to maintain charter logbook	(1)
Copy of IFQ permit not ready for inspection	(2)
Sport fishing without a permit	(2)



LT Jeff Schoknecht
Response & Enforcement Division

Subsistence Harvests of Pacific Halibut in Alaska, 2016



**Division of Subsistence
Alaska Department of Fish and Game**

**Presentation to the
International Pacific Halibut Commission**

**Portland, OR
January 2018**

**Project funded through a grant from the
National Marine Fisheries Service:
No. NA16NMF4370166**

For the full study findings, see:

Fall, James A. and David Koster. 2018. Subsistence Harvests of Pacific Halibut in Alaska, 2016. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 436. Anchorage.

Project Background

- New subsistence regulations in effect May 2003
- 118 communities and 123 tribes eligible, plus residents of designated rural areas
- Registration requirement (SHARC)
- Regulations have provision for collecting harvest data
- This report covers the 12th year of the harvest assessment program (harvests in 2016)
- Due to funding constraints, the project did not document 2013 or 2015 harvests and will not document 2017 harvests
- If funding available, could continue for 2018

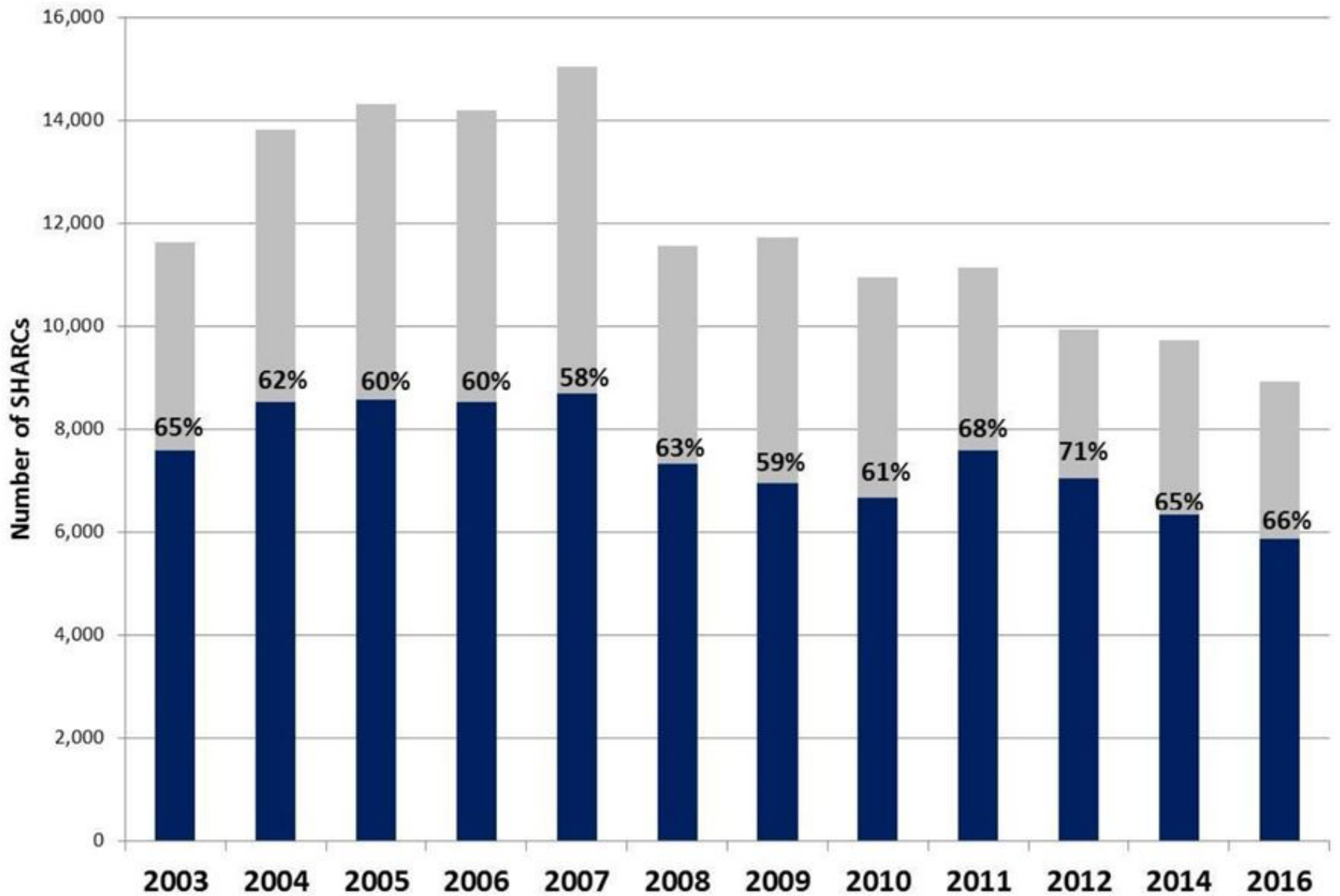
Methods

- Mailed survey is primary data collection method; response voluntary
- Mailed to all persons holding SHARCs during 2016: 8,779
- Three rounds of mailings
- Supplemented by contacts & interviews in 5 communities in southeast and western AK
- Harvests of some non-SHARC holders (146) included in estimates
- Total target group = 8,925 potential fishers

Sample Achievement for 2016

- **5,862 surveys returned**, of 8,925 potential fishers
- **Sampling fraction of 66%**
- **High rates of return** achieved in most larger communities with the most SHARCs issued

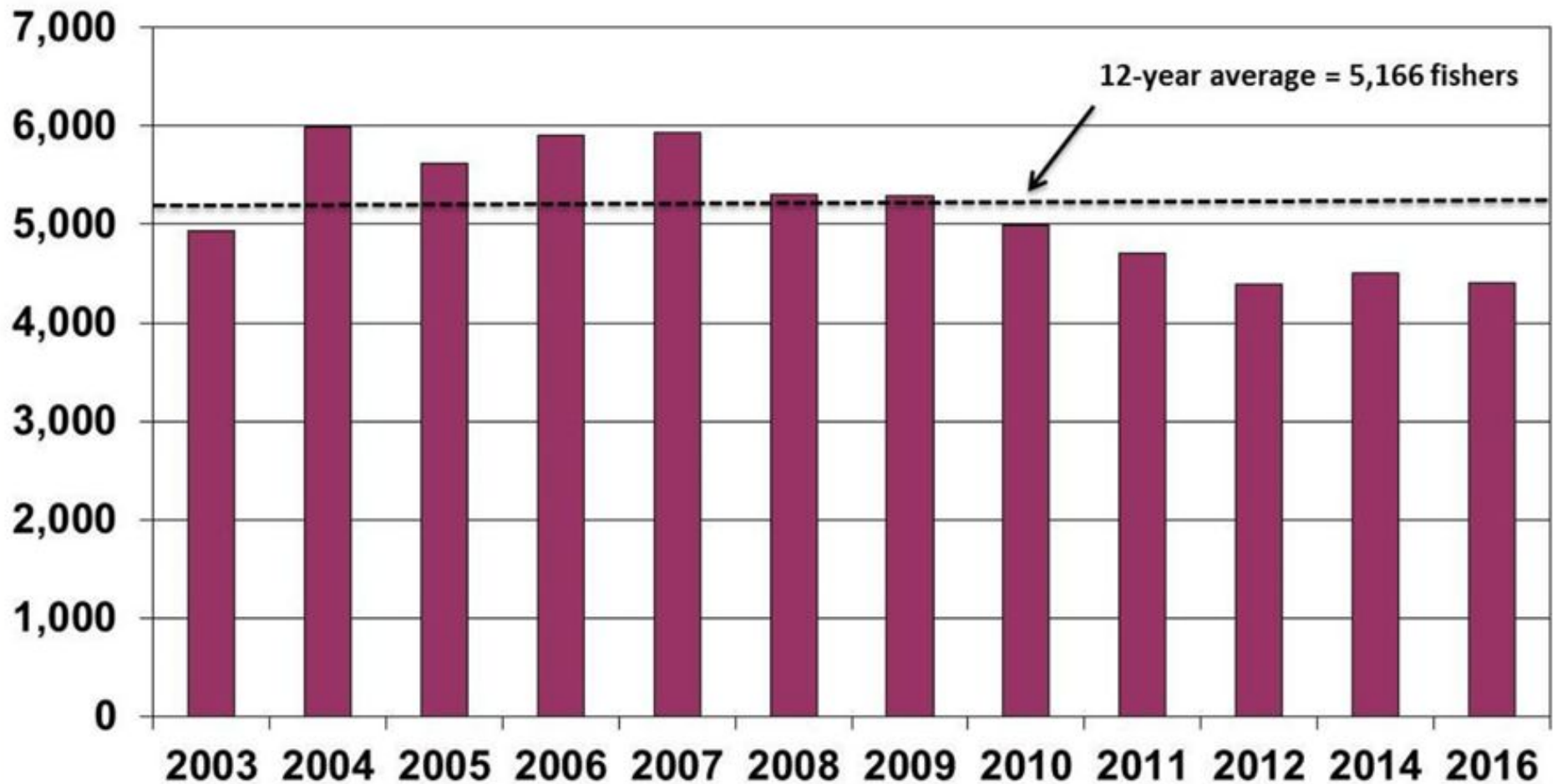
SHARC Survey Achievement, 2003-2012, 2014 & 2016



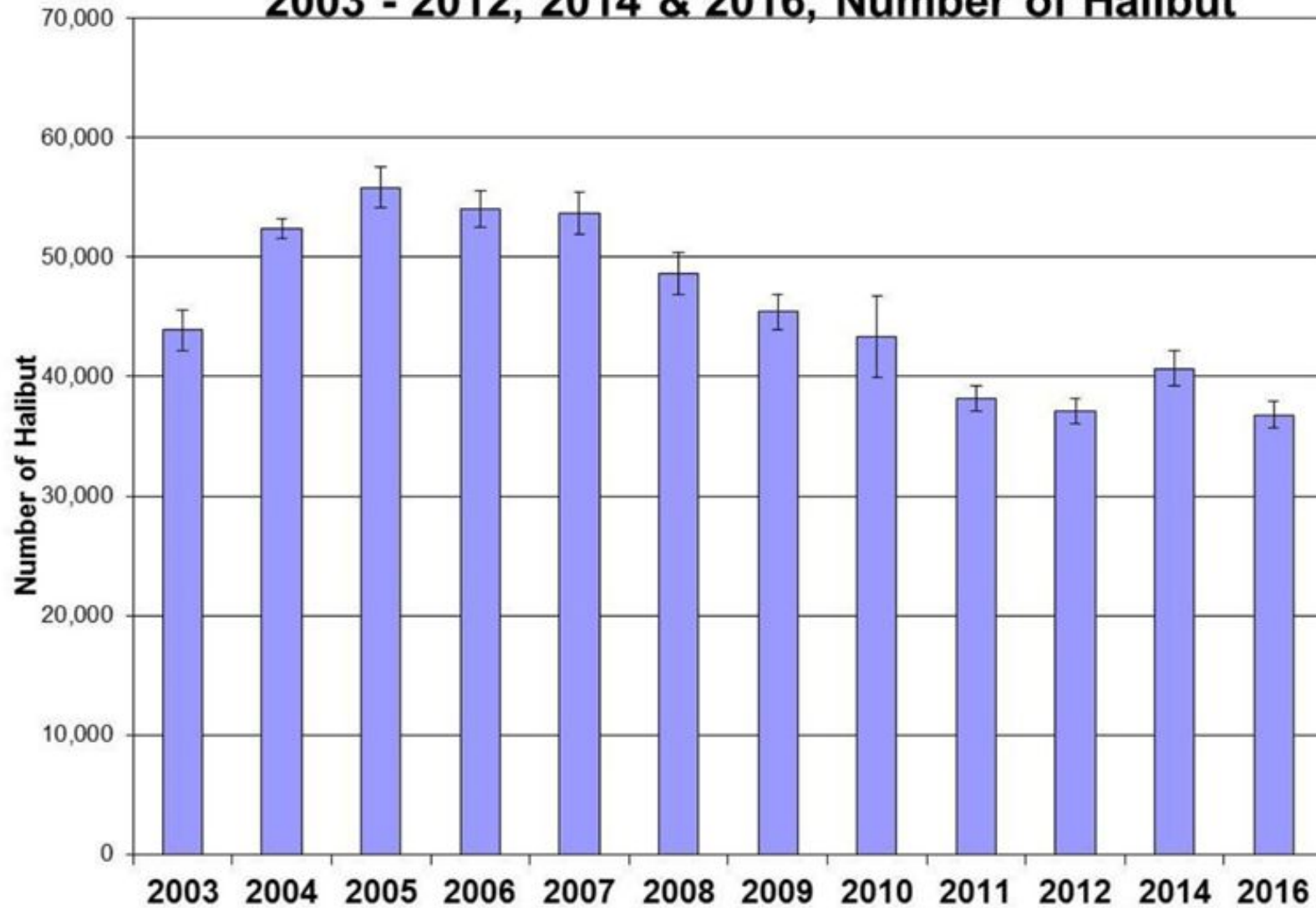
Study Findings: Halibut 2016

- Estimated number of **subsistence fishers = 4,408**
- Estimated subsistence harvest = **36,815 halibut**
- Estimated subsistence harvest = **727,178 lbs** net weight (= 75% of round weight) (19.8 lbs/fish)
- **60% of harvest occurred in Area 2C** (SE Alaska), 31% in Area 3A (SC Alaska), & 6% in Area 4E (East Bering Sea Coast)
- 75% of harvest taken with setline gear; 25% with hand-operated gear

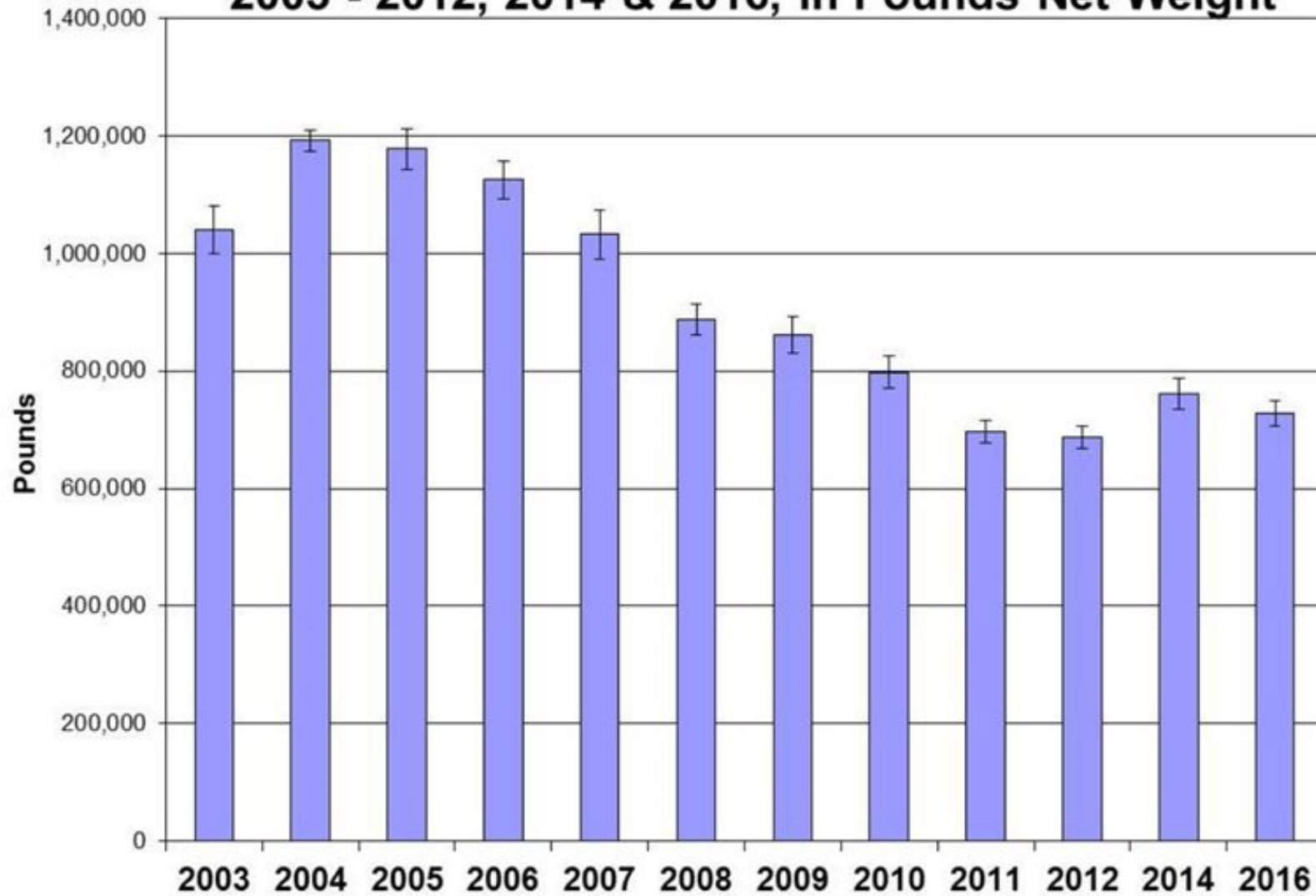
Estimated Number of Individuals Subsistence Fishing for Halibut in Alaska, 2003-2012 , 2014 & 2016



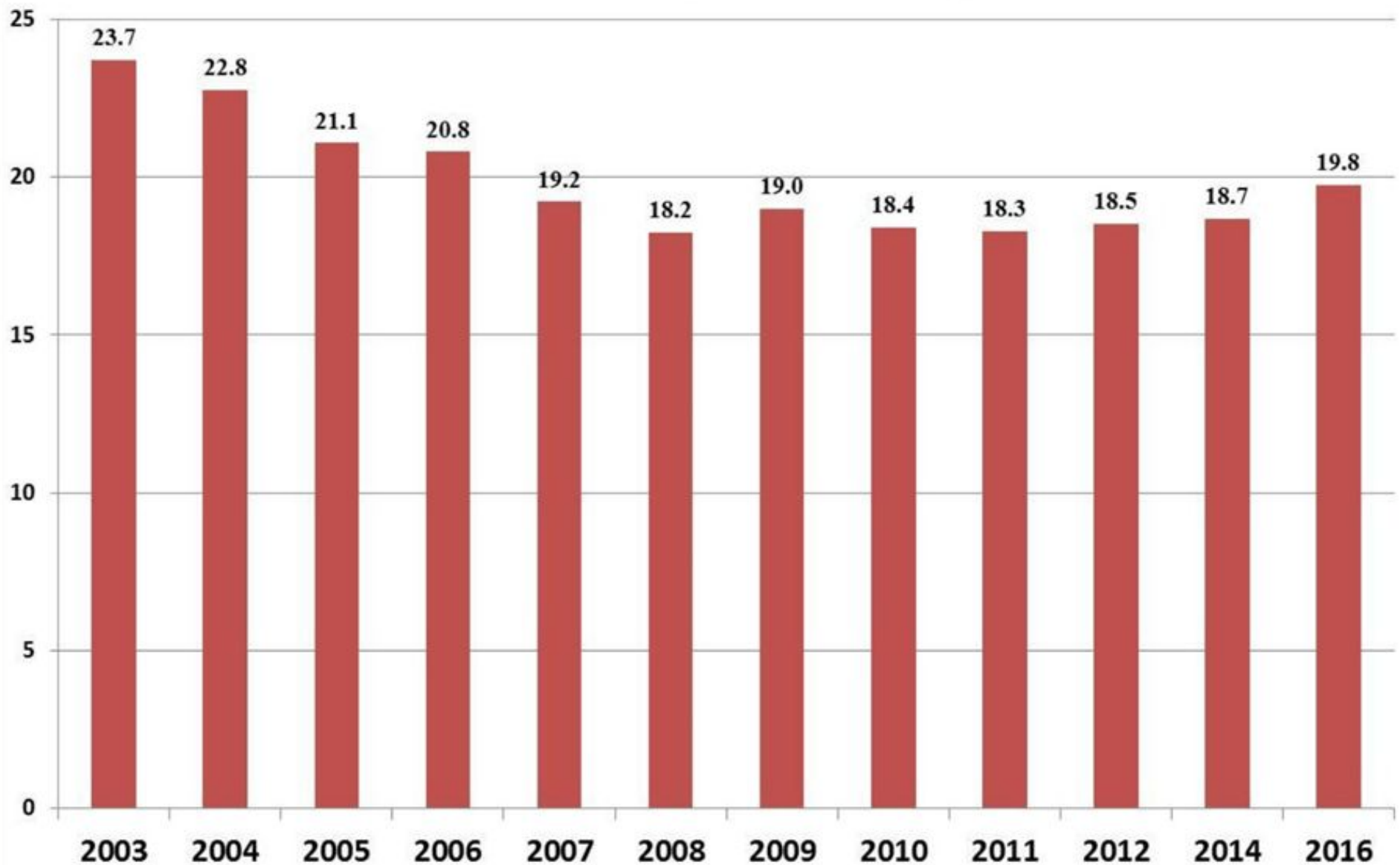
Estimated Subsistence Harvests of Halibut in Alaska, 2003 - 2012, 2014 & 2016, Number of Halibut



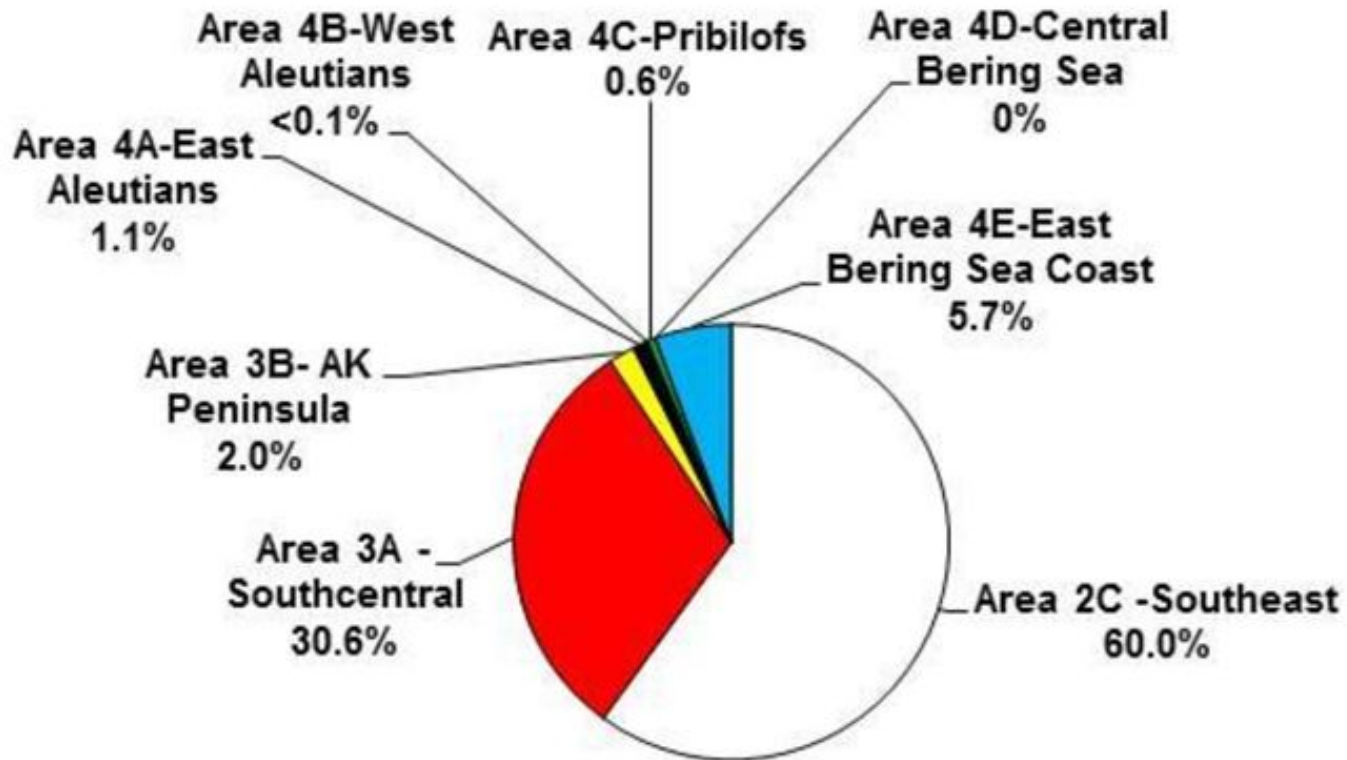
Estimated Subsistence Harvests of Halibut in Alaska, 2003 - 2012, 2014 & 2016, in Pounds Net Weight



Average net weight of halibut (lb per fish) in the Alaska subsistence fishery, 2003 - 2012, 2014 & 2016

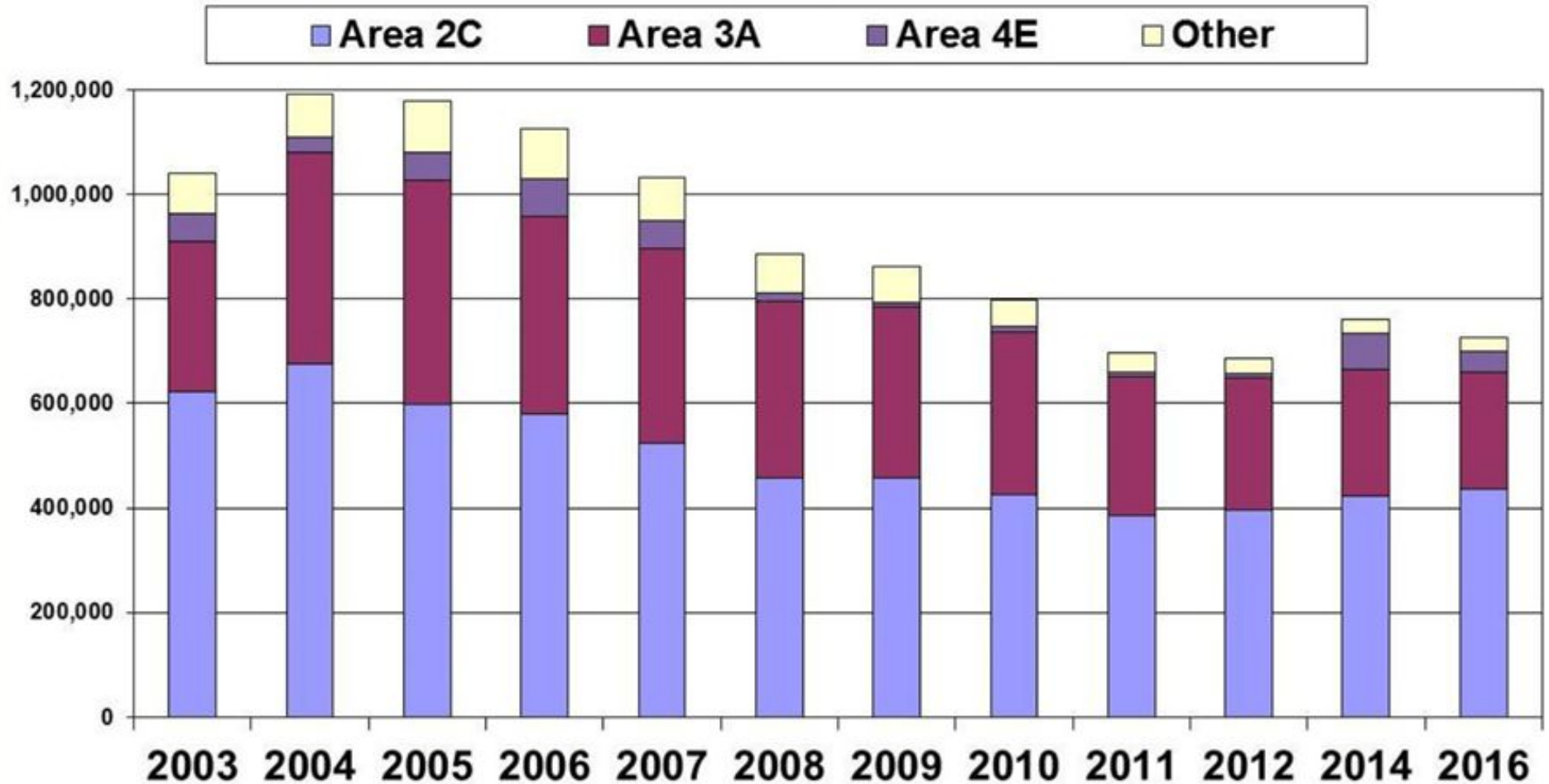


Percentage of Subsistence Halibut Harvest by Regulatory Area Fished, 2016

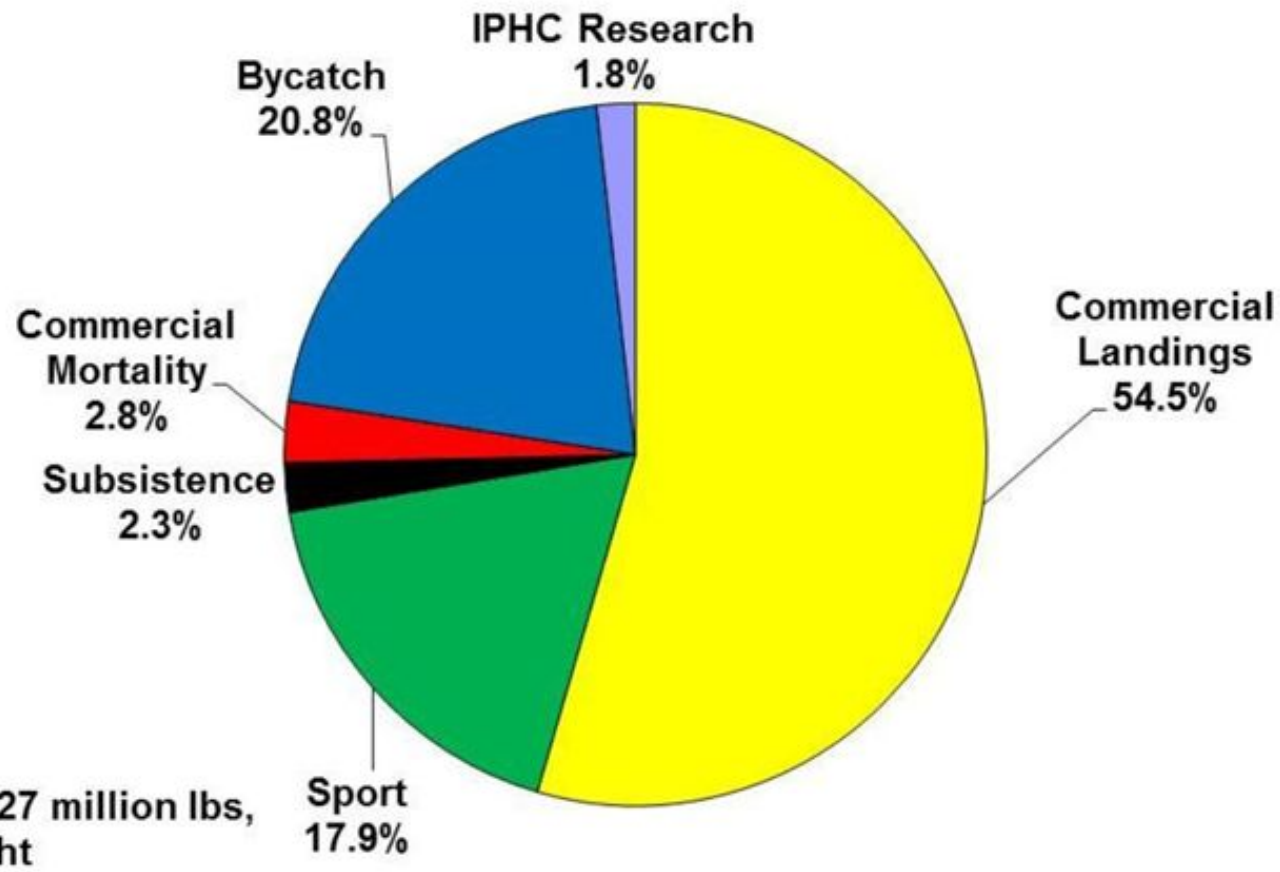


N= 727,178 pounds net weight

Estimated Subsistence Harvests of Halibut in Alaska, 2003 - 2012, 2014 & 2016 (lbs net weight), by Area



Halibut Removals, Alaska, 2016



- Subsistence harvests by area ranged from 6.4% in Area 2C to 0.4% in Area 3B

Conclusions: Harvest Survey, 2016

- Overall, 2016 harvest survey was a success: good response rates and overall reliable harvest estimates
- Can discern some general patterns in the fishery since the new regulations came into effect
- Reasons for overall decline in harvests likely complex and require further investigation
- Concerns about nonrenewal of SHARCs, especially in certain regulatory areas
- Need to supplement mailed SHARC survey with in-person survey in portions of Area 4
- Recommendation to continue harvest monitoring

For More Information

- Division of Subsistence Website:
www.subsistence.adfg.state.ak.us and go to publications for final report
- Or: call us at 907-465-4147, or 465-3617, or 267-2353
- Or write: ADF&G, Division of Subsistence, 333 Raspberry Road, Anchorage, AK, 99518
- Or contact NMFS at: 1-800-304-4846 (option 2) or www.fakr.noaa.gov/ram/subsistence/halibut.htm

Regulatory Proposals

Agenda item 8

IPHC-2018-AM094-PropA1-A5: IPHC Secretariat

IPHC-2018-AM094-PropB1-B3: [Agency staff](#)

IPHC-2018-AM094-PropC1-17: [Stakeholders](#)

L. Boitor



INTERNATIONAL PACIFIC
HALIBUT COMMISSION

Regulatory proposals for 2018

- Submission deadline for AM094: 23 Dec 2017
 - 5 proposals from the IPHC Secretariat
 - 3 proposals from Contracting Party agencies
 - 17 proposals from other Stakeholders
- Other information for consideration
 - Stakeholder statements: [IPHC-2018-AM094-INF04](#)
 - Secretariat implementation notes: [IPHC-2018-AM094-23](#)



IPHC Secretariat

Document Number	Title
IPHC-2018-AM094-PropA1	IPHC closed area (Section 10)
IPHC-2018-AM094-PropA2	Fishing periods (Section 8)
IPHC-2018-AM094-PropA3	VMS requirement for IPHC Regulatory Area 4 clearances (Section 15)
IPHC-2018-AM094-PropA4	IPHC Fishery Regulations: minor amendments
IPHC-2018-AM094-PropA5	Discussion paper: Frozen-at-sea exemption for head-on requirement (Section 13)



Contracting Party (by agency)

Document Number	Title	Contracting Party
IPHC-2018-AM094-PropB1 Rev_1	Leasing in IPHC Regulatory Area 4 (Sections 7 and 11 of the IPHC Regulations)	United States of America NOAA-Fisheries: Glenn Merrill (NMFS-AR)
IPHC-2018-AM094-PropB2	Clarify 2C-3A sport fishery regulations (Section 28)	United States of America NOAA-Fisheries: Glenn Merrill (NMFS-AR)
IPHC-2018-AM094-PropB3	Clarify head-on weight requirement (Section 17)	United States of America NOAA-Fisheries: Glenn Merrill (NMFS-AR)



Other stakeholders

Document Number	Title	Proponent
IPHC-2018-AM094-PropC1	Catch limit proposals (Section 11)	Various
IPHC-2018-AM094-PropC2	Preserving catch on private live-aboard vessels	A. Cooper
IPHC-2018-AM094-PropC3	Unguided angler harvest record	P. Phillips
IPHC-2018-AM094-PropC4	Sport cleaning regulations	S. Riehemann
IPHC-2018-AM094-PropC5	Elimination of skin-on regulation	J. Shirk
IPHC-2018-AM094-PropC6	Live-aboard processing and possession exemption	D. Robertson
IPHC-2018-AM094-PropC7	Eliminate the requirement for a charter halibut permit (CHP)	S. Riehemann



Other Stakeholders, continued

Document Number	Title	Proponent
IPHC-2018-AM094-PropC8	Allow shellfish pots on board	ALFA
IPHC-2018-AM094-PropC9	Processing greater than 4 fillets	M. Cowart
IPHC-2018-AM094-PropC10	Halibut length measurement method	R. Yamada
IPHC-2018-AM094-PropC11	Long-term storage on pleasure vessels	L. Thompson
IPHC-2018-AM094-PropC12	Long-term storage on cruising vessels	W. Cornell
IPHC-2018-AM094-PropC13	Halibut in Bering Sea pot gear	J. Kauffman
IPHC-2018-AM094-PropC14	Status quo harvest measures 3A	R. Yamada



Other Stakeholders, continued

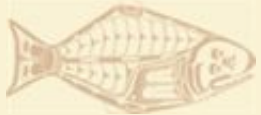
Document Number	Title	Proponent
IPHC-2018-AM094-PropC15	Trawler Halibut Bycatch Tender boat program	J. Kearns
IPHC-2018-AM094-PropC16	Reduce daily bag limit for all anglers in Area 2C and 3A in times of low abundance	M. Grove
IPHC-2018-AM094-PropC17	Recreational sportfishing only allocation	J. Kearns



INTERNATIONAL PACIFIC



HALIBUT COMMISSION



Post-AM094 Commission approval process

- Text of regulatory changes to be approved at AM094
- Final text shortly after meeting
 - If typographical and formatting changes are necessary
- Submission to Contracting Parties



Alaska Sport Halibut Fisheries through 2017



**For the International Pacific Halibut Commission
2018 Annual Meeting**

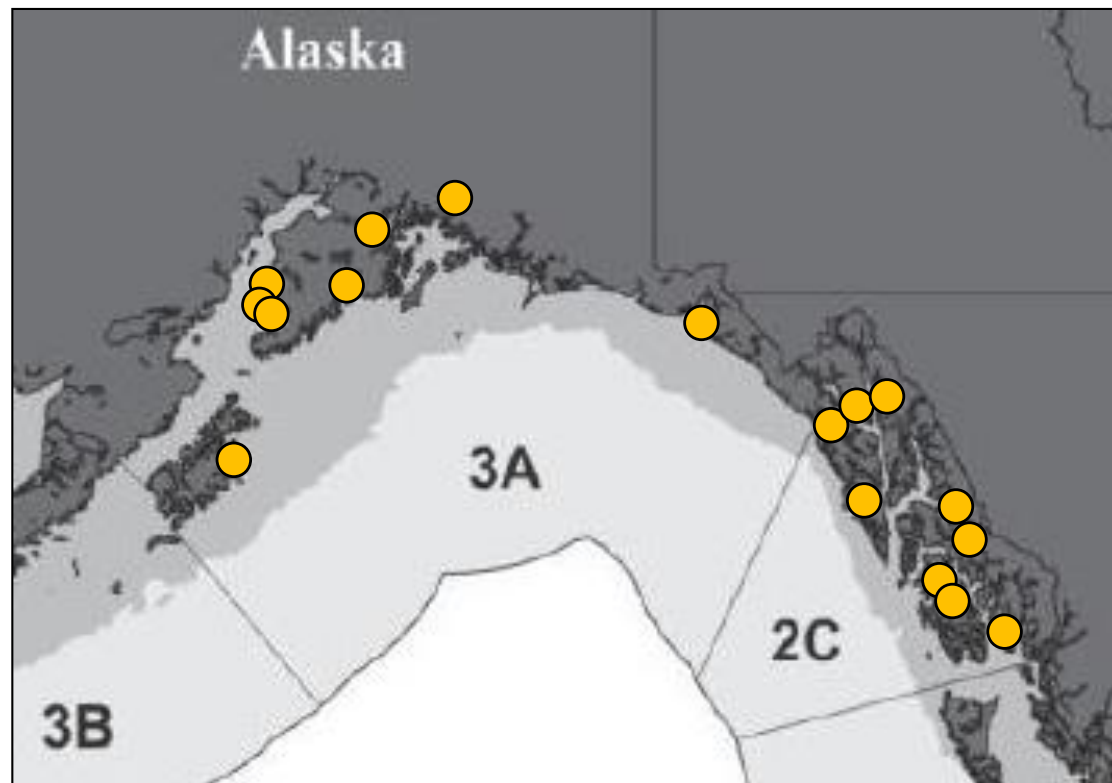
Scott Meyer
Alaska Department of Fish and Game

What estimates does ADF&G provide to IPHC?

- ▶ Numbers of halibut harvested, released (by sector, area)
- ▶ Average weight of sport harvest
- ▶ Sport harvest and release mortality in pounds
- ▶ Sport harvest prior to the mean date of IPHC survey in 2C, 3A
- ▶ Length composition (on request)
- ▶ Age and sex composition (on request, Area 3A only)

Data sources

- ▶ Charter logbook (mandatory, statewide)
- ▶ Statewide harvest survey (mail)
- ▶ Creel sampling at major ports in 2C, 3A



Charter information (2016)

▶ Active Charter Businesses and Guides

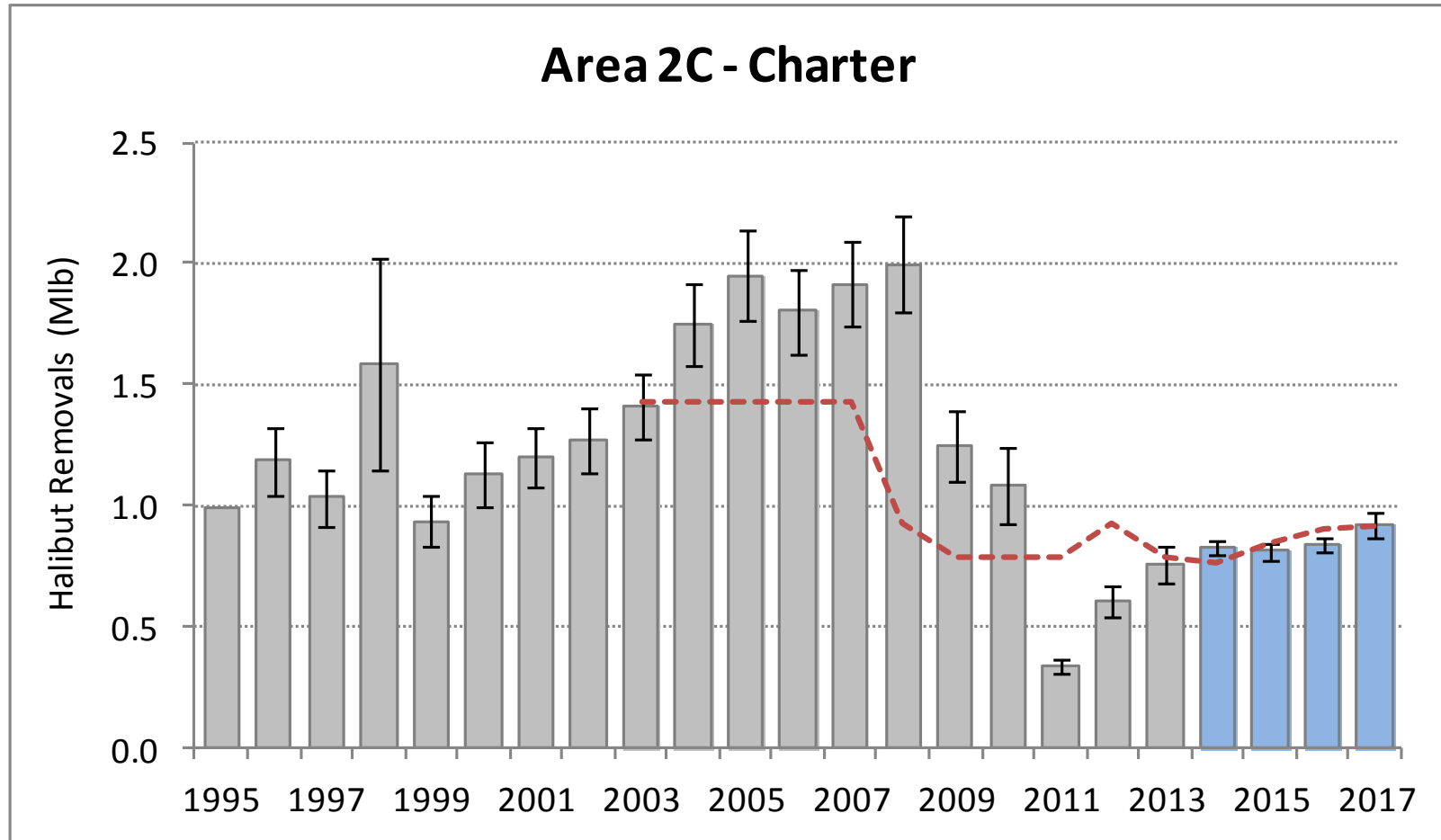
Measure	Southeast	Southcentral	Total
Active Businesses	309	256	564
Active Guides	746	531	1,235
Active Vessels	617	384	1,000

Columns not additive due to activity in both regions.

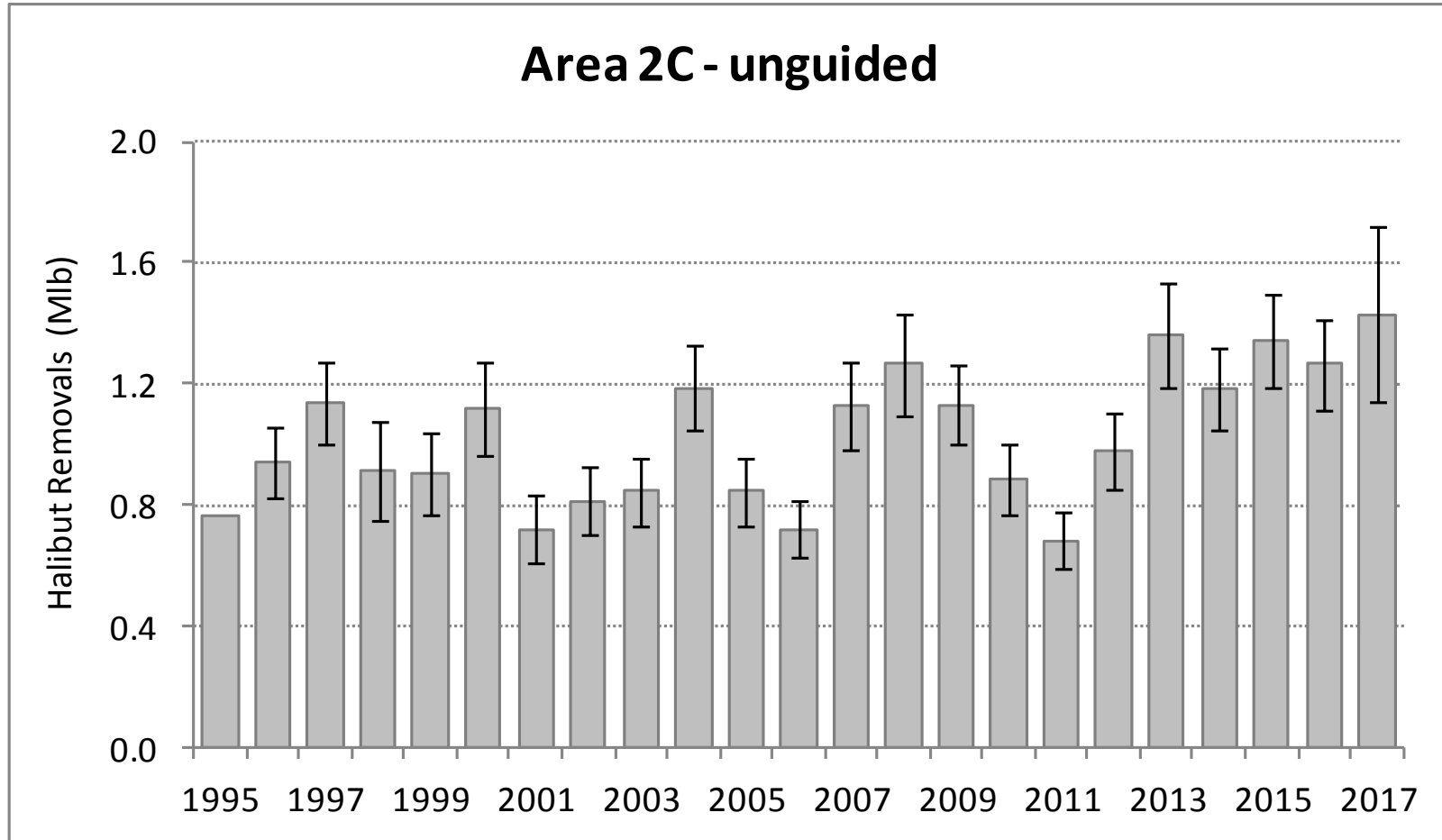
▶ Charter Vessels that Harvested Halibut

Area Fished	No. Vessels
2C	506
3A	360
2C and 3A	26
3B	2
3A and 3B	1
4A	1

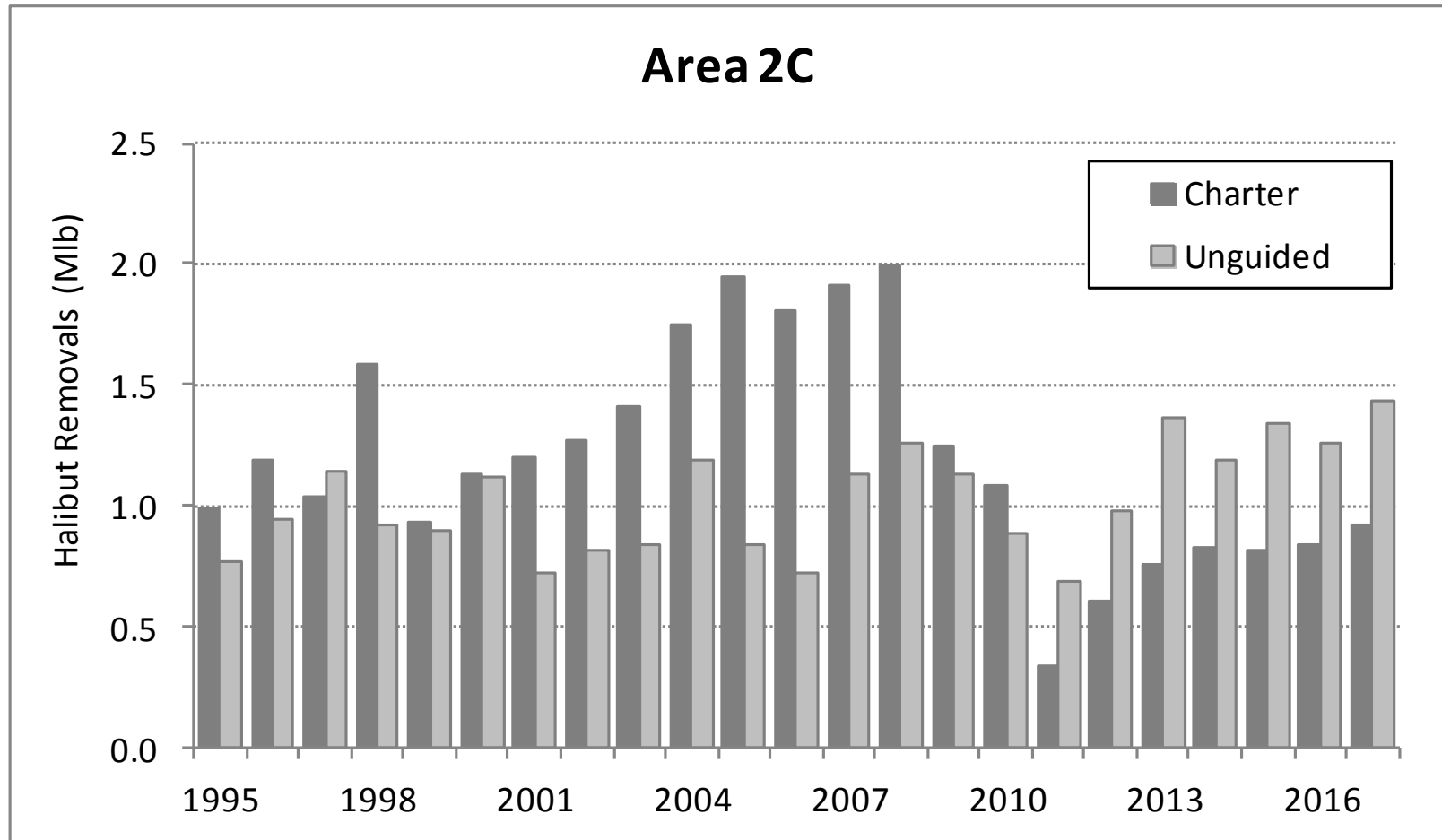
Area 2C charter



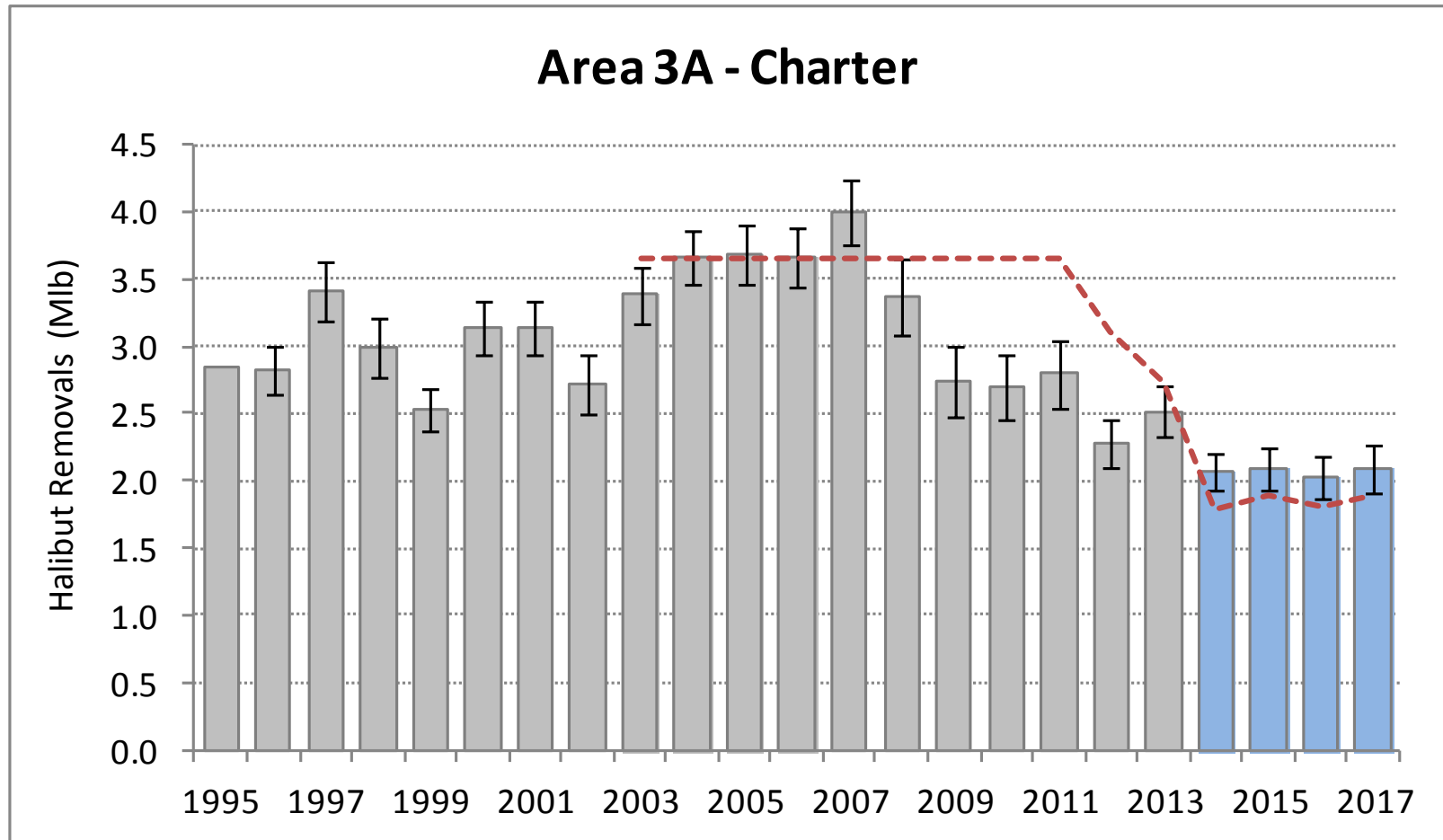
Area 2C unguided



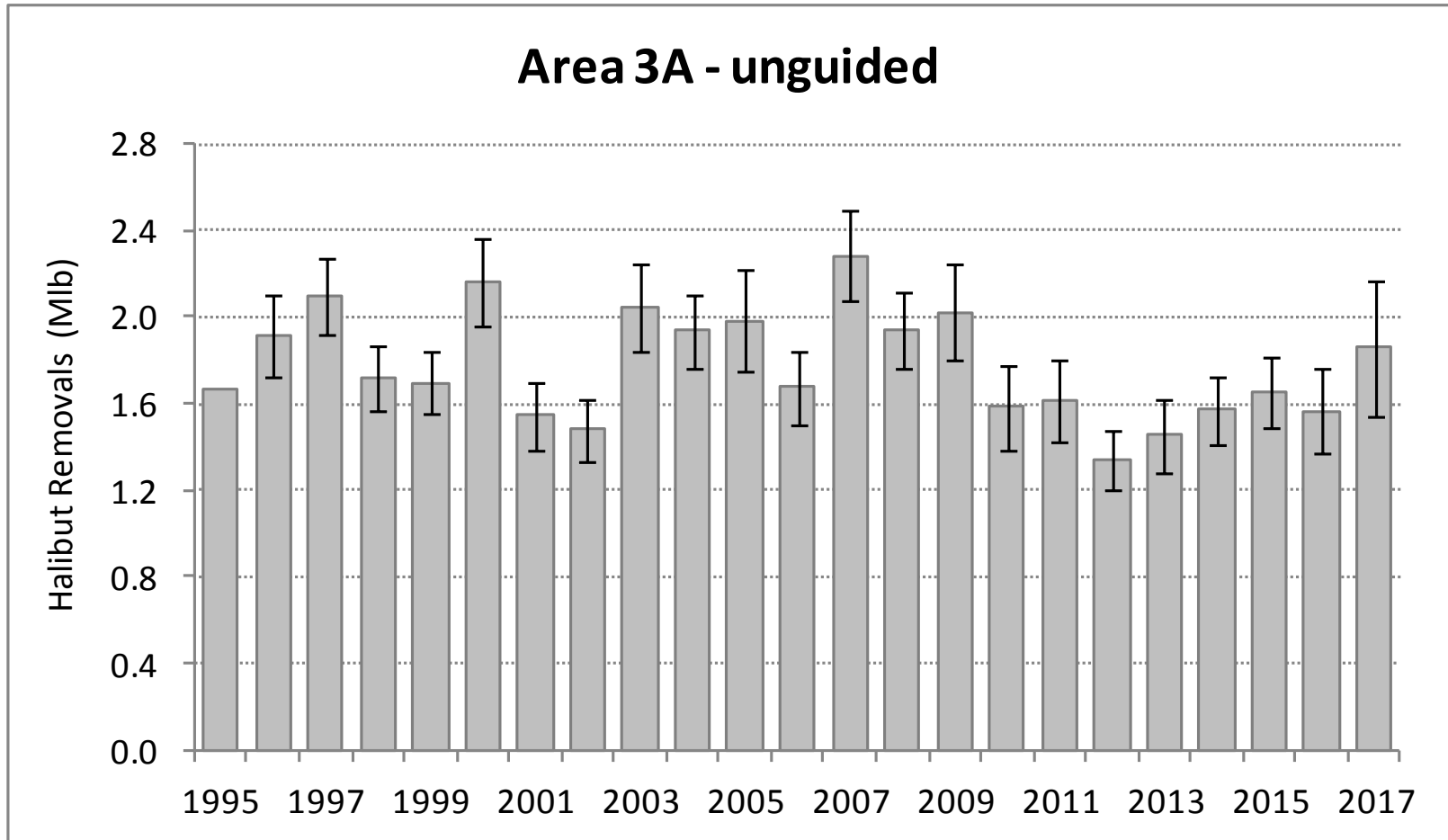
Area 2C charter and unguided



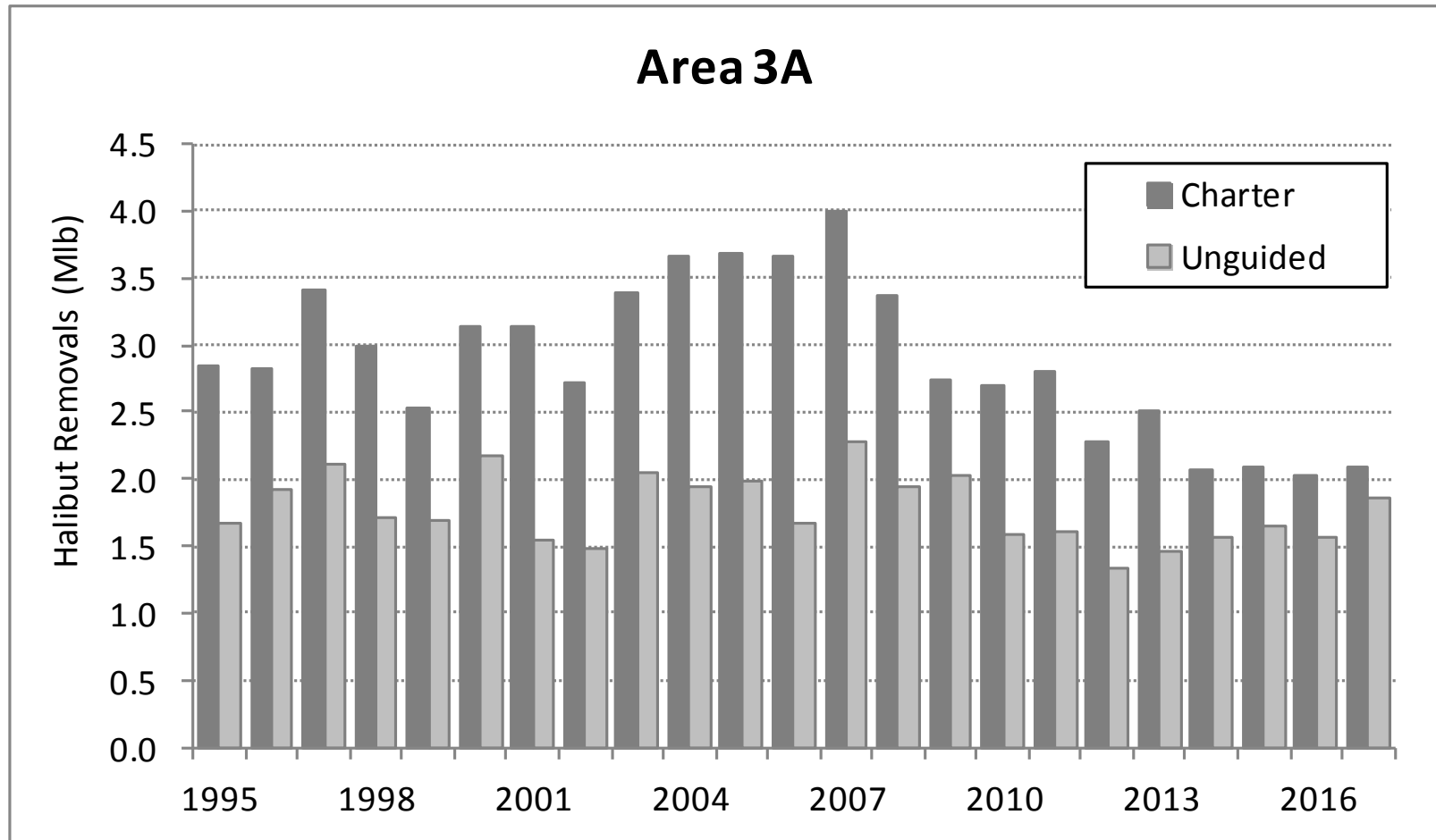
Area 3A charter



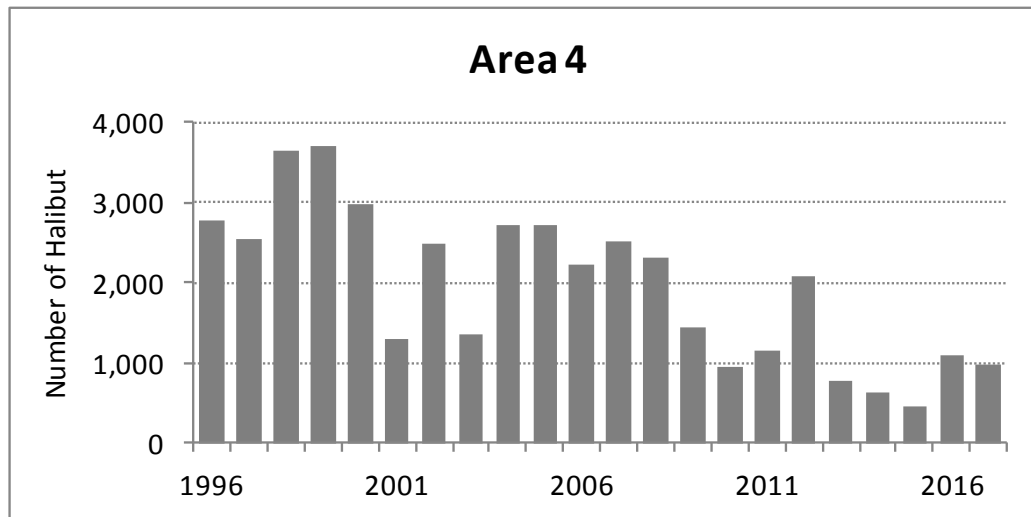
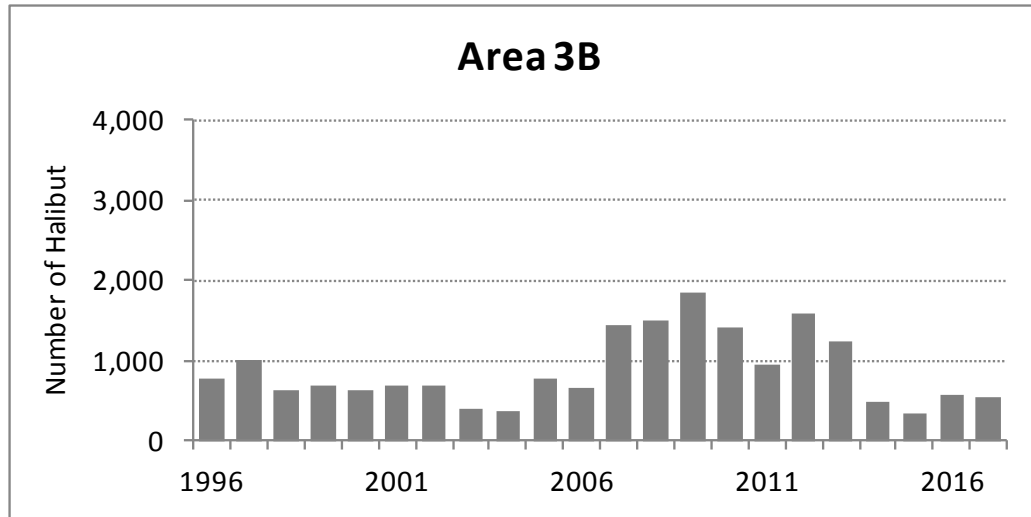
Area 3A unguided



Areas 3A – charter and unguided



Areas 3B and 4 – total sport harvest



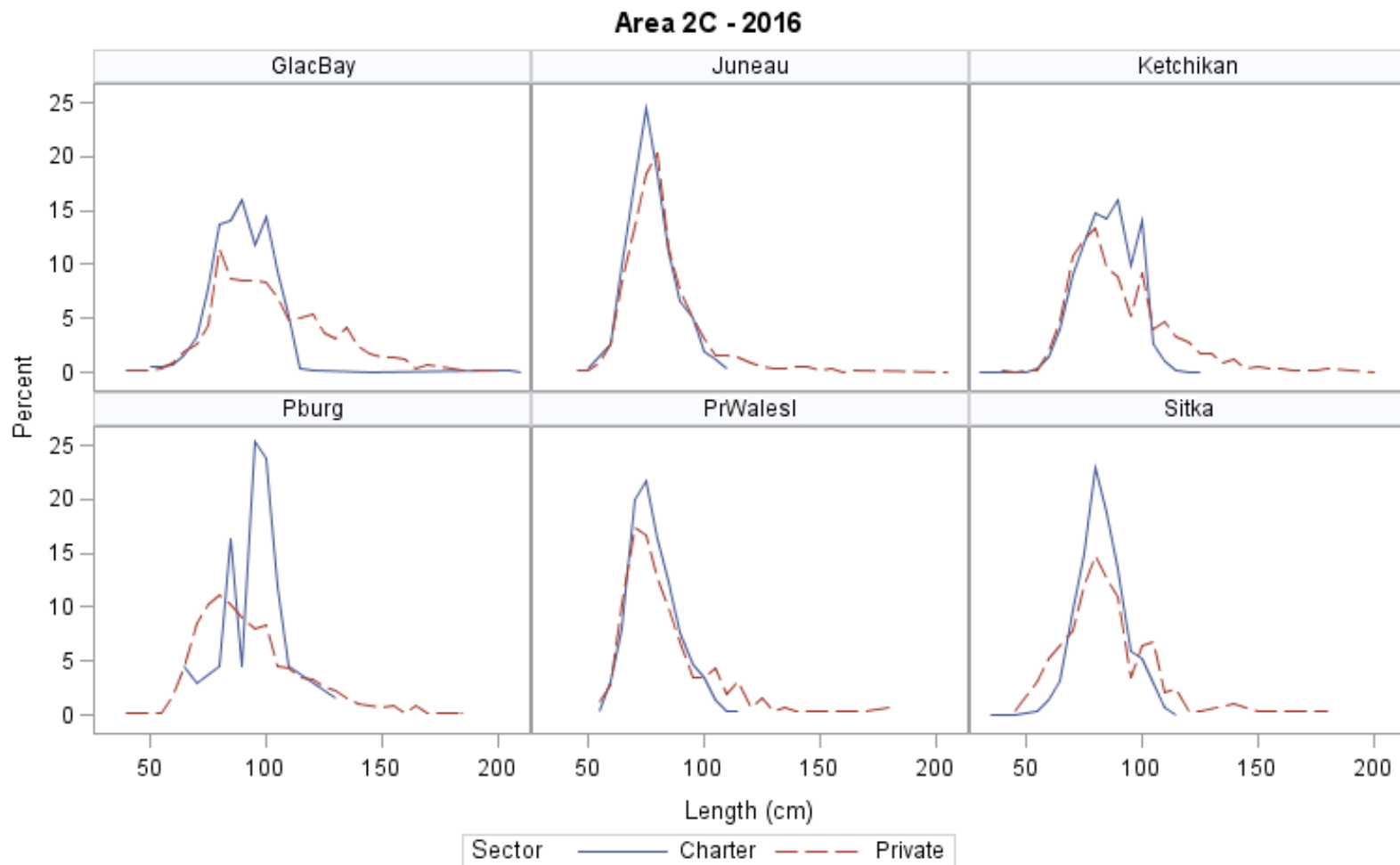
Sport fishery release mortality

Estimated Sport Fishery Release Mortality (Mlb)

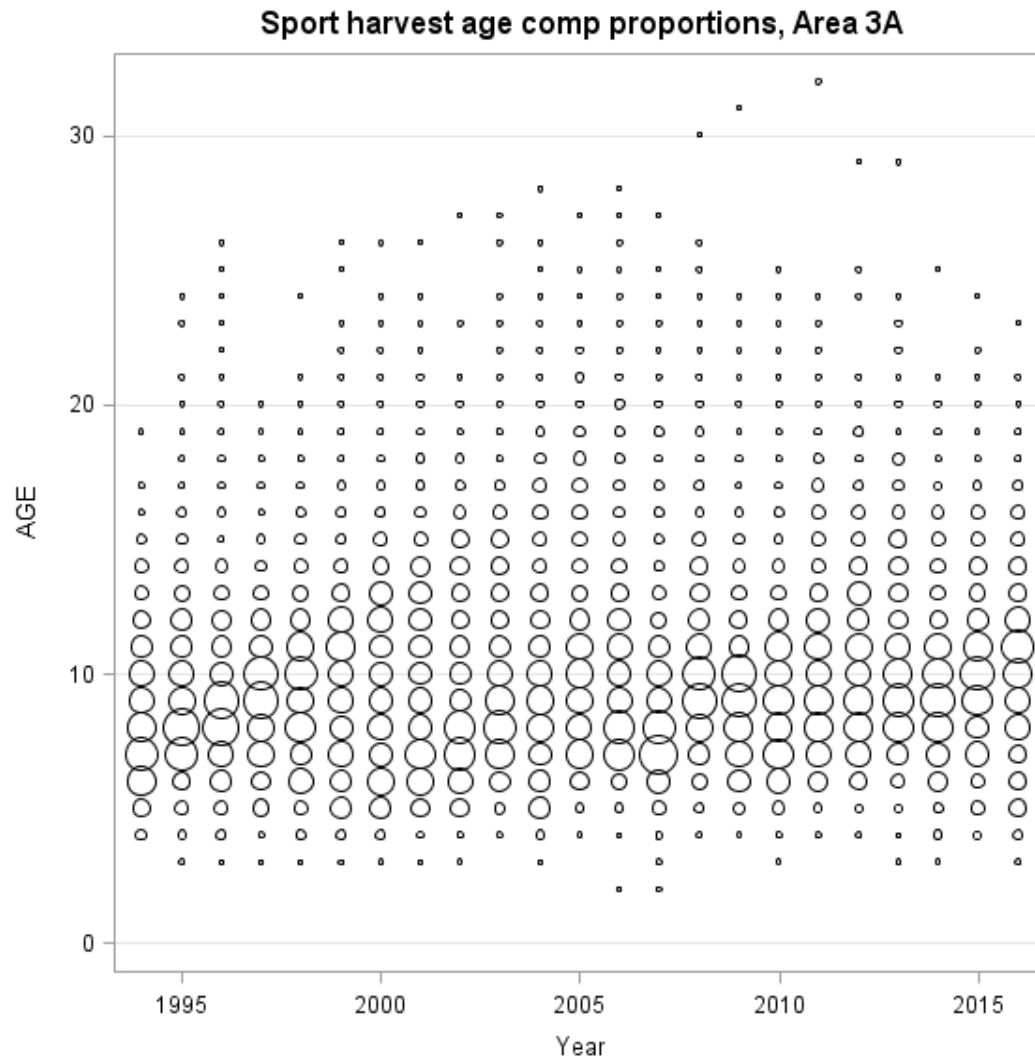
Area	Year	Yield	Total RelMort	% of Removals
2C	2014	1.954	0.062	3.1%
	2015	2.094	0.065	3.0%
	2016	2.035	0.071	3.4%
	2017	<i>2.295</i>	<i>0.059</i>	2.5%
3A	2014	3.567	0.070	1.9%
	2015	3.682	0.073	1.9%
	2016	3.542	0.056	1.6%
	2017	<i>3.905</i>	<i>0.052</i>	1.3%
3B	2014	0.007	0.000	0.0%
	2015	0.005	0.000	0.0%
	2016	0.008	0.000	0.0%
	2017	<i>0.008</i>	<i>0.000</i>	0.0%
4	2014	0.009	0.000	0.0%
	2015	0.007	0.000	0.0%
	2016	0.015	0.000	0.0%
	2017	<i>0.015</i>	<i>0.000</i>	0.0%

Red italics = preliminary estimates.

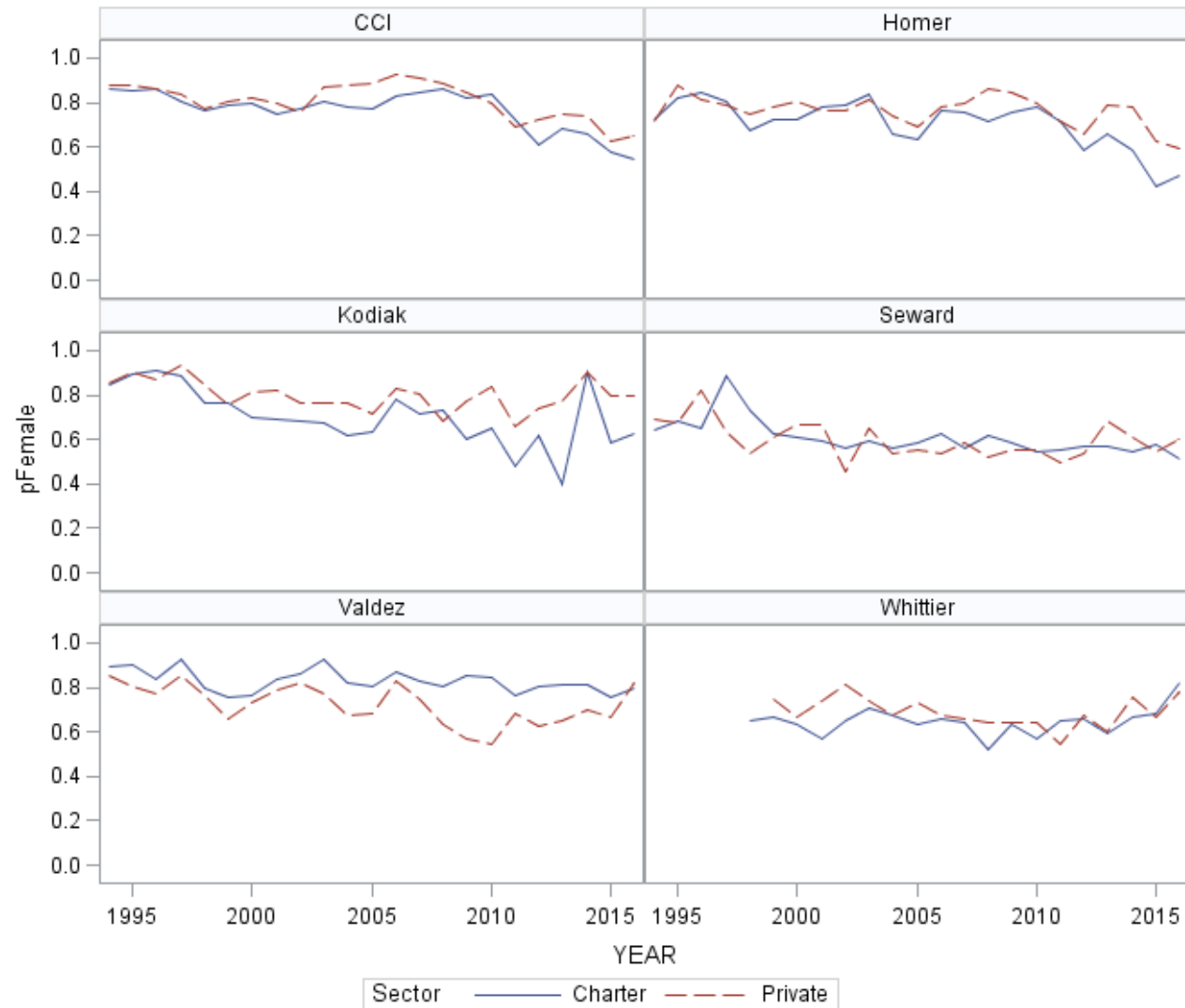
Length composition



Age composition (Area 3A only)



Sex composition (Area 3A only)



Acknowledgements

- ▶ Bob Powers – logbook data
- ▶ Diana Tersteeg, Mike Jaenicke – Southeast data
- ▶ Martin Schuster – Southcentral data
- ▶ Kathrin Sundet, Bill Romberg – SWHS
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- ▶ Cooperating anglers and charter operators

- ▶ Funding:
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DJ-WB Federal Aid in Fish Restoration

