

C-2 BSAI HALIBUT ABM OF A80 PSC LIMIT

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Council

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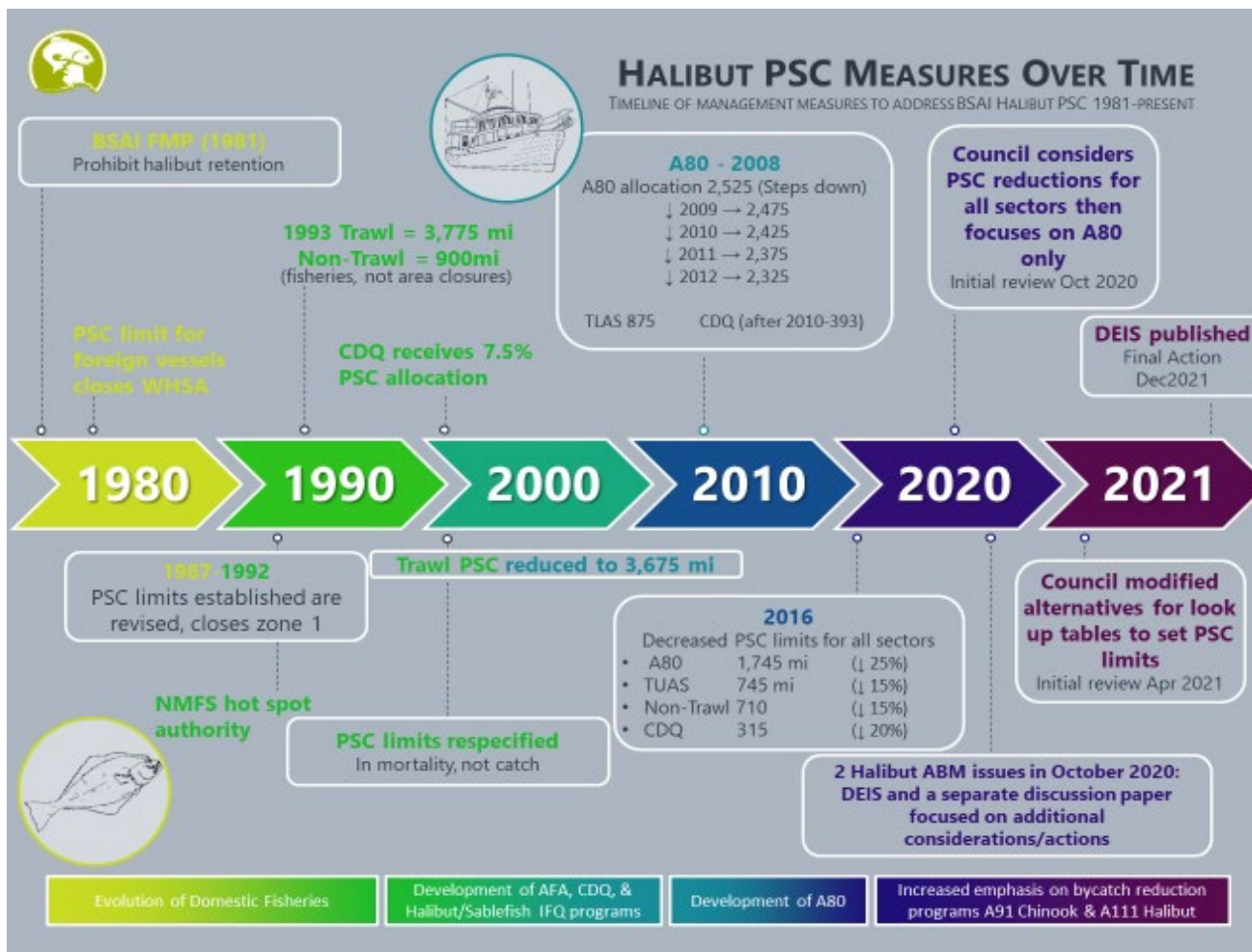
IPHC: Allan Hicks

OUTLINE OF PRESENTATION

1. Overview of timeline and action at this meeting
2. Description of relative authorities for NPFMC, NMFS and IPHC
3. Purpose and Need for this action
4. Alternatives and options under consideration
5. IPHC harvest policy, decision making and halibut stock status
6. Relative uncertainties in halibut population dynamics that contribute to the outputs in the DEIS
7. Impact on directed halibut catch
8. Status of groundfish and impacts to groundfish fishery participants
9. Social Impact Assessment
10. Preferred alternative selection and National Standards
11. *Separate NMFS presentation on public comments received on DEIS during official NEPA comment period, tribal consultations and implementation update*



HALIBUT PSC MEASURES OVER TIME





HALIBUT PSC MEASURES OVER TIME

TIMELINE OF MANAGEMENT MEASURES TO ADDRESS BSAI HALIBUT PSC 1981-PRESENT

BSAI FMP (1981)
Prohibit halibut retention



1993 Trawl = 3,775 mi
Non-Trawl = 900mi
(fisheries, not area closures)

A80 - 2008
A80 allocation 2,525 (Steps down)
↓ 2009 → 2,475
↓ 2010 → 2,425
↓ 2011 → 2,375
↓ 2012 → 2,325
TLAS 875 CDQ (after 2010-393)

Council considers PSC reductions for all sectors then focuses on A80 only
Initial review Oct 2020

PSC limit for foreign vessels closes WHSA

CDQ receives 7.5% PSC allocation

DEIS published
Final Action Dec 2021



1987-1992
PSC limits established are revised, closes zone 1

Trawl PSC reduced to 3,675 mi

2016
Decreased PSC limits for all sectors
• A80 1,775 mi (↓ 25%)
• TUAS 745 mi (↓ 15%)
• Non-Trawl 710 (↓ 15%)
• CDQ 315 (↓ 20%)

Council modified alternatives for look up tables to set PSC limits
Initial review Apr 2021

NMFS hot spot authority

PSC limits respecified
In mortality, not catch

2 Halibut ABM issues in October 2020: DEIS and a separate discussion paper focused on additional considerations/actions



Evolution of Domestic Fisheries

Development of AFA, CDQ, & Halibut/Sablefish IFQ programs

Development of A80

Increased emphasis on bycatch reduction programs A91 Chinook & A111 Halibut

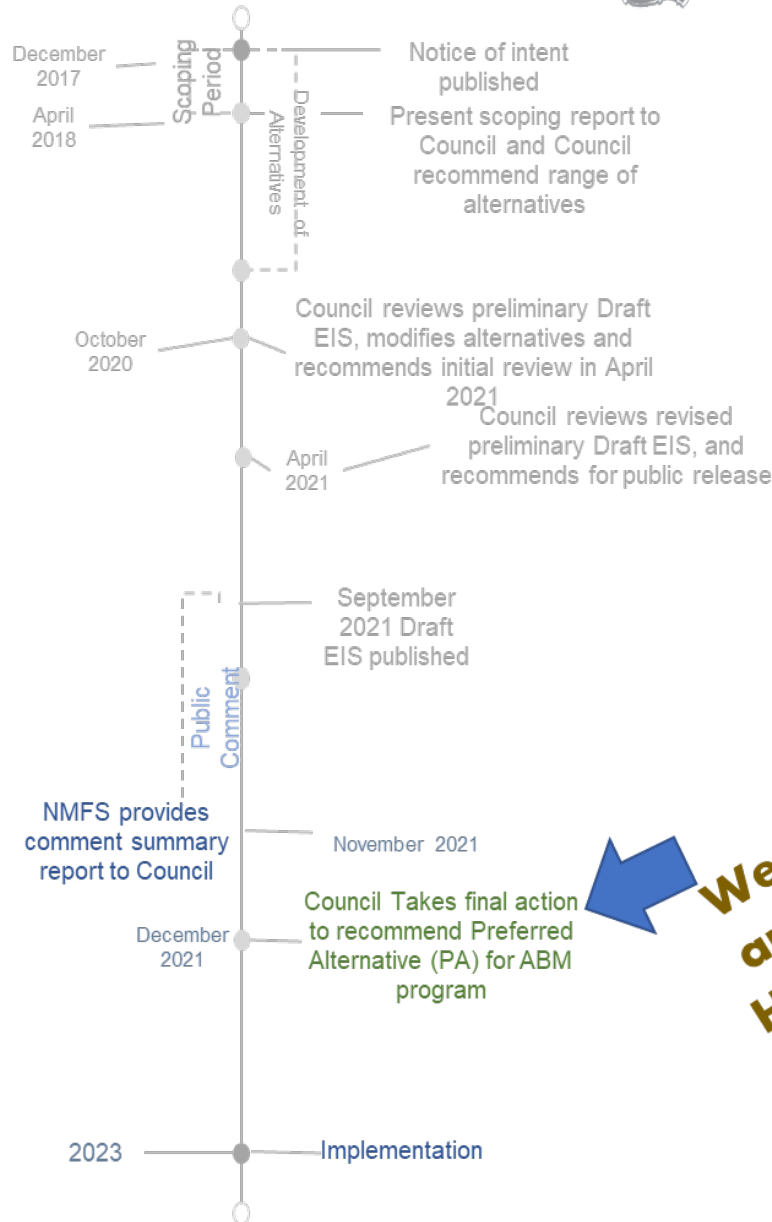


Topic	Information	Link
Initial Review DEIS	April 2021 initial review DEIS	April 2021 initial review DEIS
Initial Review DEIS	Preliminary DEIS on previous alternative set	October initial review preliminary ABM DEIS
	Revised Alternative set from October 2020 motion	October 2020 Council motion
Preliminary DEIS	Previous initial review draft which contained alternatives that applied to all sectors	October 2019
Indices	Data sources from which to derive indices including strengths and weaknesses of each	April 2016
	Description of potential abundance indices IPHC assessment; EBS trawl survey; combined and applied in a control rule	April 2016
Fishery characteristics	Halibut PSC by target; observed trawl and longline effort, CPUE, PSC rates	Supplement April 2016
Control rules	Control rule background	April 2016 October 2016 April 2017 April 2018
	Control rule features	April 2016 October 2016 April 2017 April 2018
	Control rule examples already in use	April 2016 April 2017
Quantifying objectives	Performance metrics	February 2017 April 2017 June 2017
Incentives	Incentives	April 2017
Alternatives and scenarios	Example ABM alternatives	April 2016 October 2016 April 2017 Supplement Apr 17 April 2018
	Management issues and methods	October 2016
	Analytical considerations and example scenarios	April 2016 Supplement ppt October 2016 April 2017 Supplement Apr 17
	Methodology for analysis	June 2018(a)
Performance standard	Proposed O26 performance standard	June 2018 (b)

TABLE I-2

PG 47

Potential Schedule for EIS



TIMING OF ACTION AT THIS MEETING



RELATIVE AUTHORITIES: NPFMC, NMFS AND IPHC

SECTION 1.2.1

NPFMC AND NMFS

- Management of groundfish fisheries in the BSAI under the authority of the MSA (16 U.S.C. 1801-1884), and through a Fishery Management Plan for the Groundfish of the BSAI Management Area (BSAI FMP).
- “prohibited species” in the groundfish fisheries.
 - capture is required to be avoided, and their retention is prohibited except when retention is required or authorized by other applicable law, such as for the Prohibited Species Donation Program.
- Halibut PSC limits, in the BSAI groundfish fisheries are to minimize halibut bycatch and bycatch mortality. The BSAI FMP specifies that when a halibut PSC limit is reached in an area, further groundfish fishing with specific types of gear or modes of operation is prohibited by those who take their halibut PSC in that area.
 - Halibut PSC limits impose an upper limit on bycatch.



HALIBUT PSC MORTALITY AND DMRS

- This analysis primarily addresses halibut PSC, i.e., the subset of halibut bycatch that is assumed to be dead because of interactions with the groundfish fisheries.
- Mortality calculations are made for all halibut bycatch in the groundfish fisheries to estimate halibut PSC, using discard mortality rates adopted annually by the Council as part of the harvest specifications process.
- The Council and NMFS have the authority to set and adjust halibut PSC limits in the BSAI groundfish fisheries through FMP and regulatory amendments.
 - However, only the IPHC can make determinations on annual catch limits for halibut in the directed fisheries.



IPHC

- Responsible for overall biologic assessment and conservation of halibut off the coasts of AK, B.C. and western US
 - Annual assessment of Coastwide halibut stock accounts for all mortality
- Sets O26 (over 26”) catch limits for halibut by Regulatory Area while accounting for all mortality



DIRECT AND INDIRECT IMPACTS TO FISHERIES: FRAMEWORK FOR ANALYSIS

- Catch and revenue estimates for directly regulated entity (A80) under range of alternatives
- Indirect potential for impacts to directed halibut fishery of PSC reductions:
 - Reduced U26 portion of PSC could lead to longer term benefits to the commercial halibut fisheries through the distribution of the stock
 - Bering Sea and elsewhere depending upon migration and recruitment
 - IPHC harvest policy subtracts the O26 component of non-directed discard mortality from TCEY when calculating fishing limits





PURPOSE AND NEED AND ALTERNATIVES

PURPOSE AND NEED SECTION 1.1 P42

*Halibut is an important resource in the Bering Sea and Aleutian Islands (BSAI), supporting commercial halibut fisheries, recreational fisheries, subsistence fisheries, and groundfish fisheries. The International Pacific Halibut Commission (IPHC) is responsible for assessing the Pacific halibut stock and establishing total annual catch limits for directed fisheries and the North Pacific Fishery Management Council (Council) is responsible for managing prohibited species catch (PSC) in U.S. commercial groundfish fisheries managed by the Council. **The Amendment 80 sector is accountable for the majority of the annual halibut PSC mortality in the BSAI groundfish fisheries. While the Amendment 80 fleet has reduced halibut mortality in recent years, continued decline in the halibut stock requires consideration of additional measures for management of halibut PSC in the Amendment 80 fisheries.***

When BSAI halibut abundance declines, PSC in Amendment 80 fisheries can become a larger proportion of total halibut removals in the BSAI, particularly in Area 4CDE, and can reduce the proportion of halibut available for harvest in directed halibut fisheries. The Council intends to establish an abundance-based halibut PSC management program in the BSAI for the Amendment 80 sector that meets the requirements of the Magnuson-Stevens Act, particularly to minimize halibut PSC to the extent practicable under National Standard 9 and to achieve optimum yield in the BSAI groundfish fisheries on a continuing basis under National Standard 1. The Council is considering a program that links the Amendment 80 sector PSC limit to halibut abundance and provides incentives for the fleet to minimize halibut mortality at all times. This action could also promote conservation of the halibut stock and may provide additional opportunities for the directed halibut fishery.



PURPOSE AND NEED FOR FOCUS ON A80 SECTOR

- “The Amendment 80 sector is accountable for the majority of the annual halibut PSC mortality in the BSAI groundfish fisheries. While the Amendment 80 fleet has reduced halibut mortality in recent years, continued decline in the halibut stock requires consideration of additional measures for management of halibut PSC in the Amendment 80 fisheries.”*



Table 3-18 Proportion of Pacific halibut mortality by BSAI groundfish sectors (2010 through 2019)

A80	TLAS	HALCP	CDQ	HALCV	POT*	AFA*
60.3%	16.1%	11.1%	6.9%	0.1%	0.1%	6.3%

* The Pot and AFA sectors' halibut mortality does not accrue to annual PSC limits.

Table 3-19 Bycatch of Pacific halibut by year and sector by estimated catch (mt) and PSC mortality (mt)

Year	Measure	A80	TLAS	HALCP	CDQ	HALCV	Total
2010	Catch	2,808	399	4,814	837	37	8,895
	Mortality	2,243	286	482	151	4	3,166
2011	Catch	2,277	469	4,698	844	22	8,310
	Mortality	1,810	346	470	203	2	2,831
2012	Catch	2,469	824	5,380	796	20	9,489
	Mortality	1,944	606	538	258	2	3,348
2013	Catch	2,676	669	5,280	817	40	9,482
	Mortality	2,165	503	476	253	4	3,401
2014	Catch	2,667	673	4,523	604	74	8,541
	Mortality	2,178	508	407	224	7	3,324
2015	Catch	1,719	508	3,313	339	20	5,899
	Mortality	1,638	381	299	122	2	2,200
2016	Catch	1,965	689	2,192	451	1	5,298
	Mortality	1,412	488	198	165	0	2,263
2017	Catch	1,976	654	2,133	436	5	5,204
	Mortality	1,167	394	171	147	1	1,880
2018	Catch	2,556	649	1,440	412	25	5,082
	Mortality	1,343	412	115	148	4	2,022
2019	Catch	3,067	880	975	418	39	5,379
	Mortality	1,461	539	78	189	2	2,270

PURPOSE AND NEED SECTION 1.1 P34

Halibut is an important resource in the Bering Sea and Aleutian Islands (BSAI), supporting commercial halibut fisheries, recreational fisheries, subsistence fisheries, and groundfish fisheries. The International Pacific Halibut Commission (IPHC) is responsible for assessing the Pacific halibut stock and establishing total annual catch limits for directed fisheries and the North Pacific Fishery Management Council (Council) is responsible for managing prohibited species catch (PSC) in U.S. commercial groundfish fisheries managed by the Council. The Amendment 80 sector is accountable for the majority of the annual halibut PSC mortality in the BSAI groundfish fisheries. While the Amendment 80 fleet has reduced halibut mortality in recent years, continued decline in the halibut stock requires consideration of additional measures for management of halibut PSC in the Amendment 80 fisheries.

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ALTERNATIVES



ALTERNATIVE I: NO ACTION. BSAI HALIBUT AMENDMENT 80 PSC LIMIT IS 1,745 T.

A80 Sector	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PSC limit	2,425	2,375	2,325	2,325	2,325	2,325	1,745	1,745	1,745	1,745	1,745
Halibut encounters	2,823	2,277	2,469	2,677	2,667	1,719	1,965	1,976	2,555	3,067	2,031
Halibut mortality	2,254	1,810	1,944	2,166	2,178	1,404	1,412	1,167	1,343	1,461	1,097

2021(12/1/21):

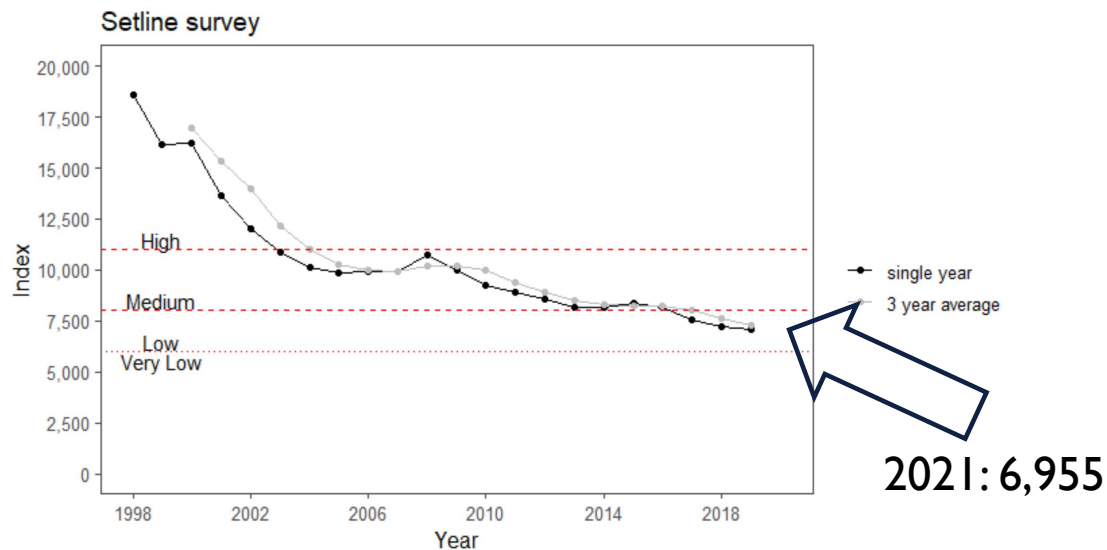
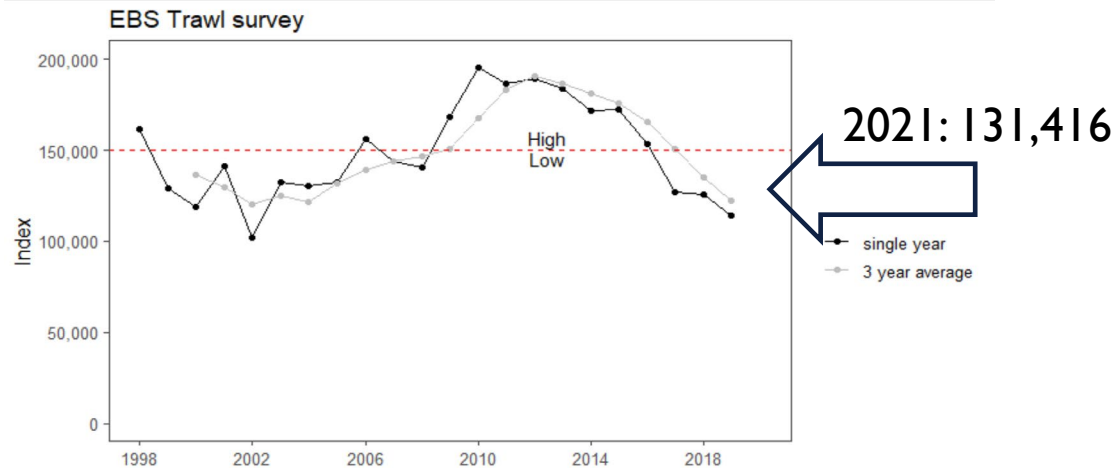
Halibut encounters 1,589

Halibut mortality 967



ALTERNATIVES 2-4

USE COMBINATION OF SURVEY STATES TO DETERMINED PRE-SPECIFIED PSC LIMITS IN LOOK UP TABLES



Alternative 2		EBS shelf trawl survey index (t)	
		Low < 150,000	High ≥ 150,000
IPHC setline survey index in Area 4ABCDE (WPUE)	High ≥ 11,000	1,571 mt (10% below current)	1,745 mt (current limit)
	Medium 8,000 – 10,999	1,483 mt (15% below current)	1,571 mt (10% below current)
	Low < 8,000	1,396 mt (20% below current)	1,483 mt (15% below current)

Alternative 3		EBS shelf trawl survey index (t)	
		Low < 150,000	High ≥ 150,000
IPHC setline survey index in Area 4ABCDE (WPUE)	High ≥ 11,000	1,745 mt (current limit)	2,007 mt (15% above current)
	Medium 8,000 – 10,999	1,396 mt (20% below current)	1,745 mt (current limit)
	Low 6,000-7,999	1,309 mt (25% below current)	1,396 mt (20% below current)
	Very Low < 6,000	1,222 mt (30% below current)	1,309 mt (25% below current)

Alternative 4		EBS shelf trawl survey index (t)	
		Low < 150,000	High ≥ 150,000
IPHC setline survey index in Area 4ABCDE (WPUE)	High ≥ 11,000	1,396 mt (20% below current)	1,745 mt (current limit)
	Medium 8,000 – 10,999	1,222 mt (30% below current)	1,396 mt (20% below current)
	Low 6,000-7,999	1,047 mt (40% below current)	1,222 mt (30% below current)
	Very Low < 6,000	960 mt (45% below current)	1,047 mt (40% below current)

ALTERNATIVES 2-4 LOOK UP TABLES

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**ALTERNATIVE
PSC LIMITS
RESULTING
FROM 2021
SURVEY STATES**

TABLE 2-9 STATUS QUO PSC LIMITS COMPARED ACROSS SECTORS WITH ACTION ALTERNATIVES

Minimum and maximum PSC limits by alternative for Amendment 80 as compared with fixed limits for others sectors not impacted by this action

Groundfish Sector	A80	A80	A80	A80	BSAI TLAS	Non-Trawl	CDC
Alternative	1	2	3	4	All	All	All
Minimum PSC Limit	1745	1396	1222	960	745	710	315
Maximum PSC Limit	1745	1745	2007	1745	745	710	315



A80 ACTIVE VESSELS HARVESTING A80 AND CDQ ALLOCATIONS

Table 3-12 Active A80 vessels that harvested A80 and CDQ allocations

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
A80	19	20	19	18	18	18	19	19	19	20	19	23
CDQ	7	8	7	6	6	4	6	7	8	8	7	12
Total	19	20	20	18	18	18	19	19	19	20	19	23





OPTIONS 1-3

TABLE 5-9

- Option 1: Rolling survey average to determine PSC limits

Option 1: 3-yr rolling average

PSC Limits from Look up tables

PSC limit year	Alt 2.1	Alt 3.1	Alt 4.1
2001	1745	2007	1745
2002	1571	1745	1396
2003	1571	1745	1396
2004	1571(1483)	1745(1396)	1396 (1222)
2005	1571(1483)	1745(1396)	1396 (1222)
2006	1483	1396	1222
2007	1483(1571)	1396(1745)	1222(1396)
2008	1483	1396	1222
2009	1571	1745	1396
2010	1483	1396	1222
2011	1483	1396	1222
2012	1571	1745	1396
2013	1571	1745	1396
2014	1571	1745	1396
2015	1571	1745	1396
2016	1571	1745	1396
2017	1571	1745	1396
2018	1571(1396)	1745(1309)	1396(1047)
2019	1571	1745	1396
2020	1396	1309	1047

OPTION 2: PSC VARIABILITY

- *PSC limit varies no more than a selected percentage **in the first year of implementation***
 - *Suboptions:*
 - 10%
 - 15%
- Reduce the initial inter-annual variability in the PSC limit in the first year of implementation (2023).
 - Regardless of the PSC limit determined from the look up table, the PSC limit in the first year of implementation must fall within the range 1,483 to 2,006
 - = variability of +/- maximum 15% change from status quo 1,745 mt

OPTION 3 ANNUAL LIMIT

80% OR 90% OF ANNUAL PSC LIMIT.

IF PSC USE > A.L. IN > 3 OF 7 YEARS = HARD CAP

TABLE 2-6

Hypothetical synopsis of application of annual limit under Option 3 and the interplay between when it is imposed as a hard cap and for how long. A year specified as **bold** is prosecuted under a hard cap in that year.

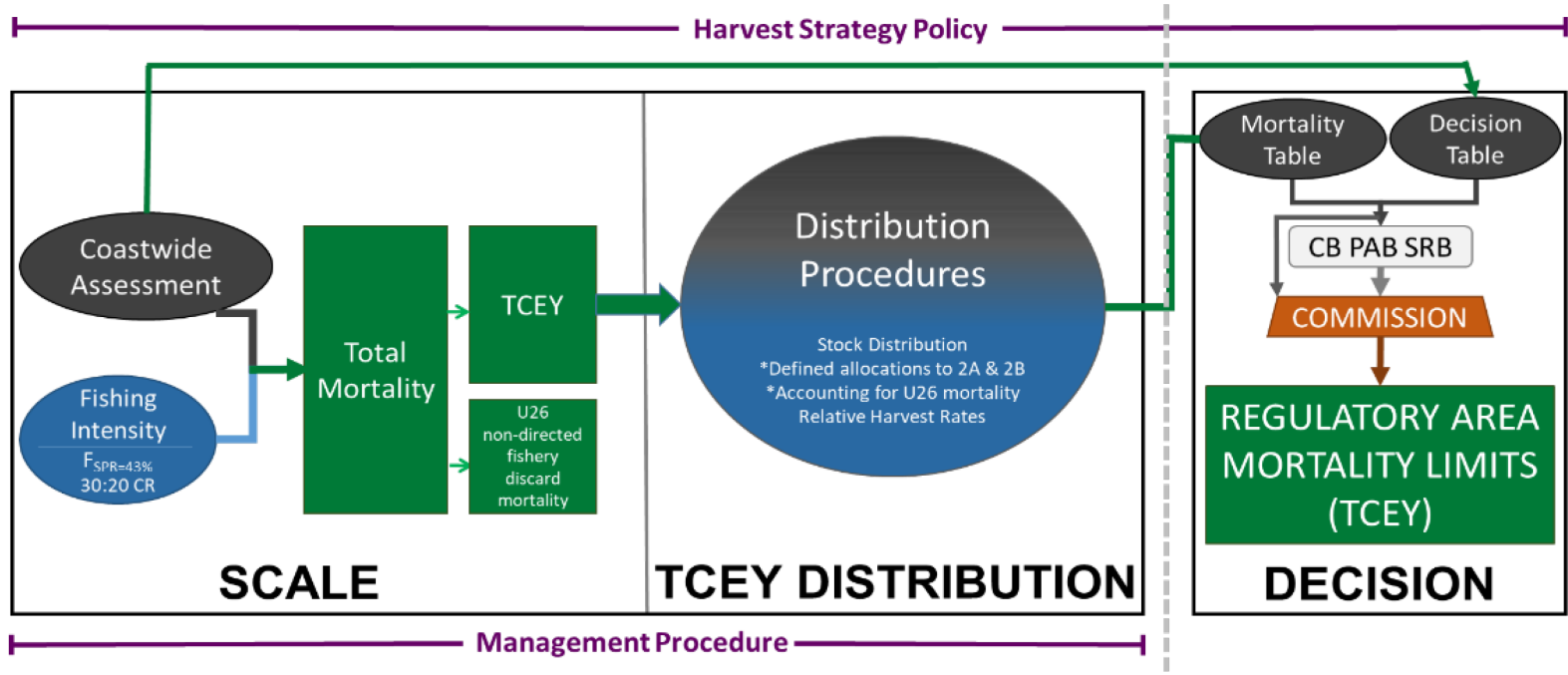
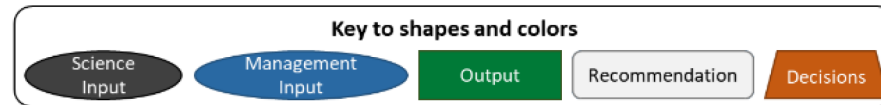
Year	Annual Limit exceeded	Annual Limit imposed as a Hard cap	Years Over Limit
2021	Y	N	1 of 1
2022	N	N	1 of 2
2023	N	N	1 of 3
2024	Y	N	2 of 4
2025	Y	N	3 of 5
2026	NA	Y	3 of 6
2027	N	N	3 of 7
2028	Y	N	3 of 7
2029	NA	Y	3 of 7
2030	N	N	3 of 7





IPHC HARVEST POLICY AND DECISION MAKING AND HALIBUT STOCK STATUS

IPHC Interim Harvest Strategy Policy



Baseline TCEY distribution

Interim Management Procedure: baseline

	<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>
O32 Stock Distribution	1.8%	12.0%	11.3%	33.6%	18.8%	6.9%	5.7%	10.0%	100%
HR	1.0	1.0	1.0	1.0	0.75	0.75	0.75	0.75	NA
TCEY Distribution	2.0%	13.4%	12.6%	37.5%	15.7%	5.8%	4.8%	8.3%	100%

2021 observed stock distribution → 2022 TCEY distribution



Baseline and adjustments

Interim Management Procedure: adjustments

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
O32 Stock Distribution	1.8%	12.0%	11.3%	33.6%	18.8%	6.9%	5.7%	10.0%	100%
HR	1.0	1.0	1.0	1.0	0.75	0.75	0.75	0.75	NA
TCEY Distribution	2.0%	13.4%	12.6%	37.5%	15.7%	5.8%	4.8%	8.3%	100%
Adjusted	1.65	18.0%	<i>Depends on total TCEY</i>						
Final % from total TCEY	4.0%	18.3%	11.5%	34.4%	14.4%	5.3%	4.4%	7.6%	100%
TCEYs	1.65	7.56	4.75	14.19	5.94	2.18	1.80	3.15	41.22

2B includes 0.14 Milb accounting for U26 non-directed discards in AK



Decision step (looking at the past)
 [note information in DEIS table 4-3 Pg 164]

Reference TCEYs

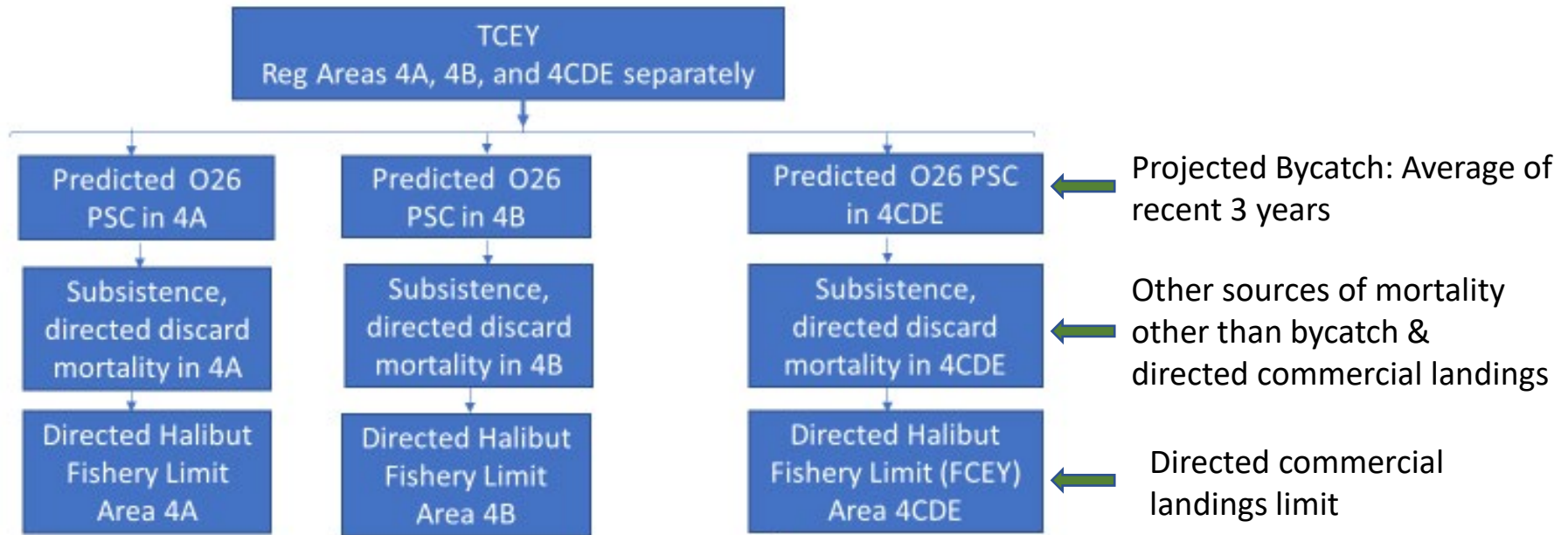
	<u>2A</u>	<u>2B</u>	<u>2C</u>	<u>3A</u>	<u>3B</u>	<u>4A</u>	<u>4B</u>	<u>4CDE</u>	<u>Total</u>
2019	0.78	4.91	6.26	16.35	2.97	2.21	1.95	4.59	40.00
2020	1.65	5.80	4.97	9.80	2.94	2.26	1.27	3.22	31.90
2021	1.65	7.00	5.16	14.12	3.12	2.51	1.47	3.98	39.00
2022	1.65	7.56	4.75	14.19	5.94	2.18	1.80	3.15	41.22

Adopted TCEYs

2019	1.65	6.83	6.34	13.50	2.90	1.94	1.45	4.00	38.61
2020	1.65	6.83	5.85	12.20	3.12	1.75	1.31	3.90	36.60
2021	1.65	7.00	5.80	14.00	3.12	2.05	1.40	3.98	39.00

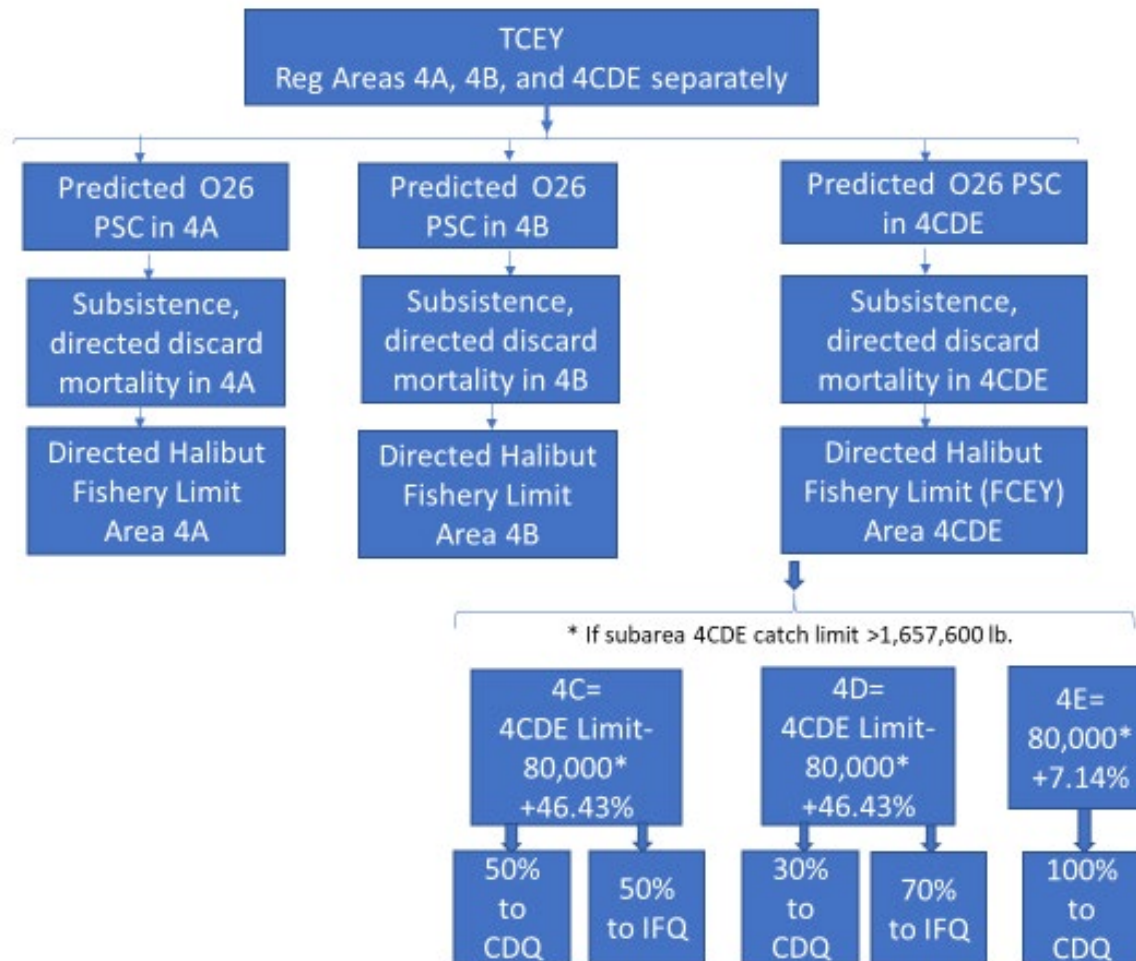


Directed commercial mortality limits



U26 non-directed discard mortality is separate from the TCEY

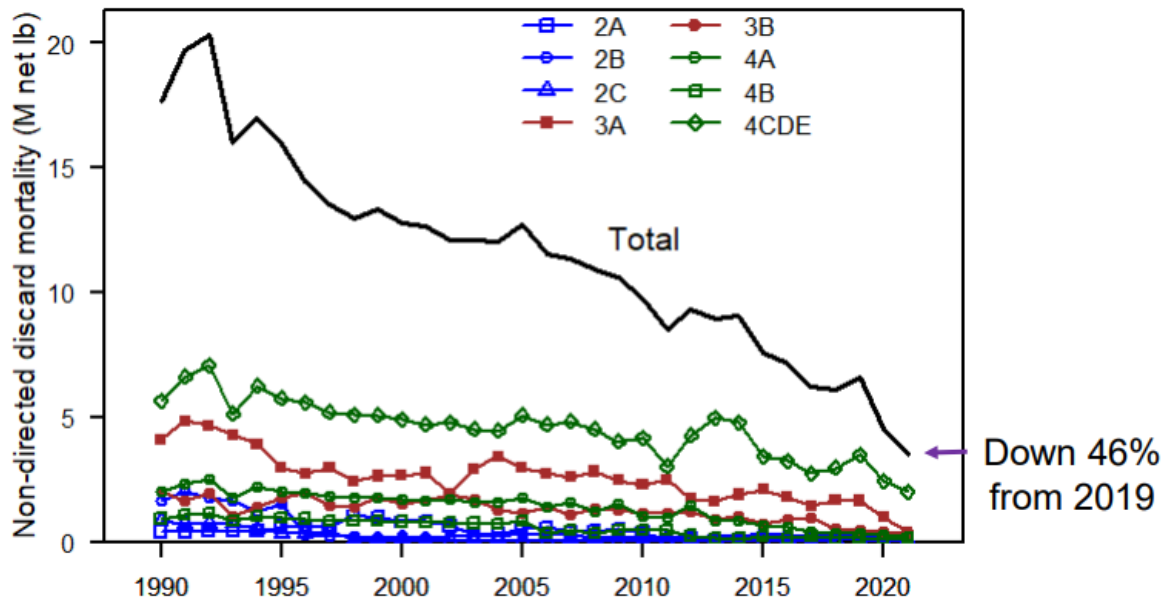
FIGURE 4-5 DISTRIBUTION OF TCEY TO DIRECTED FISHERY USERS IN IPHC AREA 4



Projected bycatch

Recent non-directed discard mortality

- Use an average of the recent 3 years



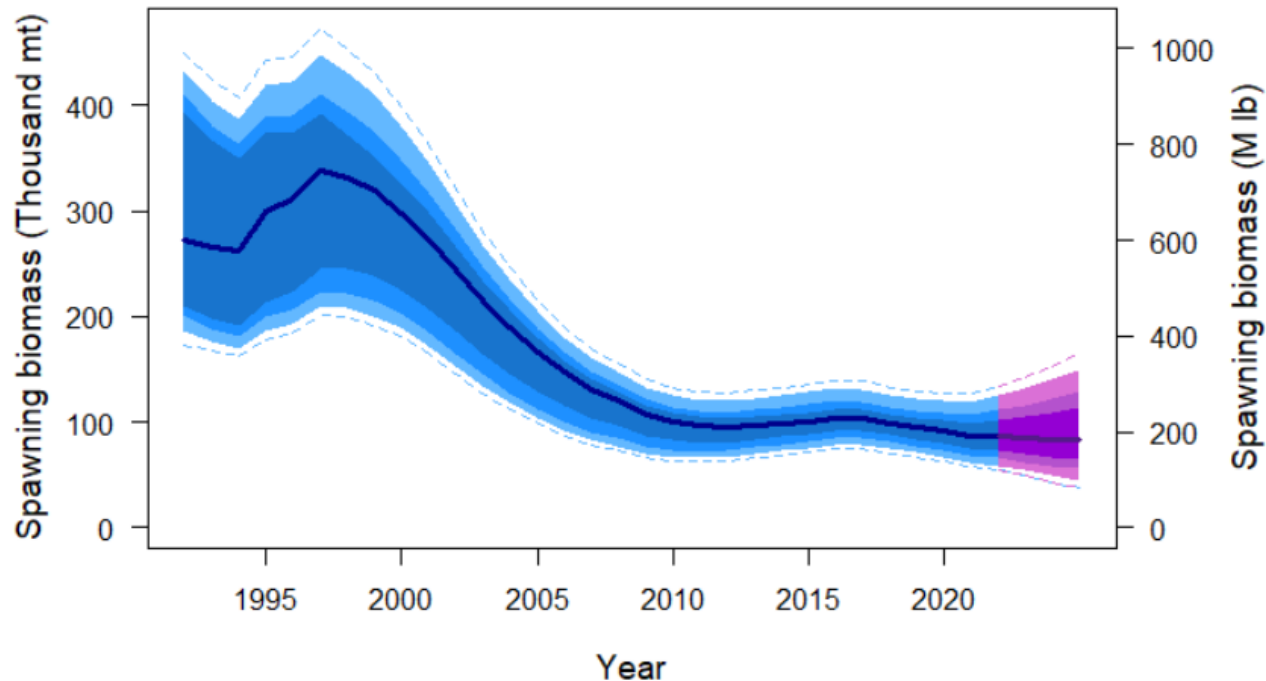
Preliminary mortality table for 2022

Interim Management procedure: detailed results

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Commercial discards	0.07	0.21	NA	NA	0.29	0.07	0.06	0.02	0.73
U26 Non-directed discards	0.09	0.21	0.07	0.72	0.34	0.23	0.11	1.93	3.69
Recreational	NA	0.03	1.09	1.58	0.01	0.01	0.00	0.00	2.71
Subsistence	NA	0.41	0.29	0.18	0.01	0.01	0.00	0.04	0.94
Total non-FCEY	0.16	0.86	1.45	2.47	0.66	0.32	0.18	1.99	8.07
Commercial discards	NA	NA	0.10	0.40	NA	NA	NA	NA	0.50
Recreational	0.60	1.01	0.60	2.05	NA	NA	NA	NA	4.26
Subsistence	0.03	NA	NA	NA	NA	NA	NA	NA	0.03
Commercial landings	0.86	5.70	2.60	9.28	5.28	1.86	1.63	1.16	28.35
Total FCEY	1.49	6.70	3.30	11.72	5.28	1.86	1.63	1.16	33.15
							4C FCEY	0.54	
							4D FCEY	0.54	
							4E FCEY	0.08	
TCEY	1.65	7.56	4.75	14.19	5.94	2.18	1.80	3.15	41.22
U26 Non-directed discards	0.00	0.03	0.00	0.29	0.07	0.07	0.01	0.72	1.20
Total	1.65	7.59	4.75	14.48	6.01	2.25	1.82	3.87	42.42

Preliminary stock assessment for 2022

Projections: reference level (41.2 Mib TCEY)



INTERNATIONAL PACIFIC
HALIBUT COMMISSION

IPHC

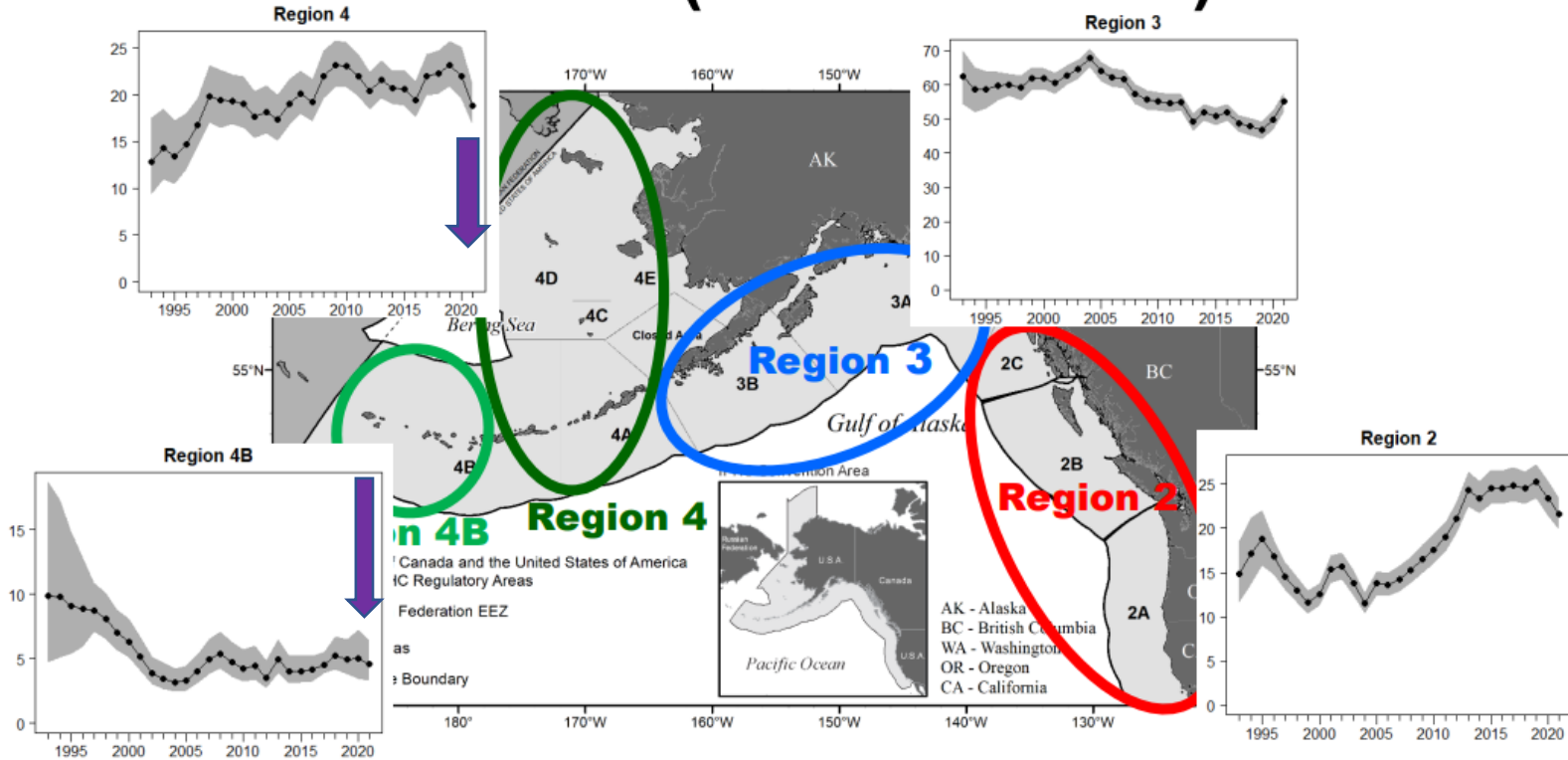
Slide 51

[IPHC-2021-IM097-10-p](https://www.iphc.org/2021/09/10/iphc-2021-im097-10-p)

- Decline in spawning biomass has slowed
- Signs of a higher than average 2012 year class after 6 years of low recruitment
- Signs of stable or possibly increasing size-at-age

Predicted stock distribution in 2021

Stock distribution (% of biomass)



- Decline in proportion of O32 stock (biomass) in Areas 4ABCDE
- Increased proportion of O32 stock in central areas

RELATIVE UNCERTAINTIES IN HALIBUT POPULATION DYNAMICS THAT CONTRIBUTE TO THE OUTPUTS IN THE DEIS

Many aspects of the process and halibut population were difficult to assess in this analysis. These include both varying authorities process and jurisdiction. For management agencies this includes:

- The IPHC decision-making process occurs annually and may deviate from a defined procedure
 - deciding coastwide catches and how much is allocated to BSAI- socioeconomic factors are considered on a year-to-year basis
- The two management agencies (IPHC and NMFS) have different spatial area boundaries and any examination of limits set by these two agencies will require some simplification of the boundaries.



RELATIVE UNCERTAINTIES IN HALIBUT POPULATION DYNAMICS THAT CONTRIBUTE TO THE OUTPUTS OF THE DEIS

For halibut there are substantial uncertainties that complicate estimation of future impacts:

- The variability of recruitment and weight-at-age for Pacific halibut is substantial and are major components of future uncertainty.
- The relationship between PSC limits and realized PSC (usage) under future conditions is highly uncertain, especially when PSC limits are projected outside of the historical range.
- The dynamics of halibut movement into and out of the BSAI are variable and uncertain; BSAI survey abundance data and results from analyses using the IPHC tagging data have been inconsistent.
- Additional sources of uncertainty include variability in the PSC selectivity from trawl gear in the BSAI which creates differences in age-specific mortality and causes variability in downstream impacts to the directed fishery.



IMPACTS OF ALTERNATIVES ON HALIBUT SSB

- All alternatives are expected to result in no impact to SSB.
 - IPHC's SPR-based management approach is expected to conserve spawning biomass across differing patterns in fishery selectivity and/or allocation among different fisheries.
- Closed loop simulation results from previous analyses are consistent with the conclusion that given the IPHC's SPR management policy there are no expected impacts to SSB.
- SSC concurred in April 2021 and noted that the estimated model uncertainty may be underestimated due to the limited treatment of recruitment scenarios related to the Pacific Decadal Oscillation and of historical variability of body weight-at-age projected forward.
- April 2021 SSC report 'Although a closed loop simulation is helpful to understand the effects of potential lags in information use and observation uncertainty, even without this information, the SSC supports the general conclusion that there is likely to be little difference among the average future halibut spawning biomass under different levels of PSC..''



5.4 IMPACTS ON BSAI HALIBUT COMMERCIAL CATCH

- The IPHC analyzed the relationship between bycatch and directed halibut fishery yield by comparing results of the coastwide assessment with and without coastwide bycatch, concluding that “potential yield to the directed fishery was generally larger than a simple reallocation from non-directed discards (115% on average), [and] that the rate of exchange is variable over time (range of 86–139%)” (Stewart et al. 2021).
- Reasons for not using this include:
 - Considered coastwide not BSAI
 - Used zero bycatch mortality coastwide which is different from the change in PSC limits between alternatives considered in this analysis
 - SSC recommended otherwise hence ratio of 0-1



SSC MINUTES APRIL 2021 (P.11)

- The SSC recognizes that actual ratios of change in PSC to change in halibut fishery limits will be variable over time, reflecting changing fishery selectivity (e.g., relative fraction of O26 vs. U26 in the PSC) and biological processes.
- Through several iterations of the ABM analysis, these factors, and the variability inherent in them, have become more clear. This variability suggests that a single most likely value cannot represent the year-to-year differences in the relationship between these two sources of fishing mortality.
- For this reason, the SSC recommends that the Council compare alternatives based on a range of plausible ratios (0.0-1.0) without an implicit or explicit likelihood assigned to each.
- The SSC suggests that since O26 is deducted at a rate of 1.0 in the annual halibut calculations, this would be a logical upper bound in the case that all PSC in a particular year was O26.
- U26, calculated to have an effect on halibut yield that is greater than 1.0 is deducted from individual IPHC areas in proportion to stock abundance, for which recent historical values have been in the range of 20% for the sum of the BSAI areas.
- Thus, ratios from 0.0-1.0 should logically encompass a sufficiently broad enough range for comparison of the alternatives that is consistent with recent management.



5.4 IMPACTS ON BSAI HALIBUT COMMERCIAL CATCH

- Ratio of 1 represents:
 - A PSC limit reduction leading to an equivalent increase in directed catch
 - A scenario in which 100% of the PSC limit is taken as O26 PSC for the previous three years given that the projected PSC removal is the three-year average of recent O26 PSC usage rather than the PSC limit.
- Ratios less than 1 represent:
 - PSC usage occur wholly (ratio=0) or partially on Pacific halibut less than 26 inches
 - Such fish would be subject to natural mortality and movement out of the region
- Given recruitment variability, variable fishing patterns resulting in annual changes to selectivity, and variable population processes such as growth and movement, the ratio may occur anywhere in this range in a given year.



5.4 IMPACTS ON BSAI HALIBUT COMMERCIAL CATCH

- **Potential Δ BSAI directed halibut catch** * values (ex-vessel or wholesale head and gut) = potential change in revenue
- Calculated based on change in PSC limit (not use estimate)
- Assume 100% usage of the additional directed halibut catch limit
- Revenue impacts should be used only to compare across alternatives for the directed halibut fishery sector and not be used for comparing revenue impacts among sectors.

Table 5-15 Potential change in revenue from status quo based on PSC limit (2018\$)

			ratio	960	1047	1222	1309	1396	1483	1571	1745	2007
ex-vessel values	2019	\$4.33	1.00	5,620,218	4,997,340	3,744,425	3,121,548	2,498,670	1,875,792	1,245,755	0	-1,875,792
			0.75	4,215,163	3,748,005	2,808,319	2,341,161	1,874,003	1,406,844	934,316	0	-1,406,844
			0.50	2,810,109	2,498,670	1,872,213	1,560,774	1,249,335	937,896	622,878	0	-937,896
			0.25	1,405,054	1,249,335	936,106	780,387	624,668	468,948	311,439	0	-468,948
	Average 2015-19	\$5.54	1.00	7,190,764	6,393,826	4,790,789	3,993,851	3,196,913	2,399,975	1,593,876	0	-2,399,975
			0.75	5,393,073	4,795,369	3,593,092	2,995,388	2,397,685	1,799,981	1,195,407	0	-1,799,981
			0.50	3,595,382	3,196,913	2,395,395	1,996,925	1,598,456	1,199,987	796,938	0	-1,199,987
			0.25	1,797,691	1,598,456	1,197,697	998,463	799,228	599,994	398,469	0	-599,994
wholesale head and gut	2019	\$6.37	1.00	8,268,080	7,351,745	5,508,543	4,592,208	3,675,873	2,759,538	1,832,670	0	-2,759,538
			0.75	6,201,060	5,513,809	4,131,407	3,444,156	2,756,904	2,069,653	1,374,503	0	-2,069,653
			0.50	4,134,040	3,675,873	2,754,271	2,296,104	1,837,936	1,379,769	916,335	0	-1,379,769
			0.25	2,067,020	1,837,936	1,377,136	1,148,052	918,968	689,884	458,168	0	-689,884
	Average 2015-19	\$7.04	1.00	9,137,721	8,125,006	6,087,934	5,075,219	4,062,503	3,049,787	2,025,431	0	-3,049,787
			0.75	6,853,291	6,093,754	4,565,951	3,806,414	3,046,877	2,287,340	1,519,073	0	-2,287,340
			0.50	4,568,861	4,062,503	3,043,967	2,537,609	2,031,251	1,524,894	1,012,716	0	-1,524,894
			0.25	2,284,430	2,031,251	1,521,984	1,268,805	1,015,626	762,447	506,358	0	-762,447



5.4.1 IMPACTS WITHIN IPHC REGULATORY AREA 4

- Response to SSC recommendation *“additional discussion be added to the document on the interannual variability in PSC use among IPHC areas and how it has and may affect directed halibut fisheries.”*

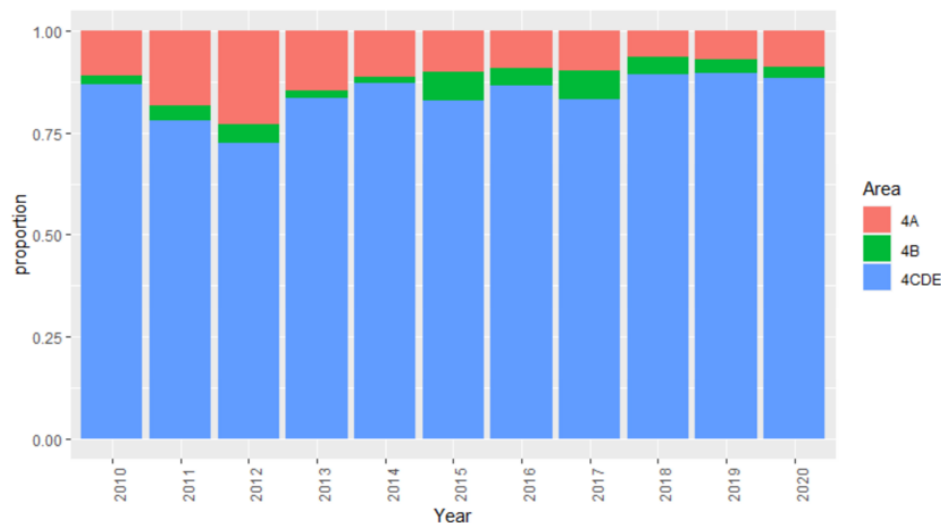


Figure 5-14 Proportion of A80 PSC by IPHC Regulatory Area from 2010 to 2020.



5.4.1 IMPACTS WITHIN IPHC REGULATORY AREA 4

- NMFS methodology to apportion PSC to IPHC area changed after 2015
- Some statistical areas overlap two IPHC Regulatory Areas
- With changes in the age structure of the halibut population and movement of target fish species between areas, a particular year may show a relatively higher amount of PSC, or possibly an increasing trend in PSC in an IPHC Regulatory Area.
- This type of variability may result in unexpected changes in the directed halibut catch and the impacts to the directed halibut fisheries in a particular IPHC Regulatory Area, such as 4CDE, may be greater than in the entire BSAI.

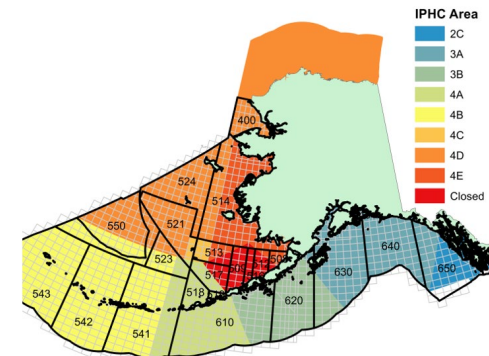


Figure 5-13 Agency reporting areas: NMFS (black lines), ADFG (small grid), and IPHC (colored blocks).

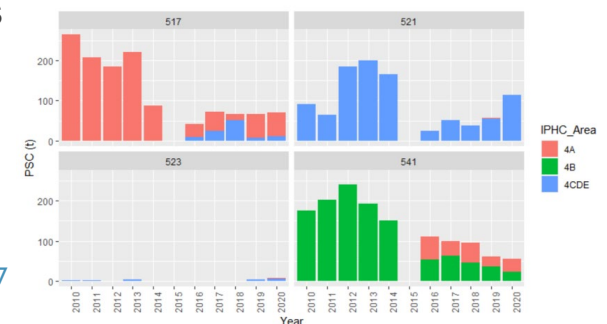


Figure 5-15 A80 PSC by NMFS reporting area and IPHC Regulatory Area



GROUND FISH: STOCK CONSIDERATIONS, ENCOUNTER RATES AND IMPACTS [CH 3, 5]

IMPACTS TO GROUND FISH STOCKS

- Focus on no change in management, assessment cycle and TAC-setting processes
- TACs for flatfish remain well below ABCs for a variety of reasons
 - Harvesting constraints due to both bycatch and market considerations
- Recent focus on NBS and connectivity to EBS for BSAI stocks



SPECIFICATIONS AND REGULATIONS

- BSAI Halibut PSC limits are in regulation (and in FMP) currently as a fixed amount for all 4 sectors (A80, TLAS, non-trawl and CDQ).
- The apportionment of halibut PSC limits to targets within the TLAS and non-trawl is part of groundfish specifications process
- OFL, ABC and TAC for target groundfish stocks under BSAI FMP are set annually in BSAI groundfish specifications
 - Sum of TACs \leq 2.0 mmt (OY 'cap')
- Any modification to the A80 PSC limit as a result of this action would be in regulation (and in FMP) and the resulting annual limit based upon value of the look up table selected would not be available to be modified during the annual specifications process
 - E.g. Chinook PSC limit for the EBS pollock fishery



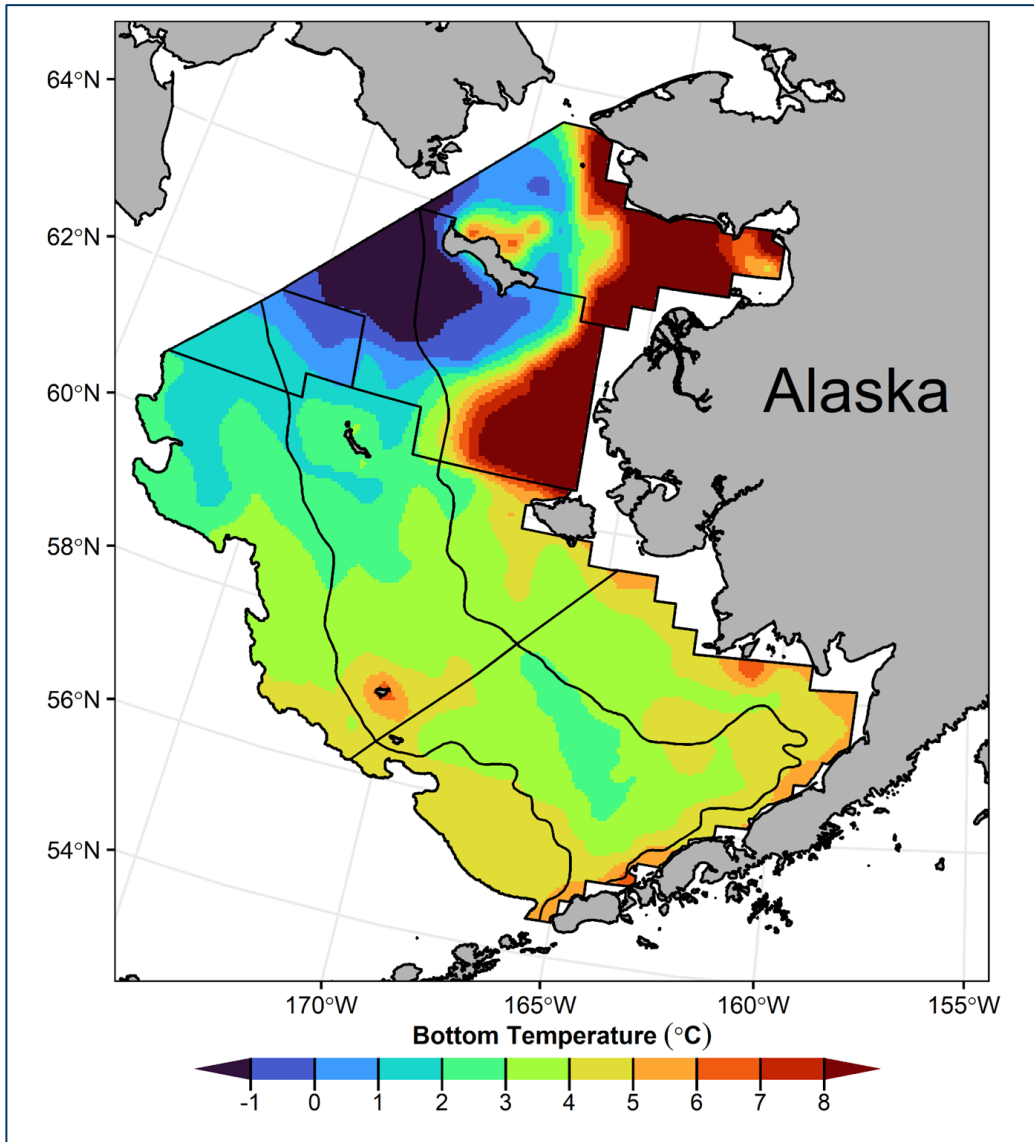
FLATFISH STOCKS RESPONSE TO TEMPERATURE (BSAI 2021 SAFE)

- Inconclusive evidence of connectivity between the EBS and NBS across flatfish stocks
- Plan Team discussions on survey trends across stocks (in particular observed differences among YFS and AK Plaice) and population responses to temperature (YFS)
- Further exploration prior to the BSAI Plan Team recommending including the NBS and EBS for all FF stock assessments
- Additional information to summarize recent survey trends and research topics to be addressed in FEIS



2021 bottom temperatures

Rohan & Barnett



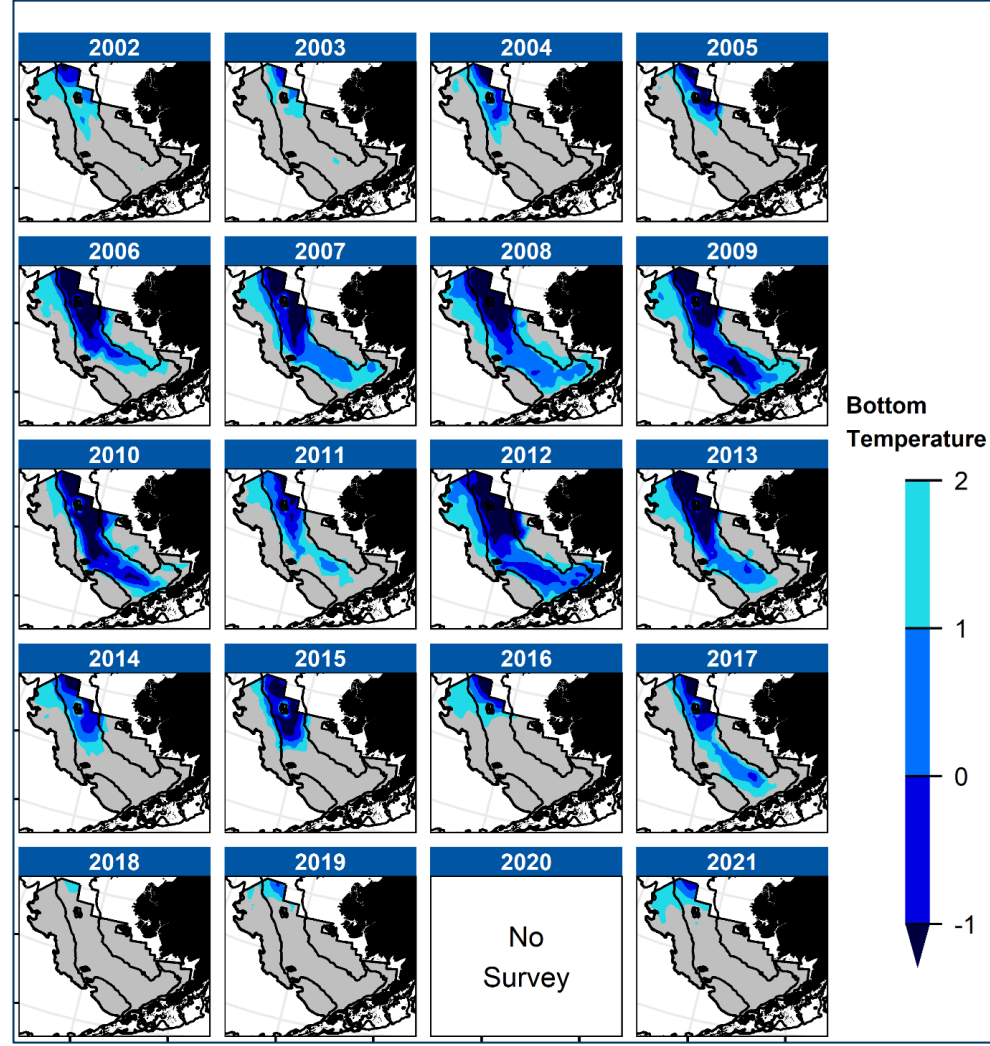
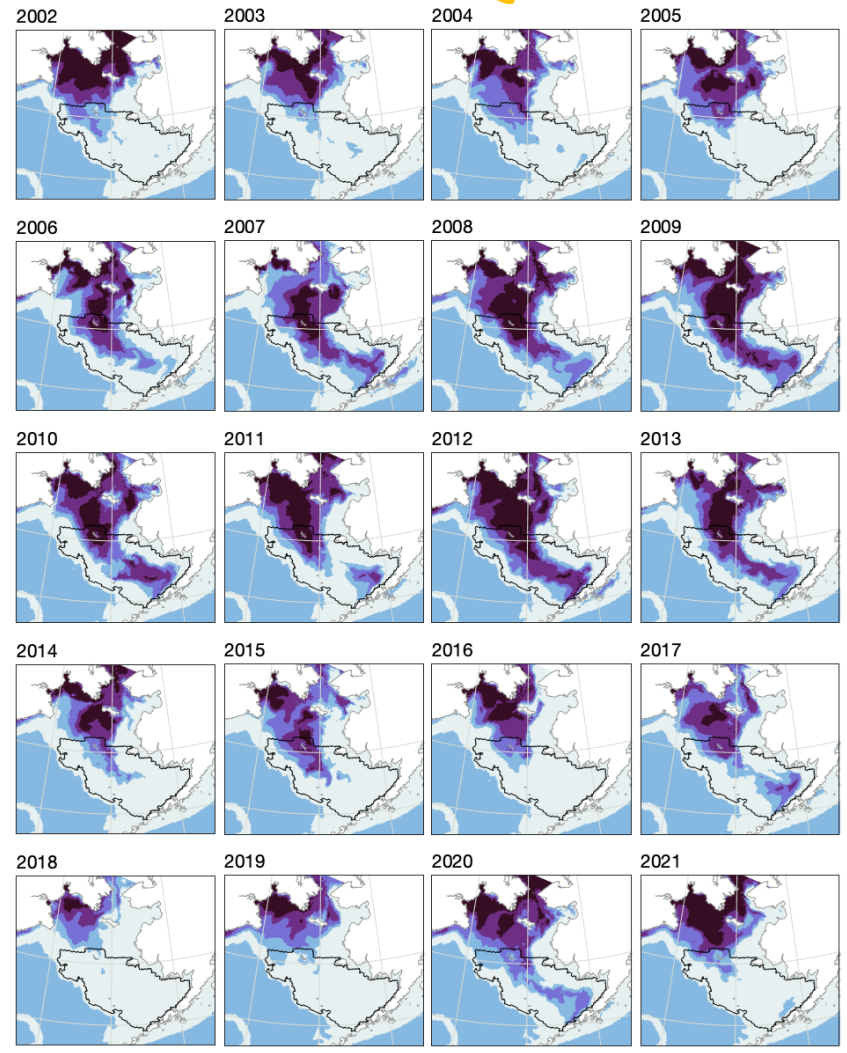
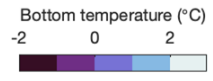
- Cold pool restricted to northwest of survey area
 - May have imposed some barrier to migration
- Extremely warm bottom waters on the northern inner shelf
 - Partially due to survey timing



2021 cold pool

Kearney, Rohan & Barnett

Bering IOK ROMS hindcast
Extracted July 1 each year

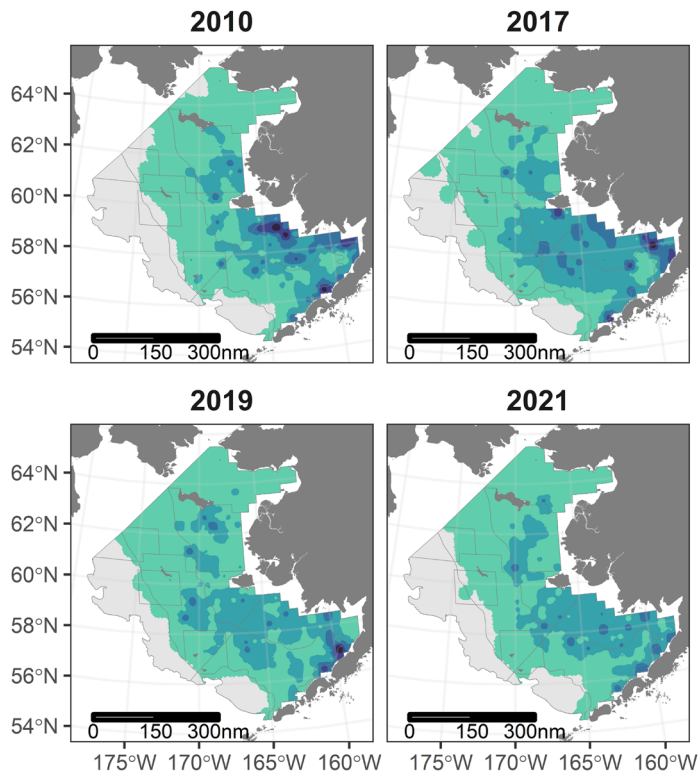


- 2021 resembles 1982 and 2004
- Warmer than average, but not extreme

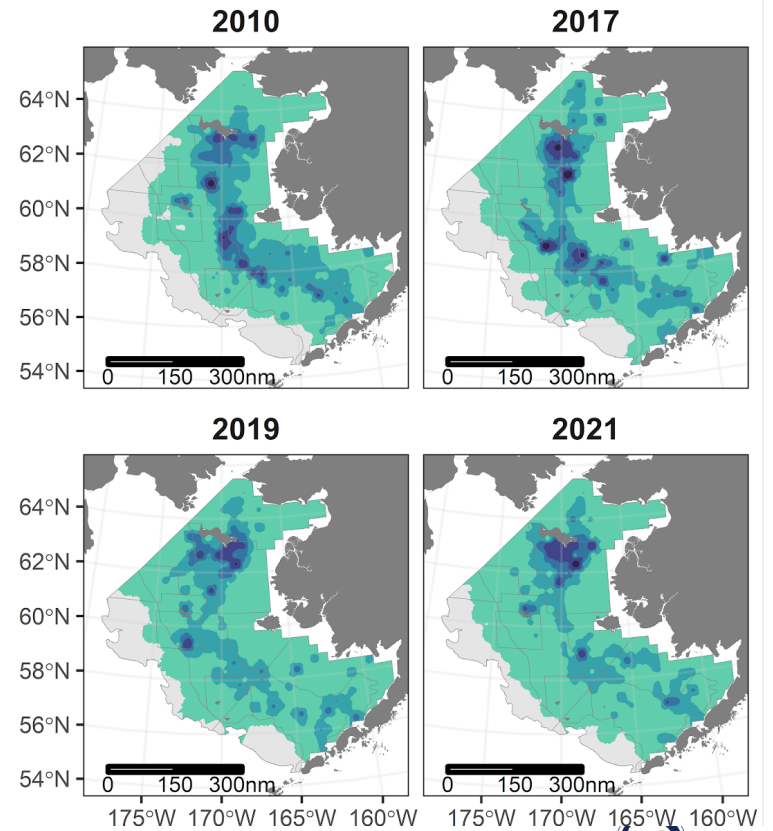
- 2021 cold pool was 4th lowest on record
- >1SD below the time series mean



CURRENT CONSIDERATIONS OF CONNECTIVITY



YFS



AK Plaiice

3.4.4 COMPARISON OF A80 PSC AND SURVEY TRENDS

- New section to DEIS in response to SSC recommendation including information that was previously presented in discussion papers
- Factors other than halibut population size that may lead to increased encounter rates include mixing with target species, variable groundfish aggregation behavior across years, and targeting of different species by the various fleets/companies within the sector.
- Halibut population size and distribution certainly plays some role in the abundance:mortality relationship but total PSC mortality is likely also driven by fleet behavior in response to management.
- A lack of correlation between surveyed abundance and A80 encounter does not discount the underlying assumption of abundance-based management of halibut PSC limits (that limits are tied to abundance); however, it may affect the potential impacts



FIGURE 3-25 A80 HALIBUT PSC LIMIT, CATCH, AND MORTALITY, 2010 THROUGH 2020

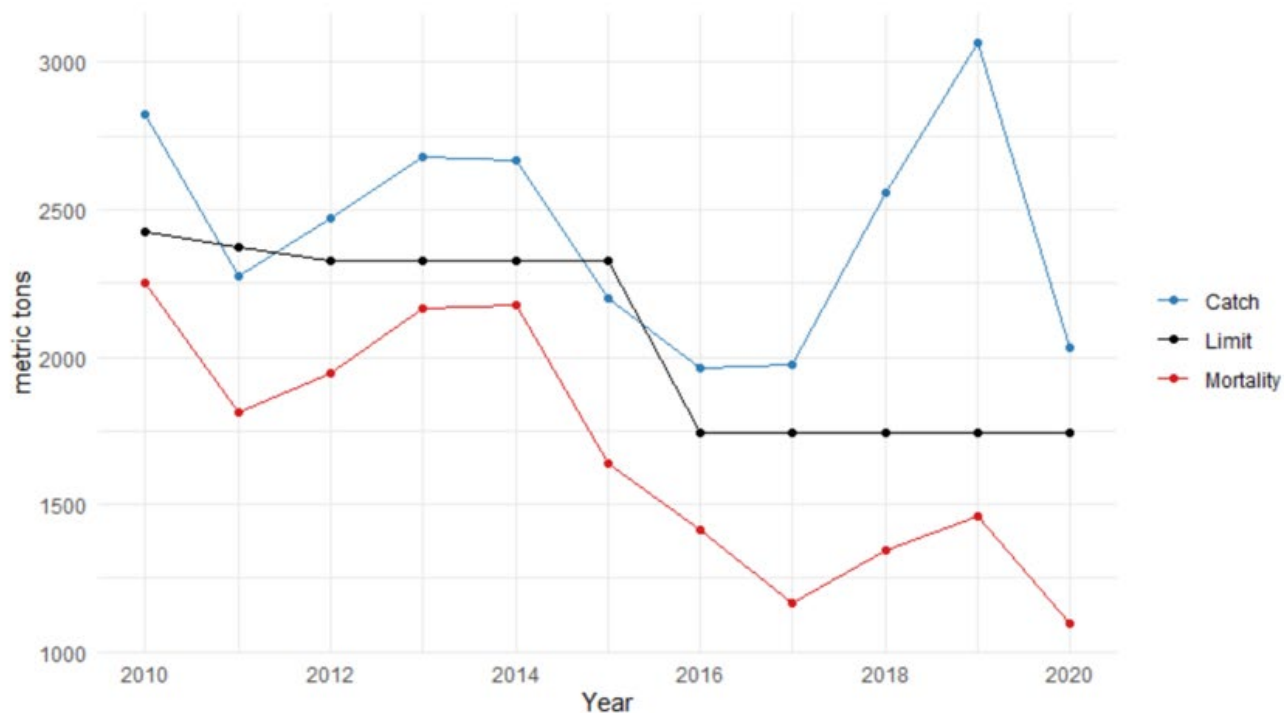


Figure 3-25 A80 halibut PSC limit, catch, and mortality, 2010 through 2020

FIGURE 3-39 A80 HALIBUT CATCH AND MORTALITY (TOP PANELS) AND SETLINE AND TRAWL SURVEY INDICES (BOTTOM PANELS), 2010 THROUGH 2019

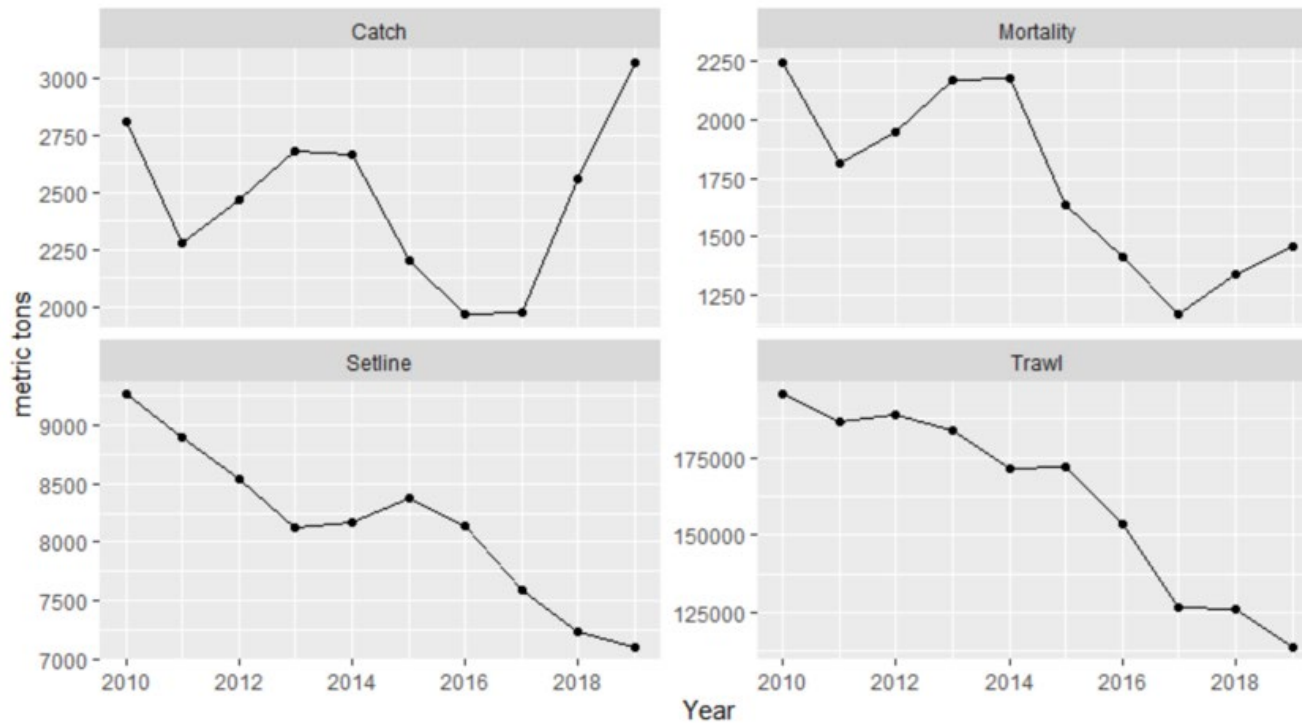


Figure 3-39 A80 halibut catch and mortality (top panels) and setline and trawl survey indices (bottom panels), 2010 through 2019

FIGURE 3-40 PLOT OF ANNUAL HALIBUT CATCH AND MORTALITY AGAINST SETLINE AND TRAWL SURVEY INDICES 2010-2019.

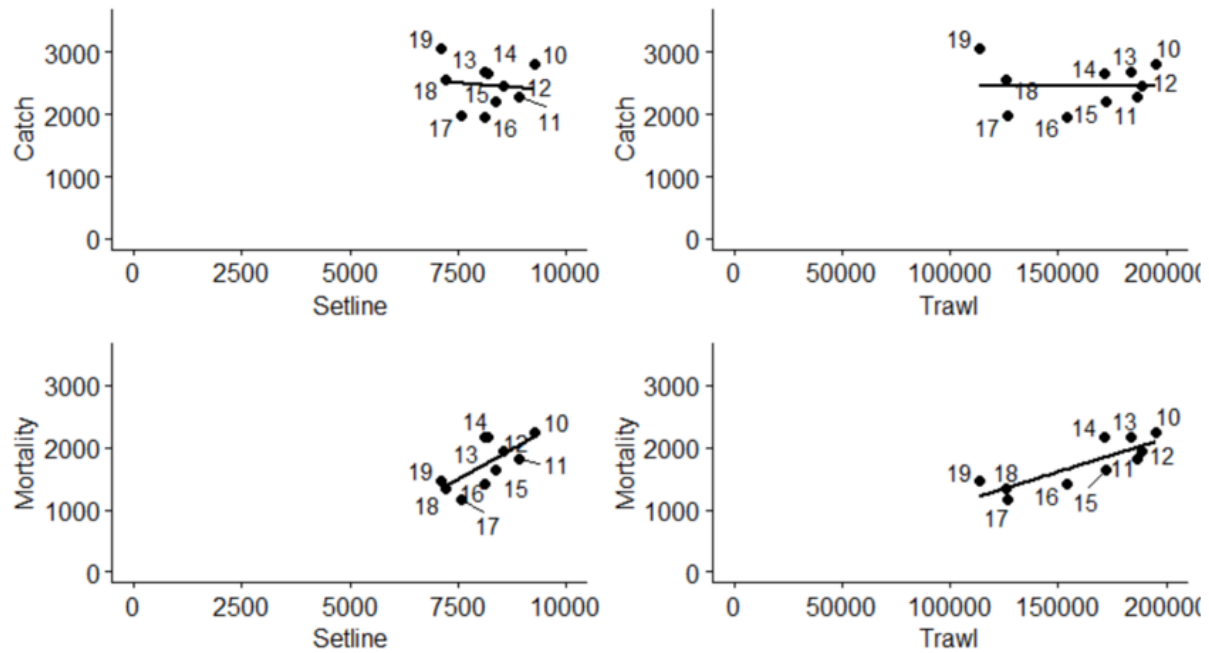


Figure 3-40 Plot of annual halibut catch and mortality against setline and trawl survey indices 2010-2019.



FIGURE 3-28 A80 SECTOR BYCATCH OF PACIFIC HALIBUT (MT) VERSUS GROUND FISH CATCH BY TARGET SPECIES, 2010 THROUGH 2019.

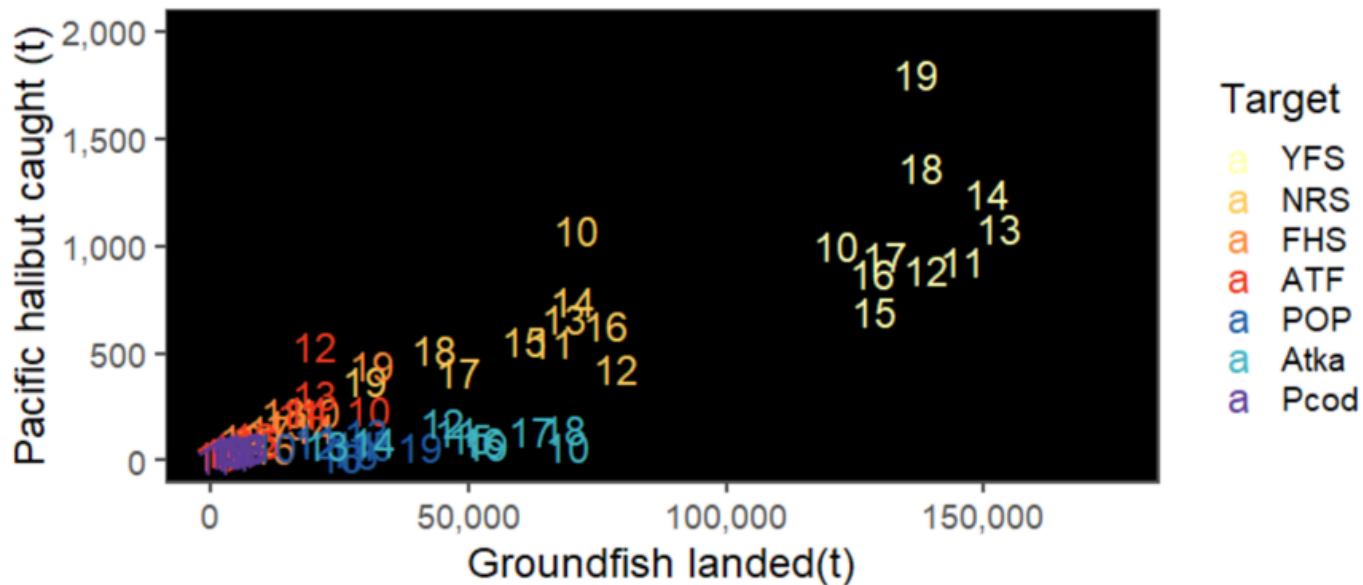


Figure 3-28 A80 sector bycatch of Pacific halibut (mt) versus groundfish catch by target species, 2010 through 2019.

FIGURE 3-38 ADF&G STATISTICAL AREAS WHERE HALIBUT PSC OCCURRED IN THE A80 FISHERY (RED) OVERLAID ON AREAS WHERE THE EBS TRAWL SURVEY (EBS) ENCOUNTERED HALIBUT, 2017 THROUGH 2019.

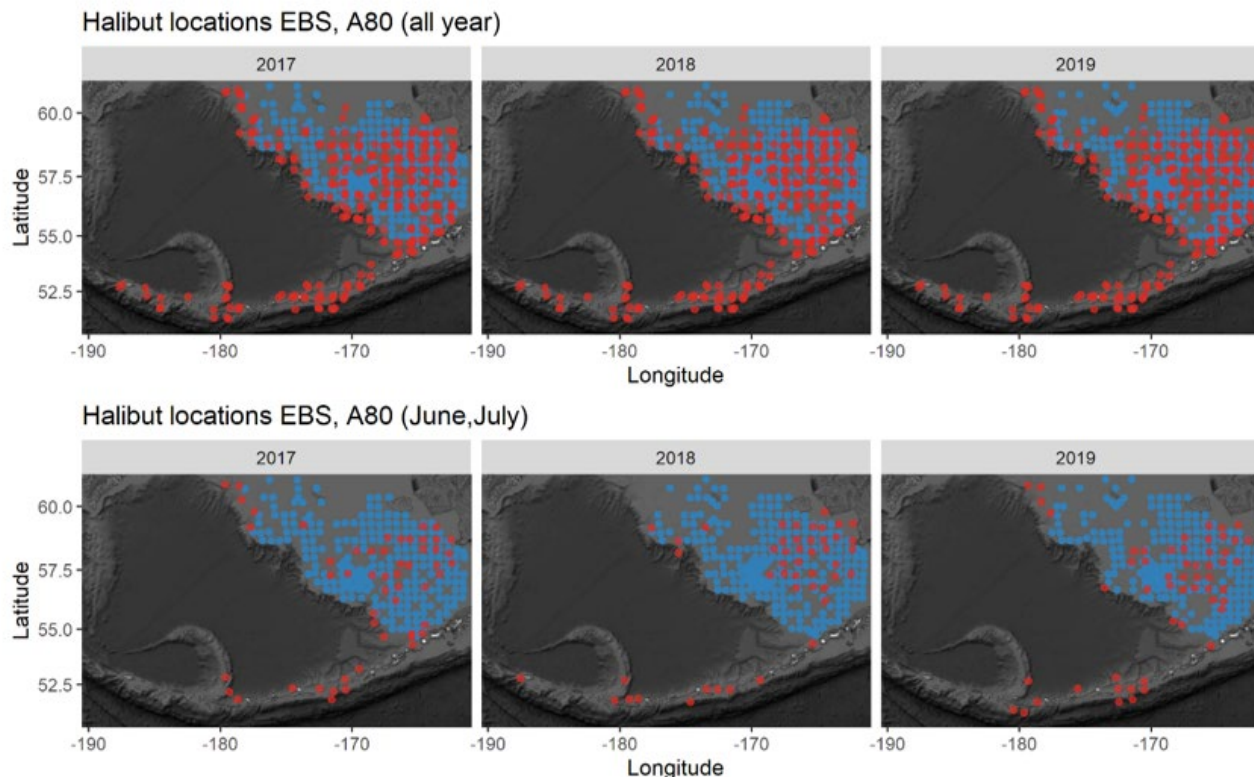


Figure 3-38 ADF&G statistical areas where halibut PSC occurred in the A80 fishery overlaid on areas where the EBS trawl survey (EBS) encountered halibut, 2017 through 2019. Top panel shows areas with A80 halibut catch throughout the year; bottom panel show areas with A80 halibut catch for the months during which the EBS trawl survey typically occurs.



5.3.2.3 PRACTICABILITY OF BYCATCH AVOIDANCE/MEETING PSC LIMITS BY THE A80 SECTOR

- New to this latest version of the document, contributed by Darrell Brannan
- Gathered information through informal interviews, review of relevant literature and available data
- Addresses the practicability of further bycatch reduction under the action alternatives considered
- Considers this under the mandate to address competing National Standards (1 and 9) in the purpose and need statement
- Exogenous and endogenous factors that impact A80 companies' ability to reduce halibut mortality.



5.3.2.3.3 CURRENT BYCATCH AVOIDANCE/MITIGATION STRATEGIES

- Cooperative Fishing Strategy
- Halibut Avoidance Plans (HAP)
- Standard Bycatch Rates
- Communication
- Small Test Tows
- Reduce Night Fishing
- Tow Duration
- Excluder Use
- Deck Sorting



5.3.2.3.3 CURRENT BYCATCH AVOIDANCE/MITIGATION STRATEGIES

Excluders- ongoing research to improve effectiveness

- West Coast studies
 - Several differences in the West Coast fisheries and the BSAI fisheries could impact the effectiveness of the design including catch per unit effort, fishing depth, fishing speed, seaweed and other organic matter suspended in the water, tow duration, and the size of the tow
- Further evaluation of excluders over various fishing conditions would provide important information to determine their true efficacy in BSAI fisheries
- EFP- collaborative study with Amendment 80 fishermen to conduct field testing among the various excluders in use that flatfish fishermen feel is most likely to provide the best and most useful selectivity under today's fishing conditions.
 - results could allow the fleet to increase use of the current excluder designs that are most effective to achieve lower halibut bycatch per mt of groundfish harvested
- Anticipated that the pressure to reduce halibut bycatch will continue to motivate the fishing industry, agency scientists, and the public to continue to develop new technologies.
- The speculative nature of what those may ultimately be and how effective they are makes their current use not practicable.



5.3.2.3.3 CURRENT BYCATCH AVOIDANCE/MITIGATION STRATEGIES

- Cooperative Fishing Strategy
- Halibut Avoidance Plans (HAP)
- Standard Bycatch Rates
- Communication
- Small Test Tows
- Reduce Night Fishing
- Tow Duration
- Excluder Use
- Deck Sorting
- Firm's decisions driven by estimated halibut mortality
- All of the tools utilized to avoid halibut or reduce mortality of halibut increase total costs associated with fishing
- A fleet's last response to constraining halibut PSC limits is to reduce total groundfish harvest.



5.3.2.4 IMPACTS AT THE FIRM LEVEL

- PSC limits are managed and enforced by NMFS at the sector level.
- The apportionment of PSC limits to firms is done within the cooperative.
- Based on information provided by A80 coop reps, the cooperative distributes the PSC limit to each firm based on a percentage of the overall limit.
 - The result is that each firm has its own PSC limit within the cooperative
 - Because each firm's PSC limit is based on a percentage of the total sector limit, it increases or decreases proportionally to the overall sector limit.
- Firm level division of the PSC limit has differential impacts on firms that may not be obvious from simply reviewing sector level PSC use relative to the proposed limits



5.3.2.4 IMPACTS AT THE FIRM LEVEL

- Individual firms would be impacted differently depending on the size of the PSC limit and in different years

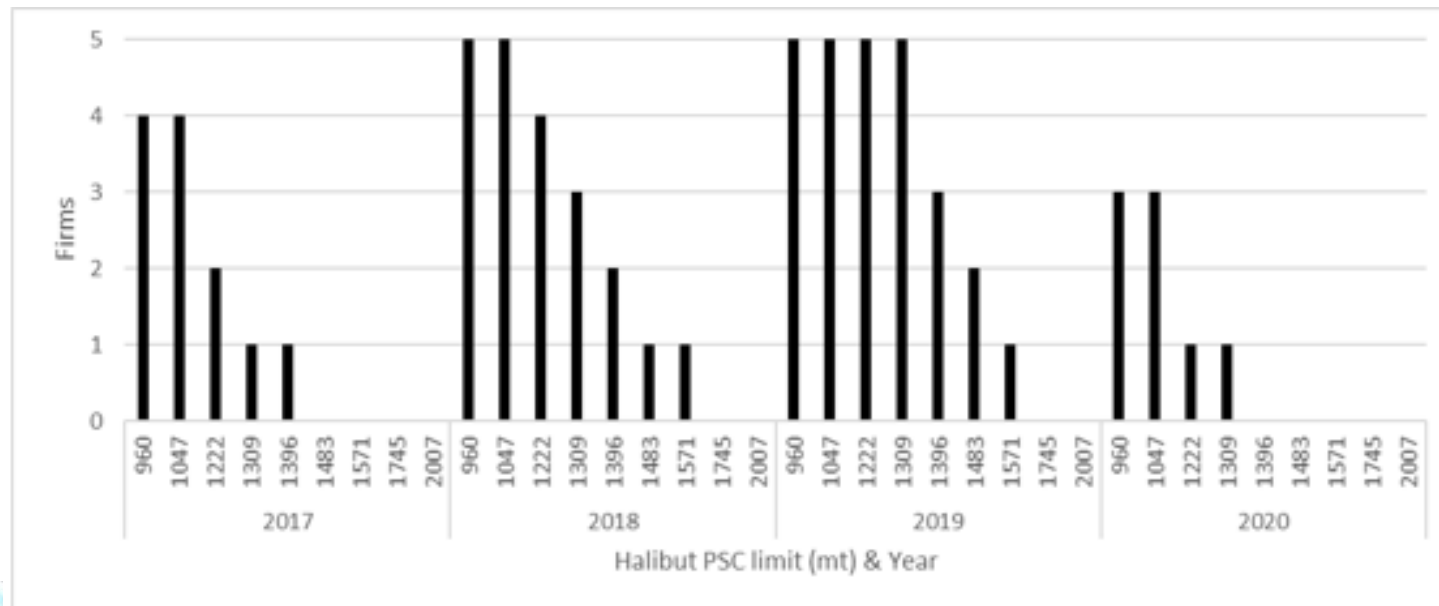


Figure 5-11 Count of A80 firms that would have exceeded the proposed halibut PSC limits 2017 through 2020

Source: AKFIN summary of CAS data and A80 sector supplied initial PSC limits by firm



5.3.2.5 CONCLUSIONS

- Because of the efforts and expenditures already undertaken by the sector, dramatic increases in halibut avoidance or reductions in mortality are not expected with the tools that are currently available to the fleet.
- Some marginal improvements are anticipated to continue to be realized, especially if halibut limits are further reduced and the fleet forgoes some amount of profitability to reduce halibut mortality further.
- Reductions in halibut mortality that are realized are expected to result from the sector increasing costs or reducing efficiency
- As halibut limits become more constraining it could potentially result in more consolidation of the A80 sector



GROUNDFISH REVENUE IMPACT ESTIMATION

General approach

- A80 haul level data (PSC, groundfish catch, wholesale value)
- Resample hauls without replacement until reaching PSC limit or groundfish catch limit
- Separate runs with 2 groundfish catch limits
 - 310,000 mt (maximum all years)
 - 290,000 mt (maximum in most recent years)
- Sum wholesale values to estimate annual revenue
- Random and Stratified random resampling

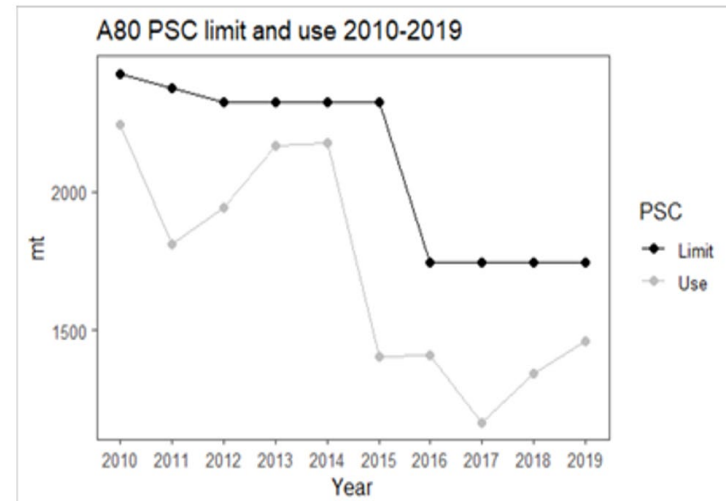


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- Sum wholesale values to estimate annual revenue
- Random and Stratified random resampling

- PSC limits and use varied over the last 10 years



PSC limits and PSC use (in metric tons) for the A80 sector 2010-2019.

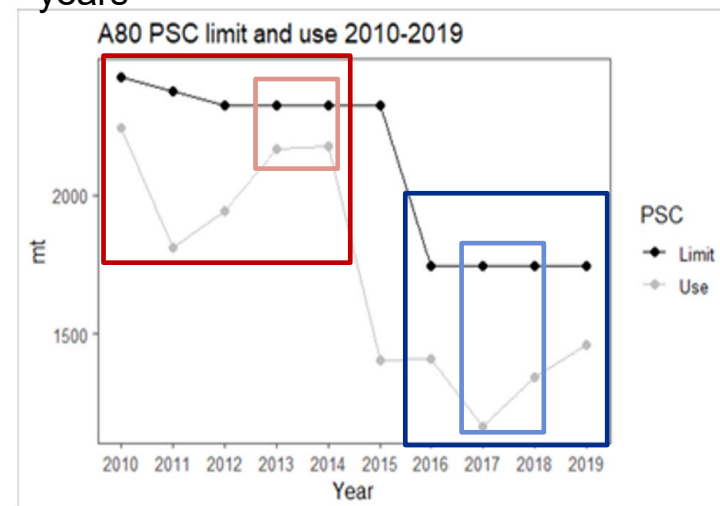


GROUND FISH REVENUE IMPACT ESTIMATION

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 - 310,000 mt (maximum all years)
 - 290,000 mt (maximum in most recent years)
- Sum wholesale values to estimate annual revenue
- Random and Stratified random resampling

- PSC limits and use varied over the last 10 years



PSC limits and PSC use (in metric tons) for the A80 sector 2010-2019.

- Subset into 5 datasets
 - Higher PSC use (2013-14)
 - High PSC use years (2010-2014)
 - all years (2010-2019, excluding 2015)
 - Low PSC use years (2016-2019)
 - Lower PSC use (2017-18)



GROUND FISH REVENUE IMPACT ESTIMATION

- Each PSC limit has 16 revenue estimates based on “scenarios” defined by combination of
 - Groundfish limit (290,000t or 310,000t)
 - Dataset used (years of data included)
 - Sampling method (random or stratified and ordered by month)

Table 5-5 Estimated revenue (million wholesale \$2018) by PSC limit and Alternative using different estimation methods. Green shading indicates the results were constrained by the PSC limit, blue shading indicates the results were constrained by the groundfish limit (290,000 or 3310,000 t).

Estimation	PSC limit	960		1047		1222		1309		1396		1483		1571		1745		2007	
	Alternative(s)	4		4		3		3		2,3,4		2		2		1,2,3,4		3	
	GF limit (1,000 mt)	290	310	290	310	290	310	290	310	290	310	290	310	290	310	290	310	290	310
Random	2010-14	160.582	160.815	174.982	175.215	204.050	204.313	219.181	218.550	233.493	233.235	248.384	247.668	262.813	262.705	291.338	291.603	327.968	335.497
	2010-19	189.686	190.121	207.396	206.935	241.993	241.715	259.314	258.923	276.215	276.468	293.723	293.380	310.690	310.046	335.887	345.264	335.937	359.123
	2016-19	246.206	246.385	268.807	268.887	313.489	313.519	335.524	335.829	346.417	358.232	346.366	370.300	346.425	370.269	346.417	370.311	346.454	370.271
	2013-14	137.994	138.184	150.453	150.591	175.812	175.384	187.950	187.992	200.795	200.295	213.141	213.202	225.934	225.979	251.137	251.123	288.273	288.545
	2017-18	282.581	282.479	307.928	308.073	359.795	359.146	376.517	385.223	376.582	402.458	376.509	402.584	376.623	402.591	376.558	402.546	376.604	402.554
Stratified	2010-14	182.258	182.272	195.088	195.065	216.307	216.059	227.666	227.668	246.072	246.276	268.338	267.997	283.966	283.479	313.799	313.520	327.054	349.666
	2010-19	202.931	202.828	216.382	216.445	242.752	242.719	255.780	256.090	277.083	277.964	305.385	305.515	326.047	326.307	336.782	360.053	336.793	360.511
	2016-19	218.741	218.978	253.143	253.251	319.090	318.907	341.704	341.720	349.070	366.178	349.027	372.528	349.165	372.536	349.034	372.499	349.147	372.479

5.5.1 GROUND FISH REVENUE IMPACT ESTIMATION

Table 5-6 Estimated status quo revenues (millions wholesale \$2018) and percent difference from status quo by Alternative and PSC limit based on survey states. Percent differences are calculated across the rows (comparing estimates using same methods and datasets)

Estimation method	EBS Trawl Survey		Low		High		Low		High		Low		High		Low		High		
	Setline survey		Very Low		Very Low		Low		Low		Medium		Medium		High		High		
	PSC limit	GF limit (1,000 t)	290	310	290	310	290	310	290	310	290	310	290	310	290	310	290	310	
Random	PSC limit	1745	1396		1483		1396		1483		1483		1571		1571		1745		
	2010-14	291.338	291.603	-20%	-20%	-15%	-15%	-20%	-20%	-15%	-15%	-15%	-15%	-10%	-10%	-10%	-10%	0%	0%
	2010-19	335.887	345.264	-18%	20%	-13%	-15%	-18%	-20%	-13%	-15%	-13%	-15%	-8%	-10%	-8%	-10%	0%	0%
	2016-19	346.417	370.311	0%	-3%	0%	0%	0%	-3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2013-14	251.137	251.123	-20%	-20%	-15%	-15%	-20%	-20%	-15%	-15%	-15%	-15%	-10%	-10%	-10%	-10%	0%	0%
	2017-18	376.558	402.546	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2010-14	313.799	313.520	-22%	-21%	-14%	-15%	-22%	-21%	-14%	-15%	-14%	-15%	-10%	-10%	-10%	-10%	0%	0%
	2010-19	336.782	360.053	-18%	-23%	-9%	-15%	-18%	-23%	-9%	-15%	-9%	-15%	-3%	-9%	-3%	-9%	0%	0%
	2016-19	349.034	372.499	0%	-2%	0%	0%	0%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Strat.	PSC limit	1745	1222		1309		1309		1396		1396		1745		1745		2007	
2010-14		291.338	291.603	-30%	-30%	-25%	-25%	-25%	-25%	-20%	-20%	-20%	-20%	0%	0%	0%	0%	13%	15%
2010-19		335.887	345.264	-28%	-30%	-23%	-25%	-23%	-25%	-18%	-20%	-18%	-20%	0%	0%	0%	0%	0%	4%
2016-19		346.417	370.311	-10%	-15%	-3%	-9%	-3%	-9%	0%	-3%	0%	-3%	0%	0%	0%	0%	0%	0%
2013-14		251.137	251.123	-30%	-30%	-25%	-25%	-25%	-25%	-20%	-20%	-20%	-20%	0%	0%	0%	0%	15%	15%
2017-18		376.558	402.546	-4%	-11%	0%	-4%	0%	-4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2010-14		313.799	313.520	-31%	-31%	-27%	-27%	-27%	-27%	-22%	-21%	-22%	-21%	0%	0%	0%	0%	4%	12%
2010-19		336.782	360.053	-28%	-33%	-24%	-29%	-24%	-29%	-18%	-23%	-18%	-23%	0%	0%	0%	0%	0%	0%
2016-19		349.034	372.499	-9%	-14%	-2%	-8%	-2%	-8%	0%	-2%	0%	-2%	0%	0%	0%	0%	0%	0%
Random		PSC limit	1745	960		1047		1047		1222		1222		1396		1396		1745	
	2010-14	291.338	291.603	-45%	-45%	-40%	-40%	-40%	-40%	-30%	-30%	-30%	-30%	-20%	-20%	-20%	-20%	0%	0%
	2010-19	335.887	345.264	-44%	-45%	-38%	-40%	-38%	-40%	-28%	-30%	-28%	-30%	-18%	-20%	-18%	-20%	0%	0%
	2016-19	346.417	370.311	-29%	-33%	-22%	-27%	-22%	-27%	-10%	-15%	-10%	-15%	0%	-3%	0%	-3%	0%	0%
	2013-14	251.137	251.123	-45%	-45%	-40%	-40%	-40%	-40%	-30%	-30%	-30%	-30%	-20%	-20%	-20%	-20%	0%	0%
	2017-18	376.558	402.546	-25%	-30%	-18%	-23%	-18%	-23%	-4%	-11%	-4%	-11%	0%	0%	0%	0%	0%	0%
	2010-14	313.799	313.520	-42%	-42%	-38%	-38%	-38%	-38%	-31%	-31%	-31%	-31%	-22%	-21%	-22%	-21%	0%	0%
	2010-19	336.782	360.053	-40%	-44%	-36%	-40%	-36%	-40%	-28%	-33%	-28%	-33%	-18%	-23%	-18%	-23%	0%	0%
	2016-19	349.034	372.499	-37%	-41%	-27%	-32%	-27%	-32%	-9%	-14%	-9%	-14%	0%	-2%	0%	-2%	0%	0%
	Strat.	PSC limit	1745	960		1047		1047		1222		1222		1396		1396		1745	
2010-14		291.338	291.603	-45%	-45%	-40%	-40%	-40%	-40%	-30%	-30%	-30%	-30%	-20%	-20%	-20%	-20%	0%	0%
2010-19		335.887	345.264	-44%	-45%	-38%	-40%	-38%	-40%	-28%	-30%	-28%	-30%	-18%	-20%	-18%	-20%	0%	0%
2016-19		346.417	370.311	-29%	-33%	-22%	-27%	-22%	-27%	-10%	-15%	-10%	-15%	0%	-3%	0%	-3%	0%	0%
2013-14		251.137	251.123	-45%	-45%	-40%	-40%	-40%	-40%	-30%	-30%	-30%	-30%	-20%	-20%	-20%	-20%	0%	0%
2017-18		376.558	402.546	-25%	-30%	-18%	-23%	-18%	-23%	-4%	-11%	-4%	-11%	0%	0%	0%	0%	0%	0%
2010-14		313.799	313.520	-42%	-42%	-38%	-38%	-38%	-38%	-31%	-31%	-31%	-31%	-22%	-21%	-22%	-21%	0%	0%
2010-19		336.782	360.053	-40%	-44%	-36%	-40%	-36%	-40%	-28%	-33%	-28%	-33%	-18%	-23%	-18%	-23%	0%	0%
2016-19		349.034	372.499	-37%	-41%	-27%	-32%	-27%	-32%	-9%	-14%	-9%	-14%	0%	-2%	0%	-2%	0%	0%



GROUND FISH REVENUE IMPACT ESTIMATION

- Revenue estimates should be read for comparison across alternatives
 - Results are not stand-alone predictions of future A80 revenue under each PSC limit. Harvesters are expected to make strategic choices that are different from the randomized selection of hauls used in this analysis.
- Results are aggregated at the A80 sector level
 - The distribution of impacts across companies and vessels will differ based on many factors, most notably fishing portfolio
- Estimates are based on actual fishery data
 - Only reflects the environmental conditions and fishing behavior that occurred during the past 10 years
 - Does not estimate outcomes under a changed environment or management regime, future TACs or market conditions, or incorporate potential future fishing adaptations or operational changes
- No predetermined relationship between PSC use and PSC limit
 - Implicit assumption that 100% of PSC use is possible (and is reached unless groundfish limit is reached first)
- Random selection of hauls
 - Hauls are selected based on their prevalence in the underlying distribution
 - Random= proportional reduction across year
 - Stratified random= “business as usual”, upper bound



GROUND FISH REVENUE IMPACT ESTIMATION

- Generally, lower PSC limits tend to result in reduced groundfish revenue
- Revenue constrained by PSC at low PSC limits (shaded green in table)
 - Similar revenue estimates under both groundfish limits
- Revenue constrained by groundfish limits at higher PSC limits (shaded blue in table)
 - Revenue estimates vary with groundfish limit
- Revenue estimates are lower under the **high** PSC use and higher under **low** PSC use datasets
 - Large range of potential revenue for each PSC limit based on **high** or **low** PSC use
- The range of estimates under each dataset (years sampled) should be considered when comparing alternatives
- Given reductions in PSC limits and operational changes such as increased deck sorting, it is most likely that future PSC use will be similar to what has been seen in the years since 2015 (estimates using 2016-19 or 2017-18 data are most likely).
- However, it is possible that estimates using the earlier, higher PSC-use datasets may be representative if encounter rates were to increase and efforts to reduce mortality became less effective.



5.3.1 APPROACH TO REVENUE ESTIMATES

- The revenue estimates for the A80 fishery and the directed halibut fishery sectors are estimated separately, using different methodologies and are meant to help compare impacts across alternatives *within* each sector and **should *not* be used to compare impacts across sectors**
- *“The SSC concurs with the analysts’ assessment of the inappropriateness of comparing revenue impacts across the two sectors and recommends that estimated revenue impacts only be used for comparing across alternatives for a given sector, and not for comparing across sectors.”*
(April 2021 SSC minutes)
- Revenue estimates do not incorporate economic multipliers to estimate the total economic contributions of the A80 fishery or the directed halibut fishery in terms of output, income, employment or other economic measures.



NET BENEFITS TO THE NATION (5.6)

- The analysis in this section is qualitative and based on the estimation of net benefits and not welfare economics.
- Net benefits to the Nation are estimated by summing all producer and consumer surplus that occurs in the US economy.
- Both costs and benefits are defined broadly, from the Nation's perspective, to include all surpluses that accrue to direct and indirect participants in the fishery as well as to other members of society.
- The groups considered include those persons who harvest or process fish effected by the action, those who provide support services to the harvesting and processing sectors of the fishing industry effected by the action, consumers of the halibut and A80 fishery products (and any other substitute species whose producer or consumer surplus changes as a direct result of the action), and members of society that are non-consumptive users of halibut that value the resource.



NET BENEFITS TO THE NATION (5.6)

- It is anticipated that depending in the size of the halibut PSC mortality limit reduction to the A80 sector the proposed action is expected to:
 - increase costs to the A80 sector in an effort to reduce bycatch mortality;
 - reduce revenue in years when the mortality limit is a constraint;
 - have a positive effect on all directed halibut fisheries resource users when the limit results in the actual halibut mortality used by the A80 fleet being lower than would have been used under the current limit;
 - have positive impact on A80 suppliers (fuel, excluder manufactures, etc.) that benefit from the A80 sector's increased costs;
 - have a negative impact on A80 suppliers (e.g., suppliers of packaging material) that lose business as a result of the action;
 - have a modest positive impact on suppliers to the directed halibut fisheries, if it results in increased harvests;
 - have little impact on halibut consumers;
 - impacts on A80 species consumers will depend on if the supply of A80 species' changes and relative cost and value of other substitute commodities.



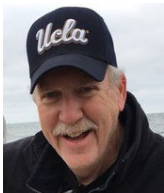
NET BENEFITS TO THE NATION (5.6)

- Given these impacts it is anticipated that, depending on the size of the halibut PSC mortality limit reduction to the A80 sector, the proposed action is expected to:
 - Negatively affect producer surplus (dependent on the preferred alternative chosen and unknown future conditions)
 - The expected reductions in the A80 producer surpluses and importers of A80 species are not offset by increases in producer surpluses generated by harvesters, processors, and sellers of any increased catch in the directed halibut fisheries. Quantitative estimates are not provide based on direction from the SSC not to compare the quantitative estimates of gross revenue changes between the A80 and directed halibut fishery.
 - Consumer surplus will be little changed and will depend on the relative cost and availability of substitutes in the world whitefish market.
- Overall, net benefits to the Nation are expected to be negative.
- The magnitude cannot be quantified and is expected to be more negative as the mortality limit reduces the amount of A80 species catch taken on an annual basis and increases costs associated with the harvest of those species.
- This is one of many aspects including the National Standards to consider in selecting a preferred course of action



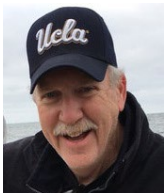
DRAFT EIS SECTION 5.5: SOCIAL AND ENVIRONMENTAL JUSTICE

- **DEIS Section 5.5 summarizes findings of the Social Impact Assessment (Appendix 1)**
 - **This portion of the presentation will focus on:**
 - Changes to the SIA since last reviewed by the SSC, AP, and Council (April 2021)
 - No Action Alternative effects considerations
 - Action Alternatives effects considerations
 - Environmental Justice considerations
 - Next steps for the Final SIA



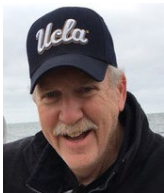
SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

- **Revisions since April 2021 SSC/AP/Council review**
 - **None of the revisions made change the overall findings of the SIA as reviewed in April 2021**
 - **Changes made throughout the SIA**
 - Selected income variables shown in multiple tables used to identify low-income populations of potential Environmental Justice concern have been updated with 2019 American Community Survey data.
 - Minor edits have been made for clarity and to fix typographic, grammatical, and formatting errors.



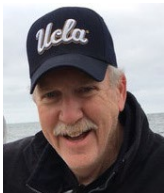
SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

- **Revisions since April 2021 SSC/AP/Council review (continued)**
 - **Section 3 - Regulatory Context**
 - EO 14031, May 28, 2021, Advancing Equity, Justice, and Opportunity for Asian-Americans, Native Hawaiians, and Pacific Islanders has been added (*SIA Page 7/PDF Page 328*)
 - **Section 6 - Regional and Community Context of the Fisheries**
 - Table 26 “CDQ Group and State of Alaska Selected Demographic Indicators” (and accompanying discussion) has been added (*SIA Page 60/PDF Page 381*)
 - Information provided during April 2021 public testimony and obtained during follow-up has been added to CVRF fisheries related programs discussion (*SIA Pages 101, 104, and 105/PDF Pages 422, 425, and 426*)



SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

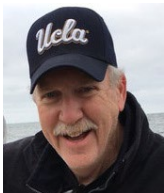
- **Revisions since April 2021 SSC/AP/Council review (continued)**
 - **Section 7 - Regional and Community-Level Social Impacts by Alternative**
 - Discussion of CDQ entities leasing quota to and/or acquiring ownership interest in industry partners in the Amendment 80 sector has been expanded (SIA Page 141/PDF Page 462) and an accompanying potential environmental justice concerns discussion has been added (SIA Pages 142-143/PDF Pages 463-464)
 - Discussion of “BSAI Groundfish Amendment 80 Fishery Dependency and Vulnerability to Community Level-Impacts of the Proposed Action Alternatives among Pacific Northwest Communities” has been expanded with information that previously appeared in DEIS Social and Environmental Justice section (SIA Pages 143-144/PDF Pages 465-466).
 - Updated Amendment 80 crew data, supplied by industry, also appears in this section (SIA Page 144/PDF Page 465) and in tabular format in Table 85 in Attachment C (Section 10.3, SIA Page 185/PDF Page 506)
 - Discussion of “Community Engagement, Dependence, Vulnerability, Resilience, and Risks to Fishing Community Sustained Participation in the Relevant BSAI Halibut Fisheries” has been expanded with information that previously appeared in DEIS Social and Environmental Justice section (SIA Pages 145-147/PDF Pages 466-468)



SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

■ No Action Alternative

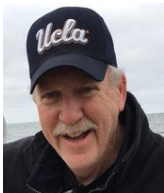
- Problematic nature of the no-action alternative for directed halibut fishery participants under halibut low abundance conditions is inherently recognized in the Council's purpose and need statement.
- Directed halibut fishery in Area 4
 - Regional and community context of the fisheries discussion organized by CDQ region for Alaska communities
 - CDQ entities mediate, to varying degrees, community engagement in the relevant halibut fisheries and the Amendment 80 fishery and would themselves be potentially affected in multiple ways by the proposed alternatives.
 - CDQ entity interests may vary from the interests of individual tribal entities and communities within their region.
 - For communities outside of Alaska, discussion organized by Seattle MSA and other Pacific Northwest geographies



SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

■ No Action Alternative (continued)

- Subsistence halibut fishery in Area 4
 - Change in access (vs. availability) with changes in directed commercial fishery.
 - Retention of halibut from commercial catch for subsistence use, including U32 in Areas 4D and 4E (Table 24, SIA page 49/PDF page 370)
 - Loss of joint production opportunities (SIA page 151/PDF page 472)
 - Loss of opportunity to use commercial fishing gear and vessels for subsistence pursuits
 - Loss of income from commercial fishing to capitalize subsistence pursuits
- Potential cumulative small/rural community and cultural context issues (SIA page 153/PDF page 474)
 - Cultural importance of halibut and halibut fishing



SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

■ Action Alternatives

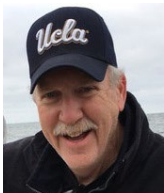
■ Communities engaged in the Amendment 80 fishery

- Alaska communities (SIA page 132/PDF page 453)
 - **Unalaska/Dutch Harbor:** Fishery Resource Landing Tax revenue; center of BSAI region support service business activity
 - **Adak and Atka:** FRLT revenue; limited support services in Adak
 - **CDQ groups:** lease of CDQ quota to Amendment 80 industry partners (4 CDQ groups) and investment in Amendment 80 vessel ownership (1 CDQ group)
- Pacific Northwest communities (SIA page 143/PDF page 464)
 - **Seattle MSA**
 - Concentration of Amendment 80 vessel ownership
 - Support service industry concentration



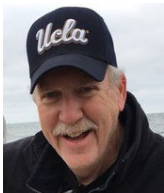
SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

- **Action Alternatives (continued)**
 - **Communities engaged in the directed halibut fishery**
 - Purpose and Need: Action may provide additional opportunities for the directed halibut fishery
 - Incidental reallocative effects (all participating communities)
 - Interrelated opportunities for the subsistence halibut fishery (Alaska communities)
 - Purpose and Need: Action could promote of conservation of the halibut stock.
 - Likely to be little difference among the average future halibut spawning biomass under levels of PSC anticipated across the alternatives (DEIS Section 5.2)
 - Impacts, to the extent they would occur, would be coastwide; multiple biological, spatial, and temporal uncertainties in linking to effects to specific regions and communities.



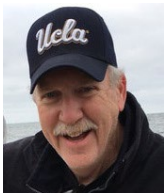
SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

- **Environmental Justice (Executive Order 12898)**
 - **Described on SIA page 5 (PDF page 326)**
 - Directs federal agencies *“to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations”*
 - CEQ guidance under NEPA also specifically calls for consideration of potential disproportionately high and adverse impacts to Indian tribes beyond a more general consideration of potential disproportionately high and adverse impacts to minority populations.
 - Identification of [an effect of Environmental Justice concern] should heighten agency attention to alternatives, mitigation strategies, monitoring needs, and preferences expressed by the affected community or population. (SIA page 5/PDF page 326, Footnote 7)



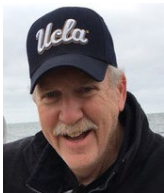
SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

- **Environmental Justice (EO 12898, continued)**
 - **Of the 17 Alaska communities considered dependent on the Area 4 directed halibut fishery (SIA page 150/PDF page 471)**
 - 16 of the communities have federally recognized Alaska Native tribes and 15 are members of CDQ groups.
 - Minority residents accounted for more the 90% of the population in 13 communities and more than 65% in all communities.
 - 7 communities had more than 30 percent of their residents living below the poverty threshold and 14 had a higher percentage of residents living below the poverty line than the state of Alaska as a whole.
 - **Additionally, halibut and halibut fishing is of interrelated social, cultural, occupational, historic, economic, and subsistence importance in each of these communities**



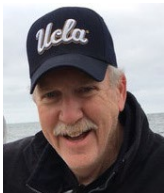
SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

- **Environmental Justice (EO 12898, continued)**
 - **For the Amendment 80 fishery under the action alternatives, Environmental Justice would potentially be an issue of concern for**
 - Amendment 80 crew (minority population proportion of which is meaningfully greater than the minority proportion of the general population of the Seattle MSA).
 - Of potential concern would be loss of income opportunities for crew, with due to increased expenses in operations with additional halibut avoidance measures, and/or more time away from home with time-consuming and/or labor-intensive measures such as increased deck sorting.
 - CDQ groups with industry partners in the Amendment 80 fishery.
 - Amendment 80-derived revenues are an important source of income that funds to varying degrees a range of benefit programs for communities with limited alternative revenue sources and funding opportunities.



SOCIAL IMPACT ASSESSMENT (APPENDIX 1)

- **Next steps for Final SIA:**
 - Include cross-reference to (or summary of) the outcome of the Tribal Consultation process and revise the SIA as needed.
 - Revise SIA as needed based on selection of a Preferred Alternative and AP, Council, and public comment input as relevant.
 - Revise EIS Section 5.5 Social and Environmental Justice as needed based on revisions to the SIA.



SELECTING A PREFERRED ALTERNATIVE

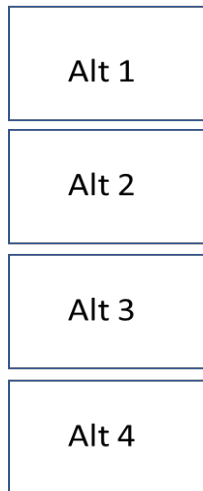
CLARIFICATIONS, NATIONAL STANDARDS, WRAP UP



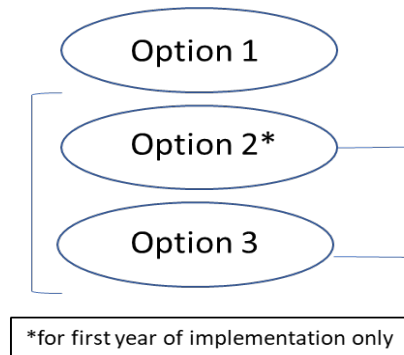
SELECTING A PREFERRED ALTERNATIVE

Selecting a Preferred Alternative

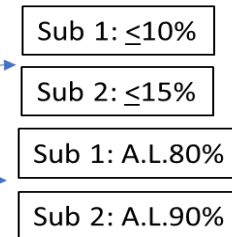
Step 1:
Select overall Alternative



Step 2:
Select options (not mandatory)



Step 3:
Select sub-options (if applicable)



ADDITIONAL ITEMS FOR CLARIFICATION

- What to do in the case of a missing survey value (as with 2020 or in the case of reduced survey effort)? This is particularly important for the EBS trawl survey
- Any clarifications to option 3?
 - Confirm that it is the Council's intent that the annual limit is not retained as a hard cap in subsequent years
 - Consider modifying the evaluation of an overage based on rolling multi-year basis rather than within a single-year only
- Implementation considerations: Option 2 vs some other method to set Year 1 limit [this will be discussed in conjunction with the NMFS report to follow]





NATIONAL STANDARDS

BRIEF REVIEW OF SUBSET OF NATIONAL STANDARDS AND GUIDELINES
FOR ADDRESSING NATIONAL STANDARDS 1, 2, 4, 8, 9



PURPOSE AND NEED

Halibut is an important resource in the Bering Sea and Aleutian Islands (BSAI), supporting commercial halibut fisheries, recreational fisheries, subsistence fisheries, and groundfish fisheries. The International Pacific Halibut Commission (IPHC) is responsible for assessing the Pacific halibut stock and establishing total annual catch limits for directed fisheries and the North Pacific Fishery Management Council (Council) is responsible for managing prohibited species catch (PSC) in U.S. commercial groundfish fisheries managed by the Council. The Amendment 80 sector is accountable for the majority of the annual halibut PSC mortality in the BSAI groundfish fisheries. While the Amendment 80 fleet has reduced halibut mortality in recent years, continued decline in the halibut stock requires consideration of additional measures for management of halibut PSC in the Amendment 80 fisheries.

*When BSAI halibut abundance declines, PSC in Amendment 80 fisheries can become a larger proportion of total halibut removals in the BSAI, particularly in Area 4CDE, and can reduce the proportion of halibut available for harvest in directed halibut fisheries. The Council intends to establish **an abundance-based halibut PSC management program in the BSAI for the Amendment 80 sector** that meets the requirements of the Magnuson-Stevens Act, particularly **to minimize halibut PSC to the extent practicable under National Standard 9** and **to achieve optimum yield in the BSAI groundfish fisheries** on a continuing basis under **National Standard 1**. The Council is considering a program that links the Amendment 80 sector PSC limit to halibut abundance and **provides incentives for the fleet to minimize halibut mortality at all times**. This action **could also promote conservation of the halibut stock** and **may provide additional opportunities for the directed halibut fishery**.*



NATIONAL STANDARD 1

Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield (OY) from each fishery for the U.S. fishing industry.

- **Prevent overfishing-**
 - BSAI groundfish (including FF stocks) are stable, not overfished and harvested at a level that is conservative and not subject to overfishing.
 - Halibut stock managed by IPHC, SPR-based harvest strategy ensures that overall fishing mortality levels are not likely to affect SSB
- **Achieving optimum yield-OY** of BSAI groundfish complex defined in 1981 Amendment 1 BSAI FMP (considering non-economic impacts)
 - 85% of the historical estimate of MSY, or 1.4 to 2.0 million mt
 - Assure the continued health of the target species themselves
 - Mitigate the impact of commercial groundfish operations on other elements of the natural environment



NATIONAL STANDARD 2

- Conservation and management measures shall be based upon the best scientific information available.
- *From NS2 Guidelines 50 CFR 600.315(c)(1)*
 - ***SSC scientific evaluation and advice to the Council.***
 - (1) SSC scientific advice and recommendations to its Council are based on scientific information that the SSC determines to meet the guidelines for best scientific information available Such scientific advice should attempt to resolve conflicting scientific information, so that the Council will not need to engage in debate on technical merits. Debate and evaluation of scientific information is the role of the SSC.



NATIONAL STANDARD 4

- Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various U.S. fishermen, such allocation shall be:
 - (1) Fair and equitable to all such fishermen.
 - (2) Reasonably calculated to promote conservation.
 - (3) Carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

*Assessing this standard as it pertains to A80 as directly affected entity.
However, the action could provide additional opportunities for directed halibut fishing if the IPHC increases the commercial catch limit for the directed halibut fishery in response to this action*



NATIONAL STANDARD 8

- Conservation and management measures shall, consistent with the conservation requirements of the Magnuson-Stevens Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that are based upon the best scientific information available in order to:
 - (1) Provide for the sustained participation of such communities; and
 - (2) To the extent practicable, minimize adverse economic impacts on such communities.

(p 282) “...reduced halibut PSC mortality, relative to status quo, might benefit fishing communities that depend on commercial and noncommercial halibut harvest, though the magnitude of that effect is likely attenuated by the several biological and policy steps that separate bycatch mortality savings from directed harvest opportunities. Communities that are engaged in the groundfish fisheries could be adversely impacted on a more direct basis. In selecting a Preferred Alternative, the Council must consider minimizing the risk of adverse impacts to fishing communities, while balancing the requirements of National Standards 9 and 1.”



NATIONAL STANDARD 9

- Conservation and management measures shall, to the extent practicable:
 - (1) Minimize bycatch; and
 - (2) To the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

*The proposed action is specifically intended to minimize halibut PSC in the Amendment 80 sector **to the extent practicable.***



NS9 GUIDELINES

50 CFR 600.350(d)(3)(i)

■ (i) A determination of whether a conservation and management measure minimizes bycatch or bycatch mortality to the extent practicable, consistent with other national standards and maximization of net benefits to the Nation, should consider the following factors:

(A) Population effects for the bycatch species.

(B) Ecological effects due to changes in the bycatch of that species (effects on other species in the ecosystem).

(C) Changes in the bycatch of- other species of fish and the resulting population and ecosystem effects.

(D) Effects on marine mammals and birds.

(E) Changes in fishing, processing, disposal, and marketing costs.

(F) Changes in fishing practices and behavior of fishermen.

(G) Changes in research, administration, and enforcement costs and management effectiveness.

(H) Changes in the economic, social, or cultural value of fishing activities and nonconsumptive uses of fishery resources.

(I) Changes in the distribution of benefits and costs.

(J) Social effects.



BALANCING THE NATIONAL STANDARDS: POLICY TRADE-OFFS

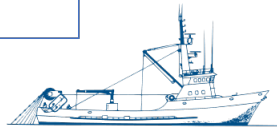
National Standard 9:

Balance between allowing A80 to flexibility to achieve TAC and to minimizing bycatch to extent practicable

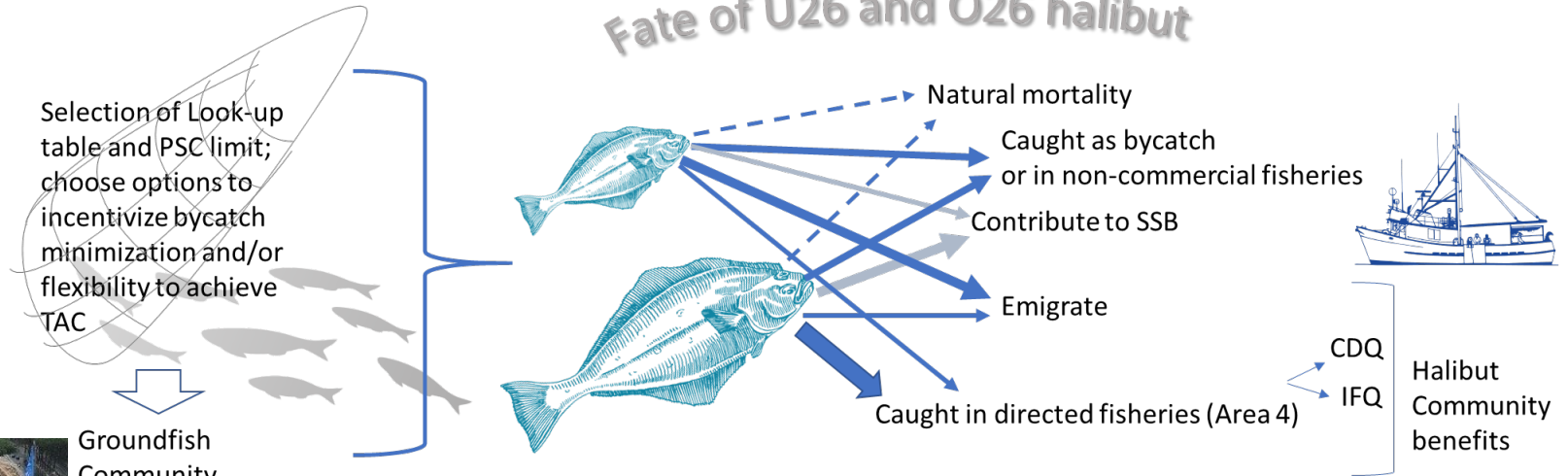
Policy Considerations

National Standards 4 and 8:

Consider indexing a fishing allocation or privilege (PSC limit) to abundance to promote conservation in a fair and equitable manner; Consider beneficial and adverse direct and indirect impacts to groundfish- and halibut-dependent fishing communities.



Fate of U26 and O26 halibut





THANK YOU