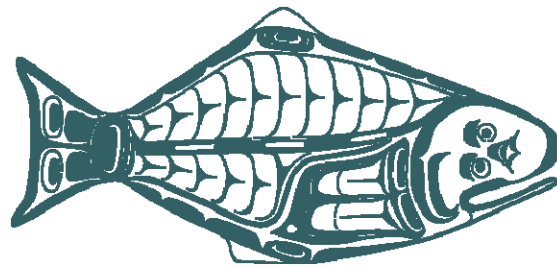


IPHC Report to the North Pacific Fishery Management Council

7 June, 2014



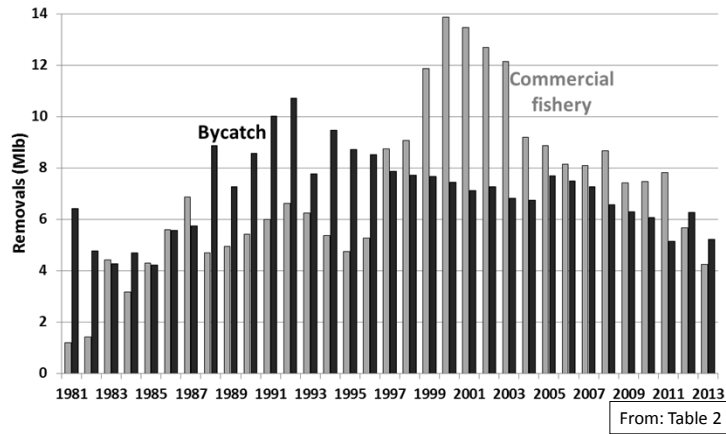
Council Request

1. Status of the BSAI halibut resource
2. Impacts of PSC (bycatch) on directed fishery yield

1. Status

2

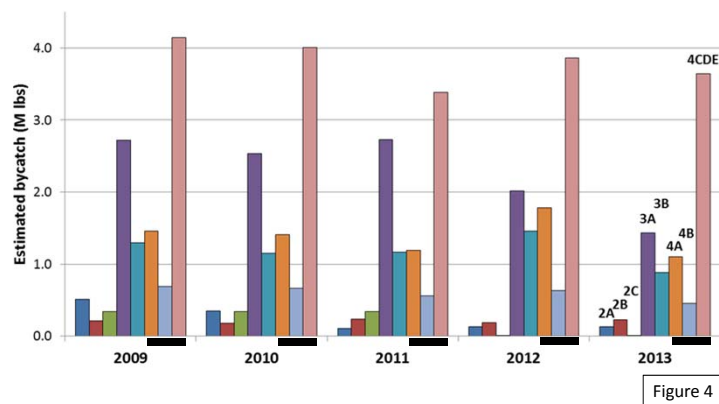
BSAI fisheries (4A, 4B, 4CDE)



1. Status

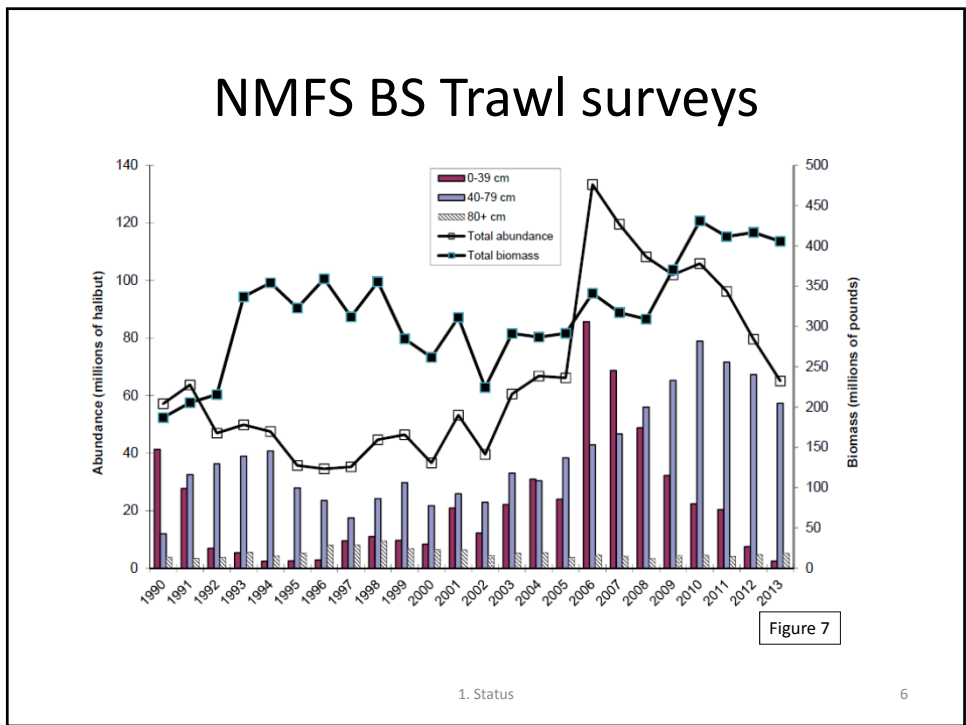
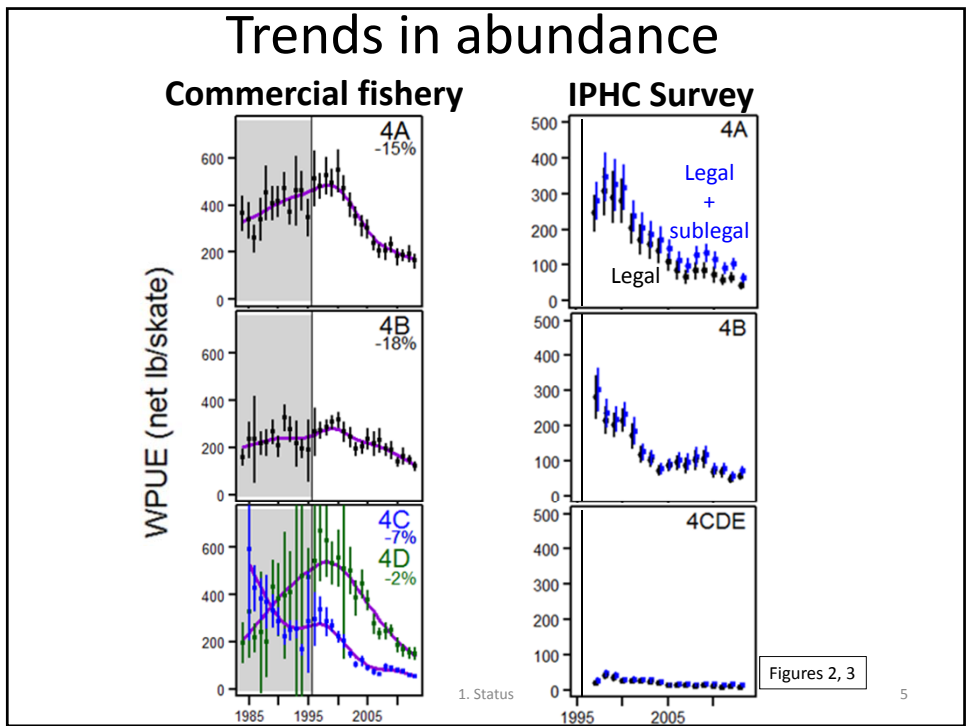
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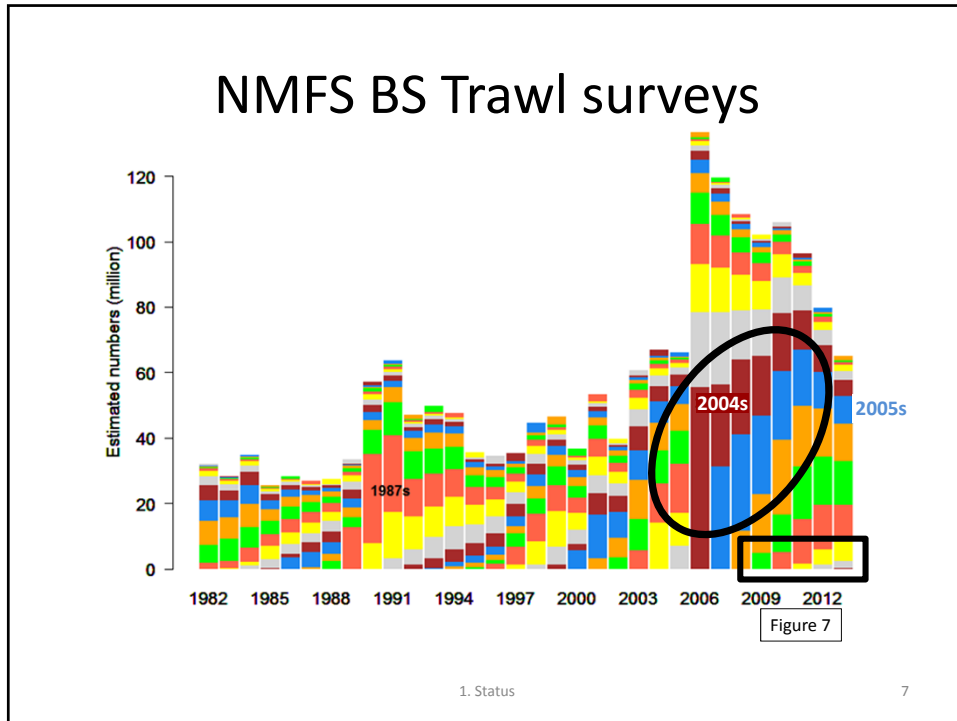
Bycatch estimates by IPHC area



1. Status

4





- ### NMFS BS Trawl surveys
- When and where would we expect to see these juveniles?
 1. Fishery catch rates (~2013+).
 2. Survey sub-legal and legal catch rates (~2010+)
 3. GOA trawl surveys (~2008+).
1. Status 8

Distribution and movement

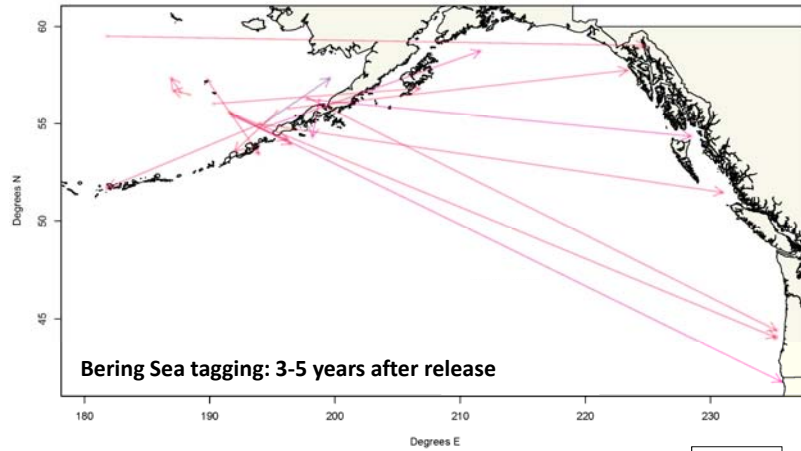


Figure 13

1. Status

9

Distribution and movement

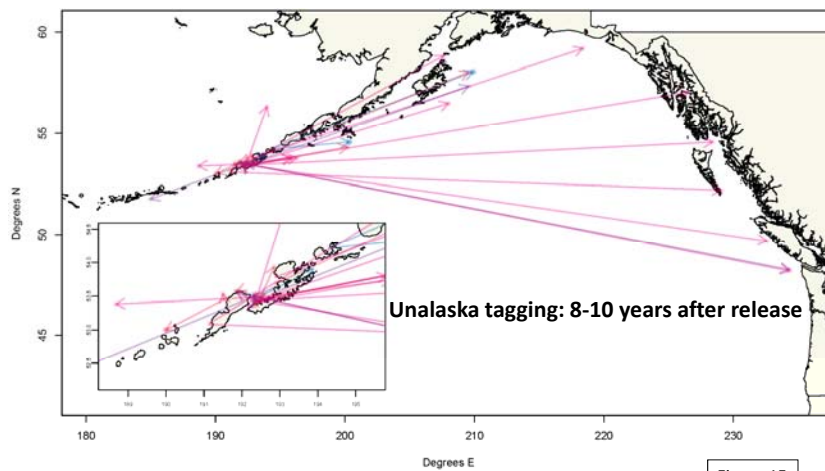


Figure 15

1. Status

10

NMFS GOA Trawl surveys

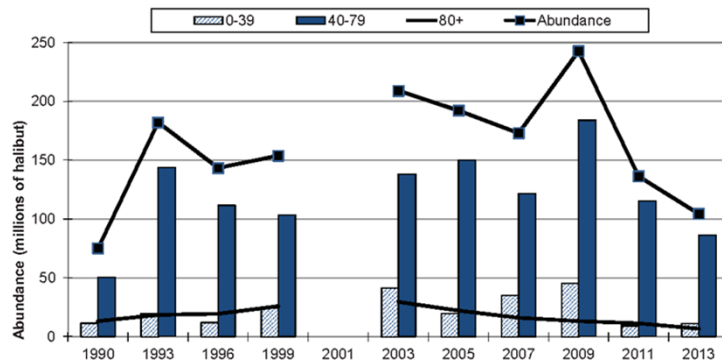


Figure 16

1. Status

11

Potential explanations

1. Bering Sea juveniles have remained there, but have not yet been observed in either the survey or fishery in the Bering Sea.
2. Higher than normal natural mortality and/or unaccounted for fishing mortality has reduced cohort abundance.
3. Below average abundance in other areas has resulted in a dilution of Bering Sea cohorts.
4. Environmental, distribution, or other effects on catchability/availability, but not abundance was responsible for large Bering Sea trawl survey estimates.

→ The next 1-3 years data will provide more information.

1. Status

12

Council Request

1. Status of the BSAI halibut resource
2. Impacts of PSC (bycatch) on directed fishery yield

13

Apportionment

Apportionment: Uses the IPHC setline survey to estimate the distribution of the coastwide biomass by regulatory area.

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Exploitable biomass	4.03	26.64	25.44	56.07	23.14	9.69	7.23	18.06	170.29
Percent	2.4%	15.6%	14.9%	32.9%	13.6%	5.7%	4.2%	10.6%	100.0%

2. Impacts

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Apportionment and harvest policy

Apportionment: Uses the IPHC setline survey to estimate the distribution of the coastwide biomass by regulatory area.

Harvest policy: Applies a target harvest rate to each regulatory area based on mortality of halibut greater than 26 inches (O26).

TCEY: The sum of all O26 mortality.

“Other removals”: includes bycatch; wastage, personal use, recreational (in some areas, depending on CSPs)

FCEY: Commercial fishery landings; wastage and recreational (depending on CSP)

2. Impacts

15

Apportionment and harvest policy

Apportionment: Uses the IPHC setline survey to estimate the distribution of the coastwide biomass by regulatory area.

Harvest policy: Applies a target harvest rate to each regulatory area based on mortality of halibut greater than 26 inches (O26).

2013 Blue Line

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Exploitable biomass	4.03	26.64	25.44	56.07	23.14	9.69	7.23	18.06	170.29
Percent	2.4%	15.6%	14.9%	32.9%	13.6%	5.7%	4.2%	10.6%	100.0%
Harvest rate	21.5%	21.5%	21.5%	21.5%	16.1%	16.1%	16.1%	16.1%	19.7%
Total CEY	0.87	5.73	5.47	12.05	3.73	1.56	1.17	2.91	33.49
Other removals	0.14	0.74	1.31	2.63	0.90	0.71	0.34	2.27	9.04
Fishery CEY	0.72	4.98	4.16	9.43	2.84	0.85	0.82	0.64	24.45

2. Impacts

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Impacts of bycatch

- Starting with the 2013 Stock assessment results:
 - Recalculate the harvest policy tables under different levels of bycatch
 - Coastwide (document)
 - BSAI-only (presented here)

2. Impacts

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2013 Blue Line

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Exploitable biomass	4.03	26.64	25.44	56.07	23.14	9.69	7.23	18.06	170.29
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20% more bycatch in the BSAI

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Total CEY	0.87	5.72	5.47	12.06	3.73	1.56	1.17	2.91	33.49
Other removals	0.14	0.74	1.31	2.63	0.90	0.83	0.41	2.71	9.66
Fishery CEY	0.72	4.98	4.16	9.43	2.84	0.73	0.76	0.20	23.83

2013 Blue Line									
	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Exploitable biomass	4.03	26.64	25.44	56.07	23.14	9.69	7.23	18.06	170.29
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Other removals	0.14	0.74	1.31	2.63	0.90	0.59	0.28	1.84	8.43
Fishery CEY	0.72	4.98	4.16	9.43	2.84	0.97	0.88	1.07	25.06

Impacts of bycatch

- O26 mortality is basically just moved from “Other removals” to the FCEY (accounting for changes in CSPs, wastage) – the TCEY remains unchanged.
- This means that the U26 mortality will only be accounted for in subsequent processes, when its effect on productivity has been realized.

Impacts of bycatch

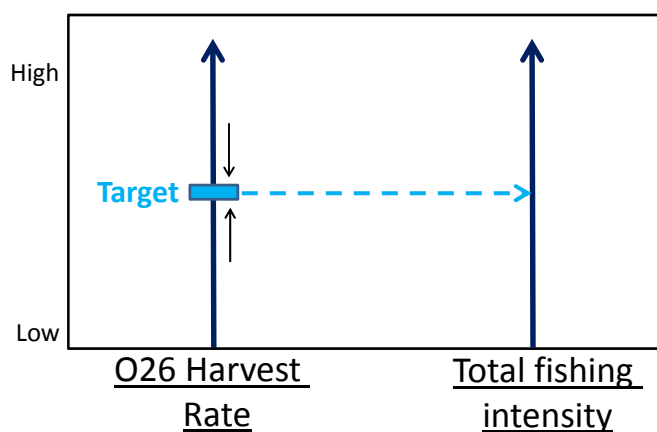
- Starting with the 2013 Stock assessment results:
 - Recalculate the harvest policy tables under different levels of bycatch
 - Repeat these calculations extending the harvest policy accounting to total fishing intensity (all sizes and sources of mortality).

This analysis provides a framework for accounting, but does not imply any change in management!

2. Impacts

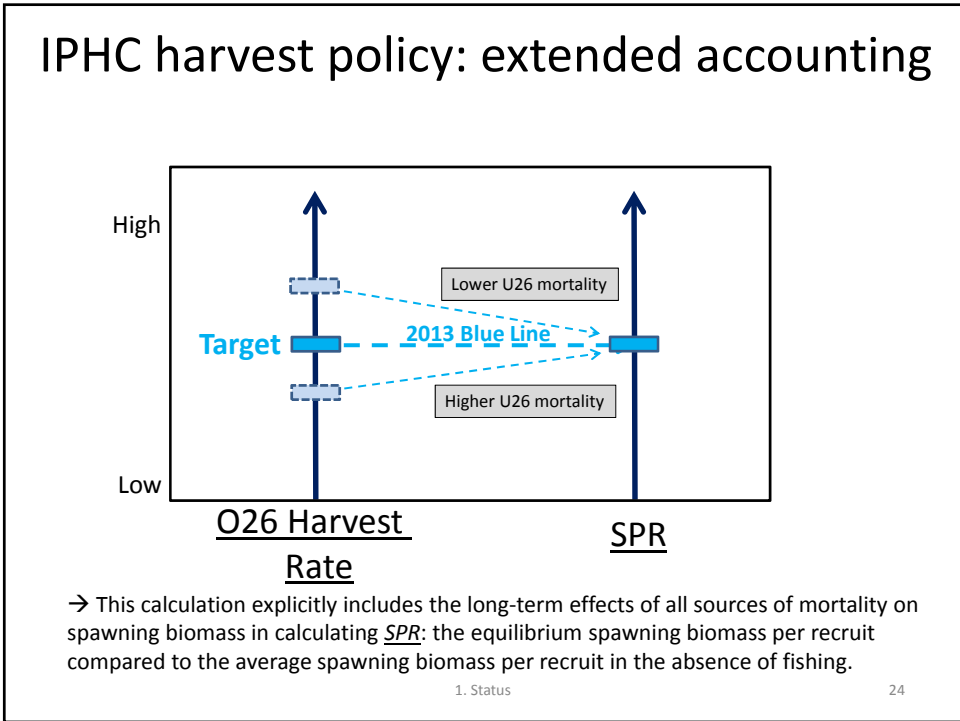
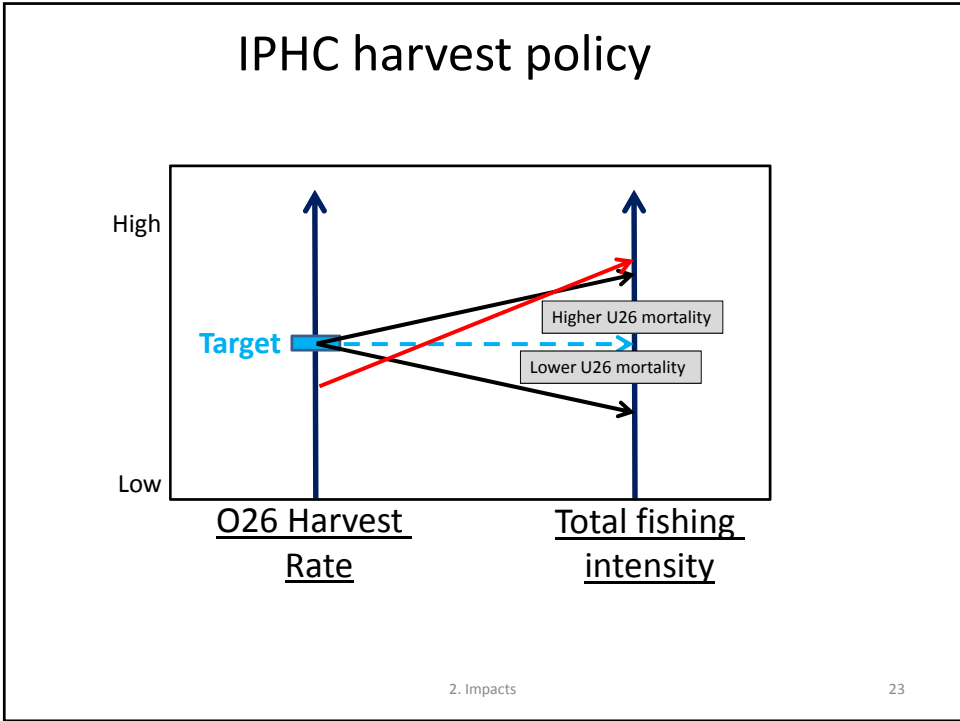
21

IPHC harvest policy



2. Impacts

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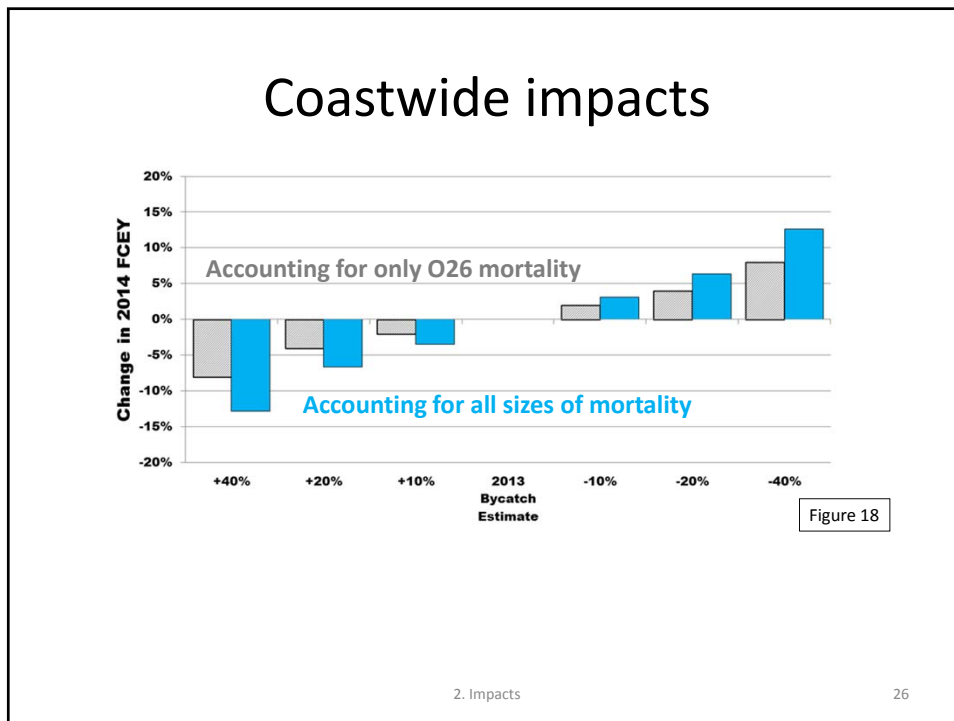


20% less bycatch in the BSAI

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Fishery CEY	0.72	4.98	4.16	9.43	2.84	0.97	0.88	1.07	25.06

20% less bycatch in the BSAI – accounting for U26 mortality

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
Exploitable biomass	4.03	26.64	25.44	56.07	23.14	9.69	7.23	18.06	170.29
Percent	2.4%	15.6%	14.9%	32.9%	13.6%	5.7%	4.2%	10.6%	100.0%
Harvest rate	21.5%	21.8%	21.8%	21.8%	16.3%	16.3%	16.3%	16.4%	19.9%
Total CEY	0.88	5.80	5.55	12.22	3.78	1.58	1.18	2.95	33.94
Other removals	0.14	0.74	1.31	2.63	0.90	0.59	0.28	1.84	8.44
Fishery CEY	0.73	5.06	4.24	9.59	2.88	0.99	0.90	1.11	25.50



Summary

- Adult trends in all areas of the BSAI have been declining
- BS juvenile trends uncertain – the next several years will provide more information
- Current IPHC harvest policy accounts for O26 bycatch directly in FCEY, and U26 bycatch indirectly via the target harvest rate and subsequent estimates of stock size
- Under recent size distributions, the trade-off between pounds bycatch of all sizes and FCEY is estimated to be ~1:1; this is consistent with previous analyses
- Impacts of bycatch are most pronounced in Area 4CDE: a 20% change in bycatch results in a 70% change in FCEY
- Extended harvest policy accounting brings these calculations into a single framework for evaluation

3. Summary

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Uncertainty

- General sources: movement, natural mortality, forecasting selectivity, many others.
- Tractable sources:
 - IPHC survey trend information
 - Depth/ spatial expansions
 - Repeated calibration with trawl survey
 - Precision and accuracy of bycatch estimates (magnitude and size-distribution)
 - Broader observer coverage
 - Detailed reporting of appropriately expanded estimates (magnitude and size-distribution) for the IPHC

3. Summary

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