

Bering Sea Aleutian Island cod assessment and management

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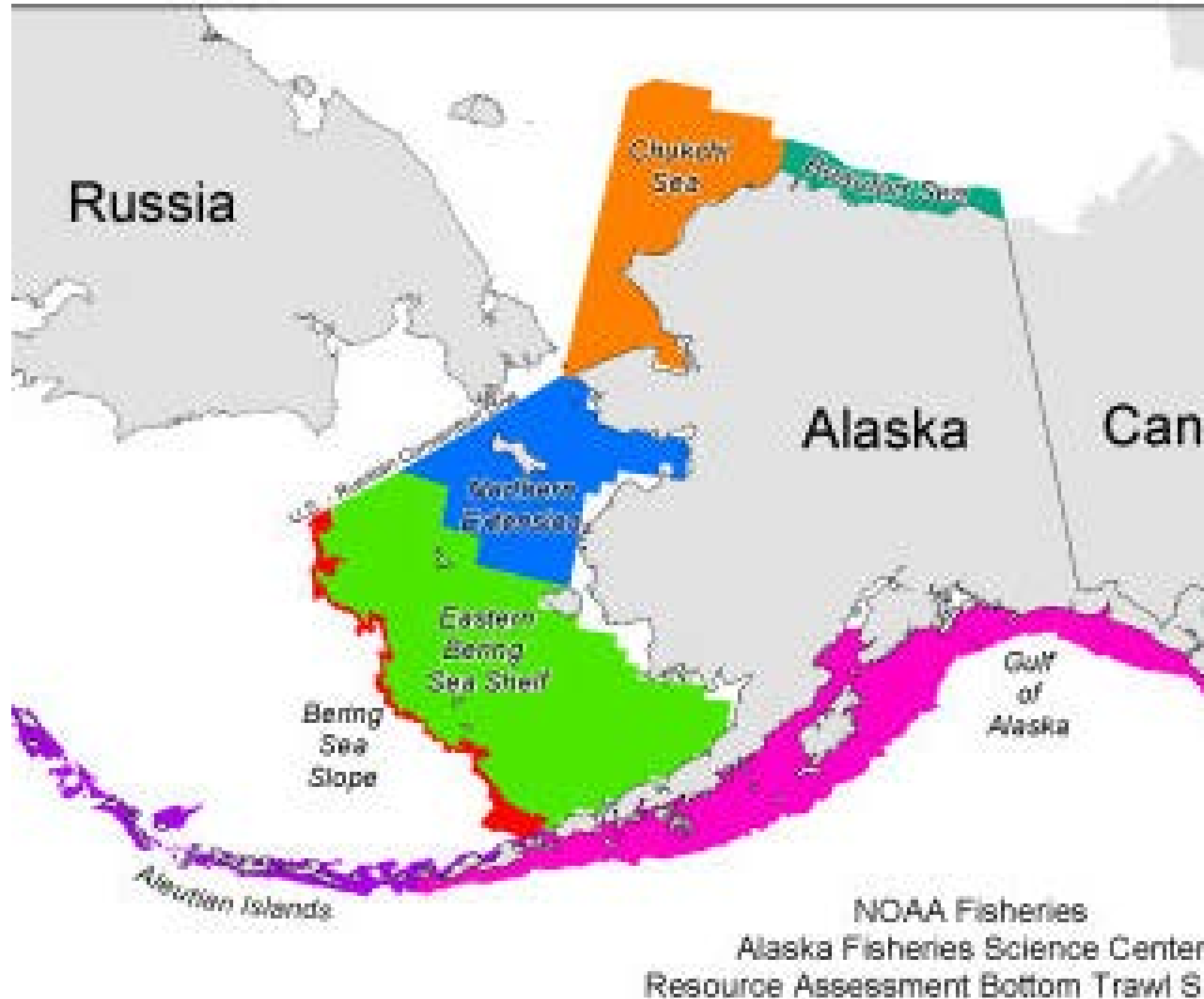
NPFMC

Joint Protocol Committee

October 17, 2018

3 managed stocks

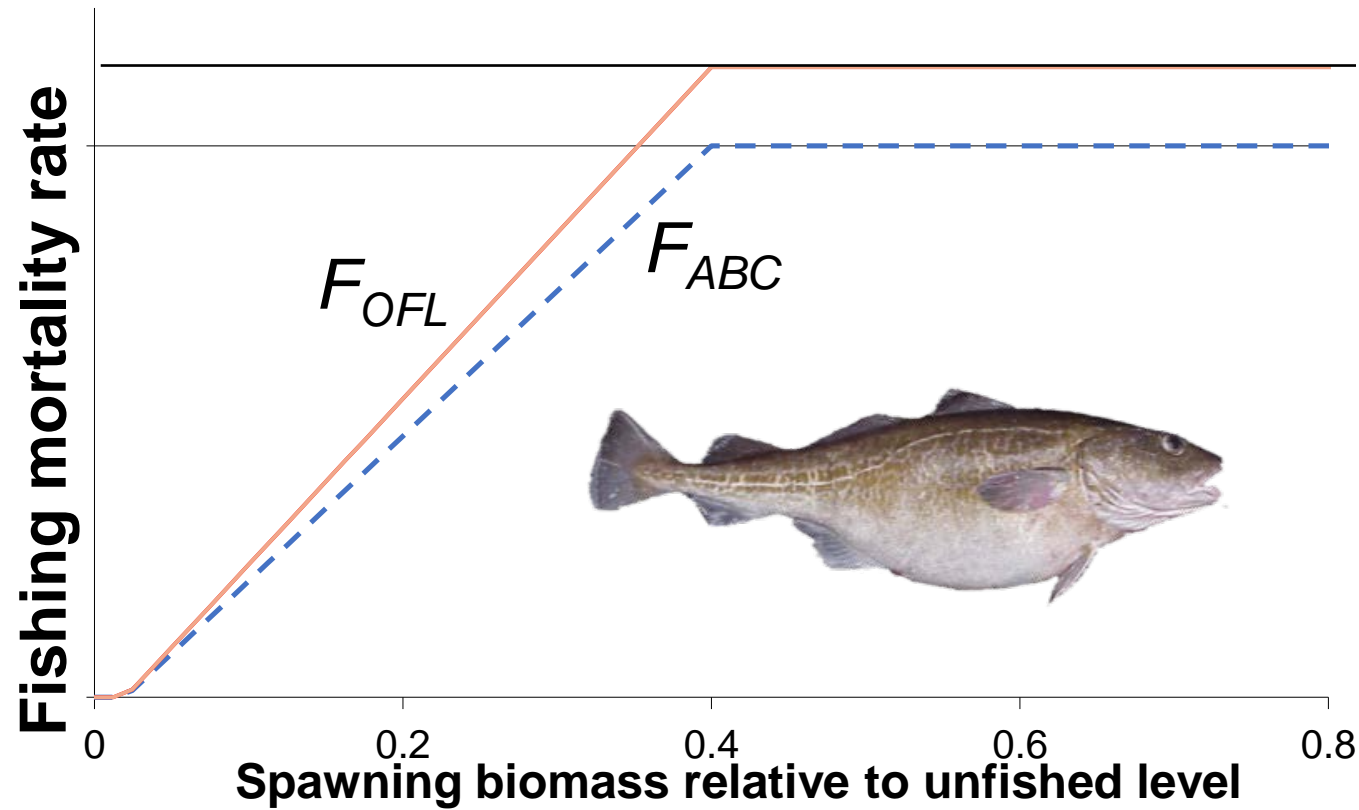
- Bering Sea
- Aleutian Islands
- Gulf of Alaska





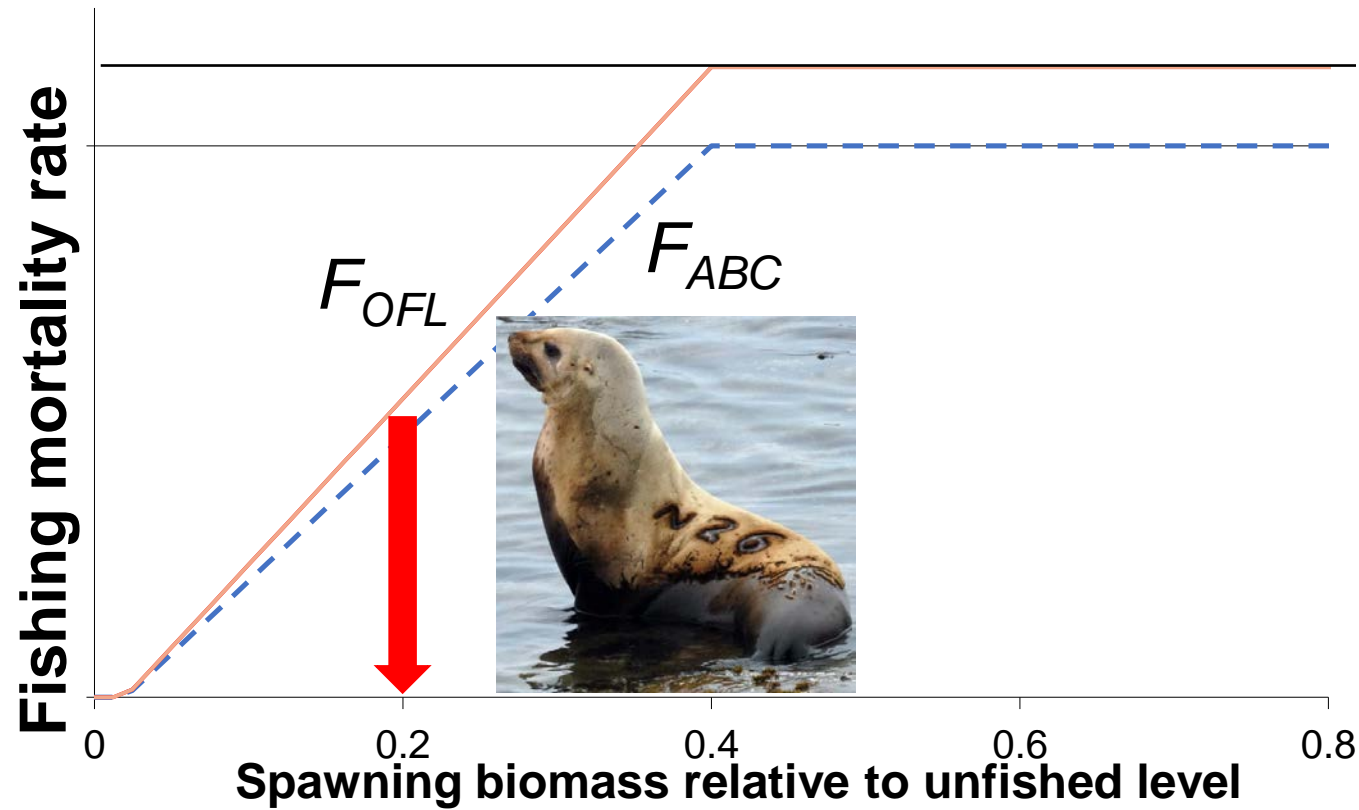
BSAI Pacific cod assessment

- Managed as a single unit stock from 1977-2013
 - Tagging studies show migration within and between EBS, AI, GOA
- Research indicated discrete stocks between EBS and AI (Canino et al., 2005, Cunningham et al. 2009, Canino et al, 2010, Spies 2012)
- 2014-on separate harvest specifications by area (EBS and AI)



- Sloping control rule to set specifications.
- Control rule provides for automatic rebuilding below 40% of unfished level

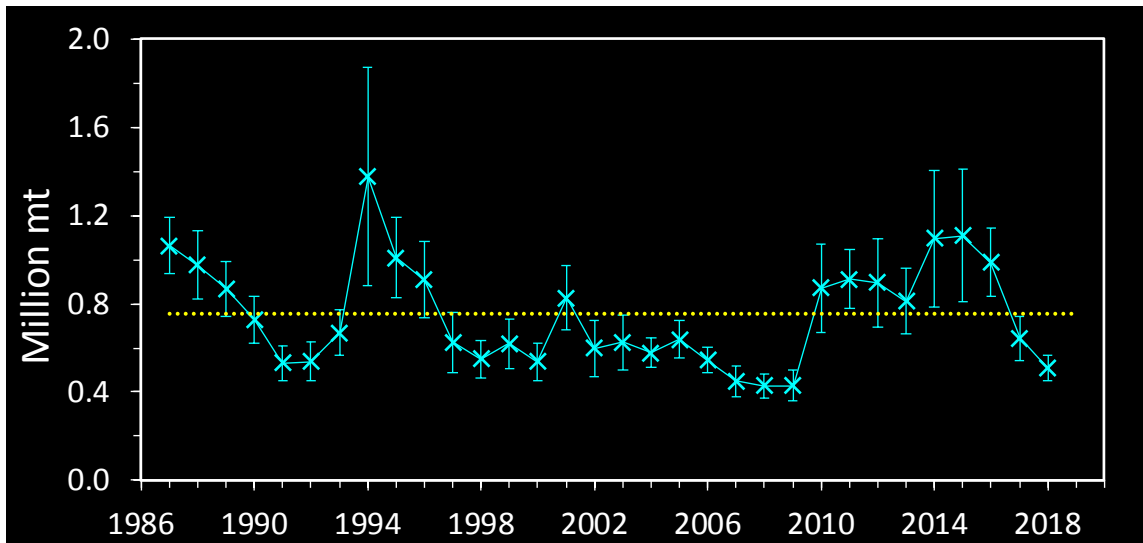
Control rule for cod



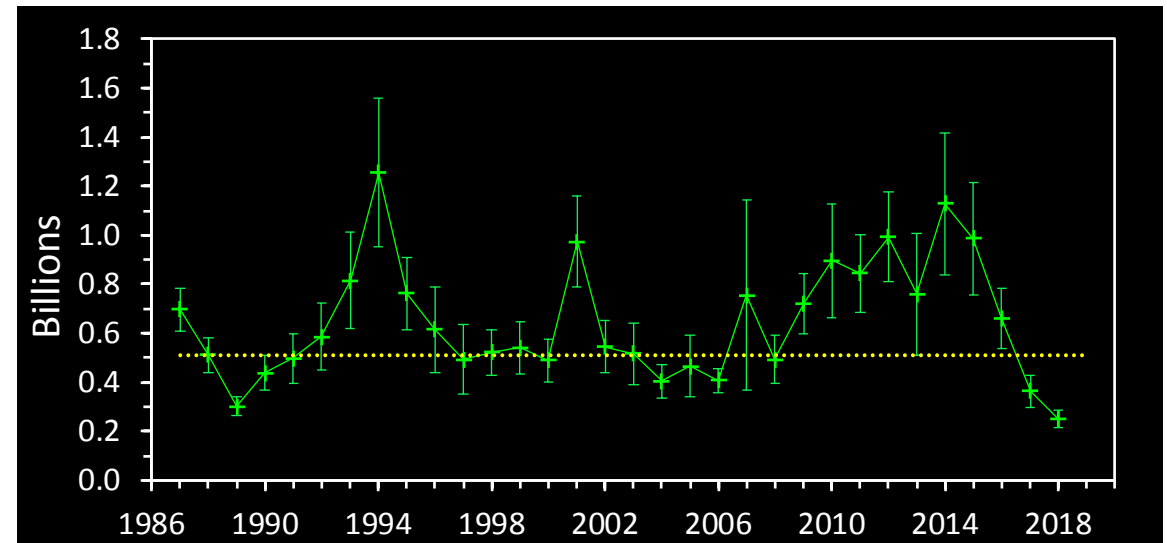
Directed fishery = 0 at $\leq 20\%$ of unfished level

Control rule for cod, pollock and Atka mackerel

2018 Bering Sea survey

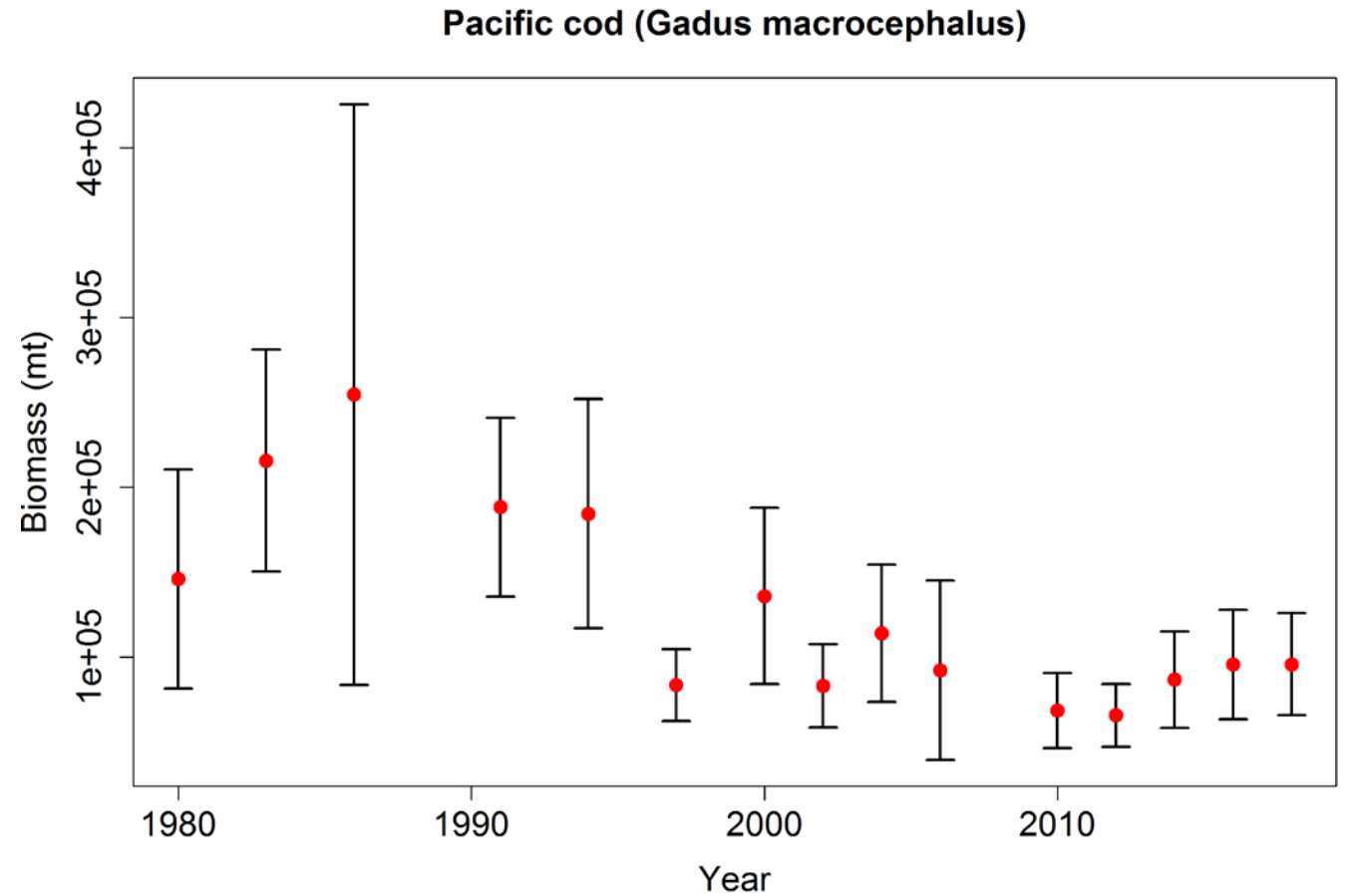


Biomass in millions MT



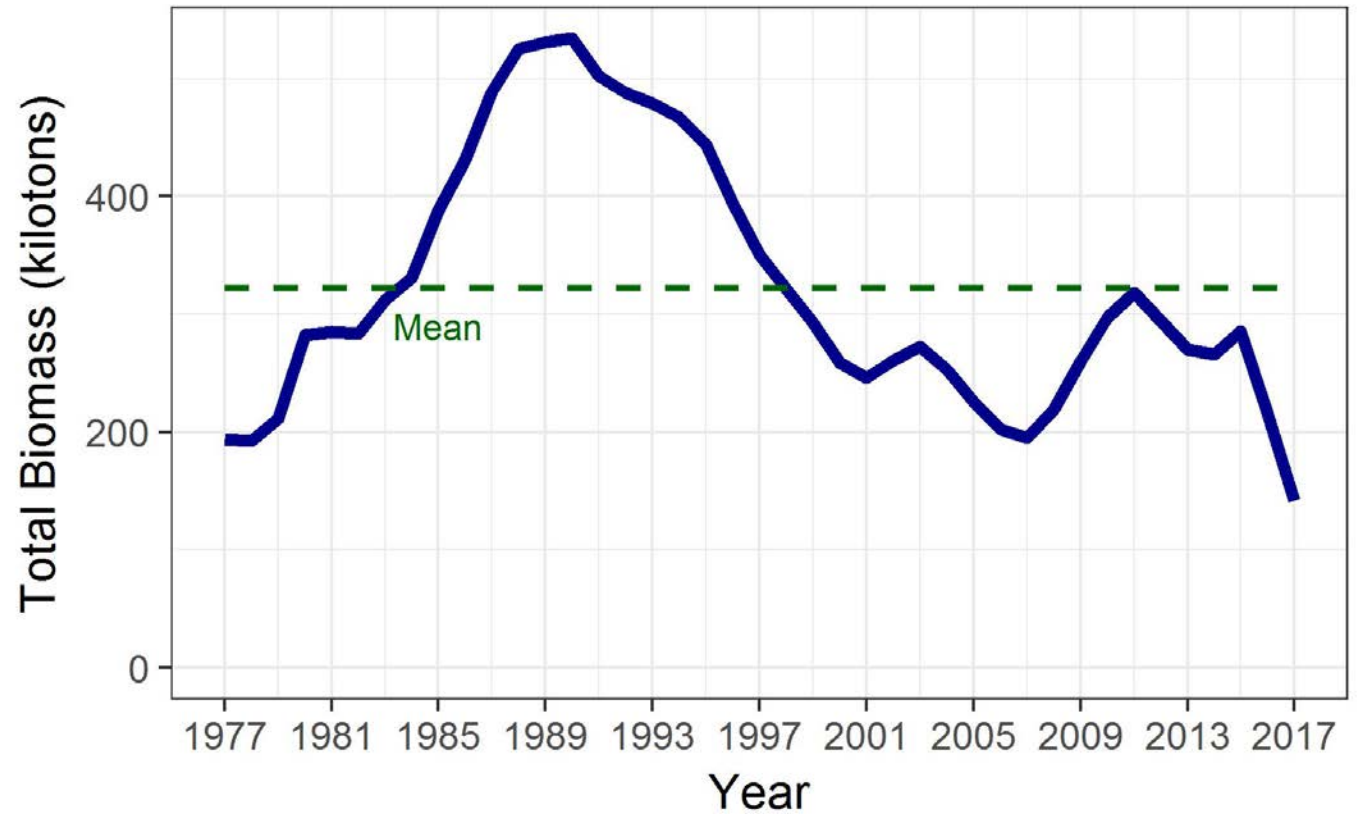
Abundance in billions of fish

Aleutian Islands survey biomass



Gulf of Alaska cod

GOA Pacific Cod Total Biomass



Relative abundance of
cod in state waters:
EBS survey

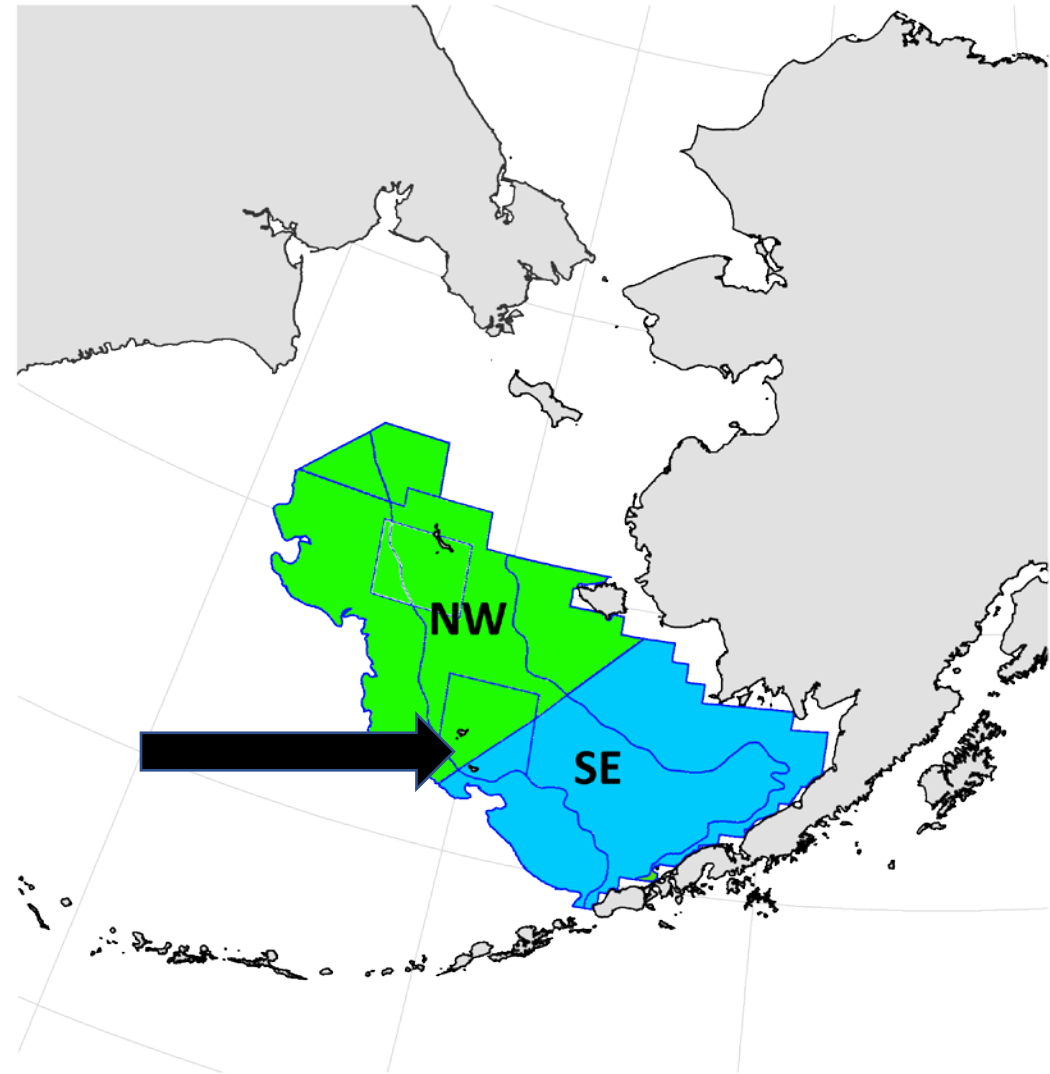
EBS survey annual

Only 3 of 376 stations in State
waters

All 3 near Pribilof Islands

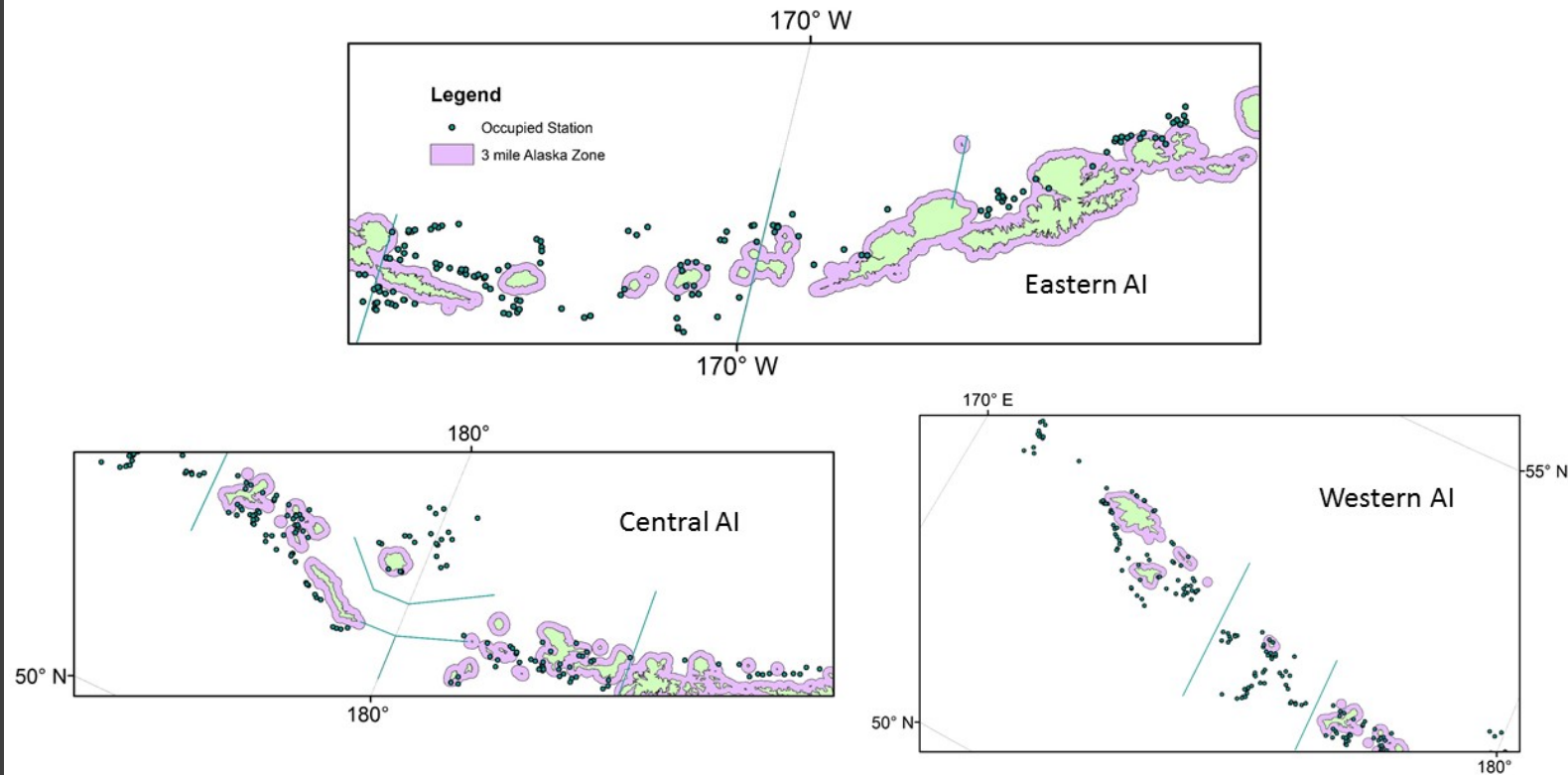
Since 1982 have comprised
between 0.3 – 4.0% of total
cod in survey

One additional station in
eastern Bristol Bay has partial
tow frequently in State waters



Relative abundance of cod in state waters: AI survey

- AI survey biennial (2018 most recent)
- Numerous stations within State waters in AI survey



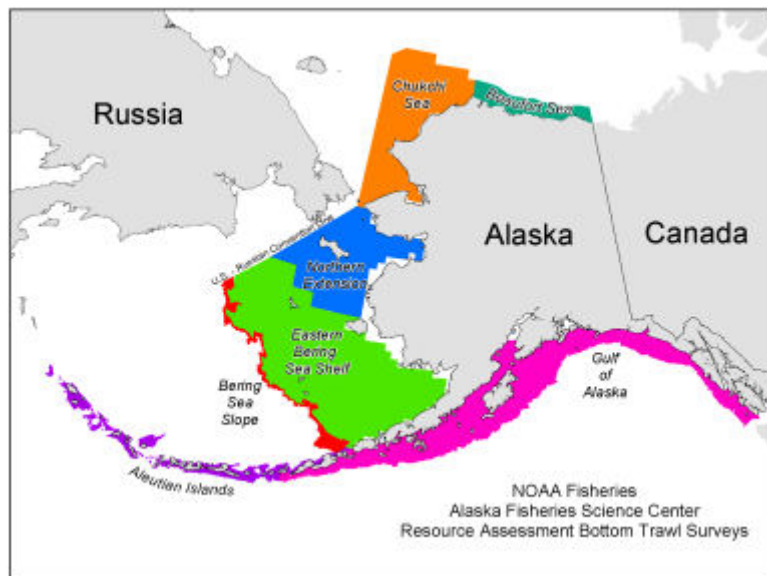
AI Survey Year	% catch in State waters
2010	20.2
2012	26.0
2014	17.9
2016	13.0
2018	13.2

2018 Bottom Trawl Survey Stations

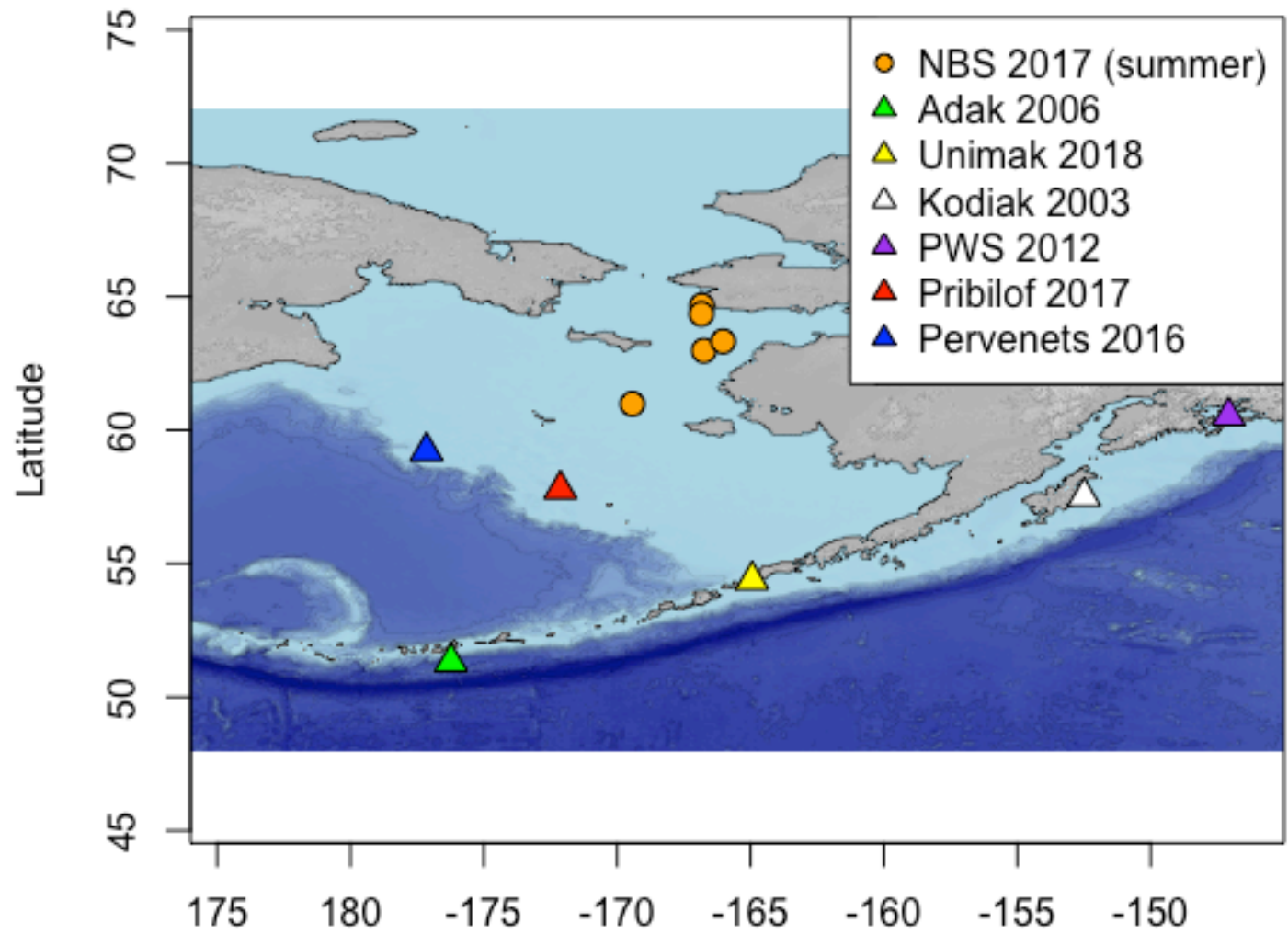


Trends in cod across Bering Sea areas

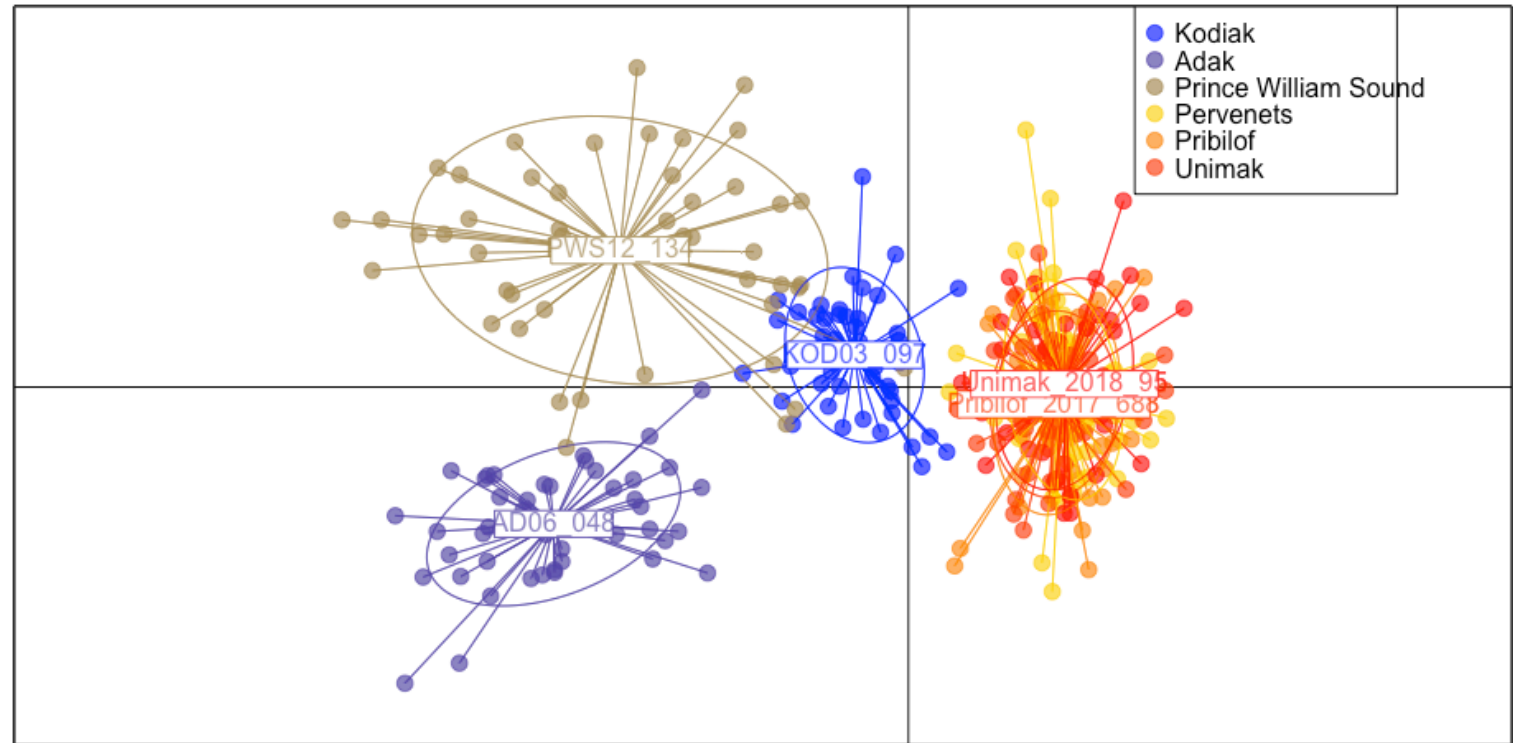
- Pacific cod in the NBS increased from 28,425 t to 286,310 t between 2010 and 2017
 - Where are these fish from?
- Decreased in the EBS by 37% since 2016, to 598,260t.
 - Did they move to NBS?
- Similar results in 2018: Plans for addressing this in 2018 Assessment



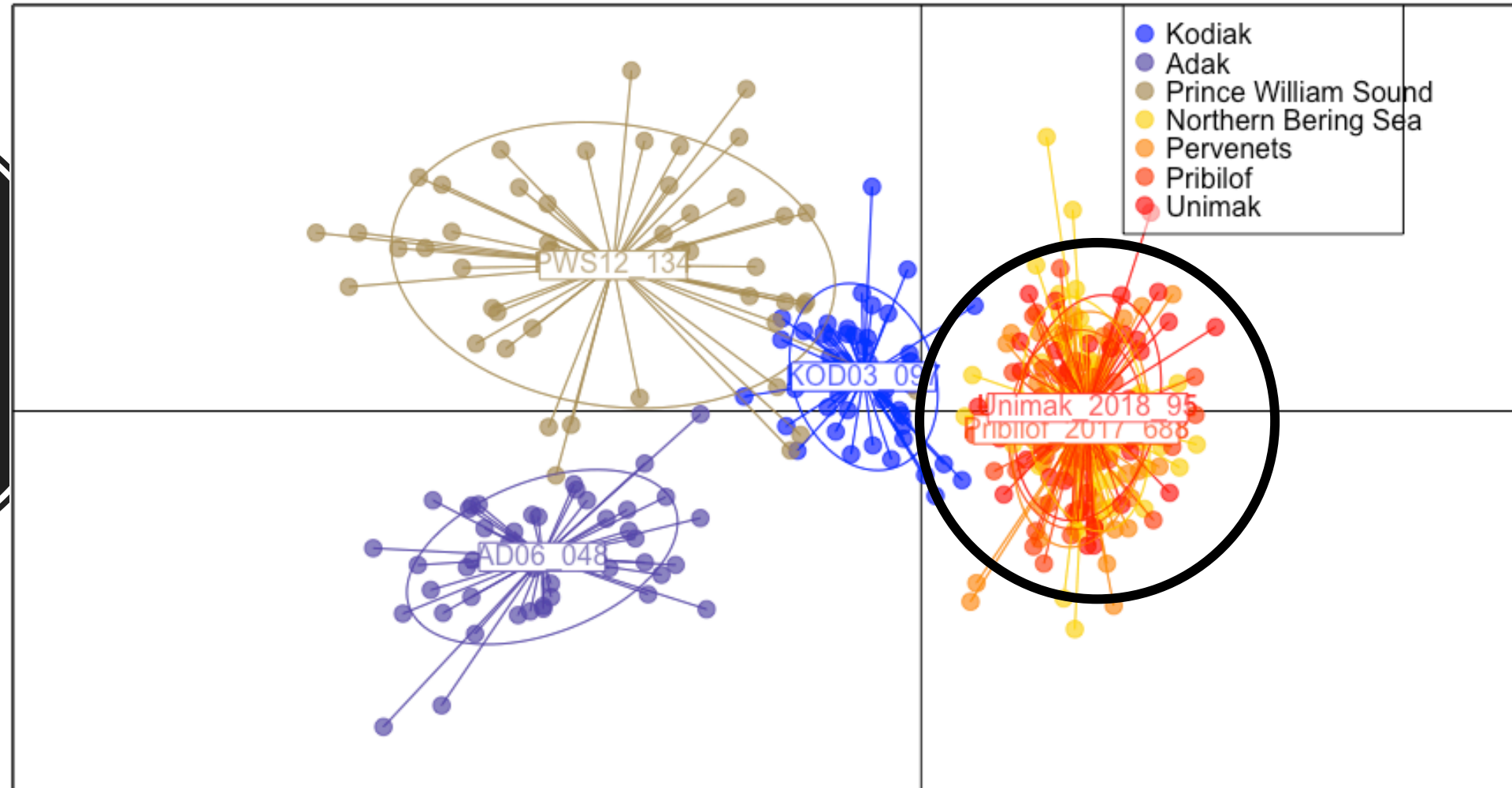
Genetic
baselines
from six
spawning
populations



Eastern Bering
Sea samples
cluster together,
separate from
Kodiak, Prince
William Sound,
Adak



Eastern Bering
Sea and
Northern
Bering Sea
samples cluster
together



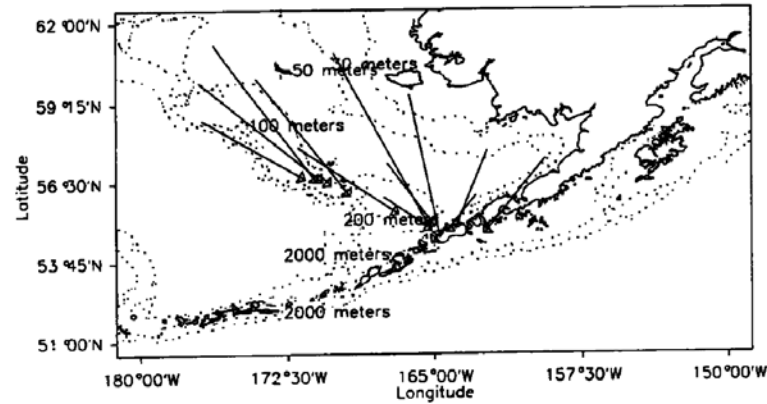
Conclusions

- Northern Bering Sea sample (68 fish from August 2017) is most similar to spawning cod from the Southern Bering Sea.
- Northern Bering Sea sample was not from Gulf of Alaska, Russia, or elsewhere.

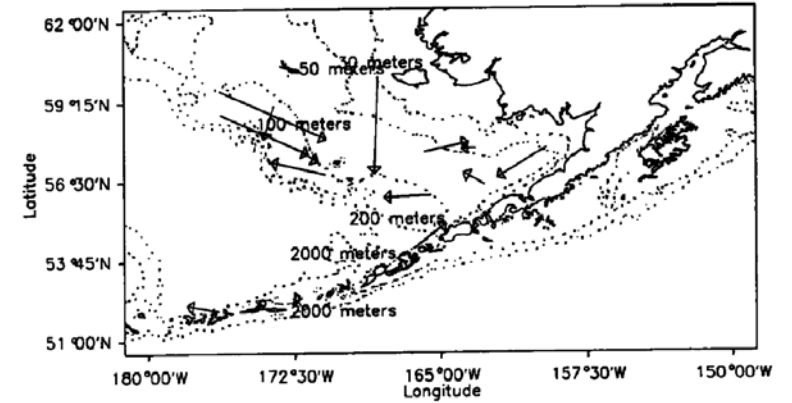
Cod migration studies



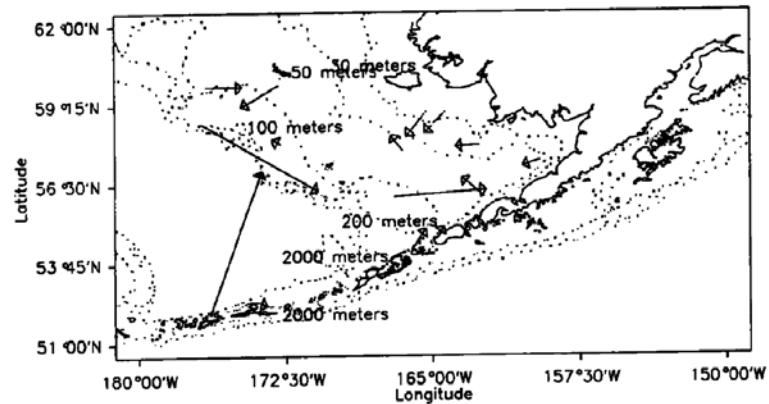
WINTER (JANUARY–MARCH)



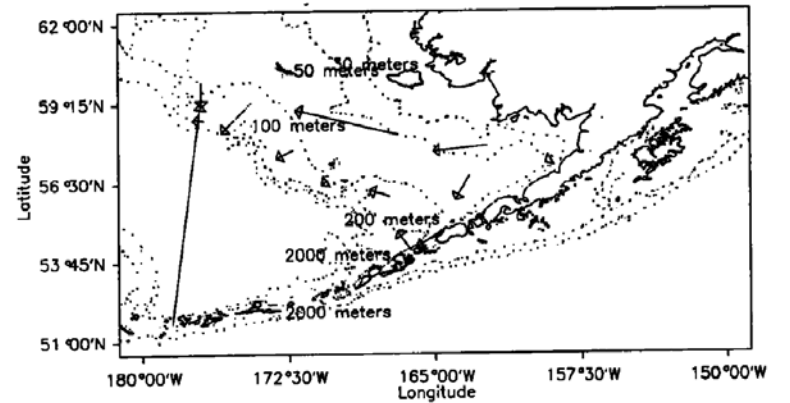
SPRING (APRIL–JUNE)



SUMMER (JULY–SEPTEMBER)



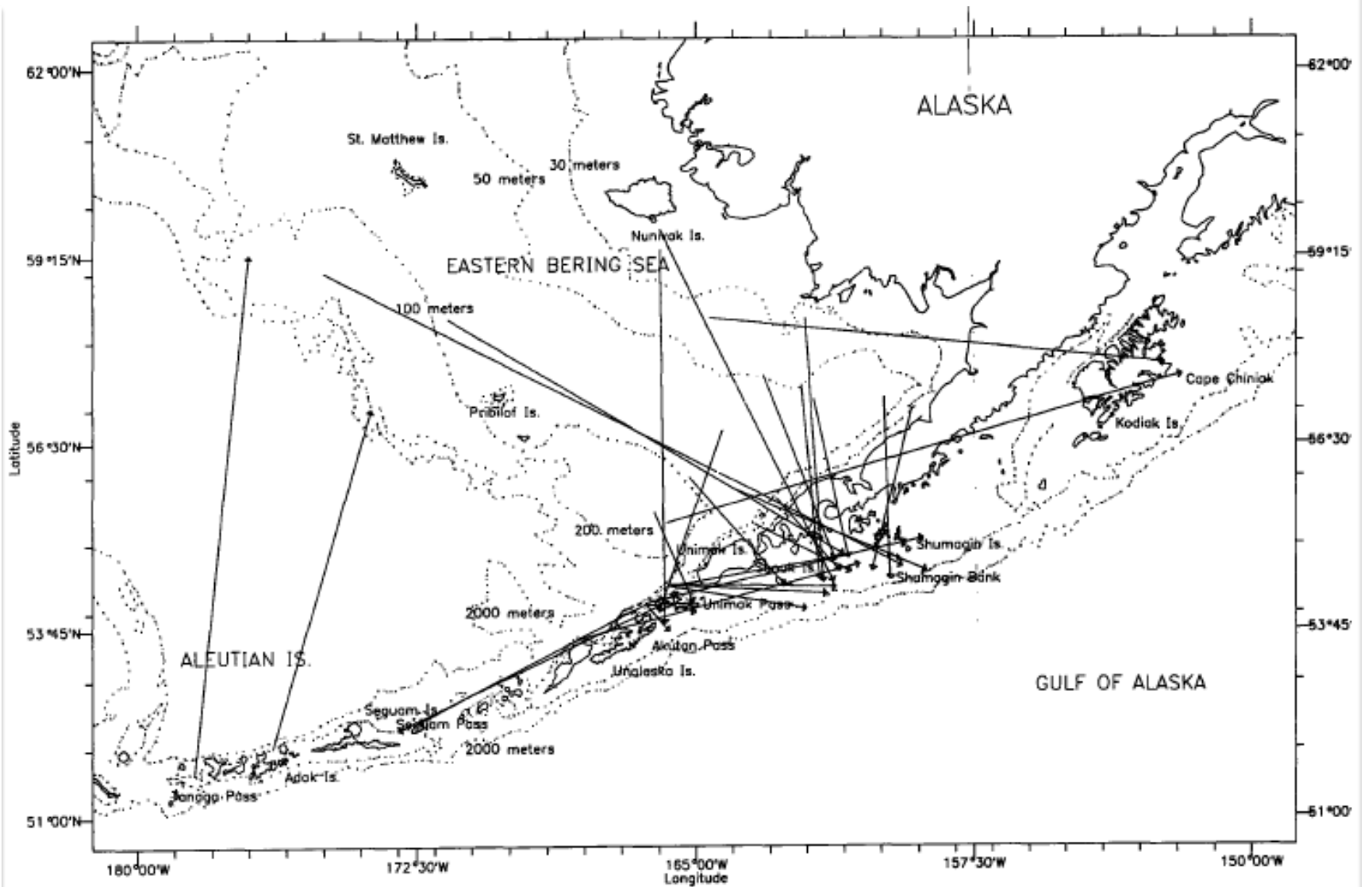
FALL (OCTOBER–DECEMBER)



Migrations of tagged cod (Shimada and Kimura, 1994)

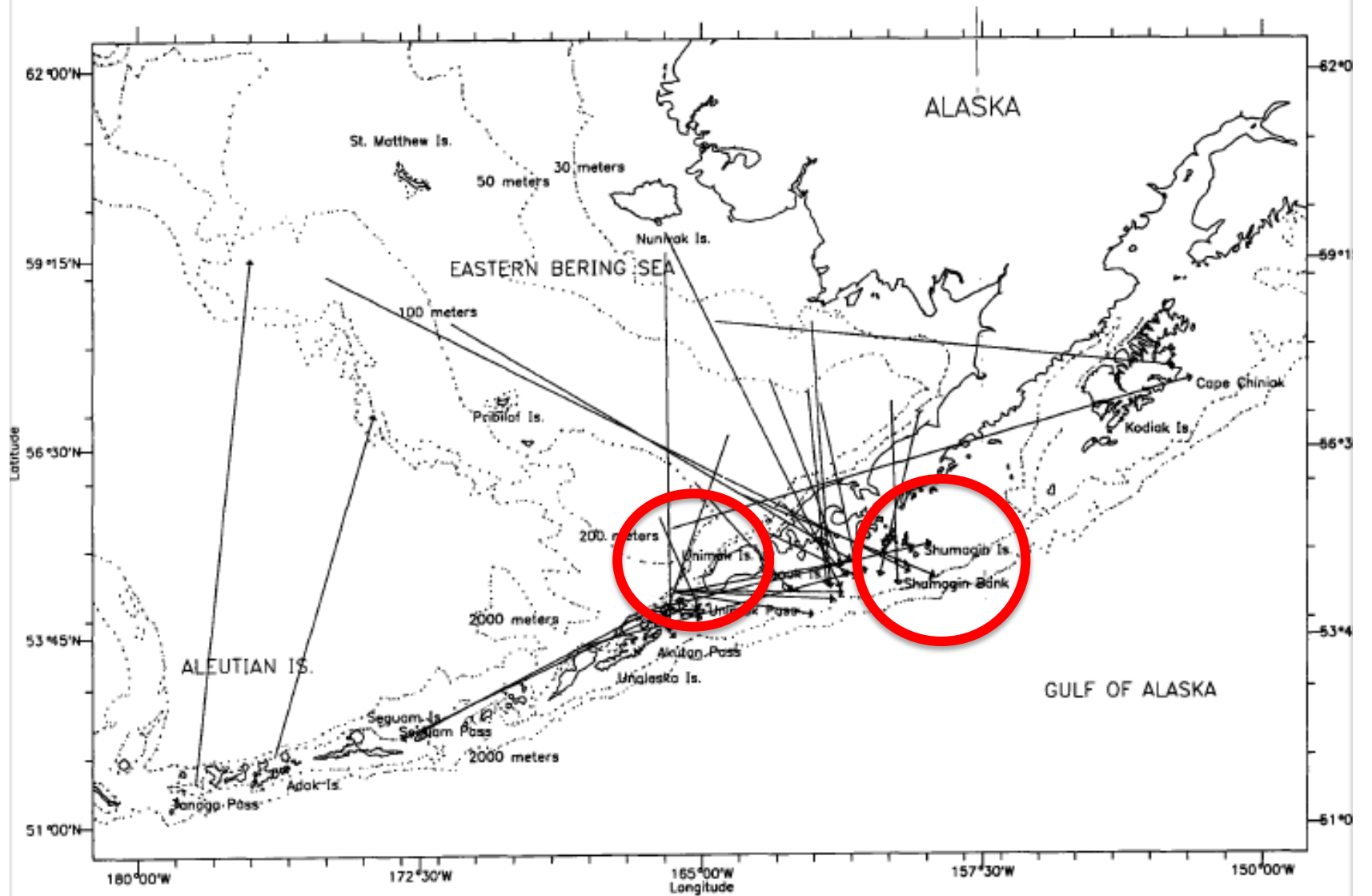
Strong seasonal movement within EBS

Tag recoveries suggest that 15-17% of the total EBS population may migrate to GOA in winter



Migration from Eastern Bering Sea to Gulf of Alaska

Spawning
population
association



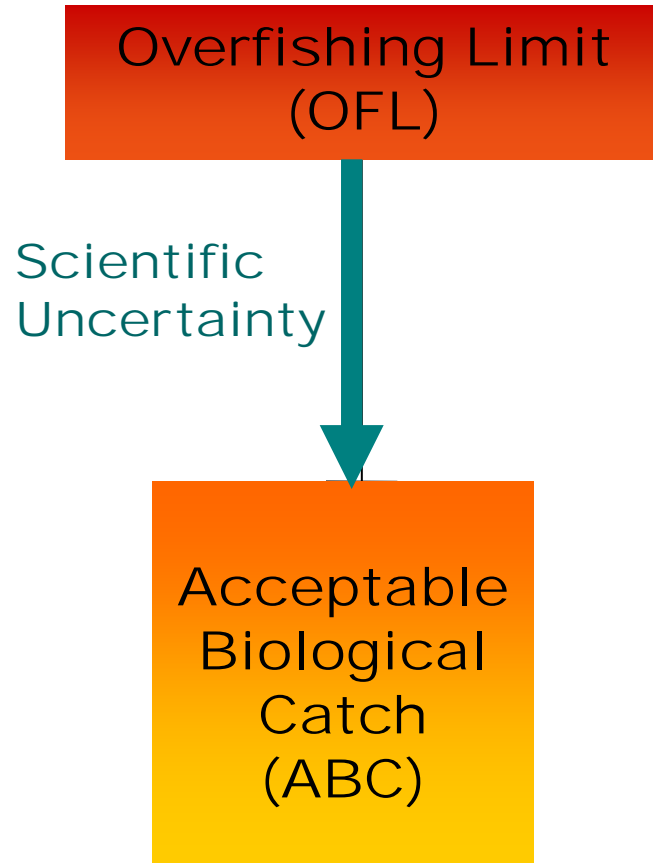
Likely strong association between Shumagin and Unimak populations

Future genetic work

- whole genome sequencing
 - develop a more complete suite of markers for classifying differentiation among BSAI and GOA spawning stocks
 - Further investigate samples from NBS (2018) as well as known spawning samples from 2017, 2018, 2019
 - Currently do not have samples from Shumagins but could work with industry to collect for genetic analysis

Cod specifications and allocations

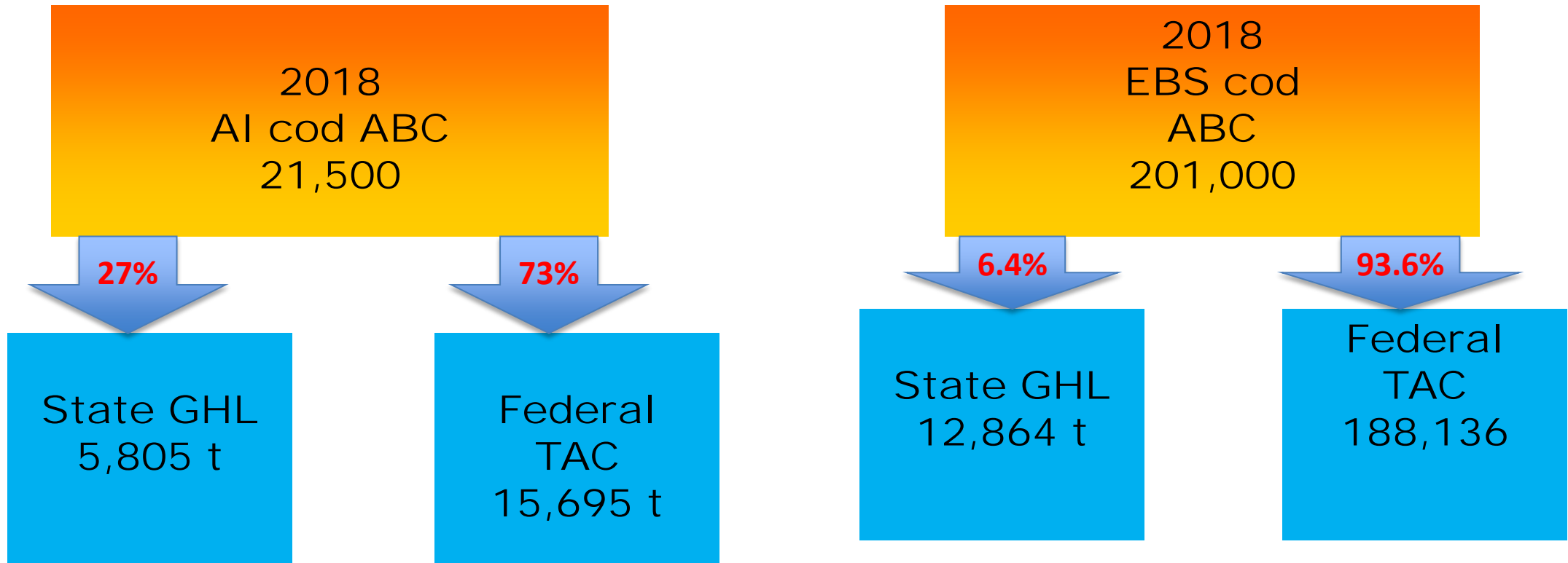
Assessment, Plan Team, SSC Role: Specify separate AI and EBS



The ABC (or ABC proxy) is:

- A limit.
- A level of annual catch that should not be exceeded in order to have a low probability that the maximum fishing mortality threshold is exceeded.
- Reduced from the overfishing limit (OFL) to account for scientific uncertainty in OFL.
- Is recommended by the SSC to the fishery management council.

How is the ABC reduced prior to TAC-setting?



AI:

- Annual step-up provisions: 31%,35%,39%
- Maximum 15 million pounds (6,804 mt)

EBS:

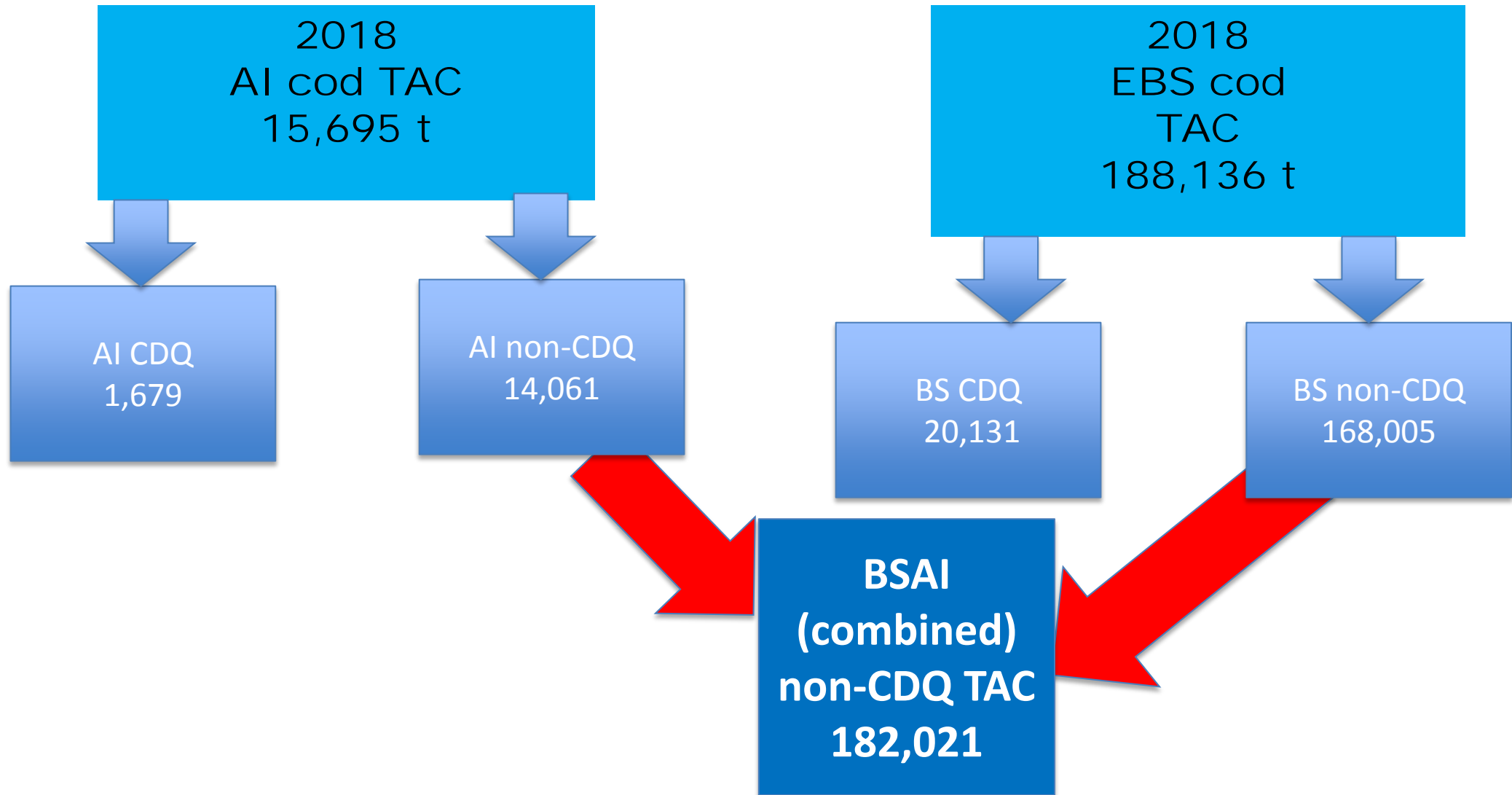
- No step-up provisions
- No maximum


BS & AI Pacific Cod Overview

- BS and AI Cod fully prosecuted fishery
- Targeted by multiple gear types
 - Primarily trawl gear and hook-and-line CPs
 - Smaller amounts by hook-and-line, jig vessels, and pot gear
- Council has modified BSAI sector cod allocations for nearly 3 decades
 - 6 major modifications to the BSAI sector cod allocations since 1994



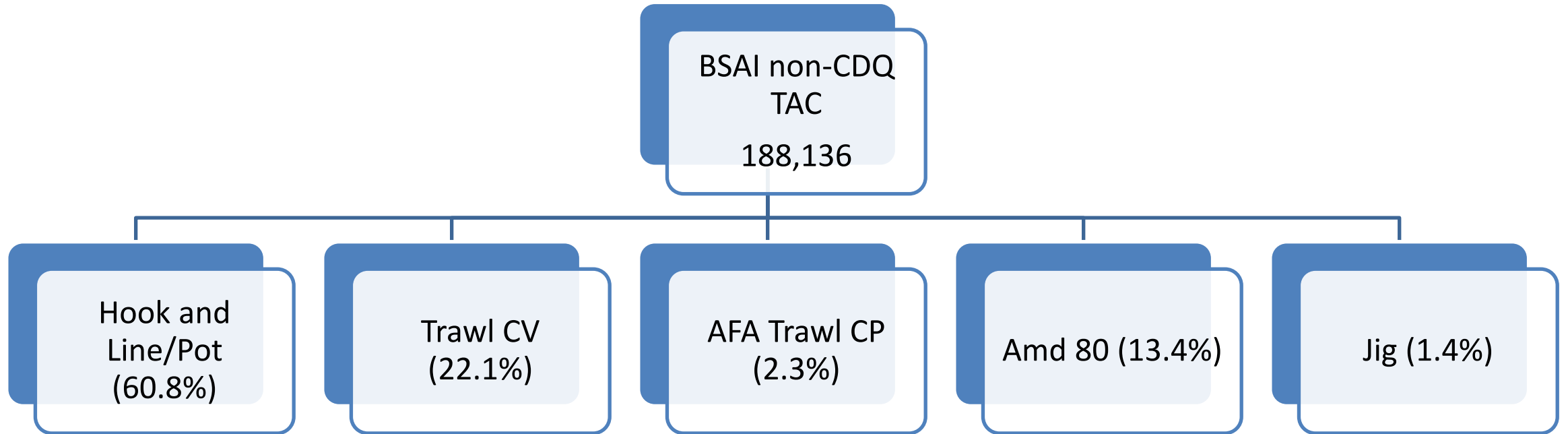
TAC and sector allocations



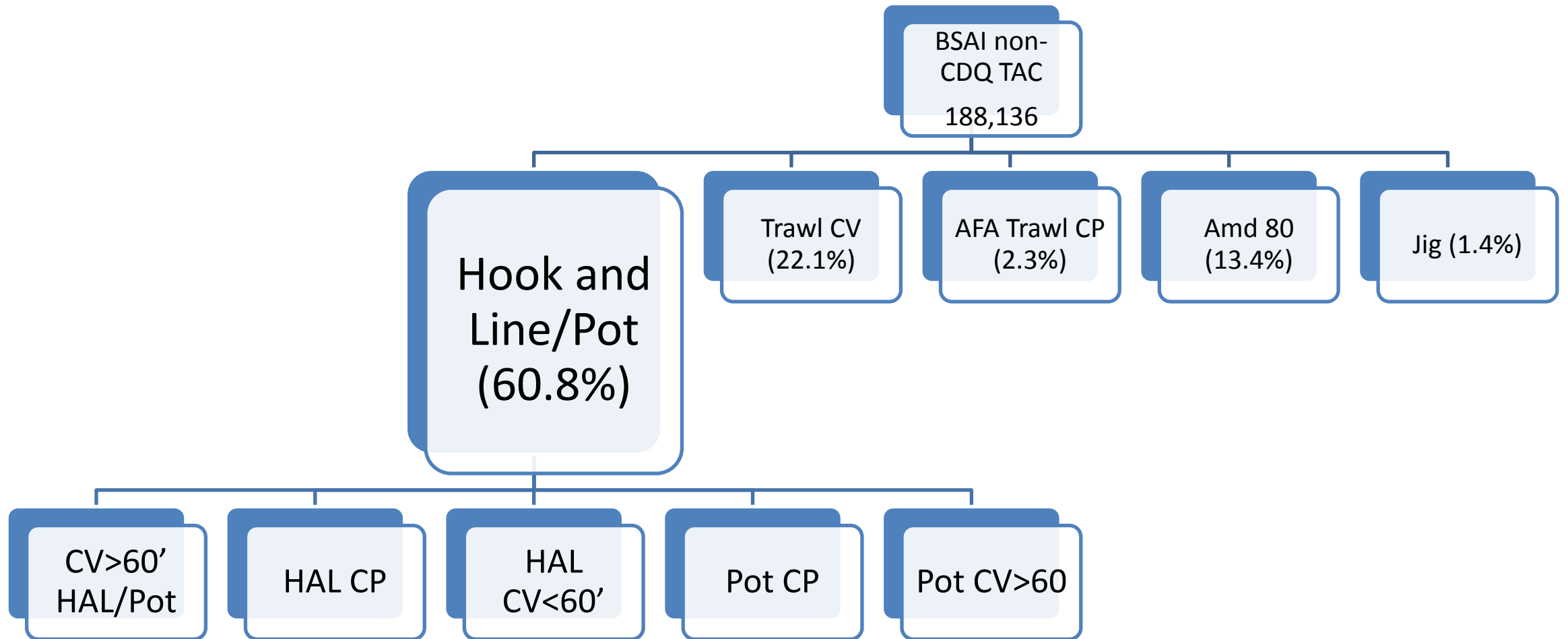


WAI Limit
(Area 543)
4,018 t
SSL Provision

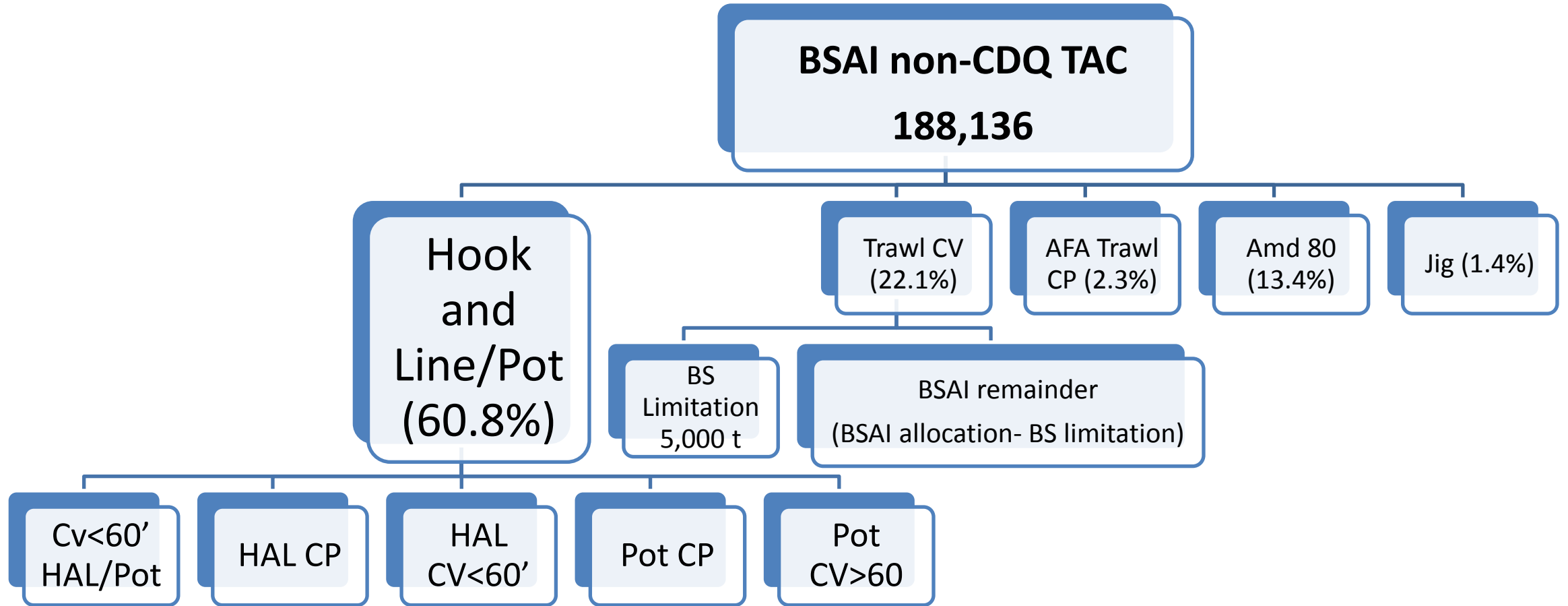
Cod allocation to sector



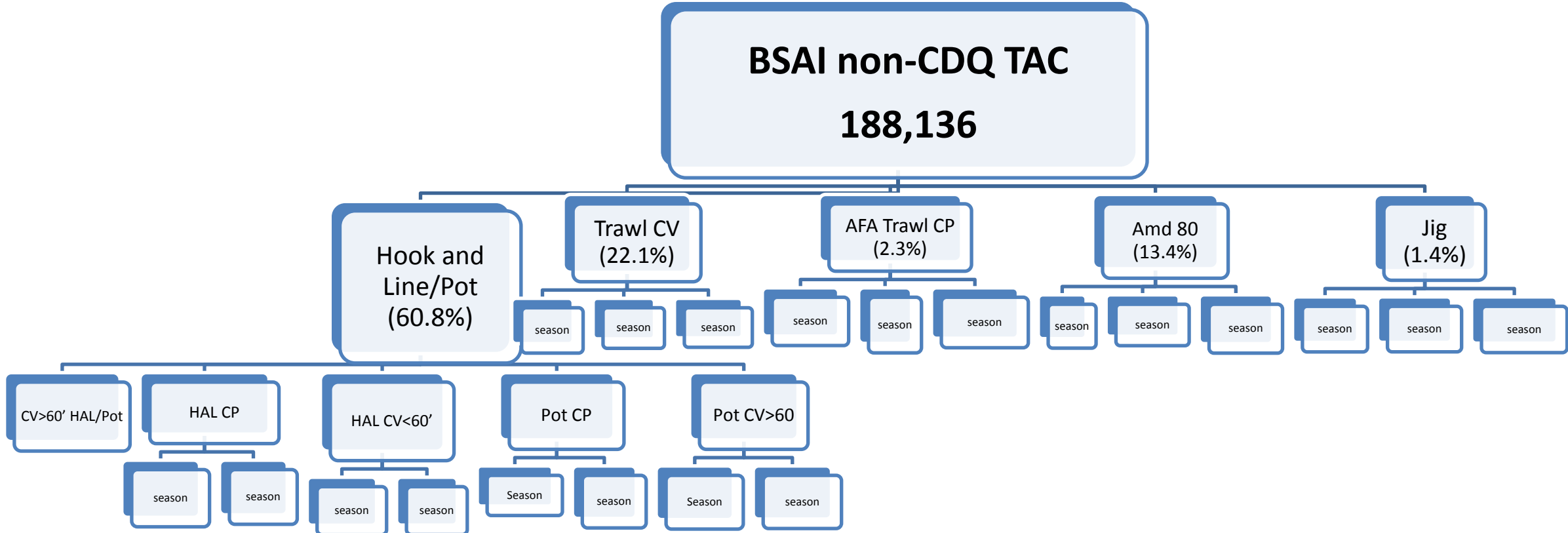
Cod allocation to sector



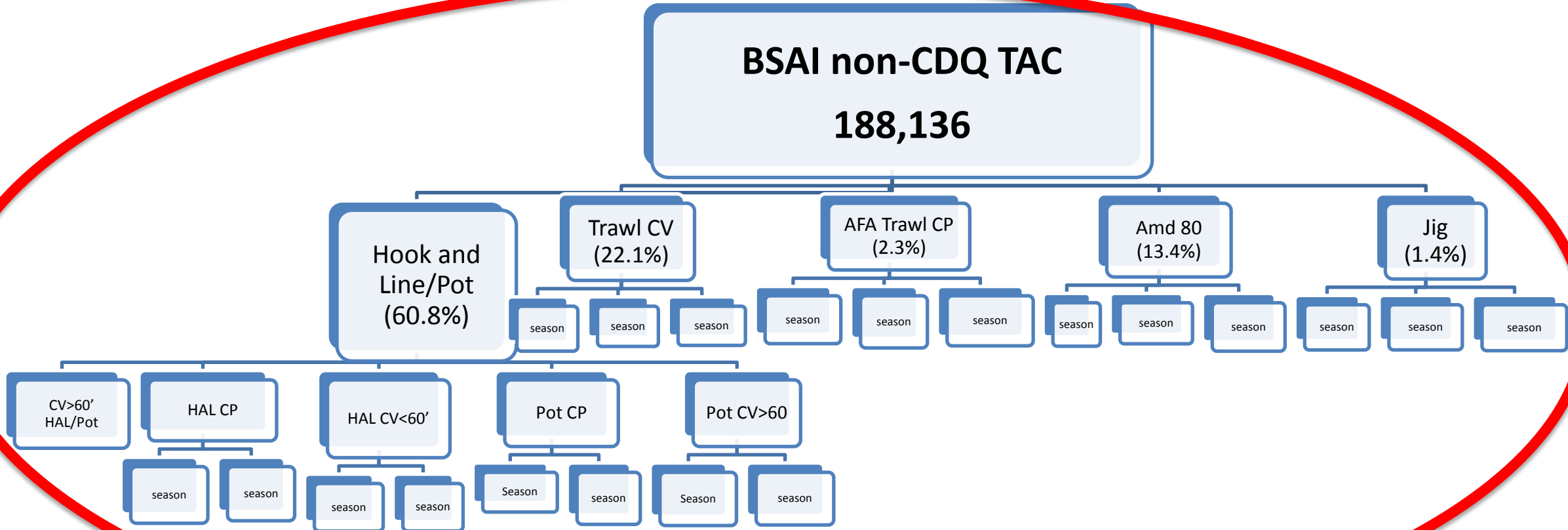
Cod allocation to sector



Cod allocation to sector/season



Cod allocation to sector/season



34 separate allocations

Catch by sector 2017-2018

BSAI Sector	Catch 2018*	# vessels	Catch 2017	# vessels
CDQ	17,776	92	25,359	95
Hook-and-line C/P	66,643	25	108,748	28
Pot C/P	2,810	5	4,942	4
Pot CV >= 60 ft	13,125	33	13,725	34
Hook-and-line/Pot CVs < 60 ft	6,280	25	9,958	24
Jig	56	<3	13	<3
Trawl CV	37,787	103	44,160	100
AFA C/P	4,028	16	4,712	16
Amendment 80 C/P	21,127	19	23,203	19
Total	169,630	318	234,822	320

* Catch through 10/08/18

BSAI Cod Observer Coverage

- BSAI Observer partial coverage in 2017
 - Hook-and-line: 13.8% / 10.1%
 - Pot-no Tender: 10.8% / 6.6%
 - Pot-Tender: 5.3%
 - Trawl: 20.5%
- BSAI Observer coverage in 2018 and 2019
 - 15% for all gear types + Optimization of remaining funds to PSC-limited fisheries
- In 2017, Pacific cod contributed to 45% of all observer fees collected in the BSAI region and **8%** of the fee coastwide.



AI Pacific cod Harvest Set-Aside

- Since 2008, Council has evaluated AI community protections due to rationalization programs
- In Oct 2015, Council approved a stability program for AI shoreplants and communities
 - Prioritize up to 5,000 mt of AI Pacific cod for AI shoreplants
 - First year of program was 2018
 - Council is currently adjusting the program to better meet the Council's goal of providing stability for AI shoreplants and communities



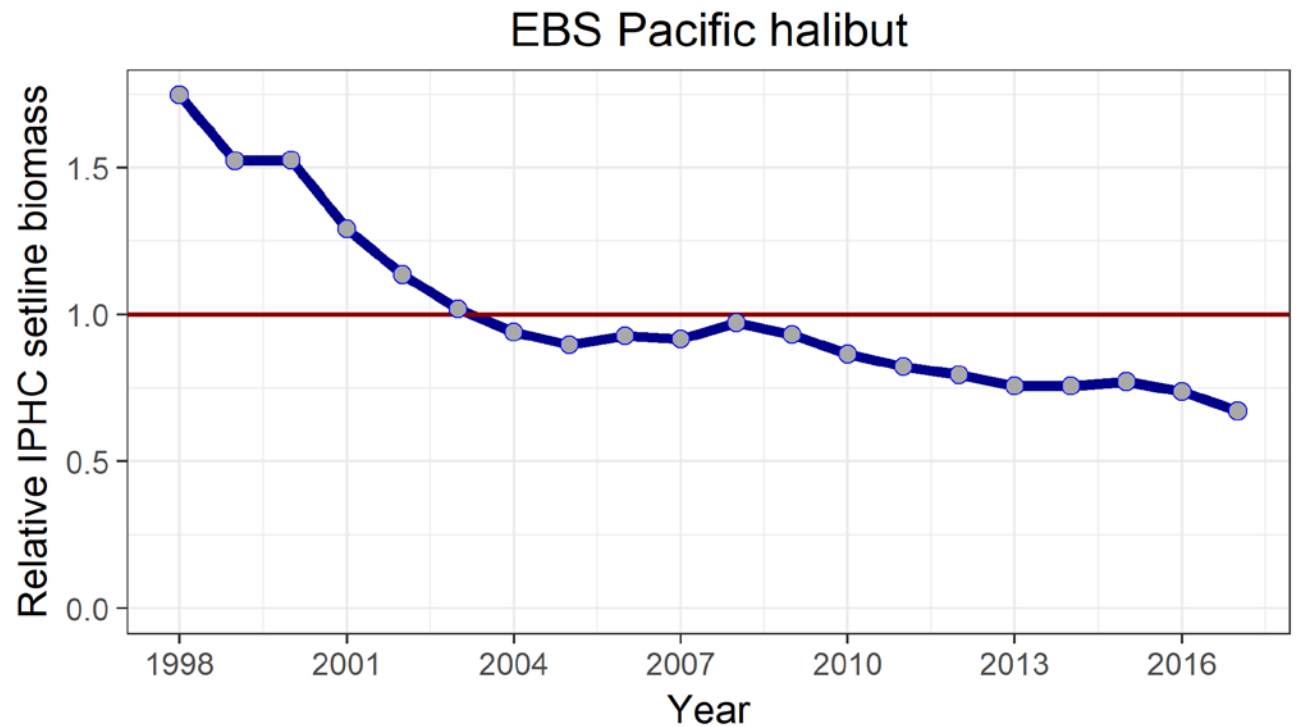
BSAI Pacific cod Mothership Limitation and Trawl CV Allocation

- The Council considering limiting participation in the BSAI trawl CV Pacific cod fishery (Feb 2019 Council meeting)
 - Could limit the number of CPs acting as motherships and the amount of Pacific cod delivered
 - Could impact AM80 CPs and AFA CPs that act as mothership in the BS and AI Pacific cod fishery
 - Removing latency in the BSAI trawl cod fishery
 - Could establish AFA and non-AFA allocations for the BSAI trawl CV Pacific cod fishery



Halibut implications

- Declining BSAI halibut stock
- Current BSAI halibut limits by sector (A80, TLAS, CDQ, longline)
- No halibut limits for pot
- Pot bycatch discard mortality rate of 9%
- Mortality accrues (only) toward total mortality for purposes of IPHC





Potential implications

1. Observer coverage
 - Decrease in fees
 - Halibut mortality
2. Smaller allocations for all sectors
 - Shorter seasons
 - Constraint on fisheries for which cod is limiting
3. If increased GHL cannot be fully utilized then cod stranded in State waters (i.e. cannot be rolled to federal TAC)

Acknowledgements

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