Joint Protocol Committee of the NPFMC and Alaska BOF

Anchorage, October 17, 2018

BSAI p-cod proposals 12, 13, and 14. Submitted PC-11

Conservation and allocation issues with Proposal 12, 13, 14

- **Freezer-Longline Coalition**: 28 active vessels with over 30 years of participation in p-cod fisheries: 85% dependent on BSAI p-cod; with CDQ ownership (14 vessels with an average of 57% CDQ ownership, range =33% to 100% ownership).
- **CDQ program:** Represents 65 villages with 27,000 residents in western AK.
- Proposals would increase the Dutch Harbor Subdistrict (DHS) GHL by +**25%, +56%, and +213%.**
- EBS p-cod ABC declined **-22%** last year and is expected to be reduced another -**25%** in 2019 for purposes of conservation – and expected to remain at low harvest levels for several years until recruitment improves.

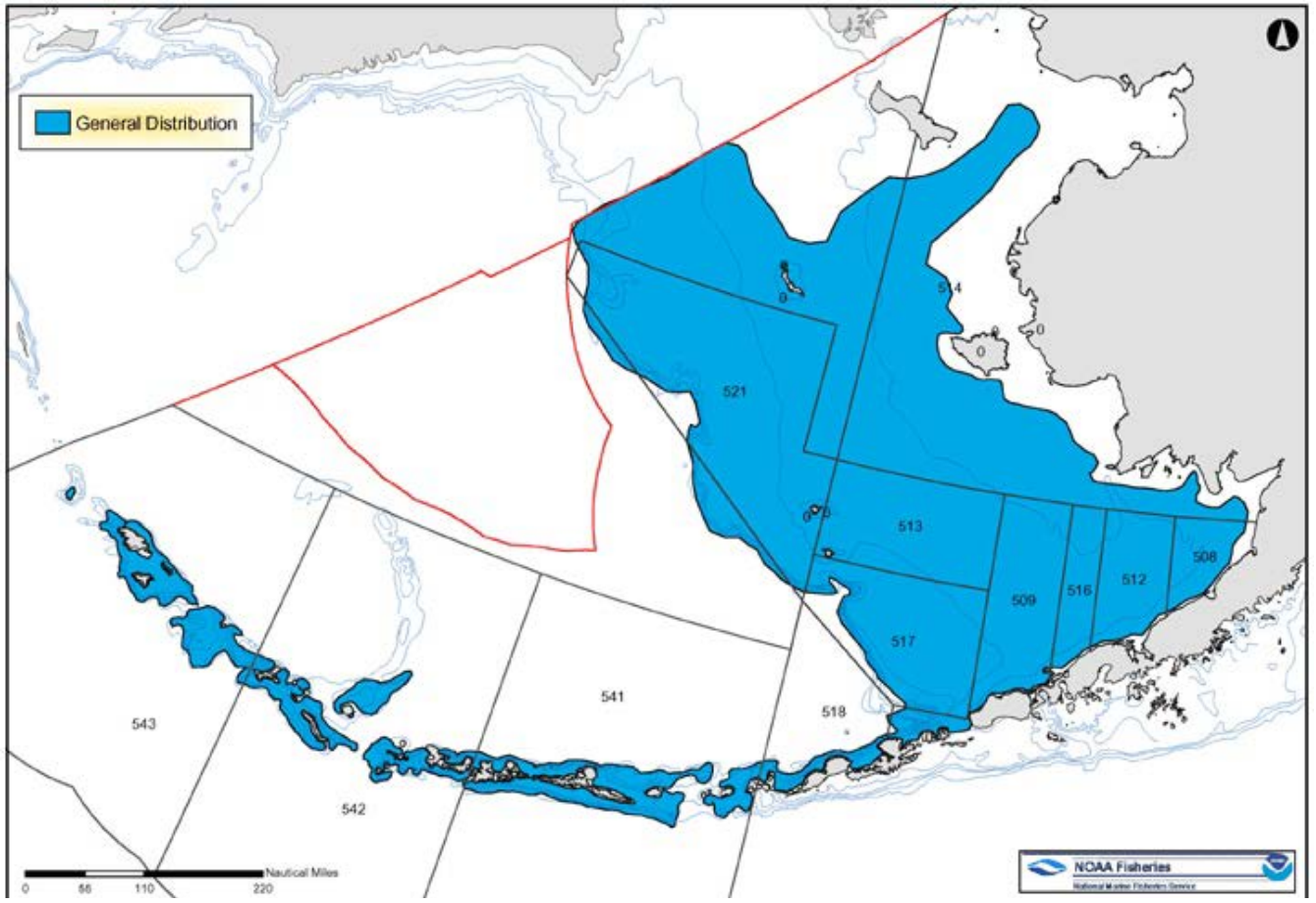
Conservation Issues with Proposals 12, 13, & 14

- Both EBS and GOA p-cod stocks are at historic low biomass levels.
- Warming seawater temperature is having a negative effect on recruitment as well as shifting biomass distribution northward.
- Increasing harvest pressure in the DHS GHL fishery in a concentrated time and area during spawning aggregation while stocks are at a low level will inhibit the rebuilding of p-cod stocks - and could result in a long term conservation issue.
- I cannot tell you with certainty that an increase in GHL will cause a conservation concern – but given the major recent changes in BS p-cod – the biologic warning signs are there.
- Conversely, no one can tell you with any certainty that an increase in the GHL will not cause a conservation concern – particularly in the absence of supporting data. Currently in the DHS GHL fishery, there is no port sampling nor observer data nor a dedicated stock assessment and survey of p-cod inside 3 miles.
- Application of the precautionary principle places the burden of proof on the proposers ----that they need to show that any increase in the GHL will not be to the detriment of the resource.

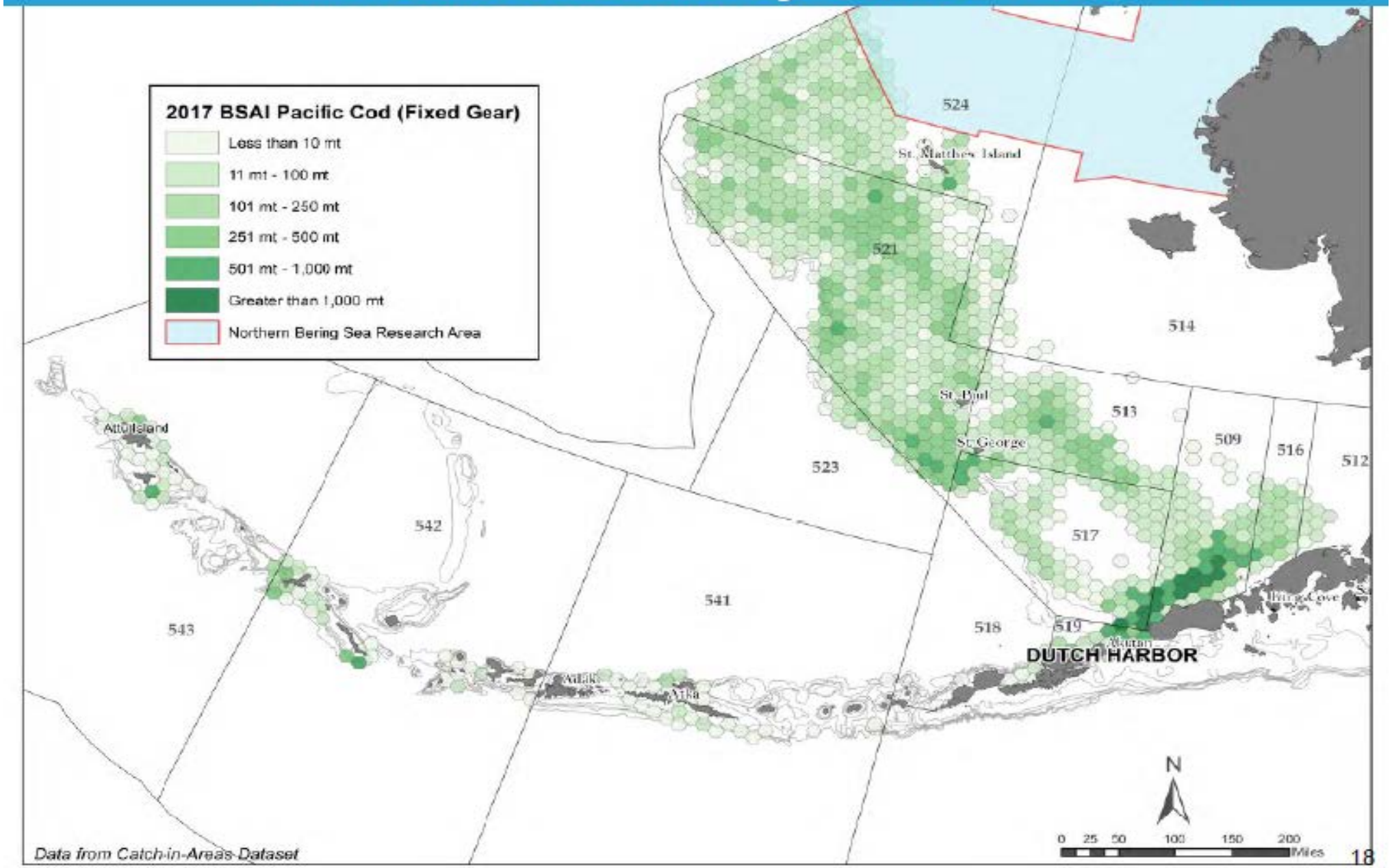
Concentration of harvest inside 3 miles in the EBS and Dutch Harbor Sub-district

- Prior to the establishment of the DHS GHL p-cod fishery, average catch (2006-2013) inside 3 miles of BSAI p-cod = **0.67% of BSAI ABC**
- 2014 DHS GHL = **3% of BSAI ABC** (or 5 times the historic catch level)
- 2016 DHS GHL = **6.4% of EBS ABC** (or 10 times the historic catch level)
- 2017 total removals inside 3 miles (GHL and parallel) = **10.45% of EBS ABC***
- In 1996, when the BOF established the GOA p-cod GHL fisheries, the GHL was based on the existing average parallel catch – to prevent localized depletion. Average catch (1994-1996) = 22.6% (where the GOA has a much higher proportion of cod fishing grounds within 3 miles than the EBS).
- *Source: NMFS Inseason management (in total removals).

The area of the Dutch Harbor sub-district is less than 1% of the Bering Sea p-cod fishing grounds (but with 10% of the total p-cod harvest). [From EFH – Essential Fish Habitat for BSAI p-cod]. See



2017 Pacific Cod Catch by Non-Trawl Gear

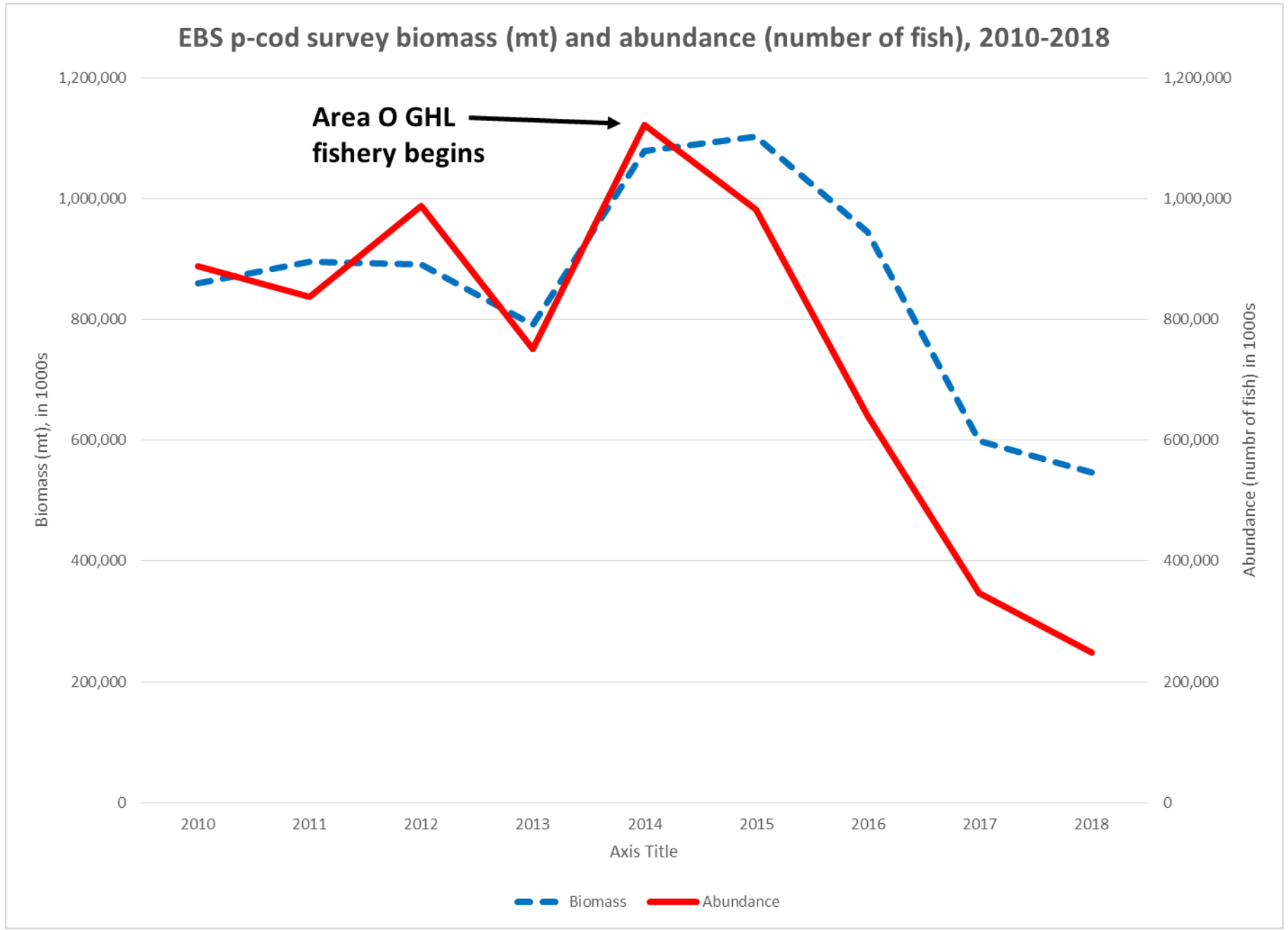


Proportion of all EBS pot cod harvest (federal and state) inside 3 miles is now 37%-47%

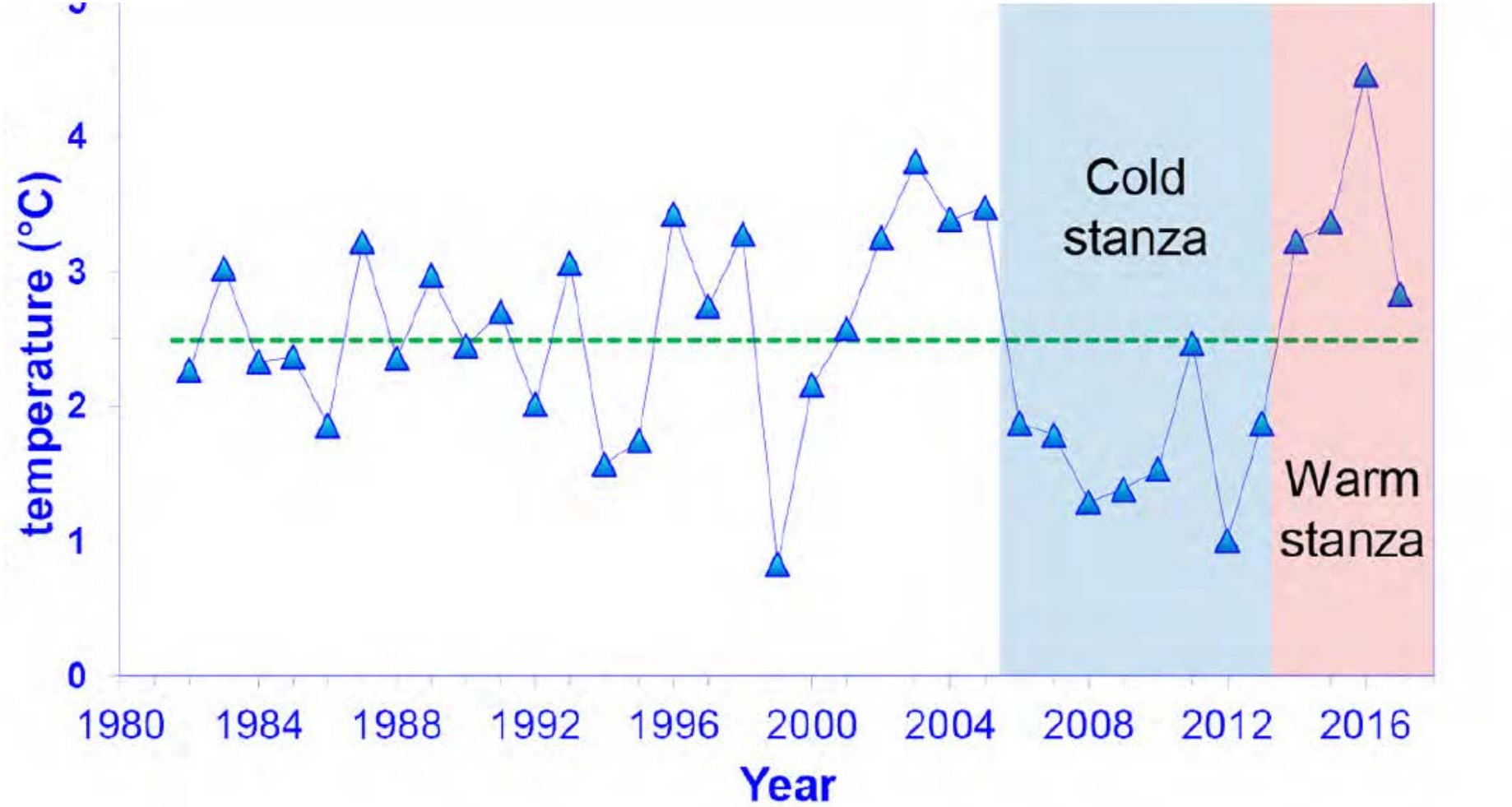
- Prior to the establishment of the DHS GHL fishery, the proportion of the total EBS pot cod harvest - occurring inside 3 miles - was less than **<1%.**
- In 2014, **22%** of all EBS pot cod harvest occurred inside 3 miles.
- In both 2016 & 2017, **37%** of EBS pot cod harvest occurred inside 3 miles.
- In 2018 (as of 9/1), **47%** of all EBS pot cod harvest had occurred inside 3 miles (predominately <60' vessels).

EBS p-cod Stock Status: Declining (and moving northward)

- EBS trawl survey p-cod biomass (B), 2014 to 2018: down **-49%.**
- EBS trawl survey p-cod abundance (N), 2014 to 2018: down **-78%.**
- From 2017 to 2018, survey biomass of EBS p-cod went down **-21%.**
- From 2017 to 2018, survey abundance of EBS p-cod went down **-32%.**
- 2016 recruitment is at its lowest historical value (1977-2016).
- EBS p-cod biomass is shifting north (in response to warming temperature and feed distribution).
- Adding the NBS or NW strata biomass to the stock assessment will not necessarily result in an increase in ABC (geo-spatial modeling).

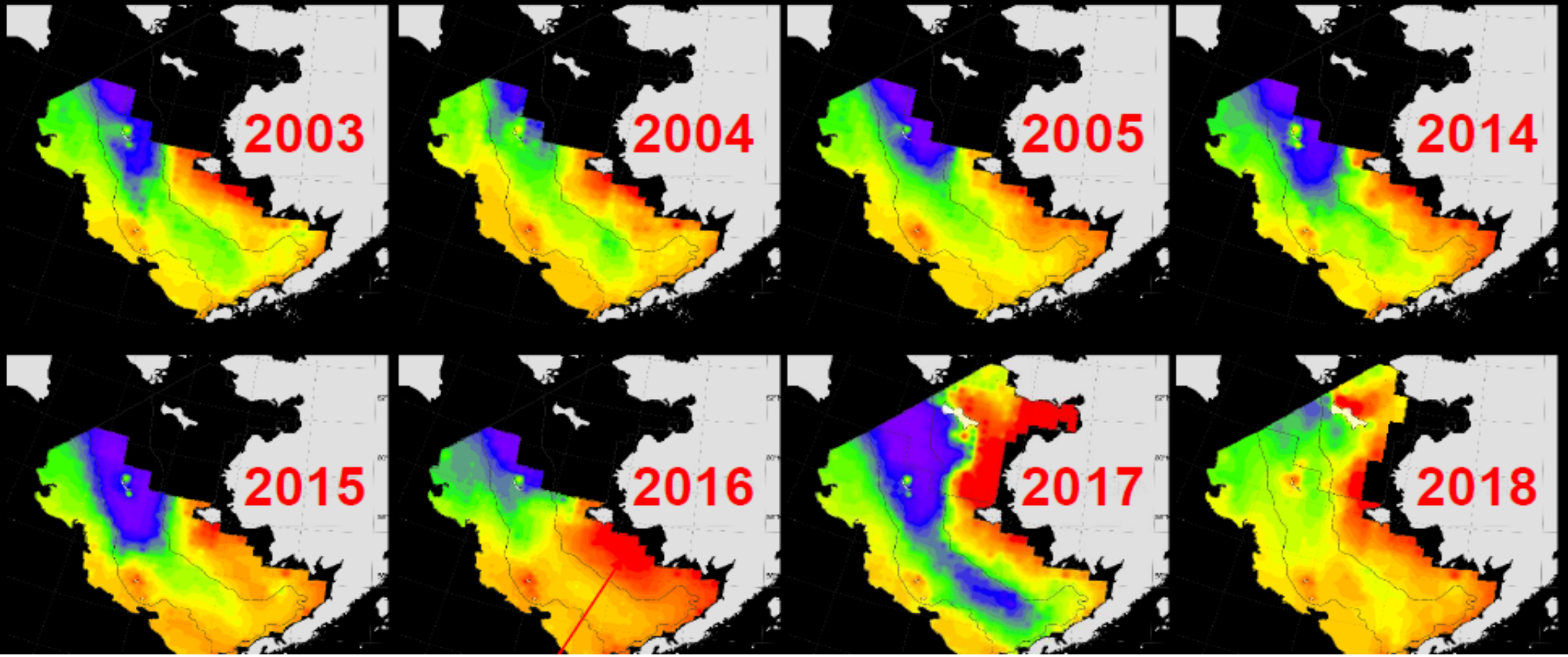

EBS p-cod survey biomass (mt) and abundance (number of fish), 2010-2018
Area O GHL fishery begins
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
Biomass (mt), in 1000s
Abundance (numbr of fish) in 1000s
2010
2011
2012
2013
2014
2015
2016
2017
2018
Axis Title
Biomass
Abundance

EBS Summer bottom temperature: 1982-2017. In 2018, first time ever – no cold pool formation.



Bottom temperatures 2003-05 & 2014-18

Above average “warm” years



EBS p-cod recruitment: 2016 all time low

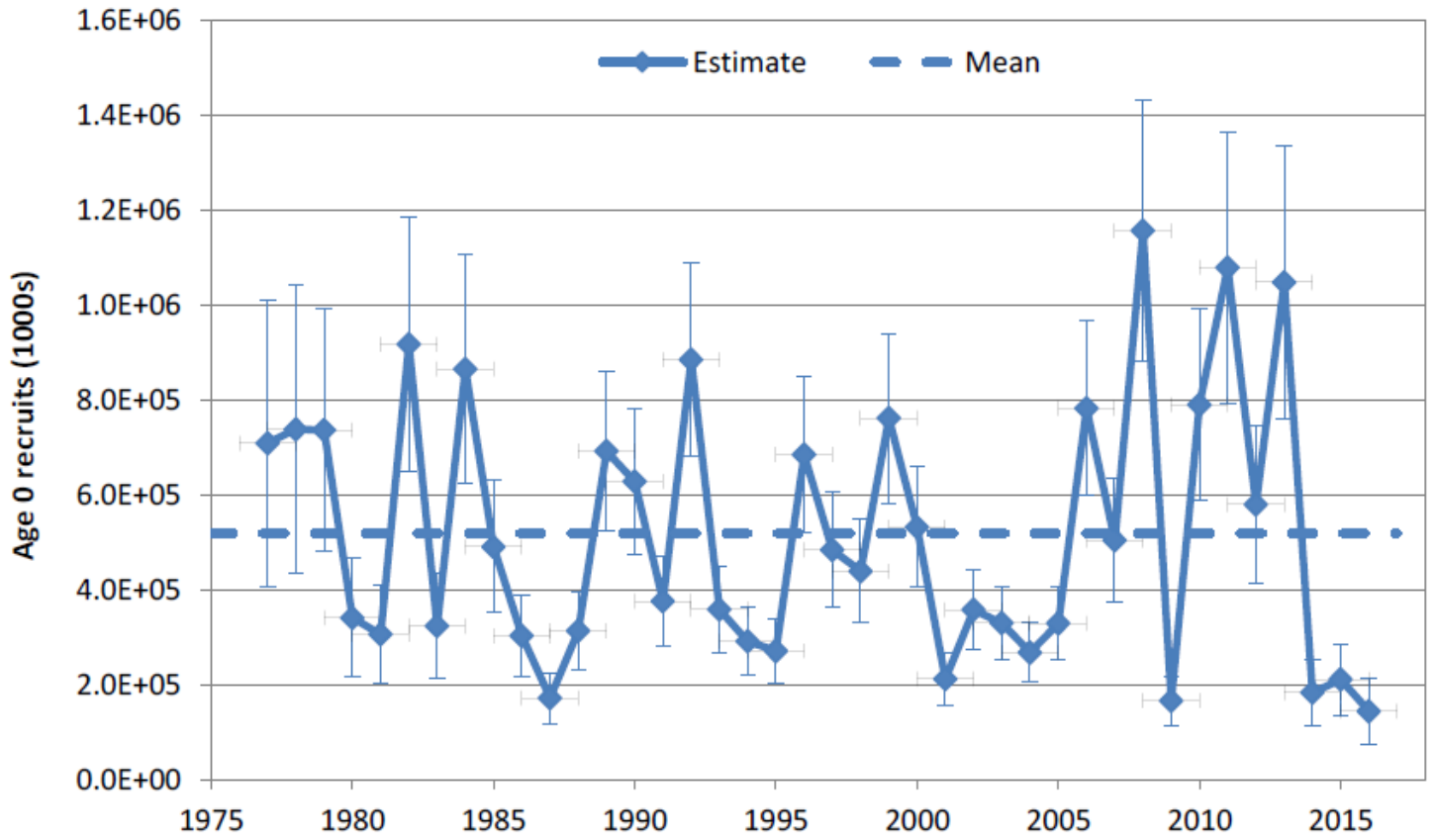
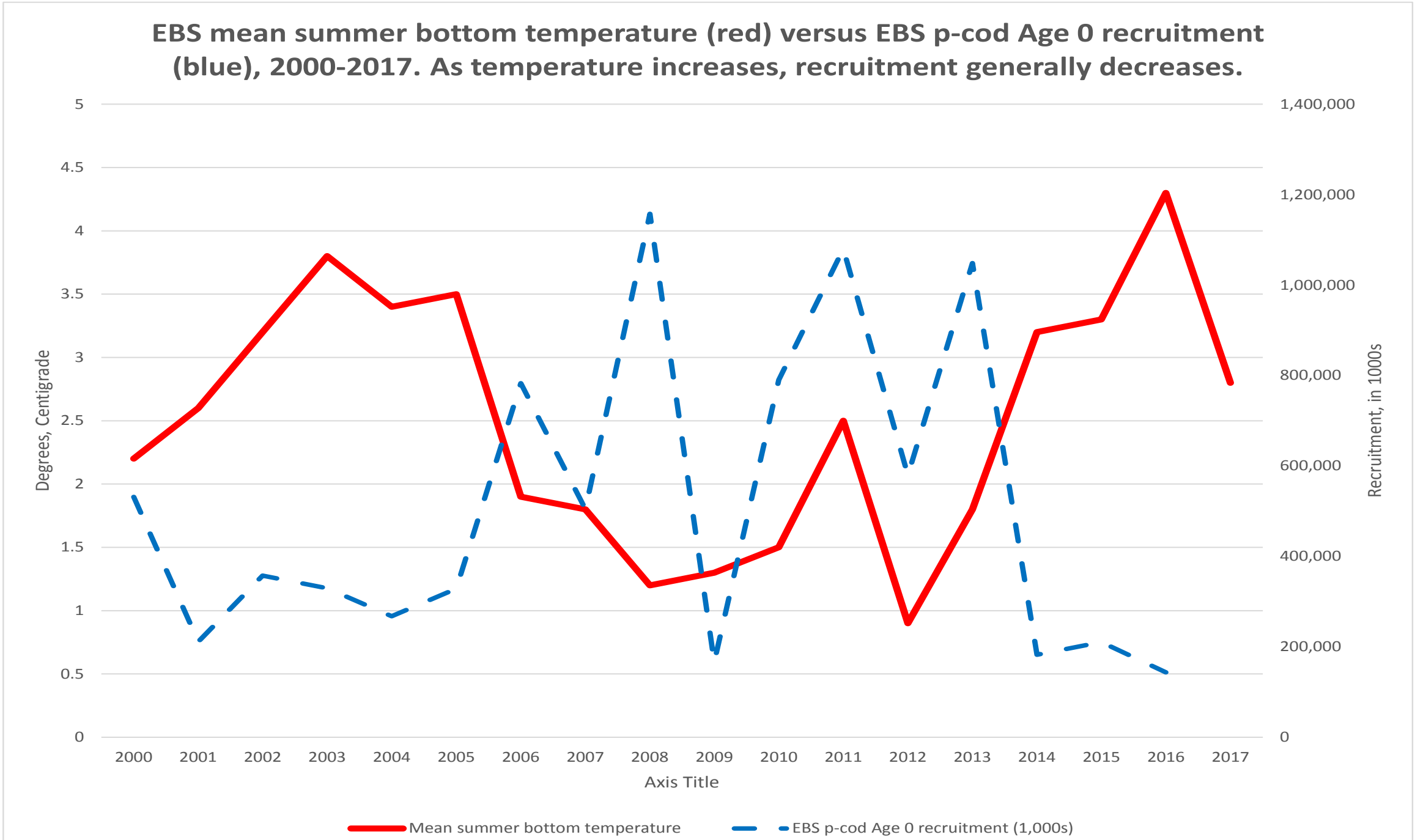
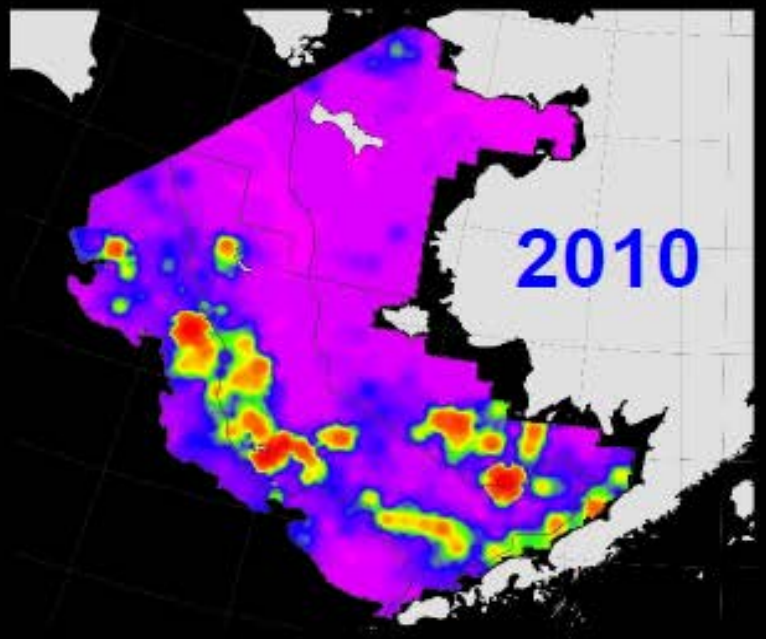
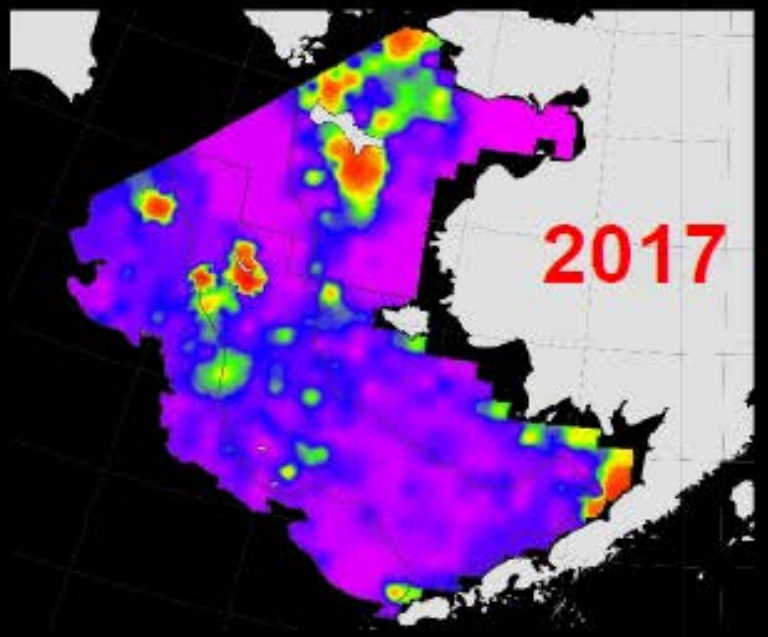


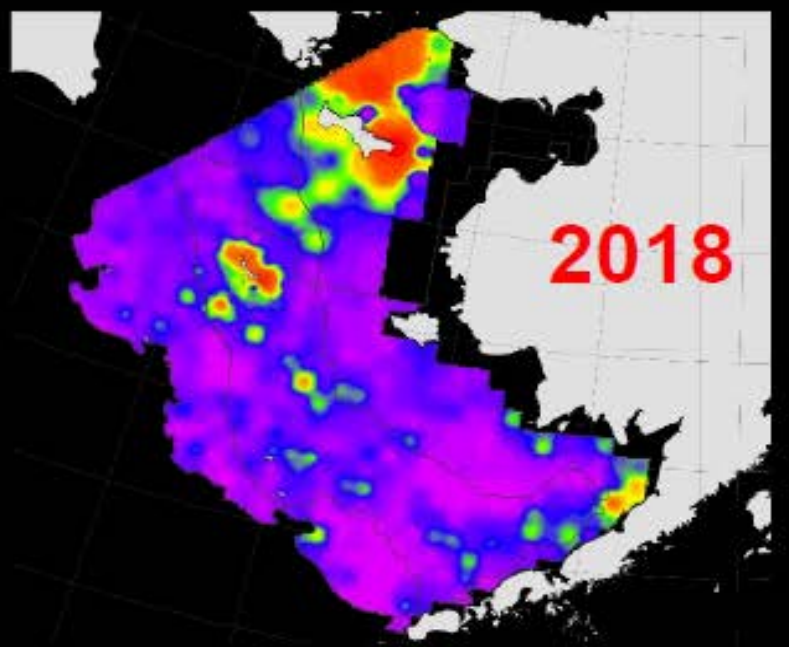
Figure 2.32—Time series of recruitment at age 0 as estimated Model 17.2.


EBS mean summer bottom temperature (red) versus EBS p-cod Age 0 recruitment (blue), 2000-2017. As temperature increases, recruitment generally decreases.
Degrees, Centigrade
Recruitment, in 1000s
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Axis Title
Mean summer bottom temperature
EBS p-cod Age 0 recruitment (1,000s)

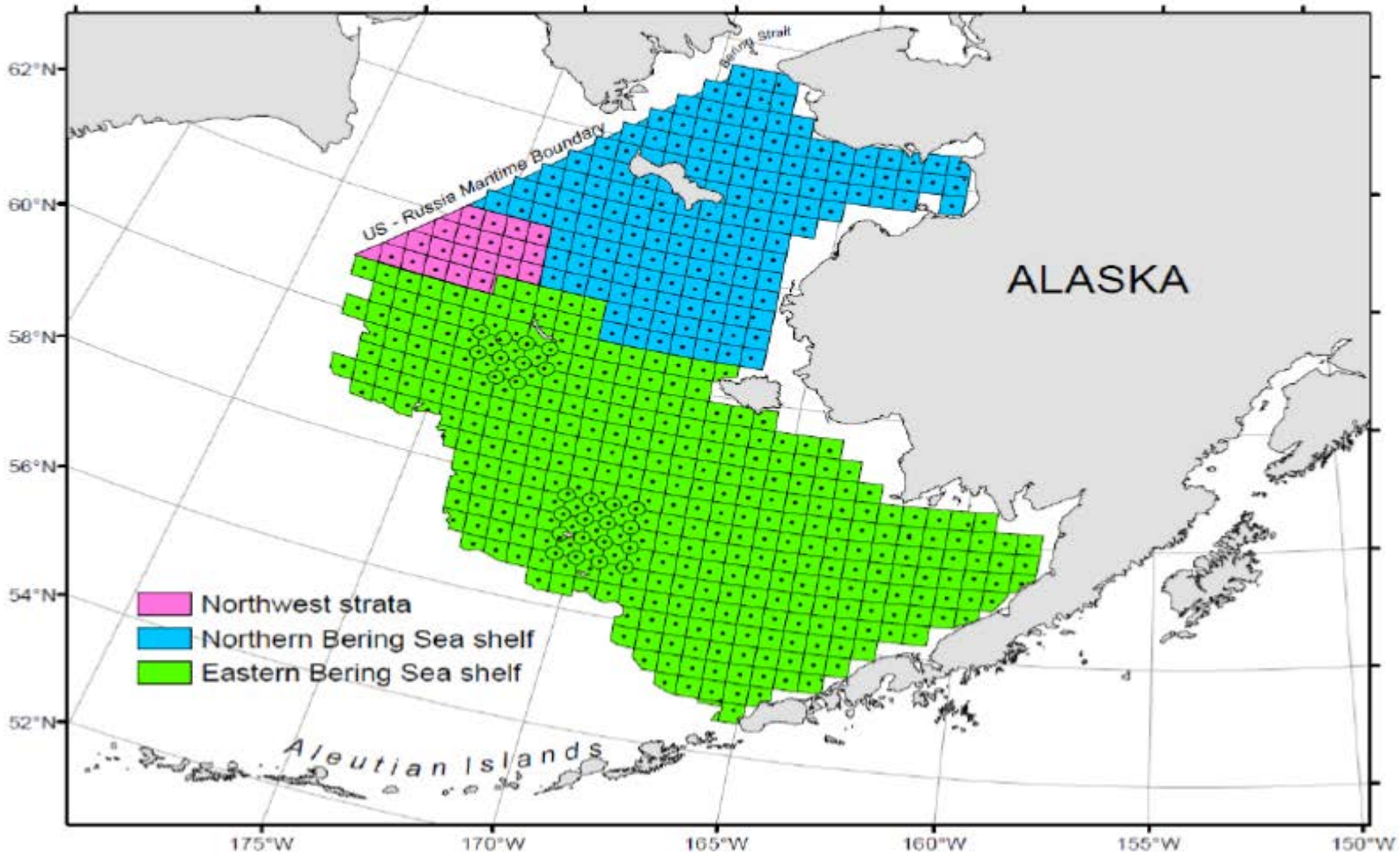
Pacific cod distribution







Northern Bering Sea (pink and blue)



Bering Sea P-cod survey biomass distribution

Year cold/warm	% Southern EBS	% Northern EBS
2010 – cold	97%	3%
2017- warm	68%	32%
2018 – warm	49%	51%

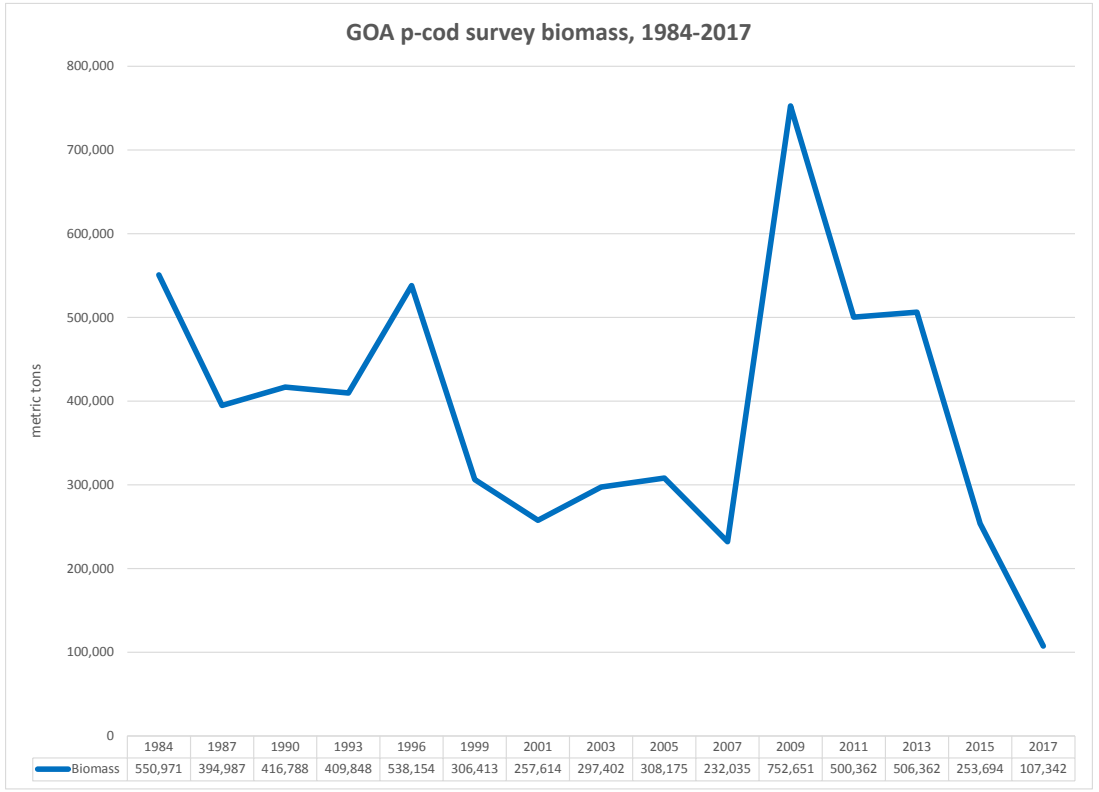
Spies 2018: Genetics of p-cod in NBS are the same EBS p-cod stocks (Pervenets; Pribilof; and Unimak) but with extended spawning/feeding migration with unknown implications.

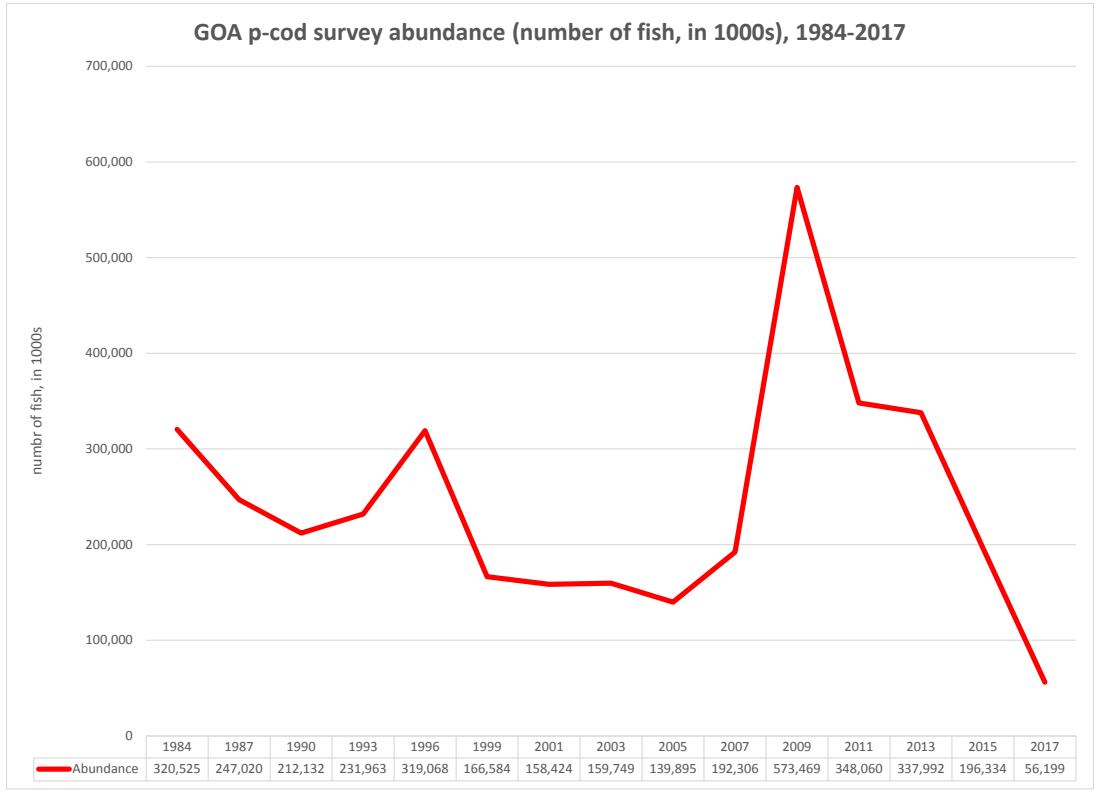
Movement observed may exceed typical summer feeding movements of Pacific cod.

Implications and questions

- Is a 1,000+ km feeding migration realistic?
- Will there be a change in reproduction?
- Will all cod return to spawn in their spawning area of origin?

GOA p-cod survey biomass and abundance have declined - 80% since 2013 to historical low levels (due to “warm blob” event). DHS GHL fishery is immediately adjacent to WGOA





ADFG staff comments:

- **ADFG:** *"The current timing of the DHS season generally corresponds with Pacific cod spawn timing in the Bering Sea.* ***The effects concentrating removals inside state-waters of the DHS on the overall productivity of the stock are unknown."***
- **ADFG:** *"The GOA Pacific cod stock is managed independent of the BSAI stocks. The southern boundary of the DHS corresponds with the northern boundary of the Western Gulf of Alaska Management Area.* ***A higher GHL may increase unintended harvest of Gulf of Alaska Pacific cod when fishing effort occurs near the boundary line."***

"Movement of individual tagged Pacific cod from the EBS into the GOA and other interregional migrations". Shimada and Kimura 1997. *"Tagging studies have demonstrated significant migration both within and between the EBS, AI, and GOA."* 2017 EBS p-cod SAFE (Stock Assessment and Fishery Evaluation)

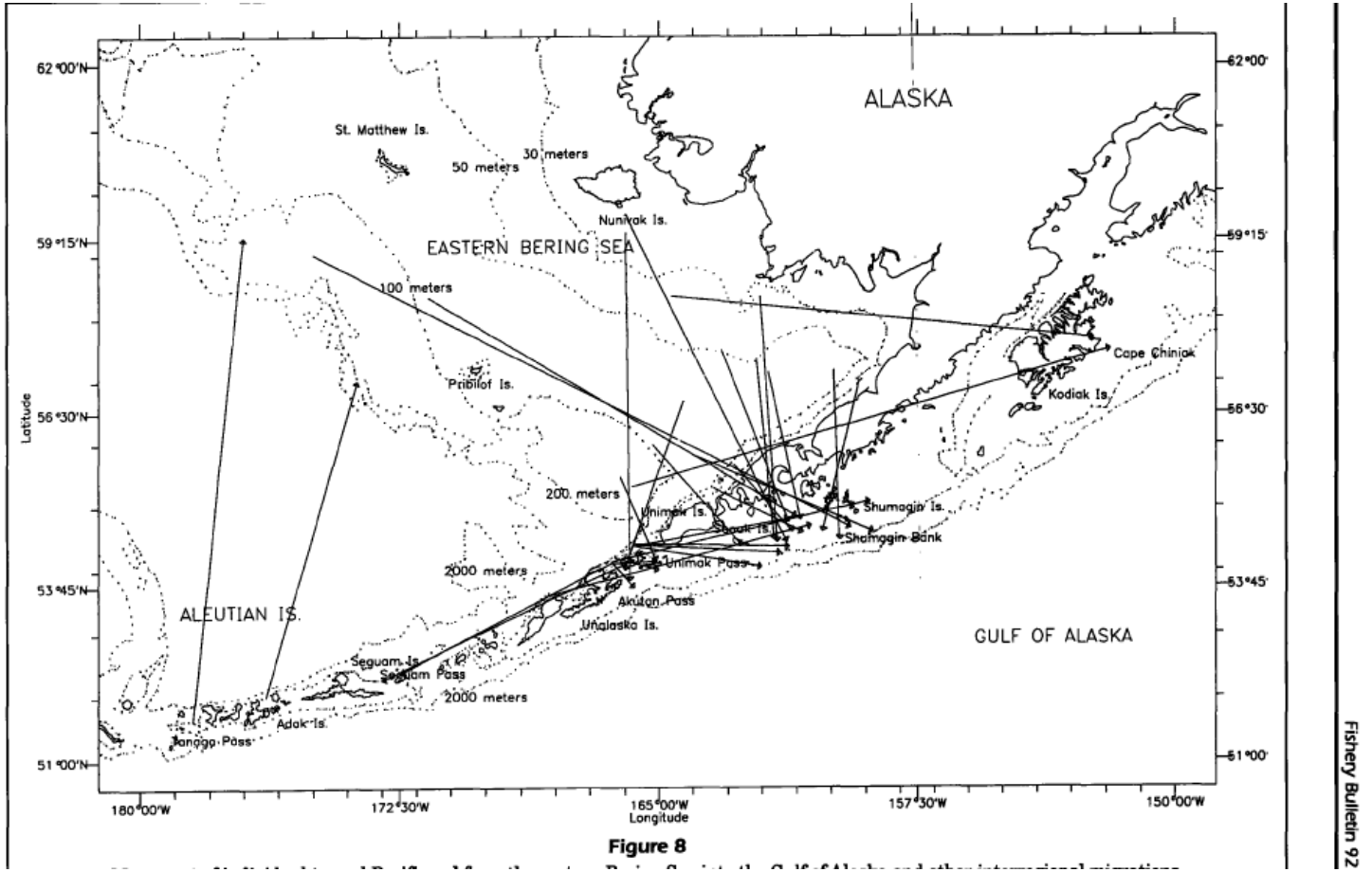


Figure 8

Unimak Island/Pass: A concentrated spawning area for p-cod with considerable p-cod migration and movement.

- As a result of seasonal densities, it is possible to maintain CPUE in an area – at the same time overall stock biomass continues to decline**.** This is what occurred in the Canadian Atlantic cod fisheries.
- **Canada:** *"However, CPUE was hyper-stable with respect to density and not to biomass…high cod densities were interpreted as indicative of high abundance in the late 1980s."*
- In 1989: *"our captains are convinced that northern cod are as plentiful as ever offshore and our vessels have few problems catching their trip allotments throughout the year. Two years later, this fishery had collapsed."*
- From Rose and Kulka, 1999: ***"Hyper-aggregation of fish and fisheries: How CPUE increased as northern cod declined".***
- Distribution of harvest spatially and temporally is important – particularly regarding spawning populations. The "tipping point" is unknown.

Summary:

- Considerable unprecedented flux and uncertainty in EBS p-cod stocks
- Warming water trend
- 2018: first time ever – no cold pool formation in EBS
- Most northward ever distribution of cod biomass;
- Unknown effect of concentration of harvest inside 3 on spawning aggregation
- Extent of interaction with GOA stocks (biomass down -80%)
- Recommend BOF consider no increases in GHL at this time
- And if we think what happened on the east coast could never happen here, consider the Aleut word for “Pacific cod”

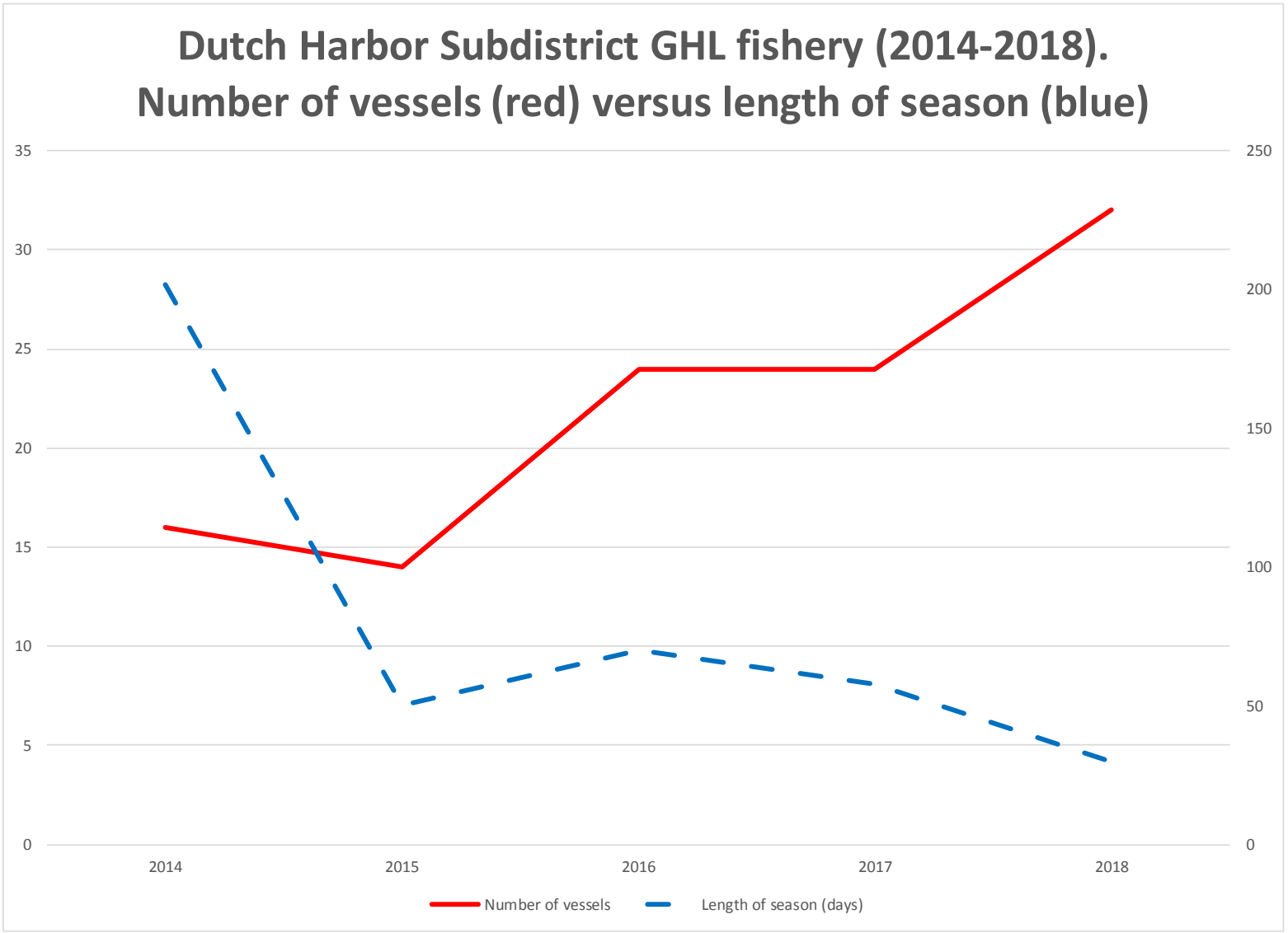
Aleut word for P-cod: *"fish that stops"*

"Pacific cod populations may be susceptible to fluctuations in oceanic regimes to the extent that they periodically disappear in significant numbers from the ecosystem, only to reappear in greater numbers at a later date."

"This condition has deep historical roots; ***the ancient Aleut name for Pacific cod translates literally into "the fish that stops" because this species periodically disappears (Black, 1981), a situation that occurred, according to traditional Aleut knowledge, at least once in the mid-19th century, and again in approximately 1942****."*

[From Maschner et al 2008, "A 4500-year time series of Pacific cod (*Gadus macrocephalus*) size and abundance: archaeology, oceanic regime shifts, and sustainable fisheries]


PROWLER


Dutch Harbor Subdistrict GHL fishery (2014-2018).
Number of vessels (red) versus length of season (blue)
35
30
25
20
15
10
5
0
250
200
150
100
50
0
2014
2015
2016
2017
2018
Number of vessels
Length of season (days)

2017 Pacific Cod Catch by Trawl Gear