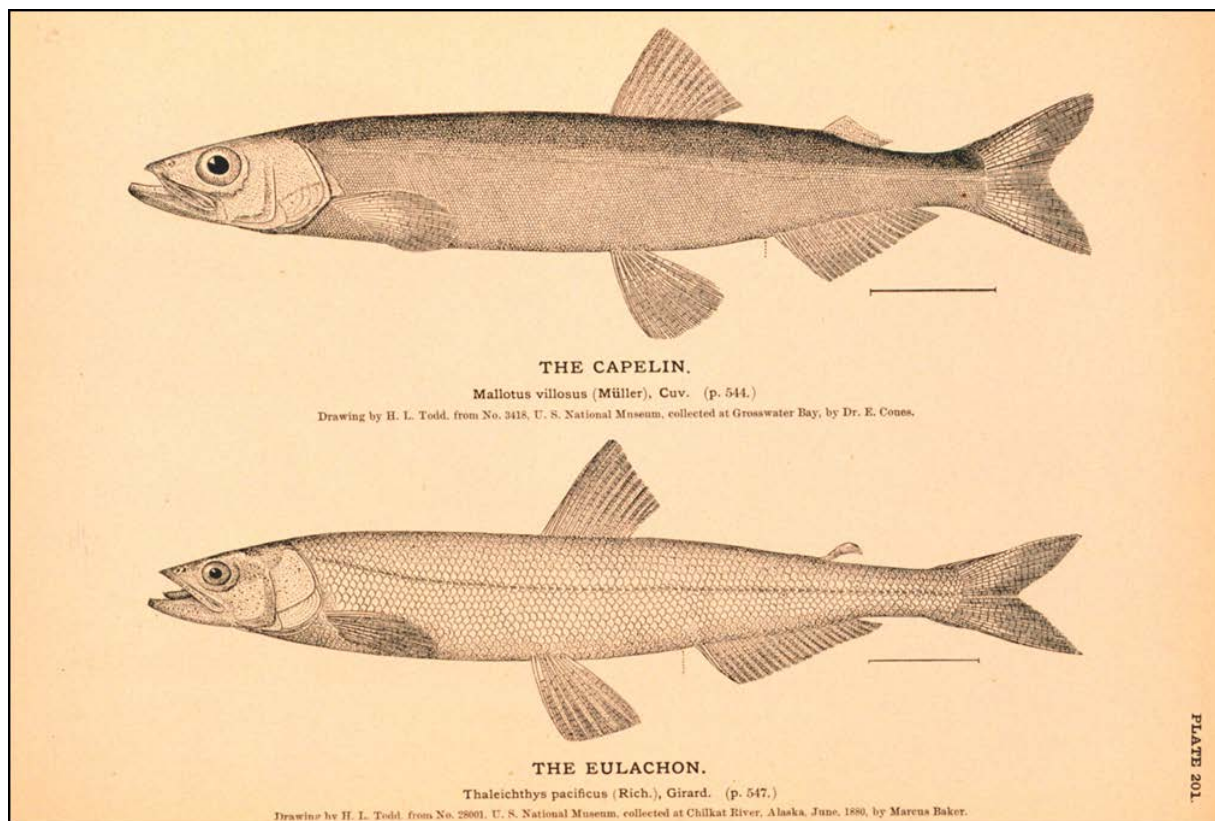


# BSAI forage fish report



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BSAI Plan Team \* November 2017



# **overview**

- **updates**
- **trends in capelin, eulachon, herring**
- **smelt, herring, and shrimp bycatch**

# **forage fish report outline**

- 1) Summary of updates & responses to Plan Team & SSC comments**
- 2) Overview of forage species and their management**
- 3) Trends in abundance and spatial distribution**
- 4) Bycatch and other impacts of federal fisheries on forage species**
- 5) Data gaps and research priorities**
- 6) Appendix**

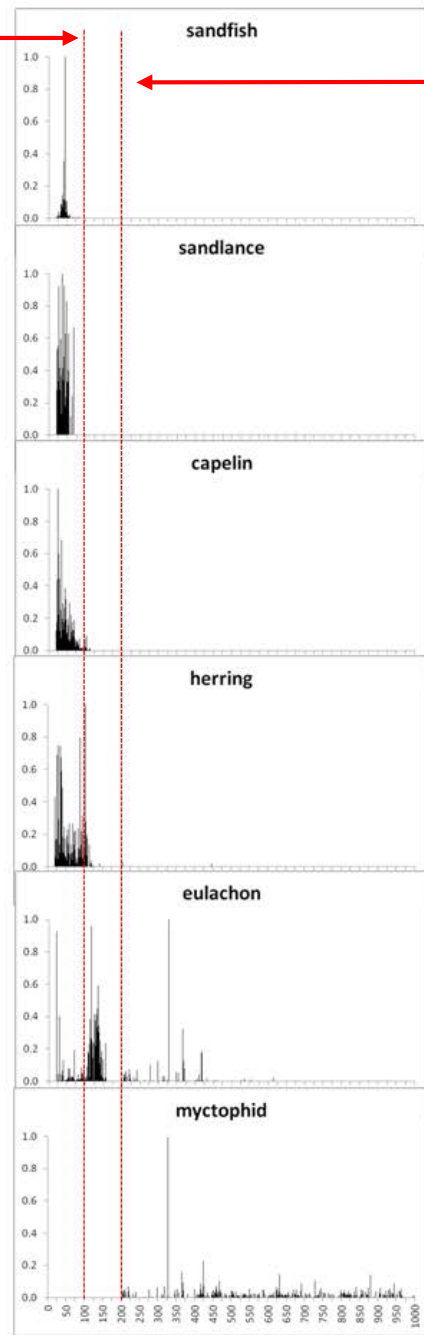
# forage species overview

- members of the “forage fish group” listed in the BSAI Fishery Management Plan (FMP)
- Pacific herring *Clupea pallasii*
- juvenile groundfishes and salmon
- shrimps
- squids
- Arctic cod *Boreogadus saida*

100 m

200 m

normalized  
CPUE



bottom depth

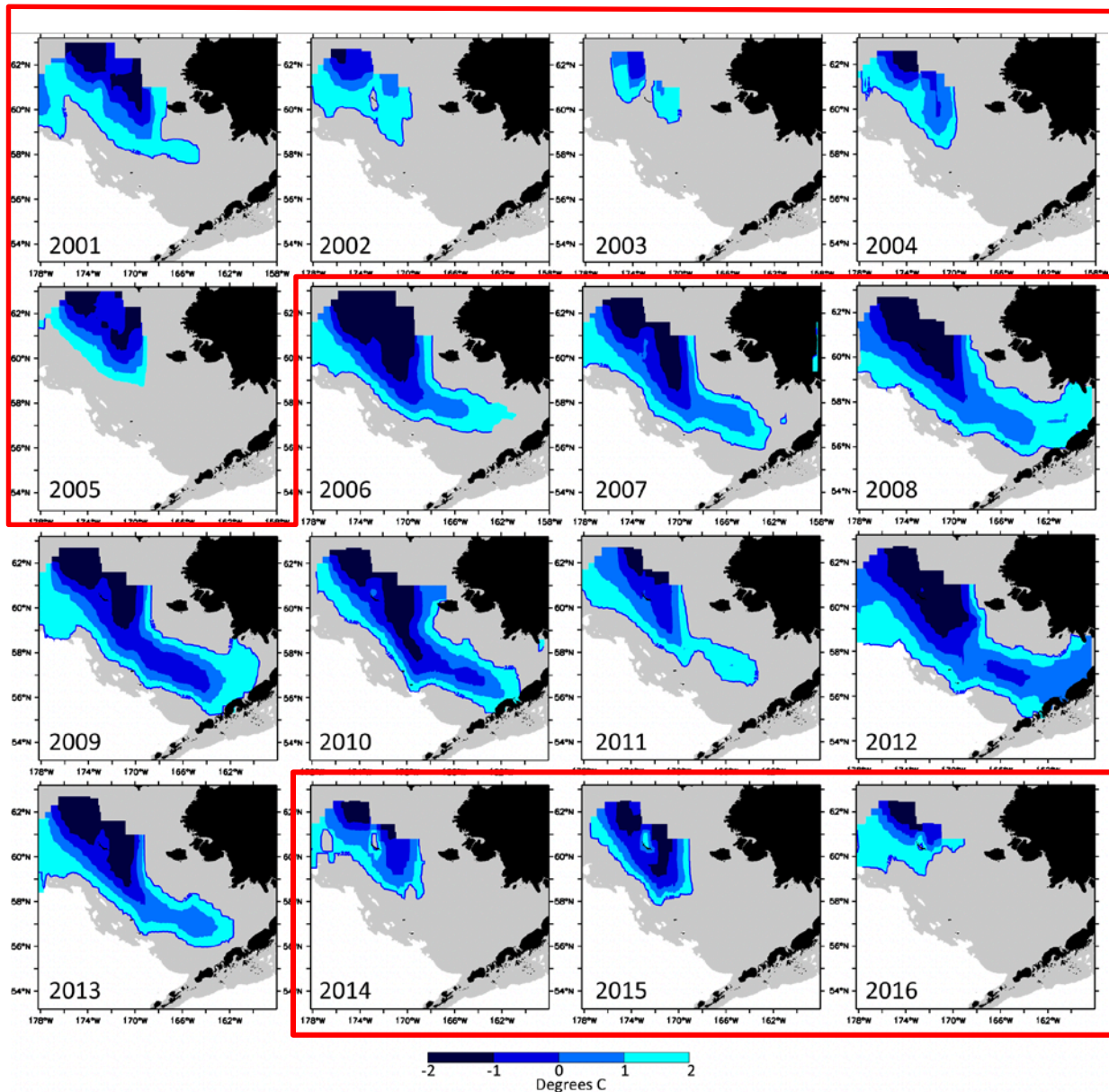
# BSAI forage species spatial partitioning

# temperature regimes: warm 2014-2107

forage report temperature regimes	
cold 1	1975-1976
warm 1	1977-1987
cold 2	1988-2000
warm 2	2001-2005
cold 3	2006-2013
warm 3	2014-2017

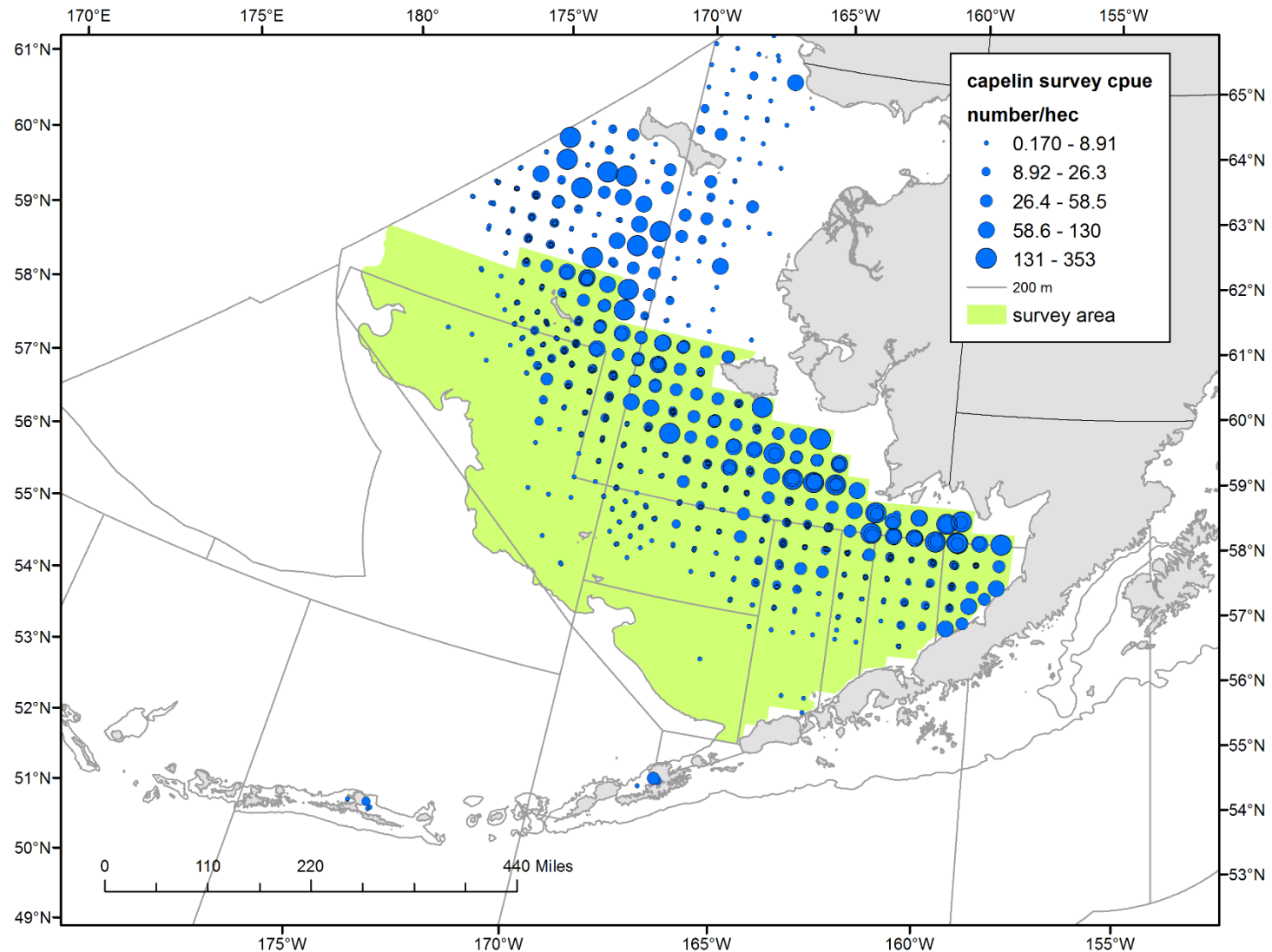
based on M2 mooring surface temperature

# temperature regimes: warm 2014-2107



(from 2016  
Ecosystem  
Considerations  
chapter)

# capelin: spatial distribution

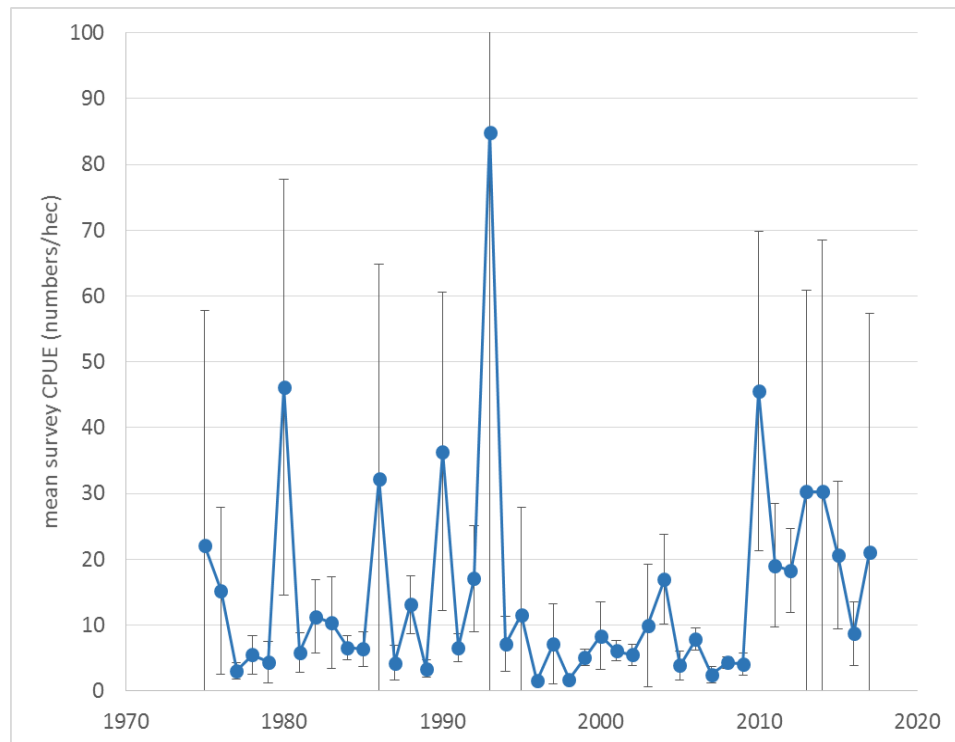
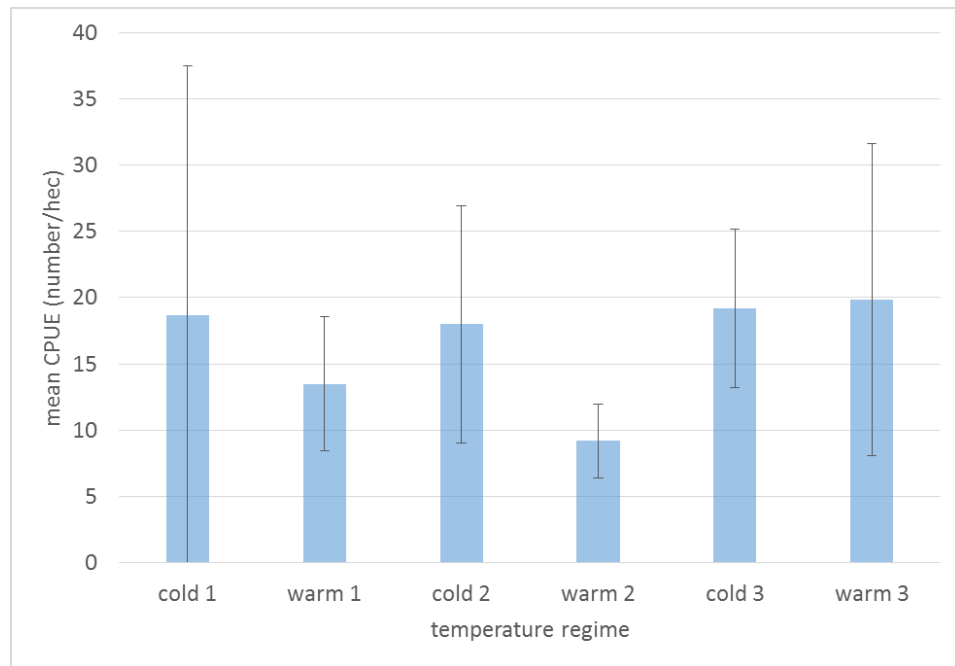


bottom trawl survey 2006-2017

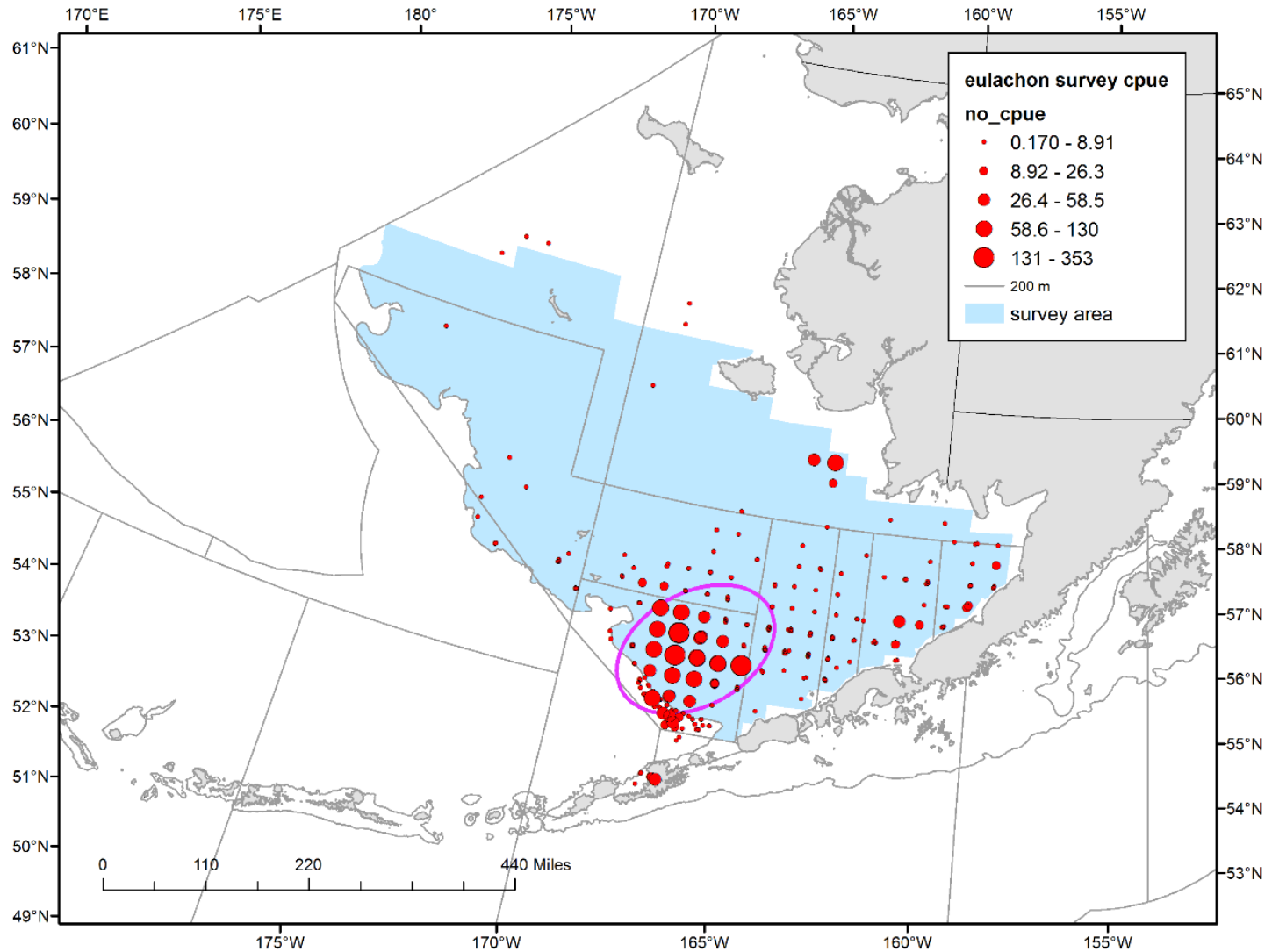


# capelin: abundance

T regimes	
C1	75-76
W1	77-87
C2	88-00
W2	01-05
C3	06-13
W3	14-17



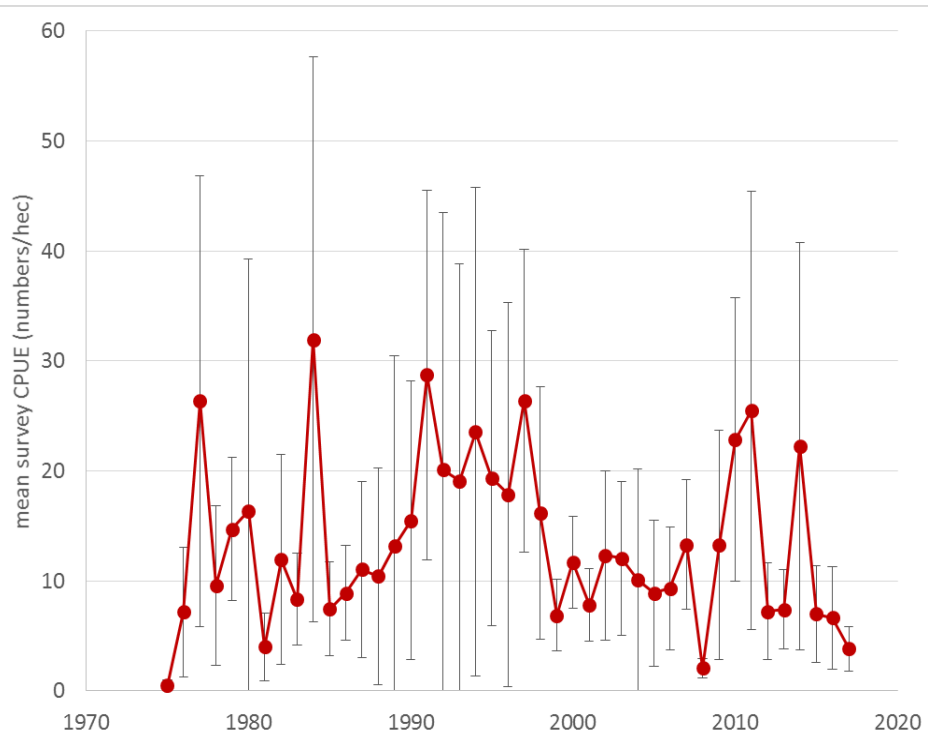
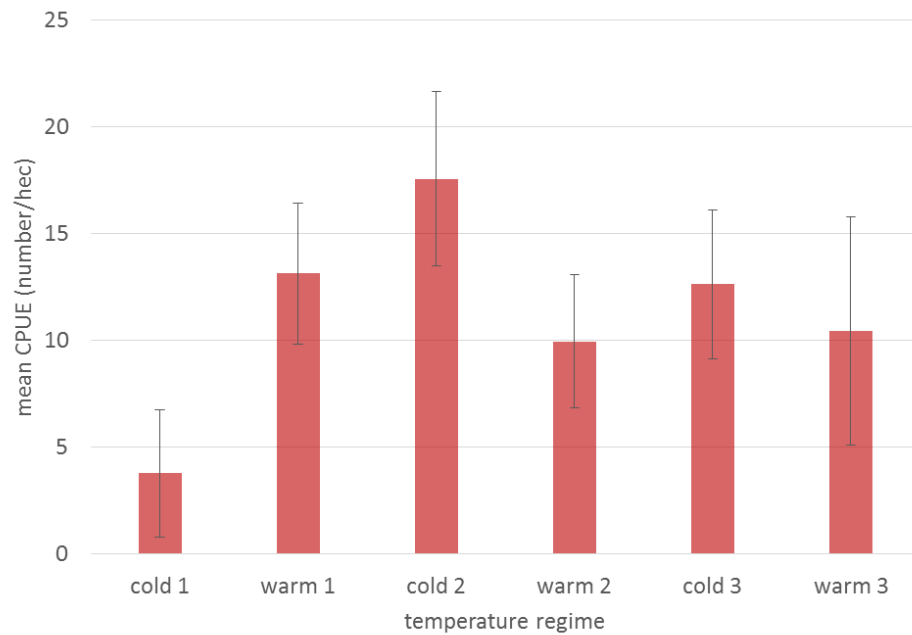
# eulachon: spatial distribution



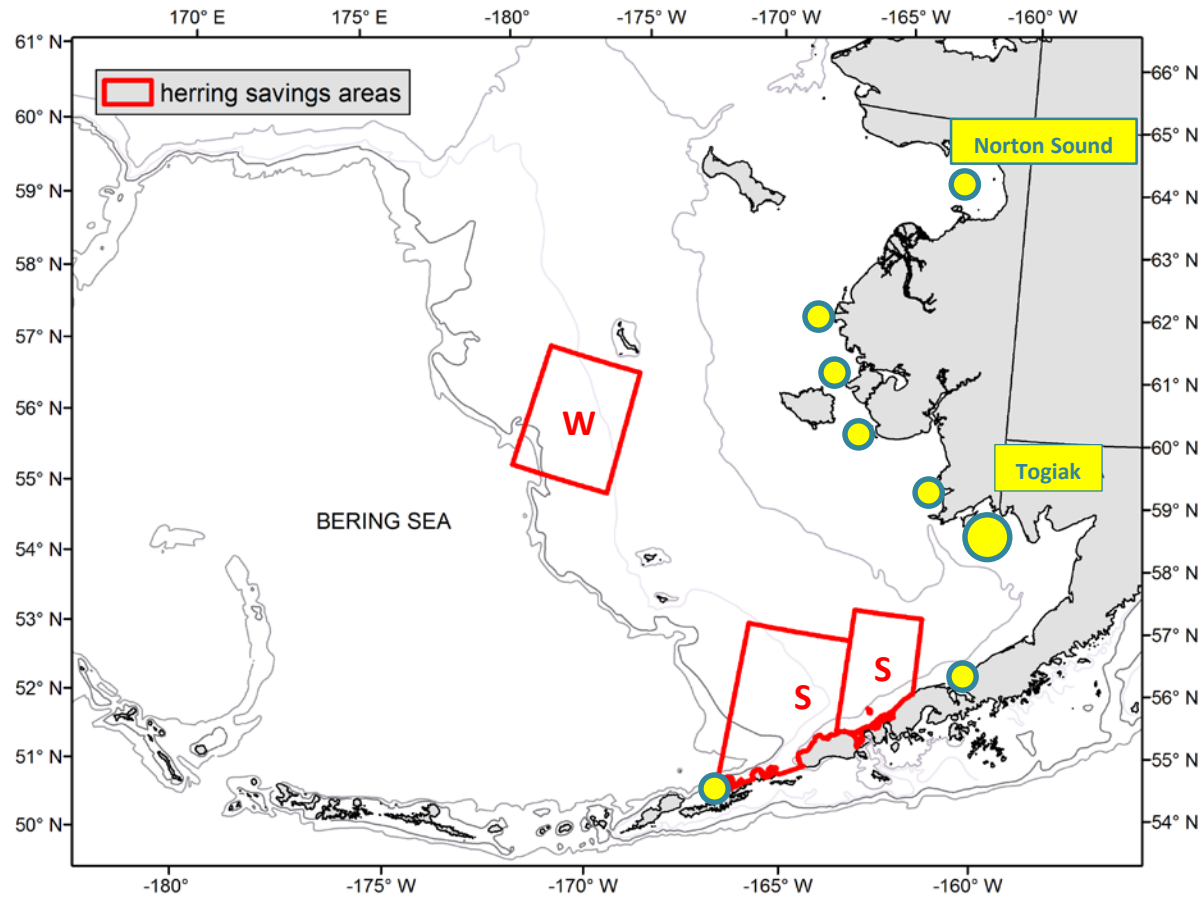
bottom trawl survey 2006-2017

# eulachon: abundance

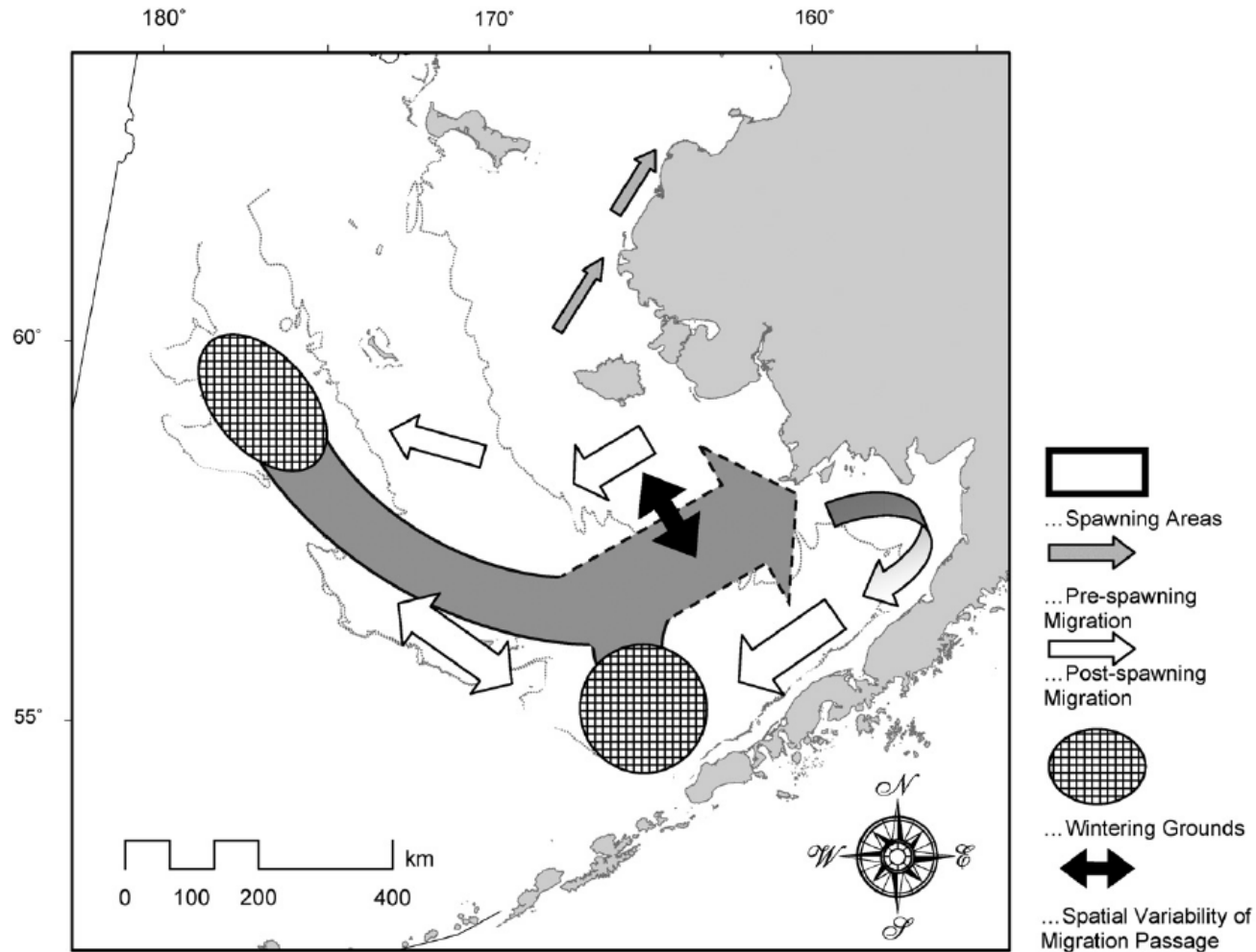
T regimes	
C1	75-76
W1	77-87
C2	88-00
W2	01-05
C3	06-13
W3	14-17



# herring: fisheries & savings areas

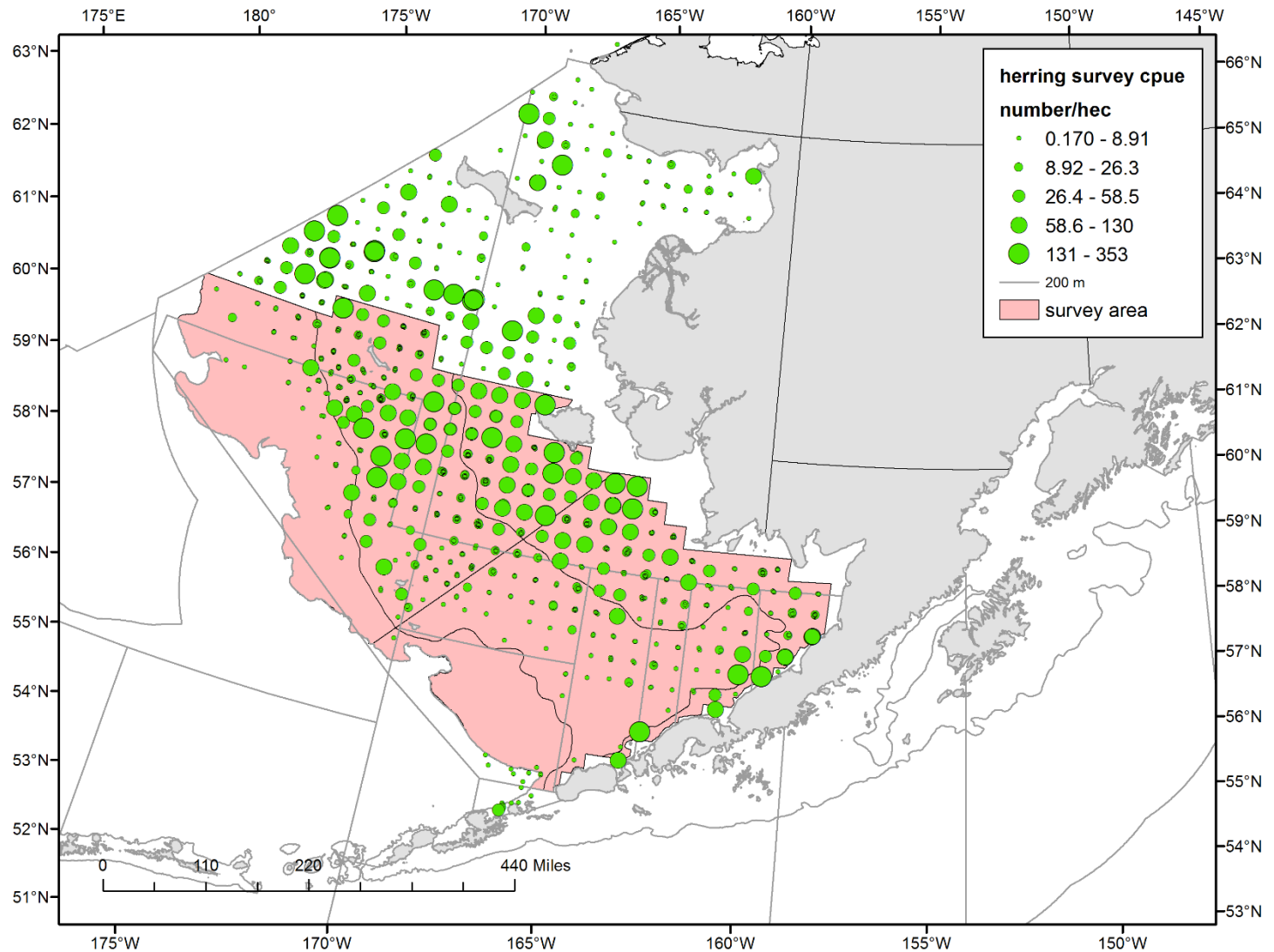


# herring: migration patterns



(from Tojo et al. 2007)

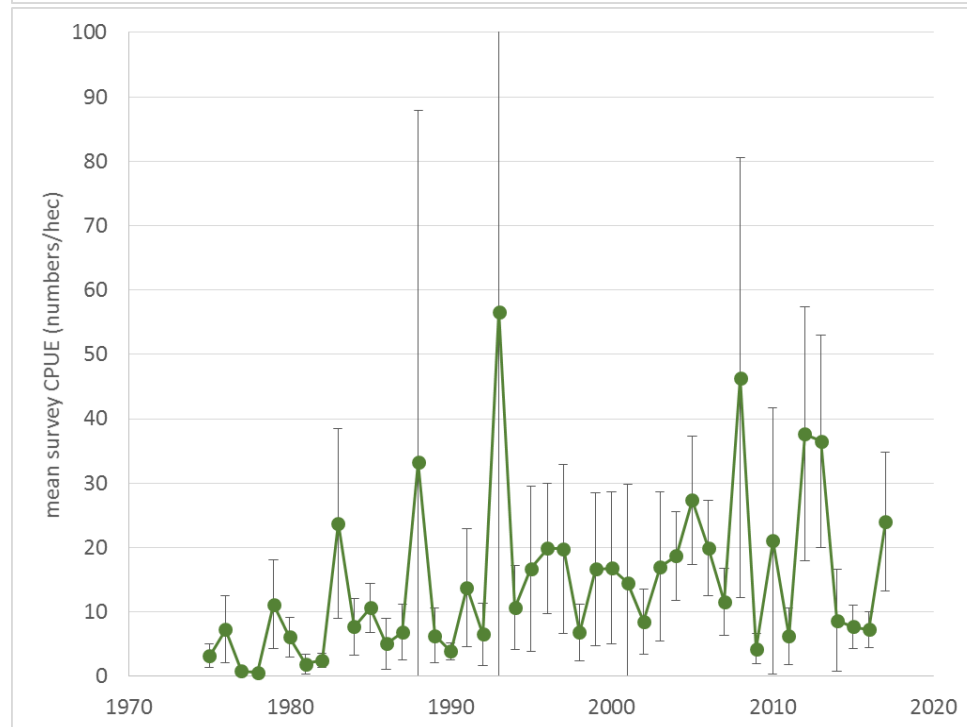
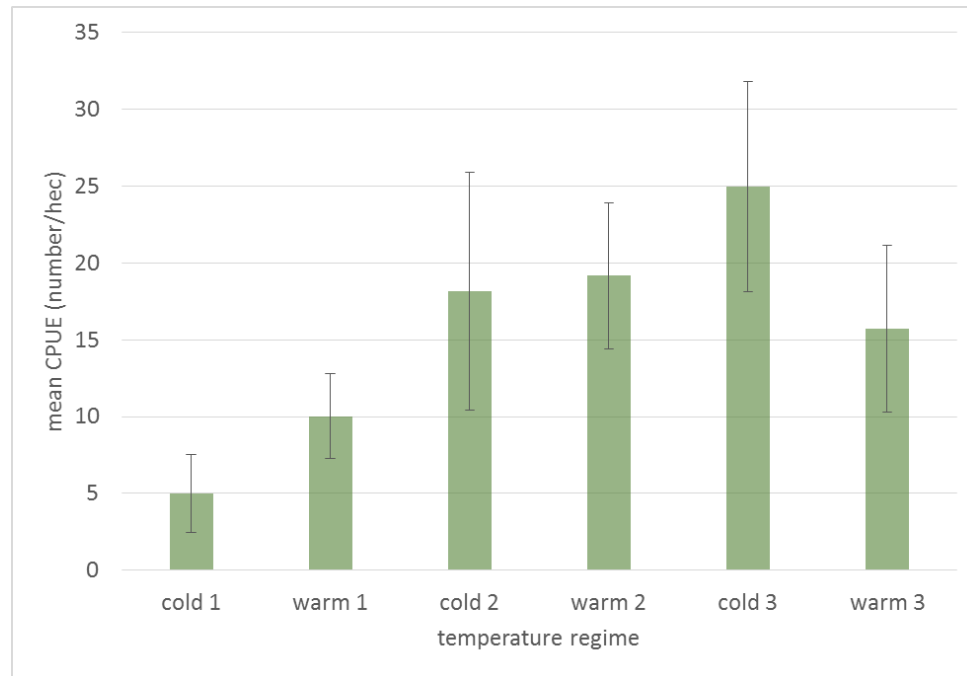
# herring: spatial distribution



bottom trawl survey 2006-2017

# **herring:** **abundance**

T regimes	
C1	75-76
W1	77-87
C2	88-00
W2	01-05
C3	06-13
W3	14-17

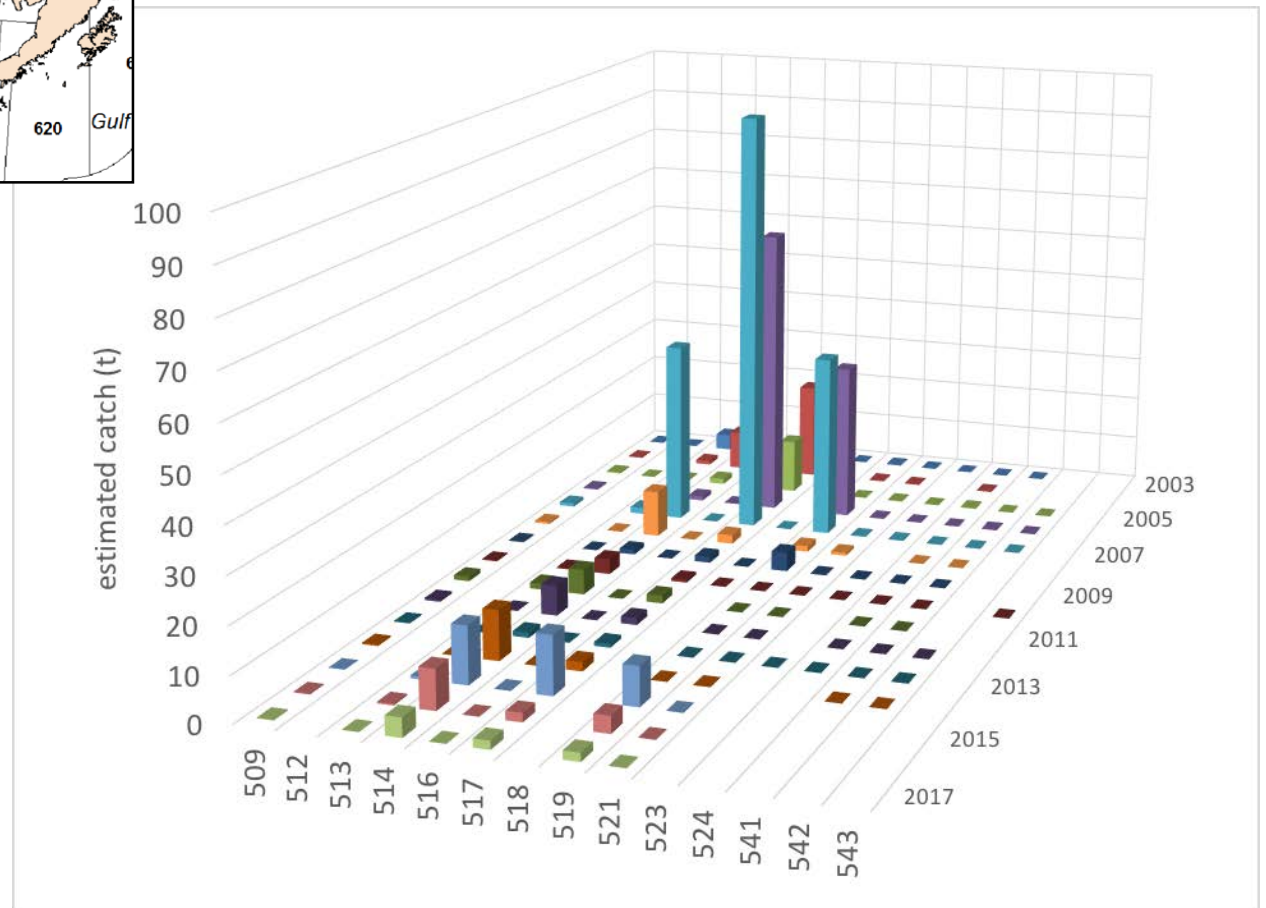
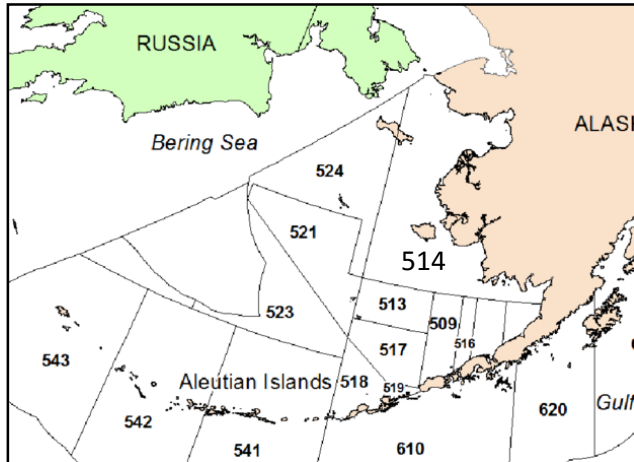


# forage fish bycatch

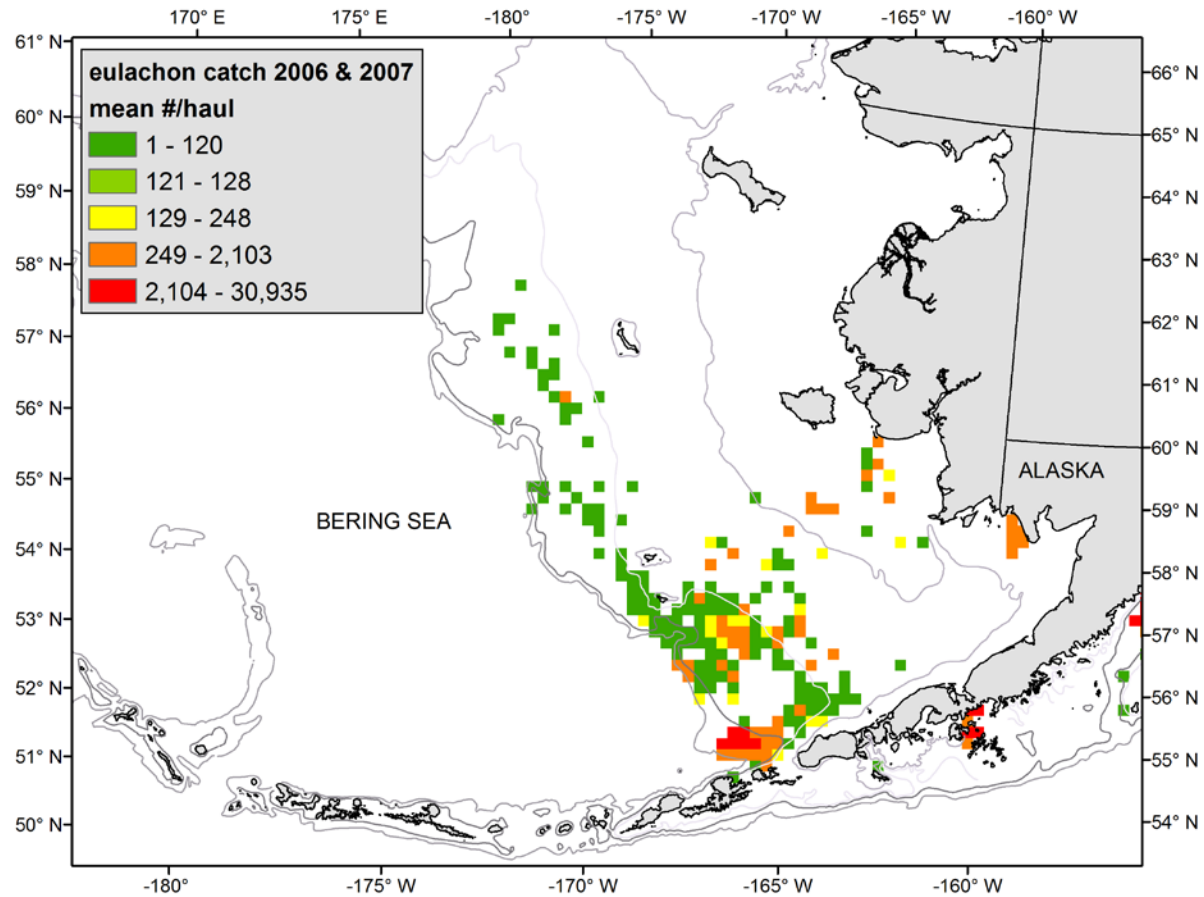
- herring are PSC
- smelt (osmerids) are common bycatch
- myctophids are occasional bycatch
- most herring bycatch is in pollock fishery
- most smelt bycatch is in pollock fishery
- YFS fishery has occasional smelt bycatch



# eulachon bycatch

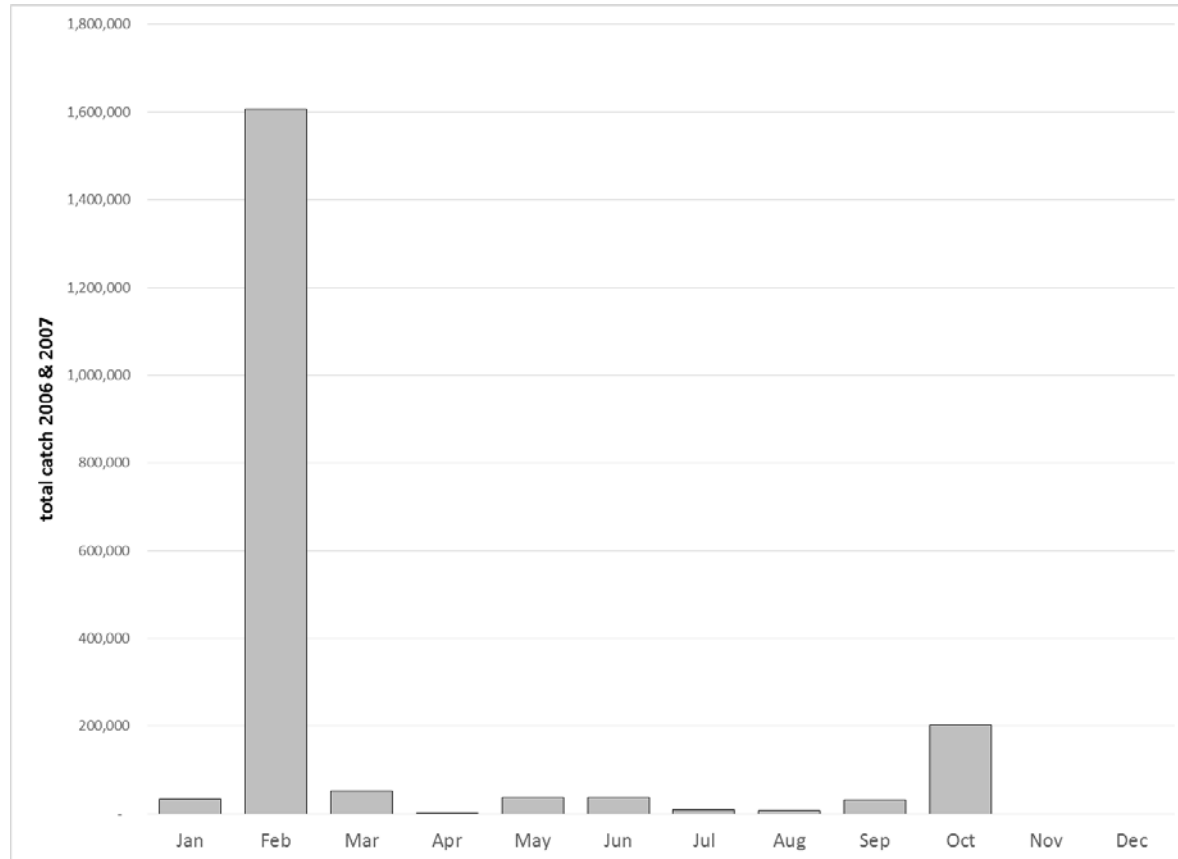


# eulachon bycatch



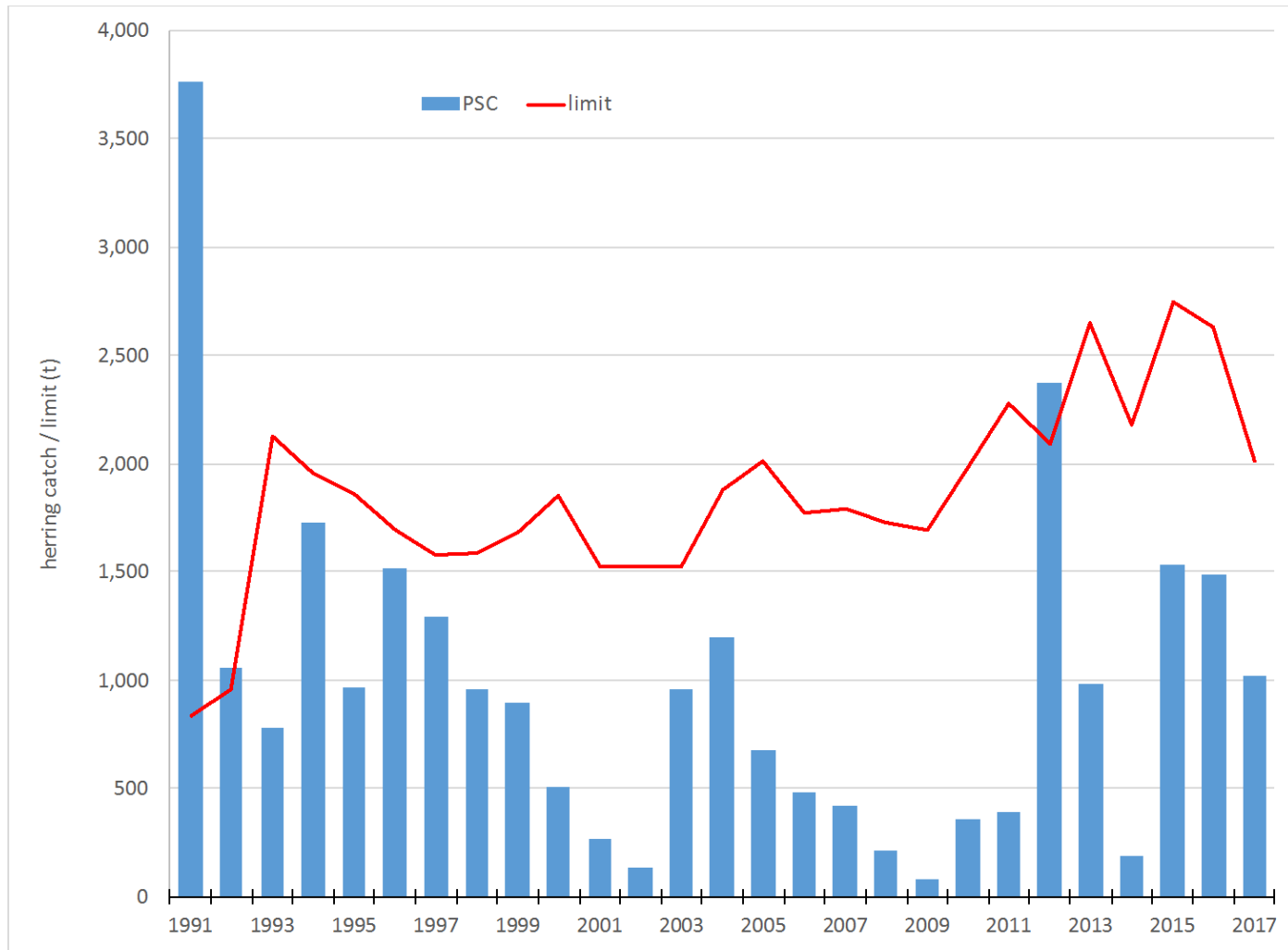
2006 & 2007 data only

# eulachon bycatch

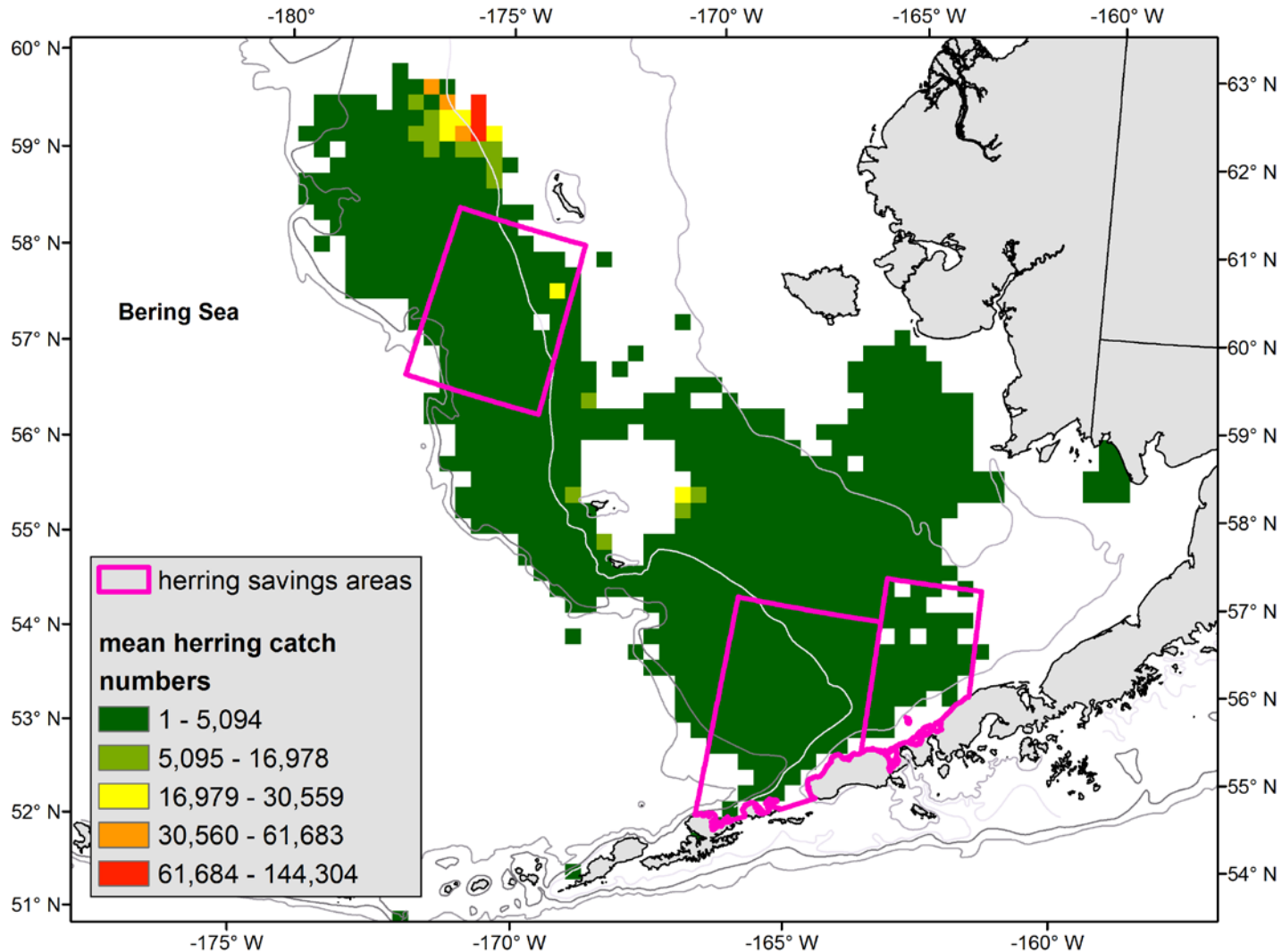


2006 & 2007 data only

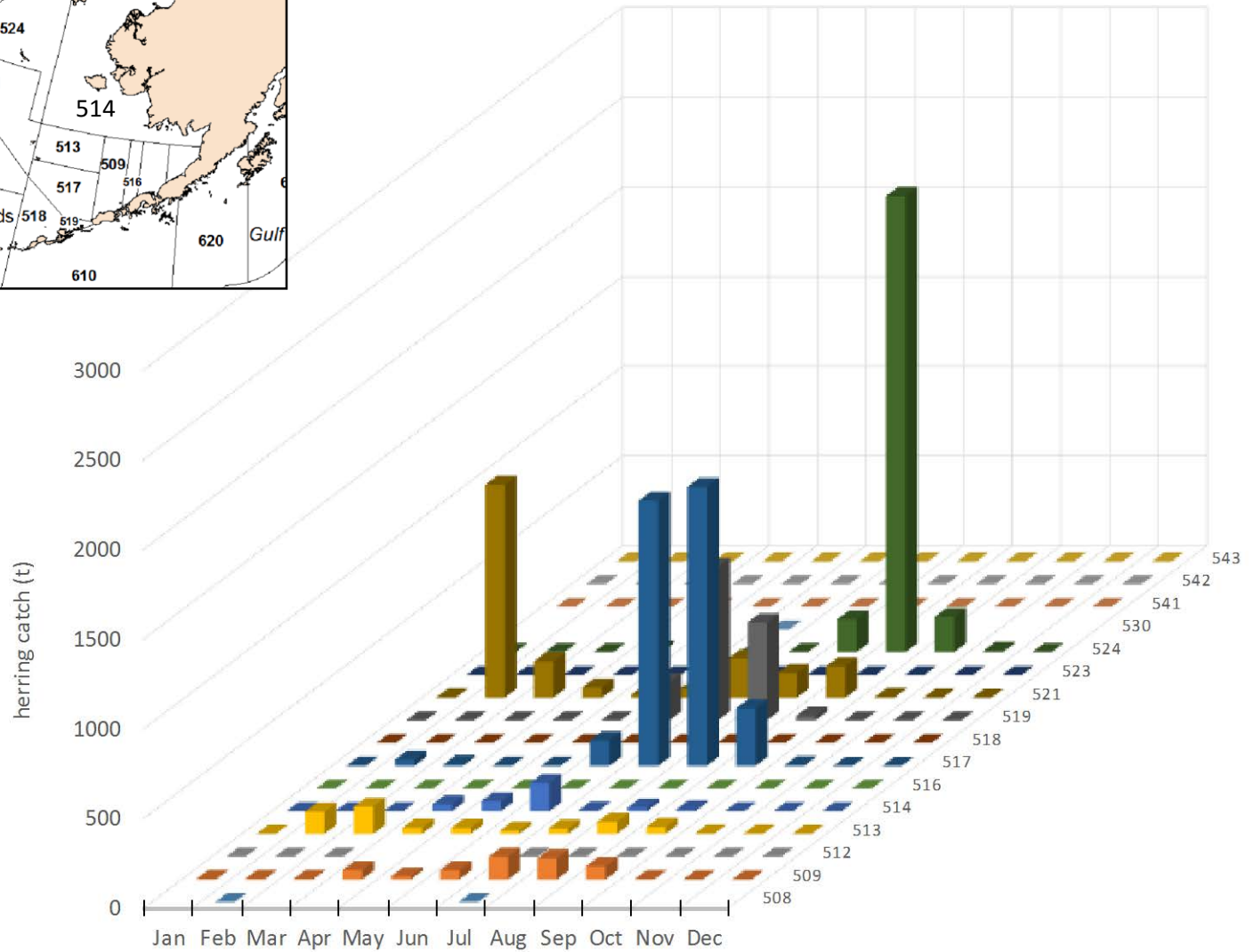
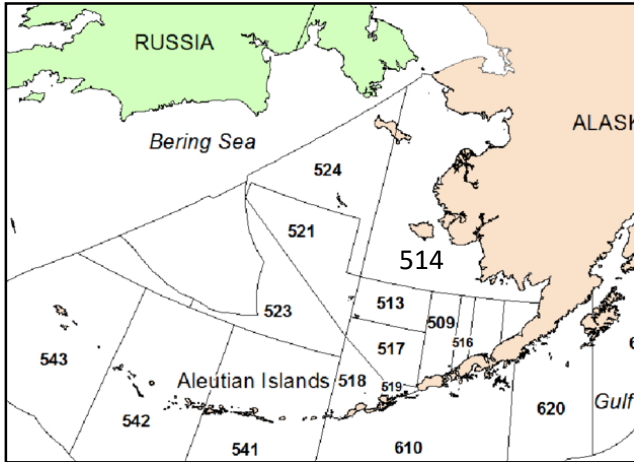
# herring bycatch vs PSC limit



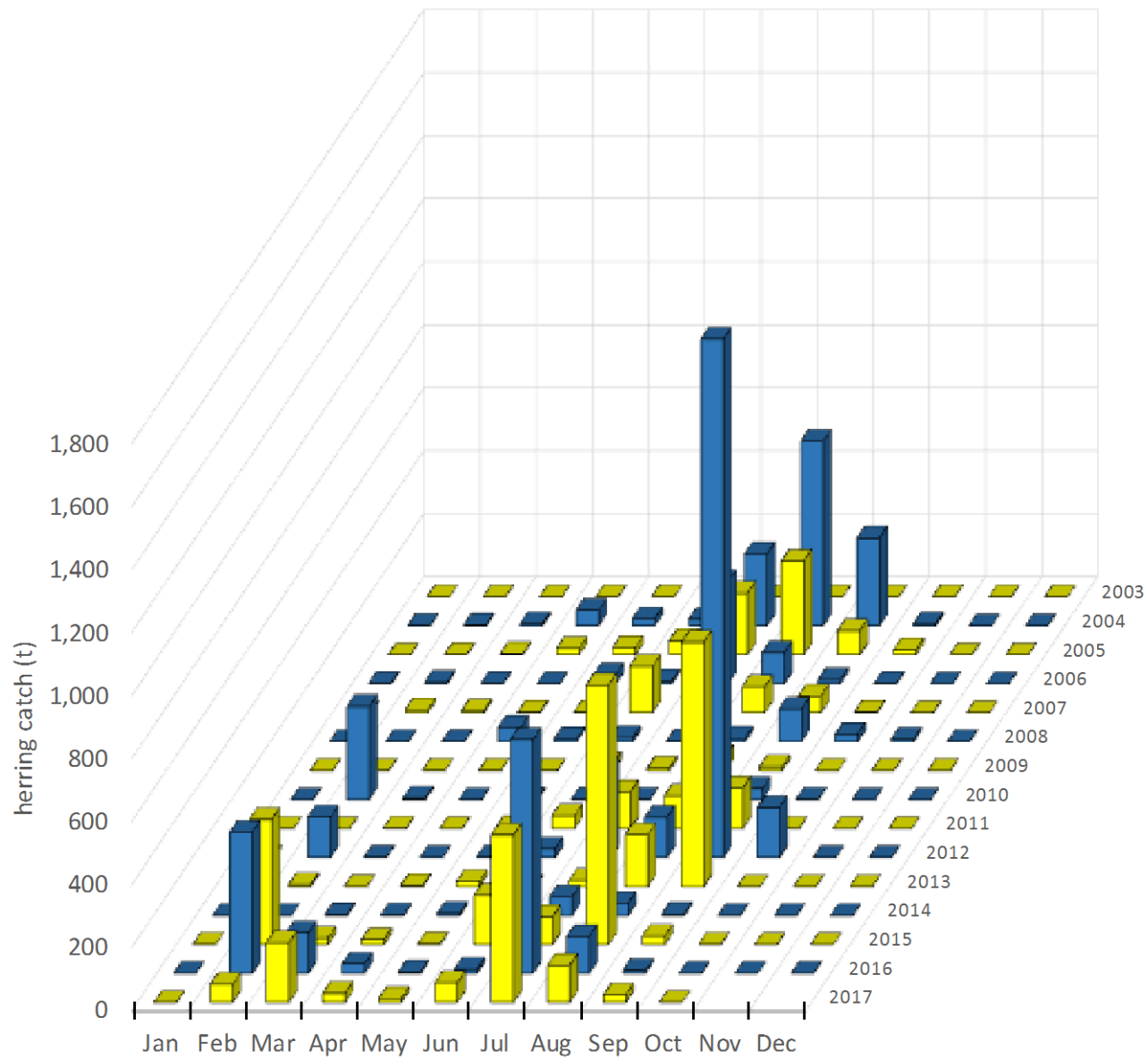
# herring bycatch



# herring bycatch



# herring bycatch



# **data gaps & research priorities**

- 1) Absolute abundance of capelin, eulachon, and rainbow smelt.
- 2) Spawning areas of BSAI eulachon.
- 3) Similarly, it would be useful to have a clearer understanding of which herring (ie which stocks) are being captured in federal fisheries.
- 4) Enhanced knowledge regarding seasonal migrations of herring.
- 5) Enhanced knowledge of survey selectivity and catchability for capelin, eulachon.
- 6) Continued studies of how climate variability influences the abundance, distribution, and energy content of forage species in the BSAI.