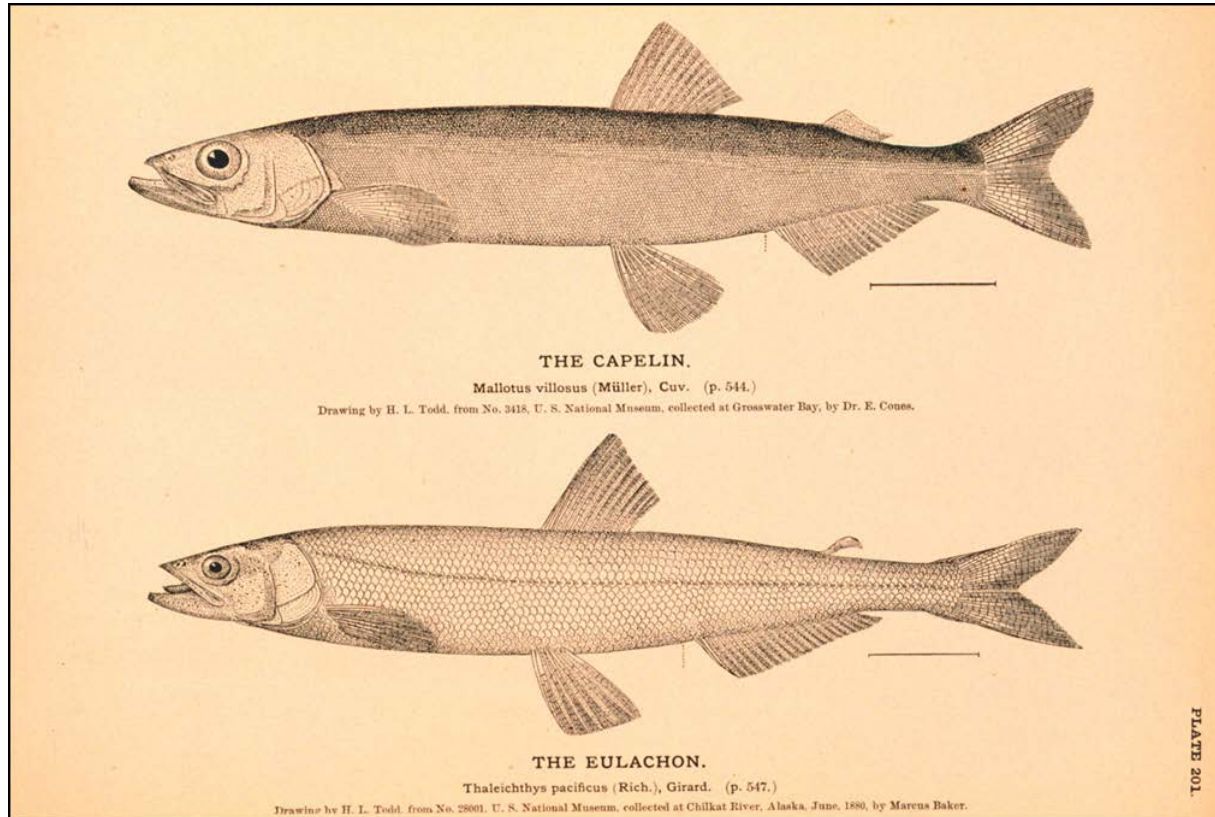


BSAI forage fish report



Olav A. Ormseth, AFSC
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*

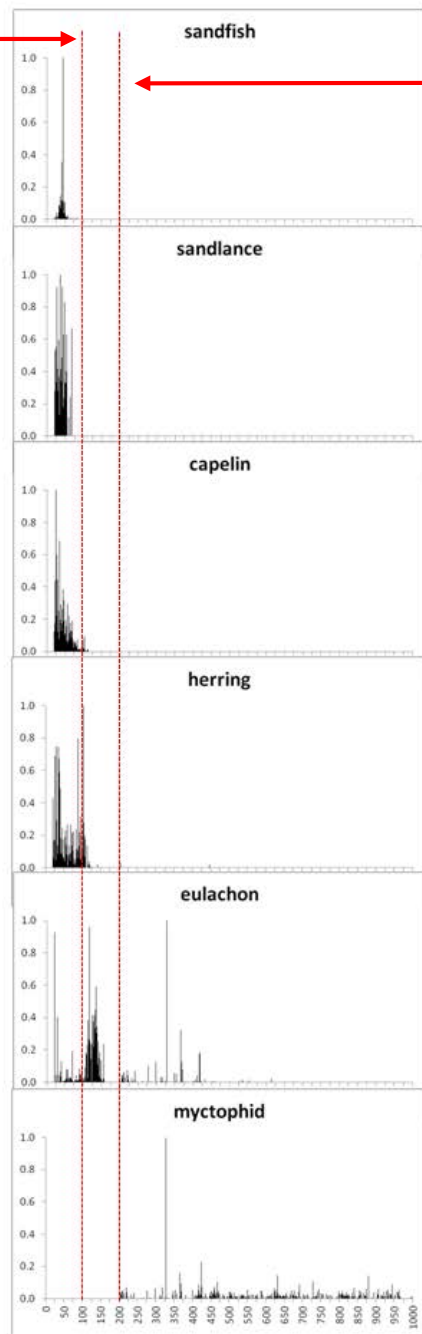
100 m



200 m



normalized
CPUE



bottom depth

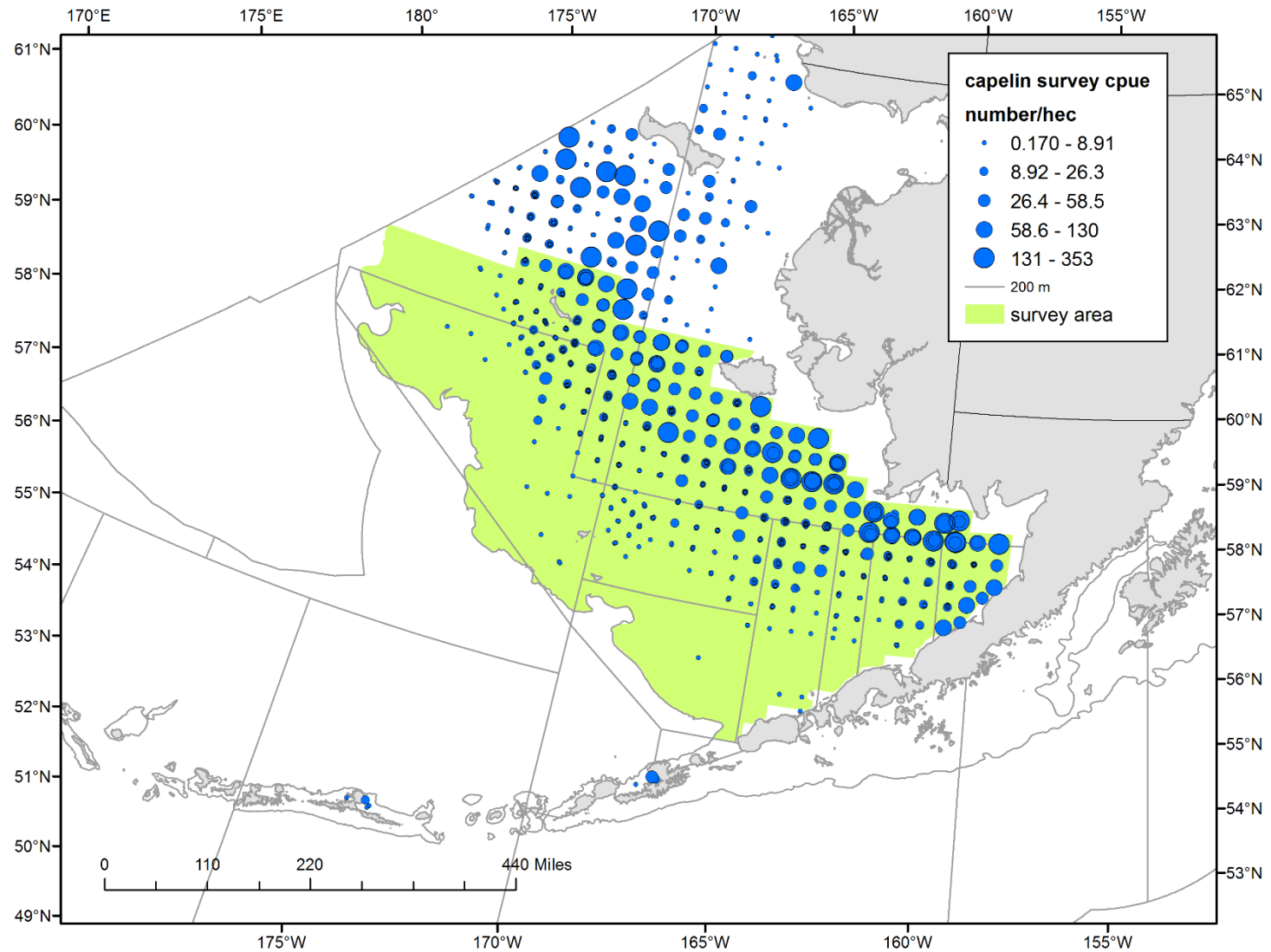
BSAI forage species spatial partitioning

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

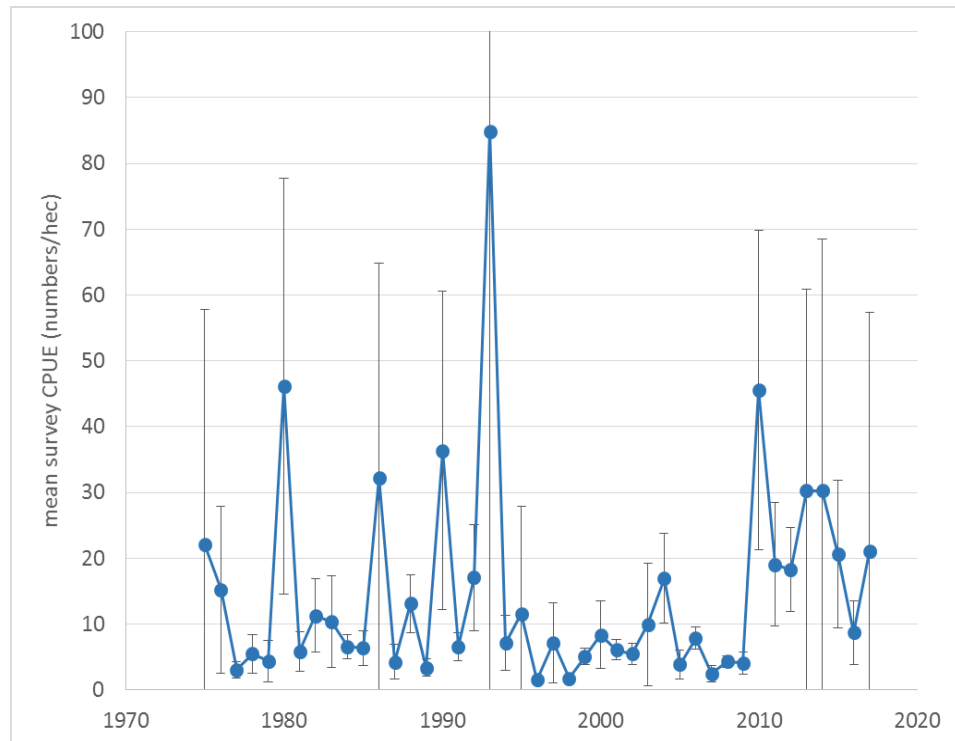
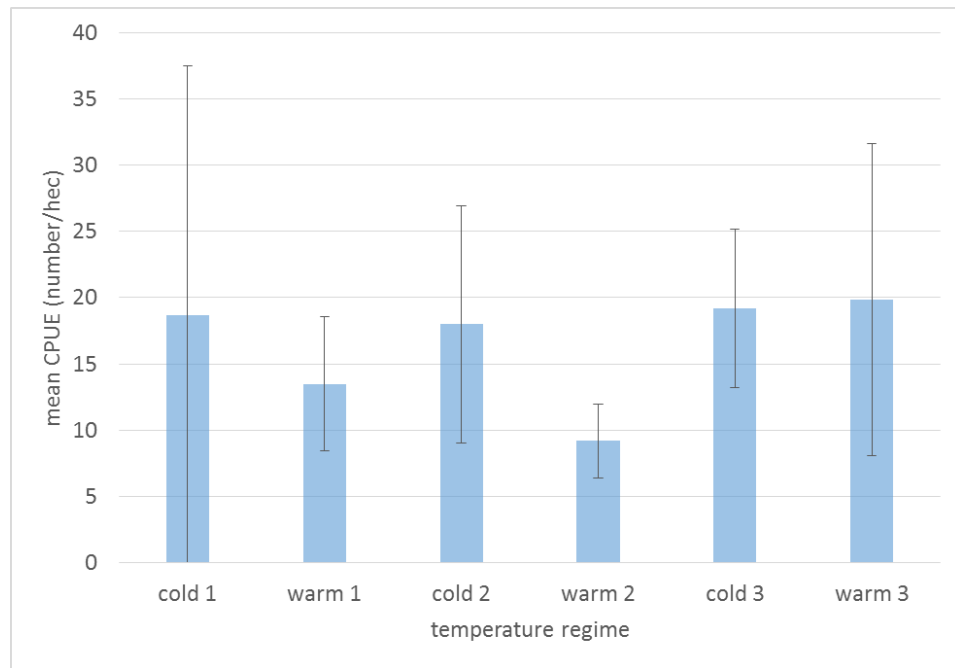
capelin: spatial distribution



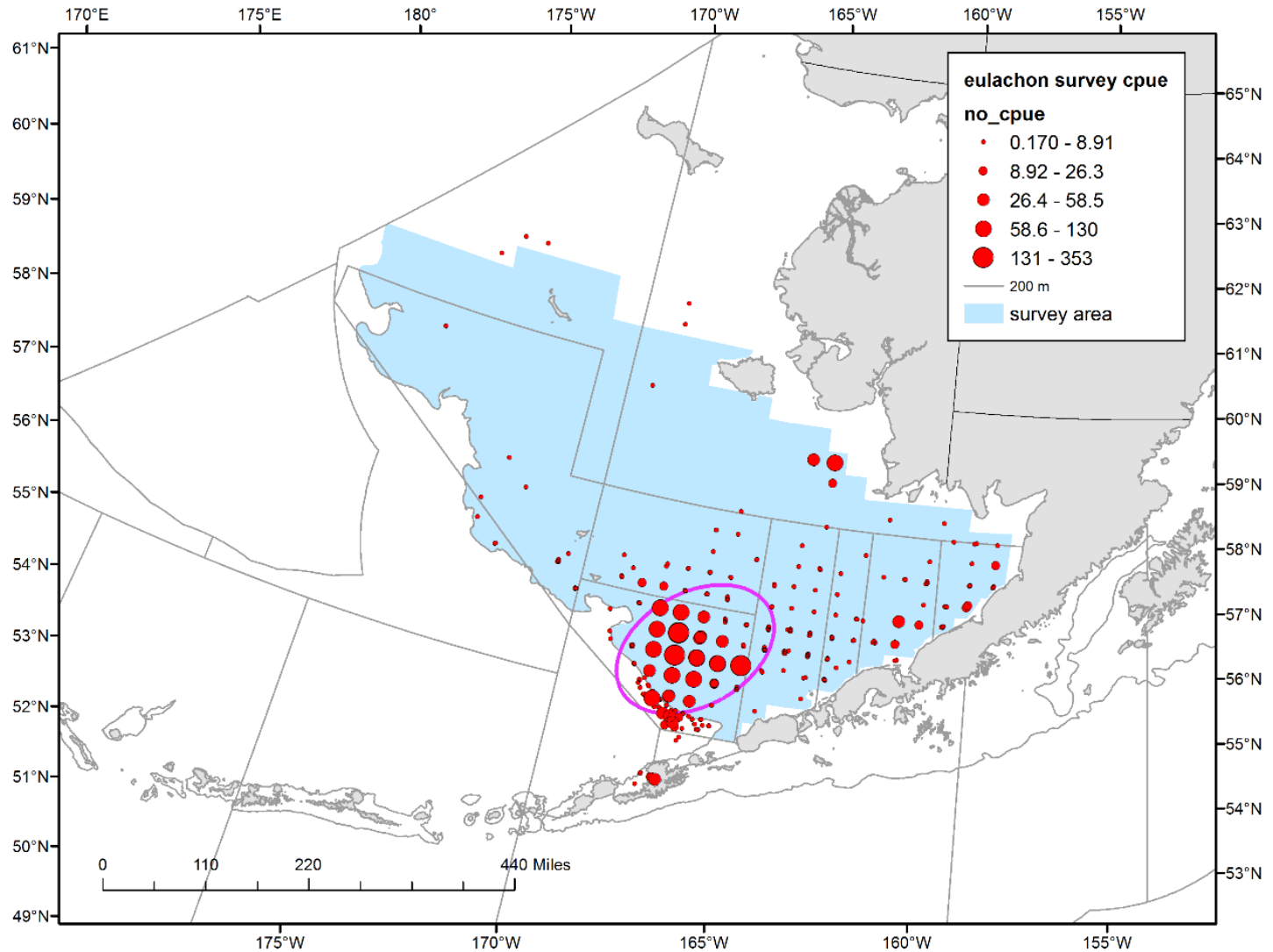
bottom trawl survey 2006-2017

capelin: abundance

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



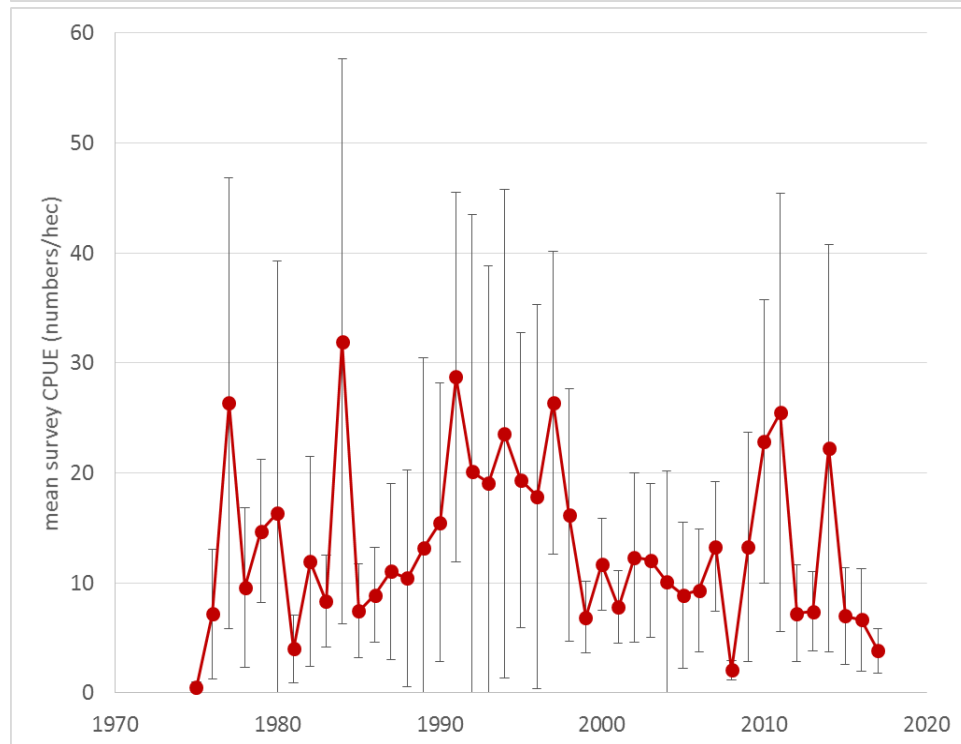
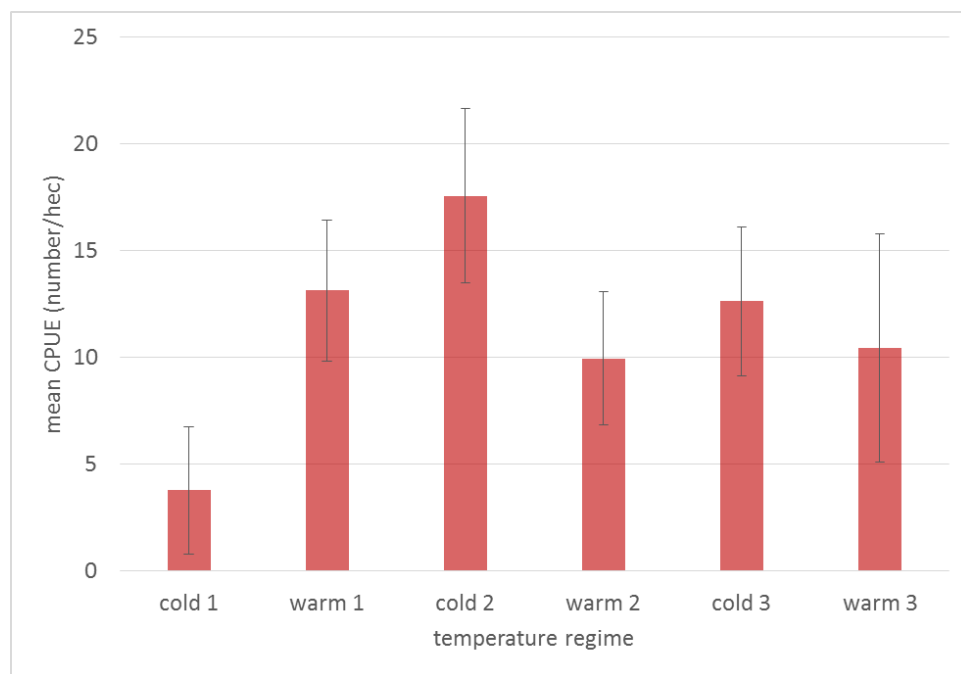
eulachon: spatial distribution



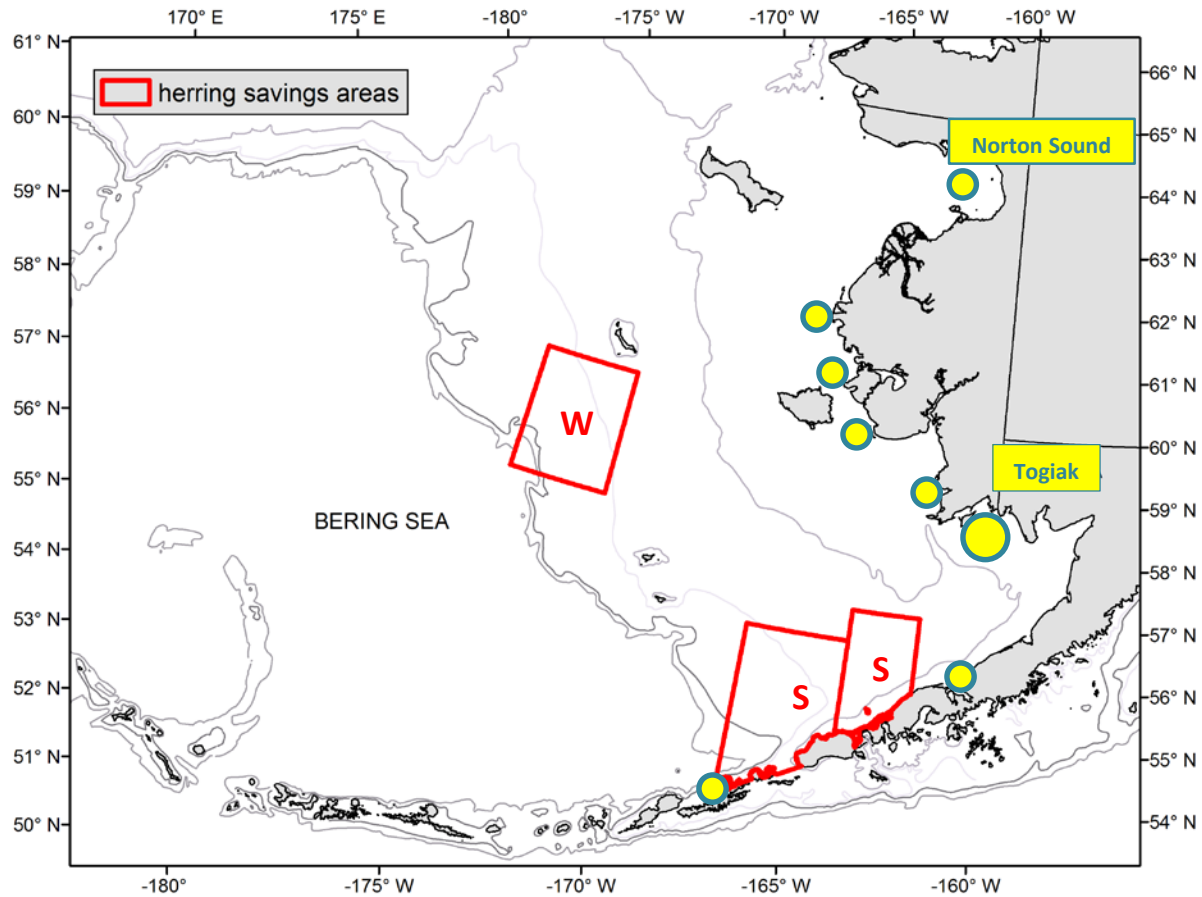
bottom trawl survey 2006-2017

eulachon: abundance

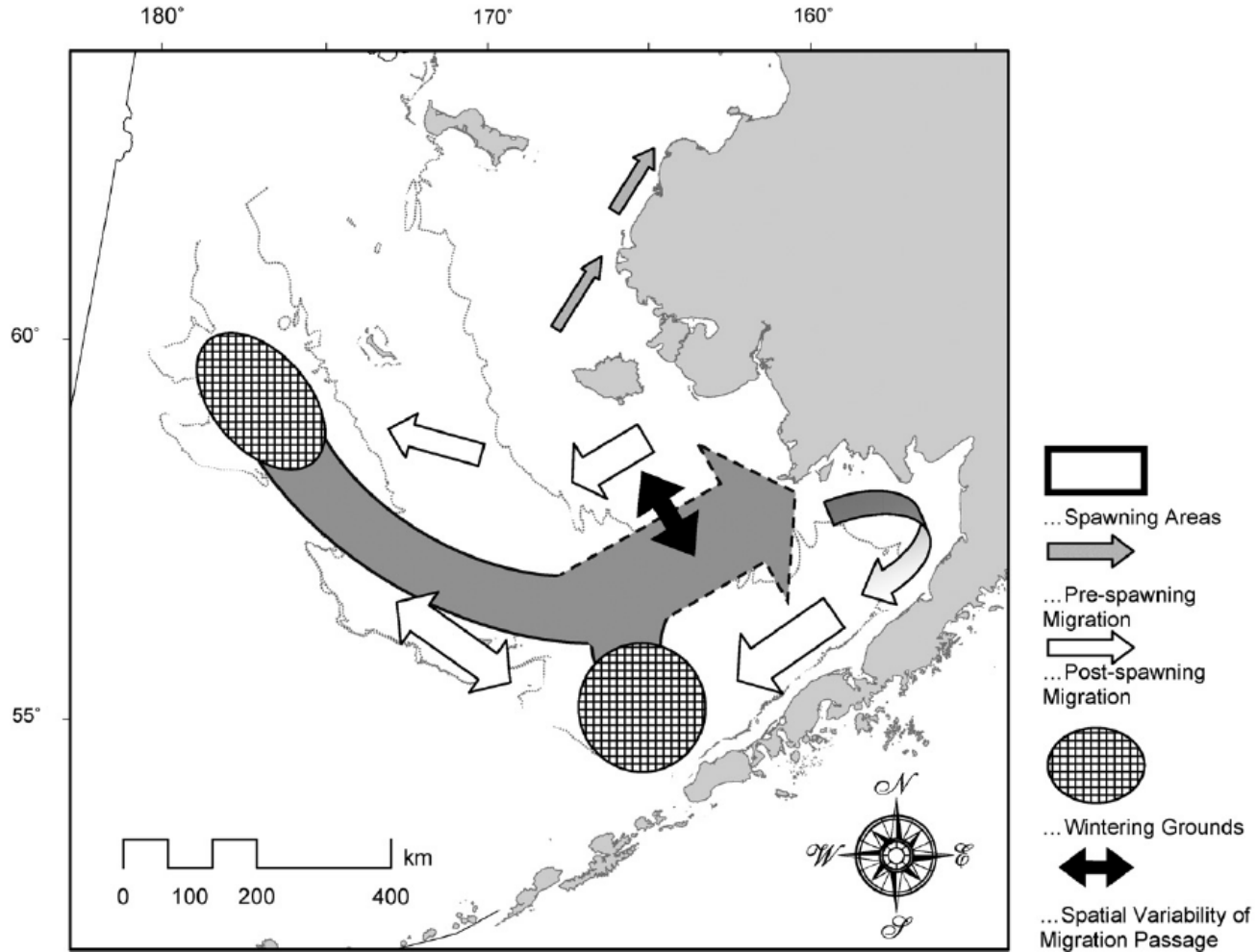
T regimes	
C1	75-76
W1	77-87
C2	88-00
W2	01-05
C3	06-13
W3	14-17



herring: fisheries & savings areas

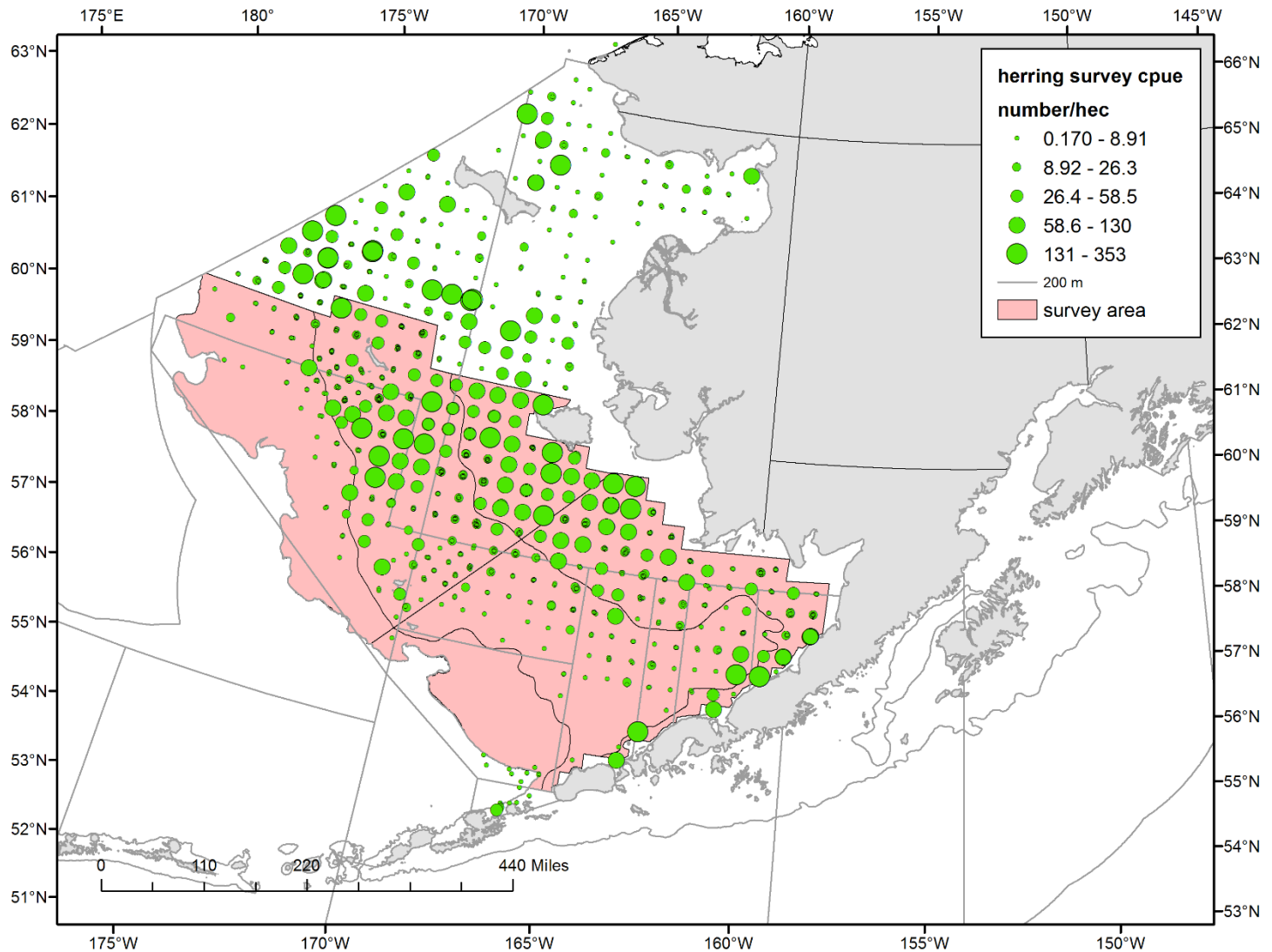


herring: migration patterns



(from Tojo et al. 2007)

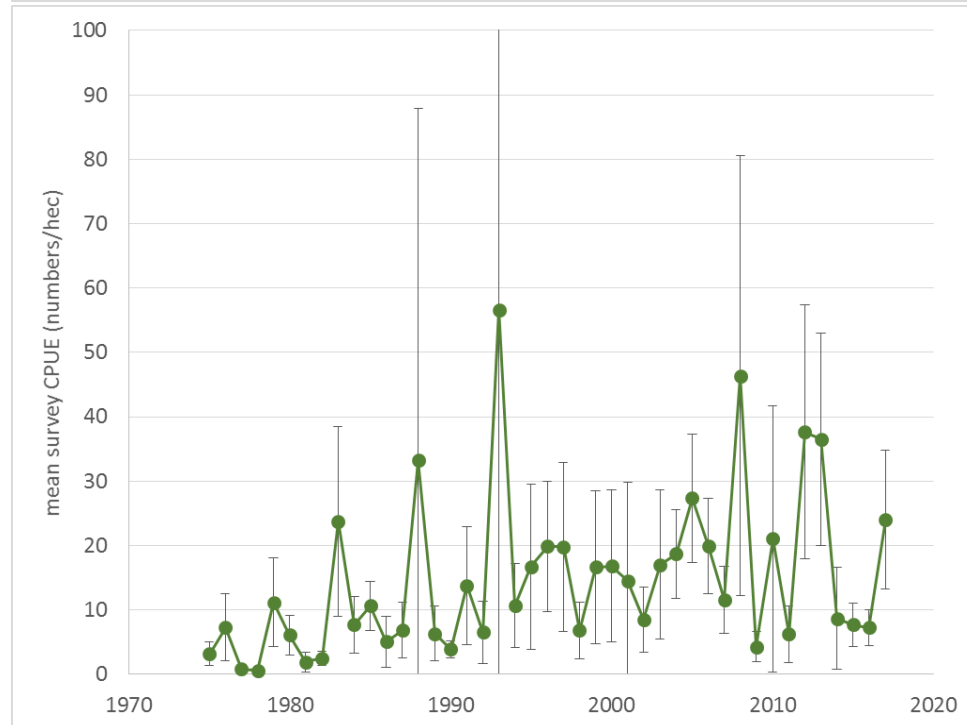
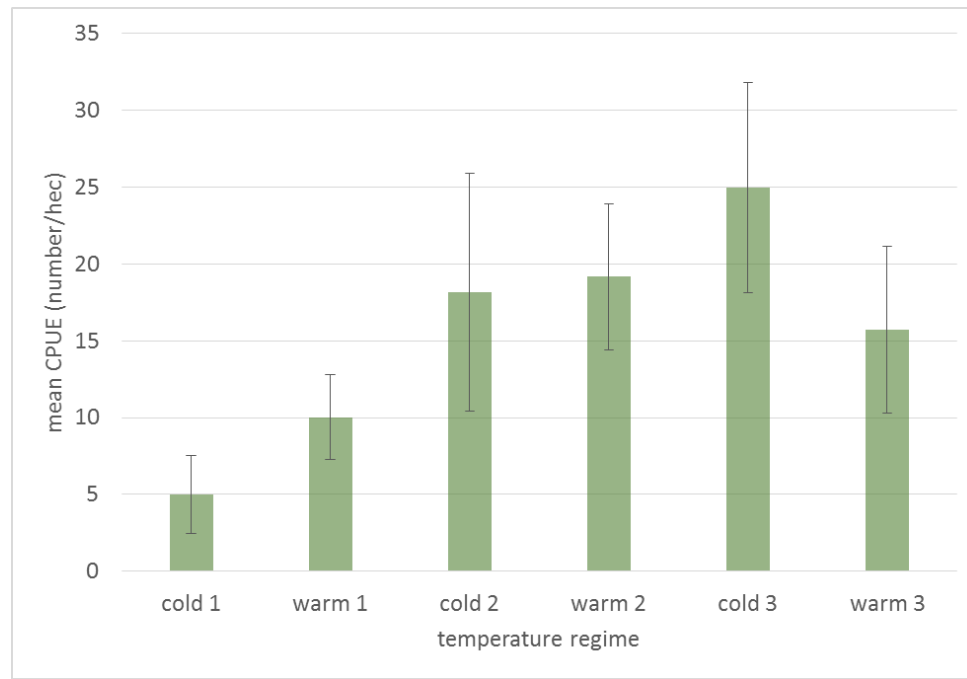
herring: spatial distribution



bottom trawl survey 2006-2017

herring: abundance

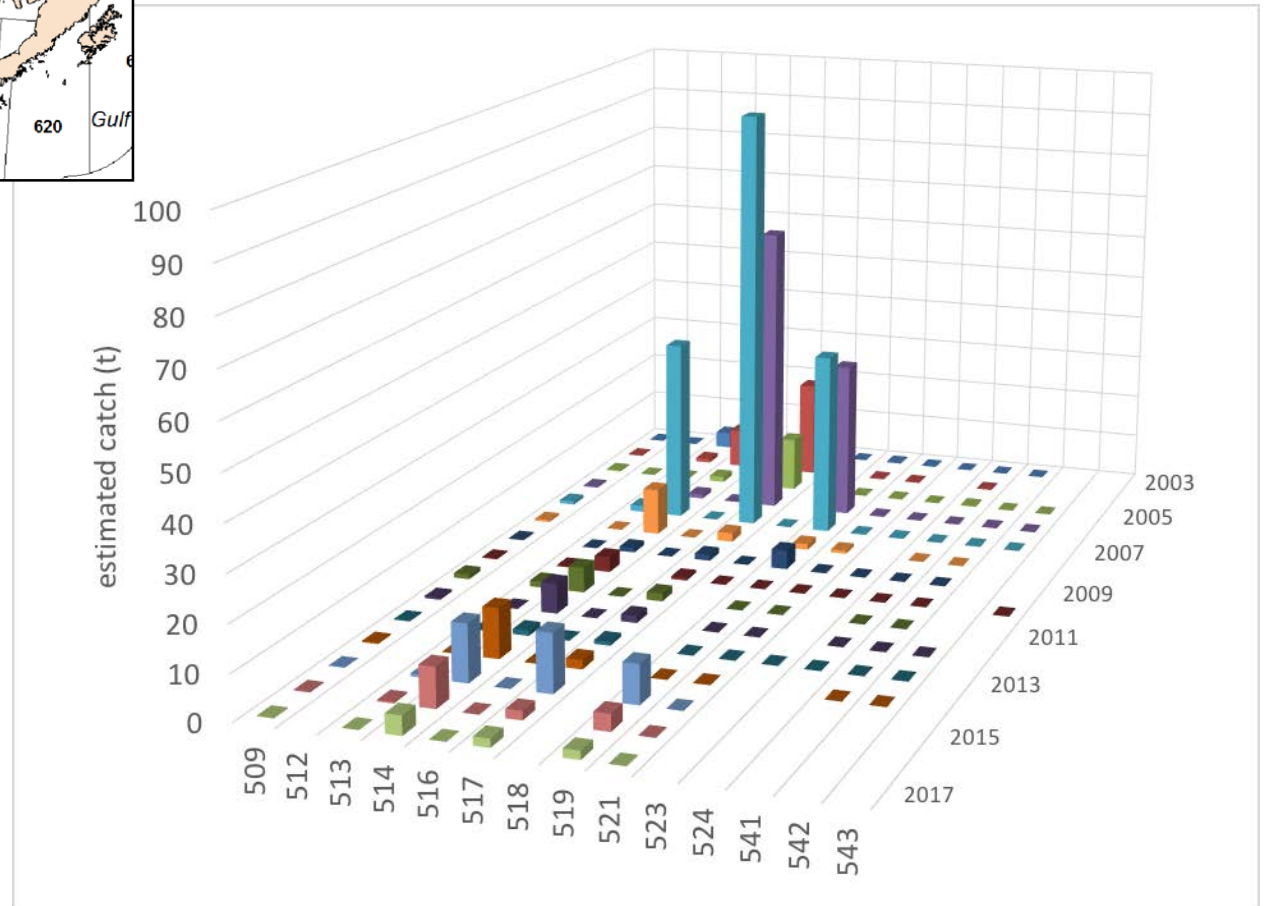
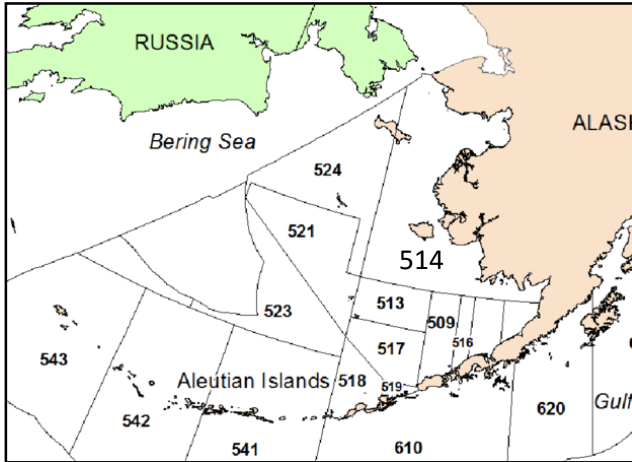
T regimes	
C1	75-76
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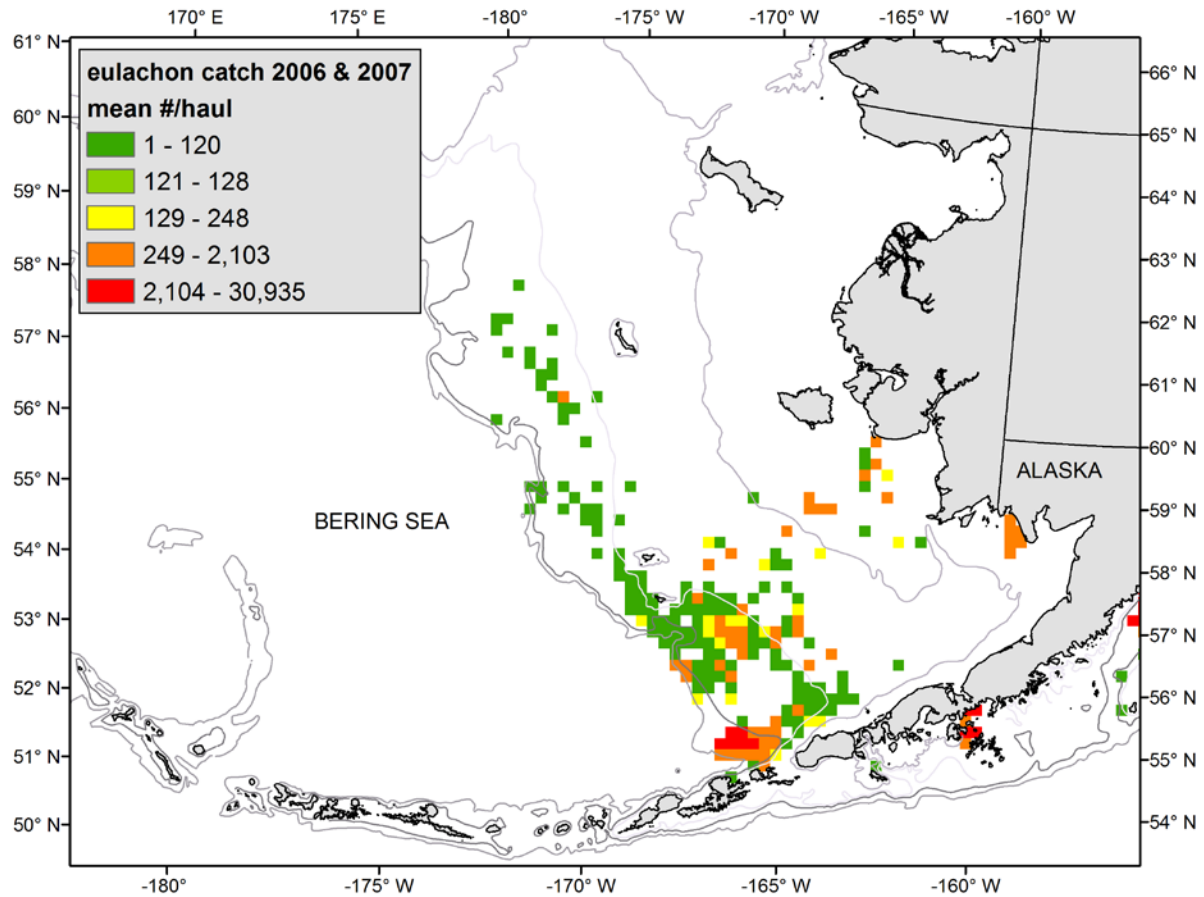
forage fish bycatch

- 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

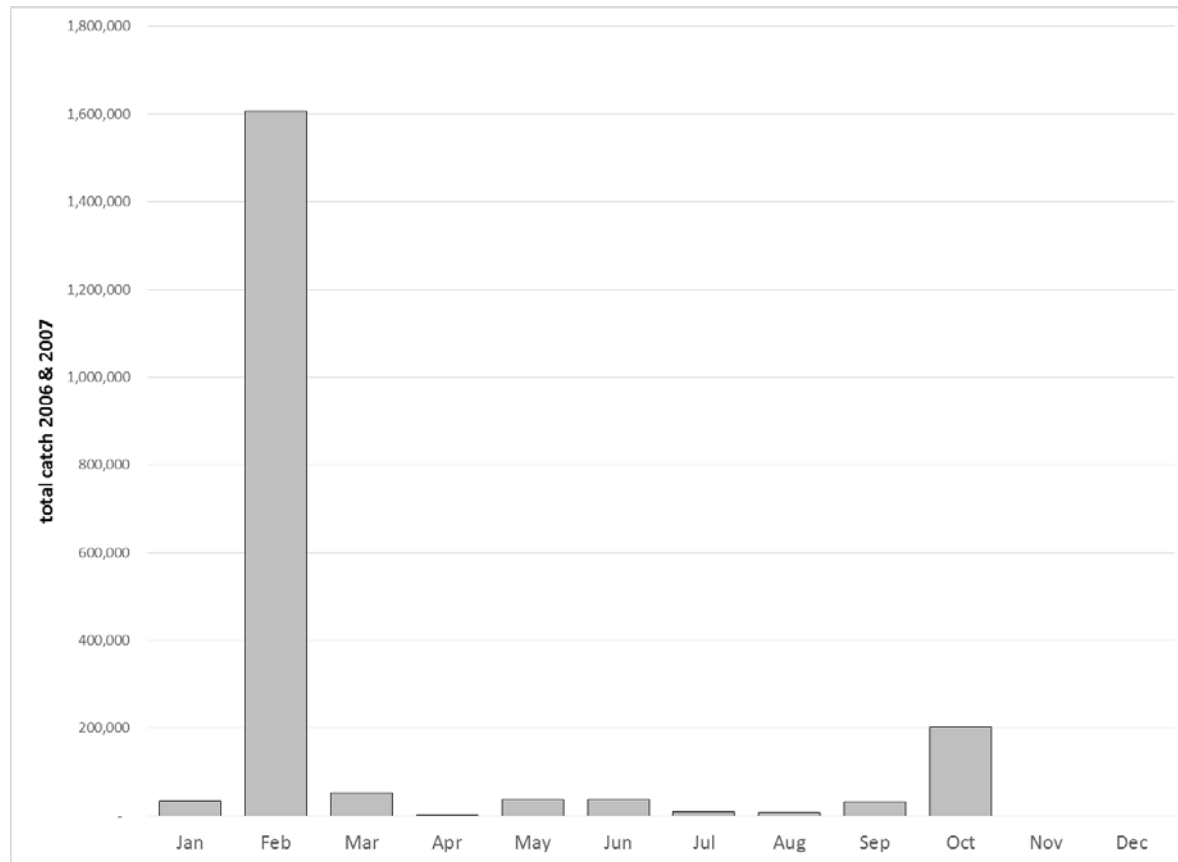


eulachon bycatch



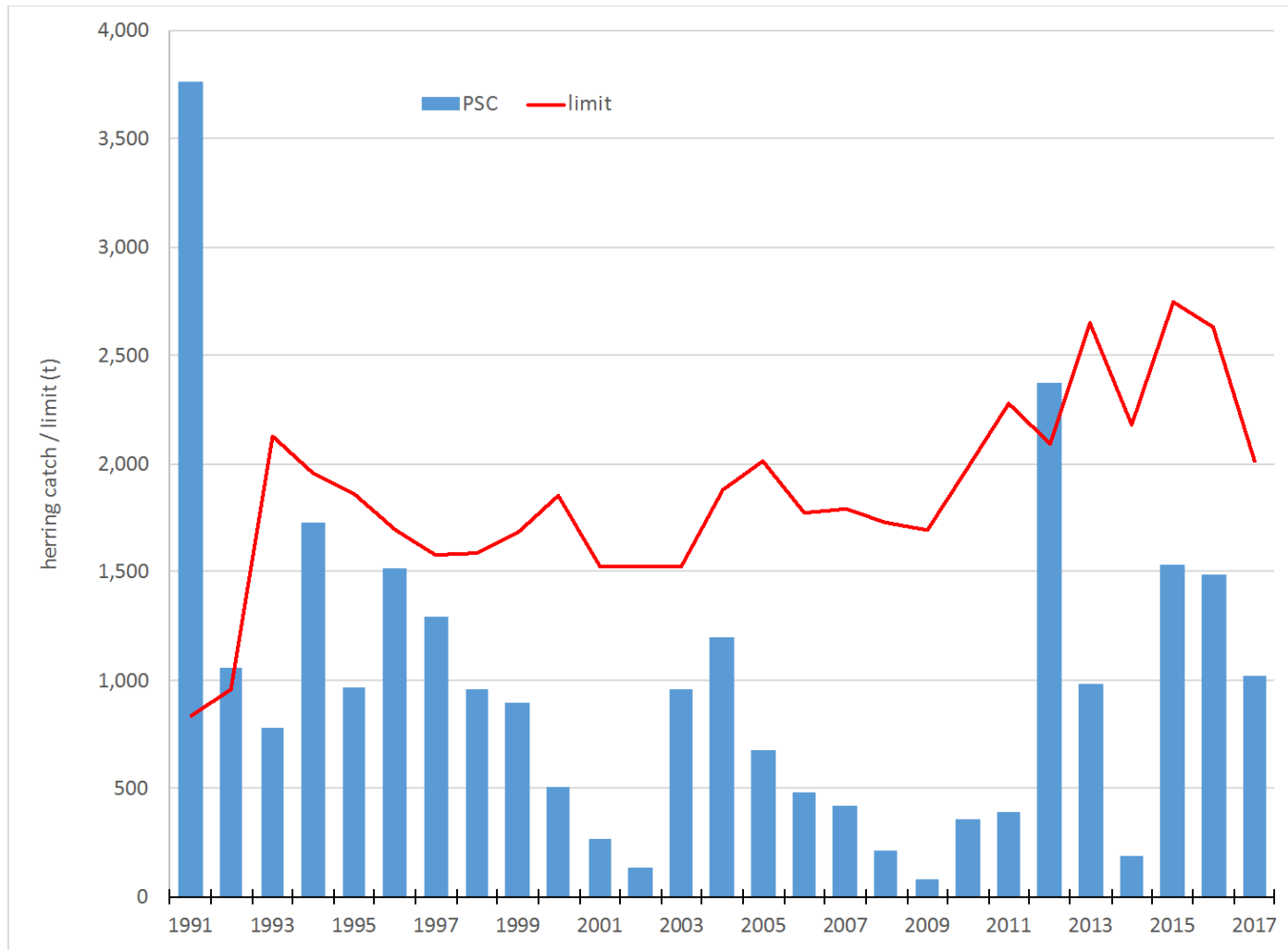
2006 & 2007 data only

eulachon bycatch

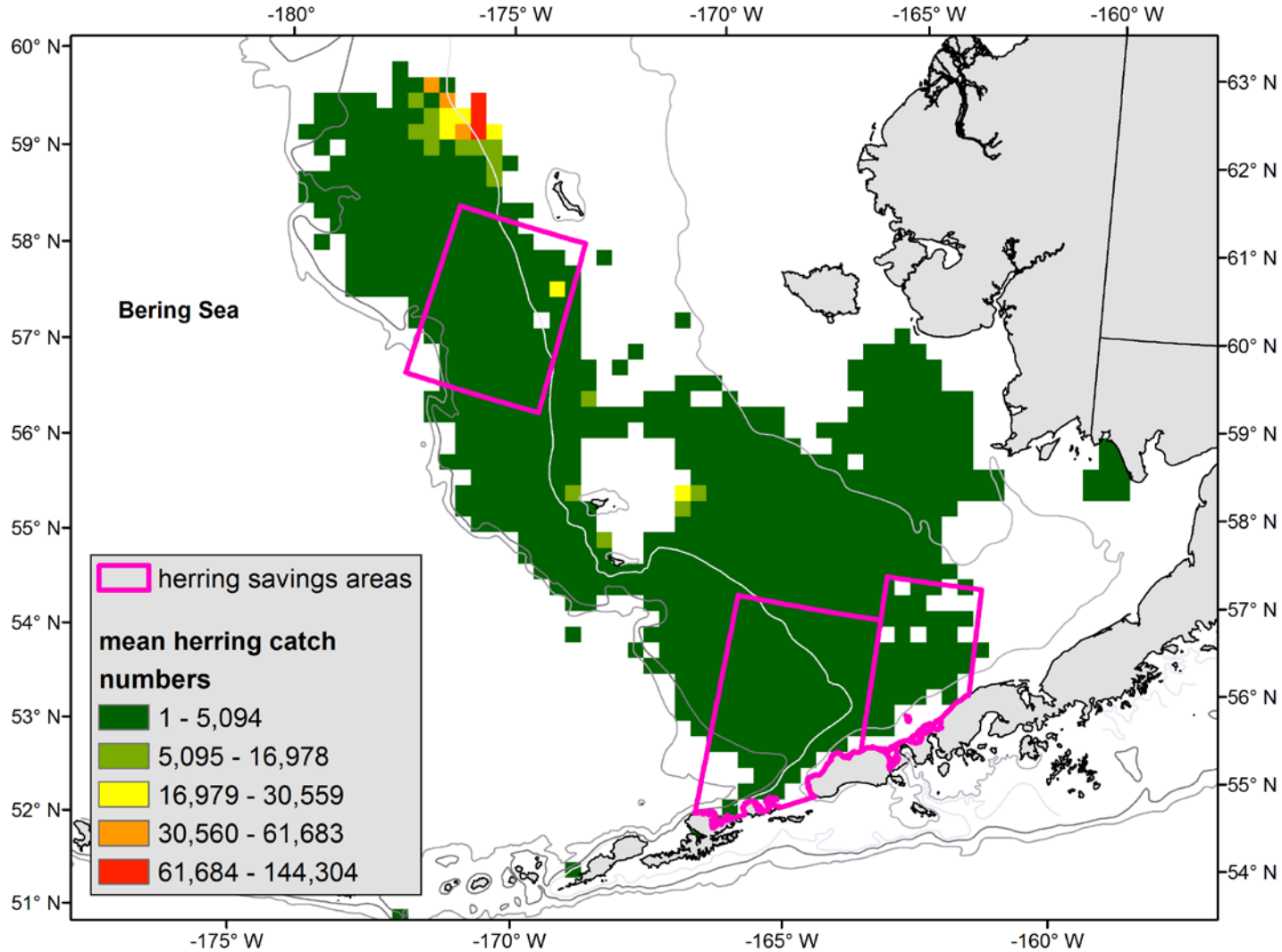


2006 & 2007 data only

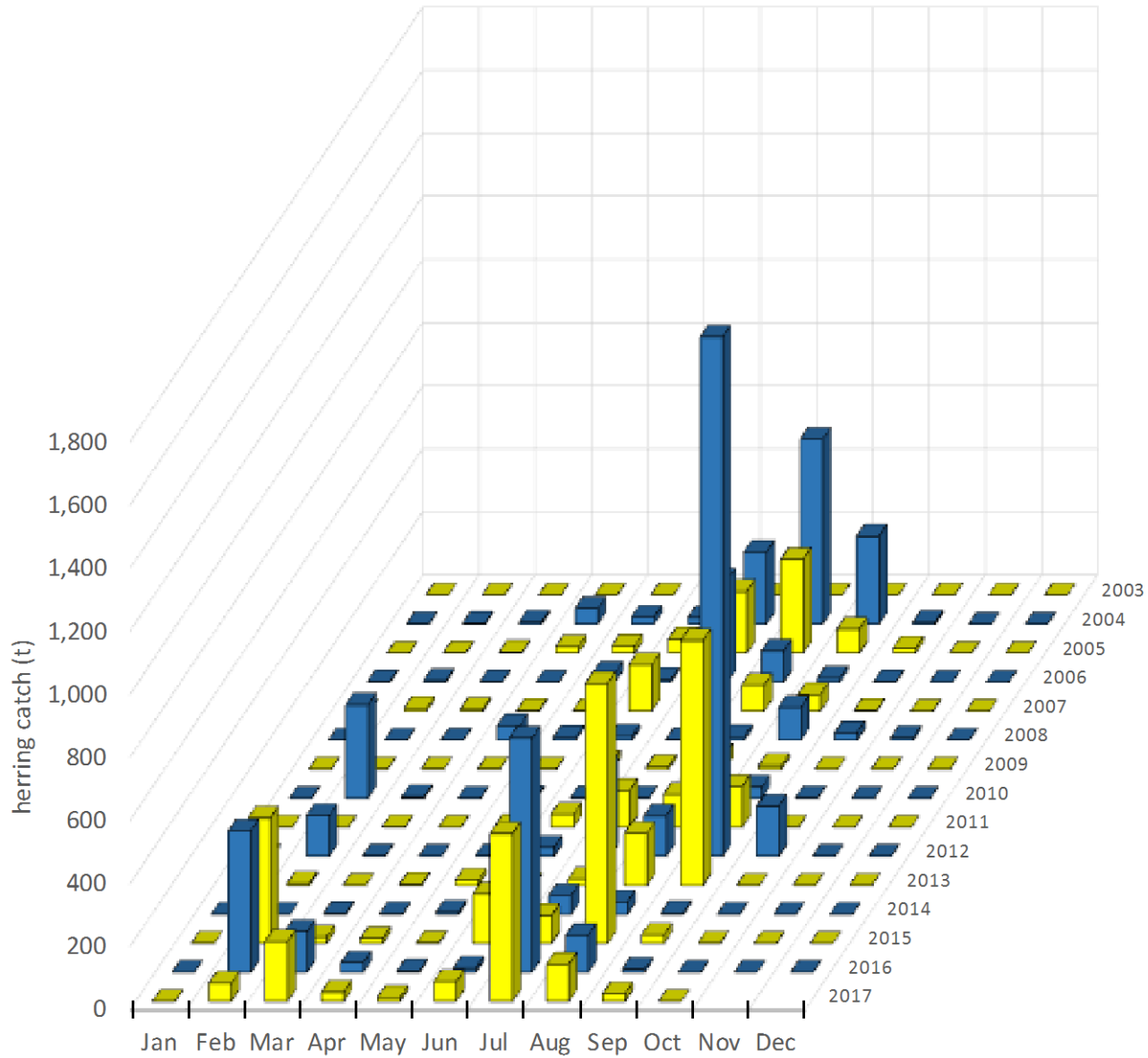
herring bycatch vs PSC limit



herring bycatch



herring bycatch



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.