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# 2023 Gulf of Alaska Biennial Bottom Trawl Survey



Groundfish Assessment Program  
Alaska Fisheries Science Center  
RACE Division

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# 2023 GOA bottom trawl survey

The survey took place between May 18th through August 6th, 2023. The previous GOA survey was in 2021.

We successfully surveyed **526** stations with two survey vessels.



# Survey purpose

To collect standardized and fishery-independent time series of:

- Relative abundance
- Distribution
- Age and biological condition

Support > 20 species / species complex stock assessments in the Gulf of Alaska





# Survey charter vessels



## *F/V Alaska Provider*

2013, 2015, 2021, 2023

Cpt Loren Reynolds,  
> 50 yrs experience



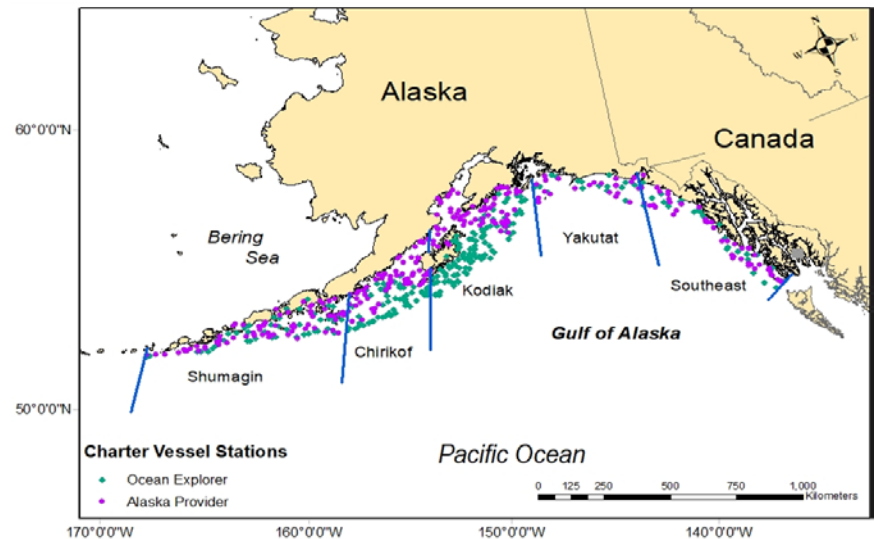
## *F/V Ocean Explorer*

2011, 2013, 2015, 2017,  
2019, 2021, 2023

Cpt Dan Carney,  
> 30 yrs experience

# Survey design

- Stratified random survey
- 54 strata defined by depth, statistical district, geography
- Station allocation optimized by abundance, variance, stratum area, and economic value
- 15 minute trawls (usually about 1.5 km distance)
- Poly Nor'Eastern trawl with roller & bobbin ground gear



# Data status

- GOA 2023 data are finalized
- Age composition will be updated as ages become available
- Data Products will be available on FOSS<sup>1</sup> and are available on AKFIN<sup>2</sup>
- Innovation and Collaboration
  - SMART
  - *gapindex*
  - GOA restratification







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# Collections



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# Species lengths collected



Common name	Number of lengths collected
arrowtooth flounder	13602
Atka mackerel	288
blackspotted RF	260
Dover sole	1701
flathead sole	4933
northern rock sole	259
Pacific cod	3947
POP	3774
rex sole	4674
sablefish	2115
shortraker RF	251
silvergray RF	377
southern rock sole	3577
walleye pollock	8000
eulachon	358
big skate	105
<b>Total</b>	<b>48221</b>



# Species otoliths collected

Common name	Target	% difference	Target Met?
arrowtooth flounder	600	54	✓
Atka mackerel	100	105	✓
blackspotted RF	250	-10	✓
Dover sole	500	-39	✗
dusky RF	500	-35	✗
flathead sole	500	-9	✓
harlequin RF	200	-36	✗
northern rock sole	500	-13	✓
northern RF	500	-45	✗
Pacific cod	1000	14	✓
POP	1000	-4	✓
rex sole	700	-5	✓
rougeye RF	300	2	✓
sablefish	350	-36	✗
shortraker RF	400	-40	✗
silvergray RF	200	44	✓
southern rock sole	500	<1	✓
walleye pollock	1500	9	✓



# Other Projects and Special Collections

## Acoustics

ES 60 acoustic data collection

## Environmental Monitoring

Evaluation of eDNA and bottom trawl data similarities  
Harmful algal bloom (HAB) toxins in Alaskan food web  
Measuring light intensity on bottom trawl surveys  
Drop-camera photos in untrawlable habitat

## Population Genetics

Flatfish genomics  
Pacific cod genetics  
Northern and dusky RF genetics  
Ecology of Arctic and Pacific lampreys  
POP Genetics and morphometrics  
Shark genetics and age structure (sleeper/salmon)  
Sponge identification and genetics in the Gulf of Alaska  
Larval sandlance genetics

## Feeding Habits

Atka mackerel, arrowtooth flounder, Kamchatka flounder,  
Northern rockfish, Pacific cod, Pacific Halibut, Pacific ocean  
perch, pollock, sablefish

## Miscellaneous

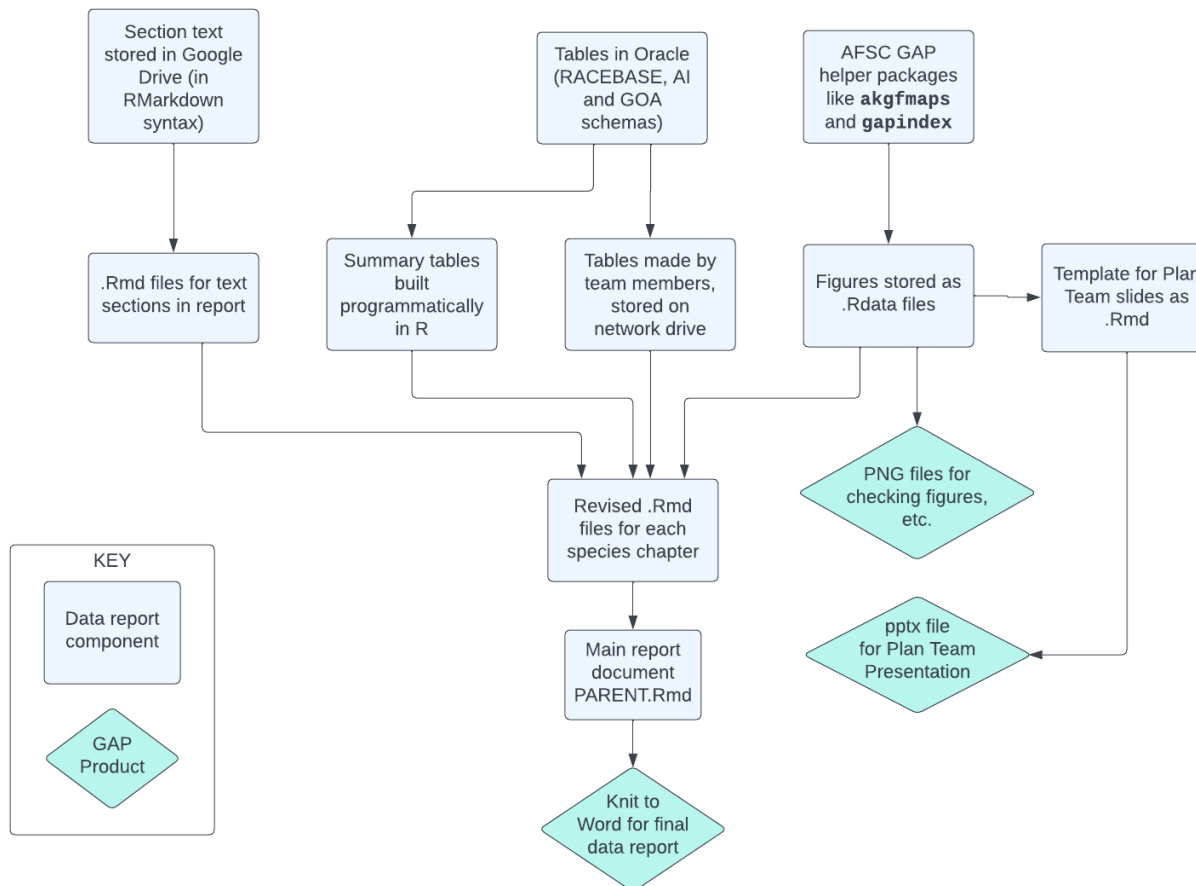
IPHC Pacific halibut data collection and tagging  
JPA Isotopes  
Pacific cod tagging  
GOATS validation  
Visual maturity collection of flatfish and rockfish

## Specimen Collection

Coral collections  
Mollusk collection  
NWFSC + UW voucher collection  
Observer fish and crab training specimens  
Juvenile prowlfish  
Market squid



# Automated data reports

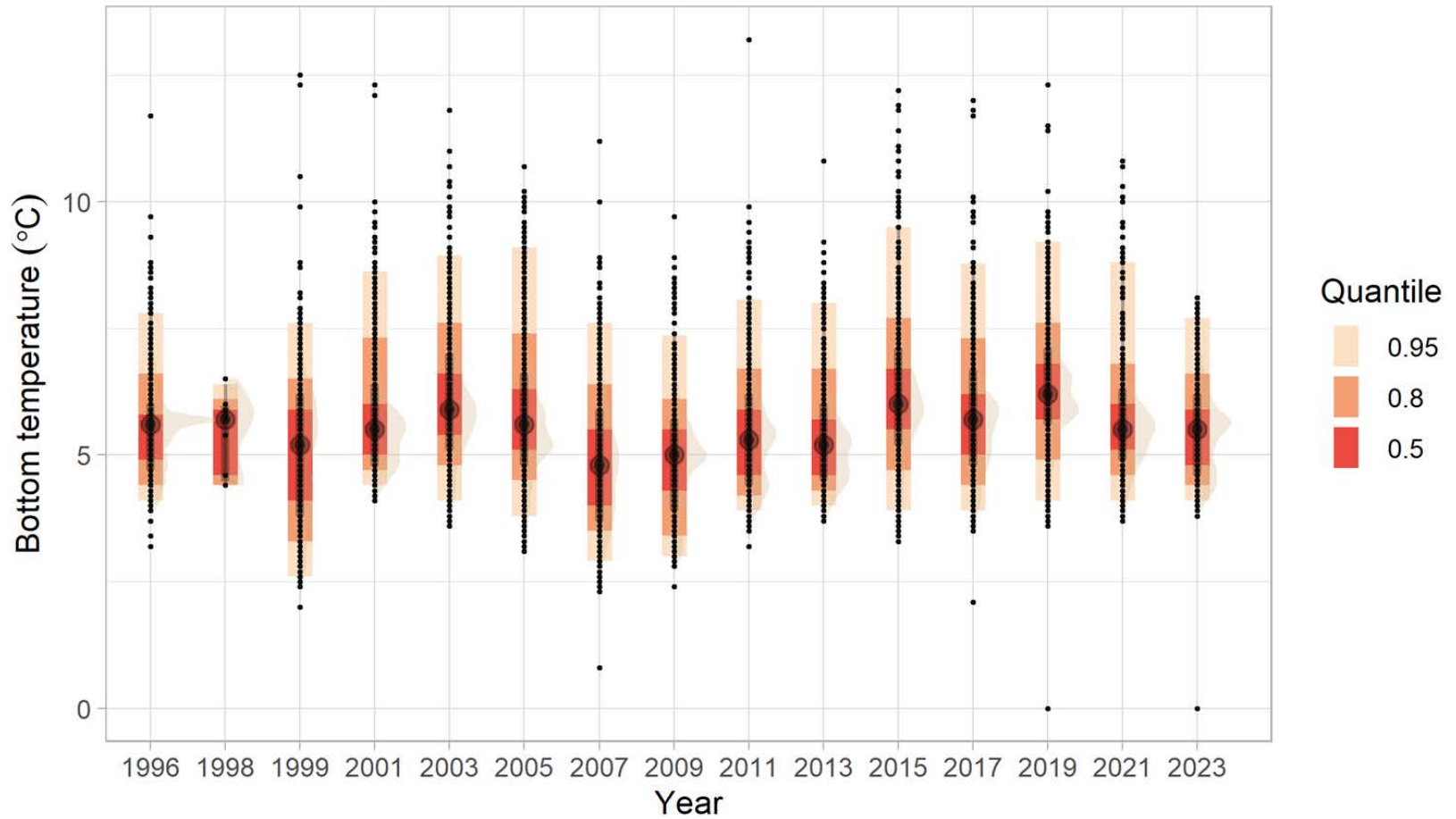


Flow of new automated data reports

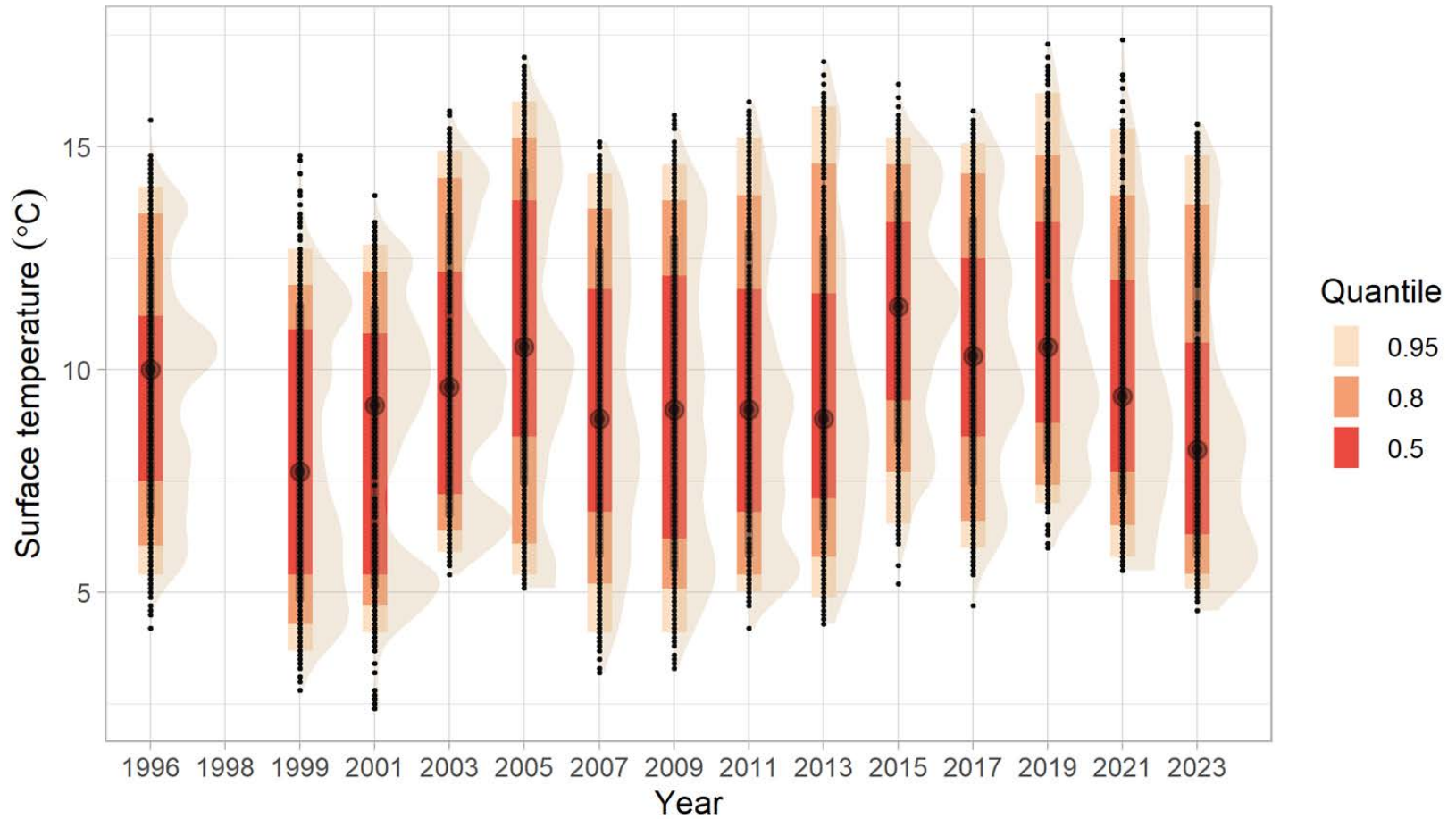
In progress at the AFSC GAP products [GitHub page](#).



# Bottom temperature (°C)



# Surface temperature (°C)



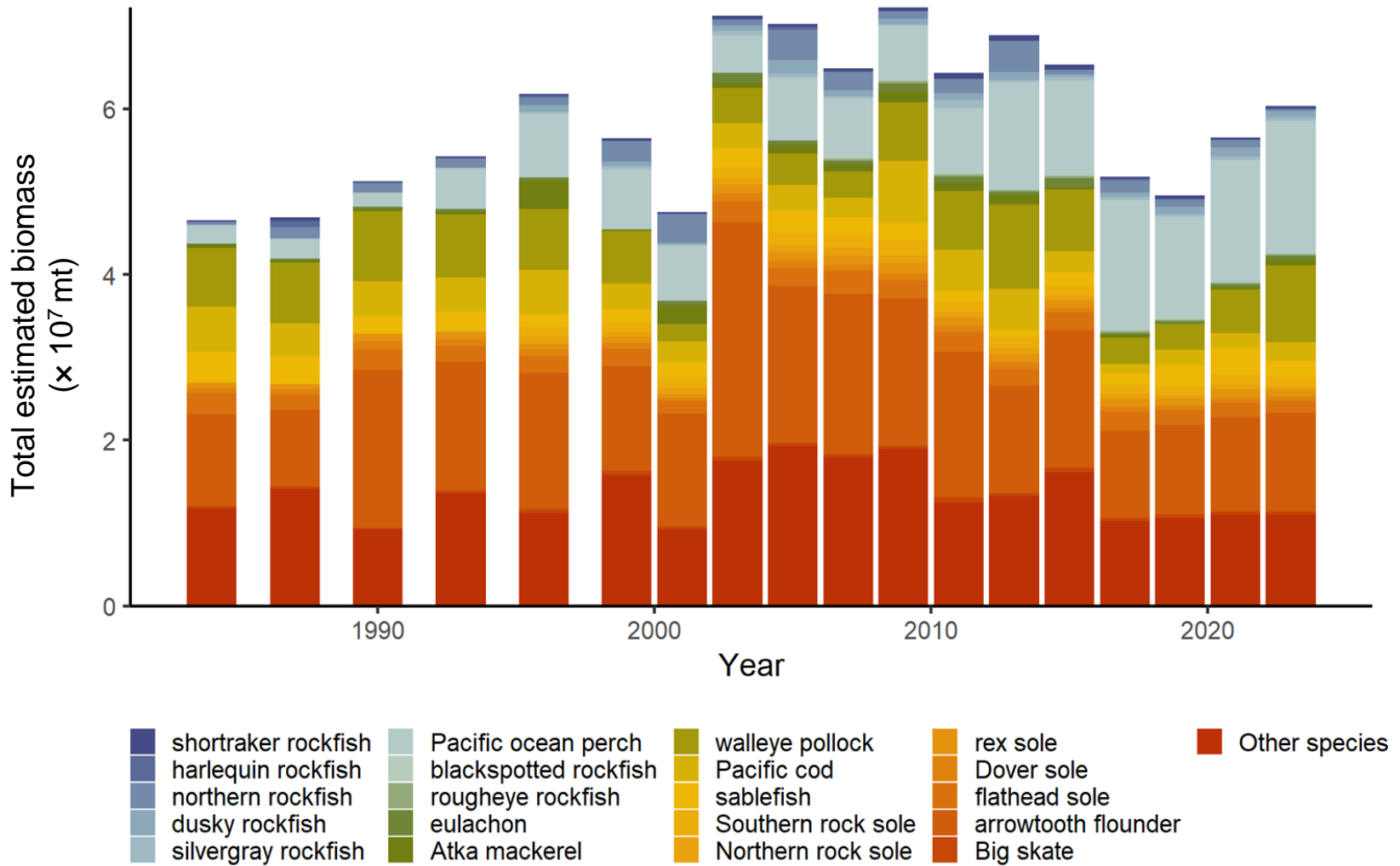


## Trends:

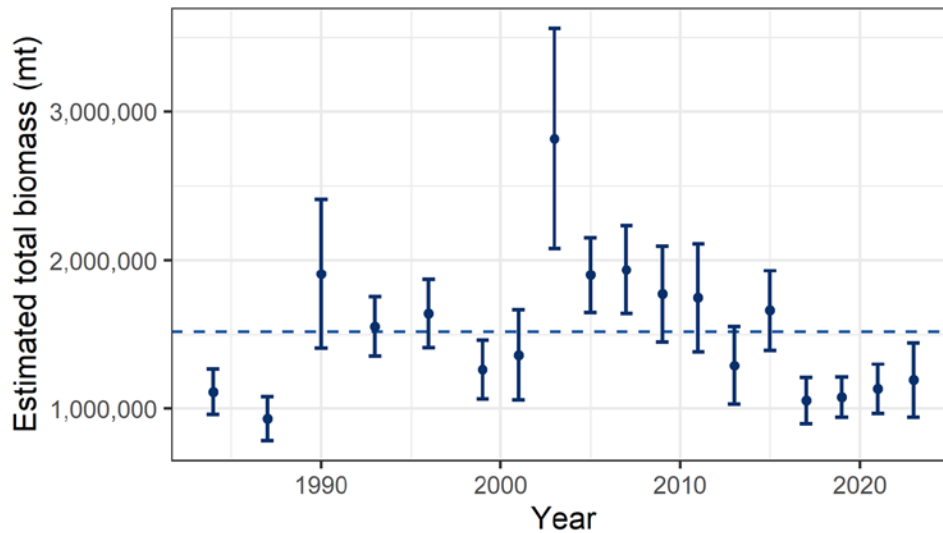
- ❑ Biomass
- ❑ Length Frequency
- ❑ Spatial Distribution



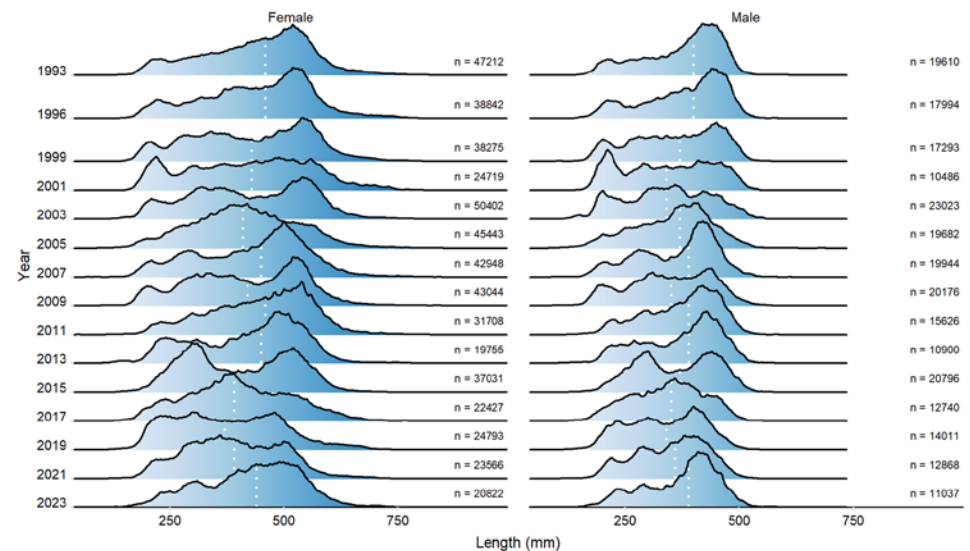
# Catch composition



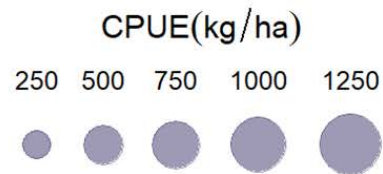
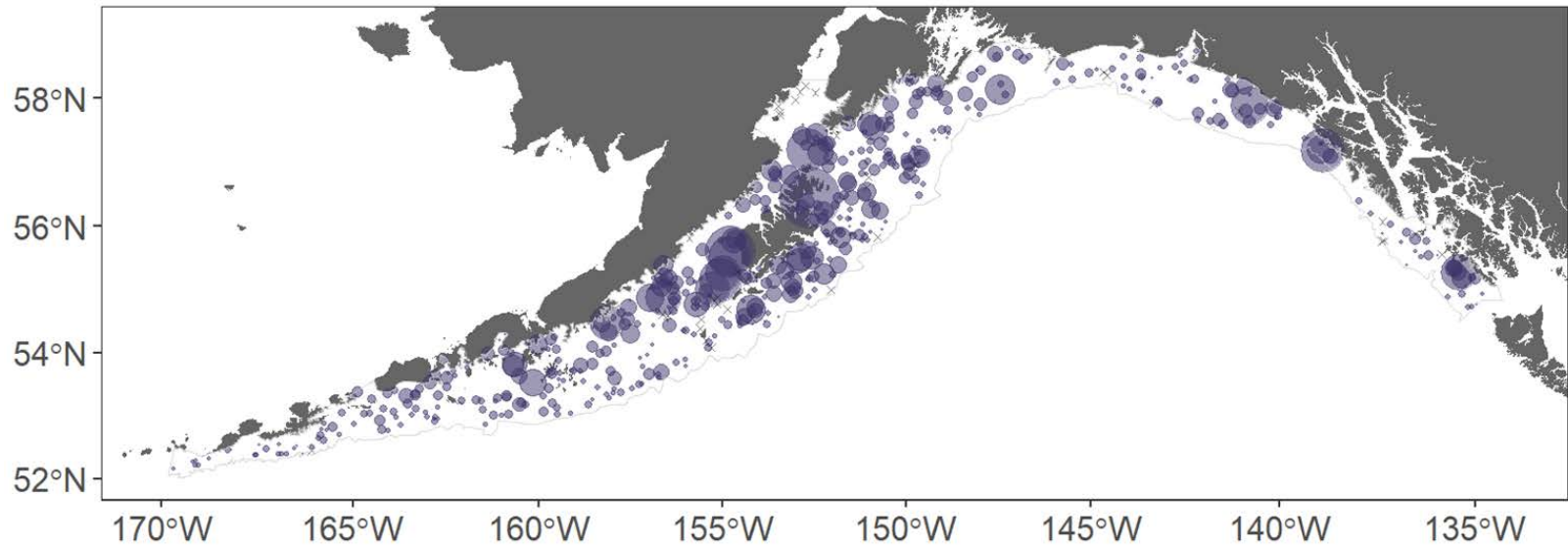
# Arrowtooth flounder (*Atheresthes stomias*)



- Total caught in 2023: ~1193000 mt
- 5.3% from 2021 (~60000 mt)

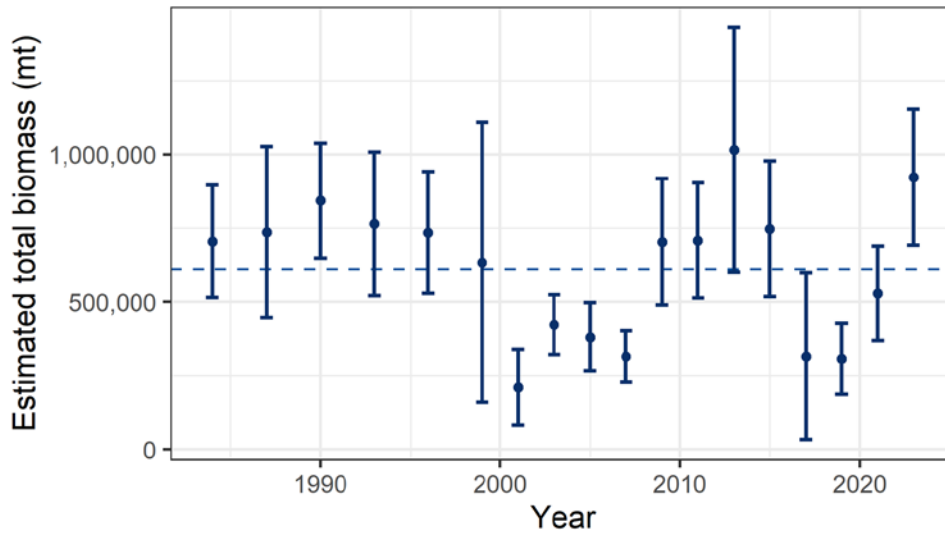


# Arrowtooth flounder (*Atheresthes stomias*)

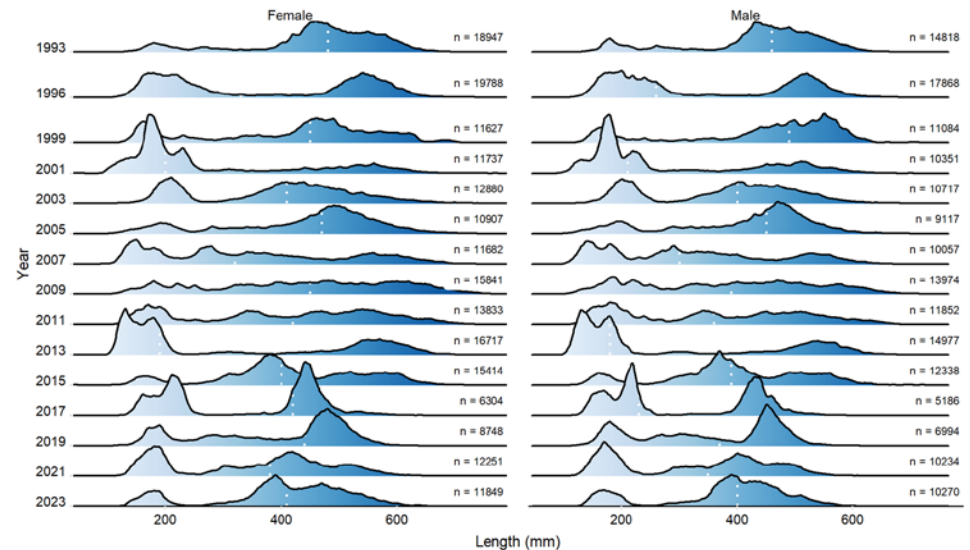




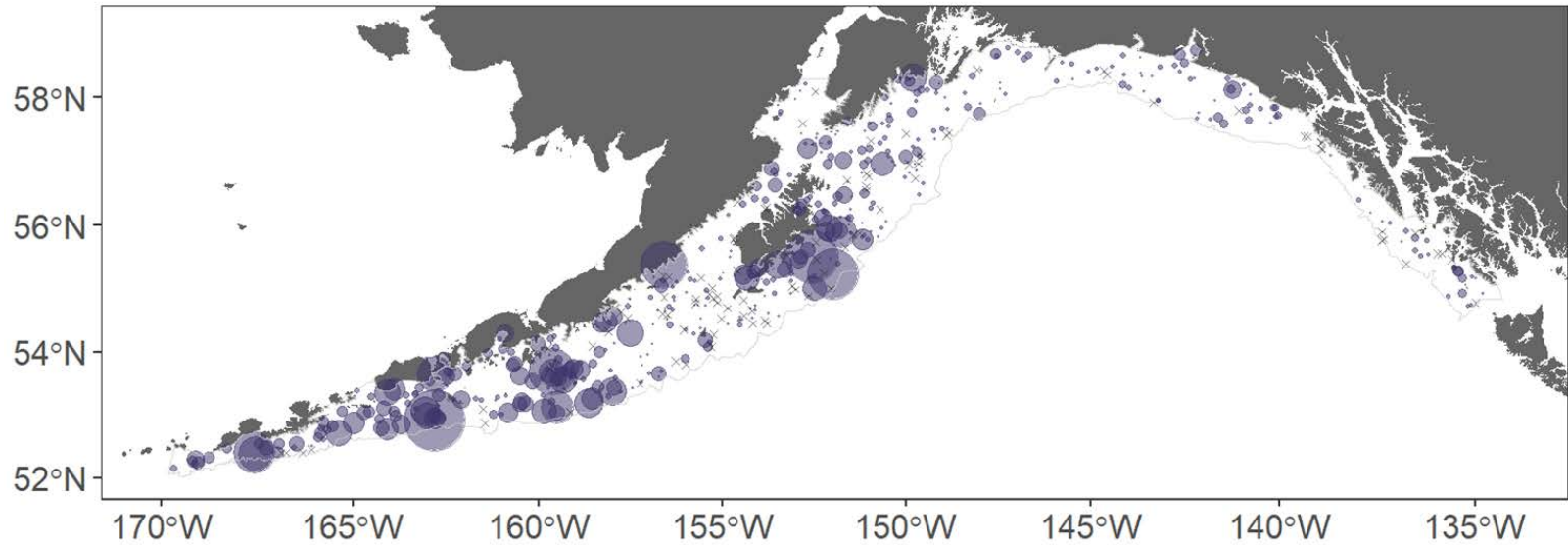
# Walleye pollock (*Gadus chalcogrammus*)



- Total caught in 2023: ~922000 mt
- 74.3% from 2021 (~393000 mt)



# Walleye pollock (*Gadus chalcogrammus*)

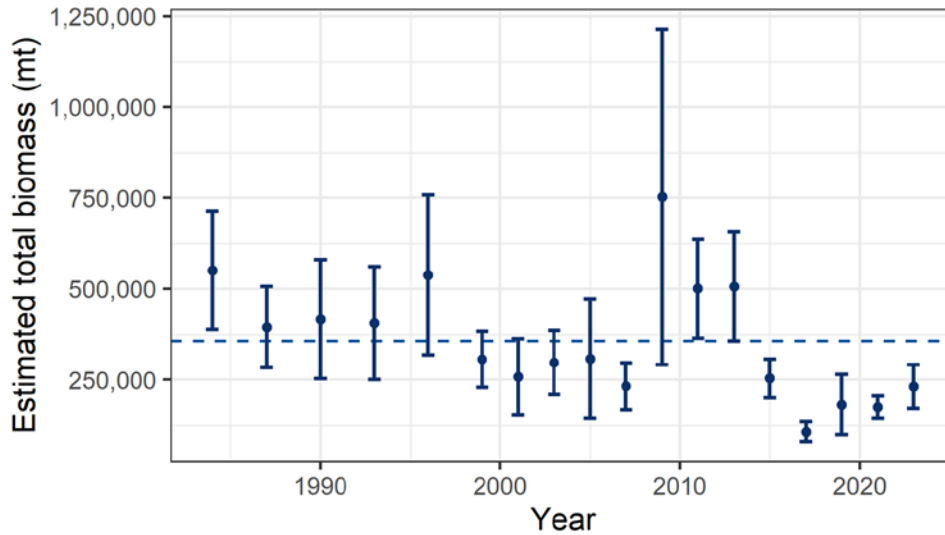


CPUE(kg/ha)

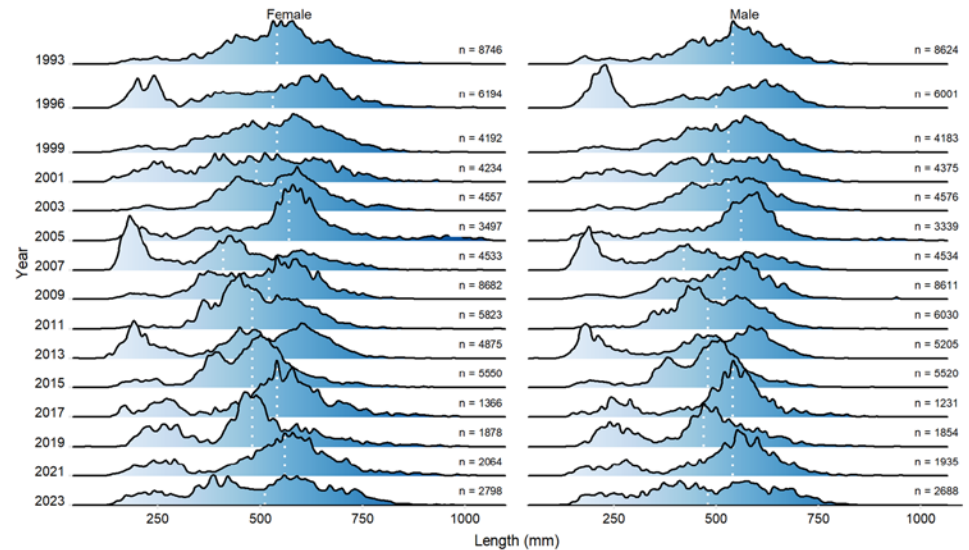
500 1000



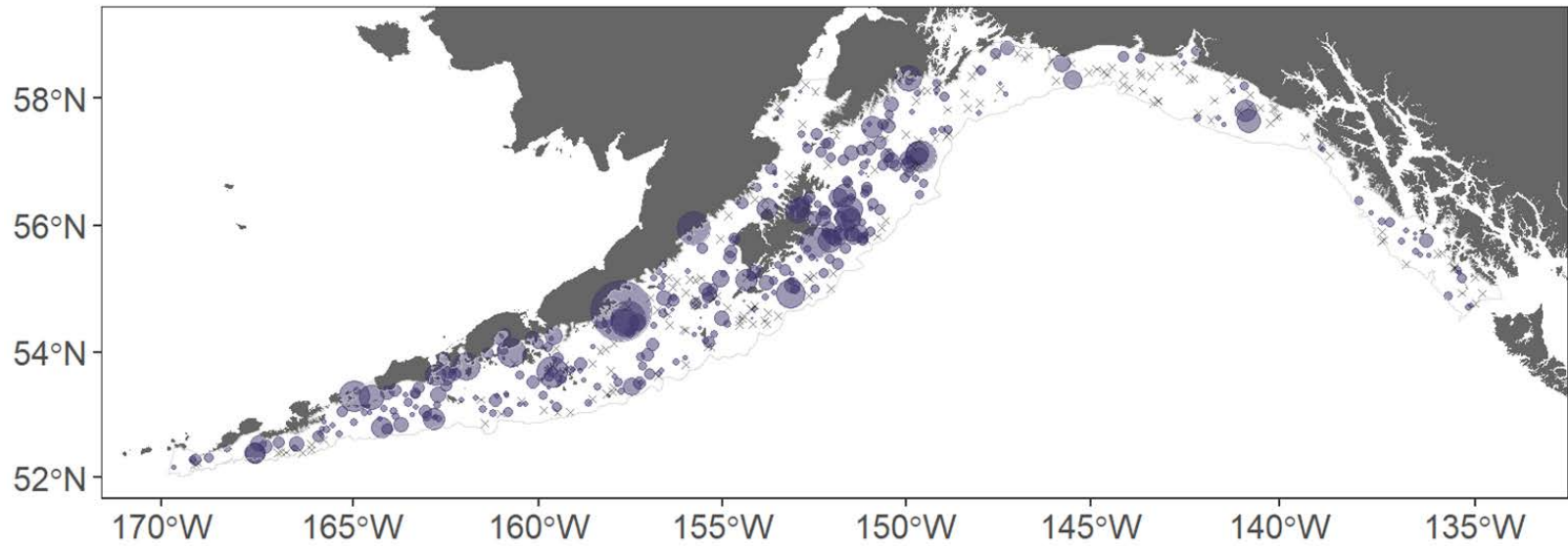
# Pacific cod (*Gadus macrocephalus*)



- Total caught in 2023: ~231000 mt
- 32.5% from 2021 (~57000 mt)



# Pacific cod (*Gadus macrocephalus*)



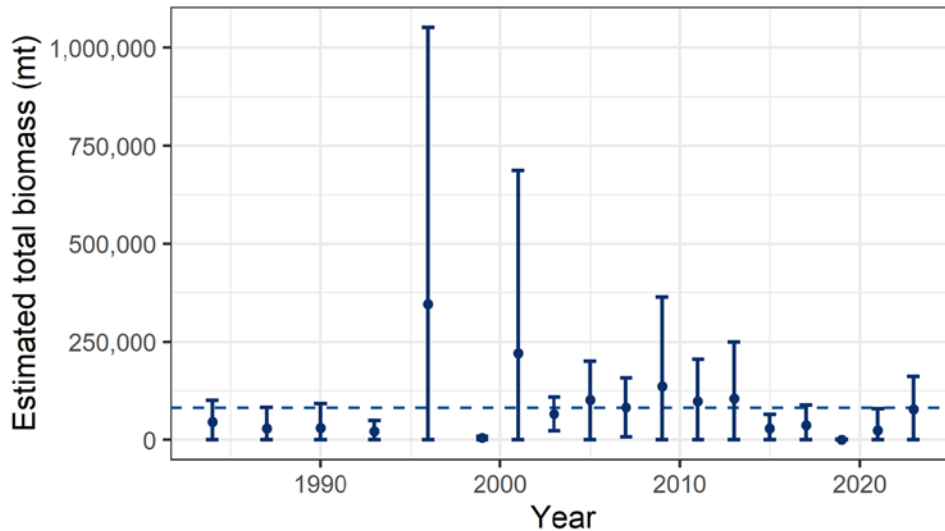
CPUE(kg/ha)

100 200 300

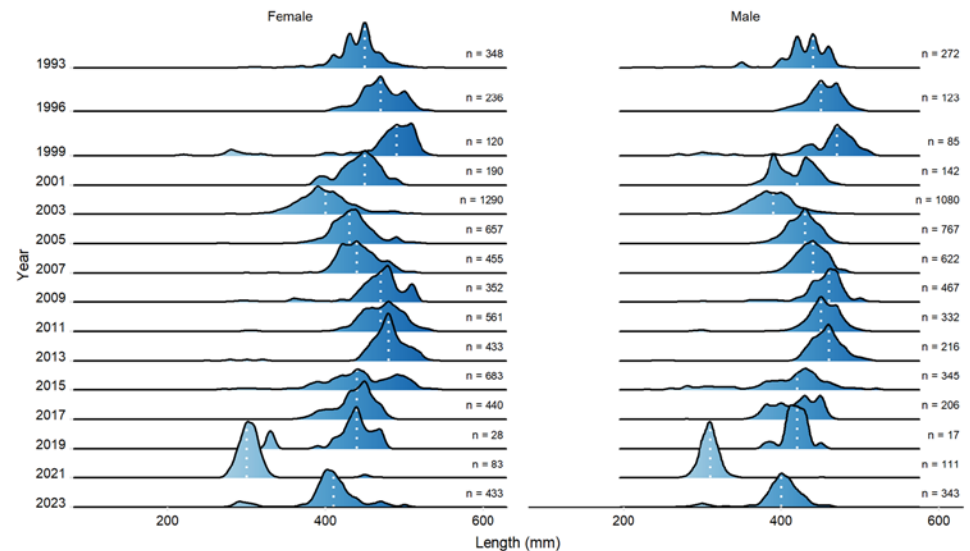




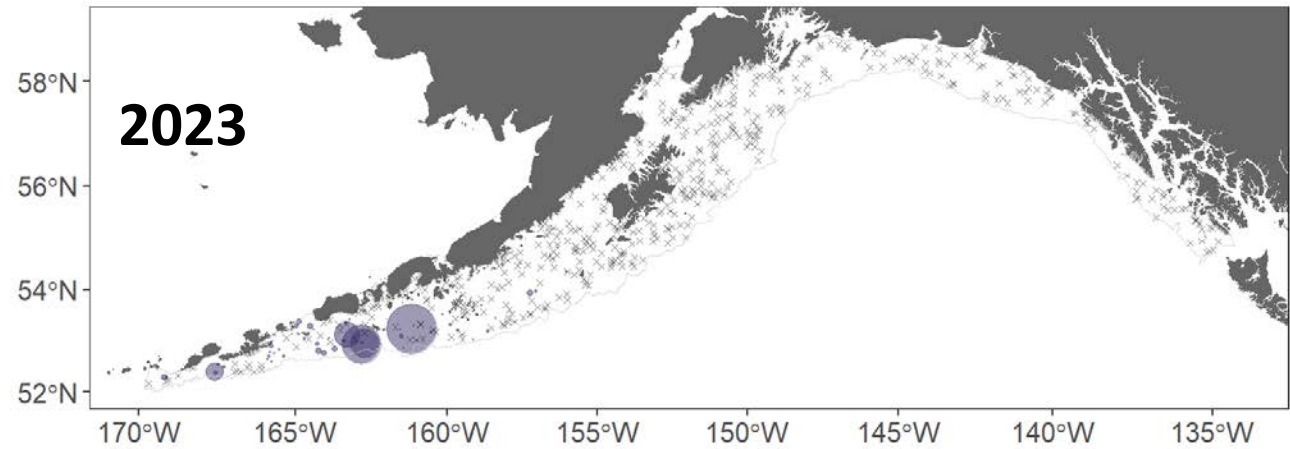
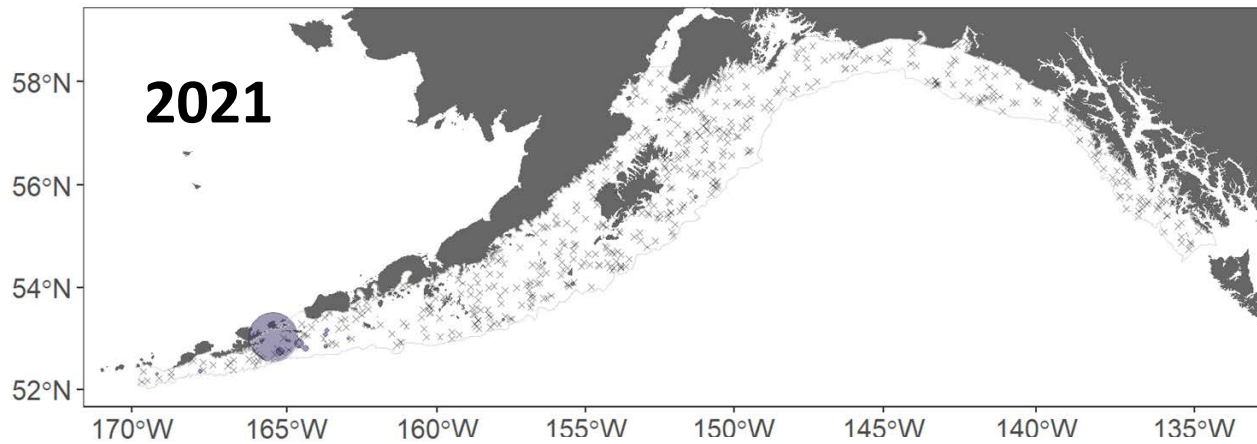
# Atka mackerel (*Pleurogrammus monopterygius*)



- Total caught in 2023: ~78000 mt
- 219% from 2021 (~53000 mt)



# Atka mackerel (*Pleurogrammus monopterygius*)

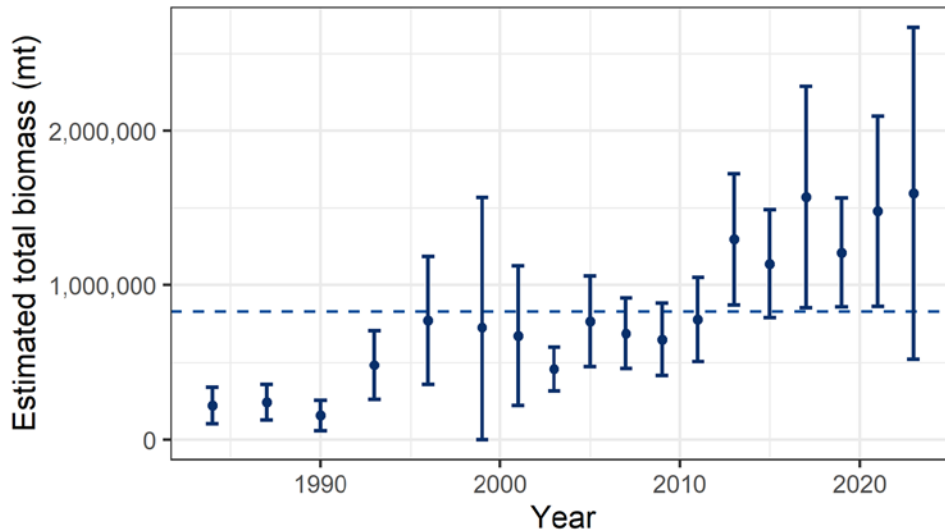


CPUE(kg/ha)

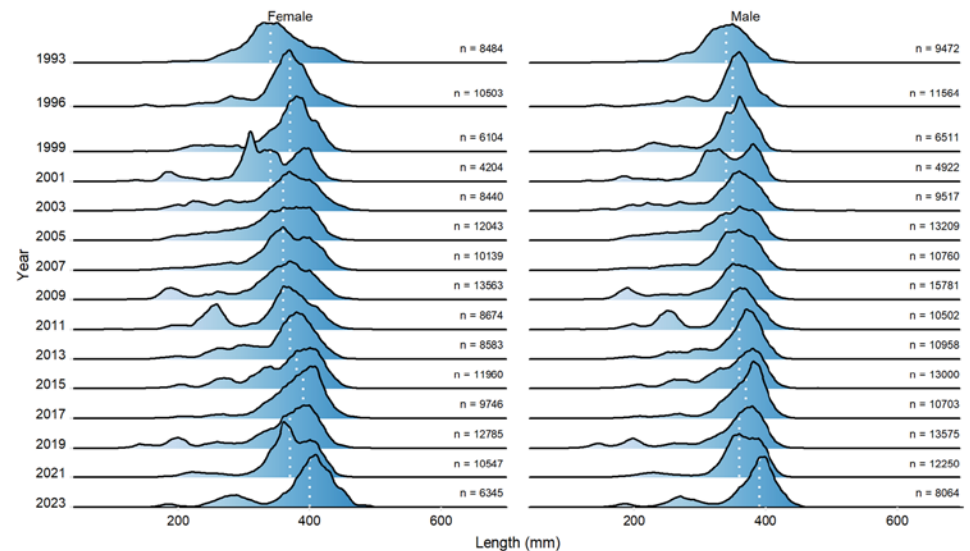
200 400 600



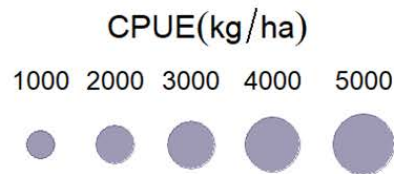
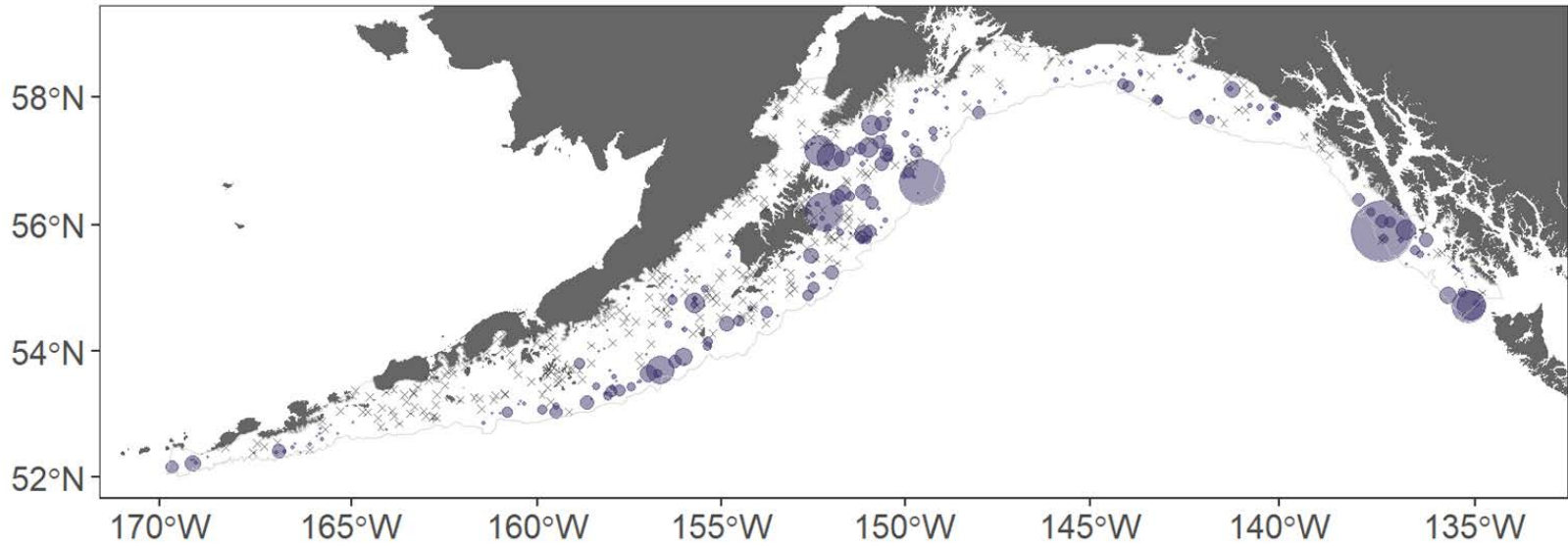
# Pacific ocean perch (*Sebastes alutus*)



- Total caught in 2023: ~1600000 mt
- 7.9% from 2021 (~117000 mt)

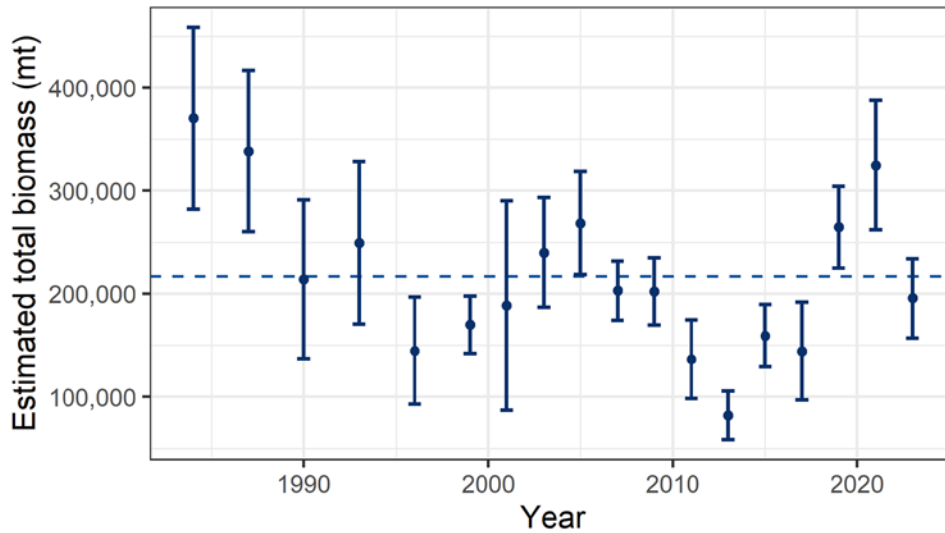


# Pacific ocean perch (*Sebastes alutus*)

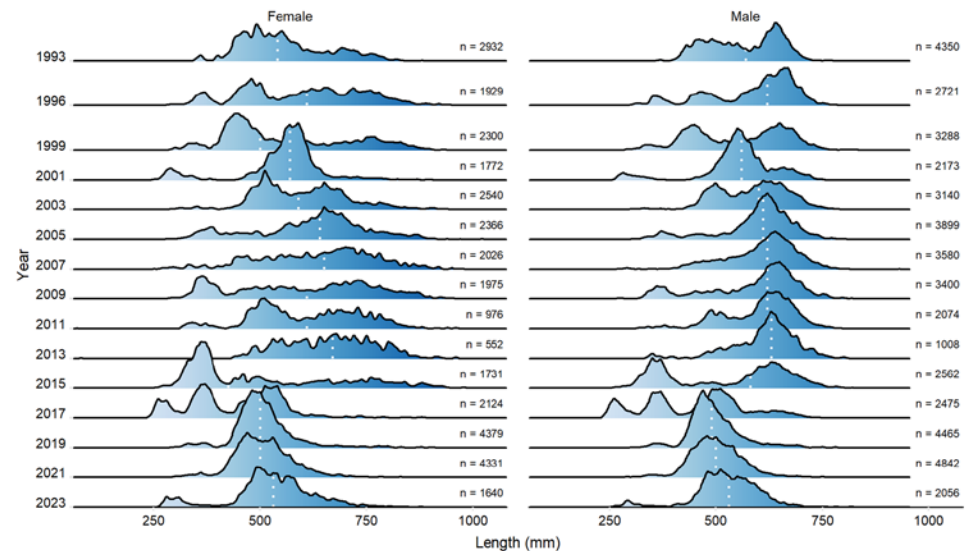




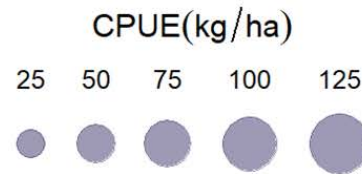
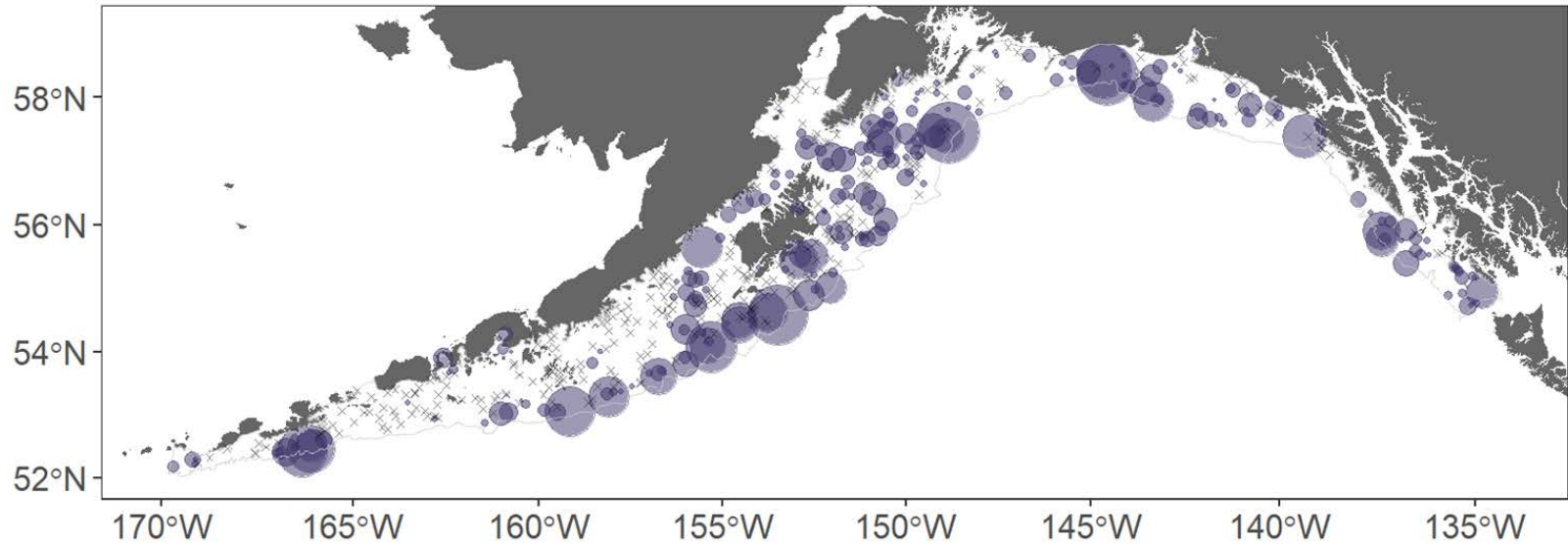
# Sablefish (*Anoplopoma fimbria*)



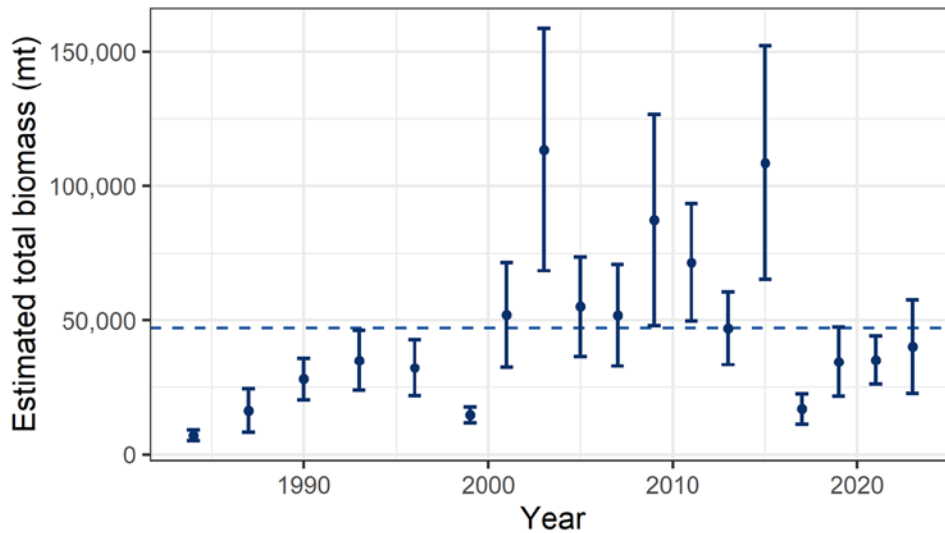
- Total caught in 2023: ~196000 mt
- **-39.8%** from 2021 (~130000 mt)



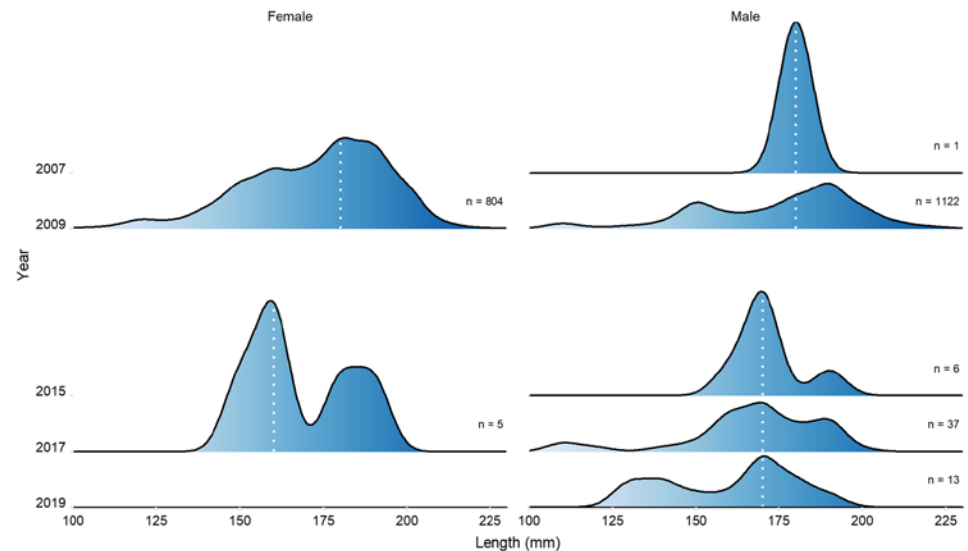
# Sablefish (*Anoplopoma fimbria*)



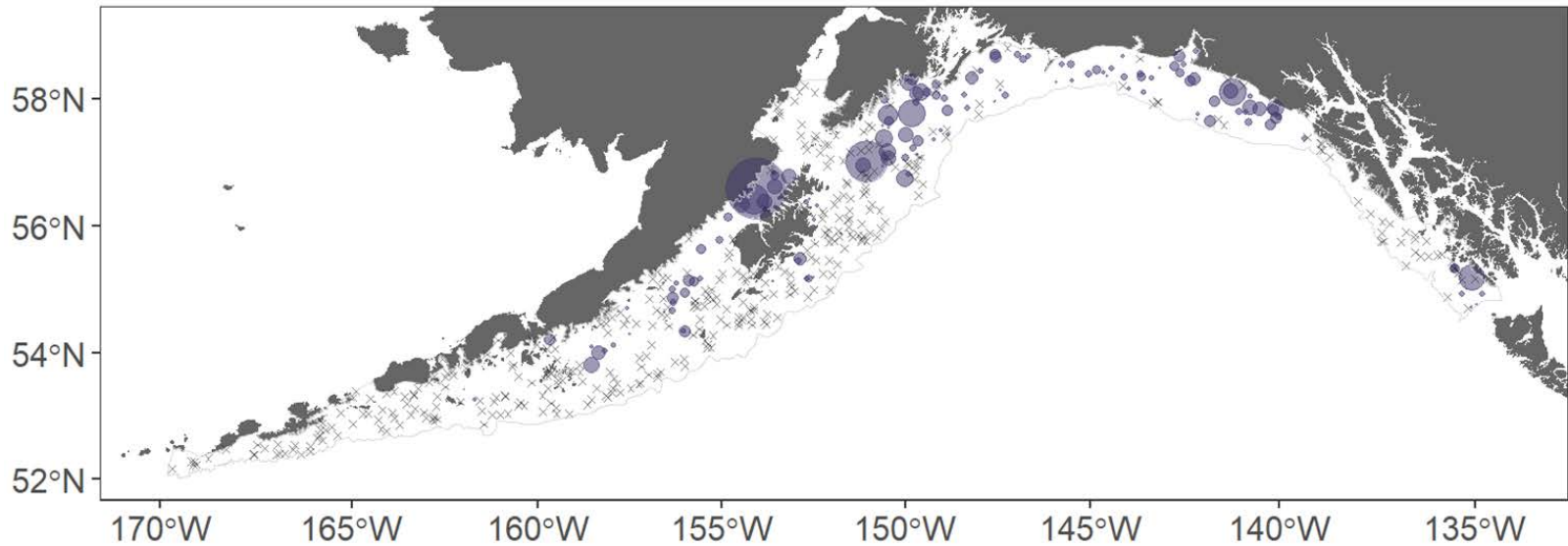
# Eulachon (*Thaleichthys pacificus*)



- Total caught in 2023: ~40000 mt
- 14.1% from 2021 (~5000 mt)



# Eulachon (*Thaleichthys pacificus*)



CPUE(kg/ha)

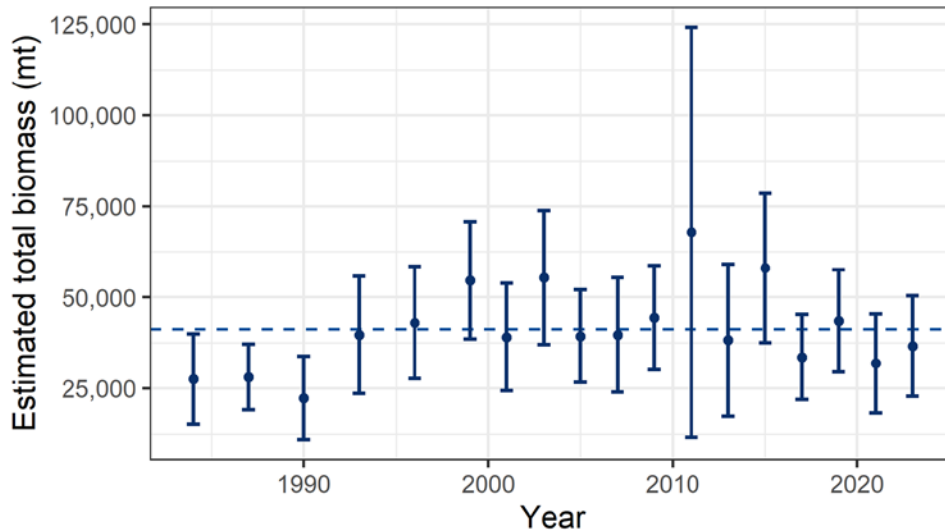
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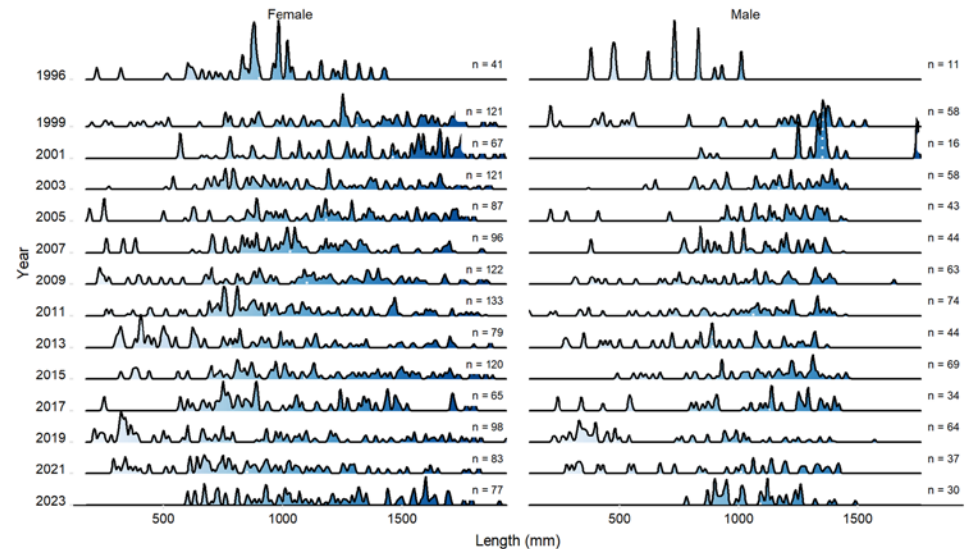
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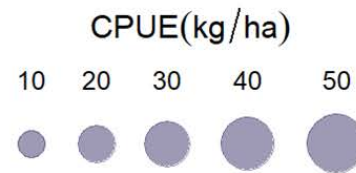
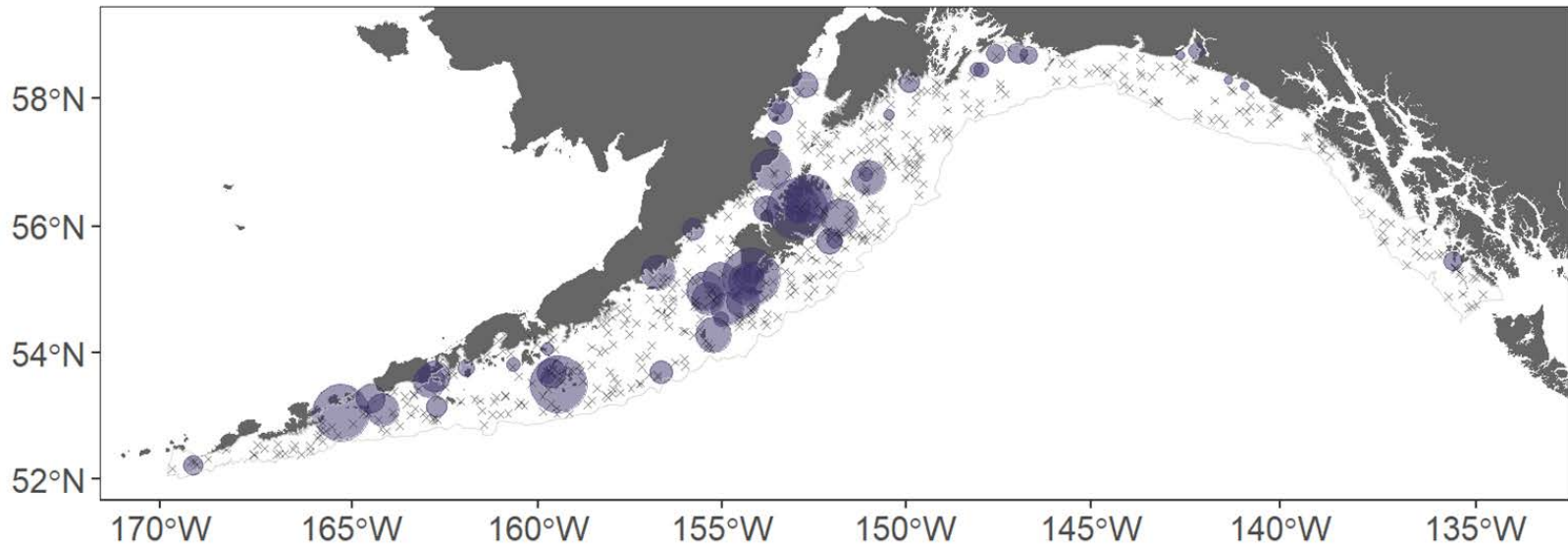
# Big skate (*Beringraja binoculata*)



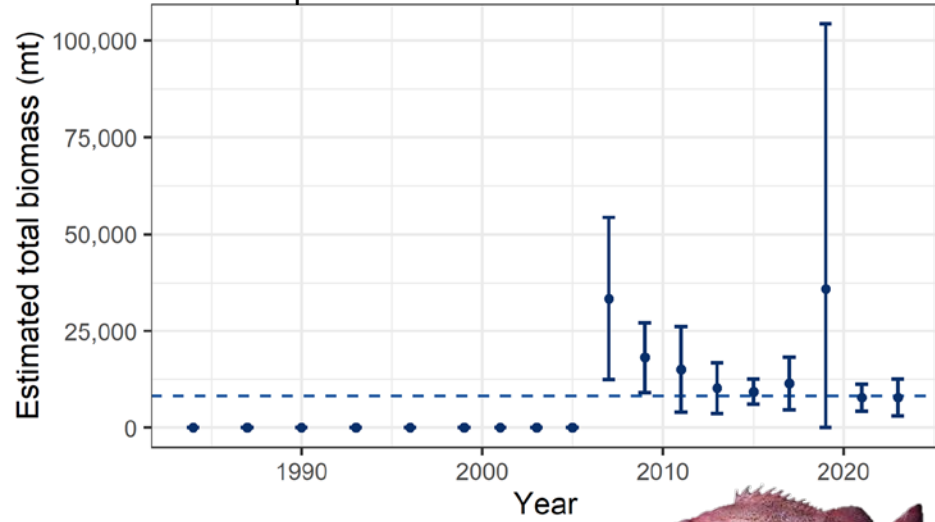
- Total caught in 2023: ~37000 mt
- 14.9% from 2021 (~5000 mt)



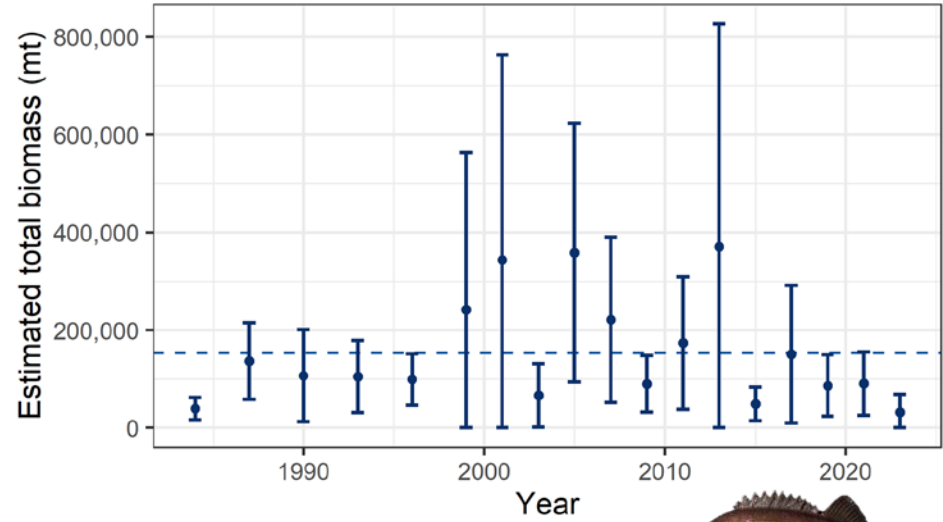
# Big skate (*Beringraja binoculata*)



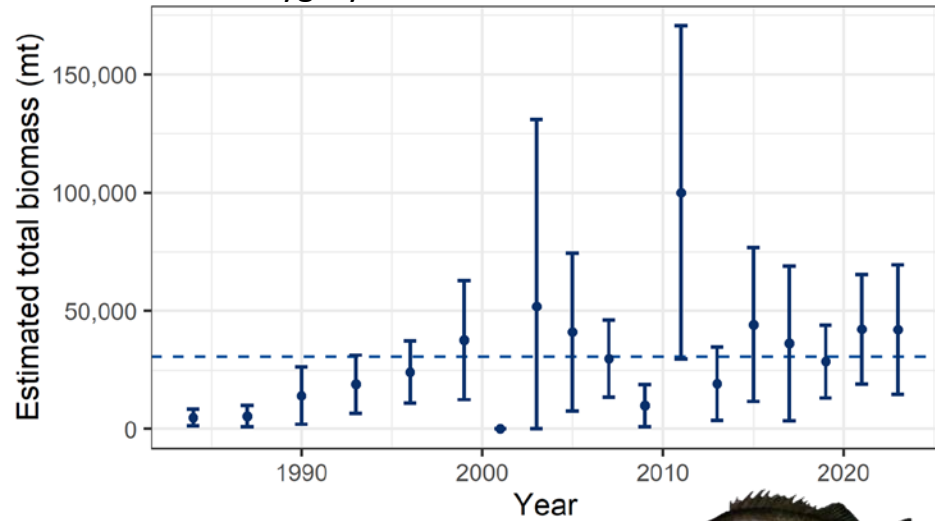
blackspotted rockfish



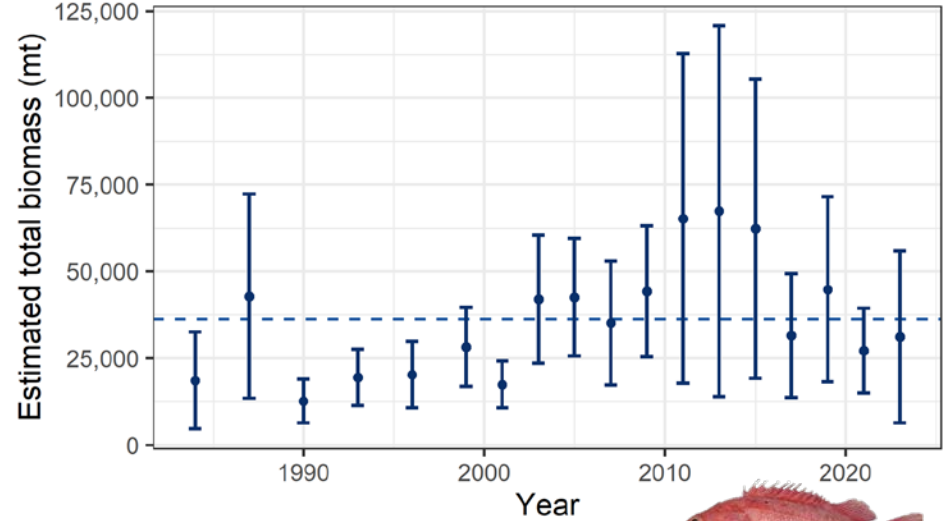
northern rockfish



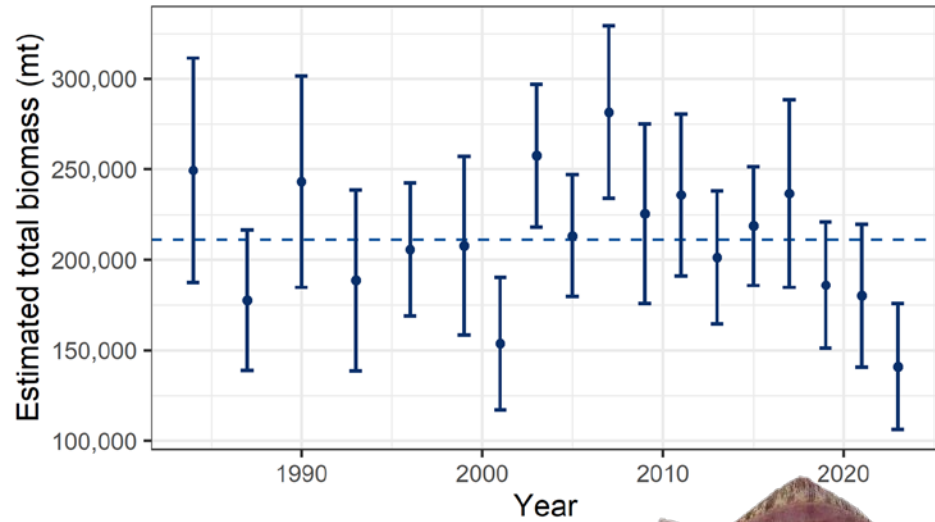
silverygray rockfish



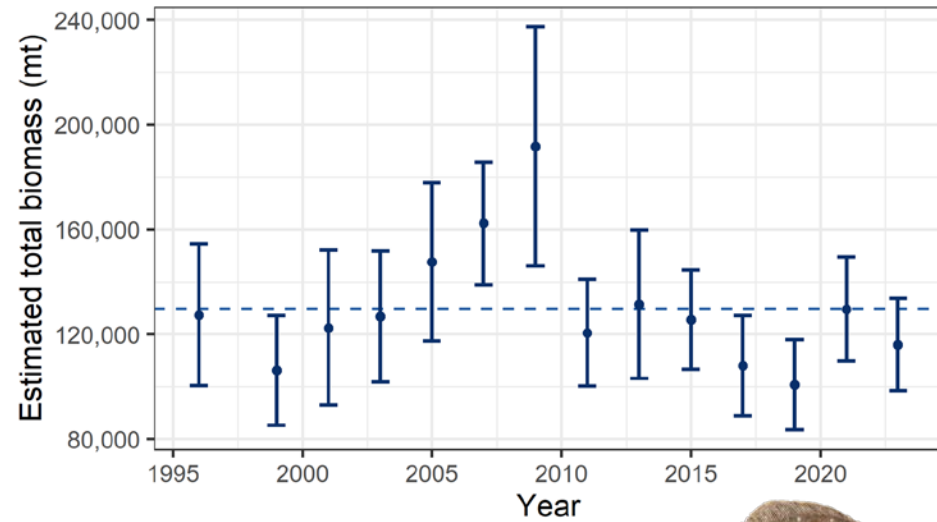
shortraker rockfish



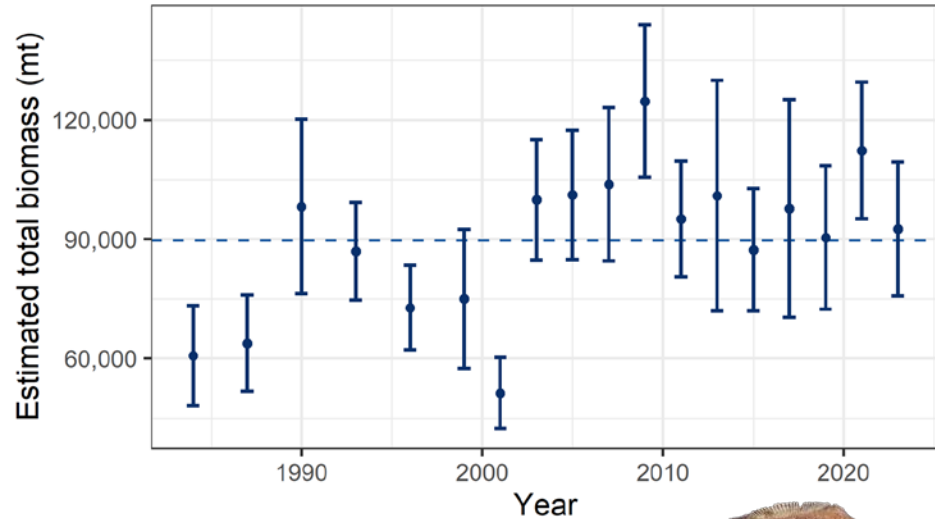
flathead sole



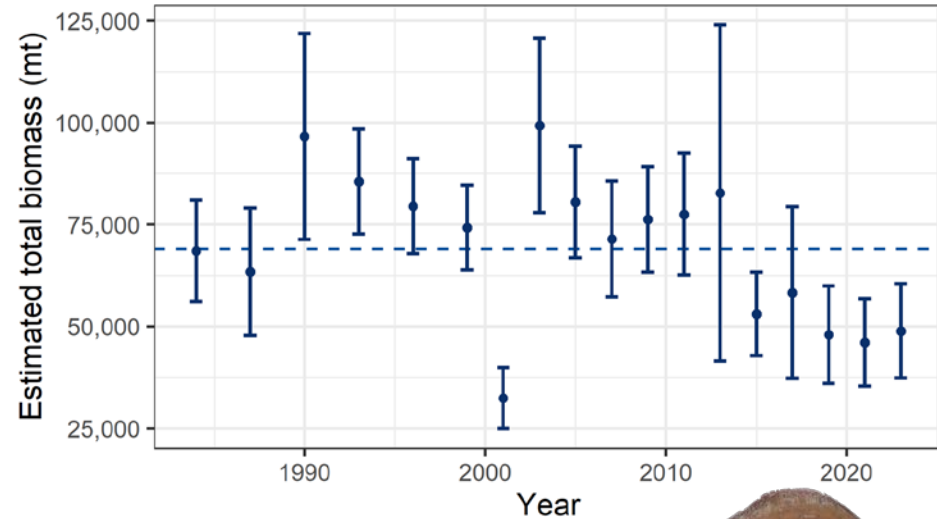
southern rock sole



rex sole



Dover sole



# Biomass Trends

Common name	% difference	Relative to longterm average
arrowtooth flounder	+5.3	Below
Atka mackerel	+219	Average
blackspotted RF	+0.6	Average
Dover sole	+6.2	Below
flathead sole	-21.7	Below
northern RF	-65	Below
Pacific cod	+32.5	Below
POP	+7.9	Above
rex sole	-17.6	Average
sablefish	-39.8	Below
shortraker RF	+14.4	Below
silvergray RF	-0.3	Above
southern rock sole	-10.4	Below
walleye pollock	+74.3	Above
eulachon	+14.1	Below
big skate	+14.9	Below



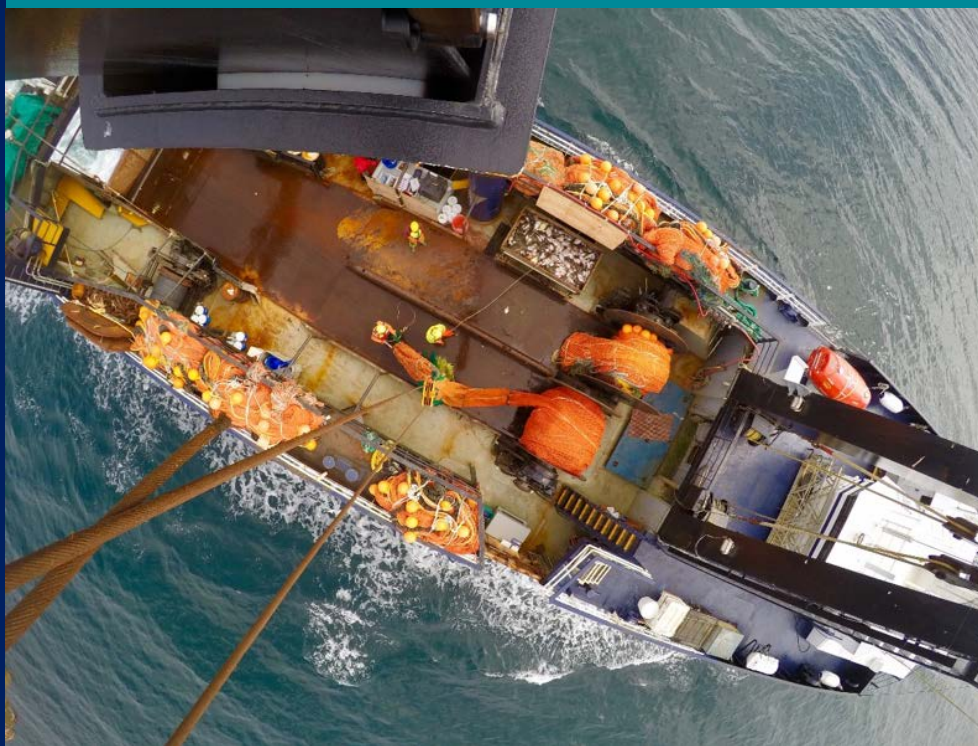


# Summary

- Survey data final before September Plan Team
- Continued collaboration with Stock Assessment
- Biomass for 10 out of 16 species increased
- GAP\_PRODUCTS



# THANK YOU



## Gulf of Alaska Trawl Survey Team

**Thank you scientists!!**

Nate Raring	Sean Rooney
Megsie Siple	Paul von Szalay
Autumn Farris	Kevin McCarty
Bridget Ferriss	Rick Hibpshman
Sarah Friedman	Andrea Muñoz Ledo
Gavin Page (observer)	Zack Oyafuso
Jon Reum	Lyle Britt
Jerry Hoff	KC Dill
Bethany Riggle	Cecilia O'Leary
Susanne McDermott	Alex Dowlin
Catalina Burch (UW Grad)	Katie D'Amelio
Joanna Magner	Nancy Roberson
Gordon Alford	Pearl Rojas
Jacob Buck (observer)	Pete Hulson
Francis Maddox (IPHC)	Michael Finley

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