

# Observer data in stock assessments and other analyses

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# Outline

- **Historical levels of observer coverage**
- **Observer data in estimating age compositions**
- **Alternative applications of observer data**
  - ★ Bycatch
  - ★ Temporal and spatial patterns of fishing



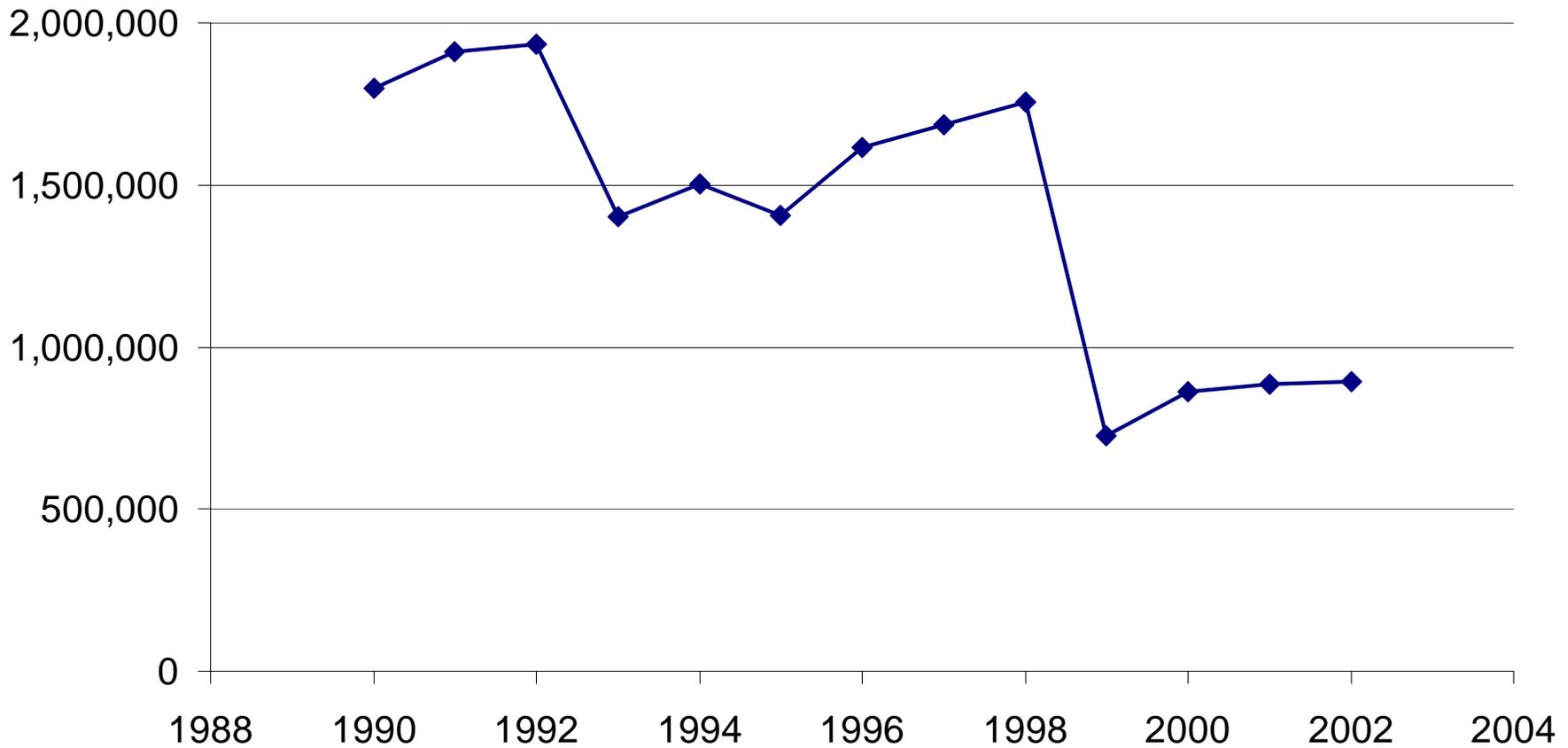
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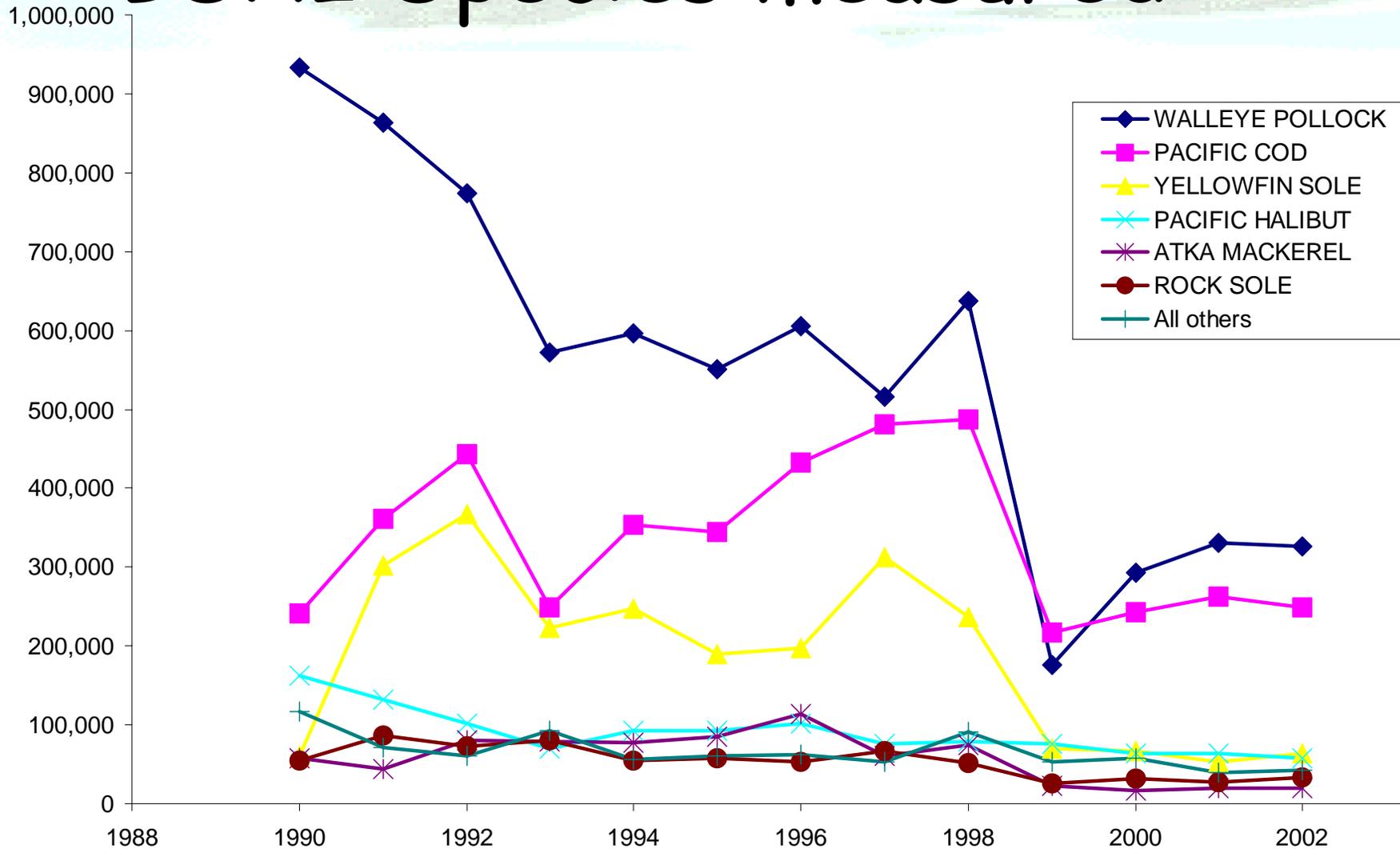
# Observer Sampling Effort

Number of fish measured (BSAI)

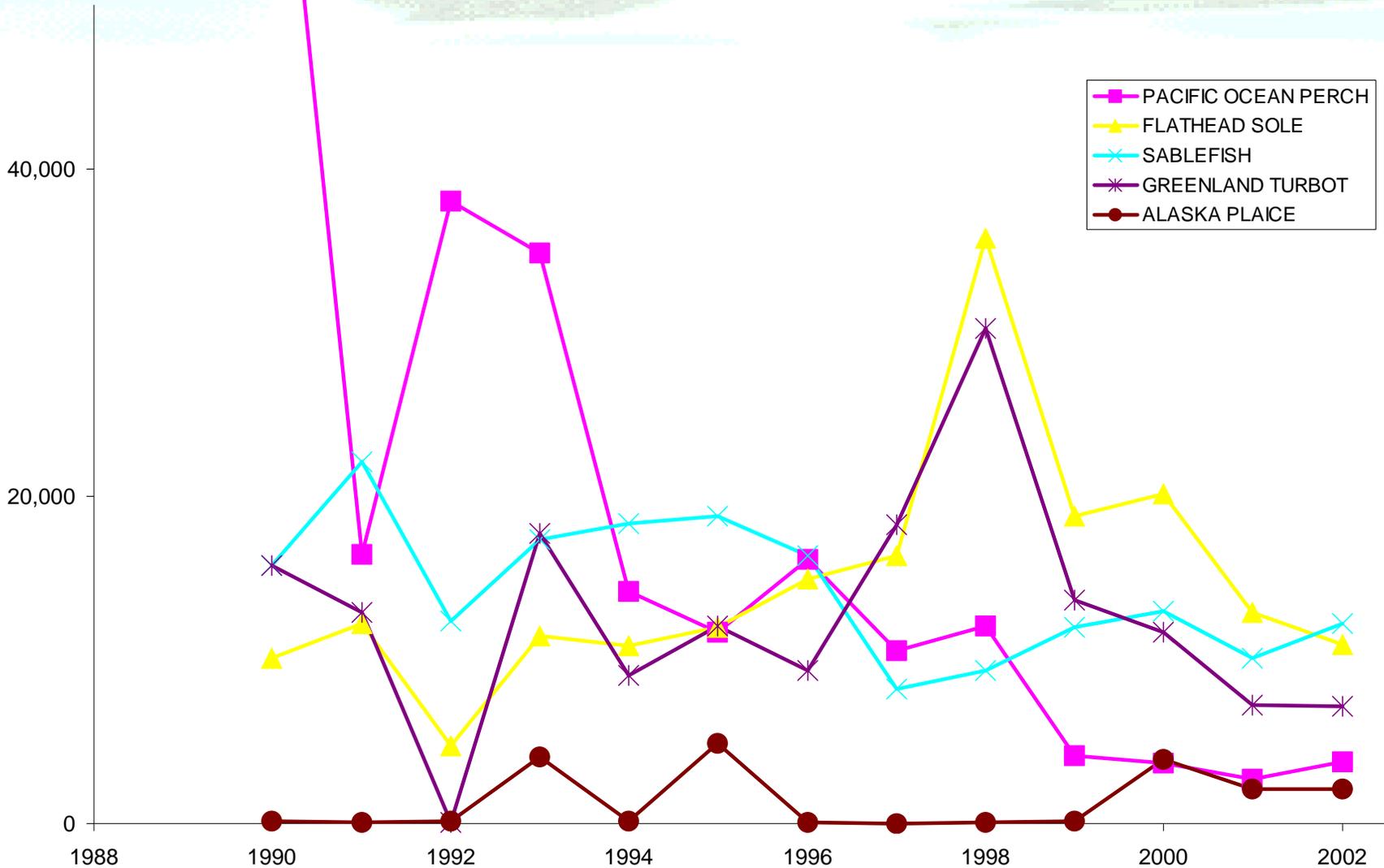




# BSAI Species measured

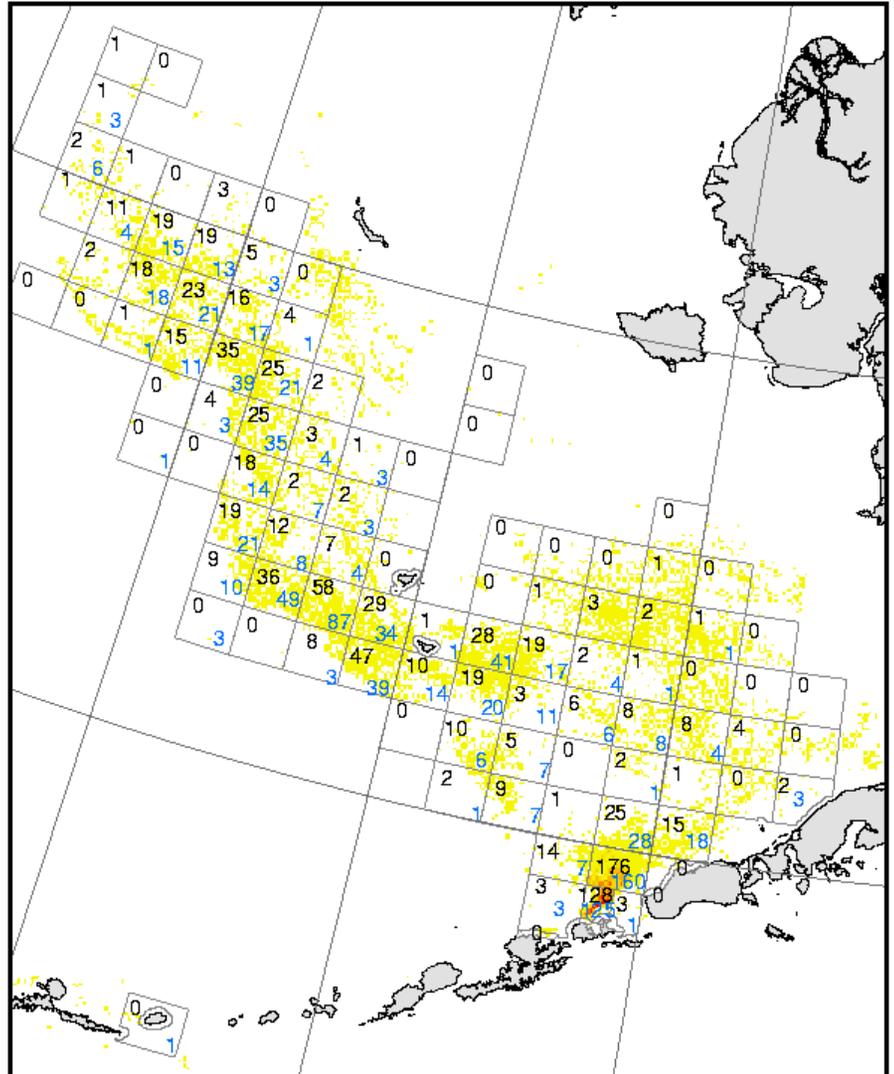
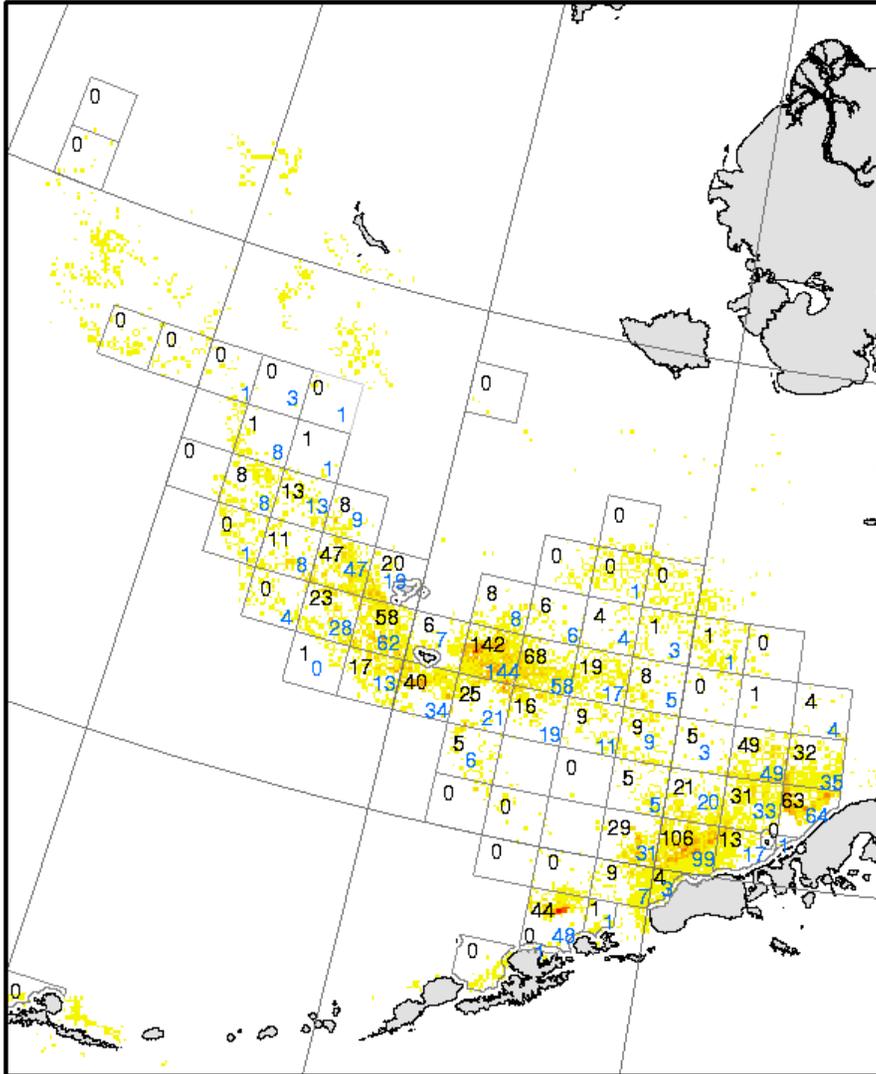


# BSAI species measured (cont'd)



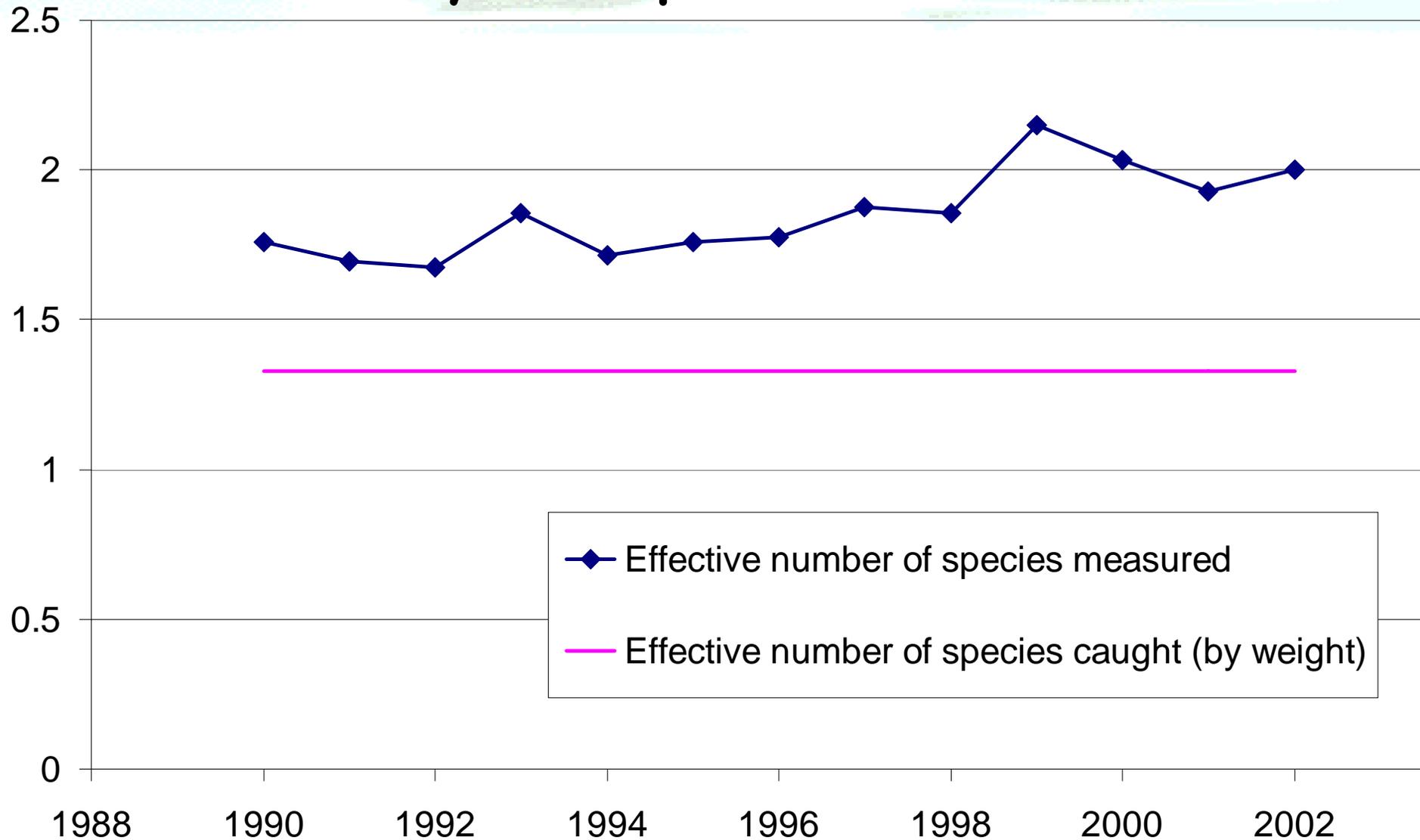


# Fishery sampling (pollock)





# Diversity of species measured



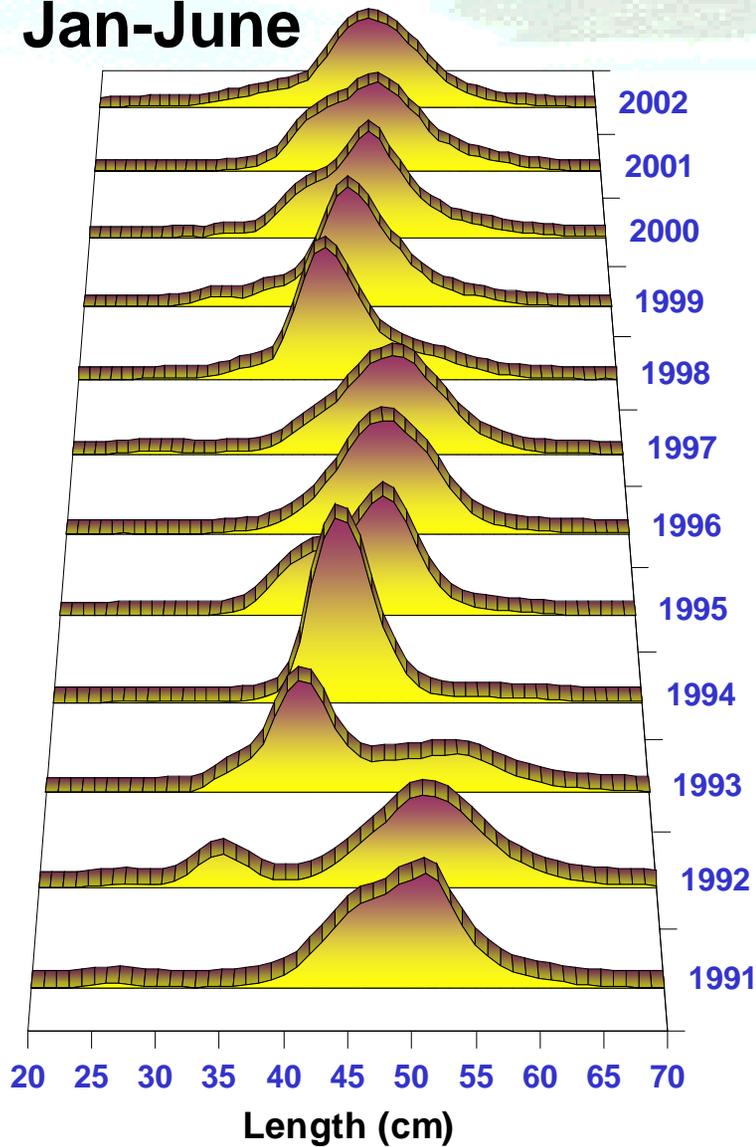


# Outline

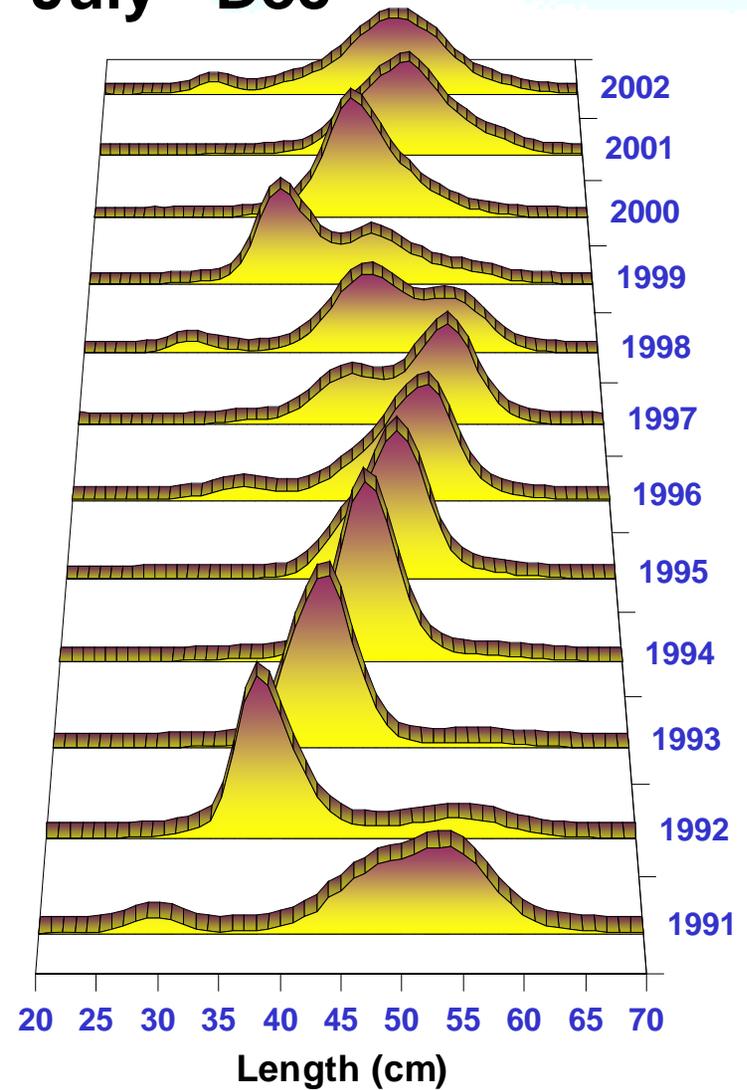
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# Catch size distribution

Jan-June

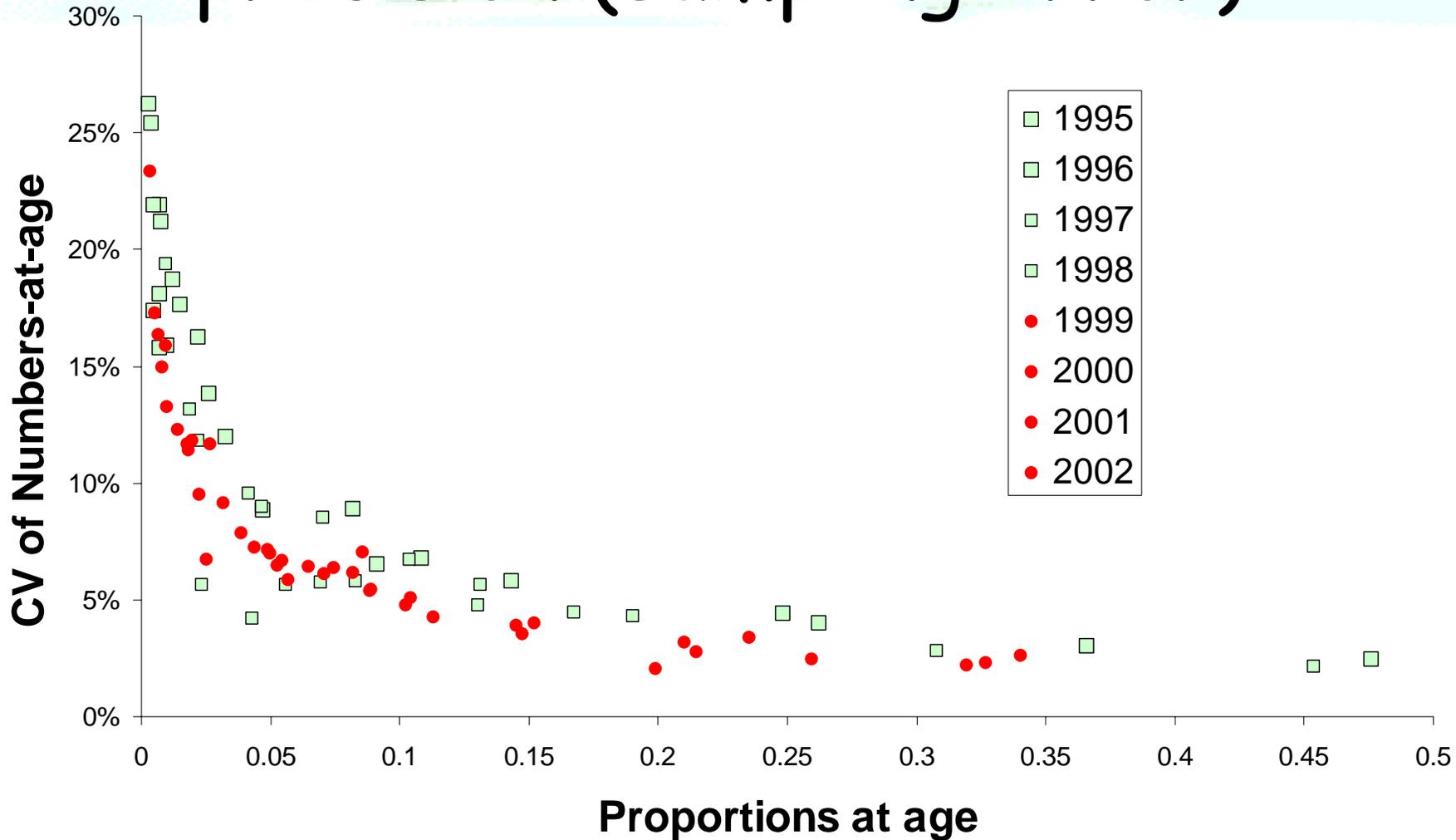


July - Dec





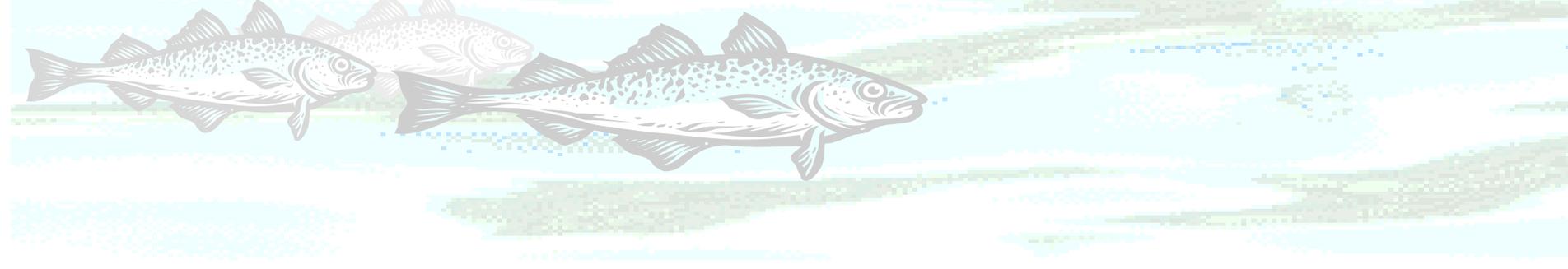
# Comparison of estimation precision (sampling error)





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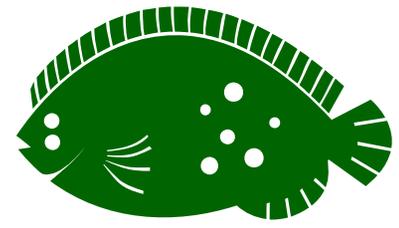
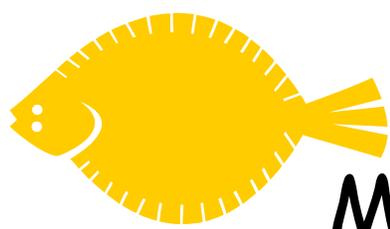
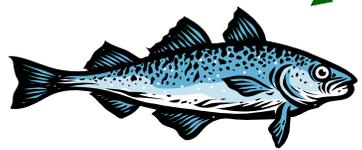
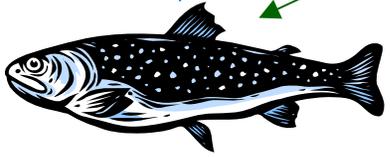
Observer data in  
multispecies technical  
interaction models



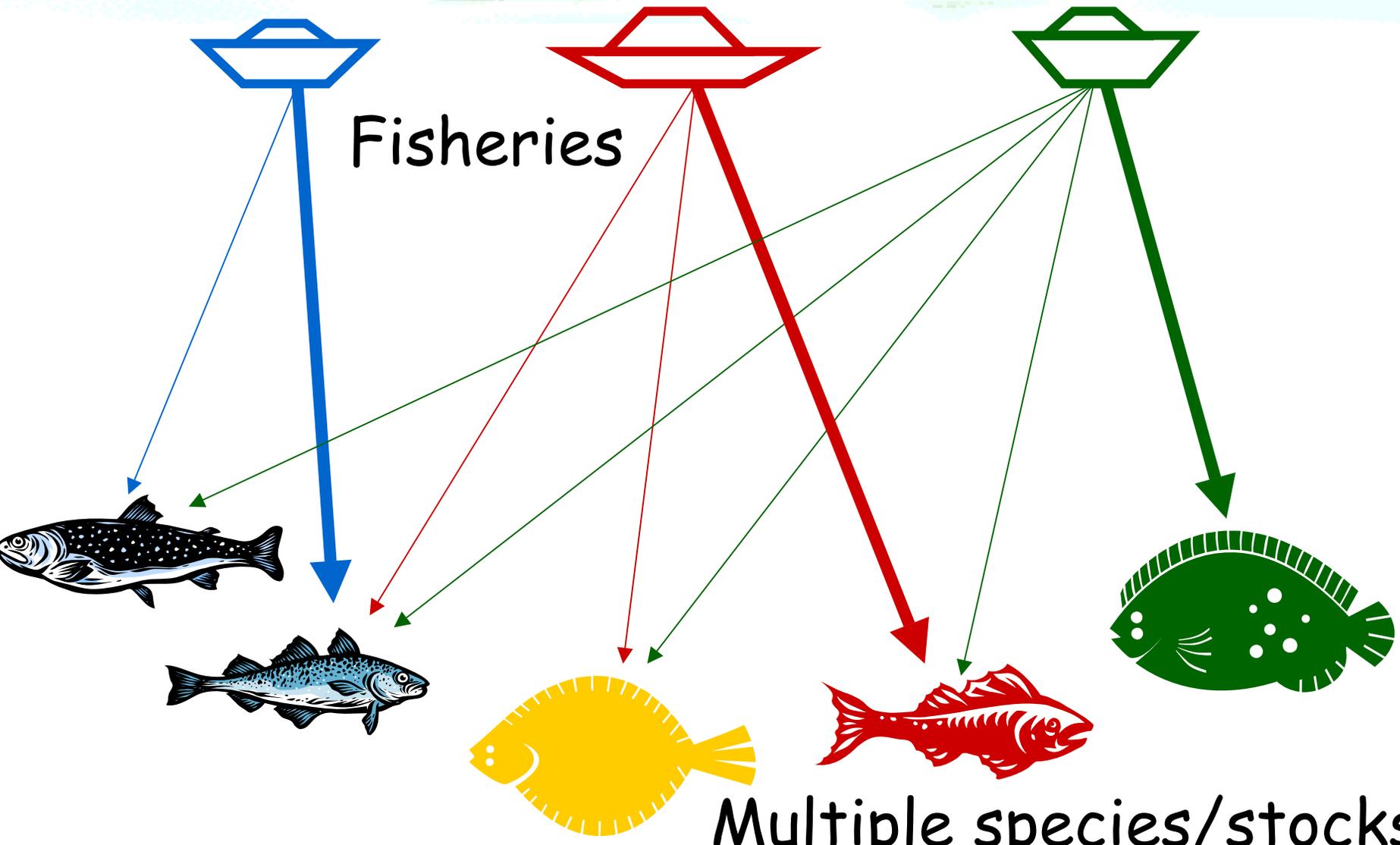
# Multispecies-multifisheries management



Fisheries



Multiple species/stocks





# What defines a fishery?

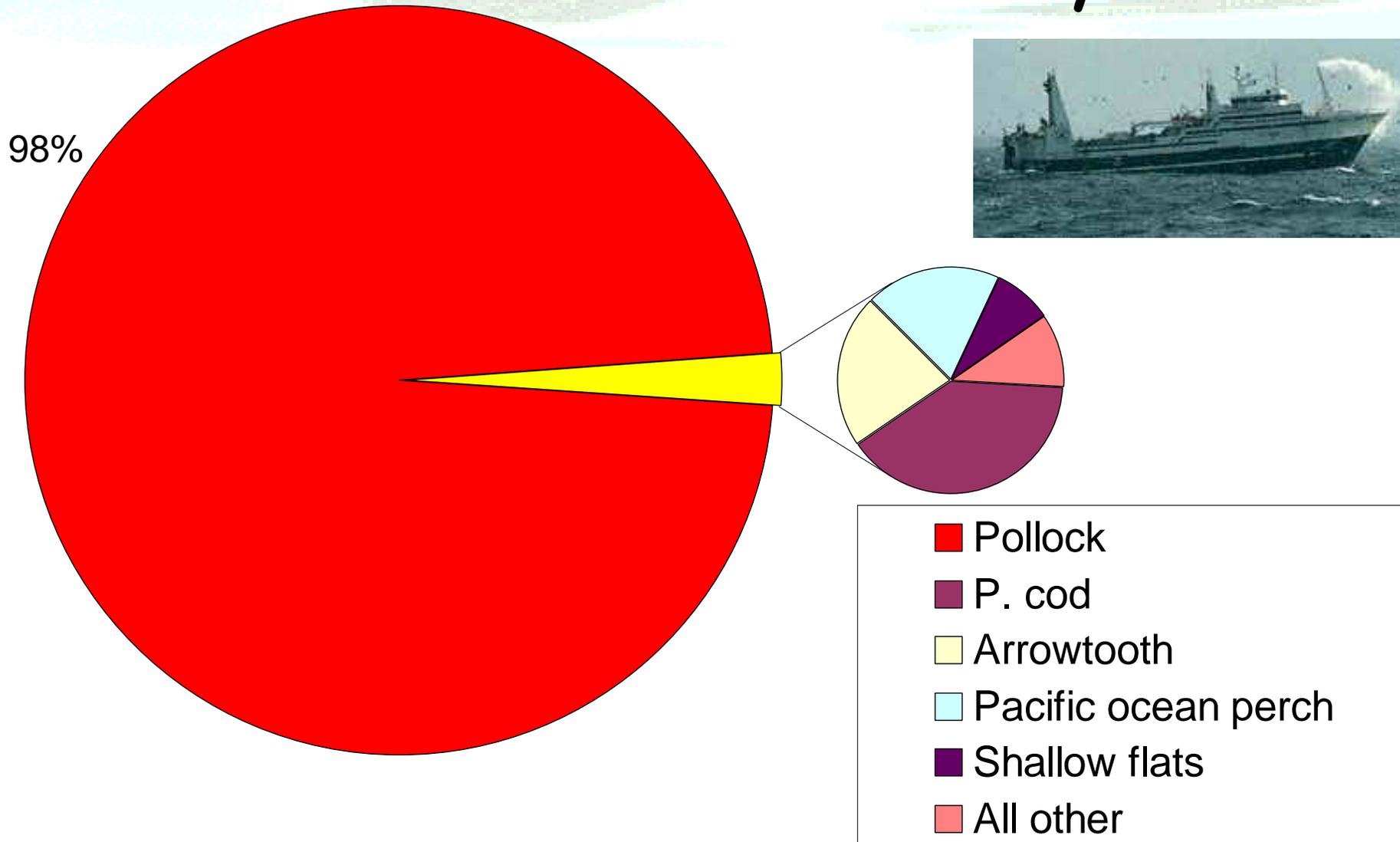
- **Simply**

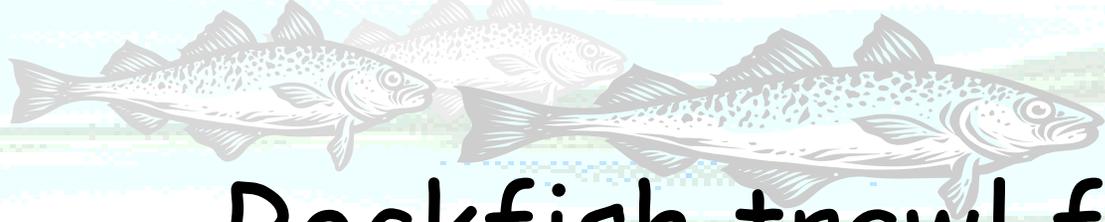
- ★ Gear type

- ★ Area fishing

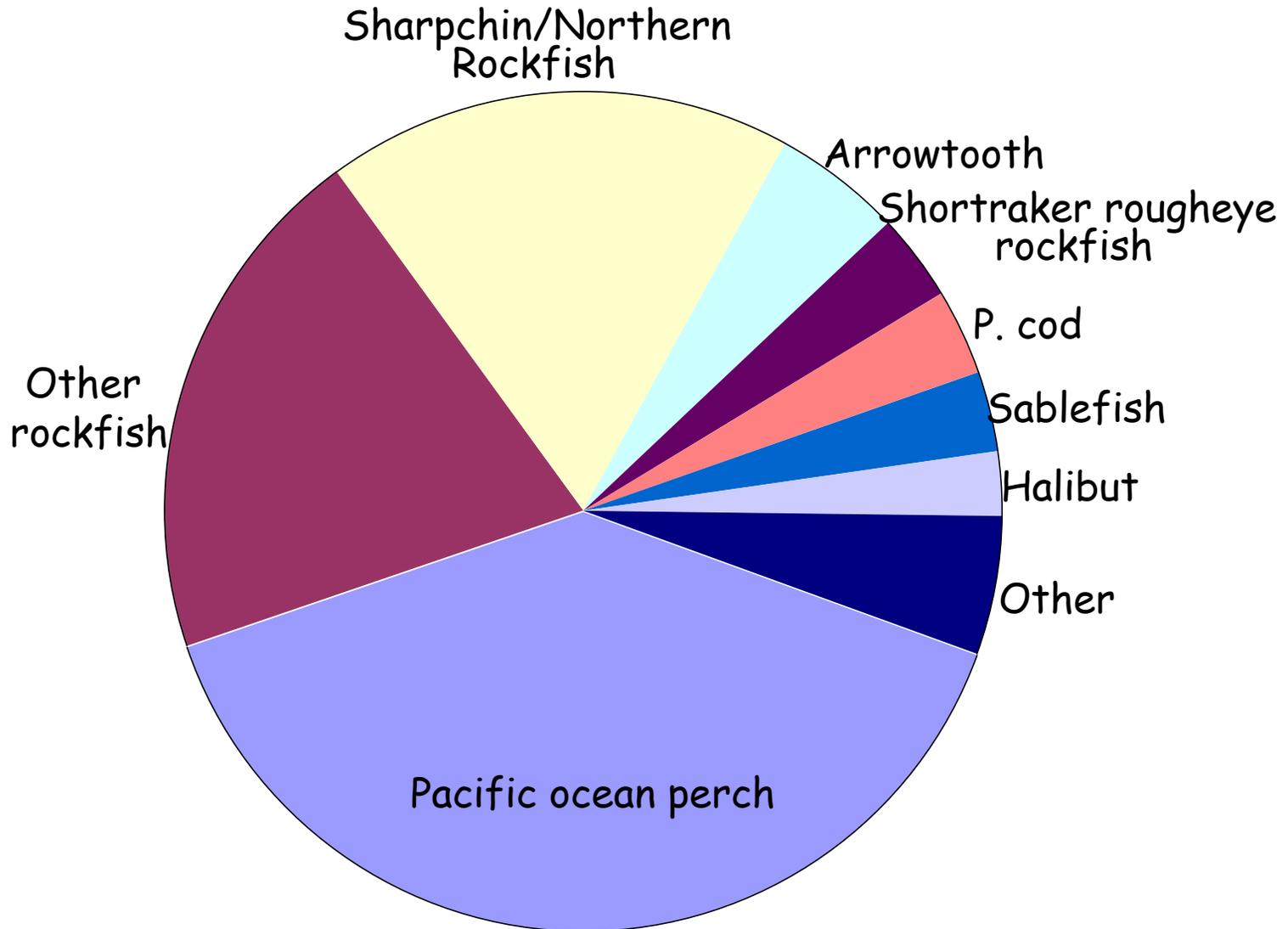
- ★ "Target" species

# Pollock trawl fishery





# Rockfish trawl fishery





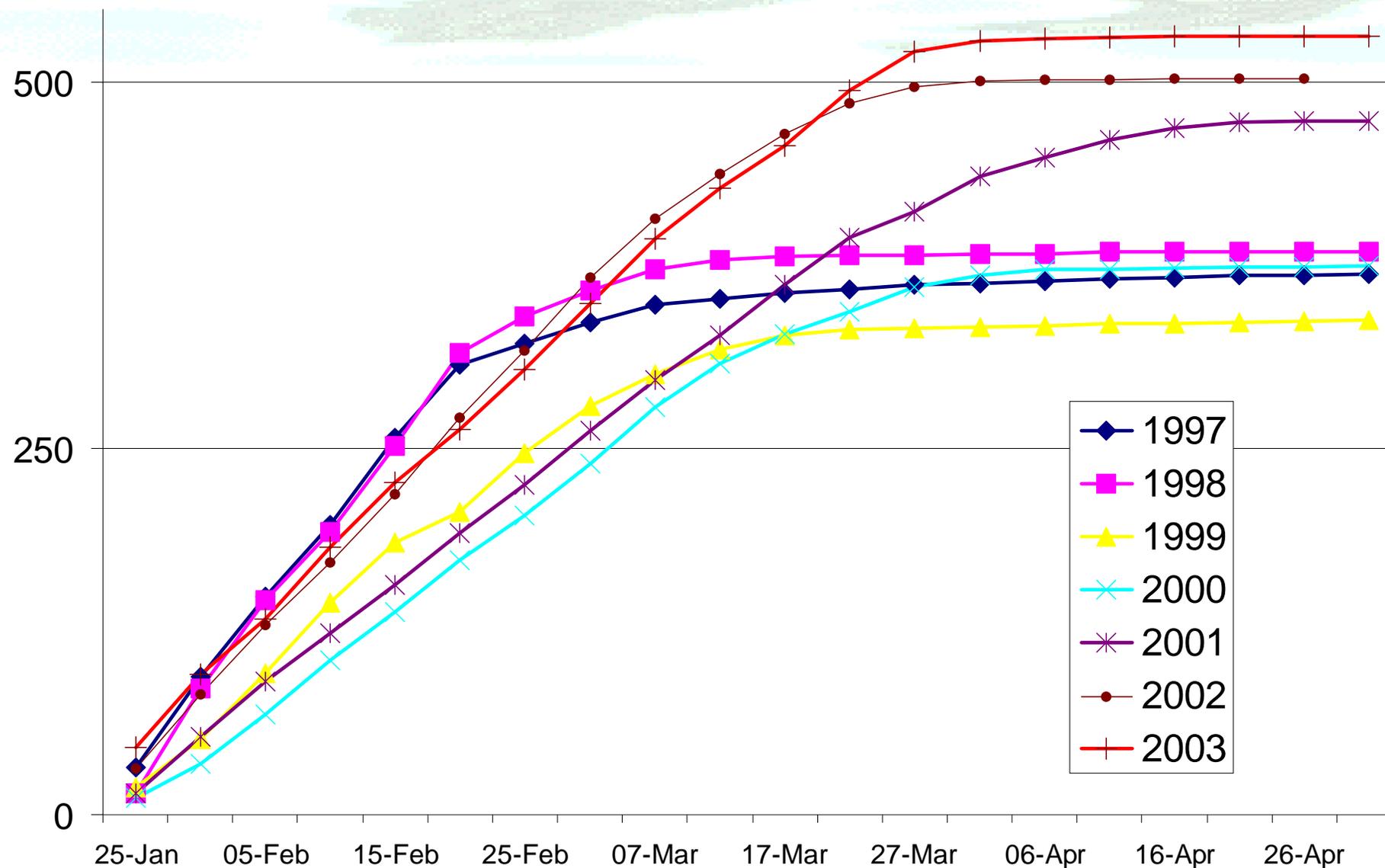
# Outline

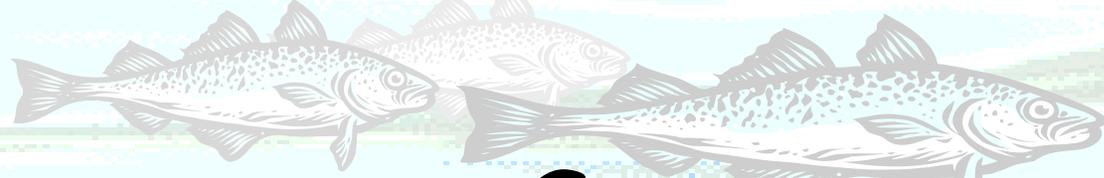
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# Within-year production (E. Bering Sea)

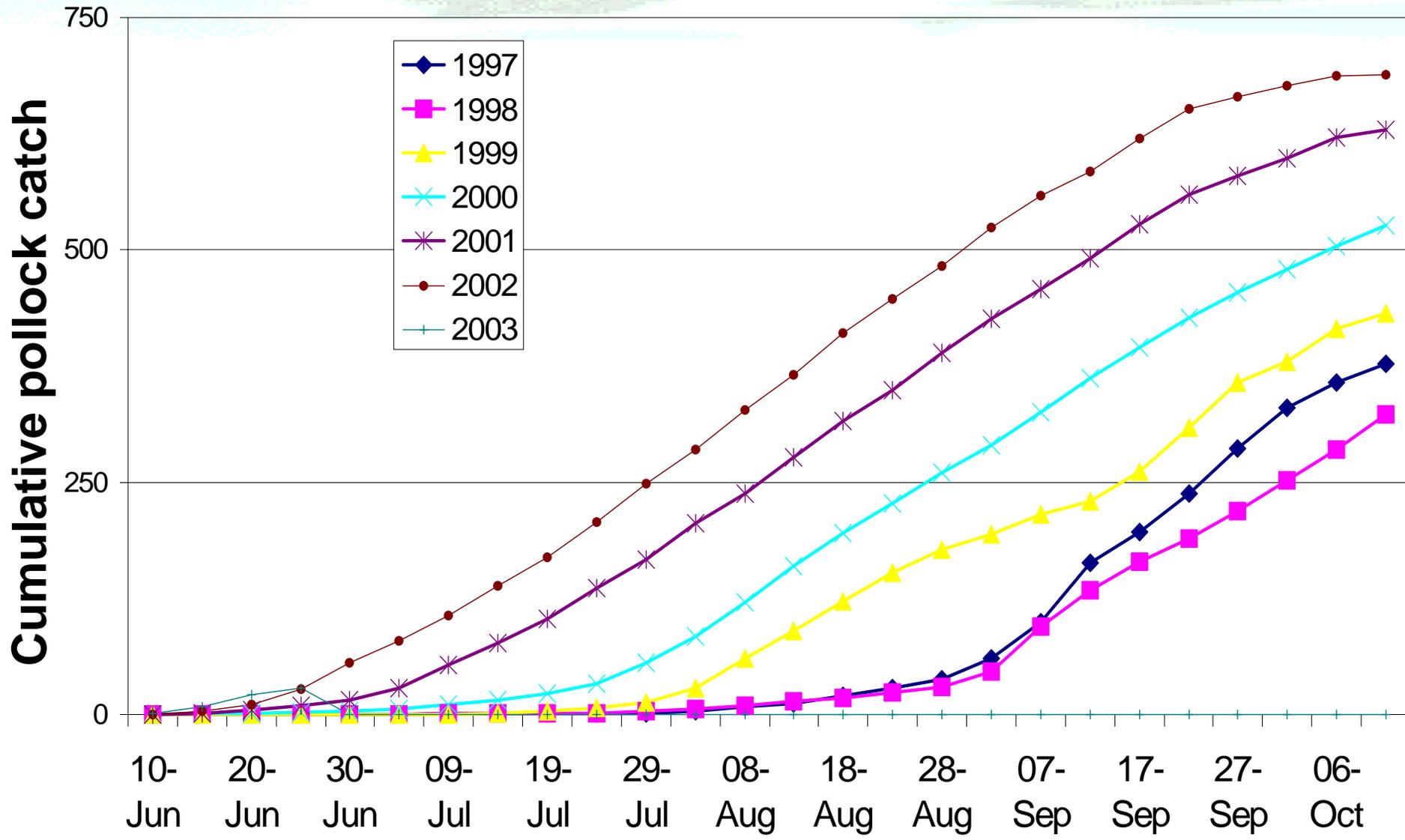
k-tons

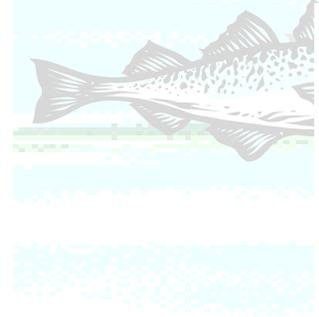
Cumulative pollock catch





# Summer season

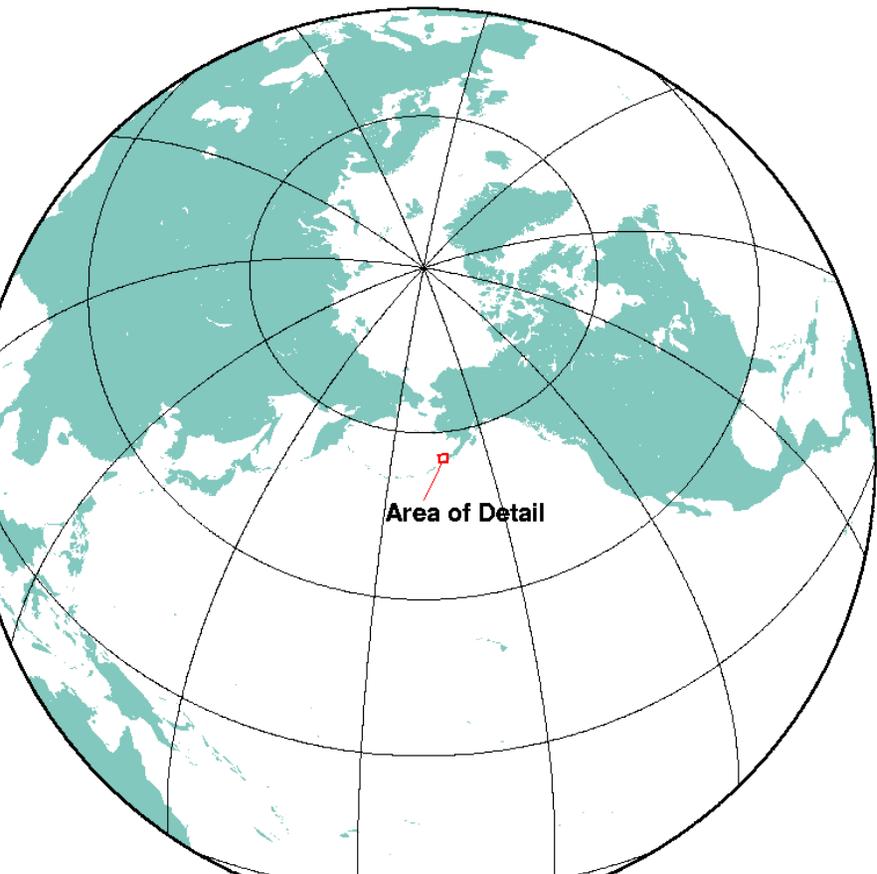




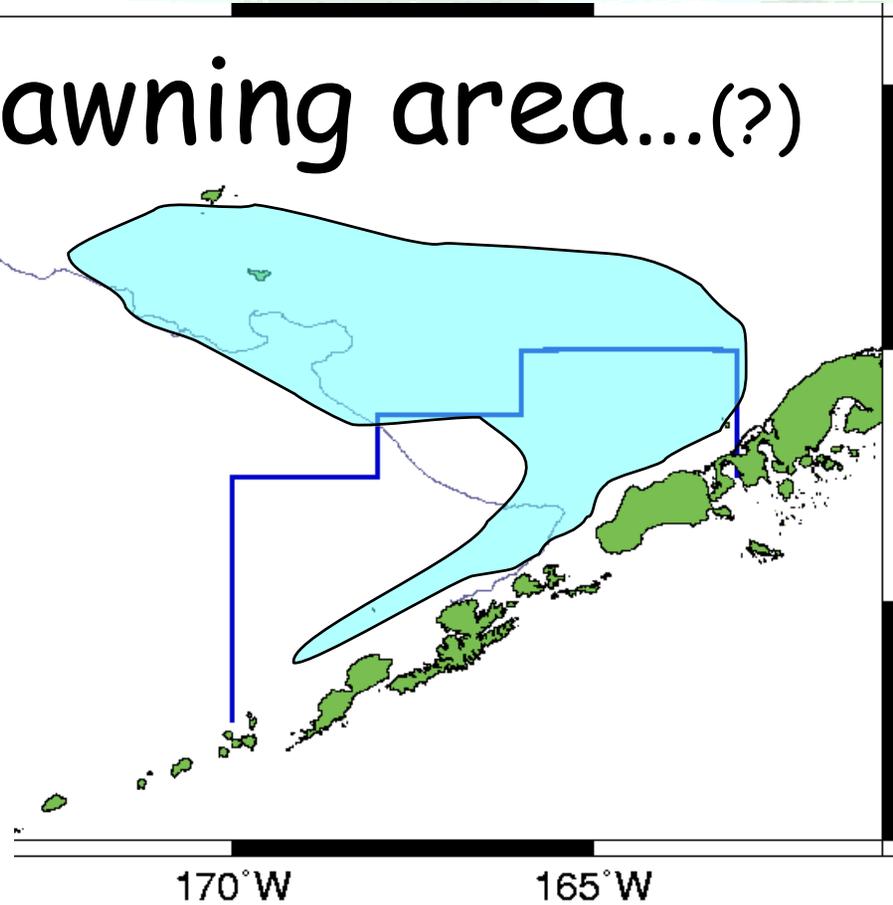
58°N

56°N

# Main spawning area...(?)



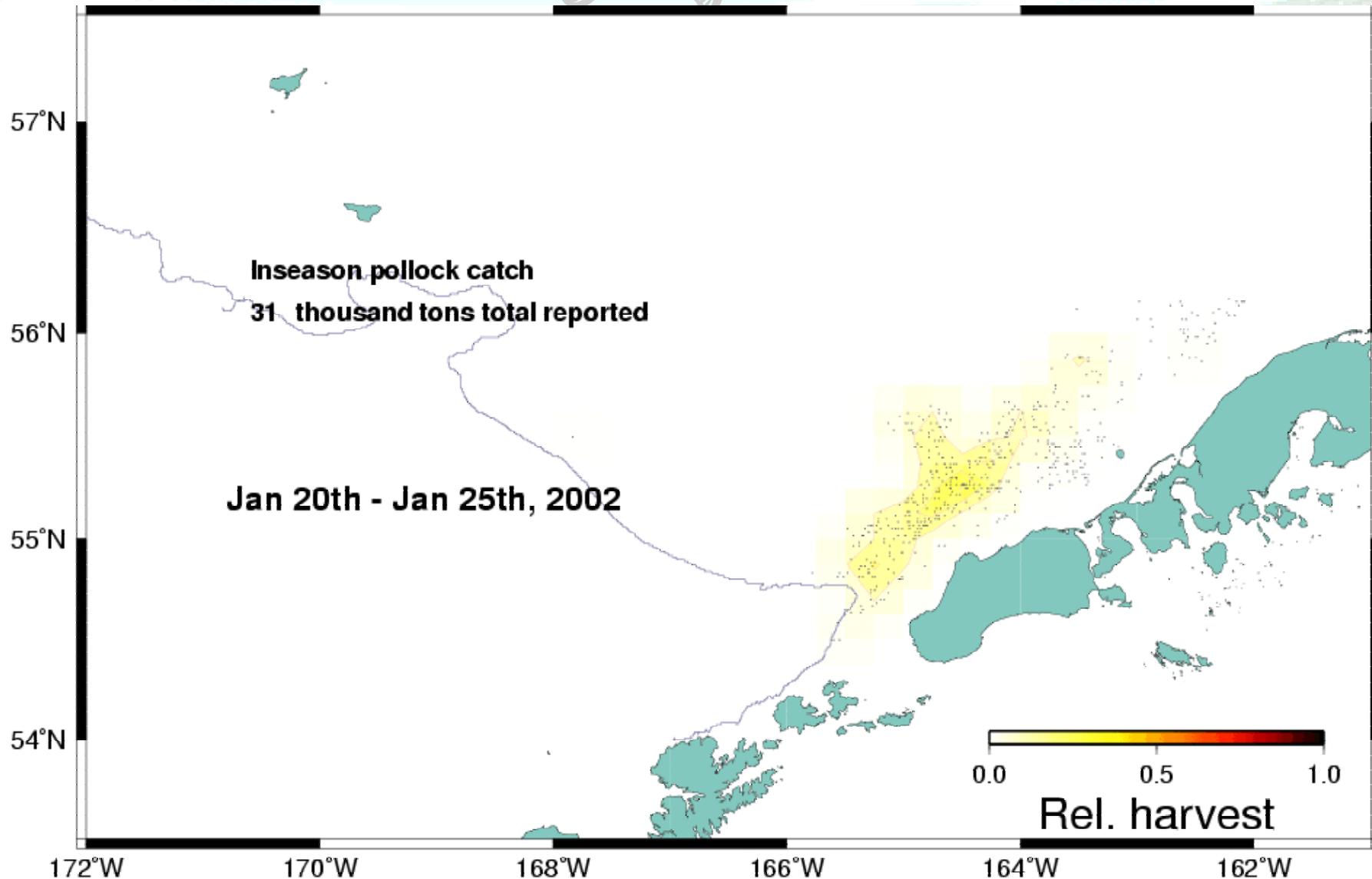
Area of Detail

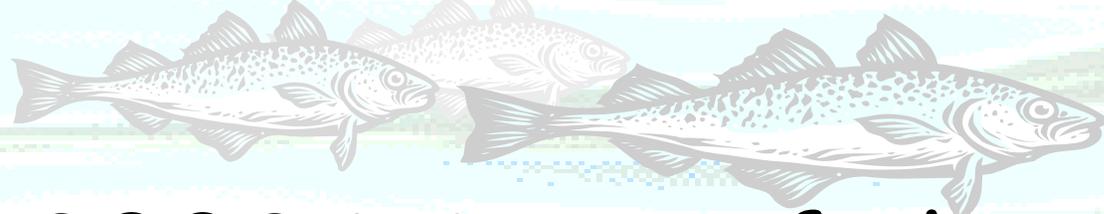


170°W

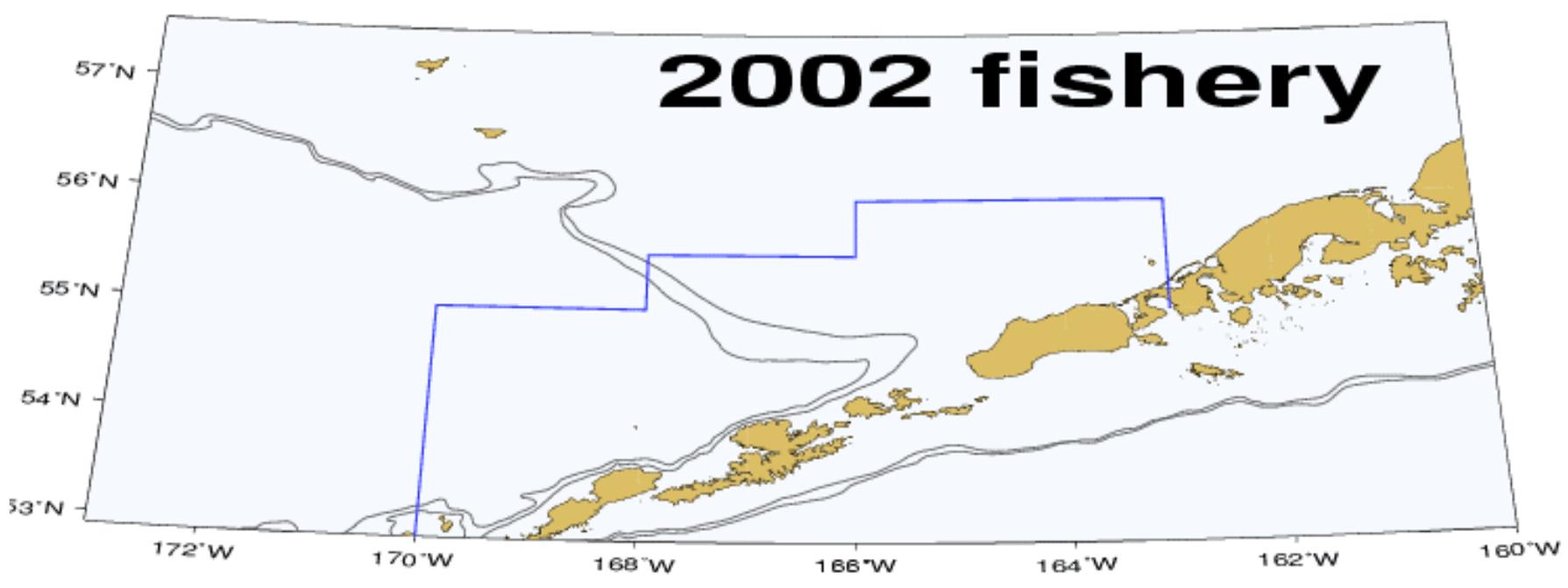
165°W

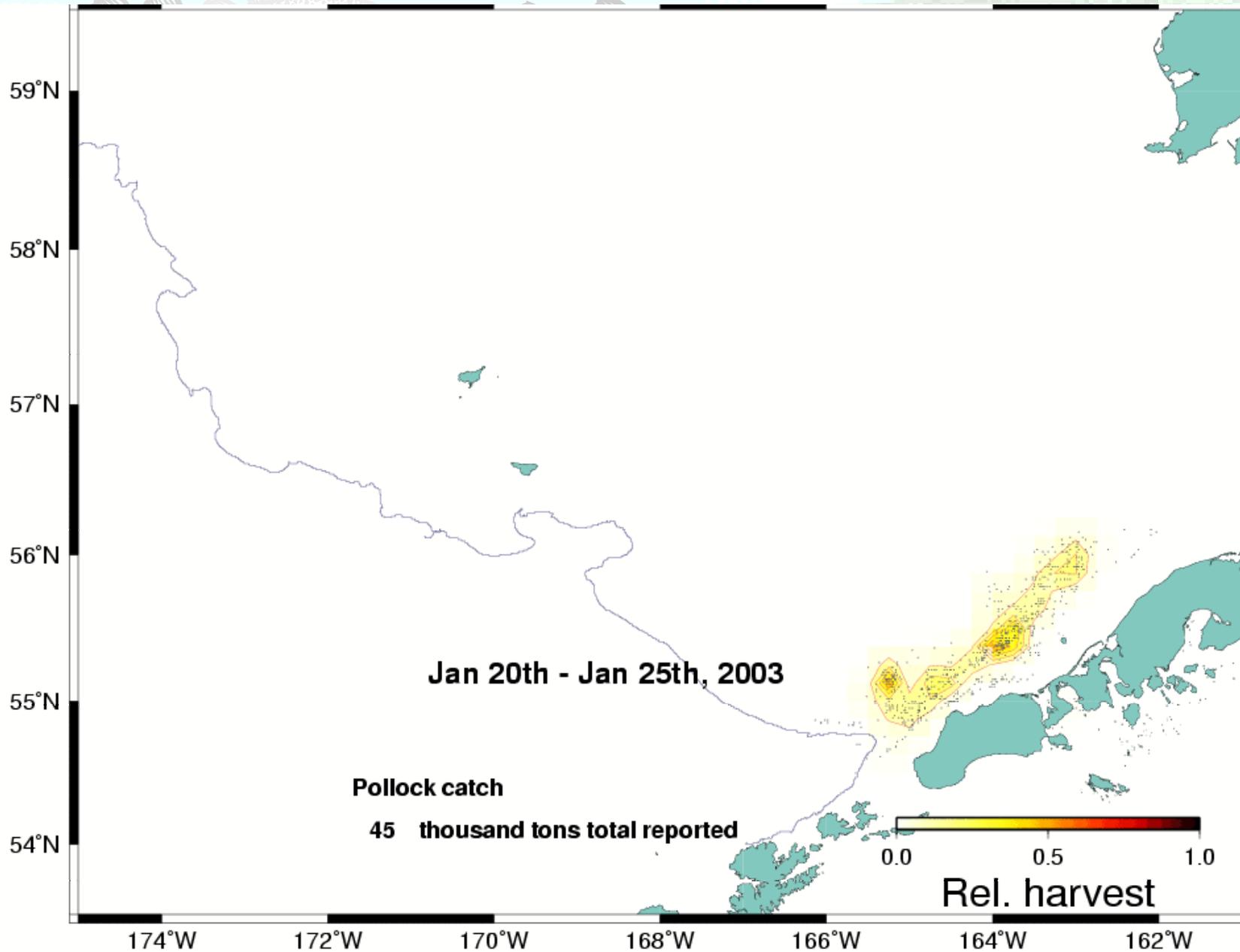
# Roe-fishery distribution

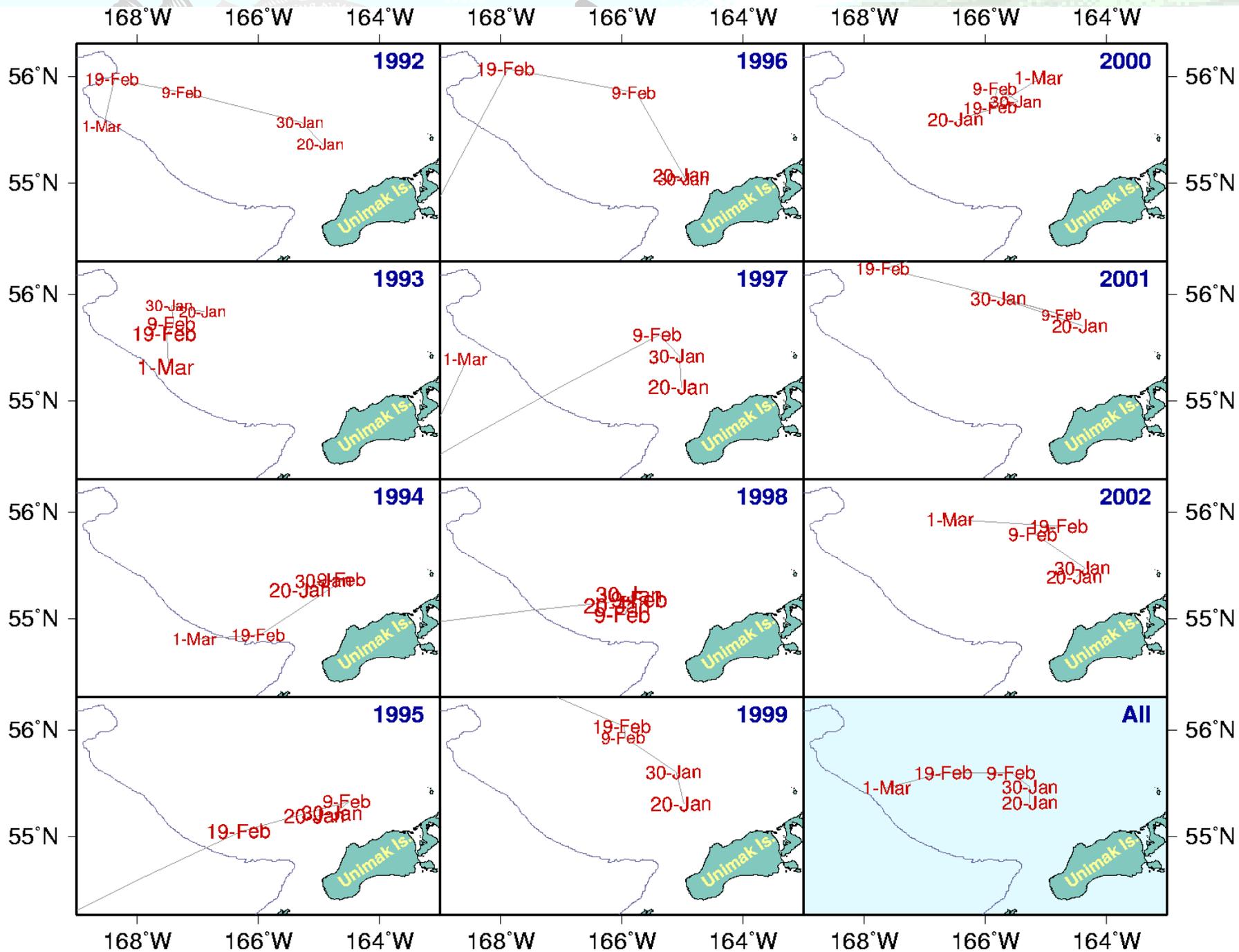


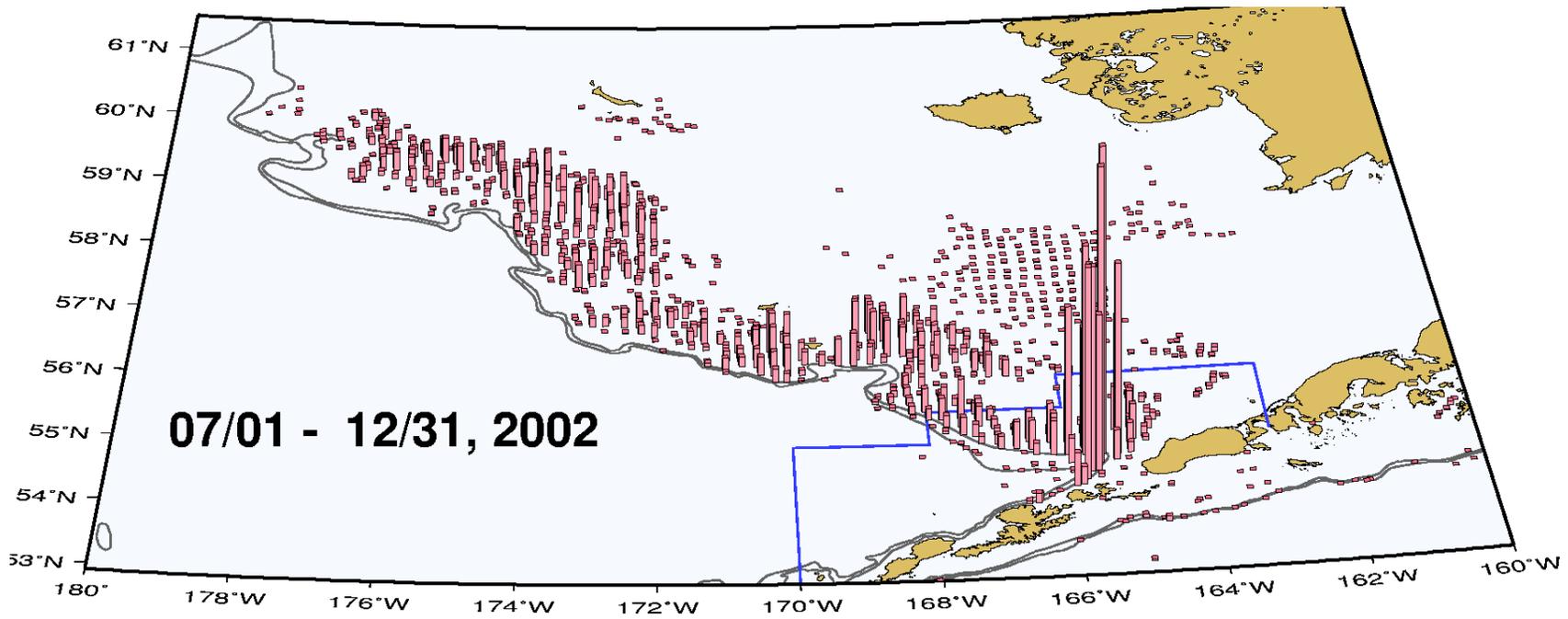
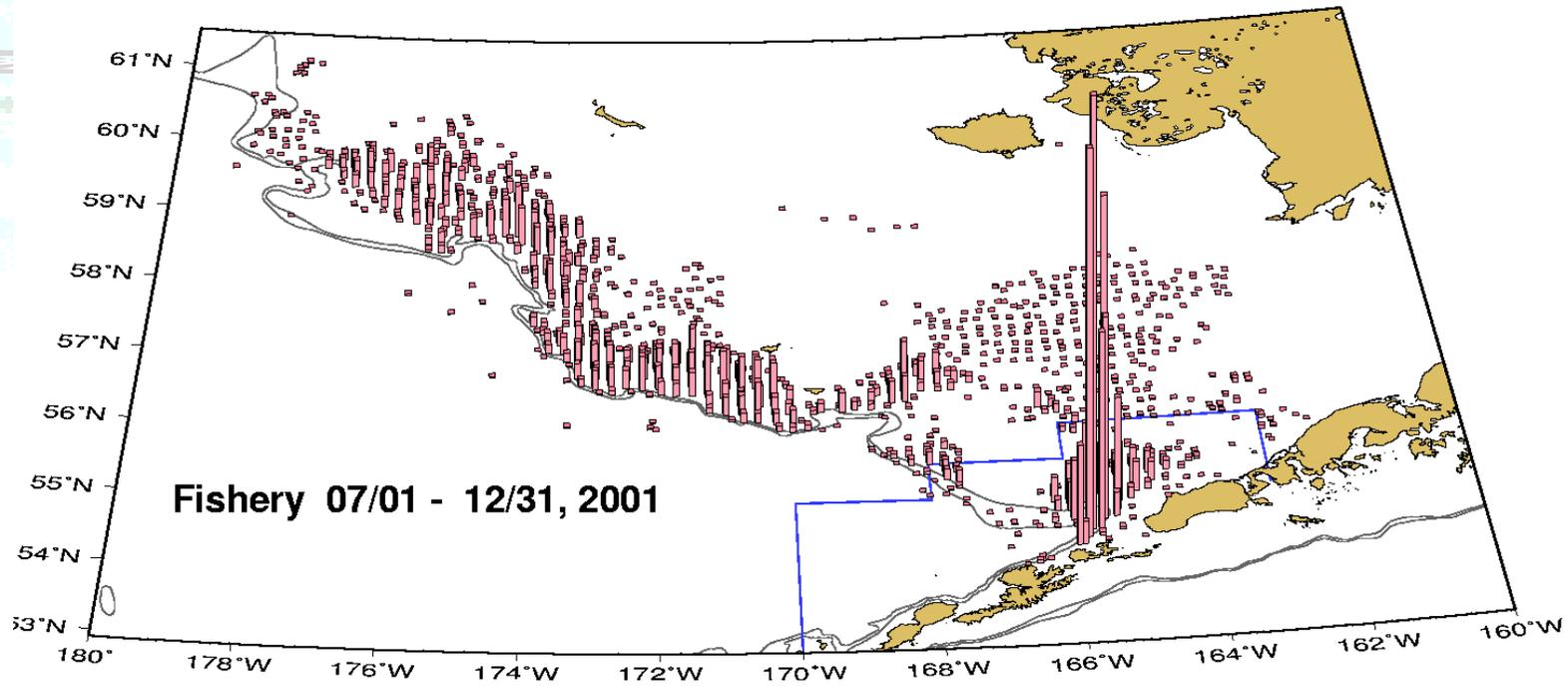


# 2002 Winter fishery distribution







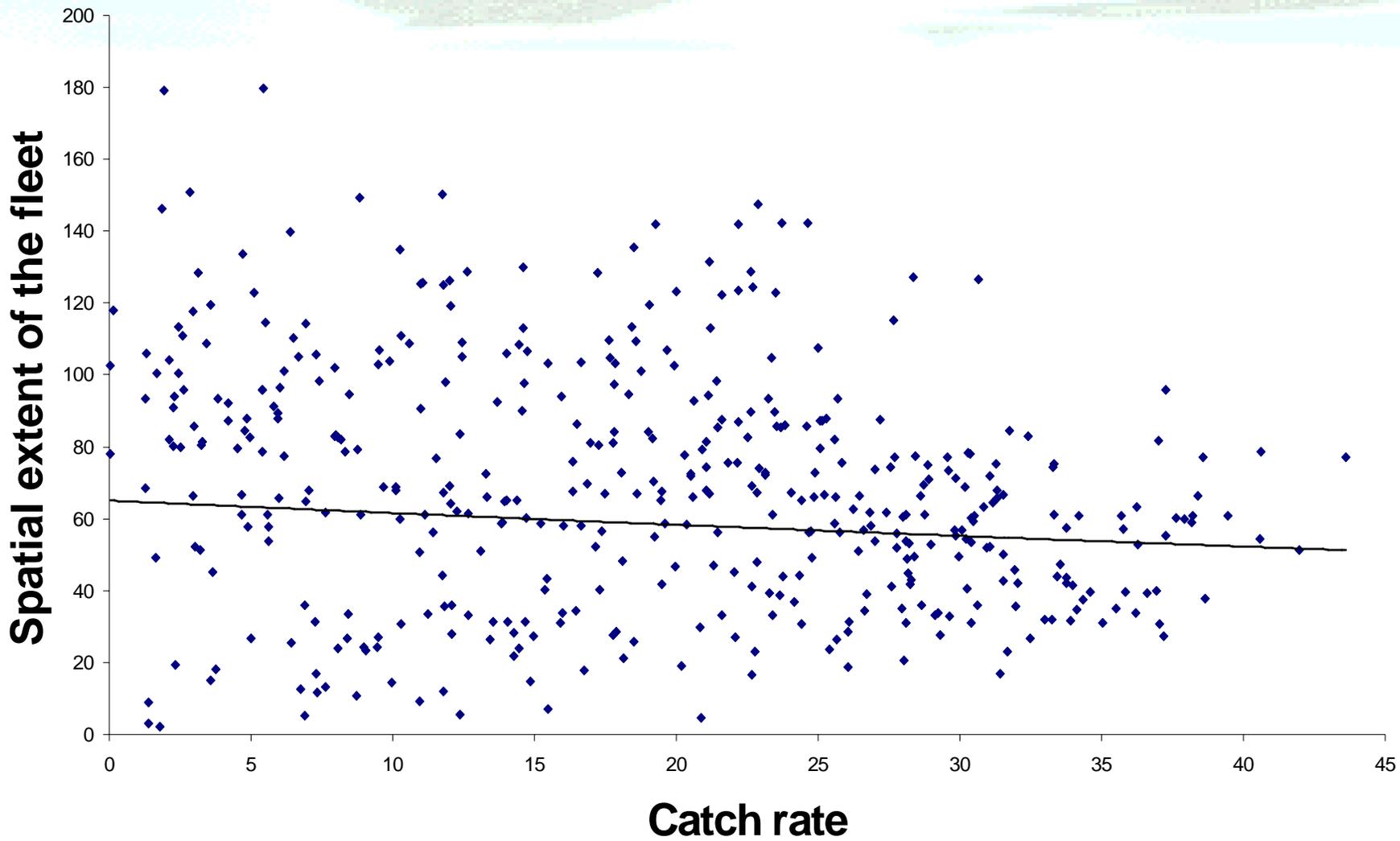
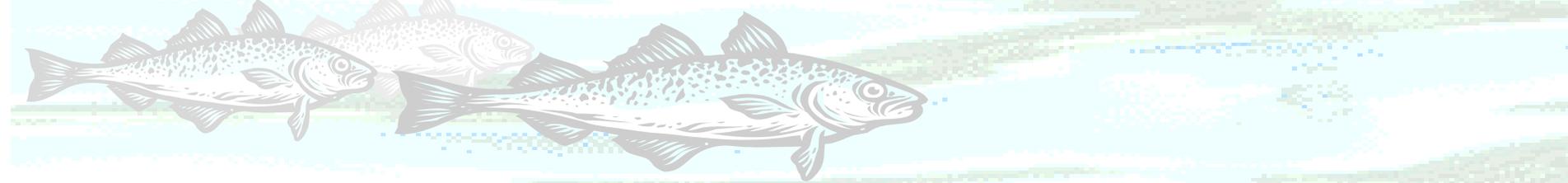


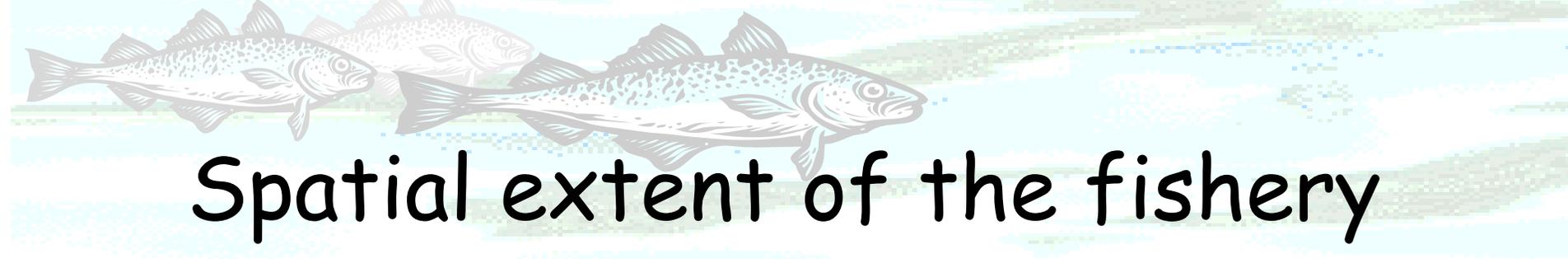


# Quantifying spatial extent of the fisheries

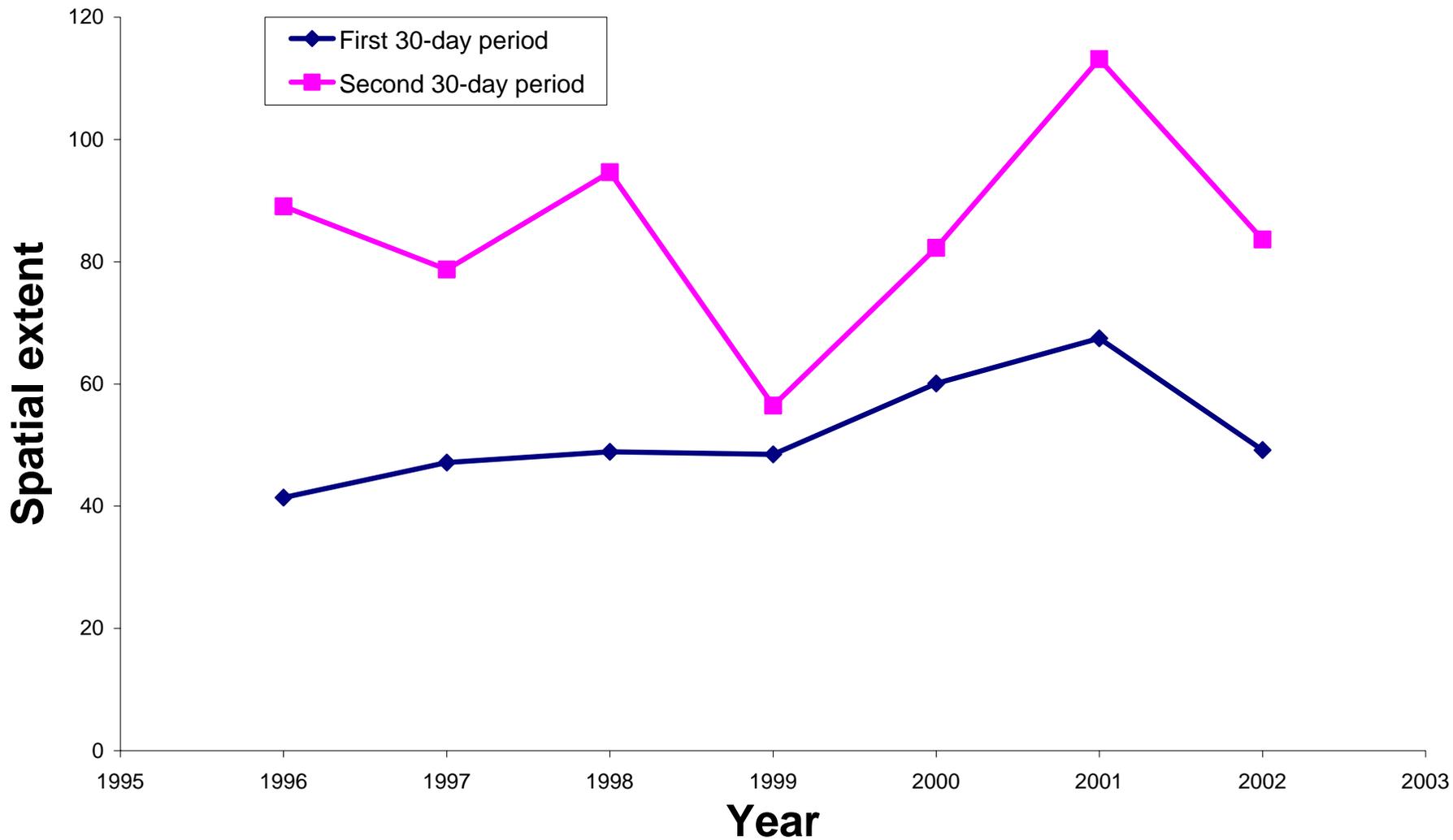
$$S = \frac{\sum_{i=1}^n D_i}{n}$$

- $D_i$  is the distance between the mean location of all vessels
- $n$  is the number of distances computed between each vessel and all other vessels on each day
- High values mean dispersed fishery

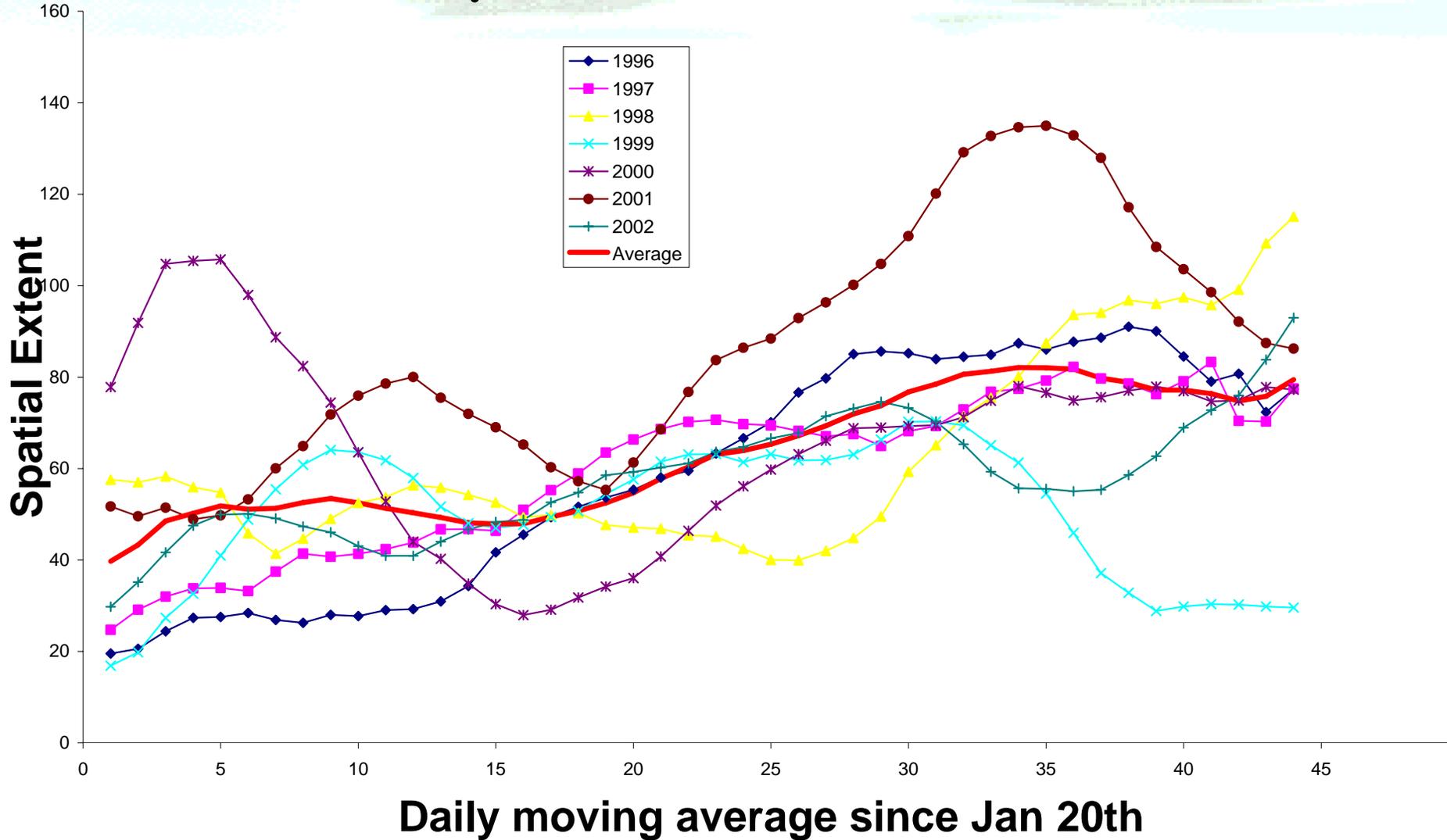


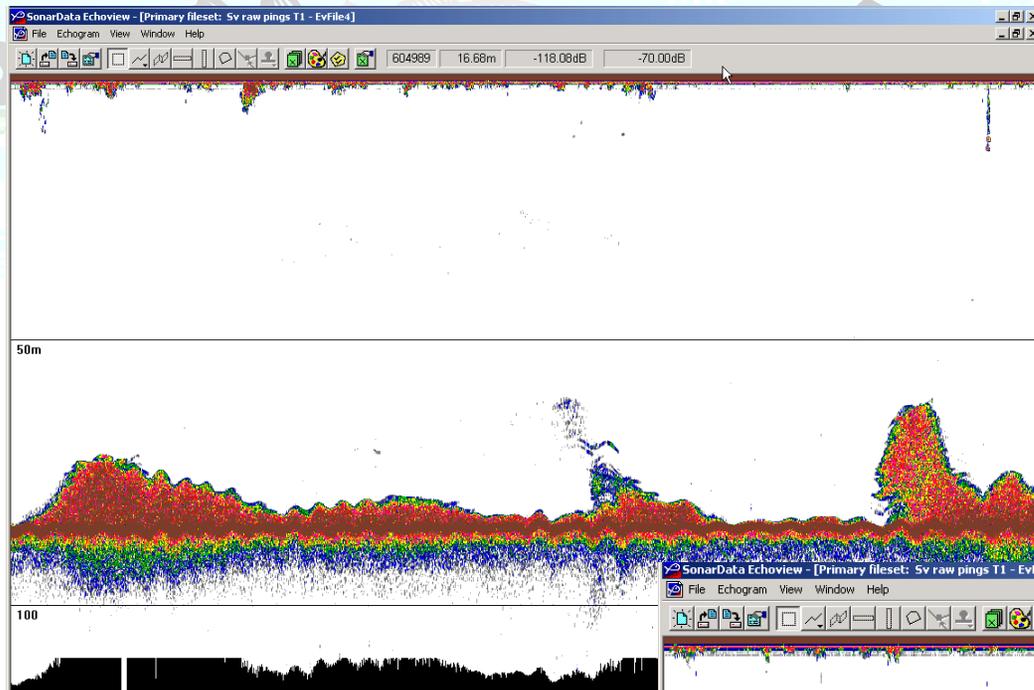


# Spatial extent of the fishery

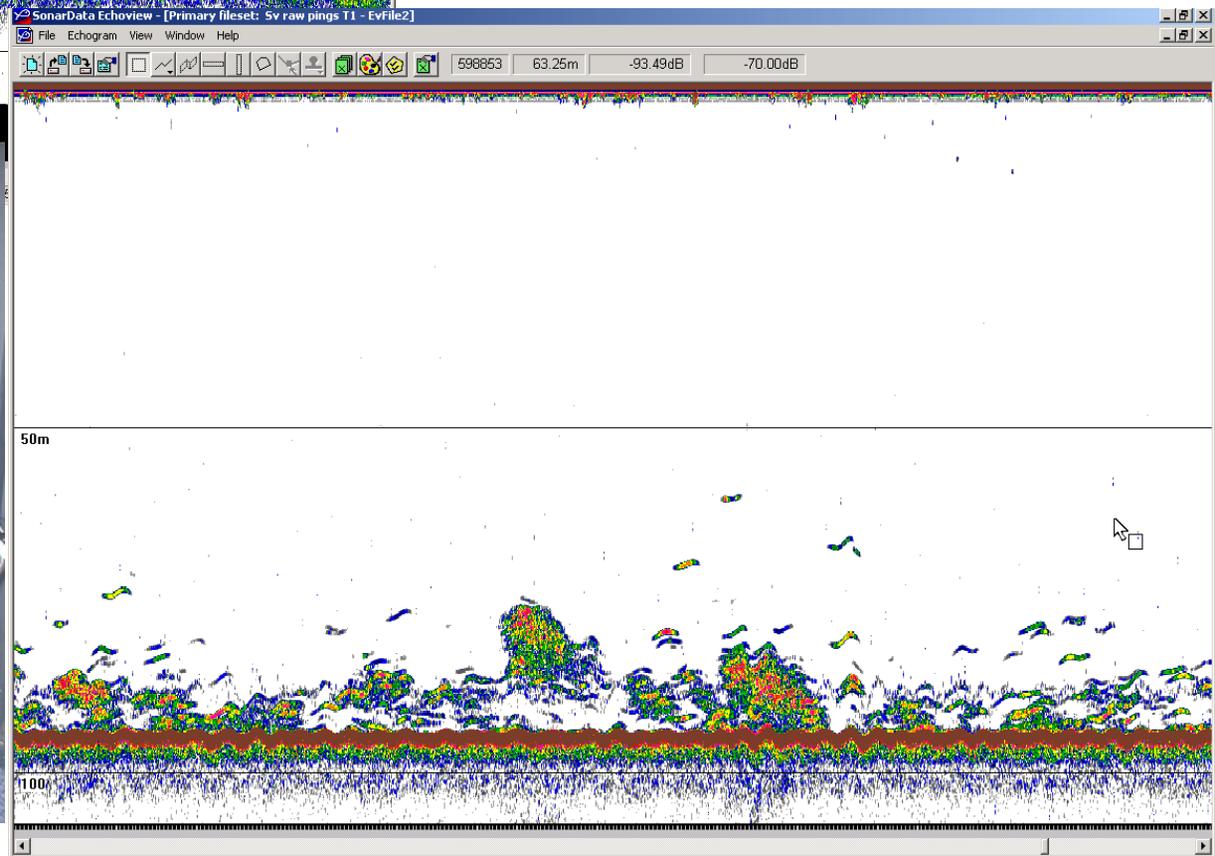
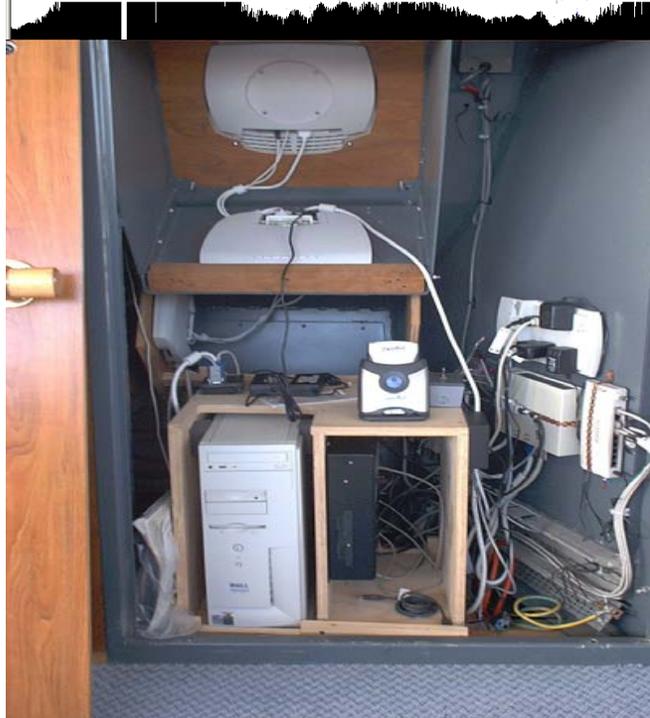


# Spatial extent





# Acoustic return...



56° 00'N

55° 30'N

55° 00'N

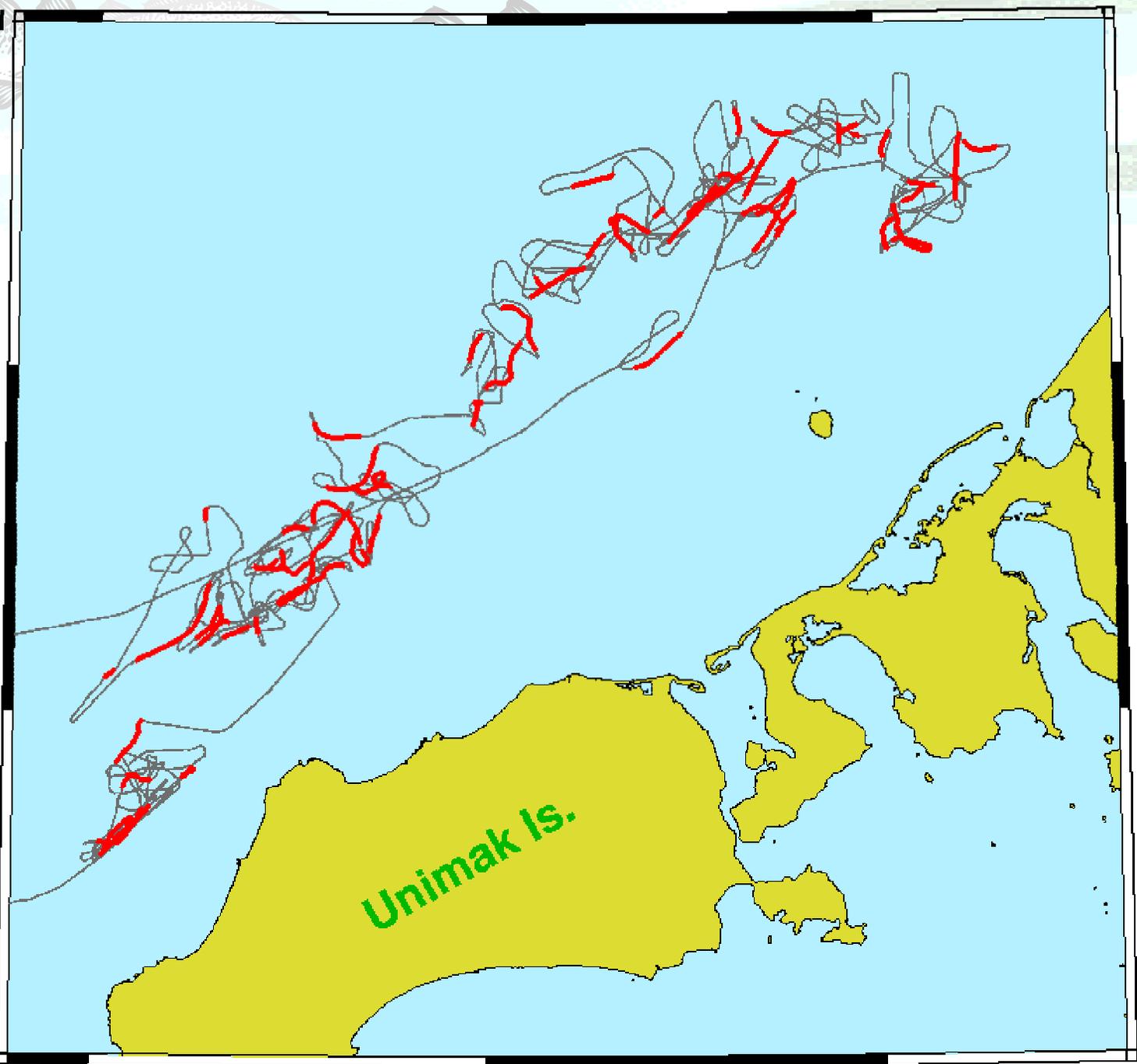
54° 30'N

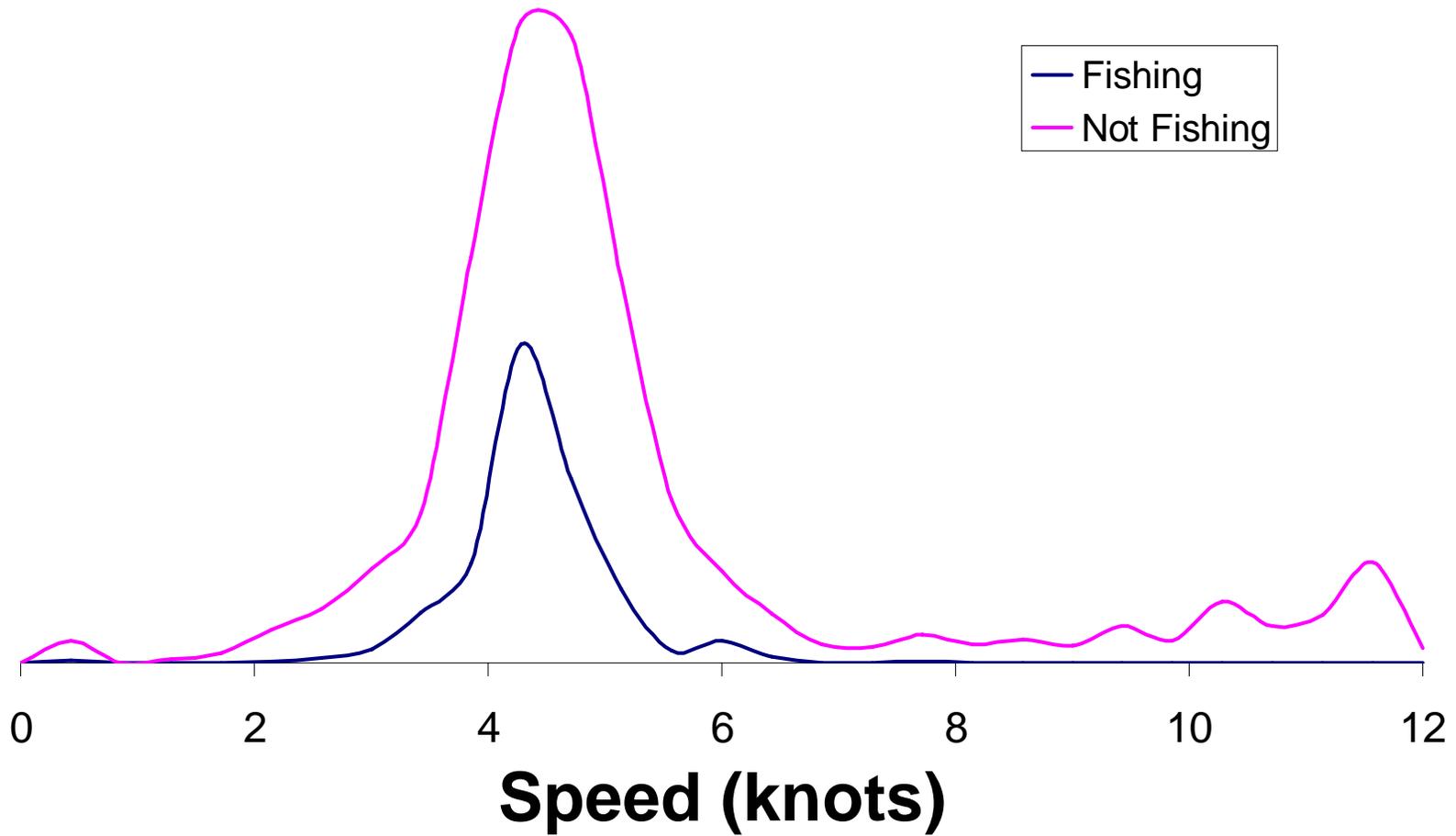
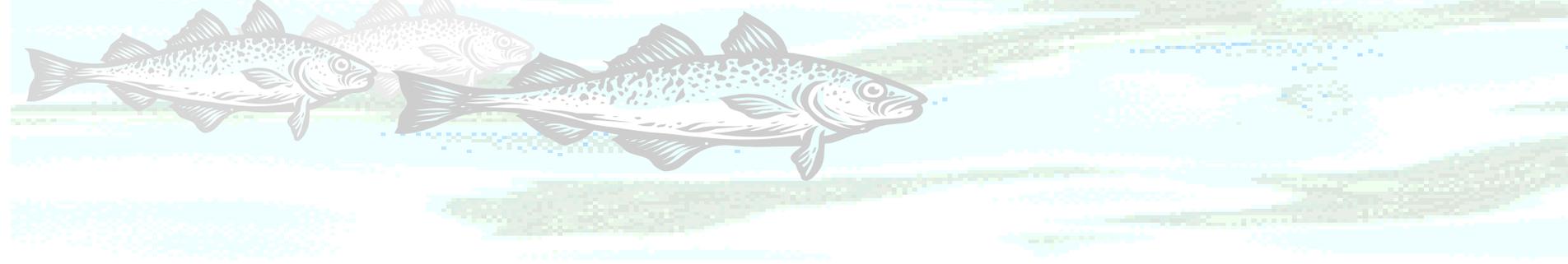
165°W

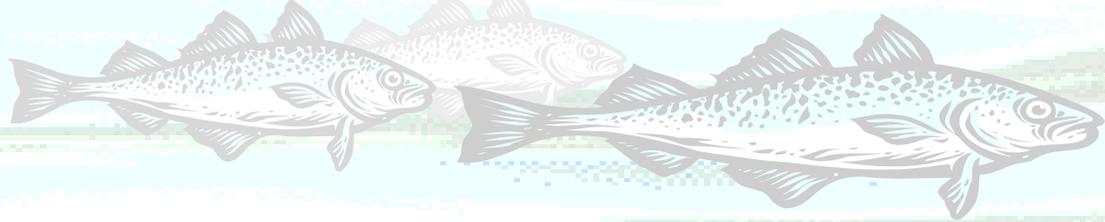
164°W

163°W

Unimak Is.

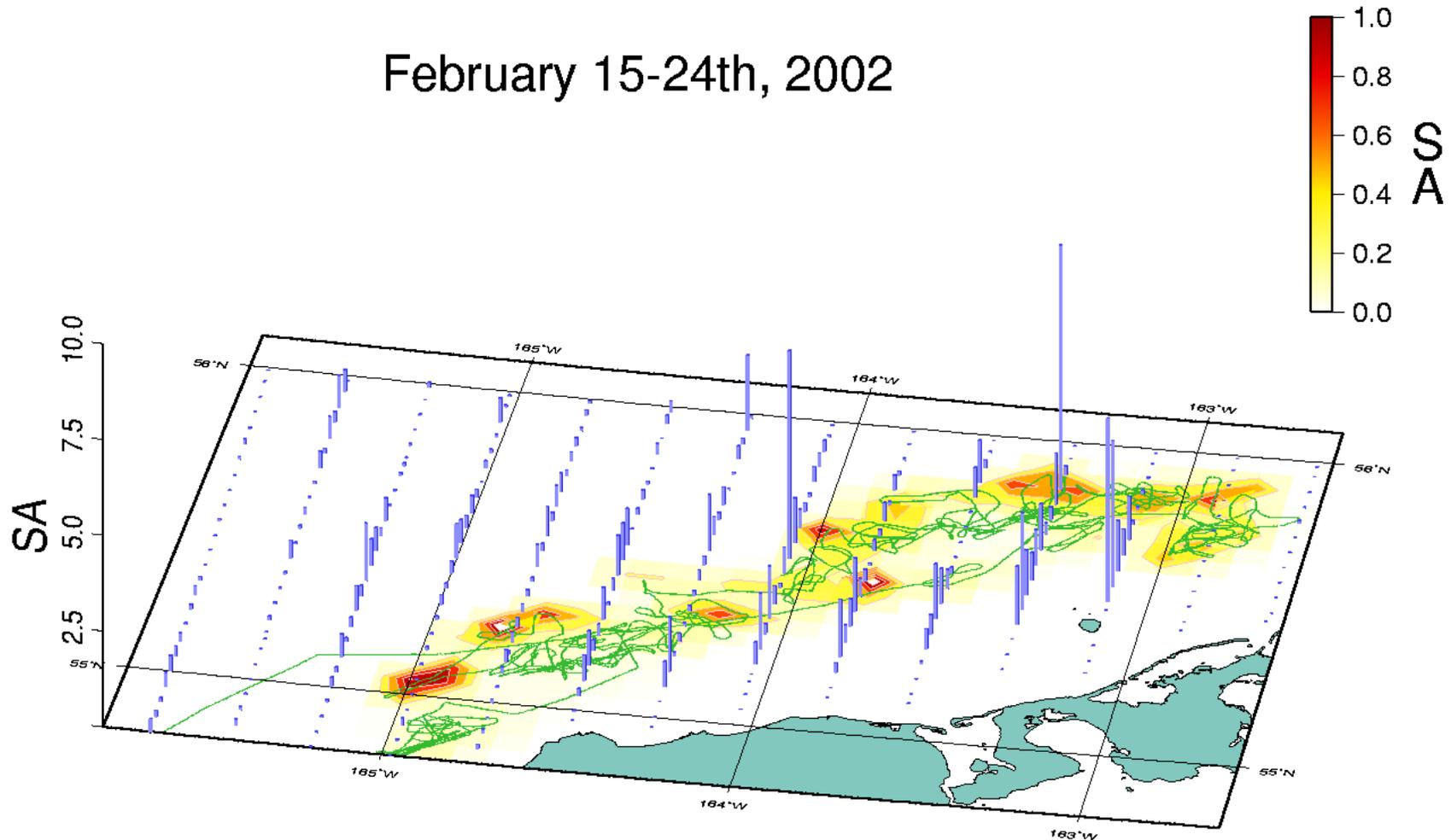






# Relative $s_A$ : Survey vs Fishery

February 15-24th, 2002





# Summary

- **Observer coverage level important for a number of alternative analyses**
  - ★ The Alaska observer program is multipurpose
  - ★ Inference from classical sampling design may limit future applications of the data
  - ★ Some new metrics to assess fishery sampling relative to actual catch shows some promise and need further development