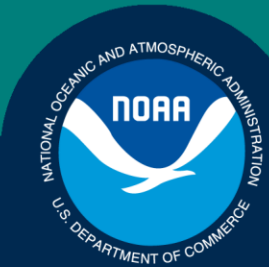


Science, Service, Stewardship



2018 Aleutian Islands Biennial Bottom Trawl Survey

Wayne Palsson

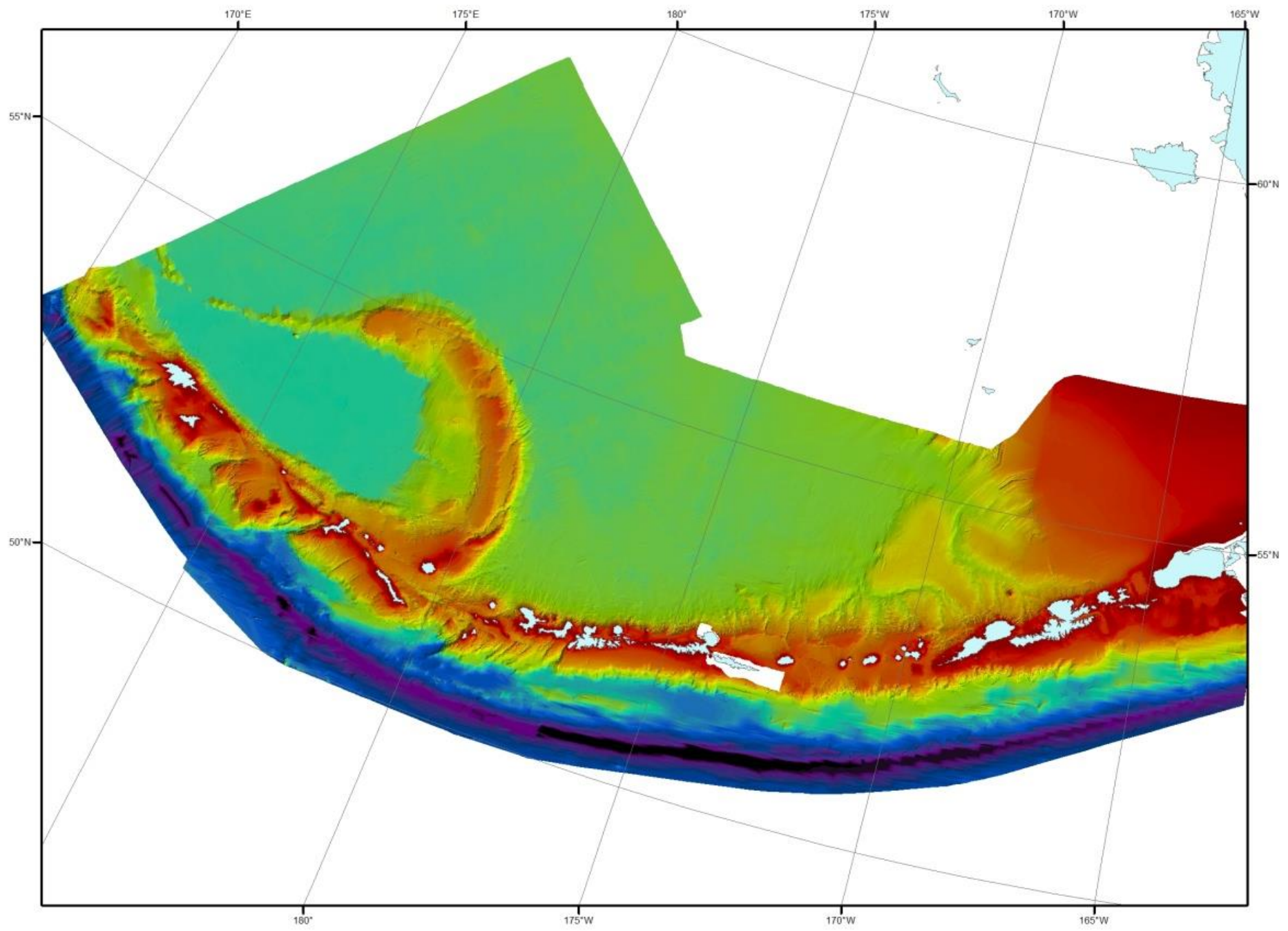
Team Leader

Aleutian Islands/Gulf of Alaska Survey Group

Alaska Fisheries Science Center, Seattle

September 19, 2018

**NOAA
FISHERIES
SERVICE**



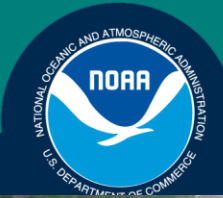


Survey Purpose

To continue a 38 year standardized and fishery-independent time series of

- Relative Abundance
- Distribution
- Biological Condition

31 managed or ecosystem species or species groups in the Bering Sea/Aleutian Islands complex that have stock assessments.



General Survey Design



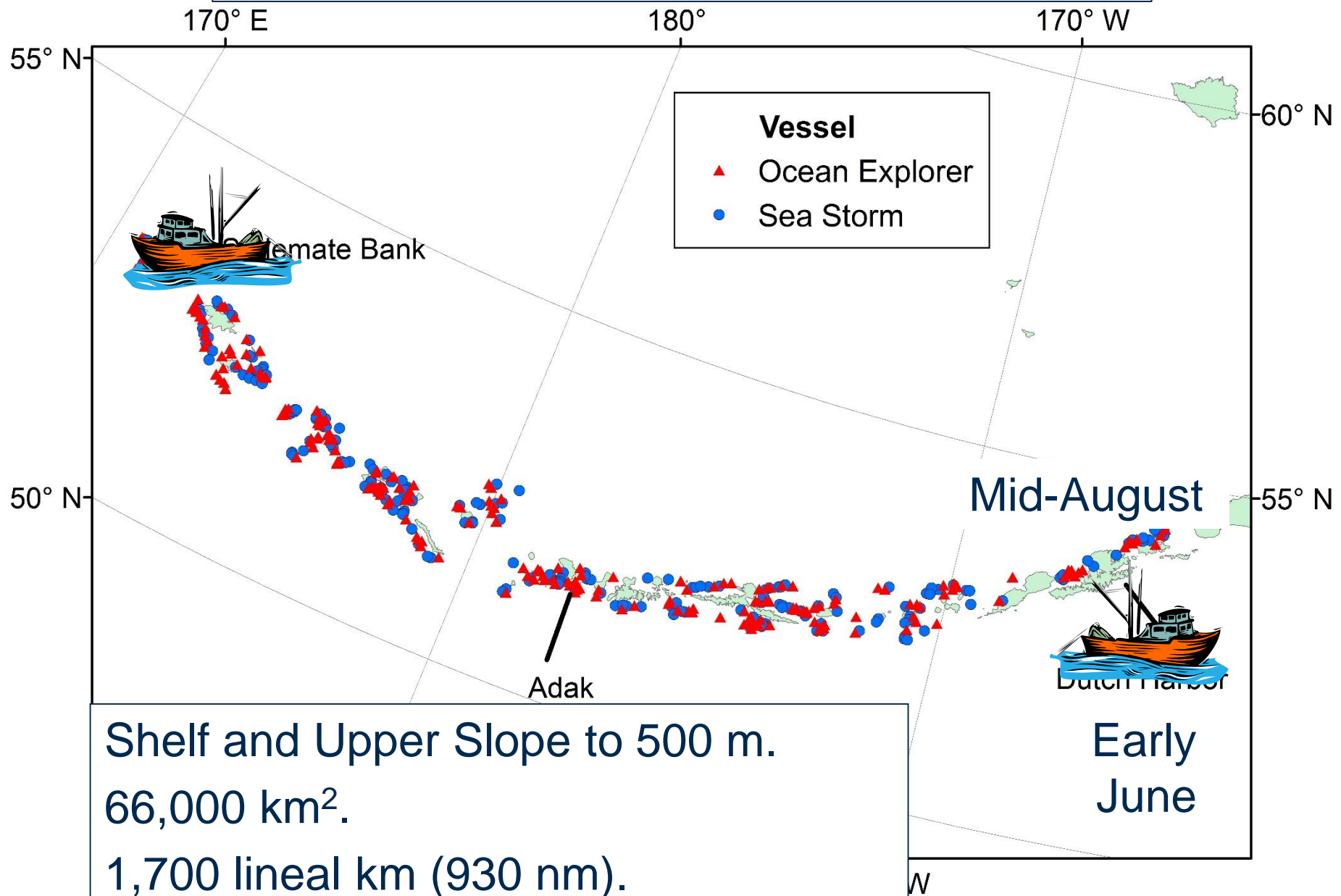
16 years



5 years

- Chartered commercial vessels: *Sea Storm*, *Ocean Explorer*
- Vessels must be at least 30.6 m in length, 1000 HP
- 5-6 crew + 6 scientists
- 70 day charter for each vessel

Aleutian Island Survey Characteristics

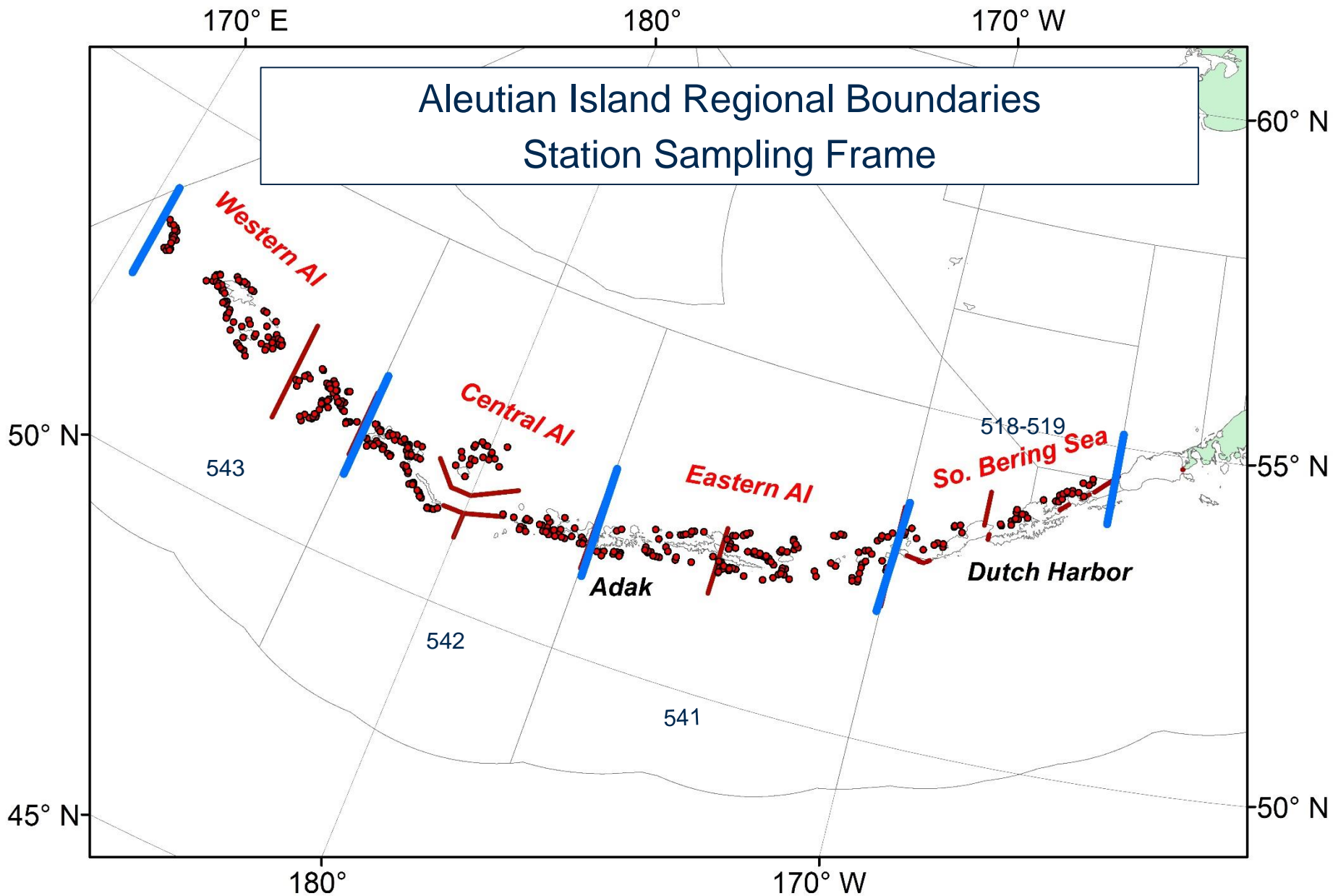


Shelf and Upper Slope to 500 m.
66,000 km².
1,700 lineal km (930 nm).
16 surveys since 1980, now biennially.



General Survey Design

- Stratified-random survey of successful stations
- 45 Strata based on geography and depth zones:
1-100, 101-200, 201-300 & 301-500 m
- Station allocation based upon abundance, variance, survey area, and economic value
- 15 minute trawl, usually 1.5 km distance
- Poly Nor 'Eastern net with rollers & bobbins



AI Survey Stations



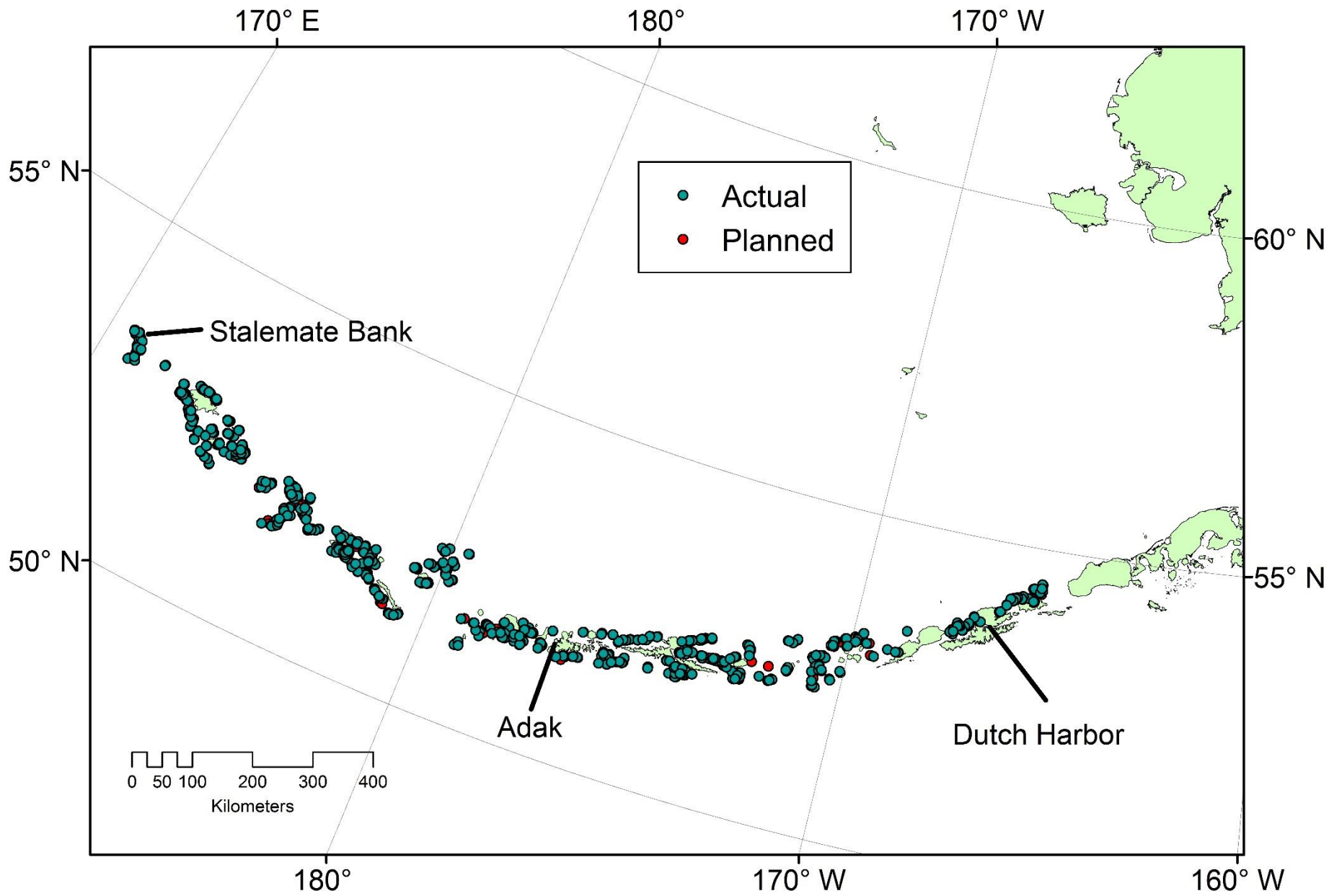
| <u>Year</u> | <u>Stations</u> | <u>Comment</u> |
|-------------|-----------------|--------------------|
| 1980 | 126 | 30-60 min duration |
| 1983 | 287 | Japanese Research |
| 1986 | 382 | Nets did differ |
| 1991 | 340 | Net standardized |
| 1994 | 381 | |
| 1997 | 397 | 15 min duration |
| 2000 | 416 | |
| 2002 | 417 | |
| 2004 | 420 | |
| 2006 | 358 | |
| 2008 | | No Survey |
| 2010 | 418 | |
| 2012 | 420 | |
| 2014 | 410 | |
| 2016 | 417 | |
| 2018 | 420 | |

AI Survey Start Dates



| Year | Start Date | Days Surveying | Boats |
|-------------|-------------------|-----------------------|--------------|
| 1980 | 3 July | 187 | 3 |
| 1983 | 15 July | 147 | 3 |
| 1986 | 18 May | 148 | 2 |
| 1991 | 19 July | 126 | 2 |
| 1994 | 3 June | 130 | 2 |
| 1997 | 10 June | 137 | 2 |
| 2000 | 20 May | 126 | 2 |
| 2002 | 17 May | 137 | 3 |
| 2004 | 6 June | 116 | 2 |
| 2006 | 6 June | 104 | 2 |
| 2008 | | | |
| 2010 | 9 June | 127 | 2 |
| 2012 | 8 June | 124 | 2 |
| 2014 | 11 June | 117 | 2 |
| 2016 | 7 June | 128 | 2 |
| 2018 | 9 June | 128 | 2 |

2018 Aleutian Islands Bottom Trawl Survey Stations





Depth Allocation

| Stratum Depth (m) | 2018 Tows | 2018 % | 2010-6 Mean % |
|-------------------|-----------|--------|------------------|
| 1-100 | 97 | 23.1 | 22.9 |
| 101-200 | 200 | 47.6 | 43.1 |
| 201-300 | 95 | 22.6 | 25.7 |
| 301-500 | 28 | 6.7 | 8.3 |



Area Allocation

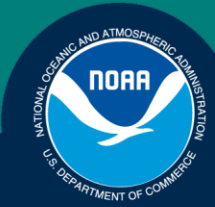
| <u>Survey Area</u> | <u>2018 Tows</u> | <u>2018%</u> | <u>2010-6 Mean%</u> |
|--------------------|------------------|--------------|-------------------------|
| So. Bering Sea | 45 | 10.7 | 11.6 |
| Eastern AI | 126 | 30.0 | 30.1 |
| Central AI | 120 | 28.6 | 27.9 |
| Western AI | 129 | 30.7 | 30.4 |



Poly Nor'eastern Net Characteristics

- 12.7 cm mesh with
- 3.2 cm liner
- 4 seams/panels
- 3 bridles
- 36 cm bobbins
- 10 cm disks
- Net width 8 to 20 m
- Height ~ 7 m

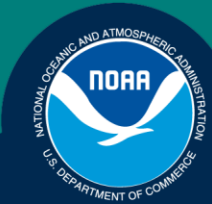




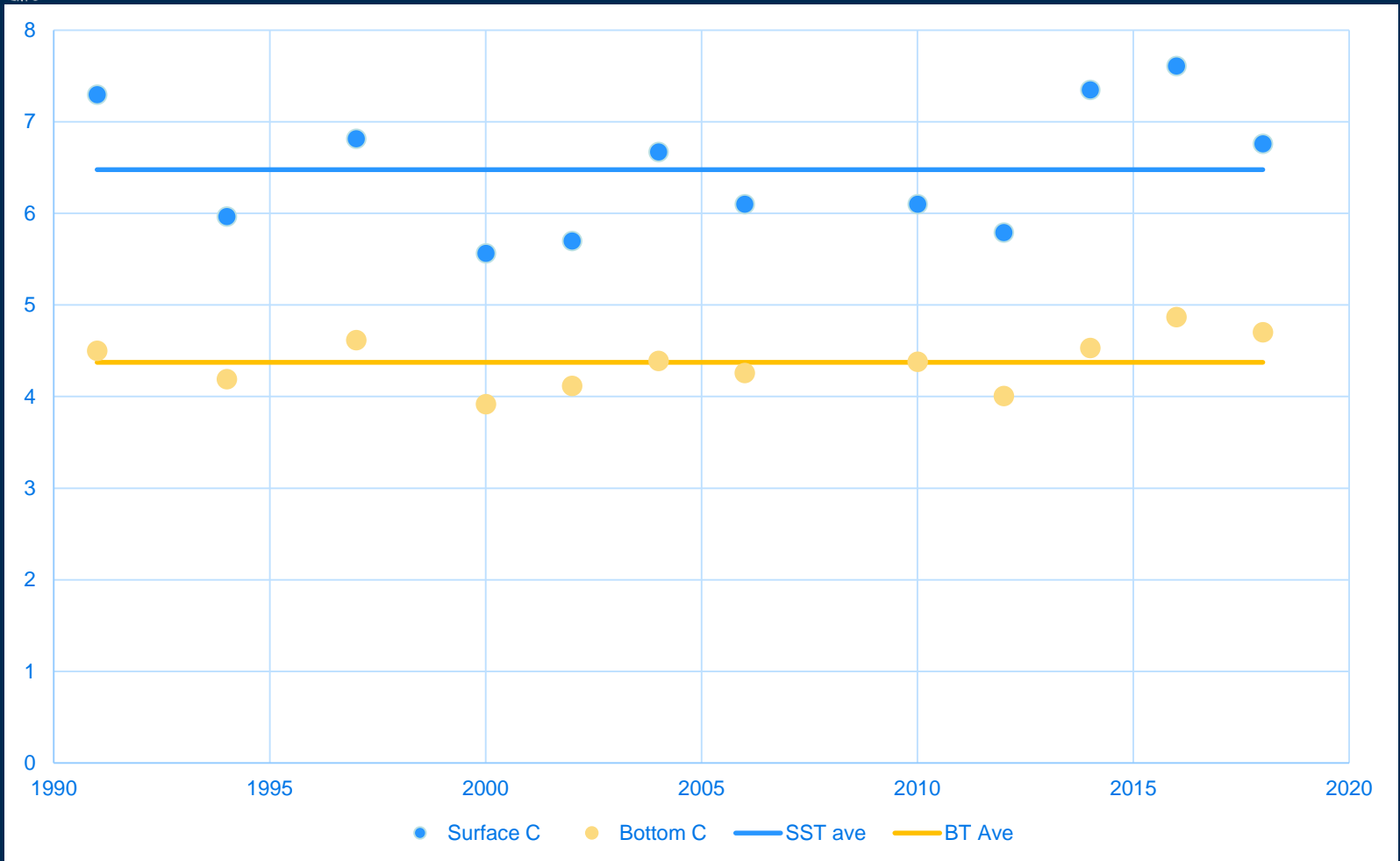
Mensuration



- Spread Sensors at the wings
- Height Sensor at center headrope
- Bathythermograph on headrope (gear depth)
- Bottom Contact Sensor on Footrope (on/off bottom)
- GPS integrated wheelhouse program
- Separate Navigation Software (Globe)



Mean SST and Bottom Temp (°C)



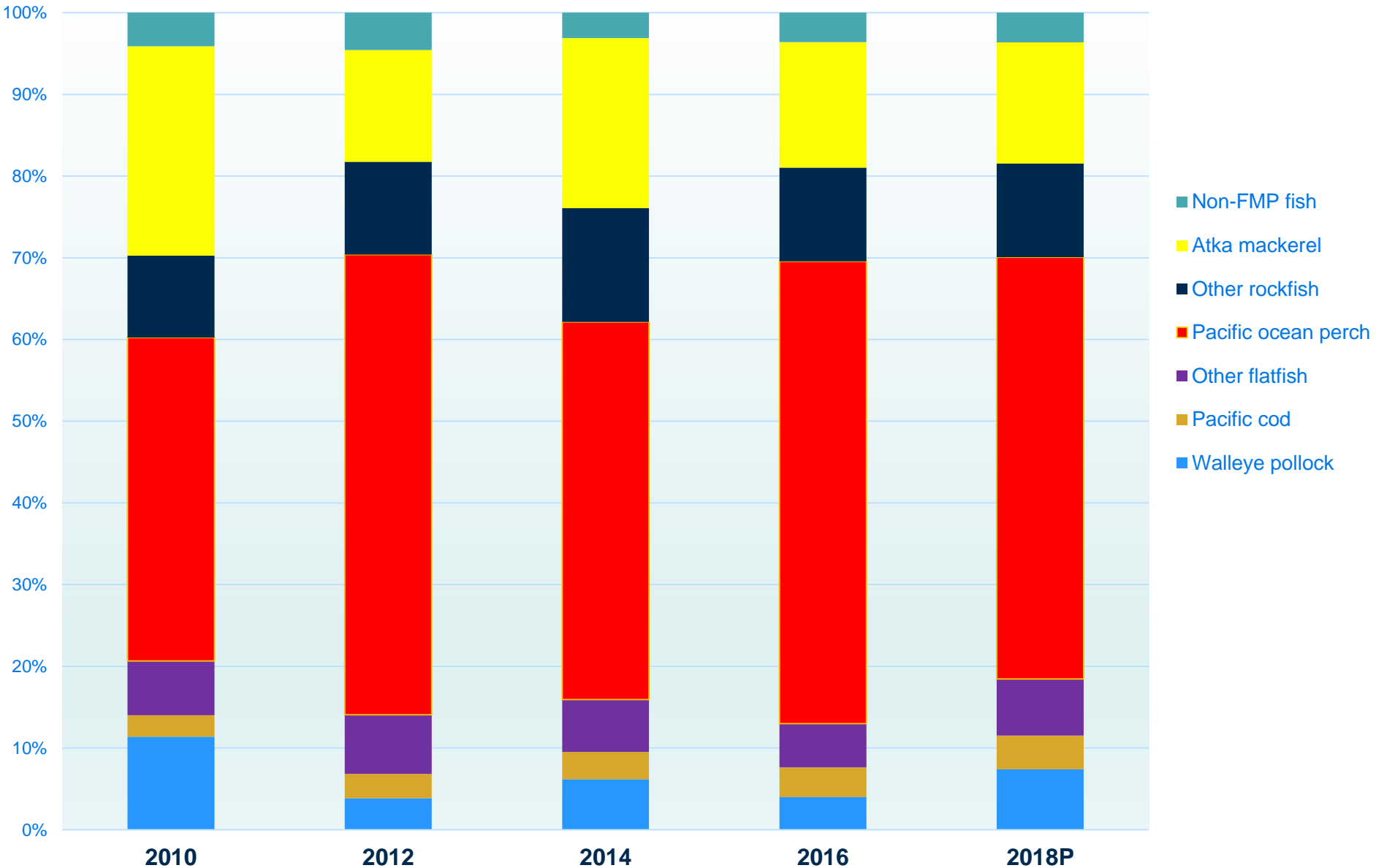
Catch Processing



- All living specimens are sorted to lowest possible taxon, weighed and counted
- Sub-sampling at various levels of catch and specimen numbers



Average Species Composition 2010-2018





Length Collections



| <u>Species</u> | <u>Number</u> |
|-----------------------|---------------|
| Arrowtooth flounder | 10225 |
| Kamchatka flounder | 3623 |
| Flathead sole | 4941 |
| Pacific halibut | 945 |
| Dover sole | 65 |
| Rex sole | 4081 |
| Northern rock sole | 11767 |
| Southern rock sole | 1656 |
| Atka mackerel | 7301 |
| Walleye pollock | 12972 |
| Pacific cod | 6093 |
| Shortspine thornyhead | 2954 |
| Sablefish | 1166 |
| Rougeye rockfish | 14 |
| Blackspotted rockfish | 1195 |
| Pacific Ocean Perch | 30980 |
| Northern rockfish | 14640 |
| Shorthead rockfish | 694 |
| Dusky rockfish | 460 |
| Skates | 933 |
| Other | 4887 |
| Total | 121592 |

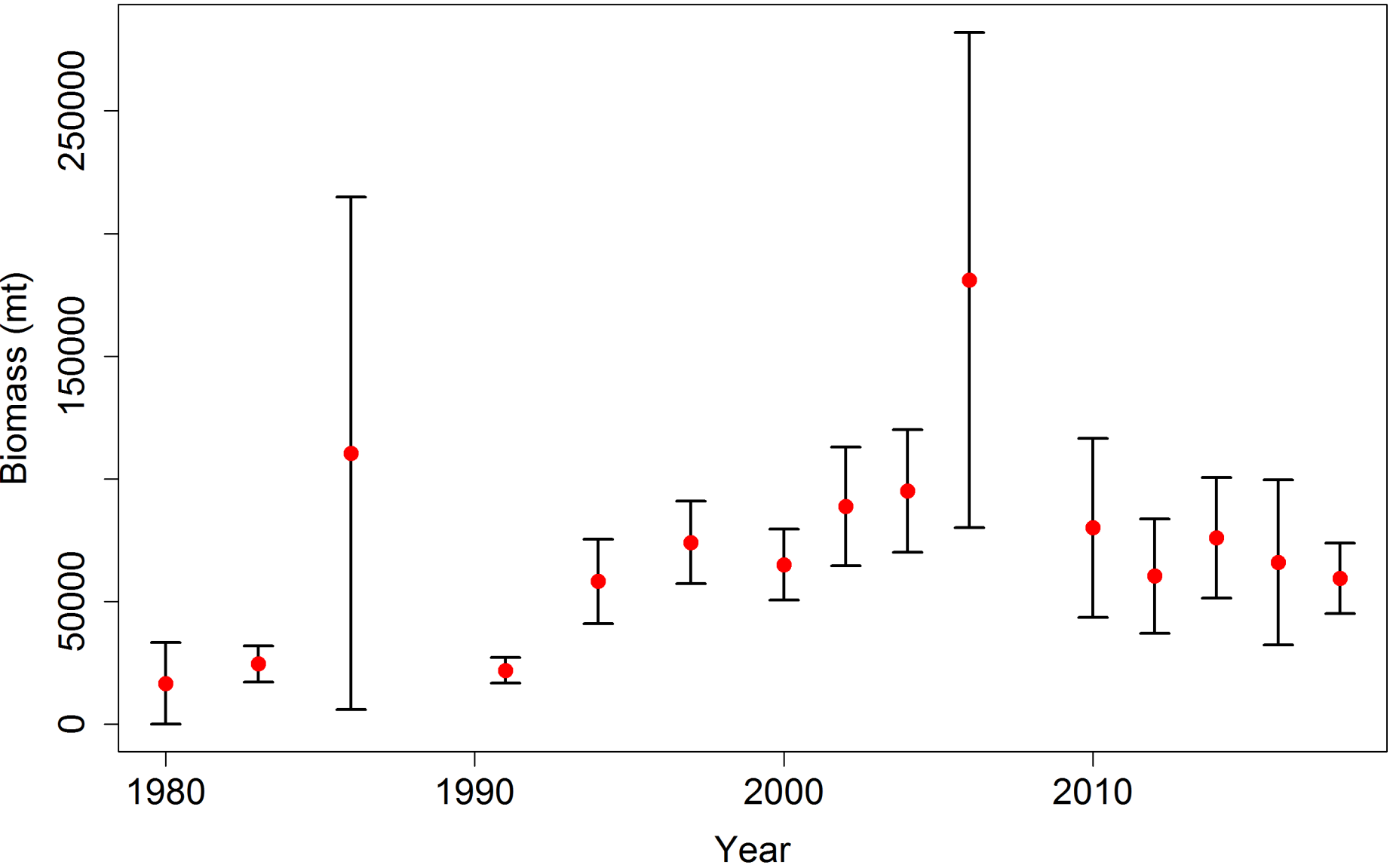


Otolith Collections

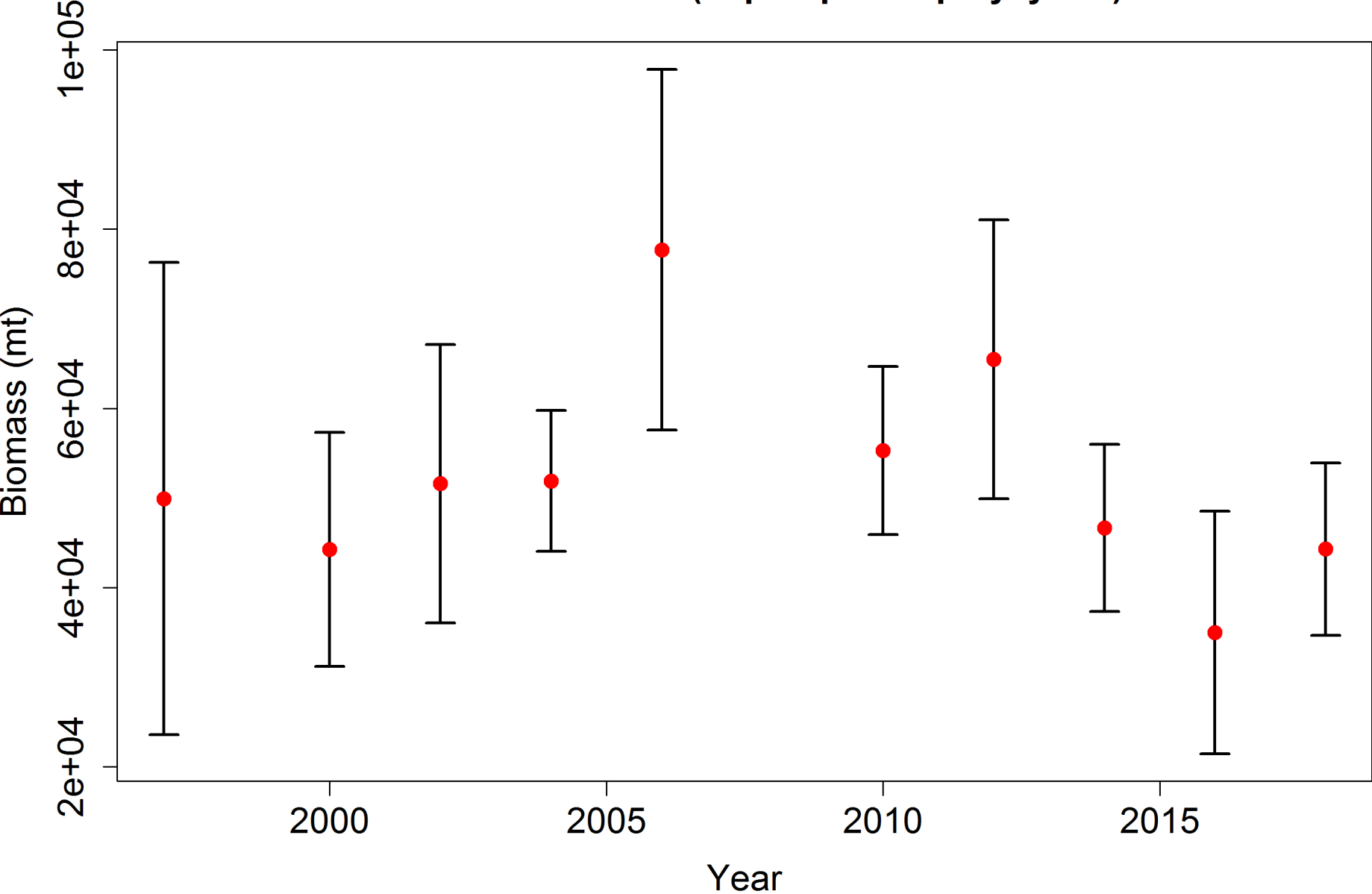


| <u>Species</u> | <u>Collection Type</u> | <u>2018</u> | <u>Target</u> |
|-----------------------|------------------------|--------------|---------------|
| Arrowtooth flounder | Random | 594 | 500 |
| Kamchatka flounder | Random | 632 | 700 |
| Greenland turbot | Random | 7 | 200 |
| Northern rock sole | Random | 497 | 300 |
| Southern rock sole | Random | 212 | 300 |
| Atka mackerel | Random | 1,078 | 1,000 |
| Walleye pollock | Random | 916 | 700 |
| Pacific cod | Random | 584 | 500 |
| Shortspine thornyhead | Random | 318 | 600 |
| Rougheye rockfish | Random | 10 | 100 |
| Blackspotted rockfish | Random | 304 | 400 |
| Pacific Ocean Perch | Random | 922 | 1,200 |
| Northern rockfish | Random | 588 | 600 |
| Shortraker rockfish | Random | 110 | 350 |
| Total | | 6,772 | 7,050 |

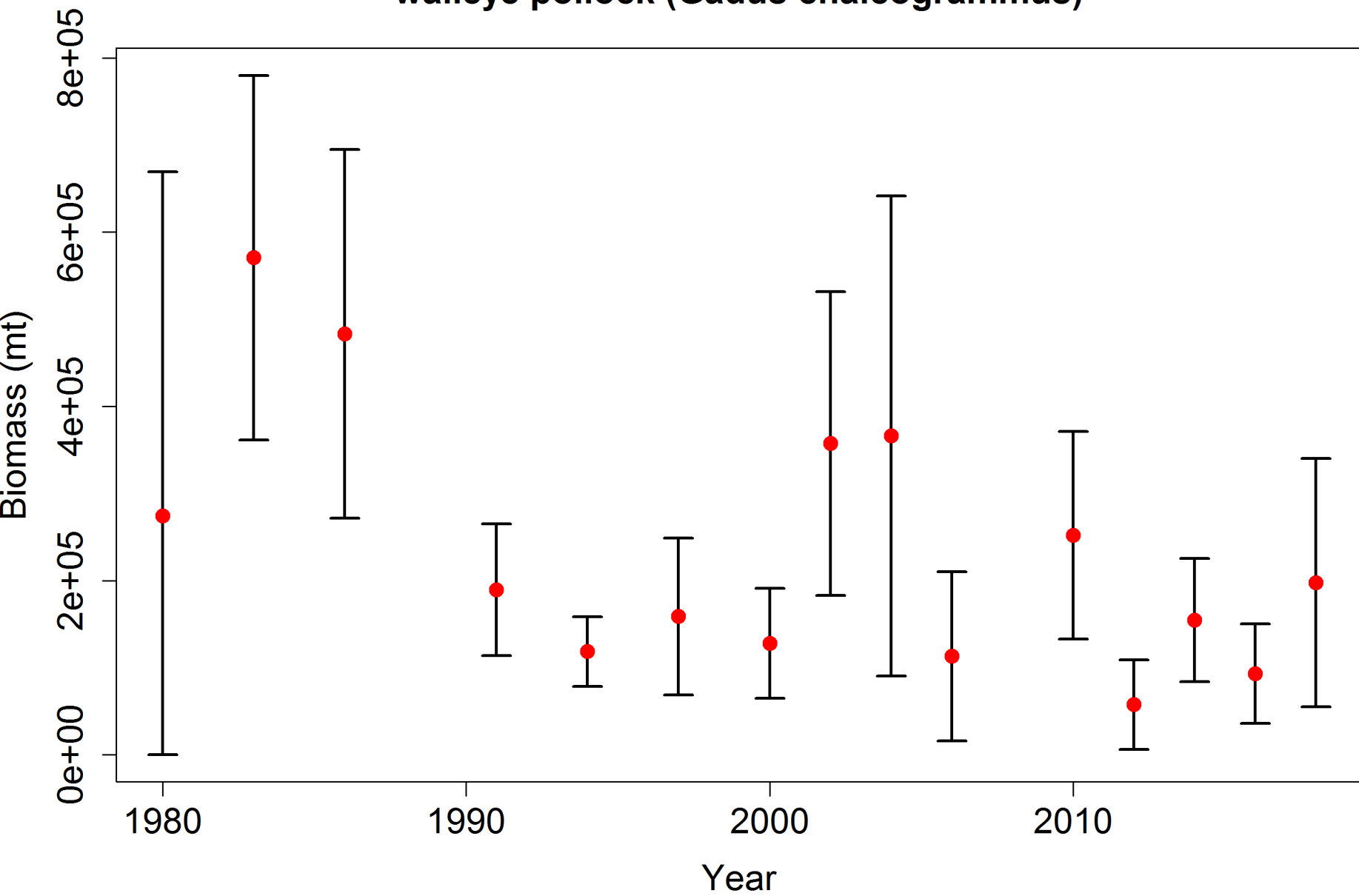
arrowtooth flounder (*Atheresthes stomias*)



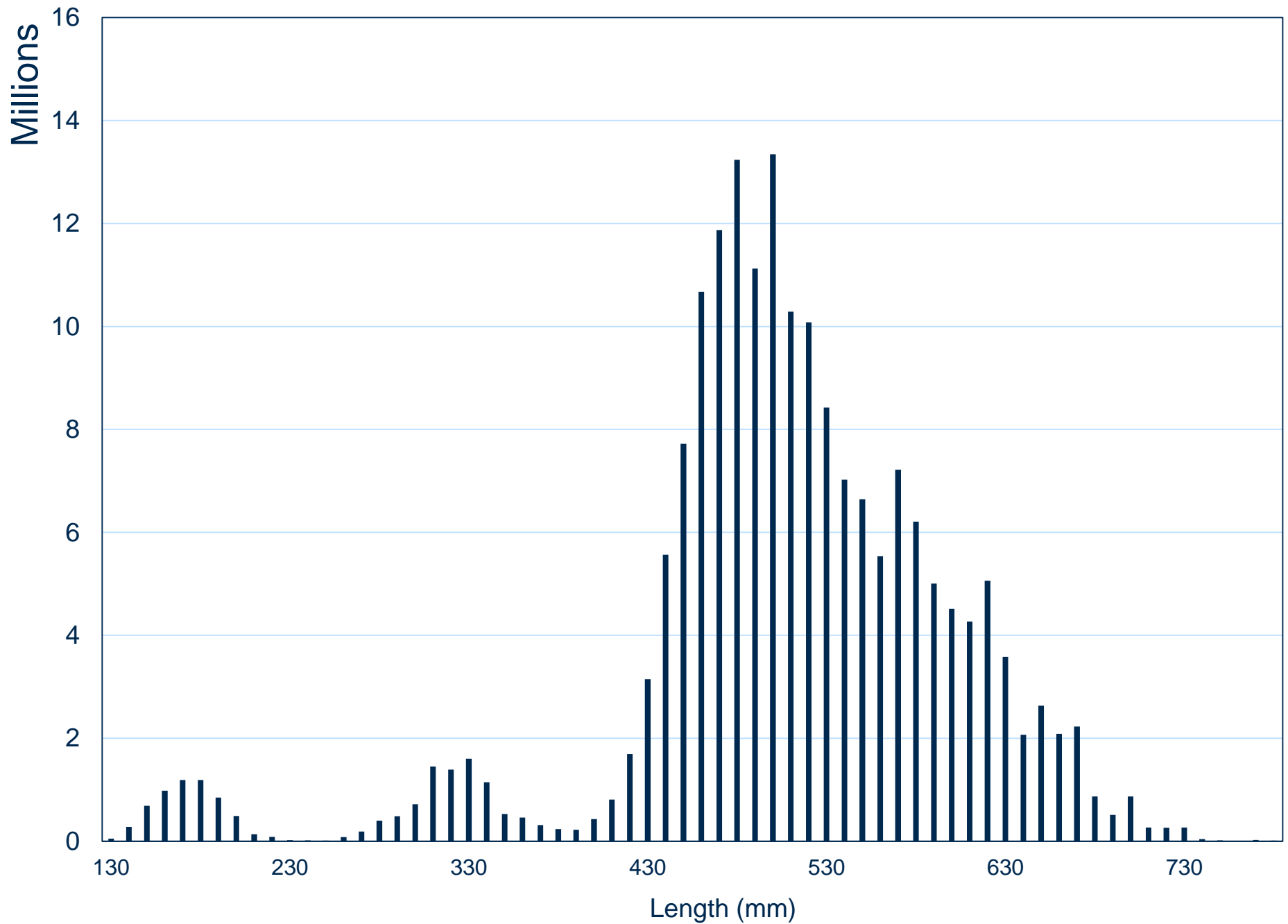
northern rock sole (*Lepidopsetta polyxystra*)



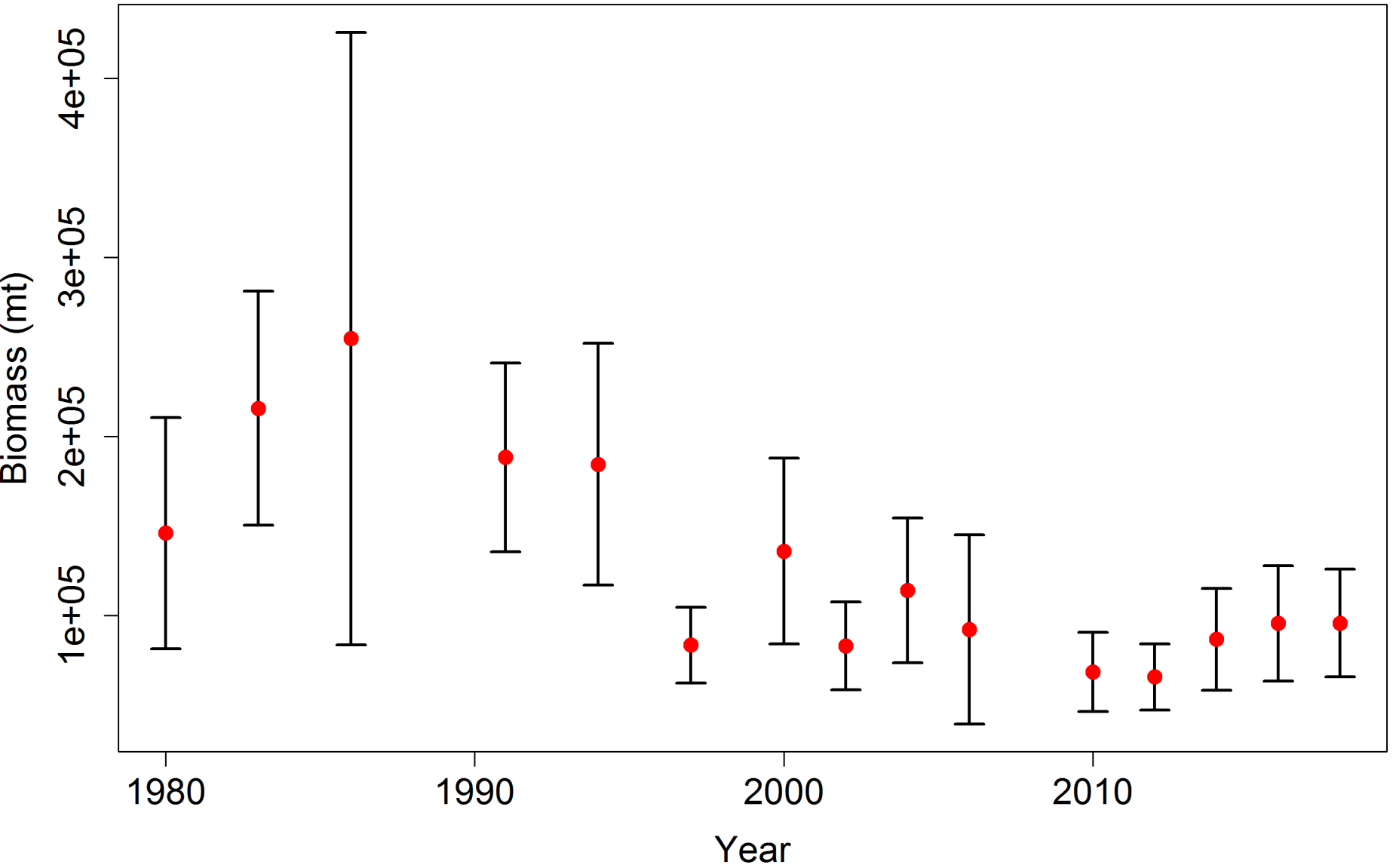
walleye pollock (*Gadus chalcogrammus*)



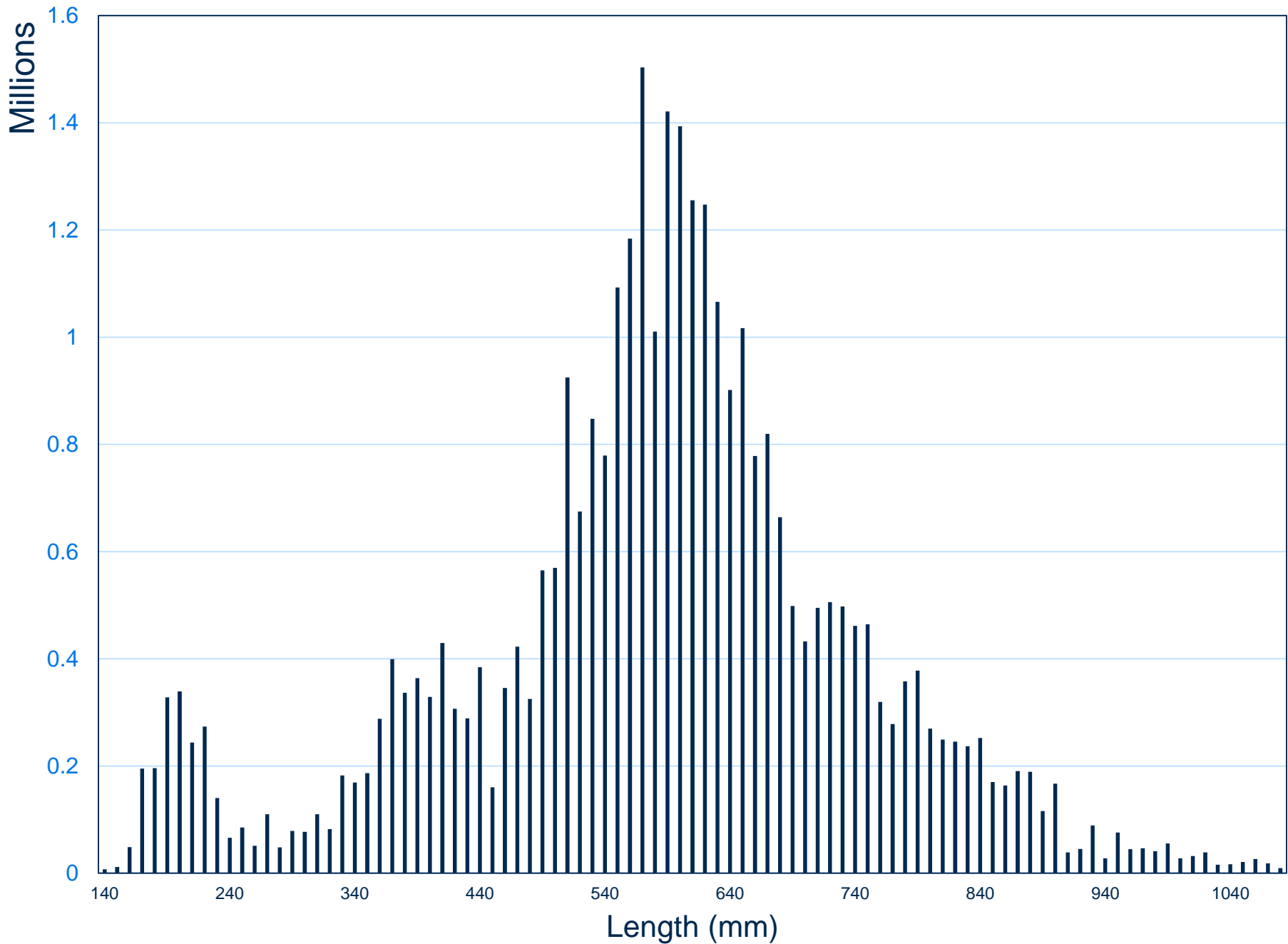
Pollock Population (numbers)



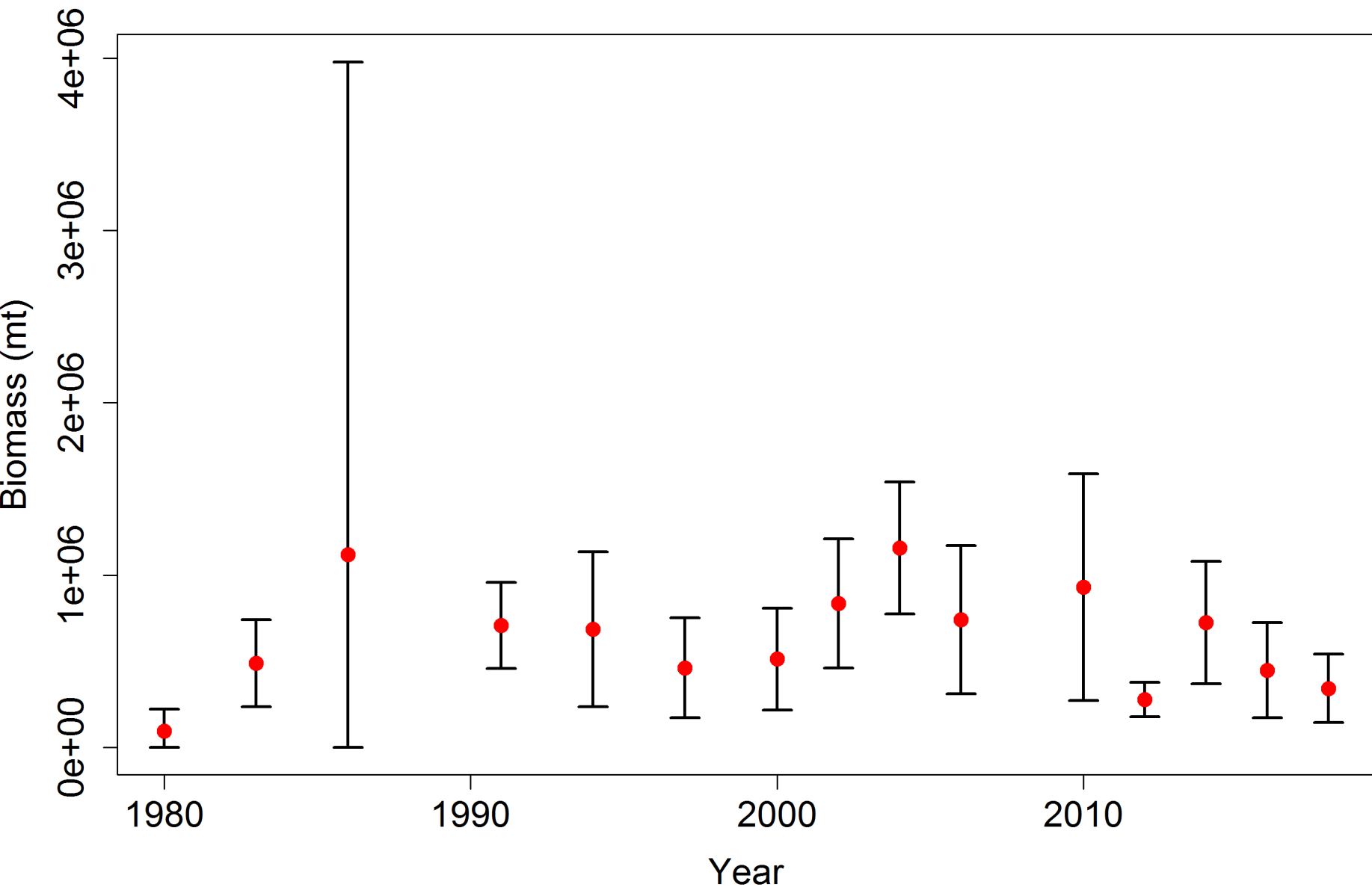
Pacific cod (*Gadus macrocephalus*)



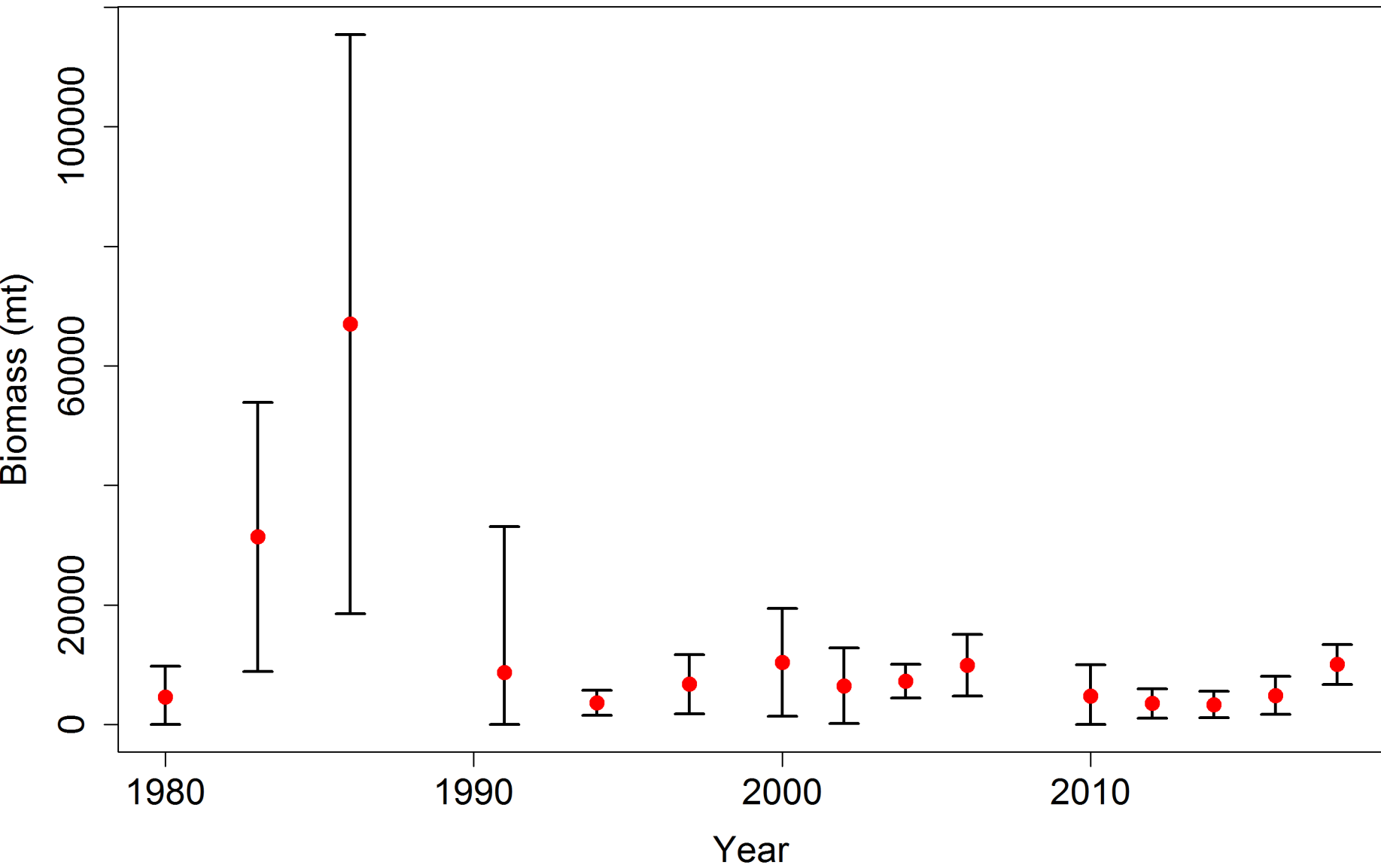
Cod Population (numbers)



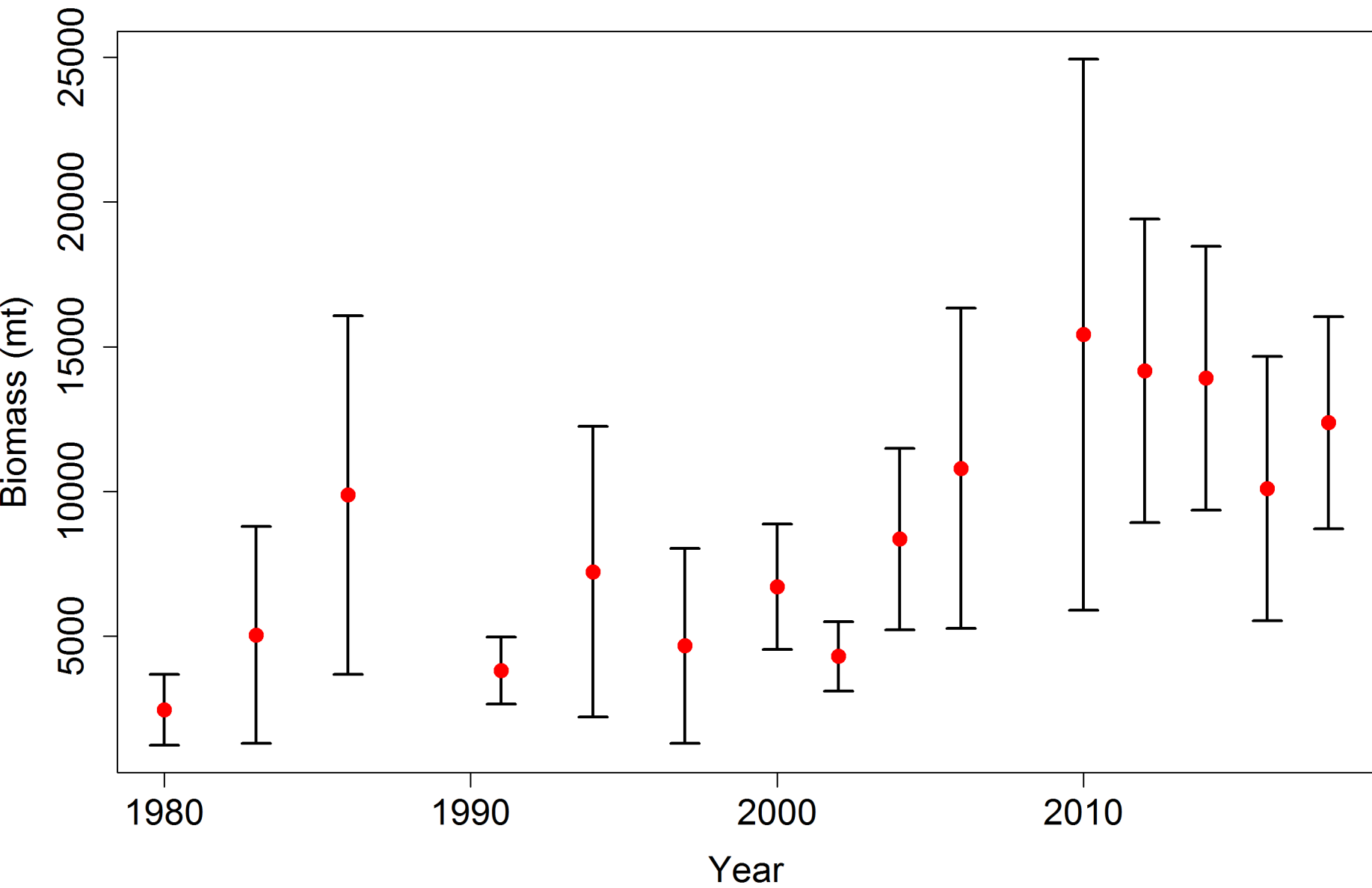
Atka mackerel (*Pleurogrammus monopterygius*)



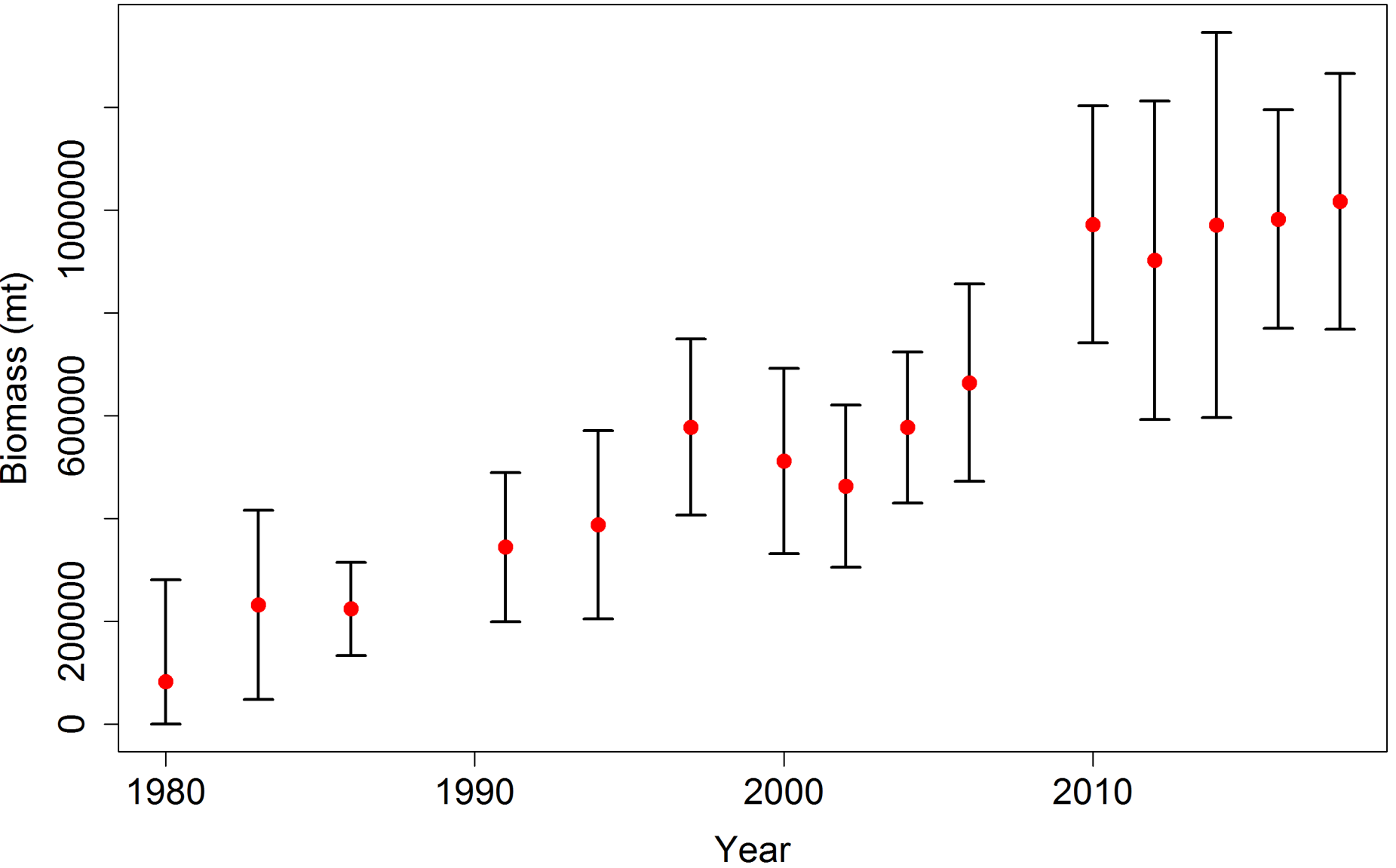
sablefish (*Anoplopoma fimbria*)



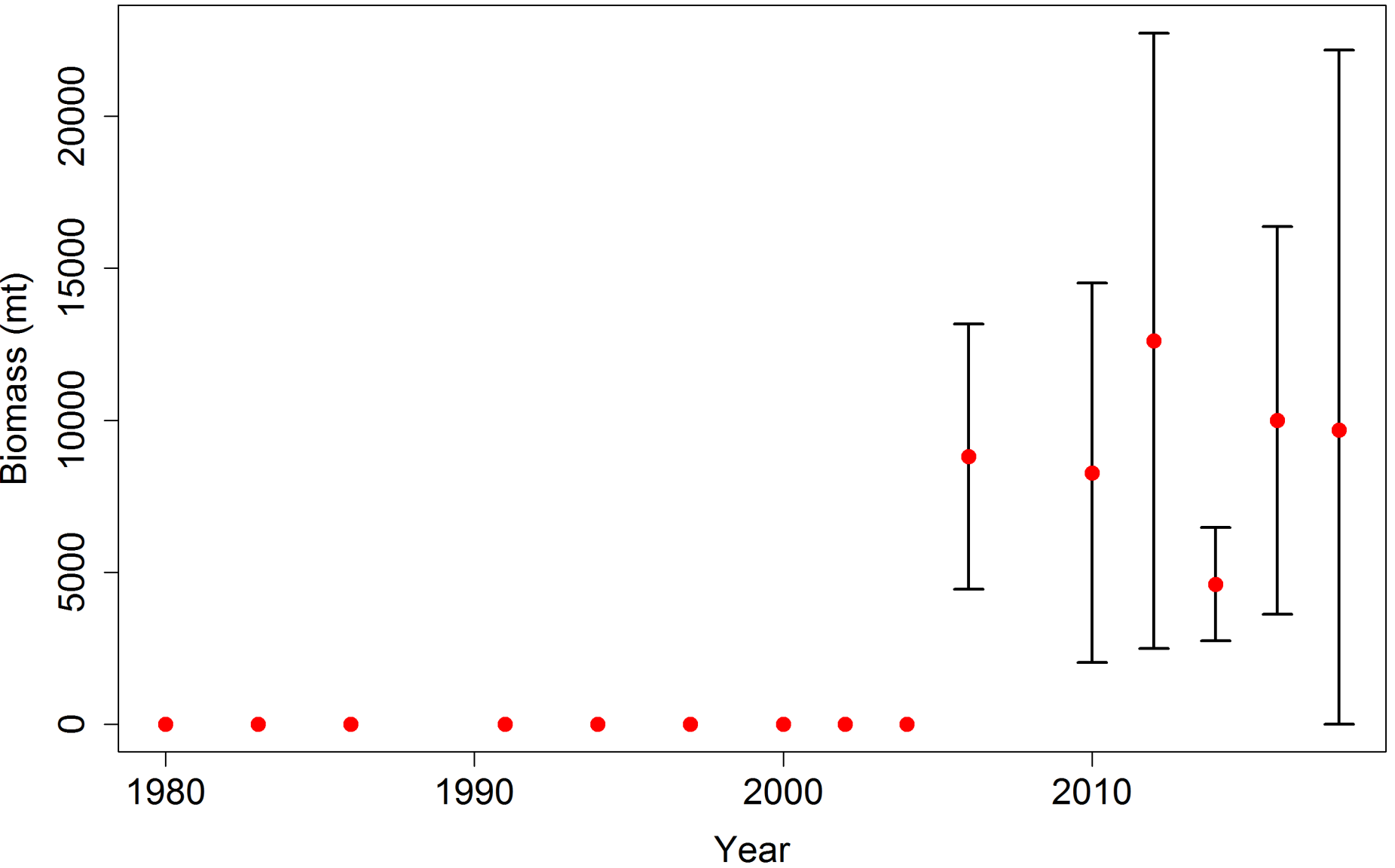
yellow Irish lord (*Hemilepidotus jordani*)



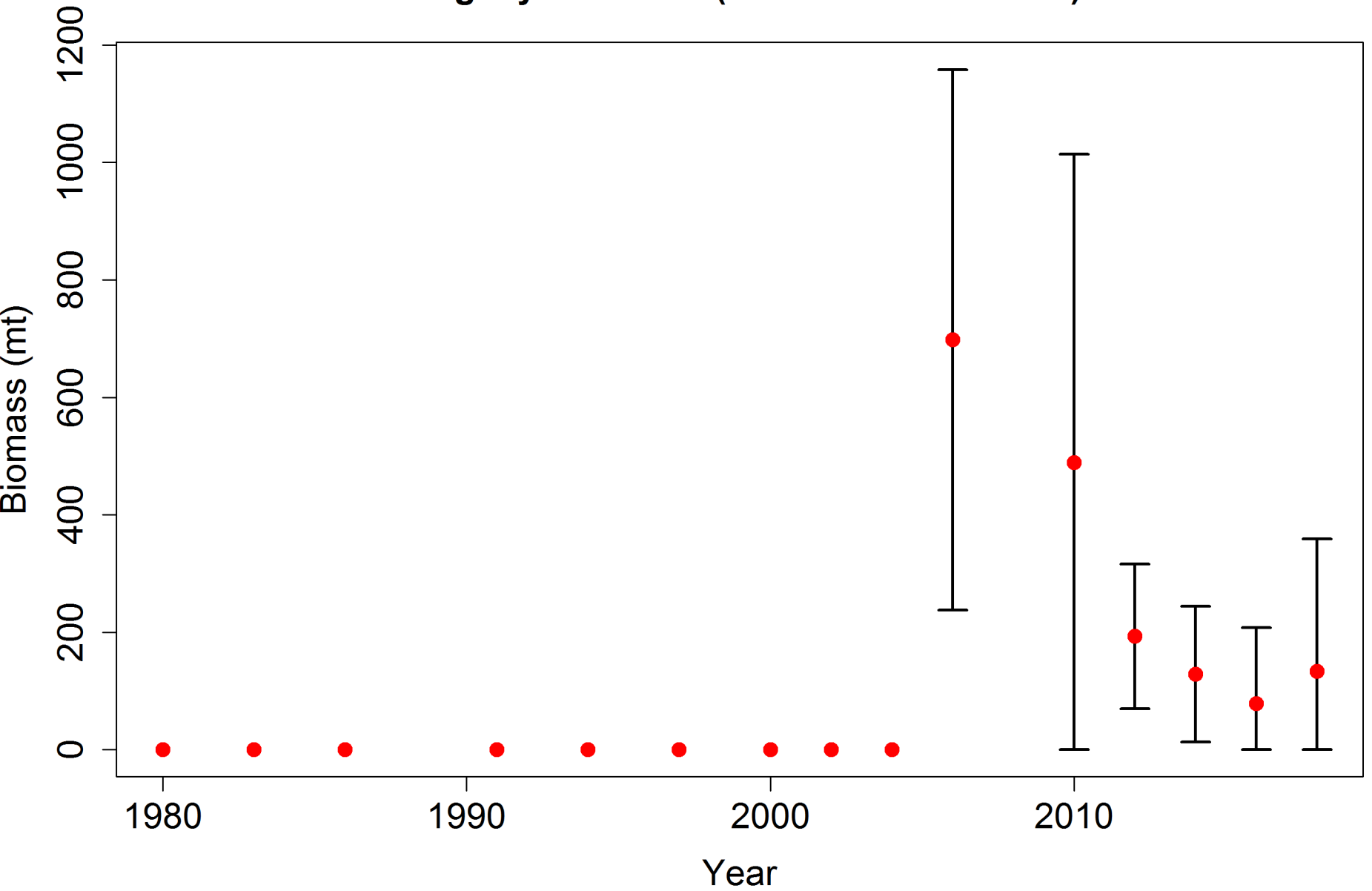
Pacific ocean perch (*Sebastes alutus*)



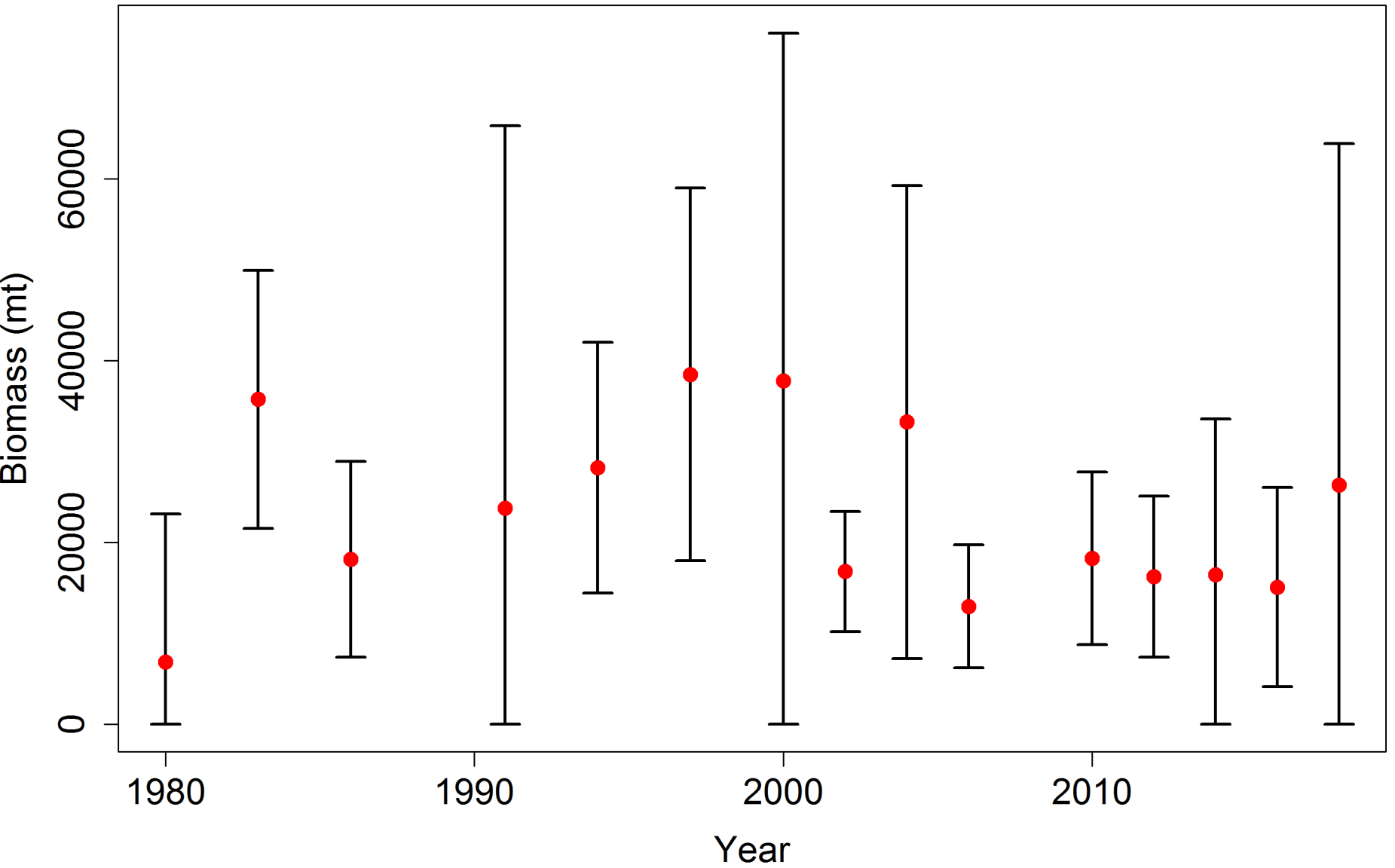
blackspotted rockfish (*Sebastes melanostictus*)



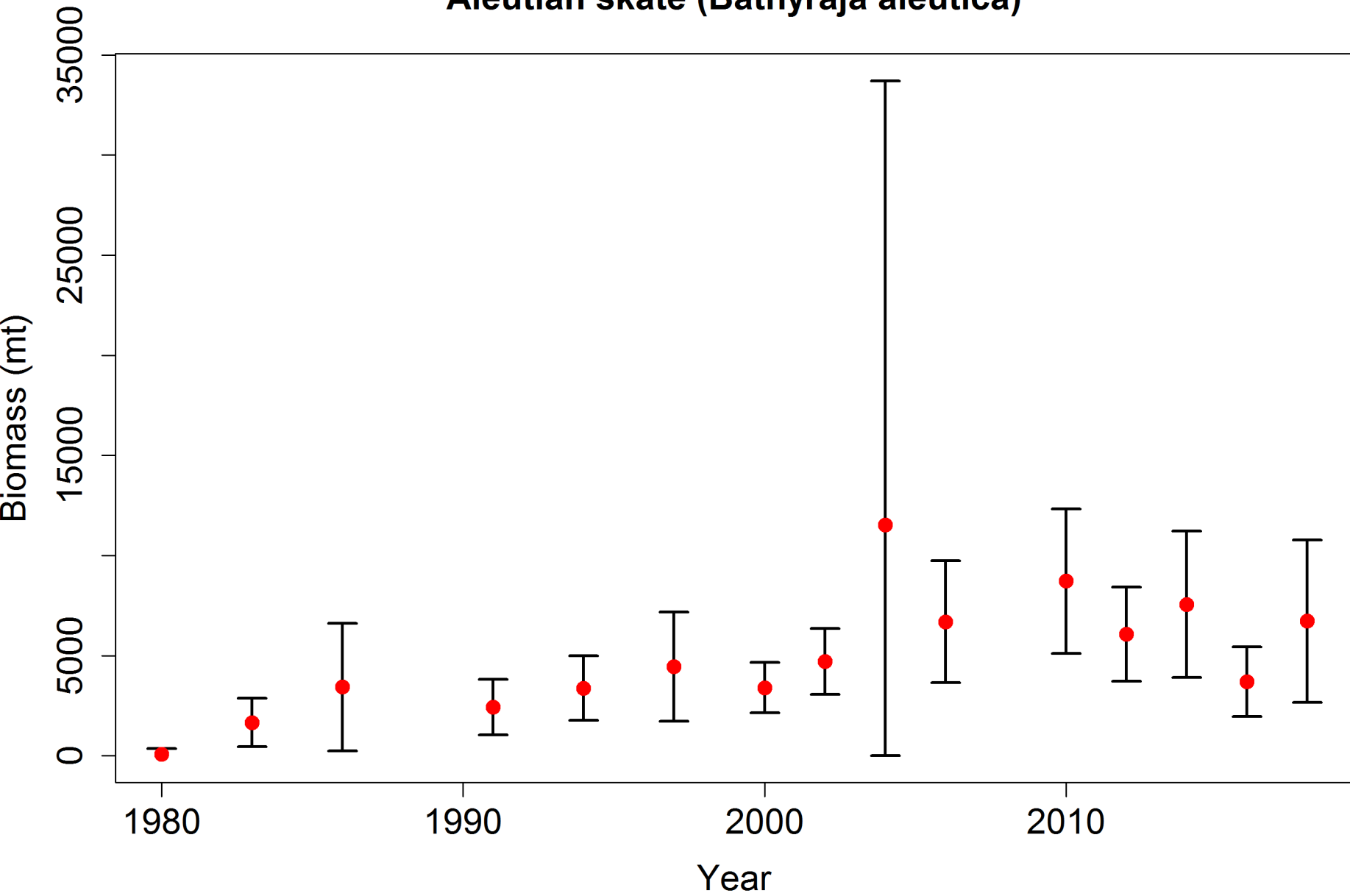
rougheye rockfish (*Sebastes aleutianus*)

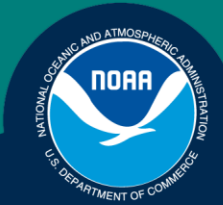


shortraker rockfish (*Sebastes borealis*)



Aleutian skate (*Bathyraja aleutica*)





Summary

- Most abundance estimates are similar to the last several surveys
- Temperatures appear to be on the high side of average
- Final estimates are forthcoming



Next Steps

- Complete effort review
- Finalize data base
- Re-estimate survey biomass, size, etc.
- Update age composition
- Update ecosystem analyses
- Upload data to AKFIN
- End of next week (9/28)