Gulf of Alaska and Aleutian Islands Bottom Trawl Surveys

NMFS AFSC RACE Division
Groundfish Assessment Program

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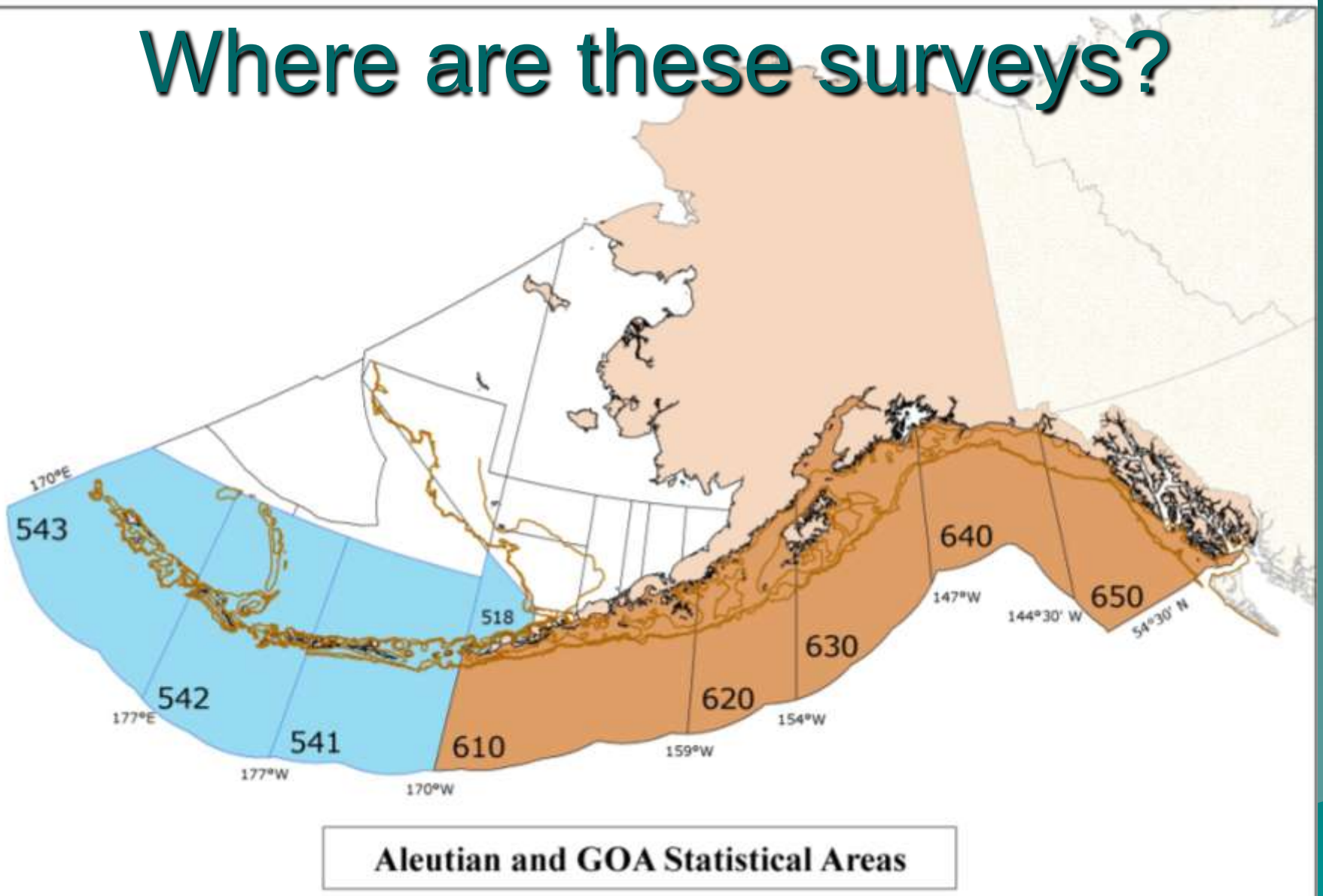
Information that a bottom trawl survey can provide:

- ***Distribution of species***
- ***Relative abundance***
- ***Biological characteristics***
  - **Size composition (from sexed/unsexed length frequency)**
  - **Age composition and growth parameters (from samples of age structures)**
  - **Trophic relationships (stomach scans and analyses)**
  - **Maturation schedules (length and age at maturity)**

Methods

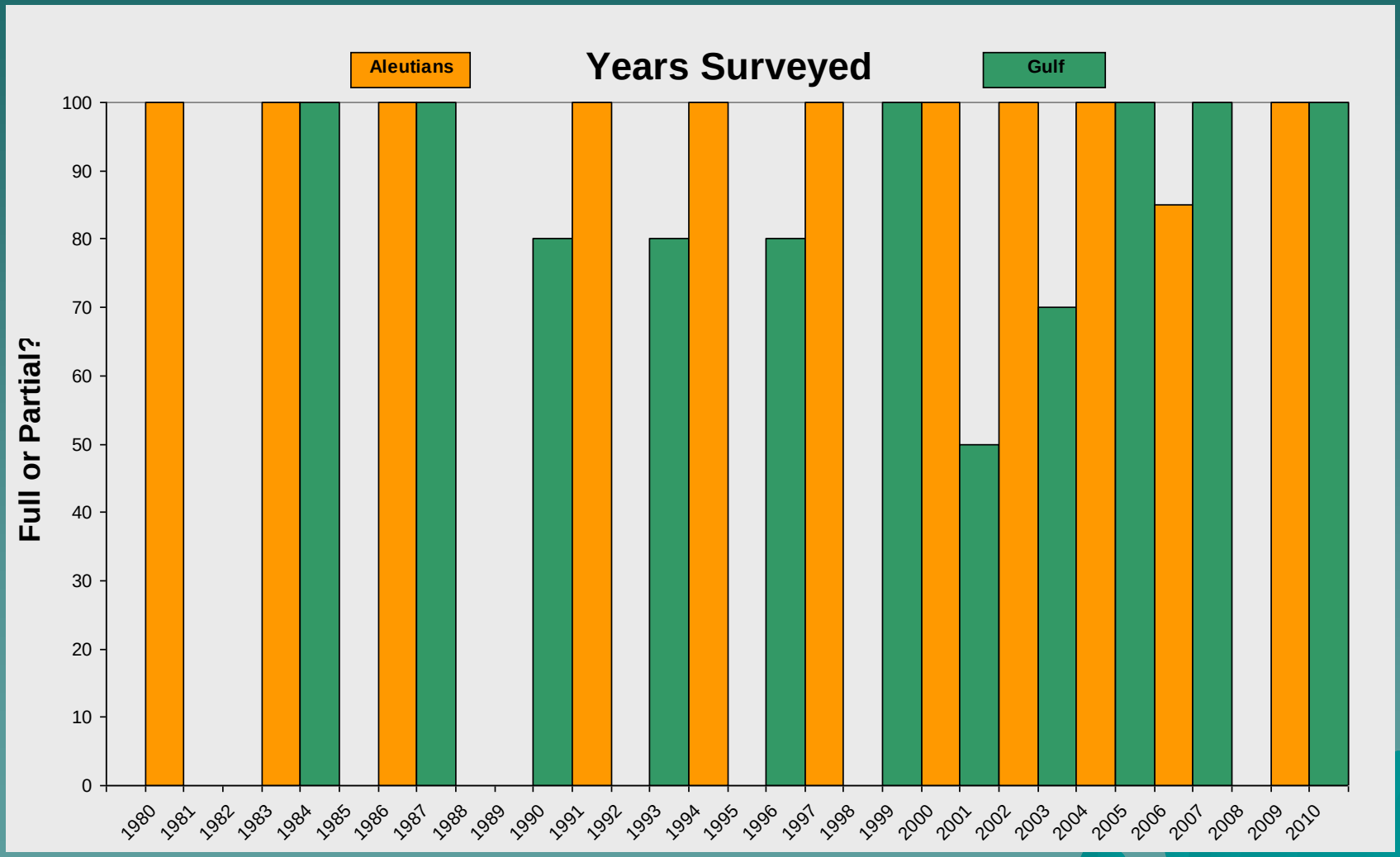
- Survey Area
- Survey Design
- Vessels
- Sampling Gear
- Mensuration Electronics
- Data Collection

Where are these surveys?



Aleutian and GOA Statistical Areas

How often are they conducted?

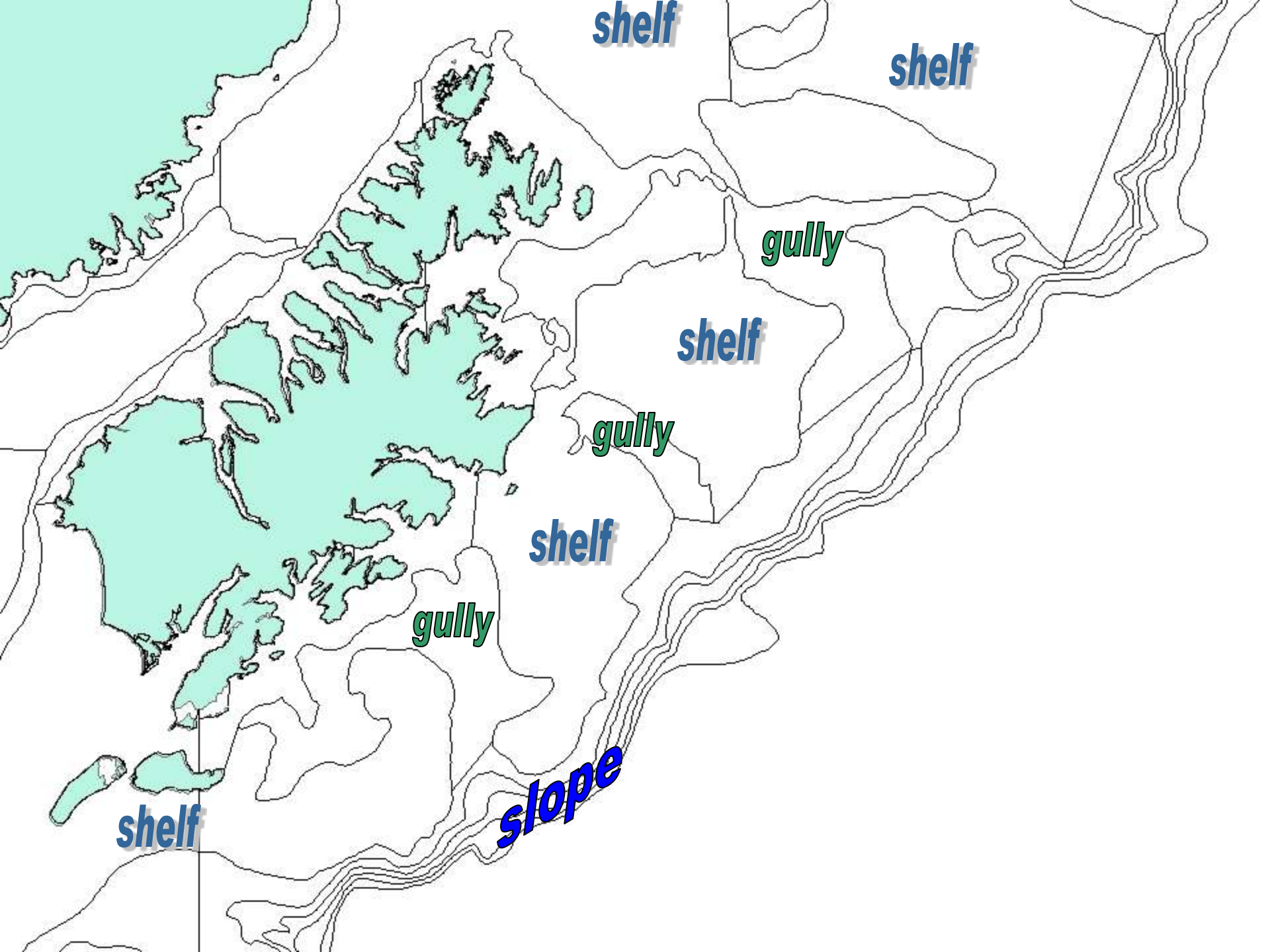


GOA & AI Surveys Approached Similarly

- Array of habitats similar – rougher terrain than EBS
- Community of economically and ecologically important species similar – rockfishes important, as well as flatfish, cod, pollock, sablefish, skates, & sculpin
- Two areas surveyed on rotating, biennial schedule using same methods
- Multispecies surveys – generalized to produce "best estimates" for a large suite of important species

Survey Design Stratified-Random

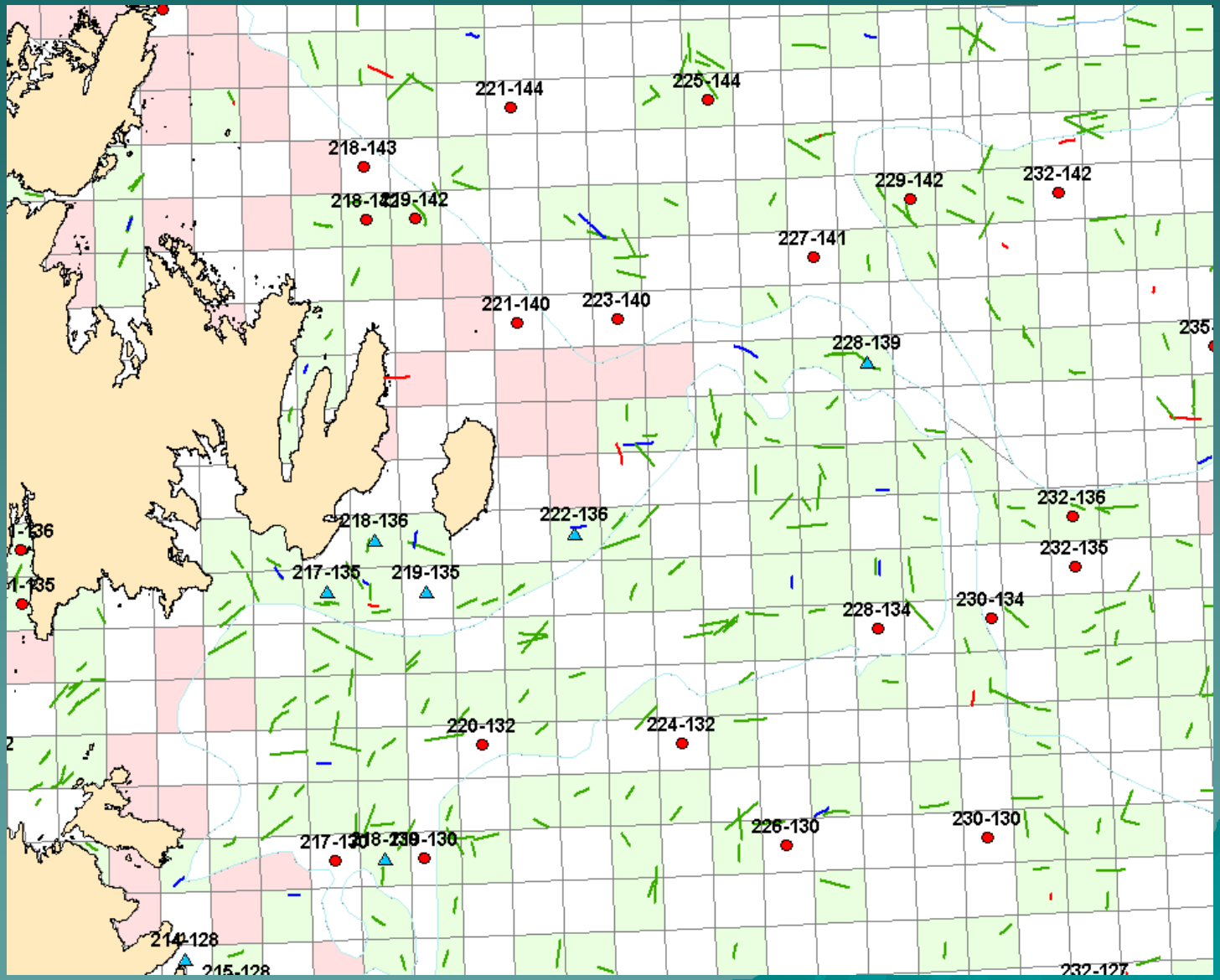
- Stratification
  - By regulatory area (INPFC areas)
  - By depth zone
    - Shelf: 10-100, 101-200, 201-300 & 301-500 m
    - Slope (GOA only) 501-700 & 701-1000 m
  - (GOA only) By habitat classification
    - Shelf - 74% of survey area
    - Gullies – 20% of survey area
    - Slope – 6% of survey area


shelf
shelf
gully
shelf
gully
shelf
gully
slope
shelf

Station Selection

- Grid and stratum boundaries overlaid over entire survey area
- Number of stations/stratum from allocation algorithm
- Stations assigned to randomly chosen cells within a stratum
- At least 2 stations/stratum
- Stations in a stratum distributed evenly among vessels

Overlaid 5x5 km grids = stations



Vessels

- Chartered commercial trawlers with skippers & crews
- 85 to 160 ft LOA (historically)
- Require full crew and berths for 6 scientists
- Current minimum 120’ LOA & 1500 HP

Sampling Gear

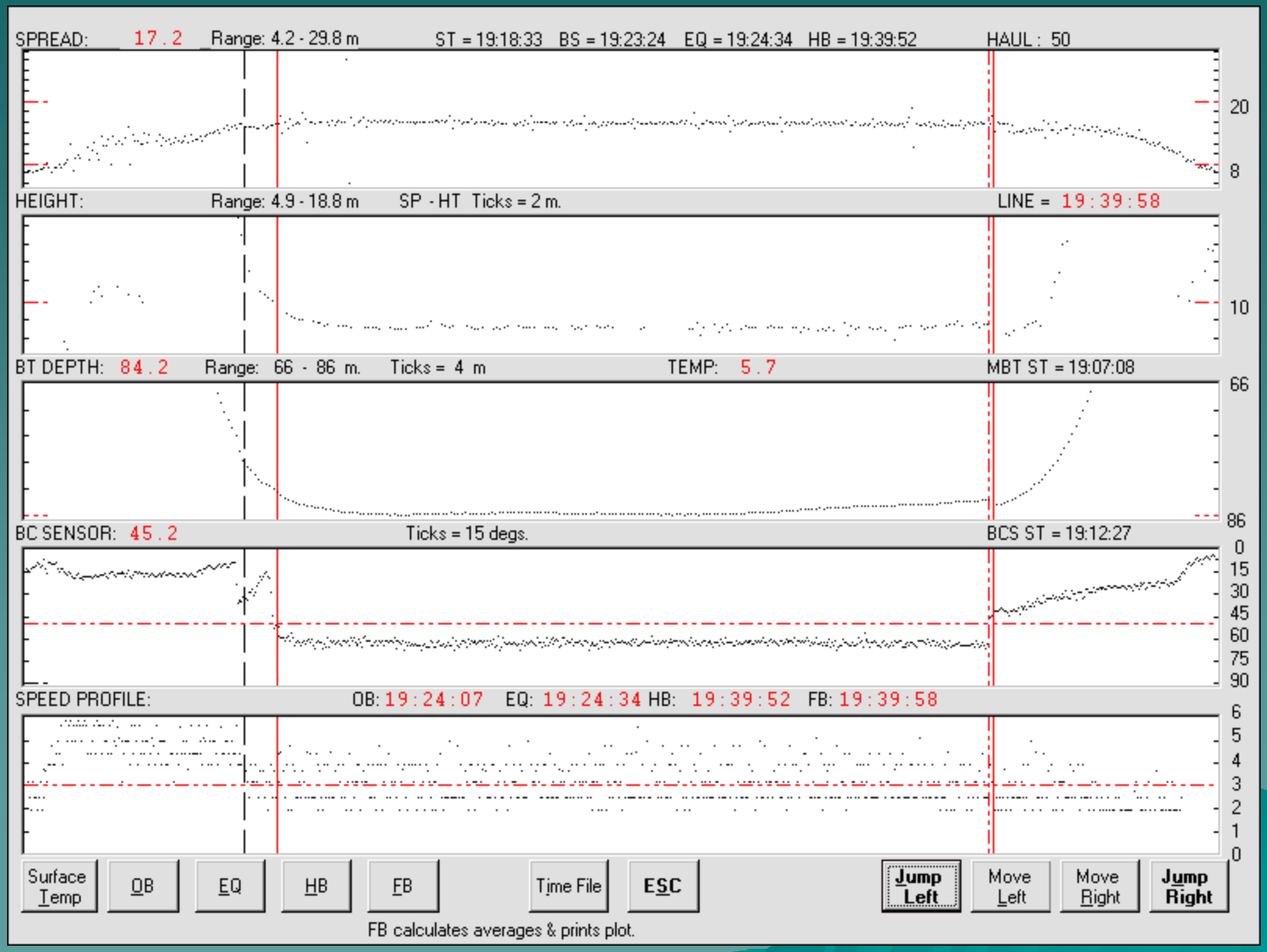
- Poly-Nor'eastern 4-seam bottom trawl
- 16 m wingtip spread
- 6.5 m headrope height
- Bobbin roller gear
- 12.7 cm mesh body 3.2 cm codend liner
- V-doors
- 55 m bridles

Mensuration Electronics

- Scanmar sensors measure wingtip spread and headrope height
- Bathythermograph on headrope measures depth and temperature
- Bottom contact sensor evaluates footrope bottom tending (on- or off-bottom)
- GPS data stream records position of vessel

Data Collection

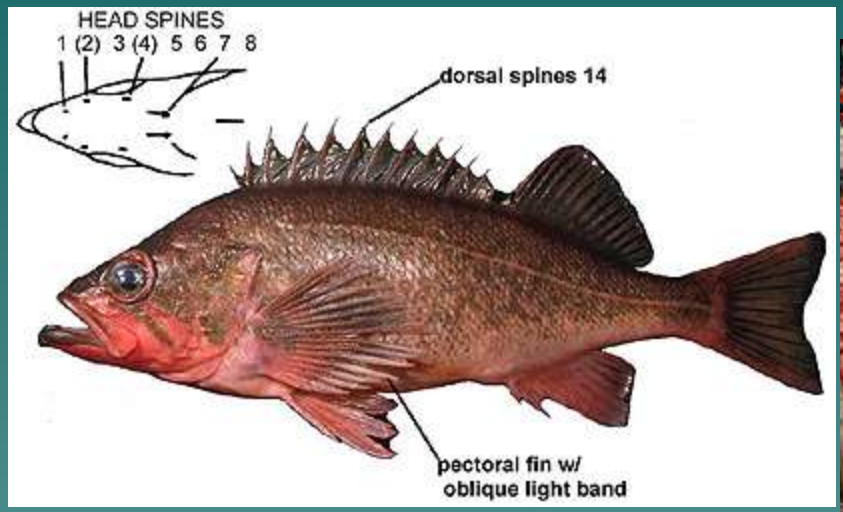
Effort data from mensuration electronics

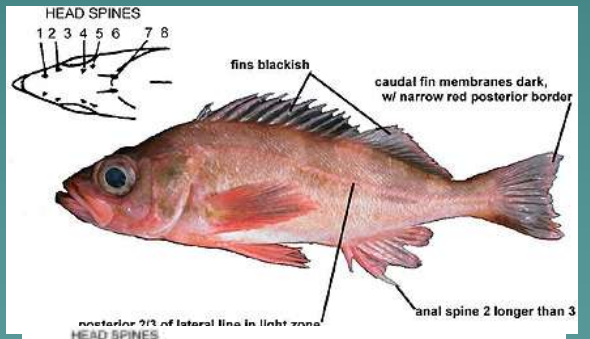


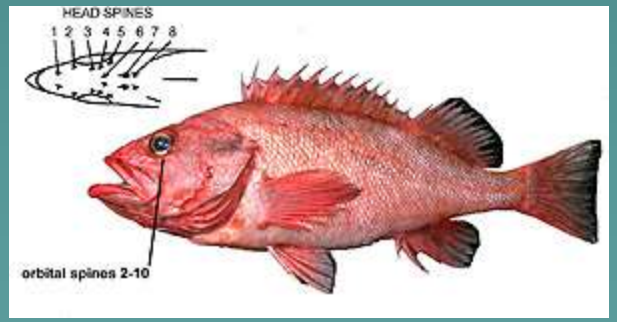
Species catch weight and numbers from sorted catch

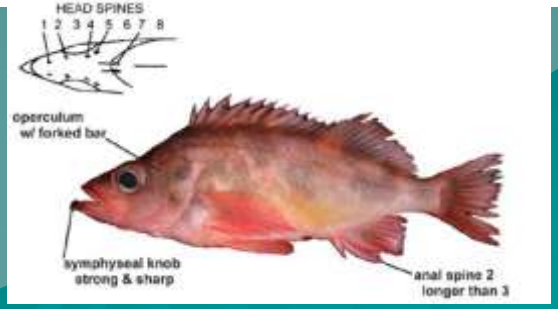
Major Species
Flatfishes

Major Species
Rockfishes









Atka Mackerel

Major Species
Gadids & Grenadiers

Sculpins, Skates, Sablefish

Sexed length frequency distributions


Benthic Bag Sampler

Biological Data and Specimens

- Age structures (otoliths)
- Stomach scans and collections
- Length-weight relationships
- Gonads for maturation/fecundity studies
- Specimens of rare or undiscovered species and benthic bag contents

Analysis

- CPUE for each species at each station
- Mean CPUE for stratum expanded to stratum area to estimate biomass
- Length frequencies weighted by CPUE and expanded to estimate size composition
- Ages from otoliths used to estimate age composition

Data Limitations

- Multi-species survey forces compromises in design
- Availability to survey – depth, habitat, and geographic ranges of various species
- Distributional characteristics: area-swept method works well for evenly distributed species, poorly for contagiously distributed species
- Catchability: herding, escapement, size selectivity

Data Limitations
Evolution of Methodology

- Decreased duration of tows
  - 1984-1993 tows were 30 minutes
  - 1996-present tows are 15 minutes
- Electronic monitoring of net performance
  - More accurate distance fished has shown us tows are longer than we originally believed, therefore current CPUE estimates are "deflated"
- Standard operating procedures – unknown effects