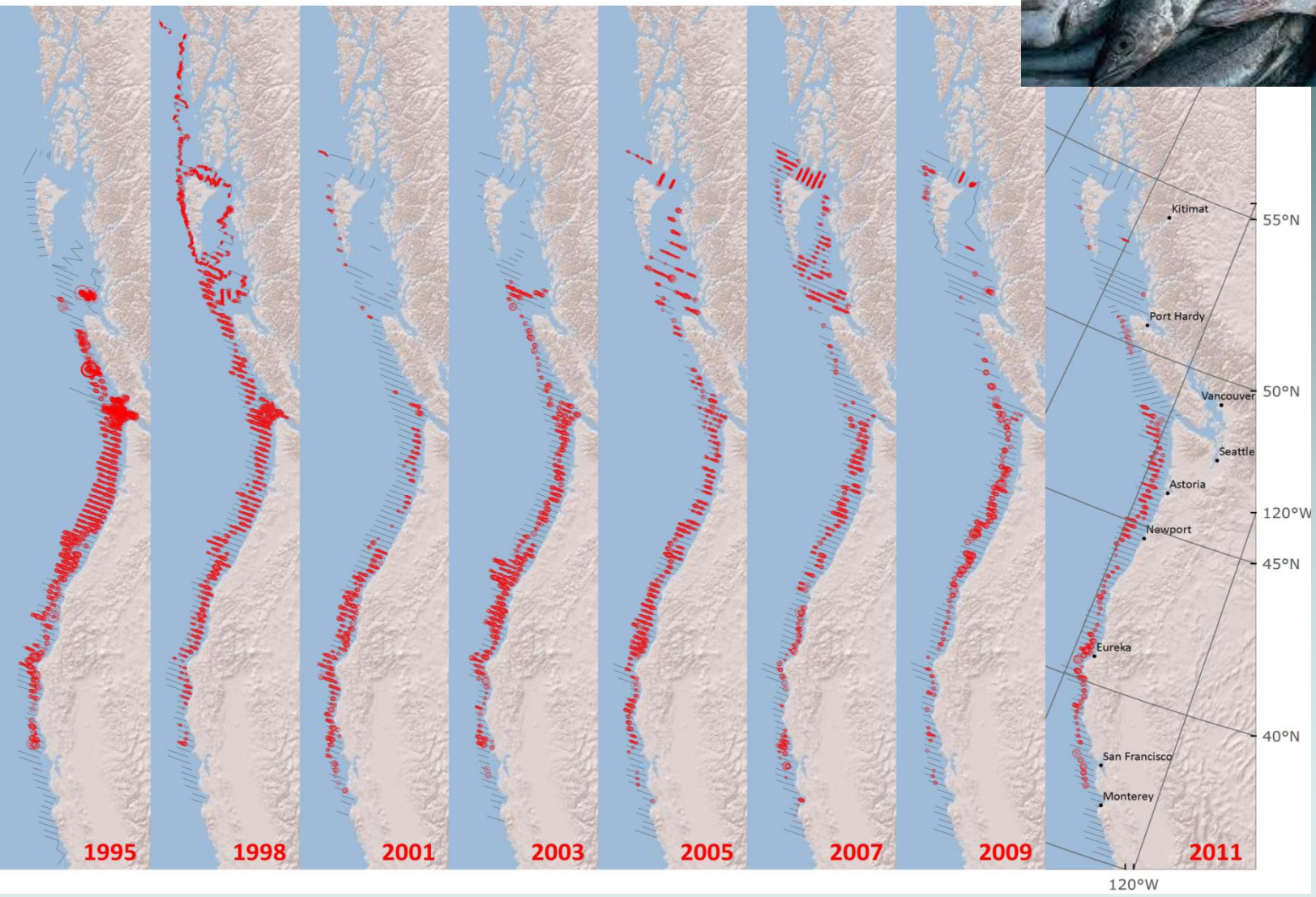
Overview

2012 Joint NW-SW Hake-Sardine Integrated Acoustics-Trawl Survey

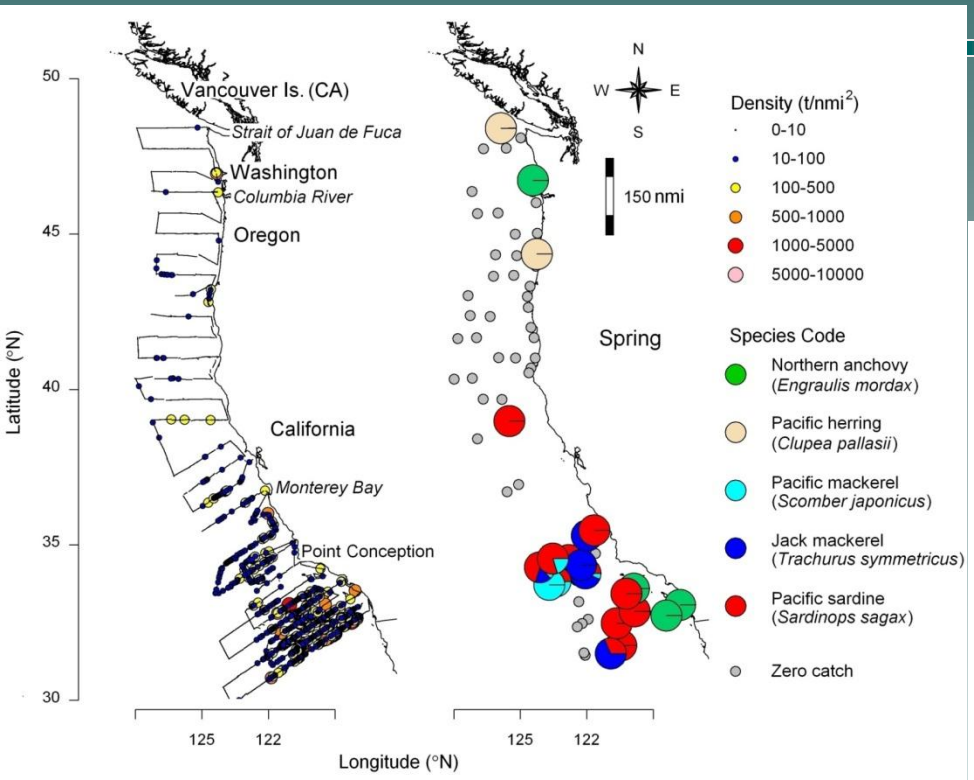
NOAA Science Board

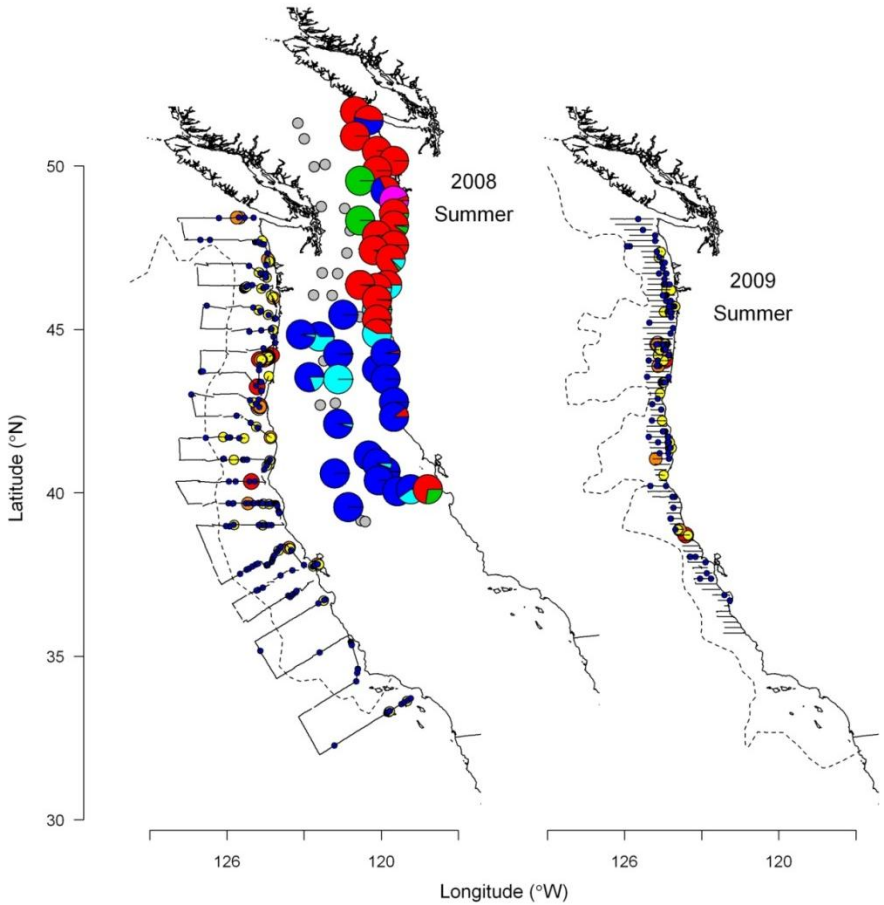
July, 2012

Hake Biology



Spring v. Summer CPS Distributions

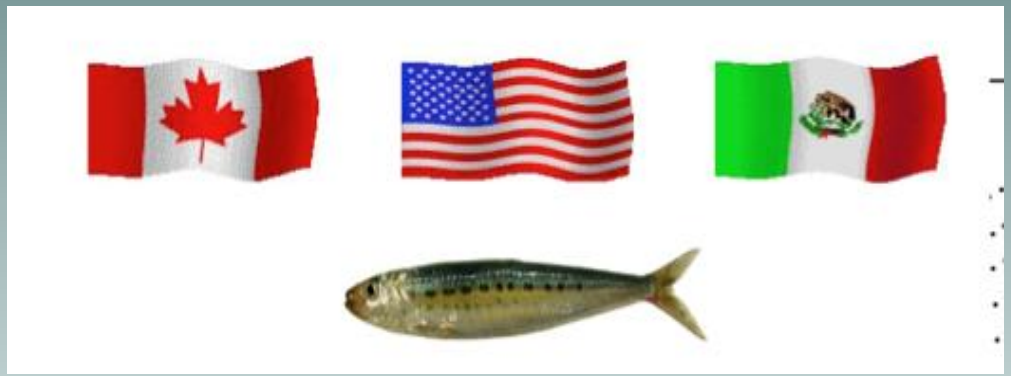




2012 Objectives

- **Estimate the distributions and abundances of Pacific hake and sardine.**
- **Environmental and oceanographic observations as possible**
- **Evaluate feasibility of long-term, annual hake and sardine survey**

International - Inter-Center-Industry Collaboration



- Northwest Fisheries Science Center, NMFS
- Southwest Fisheries Science Center, NMFS
- Fisheries and Oceans, Canada
- CONAPESCA, Mexico
- Pacific Whiting Conservation Cooperative

Fisheries and Oceans Canada | Pêches et Océans Canada

SAGARPA

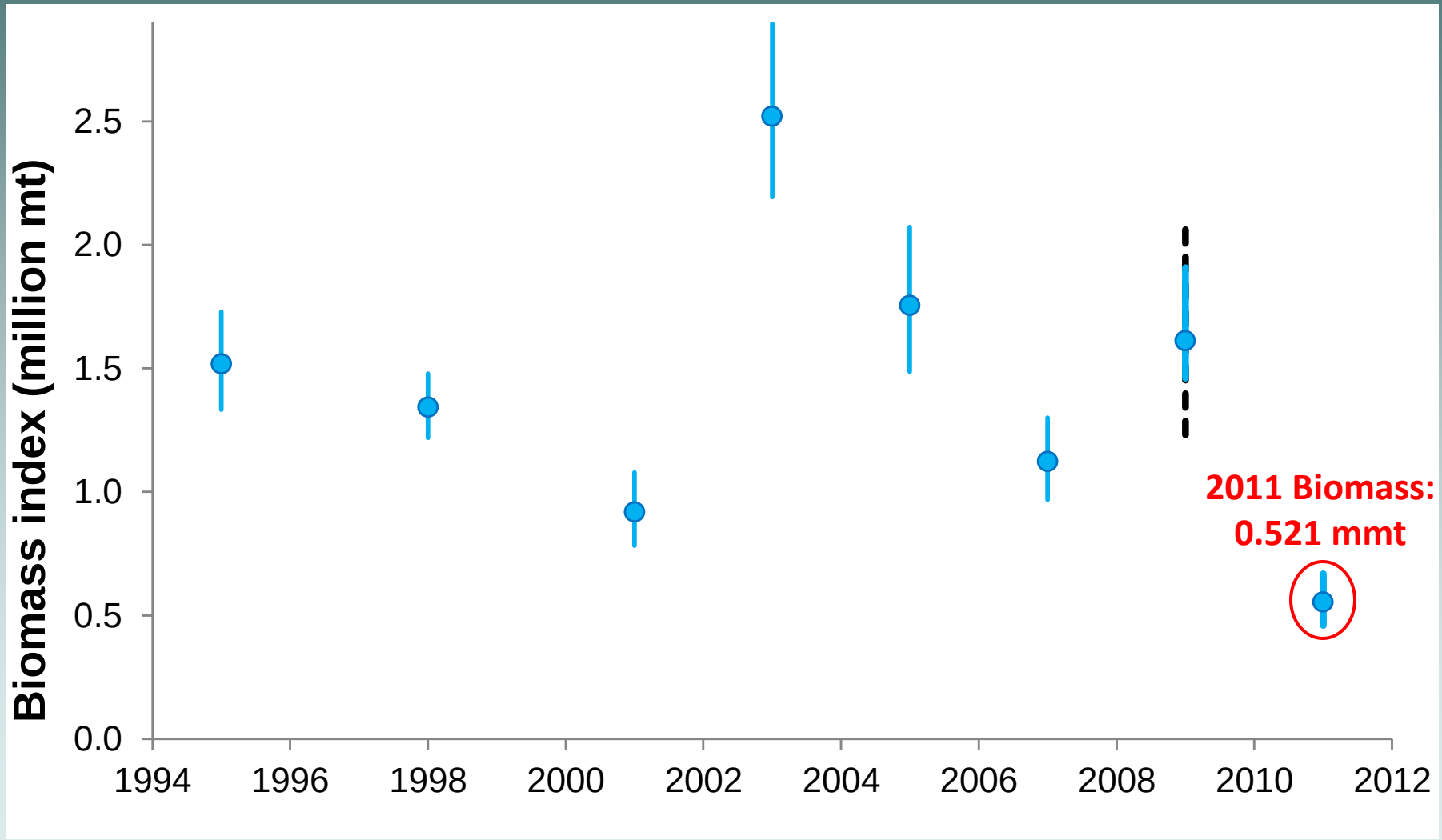
conapesca comisión nacional de acuacultura y pesca

NOAA Fisheries

Why a Joint Survey in 2012?

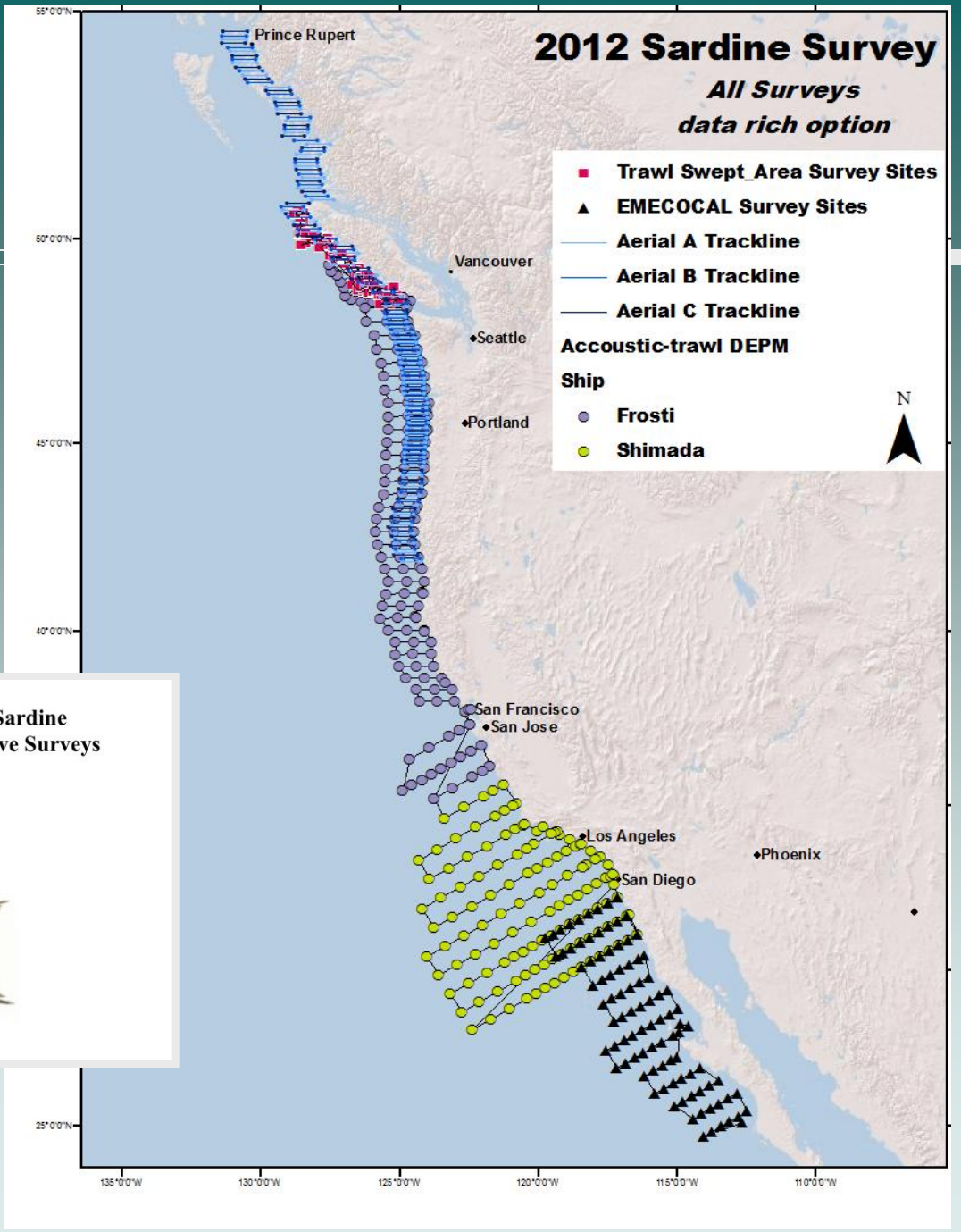
- Industry needs/requests
- Setting the stage for the future
  - Improving scientific information supporting management
  - Efficiency

Adult Pacific Hake Biomass Estimate: 1995 - 2011



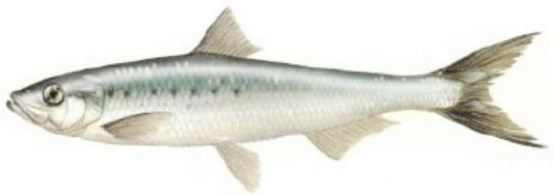
2012 CPS Spring and Summer Coastwide Survey Plans

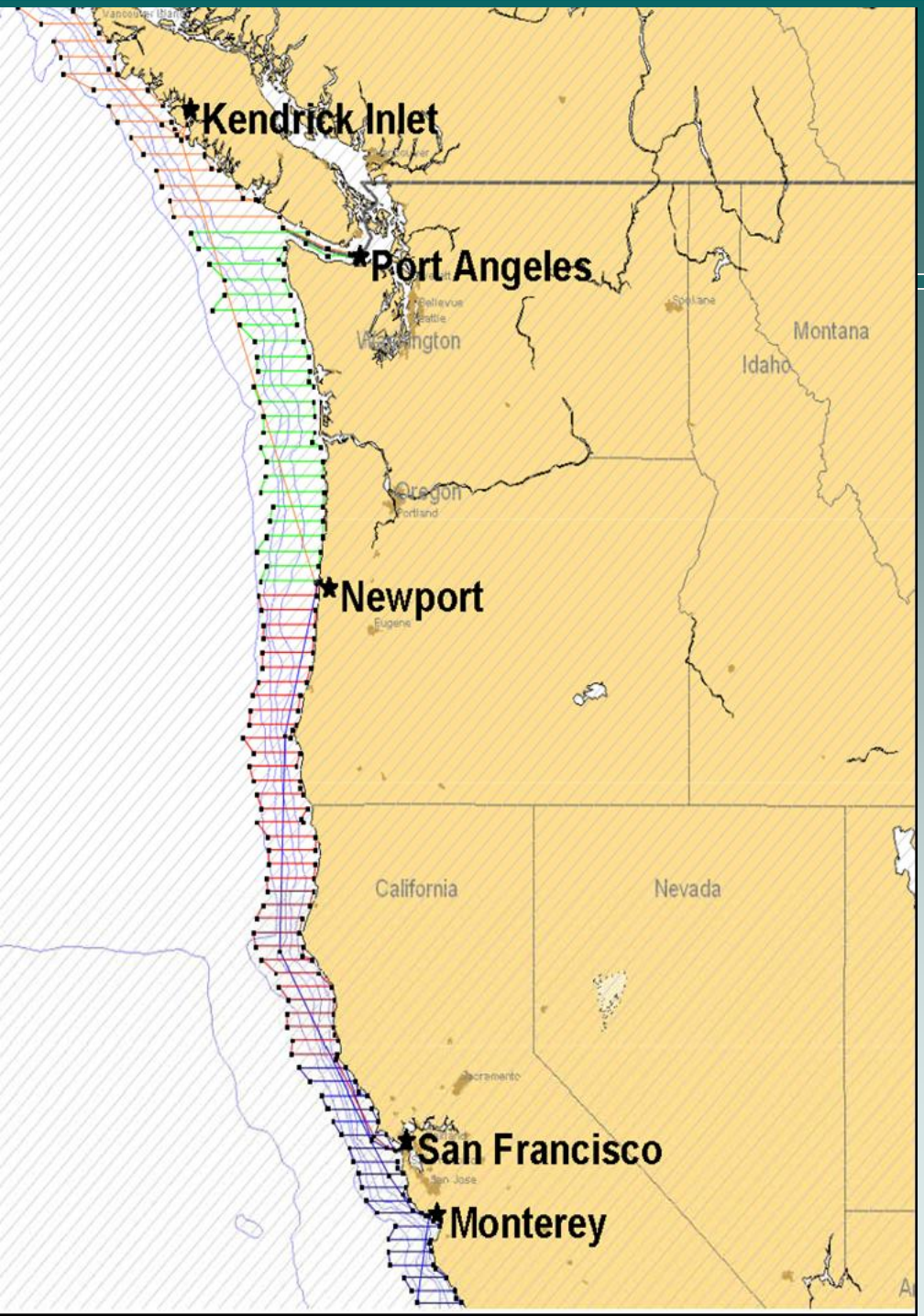
November, 2011 Costa Mesa SWFSC Report to Council



Workshop on Enhancing Stock Assessments of Pacific Sardine in the California Current through Coordinated Comparative Surveys

May 23-24, 2011
La Jolla, California





2012 Bell M. Shimada & F/V Forum Star Transects

Leg 1: Newport to San Francisco
June 24 – July 6

Leg 2: San Francisco to Newport
July 9 – July 25

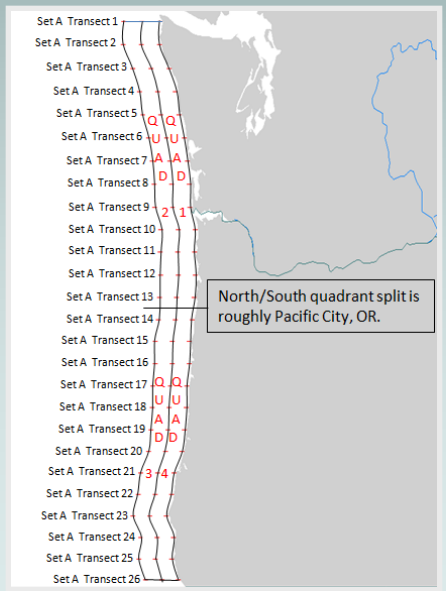
Leg 3: Newport to Port Angeles
July 30 – August 12

Leg 4: Port Angeles to Newport
August 15 – August 30

2012 DFO/CCGS *W. E. Ricker* Transects

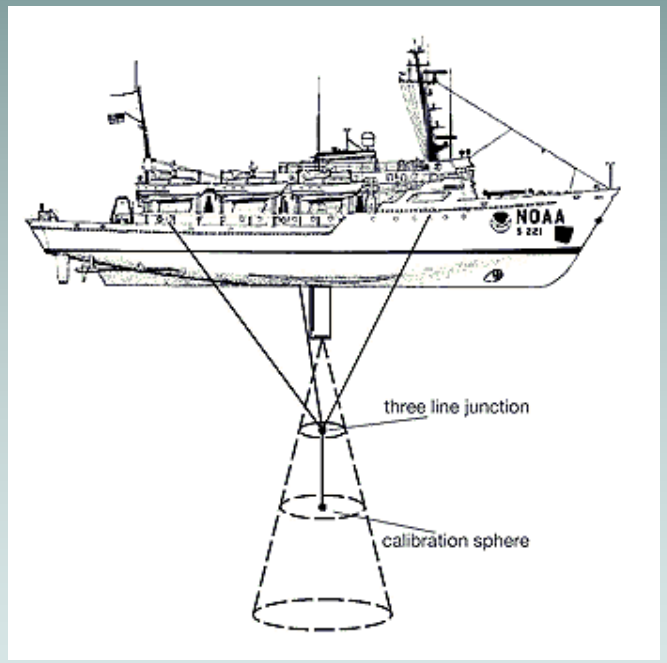
Aerial Surveys for Sardine

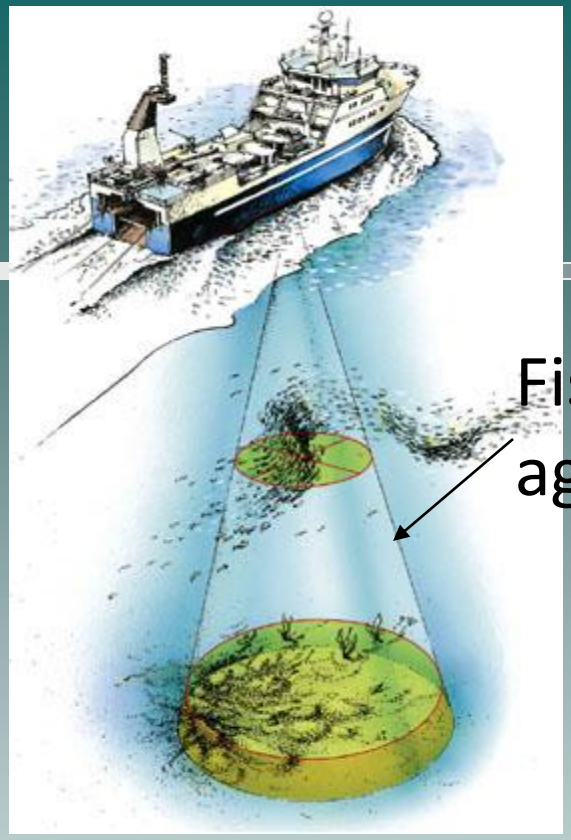
Aerial surveys use spotter planes and purse-seine sampling of schools to estimate densities



Acoustic Sampling and Calibration

- Common frequencies on all vessels





Fish aggregation

Echogram

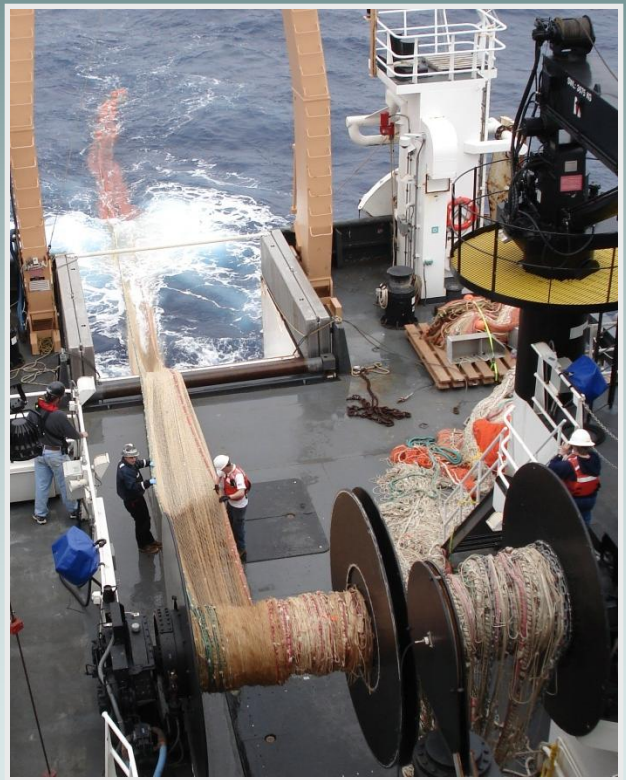
Echo Integration

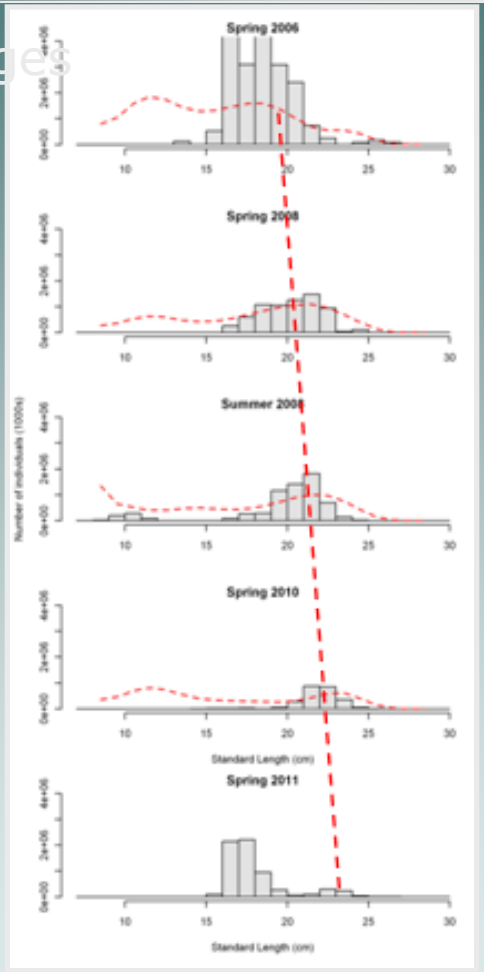
Nautical Aerial Scattering Coefficient (NASC)

Echo Integration provides the theoretical basis of quantitative fish biomass estimate

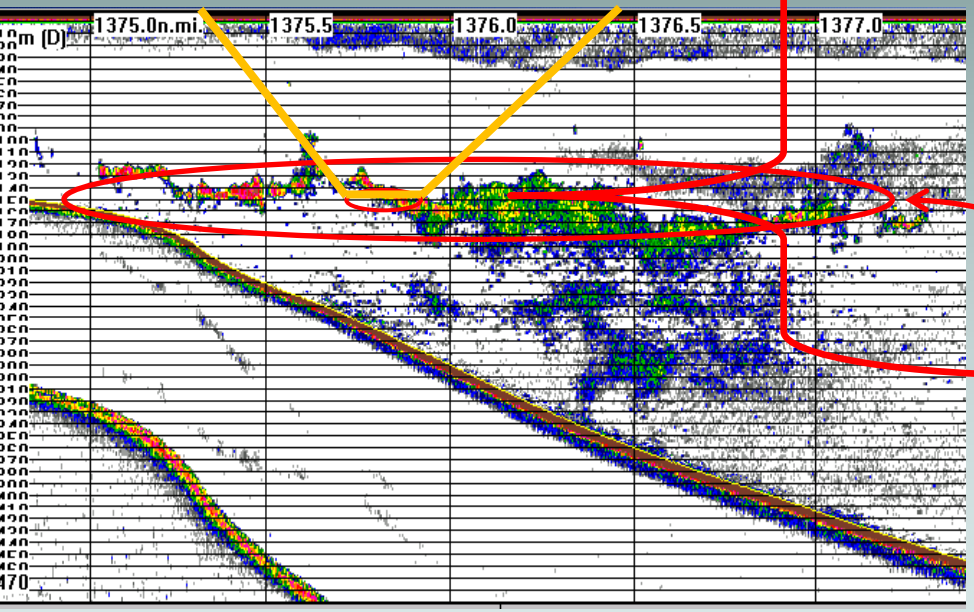
Biological Sampling for Sardine

Catches provide species proportions, sizes, and ages





…. And Hake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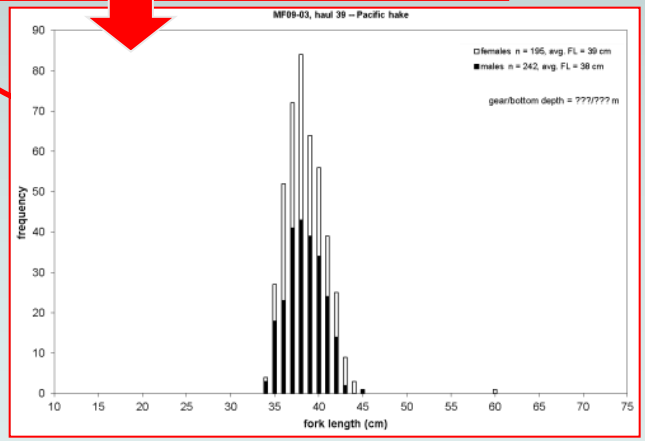
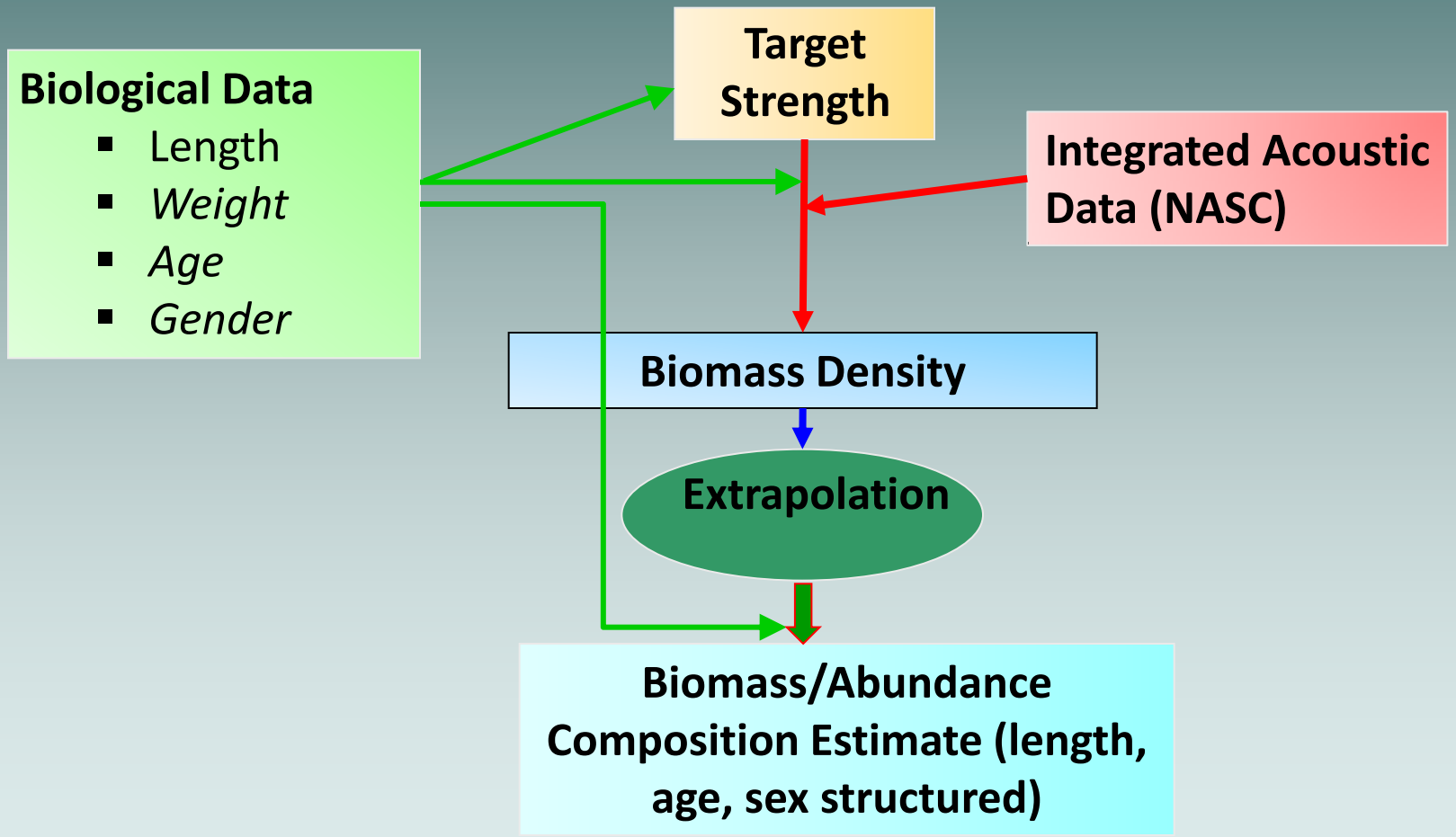
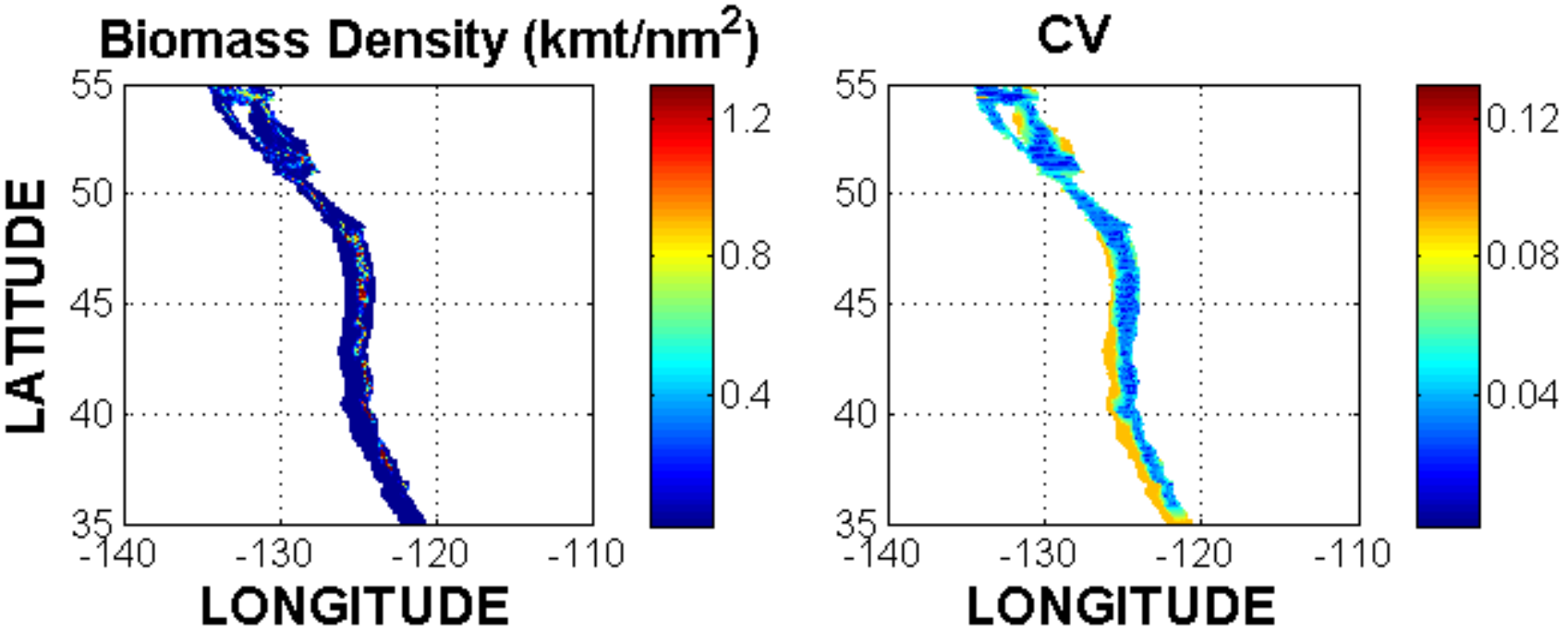

MF09-03, haul 39 -- Pacific hake
females n = 195, avg. FL = 39 cm
males n = 242, avg. FL = 38 cm
gear/bottom depth = ???/??? m
frequency
fork length (cm)

Biomass/Abundance Composition Estimates



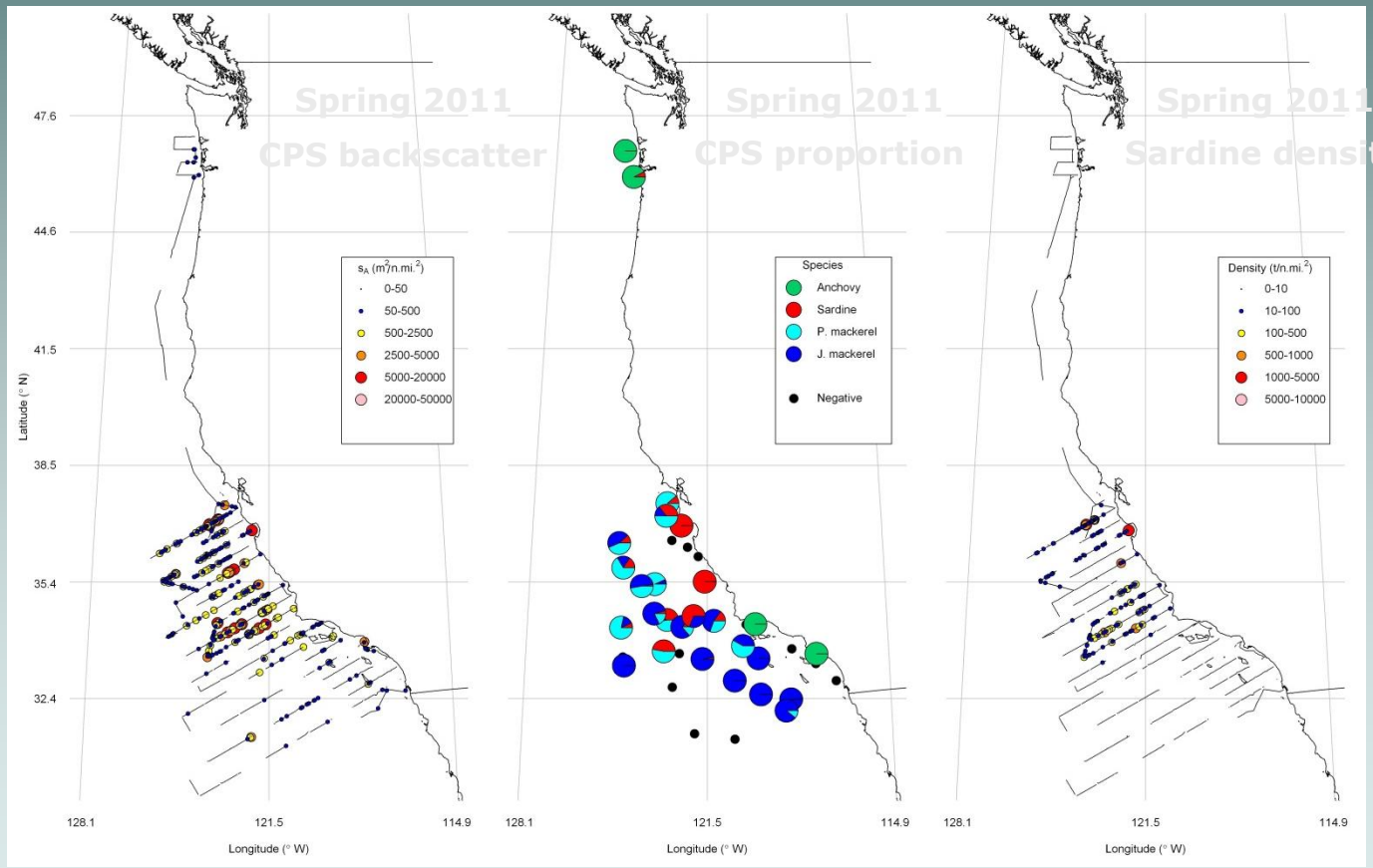
Maps of Kriged biomass & CV

Biomass = Biomass density x area of kriging grid cell



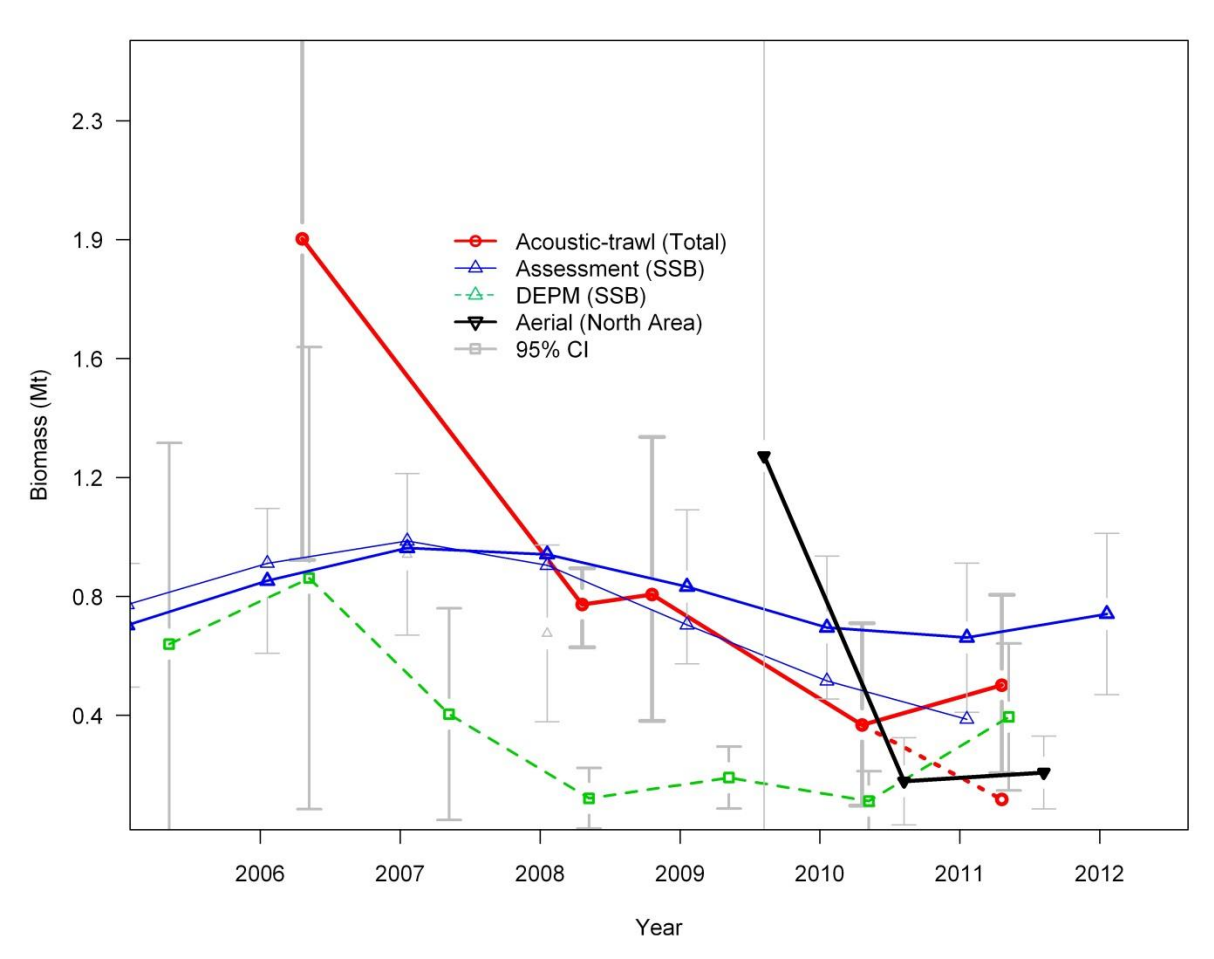
Acoustic-Trawl Analysis Method

CPS backscatter is apportioned to species and converted to sardine densities using trawl catch information.



Acoustic-Trawl Analysis Method

Sardine densities are multiplied by stratum areas to estimate biomass for inclusion in the assessment and comparison with other measures.



2012 Challenges

- First time operating a separate fishing boat with acoustics aboard the NOAA vessel
  - Challenges: transmittal of data
  - Both vessels keeping to tight schedule

- Time constraints prevent ecological – environmental data collection normally done on both surveys

Long-Term Challenges

- Science
  - Using downward and side sonar together
  - Ecosystem sampling
  - Year 1 index for hake
- Resources
  - Ship time (NOAA and industry)
  - Multi-species sampling
  - Staffing