Southern California Coastal Pelagic Species Aerial Survey

**California Department of Fish and Wildlife
California Wetfish Producers Association**

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*Pacific Fishery Management Council
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Study Goals

1) Project 1 - Relative indices of nearshore abundance for sardine and anchovy

2) Project 2 - Inshore Correction factor
   - Add to ATM biomass estimate

3) Validate observer species identifications

4) Collect biological samples
   - length, weight, age, maturity

➢ Field – aerial transects, boat sampling

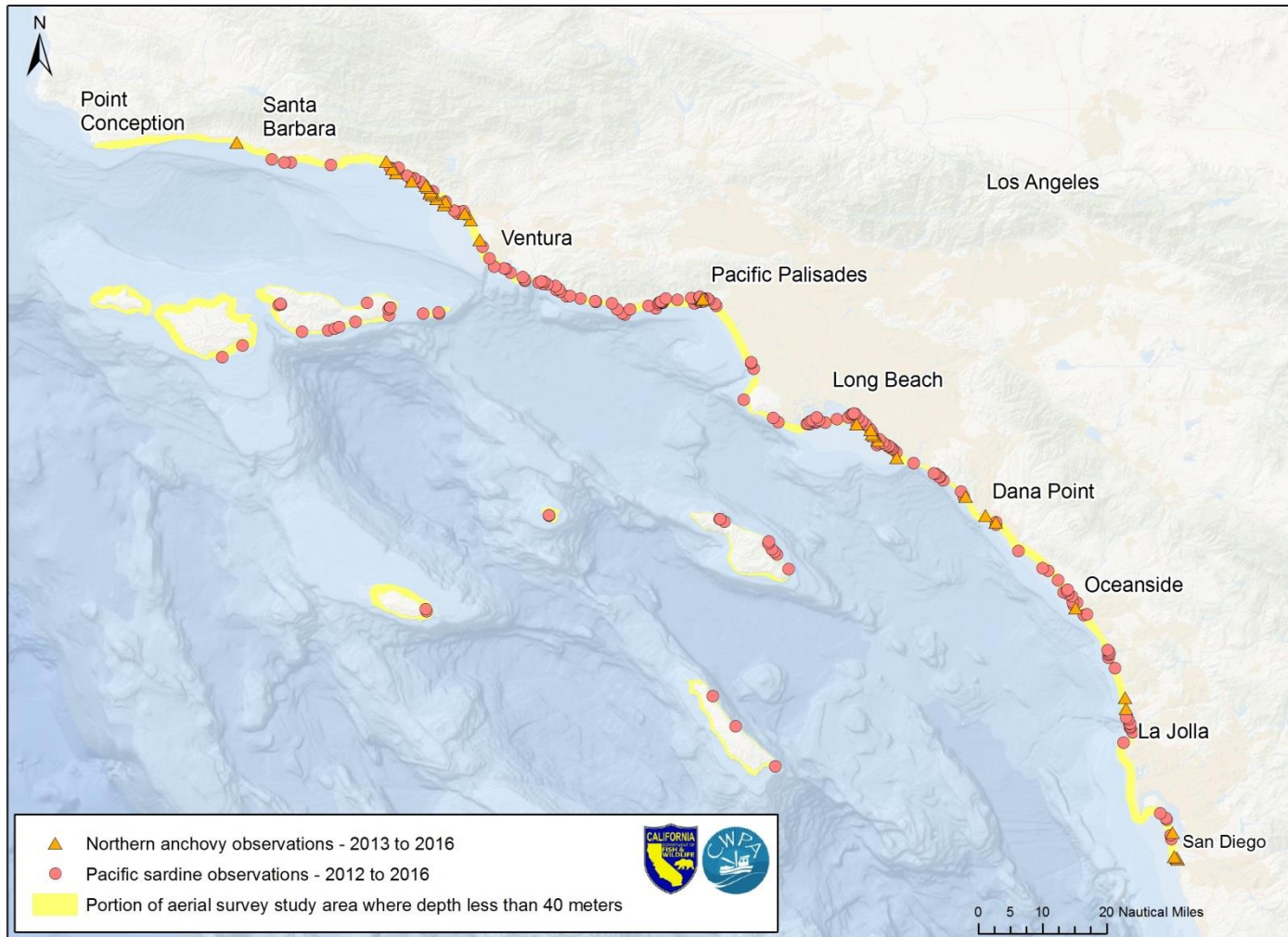➢ Lab – estimate calculations, mapping, process samples

Aerial Survey and CPS Management

- Sardine stock assessment survey indices
  - Offshore waters

- CA - nearshore sardine fishery

- CDFW-CWPA partnership
  - Summer 2012 – present
  - Direct nearshore survey

Aerial Survey and CPS Management

Aerial Survey Observations from Depths Shallower Than Minimum Operational Depth of ATM Vessel

Legend:
- ▲ Northern anchovy observations - 2013 to 2016
- ● Pacific sardine observations - 2012 to 2016
- ▮ Portion of aerial survey study area where depth less than 40 meters

Locations labeled: Point Conception, Santa Barbara, Ventura, Los Angeles, Pacific Palisades, Long Beach, Dana Point, Oceanside, La Jolla, San Diego

Scale: 0 5 10 20 Nautical Miles

Methods – Design/Operations
Project 1

- Coastal areas

- Survey conducted during spring and summer

- Summer 2012 – Summer 2016

- Flights dependent on weather and plane availability

Coastal Survey Transects for Coastal Pelagic Species
— Coastal Transects
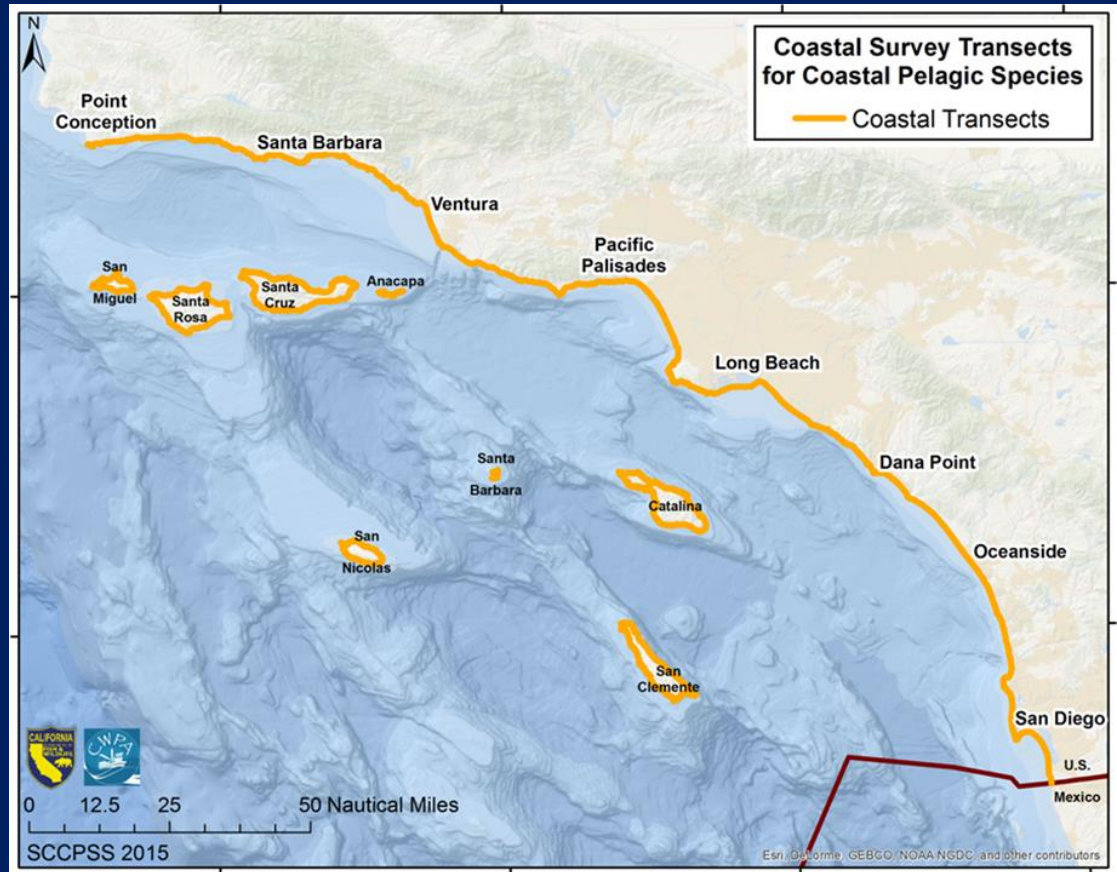
Methods – Transects
Project 1

- Verify species
- Get tonnage estimate
- Photo passes
- Frame/time noted
- Resume transect

Sardine off Seal Beach

Data Log file

Logsheet

Methods – Boat Sampling
Project 1

- Conducted each season

- Boat directed by plane to fish school

- Aerial observer ID species

- Boat samples fish
  - tow camera (right) or diver video
  - Hook and line (sabiki rig), gillnet, purse seine

- Water temperature, clarity, salinity recorded
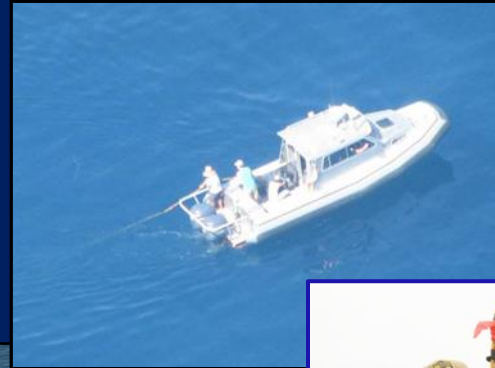
Deploying tow camera

Fish schools under boat

Methods – Analyses
Project 1

Survey Photos
- Document observations
- Corroborate field logs

Species ID Validation - Boat
- Tow and diver video
- Hook and line sampling

Biological Samples
- Age structure of population

Methods – Analyses
Project 1

- Index of relative abundance = fish density
- Fish density (D) = all estimated observed tons (T_{obs}) / area surveyed (A):

$$D = T_{obs}/A$$

- Estimated observed tons - adjusted for observer bias
- Area surveyed - dependent on actual flight path and transect width
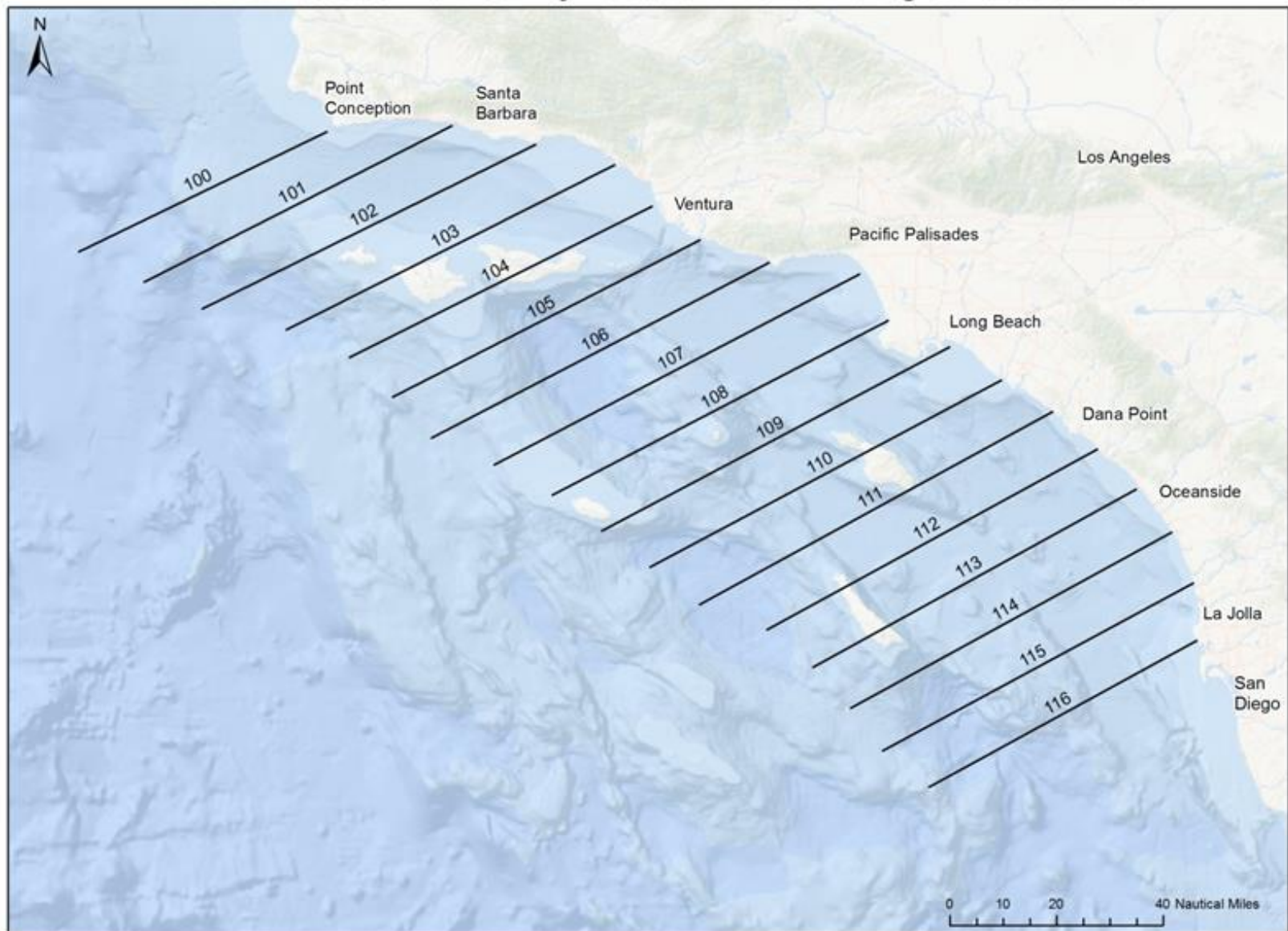
Methods - Project 2

NOAA Acoustic Trawl Survey - Southern California Bight Transect Lines

Methods – Analyses
Project 2

Goal: Total SCB estimate (offshore and inshore)

1. Combine ATM (offshore) and SCCPSS (inshore) estimates for SCB

$$T = T_{ATM} + T_{SCCPSS}$$

2. Combine ATM (offshore) and calculated tonnage (inshore) from SCCPSS and ATM data

$$T = T_A + (\Sigma T_C / \Sigma T_{Bp}) * T_{Bs}$$

CDFW Aerial Overflight Observations of NOAA Acoustic Trawl Survey
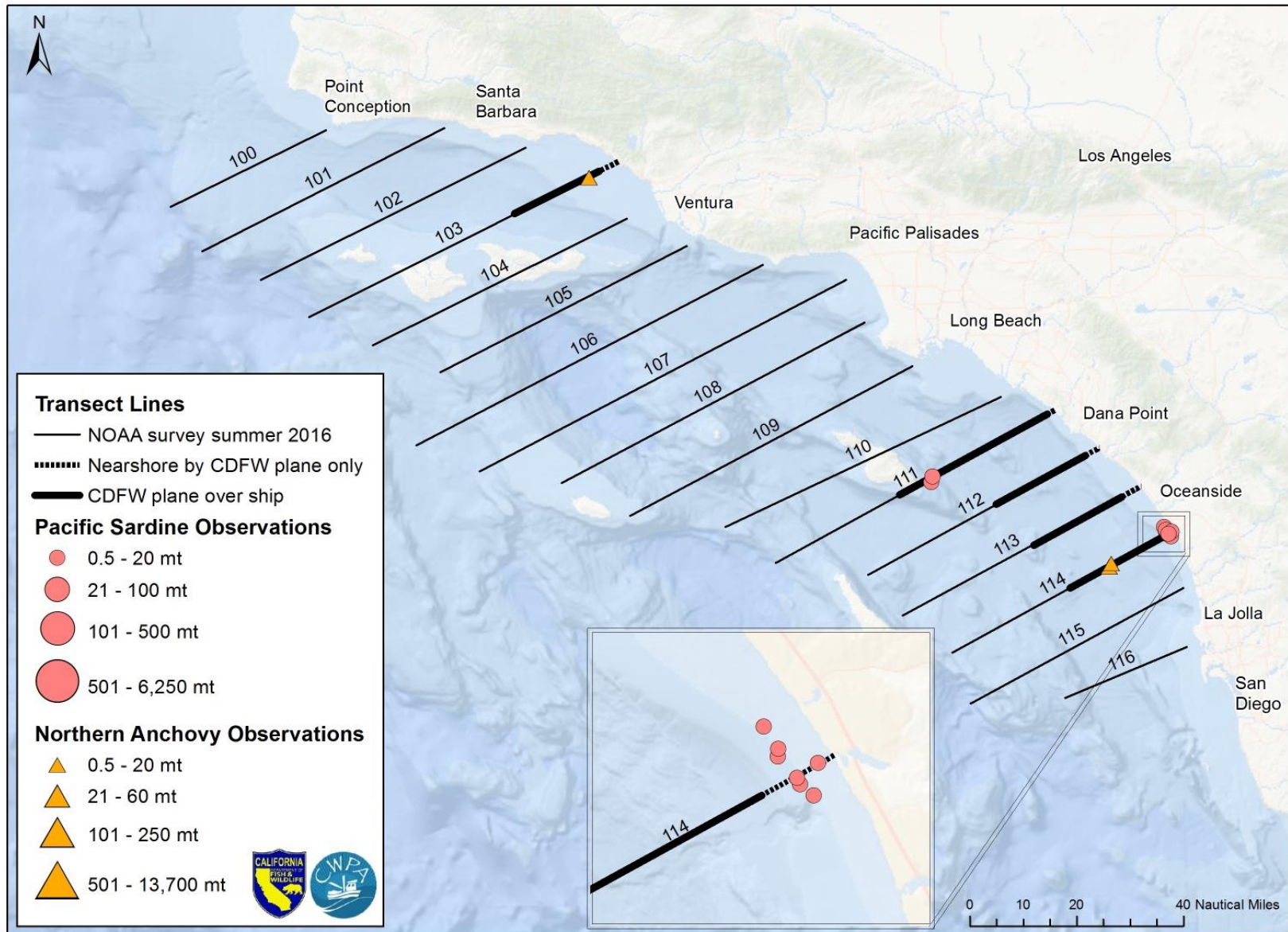
Future Work

- Continue boat sampling - validate species ID, collect additional samples

- Collect more data for Project 2 inshore/offshore ratio

- Potential index of recruitment

- Continued CDFW and CWPA support

Summary

- Survey covers coastal nearshore areas of Southern California Bight

- Results useful for:
  - Index of nearshore abundance (Project 1)
  - Supplement to ATM offshore data to account for nearshore biomass (Project 2)

- Additional data stream for CPS stocks

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