

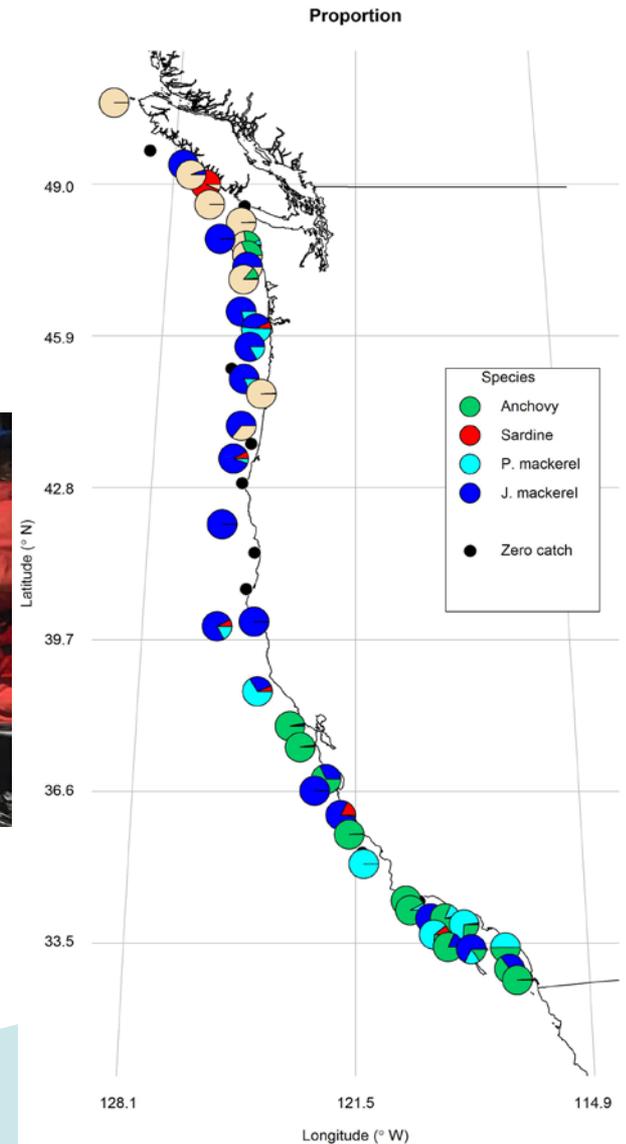
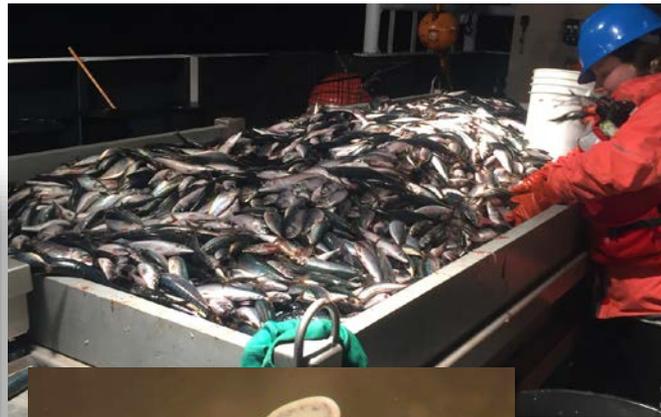


# NMFS Report SWFSC Activities

**NOAA**  
**FISHERIES**

Southwest  
Fisheries  
Science Center

Gerard DiNardo  
Dale Sweetnam



# Outline

1. 2016 Summer California Current Ecosystem Survey (CCES) Acoustic Trawl Method (ATM) – **Distribution and Biomass of the Central Population of Northern Anchovy**
2. **2018 ATM** Methodology Review (January 2018)
3. **2017 Spring CalCOFI/CPS DEPM Survey** - Preliminary Results (currently underway)
4. **Future Surveys and Activities - 2017**
  - Summer California Current Ecosystem Survey
  - Rockfish Recruitment and Ecosystem Assessment Survey
  - SWFSC-Industry Collaborations
  - Assessments

# 2016 Summer CCES Survey: Central Population of Northern Anchovy

## Goal

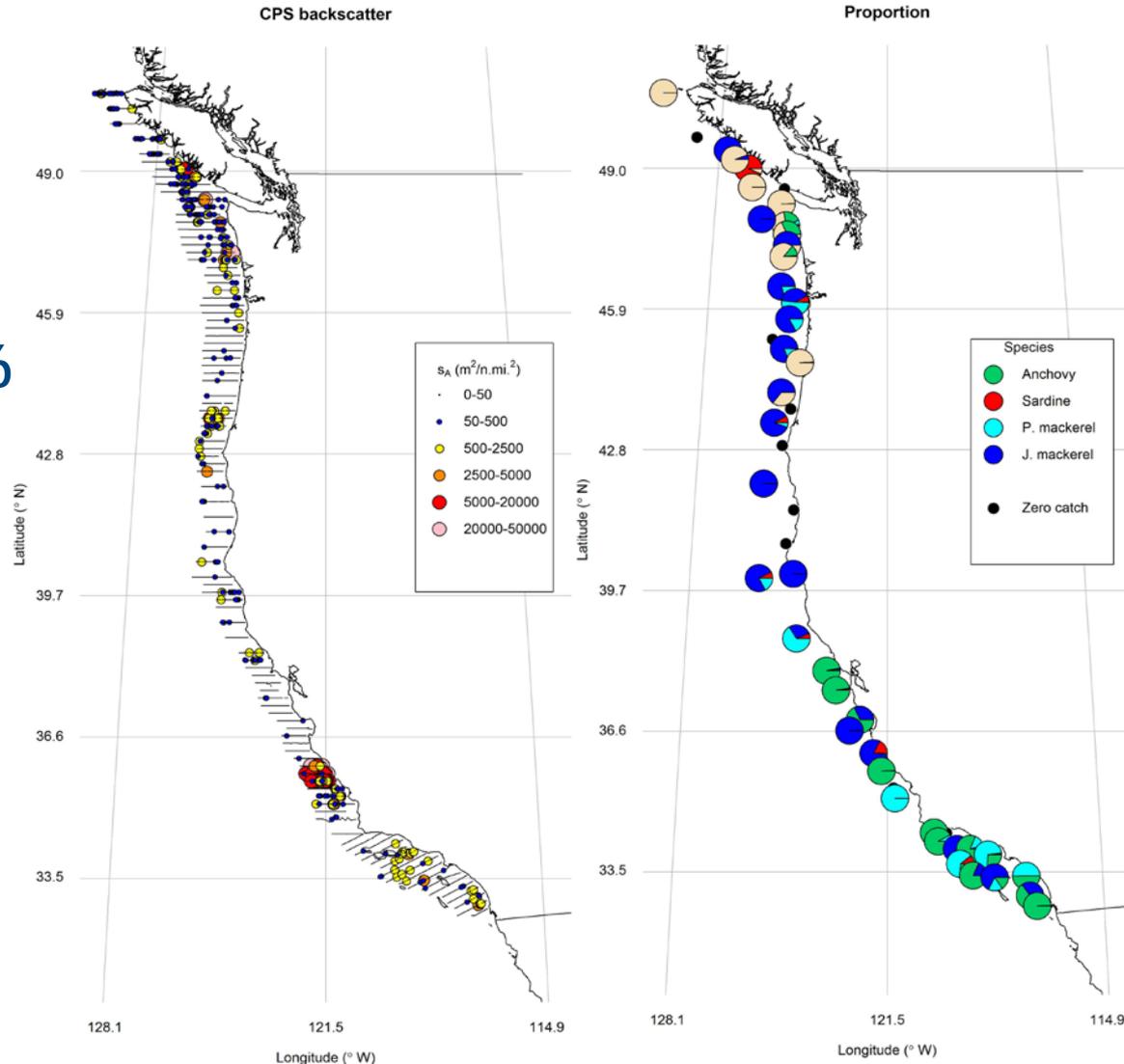
- Estimate abundances and distributions of CPS stocks
  - provides the basis for decision making at the PFMC

## Task

- Council requested SWFSC to estimate biomass of central subpopulation of northern anchovy and provide the estimate at the April 2017 meeting

# Methods

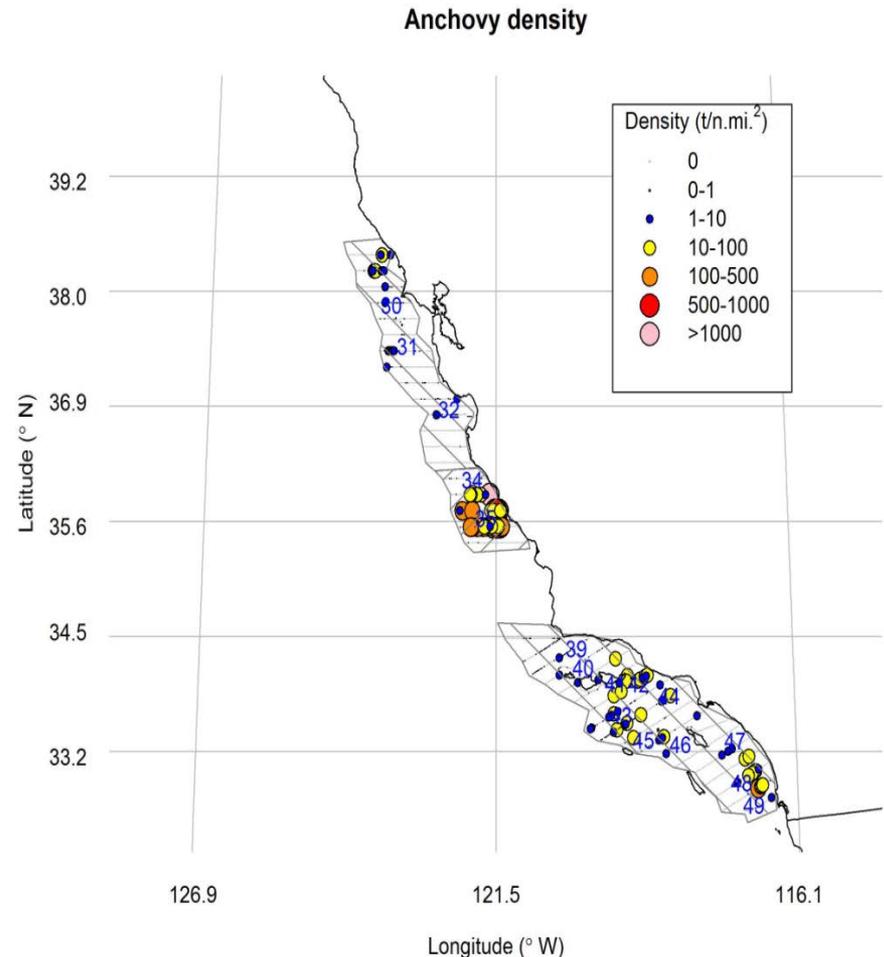
- ATM Survey
  - FSV Reuben Lasker
  - June – September 2016
  - 80 Days
  - Vancouver Island, Canada-U.S. Mexico Border
  - Daytime acoustic backscatter (EK-60)-nighttime trawling



# Results

## Estimation of Anchovy Biomass

- Target Strength of swim bladders (size and orientation)
  - 2015 – Anchovy off South Africa
  - 2016 – In situ studies consistent with Japanese anchovy



# Results

## Estimation of Anchovy Biomass

- Current Biomass Estimate (2016):
  - **151,558 mt**; CV=41%
    - based on Japanese anchovy TS
    - **minimum estimate**
- 2015 Biomass Estimate: **31,427 mt**  
(Appendix I of Agenda Item G.4.A Supplemental SWFSC Report, November 2016)
- 2016 Biomass Estimate: **290,159 mt**; CV=50.1%
  - Based on South African anchovy TS



# 2018 ATM Methodology Review

- Preliminarily scheduled for January 2018
- Delayed for a year due to transition of basic acoustics from Simrad EK60 to EK80 which will now be the standard on all NOAA vessels
- Agenda Item G.3.a is the formal request for the methodology review
- The SWFSC requested SSC to provide a list of prioritized questions that the review will address
  - SWFSC & SSC CPS-Subcommittee tasked with providing a detailed ToR for the review

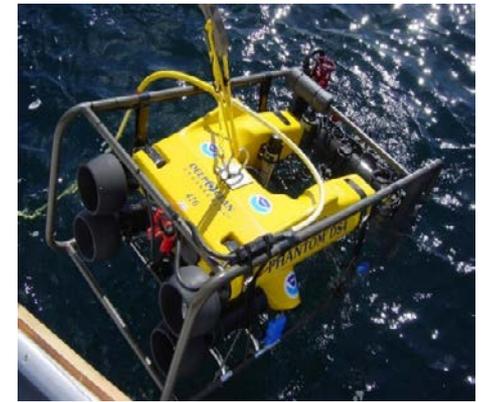
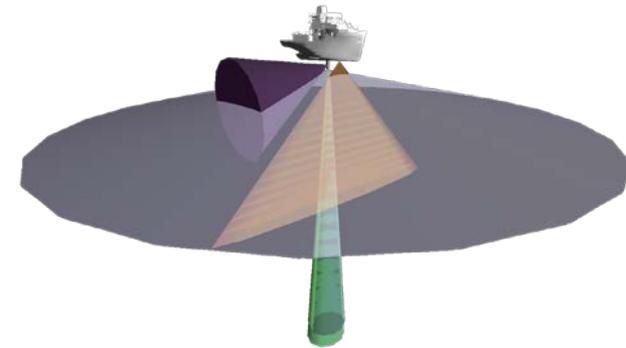
# EK60 to EK80 transition

After 10+ years of service Simrad has discontinued EK60 series and introduced EK80 series of transceivers and control software.

Shift from narrow-bandwidth transmit pulses to wide-bandwidth pulses using existing hull-mounted transducers

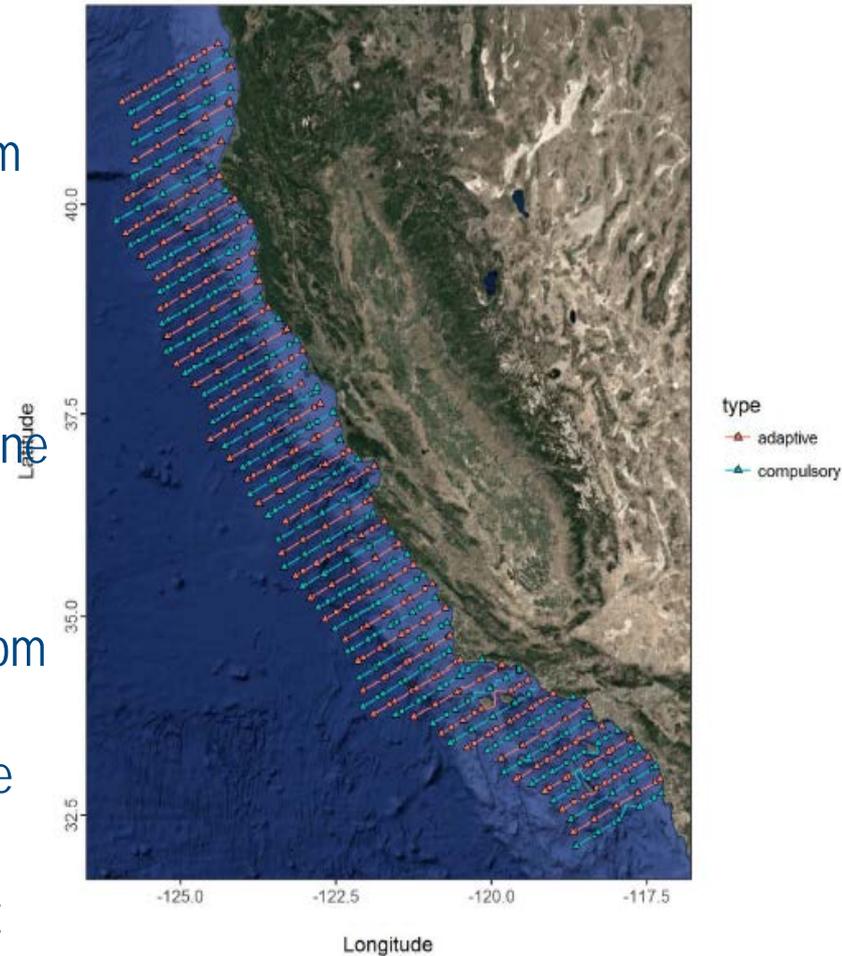
## Benefits

- Fish echoes captured from more complete band of frequencies allowing improvement in species identification
- Increased range resolution allowing detection of fish close to the bottom and individual fish within an aggregation
- Increased signal-to-noise ratio allowing improvements in detection capabilities and effective range
- Extension and miniaturization of wide-band technology allowing autonomous deployment on surface buoys, deep moorings, ROVs



# 2017 Spring CalCOFI and CPS/DEPM Surveys (currently underway)

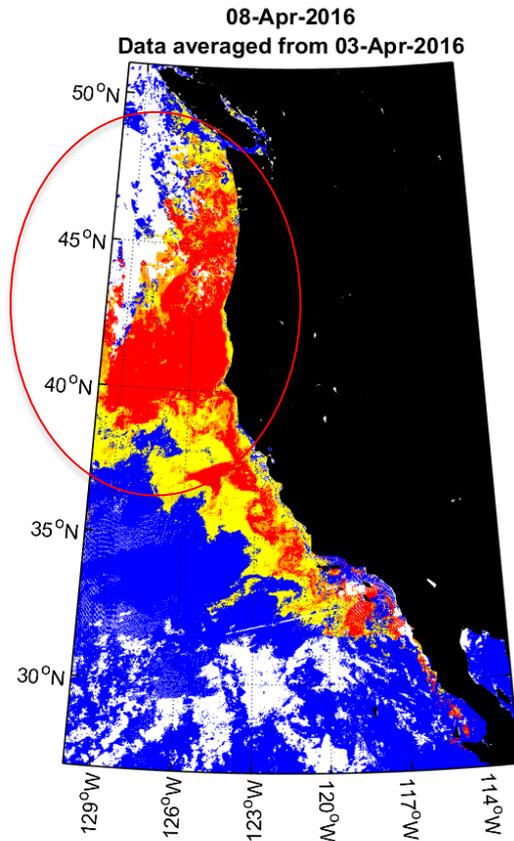
- CalCOFI Spring Survey - *FSV Shimada*
  - March 29-April 29, 2017 (30 DAS)
  - Sampling standard CalCOFI grid out to 600 km
- Coastal Pelagic Species Survey - *FSV Lasker*.
  - March 21-April 22, 2017 (30 DAS)
  - Adaptive sampling prioritized for central subpopulation of northern anchovy, use of drone for nearshore extension of grid lines to shore (leg II)
  - Leg 1 completed, Southern California Bight from Mexican border to Morro Bay; in port at Exploratorium, San Francisco and open house on April 8
  - Leg II starts April 11 and will resume survey at Morro Bay and sample up to Cape Mendocino



# 2017 Spring CPS/DEPM Survey

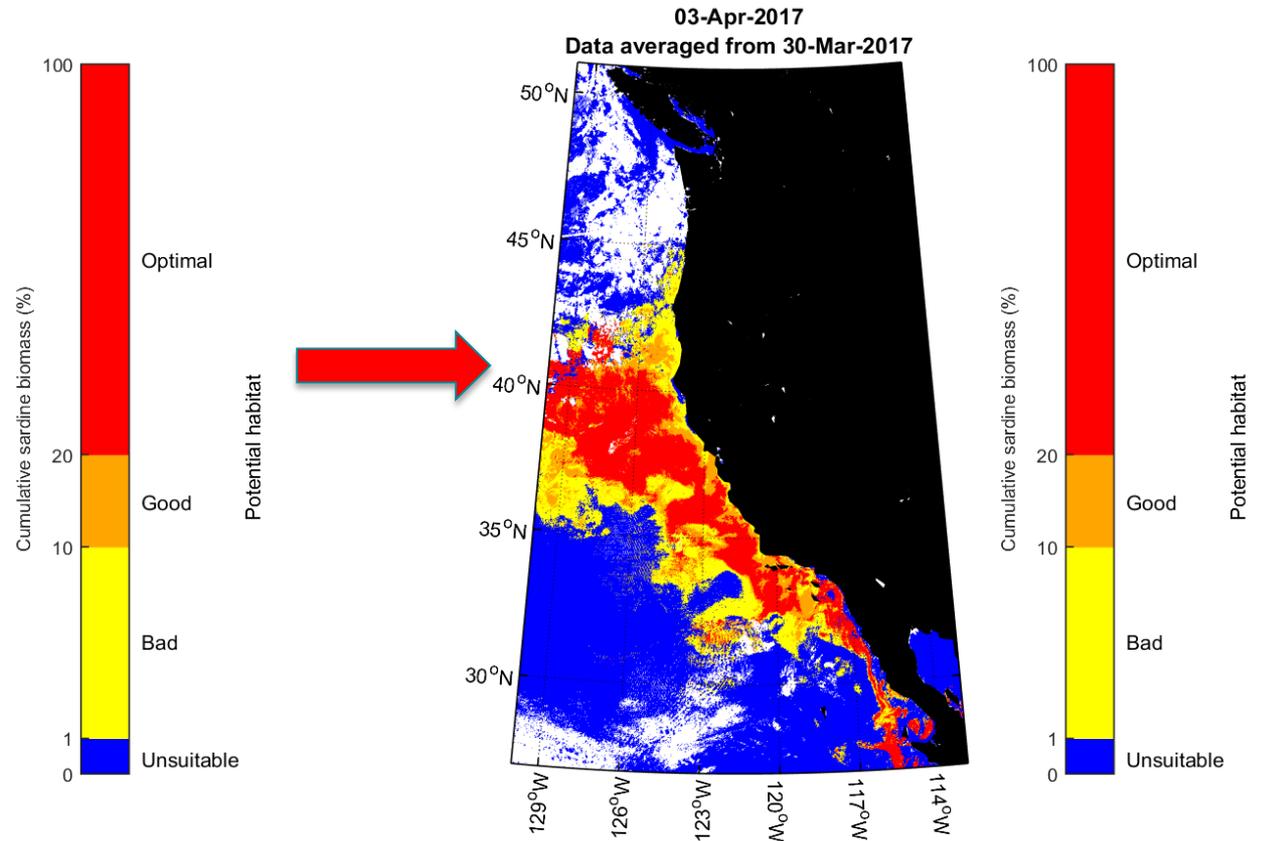
2016

Sardine optimal habitat extended into PNW



2017

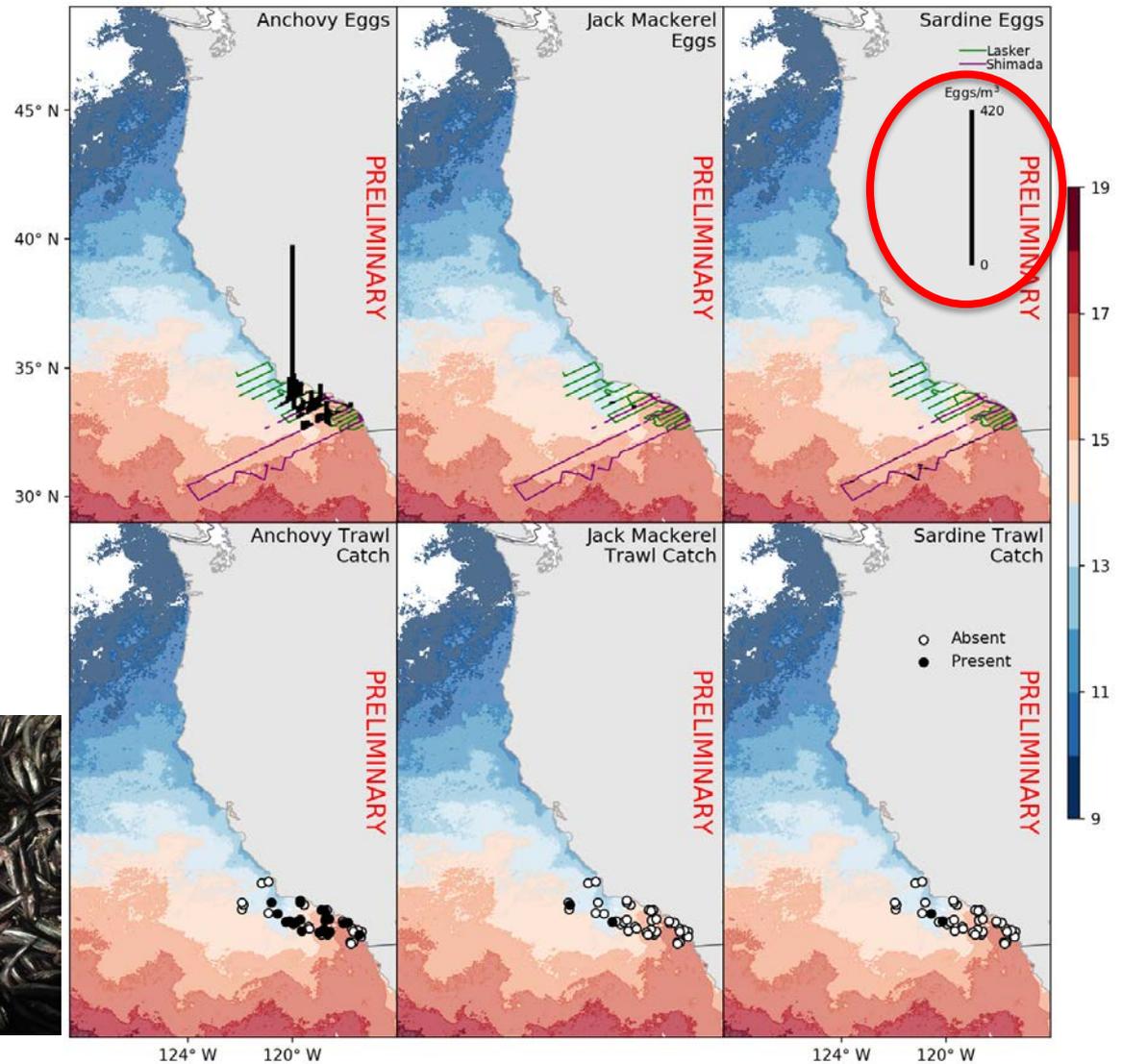
Sardine optimal habitat extends only to Cape Mendocino



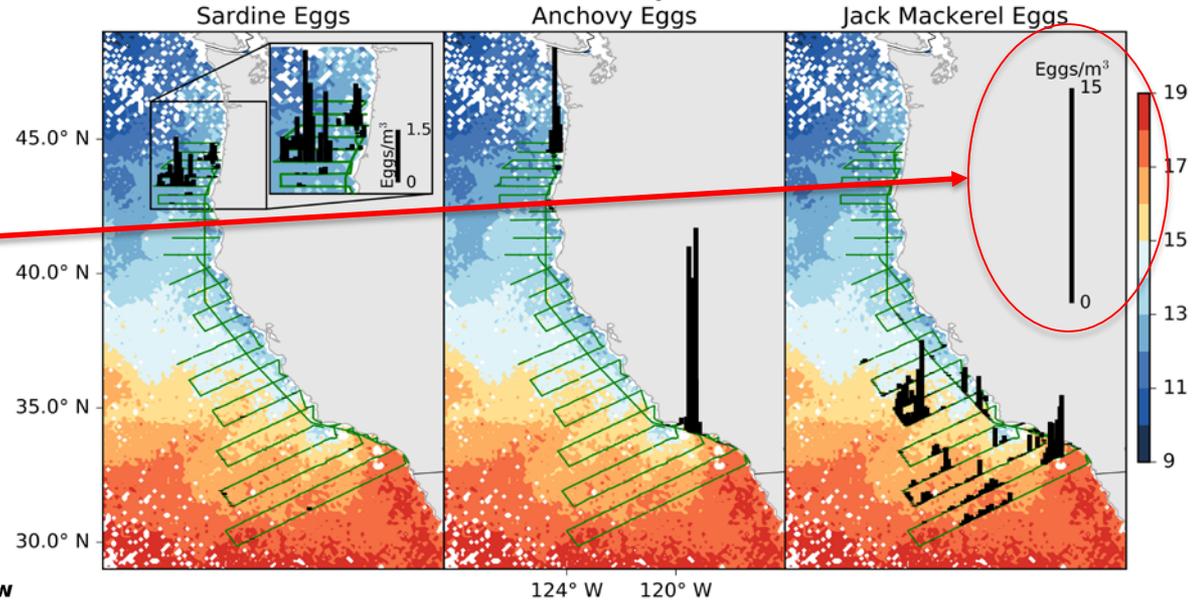
# 2017 Spring CPS/DEPM and CaCOFI Surveys - PRELIMINARY

FSV Bell M. Shimada and FSV Reuben Lasker  
21 March to 06 April 2017

- High densities of anchovy eggs observed in SCB (up to 420 eggs/m<sup>3</sup>) compared to previous years
- 420 eggs/m<sup>3</sup> is the highest anchovy egg density observed since 1990
- Adult anchovy collected in 23 out of 40 trawls, maximum catch 619 kg

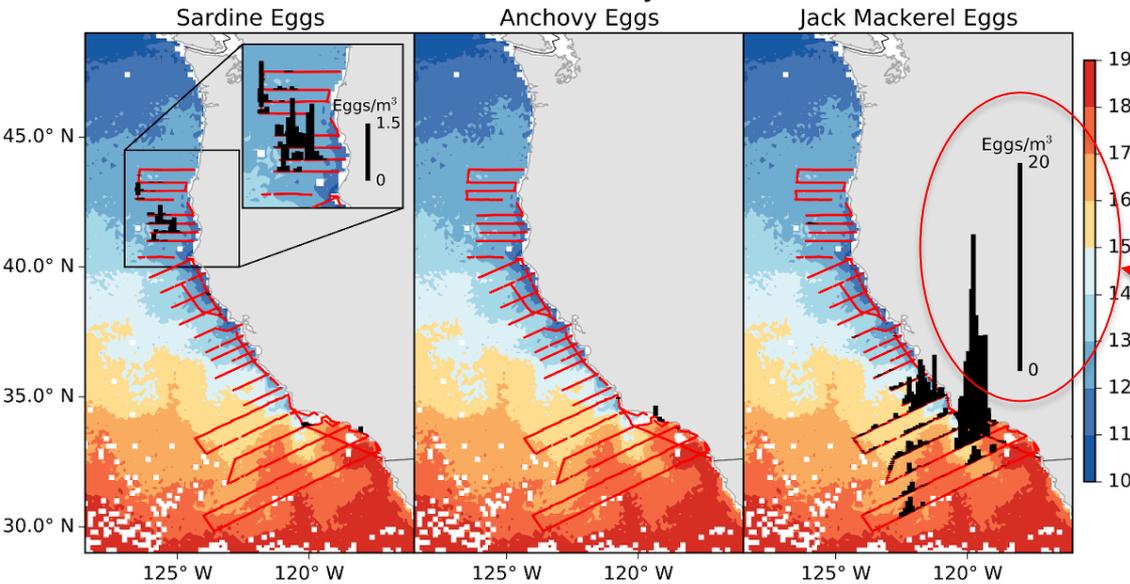


FSV Bell M. Shimada and FSV Reuben Lasker  
22 March to 22 April 2016



2016 - 15 eggs/m<sup>3</sup>

FSV Bell M. Shimada and RV New  
29 March to 01 May 2015



2015 - 20 eggs/m<sup>3</sup>

# Northern Anchovy Egg Rearing at Sea Experiment:

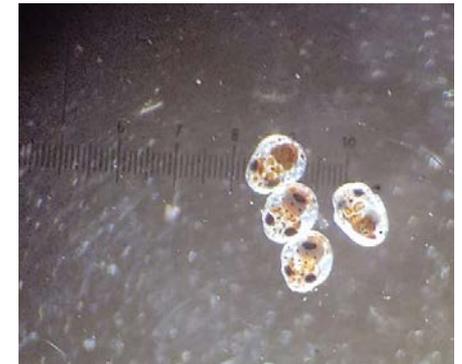
On 24 March during Trawl # 10 of the Spring CPS cruise we collected 5 hydrated female and 5 mature male Northern Anchovies and mixed their gametes in a large beaker to induce fertilization. This resulted in approximately 1,500 fertilized eggs which were divided equally among three chiller baths held at 11°C, 13°C, and 15°C. HAPPY BIRTHDAY GERARD!

It took approximately 131 hours, 90 hours, and 64 hours, respectively, for each temperature group to hatch.



**Two seawater baths are connected to each chiller to provide space for simultaneous egg incubation of two species in the event that both spawning Pacific Sardine and or another CPS are collected during the cruise.**

Photo – Christopher Tait – Teacher at Sea



**Paper nautilus paralarvae collected and hatched in the incubator bath**

# Future Surveys and Activities – 2017

## Surveys

- Rockfish Recruitment and Ecosystem Assessment Survey – *FSV Lasker*.
  - April 26-June 13, 2017 (45 DAS)
- Summer CCES survey - *FSV Lasker*.
  - June 19-August 11, 2017 (50 DAS)
  - Trawl selectivity testing
  - Provisional inshore sampling - anchovies
- Summer Pacific Hake Acoustic Trawl Survey - *FSV Shimada*
  - June 16-September 13, 2017 (80 DAS)



# Future Surveys and Activities – 2017

## Activities

- SWFSC-Industry Collaborative Studies – **Potential Topics for Further Discussion**
  - Assess impacts of a 10-12 hour time lag between when CPS are observed by acoustics and when the research vessel returns to the location of the school to trawl (species and size composition);
  - Conduct fly-overs on ATM transects to provide visual confirmation on the number of schools in the vicinity of the survey transects. This information could help understand the capabilities of the side-scanning sonar on the research vessel;
  - Development of a joint SWFSC-Industry survey to assess northern anchovy populations in shallow coastal areas of the CCE that are outside the spatial footprint of the current CPS survey;
  - Explore additional biological sampling platforms and develop realistic protocols to collect requisite data; and
  - Meet routinely to discuss progress and identify new areas of mutual interest.

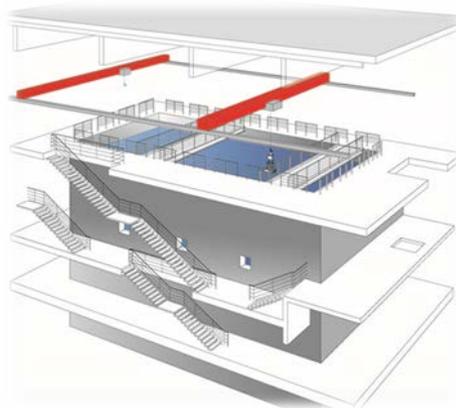
# Future Surveys and Activities – 2017

## Activities

- Pacific Mackerel Catch Only Projection - June
- 2<sup>nd</sup> EK-80 Workshop – Fall 2017 (SWFSC)
  - 1<sup>st</sup> EK-80 Workshop

<http://ices.dk/news-and-events/news-archive/news/Pages/Wideband-echosounder-evaluated-in-new-report.aspx>

- TS tank trials - SWFSC



# QUESTIONS?

