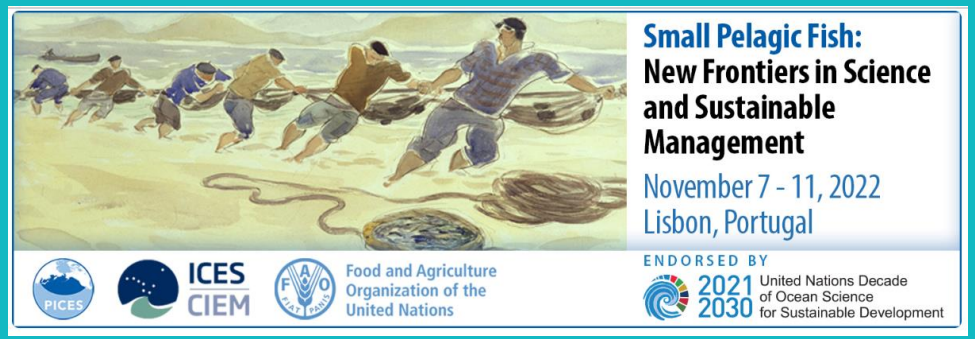
CalCOFI's past, present, and future role in the ecosystem approach to fishery research

Noelle Bowlin, Andrew Thompson, William Watson, Edward Weber, David Demer, and Brad Erisman

NOAA Southwest Fisheries Science Center
La Jolla, California



Session 5

Progress in Pelagic Surveys: From Biomass Estimates to Monitoring Ecosystems

Convenors:
Maria Manuel Angélico
Chris Rooper
Jeroen van der Kooij
Tim Ward

NOAA FISHERIES

Outline

- Background
- CalCOFI History
- CalCOFI Today
- CalCOFI Future

National Oceanic and Atmospheric Administration

- United States Federal Government
- NOAA has 8 branches
- NOAA Fisheries

  Stewardship of the nation's ocean resources and their habitat

  - Productive and sustainable fisheries
  - Safe sources of seafood
  - Recovery and conservation of protected resources
  - Healthy ecosystems

NOAA FISHERIES

NOAA Southwest Fisheries Science Center

On the Scripps Institution of Oceanography campus

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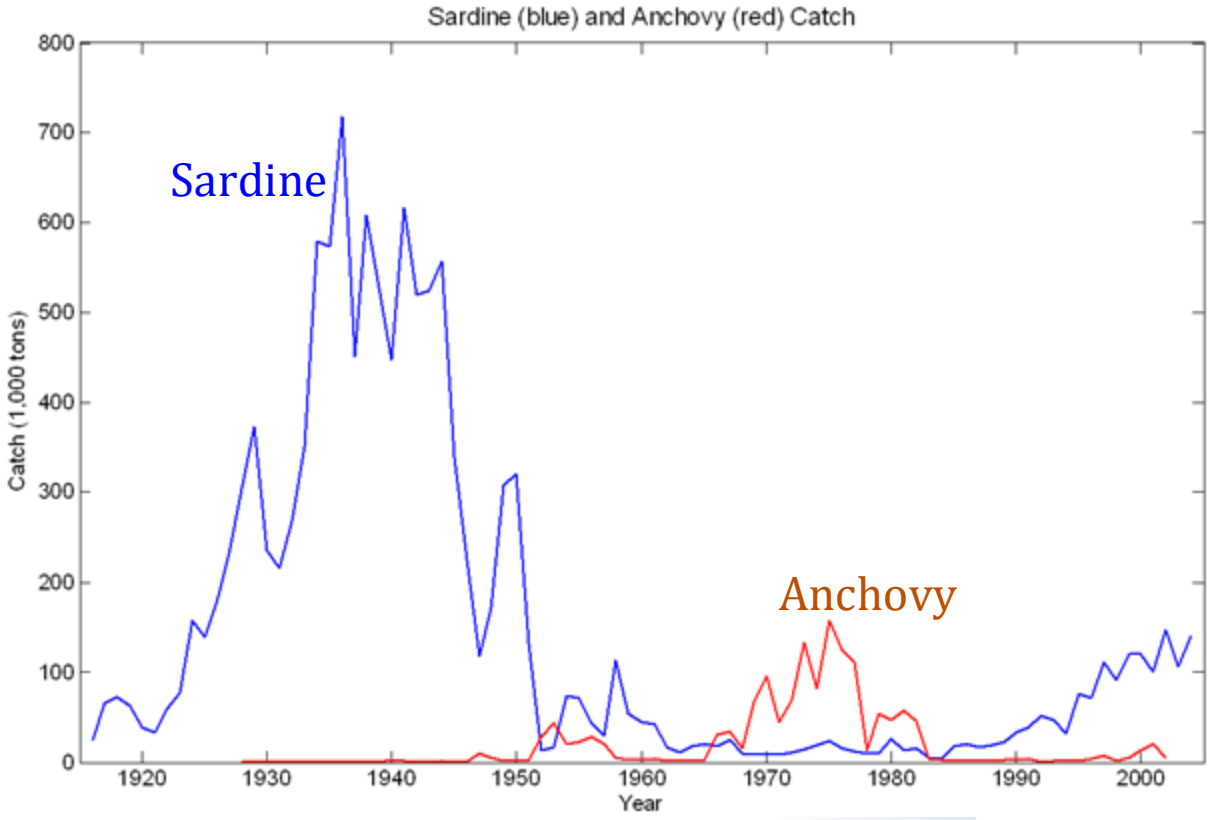
CalCOFI

California Cooperative Oceanic Fisheries Investigations

Pacific Sardine
(*Sardinops sagax*)



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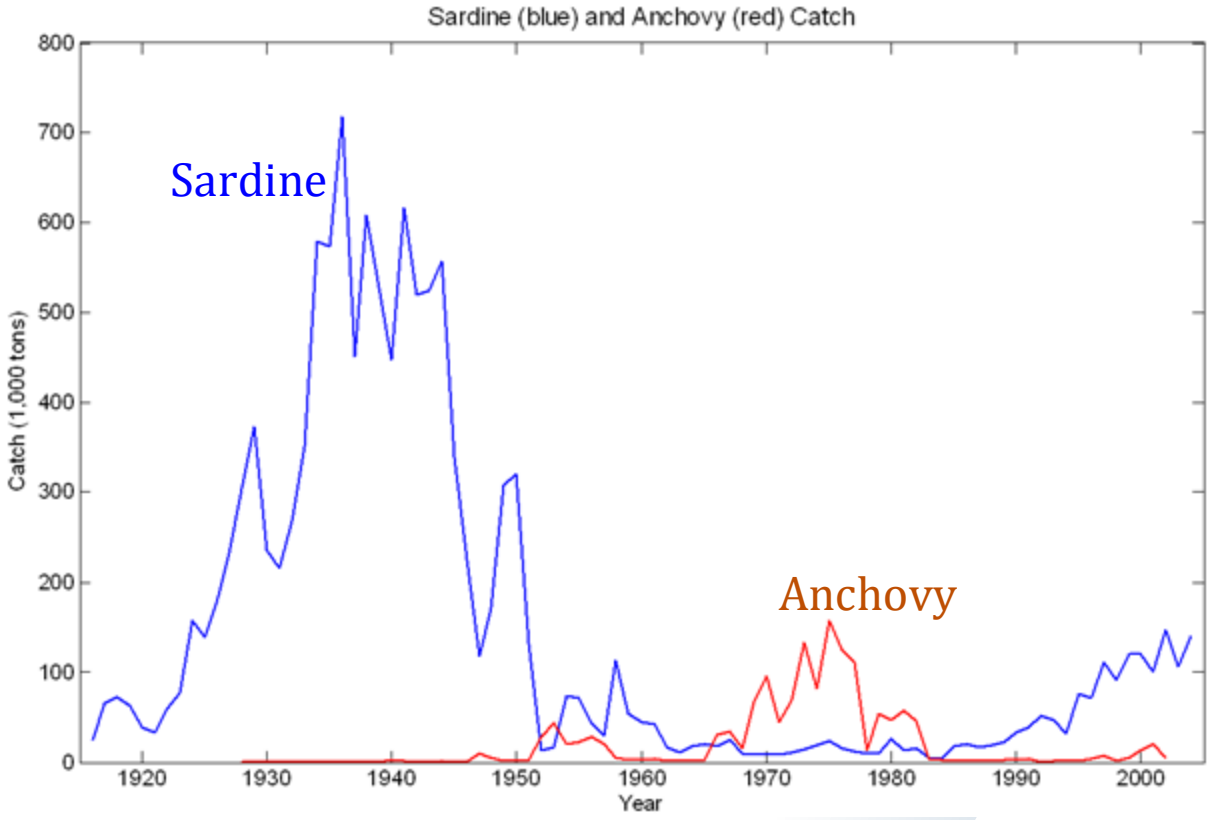
CalCOFI

California Cooperative Oceanic Fisheries Investigations

Overfishing vs environmental changes

Pacific Sardine
(*Sardinops sagax*)



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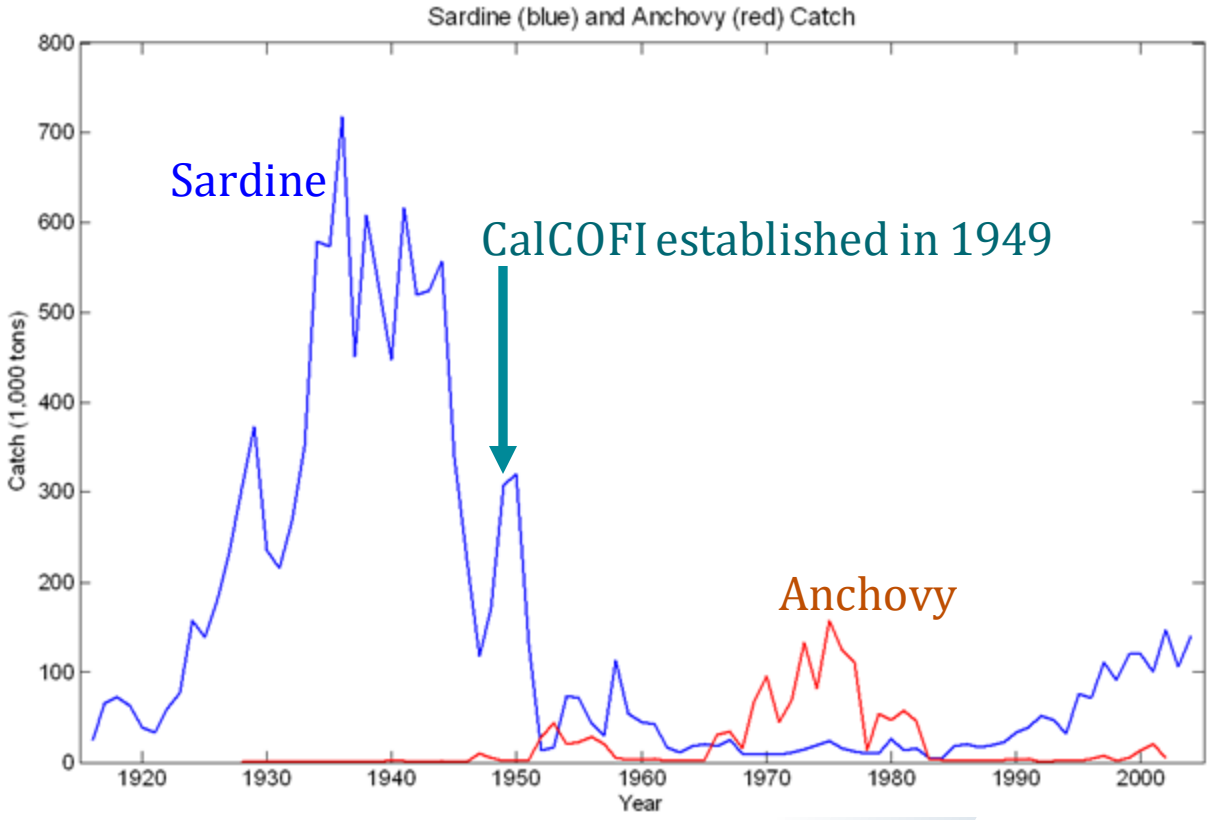
CalCOFI

California Cooperative Oceanic Fisheries Investigations

Overfishing vs environmental changes

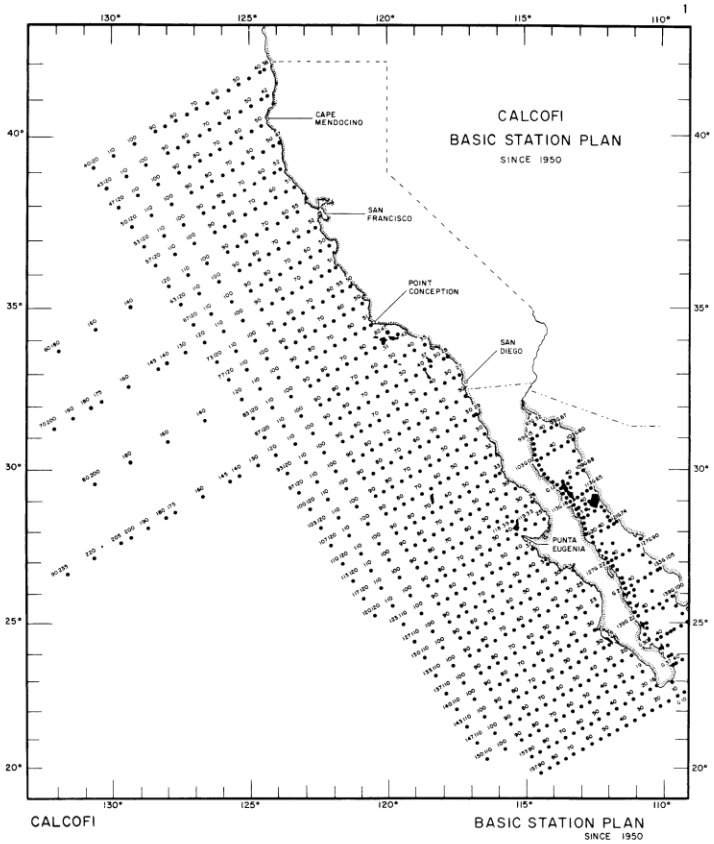
- NOAA Fisheries
- Scripps Institution of Oceanography
- California Department of Fish and Wildlife



NOAA FISHERIES

CalCOFI

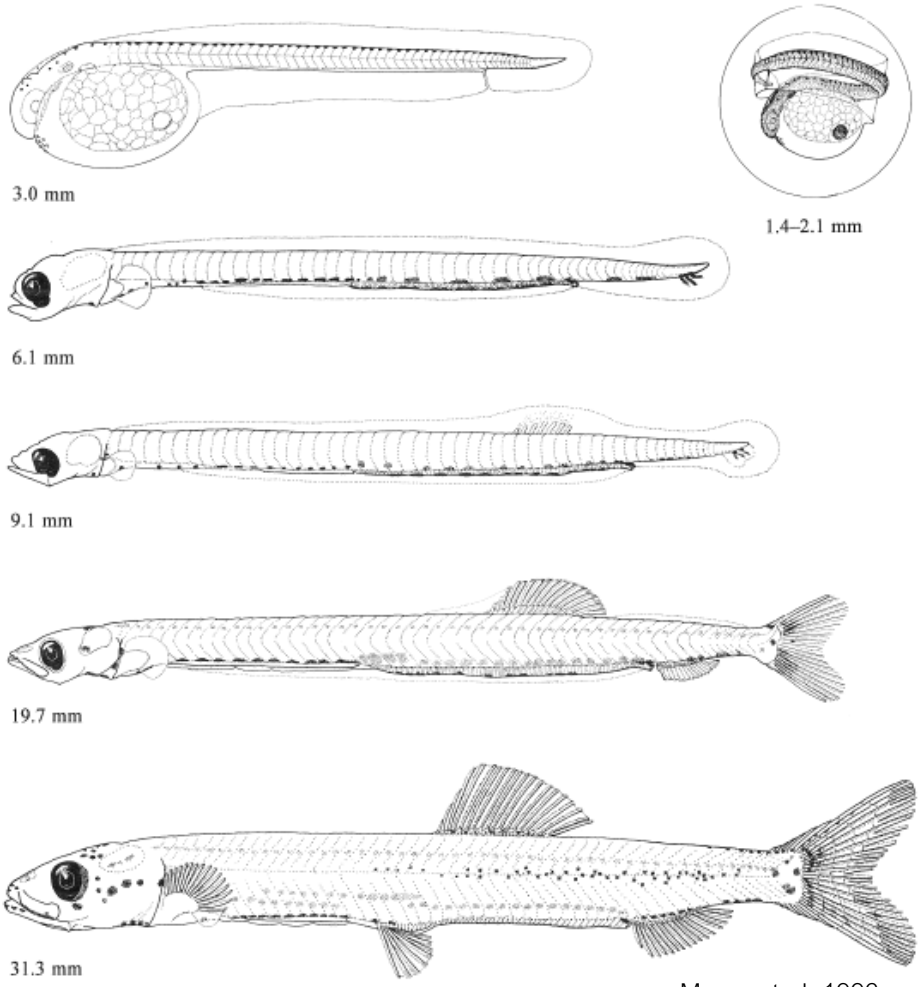
California Cooperative Oceanic Fisheries Investigations



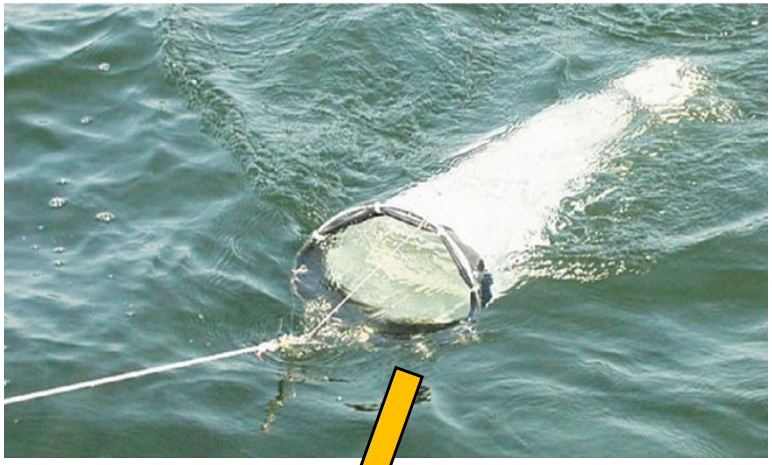
Monthly cruises, 3 ships working year round

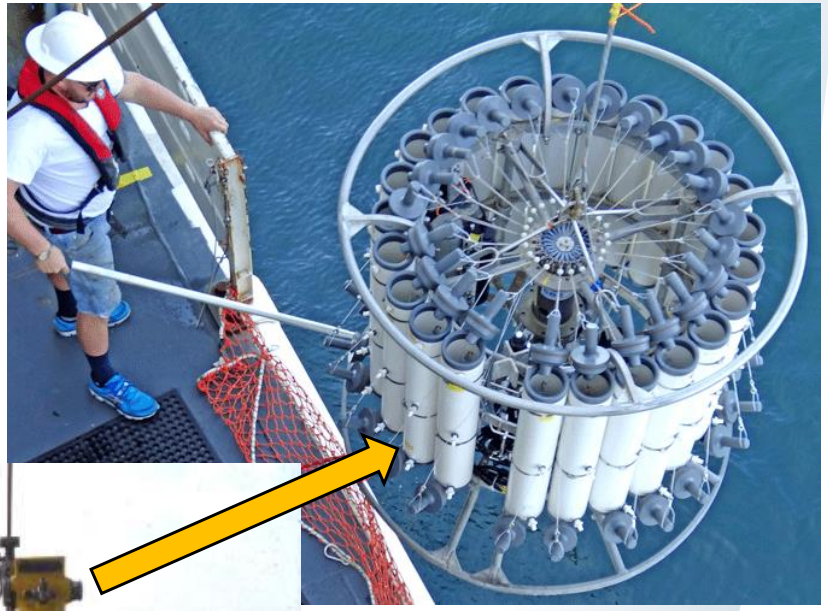
R/V Black Douglas

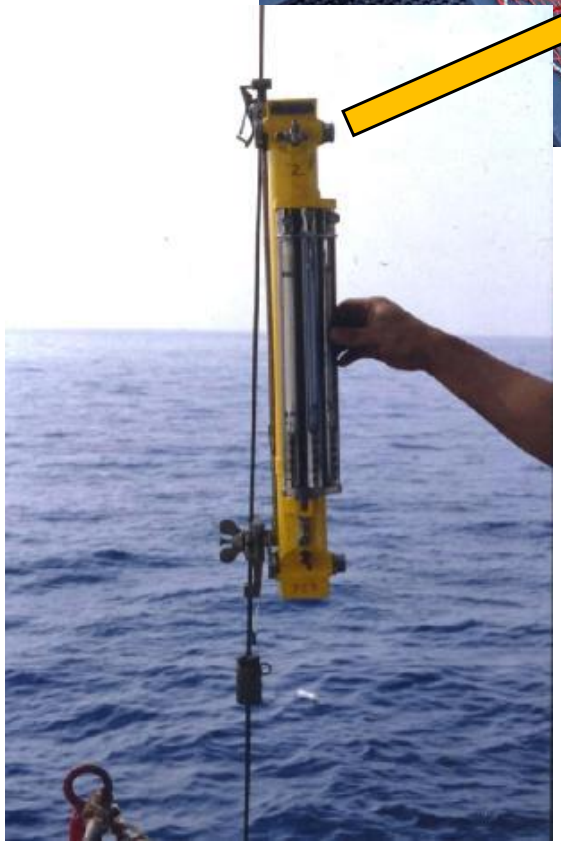
Pacific sardine *Sardinops sagax*



Moser et al. 1996







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Oceanographic approach to fishery research (Ecosystem approach)

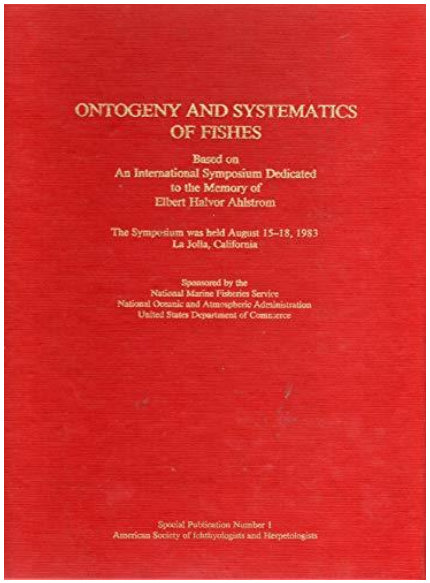
CalCOFI – NOAA Fisheries

Elbert "Ahlie" Ahlstrom

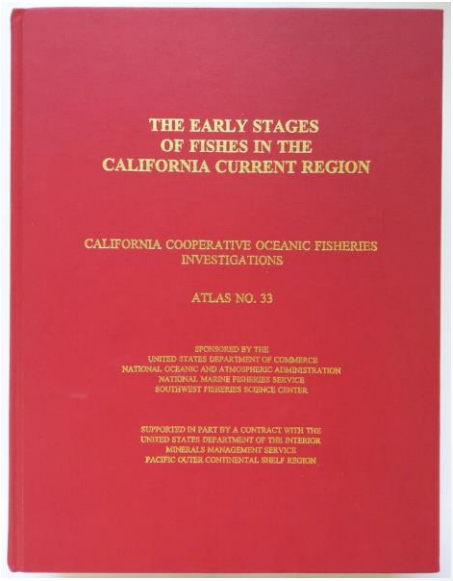
H. Geoffrey Moser

1. Quantitative ichthyoplankton sampling
2. Describe all fish species

Ontogeny and Systematics of Fishes
ASIH Special Pub No. 1, 1983



The Early Stages of Fishes in the California Current
CalCOFI Atlas 33, 1996



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CalCOFI – Seminal work

- CalCOFI Symposium (1958): "*The Changing Pacific Ocean in 1957 and 1958*"
- First use of "El Niño" to describe the widespread anomalies now known to be associated with the Southern Oscillation

"By the fall of 1957, the coral ring of Canton Island, in the memory of man ever bleak and dry, was lush with the seedlings of tropical trees and vines."

Elton Sette and John D. Isaacs
CalCOFI Reports Vol. 7

CalCOFI – Seminal work

NOAA Technical Report NMFS 36 December 1985

An Egg Production Method for Estimating Spawning Biomass of Pelagic Fish: Application to the Northern Anchovy, *Engraulis mordax*

Reuben Lasker (Editor)

CalCOFI – Seminal work

Vol. 5: 225–227, 1981 | MARINE ECOLOGY – PROGRESS SERIES
Mar. Ecol. Prog. Ser. | Published May 31

New Net for Sampling the Ocean Surface

D. M. Brown and L. Cheng

Scripps Institution of Oceanography, A-028, University of California, San Diego, La Jolla, California 92093, USA

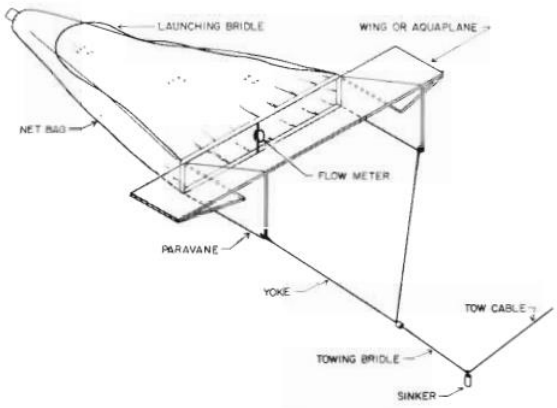

Fig. 1. Manta Net. Schematic diagram

@CalCOFI

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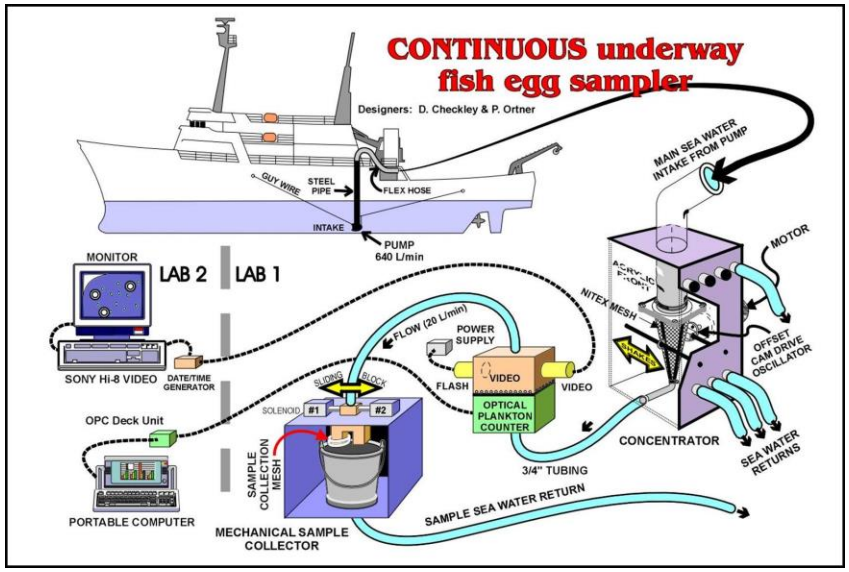
CalCOFI – Seminal work

FISHERIES OCEANOGRAPHY

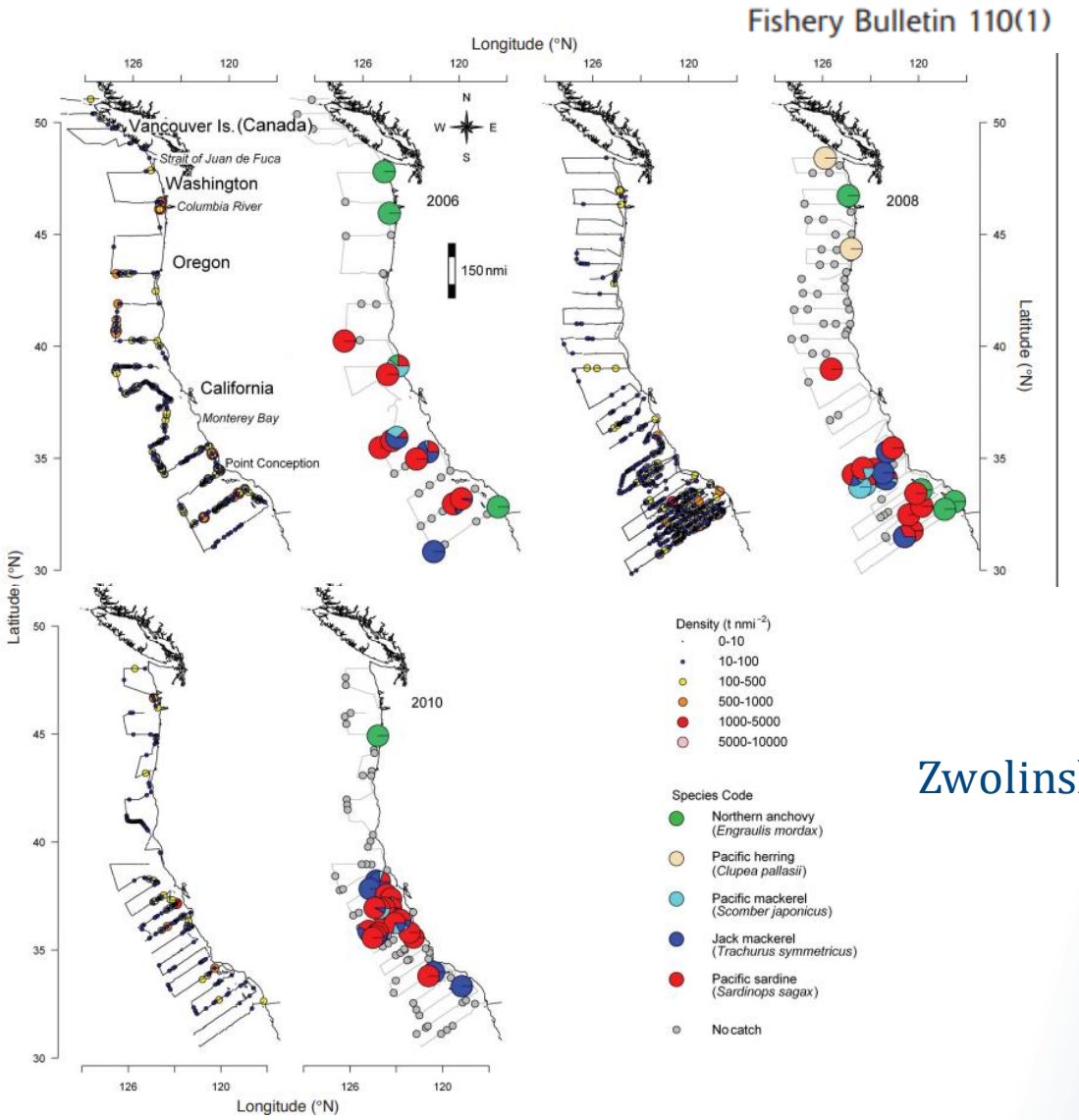
Fish. Oceanogr. 6:2, 58–73, 1997

A continuous, underway fish egg sampler

DAVID M. CHECKLEY, JR,[1] PETER B. ORTNER,[2] LAWRENCE R. SETTLE,[3] AND SHAILER R. CUMMINGS[2]

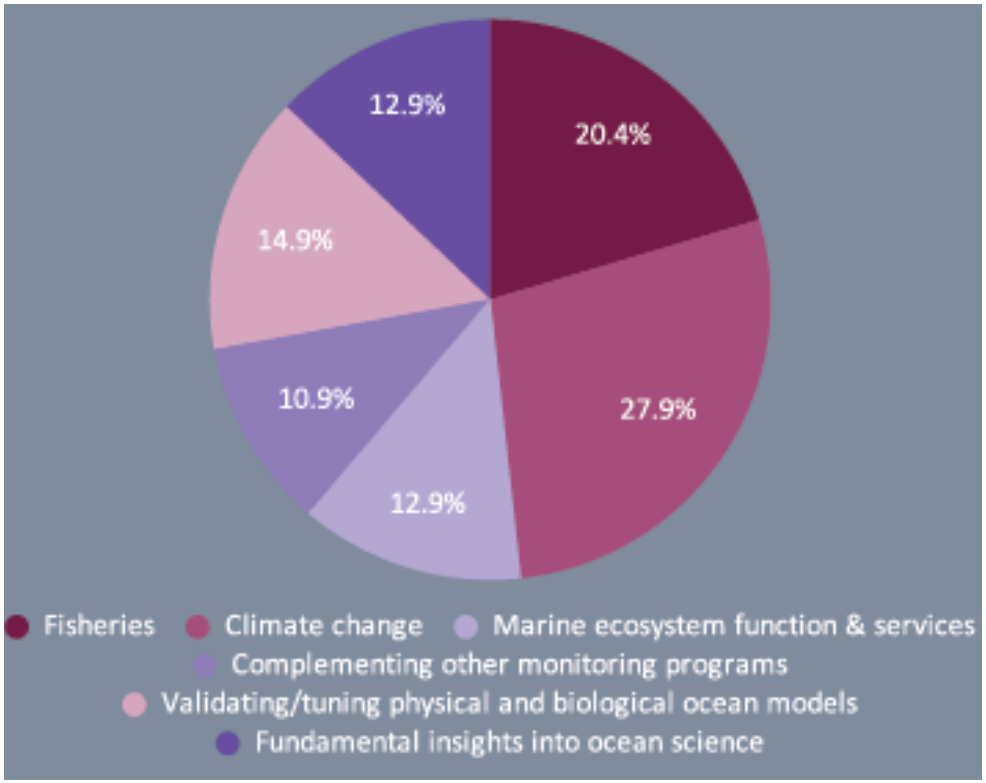


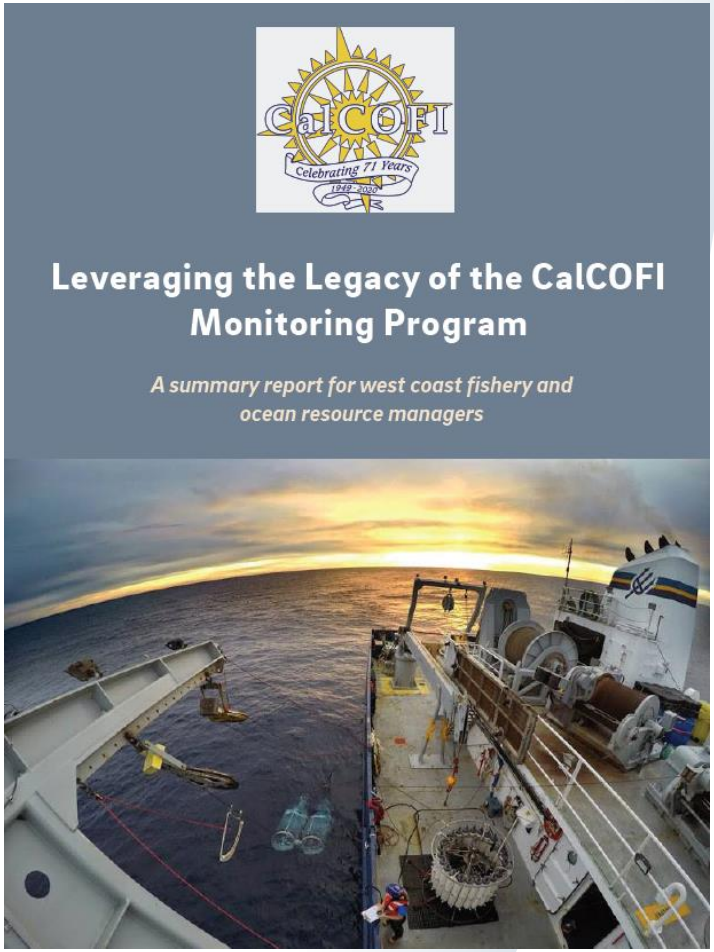
Acoustic Trawl Method – SPF Biomass Estimation



Zwolinski et al. 2012

CalCOFI has always been an inclusive community working together to advance our understanding of SPF stocks and their ecosystems





Engeman et al. 2020

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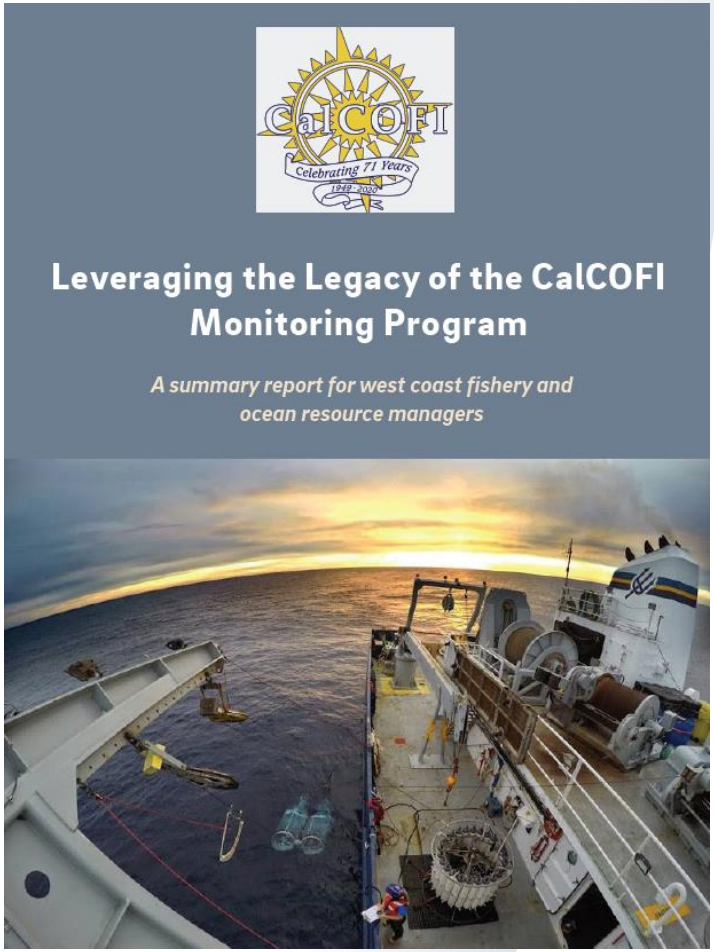
Recommendations:

1. Enhance spatial coverage (cross-shore and alongshore
2. Enhance ocean ecosystem monitoring collaborations
3. Ensure continuity of biogeochemical sampling & analysis
4. Test emerging research questions and monitoring methods
5. Improve data management and access
6. Make user friendly data products



Engeman et al. 2020

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CalCOFI Conference

2-3 December 2019

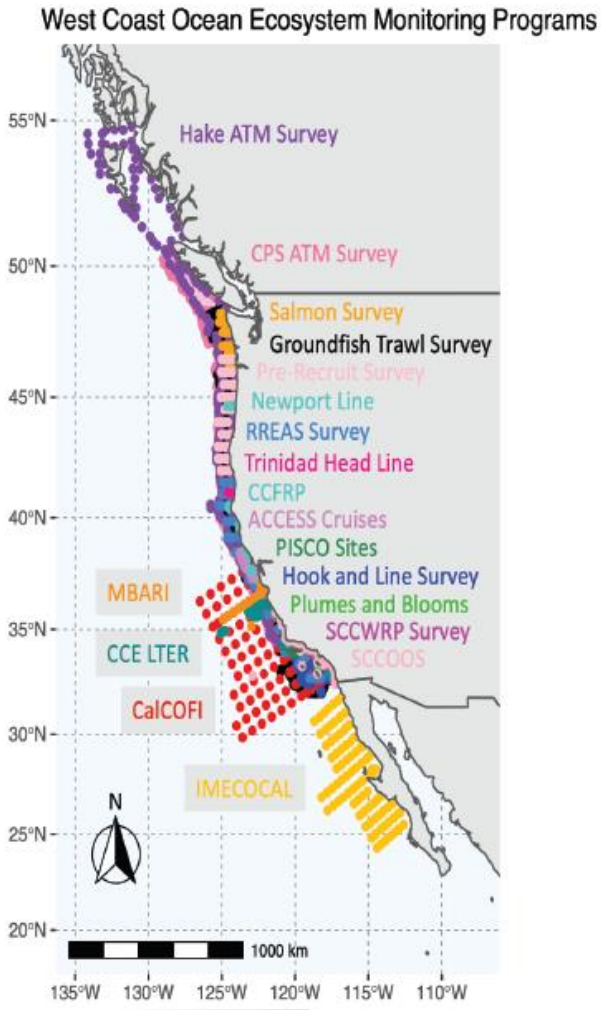
Session IV: The Symposium of the Conference: Putting Ocean Ecosystem Monitoring Data To Use

frontiers in Marine Science

REVIEW
published: 02 March 2022
doi: 10.3389/fmars.2022.757124

Fisheries Surveys Are Essential Ocean Observing Programs in a Time of Global Change: A Synthesis of Oceanographic and Ecological Data From U.S. West Coast Fisheries Surveys

Natalya D. Gallo[1], Noelle M. Bowlin[2], Andrew R. Thompson[2], Erin V. Satterthwaite[3], Briana Brady[4] and Brice X. Semmens[5]*



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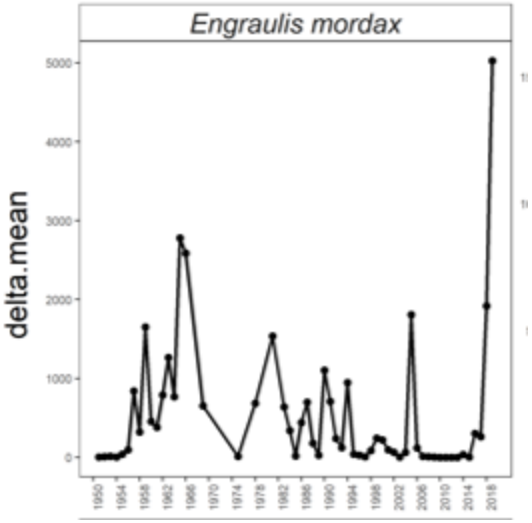
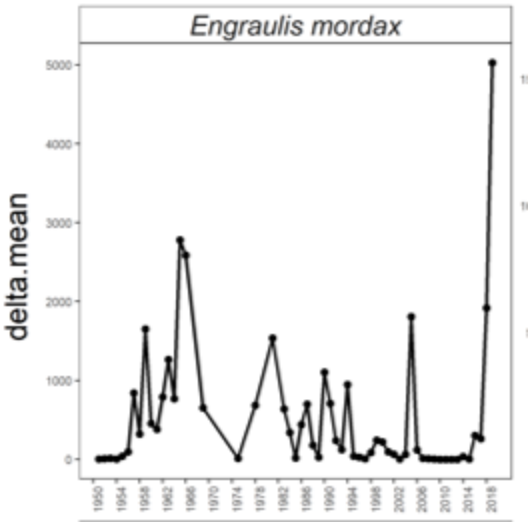
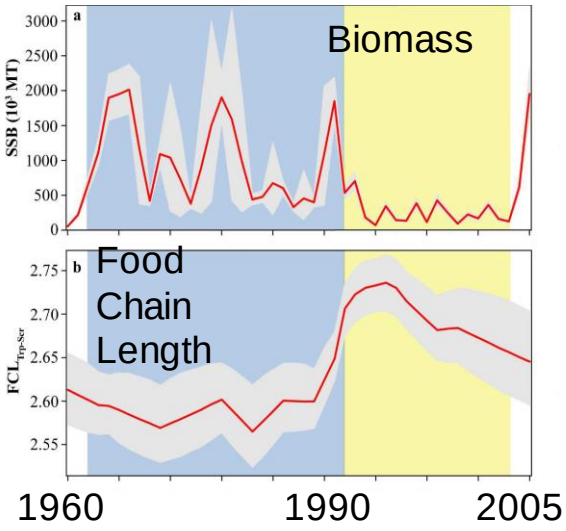
New technologies and methods to address unresolved questions

New technologies and methods to address unresolved questions



New technologies and methods to address unresolved questions





Rasmus Swalethorp, SIO

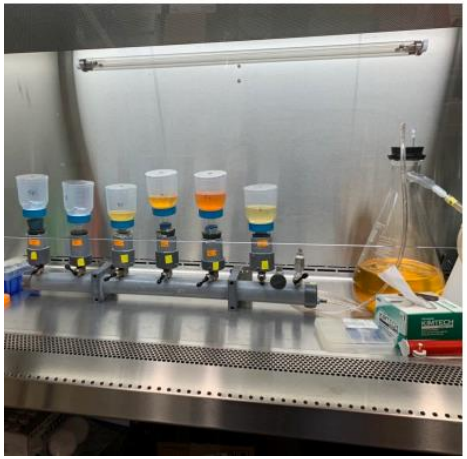
CSSIA of larval anchovy from 1960-2005

SSB lagged by 2 yrs ~ prey TL

Anchovy boom when feeding on lower TL prey

Efficient energy transfer facilitates larval survival

New technologies and methods to address unresolved questions



New Results

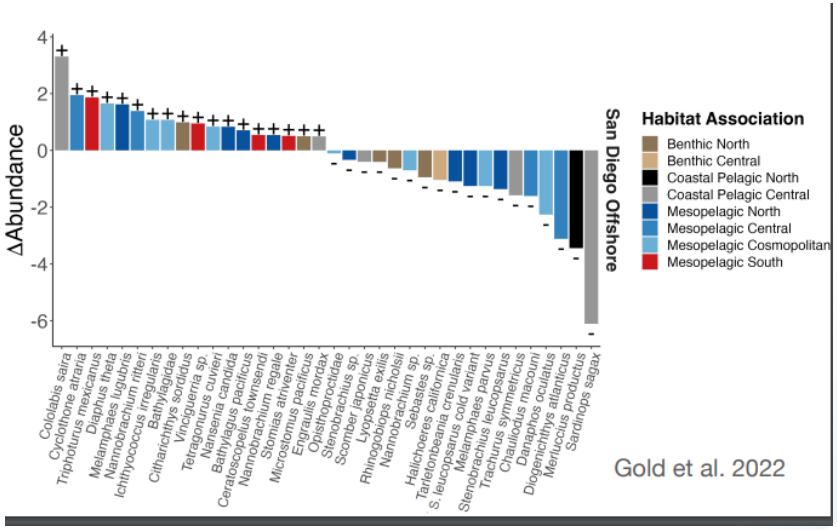
Follow this preprint

Message in a Bottle: Archived DNA Reveals Marine Heatwave-Associated Shifts in Fish Assemblages

Zachary Gold, Ryan P. Kelly, Andrew Olaf Shelton, Andrew R. Thompson, Kelly D. Goodwin, Ramón Gallego, Kim M. Parsons, Luke R. Thompson, Dovi Kacev, Paul H. Barber

doi: https://doi.org/10.1101/2022.07.27.501788

Reconstruct the fish fauna of the California Current Large Marine Ecosystem before, during, and after the 2014–2016 Pacific Marine Heatwave



There's more…

Ta Da!