CWPA MARKET SQUID RESEARCH :

Meeting the goals of the California Ocean Protection Council Strategic Plan

Marine Life Management Act and Market Squid FMP call for Essential Fishery Information

Age and growth characteristics
Distribution of stocks *
Ecological interactions *
Estimates of abundance *
Movement Patterns *
Recruitment *
Reproductive characteristics *
Total mortality *

* EFI Elements in CWPA Cooperative Research Program

California's wetfish industry: a traditional industry with a contemporary outlook

RESEARCH GOALS

DFG:
• Analysis of egg escapement method for California squid
• Develop better understanding of squid biology and population responses to environmental influences and fishery harvest

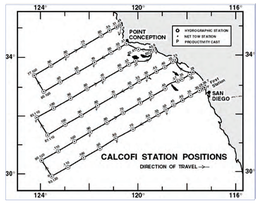
CALIFORNIA WETFISH PRODUCERS ASSOCIATION:
• Investigate resource sustainability and ensure negligible fishery impact
• Facilitate cooperative management of the squid fishery

CalCOFI Research: one of the most comprehensive and continuous datasets in existence

CalCOFI was formed in 1949 to investigate sardines and their environment
• Biological research: egg, fish and larvae sampling is conducted quarterly from San Diego to San Francisco

• Squid are captured incidentally, but CalCOFI research is primarily offshore. Spawning squid and paralarvae are found in highest concentrations nearshore.

CalCOFI Bongo Nets

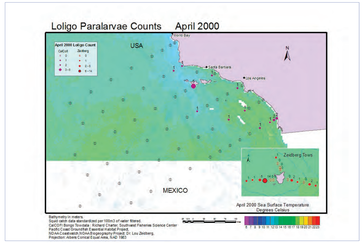


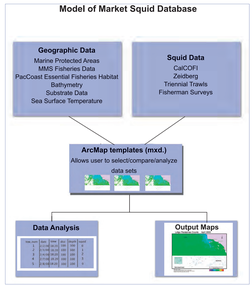
CWPA is training fishermen to tow bongo nets to collect paralarvae nearshore to expand the CalCOFI program

CWPA Research Program Components

Develop and maintain market squid GIS database:

CalCOFI paralarvae data, Triennial trawl data
CWPA nearshore paralarvae data
Biosonics localized squid concentrations
Environmental factors:
monthly composite Sea Surface Temperature
chlorophyll, upwelling, current patterns



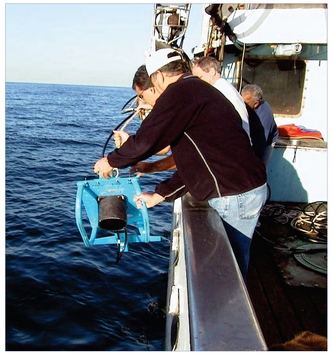


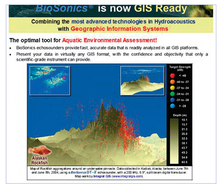
RESEARCH QUESTIONS:

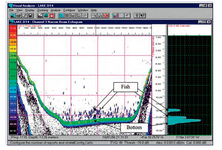
1. Measure local and regional abundance over time
2. Map squid occurrence / abundance relative to environmental indicators
3. Estimate harvest rates in varying environmental conditions to test the assumption that squid abundance is primarily influenced by oceanic conditions

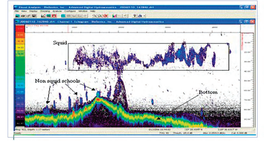
CWPA hydroacoustic survey deploys a BioSonics digital echosounder to map and quantify local squid abundance on major spawning grounds.

Biomass recorded on computer will be analyzed and imported into the GIS database, enabling researchers to study squid variability compared to environmental cycles as well as fishing effort.









Research Questions:

4. Determine the number of samples needed to develop a Paralarvae Density Index (PDI) of abundance
5. Test levels of precision for predicting future regional abundance prior to the spawning season with PDI.