



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, CA 92037

May 4, 2006

F/SWC1:RCD

CRUISE REPORT

VESSEL: NOAA Vessel *Miller Freeman*, MF-08-04

CRUISE DATES: April 1 – April 30, 2008

PROJECT: California Current Ecosystem Survey, Fisheries Resources Division

ITINERARY: Leg 1: The *Miller Freeman* departed Port Angeles, Washington on April 1, 2006 but a test of the vessel's fire alarm system indicated that it was not working properly so the vessel returned to Port Angeles for repairs. Repairs were completed the morning of April 2 and the ship again departed Port Angeles by late morning. The evening of April 2 a family emergency for one of the crew members necessitated running back near shore and dropping him off in port by small boat. On April 14 the ship put in to Newport, Oregon after completion of Leg I.

Leg II: Departed Newport, OR on April 17 and continued survey transect where we left off on Leg I. Completed planned survey itinerary and picked up two lines of stations at the southern end of the pattern to make up for perceived shortfall by the research vessel *David Starr Jordan*. Put in to port at San Francisco, California on April 30.

OBJECTIVES:

1. To conduct continuous underway sampling of surface waters. Temperature and salinity will be automatically logged by computer with the output from the GPS navigational unit.
2. To record current profiles throughout the duration of the cruise with the Acoustic Doppler Current Profiler.
3. To perform an assessment of pelagic fish stocks between Point Reyes, CA and Cape Flattery, WA.
4. To collect information on sardine reproductive parameters, spatial distribution of size, age, and abundance of sardine, and acoustics



ground truth information using trawling.

5. To monitor environmental conditions within the survey area.
6. To make continuous observations of sea birds and marine mammals.
7. To collect specimens throughout the survey pattern for genetics, micro chemistry, maturity, age and fecundity determination.
8. To acoustically identify and quantify pelagic fish schools during transit between stations with the Simrad EK-60 scientific sounder.

PROCEDURES:

1. Each coast-wide survey station included the following:

- a. A CTD/Rosette consisting of four 2.5 liter hydrographic bottles lowered to 500 meters (depth permitting) to measure physical parameters and collect water at discrete depths for analysis of salinity.
- b. A CalBOBL (CalCOFI Bongo) standard oblique plankton tow with 300 meters of wire out, depth permitting, using a 505 μm mesh net paired with a 333 μm mesh net with 71 cm diameter openings. The technical requirements for this tow were: Descent wire rate of 50 meters per minute, held at terminal depth for 30 seconds and retrieved at a wire rate of 20 meters per minute. . A 45° wire angle was closely maintained during the ascent and descent of the net frame. All tows with ascending wire angles lower than 38° or higher than 51° in the final 100 meters of wire were repeated.
- c. A Manta net (neuston) tow, using a 505 μm mesh net on a frame with a mouth area of 0.133 m². The frame was towed for 15 minutes at a target speed of 60-70 cm/sec or an angle of stray between 20-25 degrees.
- d. Weather observations.
- e. A Pairovet (vertical) plankton tow was taken at all stations. The Pairovet net was fished from 70 meters to the surface (depth permitting) using paired 25 cm diameter 150 μm mesh nets. The technical requirements for Pairovet tows were: Descent rate of 70 meters per minute, held at depth for 10 second duration then an ascent rate of 70 meters per minute. All tows with wire angles exceeding 15° during the ascent were repeated.
- f. A surface tow using a Nordic 264 pelagic trawl was conducted during nighttime operations. Each tow was fished for a 30 minute duration at a towing speed of approximately 3.5 knots. The catch of each tow was processed in the following manner: Sardines collected in each trawl were randomly sub-sampled. Standard length and body weight were measured, otoliths were collected, and ovaries preserved in buffered formalin. These fish were assigned a maturity code based on a four stage system developed during a previous Tri-national Sardine Forum.

- g. During daylight hours marine mammal and seabird observations were conducted enumerating and identifying all seabirds and marine mammals encountered. Mammals were not quantitatively surveyed on Leg II.
2. While underway during the coast-wide sardine survey, the following operations were conducted:
- a. Directed adaptive sampling of pelagic fish eggs using the following protocol: Water was continuously sampled using the CUFES (Continuous Underway Fish Egg Sampler) from a depth of six meters. Approximately 640 liters/minute was sent through a concentrator which filters all material larger than 505 μm . The sieved sample was collected and identified. All fish eggs were identified to lowest taxa, counted and entered into the data acquisition software. Each sample entry is coupled with sea surface temperature, geographical position, wind speed and direction, date and time, and surface salinity.

Sampling intervals varied in length, depending on the number of fish eggs seen, from two to sixty minutes with an average interval of thirty two minutes. When two consecutive samples had a concentration of Pacific sardine eggs equal to or greater than 1 egg per minute, the ship stopped to conduct a Pairovet tow. Pairovet tows continued at four mile intervals until a concentration of less than one egg per minute was observed in two consecutive samples. All Pairovet samples were taken concurrently with a CUFES sample in addition to sampling continuously between Pairovet samples.
 - b. Once underway, the *Freeman's* Acoustic Doppler Current Profiler (ADCP, RDI 150 kHz model) was sampling at all times. Data was periodically backed up to a writable DVD.
 - c. Once underway, the scientific sounder (Simrad EK-60, 38, 120, and 200 kHz split beam transducer) was sampling at all times. Data was periodically backed up to a writable DVD.
 - d. Once underway, the *Freeman's* thermosalinometer (TSG) was run at all times with the ship's Scientific Computing System (SCS) serving as the main data collection system.

RESULTS:

<u>Activity</u>	<u>Requested</u>	<u>Completed</u>	<u>Aborted</u>
Bongo Tows	95	94	1
Manta	95	94	1
Pairovet	95	95	0
CTD	95	95	0
Salinity	245	241	4
Weather	95	95	0
Surface Temp.	95	95	0
CUFES samples	591	591	0
ADCP (hours)	648	648	0
EK-500 (hours)	648	648	0
Mid-Water Trawl	42	42	0
Bird & Mammal Obs.	210 hrs.	210 hrs.	0

Trawl Results:

<u>Selected species</u>	<u>Total Weight (kg)</u>
Pacific sardine (<i>Sardinops sagax</i>)	0.15
Northern anchovy (<i>Engraulis mordax</i>)	0.059
Pacific herring (<i>Clupea pallasii</i>)	6.11
Dover sole (<i>Microstomus pacificus</i>)	0.011
Myctophidae	15.48
Pacific hake (<i>Merluccius productus</i>)	0.37
Whitebait smelt (<i>Allosmerus elongatus</i>)	1.19
Black rockfish (<i>Sebastes melanops</i>)	1.72
Coho salmon (<i>Onchorhynchus kisutch</i>)	10.27
Chinook salmon (<i>Onchorhynchus tshawytscha</i>)	1.50
Squid	9.38
Miscellaneous invertebrates	108.95

DISPOSITION OF DATA:

CalBOBL, Pairovet, Manta tow data sheets and formalin preserved samples – Richard Charter, FRD (SWFSC)

Station activity logs, weather data and surface temperature data
- Richard Charter, FRD (SWFSC)

ADCP data – Sam McClatchie, FRD (SWFSC)

EK-500 data – David Demer, FRD (SWFSC)

CTD data – Sam McClatchie, FRD (SWFSC)

Alcohol preserved bongo samples – William Watson, FRD (SWFSC)

Mid-water trawl samples – Beverly Macewicz, FRD (SWFSC)

CUFES samples – Richard Charter, FRD (SWFSC)

INCIDENTS & MALFUNCTIONS:

The shipboard fire alarm system failed to function properly in a test when the ship left Port Angeles and we had to return to port. A company representative was there the following morning and had the system up and operational in a couple of hours. Time lost 26 hours.

The Continuous Underway Fish Egg Sampler (CUFES) shaker that was provided by the ship began to lose a bearing after two days of use. Poor maintenance of this shaker prevented disassembly and repair of the ship's system so the back-up shaker brought by the scientific party was installed and used through the duration of the cruise.

The winch controls on the starboard oceanographic winch used for deploying plankton nets was not working properly, with very poor fine speed control, particularly at slow speeds. This was both extremely hazardous for the first leg of the cruise and prevented the winch operator from maintaining proper deployment speeds on the plankton nets. It was also extremely hard on the winch itself since start and stop occurred at high speeds. Repairs were done during the in port after Leg I and fine speed control was regained at the loss of maximum speed control which fell below the deployment parameters of one plankton net deployed at each station during Leg II.

COMMENDATIONS:

The personnel of the *Miller Freeman* should be recognized and commended for their dedication and professional manner, ensuring the completion of the cruise:

The deck department for their ability to meet the needs of all types of gear with speed and expertise.

The bridge officers for their assistance with all sampling operations as well as assuring the safety and well-being of all personnel aboard. Efforts to complete stations in a timely manner and meet specific time schedules for projects contributed to the completion of scheduled work.

The engineering department for their performance and ability correcting major and minor malfunctions to allow the completion of the cruise.

The electronics specialist for his assistance with communications and for correcting any electronic malfunctions for both the ship and scientific gear.

The Survey technicians who kept scientific operations up and running throughout the cruise.

The stewards department for providing excellent meals and accommodations in all weather conditions.

In addition, the scientific staff personnel should be commended on their ability to continuously collect high quality data throughout the duration of the cruise.

PERSONNEL: Leg I

Sam McClatchie, Chief Scientist

Ron Dotson, Cruise Leader

Noelle Bowlin

Sherri Charter

Gary Friedrichson

Juliet Alla

Rachel Struch

Scott Mills

Terry Hunefield

Candice Emmons

Leg II
Ron Dotson, Cruise Leader
Noelle Bowlin
Amy Betcher
Stephanie Snyder
Sherri Charter
Paul Ton
Jessica Wilson
Eric Bjorkstedt
Scott Mills
Matt Sadowski

SWFSC personnel authorized per diem at the rate of \$3.00 per day to be paid at the termination of the cruise.

WATCH HOURS: 0000-1159 Charge to account F8LAF28-PCS
 1200-2359
 1800-0600
 0600-1800

OVERTIME: 1356 hours (Authorized total for NMFS personnel)
NIGHT DIFF: 1386 hours (Authorized total for NMFS personnel)

Date: _____

Prepared by: _____
 Ronald C. Dotson

Approved by: _____
 Norman W. Bartoo, Ph.D.
 Acting Science & Research Director
 Southwest Region

0804MF California Current Ecosystem Survey

