



**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 29, 2008

F/SWC1:DAG

#### CRUISE REPORT

**VESSEL:** NOAA Vessel *David Starr Jordan*, 0804-JD, DS 08-02.

**CRUISE DATES:** March 24 - May 1, 2008

**PROJECT:** CalCOFI and California Current Ecosystem (CCE) Survey, Fisheries Resources Division.

**ITINERARY:** Leg I: Departed the Nimitz Marine Facility, San Diego at 0800 on March 24, 2008 and moved to a location within San Diego Bay to calibrate the EK-60 scientific sounder. Calibration was completed at approximately 1300 and after transferring the calibration personnel back to MARFAC, the ship proceeded to the first station 93.3/26.7 (position 32° 57.4'N/117° 18.3'W) and began the occupation of the CalCOFI pattern (see attached cruise track). The *Jordan* arrived back in San Diego on April 9, 2008 at the completion of leg I.

Leg II: Departed San Diego Bay on April 12 after personnel transfer and gear reconfiguration and headed to station 91.7/30.0 to begin sampling for adult sardine. Completed leg II in Avila Beach on April 23, 2008.

Leg III: Departed Avila Beach on April 23 after personnel transfer and began working line 76.7 which was not occupied during leg I. Continued to work northward until arriving in San Francisco on May 1, 2008.

**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 continue an ongoing assessment of pelagic fish stocks between La Jolla and San Francisco, California.
4. To monitor environmental conditions within the CCE survey area.
5. To make continuous observations of sea birds and marine mammals.
6. To record continuous acoustic targets obtained with the EK-60 scientific sounder.
7. To collect information on sardine reproductive parameters, spatial distribution of size, age and abundance of sardine, and acoustics ground truth information using trawl gear.

**PROCEDURES:** The *Jordan* conducted operations in the Southern California Bight as well as occupying stations north of Point Conception up to Monterey Bay. The CCE Survey was conducted as a two ship synoptic survey of the western US coast of North America. The NOAA vessel *Miller Freeman*



conducted similar operations over the northern section of the CCE during the same period.

1. Each standard CalCOFI station included the following:
  - a. CTD/Rosette - consisting of 24 10-liter hydrographic bottles, the CTD was lowered to 500 meters (depth permitting) to measure physical parameters and collect water at discrete depths for analysis of: salinity, nutrients and chlorophyll. Casts conducted on line 66.7 were to a depth of 1000 meters.
  - b. CalBOBL (CalCOFI Bongo) - standard oblique plankton tow with 300 meters of wire out, depth permitting, used paired 505  $\mu$ m mesh nets with 71 cm diameter openings. The technical requirements for this tow were: Descent wire rate of 50 meters per minute and an ascent wire rate of 20 meters per minute. All tows with ascending wire angles lower than 38° or higher than 51° in the final 100 meters of wire were repeated. Additionally, a 45° wire angle should be closely maintained during the ascent and descent of the net frame.
  - c. Manta net (neuston) tow - using a 505  $\mu$ m mesh net on a frame with a mouth area of 0.1333 m<sup>2</sup>. Tows were 15 minutes in duration at towing speed of approximately 1.5 - 2.0 knots. Wire angles were kept between 15° and 25°.
  - d. Weather observations.
  - e. Pairovet net - was fished from 70 meters to the surface (depth permitting) using paired 25 cm diameter 150  $\mu$ m mesh nets. The technical requirements for Pairovet tows were: Descent rate of 70 meters per minute, a terminal depth time of 10 seconds and an ascent rate of 70 meters per minute. All tows with wire angles exceeding 15° during the ascent were repeated.
  - f. PRPOOS (Planktonic Rate Processes in Oligotrophic Ocean Systems) net - were scheduled to be taken at all stations on line 90.0 and 80.0 as well as stations out to and including station 70.0 on lines 86.7 and 83.3. Unfortunately due to strong winds and high seas throughout the duration of the survey, only thirteen tows were completed. These stations were occupied as part of the LTER (Long Term Ecological Research) project. The mesh of the PRPOOS net is 202  $\mu$ m and the tow was a vertical cast up from 210 meters.
  - g. Primary productivity - at about 1100 hours on each day of the cruise a primary productivity CTD cast consisting of six 10-liter hydrographic bottles was carried out. The cast arrangement was determined by a Secchi disc observation. The purpose of the cast was to collect water from six discrete depths for daily *in situ* productivity experiments. Measurements of extracted chlorophyll and phaeophytin was obtained with a fluorometer. Primary production was measured as C<sup>14</sup> uptake in a six hour *in situ* incubation. Nutrients were measured with an auto-analyzer. All radioisotope work areas were given a wipe test before the departure of the SIO and MBARI technical staff.
  - h. A light meter - was used to measure the light intensity in the euphotic zone once a day with the primary productivity cast.

2. Acoustics - The scientific EK-60 depth sounder was operated at 38, 70, 120 and 200 KHz and interfaced to a data acquisition system to estimate micronekton biomass between 0 and 500 m. Its use was continuous.
3. ADCP - The ship's ADCP (Acoustic Doppler Current Profiler) ran continuously and was logged to a data acquisition system. Complete system settings were provided by the oceanographer and included 5-minute averaging of currents, AGC and 4 beam returns in 60 8-meter bins.
4. Marine mammal observations - During transit between stations, a marine mammal observer (only on leg I) and bird observer recorded location and species of various birds and marine mammals.
5. Acoustic hydrophone (leg I only) - During transit between most daylight stations, an acoustic hydrophone array was towed from the stern with a cable/winch and recorded sounds from marine mammals. Upon approaching a station, a sonobuoy was deployed one nautical mile prior to stopping for station work.
6. CUFES (Continuous Underway Fish Egg Sampler) - The egg pump was mounted inside the ship's hull drawing water from a depth of three meters. During the grid occupation, the pump ran continuously between stations to sample any pelagic fish eggs. Approximately 640 liters/minute is sent through a concentrator which filters all material larger than 505  $\mu\text{m}$ . 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 was 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 around thirty minutes. At any time during the survey when the CUFES detected sardine egg concentrations of one egg per minute or higher in two consecutive samples, the ship began conducting paironet tows at four mile intervals until the egg concentration fell below a density of one egg per minute in two consecutive samples. This information was relayed to the bridge by scientists monitoring the CUFES system.
7. SCCOOS - An additional nine stations were scheduled to be occupied within the CalCOFI pattern for SCCOOS (S. California Coastal Ocean Observation System). Unfortunately due to the severity of the weather only two SCCOOS stations were occupied. These are 20 meter depth stations and consisted of a CTD lowered to within a few meters from the bottom and a Bongo tow. These stations were included in the original station plans provided to the ship.
8. Surface trawling - During legs II and III, a Nordic 264 surface trawl was deployed between the hours of approximately 1800 and 0600 PST within the Southern California Bight and north up to San Francisco. In some instances, the trawl positions within the Southern California Bight were placed due to information gained during leg I and the occurrence of sardine eggs.

Any adult salmon caught in the trawl were immediately returned to the sea and assumed to have survived. Any juvenile salmon caught incidentally were frozen and turned over to Bob Emmett at NWFSC for further study.

Each tow was fished for 30 minutes in duration at a towing speed of approximately 3.5 knots. The catch of each tow was processed in the following manner: The fish were sorted to species, when

possible, and the catch weighed. Sardines collected in each trawl were randomly subsampled. Standard length and body weight were measured, fish were sexed and maturity graded, otoliths were collected, ovaries preserved in buffered formalin and tails preserved in ethanol vials for genetics. Standard length and body weight were also measured for Northern anchovy, jack and Pacific mackerels, hake and other species as time permitted.

RESULTS:

<u>Activity</u>	<u>Requested</u>	<u>Completed</u>	<u>Aborted</u>
Bongo tows	105	68	37
Manta tows	96	65	31
Pairovet tows	200	151	49
CTD casts	110	80	30
Salinity	110	80	30
Nutrients	110	80	30
Chlorophyll	110	80	30
Weather	226	175	51
Surface Temp.	226	175	51
Primary productivity	14	14	0
Surface Trawls	29	29	0
ADCP (hours)	876	876	0
EK-60 (hours)	876	876	0
CUFES samples	1053	1053	0
PRPOOS tows	35	13	22
SCCOOS stations	9	2	7

Trawl results:

<u>Species</u>	<u>Total weight (kg)</u>
Pacific sardine ( <i>Sardinops sagax</i> )	103.23
Northern anchovy ( <i>Engraulis mordax</i> )	531.52
Jack mackerel ( <i>Trachurus symmetricus</i> )	60.73
Pacific mackerel ( <i>Scomber japonicus</i> )	2.61
Myctophidae	17.67
Squid	55.24
Misc. Invertebrates	51.38

DISPOSITION  
OF DATA:

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

PRPOOS tow data sheets and formalin preserved samples - Ralf Goericke, IOD (SIO).

EK-60 data files - David Demer, FRD (SWFSC).

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

ADCP data - Sam McClatchie, FRD (SWFSC).

CTD data - Sam McClatchie, FRD (SWFSC), Ralf Goericke, IOD (SIO) and Tim Pennington (MBARI).

Water analysis data (temperatures, salinities, nutrients and chlorophylls) - Ralf Goericke, IOD (SIO) and Tim Pennington (MBARI).

Underway data - Richard Charter, FRD (SWFSC).

Alcohol preserved bongo samples - William Watson, FRD (SWFSC).

INCIDENTS &  
MALFUNCTIONS:

Mechanical problems were minimal over the course of this survey and only accounted for approximately 5 hours of lost time.

On two separate occasions the ship was diverted to port for medical emergencies.

The constant severity of high winds and seas accounted for the majority of lost time due to slow transit speeds and the inability to work. Three separate instances the ship had to hold on station until the weather subsided.

COMMENDATIONS:

The personnel of the *David Starr Jordan* 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. Adapting to specific trawling requests and last minute schedule changes was greatly appreciated. The transition from leg I to leg II went without a hitch due to their hard work.

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 all scheduled work. Considering the difficulties faced with constant marginal weather, the ship handlers are what made the survey a success.

The engineering department for their performance and ability correcting major and minor malfunctions to allow the completion of the cruise with little or no loss of time. They did a remarkable job.

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

The stewards department for providing excellent meals and accommodations in all weather conditions. Unfortunately, in this case, the majority of the weather conditions were bad.

PERSONNEL:

Leg I:  
Dave Griffith, Cruise Leader . . . . . SWFSC  
Amy Hays . . . . . SWFSC  
Dimitry Abramenkoff . . . . . SWFSC  
Bryan Overcash . . . . . CDFG  
Jim Wilkinson . . . . . SIO  
Jennifer Wolgast . . . . . SIO  
Dave Faber . . . . . SIO  
Robert Thombley . . . . . SIO  
Shonna Dovel . . . . . SIO  
Sue Reynolds . . . . . SIO  
Greg Campbell . . . . . SIO  
Daniel Yee . . . . . SIO  
Dominique Camacho . . . . . CR  
Michael Bentley, bird observer . . . . . PRBO

Leg II:  
Dave Griffith, Cruise Leader . . . . . SWFSC  
Amy Hays . . . . . SWFSC  
Dimitry Abramenkoff . . . . . SWFSC  
William Watson . . . . . SWFSC

Bev Macewicz . . . . .	SWFSC
Sarah Zao . . . . .	SWFSC
Kevin Hill . . . . .	SWFSC
Marguerite Blum . . . . .	MBARI
Daniel Schperberg . . . . .	MBARI
Byungyul Cha . . . . .	FRDI
Kirsten Lindquist . . . . .	PRBO

Leg III:

Dave Griffith, Cruise Leader . . . . .	SWFSC
Amy Hays . . . . .	SWFSC
Dimitry Abramenkoff . . . . .	SWFSC
William Watson . . . . .	SWFSC
Bev Macewicz . . . . .	SWFSC
Sarah Zao . . . . .	SWFSC
Scott Benson . . . . .	SWFSC
Jennifer Wolgast . . . . .	SIO
Bryan Overcash . . . . .	CDFG
Marguerite Blum . . . . .	MBARI
Daniel Schperberg . . . . .	MBARI
Kirsten Lindquist . . . . .	PRBO

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

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

Date: June 17, 2008

Prepared by:   
David Griffith

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

