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

January 20, 2005 F/SWC1: DAD

CRUISE ANNOUNCEMENT

VESSEL: NOAA Vessel *David Starr Jordan*, DS-05-02.

CRUISE NUMBER: DS-05-02

CRUISE DATES: February 3-22, 2005

PROJECT: Cowcod Survey, Fisheries Resources Division.

ITINERARY:

Date	**Activity**	**DAS**
3 February	San Francisco to Santa Barbara	1.5
4 February	Pickup scientists with launch; transit to San Miguel Island; and calibrate the EK60 system	0.5
5-21 February	Daytime acoustic surveys; and nighttime ichthyoplankton surveys	17.5
22 February	Transit to San Diego	0.5

After departing from San Francisco on 3 February, proceed to the City of Santa Barbara to pickup scientific personnel. Midday on 4 February, launch RHIB to pickup personnel (Demer) from Santa Barbara and return to the ship. Proceed to the lee side of San Miguel Island and anchor in at least 30 m of water for EK60 echo sounder calibration experiments. At the conclusion of the calibration experiments, proceed to the first ichthyoplankton station. Stop ichthyoplankton sampling each night so as to be at the beginning of the acoustic survey at sunrise. Then, continue the proposed acoustic survey pattern at a speed of 10 knots, until it is completed, or until sunset (see attached cruise track segments; Nobeltec routes and waypoints file will be provided). Echo sounder

surveys will only be conducted between sunrise and sunset (approximately 10 hours per day). At the conclusion of each survey segment, a CTD will be deployed in the area. If daytime, the ship will then transit to the next cruise segment and begin surveying until it is completed, or until sunset. If nighttime, the CTD will be deployed prior to beginning the ichthyoplankton survey. At night, the ship will either be: 1) transiting to the next survey segment; or 2) conducting ichthyoplankton tows, but staged to begin the next echo sounder survey segment at sunrise. The echo sounder survey and CTD casts will take priority to the nighttime ichthyoplankton tows.

Information about the distribution and abundance of acoustically surveyed rockfish will be relayed daily by VHF radio or ethernet modem to Dr. John Butler aboard F/V *Outer Limits*, who will be concurrently conducting ROV surveys for video verification of species.

Table 1. Tentative Acoustical Survey Schedule

Apx. Dates	Rockfish Habitat	Distance (n.mi.)	Time (Hours)	Time (Days)
5-Feb	SW San Miguel Island	88	8.8	0.9
6-Feb	NW San Miguel Island	203	20.3	2
8-Feb	N San Miguel Island	17	1.7	0.2
8-Feb	NE San Miguel Island	24	2.4	0.2
8-Feb	N Santa Rosa Island	16	1.6	0.2
8-Feb	SE Santa Rosa Island	21	2.1	0.2
9-Feb	Santa Cruz Canyon	13	1.3	0.1
9-Feb	Anacapa Pass	40	4	0.4
9-Feb	S Anacapa Pass	10	1	0.1
10-Feb	Santa Rosa Flats	420	42	4.2
14-Feb	Hidden Reef	23	2.3	0.2
14-Feb	N Santa Barbara Island	61	6.1	0.6
15-Feb	117 Seamount	13	1.3	0.1
15-Feb	SW Santa Barbara Island	51	5.1	0.5
15-Feb	Osborne Bank	37	3.7	0.4
16-Feb	SE San Nicolas Island	17	1.7	0.2
16-Feb	E San Nicolas Island	174	17.4	1.7
18-Feb	N San Nicolas Island	134	13.4	1.3
19-Feb	NW San Nicolas Island	75	7.5	0.8
20-Feb	Potato Bank	67	6.7	0.7
20-Feb	118 Bank	17	1.7	0.2
21-Feb	107 Bank	15	1.5	0.2
21-Feb	Inner Cherry Bank	15	1.5	0.2
21-Feb	70-90 Seamount	50	5	0.5

On 9 February, a launch will be sent into the city of Santa Barbara to drop-off Scientists Demer and Giddens.

The ship will return to San Diego in the afternoon of 22 February, 2005.

OBJECTIVES:

1. Survey rockfish in the Southern California Bight area (see attached map) using a combination of multiple-frequency echo sounders (NOAA vessel *David Starr Jordan*) and a remotely operated vehicle equipped with high-resolution video (F/V *Outer Limits*). The combination of methods is being developed for assessing rockfish abundance over rocky bottom habitat. Activities include:

- Continuous recording of acoustic targets with four EK60 scientific sounders (38, 70, 120, and 200 kHz);
- Testing of multi-frequency echosounder algorithms for bottom mapping, habitat classification, and identification of fish sizes and taxa;
- Continuous underway sampling of surface waters using the ship's thermosalinograph and the SCS. Temperature and salinity data will be automatically merged with the time and position data from the ship's GPS navigational unit and logged by computer each minute;
- Sampling of physical oceanographic conditions corresponding to the acoustical surveys. A Seabird 911+ or 19+ CTD will be used to record temperature and salinity profiles at each survey location; and
- Directing of location and timing of ROV operations conducted aboard R/V *Outer Limits*. Preliminary results of the acoustical surveys, in GeoTiff format, will be communicated by radio and ethernet radio link to the F/V *Outer Limits*.

2. Ichthoplankton surveys in the Southern California Bight will begin at the completion of each day's acoustic survey. High density patterns will be surveyed in close proximity to each acoustic survey end point. The pattern will be designed with grid lines at ten mile spacing and stations every five miles along each grid line. These positions will be provided to the ship prior to departure. Station activities will include:

- A CalBOBL (CalCOFI Bongo) standard oblique plankton tow with 300 meters of wire out, depth permitting, using paired 505 µm mesh nets with 71 cm diameter openings. The technical requirements for this tow are: 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 will be repeated. Additionally, a 45° wire angle should be closely maintained during the ascent and descent of the net frame.

- Weather observations.

- A CTD (Seabird 911+) will be lowered to 500 meters (depth permitting) to measure physical parameters such as salinity, oxygen concentration and chlorophyll at specified stations within the high density pattern.

PROCEDURES: The research vessel *David Starr Jordan* will conduct operations in conjunction with the fishing vessel *Outer Limits*.

Echo sounder calibrations will be conducted while anchored in the lee of San Miguel Island.

During daylight hours, conduct acoustical surveys at a speed of 10 knots. Multi-frequency acoustical backscatter will be measured continuously by the SWFSC's EK60 echo sounders and the ship's hull-mounted transducers (38, 70, 120, and 200 kHz), and recorded on computer hard disk. The data will be backed-up to external hard disk and DVD media.

Except for the EK60 sounders being used for these surveys, all other echo sounders and sonars operating at frequencies of 38, 70, 120, and 200 kHz must be secured during all survey operations. This includes the ship's 150 kHz broad bandwidth ADCP, 200 kHz Doppler speed log, and 200 kHz bridge echo sounders. Operation of the ship's 50 kHz ES60 navigation sounder should not interfere with the EK60 measurements, but all echosounder transmissions should be synchronized.

The daytime between sunrise and sunset is approximately 10 hours.

The thermosalinograph data, indexed by GPS data and position information will be stored each minute throughout the cruise by the SCS. At the conclusion of the cruise, these data will be provided on CD to the Cruise Leader.

Survey information will be relayed by either radio and ethernet radio links to F/V *Outer Limits*.
David Starr Jordan will need to coordinate activities with F/V *Outer Limits* which will be concurrently conducting ROV surveys for video verification of species.

At the completion of each day, a series of stations located on the high density grid pattern will be chosen in relation to the final acoustic transect end point so as to minimize transit time between acoustic tracklines and ichthyoplankton stations. These stations will be occupied throughout the night until it is necessary to break

off operations to position the ship at the starting point for the day's acoustic survey. At each station occupied, a bongo tow and weather observations will be performed. At stations which coincide with current CalCOFI positions, a CTD cast will be performed in addition to the above procedures.

EQUIPMENT: Supplied by scientific party:

- Simrad EK60 echosounders (38, 70, 120, and 200 kHz)
- Data logging and processing computers
- GPS and antenna
- Ethernet radio, power supply, cabling, and antenna
- Calibration apparatus
- Seabird 911+ CTD
- Seabird 19+ CTD
- 71 cm dia. Bongo frame
- 505 µm mesh Bongo nets
- 333 µm codends and couplers
- GO flowmeters
- 37% Formalin
- Ethanol
- Tris buffer
- Sodium borate
- 30 cc and 50 cc syringes
- Canulas
- Pint, quart and gallon jars
- Inside and outside labels
- CalCOFI net tow data sheets
- Inclinometer for bongo tows
- 75 lb Bongo weight
- Standard CalCOFI tool boxes
- Bucket thermometers and holders
- Data sheets for scheduled hydrographic work
- Weather observation sheets

Supplied by *David Starr Jordan*:

- Seabird thermosalinograph
- GPS time and position data in NEMA 0183 / RS232 format
- SCS acquisition for thermosalinograph and GPS data
- VHS radio for scientific communications with F/V *Outer Limits*
- Starboard hydro winch with ¼" cable for standard Bongo tows
- Port winch with .322" conductive cable
- J-frame w/block to accommodate .322" cable
- Winch monitoring system
- Knudsen 12 kHz depth recorder

MISCELLANEOUS: 1. At the completion of the cruise an inspection will be made of scientific working and berthing spaces by the Commanding Officer or his designated representative. The Scientific party is responsible for the condition and cleanliness of spaces assigned to the scientific party.

2. The Cruise Leader will hold a pre-cruise meeting aboard the vessel while the ship is enroute to the first survey area.

3. The Cruise Leader will hold a post-cruise meeting with the CO upon termination of the cruise.

4. NOAA Fleet Medical Policy requires that all scientific personnel embarking on NOAA vessels complete an SF-93 form, Report of Medical History.

5. All dates and times recorded will be in GMT.

PERSONNEL: Scientific personnel generally on R/V *David Starr Jordan*
David Demer Cruise Leader I (2/3-2/9) SWFSC
Eric Giddens Acoustic Oceanographer UCSD/SIO
Lara Asato Acoustic Technician SWFSC
Deanna Pinkard Cruise Leader II (2/9-2/22) SWFSC
Amy Hays Fishery Biologist SWFSC
Dimitry Abramenkoff Fishery Biologist SWFSC

Scientific personnel on F/V *Outer Limits*
John Butler Fishery Biologist SWFSC
Scott Mau Biological Technician SWFSC
David Murfin Biological Technician SWFSC

Contact Numbers:
David Demer (858) 546-5603 (wk)
John Butler (858) 546-7149 (wk); (858) 692-6397 (cell)

F/V *Outer Limits* (619) 972-1828 (cell); (877) 298-0735 (sat)

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: 0600-1800 and 1800-0600

OVERTIME: 256 hours (Authorized total per NMFS personnel)

NIGHT DIFF: 240 hours (Authorized total per NMFS personnel)

Date:

Prepared by:

Dr. David Demer and David Griffith
Fisheries Resources Division
SWFSC

Approved by:

Dr. William Fox
Science and Research Director
SWFSC

Figure 1. Cowcod survey plan. The Cowcod Conservation Area is grey and outlined in black. The planned survey waypoints and tracklines are in yellow. Potential ichthyoplankton stations are white dots with numbers.