

## **SR2008/CalCOFI 2010SR Cruise Instructions**

**Date Submitted:** 09/3/2020

**Platform:** R/V *Sally Ride*

**Project Number:** UNOLS SR2008; CalCOFI 2010SR

**Project Title:** CalCOFI Survey

**Project Dates:** October 11-26, 2020

**Prepared by:** Daniel Schuller and Ralf Goericke, Integrative Oceanography Division, Scripps Institution of Oceanography

### **I. Overview**

#### **A. Brief Summary and Project Period**

Survey the distributions and abundances of pelagic fish stocks, their prey, and their biotic and abiotic environments in the area of the California Current between San Diego, California and Avila Beach, California during the period of fall 2020.

#### **B. Operating Area**

From San Diego, CA to Avila Beach, CA and out 300 nautical miles. Please refer to 2010-schedule.pdf for CalCOFI Line and Sta name, coordinates, and predicted order. Please note that station order may change due to weather or naval operations.

#### **C. Summary of Objectives**

Survey the distributions and abundances of pelagic fish stocks, their prey, and their biotic and abiotic environments in the area of the California Current between San Diego, California and Avila Beach, California.

I.C.1. Continuously sample sea-surface temperature, salinity, and chlorophyll-a using a thermosalinograph. These data will be used to estimate the physical oceanographic habitats for target species.

I.C.2. Continuously sample air temperature, barometric pressure, and wind speed and direction using an integrated weather station.

I.C.3. Sample profiles of seawater temperature, salinity, chlorophyll-a, nutrients, and phytoplankton using a CTD with water-sampling rosette and other instruments at prescribed stations. Measurements of extracted chlorophyll and phaeophytin will be obtained with a fluorometer. Primary production will be measured as C<sup>14</sup> uptake in a six hour in situ incubation. Nutrients will be measured with an auto-analyzer. These data will be used to estimate primary productivity and the biotic and abiotic habitats for target species.

I.C.4. Sample the light intensity in the photic zone using a standard secchi disk once per day in conjunction with a daytime CTD station. These data will be used to interpret the measurements of primary production.

I.C.5. Sample plankton using a CalBOBL (CalCOFI Bongo Oblique) at prescribed stations. These data will be used to estimate the distributions and abundances of ichthyoplankton and zooplankton species.

I.C.6. Sample plankton using a Manta (neuston) net at prescribed stations. These data will be used to estimate the distributions and abundances of ichthyoplankton species.

I.C.7. Sample the vertically integrated abundance of fish eggs using a Pairovet net at prescribed stations. These data will be used to quantify the abundances and distributions of fish eggs.

I.C.8. Sample plankton using a PRPOOS (Planktonic Rate Processes in Oligotrophic Ocean Systems net) at all prescribed CalCOFI stations on lines 90.0, 86.7, 83.3 and 80.0 only. These data will be used in analyses by the LTER (Long Term Ecological Research) project.

I.C.9. Deployment of four expendable wave measuring buoys at the offshore end of CalCOFI lines.

#### D. Participating Institutions

I.D.1 Scripps Institution of Oceanography (SIO)

I.D.2 Southwest Fisheries Science Center (SWFSC)

#### E. Administrative

##### 1. Points of Contacts:

Chief Scientist: Ralf Goericke 858-534-7970, 9500 Gilman Dr, Dept 0206, La Jolla, CA, 92093 (rgoericke@ucsd.edu)

Alternate: Daniel Schuller 760-554-6287, 9500 Gilman Dr, Dept 0206, La Jolla, CA, 92093 (dschuller@ucsd.edu)

##### 2. Diplomatic Clearances N/A

##### 3. Licenses and Permits

- a. CDFW April 2, 2015 to NOAA-SWFSC-FRD-Cisco Werner (SC-12372)

## II. Operations

### A. COVID-19 PRE-EMBARKATION PROTOCOL

Please see SIO Covid-19 Preparednessplan.v10.pdf, SR2008-risk-assessment-signed.pdf and <https://scripps.ucsd.edu/ships/novel-coronavirus-covid-19-information-sio-research-vessels> for a full review of the SIO COVID-19 protocols.

In summary:

9/25/2020: Begin shelter in place. First COVID-19 test  
10/1/2020: Gear to Nimitz Marine Facility (MarFac) San Diego staged for mobilization  
10/3/2020: Second COVID-19 test prior to hotel check-in  
10/3/2020: 1600 begin self-isolation at Humphreys Half Moon Inn  
10/7/2020: Third COVID-19 test  
10/9/2020: Board RV Sally Ride and begin mobilization

All transportation, meals and lodging provided directly by SIO Ship Operations beginning at 1600 October 3, 2020. Please see Self-Isolation.Info\_.Humphreys.v2.2020-08-12.pdf for additional information.

### Project Itinerary

October 9 - 10: Load scientific gear aboard RV Sally Ride at MarFac

Oct 11 (Sunday) 0700: All cruise participants onboard

Oct 11 0800: Depart San Diego, CA

Oct 26 1600: Arrive San Diego, CA

Oct 27 0800: Unload RV Sally Ride at MarFac

### Staging and De-staging

Staging for CalCOFI requires 2 days. Final de-staging will be conducted in San Diego, CA (MarFac).

We request 2 laboratory vans to be craned onto the afterdeck and secured in San Diego prior to departure. The dimension of the CalCOFI van is approximately 8x10x8 feet weighing 6500 lbs. Dimension of GP van is approximately 8x20x8 feet weighing 8500 lbs. Power requirement is 110V for CalCOFI van and 440V 3-phase for GP van.

We request from SIO-STIS 1x 24-place rosette with full suite of sensors to be used as backup only.

## B. Operations to be conducted

### II.B.1. Underway Operations

II.B.1.a. Thermosalinograph sampling - RV Sally Ride will provide and maintain a thermosalinograph (TSG), which is calibrated and in working order, for continuous measurement of surface water temperature and salinity.

II.B.1.b. Expendable wave measuring drifter. Four expendable wave measuring drifters to be deployed at the offshore end of CalCOFI lines 93.3, 86.7, 80.0, 76.7. Drifters will be deployed by ship research or science technician as ship is coming up to speed steaming away from station.

### II.B.2. Station Operations

Each standard station will include the following:

II.B.2.a. CTD/Rosette consisting of 24 10-liter hydrographic bottles will be lowered to approximately 515 meters (depth permitting) at each station to measure physical parameters and collect water at discrete depths for analysis of: salinity, nutrients, oxygen, chlorophyll, etc.

II.B.2.b. CalBOBL (CalCOFI Bongo Oblique): standard oblique plankton tow with 300 meters of wire out, depth permitting, using paired 505  $\mu\text{m}$  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  $38^\circ$  or higher than  $51^\circ$  in the final 100 meters of wire will be repeated. Additionally, a  $45^\circ$  wire angle should be closely maintained during the ascent and descent of the net frame. The port side sample will be preserved in buffered ethanol at every station.

II.B.2.c. Manta net (neuston) tow: using a 505  $\mu\text{m}$  mesh net on a frame with a mouth area of 0.1333  $\text{m}^2$ . Tows are 15 minutes in duration at towing speed of approximately 1.5 - 2.0 knots. Wire angles should be kept between  $15^\circ$  and  $25^\circ$ .

II.B.2.d. Pairovet net: will be fished from 70 meters to the surface (depth permitting) using paired 25 cm diameter 150  $\mu\text{m}$  mesh nets at all stations out to and including station 70.0. The technical requirements for Pairovet tows are: 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  $15^\circ$  during the ascent will be repeated.

II.B.2.e. A PRPOOS (Planktonic Rate Processes in Oligotrophic Ocean Systems) net will be taken on specific stations on line 90.0, 86.7, 83.3, and 80.0. These stations are occupied as part of the LTER (Long Term Ecological Research) project. The mesh of the PRPOOS net is 202  $\mu\text{m}$  and the tow is a vertical cast up from 210 meters. The technical requirements for the PRPOOS tows are: Decent rate of 40 meters per minute, a terminal depth time of 20 seconds and an ascent rate of 50 meters per minute.

II.B.2.f. Primary productivity: at about 1100 hours on each day a primary productivity CTD cast consisting of six 10-liter hydrographic bottles (mounted on CTD frame) will be carried out. The cast arrangement will be determined by a Secchi disc observation. This cast will be in conjunction with an already scheduled station. The purpose of the cast is to collect water from six discrete depths for daily *in situ* productivity experiments. Measurements of extracted chlorophyll<sup>14</sup> and phaeophytin will be obtained with a fluorometer. Primary production will be measured as C uptake in a six hour *in situ* incubation. Nutrients will be measured with an auto-analyzer. All radioisotope work areas will be given a wipe test before the departure of the SIO technical staff.

II.B.2.g. A light meter (Secchi disk) will be used to measure the light intensity in the euphotic zone once a day with the primary productivity cast and all daytime stations.

II.B.2.h. Weather observations.

II.B.3.a. Order of Operations for each standard station:

- 1) CTD to 515 meters with 24 bottle rosette (depth permitting).
- 2) Secchi disk (daylight stations only, Secchi will be first prior to CTD on Primary Productivity station of the day which is typically 0900-1100).
- 3) PRPOOS net tow (lines 90.0, 86.7, 83.3 and 80.0 only).
- 4) Pairovet net tow (on all lines out to station 70.0 but not to include near shore SCCOOS).
- 5) Manta net tow (on all stations except for near shore SCCOOS and stations after line 76.7).
- 6) Bongo net tow (on all stations).

II.B.4.a.

Transit between stations at vessel speed of approximately 10 knots, weather permitting.

C. Applicable Restrictions Conditions which preclude normal operations:

In the event of poor weather conditions, we will work with the ship's officers on developing the best strategy for completion of all stations safely.

We have replacement gear for most operations. Equipment failure should not impact our project.

### **III. Equipment**

A. Equipment and Capabilities provided by the ship (itemized)

We request the following systems and their associated support services, sufficient consumables, back-up units, and on-site spares. All measurement instruments are assumed to have current calibrations and we request that all pertinent calibration information be included in the data package.

- Starboard aft hydro LARS with 3/8" cable and CalCOFI block for standard Bongo, Manta, Pairovet and PRPOOS tows
- Starboard forward LARS with EM cable for standard CTD casts
- Wet lab reefer set at  $2^{\circ}\text{C} \pm 1^{\circ}\text{C}$  ( $35^{\circ}\text{F} \pm 2^{\circ}\text{F}$ )
- Dry lab reefer secured, to be used as storage
- $-80^{\circ}\text{C}$  chest freezer in wet lab or dry lab
- Knudsen 12 kHz depth recorder or comparable
- 110V power to science van on main deck
- 440V power to GP van on main deck
- Meteorological science system
- Underway surface seawater system
- Deck fresh and saltwater

B. Equipment and Capabilities provided by the scientists (itemized)

- 37% Formalin (SWFSC) Ethanol (SWFSC)
- Tris buffer (SWFSC)
- Sodium borate (SWFSC)
- 30 cc and 50 cc syringes (SWFSC)
- Cannulas (SWFSC)
- Pint, quart and gallon jars (SWFSC)
- Inside and outside labels (SWFSC)
- CalCOFI net tow data sheets (SWFSC)
- 71 cm CalCOFI Bongo frames (SWFSC)
- 71 cm CalCOFI 505  $\mu\text{m}$  mesh nets (SWFSC)
- CalCOFI 150  $\mu\text{m}$  Pairovet nets and codends (SWFSC)
- CalCOFI Pairovet frames (SWFSC)
- 333  $\mu\text{m}$  mesh codends (SWFSC)
- Digital flowmeters (SWFSC) PRPOOS frames (SIO)
- 170 lb PRPOOS weight (SIO)
- 202  $\mu\text{m}$  mesh PRPOOS nets and codends (SIO)
- 75 lb Bongo weight (SWFSC)
- 100 lb hydro weight (SWFSC)
- CalCOFI Manta net frames (SWFSC)
- 60 cm CalCOFI 505  $\mu\text{m}$  mesh Manta nets (SWFSC)
- Standard CalCOFI tool boxes (SWFSC)
- Bucket thermometers and holders (SIO)
- Hand held inclinometer for Pairovet and Bongo tows (SWFSC)
- Oxygen auto-titration rig with reagents (SIO)
- Oxygen flasks (SIO)
- Guildline Portasal (SIO)
- Salinity bottles (SIO)
- Standard sea water (SIO)
- Data sheets for scheduled hydrographic work (SIO)
- Weather observation sheets (SIO)
- Primary productivity incubation rack (SIO)
- $^{14}\text{C}$  and other chemicals for primary productivity work (SIO)
- SBE911+ CTD unit with necessary sensors (SIO)
- Turner fluorometer (SIO)
- 90% acetone and all supplies for chlorophyll extraction (SIO)
- Nutrient auto analyzer (SIO)
- Chemicals for all nutrient analyses (SIO)
- Isotope van (SIO)

## **V. Additional Projects**

N/A

## **VI. Disposition of Data and Reports**

### **A. Data Responsibilities**

The Chief Scientist will receive all original data related to the project. The Chief Scientist will in turn furnish the Captain with a complete inventory listing of all data gathered by the scientific party, detailing types of operations and quantities of data prior to departing the ship **if requested**. All data gathered by the vessel's personnel that are desired by the Chief Scientist will be released to him, including supplementary data specimens and photos gathered by the scientific crew.

### **B. Pre and Post Project Meeting**

Prior to departure, the Chief Scientist will conduct a meeting of the scientific party to train them in sample collection and inform them of project objectives. Some vessel protocols, e.g., meals, watches, etiquette, etc. will be presented by the ship's Resident Technician and/or First Mate.

## **VII. Miscellaneous**

### **A. Meals and Berthing**

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the survey.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist will work on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Chief Scientist is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Chief Scientist is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

### **B. Shipboard Safety**

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also required when working with suspended loads.

Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

## **VII. Appendix**

### 1.a. Spill control plan

- 2 x 1/2 gallon of Safety Sorbent (<http://wyksorbents.com/anti-slip-safety-sorbent>) for radioisotope spills
- Sodium Bicarbonate (Arm & Hammer baking soda) 2 x 13.5 lbs bag for Acid Spills
- Portable Allwik Economy Spill Kit in Yellow Bag (<http://www.fastenal.com/web/products/detail.ex?sku=1007705>)
- Vinyl gloves 10+ boxes (50-100) count, multiple sizes
- Containment bags 3 rolls of 50 each
- Roll paper towels 12 each.

### 1.b. Additional Documentation

- 2010SR-schedule.pdf
- SIO Covid-19 Preparednessplan.v10.pdf
- SR2008-risk-assessment-signed.pdf
- Self-Isolation.Info\_.Humphreys.v2.2020-08-12.pdf