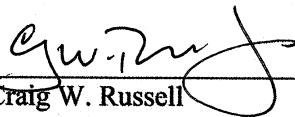




Project Instruction

Date Submitted: Monday March 21, 2011
Platform: NOAA Ship *Okeanos Explorer*
Project Number: EX-11-02
Project Title: Dockside ROV Integration (April 4 - 18, 2011)
ROV Shakedown Cruise (April 19 - 28, 2011)
Project Dates: April 19-28, 2011

Prepared by: Catalina Martinez
Expedition Coordinator
Office of Ocean Exploration & Research

Approved by:  Dated: 4/12/11
Craig W. Russell
Program Manager
Office of Ocean Exploration & Research

Approved by: _____ Dated: _____
Captain David A. Score, NOAA
Commanding Officer
Marine Operations Center – Atlantic

I. Overview

A. Project Period

This project plan covers the dockside integration of the new OER camera platform into *Okeanos Explorer* systems and ROV control room, as well as the subsequent shakedown cruise associated with performance and operation of this tandem system using the Institute for Exploration (IFE) Little Hercules ROV as the main vehicle.

B. Operating Area

The operating area will be offshore San Diego and in the vicinity of the Channel Islands.

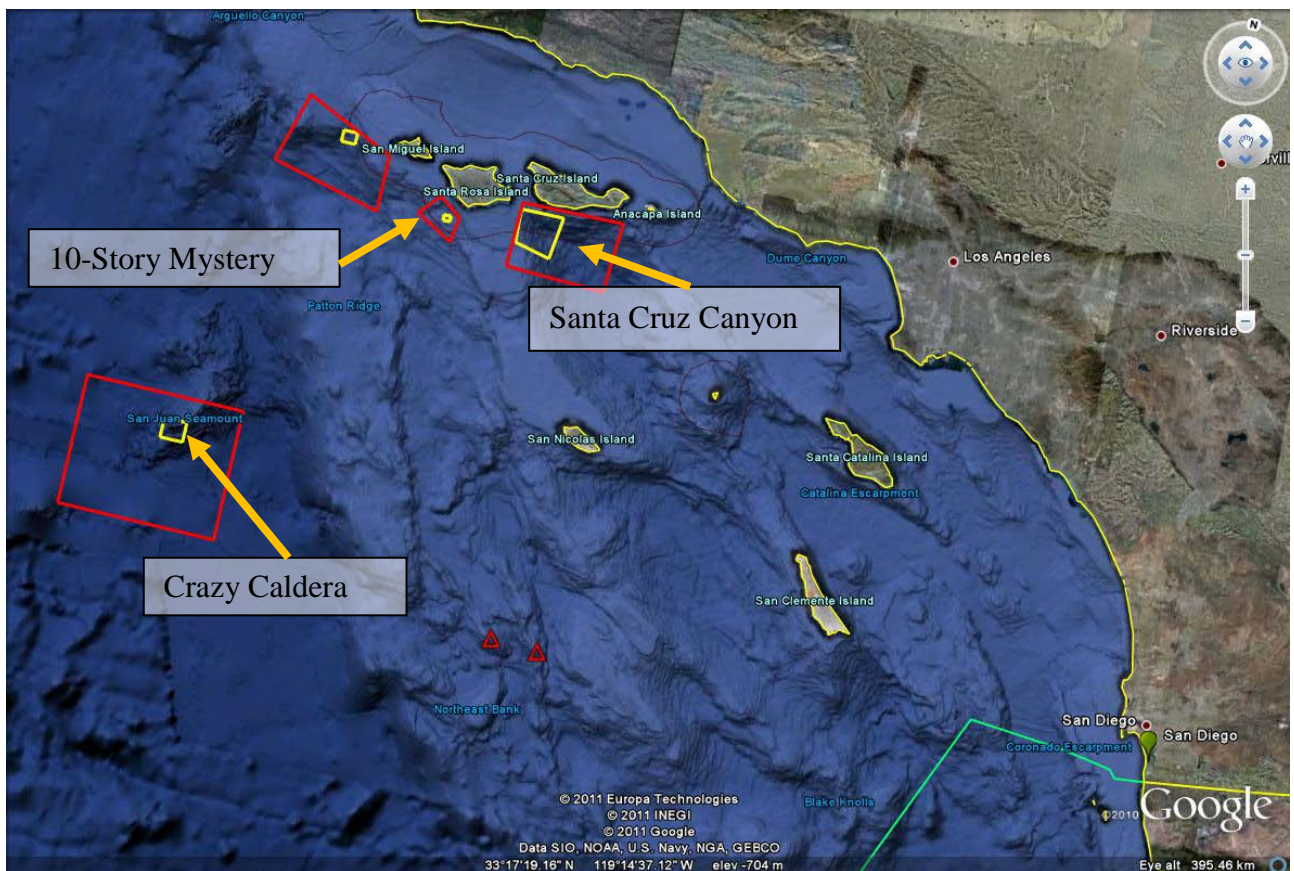


Figure 1. Operating areas in the vicinity of San Diego and the Channel Islands for potential dive site locations for the ROV test dives. Image created in GoogleEarth. Not for navigation.

The EX mapping team surveyed these targets during EX-11-01 to test the mapping systems and to prepare data for ROV dive target locations.

| Name | Category | Survey conducted during EX-11-01 | Longitude (W) | Latitude (N) | Depth(s) in meters (approx) |
|-----------------------------------|--------------------------------|------------------------------------|-----------------|-----------------|-----------------------------|
| San Juan Seamount / Crazy Caldera | CINMS | 100% coverage | See table below | See table below | 1800m - 3800m |
| Area West of San Miguel Island | CINMS deep water coral habitat | 100% coverage | See table below | See table below | 300m -2200m |
| “10 Story Building Mystery” | CINMS deep water coral habitat | 100% coverage | See table below | See table below | 100m -600m |
| Santa Cruz Canyon | CINMS deep water coral habitat | 100% coverage | See table below | See table below | 130m-1920m |
| Hancock Seamount | Seamount | Single pass or full survey if time | See table below | See table below | 300m -1250m |
| 109 Seamount | Seamount | Single pass or full survey if time | See table below | See table below | 370m -700m |

Table 1. EX-11-01 Survey Targets

Below are tables containing latitude / longitude coordinates for each survey area, including priorities within each larger area.

| Point ID | Longitude (W) | Latitude (N) |
|--|---------------|--------------|
| Large area – San Juan Seamount | | |
| NE corner | 120° 46’ 40” | 33° 06’ 06” |
| SE corner | 120° 46’ 35” | 32° 39’ 53” |
| SW corner | 121° 25’ 04” | 32° 40’ 05” |
| NW corner | 121° 25’ 10” | 33° 06’ 19” |
| Subarea – “Crazy Caldera” – highest priority | | |
| NE corner | 120° 59’ 23” | 33° 01’ 31” |
| SE corner | 120° 59’ 12” | 32° 57’ 40” |
| SW corner | 121° 04’ 48” | 32° 57’ 43” |
| NW corner | 121° 04’ 46” | 33° 01’ 39” |

Table 2: Lat/Longs of Southern San Juan Seamount / “Crazy Caldera” survey area

| Point ID | Longitude (W) | Latitude (N) |
|----------------------------|---------------|--------------|
| Large area | | |
| NE corner | 120° 27’ 39” | 34° 00’ 09” |
| SE corner | 120° 27’ 25” | 33° 48’ 52” |
| SW corner | 120° 53’ 58” | 33° 54’ 27” |
| NW corner | 120° 48’ 49” | 34° 08’ 14” |
| Subarea – highest priority | | |

| | | |
|-----------|--------------|-------------|
| NE corner | 120° 35' 59" | 34° 03' 04" |
| SE corner | 120° 36' 00" | 34° 00' 53" |
| SW corner | 120° 39' 20" | 34° 00' 51" |
| NW corner | 120° 39' 14" | 34° 03' 05" |

Table 3: Lat/Longs of Area West of San Miguel Island survey area

| Point ID | Longitude (W) | Latitude (N) |
|----------------------------|---------------|--------------|
| Large area | | |
| NE corner | 120° 08' 24" | 33° 51' 13" |
| SE corner | 120° 09' 16" | 33° 46' 24" |
| SW corner | 120° 18' 05" | 33° 50' 33" |
| NW corner | 120° 13' 47" | 33° 54' 41" |
| Subarea – highest priority | | |
| NE corner | 120° 10' 31" | 33° 51' 20" |
| SE corner | 120° 10' 31" | 33° 50' 16" |
| SW corner | 120° 12' 07" | 33° 50' 14" |
| NW corner | 120° 12' 08" | 33° 51' 20" |

Table 4: Lat/Longs of “10 Story Mystery” survey area

| Point ID | Longitude (W) | Latitude (N) |
|----------------------------|---------------|--------------|
| Large area | | |
| NE corner | 119° 31' 15" | 33° 57' 01" |
| SE corner | 119° 32' 03" | 33° 43' 07" |
| SW corner | 119° 55' 29" | 33° 44' 10" |
| NW corner | 119° 54' 44" | 33° 56' 55" |
| Subarea – highest priority | | |
| NE corner | 119° 45' 08" | 33° 55' 38" |
| SE corner | 119° 46' 23" | 33° 47' 22" |
| SW corner | 119° 54' 38" | 33° 49' 08" |
| NW corner | 119° 54' 53" | 33° 55' 35" |

Table 5: Lat/Longs of Santa Cruz Canyon survey area

| Point ID | Longitude (W) | Latitude (N) |
|----------------------------------|---------------|--------------|
| NE corner | 119° 27' 20" | 32° 35' 28" |
| SE corner | 119° 27' 20" | 32° 31' 42" |
| SW corner | 119° 32' 57" | 32° 31' 42" |
| NW corner | 119° 32' 57" | 32° 35' 28" |
| Seamount peak – highest priority | 119° 29' 31" | 32° 33' 20" |

Table 6: Lat/Longs of Hancock Seamount survey area

| Point ID | Longitude (W) | Latitude (N) |
|----------------------------------|---------------|--------------|
| NE corner | 119° 35' 19" | 32° 35' 11" |
| SE corner | 119° 35' 19" | 32° 30' 53" |
| SW corner | 119° 43' 46" | 32° 30' 53" |
| NW corner | 119° 43' 46" | 32° 35' 11" |
| Seamount peak – highest priority | 119° 40' 20" | 32° 33' 55" |

Table 7: Lat/Longs of 109 Seamount survey area

Below are screen grabs taken in Google Earth showing each survey area within the Channel Islands Marine National Sanctuary (CIMNS). Overall, survey areas of interest are indicated by a red box and the priority areas are indicated with a yellow box.

The targets “Crazy Caldera”, “10 Story Mystery”, and “Santa Cruz Canyon,” were chosen in partnership with the Office of National Marine Sanctuaries. Steve Katz, Research Coordinator for the Channel Islands National Marine Sanctuary will sail on EX 1102 as an observer and will provide guidance on dive targets as necessary.

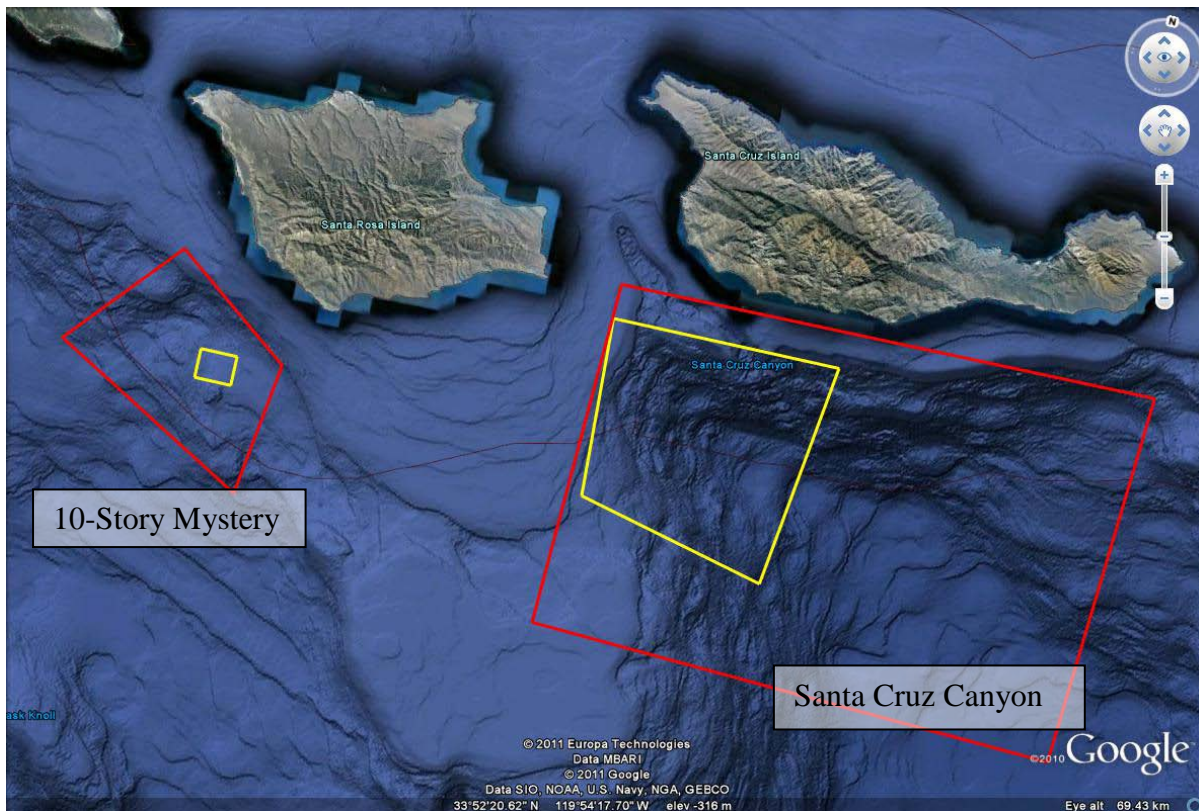
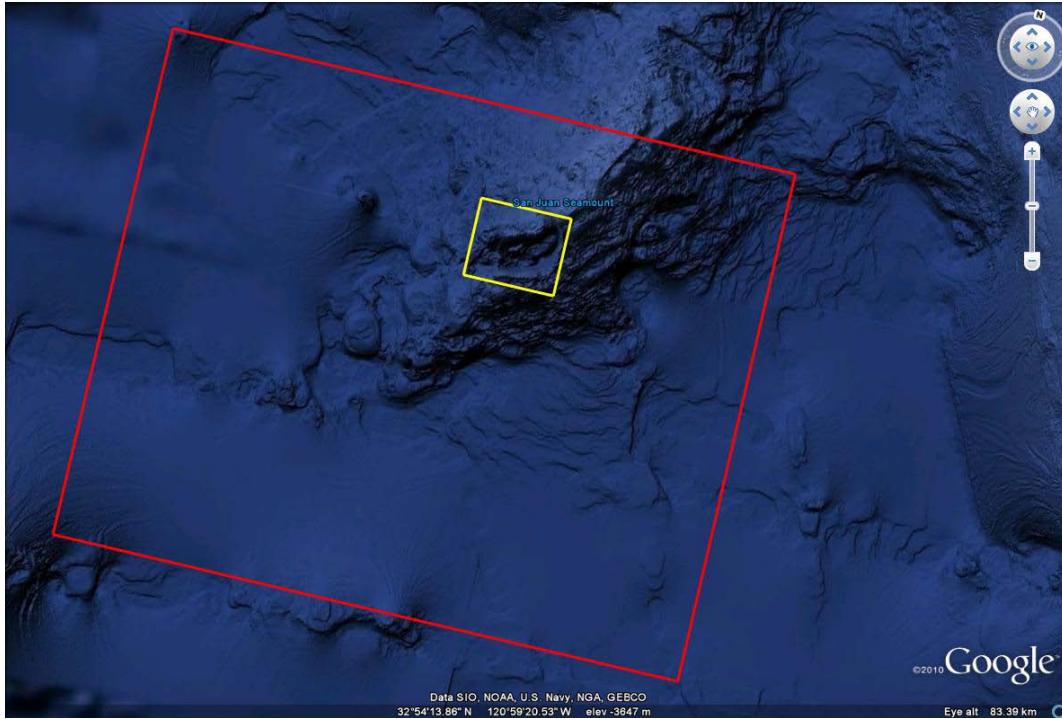


Figure 2. Closer images of the “10-Story Mystery” and Santa Cruz Canyon. Image created in GoogleEarth. Not for navigation.



*Figure 3. "Crazy Caldera" on San Juan Seamount.
Image created in GoogleEarth, not for navigation.*



*Figure 4. Two seamounts requested as mapping / ROV targets by
Peter Etnoyer for deep-water coral habitat identification.*

C. Summary of Objectives

ROV Integration period (April 4 - 18, 2011):

1. ROVs
 - a. *Okeanos Explorer* ROV systems preparation
 - b. Integrate new camera platform into ship systems and ROV control room
 - c. Conduct comprehensive integration system testing at dock
 - d. Perform camera platform and ROV testing over the side at dock sequentially, with the camera platform tested first as an independent system
 - e. Apply, develop and/or refine system checklists and SOP's
 - f. Ongoing familiarization and training
 - g. Refine communications protocols
 - h. Establish clear chain of command
2. Telepresence
 - a. Test VSAT connection (5 mb/sec ship to shore; 1544 kb/sec shore to ship)
 - b. Test all equipment and software
 - c. Test external network connections
 - d. Test URI audio connectivity to ship
 - e. Apply, develop, and/or refine system checklists and SOP's
 - f. Ongoing familiarization and training
 - g. Refine communications protocols and control room position descriptions based on any alterations to system configuration
3. Data management
 - a. See the Data Management Plan in Appendix B.
4. Ship
 - a. Test *Okeanos Explorer* ROV Support Systems
 - Deck equipment (A-frame, ROV Crane, Traction Winch, tuggers, etc.)
 - USBL System testing
 - b. Train deck crew in ROV launch and recovery ops at dock

ROV Shakedown (April 19-28, 2011)

1. ROV
 - a. Put Little Herc and camera platform through rigorous engineering tests to 4000 meters
 - b. Train pilots to take high quality images
 - c. Continue to apply, develop and/or refine system checklists, SOP's, spares lists, etc.
 - d. Continue to train ship's deck crew in ROV launch and recovery ops

- e. Train Junior Officers on the ROV Navigator Position
 - f. Develop contingency plans in the event of system failures
 - g. Ongoing system familiarization and training
 - h. Refine communications protocols
 - i. Establish chain of command
2. Telepresence (VSAT 5 mb/sec ship to shore; 1544 kb/sec shore to ship)
 - a. Observe and test VSAT
 - b. Test clearinghouse data transfer method
 - c. Test terrestrial links between ship and shore
 - d. Continue to apply, develop and/or refine system checklists, SOP's, spares lists, etc.
 - e. Develop contingency plans in the event of system failures
 - f. Ongoing system familiarization and training
 - g. Refine communications protocols and control room position descriptions
 - h. Refine and test information sharing protocols between ship and shore (EX Portal)
 3. Data management
 - a. See the Data Management Plan in Appendix B.
 4. Ship
 - a. Test bow thruster
 - b. Test A-frame and ROV crane
 - c. Continue training deck crew in live underway ROV launch and recovery operations in various sea and weather conditions
 - d. Support ROV operations
 - e. Continue to train bridge crew on ROV ops and use of DP
 - f. Develop list of necessary spares/consumables for all departments
 5. Mapping
 - a. The possibility of conducting mapping operations when the ROV is on deck is slight, and the projected level of operations could be accomplished with personnel on board.

D. Participating Institutions

National Oceanic and Atmospheric Administration – Office of Ocean Exploration and Research (OER) 1315 East-West Hwy, Silver Spring, Maryland 20910

National Oceanic and Atmospheric Administration – Office of National Marine Sanctuaries

University of New Hampshire (UNH), Center for Coastal and Ocean Mapping (CCOM)
Jere A. Chase Ocean Engineering Lab, 24 Colovos Road, Durham, NH 03824 USA

University Corporation for Atmospheric Research (UCAR), Joint Office for Science Support (JOSS) PO Box 3000 Boulder, CO 80307

E. Personnel (Science Party)

The staffing plans for each leg will be developed and submitted with the final cruise plan. Current drafts are subject to change. Assume all 19 mission berths will be utilized by OER mission personnel.

ROV Integration (April 4 – 18, 2011):

| Name | Affiliation | Role | M/F | Status |
|------------------|--------------------|--------------------------------|------------|---------------|
| Dave Lovalvo | OER | ROV Team Lead | M | US Citizen |
| Dave Wright | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Andy O'Brien | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Todd Gregory | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Brian Bingham | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Karl McLetchie | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Bobby Mohr | OER | ROV Pilot/Co-pilot | M | US Citizen |
| John Mefford | OER | ROV Nav/Mechanical Engineer | M | US Citizen |
| Tom Kok | OER | ROV Nav/Mechanical Engineer | M | US Citizen |
| Roland Brian | OER | ROV Video Engineer | M | US Citizen |
| Joe Biscotti | OER | ROV Video Engineer | M | US Citizen |
| Brian Brinkman | OER | ROV Video Engineer | M | US Citizen |
| Jeff Williams | OER | Data /Electrical Engineer | M | US Citizen |
| Gregg Diffendele | OER | Data /Video/Satellite Engineer | M | US Citizen |
| Webb Pinner | OER | Telepresence Lead | M | US Citizen |

Table 8: Full list of the science party and their affiliation for the ROV Integration

ROV Shakedown (April 19-28, 2011):

| Name | Affiliation | Role | M/F | Status |
|------------------|--------------------|--------------------------------|------------|---------------|
| Kelley Elliott | OER | Expedition Coordinator | F | US Citizen |
| Dave Lovalvo | OER | ROV Team Lead | M | US Citizen |
| Webb Pinner | OER | Telepresence lead | M | US Citizen |
| Dave Wright | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Andy O'Brien | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Todd Gregory | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Brian Bingham | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Karl McLetchie | OER | ROV Pilot/Co-pilot | M | US Citizen |
| Bobby Mohr | OER | ROV Pilot/Co-pilot | M | US Citizen |
| John Mefford | OER | ROV Nav/Mechanical Engineer | M | US Citizen |
| Tom Kok | OER | ROV Nav/Mechanical Engineer | M | US Citizen |
| Roland Brian | OER | ROV Video Engineer | M | US Citizen |
| Joe Biscotti | OER | ROV Video Engineer | M | US Citizen |
| Brian Brinkman | OER | ROV Video Engineer | M | US Citizen |
| Jeff Williams | OER | Data /Electrical Engineer | M | US Citizen |
| Gregg Diffendele | OER | Data /Video/Satellite Engineer | M | US Citizen |
| Steve Katz | ONMS | Science Observer | M | US Citizen |

Table 9: Full list of the science party and their affiliation for the ROV Shakedown

F. Administrative

Key Points of Contact

Ship Operations Marine Operations Center, Atlantic (MOA)
 439 West York Street
 Norfolk, VA 23510-1145
 Telephone: (757) 441-6776
 Fax: (757) 441-6495

Marine Operations Center, Pacific (MOP)
 1801 Fairview Avenue East
 Seattle, WA 98102-3767
 Telephone: (206) 553-4548
 Fax: (206) 553-1109

Chief, Operations Division, Atlantic (MOA)
 LCDR Jennifer Pralgo
 Telephone: 757-441-6716
 E-mail: ChiefOps.MOA@noaa.gov

Chief, Operations Division, Pacific (MOP)
 LCDR Demian Bailey
 Telephone: (206) 553-8705
 Email: ChiefOps.MOP@noaa.gov

Mission Operations

Dave Loyalvo, ROV Program Manager for NOAA
Eastern Oceanics
Phone: 203-246-5531
Email: eo@wispwest.com

CDR Robert Kamphaus, NOAA
Commanding Officer
NOAA Ship *Okeanos Explorer*
Phone: (401) 378-8284
Email: CO.Explorer@noaa.gov

LT Nicola VerPlanck, Field Operations Officer
NOAA Ship *Okeanos Explorer*
Phone: 321-960-3726
E-mail: ops.explorer@noaa.gov

Other Mission Contacts

Craig Russell, EX Program Manager
NOAA Ocean Exploration & Research
Phone: 206-526-4803 / 206-518-1068
E-mail: Craig.Russell@noaa.gov

John McDonough, Deputy Director
NOAA Ocean Exploration & Research
Phone: 301-734-1023 / 240-676-5206
E-mail: John.McDonough@noaa.gov

Meme Lobecker, Mapping Lead
NOAA Ocean Exploration & Research (ERT, Inc.)
Phone: 603-862-1475 / 301-938-8460
E-mail: elizabeth.lobecker@noaa.gov

Catalina Martinez, EX Expedition Coordinator
NOAA Ocean Exploration & Research
Phone: 401-874-6250 (o) / 401-330-9662 (c)
Email: Catalina.martinez@noaa.gov

Webb Pinner, Systems Engineer
NOAA Ocean Exploration & Research (2020, Inc.)
Phone: 401-749-9322
Email: webb.pinner@noaa.gov

LTjg Megan Nadeau, Incoming Ops Officer
NOAA Office of Ocean Exploration & Research
Phone: (401) 874-6150 (o) / (207) 240-0957 (c)
Email: Megan.Nadeau@noaa.gov

Shipments

Be sure to send an email to *Okeanos Explorer* Operations Officer OPS.Explorer@noaa.gov indicating the size and number of items being shipped and the name of person it is being shipped to.

For U.S. Postal Service mail (i.e letters):
NOAA Ship *Okeanos Explorer*
PO Box 368009 - PMB #165 - F
San Diego CA 92136-8009

For UPS or FedEx -- anything that needs a physical address:
NOAA Ship *Okeanos Explorer*
PMB #165 - F
c/o The UPS Store #3848

32nd Street Naval Base, Bldg 3187
San Diego CA 92136-8009

For large freight shipments* (i.e. anything bigger than a pallet) that need to be delivered directly to the ship use:

NOAA Ship Okeanos Explorer
Quay Wall North Pier 8
32nd Street Naval Base
San Diego CA 92136

* Clearance from the Navy is required for all large deliveries. Provide details to OPS-EX.

G. [Diplomatic Clearances](#)

NOT APPLICABLE TO THIS CRUISE

H. [Licenses and Permits](#)

Channel Islands National Marine Sanctuary requires a permit for the discharge of expendable bathythermographs (XBTs) throughout the CINMS in the event of possible multibeam survey work and for ROV operations in the CINMS to account for any possibility of accidental impact to the bottom. See Appendix D.

II. Operations

A. Cruise Plan Itinerary

ROV Integration (April 4 - 18, 2011):

All ROV related shipboard systems will be prepared and tested during this time. Comprehensive integration testing will occur prior to initiating sequential deck testing of the two vehicles. On deck functionality tests will be conducted on the camera platform first, and then on the Little Hercules vehicle. Before beginning pier-side in-water vehicle testing, the vehicle systems shall be fully operational on deck, all compensator circuits connected, charged and leak checked, and all hydraulic lines connected, charged and leak checked.

Pier-side in-water vehicle testing will begin at the surface and will then be performed below the surface.

| Dates | Location | ROV ops | Telepresence/VSAT | Ship |
|-----------------------------|------------------|---|---|---|
| IN PORT 4/2-4/6 | San Diego, CA | EX ROV systems prep and integration | Test equipment and software; test VSAT connection | Support ROV systems prep and integration efforts |
| IN PORT 4/7-4/11 | San Diego, CA | ROV integration; integration testing; potential training | Support ROV integration and testing | Test ROV support systems; Support ROV integration and testing |
| IN PORT 4/12-4/18 | San Diego, CA | Sequential ROV testing on deck and over the side at dock; potential training | Support ROV and camera platform testing | Support ROV and camera platform testing; Potential Deck crew training in ROV launch and recovery ops |

Table 10: Draft table of activities for ROV Integration

ROV Shakedown (April 19 - 28, 2011):

Upon successful completion of pier-side in-water vehicle tests, the ship will transit to a pre-determined dive site to initiate operational system tests of vehicles. The camera platform will be tested first as an independent towed vehicle, and its utility will be evaluated in this mode. The Little Herc vehicle will be added for sequential testing once the camera platform tests out successfully. ROV dives will be conducted in shallow and deep water for comprehensive operational system checks of all systems and support equipment. Deck crew will be trained on launch and recovery procedures, and training will be ongoing for ROV positions in the control room. Training will begin for ROV pilots and video engineers on capturing the highest possible image quality during dives.

| Dates | Location | ROV ops | Telepresence/VSAT | Ship |
|---------------|---|--|--|-----------------------------------|
| 4/19 | Depart San Diego and transit to 1st dive site | ROV prep; familiarization and training | Test VSAT connection; familiarization and training | Transit |
| 4/20- 4/25 | Dive sites chosen from EX-11-01 | Continue ROV system tests; ROV dives; ongoing familiarization and training | Support ROV ops and training; control room familiarization and training; test clearinghouse protocols | Support ROV ops and testing |
| 4/26- 4/28 | Transit back to San Diego | Prepare vehicles and support systems for future cruise | Prepare all systems for future cruise | Prepare ship for future cruise |

Table 11: Draft table of activities for ROV Shakedown

B. Staging and de-staging:

The new camera platform is scheduled to arrive in San Diego on Thursday, April 7, along with additional equipment and spare parts for the EX ROV program. A crane is needed at the dock at ~1300 to remove the 20' container from the flatbed. The ship will determine whether the Navy facility in San Diego can provide an appropriate crane or if one must be brought in for this effort.

Fully loaded with equipment, the container weighs approximately 12,000 lbs; when the container is empty, it weighs approximately 5160 lbs. A forklift with long forks (5-6' plus) is desirable for offloading the 20' container. If this is not available, the ship's crane can be used to remove the camera platform. The ship's crane will be needed to lift all items from the dock to the aft deck of the ship. This can be done on April 7th or 8th depending on time and personnel available.

Once on board, the camera platform will be located under the A-frame where it will be setup and connected to the .68 cable. The transformer may have to be temporarily removed from the camera platform for re-tapping and the ship's cranes may be needed to accomplish this. This will be determined when personnel arrive and start integration. The ROV PDU transformer will also need to be re-tapped down in the winch room. No special equipment or personnel will be required. All equipment once on board is expected to stay on board and no de-staging is anticipated.

As the ROV program has outgrown the current storage space available on the ship, the 20' container has been purchased by OER and will need to be installed on the 02 deck for the duration of the field season. This can be done anytime between April 8th and April 17th depending on time and personnel available. When the ship arrives in RI at the home port facility in October 2011, the container will be removed from the ship and outfitted with shelving for spares inventory and storage on further cruises in 2012 and beyond.

C. Dive Plan (SCUBA)

NOT APPLICABLE TO THIS CRUISE

D. Applicable Restrictions

NOT APPLICABLE TO THIS CRUISE

III. Equipment

A. Equipment and capabilities provided by the ship

- Kongsberg Simrad EM302 Multibeam Echosounder (MBES)
- Kongsberg Simrad EA600 Deepwater Echosounder (SBES)
- Knudsen 3260 Sub-bottom profiler (SBP)
- LHM Sippican XBT (various probes)
- Seabird SBE 911Plus CTD
- Seabird SBE 50 CTD Stand
- CNAV GPS
- POS/MV
- Seabird SBE-45 (Micro TSG)
- Kongsberg Dynamic Positioning-1 System

- NetApp mapping storage system
- CARIS HIPS Software
- IVS Fledermaus Software
- SIS Software
- Hypack Software
- Scientific Computing System (SCS)
- ECDIS
- Met/Wx Sensor Package
- Telepresence System
- VSAT High-Speed link (OER to arrange high speed bandwidth)
- Cruise Information Management System (CIMS)
- Little Hercules ROV
- Camera Platform (to be delivered on April 7th)

B. Equipment and capabilities provided by the scientists

NOT APPLICABLE TO THIS CRUISE

IV. Hazardous Materials

A. [Policy and Compliance](#)

NOT APPLICABLE TO THIS CRUISE

B. [Radioactive Isotopes](#)

NOT APPLICABLE TO THIS CRUISE

C. Inventory

NOT APPLICABLE TO THIS CRUISE

V. Additional Projects

A. Supplementary ("Piggyback") Projects

NOT APPLICABLE TO THIS CRUISE

B. NOAA Fleet Ancillary Projects

NOT APPLICABLE TO THIS CRUISE

VI. Disposition of Data and Reports

A. Data Responsibilities

All data acquired on *Okeanos Explorer* will be provided to the public archives without proprietary rights. All data management activities shall be executed in accordance with NAO 212-15, Management of Environmental and Geospatial Data and Information [http://www.corporateservices.noaa.gov/ames/NAOs/Chap_212/naos_212_15.html].

Ship Responsibilities

The Commanding Officer is responsible for all data collected for missions until those data have been transferred to mission party designees. Data transfers will be documented on NOAA Form 61-29. Reporting and sending copies of project data to NESDIS (ROSCOP form) is the responsibility of OER.

NOAA OER Responsibilities

The Expedition Coordinator will work with the *Okeanos Explorer* Operations Officer to ensure data pipeline protocols are followed for final archive of all data acquired on the EX without proprietary rights.

Deliverables

- a. At sea
 - Daily plans of the Day (POD)
 - Daily situation reports (SITREPS)
- b. Post cruise
 - Refined SOPs for all pertinent operational activities
 - Assessments of all activities
- c. Science
 - Multibeam and XBT raw and processed data
 - Mapping report
 - ROV deliverables
 - Dive tracks
 - Image
 - HD footage

Archive

- The Program and ship will work together to ensure documentation and stewardship of acquired data sets in accordance with NAO 212-15. The Cruise Information Management System is the primary tool used to accomplish this activity.

B. [Pre and Post Cruise Meeting](#)

Pre-Cruise Meeting

Prior to departure, the Expedition Coordinator will conduct a meeting of the scientific party to inform them of cruise objectives. Some vessel protocols, e.g., meals, watches, etiquette, etc. will be presented by the ship's Operations Officer.

Post-Cruise Meeting

Upon completion of the cruise, a meeting will be held (unless prior alternate arrangements are made) and attended by the ship Survey Technicians, the Expedition Coordinator and members of the scientific party to review the cruise. Concerns regarding safety, efficiency, and suggestions for improvements for future cruises should be discussed.

Shipboard Meetings

Daily Operations Briefing meetings will be held at 1500 in the forward lounge to review the current day, and define operations, associated requirements and staffing needs for the following day. A Plan of the Day (POD) will be posted each evening for the next day in specified locations throughout the ship. A safety brief and overview of POD will occur on the Bridge each morning at 0800. Daily Situation Reports (SITREPS) will be posted as well and shared daily through e-mail and/or the EX PLONE site (<http://terra.gso.uri.edu/NOAAShipOkeanosExplorer>).

C. [Ship Operation Evaluation Report](#)

Within seven days of the completion of the cruise, a Ship Operation Evaluation form is to be completed by the Expedition Coordinator. The preferred method of transmittal of this form is via email to OMAO.Customer.Satisfaction@noaa.gov. If email is not an option, a hard copy may be forwarded to:

Director, NOAA Marine and Aviation Operations
NOAA Office of Marine and Aviation Operations
8403 Colesville Road, Suite 500
Silver Spring, MD 20910

VII. **Miscellaneous**

A. [Meals and Berthing](#)

Meals and berthing are required for up to 19 scientists. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the cruise, and ending two hours after the termination of the cruise. 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 twenty one days prior to the survey (e.g., Expedition Coordinator is allergic to fin fish).

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Expedition Coordinator. The Expedition Coordinator and Operations Officer will work together 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 Expedition Coordinator 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 Expedition Coordinator is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the cruise and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Expedition Coordinator will ensure that all non-NOAA or non-Federal scientists aboard also have proper orders. It is the responsibility of the Expedition Coordinator to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. [Medical Forms and Emergency Contacts](#)

The NOAA Health Services Questionnaire (NHSQ, Revised: 08/08) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Expedition Coordinator or the NOAA website at [NOAA HEALTH SERVICES QUESTIONNAIRE](#). The completed form should be sent to the Regional Director of Health Services at Marine Operations Center. The participant can mail, fax, or scan the form into an email using the contact information below. The NHSQ should reach the Health Services Office no later than 4 weeks prior to the cruise to allow time for the participant to obtain and submit additional information that health services might require before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of the NHSQ. Be sure to include proof of tuberculosis (TB) testing, sign and date the form, and indicate the ship or ships the participant will be sailing on. Clearances are valid for 2 years for personnel under age 50 and 1 year for age 50 and over. All PPD's expire after one year from the date of administration. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757.441.6320
Fax 757.441.3760
E-mail: MOA.Health.Services@noaa.gov

Please make sure the medical.explorer@noaa.gov email address is cc'd on all medical correspondence.

Prior to departure, the Expedition Coordinator must provide a listing of emergency contacts to the Operations Officer for all members of the scientific party, with the following information: name, address, relationship to member, and telephone number.

Emergency contact form is included as Appendix A.

C. [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.

Operational Risk Management: For every operation to be conducted aboard the ship (NOAA-wide initiative), risk management procedures will be followed. For each operation, risks will be identified and assessed for probability and severity. Risk mitigation strategies / measures will be investigated and implemented where possible. After mitigation, the residual risk will have to be assessed to make Go-No Go decisions for the operations. Particularly with new operations, risk assessment will be ongoing and updated as necessary. This does not only apply to over-the-side operations, but to everyday tasks aboard the vessel that pose risk to personnel and property.

- CTD (and other pertinent) ORM documents will be followed by all personnel working on board *Okeanos Explorer*
- All personnel on board are in the position of calling a halt to operations/activities in the event of a safety concern.

D. [Communications](#)

A daily situation report (SITREP) on operations prepared by the Expedition Coordinator will be relayed to the program office. Sometimes it is necessary for the Expedition Coordinator to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Expedition Coordinator upon request, in order to conduct official business. The ship's primary means of communication with the Marine Operations Center is via e-mail and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30 day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required it must be arranged at least 30 days in advance.

Specific information on how to contact the NOAA Ship *Okeanos Explorer* and all other fleet vessels can be found at: <http://www.moc.noaa.gov/phone.htm>

Important Telephone and Facsimile Numbers and E-mail Addresses

Ocean Exploration and Research (OER):

OER Program Administration:

Phone: (301) 734-1010

Fax: (301) 713-4252

E-mail: Firstname.Lastname@noaa.gov

University of New Hampshire, Center for Coastal and Ocean Mapping

Phone: (603) 862-3438

Fax: (603) 862-0839

NOAA Ship *Okeanos Explorer* - Telephone methods listed in order of increasing expense:

Okeanos Explorer Cellular:

Ship (401) 932-4114

OOD (401) 378-7414

Okeanos Explorer Iridium: (808) 659-9179

Okeanos Explorer INMARSAT B

Line 1: 011-872-764-852-328

Line 2: 011-872-764-852-329

Voice Over IP (VoIP) Phone: 301-713-7772

E-Mail: Ops.Explorer@noaa.gov (mention the person's name in SUBJECT field)

expeditioncoordinator.explorer@noaa.gov - For dissemination of all hands emails by Expedition Coordinator while on board. See ET for password.

E. [IT Security](#)

Any computer that will be hooked into the ship's network must comply with the NMAO Fleet IT Security Policy prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

1. Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.
2. Installation of the latest critical operating system security patches.
3. No external public Internet Service Provider (ISP) connections.

Completion of these requirements prior to boarding the ship is preferable.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA's IT Security Awareness Course within 3 days of embarking.

F. [Foreign National Guests Access to OMAO Facilities and Platforms](#)

NOT APPLICABLE TO THIS CRUISE

Appendix A

**EMERGENCY DATA SHEET
NOAA OKEANOS EXPLORER**

PRINT CLEARLY

NAME: _____
(Last, First, Middle)

Mailing Address _____

(Other than the ship address)

Phone (Home) _____
(Cell) _____

Date of Birth _____

Emergency Contact: _____
(Name and Relationship)

Address: _____

Phone (Home) _____
(Work) _____
(Cell) _____

Email: _____

Signature _____ Date _____

Appendix B

Data Management Plan

Document Purpose

This document is an addendum to the overarching Okeanos Explorer FY11 Data Management Plan (EX_FY11_DMP.doc) and is specific to the EX-11-02 mission entitled “Dockside ROV Integration and ROV Shakedown.” For more detailed information on the data management effort for the Okeanos Explorer in FY11, please refer to that document.

Data Management Overview

In its second mission of the FY11 field season, the *Okeanos Explorer* (EX) will perform shakedown exercises of its new camera platform, “*Seirios*”, working in tandem with the Institute for Exploration (IFE) Little Hercules ROV in targeted areas off the coast of southern California and near the Channel Islands.

Assumptions

All data from all sites identified in the EX-11-02 Project Instructions is publicly releasable. No protected sites have been identified.

EX-11-02

- ❖ *Dockside ROV Integration (April 4 – April 18, 2011)*
- ❖ *ROV Shakedown (April 19 – April 28, 2011)*

Data Management Objectives

The DMT’s objectives for this mission are:

- *Dockside ROV Integration (April 4 - 18, 2011)*
 - Toward the end of the dockside integration period, it is anticipated that test data files from the new cameras may be staged for retrieval from the URI SRS. If so, these files will be used to test the video pipeline, including documentation and throughput to the data centers for archive and VDMS access.
- *ROV Shakedown (April 19 – 28, 2011)*
 - During the mission:
 - Continue to test the new folder structure and file naming conventions defined during the off-season to streamline data flow and metadata generation.
 - Review and refine Standard Operating Procedures (SOP) for Data Management efforts.
 - Ensure the near real-time update of the *Okeanos Atlas* with
 - Ship track and hourly observations received via email.
 - ROV dive tracks from new kml format
 - ROV and Camera Sled images linked to dive tracks

- CTD launch sites and profiles received via URI SRS. DMT will post-process and thin the profiles for quicker display on the site.
 - Daily logs pulled from URI through RSS feeds and links to related images on oceanexplorer.noaa.gov website.
 - Daily cumulative bathymetric image overlays received via URI SRS.
 - Test new ship track KML received via URI SRS.
 - Cross train backup personnel in SOPs.
- Post-Mission:
 - Test video pipeline and the Video Metadata System (ViMS) for generation of video and image metadata in MARC for the NOAA Central Library.
 - Based on results from EX1101 testing, refine and retest bathymetric data pipeline as needed.
 - Based on results from EX1101 testing, refine and retest oceanographic data pipeline as needed.
 - Based on results from EX1101 testing, refine and retest ISO metadata transforms for cruise-level metadata.

Expedition Principals for Data Management

Kelley Elliott, OER Expedition Coordinator

Webb Pinner, OER Telepresence, EX Data and Information Lead

Sharon Mesick, NCDDC, Federal Program Manager, IPT Chair

Susan Gottfried, NCDDC, OER Data Management Coordinator

Andrew Navard, NCDDC, Near Real-Time GIS Applications

McKinley Freeman, NCDDC, Data Pipeline Software Developer

Denise Gordon, NCDDC, Data Organization and Metadata Processing

Appendix C
Categorical Exclusion for NOAA Ship *Okeanos Explorer*

MEMORANDUM FOR: The Record

FROM: John McDonough
Deputy Director NOAA Office of Ocean Exploration

SUBJECT: Categorical Exclusion for NOAA Ship *Okeanos Explorer*
cruise EX1102

NAO 216-6, Environmental Review Procedures, requires all proposed projects to be reviewed with respect to environmental consequences on the human environment. This memorandum addresses the NOAA Ship *Okeanos Explorer's* scientific sensors possible affect on the human environment.

Description of Projects

This project will conduct remotely operated vehicle (ROV) operations and ocean mapping activities designed to increase knowledge of the marine environment. This project is entitled "EX1102 ROV Shakedown" and will be led by David Lovalvo, a contractor and ROV Team Lead for the *Okeanos Explorer* program within OER, and Kelley Elliott, also a contractor sailing as Expedition Coordinator for OER. The work will be conducted in April offshore from California, at various locations between San Francisco and San Diego. A tandem 4,000 meter ROV system will be deployed and tested during this cruise, and there is a slight possibility that the Kongsberg EM 302 multibeam system might be operated for a brief time during the project. Additionally, expendable BathyThermograph (XBT) and CTD operations might be conducted if multibeam data is acquired.

Effects of the Projects

As ocean research with limited time or presence in the marine environment this project will not have the potential for significant impacts. Knowledgeable experts who are aware of the sensitivities of the marine environment will conduct the at-sea portions of these projects.

Categorical Exclusion

This project would not result in any changes to the human environment. As defined in Sections 5.05 and 6.03.c.3 (a) of NAO 216-6, these are research projects of limited size or magnitude or with only short-term effects on the environment and for which any cumulative effects are negligible. As such, this project is categorically excluded from the need to prepare an Environmental Assessment.

Signed: _____ Date: _____
John McDonough, Deputy Director

Appendix D
Channel Islands National Marine Sanctuary Permit



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Channel Islands National Marine Sanctuary
113 Harbor Way
Santa Barbara, CA 93109

April 8, 2011

Ms. Megan Nadeau
NOAA Office of Ocean Exploration and Research
215 South Ferry Road
Narragansett, RI 02882

Dear Ms. Nadeau:

The National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries (ONMS) has approved the issuance of permit number CINMS-2011-001 to conduct activities within Channel Islands National Marine Sanctuary (sanctuary) for research purposes. Activities are to be conducted in accordance with the permit application and all supporting materials submitted to the sanctuary, and the terms and conditions of permit number CINMS-2011-001 (enclosed).

This permit is not valid until signed and returned to the ONMS. Retain one signed copy and carry it with you while conducting the permitted activities. Additional copies must be signed and returned, by either mail or email, to the following individuals within 30 days of issuance and before commencing any activity authorized by this permit:

Dani Lipski
Research Specialist
Channel Islands National Marine Sanctuary
113 Harbor Way
Santa Barbara, CA 93109
Danielle.Lipski@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
nmspermits@noaa.gov

Your permit contains specific terms, conditions and reporting requirements. Review them closely and fully comply with them while undertaking permitted activities.

If you have any questions, please contact Dani Lipski at 805-966-7107. Thank you for your continued cooperation with the ONMS.

Sincerely,

Christopher Mobley
Superintendent

Enclosure





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Channel Islands National Marine Sanctuary
113 Harbor Way
Santa Barbara, CA 93109

**CHANNEL ISLANDS NATIONAL MARINE SANCTUARY
RESEARCH PERMIT**

Permittee:

Ms. Megan Nadeau
NOAA Office of Ocean Exploration and Research
215 South Ferry Road
Narragansett, RI 02882

Permit Number: CINMS-2011-001

Effective Date: April 19, 2011

Expiration Date: April 30, 2011

Project Title: NOAA Ship Okeanos Explorer Cruise EX1102

This permit is issued for activities in accordance with the National Marine Sanctuaries Act (NMSA), 16 USC §1431 *et seq.*, and regulations thereunder (15 CFR Part 922). All activities must be conducted in accordance with those regulations and law. No activity prohibited in 15 CFR Part 922 is allowed except as specified in the activity description below.

Subject to the terms and conditions of this permit, the National Oceanic and Atmospheric Administration (NOAA), Office of National Marine Sanctuaries (ONMS) hereby authorizes the permittee listed above to conduct research activities within Channel Islands National Marine Sanctuary (CINMS or sanctuary). All activities are to be conducted in accordance with this permit and the permit application received March 22, 2011. The permit application is incorporated into this permit and made a part hereof; provided, however, that if there are any conflicts between the permit application and the terms and conditions of this permit, the terms and conditions of this permit shall be controlling.

Permitted Activity Description:

The following activities are authorized by this permit:

The permittee is authorized to discharge XBTs into CINMS.

No further violation of sanctuary regulations is allowed.

Permitted Activity Location:

The permitted activity is allowed only in the following location(s):

Two target areas have been identified in CINMS: Santa Cruz Canyon on the south side of Santa Cruz Island, and "10-story Mystery" on the south side of Santa Rosa. Coordinates are available in cruise plan.



Special Terms and Conditions:

1. All authorized activities may be conducted from April 19, 2011 through April 30, 2011. The permittee may request an amendment from the CINMS Superintendent in advance of this expiration date, to extend the effective date of this permit.
2. Permitted activities shall include the discharge of expendable bathythermographs (XBTs), which are expendable, degradable equipment necessary to conduct research, and cannot be practicably retrieved.
3. The equipment and support structures authorized by this permit shall be used in accordance with the methods and objectives identified in the permit application and Special Conditions included here. Disturbance of any other sanctuary resources is prohibited.
4. No activity authorized by this permit shall disturb or impact any historical or marine archaeological resources of the sanctuary. If historical or marine archaeological resources are encountered at any time, the permittee shall cease all further activities under this permit and immediately contact the CINMS Superintendent.
5. All equipment and instruments deployed (except XBTs as in special condition #2 above) must be recovered, brought to the surface and stored or disposed of properly ashore. At no time may hazardous materials (e.g., batteries) be exposed to the sea or discarded within the sanctuary.
6. If sanctuary staff concludes that permitted activities are in danger of creating a disturbance to natural resources of the CINMS, the permit holder shall be immediately notified and the project shall be suspended, altered, or postponed to eliminate disturbance of such natural resources.
7. The permittee shall submit a final report of all activities conducted under this permit to the CINMS (see contact in general condition #1) no later than **May 31, 2011**. The report should include a summary of activities and information regarding daily activities such as location (latitude and longitude) of surveys, deployments, or samples, discovery or disturbance of historical artifacts, problems encountered, equipment lost, etc. The annual report shall also include a synopsis of research results to date.
8. The permittee shall provide the location (latitude and longitude using GPS) of each survey location or XBT deployment to the CINMS Research Department. Coordinates shall be submitted electronically in a table or spreadsheet format.
9. Abandonment of equipment or any item not otherwise permitted is prohibited. In the event that any equipment is damaged or dislocated due to weather or any other cause, the permittee shall use all available means to locate and recover the affected item(s). The location and description of any equipment abandoned or lost in the sanctuary for any reason shall be noted in the summary report (see Special Condition #7) with an explanation why the equipment was not recovered.

10. The permittee may be required to pay any or all expenses associated with the locating of and/or removal by NOAA or its designee of any equipment that is not recovered by the permittee.
11. This activity may also require permission from other agencies. The enclosed permit is not valid until all other necessary permits and/or authorizations are obtained. Any direct or incidental harassment of marine mammals requires a permit from the National Marine Fisheries Service (contact Monica DeAngelis at 562-980-3232) and/or U.S. Fish and Wildlife Service (contact Douglass Cooper at 805-644-1766). Direct or incidental harassment of seabirds requires a permit from the U.S. Fish and Wildlife Service. Deployment of mooring or surface buoys may require authorization from the US Coast Guard (contact Sector LA/LB Command Center 310-521-3801). Research conducted within California state waters or California State marine protected areas (MPA) may require permission from the California Department of Fish and Game (contact Brian Owens at BOwens@dfg.ca.gov). Permission to drill into rock or install devices may require permission from the California State Lands Commission (contact Grace Kato 916-574-1227).

General Terms and Conditions:

1. Within 30 (thirty) days of the date of issuance, the permittee must sign and date this permit for it to be considered valid. Once signed, the permittee must send copies, via mail or email, to the following individuals:

Dani Lipski
Research Specialist
Channel Islands National Marine Sanctuary
113 Harbor Way
Santa Barbara, CA 93109
Danielle.Lipski@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
nmspermits@noaa.gov

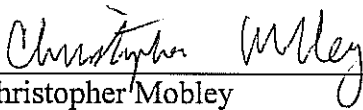
2. It is a violation of this permit to conduct any activity authorized by this permit prior to the ONMS having received a copy signed by the permittee.
3. This permit may only be amended by the ONMS. The permittee may not change or amend any part of this permit at any time. The terms of the permit must be accepted in full, without revision; otherwise, the permittee must return the permit to the sanctuary office unsigned with a written explanation for its rejection. Amendments to this permit must be requested in the same manner the original request was made.
4. All persons participating in the permitted activity must be under the supervision of the permittee, and the permittee is responsible for any violation of this permit, the NMSA, and sanctuary regulations for activities conducted under, or in junction with, this permit. The permittee must assure that all persons performing activities under this permit are fully aware of the conditions herein.

5. This permit is non-transferable and must be carried by the permittee at all times while engaging in any activity authorized by this permit.
6. This permit may be suspended, revoked, or modified for violation of the terms and conditions of this permit, the regulations at 15 CFR Part 922, the NMSA, or for other good cause. Such action will be communicated in writing to the applicant or permittee, and will set forth the reason(s) for the action taken.
7. This permit may be suspended, revoked or modified if requirements from previous ONMS permits or authorizations issued to the permittee are not fulfilled by their due date.
8. Permit applications for any future activities in the sanctuary or any other sanctuary in the system by the permittee might not be considered until all requirements from this permit are fulfilled.
9. This permit does not authorize the conduct of any activity prohibited by 15 CFR § 922, other than those specifically described in the "Permitted Activity Description" section of this permit. If the permittee or any person acting under the permittee's supervision conducts, or causes to be conducted, any activity in the sanctuary not in accordance with the terms and conditions set forth in this permit, or who otherwise violates such terms and conditions, the permittee may be subject to civil penalties, forfeiture, costs, and all other remedies under the NMSA and its implementing regulations at 15 CFR Part 922.
10. Any publications and/or reports resulting from activities conducted under the authority of this permit must include the notation that the activity was conducted under National Marine Sanctuary Permit CINMS-2011-001 and be sent to the ONMS officials listed in general condition number 1.
11. This permit does not relieve the permittee of responsibility to comply with all other federal, state and local laws and regulations, and this permit is not valid until all other necessary permits, authorizations, and approvals are obtained. Particularly, this permit does not allow disturbance of marine mammals or seabirds protected under provisions of the Endangered Species Act, Marine Mammal Protection Act, or Migratory Bird Treaty Act. Authorization for incidental or direct harassment of species protected by these acts must be secured from the U.S. Fish and Wildlife Service and/or NOAA Fisheries, depending upon the species affected.
12. The permittee shall indemnify and hold harmless the Office of National Marine Sanctuaries, NOAA, the Department of Commerce and the United States for and against any claims arising from the conduct of any permitted activities.
13. Any question of interpretation of any term or condition of this permit will be resolved by NOAA.

Your signature below, as permittee, indicates that you accept and agree to comply with all terms and conditions of this permit. This permit becomes valid when you, the permittee, countersign and date below. Please note that the expiration date on this permit is already set and will not be extended by a delay in your signing.

Ms. Megan Nadeau
NOAA Office of Ocean Exploration and Research

Date



Christopher Mobley
Superintendent
Channel Islands National Marine Sanctuary

4-11-2011
Date

0 document(s) attached.

Appendix E
Marine Mammal Protection Act Permit