

Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuaries

Research Vessel *Fulmar* Summary of 2009 Accomplishments

- Support area: 7,963+ square miles
- Missions completed: 50
- Percent of mission days completed: 94
- Days at sea: 164
- Education and outreach participants: 305
- Scientists supported: 290
- Number of SCUBA dives: 416
- Combined SCUBA diver bottom time: 304 hours



NOAA's R/V *Fulmar* in Monterey Bay. Photo credit: Princess Monterey Whale Watching

NOAA's Office of National Marine Sanctuaries operates a fleet of small boats to support mission critical programs in sanctuaries. The Research Vessel *Fulmar* has provided over three years of regional support for three central California national marine sanctuaries as a platform for research, resource protection, education, and outreach missions. In 2009, the R/V *Fulmar* maintained her rigorous schedule of previous years to conduct 27 different projects in Cordell Bank, Gulf of the Farallones, and Monterey Bay national marine sanctuaries.

RESEARCH: Highlights Aboard R/V *Fulmar*

The majority of operational days at sea aboard the *Fulmar* are dedicated to conducting research (79%). Each of the central California sanctuaries maintain site specific research projects that contribute to long-term monitoring data sets to meet management plan needs. Research design, methods, and results are reported on the Sanctuary Integrated Monitoring Network SIMoN Web site at www.sanctuariesimon.org. Research highlights in 2009 from these sanctuaries include:

Cordell Bank National Marine Sanctuary:

❖ Regional Ecosystem Monitoring

Cordell Bank National Marine Sanctuary's CBNMS research team initiated a collaborative regional monitoring program with Point Reyes Bird Observatory PRBO and Gulf of the Farallones sanctuary to improve understanding of the central California marine ecosystem, including three national marine sanctuaries.



Based on historically surveyed offshore transects, this project continues to collect integrative information on oceanographic conditions, zooplankton community, and seabird and marine mammal distribution and abundance. These data provide the foundation for understanding change in the sanctuary environment and can be used to support difficult management decisions.

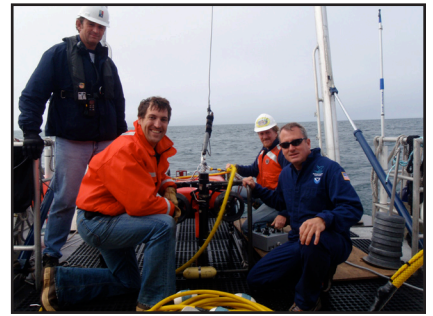
Regional Ecosystem Monitoring serves as a stable and rigorous backbone to measure global climate change.

Jennifer Aragon and Kaitlin Graiff prepare a CTD to collect salinity, temperature, and depth profiles along transects from north of Cordell Bank through GFNMS. Photo credit: Shannon Lyday, FMSA/GFNMS.



❖ Reef Crest: CBNMS Remotely Operated Vehicle ROV Video Sampling Methods

In August, CBNMS led ROV Tiger Team staff members from MBNMS, CBNMS, and the West Coast Regional Office (WCRO) tested video sampling methods to determine the feasibility of conducting quantitative sampling with an ROV on Cordell Bank. This mission was an important first step for the second stage of the project planned in 2010 that will involve SCUBA divers and ROV video collection on Cordell Bank. The ROV Tiger Team was able to log ROV piloting hours under the guidance of a professional pilot.



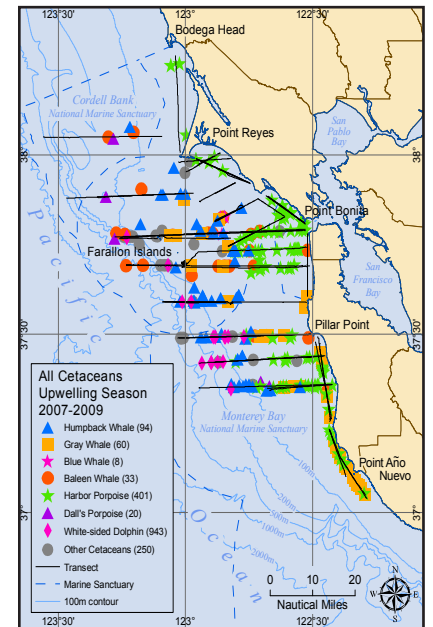
ROV Tiger Team members prepare to launch Phantom HD2. Photo credit: Lorraine Anglin, WCRO.

Gulf of the Farallones National Marine Sanctuary:

❖ SEAS: Sanctuary Ecosystem Assessment Surveys

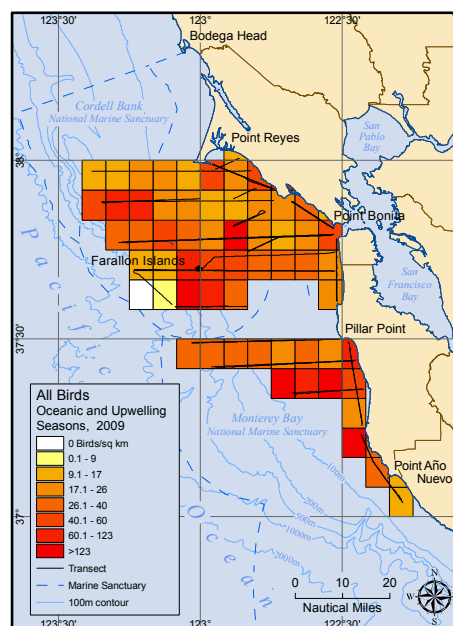
SEAS Pelagic Habitat surveys continued to contribute data to the long-term monitoring of nearshore and offshore habitats of Cordell Bank, Gulf of the Farallones, and the northern management area of Monterey Bay NMS (see adjacent study area transects). The SEAS project began this year to integrate more fully into the Regional Ecosystem Monitoring project conducted by CBNMS to standardize the collaborative survey methods.

GFNMS staff are compiling 2007 - 2009 SEAS-PH data sets from the data collected aboard R/V *Fulmar* to be published in mid 2010. The technical report reviews the region's nearshore and offshore habitats and marine zones, and summarizes qualitative and quantitative analyses for seabirds, marine mammals, vessel activities, frontal zones, sea turtles, target jellyfish, marine debris, and phytoplankton harmful algal blooms. Individual species and small scale observations are broken out in this report, such as the presence of several land birds offshore during the fall 2009 SEAS-PH surveys, in addition to large scale summaries and taxa groupings.

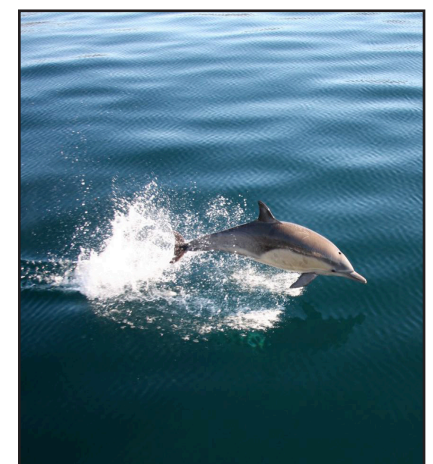


Summary of cetaceans observed in the 2007 - 2009 spring and fall upwelling seasons. Image credit: Tim Reed, GFNMS.

The waters around the North Farallon Islands are now designated as Marine Protected Areas and areas of Special Closure under the state's MLPA. SEAS-PH conducted fine-scale pinniped counts at North Farallon Island during every SEAS PH cruise, adding to population, distribution, and pupping information on Steller sea lions.



(Right): Compilation of 2009 seabird and land bird observations during SEAS cruises for both oceanic and upwelling seasons. Image credit: Tim Reed, GFNMS.



A Pacific white-sided dolphin is one of the cetacean species surveyed during SEAS from north of Cordell Bank to the northern MBNMS. Photo credit: Steve Lonhart, MBNMS/SIMoN.

Monterey Bay National Marine Sanctuary:

❖ Central California Subtidal Marine Protected Area MPA Monitoring
SIMoN staff and research divers from UC Santa Cruz's PISCO sampled multiple sites along the Big Sur coastline to determine the effectiveness of the MPAs established in 2007. Subtidal SCUBA surveys capture events and trends such as an abundance of young of the year (YOY) fishes in 2009 in both the kelp canopy and along the rocky bottom.



(Above): Every ninety days, divers from SIMoN and PISCO at the University of California, Santa Cruz, used the R/V *Fulmar* to service moorings. Photo credit: Steve Lonhart, MBNMS/SIMoN.



Summary results from 2007 - 2008 PISCO baseline monitoring surveys, made possible with staff and R/V *Fulmar* support from MBNMS.



❖ West Coast Observation Project (WCObs)
Physical data collected at the five sanctuary sites located on the west coast Olympic Coast, Cordell Bank, Gulf of the Farallones, Monterey Bay, and Channel Islands .

12 unit array of moorings within southern MBNMS serviced by R/V *Fulmar*, record nearshore SST data that are not captured by the larger oceanographic buoys in offshore waters.

To view SST data, go to <http://portal.ncddc.noaa.gov/wco/>. To read more about PaCOOS, go to <http://pacoos.org>.

(Left): "Stumpy" the friendly humpback whale came in for a close encounter with the WCObs personnel on R/V *Fulmar*'s stern. Photo credit: Steve Lonhart, MBNMS/ SIMoN.

❖ MPA Monitoring and Shelf Characterization in MBNMS

A towed camera sled and ROV were used to capture live annotated video and images inside and outside state MPAs at depths typically averaging 100 m to monitor the continental shelf and slope of southern MBNMS. This data is analyzed by the Institute for Applied Marine Ecology at California State University Monterey Bay CSUMB , and images are accessible at <http://sep.csUMB.edu/iame/s/index.html>.

❖ California Department of Fish and Game Fish Surveys in Carmel Bay

MBNMS Research staff divers assisted the California Department of Fish and Game in conducting subtidal fish surveys off of the R/V *Fulmar* in Carmel Bay to quantify the diversity and abundance of key fish species, as well as mark and recapture estimates, as more than 2,000 fish have been tagged by CDFG over the past several years.



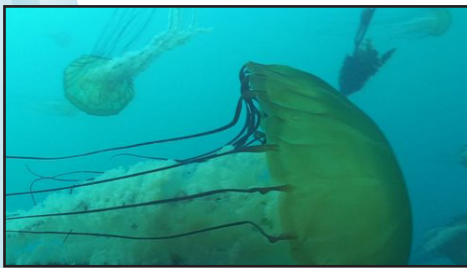
R/V *Fulmar* prepared for dive operations on the Big Sur coast. Photo credit: Dave Minard, R/V *Fulmar* Captain.

❖ Big Sur Nearshore Characterization BSNC

SIMoN staff successfully completed 7 days of diving for the BSNC project in the spring and fall building upon marine resources surveys conducted from 2003 to 2005 as part of the Coast Highway Management Plan CHMP for Highway 1 in Big Sur. Given recent permit approvals for CalTrans to sidecast materials at several sites, divers surveyed four sites with either existing sidecasting (Willow Creek) or soon to be used sites (Dogs, Grimes Cr, and Lafler Cr). Lafler and Grimes are particularly interesting sites, with high, solid rock cliffs, steep underwater drop offs, high invertebrate and fish diversity, and proximity to the head of Partington Canyon.

EDUCATION AND OUTREACH: Highlights Aboard R/V *Fulmar*

The R/V *Fulmar* is an excellent teaching platform for education missions. In 2009, volunteers, teachers, students, local government, and even other agencies within the National Ocean Service were included on research and resource protection missions to educate these audiences on specific management issues or about general sanctuary resources at all three central CA sites.



Crysaora bloom in Monterey Bay. Photo credit: Chad King, MBNMS/SIMoN.

❖ CBNMS Regional Ecosystem Monitoring program provided a conduit for the NOAA Teacher at Sea program.

❖ GFNMS Teacher Institute, B WET, and MERITO programing reached the majority of the over 300 education participants.

RESOURCE PROTECTION: Highlights Aboard R/V *Fulmar*

In 2009, two important Resource Protection missions were successful in the first year of multi-year data collection and reaching benchmark objectives with the assistance of partners and other vessels:

❖ Lost Fishing Gear Identification in MBNMS

Side scan sonar was used aboard the R/V *Fulmar* to refine lost fishing gear targets for the purpose of removing the gear in subsequent cruises aboard the R/V *Fulmar* and F/V *Donna Kathleen*. The ROV Tiger Team tested the newly acquired Seabotix ROV to further groundtruth lost gear targets in September, followed by use of the central CA sanctuaries' Phantom HD2 ROV aboard the F/V *Donna Kathleen* in October for the successful removal of several yards of nets and traps.

❖ Benthic Trawl Impact and Seafloor Habitat Recovery

In the first sampling season of the project, the R/V *Fulmar* provided the platform to compare distributions in benthic microhabitats across a gradient of trawling effort. This multi year project uses a large ROV (Vector 4) operated by MARE and staffed by the Nature Conservancy and MBNMS.

A VALUABLE REGIONAL ASSET

The R/V *Fulmar* was successfully operated and managed by the three central California sanctuaries for 245 mission, maintenance, and training days. This platform was integral in maintaining important long-term monitoring projects with partners in addition to forging alliances to meet the needs of new partners, such as emergency hoisting training with USCG Air Station San Francisco.



USCG Dolphin helicopter lowering hoisting basket to R/V *Fulmar* deck. Photo credit: Chad King, MBNMS/SIMoN.