

NOAA DIVING PROGRAM

FY 2008 ANNUAL REPORT

The NOAA Diving Program
Diving for Science and Technology

This report highlights the activities and significant programs of the NOAA Diving Program for fiscal year 2008. During the year, a total of 508 NOAA divers conducted 14,630 dives for a total of 8,765 hours of bottom time. These data represent an 11% increase in the number of divers and a 2% decrease in number of dives and hours of bottom time compared to FY07.

However, the successes of the NOAA Diving Program were overshadowed by the death of a NOAA diver in March 2008. The diver, Rusty Mason, a NOAA diver employed by the Florida Department of Environmental Protection, ran out of air following a dive to 104 feet approximately 14 nautical miles southwest of the Dry Tortugas. An external investigation was conducted and a number of corrective actions were identified. This tragic event is a stark reminder that diving is an inherently hazardous activity and injuries, even death, can occur anywhere and at any time. The lessons learned from this incident and the actions taken will ultimately improve the safety of the NOAA Diving Program.

LINE OFFICE DIVING ACTIVITIES

NATIONAL MARINE FISHERIES SERVICE

The National Marine Fisheries Service (NMFS) is dedicated to protecting and preserving the nation's living marine resources through scientific research, fisheries management, enforcement and habitat conservation. During the year, 199 NMFS divers conducted 6,605 dives (Table 1). NMFS diving efforts in 2008 supported a wide range of projects in all regions of the country. The largest number of dives were conducted in the Pacific Islands and Southeast Fisheries Science Center; however, critical projects were completed in all other regions as well. Several categories of dives were conducted, including direct observation and sample collection, collection of telemetry data, ship husbandry and safety/training.

A milestone was reached in the Southwest Fisheries Science Center with the completion of the 25th year of juvenile rockfish surveys along the California coast. Coral and fish surveys in the Northwestern Hawaiian Islands (PIFSC) and the Dry Tortugas (SEFSC) involved nearly 4,000 individual dives by NOAA Fisheries staff and several reciprocity partners. Other projects addressed abalone, conch, elkhorn coral, hake, lingcod, mutton snapper, red king crab, several salmon species, sea lions, six-gill shark and tanner crab. An abbreviated list of dive sites included



NOAA Working Diver LTJG Tracy Hamburger empties a tube of cement into a newly drilled mooring at the Flower Garden Banks. *By Emma Hickerson, UDS*

American Samoa, Equatorial Islands, Florida Keys, Kingman Reef, Kodiak Island, Main Hawaiian Islands, Monterey Bay, Palmyra Atoll, Prince William Sound, Riley's Hump, Sacramento River and San Diego. Nearly 20 scientific publications and technical reports as well as presentations at the 11th International Coral Reef Symposium and 3rd International Symposium on Deep-Sea Corals resulted from data collected by NOAA Fisheries divers. Fisheries divers were involved in a saturation diving mission at the Aquarius habitat, conducted surveys of mangrove habitats with a DIDSON sonar, advanced the development of bycatch reduction devices and trawl efficiency devices, and removed a considerable amount of marine debris.

OCEANIC AND ATMOSPHERIC RESEARCH

The mission of the Office of Oceanic and Atmospheric Research (OAR) is to conduct research, develop products, provide scientific understanding and leadership and conduct outreach towards fostering the evolving environmental and economic mission of NOAA.

OAR divers, scientists, engineers and technicians provide critical support in the design, testing, deployment, maintenance, and retrieval of oceanographic monitoring and data collection instrumentation. This includes the field testing of various new and novel underwater data collection systems deployed as primary components of major oceanographic programs. Pacific Marine Environmental Laboratory (PMEL) and Atlantic Oceanographic and Meteorological Laboratory (AOML)

Research Diver units (12 divers total) provide diver services as a collateral duty to their scientific and administrative assignments. Major oceanographic programs include the Coral Reef Early Warning System/Integrated Coral Reef Observation Network (CREWS/ICON) at AOML and the Deep-ocean Assessment and Reporting of Tsunamis (DART) program at PMEL.

AOML diver teams are provided for CREWS/ICON CREWS site modifications, repair of storm damages and instrumentation replacement. In FY08, a joint operation of AOML and the National Undersea Research Program divers from the Aquarius Habitat and University of North Carolina (Wilmington) staff was conducted to repair storm damage at the Discovery Bay CREWS station in Jamaica. Additional base repair was also completed at the La Parguera, PR, CREWS station. A new site was surveyed and base foundations established for a new CREWS station at the Little Cayman Research Center, for deployment in second quarter FY09.

PMEL diver teams provided important support in the development of the pCO₂ Ocean Acidification (OA) Buoy, deployed at Kanoeh Bay, HI, in FY08. This system is part of the establishment of an ocean acidification monitoring network for remote coral reef ecosystems. Initial survey work has been completed for a joint PMEL, AOML, USGS and University of Puerto Rico program to deploy and maintain a sampling pCO₂/OA Buoy at La Parguera, PR, in early FY09.

During FY08, Oceanic and Atmospheric Research divers performed a total of 115 dives (Table 1).

NATIONAL OCEAN SERVICE

The National Ocean Service (NOS) is the Nation's principal advocate for coastal and ocean stewardship. NOS divers provide the scientific data necessary for resource managers to make informed decisions to provide for the safe and sustainable use of ocean and coastal marine resources.

NOS's Office of Coast Survey is responsible for updating nautical charts, locating submerged obstructions/wrecks and positioning features deemed dangers to navigation. This year, NOS divers were able to complete several surveys in Wilmington, NC; Great Lakes and Gulf Coast. Other hydrographic activities included New England diving on *Automated Wreck and Obstruction Information System (AWOIS)* targets and other dangers to navigation.

The primary responsibility for NOS CO-OPS is to install, maintain and remove underwater components for Tidal Measurement /Tsunami Warning Stations. This year, divers from the Pacific Region installed/maintained Physical Oceanographic Real-Time System (PORTS) tide stations in Tacoma, WA, the

Columbia River and San Francisco. They also conducted special operations in the Elkhorn Slough National Estuarine Research Reserve and Pago Bay, Guam. On the other side of the United States, divers worked from the Great Lakes around the entire East Coast out of the Chesapeake, VA, office.

Divers from the National Centers for Coastal Ocean Science (NCCOS) log many dives a year and accomplish a wide variety of tasks. The mission of the Center for Sponsored Coastal Ocean Research is to provide the highest quality research in support of coastal management decisions through competitive, peer-reviewed research and holistic ecosystem studies. Diving missions conducted this year involved site visits and project evaluations, particularly focused on its Caribbean Coral Reef Institute at the University of Puerto Rico, ongoing Caribbean Coral Reef Ecosystem Studies, and its National Coral Reef Institute. The primary responsibility of the Center for Coastal Monitoring and Assessments is to assess and forecast coastal and marine ecosystem conditions through research and monitoring. Its accomplishments this year included characterizing and monitoring coral reef ecosystems in the National Monuments and Parks in St. Croix and St. John, USVI, and southwestern Puerto Rico. Divers from the Center for Coastal Fisheries and Habitat Research have continued their work in habitat characterization, assessment of human impacts on coastal resources, assessment of invasive species on coastal and ocean habitat and ecology, and ecosystem recovery modeling in the Caribbean, Western Europe and the southeast Atlantic. Some highlights from around NCCOS this year include: a NCCOS/Smithsonian research mission at Carrie Bow Cay, Belize, that resulted in the discovery of a new species of fish parasite; collaborating with NOAA's Office of Response and Restoration to prioritize conservation efforts needed to clean up and restore the area surrounding the former U.S. Navy bombing range at Vieques Island, PR; providing training and assistance to Portuguese University and Government personnel attempting to restore sea grass beds off the coast of Portugal; and completing an educational video that showcased cutting-edge technologies combined with SCUBA surveys to map and monitor marine environments, demonstrating the effectiveness of marine protected areas in the Virgin Islands.

Diving for the Office of National Marine Sanctuaries is conducted to better understand living marine resources and their ecosystems; to assist resource managers in making sound decisions that ensure the protection of sanctuary resources; to discover, characterize and protect submerged cultural resources to further understanding of our nation's maritime heritage; and to provide education on all these activities with outreach to the general public. Dives conducted within the sanctuaries occur across a geographic range from Thunder Bay in Lake Huron to the Papahānaumokuākea Marine National Monument in the waters of Hawaii. Some of the activities conducted throughout the sanctuary system include: technical diving to characterize and map deep wrecks in Thunder Bay; dive support for the study of a harmful algal bloom in the Gulf of Maine in collaboration with Woods Hole Oceanographic Institution; mapping and characterization of two German U-boats off the coast of North Carolina; deployment of an acoustic fish-tagging array off the coast of Georgia; aquanauts from the Aquarius Undersea Lab who transmitted live video broadcasts to classrooms around the world from the waters of the upper Keys; support for

Table 1 : FY08 NOAA DIVING ACTIVITY			
	Divers	Dives	Bottom Time
OAR	12	115	62
NMFS	199	6605	4279
NOS	188	5788	3315
OMAO	109	2122	1109
TOTALS	508	14630	8765

the NOAA Diving Center's Working Diver class in the Lower Florida Keys; deployment of water quality instruments and acoustic receivers in the Gulf of Mexico; support for the National Park Service and BIGHT '08 kelp forest monitoring programs in the Channel Islands; support for the "Immersion Presents" program whose video segments were beamed live, via satellite from Monterey Bay to Rhode Island for distribution over the Web; diver documentation of the "Dive With a Purpose" event in connection with the National Association of Black Scuba Divers; and marine debris surveys and removal of debris from the reefs surrounding Midway Atoll. During FY08, 188 NOS divers performed a total of 5,788 dives (Table 1).

OFFICE OF MARINE AND AVIATION OPERATIONS

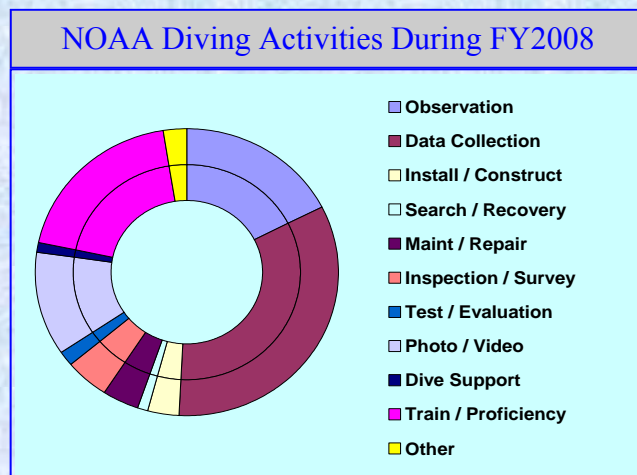
The Office of Marine and Aviation Operations (OMAO) dive complement includes NOAA Corps officers and wage mariners at the two Marine Operations Centers and in the fleet of NOAA ships. Fleet diving activities include ship husbandry tasks such as clearing screws and sea strainers, conducting hull surveys for damage and installing transducers. Scientific support activities include installing tide gauges, installing and replacing data gathering equipment and investigating multi-beam contacts. These activities provide cost savings to the NOAA fleet, enhance customer service and facilitate self-sufficiency on the seas.

During FY08, 109 OMAO divers conducted a total of 2,122 dives (Table 1). It was quite a busy year in the fleet. There were seven significant propeller/rudder foulings this year in which divers cleared the obstructions. All ships worked hard to complete a diving safety stand-down training event and implement new training requirements in the use of the Reserve Air Supply System (RASS) and line-tending for standby divers. This year also saw the standardization of the designation of a Dive Officer on each ship. Highlights from each of the ships follows:

NOAA Ship *Albatross IV* dive team completed 24 dive operations including net sensor calibrations and biannual high-pressure cleaning of her sea-chests and main trunk lines. NOAA Ship *David Starr Jordan* divers removed a fouled net from the ship's port screw, enabling cruise operations to continue. The incident occurred 100 nautical miles from shore. NOAA Ship *Delaware II* divers improved engine performance by clearing lobster pot gear on a regular basis from the propeller and bow-thruster, and removing a hawser knot that was jammed in the rudder saved valuable ship time. NOAA Ship *Fairweather's* primary mission is hydrographic surveys. Ship divers installed four tide gauges in remote locations that would be costly to outsource to contractors. NOAA Ship *Gordon Gunter* divers support the ship, not projects specifically. Dives included husbandry, proficiency and training. NOAA Ship *Henry B. Bigelow* divers maintained an acoustically quiet hull for fisheries research and ensured equipment below the waterline was in optimal working condition. NOAA Ship *Hi'ialakai* supported over 4,000 dives in support of a wide range of NOS and NMFS scientific operations. Ship divers conducted three separate hull-cleaning operations this year as a requirement to enter the Papahānaumokuākea Marine National Monument. These dives saved the ship \$11,000 in contracting funds that would otherwise have been paid for this work. The entire ship from waterline to keel was scrubbed. They also removed a 60

ft. length of hawser from the propulsion system, saving an estimated \$10,000 in operational time, not including the expense of towing *Hi'ialakai* back to Honolulu.

Prior to its decommissioning this year, NOAA Ship *John N. Cobb* collected specimens for the new aquarium at NOAA's Ted Stevens Marine Research Institute in Juneau, AK, and surveyed a coral reef in Tracy Arm, southeast AK. NOAA Ship *Ka'imimoana's* divers serviced the Tropical Atmosphere and Oceans (TAO) buoy array in the mid-Pacific Ocean. Husbandry dives included removing and replacing broken rope guards and tie wraps on the starboard shaft and removal of heavy growth, which increased the vessel's speed through the water by 2.5%. When NOAA Ship *McArthur II* departed the shipyard to begin its season, ship divers were deployed to investigate the source of high-pitched noises observed at high rpm's and to photograph the propellers. Subsequently, commercial divers were hired by the yard to sharpen the blades. Their work was verified by the ship's dive team. NOAA Ship *Miller Freeman* divers had a quiet season, primarily maintaining proficiency and conducting hull inspections. NOAA Ship *Nancy Foster* divers were instrumental to the completion of seven of 15 research projects. On two separate occasions the ship's Z-drive was fouled with fishing or ROV gear. Ship divers responded and cleared them. NOAA Ship *Okeanos Explorer* was commissioned in August and the dive team has since been conducting training and ship familiarization dives. NOAA Ship *Oregon II* divers removed lines from the bow thruster and longline gear from its propeller. NOAA Ship *Oscar Dyson* divers also removed lines and kelp from the propulsion system and conducted hull inspections after working at the edge of the Bering Sea ice shelf. NOAA Ship *Oscar Elton Sette* divers primarily conducted training and proficiency dives. NOAA Ship *Rainier* performed tide gauge installation and maintenance, and conducted nautical charting item investigations and least-depth measurements. The use of a diver's least depth gauge allows for highly accurate measurement of the shallowest point of submerged features. NOAA Ship *Ronald H. Brown* divers performed hull inspections and replaced a TAO buoy sensor. NOAA Ship *Thomas Jefferson* conducts fewer dive operations in support of hydrographic surveys than in the past due to improved sonar technology. No specific projects or operations were conducted during this year.



NOAA DIVING CENTER

The NOAA Diving Center (NDC), located at the NOAA Western Regional Center in Seattle, WA, serves as the administrative headquarters for the NOAA Diving Program and primary facility for all NOAA diver training activities and equipment maintenance and distribution. Located within the NDC complex are five operational hyperbaric chambers, offices, classrooms, workshops, gear lockers, air compressors, gas storage facilities, and a 30' high x 15' wide, 40,000 gallon water tower for diver training and equipment testing.

One of the primary missions of the NDC is training. Diver training is conducted at the NDC and in Key West, FL. Dive training programs include Working Diver, Divemaster, Nitrox, and visual cylinder inspection. This year 48 Working Divers and 20 Divemasters were trained and certified by the NDC. An additional 31 scientific divers were certified at the unit level. One Diving Medical Officer Course was held this year, attended by 27 physicians who included eight Foreign Nationals from Canada, Columbia, St. Lucia, Guyana, Switzerland and Bermuda.

Employees from other federal, state and municipal agencies frequently enroll in NDC classes on a space-available basis. In FY08, there were participants from the following agencies: Everett Police (WA); Oregon Dept. of Transportation; Seattle Harbor Patrol; Seattle Fire Dept.; Snohomish Co. Sheriff (WA); and Mercer Island Police (WA).

EQUIPMENT

The NOAA Diving Center Standardized Equipment Program outfitted 67 new and returning divers, including 21 scientific divers. During the year, 778 regulators were serviced, including Shadow secondary air sources. In response to a voluntary manufacturer's recall of certain batches of the Oceanic FDX10 regulators, NDC carried out a recall/replacement of 217 regulators.

NDC also implemented a new equipment policy requiring the use of a reserve air supply system (RASS). An online training module for this new equipment configuration was developed and placed on the Commerce Learning Center and NDP Web site. Three hundred and seventy-nine RASS units were issued.

NDC OUTREACH

Personnel from the NOAA Diving Center participated in a variety of outreach activities for NOAA Line Offices, state and local government agencies, educational institutions, and the general public. These outreach efforts consisted of technical guidance, operational support and educational services. A partial list of FY08 activities includes:

- participation in NOAA's Science Camp for Kids
- facility tours for the National Association of Black Scuba Divers, Seattle Federal Executive Board, Mercer Island Boy Scout Troop #624, DOC/WFM, NOAA Program Analysis and Evaluation, OMAO Chief Financial Officer, and congressional staffers
- representation at a number of diving symposiums and conferences; e.g., DEMA, the AAUS annual conference and U.S. Navy Working Diver conference.

In Remembrance



Rusty Mason

People remember Rusty as a man who could bring smiles readily to their faces, and as someone with a true zeal for life. May those who knew him continue to smile, and know that his memory lives on.

~ excerpted from the Memorial service

Rustin "Rusty" Mason was born in 1953 in Evansville, IN. He attended the Florida Institute of Technology, where he graduated in 1976 with a BA in Oceanographic Technology. Rusty was an active and beloved member of the dive community in the Lower Keys since 1990, when he first worked for Looe Key Reef Resort as a vessel operator and dive instructor. At the time of his death, Rusty was employed as a marine mechanic for the Florida Department of Environmental Protection's Office of Coastal and Aquatic Managed Areas, working for the Florida Keys National Marine Sanctuary (FKNMS). Rusty's accreditations include serving as a USCG Licensed Vessel Operator, NOAA Working Diver, and NOAA Divemaster responsible for installation, repair and maintenance of mooring systems within the FKNMS. Rusty had been employed in this role since May 28, 2002. He played a key role assisting with vessel and dive support during NDP's dive training classes in Key West. Rusty regularly acted as vessel operator and dive support for FKNMS's annual coral spawning cruise. He also regularly provided boating support for researchers, elected officials, and other visitors to the sanctuary. His love for people and his outgoing nature made him a natural in this role.



ACKNOWLEDGEMENTS

The science and work conducted by NDP divers are essential to accomplishment of NOAA missions. The NDP thanks all divers for their continuing safe practices, hard work, dedication and contributions.