



# NOAA DIVING PROGRAM



## FY 2004 ANNUAL REPORT

### DIRECTOR'S SUMMARY

Diving has always played an important role in helping NOAA accomplish its marine research objectives. By physically 'being there,' divers can interrelate with their surroundings and respond to changing conditions and situations, to accomplish their required work safely and efficiently. NOAA divers perform a myriad of tasks underwater from surveying damage from vessel groundings, to installing and maintaining tide gauges and boat moorings, to removing debris from ship propellers, to fish counts and collection of bottom and water samples.

During the period 1 October 2003 – 30 September 2004, over 450 NOAA divers conducted dives in support of various NOAA projects throughout the world. This figure represents a 13% increase in the number of NOAA divers compared to the previous fiscal year. Despite this increase, there was a 10.5% decrease in the total number of dives performed and a 5.5% decrease in the number hours of bottom time as compared with the previous year.

Six (6) cases of decompression sickness were recorded during the period, all of which occurred during dive or dive-related medical training at the NOAA Diving Center (NDC). The fact that all of these cases occurred during training, rather than in an operational setting, is not surprising as students are typically inexperienced and their physiological responses to hyperbaric conditions unknown. Fortunately, all six divers were successfully treated with hyperbaric oxygen therapy with no residual symptoms.

Despite these incidents, the NOAA Diving Program still maintained an excellent overall safety record with an incident rate of approximately 1 case per 5,300 dives. These statistics correlate to an incident rate of .02%; or inversely, 99.98% incident-free dives, which is comparable to other similar government civilian diving programs in the United States.

The Diving Center continued to investigate various pieces of commercial-off-the-shelf dive equipment for potential use by NOAA personnel. Most notable among these were mixed-gas dive computers and closed-circuit mixed-gas rebreathers. The NDC also designed and constructed a containerized hyperbaric treatment system to support remote and/or advanced diving operations. The system is designed to treat divers affected by pressure-related injuries such as Decompression Sickness [aka 'the Bends'] or Arterial Gas Embolism - both of which can be fatal if not treated immediately. The system was utilized to

support shallow, yet remote diving operations in the Northwestern Hawaiian Islands off the new NOAA Ship *HI'IALAKAI*. A second containerized chamber system is planned for FY '05.

### LINE OFFICE DIVING ACTIVITIES

#### NOAA RESEARCH

The mission of NOAA Research is to provide comprehensive knowledge to guide environmental policy decisions, improve environmental services, and provide economic growth through science. OAR divers support scientists and engineers in the design, testing, deployment, maintenance and retrieval of oceanographic monitoring and data collection instrumentation. Sixteen OAR divers conducted 314 dives in FY '04, for a total of 160 hours of bottom time.

Atlantic Oceanographic and Meteorological Laboratory (AOML) divers surveyed the Miami ADCP underwater data transmission cable pathway. AOML divers continued work on CREWS (Coral Reef Early Warning System) by installing a new site at the Caribbean Marine Research Center (CRMC), Lee Stocking Island, Bahamas. In addition, repairs were made to a CREWS station after storm damage. Lab divers surveyed a site in Discovery Bay, Jamaica, for future CREWS installation. AOML divers also participated in a Biscayne Bay Submarine Groundwater Discharge study by utilizing diver-deployed CTD's in a shallow water environment in Biscayne Bay, FL. AOML divers were integral in an EPA/NOAA Bio-marker coral Genetic Study, deployed off NOAA Ship *NANCY FOSTER*, to study the genetic effects of stress on corals created by turbidity in dredge material discharge areas.

Pacific Marine Environmental Laboratory (PMEL) divers evaluated an anchoring device for the Platform Instrumentation for Continuous Observations (PICO). PMEL divers also field-tested various underwater mountings, moorings, acoustic releases, sensors, CTD systems, sampling equipment and profilers, and in-situ deployment and recovery of PMEL instruments as required. A PMEL diver also participated in tagging of Stellar Sea Lions in the Aleutian Islands with the Alaska Fish and Wildlife Department.



*AOML Diver drilling anchor points*

## NOAA FISHERIES

NOAA Fisheries is responsible for conserving and promoting the health of the marine environment through science-based management. As steward of the nation's living marine resources, its goals are to rebuild and maintain sustainable fisheries, promote the recovery of

protected species, and protect and maintain the health of coastal marine habitats. Accomplishing these goals often requires Fisheries researchers to dive to collect data, conduct surveys, install and recover instrumentation, and evaluate fishing gear performance. In FY '04, 189 NMFS divers completed 6022 dives for 3,720 hours of bottom time.

During FY '04, NMFS diving was primarily directed at surveys of fish and habitat. Reef ecosystems received the most attention with work being conducted by the Panama City, Beaufort,



*CREI diver switching out an SST buoy*

Miami and Hawaii labs. Much of this work was to assess marine reserves in the Florida Keys, Dry Tortugas, Puerto Rico and the Northwestern Hawaiian Islands. The first extensive coral reef surveys of American Samoa were also conducted this year. Habitat surveys at Long Beach and Chesapeake Bay units were focused on eelgrass, kelp and algal ecosystems. Dives in support of fisheries included studies of rockfish recruitment by the Santa Cruz unit, surveys of scallops by the Milford unit, invertebrate surveys by the Anchorage unit and mackerel nesting habitat studies by the Seattle/Alaska unit. Support of protected species research was conducted by Seattle/Alaska divers who snared Stellar sea lions for satellite telemetry studies and by divers in Hawaii who recovered archival monitors used in the study of the foraging habitat of the endangered Hawaiian Monk seal. Response and restoration activities comprise much of the diving including marine debris removal in Hawaii and Florida, and ESA appraisal of groupers, and stream restoration in Santa Rosa. The rest of the diving was in support of installation and maintenance of seawater systems, hull mounted instruments, oceanographic instruments and testing of sampling gear.

Highlights of the year included NOAA divers first use of semi-closed circuit rebreathers to study fish behavior patterns and population numbers, at the newly established Montlake lab diving unit. The NMFS Kodiak unit hosted an archeological diving expedition on a recently discovered shipwreck from the 1800's to map its location and verify its identity. CREI divers removed upwards of 123 tons of nets and debris from various

<b>FY2004 NOAA DIVING ACTIVITY</b>			
	<i>Divers</i>	<i>Dives</i>	<i>Bottom Time</i>
<b>OAR</b>	<b>16</b>	<b>314</b>	<b>160</b>
<b>NMFS</b>	<b>189</b>	<b>6022</b>	<b>3720</b>
<b>NOS</b>	<b>188</b>	<b>5363</b>	<b>3062</b>
<b>NMAO</b>	<b>79</b>	<b>1728</b>	<b>875</b>
<b>TOTALS</b>	<b>472</b>	<b>13427</b>	<b>7817 hrs.</b>

areas of the Northwest Hawaiian Islands.

## NOAA OCEANS and COASTS

The mission of NOAA Oceans and Coasts is to serve as the nation's advocate for coastal and ocean stewardship and to support and provide the science,

education, management, and leadership necessary to balance the well-being of the nation's coastal resources and communities. Diving operations provide the scientific information necessary for NOS to shape and balance this process through resource protection, assessment, restoration, monitoring, documentation, and sample/data collection. In FY '04, 188 NOS divers completed 5,363 dives for 3,062 hours of bottom time.

In the southeast, Florida Keys National Marine Sanctuary (NMS) divers continued maintenance of the extensive network of mooring, boundary, and regulatory buoys to help protect fragile coral areas and other vital areas from damage or exploitation. Divers in the Upper Keys participated in the placement of a USGS marker at the restoration site of the M/V Wellwood grounding at Molasses Reef. Damage assessment divers acted as on-scene technical representatives for the Sanctuary at both the Adaro and Diego groundings. Lower Keys divers assisted in Coral Restoration work associated with vessel groundings at Washer Woman, Looe Key, Western Sambo, and Rock Key. They also assisted the Navy in assessment of a dredging project and removal and replacement of Coral at the Truman Annex harbor Facility. Monitor NMS divers participated in a joint expedition with the U.S. Navy to document the current condition of the wreck and to recover equipment from an earlier project. Sanctuary divers at Gray's Reef NMS performed Paleontological research to investigate the evidence of terrestrial mammal remains, and dove in support of several educational outreach programs.

Stellwagen Bank NMS divers in the northeast continued documentation of the wrecked coal schooner Paul Palmer, and implemented and documented a new autonomous underwater vehicle in a joint project with the Naval Undersea Warfare Center. Thunder Bay NMS divers in the Great Lakes conducted fish surveys and documented historic shipwrecks. In the Gulf of Mexico, Flower Garden Banks NMS divers supported many



*NOS diver surveying anchor from wreck of the Kad'Yak*

different projects from cephalopod research, to deepwater fish habitat characterizations utilizing ROV's and divers. Divers for Channel Islands NMS in the southwest conducted fish and invertebrate surveys in addition to assisting in the Channel Islands National Park Service's Kelp Forest Monitoring program. CINMS Divers also collected video and still photography for a variety of purposes (education, research, and damage assessment). Divers for the Olympic Coast NMS in the northwest continued servicing scientific moorings along the Washington coast.



*CINMS Diver deploying off the R/V Shearwater*

Divers from the Northwest Hawaiian Islands Coral Reef Ecosystem Reserve assisted in a cooperative project with the Pearl Harbor National Park Service on a monitoring project of the USS Arizona and USS Utah.

Divers from the Navigation Services Division and related programs installed and maintained tide gauges and investigated hazards to navigation in support of nautical charting on the Atlantic and Pacific coasts. NOS Field Operations Division divers on both coasts and the Great Lakes supported the National Water Level Observation Network and the Physical Oceanographic Real Time Monitoring System by installing and maintaining tide gauges and oceanographic sensors. Collected data is used to publish predicted tide tables, establish sea level datums, and provide real time tide and current data which benefits a variety of users. Divers from the Eastcoast NRT Teams responded after hurricanes *Frances, Ivan & Jeanne*, in addition to re-locating a lost anchor from the USCG Barque "Eagle."

## **NOAA MARINE AND AVIATION OPERATIONS**

### **SHIPS**

During FY '04 ship-based divers deployed from NOAA's growing fleet, (two new platforms came online in FY '04), of eighteen hydrographic survey and research vessels and conducted underwater tasks in support of scientific data collection, as well as routine ship's husbandry and emergency vessel support. By providing a ship-based ready resource, shipboard divers are essential to mission support by participation in the planning and execution of underwater research activities. Divers provide ship support by maintaining propellers, steering gear, and hull-mounted equipment, as well as conducting detailed hull inspections, saving the ship significant time and cost, and by providing a ready ability to accomplish underway repairs or maintenance. Dives are often made on short notice and under severe conditions of low visibility, high current or rough seas. In FY '04, 79 NMAO divers conducted 1,728 dives for

875 hours of bottom time, operating off the east and west coasts of the United States, the Gulf of Mexico, Puerto Rico, throughout the Pacific, and Alaska.

NOAA ship divers performed many different tasks, both to support science and to maintain the fleet. NOAA Ship OSCAR ELTON SETTE divers assisted the Pacific Island Fisheries Science Center by performing benthic surveys, fish counts, installation and recovery of data gathering moorings, video documentation, dive support for deep water mixed gas diving, deployment and recovery of bottom sensors, and tow boarding surveys. NOAA Ship NANCY FOSTER divers were instrumental in completion of many projects, especially a joint project for monitoring coral disease in the FKNMS with the US EPA. Divers from NOAA Ship MILLER FREEMAN saved thousands of dollars when they located and recovered the ship's lost transducer pod, and reinstalled working equipment enabling the ship to continue operations without having to return to the shipyard for repairs.

Divers from the NOAA Ships KA'IMIMOANA and RONALD H. BROWN installed or repaired various subsurface instrument packages located on Tropical Atmosphere Ocean project moorings, while divers from the RONALD H. BROWN divers also supported AOML tide gauge maintenance.

Divers from the NOAA Ships RAINIER, RUDE and THOMAS JEFFERSON supported hydrographic survey operations by tide gauge, tide station maintenance and item investigations evaluating hazards to navigation in the approaches to Tampico and Altamira, Mexico; Flower Gardens NMS; Quicks Hole and Edgartown Harbor, MA; Chesapeake Bay; Narragansett Bay, RI; and Long Island Sound, NY. NOAA Ship RUDE divers also assisted the USCG on several recovery operations in the Northeast to clear a channel and recover sunken buoys. And finally, NOAA Ship FAIRWEATHER divers began operations in August (the first operations in 15 years) and assisted in surveying the newly acquired NOAA shore side facility in Ketchikan, AK.



*Draeger Semi-Closed Circuit Rebreather training, Seattle*

### **NOAA DIVING CENTER (NDC)**

NOAA dive and dive-related training is conducted at the NDC training facility in Seattle, WA and in Key West, FL. Dive

training programs range from basic Working Diver to advanced specialties that include Divemaster, and Physician's Training in Diving and Hyperbaric Medicine. During FY '04, 95 individuals were outfitted, trained, and certified by NDC personnel in one or more of these specialties. Unit Diving Supervisors and NDC certified an additional 43 Scientific or Working Divers nationwide. Additional courses taught at the NOAA Diving Center included Oxygen Administration, DMT Prep, DMT, Visual Cylinder Inspection and Nitrox. An additional 120 persons were trained in one or more of these specialties during the fiscal year.

Employees from other federal, state, and municipal agencies frequently enroll in classes on a space available basis. Outside agency participation in FY2004 included:

EPA	FBI (New York field unit)
King Co. (WA) Sheriff	Port of Seattle Police
Seattle Harbor Patrol	Snohomish Co. (WA) Sheriff
Seattle Fire Dept.	

### Equipment

During FY '04 the NOAA Diving Program's Standardized Equipment Program (SEP) outfitted 77 new and returning divers, performed annual maintenance and re-issued 400 regulators, and serviced and re-issued an additional 200 octopus and Shadow regulators.

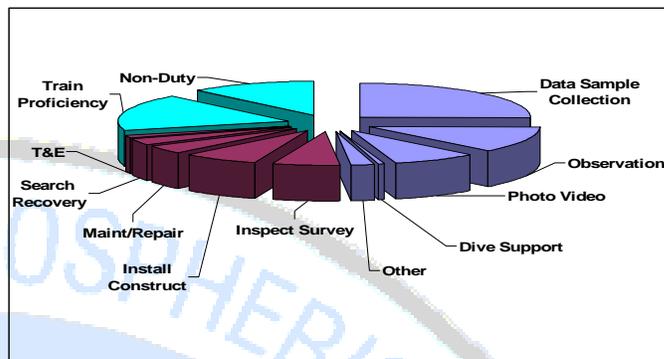
The NDP was involved in the following equipment-related testing and evaluation efforts during FY '04:

- NDC personnel underwent training with Draeger Dolphin SCR to further implement their usage in the field for scientific studies, the units were utilized by divers at the NMFS Montlake lab in the study and observation of local species.
- Continued testing of advanced prototype dive computers for use with CCR and open circuit diving operations.



*NDC's New Containerized Hyperbaric Chamber System*

### Breakdown of NDP Diving Activities During FY2004



■ Research ■ Research Support ■ Training/Proficiency

- During FY '04 the NDC built and deployed a new, fully self-sufficient, containerized Hyperbaric Chamber system to support remote and advanced dive operations. The chamber is the first of several that are planned to help bring NOAA programs in line with new safety regulations and to provide the immediate medical care for injured divers.

### Outreach

Personnel from the NOAA Diving Center supported activities of the 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. The following activities were accomplished during FY '04:

- Provided operational support for the U. S. Coast Guard District Thirteen Maritime Safety and Security Team (MSST) 91101 in surface-supplied and dry suit training in the NDC diving tower.
- Conducted tours of the facility for representatives from other NOAA offices, conducted presentations and tours of the Center to local NOAA dependents during "Bring Your Child to Work" day (April), 65 ten and eleven year-old science students during NOAA Science Camp (June), a group of high-school teachers from all over the country (June), students attending a hyperbaric chamber technician course at Virginia Mason Medical Center, Seattle, WA (October), and members of the National Science Teacher's Association (Nov.)

### ACKNOWLEDGEMENTS

The NOAA Diving Center would like to thank everyone who contributed information or images to this annual report. The work that our divers do is essential to the continued monitoring of the environment around us, and the constant changes occurring in it. Their dedication and hard work is what keeps our program successful and safe.