NOAA OFFICE OF OCEAN EXPLORATION EXPEDITIONS AND PROJECTS – FY 2006

FY 2006 SIGNATURE EXPEDITIONS:

During the 2006 field season, the NOAA Office of Ocean Exploration (OE) will engage in six "Signature" expeditions that combine the skills of multiple experts to investigate unique facets of the world's oceans. The following provides a brief synopsis of these efforts.

Davidson Seamount (Jan-26 to Feb-04)

Scientists will use the Monterey Bay Aquarium Institute's R/V *Western Flyer* and ROV *Tiburon* to explore deep coral habitats around one of the largest seamounts along the western United States.

The Submarine Ring of Fire—2006 (Apr-18 to May-13)

Scientists aboard the R/V *Melville* will continue their very successful exploration program of the Mariana Arc volcanoes begun in 2004. Using the U.S. National Deep Submergence Facility ROV *JASON*, scientists will further their quest to discover and study the range of environments, species, mineral deposits, and chemical and geological processes that exist along active submarine volcanic arcs.

Gulf of Mexico Chemosynthetic Communities (May-07 to Jun-02)

In 2006 and 2007, OE is collaborating with the Minerals Management Service to investigate chemosynthetic and deep-sea coral communities on the continental shelf and slope of the central Gulf of Mexico concentrating on depths greater than 1000 m. The 31-day expedition will use the R/V *Atlantis* and U.S. National Deep Submergence Facility submersible *ALVIN*.

Olympic Coast Deep Sea Corals (May-22 to Jun-02)

NOAA scientists are following-up on an expedition conducted in 2004 that offered a brief glimpse of the diversity of deep-sea corals, sponges, and associated fauna living in the depths of the Pacific off the coast of the Olympic Peninsula. The 2006 expedition will combine side-scan sonar and multibeam bathymetric mapping as well as a more robust and comprehensive investigation using the Canadian Scientific Submersible Facility's ROV *ROPOS*, which will be deployed by the NOAA Ship *McArthur II*.

High Resolution Mapping of Ancient Deep Water Shipwrecks and Geologic Features (Jun-25 to Jul-04)

Scientists from the U.S. and Greece will collaborate on this expedition to locate, rapidly map in high resolution, and assess ancient shipwrecks and active geologic and chemical features at three areas in Greece's deep-sea basins aboard the Greek R/V *Aegaeo*. The primary platform for target characterization and precision survey will be the *SeaBED* Autonomous Underwater Vehicle (AUV) equipped with cameras, lights, and a variety of environmental sensors.

Hawaii Laser Line Scan Survey (October 2006)

Across a spectrum of coral reef ecosystem habitats, closely co-located in the waters between the islands of Maui County in the Hawaiian Archipelago, a consortium of academic and management agency partners will test the capability of laser line scan technology to comprehensively map and conduct an ecological assessment of coral reefs and associated marine communities. The project will be staged from the NOAA Ship *Hi'Ialakai*.

FY 2006 PROJECTS:

In addition to the "Signature" expeditions, OE will support an additional 19 projects occurring during 2006. The following provides a brief synopsis of these efforts.

Explorer Submarine (Feb-16 to Feb-26)
Working aboard the private Panamanian vessel *Cheers*, principal investigator James Delgado will be joined by a multidisciplinary team of researchers from the US, Canada, Australia, and a Panamanian representative, to complete the archaeological documentation, conduct corrosion and environmental context assessments, and formulate preservation plans for the Submarine *Explorer*. The craft was discovered by chance during a 2001 visit to a remote island on Panama's Pacific coast, and provides a "missing link" in the history of the submarine.

Documenting Alaskan Shipwrecks (Apr-04 to Apr-12)
Scientists will work with local volunteers, professional archaeologists and University of Alaska scientists to conduct systematic site investigations of several significant shipwrecks located in coastal southeast Alaska through diving operations aboard a chartered vessel.

CoML Marine Zooplankton Partnership Project (Apr-10 to Apr-30)
This expedition on the NOAA Ship *Ron Brown* will initiate a biotic survey of the tropical/subtropical waters of the Atlantic Ocean west of the Mid-Atlantic ridge and conduct a comprehensive analysis of biodiversity of the zooplankton assemblage. The mission is in association with the Census of Marine Zooplankton (CMarZ), an ocean realm field project of the Census of Marine Life (CoML). Sampling will be conducted along a transect extending from the northern Sargasso Sea to the equatorial waters northeast of Brazil. At five primary stations, environmental data and zooplankton samples will be collected using large opening/closing trawls and net systems, with several mesh sizes, and SCUBA.

Unexplored regions of the Aegean, Black, and Eastern Mediterranean Seas (Apr-26 to Jun-17)
This international expedition will survey and document unexplored regions of the Aegean, Black, and Eastern Mediterranean Seas. Scientists will search for locations of well-preserved archaeological sites and investigate complex undersea terrains where the discovery potential is high. The cruise will be conducted on the R/V *Endeavor*, and will include both side scan sonar surveys and exploration with the *Hercules* and *Argus* ROV system.

Hydrothermal Exploration of the Southern Mid-Atlantic Ridge (Apr-27 to Jun-02)
The equatorial Atlantic represents a key study area for the Census of Marine Life's "ChEss" program devoted to understanding the biogeography and biodiversity of chemosynthetic ecosystems. This expedition on the German R/V *Meteor* will investigate four new vent-fields on

the southern Mid-Atlantic Ridge. The first, discovered during a NOAA-sponsored expedition in 2005, is undergoing rapid evolution. The team will use the Autonomous Underwater Vehicle (AUV) *ABE* and the German ROV *Quest* to dive upon three new, previously unexplored vents.

Archaeological Survey off the Virginia Capes (May-30 to Jun-09)
Spurred by an historically significant cannon found by fisherman in 1980, researchers from the University of Rhode Island plan to systematically survey an area off the coast of Cape Henry using the NOAA Ship *Thomas Jefferson* to try to locate a historical shipwreck.

New Ocean Resources: Exploration and Drug Discovery in the "Twilight Zone" (Summer 2006)
The objectives of this project are to explore and survey the biodiversity and distribution patterns of deep fore-reef communities of the Bahamas, and to assess the associated flora and fauna for potential biotechnological uses including drug discovery and fluorescent probe development. The project will use SCUBA and advanced rebreather technologies.

Indianola Archeological Remote-Sensing Survey (Summer 2006)
State archaeologists and volunteers will conduct an archaeological remote-sensing survey and ground-truth sonar targets using SCUBA at the historic (and now abandoned) Port of Indianola. Indianola rivaled Galveston as the premier deep-water port in the mid to late 1800's before two hurricanes devastated the town.

Lake Champlain Shipwreck Survey (Jun-12 to Jun-23)
Researchers aboard the R/V *Neptune* will resurvey areas lacking adequate data for the possible resting places of two commercial era sloops. They will also verify shallow water targets identified during the previous remote sensing survey covering nearly 300 square miles of Lake Champlain's bottomlands.

Search for the *Trouvadore* (Jul-05 to Jul-22)
Investigators will conduct sea bottom and shoreline surveys around sections of East Caicos Island in search of the remains of the Spanish Slaver *Trouvadore* or her survivor camps. Windward Media will take part in the creation of a documentary film about the *Trouvadore,* which wrecked off the island in 1841*,* as a sizeable proportion of the current native population of the Turks and Caicos Islands today is descended from her survivors.

The Search for the Bonhomme Richard, Flagship of John Paul Jones (Jul-17 to late August)
Investigators from the Ocean Technology Foundation and the Navy Historical Center will partner with the University of St Andrews (UK) and others to create a GIS database and map of potentially significant submerged cultural resources, surface geologic features, and bottom sediments in the project area where the *Bonhomme Richard*, flagship of John Paul Jones, is believed to have sunk. Areas identified with the highest probability of her resting placed will be systematically mapped aboard the R/V *Lia* over 40 days using state-of-the-art remote sensing including magnetometry, side-scan sonar and swath bathymetric systems.

Exploring Two Albemarle Sound River Systems (Jul-24 to Aug-17)

Following the discovery of many submerged cultural resources in the Albemarle and Pamlico sounds during surveys in 2004 and 2005, researchers aboard the R/V *Beeliner* will examine vessel deposition patterning and conduct a remote sensing survey in two Albemarle Sound rivers.

Artificial Seep Exploration Experiment (Aug-07 to Aug-23)
This project on the R/V *Seward Johnson* will complete an experiment that began in 2002 to test the feasibility of detecting the local presence of tube worm larvae that are typically associated with deep water seeps and vents. The *Johnson-Sea-Link* submersible will be used to recover the experimental devices deployed more than three years ago, and to characterize the surrounding environment to learn more about how these species populate sites separated by vast distances.

South Atlantic Bight Habitat Mapping (Aug-07 to Sep-03)
This expedition on the NOAA Ship *Nancy Foster* will deploy state-of-the-art sonar to map coral areas, other suspected essential fish habitat areas, and physically- and biogenically-formed bottom features of the outer continental shelf and upper slope of the South Atlantic Bight. This project is aimed at discovering, surveying, and mapping complex habitats and will complement previous and current NOAA-funded projects aimed at determining the factors that constitute spawning grounds for reef fishes, especially deep-reef species.

USS Macon Site Reconnaissance (September 2006)
Following a side scan survey of the USS Macon (a wrecked dirigible) conducted in 2005, researchers from NOAA, USGS and the State of California will investigate the wreck site aboard the NOAA Ship *McArthur II*, using an ROV from the Monterey Bay Aquarium and Research Institute.

Acoustic Exploration of Seafloor Seismic Activity in the Indian Ocean (September 2006)
This is a project will monitor the low-level seismic activity associated with the Indian Ocean ridge system and the Java-Sumatra subduction zone, using a network of temporary (autonomous) hydrophones combined with the three permanent hydro acoustic stations deployed in the Indian Ocean. The project will record seismicity in the remote, and essentially unmonitored and unknown central Indian Ocean. The temporary array will be deployed using the French R/V *Marion Dufresne.*

Arctic Methane Hydrates (Oct-09 to Oct-22)
Biologists and experts in the development of autonomous underwater vehicle (AUV) technology are teaming up to test recently developed AUVs under the Arctic pack ice. NOAA is supplementing this technology development project, funded by NSF and NASA, to explore a 'pockmark' area in the Arctic Ocean. Information collected by the AUVs may point toward evidence of gas hydrates or chemosynthetic life on the seafloor.

New Zealand Chemosynthetic Communities (November 2006)
U.S. and New Zealand scientists are teaming up to study a variety of deep-water habitats that support chemosynthetic life off the coast of New Zealand. Two cruises on the New Zealand R/V *Tangaroa* will provide baseline information vital to a later more comprehensive assessment of these little-known areas.

Winter Oceanographic Exploration of an Offshore Arctic Ecosystem--Assisted by Narwhals (Fall and Winter 2006)

This project takes a novel approach to explore the offshore deep waters of Baffin Bay by using an over wintering top predator as an oceanographic sampling platform. Narwhals will be instrumented with satellite-linked time-depth-temperature recorders collecting water column temperature profiles in the pack ice to >1,500 m depths. This integrated approach will offer high-resolution real time oceanographic data from offshore Baffin Bay in winter, and provide important ecological information about narwhal-pack ice relationships.

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