NOAA Fleet Update
April 2016

The following update provides the status of NOAA’s fleet of ships and aircraft, which play a critical role in the collection of oceanographic, atmospheric, hydrographic, and fisheries data. NOAA’s current fleet of 16 ships – the largest civilian research and survey fleet in the world – and nine aircraft, are operated, managed, and maintained by NOAA’s Office of Marine and Aviation Operations (OMAO). OMAO includes civilians, mariners, and officers of the United States NOAA Commissioned Officer Corps (NOAA Corps), one of the nation’s seven Uniformed Services.

Find us on Facebook for the latest news and activities.
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Office of Marine and Aviation Operations (OMAO) and the NOAA Commissioned Officer Corps

- In the News -

**Saving Right Whales From 1,000 Feet Above**
-WUSF-FM
Melanie White is on a mission to help save the elusive - and endangered - North Atlantic Right Whale. "They have been here longer than we have, and there's no reason they shouldn't be able to survive and co-exist with humans," she says. For a decade now, White has been spending most of her days in cramped planes such as DeHavilland Twin Otter [sic], whose twin propellers sputter to life on a cold winter morning on the Southern Georgia coast. Her uniform: a green flight suit and a pair of fingerless gloves...White is with Sea to Shore Alliance, a conservation group based in Sarasota. The Double Otter, based out of Tampa's MacDill Air Force Base, is provided through an agreement with NOAA, the National Oceanic and Atmospheric Administration...

**Deep-Sea Robot Spies Ghostly, Unknown Octopus**
-Smithsonian
No matter how deep scientists venture, the ocean always seems to be full of surprises. In late February, researchers from the National Oceanic and Atmospheric Administration (NOAA) took a deep-sea robot for a spin near Hawaii, and they stumbled across a single, small octopus unlike any they'd ever seen before. For a few years, the NOAA has dispatched the NOAA Ship Okeanos Explorer to oceans all over the world to explore with its deep-diving robot, the Deep Discoverer. For the first dive of the year, the researchers sent the robot to examine the ocean floor northeast of Hawaii’s Necker Island. As it trawled around about two-and-a-half miles below the surface, the Deep Discoverer came across a tiny, ghost-like octopus hanging out on a large, flat rock all by itself, Sarah Laskow reports for Atlas Obscura...

**NOAA vessel carries out research on data poor fish**
-Talanei (American Samoa) Full story below
The NOAA research vessel Oscar Elton Sette is carrying out fisheries studies in the waters of Samoa and American Samoa for the next 100 days. This morning Commanding Officer of the vessel, Lt. Commander Keith Golden, and his team of commissioned officers, scientists and crew hosted traditional leaders on board. According to the Captain, it's important for any mission that NOAA carries out in foreign waters, that the community understands their purpose and methods and support their work. Secretary of Samoan Affairs Mauga Tasi Asuega and District Governors Misaalefua Hudson and Alo Dr. Paul Stevenson received a briefing about the vessel's mission in the Samoan archipelago from Captain Golden and Supervisory Research Scientist Robert Humphreys. While the vessel will be mostly out at sea there will be times when small boats will be close to shore collecting small fish for research purposes. Dr. Humphreys says their work here is to improve data on certain reef fish classified as data poor fish. A local marine science student who interned at the National Marine Sanctuary, Ropate Delana, is joining the expedition. And one staff member from the Department of Marine and Wildlife Resources will go on the Samoa leg of the research. The Samoan Affairs officials got a tour of the vessel and were treated to a lavish breakfast served up by the American Samoan head chef, Clementine Gebauer Lutali. Right after hosting the local officials, the vessel left port to study fish but will be back in May and if all goes according to plan; there will be opportunity for school tours of the research vessel.
**NOAA Aircraft, Ship Support Major El Niño Study**
Organized by NOAA’s Earth Science Research Laboratory in Boulder, CO, research flight tracks were generally split between studies of the poleward upper level moisture and wind flow from the equatorial Inter-Tropical Convergence Zone (ITCZ), and focused intensive dropsonde and Tail Doppler Radar coverage of Meso-Convective Systems embedded in the ITCZ. The NOAA G-IV is part of El Niño Rapid Response ended with a series of four missions over about nine days, following moisture sources from the ITCZ at the dateline to Hawaii and toward the west coast as this tropical pulse became an Atmospheric River presently impacting California.

*Photo Credit: NOAA*

**NOAA G-IV embarks on its final El Niño Rapid Response mission.**

*Photo Credit: NOAA*

**NOAA G-IV on El Niño rapid Response Mission with Diamond Head Crater in the background.**

*Photo Credit: Mike Holmes/NOAA*

Some interesting statistics from NOAA’s portion of the multi-agency campaign:

- 53 days in the field
- 175 research hours flown
- 77,000 miles of research tracks
- 630 dropsondes, processed.
NOAA Basic Officer Training Class (BOTC) 127

It’s been an exciting month for BOTC 127. Between firefighting, simulator training, meet-and-greets with NOAA Corps officers, achieving Senior Status, and embarking aboard USCGC Eagle, the Officer Candidates have been very busy preparing for life in the fleet. With Billet Night on the horizon, the students are eagerly waiting to find out what the future holds for them.

Officer Candidate McAcy crosses the brow of USCGC Eagle, joining her NOAA and USCG shipmates for the two-week training cruise
[Photo: ENS DeCastro/NOAA]

Officer Candidate Fredrick officially enters Senior Status. The shoulder boards being placed on his uniform signify his position as Platoon Commander. Senior Status is the final step the students take in their transition to Junior Officers preparing to enter the fleet.
[Photo: ENS DeCastro/NOAA]
Independent Review Team

In January 2016, OMAO convened an Independent Review Team (IRT) to conduct a review of our ship fleet and:

- The IRT will assess the health of the NOAA Fleet of research vessels, requirements for recapitalization, and analysis of operational, maintenance practices and technology infusion, as well as:
  - Utilization of alternatives to the NOAA Fleet (commercial contracting, Academic Research Fleet, other public-funded vessels) to meet requirements;
  - Analysis of current operational systems (crewing, scheduling) and current maintenance practices; and
  - Technology readiness and infusion (instrumentation and mechanical).
- The IRT will deliver a final report in September 2016.
- The guidance from the IRT will inform modernization plans of the NOAA fleet in alignment with the Federal Oceanographic fleet, charter options, as well as operation and maintenance strategies of the current fleet.
- The IRT process & report is independent of any larger Administration planning efforts related to the federal fleet.
- The IRT consists of twelve persons from across Federal government, Academia, and private sector to include expertise in science, ship-based data collection requirements, vessel operation, vessel design and building, and ship-based technological advancements

Independent Review Team

Co-Chairs:
Dick West
RADM, US Navy (ret)

Robert Winokur
Senior Advisor
Michigan Tech Research Institute / Michigan Tech Univ.

Members:
Fred Byus
RDMF, US Navy (ret)
Vice President & General Manager
Battelle Mission and Defense Technologies

Dr. John Hughes-Clarke
Professor
University of New Hampshire

John Crowley
RADM, US Coast Guard (ret)
Executive Director
National Association of Waterfront Employers

Bauke (Bob) Houtman
Head, Integrative Programs Section
National Science Foundation, Ocean Sciences Division

Dr. Steve Murawski
Professor
University of South Florida

Blake Powell
President
JMS Naval Architects

Nancy Rabalais, Ph.D.
Executive Director and Professor
Louisiana Universities Marine Consortium
National Defense University, Penn State University

Dr. Steve Ramberg
Distinguished Research Fellow
Center for Technology and National Security Policy,

Robert (Tim) Schnoor
Ocean Research Facilities Manager
Office of Naval Research

Dick Vortmann
President and CEO (retired)
National Steel and Shipbuilding Company (NASSCO)

NOAA Liaisons:
Nancy Hann, CDR/NOAA
Chief of Staff
NOAA Office of Marine and Aviation Operations

Richard J. Park, LT/NOAA
Flag Aide to Director, NOAA Corps and OMAO
NOAA Office of Marine and Aviation Operations
OMAO’s Ships and Centers

OMAO’s Ship Tracker (screen shot below) shows information about the location - present and past - of our fleet of research and survey ships. Please note: To access Ship Tracker you must create an account with a .gov or .mil email address. All other access is restricted.

OMAO’s ships and related Marine Centers are listed below based on the geographical location of the vessels’ homeports starting in the Northeast and ending in the Pacific.

**New Castle, NH**
**NOAA Ship Ferdinand R. Hassler**
Commanding Officer: LCDR Briana Welton  
Primary Mission Category: Hydrographic Surveys  
Ship Status: Dry Dock Repair Period, ship will be alongside for scheduled maintenance, repairs, scientific data processing, crew rest, and training.

**Woods Hole, MA (currently docks in Newport, RI)**
**NOAA Ship Henry B. Bigelow**
Commanding Officer: CDR G. Mark Miller  
Primary Mission Category: Fisheries Research  
DEPART: Norfolk, Virginia  
ARRIVE: Newport, Rhode Island

**Project 1:** Spring Bottom Trawl Survey  
**Objectives:** Determine the spring distribution and relative abundance of fish and invertebrate species found on the continental shelf and upper slope, including the collection of additional biological information following the pre-established sampling plan at the direction of the Chief Scientist. Opportunistically evaluate survey gear efficiency, methods, and survey related equipment that may benefit the trawl survey and fish stock assessments. Collect oceanographic data including Conductivity, Temperature, Depth (CTD) casts and bongo tows at selected stations; and opportunistically collect acoustic data along cruise tracks with the EK-60 and ME-70 acoustic systems.
Davisville, RI
NOAA Ship Okeanos Explorer
Commanding Officer: CDR Mark Wetzler
Primary Mission Category: Oceanographic Exploration and Research
Depart: Honolulu, Hawaii
Arrive: Kwajalein, Republic of the Marshall Islands
Depart: Apra Harbor, Guam
Arrive: Apra Harbor, Guam

Project 1: CAPSTONE
Objectives: CAPSTONE is a three year initiative to collect critical baseline NOAA science and management needs in largely unknown areas of U.S. waters in the Pacific. Operations conducted during this campaign support NOAA missions to understand and predict changes in climate, weather, oceans and coasts, and share that knowledge and information with others. Much of this work associated with CAPSTONE will contribute to and complement Deep Sea Coral Research and Technology Program’s three-year Pacific Islands Regional Initiative.

[Photo: NOAA]

Norfolk, VA
NOAA Ship Thomas Jefferson
Commanding Officer: CAPT Shepard Smith
Primary Mission Category: Hydrographic Surveys

Ship Status: Alongside US Coast Guard Yard Curtis Bay - Baltimore, Maryland, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

OMAO’S MARINE OPERATIONS CENTER – ATLANTIC (MOC-A)
CAPT Anne Lynch, Commanding Officer MOC-A
MOC-A serves as a homeport for one NOAA ship, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the research and survey ships in NOAA’s Atlantic fleet. Each year these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.
Charleston, SC  
NOAA Ship Nancy Foster  
Commanding Officer: LCDR Jeffrey Shoup  
Primary Mission Category: Oceanographic Research, Environmental Assessment  
Depart: San Juan, Puerto Rico  
Depart: Ponce, Puerto Rico  
Depart: San Juan, Puerto Rico  
Arrive: Ponce, Puerto Rico  
Arrive: San Juan, Puerto Rico  
Arrive: Miami, Florida  

Project 1: Essential Fish Habitat  
Objectives: The Center for Coastal Monitoring and Assessment will be conducting the tenth year of an ongoing scientific research mission onboard NOAA Ship Nancy Foster funded by NOAA’s Coral Reef Conservation Program. The purpose of the cruise will be to collect swath bathymetry, acoustical backscatter, remotely operated vehicle (ROV) optical validation, fishery acoustics, and Slocum Glider deployments within coastal waters of Puerto Rico and St. Thomas, United States Virgin Islands.

Project 2: Bluefin Tuna Ecology and Coral Reef Ecosystem Research  
Objectives: Southeast Fisheries Science Center and the Atlantic Oceanographic and Meteorological Laboratory will be collaborating on two joint projects focused on Bluefin Tuna Ecology and Coral Reef Ecosystem research. This project will allow NOAA to gain a better understanding of the importance of alternative spawning sites and to improve management of the western Atlantic stock, as well as continue a multi-year, interdisciplinary research project to conduct biological and physical oceanographic surveys of the Virgin Islands bank ecosystems and surrounding regional waters.

NOAA Ship Ronald H. Brown  
Commanding Officer: CAPT Robert Kamphaus  
Primary Mission Category: Oceanographic Research, Environmental Assessment  
DEPART: San Diego, California  
ARRIVE: San Diego, California  

Project 1: Eastern Tropical Pacific Nitrogen Fixation  
Objectives: Measure Nitrogen fixation and the diversity of diazotrophic communities with respect to vertical gradients of oxygen, light, and dissolved nitrogen concentrations. We will compare these detailed vertical profiles with similar profiles made adjacent waters. In addition, we will compare and contrast two very different regions; one that includes some of the most productive oceanic waters on Earth, and another that is far less productive.

Pascagoula, MS  
NOAA Ship Oregon II  
Commanding Officer: Master Dave Nelson  
Primary Mission Category: Fisheries Research  
DEPART: Pascagoula, Mississippi  
DEPART: Galveston, Texas  
ARRIVE: Galveston, Texas  
ARRIVE: Pascagoula, Mississippi  

Project 1: Experimental Longline Survey  
Objectives: Conduct experimental bottom longline survey, on the U.S. continental shelf in the north east Gulf of Mexico. The comparison of bait types (squid vs. Atlantic Mackerel), gangion material (monofilament gangions vs. steel braided leaders), and deployment of a ROV for species identification and size; will be the primary focus of the investigation.
NOAA Ship *Oregon II* arriving in Pascagoula, Mississippi  [Photo: Alanna Frayne/NOAA]

**NOAA Ship Pisces**

**Commanding Officer:** CAPT Michael Hopkins  
**Primary Mission Category:** Fisheries Research  
**DEPART:** Pascagoula, Mississippi  
**ARRIVE:** Galveston, Texas  
**DEPART:** Galveston, Texas  
**ARRIVE:** Pascagoula, Mississippi

**Project 1:** SEAMAP Reef Fish Video Survey  
**Objectives:** Conduct a survey of reef fish on the U.S. continental shelf of the GOM using a custom built stereo/video camera system and bandit reels. The ship's ME-70 multi-beam system and Simrad EK60 echo-sounder will be used to map predetermined targeted areas on a nightly basis to improve or increase the reef fish sample universe.

**NOAA Ship Gordon Gunter**

**Commanding Officer:** Master Donn Pratt  
**Primary Mission Category:** Fisheries Research  
**DEPART:** Pascagoula, Mississippi  
**ARRIVE:** Woods Hole, Massachusetts  
**DEPART:** Woods Hole, Massachusetts  
**ARRIVE:** Newport, Rhode Island

**Project 1:** Northern Right Whale Biology  
**Objectives:** Collect photo ID and biopsy samples of baleen whales. Primary target species is North Atlantic right whales. Apply dermal tags to Right and Sei whales. Conduct oceanographic sampling, zooplankton sampling in proximity to tagged whales. Collect Right and Sei whale fecal and blow samples for hormone analysis, and deploy sonobuoys near aggregations of whales.

**San Diego, CA**

**NOAA Ship Reuben Lasker**

**Commanding Officer:** CDR John Crofts  
**Primary Mission Category:** Fisheries Research  
**DEPART:** San Diego, California  
**ARRIVE:** San Francisco, California  
**DEPART:** San Francisco, California  
**ARRIVE:** San Francisco, California

**Project 1:** Rockfish Recruitment and Ecosystem Assessment  
**Objectives:** This project will sample for pelagic juvenile rockfish (*Sebastes* spp.) and other epi-pelagic micronekton. Characterize prevailing ocean conditions and examine prominent hydrographic features as well as harmful algal blooms. Map the distribution and abundance of krill (Euphausiacea). Observe seabird and marine mammal distribution and abundance. Finally collect Humboldt squid (*Dosidicus gigas*), and sample for juvenile salmon (*Oncorhynchus* spp.).
Project 2: Coastal Pelagic Species

Objectives: Survey the distributions and abundances of pelagic fish stocks, their prey, and their biotic and abiotic environments in the area of the California Current between Newport, Oregon and Point Conception, California. The goal is to cover the northern inshore and offshore waters by occupying transect lines at 20 mile spacing in those areas where eggs and schools are present. If time allows, occupation of stations within the Southern California Bight will be conducted with data collected during the spring CalCOFI survey from the NOAA ship Bell M. Shimada. These stations will be added on an opportunistic basis.

Newport, OR

NOAA Ship Rainier

Commanding Officer: CDR E.J. Van Den Ameele
Primary Mission Category: Hydrographic Surveys

Ship Status: In drydock at Mare Island Drydock, in Vallejo, California, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

The NOAA Ship Rainier at Mare Island Drydock, in Vallejo, California.
[Photo: NOAA]

NOAA Ship Bell M. Shimada

Commanding Officer: CDR Paul Kunicki
Primary Mission Category: Fisheries Research
DEPART: San Diego, California
ARRIVE: San Francisco, California
DEPART: San Francisco, California
ARRIVE: San Francisco, California

Project 1: CalCOFI

Objectives: Survey the distributions and abundances of pelagic fish stocks, their prey, and their biotic and abiotic environments in the area of the California Current between San Francisco, California and San Diego, California.

Project 2: Patterns in Deep Sea Coral and Sponge Communities

Objectives: To-date over 50% of the Channel Islands National Marine Sanctuary remains uncharacterized yet anecdotal evidence suggests that these areas are home to large populations of commercially important species including fish and lobster as well as fragile ecosystem components such as deep sea corals. With a mandate to preserve and maintain this special place, sanctuary management requires a detailed understanding of the distribution, abundance and condition of the resources at the site. During this mission we will simultaneously acquire fish and seafloor data with the use of the vessel’s ME-70 and EK-60 sonars together with the Office of Coast Survey’s REMUS-600 mapping Autonomous Underwater Vehicle. This information will help inform resource protection issues and will provide valuable input into the next revision of the sanctuary management plan.
OMAO’S MARINE OPERATIONS
CAPT Todd Bridgeman, Director of Marine Operations
OMAO’s Marine Operations over-sees operations of the three regional Centers, including the Marine Operations Center-Pacific, Marine Operations Center-Atlantic, and Marine Operations Center-Pacific Islands.

OMAO’S MARINE OPERATIONS CENTER – PACIFIC (MOC-P)
CDR Brian Parker, Commanding Officer MOC-P
MOC-P serves as a homeport for two NOAA ships, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the research and survey ships in NOAA’s Pacific fleet. Each year these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.

Ketchikan, AK
NOAA Ship Fairweather
Commanding Officer: CDR David Zezula
Primary Mission Category: Hydrographic Surveys
Depart: Seattle, Washington Arrive: Ketchikan, Alaska

Project 1: Mapping West of Prince Wales Island, Alaska.
Objective: To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation, as identified during the course of survey operations.

Kodiak, AK
NOAA Ship Oscar Dyson
Commanding Officer: CDR Arthur “Jesse” Stark
Primary Mission Category: Fisheries Research
Depart: Kodiak, Alaska Arrive: Dutch Harbor, Alaska

Project 1: Ecology of Ice-associated Seals in the Bering Sea
Objective: Study of the habitat requirements and ecological relationships with sea ice, of ribbon and spotted seals in the core of their Bering Sea breeding area. The seals’ movements, haul-out behavior, diet, genetic population structure, health will be investigated and monitored. A particular focus of the work in 2016 will be on health and condition of young-of-the-year seals and potential impacts of diminishing sea ice.

Honolulu, HI
NOAA Ship Hi’ialakai
Commanding Officer: CDR Elizabeth Kretovic
Primary Mission Category: Oceanographic Research, Environmental Assessment
Depart: Pearl Harbor, Hawaii Arrive: Pearl Harbor, Hawaii

Project 1: Hawaiian Monk Seal Population Assessment
Objective: This project will deploy Hawaiian monk seal camps at French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef and Kure Atoll. Conduct monk seal surveys at Ni’ihau, Midway Atoll, and opportunistically at Nihoa and Necker Islands. Perform opportunistic health assessment and sampling of seals at all sites visited. Translocate injured Hawaiian monk seals from Northwestern Hawaiian Islands’ populations for rehabilitation at a facility in Kona, Hawaii. Deliver supplies to Kure Atoll for the Department of Forestry and Wildlife, Department of Land and Natural Resources, State of Hawaii. Finally, set up a collaborative project with Sustainable Coastlines Hawaii for marine debris cleanup and monitoring during the field season.
The NOAA Ship Hi’ialakai as seen from one of its small boats. Divers don’t actually dive from the ship itself, but enter the water from the small boats which are launched at research sites. [Photo: NOAA]

**NOAA Ship Oscar Elton Sette**

**Commanding Officer:** LCDR Keith Golden  
**Primary Mission Category:** Fisheries Research  
**DEPART:** Apia, American Samoa  
**ARRIVE:** Apia, American Samoa  
**DEPART:** Apia, American Samoa  
**ARRIVE:** Pago Pago, American Samoa

**Project:** Samoan Archipelago Fisheries Life History  
**Objectives:** Support deep-slope and shallow-water bottom fish, coastal pelagic fishes, and coral reef fishes bio sampling, collection of larval and juvenile stage pelagic and bottom fish species, surveys of coral reef ecosystems, and exploration of seamount benthic species, through collection of adult deep-slope bottom fish, coral reef fish, and coastal pelagic fishes. Collection of pelagic stage (larvae and juveniles) eteline snappers and tuna, as well as fishes and invertebrates at offshore seamounts using strings of Fathoms Plus traps. Oceanographic data from routine conductivity, temperature, depth casts, continuous acoustic doppler current profiler, and thermosalinograph measurements and daylight coral reefs snorkel surveys.

**OMAO’S MARINE OPERATIONS CENTER – PACIFIC ISLANDS (MOC-PI)**

**CDR Matthew Wingate, Commanding Officer MOC-PI**

MOC-PI serves as a homeport for two NOAA ships, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the ships in NOAA’s Pacific Islands’ fleet.
Tampa, Florida
WP-3D (N42RF) – “Hurricane Hunter”
Aircraft Commander: N/A
Temporary Base: Naval Air Station Jacksonville, FL
Current Mission: Scheduled Maintenance - Until June 2016

The aircraft is at the Naval Air Station Jacksonville, Florida undergoing an extensive refurbishment period which will include replacing the wings and upgrading various components. This effort will extend the useful life of the aircraft for another 15-20 years.

UPDATE - Delay in WP-3D Service Life Extension Timetable

- The first NOAA P-3 (N42RF) currently in maintenance at the U.S. Navy Fleet Readiness Center Southeast (FRCSE) in Jacksonville, FL, will experience a 1 month delay in completion of its service life extension. This delay will have no scheduled impacts on NOAA programs, and the aircraft is scheduled to return to service for the last four months of the 2016 hurricane season.
- NOAA’s second P-3 (N43RF) was scheduled to enter its service life extension maintenance period in Aug 2016. This project has experienced a 6 month delay due to an increased workload at FRCSE. The updated timeline now calls for the service life extension to begin in Feb 2017 and be completed approximately 14 months later.
- There are no programmatic impacts of the 1 month delay for N42RF or the 6 month slip for N43RF. Due to the schedule changes, NOAA will now have 2 aircraft available for the 2016 Hurricane season and one available for the 2017 Hurricane Season, the scenario before the schedule changes.

WP-3D (N43RF) – “Hurricane Hunter”
Aircraft Commander: CDR Price/ LCDR Kerns
Temporary Base: Alaska and Greenland
Current Mission: NASA Ice Bridge

NASA’s Operation IceBridge images Earth’s polar ice in unprecedented detail to better understand processes that connect the Polar Regions with the global climate system. Utilizing NOAA’s highly specialized research aircraft, IceBridge employs the most sophisticated suite of science instruments ever assembled to characterize annual changes in thickness of sea ice, glaciers, and ice sheets. In addition, IceBridge collects critical data used to predict the response of Earth’s polar ice to climate change and resulting sea-level rise. IceBridge also helps bridge the gap in polar observations between NASA’s ICESat satellite missions.

Jet Prop Commander (N45RF)
Aircraft Commander: LT Salling/ LTJG Doremus
Temporary Base: Various locations
Current Mission: Soil Moisture Surveys

NOAA aircraft use specialized detection equipment to make accurate, real-time measurements of snowpack characteristics and soil moisture across the country. This information is critical for managers and others to make optimal decisions supporting river, flood, and water supply forecasting, agriculture and forest management, recreation and winter tourism, and the commerce, industry, and transportation sectors of the Nation’s economy. A single snowmelt flood can cause billions of dollars in damage and in the western areas of the country spring snowmelt provides over 70% of the annual water supply. The benefits of accurate snow and soil moisture measurements are immense and NOAA aircraft are uniquely capable to provide this information.
Gulfstream IV (N49RF)
Aircraft Commander: N/A
Current Mission: Maintenance (through April 2016)
The aircraft is undergoing scheduled maintenance for inspections and equipment upgrades that will increase capability to support NOAA science and extend the life of the aircraft.

Twin Otter (N46RF)
Aircraft Commander: LT Marino/LTJG Norman
Temporary Base: Various locations
Current Mission: Soil Moisture Surveys
NOAA aircraft use specialized detection equipment to make accurate, real-time measurements of snowpack characteristics and soil moisture across the country. This information is critical for managers and others to make optimal decisions supporting river, flood, and water supply forecasting, agriculture and forest management, recreation and winter tourism, and the commerce, industry, and transportation sectors of the Nation’s economy. A single snowmelt flood can cause billions of dollars in damage and in the western areas of the country spring snowmelt provides over 70% of the annual water supply. The benefits of accurate snow and soil moisture measurements are immense and NOAA aircraft are uniquely capable to provide this information.

King Air (N68RF)
Aircraft Commander: CDR Sweeney/LT Sims
Current Mission: Various Locations – Continuous Coastal Mapping
Coastal Mapping is an on-going mission of NOAA’s National Geodetic Survey (NGS) to survey approximately 95,000 miles of United States coastline providing the Nation with an accurate, up-to-date and seamless database of the national shoreline. This data is used as the baseline for defining America’s marine territorial limits, including its Exclusive Economic Zone, and for the geographic reference needed to manage coastal resources and support marine navigation. Stereo photogrammetry and Light Detection and Ranging (LiDAR) are used to produce a digital database. In addition, the Coastal Mapping Program supports NOAA’s homeland security and emergency response requirements by rapidly acquiring and disseminating a variety of datasets to federal, state, and local government agencies as well as the general public.

Twin Otter (N48RF)
Aircraft Commander: ENS Blaauboer
Temporary base: Various locations
Current Mission: North Atlantic Right Whale
North Atlantic right whales are critically endangered and listed under the Marine Mammal Protection Act. Aerial surveys serve multiple objectives with regard to conservation including providing locations and distribution of right whales to mariners to avoid collisions with ships, photo identification records on right whales, information on distribution and abundance of marine mammals and turtles, and provide sightings of dead whales for monitoring mortality.

Twin Otter (N56RF)
Aircraft Commander: LCDR Mansour
Temporary base: Florida Keys
Current Mission: National Marine Sanctuary Surveys
The Florida Keys National Marine Sanctuary (FKNMS) encompasses approximately 2,900 square nautical miles of coastal and oceanic waters. The purpose of this project is to acquire data providing a greater understanding of usage patterns within the FKNMS and surrounding waters. This information is essential to help sanctuary managers better manage sanctuary resources, inform modifications to or the creation of new marine zones, and for revision of the overall sanctuary management plan.
**Twin Otter (N57RF)**

**Aircraft Commander:** LT Mitchell  
**Temporary base:** Various Locations  
**Current Mission:** TopoBathy LiDAR

The TopoBathy LiDAR mission will collect data in the coastal zone used to produce the most up-to-date- and accurate marine navigation charts, FEMA flood plain and inundation maps, and other Integrated Ocean and Coastal Mapping (IOCM) applications. Data gathered will help ensure safe and efficient marine transportation and benefit coastal communities with accurate resource management and aid emergency response efforts.

**OMAO’S AIRCRAFT OPERATIONS CENTER (AOC)**

**CAPT Michael Silah, Commanding Officer AOC**

The AOC, located at MacDill Air Force Base in Tampa, Florida, serves as the main base for OMAO’s fleet of nine aircraft and provides capable, mission-ready aircraft and professional crews to the scientific community. Whether studying global climate change or acid rain, assessing marine mammal populations, surveying coastal erosion, investigating oil spills, flight checking aeronautical charts, or improving hurricane prediction models, the AOC flight crews continue to operate in some of the world's most demanding flight regimes.

Lead Technician, Mike Mascaro, installs upgraded mission system wiring in the leading edge of NOAA P3 recently installed new wing-set at the Navy's Fleet Readiness Center Southeast depot at Naval Air Station Jacksonville. This is one of many upgrades AOC personnel are engaged in while the plane is undergoing depot level work and being prepared for this summer’s hurricane season.

[Photo: Terry Lynch/NOAA]
Unmanned Systems Support

**NASA Global Hawk**

**Location:** Edwards Air Force Base (AFB), CA/ NASA Wallops Flight facility  
**Mission:** Maintenance  
**Project Manager:** LCDR Neuhaus  

The RQ-4 Global Hawk aircraft successfully completed the NOAA funded El Nino Southern Oscillation (ENSO) Rapid Response series of flights in early spring 2016. For the month of April, the aircraft will complete required pilot proficiency flights and aircraft maintenance before being configured for another project. NOAA will fund a 2016 summer-fall hurricane surveillance campaign called SHOUT (Sensing Hazards Operationally using Unmanned Technology). SHOUT officially begins in early July with payload integration followed by a lengthy deployment to Wallops, VA. Flight operations for SHOUT will base out of Edwards AFB, CA and Wallops, VA, during the science campaign to expand the Global Hawk’s operational area to the Pacific, Atlantic and Gulf of Mexico.

**APH-22 Hexacopter**

**Location:** Everett, WA  
**Mission:** Levee Setback Environmental Condition Monitoring  

The NOAA Northwest Restoration Center seeks to add another layer of information to the monitoring effort on levees in the Snohomish River estuary in Puget Sound by utilizing data collected by the APH-22 UAS. The broad goals of the project are to transform the site into a vegetated, self-sustaining wetland that will maximize the modern, natural ecological potential of the site; minimize adverse effects on, and add socio-economic value to the surrounding community; and advance the science and practice of restoration.

**Location:** Piedras Blancas, CA  
**Mission:** Grey Whale Photogrammetry  

The Southwest Fisheries Science Center (SWFSC) plans to survey Gray Whales from Piedras Blancas Lighthouse near San Simeon, CA during the period of April to May. The plan is to assess the body condition and nutritional status of reproductive female gray whales based on measurements of length and width from vertical aerial photographs. Estimates of length will inform long-term growth trends and minimum size at sexual maturity for this population. Widths will be used to infer current nutritional status and to establish a baseline of conditions for reproductive females within this population. These metrics will be compared to samples collected from manned platforms in previous years and data collected during scientific whaling operations in the late 1950’s and 1960’s. The data will be used to inform us on how changes in the Arctic are impacting the population of large whales. The expectation is that this sampling will become part of our annual survey of northbound gray whale cow/calf pairs from the Piedras Blancas Light Station.

**Location:** Cape Cod, MA  
**Mission:** Cape Cod Whale Photogrammetry  

The Northeast Fisheries Science Center (NEFSC) plans to survey North Atlantic Right Whales in Cape Cod Bay, MA during the period of April to May. Photographs will be collected for the purpose of cataloging individuals, obtaining measurements for body length, documenting entanglements and quantifying wildlife response to UAV’s. The operation will be conducted utilizing two scientists and will be operating from a NOAA vessel. All surveys will be in coordination with other agency vessels and a non-NOAA survey plane operated by the Center for Coastal Studies.

**Location:** Cape Cod, MA  
**Mission:** Cape Cod Whale Photogrammetry  

The Southwest Fisheries Science Center (SWFSC) plans to survey North Atlantic Right Whales in the vicinity of Cape Cod, MA during the period of March to April. This collaboration between SWFSC and Woods Hole Oceanographic Institution (WHOI) will obtain aerial images and blow samples from the whales while the whales are at the surface. These photographs and blow samples will provide the data needed to make health assessments of the Right Whale population.
Puma UAS

Location: USCGC Polar Star (WAGB10)
Mission: VORTEX Convective Initiation

The NOAA VORTEX SE program plans to measure the conditions that lead to Convective Initiation (CI) in the lower boundary layer in Northern Alabama. A PUMA UAS system (N542FC), owned by NOAA/ATDD, will be used to measure the dynamics of land-atmosphere interactions in the lower boundary layer. ATDD’s DJI S-1000 will also be used to perform storm damage assessment over a large area of Northern Alabama. The visible and near infrared cameras installed on the S-1000 will be used to document storm damage to assist the National Weather Service with determining the category of any tornado activity in the area that occurs during the VORTEX SE intensive study periods.
OMAO Partnerships

United States Senate Committee on Commerce, Science, and Transportation
Location: Washington, DC
Detail: LCDR Wendy Lewis, NOAA Commissioned Officer Corps
LCDR Lewis is currently on detail to the Committee with the staff of the Chair, Senator John Thune (R-SD), where she is assisting on activities pertaining to oceans, atmosphere, and fisheries policy, as well as other matters within the Committee’s jurisdiction.

National Science Foundation
Location: Antarctica
Mission: LT Jesse Milton, NOAA Commissioned Officer Corps
Members of the NOAA Commissioned Officer Corps carry out NOAA's mission in remote locations across the globe. LT Milton is assigned to Antarctica where he serves as the Station Chief for NOAA's Atmospheric Research Observatory (ARO) at the Amundsen-Scott South Pole Station. The ARO at the Amundsen-Scott South Pole Station is a National Science Foundation facility used in support of scientific research related to atmospheric phenomena.

Department of Defense - U.S. Pacific Command (USPACOM)
Location: Honolulu, Hawaii
Embedded Liaison: CAPT Barry Choy, NOAA Commissioned Officer Corps
The U.S. Pacific Command (USPACOM) area of responsibility encompasses approximately half the earth's surface and more than half of its population. The 36 nations that comprise the Asia-Pacific include: two of the three largest economies and nine of the ten smallest; the most populous nation; the largest democracy; the largest Muslim-majority nation; and the smallest republic in the world. The region is a vital driver of the global economy and includes the world's busiest international sea lanes and nine of the ten largest ports. By any meaningful measure, the Asia-Pacific is also the most militarized region in the world, with seven of the world's ten largest standing militaries and five of the world's declared nuclear nations. Under these circumstances, the strategic complexity facing the region is unique. CAPT Choy is linked closely with the activities within the region allowing for identification of opportunities and cooperation between USPACOM and NOAA, and better overall government function situational awareness in the region.

Department of Defense - U.S. Northern Command (USNORTHCOM)
Location: Boulder, Colorado
Embedded Liaison: CAPT Mark Moran, NOAA Commissioned Officer Corps
U.S. Northern Command (USNORTHCOM) partners to conduct homeland defense, civil support, and security cooperation to defend and secure the United States and its interests. NORTHCOM's area of responsibility includes air, land, and sea approaches and encompasses the continental United States, Alaska, Canada, Mexico, and the surrounding water out to approximately 500 nautical miles. It also includes the Gulf of Mexico, the Straits of Florida, and portions of the Caribbean region that include The Bahamas, Puerto Rico, and the U.S. Virgin Islands. CAPT Moran serves as the liaison for the NOAA Corps, helping to plan, organize, and execute homeland defense and civil support missions.
**Department of Defense - U.S. Navy**

**Location:** Washington, DC  
**Embedded Liaison:** CDR Christiaan van Westendorp, NOAA Commissioned Officer Corps  
CDR van Westendorp serves as NOAA liaison to the Oceanographer of the Navy and is an important interface between the U.S. Navy and other U.S. Federal Agencies, including NOAA. As NOAA Liaison, CDR van Westendorp serves as the Head of the Interagency Policy Branch of the International and Interagency Policy Division, Office of the Oceanographer of the Navy, located at the U.S. Naval Observatory. The mission of this Division is to coordinate and execute the Oceanographer of the Navy functions related to policy and programs involving international and/or interagency oceanography. Oceanography includes meteorology, oceanography, mapping, charting and geodesy, astronomy, and precise time and time interval.

**Location:** Stennis Space Center, Mississippi  
**Embedded Liaison:** LTJG Laura Dwyer, NOAA Commissioned Officer Corps  
Embedded in the Navy’s Naval Oceanography Mine Warfare Center, LTJG Laura Dwyer works side by side with Navy officers operating Unmanned Underwater Vehicles worldwide and is currently stationed at Stennis Space Center. This collaboration will provide knowledge and experience that will keep NOAA on the cutting edge of this emerging technology as well as strengthen the partnership between NOAA and the Navy.

**Department of Homeland Security - U.S. Coast Guard**

**Location:** Washington, DC  
**Embedded Liaison:** CAPT Scott Sirois, NOAA Commissioned Officer Corps  
As the NOAA liaison to the United States Coast Guard (USCG), CAPT Sirois maintains a current and comprehensive knowledge of interagency activities and policies related to the USCG and NOAA. He identifies potential conflicts or benefits issues for analysis and evaluation, conducts appropriate assessments and studies, and serves as the interface between NOAA and the USCG. CAPT Sirois initiates, designs, and implements strategies through federal agency liaison and coordination that results in cooperative arrangements for maritime security, oceanographic research, hazardous materials spill response, and many other activities.

**Consortium for Ocean Leadership**

**Location:** Washington, DC  
**Embedded Liaison:** LCDR Josh Slater, NOAA Commissioned Officer Corps  
LCDR Josh Slater serves as the NOAA liaison to the Consortium for Ocean Leadership (COL) and maintains a current and comprehensive knowledge of activities and policies related to COL’s work and NOAA. The Consortium for Ocean Leadership represents more than 100 of the leading public and private ocean research and education institutions, aquaria and industry with the mission to advance research, education and sound ocean policy.
The mission of the Teacher at Sea (TAS) program is to give teachers a clearer insight into our ocean planet, a greater understanding of maritime work and studies, and to increase their level of environmental literacy by fostering an interdisciplinary research experience. The program provides a unique environment for learning and teaching by sending kindergarten through college-level teachers to sea aboard NOAA research and survey ships to work under the tutelage of scientists and crew. Then, armed with new understanding and experience, teachers bring this knowledge back to their classrooms. Since its inception in 1990, the program has enabled more than 600 teachers to gain first-hand experience of science and life at sea. By participating in this program, teachers enrich their classroom curricula with knowledge that can only be gained by living and working side-by-side, day and night, with those who contribute to the world's body of oceanic and atmospheric scientific knowledge. Below is a list of the NOAA Teachers at Sea for the current monthly update for the 2016 Field Season. Once they have embarked on their cruise, you can gain access to their blogs which document their missions at sea and offer a wealth of information about the research being conducted as well as personal stories.

- Teacher at Sea Virginia Warren from Breitling Elementary School in Theodore, AL sailing out of Kodiak, AK on NOAA Ship Oscar Dyson during pollock survey.
  o https://teacheratsea.wordpress.com/author/vwarren2015/
- Teacher at Sea Mary Cook from Scammon Bay School in Scammon Bay, AK sailing out of Juneau, AK on the research Vessel the Norseman II during Ocean Exploration and Research Glacier Bay National Park research cruise
  o https://teacheratsea.wordpress.com/author/mcook2016/

Teacher-At-Sea, Virginia Warren holds up a starry flounder for the camera aboard NOAA Ship Oscar Dyson.
[Photo: NOAA]
OMAO manages and implements NOAA's Dive Program (NDP), which trains and certifies scientists, engineers, and technicians from federal, state, tribal governments, and the private sector to perform the variety of tasks carried out underwater to support NOAA's mission. NDP also has cooperative diving agreements with over 100 government agencies and academic institutions. NOAA has more than 400 divers who perform over 14,000 dives per year. The NDP is headquartered at the NOAA Diving Center at the NOAA Western Regional Center in Seattle, Washington.

NOAA Divers Working to Restore Coral Reefs- NOAA Diver Michael Nemeth works with a volunteer diver while out planting Acropora Cervicornis from a coral nursery in La Parguera, Puerto Rico.

[Photo: NOAA]
OMAO manages NOAA’s Small Boat Program and sets policy and provides safety inspections for almost 400 small boats operated by the various Line and program offices throughout NOAA, which support fisheries laboratories, dive support, nautical charting, ocean and Great Lakes research, and more.

NOAA small boats support many diverse operations across the country. [Photos: NOAA]
Office of Marine and Aviation Operations

Providing environmental intelligence for a dynamic world

The personnel, ships, and aircraft of NOAA play a critical role in gathering environmental data vital to the nation's economic security, the safety of its citizens, and the understanding, protection, and management of our natural resources. The NOAA fleet of ships and aircraft is managed and operated by the Office of Marine and Aviation Operations (OMAO), an office comprising civilians, mariners, and officers of the NOAA Commissioned Officer Corps, one of the seven uniformed services of the United States. NOAA's roots trace back to 1807, when President Thomas Jefferson ordered the first comprehensive coastal surveys. Those early surveys ensured safe passage of ship-borne cargo for a young nation. As the needs of the nation have grown, so too have OMAO's responsibilities. Today, OMAO civilians and NOAA Corps officers operate, manage, and maintain NOAA's active fleet of 16 research and survey ships and nine specialized aircraft. Together, OMAO and the NOAA Corps support nearly all of NOAA's missions.

NOAA has the largest fleet of federal research and survey ships in the nation. The fleet ranges from large oceanographic ships capable of exploring and charting the world's deepest ocean, to smaller vessels responsible for surveying the shallow bays and inlets of the United States. The fleet supports a wide range of marine activities including fisheries surveys, nautical charting, and ocean and climate studies. Based throughout the continental United States, Alaska, and Hawaii, the ships operate in all regions of the nation and around the world.

NOAA's aircraft provide a wide range of airborne capabilities. Our highly specialized Lockheed WP-3D "Hurricane Hunter" aircraft are equipped with an unprecedented variety of scientific instrumentation, radars, and recording systems for both in situ and remote sensing measurements of the atmosphere, the Earth, and its environment. Equipped with both C-band weather radar and X-band tail Doppler radar systems, the WP-3Ds have the unique ability to conduct tropical cyclone research in addition to storm reconnaissance. Together with NOAA's Gulfstream IV-SP hurricane surveillance jet, these aircraft greatly improve our physical understanding of hurricanes and enhance the accuracy of tropical cyclone forecasts. NOAA's light aircraft also play a vital role in monitoring our environment. Our King Air, Commander and Twin Otter aircraft support marine mammal population studies, shoreline change assessments, oil spill investigations, and water resource/snowpack surveys for spring flood forecasts.
The NOAA fleet provides immediate response capabilities for unpredictable events. For example, in November 2014, our aircraft flew missions over upstate New York after the record snow falls of up to seven feet and conducted airborne Snow Water Equivalent (SWE) and soil moisture measurements. Airborne SWE measurements are used by NOAA’s National Weather Service when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.

After Hurricane Sandy in 2012, NOAA ships Thomas Jefferson and Ferdinand R. Hassler conducted emergency bathometric surveys to locate possible submerged navigational hazards in the ports of New York and Virginia. These surveys enabled the ports to reopen quickly. Aerial images of storm-stricken regions, taken by NOAA aircraft, helped residents and emergency workers to quickly assess the condition of houses, bridges, and vital infrastructure. In 2010, the NOAA fleet and the NOAA Corps played a major role in the response to the BP Deepwater Horizon oil spill. NOAA’s entire Atlantic fleet and over a quarter of the total strength of the NOAA Corps were deployed to the Gulf following the spill, developing mission plans and assisting response efforts.

While manned aircraft and sea-going vessels have been, and will continue to be, a primary source of environmental data, new technology will have a significant role to play in the future NOAA fleet. OMAO, in coordination with other NOAA offices and federal agencies, is evaluating and deploying remotely piloted underwater and aircraft systems that could significantly contribute to environmental observations. OMAO's ongoing challenge is to meet the growing demand for in situ scientific data while providing the highest level of service. To better serve the needs of the nation, NOAA is examining the composition of the fleet through an exhaustive and critical review of at-sea science and observation requirements. Our objective is to develop a clear, cost-efficient path forward to ensure that the NOAA fleet can continue to conduct at-sea surveys and research vital to fisheries management, updating nautical charts, responding to natural and manmade disasters, and understanding coastal and marine systems more fully. Meeting these requirements is essential to developing sustainable, science-based management and conservation plans that protect the health and resiliency of these resources over the long-term.

We continue our efforts to build a civilian and NOAA Corps officer work force that is uniquely qualified to gather critical environmental intelligence and be adaptive and responsive to a changing world and work to expand our partnerships with other federal agencies. For example, NOAA Corps officers are currently assigned to work in the Department of Defense, National Science Foundation, and the U.S. Senate among others where they lend their expertise and service. We also continue to strengthen our partnership with the U.S. Coast Guard. Our basic NOAA Corps officer training class is held at the U.S. Coast Guard Academy, where newly commissioned officers train alongside Coast Guard officer candidates, developing skills and professional relationships that will benefit both services, especially during challenging times. Active collaboration among the Federal family is critical to ensuring the long-term capability and success of the federal ocean infrastructure. Our partners' success is our success. The men and women of OMAO and the NOAA Corps provide environmental intelligence for a dynamic world as they serve our nation every day from the farthest seas to the highest skies.
The NOAA Commissioned Officer Corps (NOAA Corps) is one of the nation’s seven uniformed services and serve with the ‘special trust and confidence’ of the President. NOAA Corps officers are an integral part of the National Oceanic and Atmospheric Administration (NOAA), an agency of the U.S. Department of Commerce. With 321 officers, the NOAA Corps serves throughout the agency’s line and staff offices to support nearly all of NOAA’s programs and missions. The combination of commissioned service and scientific expertise makes these officers uniquely capable of leading some of NOAA’s most important initiatives.

The NOAA Corps is part of NOAA’s Office of Marine and Aviation Operations (OMAO) and traces its roots back to the former U.S. Coast and Geodetic Survey, which dates back to 1807 and President Thomas Jefferson. In 1970, NOAA was created to develop a coordinated approach to oceanographic and atmospheric research and subsequent legislation converted the commissioned officer corps to the NOAA Corps. The NOAA Corps today provides a cadre of professionals trained in engineering, earth sciences, oceanography, meteorology, fisheries science, and other related disciplines. Corps officers operate NOAA’s ships, fly aircraft, manage research projects, conduct diving operations, and serve in staff positions throughout NOAA.

Benefits of the NOAA Corps to the Nation
The combination of commissioned service with scientific and operational expertise, allows the NOAA Corps to provide a unique and indispensable service to the nation. NOAA Corps officers enable NOAA to fulfill mission requirements, meet changing environmental concerns, take advantage of emerging technologies, and serve as environmental first responders. For example:

- In November 2014, our aircraft flew missions over upstate New York after the record snow falls of up to seven feet and conducted airborne Snow Water Equivalent (SWE) and soil moisture measurements. Airborne SWE measurements are used by NOAA’s National Weather Service when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.

- After Hurricane Sandy in 2012, NOAA ships Thomas Jefferson and Ferdinand R. Hassler conducted emergency bathometric surveys to locate possible submerged navigational hazards in the ports of New York and Virginia. These surveys enabled the ports to reopen quickly. Aerial images of storm-stricken regions, taken by NOAA aircraft, helped residents and emergency workers to quickly assess the condition of houses, bridges, and vital infrastructure.

- After Hurricane Irene in 2011, the NOAA Ship Ferdinand Hassler and team completed 300 lineal nautical miles of survey work in less than 48 hours providing a Damage Assessment that enabled the U.S. Coast Guard to re-open ports and restore more than $5M per hour in maritime commerce less than three days after the storm.

- In 2010, the NOAA fleet and the NOAA Corps played a major role in the response to the BP Deepwater Horizon oil spill. NOAA’s entire Atlantic fleet and over a quarter of the total strength of the NOAA Corps were deployed to the Gulf following the spill, developing mission plans and assisting response efforts.