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EARTH SYSTEM MONITOR

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U.S. Department of Commerce
National Oceanic and Atmospheric Administration

Ecosystems: A NOAA Priority

Contributors: Katie Dombrowski, Kirsten Larsen, and Dr. Steve Murawski

The National Oceanic and Atmospheric Administration (NOAA) is responsible for stewardship of marine and coastal resources. These responsibilities include managing fisheries, protecting and recovering vulnerable species, monitoring marine and coastal habitats, and protecting these resources and habitats from pollution and invasive species. To attain long-term sustainability of our resources, NOAA is committed to moving toward an ecosystem approach to management (EAM) of the Nation's coastal and marine ecosystems. This will require increased understanding of these complex systems as well as improved management integration and collaboration. NOAA's vision for the future is a society that understands and acts as stewards of healthy coastal and marine ecosystems—not only for our aesthetic enjoyment and health, but because healthy ecosystems are fundamental to our economic future.

▲ Dr. Steve Murawski talking on EAM at the 7th UN Open-ended Informal Consultative Process on Oceans and the Law of the Sea.

An ecosystem is a geographically specified system of organisms (including humans), the environment, and the processes that control its dynamics.

EAM provides a comprehensive framework for living resource (all marine and estuarine organisms in all taxonomic groups and at all tropic levels) decision making. In contrast to individual species or single issue management, EAM considers a wider range of relevant ecological, environmental, and human factors that affect societal choices regarding resource use. To access this type of ecosystem data, more diverse observations and a more extensive geographic range are required.

In order to manage the volume of data, NOAA and many governmental, academic, and private partners around the country are building operational regional ocean observation systems that integrate biology, oceanography, chemistry, ocean-atmosphere links, and socio-economic data. This data will help us begin systematic reporting on the status of marine and coastal ecosystems through Integrated Ecosystem Assessments (IEAs), including key indicators of pressures on ecosystems and their current state relative to certain goals (e.g., water quality, species abundance). In addition, continued and more advanced modeling, experimental ecology, and observation systems will need to be linked to support management approaches to human uses of marine ecosystems consistent with NOAA's mandates under various laws.

Other key drivers in these efforts include the U.S. Ocean Action Plan and Pew Commission Report, which identify priorities complementary to those of the Ecosystem Goal Team (EGT), a group that brings together ecosystem expertise from many offices in NOAA. Priorities include a wide incorporation of ecosystem-based management, ocean governance reforms, improved fisheries management, increased reliance on science in management decisions, and more funding for ocean and coastal programs. NOAA is also developing an ecosystem research plan that provides more information to link human activities to incremental change in defined ecosystem state indicators.

NOAA has been collecting these kinds of data across many sectors within these ecosystems through its various Line Offices—Fisheries Service, Ocean and Atmospheric Research, Ocean Service, and Satellite Service. As an agency, we need qualified scientists trained in complex data analysis to begin developing regional IEAs. These scientists will have to work across traditional disciplines as well as organizational Line Offices, and increased communication will be imperative to the success of the assessments. ■

Letter from the Director

▲ Zdenka S. Willis

One of the goals under NOAA's Strategic Plan is to promote ecosystem management. NOAA is accomplishing this goal with its Ecosystem Goal Team (EGT); this team is working on protecting, restoring, and managing the use of coastal and ocean resources through an ecosystem approach to management. Through EGT's efforts, society will benefit from healthy and productive coastal and marine ecosystems and gain knowledge that will help society to act as stewards of coastal and marine ecosystems.

EGT is organized into nine programs—Aquaculture, Coastal and Marine Resources, Coral Reef Conservation, Enforcement, Ecosystem Observations, Ecosystem Research, Fisheries Management, Habitat Restoration, and Protected Species. These EGT programs collaborate on ideas and work together to implement new and innovative programs, which will help achieve NOAA's ecosystem goals.

Chartered by the NOAA Science Advisory Board, the External Ecosystem Task Team finalized their report, The External Review of NOAA's Ecosystem Research and Science Enterprise. This report is a comprehensive look at NOAA's ecosystem approach to management. In the area of data management, the team recommended that NOAA develop a national plan to archive, organize, and distribute all the types of data needed to track, forecast, and understand change in regional ecosystems.

The National Oceanographic Data Center (NODC) strongly supports this recommendation and has started working across ecosystems programs to make this a reality. Several highlights include the new sea surface temperature programs such as the international GODAE High Resolution Sea Surface Temperature Pilot Project (GHRSST-PP). GHRSST-PP was established to develop a system for delivering a new generation of global coverage high-resolution sea surface temperature data products. We are now beginning to understand how to use this product to support understanding of fish stock changes and coral disease issues.

Along with NOAA's National Marine Sanctuary Program, under the West Coast Observation Project (WCOS), NODC developed a system to make the west coast National Marine Sanctuary Program monitoring data accessible via the Internet in an Integrated Ocean Observing System (IOOS) compatible format. IOOS is envisioned as a coordinated national and international network of observations, data management, and analyses that acquires and disseminates data and information on past, present, and future states of the oceans and the Nation's Exclusive Economic Zone. We also sponsor a NOAA-wide integrated product team to support end-to-end data management for the Ocean Exploration program and support the data management needs for the Coral Reef program.

The National Coastal Data Development Center (NCDDC) developed an ecosystem data portal, the Coastal Ecosystem Program, which uses computers, Internet, and GIS-mapping technology to provide improved access to the coastal ecological data record. Efficient data management, standardized metadata, and data query (researching information) also assist in creating targeted new studies while enhancing the value of past research.

Our Library and Information Systems Division is not only a ready reference for all of NOAA but also has virtual libraries on topics such as coral reefs, habitat restoration, and aquaculture.

NODC continues to provide services and support and to share information to achieve the ecosystems goals. The collaboration and efforts will benefit our society, enhance the U.S. economy, and help protect health, life, and property. ■

EARTH SYSTEM MONITOR

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Check Out Underwater Videos at the NOAA Library

Contributors: Anna Fiolek, Dottie Anderson, and Donald W. Collins

The NOAA Central Library (NCL) has created a new video service for the segments collected by the NOAA Ocean Exploration Program. These underwater videos are indexed and available online. Video observations are valuable new resources to the NOAA Ecosystem Goal Team and the nine programs within the goal. NCL has been an innovator in applying the most efficient technology to augment the existing library services.

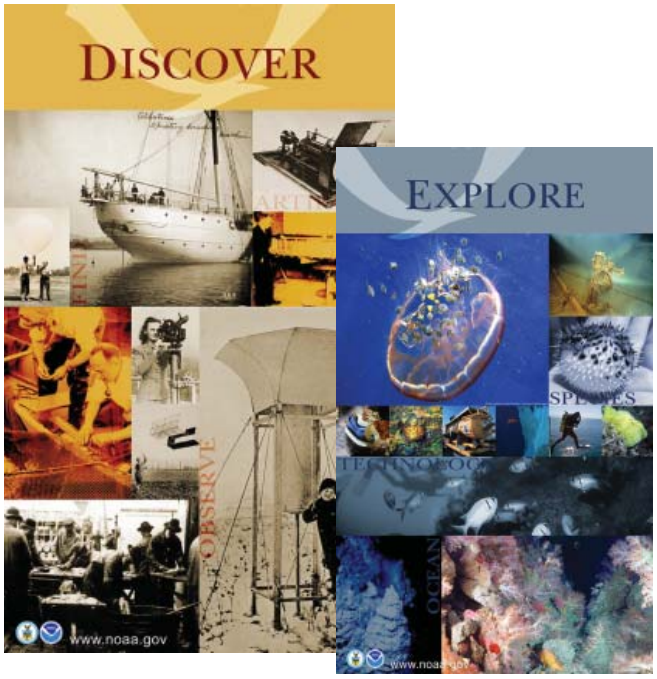
In 2003, NOAA's Office of Ocean Exploration (OE) embarked on a collaboration with NCL, the National Oceanographic Data Center (NODC), and the National Coastal Data Development Center (NCDDC) to address the increasing requirements for archiving, preserving, providing online access and managing digital video, still images, and audio resources from OE's oceanographic expeditions.

As a result of this collaboration with OE and other NOAA offices, the library team has developed the Video Data Management System (VDMS) Pilot Project to provide online information and access to NOAA oceanographic cruises and expeditions that comply with applicable metadata standards.

Information on thousands of hours of digital videos from a number of NOAA signature expeditions since 2001 is accessible to a global community through NOAALINC (**http://www.lib.noaa.gov/uhtbin/webcat**), the library online catalog. NOAA scientists can also retrieve the expeditions' original tapes from the NOAA Library Archives. Online information includes digital video highlights, still images, cruise reports, educational lesson plans, original video and image annotations, websites, and more. ■

New Ecosystems Posters

Ms. Barbara Ambrose from the NOAA National Coastal Data Development Center has created a series of posters that highlight several interpretations of the coastal ecosystems and regional marine ecosystems. Scientific analyses are complemented by visual representations and provide a valuable interpretive aspect to ecosystem management. Printed below are two thumbnail images that were created last year. Ms. Ambrose was recently recognized by Vice Admiral Conrad C. Lautenbacher, Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator, for her participation at the NOAA exhibit during the Mississippi Coastal Recovery Expo in Biloxi, MS. ■



What's New at the NOAA Central Library?

The NOAA Central Library now has selective bibliographic databases available for research on ecosystems (**http://www.lib.noaa.gov/docs/journals/databases.html**). Below are two examples of databases and their descriptions.

Aquatic Sciences and Fisheries Abstracts
International bibliography of science, technology, and management of marine, brackish, and fresh water environment and organisms from 1971 to present.

BioOne
The database currently contains 84 peer-reviewed journals and bulletins published by small societies and non-commercial publishers.

Other databases that might be of interest are: Web of Science-Science Citation Index Expanded, Water Resources Abstracts, and Oceanic Abstracts. Check out these databases! ■

Ecosystem Training Essential for Next Generation of Professionals

Jim Berkson, Ph.D., National Marine Fisheries Service (NMFS)

To implement the analytical processes for each of the nine programs in the Ecosystem Goal, the next generation of biologists will need training in computer-oriented analytical techniques at the undergraduate and graduate level. Combining the expertise of National Marine Fisheries Service (NMFS) biologists and the faculty at the Virginia Tech (VT) Department of Fisheries and Wildlife Sciences, the NMFS–VT Recruiting, Training, and Research (RTR) Program is the first of its kind in the country. The program has three objectives:

1. **Recruiting**: To recruit top undergraduates into the field of fisheries population dynamics and careers with NMFS.
2. **Training**: To present continuing education courses for NMFS employees.
3. **Research**: To conduct population dynamics and stock assessment research in support of the NMFS mission in a unique collaboration of undergraduates, graduate students, post-doctoral associates, university faculty, and NMFS biologists.

What distinguishes this program from other cooperative programs of NMFS and other agencies (e.g., the U.S. Forest Service and the U.S. Geological Service) is its primary mission of recruiting young professionals into the field. The management of natural resources is heavily dependent on the work of highly-skilled quantitative biologists. The need for these individuals is increasing as is the workload and number of agency employee retirements. The program was created to solve this problem by identifying excellent undergraduate prospects. These prospects are trained and encouraged to enter the field of population dynamics and, ultimately, careers with NMFS.

Working with the data managers at National Oceanographic Data Center (NODC) in the future is a new activity the program will investigate so that the data holdings for population surveys can be merged into future data exchange formats for the NOAA Ecosystem Goal programs. ■

For more information, contact Dr. Jim Berkson, NMFS-RTR Program at Virginia Tech, at 540-231-5910 or e-mail him at Jim.Berkson@noaa.gov.

▲ Top: Group shot of participants in the graduate and undergraduate training program.
Bottom: Fish lab tour for graduate students.

Establishing a Corporate Infrastructure for NOAA Education: Interview with Louisa Koch, Director

1. Why is it important for NOAA to be involved in education?

NOAA has a vision for "An informed society that uses a comprehensive understanding of the role of the oceans, coasts, and atmosphere in the global ecosystem to make the best social and economic decisions." Inherent in this vision is the need for an environmentally literate public that is aware of, and capable of understanding, issues affecting Earth's environment. Therefore, NOAA must actively foster the advancement of environmental literacy so that the public is well equipped to interpret and make decisions based on the unique data and findings generated by NOAA.

▲ Louisa Koch, Director of NOAA Education

NOAA education is also important because a large percentage of NOAA's senior scientists are eligible for retirement. NOAA needs to attract well-qualified students to the NOAA-related sciences using a variety of scholarship and fellowship programs. The best way to ensure NOAA's scientific leadership and global expertise in oceanic and atmospheric research, observations, and forecasting, and environmental and ocean health is to have the best and the brightest students, from a diversity of backgrounds, become fascinated with science education and the environment in which we live.

2. What are the major components of NOAA education?

NOAA has a number of programs mandated to provide education and outreach including Sea Grant, the Coral Reef Conservation Program, the National Marine Sanctuary System, and the National Estuarine Research Reserve System. These programs have a rich history of providing robust, quality educational offerings. The NOAA Education Council and the Office of Education provide the corporate oversight and direction to ensure coordination and strategic planning among all of NOAA's education programs.

3. What funding is available to the external community to support environmental literacy?

NOAA's Office of Education manages the Environmental Literacy Grants Program to support formal and informal education projects aimed at building environmental literacy among the public. In 2007 there will be three funding opportunities issued as part of the Environmental Literacy Grants: Free-choice Learning about Earth System Science, K-12 Education about Earth System Science, and Data Visualizations for Educational Use. As a companion to this program, the Office of Education runs an internal education mini grant competition to provide assistance for projects within NOAA that support the priority of environmental literacy and foster development of mission-goal education components.

4. What opportunities are available to students interested in NOAA-related sciences?

NOAA offers a variety of educational opportunities for High School, Undergraduate, and Graduate students. Some of the key programs available to students include: the Ernest F. Hollings Scholarship Program, the John A. Knauss Marine Policy Fellowship, the Graduate Sciences Program, Undergraduate Scholarship Program, the Dr. Nancy Foster Scholarship Program, and the NOAA Awards at the International Science and Engineering Fair. We are currently developing a web page (**www.oesd.noaa.gov**) that will highlight all the opportunities that NOAA offers to students. This page will be available from the Office of Education website.

(*continued on page 8*)

Hollings Scholar Creates Data Catalog for Science On a Sphere®

Contributors: John McLaughlin and David Himes

Science On a Sphere®

Imagine what it would be like to look back at Earth from space. You would have a holistic view of the dynamic planet that we call home. The large-scale processes that mold our environment would unfold in front of your eyes. Instead of the typical perspective of looking up to see clouds above your head, you would look down to watch as storm systems form and travel across the globe.

A very minute number of people ever get a chance to go into space to experience such a spectacle. Fortunately, the Science On a Sphere® (SOS) system, developed by the National Oceanic and Atmospheric Administration (NOAA), provides the ability to simulate this view. Science On a Sphere® is an animated six foot-diameter globe designed to show active images of the atmosphere, oceans, and land of Earth. This stimulating technology provides public science centers with the ability to visualize real and modeled data to teach children and adults about dynamic Earth processes. And, with daily-updated satellite images, it allows visitors to see current global weather patterns in this distinctive format.

In addition to simulating the view of Earth that an astronaut would see from space, Science On a Sphere® allows us to view processes such as ocean circulation that would not be readily visible to us from space. Science On a Sphere® can even show us what it might be like to look down on the surface of suns, moons, and other planets.

"This application of NOAA expertise and data provides science centers and museums with a profound and powerful way to teach the public about our dynamic planet," said Vice Admiral Conrad C. Lautenbacher, Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator. "These science centers will have access to the most recent and cutting-edge data about the Earth that NOAA collects."

Dataset Catalog

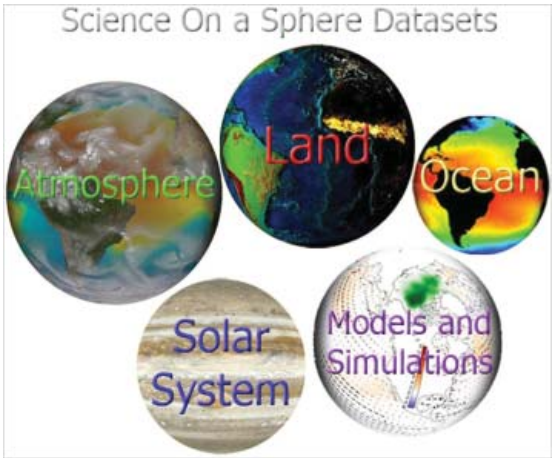
Science On a Sphere® is an ideal system for displaying a wide-variety of global datasets. NOAA provides software and more than 100 visualization

▲ Left: Science On a Sphere® at the ESRL Planet Theater.
Right: Beth Russell, Hollings Scholar; Photograph by Will von Dauster.

datasets for use by the institutions that display SOS. NOAA is also committed to making new visualizations available to the Science On a Sphere® user community as they are developed.

The growing number of visualizations available for SOS, along with the increasing number of institutions displaying SOS, has made cataloguing of datasets in a coherent, informative, and easily-searchable format a necessity. During the initial start of the SOS program, NOAA was the sole developer of content. However, a number of other groups are now developing content for SOS, making a centralized catalog even more essential.

The Technology Outreach Branch of the Global Systems Division of NOAA's Earth System Research Laboratory hosted a Hollings Scholar, Beth Russell, in the summer of 2006 to work on creating a dataset catalog for Science On a Sphere® that meets the varied needs of the user community. Beth is a meteorology student at Penn State University with a strong interest in journalism. As a student of environmental and Earth science, Beth was the perfect candidate to examine each of the Science On a Sphere® data visualizations and to create the clear and concise descriptions that went into the catalog. The descriptions provide a necessary linkage between the colorful visualizations that display on the sphere and the important pedagogical elements needed to create an effective learning experience.



▲ Categories of visualizations available for SOS.

The visualizations are grouped into the following broad categories: Atmosphere, Land, Ocean, Models/Simulations, and Solar System. Under each category, there is a page for each visualization that contains the following sections: Description, Notable Features, Data Category, and Keywords. In many of the descriptions, there is a short animation clip that gives the viewer a small glimpse of how the animation behaves. At the bottom of each description page, there is a table that lists the following essentials: Data Set Name, Data Set Source, Data Set Developer, Visualization Developer, and Audio (if included). The catalog is a living document that will continue to expand as new data are created by NOAA and other institutions. The data catalog can be found at **http://sos.noaa.gov/datasets/**.

Expanding the Science On a Sphere® Users Network

There are currently six institutions with active Science On a Sphere® installations funded by NOAA's Office of Education (OEd): Bishop Museum in Honolulu, HI; Tech Museum of Innovation in San Jose, CA; Maryland Science Center in Baltimore, MD; Science Museum of Minnesota in St. Paul, MN; The National Maritime Center at Nauticus in Norfolk, VA.; and Thunder Bay National Marine Sanctuary near Alpena, MI. Additionally, OEd just awarded funding to three institutions for future installations of Science On a Sphere®. These awards will support the creation of educational displays for the Science On a Sphere® system coupled with NOAA visual datasets at the Orlando Science Center in Orlando, FL; the University of Colorado's Fiske Planetarium in Boulder, CO; and the McWane Science Center in Birmingham, AL.

The three new awards total nearly $200,000. The awards will help educate an estimated one-half million people who visit the recipient facilities annually. At the Orlando Science Center, Science On a Sphere® will serve as the visualization component of the upcoming Global Decision Room exhibit. At the Fiske Planetarium, the grant will fund a docent program for Science On a Sphere® involving Hispanic university and high school students. At the McWane Science Center, the grant will provide an installation of Science On a Sphere® featuring an interactive kiosk that will allow users to view available datasets upon request. ■

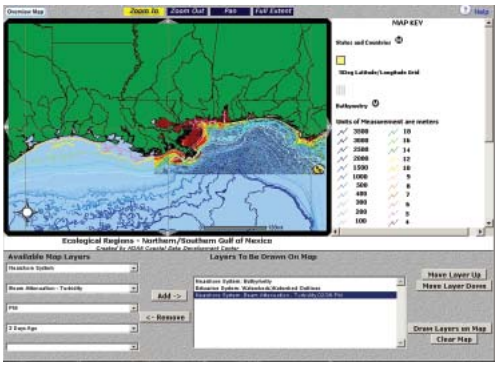
(*Koch interview continued from page 5*)

5. What is on the horizon for NOAA education? NOAA's Office of Education supported an effort to define the principles of Ocean Literacy and is now funding education projects that build upon these principles. We are also participating in a multi-agency effort to promote earth system science. The effort is following the example of the Ocean Literacy community by defining what it means to be Earth System Science literate, as well as identifying potential hurdles in obtaining that level of literacy and strategies to overcome those hurdles. In addition, education is a focus of NOAA's effort to advance our priorities through regional collaboration. The regional outreach effort will use education as a tool to build awareness of NOAA's capabilities, products and services, and increase environmental literacy with a focus on the programmatic priorities selected by the region. ■

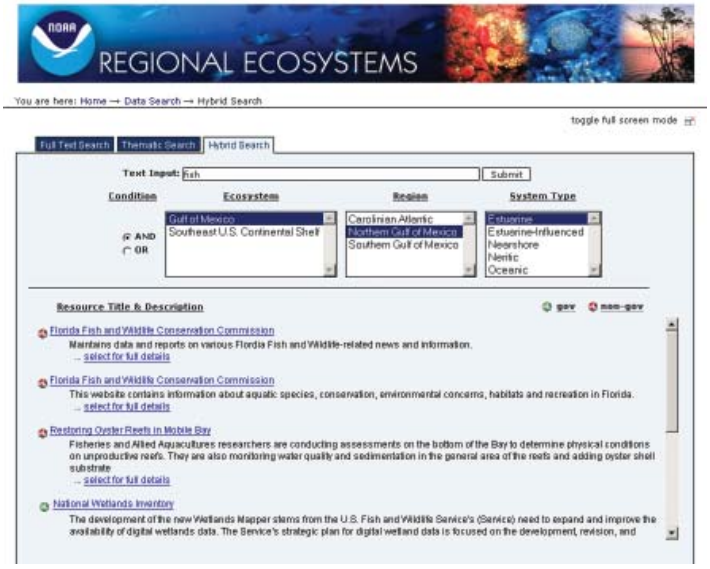
Regional Ecosystem

The National Coastal Data Development Center (NCDDC) has created a Regional Ecosystem website to assist NOAA and the Ecosystem Goal Team (EGT) in meeting goals to improve ecosystem products and services. The website provides an overview of the ecosystem approach to management; centralized access to NOAA's nine ecosystem programs; links to an array of environmental indicators and related projects; and access to Gulf of Mexico regional observing systems.

Of particular interest is a prototype implementation of the Coastal/Marine Ecological Classification Standard (CMECS), which categorizes data resources to facilitate data discovery and access. During the past few years, there has been much talk about the emergence of a "semantic Web." The semantic Web utilizes intelligent applications or systems where computers can effectively understand the meaning of the information transmitted. The application of CMECS to data, data products, and information tests the theory that semantic understanding will enhance the user experience through ease of data discovery and access.



▲The Regional Ecosystem Gulf of Mexico interactive map includes data broken into categories aligned with high-level CMECS classifications.



▲The Regional Ecosystem Semantic Search tests the theory that semantic understanding will enhance the user experience through ease of data discovery and access.

The Regional Ecosystem website is designed to be both a gateway to and a management system for diverse, distributed coastal data. NCDDC continues to work with the National Marine Fisheries Service (NMFS) and National Ocean Service (NOS) staff and other partners to implement refinements of CMECS, enhance search capabilities, and incorporate more information into the system from participating EGT program partners. ■

For more information on the Regional Ecosystem website, visit **http://ecowatch.ncddc.noaa.gov**, or contact Sharon Mesick, NCDDC Ecosystem Program Manager, at Sharon.Mesick@noaa.gov.
For more information on CMECS, contact Becky Allee at Becky.Allee@noaa.gov, or go to **http://www.csc.noaa.gov/benthic/funding/CMECS_Dec2004-1.pdf**.

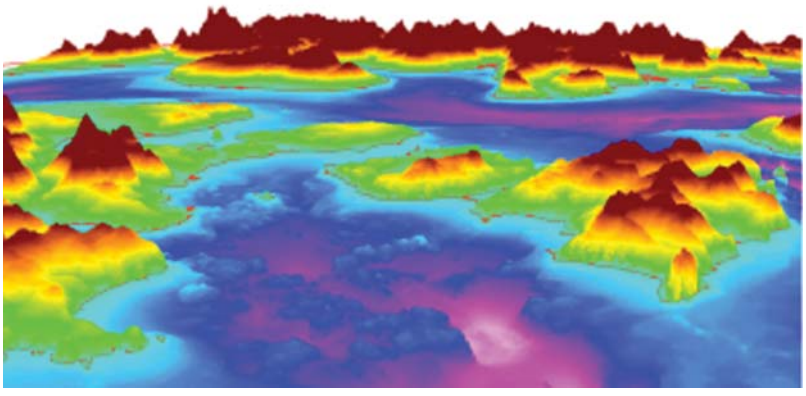
News Briefs

Improving NOAA's Tsunami Warning System

A team of scientists is contributing a crucial step in NOAA's effort to prepare U.S. coastal communities for tsunami and storm-driven flooding. The National Geophysical Data Center (NGDC) developed two high-resolution coastal digital elevation models (DEMs) of Sand Point, Alaska for the NOAA Pacific Marine Environmental Laboratory (PMEL).

DEMs are designed to improve forecasting for early tsunami warning systems. They are constructed from near-shore seafloor depth and land elevation data to create detailed representations of coastal relief. DEMs provide the underlying framework necessary to accurately forecast the magnitude and extent of coastal flooding during a tsunami event.

These combined bathymetric/topographic DEMs are part of a series that is being developed by NGDC to be used as input for the PMEL Method of Splitting Tsunami model, which simulates tsunami generation, propagation, and inundation. The new DEMs cover an area of approximately one degree square centered on Sand Point, Alaska. This information will help NOAA's Tsunami Warning Centers issue more accurate flooding forecasts in the event of an earthquake-generated tsunami.

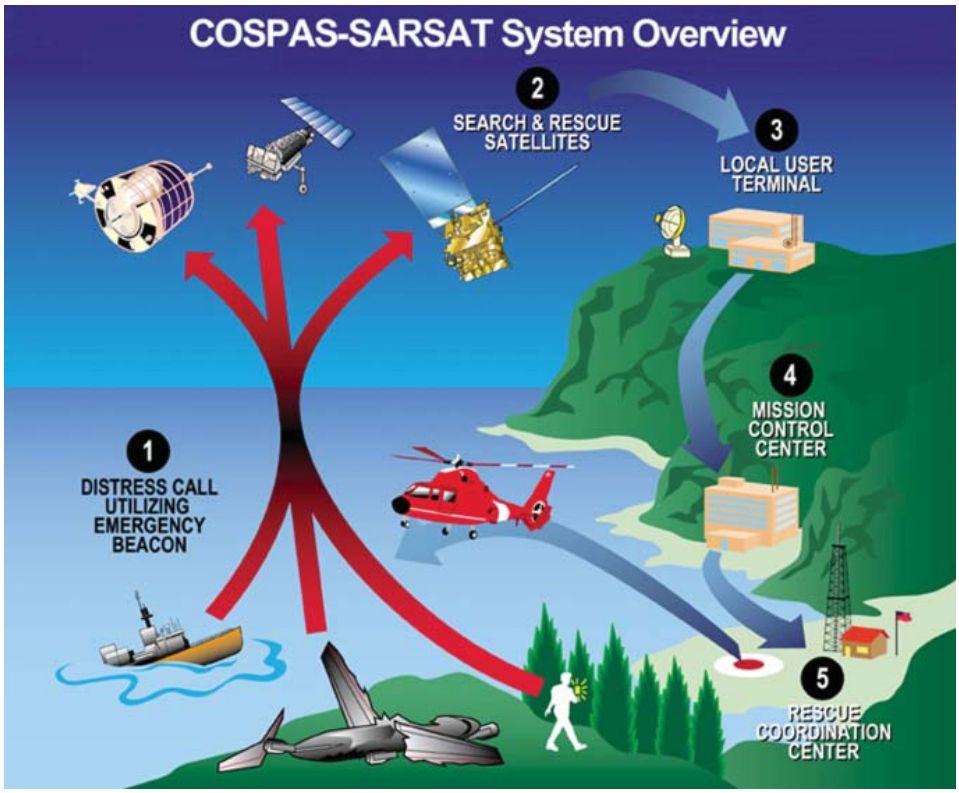


▲ Completed DEM of Sand Point, Alaska.

The COSPAS-SARSAT System

NOAA's polar and geostationary satellites, along with Russia's COSPAS spacecraft, are part of the high-tech, international Search and Rescue Satellite-Aided Tracking System, called COSPAS-SARSAT. The SARSAT system uses a network of satellites to quickly detect and locate distress signals from emergency beacons on board aircraft and boats and from hand-held personal locator beacons. As an integral part of worldwide search and rescue, NOAA operates the SARSAT system to detect and locate mariners, aviators, and recreational enthusiasts in distress almost anywhere in the world at anytime and in almost any condition.

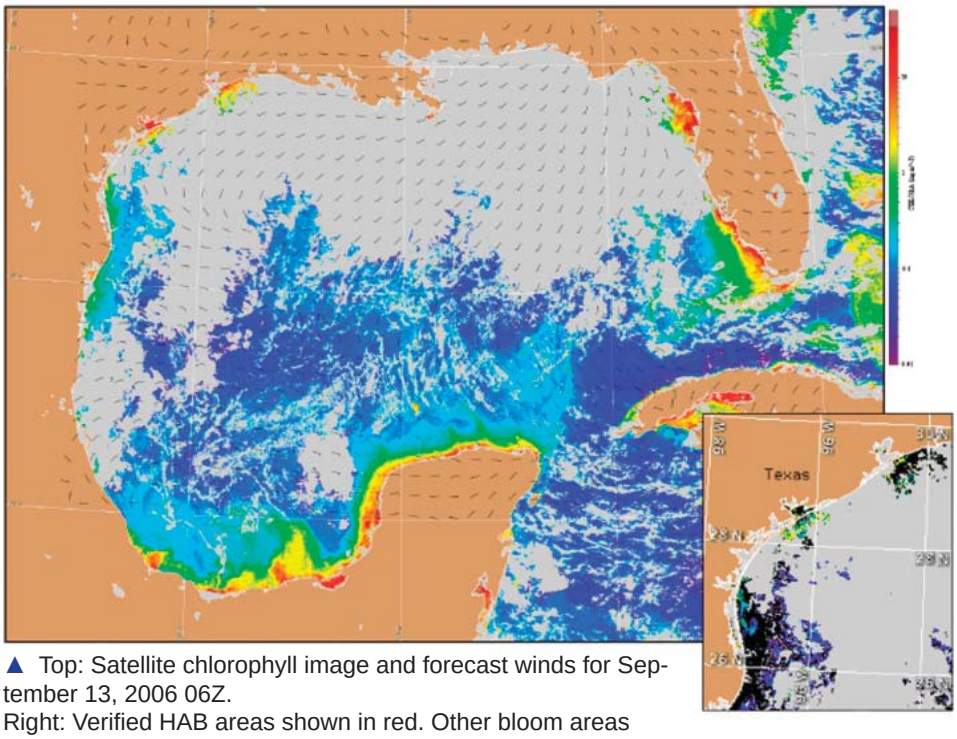
The satellites relay distress signals from emergency beacons to a network of ground stations and ultimately to the U.S. Mission Control Center (USMCC). The USMCC processes the distress signal and alerts the appropriate search and rescue authorities. As of October 14, 2006, 210 people were rescued because of the COSPAS-SARSAT system.



NOAA Implements Harmful Algal Bloom Forecast System For Texas Gulf Coast

NOAA developed a new harmful algal bloom (HAB) forecast system that is now in place along the Gulf Coast of Texas. The system generates forecasts weekly to determine the current and future location and intensity of blooms, and the likely impacts to the environment.

The system is operated by the NOAA National Centers for Coastal



▲ Top: Satellite chlorophyll image and forecast winds for September 13, 2006 06Z.
Right: Verified HAB areas shown in red. Other bloom areas shown in yellow.

Ocean Science and is geared to predict HABs caused by the highly toxic algae Karenia brevis. The blooms cause fish kills, shellfish toxicity, water discoloration, and respiratory distress in humans.

HABs occur in the waters of almost every U.S. coastal state. Direct economic impacts of blooms in the United States have been estimated to average $75 million annually, including impacts on public health costs, commercial fishing closures, recreation and tourism losses, and in management and monitoring costs.

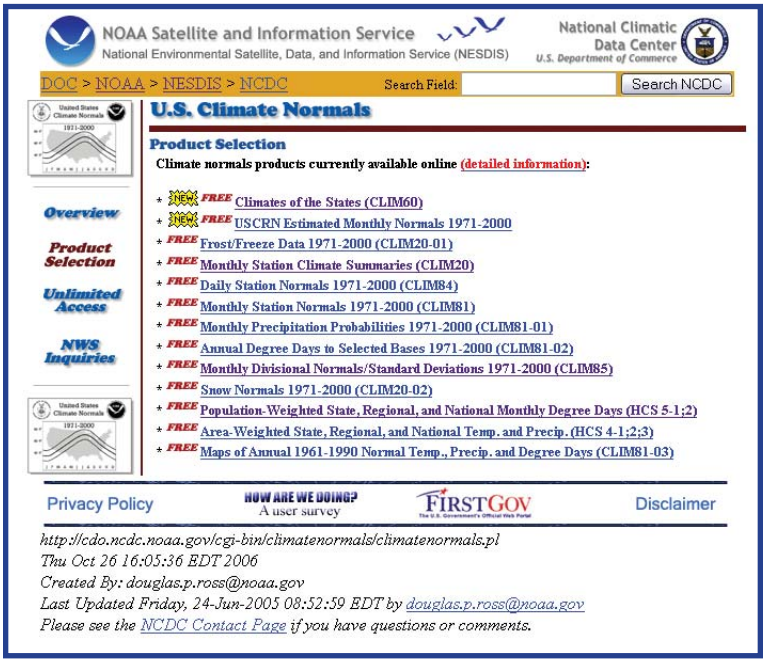
Conditions are posted to the forecasting system Web page, **http://www.csc.noaa.gov/crs/habf/**, once a week during non-bloom periods and twice a week during bloom periods. When NOAA detects a possible bloom, Texas state managers are notified to conduct field sampling. If state managers confirm the bloom, then the public is informed through the forecasting Web page, the news media, and other appropriate outlets.

New Geographical Information System (GIS) Feature Information

A new feature has been added to the National Climatic Data Center's (NCDC's) Geographical Information System (GIS) Services. The "Map Search" feature has been enhanced to utilize a 350,000+ location gazetteer, which allows users to search for data based on numerous geographic references (i.e., zip code, town, city, county, state, country, lake, etc.). When a desired location is entered, the user receives a list of results from which a specific location can be chosen. Once a dataset or product is selected, the locations are displayed on the GIS map where the data/product is available. In addition, zooming in or zooming out allows for control of the aerial coverage.
The GIS services directly incorporate numerous in-situ datasets and products, along with Next Generation Weather Radar (NEXRAD) data. Visit **http://gis.ncdc.noaa.gov/** for more information.

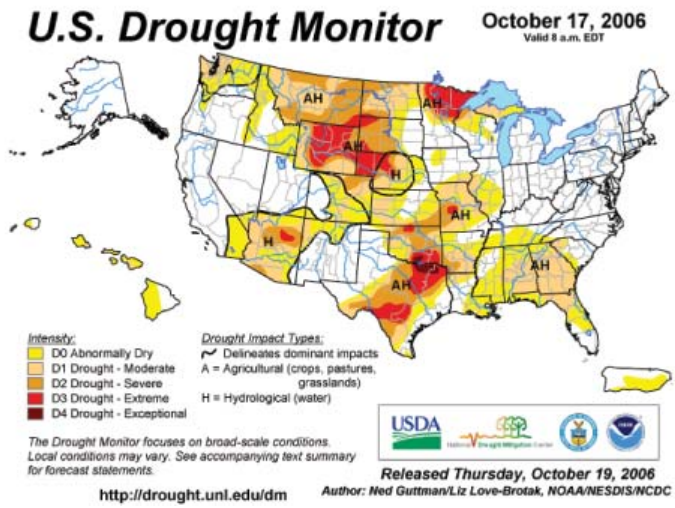
U.S. Climate Normals Are Online

The Climates of the States is now available online. Each document consists of a narrative describing the geography and climate of the state. Internet links to various state and station climate summaries and other weather data are also included in the documents. There are now a total of 13 U.S. Climate Normals products online. Also, all of the online normals products are now available at no cost to customers. See **http://hurricane.ncdc.noaa.gov/cgi-bin/climatenormals/climatenormals.pl** for more information.



▲ Climate Normals website.

New Feature Developed for the U.S. Drought Monitor



▲ Drought Monitor Map.

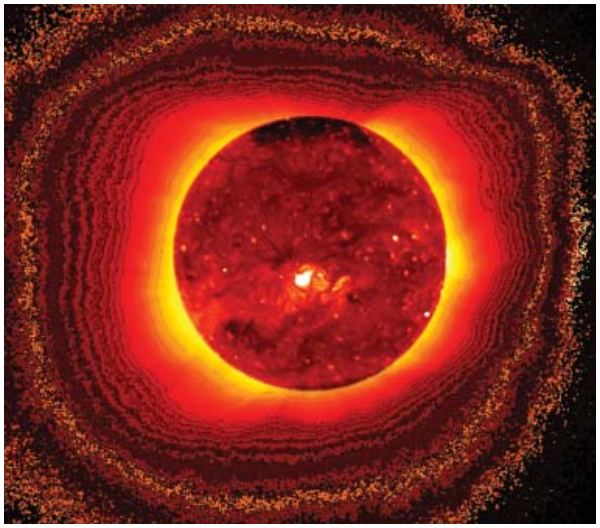
Each Thursday, NOAA's Climate Prediction Center and National Climatic Data Center, the United States Department of Agriculture, and the National Drought Mitigation Center issue a weekly drought assessment called the United States Drought Monitor. The Monitor provides a consolidated depiction of national drought conditions based on a combination of drought indicators and field reports. A new feature has been added to this tool that allows users to view a region or state just by clicking the desired area.

State and federal agencies are making decisions based on information from the U.S. Drought Monitor map. These decisions, such as eligibility for relief programs and tax deferrals, affect the public directly. See **http://www.drought.unl.edu/dm/monitor.html** for more information.

GOES-13 Solar X-ray Imager (SXI)

The latest Geostationary Operational Environmental Satellite GOES-13 is providing improved solar imagery. The imager and sounder instruments give regular measurements of the Earth's atmosphere, cloud cover, ocean temperatures, and land surfaces.

The new GOES-13 Solar X-ray Imager (SXI), which monitors the Sun's x-rays, is substantially more sensitive than the analog GOES-12 instrument, allowing for longer exposure times. With these improvements, the new-generation SXI takes very "deep," or long, exposures (8 seconds) of the Sun's outer atmosphere, or corona. This reveals excellent detail out to over one solar radius. To increase the field of view, GOES-13 SXI collects four images that are later combined into a single image.



▲ GOES-13 Deep Coronal Images.

The information from these images allows scientists to track and predict the effects of phenomena such as solar flares that can interfere with communications and navigation systems.

Coral Reef Information System (CoRIS)

Contributors: Michele Newlin and Kelly Logan

The Coral Reef Information System (CoRIS) provides a single point of discovery for coral data and information relevant to the management and preservation of the nation's coral reefs. Users can gain access to NOAA's coral reef data and information, activities, and library services through a single web portal.

Some key features of the CoRIS website are the following sections:

- About Coral Reefs
- Glossary
- The Library
- Professional Exchanges
- Discover NOAA's Data

The "About Coral Reefs" section contains essays that give an overview of corals and coral biology, hazards and diseases associated with corals and coral reefs, and coral reef ecosystems. The Glossary contains more than 5,000 coral and associated terms, as well as many pictures, and the Library provides users with a wealth of coral reef resources. For lively discussions among coral reef scientists, managers, and enthusiasts, explore the "Professional Exchanges" section. Our most important section is "Discover NOAA's Data." This section has direct access to many coral-related data sets and data products from various coral reef ecosystems with a variety of search capabilities. For more information about CoRIS, visit **http://www.coris.noaa.gov**.

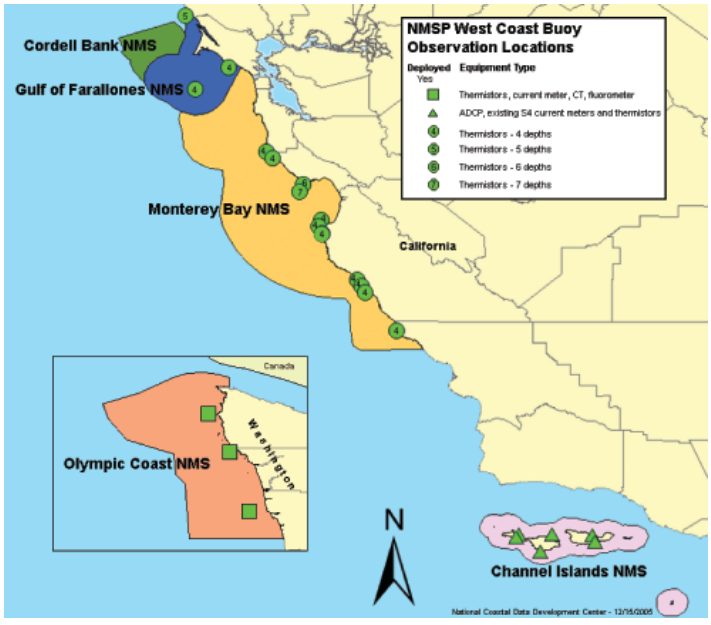
Support to Sanctuaries

The National Marine Sanctuaries Program (NMSP) has developed a data service for the West Coast Observing System (WCOS) with NOAA partners—National Oceanographic Data Center (NODC), National Coastal Data Development Center (NCDDC), Northwest Fisheries Science Center (NWFSC), Coastal Services Center (CSC), and the Office of Response and Restoration (OR&R).

WCOS is an extensible, end-to-end data management system that assists data providers in making observed information available to constituents. NCDDC developed automated software processes that transform the data sets to the network Common Data Form (NetCDF); create, validate, and publish Federal Geospatial Data Committee (FGDC) metadata records; and bundle the data/metadata records for transport to NODC where data are accessible.

Since its inception in 2005, WCOS has routinely processed more than 650 data files, each representing data sets collected over time periods ranging from one week to three months. By serving as an automated data assembly center, NCDDC adds value by reformatting the data stream, providing collection-level FGDC compliant metadata along with appropriate file-level metadata attributes, and making the data and metadata available to NODC for long-term stewardship, archive, and data access. ■

Visit the website, **http://www.mbnms-simon.org/sections/obs/nmsp_wco.php**, or contact the NCDDC Ecosystem Program Manager, Sharon.Mesick@noaa.gov, for WCOS information.



▲ This map shows the locations of the new instrument moorings.

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