

EARTH SYSTEM MONITOR

New bathymetry of Lakes Erie and St. Clair *Cooperative Great Lakes data rescue effort redefines lake features*

A guide to
NOAA's data and
information
services

INSIDE

3

News briefs

5

The NOAA Coastal
Services Center

8

Weather satellite
operations convergence

10

NODC focuses on the
coastal ocean

12

Researching
aquaculture at the
NOAA libraries

14

WINDandSEA: An
Internet locator for
the oceanic and
atmospheric sciences

15

Data products
and services

U.S. DEPARTMENT
OF COMMERCE
National Oceanic
and Atmospheric
Administration

Lisa A. Taylor¹
National Geophysical Data Center
NOAA/NESDIS

David F. Reid²
Great Lakes Environmental Research Laboratory
NOAA/OAR

Troy L. Holcombe³
National Geophysical Data Center
NOAA/NESDIS

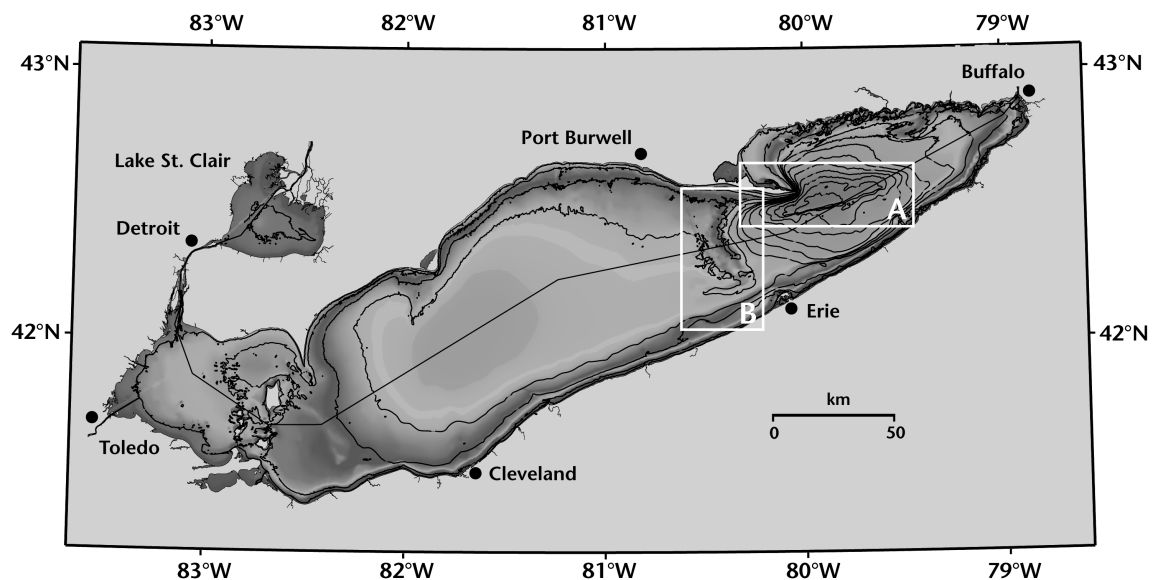
New bathymetry for all of Lake Erie and Lake Saint Clair has been completed as part of a continuing cooperative project between NOAA's National Geophysical Data Center (NGDC), NOAA's Great Lakes Environmental Research Laboratory (GLERL), and the Canadian Hydrographic Service (CHS). On the U. S. side, support for the effort comes from NOAA's Environmental Sciences Data and Information Management (ESDIM) Program. The new bathymetry was compiled at a one meter contour interval at scales of 1:100,000, 1:50,000, and larger. All good quality historic hydrographic sounding data collected since 1903 from the United States and Canada, including sounding data in digital form combined with sounding data archived only on paper, were used in the compilation. The resulting detail, exceeding that achieved in any previous

bathymetry for the two Lakes, defines more clearly the shape and location of previously known features and reveals other features for the first time.

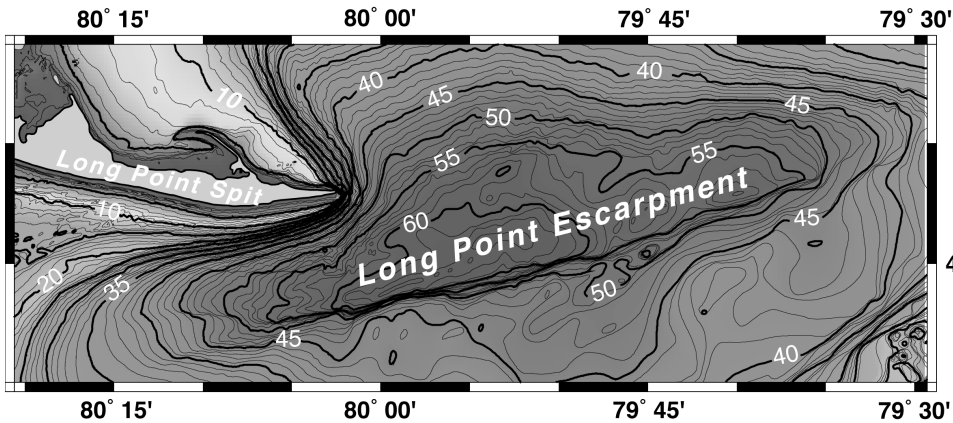
Bathymetric contouring was accomplished using overlays of digital soundings, which were converted to meters and plotted in color by depth range. Where digital data were not available, contours were generated directly on overlays of the original paper field sheets. After compilation was complete, the bathymetry was scanned and vectorized. The resulting digital vector bathymetric contour data were edited using ARC/INFO and the images were generated using a combination of the publicly-available software "Generic Mapping Tools" (GMT) and the drawing software Adobe Illustrator. The resulting bathymetry in digital raster and vector format is indexed to geographic coordinates and is therefore fully compatible with GIS systems and can be imaged at any scale and projection. The bathymetric data yields excellent maps and imagery at scales up to 1:50,000 or larger.

Lake Erie is underlain by easily erodible shallow-water marine shales and carbonates that were deposited over the region in Paleozoic time (350-400 million years before present). Repeated episodes of glacial erosion created the Lake basin during Pleistocene time (zero to one million

– continued on page 2



▲ **Figure 1.** Index map of generalized bathymetry of Lake Erie and Lake Saint Clair showing locations of detailed bathymetry further described by figures 2A and 2B. Contour interval is 5 meters. Figures 2A and 2B show bathymetry at the full-resolution contour interval of one meter.



▲ Figure 2A. Detailed bathymetry of a portion of the Eastern Erie Basin, showing lakefloor topography surrounding Long Point Spit and Long Point Escarpment. Deepest of the Lake Erie basins, the Eastern Erie Basin reaches a depth of around 64 meters.

New bathymetry, from page 1

years before present). Final retreat of glacial ice from the area about 13,000 years ago left in place a topographic surface formed by erosion of bedrock and by deposition of glacial sediments underneath or near the margins of the ice. This topography has been subsequently modified by deposition of post-glacial lacustrine sediments continuing to the present time.

Further modifications of topography have resulted from water currents depositing, eroding, and sculpting lake floor sediments. Evidence of Lake Erie's evolutionary sequence as well as recent effects of human activity can be seen in the many features revealed in this bathymetry, some of which include:

- **Long Point Escarpment.** A north-facing escarpment with a relief of 15-20 meters extends longitudinally E-W along the floor of the Eastern Erie Basin (Index map; Figure 2A). The escarpment is surrounded by irregular topography which has a relief of 1-5 meters and a dominant NE-SW lineation running at a diagonal to the escarpment. Possibly, the escarpment lies along the boundary separating gently southward dipping, more resistant upper Devonian deltaic

sands and silts—or an upper Devonian limestone bed; which are more resistant than the marine shales to the north.

Alternately, the escarpment could have been formed along a pre-existing fault, which had juxtaposed more resistant and less resistant strata. The escarpment is parallel to the inferred direction of flow of glacial ice advancing down the axis of the lake floor. Lack of large-scale irregularities along the edge of the escarpment might reflect the likelihood that in the subglacial regime of erosion, any northward projections of the resistant strata were sheared off as a result of the eroding power of flowing ice.

- **Long Point Spit.** This is one of the most prominent topographic features in Lake Erie, extending about 35 km east-south-eastward from the Ontario shore out into the Eastern Basin (Figure 2A). The spit is a late Holocene to recent depositional feature constructed of sand eroded from the Ontario shore cliffs to the west and brought eastward and deposited by long shore drift. Steep slopes and 55 meters of relief (the highest lake floor relief in Lake Erie) separate the spit from the floor of the Eastern Basin, direct physical evidence of its recent depositional origin.

- **Pennsylvania Channel.** A ridge extending westward along the north wall of the Pennsylvania Channel between the Eastern and Central Erie Basins suggests a “natural levee” in which sediments eroded from the southern end of the Long Point-Erie Ridge are carried westward and deposited as overbank deposits (Figure 2B). Very likely at the lower lake levels of early and middle Lake Erie

– continued on page 4

EARTH SYSTEM MONITOR

The *Earth System Monitor* (ISSN 1068-2678) is published quarterly by the NOAA Environmental Information Services office. Questions, comments, or suggestions for articles, as well as requests for subscriptions and changes of address, should be directed to the Editor, Sheri A. Phillips.

The mailing address for the *Earth System Monitor* is:

National Oceanographic Data Center
NOAA/NESDIS E/OC1
SSMC3, 4th Floor
1315 East-West Highway
Silver Spring, MD 20910-3282

MANAGING EDITOR

Dr. Anthony R. Picciolo
Telephone: 301-713-3281 ext.140
Fax: 301-713-3302
E-mail: apicciolo@nodc.noaa.gov

EDITOR

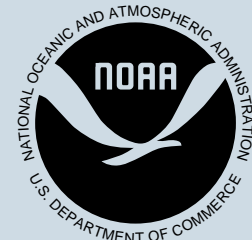
Sheri Phillips
Telephone: 301-713-3280 ext.127
Fax: 301-713-3302
E-mail: sphillips@nodc.noaa.gov

ASSOCIATE EDITOR

Roger Torstenson
Telephone: 301-713-3281 ext.107
Fax: 301-713-3302
E-mail: rtorstenson@nodc.noaa.gov

DISCLAIMER

Mention in the *Earth System Monitor* of commercial companies or commercial products does not constitute an endorsement or recommendation by the National Oceanic and Atmospheric Administration or the U.S. Department of Commerce. Use for publicity or advertising purposes of information published in the *Earth System Monitor* concerning proprietary products or the tests of such products is not authorized.



U.S. DEPARTMENT OF COMMERCE
William M. Daley, Secretary

National Oceanic and
Atmospheric Administration
D. James Baker,
Under Secretary and Administrator

^{1,3}National Geophysical Data Center
NOAA/NESDIS E/GC3
325 Broadway
Boulder, CO 80303
E-mail: holcombe@ngdc.noaa.gov

²NOAA/OAR/GLERL
2205 Commonwealth Blvd.
Ann Arbor, MI 48105
E-mail: reid@glerl.noaa.gov

GOES Rescue and Access Issues Workshop

On November 4-5, 1997, researchers convened at the National Climatic Data Center in Asheville, NC, to devise an implementation plan for the Geostationary Operational Environmental Satellite (GOES) Data Rescue and Scientific Access Opportunity. The implementation plan will include possible funding sources and strategies for requesting funds.

NCDC hosts AWIPS/NOAAPORT Users' Workshop

On October 29-30, 1997, the National Climatic Data Center (NCDC) hosted an AWIPS/NOAAPORT Users' Workshop. NOAAPORT is a broad-based communications system designed to distribute information products produced or gathered by NOAA organizations. The workshop was held to determine National Weather Service (NWS) requirements for Advanced Weather Interactive Processing System (AWIPS) data, especially model output data.

Participants discussed possible configurations for distributed archives and servicing. Background information on the AWIPS/NOAAPORT installation at NCDC, AWIPS datasets, formats and data dissemination options were presented. Attendees included representatives from each NWS region, the Cooperative Operational Meteorological Education and Training (COMET) organization, and the National Center for Atmospheric Research.

International Workshop on Terrestrial Ecosystem Modeling

Robert Webb of the National Geophysical Data Center attended the International Geosphere-Biosphere Program/Global Change and Terrestrial Ecosystems (IGBP/GCTE) workshop on landscape scale processes in San Diego, CA, October 26-28. The workshop focused on how to include the potential effects of global change on individual plants and simple communities in global models of biogeochemical processes and vegetation dynamics. Dr. Webb provided a paleoenvironmental perspective in addressing the questions of the role of landscape pattern on species migration under changing climates, the effect of landscape-scale feedbacks from the land to the atmosphere, and the role of fire as a disturbance mechanism in change landscape vegetation patterns.

News briefs

NCDC supports NASA balloon research project

The National Scientific Balloon Facility (NSBF) is performing preliminary research to select a launch site for high altitude research balloons. The balloons will be released into the polar vortex to study its atmospheric chemistry. Candidate locations include Thule, Greenland; Esrange, Sweden and Andoya, Norway. The National Climatic Data Center will provide ten years of surface and upper atmospheric data for these locations. The site will be surveyed this winter and the actual experiments will begin later in 1998. NSBF is a National Aeronautics and Space Administration facility operating under contract by New Mexico State University.

Paleoclimate research on Greenland

Dr. Jonathan Overpeck of the National Geophysical Data Center met with scientists of the Denmark and Greenland Geological Survey in Copenhagen from November 10-11. The focus of the meeting was on paleo-environmental research on Greenland. The research, funded jointly by NOAA, the U.S. National Science Foundation and the Denmark and Greenland Geological Survey, aims to reconstruct interdecadal to century-scale variability in the North Atlantic climate system, and to understand how the system may affect future climate change.

NGDC data used to monitor land-surface snow conditions

A recent article published by Sun, Neale, McDonnell, and Cheng appeared in the Institute of Electrical and Electronics Engineers transactions of Geoscience and Remote Sensing (Vol. 35, No. 4 July 1997). "Monitoring Land-Surface Snow Conditions from SSM/I Data Using an Artificial Neural Network Classifier" described the use of Normalized Difference Vegetation Index (NDVI) data acquired from the National Geophysical Data Center's Global View CD-ROM to train an Artificial Neural Network (ANN) classifier. With this method, the investigators were able to monitor snow extent and geographic distribution of snow conditions over varied terrain.

Global Digital Sea Ice Data Bank

Dr. R.G. Barry, of the National Snow and Ice Data Center, participated as U.S. representative and chairperson at the Sixth Session of the WMO (World Meteorological Organization) Commission on Maritime Meteorology steering group concerning the Global Digital Sea Ice Data Bank (GDSIDB). The meeting was hosted by the Danish Meteorological Institute in Copenhagen, Denmark, from September 22-26, 1997. Attendees included representatives of the operational sea ice agencies from Argentina, Canada, Japan, Russia and the Baltic Sea Ice Meeting as well as WMO, WDC-A for Glaciology/NSIDC (Boulder, CO), WDC-B for Sea Ice, and the Arctic and Antarctic Research Institute (AARI), St. Petersburg, Russia, which maintains the GDSIDB.

The centers reviewed the current status of the archives which span the period from 1950-94 and planned national contributions during the next intersession period (1997-1998). A new proposed format for operational data exchange (CONTOUR-2) developed by AARI was discussed. A report on the meeting will be issued by Dr. M. Krasnoperv, WMO (Ocean Affairs Division) Staff.

NODC presents at international Ocean Data Symposium

The Director of the National Oceanographic Data Center (NODC), Dr. Henry R. Frey, was the plenary speaker at the Ocean Data Symposium held in Dublin, Ireland, from October 15-18, 1997. His paper, "Balancing Coastal and Deep Ocean Data Activities at the U.S. National Oceanographic Data Center" included virtual data system developments within the National Environmental Satellite, Data, and Information Service and, in the recent Congressional legislation, the National Oceanographic Partnership Act of 1996 and the Oceans Act of 1997. He also chaired a parallel session, Data and Metadata Requirements of Scientists to Support Ocean Research.

Sydney Levitus presented a paper titled "The World Ocean Database 1998 - New Opportunities for Objective Analysis of Oceanographic Data" which was co-authored by Tim O'Brien of the NODC Ocean Climate Laboratory. Recommendations by the attendees will be published in an upcoming report. The symposium was attended by 147 individuals from 45 countries.

New bathymetry, from page 2

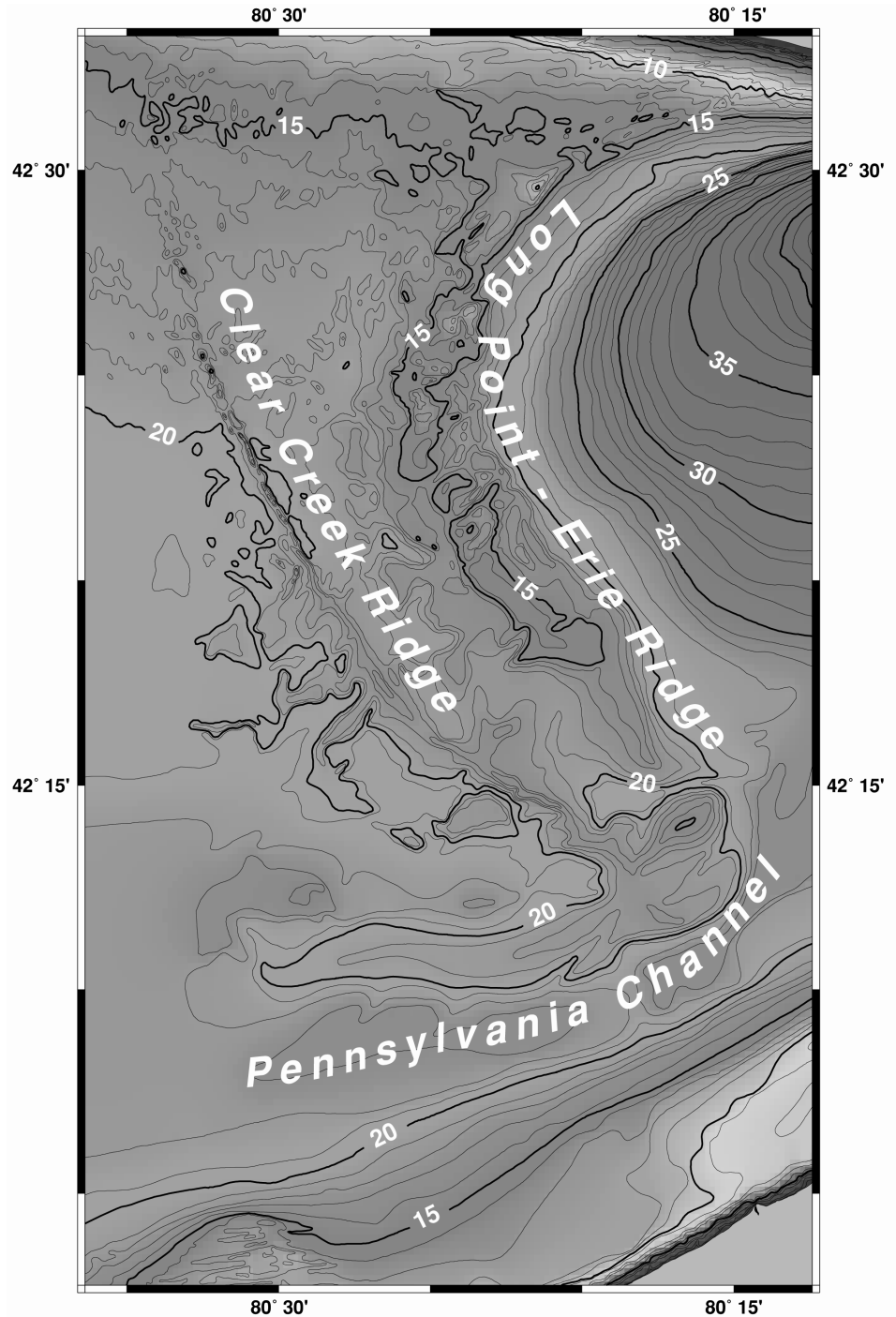
time, this channel was the location of strong return flow from the Eastern Erie Basin to the Central Erie Basin, which could have been set up during and following periods of strong frontal winds blowing from west to east longitudinally down the length of the lake surface.

Such winds would have transported surface water eastward, raising lake levels in eastern Lake Erie and requiring a compensating westward flow at depth once equilibrium was reached, or following relaxation of the strong winds. This pattern of water flow occurs at present, but it may have been stronger when lake levels were lower.

- **Long Point-Erie Ridge.** The Long Point-Erie Ridge is a broad (14-22 kilometers) arcuate ridge of 5-10 meters overall relief, capped by complex topography, extending upward to minimum depths of 10-15 meters, and extending across the lake floor from near the inshore end of the Long Point Spit, almost to the Presque Isle Spit at Erie, Pennsylvania (Fig. 2B). This feature has been interpreted as an end moraine formed during the last major re-advance of glacial ice into the Eastern Erie Basin. Overall shape of the Eastern Erie Basin, and the arcuate shape and topography of the Long Point-Erie Ridge, as seen in this new bathymetry, strengthens the interpretation that this feature is an end moraine.

- **Clear Creek Ridge.** This feature is a small, narrow arcuate ridge possessing a few meters relief which occurs 8-15 kilometers west of, and approximately parallel to, the Long Point-Erie Ridge (Figure 2B). The ridge, of an unusually linear aspect for a topographic feature, extends southward from the Ontario coast across more than half the width of Lake Erie. It has some of the morphological characteristics of an esker, but beyond being an example of glacial topography its origin is a mystery.

- **Lake Saint Clair.** The floor of Lake Saint Clair is very shallow, with the deepest point lying just in excess of 6 meters (Figure 1). Deep water sea lanes are therefore dredged channels across the extent of the lake. Microtopography formed by dumping of dredge spoils is present on either side of the dredged sea lane channel. Other small-scale topography, including a north-



▲ Figure 2B. Detailed bathymetry of the Long Point-Erie Ridge, Clear Creek Ridge, and Pennsylvania Channel. These features separate the Eastern and Central Lake Erie Basins.

south ridge extending northward from the south shore, may be anthropogenic features; otherwise their origin is unexplained.

The delta of the Saint Clair River is the dominant feature of the lake. This platform of deltaic deposits has been built out into the lake, the outer edge of which is bounded by foreset slopes extending downward from platform depths of less than one meter to more

than 3 meters in depth.

- **Offshore ridges and valleys, northern shore of the Eastern Erie Basin.** An irregular shoreline underlain by relatively resistant bedrock, and capped by only a thin mantle of glacial drift, characterizes the northern shore of the Eastern Erie Basin. Bedrock outcrops occur at several locations along the shore. The irregularities of the shoreline are con-

– continued on page 16

The NOAA Coastal Services Center

CSC brings technology, information, and services to the coastal management community

*Donna McCaskill
Communications Director
Coastal Services Center
NOAA*

At its simplest, the protection of our nation's coastal resources is a matter of drawing lines. At what point, for instance, do the rights of the individual property owners end and the rights of citizens to enjoy a public beach begin? When does deforestation begin to impact shellfish? How much of the burden should society shoulder for those who build in hazard-prone areas? To what lengths should we go to protect our natural resources?

Participants in this difficult decision-making process include regulators, sanctuary and reserve managers, wildlife officials, conservation groups, and scientific researchers. Every day they work to strike that elusive but important balance between the desire to see coastal communities prosper and the need to protect natural resources.

The role of the NOAA Coastal Services Center is to provide assistance to these professionals. The organization was established in 1994 and operates from Charleston, South Carolina. Because the Center's efforts are determined by the issues facing coastal management programs, the Center's focus can change annually as new issues arise and technology and science advance. Currently hazard mitigation, habitat protection, and data creation and access are three primary categories under which many of the Center's projects operate.

Center projects number over 100 each year. These include mapping efforts for sea grasses and shorelines; a national fellowship program; land cover change detection tools; and an international bibliography of coast-related geographic information system (GIS) projects.

*Coastal Services Center
National Oceanic and Atmospheric
Administration
2234 South Hobson Avenue
Charleston, SC 29405-2413
E-mail: dmccaskill@csc.noaa.gov*

Two projects, laser beach mapping and the Coastal Information Directory, are profiled below to give a better understanding of the type of work undertaken at the Coastal Services Center.

Laser beach mapping

Beach mapping is important to every coastal state. Powerful storms such as hurricanes can dramatically change the face of the coastline, eroding sand beaches in one area while enlarging beach areas in another. For Federal, state and local agencies to properly assess the impacts of such storms is an enormous task. To measure shoreline fluctuations and sand volumes, large sums of money and time are spent on survey crews and aerial photography. Even so these methods do not provide a precise enough account of topographical changes due to storms for the agencies to conduct fully effective shoreline development planning or beach replenishment programs.

Experiments underway at the Coastal Services Center could revolutionize the way this topographical information is gathered. The National Aeronautics and Space Administration's (NASA) Goddard Space Flight Center's Wallops Flight Facility has combined efforts with the Coastal Services Center to provide public officials with the

tools they need to accurately assess coastal erosion. The goal of this joint project is to produce a highly detailed baseline map of the beaches between Cape Henlopen, Delaware, and Charleston, an expanse of more than 560 miles, using airborne laser technology.

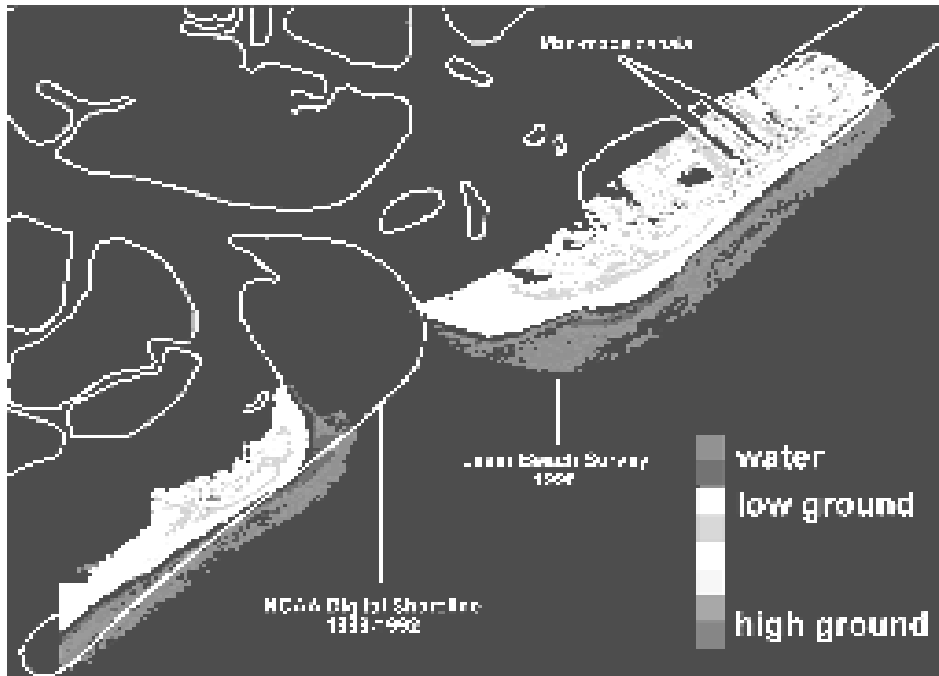
Using a laser system mounted onboard a NOAA Twin Otter aircraft (Figure 1), scientists hope to greatly shorten the time and cost associated with traditional surveying methods; they also hope to provide more comprehensive and accurate results.

NASA developed the airborne laser altimeter, the Airborne Topographic Mapper (ATM), to map polar ice sheets to examine responses to climatic changes in the Northern Hemisphere. The ATM collects 3000 to 5000 spot elevations per second as the aircraft travels over the beach at approximately 150 feet per second. Using the ATM and a Global Positioning System (GPS) satellite receiver, researchers have been able to survey beach elevations to an accuracy of ten centimeters. The Center has worked with NASA for two years to make this technology applicable for coastal use. In addition to the NASA scientists, Center partners for this effort include state coastal zone managers and

— continued on page 5



▲ Figure 1. The NOAA Twin Otter, equipped with the Airborne Topographic Mapper, is used for laser beach mapping.



▲ Figure 2. NOAA's laser-based technology documents coastal change in North Carolina.

Coastal Services Center, from page 4 the U.S. Geological Survey. "This project continues to be in the experimental stage," says Dr. John Brock, head of the Coastal Remote Sensing Department within the Coastal Services Center. "Interested parties will be able to get useful data after these flights, but I'm not ready to market this as the end-all beach surveying product. You don't revolutionize a process in a short period of time. I will say, however, that we are presenting some very exciting possibilities," he continued.

Laser mapping has the potential to provide an accurate baseline survey of all coastal areas. Annual surveys could be used to gather an understanding of long-term erosion trends and estimate the effects of beach renourishment and erosion control devices such as groins, jetties, seawalls, rock revetments, and breakwaters. After a hurricane, laser beach mapping could provide a superior way to document sand losses and shoreline vulnerability. For example, laser beach technology documents coastal change in the Top Sail Beach area (Figure 2) of North Carolina; this area was hit hard by Hurricane Fran in 1996. On an annual basis, laser beach mapping could help states determine setback and primary dune lines. Beach nourishment projects would also benefit from this technology, as more accu-

rate determinations could be made regarding needed sand volumes.

Current beach surveying methods utilize traditional, on-the-ground surveys and aerial photography. Using the new technology, projects that once took weeks to complete can be done in a matter of hours with a much higher degree of coverage and thoroughness. The airborne laser can often penetrate canopies, and it reflects well off sand and rock, allowing accurate determination of absolute elevation and topography. The laser emits high-frequency beams toward the Earth's surface through an opening in the bottom of the plane, recording the time difference between the emission of the beam and the reception of the reflected signal. The aircraft travels over the beach at approximately 135 miles per hour, surveying a swath inland from the water line.

In October, portions of the nation's east and west coasts were flown. Data taken from these flights will be used to develop baseline data from which shoreline change and sand volume comparisons can be made, given repeat surveys. "With the gathering of this baseline data, officials will for the first time have the capability to accurately quantify beach damage from a coastal storm," NASA Wallops principal investigator Bill Krabill said. Once the

baseline study is completed and the use of this technology verified, the intent is to turn the technology over to the commercial sector to conduct future mapping for those assessing beach topography, according to Krabill.

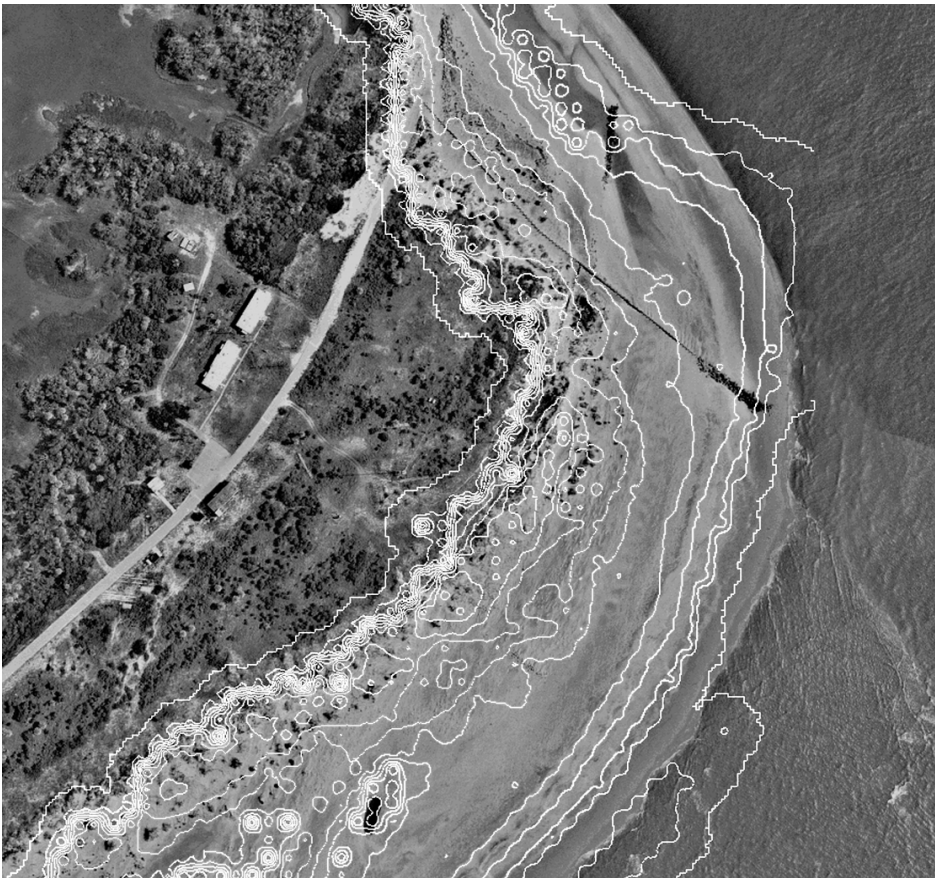
By the fall of 1998, the west coast areas will be flown again and comparisons will be made. Coastal managers on the west coast are particularly excited, for they anticipate greater than normal shoreline change as a result of the weather phenomenon known as El Niño. The aircraft laser mapping will provide extensive data from which they will be able to accurately document these changes.

NASA is responsible for the operation of the ATM and the initial processing of the data. Mission planning and the follow-on processing of the survey information and its conversion into a format that can be directly used in Geographic Information Systems will be jointly done by NASA Wallops and CSC.

All coastal states have a need for beach mapping. There are a variety of ways in which the states use and process the beach profile data. Figure 3 shows how the creation of a topographic map, in the Folly Beach area of South Carolina, is fostered by overlying an orthophotograph with the laser beach data. Project developers at the Center will meet with state and Federal agencies responsible for beach monitoring. Coordination with these agencies will include the dissemination of the resulting airborne survey data base and determination of the most common and easy-to-use data formats. "The use of the NASA instrumentation will provide cost effective and highly accurate mapping of beach erosion in particular, which is of great interest and concern to coastal communities," says John Brock. "Due to the high human and economic costs associated with flooding and other coastal hazards, this type of information will help to support sustainable beach development and improved coastal management."

Coastal Information Directory

The Coastal Information Directory is a new tool in the Center's effort to get the right information and technology to the people that can best utilize it. The Directory is an Internet-based



▲ **Figure 3.** Data derived from NOAA's laser beach mapping project, layered on top of an orthophotograph, creates a topographic map.

searching program that simultaneously searches various databases throughout the country for whatever coast-related data the user directs the system to search for. Access to the World Wide Web is all that is needed to access the Directory. The address is: www.csc.noaa.gov/CID/.

Using the directory is simple. If you want information on erosion or tides, for instance, type in your key word and hit "start search." The Directory searches every database available to it and brings the results to you. Because the search encompasses many databases concurrently, the search is more efficient and thorough.

The Coastal Information Directory is "data about data" because the Directory does not store actual, traditional data. Instead the program makes you aware of data, products, publications, and information and directs you to their source. Many of the sources are electronically linked to the Directory, making retrieval a few "clicks" away.

Currently much of the data included in the Directory is raw, such as

tidal information, weather, sea surface temperature, and turbidity; analyses is a future inclusion. One big step in that



▲ **Figure 4.** Coastal Services Center projects number over 100 a year, including the management of the Coastal Information Directory available online at URL: <http://www.csc.noaa.gov/CID/>.

direction is the recent addition of the Center's library services. The library's articles, research papers, and books are now referenced in the database.

The Center is continually searching for data sites to include in the Directory. Before a site is considered, it must be coastal in nature (Figure 4) and meet metadata standards, which are set by the Federal Geographic Data Committee (FGDC). The Center looks to state and local coastal zone management programs, universities, research facilities, and the private sector for data that meets these criteria.

For additional information on Coastal Services programs and projects, contact:
 Donna McCaskill
 Communications Director
 NOAA Coastal Services Center
 2234 South Hobson Avenue
 Charleston, S.C. 29405-2413
 Phone: 803-974-6272
 E-mail: dmccaskill@csc.noaa.gov
 Internet: <http://www.csc.noaa.gov> ■

Weather satellite operations convergence

Department of Commerce, the U.S. Air Force and contractor team pass first major test

Major Clive Paige (USAF) and
Lt. Colonel Neil R. Wyse (USAF)
Integrated Program Office
National Polar-orbiting Operational
Environmental Satellite System

A team of Department of Commerce, Air Force and contractor satellite operations experts spent the better half of October testing the NOAA satellite control system intended to operate the Department of Defense (DoD), Defense Meteorological Satellite Program (DMSP) satellites at the NOAA Satellite Operations Control Center (SOCC) located in Suitland, MD. Operation of the DMSP and NOAA satellites from a combined SOCC is one of the early goals of the Polar Satellite Convergence Program.

Integral Systems Incorporated (ISI) under contract to NOAA, and teamed with Harris Corp. and Lockheed Martin developed this system, which is known as the Integrated Polar Acquisition and Control Subsystem (IPACS). IPACS passed this, its first major development test, on October 17, 1997. As a result, ISI was given approval to install the



▲ **Figure 1.** Equipment racks, part of the Integrated Polar Acquisition and Control (IPACS) that will be used to control satellites in the Defense Department's Defense Meteorological Satellite Program (DMSP), were recently installed in NOAA's Satellite Operations Control Center in Suitland, MD.

IPACS at the NOAA SOCC where it will undergo further testing through April 1998. Contract management is con-

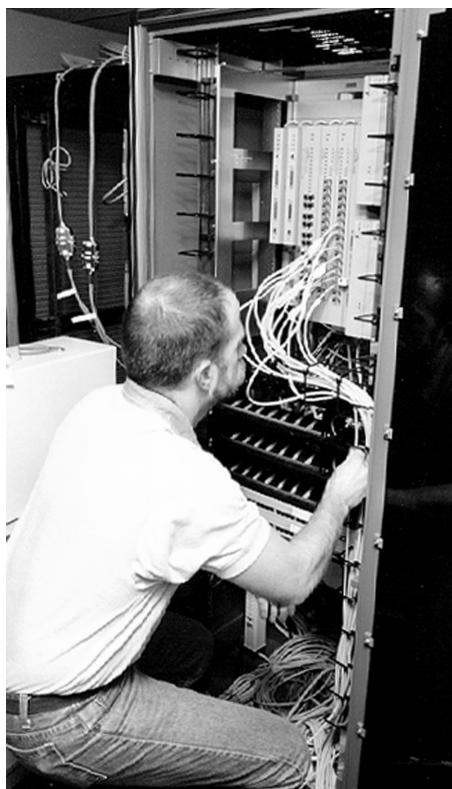
ducted by the NOAA Procurement Office in Silver Spring, MD and technical management is performed by the National Environmental Satellite, Data and Information Service (NESDIS) Office of Systems Development. The Contracting Officer's Technical Representative is Mr. Harold Wood.

NOAA is scheduled to assume operational responsibility for DMSP from Air Force Space Command's (AFSPC) 6th Space Operations Squadron at Offutt Air Force Base (AFB), located near Omaha, Neb., in the summer of 1998. After this transfer occurs, NOAA will be the sole agency responsible for operating all of the United States' weather satellite programs. NOAA currently operates the Polar-orbiting Operational Environmental Satellites (POES) and the Geostationary Operational Environmental Satellite (GOES). The installation of the IPACS at the NOAA SOCC marks a major milestone



▲ **Figure 2.** These computers, a part of IPACS that will also be used to control satellites in the Defense Department's DMSP, have been installed in NOAA's Satellite Operations Control Center. The Center is part of NOAA's National Environmental Satellite, Data, and Information Service (NESDIS).

*Integrated Program Office
8455 Colesville Road
Suite 1450
Silver Spring, MD 20910
E-mail: cpaige@ipo.noaa.gov*



▲ **Figure 3.** Computer networks were installed at the Satellite Operations Control Center as part of IPACS.

in the current effort to converge the DMSP and POES programs.

This work began when President Clinton directed the convergence of the Nation's military and civilian polar-orbiting environmental satellite systems in his Presidential Decision Directive of May 5, 1994. The merging of DMSP and POES operations at the NOAA SOCC, known as "early convergence", is the first phase of this effort. "Early convergence" is scheduled to conclude by mid summer of 1998. The next major phase is the development and acquisition of a single National Polar-orbiting Operational Environment Satellite System (NPOESS) capable of meeting both civil and military requirements for space-based environmental data. The NPOESS will become operational toward the latter half of the next decade, and will eventually replace both DMSP and POES.

The elimination of separate DOC and DoD environmental satellite systems is projected to save over \$550 million through 2003. This figure jumps to nearly \$1.7 billion over the life of NPOESS, when compared to the cost of continuing to acquire and operate sepa-

rate civilian and military polar-orbiting environmental satellite programs. The idea of converging DOC and DoD environmental satellite programs is not new. In fact, there have been 8 studies since 1972 on ways both organizations could increase coordination and eliminate duplication. These studies led to the DMSP and POES programs working together on research and development projects, using a similar spacecraft bus, dividing ground data processing responsibilities, using the same launch vehicle, and providing complimentary data to users.

Total convergence, however, never came about due to fundamental differences in the DOC and DoD requirements. Policy restraints also played a factor in precluding total convergence. The change in world political events, declining agency budgets, and recommendations contained in the National Performance Review spurred a reexamination of convergence by the DOC, DoD and National Aeronautics and Space Administration (NASA) in 1993. The resulting tri-agency study concluded that combining the two systems would significantly reduce duplication, bureaucracy, and program costs while meeting the requirements of both civilian and military users.

This tri-agency study laid the ground work for the Presidential Decision Directive of May 5, 1994. On October 3, 1994, the DOC, DoD and NASA

formed an Integrated Program Office (IPO) to develop, manage, acquire and operate a single national environmental polar-orbiting satellite system to replace the POES and DMSP. The IPO is a tri-agency office within NOAA. Mr. James Mannen, a NOAA senior executive, is the System Program Director.

The Director reports to an Under Secretary-level tri-agency Executive Committee that acts as a board of directors to provide oversight and guidance to ensure the converged program successfully meets cost, schedule and user requirements. The IPO is divided into three major offices: Operations, Acquisition, and Technology Transition. These offices are headed by Mr. Bruce Needham (NOAA), Colonel Tom Imler (USAF) and Mr. Stanley Schneider (NASA), respectively.

The acquisition of the next generation polar satellites and instruments is the primary focus of the Acquisition Office. The Technology Transfer Office is working to ensure infusion of and consideration of NASA's EOS and other technology sources for cost-effective improvements in remote sensing capabilities of NPOESS. Management of the transfer of DMSP and, in the future, implementation of the NPOESS operation to the NOAA SOCC is the focus of the Operations Office. Following the DMSP transfer, the Operations Office will be responsible for the budgeting,

- continued on page 16



▲ **Figure 4.** A console recently installed at the Satellite Operations Control Center that will be used to control satellites in the DMSP as part of IPACS.

NODC focuses on the coastal ocean

The National Oceanographic Data Center balances coastal and deep ocean data management

Rosalind Cohen

National Oceanographic Data Center
NOAA/NESDIS

A number of important changes have taken place at NOAA's National Oceanographic Data Center (NODC) over the past 18 months of interest to coastal ocean scientists and managers. In July 1996, Dr. Henry Frey, a coastal physical oceanographer, was appointed as the Director of NODC. Dr. Frey is committed to achieving a better balance in management of coastal versus deep ocean data at NODC, and to making the substantial coastal data holdings easily accessible to stakeholders.

In order to reach these goals, NODC convened the NOAA Coastal Ocean Data Workshop in March of 1997, in partnership with NOAA's Coastal Services Center, NOAA's Coastal Ocean Program Office, and the University of Rhode Island Graduate School of Oceanography. The Workshop included over one hundred participants from U.S. Coastal and Great Lakes states and Territories, representing Federal, state, and local government agencies, academia, and the private sector. The Workshop final report includes many important recommendations, and may be accessed through NODC's home page at <http://www.nodc.noaa.gov/coast/fr.html>.

NODC has already implemented several of the Workshop recommendations, including: establishment of three Coastal Ocean Data Working Groups; planning creation of a Coastal Ocean Laboratory, and expansion of the districts of the regional liaison officers.

Coastal Ocean Data Working Groups

The overall goal of all the Working Groups is to ensure that NODC is responsive to the needs of its stakeholders in the coastal ocean community in all aspects of coastal ocean data and

information management. The first series of meetings of the Coastal Ocean Data Working Groups took place in Silver Spring, MD, October 28-31, 1997. The terms of reference and membership of each Working Group are summarized in Table 1. Dr. Chris Mooers (University of Miami) was selected as chairman of the Data Acquisition Working Group; Dr. Wendell Brown (University of New Hampshire) chairs the Data Quality Assurance Working Group; and Dr. Michael Crosby (NOAA/Office of Ocean and Coastal Resource Management) chairs the Data and Information Products Working Group.

At this first series of meetings, emphasis was placed on presentations from NODC, the National Geophysical Data Center, and the National Climatic Data Center staff, at the request of Working Group members. The presentations described data and information holdings, systems, protocols, procedures, value-added products, and customer profiles, as background for the Working Group members. Ample opportunity was provided for questions during these presentations, as well as

during the special tours and demonstrations arranged each afternoon.

The Working Groups also reviewed their terms of reference, discussed operating procedures for their groups over the next two years, and made suggestions and recommendations. The Working Group reports from these meetings will be made available through the NODC Home Page at: <http://www.nodc.noaa.gov>.

NODC's Coastal Ocean Laboratory

Dr. Wayne Wilmot, a coastal physical oceanographer and ecosystem modeler, was hired to head the NODC's Data Base Management Division metamorphosis into the Coastal Ocean Laboratory (COL). The basic functional Groups of the COL are: Data Acquisition and Documentation (led by Dr. Anthony Picciolo), Data Processing (led by Francis Mitchell), Data Synthesis and Dissemination (led by Dr. L. Charles Sun), and User Services (led by Richard Abram).

A series of cross-cutting teams will have responsibility for implementing COL projects:

▲ Table 1. Summary of NODC Coastal Ocean Data Working Groups

Coastal Ocean Data Acquisition Working Group

Chair: Chris Mooers, University of Miami

Members:

Brad Butman, US Geological Survey, Woods Hole
Anders Andren, University of Wisconsin Sea Grant
Susan Burr, Dept. of Environmental Quality, Guam
Bob Carney, Louisiana State University
Kurt Grove, University of Puerto Rico Sea Grant
Dave Reid, Great Lakes Environmental Research Laboratory
Russ Moll, University of Michigan Sea Grant
Doug Sherman, University of Southern California Sea Grant
Bob VanDolah, South Carolina Marine Research Institute
Van Waddell, Scientific Applications International Corporation, NC

Data Center Liaisons:

Tony Picciolo, National Oceanographic Data Center, Lead
Troy Holcombe, National Geophysical Data Center
Art DeCotiis, National Climatic Data Center

Terms of Reference:

- set criteria to provide limits for coastal data sets to be acquired;
- identify existing data sets that meet the criteria;
- identify new projects/programs that will produce data sets meeting the criteria;
- identify individuals/organizations to be contacted regarding acquisition of the data sets;
- recommend modified or new procedures or terms of reference for the Working Group's activities; and
- other related activities mutually agreed upon by NODC and the working group.

—continued

National Oceanographic Data Center
NOAA/NESDIS E/OC
SSMC3, 4th Floor
1315 East-West Highway
Silver Spring, MD 20910-3282
E-mail: rcohen@nodc.noaa.gov

▲ Table 1 *continued***Coastal Ocean Data and Information Products Working Group**

Chair: Michael Crosby, NOAA/Office of Ocean and Coastal Resource Management

Members:

Anne Ball, NOAA/Coastal Services Center
 Deanne DiPietro/Brian Baird, California Environmental Resources Evaluation System (CERES), CA
 Ken Haddad, Florida Marine Research Institute
 Phillip Hinesley, Alabama Coastal Zone Management
 Kerry Keogh, Coastal States Organization
 Evangeline Lujan, Guam, GIS Manager
 John Rupert, Coastal Zone Management, Ohio Dept. of Natural Resources
 Kent Price, Marine Advisory Service, Leader Delaware Sea Grant College Program
 Ed Towle, Island Resources Foundation, US Virgin Islands

Data Center Liaisons:

Mary Hollinger, National Oceanographic Data Center, Lead
 Charles Sun, National Oceanographic Data Center
 Janice Beattie, National Oceanographic Data Center
 Chris Elvidge, National Geophysical Data Center
 Joe Elms, National Climatic Data Center

Terms of Reference:

- evaluate all existing NODC products related to the coastal ocean;
- recommend modifications or eliminations of existing NODC products;
- recommend new NODC data and information products;
- set criteria for data browsing, subsetting, graphics, visualization, on-line/off-line access;
- consider training and technology transfer requirements;
- recommend modified or new procedures or terms of reference for the Working Group's activities; and
- other related activities mutually agreed upon by NODC and the working group.

Coastal Ocean Data Quality Assurance Working Group

Chair: Wendell Brown, University of New Hampshire

Members:

Bob Carney, Louisiana State University
 Eric Crecelius, Battelle Northwest, WA
 David Edgington, Great Lakes Research Facility, University of Wisconsin
 Mark Luther, University of South Florida
 David Nebert, University of Alaska
 Jan Newton, Washington State Department of Ecology
 Judith Pederson, MIT Sea Grant, MA
 Van Waddell, Scientific Applications International Corporation, NC

Data Center Liaisons:

Wayne Willmot, National Oceanographic Data Center, Lead
 Margarita Conkright Gregg, National Oceanographic Data Center
 Troy Holcombe, National Geophysical Data Center
 Joe Elms, National Climatic Data Center

Terms of Reference:

- recommend parameter-specific/sensor-specific quality assurance methods/procedures for physical, chemical,
- and biological coastal ocean data;
- review NODC's existing QC/QA procedures and recommend modifications;
- recommend the latest QC/QA procedures/techniques as they become available;
- recommend modified or new procedures or terms of reference for the Working Group's activities; and
- other related activities mutually agreed upon by NODC and the working group.

- *Coastal Ocean Satellite Data Team* - responsible for Coast Watch and other remotely sensed data;
- *Coastal Ocean Data Team* - responsible for *in-situ* coastal ocean data;
- *Federal Geographic Data Committee Metadata Team* - responsible for devel-

opment and implementation of NODC's subset of FGDC content standards;

- *Quality Assurance Team* - an inter-Laboratory Team in NODC; and
- *Integrated Products and Processes Team* - responsible for integrating the

personnel, scientific disciplines, tasks, products, and processes across the Lab and NODC.

Liaison Offices of the COL

The Liaison Offices (LOs) are NODC's frontline for interactions with a broad cross-section of ocean researchers within their respective regions. Their mission is to acquire high quality data sets with adequate supporting metadata for NODC; train users in data submission and access; and provide the NODC Director's staff with additional feedback on customer requirements for products and services. The districts of the LOs have been expanded to include the U.S. island territories and the Great Lakes. The contact information for each LO can be accessed through NODC's Home Page at <http://www.nodc.noaa.gov/NODC-liaison.html>.

The new responsibilities are distributed as follows:

- *Northeast Liaison Office, Woods Hole, MA, led by George Heimerdinger:* Maine, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, Pennsylvania, Ohio, Indiana, Illinois, Wisconsin, Michigan, and Minnesota;
- *Mid-Atlantic Liaison Office, Silver Spring, MD, led by Dr. Anthony Picciolo:* New Jersey, Delaware, Maryland, and Virginia;
- *South Atlantic Liaison Office, Miami, FL, led by Michael Crane:* North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Puerto Rico, and U.S. Virgin Islands;
- *Hawaii Liaison Office, Honolulu, HI, led by Patrick Caldwell:* American Samoa, Commonwealth of Northern Mariana Islands, Guam, and Hawaii;
- *Southwest Liaison Office, La Jolla, CA, led by Dr. Norman Hall:* Louisiana, Texas, and California; and,
- *Northwest Liaison Office in Seattle, WA, led by Sidney Stillwaugh:* Washington, Oregon, and Alaska.

Interested parties should continue to check the NODC Home Page for further information on upcoming Coastal Ocean Lab reports, products, and services under development at the NODC as the International Year of the Ocean begins in 1998. ■

Researching aquaculture at the NOAA Libraries

Libraries are valuable resource for unique and highly specialized materials

Carol B. Watts
NOAA Central Library
NOAA/NESDIS/NODC
Silver Spring, MD

Nancy O'Donnell
Office of Coastal Resources Management
NOAA/NOS
Silver Spring, MD

Cathy Edstrom
Scientific Commercial Systems Corporation
NOAA Central Library
Silver Spring, MD

The NOAA libraries are a valuable resource in aquaculture research; their unique and highly specialized aquaculture materials may be an undiscovered source of knowledge for many researchers. The following libraries are all part of the NOAA Library and Information Network (NLIN) and serve as sources for aquaculture information.

The National Marine Fisheries Service (NMFS) Southwest Fisheries Center La Jolla Laboratory Library (LaJolla, CA) offers reference services and interlibrary loans in fish biology; fisheries (primarily tuna and Pacific fisheries); marine mammals, biology, and ecology; oceanography; Antarctica; and fishery management. Included in the collection is information on FADS (Fish Aggregation Devices), such as artificial reefs and floating devices that attract marine life. While the library has a limited collection of books on aquaculture, its reference staff can field questions about aquaculture to other resources such as the California Department of Fish and Game and the Department of Agriculture.

The NMFS Milford Laboratory is actively involved in aquaculture. It was founded as an oyster research facility and hatchery in the 1920s and provided "aquaculture-related" informa-

tion to the public long before the word "aquaculture" came into common usage. Much of the research in oyster propagation and rearing conducted at Milford in the 1920s through the 1960s is still sought out (Figure 1). The library receives ongoing requests for the valuable information generated during this period. From the 1960s to the early 1990s the focus switched more to environmental monitoring and analysis, but aquaculture was not completely forgotten. About one half of the library's book holdings are devoted to aquacultural topics and the library currently receives a number of journals and newsletters in the same field. At the present time the Milford Laboratory is actively involved in bay scallop and tautog aquaculture.

In Hawaii, NMFS Honolulu Laboratory Library's collection holds 10,000 books, journals, and reprints, and approximately 500 translations related to marine fisheries, ecology, mammals and turtles, oceanography, and ichthyology. In recent years, the library has begun extended study of bottom fishes and lobster stock assessment. Library staff have also embarked on research in the area of ocean layers and how the level of mixing impacts fish populations.

The NMFS Northeast Fisheries Center Woods Hole Laboratory Library in Woods Hole, Massachusetts holds the oldest fisheries collection in the U.S. The library includes a complete collection of the Bulletins and Reports of the U.S. Fish Commission and the publications of its successors, the Bureau of Commercial Fisheries and the National Marine Fisheries Services; International Council for the Exploration of the Seas (ICES) documents from 1949 to the present; International Commission for the Northwest Atlantic Fisheries

(ICNAF) documents from 1950 to 1979; Northwest Atlantic Fisheries Organization (NAFO) documents from 1979 to the present; and fishing industry periodicals and newspapers. The collection includes 700 periodical volumes, 7,000 other items, and 150 current journal items.

The library's aquaculture holdings include material on stock assessment and population dynamics. Its historical data on fish growth goes back to the late 1800s. The collection also contains information on the commercial fishing industry's impact on stock assessment, ocean dynamics, health quality, and the effects of pollution on fish stocks. Materials on U.S. government regulations and state laws are also available.

The NMFS Charleston Laboratory Library, merging with the Marine Research Library later this year, contains several thousand volumes on fisheries and marine biology. A full one-third of its collection deals with aquaculture. This library, serving NMFS, the College of Charleston and the South Carolina Dept of Natural Resources, also contains zoological records on CD-ROM, oceanographic abstracts, and deep sea research information.

Salmon, aquaculture, and genetics are the main focus of the Northwest



▲ Figure 1. Milford seed oysters.

NOAA Central Library
National Oceanographic Data Center
NOAA/NESDIS, E/OC4
1315 East-West Highway
Silver Spring, MD 20910
E-mail: cwatts@nodc.noaa.gov

and Alaska Fisheries Science Center Library located in Seattle, WA (Figure 2). The center library, built in 1935, specializes in resources on salmon stock in the Columbia River, Bering Sea, and Northeast Pacific Ocean. The collection includes approximately 33,000 books and bound journal volumes, 5,000 translations of Russian and Japanese fishery articles, and 6,000 reprints in aquaculture, marine science, fisheries, and ecology.

NMFS Pascagoula Facility Library has a smaller collection of 1,200 books, 2,150 journals (163 different titles), and 200 reprints relating to marine science and seafood technology. The library uses two research vessels that go out into the Atlantic to develop appropriate gear for shrimp fishing. In developing the trawling efficiency device, the facility library has responded to U.S. laws protecting sea turtles.

Seattle's NOAA Regional Library, while concentrating on the subjects of meteorology, oceanography, geophysics, and mathematics, also aids students and scientists of aquaculture by providing access to the Aquatic Science and Fisheries Abstracts (ASFA) database and directions to other sources in the area like the Ocean Library at the University of Washington. Like Seattle's NOAA Regional Library, many of the NOAA libraries are able to provide researchers with access to electronic resources. The Seattle Regional Library's Home Page offers electronic access to aquaculture resources (URL: <http://www.wrclib.noaa.gov/lib/aqua.html>).

Electronic resources

Electronics resources, most available via the Internet, extend the ability of researchers to obtain aquaculture information as well as NOAA Library Services' ability to provide aquaculture information. Two useful electronic resources are the NOAA Data Directory and NODC's Taxonomic Code.

The NOAA Environmental Services Data Directory is available on the NOAA Environmental Information Services page (URL: <http://www.esdim.noaa.gov/>). In the section "How can I find data available at NOAA?", the researcher selects NOAA Data Set Catalog and then Full-text Search Only. At that point the user has several choices to



▲ Figure 2. An American Indian aquaculture site in the Pacific Northwest, showing culchless (without shell) spat (baby oyster) after six months of growth.

select whatever data he/she needs. The format in which to view the data set descriptions include: Generic Hypertext (HTML), Government Information Locator Service (GILS), Federal Geographic Data Committee Metadata Standard, and Native or Original Format (DIF or NEDRES); see Appendix A.

The National Oceanographic Data Center's Taxonomic Code is also a useful tool for scientists. Data from Version 8.0 of the NODC Taxonomic Code can be found on the Integrated Taxonomic Information System (ITIS) Home Page (URL: <http://www.itis.usda.gov/itis/>). The ITIS is the result of a partnership of Federal agencies collaborating with systematists in Federal, state and private sectors to provide scientifically credible taxonomic information. It includes documented taxonomic information of flora and fauna from both aquatic and terrestrial habitats, primarily in North America.

The ITIS is currently under development by NODC, the U.S. Environmental Protection Agency, the U.S. Geological Survey (including the former National Biological Service [NBS]), the U.S. Department of Agriculture and several other agencies. Searches can be performed through the

ITIS home page using either the common (vernacular) name, the scientific name, or the taxonomic serial number (TSN). The search will yield other names that have been used historically for the organism (synonymy), plus the hierarchical placement of that name (see Appendix B).

Appendices

Appendix A: Environmental Services Data Directory or NOAA Directory Search
URL: <http://www.esdim.noaa.gov/>

1. Go to the NOAA EIS Home Page.
2. Look for "How can I find data available at NOAA"; click on NOAA Data Set Catalog.
3. On the NOAA Data Set Catalog Page, click Full-text Search Only.
4. On the Full-text Search Page, select which database you would like to search; then type in your search query. Click on the Start Search button to begin the search.
5. At the next page, select the format in which you wish to view the data set descriptions. The options are:

- Generic Hypertext (HTML)
- Government Information Locator Service (GILS)
- Federal Geographic Data Committee Metadata Standard
- Native or Original Format (DIF or NEDRES)

—continued on page 16

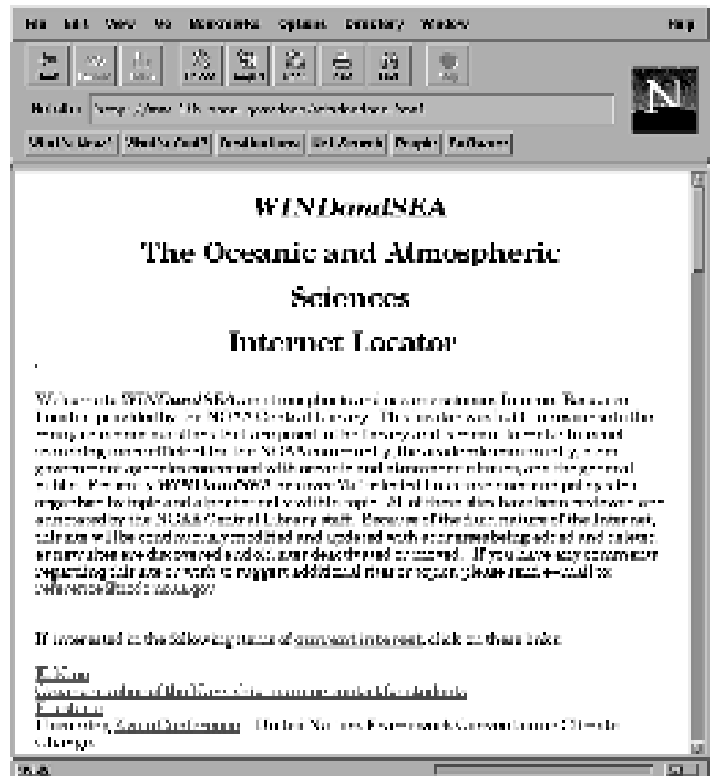
WINDandSEA: An Internet locator for the oceanic and atmospheric sciences

The Central Library of the National Oceanic and Atmospheric Administration (NOAA) has recently completed WINDandSEA (Figure 1), an Internet site designed to assist NOAA personnel, teachers, students, and the general public locate Internet pages that have science or policy information related to the oceanic and atmospheric sciences. Presently WINDandSEA has links to over 800 sites. Sites have been screened by the NOAA Library for information content and potential value to the oceanic and atmospheric communities.

WINDandSEA is organized into three main parts. There is a current interest page, an index page, and the main body which is composed of 7 separate HTML pages. The site is split into a number of pages to speed loading and access time although this is generally transparent to the user. The current interest page has links to El Niño sites, *Pfiesteria* sp. sites, and other sites that are potentially of great interest to the scientific community and public. These sites are usually, but not always, duplicated in the main body of WINDandSEA. After reviewing or bypassing the current interest page, users will access the index page. The index page is the key to optimizing the use of this site. The NOAA Library recommends reviewing the index page prior to entering the main body of the locator. The index presently has 39 major topics and over 130 subtopics within

the major topics. The major topics are organized alphabetically as are the subtopics within a major topic. Once a user finds a topic or subtopic of interest, he/she merely clicks on it and this will take the user to an HTML page within the main body of WINDandSEA. Here the user will find a number of site addresses related to the topic of interest with accompanying descriptions of each site. There is a browse option for those who wish to amble through WINDandSEA at a leisurely pace. Updating of the browse page lags behind the updating of the separate HTML pages.

WINDandSEA was developed initially as a reference tool to assist NOAA librarians in answering the diverse questions that daily come to the reference desk. It became apparent that the value of such an Internet site locator transcended library use. Accordingly, it was redesigned for the use of NOAA personnel and others interested in the oceanic and atmospheric sciences. It can be accessed through the home page of the NOAA Library at <http://www.lib.noaa.gov/> or directly at: <http://www.lib.noaa.gov/docs/windandsea.html>.



▲ Figure 1. The NOAA Central Library's WINDandSEA site offers assistance in locating oceanic and atmospheric science sites.



▲ Figure 2. A view of Point Lobos, CA, one of the many digitized images available through the NOAA Central Library photo collection.

The name WINDandSEA was selected because it is descriptive of the site and is also an uncommon character string which eases finding on the Internet if not tagged with a bookmark.

Going through the NOAA Library home page has the advantage of gaining access to the NOAA Library Catalog, a number of bibliographies produced by the library, and seeing samples of the NOAA photo collection (Figure 2) among other items of interest on the Library home page. If you have questions and suggestions for improving this site, or recommendations for adding quality science and policy sites to WINDandSEA, please contact the NOAA Central Library at the address listed or e-mail the author at: stheberge@nodc.noaa.gov.

—Albert E. Theberge
NOAA Central Library
NOAA/NESDIS
SSMC3, 2nd Floor E/OC4
1315 East-West Highway
Silver Spring, MD 20910
E-mail: reference@nodc.noaa.gov ■

GSAS used to process first GOES requests

The National Climatic Data Center (NCDC) serviced its first Geostationary Operational Environmental Satellite (GOES) data requests on-site, during October, using the new Geostationary Satellite Archive System (GSAS) software. The WWW-based GSAS software runs on an NCDC workstation and provides GOES tape inventory search and data extraction capabilities. GSAS provides for data output to magnetic media, ftp transfer, and to the McIDAS Abstract Data Distribution Environment (ADDE) for hardcopy image processing.

NCDC's GOES digital data are stored on IBM 3590 cartridges which are created at the University of Wisconsin's Space Science and Engineering Center (SSEC) and shipped twice weekly to NCDC for archival. The GOES inventory at NCDC dates from September 19, 1997, to the present. Requests for GOES data prior to that date will continue to be processed by the SSEC.

Contact: NCDC

Southeast Asia fires captured in satellite imagery

Images of the recent massive southeast Asian fires, so well visualized by the NOAA Polar-orbiting Operational Environmental Satellites (POES), have been major newsmakers worldwide. This is especially pertinent since the drought conditions in southeast Asia are blamed on the high-profile El Niño conditions in the Equatorial Pacific; not since Hurricane Fran made landfall last year has there been such a huge demand for satellite data and imagery for a single event.

A number of POES satellite images spanning the period September 20 to October 3, 1997, are now on-line at the On-line Images section of National Climatic Data Center's (NCDC) web site. In addition to the images, various national and international organizations, from the Indonesian government to the CIA have contacted the NCDC Satellite Services Group for the original digital data to further process and analyze this event. Several magazines and news groups, including the National Geographic Society and ABC News, have obtained the images directly from the NCDC web site: <http://www.ncdc.noaa.gov/ol/satellite/olimages.html#Z>

Contact: NCDC

Data products and services

Library catalogs rare items from Meteor expedition

Library staff recently compiled and located publications of the Deutsche Atlantische Expedition (1925-1927) of the research vessel *Meteor*. This expedition was the first organized large-scale study to collect physical oceanographic data. The compilation began with the donation of one piece (Bd. 6, T.2) from the personal collection of Professor Gerhard Neumann. This led to the location of 21 additional rare items that have been cataloged and described online through the library's catalog on the WWW. The NOAA Central Library holds eight complete volumes or 23 physical pieces stored in the Special Collections Room under GC481.D48 1932. Two volumes of translations have also been cataloged and are available on the open stacks.

Contact: NODC

CONTACT POINTS

National Climatic Data Center (NCDC)
704-271-4800
Fax: 704-271-4876
E-mail: *Climate Services - orders@ncdc.noaa.gov*
Satellite Services - satorder@ncdc.noaa.gov
WWW: <http://www.ncdc.noaa.gov/>

National Geophysical Data Center (NGDC)
303-497-6419
Fax: 303-497-6513
E-mail: *info@ngdc.noaa.gov*
WWW: <http://www.ngdc.noaa.gov/>

National Oceanographic Data Center (NODC)
301-713-3277
Fax: 301-713-3302
E-mail: *services@nodc.noaa.gov*
WWW: <http://www.nodc.noaa.gov/>

NOAA Environmental Services Data Directory
301-713-0572
(Gerry Barton)
Fax: 301-713-1249
E-mail: *barton@esdim.noaa.gov*
WWW: <http://www.esdim.noaa.gov/#data-products>

NOAA Central Library
Reference Services:
301-713-2600
Fax: 301-713-4599
E-mail: *reference@nodc.noaa.gov*
WWW: <http://www.lib.noaa.gov/>

NCDC assists FEMA with snowfall extreme statistics

The National Climatic Data Center (NCDC) has produced extreme snowfall statistics to be used by the Federal Emergency Management Agency (FEMA) beginning this winter in the declaration of disaster areas. The statistics are derived from daily data collected by the National Weather Service via their Cooperative Data Observation Program and date from 1948 to 1996. These data, from approximately 7,000 volunteer observing sites, have been processed and archived monthly at the NCDC. The statistics include greatest snowfall in 24 hours and snowfall amounts for return periods of 100, 50, 25 and 10 years for the snowfall season and 1, 2, and 3 day periods.

Contact: NCDC

Access to data enters new era

Access to data from the Geostationary Operational Environmental Satellite (GOES) Space Environment Monitor has entered a new era due to the enhanced SPIDR (Space Physics Interactive Resource) web data service at the National Geophysical Data Center (NGDC). Users can now interactively download these data. Other improvements include 5-minute data displays with individual x-ray, energetic particle and magnetometer plots, as well as stack plots for intercomparison. A second database of daily values was added that displays a bigger picture of the space environment that can incorporate a few months of data or an entire 11-year solar cycle. The website is located at <http://www.ngdc.noaa.gov/8080/production/html/GOES/>

Contact: NGDC

Geologic hazards photos from NGDC

The NGDC has collected photos of geologic hazards from many sources and compiled them into 36 sets of 20 slides each. Images are presented on CD-ROM in three volumes: (1) Earthquakes, General Topics; (2) Earthquake Events; and, (3) Landslides, Tsunamis, and Volcanoes. The images are copyright-free. Access to the images and descriptive text is through a Web browser interface and GeoVu, NGDC's multi-platform access and display software. GeoVu will operate on PCs running Microsoft Windows 3.x or Windows 95, and on Macintosh, UNIX Sun, and UNIX Silicon Graphics computers.

Contact: NGDC

New bathymetry, from page 4

tinuous with NE-SW trending ridges and valleys which extend offshore, and which are revealed in great detail by the new bathymetry. These ridges are formed in relatively resistant southward-dipping basal limestones of the Devonian (Bois Blanc and Dundee Limestones in Ontario; continuing eastward as Bois Blanc and Onondaga Limestones in New York State).

Descriptions of lake bottom features seen in the Western Erie Basin bathymetry are published in the *Earth System Monitor* December 1996 issue as well as in the *Journal of Great Lakes Research* 23(2): p190-201. Compilers of the bathymetry are Lisa Taylor of NGDC; Peter Vincent of the NOAA-University of Michigan Cooperative Institute for Limnology and Ecosystems Research (CILER); and John Warren of CHS.

IPACS, from page 9

planning, ground system development, and operational oversight of the DMSP. The NESDIS Office of Satellite Operations (OSO), which is headed by Mr. Gary Davis, will be responsible for actually operating and maintaining the DMSP and NPOESS constellation on a daily basis.

The success of the DMSP transfer effort, to date, is tangible evidence of the synergy which takes place when personnel from different agencies work together for a common goal. In the six months to come, the IPACS will undergo extensive testing at the NOAA SOCC, while NESDIS OSO personnel will continue their training on DMSP

Aquaculture, from page 13

Click on Retrieve Documents to display your search results.

Appendix B: Searching for Information from the NODC Taxonomic Code, Version 8.0

URL: <http://www.itis.usda.gov/itis/>

Searches can be performed using either the common (vernacular) name, the scientific name, or the taxonomic serial number (TSN). The search will lead to other names that have been used historically for the organism. The currently accepted scientific name will also be identified. (There are about 250,000 TSNs on the Version 8.0 CD-ROM.)

1. Go to the ITIS: Taxonomy for Biodiversity (Integrated Taxonomic Information System) Home Page.
2. Click on Access Database.

Project Coordinators are Troy L. Holcombe of NGDC and David F. Reid of GLERL.

A poster of the new bathymetry of Lake Erie and Lake Saint Clair is scheduled for release in early 1998. A CD-ROM containing digital vector contours, gridded data and downloadable color images of the Lakes will be available shortly after the poster is released. For more information concerning these products and data on Lake Erie and Lake Saint Clair, contact Lisa Taylor, NGDC, 325 Broadway, Boulder, CO 80303, Phone: 303-497-6767, e-mail: lat@ngdc.noaa.gov. If you would like to be contacted directly when the poster and CD-ROM are ready for distribution, please connect to NGDC's Marine Geology and Geophysics Lake Erie web page at URL: <http://www.ngdc.noaa.gov/mgg/greatlakes/erie.html> and enter your e-mail address or mailing address where prompted. ■

operations that began last summer. The testing and training taking place at the NOAA SOCC will culminate in an operational test and evaluation (OT&E) of both NESDIS OSO personnel and the NOAA SOCC equipment. Personnel from NOAA and AFSPC will conduct the OT&E and transfer of the DMSP to NOAA will take place following the test's successful completion.

A backup operations center will be operated by the Air Force Reserve's 8th Space Operation Squadron at Falcon AFB near Colorado Springs, Co. Named the Environment Satellite Operation Center (ESOC), the Falcon AFB unit is scheduled to begin backup operations in October 1998. ■

3. On the Data Access Page, click on Query the ITIS Database.

4. On the Database Query page, select the Kingdom and type of input (Scientific Name, Vernacular Name, TSN (Taxonomic Serial Number) and type your search in the text box..

5. Click Submit to perform the search.

Ordering information for NODC Taxonomic Code, Version 8.0, CD-ROM:

National Oceanographic Data Center
User Services Group
NOAA/NESDIS E/OC1, SSMC3
1315 East-West Highway, 4th Floor
Silver Spring, Maryland 20910-3282
Telephone: (301) 713-3277
FAX: (301) 713-3302
Internet: services@nodc.noaa.gov ■

Address Correction Requested
OFFICIAL BUSINESS
Penalty for Private Use \$300

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Publication Distribution Facility
1315 East-West Highway
Silver Spring, MD 20910-3282
ATTN: Earth System Monitor