



# EARTH SYSTEM MONITOR

## Preserving the Everglades

### *NOAA joins multi-agency program to study and restore the Everglades*

*A guide to  
NOAA's data and  
information  
services*

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and services

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The Florida Everglades have been described as more than a geographical location, but as an idea "outside of time, eternal, changing only as our views change." Once a silent river of grass undisturbed but for a vast variety of birds, insects, and other animal life, today south Florida supports a large, ever increasing human population drawn to the "vast glimmering openness" described by naturalist writer Marjory Stoneman Douglas.

Over time, the south Florida ecosystem of wet prairies, marshes, coastal estuaries, and hardwood hammocks was transformed into a vast interconnected system of urban, suburban, recreational, and commercial developments. Slow-moving sloughs and marshlands that once changed according to the dictates of the seasonal rainfall gave way to more regularized water management dictated by human use. Some areas



▲ The Everglades meet the sea in this aerial photograph provided by Rick Cook, National Park Service. This meeting of land and water have created a unique estuarine environment and the largest intact mangrove forest in the Western Hemisphere.

that had been wet, dried up. Toxic mercury accumulations in fish pulled from the Everglades, algal blooms and sea grass die-offs, fewer and fewer wading birds, and a rapidly diminishing number of Florida panthers—all pointed to an ecosystem under siege.

The public has expressed its support for change, and many voices have joined in support of ecosystem conservation recognizing its importance to South Florida's future. However, this complex system, on which so many demands have been placed, does not lend itself to a quick fix.

The recent deliberate flooding of the Grand Canyon, which resulted in the revival of its beaches and wildlife, gave proof that thoughtful human intervention can not only stop the clock of ecological destruction, but reverse it.

Glen Canyon Dam had long ago depleted the canyon's ecosystem by preventing the annual flooding cycle of the river. The flooding was declared a success by Department of the Interior Secretary Bruce Babbitt in an interview in the *Washington Post*. Babbitt added that the

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**Everglades, from page 1**

flooding could serve as a model for work on other restoration projects, including the Florida Everglades.

South Florida and the Everglades—two seemingly separate worlds with separate lexicons—today are inextricably tied together. The question of whether it is possible for human and natural worlds to become compatible in a way that sustains each can now be answered with a hopeful “yes.”

**Coordinating Federal agencies**

On September 23, 1993, six Federal agencies began to take steps to preserve the Everglades into the 21st century. They joined forces to promote and facilitate coordinated Federal actions to restore the Florida Ecosystem within the parameters of a five-year interagency agreement. This first ever effort of interagency coordination in the region formally established the South Florida Ecosystem Restoration Task Force. The Departments of the Interior, Commerce, Agriculture, and Justice, the Environmental Protection Agency, and the U.S. Army (Civil Works), now working as one, are coordinating the development of consistent policies, plans, and programs for addressing the pressing needs of the South Florida Ecosystem. Data from the research projects, including historical and operational data such as satellite imagery, are exchanged among agency scientists.

From the initial group of Federal agencies, the Task Force has been expanded to include State of Florida Departments of Environmental Protection and Transportation, Fresh Water and Game Commission, the South Florida Water Management District and the Miccosoukee and Seminole Indian Tribes. Each agency participates fully in this expanded policy making group.

The Task Force is seeking to balance the important task of restoring a national treasure while strengthening partnerships with a number of different constituencies within the State and native American tribal agencies. Many of these state and local groups had already been working for years on land and water issues linked to Florida's agricultural, ecological, and recreational interests.

Now the Task Force was asked to bring together all the disparate groups

working to protect the environment and create a framework for an ecosystem management strategy. In order to accomplish this task, the Task Force established a management and coordination team, known as the Interagency Working Group, composed of 11 agency managers with management and regulatory responsibilities in south Florida. This group had a one year deadline to submit a restoration report.

Given a 1995 deadline, the Task Force was asked to complete a comprehensive conservation, permitting, and mitigation strategy for wetlands and other sensitive habitats, and a multi-species recovery plan for threatened and endangered species in South Florida that further ecosystem restoration.

Four times a year an interagency working group holds public meetings to hear from the community and returns recommendations to the Task Force concerning management policies, plans, and priorities that ultimately affect Florida residents. Topics range from eradicating or controlling invasive exotics to comprehensive wetlands restoration.

The South Florida Ecosystem encompasses a vast resource of the Kissimmee watershed, Lake Okeechobee, the Big Cypress basin, the Everglades, Florida Bay, and the Florida Keys. This vast scenic area contains significant national interest conservation areas—National Parks and Wildlife Refuges and the Florida Keys National Marine Sanctuary.

Within this area, Federal agencies are charged with administering and enforcing national environmental laws that protect the air, water, coastal land and waters, and endangered inhabitants.

**Florida's role in restoration**

Particularly impressive has been the State of Florida's more than 10-year commitment to its “Save Our Everglades” program, launched by then-Governor Bob Graham in 1983. The goal of the program—to make the Everglades look and function more like it did in 1900 than in 1983 by the year 2000—was reinforced by six objectives:

- Reestablish the values of the Kissimmee River

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### NSIDC scientist wins J. Warren Nystrom Award for 1996

The J. Warren Nystrom Award for 1996 was presented to Dr. David L. McGinnis of the National Snow and Ice Data Center (NSIDC)/University of Colorado at the Association of American Geographers (AAG) meeting in Charlotte, North Carolina. The award recognized Dr. McGinnis' paper, "Downscaling Techniques for Snowfall Prediction in Global Change Studies," as the best dissertation in geography in 1996. The award is given each year after a competitive process based on the originality of ideas and potential contributions to the advancement of knowledge, clarity and effectiveness of written style, and quality and effectiveness of oral presentation.

### NODC hosts meeting on ocean data management cooperation

The National Oceanographic Data Center recently hosted joint meetings of the Global Temperature-Salinity Profile Program (GTSP) and the World Ocean Circulation Experiment's Upper Ocean Thermal Data Assembly Center at NOAA's Silver Spring location. The meeting was chaired by Dr. Ron Wilson, who retired last month as Director of Canada's Marine Environmental Data Service (MEDS). Participants included representatives of the World Meteorological Organization (WMO), the Intergovernmental Oceanographic Commission (IOC), the World Ocean Circulation Experiment's (WOCE) International Program Office, and research and data management organizations in Australia, Canada, Russia, France, Germany, Japan and the U.S.

In January, the IOC's Committee for International Oceanographic Data Exchange agreed to change GTSP from a pilot project to a fully operational program. The main goal of this meeting of GTSP was to define tasks and procedures for turning the project into a continuing program. Several technical issues were dealt with during the meetings, such as data format, quality control, and data distribution issues. Participants also agreed that GTSP should publicize more broadly the data that are available from GTSP.

Support of global ocean research and monitoring programs by GTSP was discussed. The World Ocean Circulation Experiment's Upper Ocean Thermal project has relied on joint work of data management and research organizations

## News briefs

to produce a global, scientifically quality controlled data set through GTSP. WOCE will use the data set, and others, at its Pacific Ocean Workshop to be held in Newport, California in August. The group also discussed future support for other projects such as the Global Ocean Observation System (GOOS) and the Climate Variability program (CLIVAR). Mr. Shin Tani of Japan's Hydrographic Department, speaking for the North East Asian Region GOOS, plans to use existing GTSP data quality control software now in use at the U.S. NODC. More information about GTSP is available from NODC's Web page at <http://www.nodc.noaa.gov/GTSP/gtsp-home.html>

### NCDC participates in WMO working group on marine climatology

Joe Elms of the National Climatic Data Center (NCDC) attended the seventh session of the World Meteorological Organization's (WMO) Working Group on Marine Meteorological Services, specifically participating in the sub-group on marine climatology, in Geneva. A delegate from each of the eight Responsible Member countries (one being the United States) and several additional delegates from other participating maritime nations attended the session.

The primary objective of the meeting was to prepare recommendations on marine climatology for consideration by the Commission for Marine Meteorology at its twelfth session (tentatively scheduled for March of 1997). Major areas of concern were contributions to the World Climate Programme (and other WMO programs), including data quality, exchange and archives, the *INFOCLIMA* catalogue, technical advice to the Secretariat, and published guides.

### NODC participates in international ICES meeting

Robert Gelfeld represented the National Oceanographic Data Center (NODC)/World Data Center-A for Oceanography at the International Council for the Exploration of the Sea (ICES) Marine Data Management Working Group meeting held in Copenhagen, Denmark. Data managers and scientists from ICES member countries held discussions on:

- assessment of post-1990 oceanographic data sent to ICES from members;
- progress in implementing IOC's Global Oceanographic Data Archaeology and Rescue (GODAR) project in each ICES member country;
- assessment of the minimum requirements for quality assurance of oceanographic data;
- need for extending the data archeology project to an expanded range of data types, in particular biological oceanographic parameters, and;
- development of WWW pages and links within the ICES member countries.

### NOAA Library establishes new exchange agreements

The NOAA Library has established an exchange agreement with the International Commission for the Conservation of Atlantic Tunas (ICCAT) and NOAA's National Marine Fisheries Service (NMFS) Highly Migratory Species Management Division. ICCAT will send four of their publications to the Library in exchange for NOAA technical memorandums and two NMFS annual publications from the Highly Migratory Species Division.

The Library is also working on a potential agreement with the Russian Institute of Hydrometeorological Information (WDC-B.) The Institute plans to send 64 Russian publications to the Library while the Library plans to send five CD-ROM titles. For more information, contact: NOAA Library  
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### NGDC scientist studies climatic sediment record in Chile

The National Geophysical Data Center's David Anderson will travel to southern Chile on the second leg of a National Science Foundation-sponsored field program to explore the fjords of the region in search of laminated sediment records of climate. Anderson's group was the first to discover the existence of anoxic silled basins along the coast during an expedition last October. Anoxic basins in the northern Hemisphere have been demonstrated to be recorders of climate change over the past millennium, and the goal of this project is to uncover similar records from the southern hemisphere.



▲ The Everglades are world renowned for the variety of wading bird populations, including Greater egrets. Their numbers and success in nesting are particularly good indicators of hydrological restoration success.

#### *Everglades, from page 2*

- Protect Lake Okeechobee
- Protect the Water Conservation Areas
- Protect the Big Cypress Swamp
- Restore Everglades National Park and Florida Bay, and
- Protect endangered wildlife.

This cooperation among government agencies, Congress, and conservation organizations produced a number of welcome accomplishments. The Kissimmee River restoration has begun in full partnership with the U.S. Army Corps of Engineers.

Already there has been an improvement of overland water flow through the Everglades: protection of the Florida panther and other wildlife species against highway mortality, and expansion of the Big Cypress National Preserve boundary by 146,000 acres as part of the reconstruction of Alligator Alley (State Road 84) to intersect Highway 75 across the Everglades.

In addition to these efforts, the South Florida Water Management District, in conjunction with other public and private organizations, has established a trust to protect the Corkscrew Regional Ecosystem Watershed, a 54,000 acre mixture of uplands and wetlands supporting such publicly-

owned downstream natural areas as Florida Panther National Wildlife Refuge and Big Cypress National Preserve. At Loxahatchee National Wildlife Refuge, the Corps of Engineers now floods marshlands year round to encourage nesting of wading birds. In addition, the Central and South Florida Restudy, a program cosponsored by the South Florida Water Management District and the U.S. Army Corp of Engineers, stands as an important conceptual rethinking of water management in south Florida. While such land use planning is generally a responsibility of state and local agencies, the Federal government recognizes its influence on land use through its program and policies, and is committed to interacting with state and local governments to protect regional ecosystems containing valuable national park lands. Congressional establishment of Florida Keys National Marine Sanctuary in 1990 is a strong example of Federal/state partnership in the service of the Florida ecosystem management.

#### **Innovative joint efforts**

For years, as previously stated, state and local groups have worked with such land and water issues linked to

Florida's agricultural, ecological and recreational interests, and on occasion, individual Federal agencies have been partners with them on various projects. However, these projects have not been carried out within the framework of an ecosystem management strategy.

Indeed, each Federal, state, local and private group as well as every resident of south Florida has a stake in ecosystem restoration. Water storage and delivery, agricultural runoff, and water quality contaminants issues are among those with potentially mammoth impact on this population of more than six million. On the one hand, the area's commercial and industrial health depends on a healthy ecosystem, while, on the other hand, increasing population and the demands of further infrastructure development strain the very elements of ecosystem health.

The region faces major environmental issues. Population is expected to triple in just 50 years, making advance planning critical to managing dramatic change. Increasing population growth also means increasing competition for a finite water supply, as well as increasing by-products of growth: contaminants, introduced species, and resource overuse associated with growing commercial development.

#### **Long-term planning**

The important question before the South Florida Ecosystem Restoration Task Force is how to accommodate continued growth in south Florida while reducing symptoms of ecosystem decline. Although the need to grow in order to maintain economic health may seem a necessity at first, agencies are recognizing the need for potential trade-offs to maintain environmental integrity. Industrial growth that once transformed apparently "useless" swamps and flatlands into developed land is being reevaluated as beneficial wetlands functions become better understood. In south Florida now, the public places increased importance on preserving undeveloped lands and regaining lost wetland benefits by restoring such areas as Kissimmee River.

The Interagency Working Group studied the character of the South Florida ecosystem as it existed prior to

drainage and the system as it presently exists. Over the years of human intervention, 990 miles of levees, 978 miles of canals, and 30 pumping stations were developed to compose the water management system of south Florida.

The natural balance between land and water also has changed. Excessive drainage for agricultural and other purposes has caused organic, porous soil to oxidize. Oxidation has meant diminished soil thickness—significant in south Florida because, at its deepest, only 12 to 14 feet originally existed. By 1984, 5 feet or more at these locations had been lost.

Soil loss has meant loss of elevation—the degree of incline that, prior to drainage, shifted water south, supplying it to the farthest reaches of the ecosystem, feeding down through sawgrass, soil, and limestone to supply the system's two aquifers, the Biscayne and Florida aquifers. Now, the movement of water is handled mechanically through an extensive system of levees and canals.

Soil loss has meant diminished water quality. The more soil oxidation that occurs, the less the remaining soil is able to retain minerals and other components. These wash downstream in the company of pesticides and assorted other run-off, with predictable adverse impacts on native plants and animals. Increasingly, invasive non-native species such as Brazilian pepper, Australian pine, and Malaleuca have found growth conditions more favorable for them than for native species.

Ecosystem fragmentation has further contributed to current changes. Fire, once an ally in habitat diversity, has been curtailed to a predictable schedule of use, leading to overdrying of wetlands and a diminished mosaic of burned and unburned areas necessary for habitat diversity.

Perhaps the most astounding by-product of this report is simple recognition of how much has changed—and how much will have to be undone in order to restore the ecosystem's natural components so as to achieve sustainability. Not only has the entire integrated system of water flow been rearranged, but soil composition, habitat, the identify and numbers of land and water species, and the relationship

between fresh and salt water have all changed. In the face of such dramatic differences, how can restoration proceed?

The Interagency Working Groups plan begins with hydrologic restoration. Without it, nothing else can happen effectively. But with it must come other efforts—curbing the invasion of exotic non-native species, elimination of earlier contaminants, and stopping soil erosion and oxidation. It also depends, in part, on the linkages developed between computer-generated models of current hydrology and those of future water quality, ecology, and plant and animal populations. These scientific models should enable researchers to determine relationships between water and plant and animal communities at the ecosystem level.

#### Vision for the future

What will a restored ecosystem look like? Much of that is difficult to determine now during the earliest stages of the process. However, three characteristics that gave the south Florida ecosystem resiliency and sustainability were dynamic storage and sheet flow, large spatial extent, and habitat heterogeneity. These characteristics certainly will serve as future indicators of restoration success. Increased native plant and animal diversity would suggest habitat heterogeneity, an especially important element considering that estimated ben-

efits from simply removing the black and white Australian melaleuca tree from the landscape would amount to approximately \$168 million. Also, considering that mercury contamination indicates ecosystem disruption, its opposite—mercury reduction in large-mouth bass, alligators, and panthers—would suggest another important health indicator.

The re-establishment of pre-drainage wading bird nesting colonies, another indicator is already underway. Other positive indicators are reduced numbers of deformed fish in estuaries, increased seagrass cover, no further wetlands losses, increased abundance of fish, and species recovery.

The Interagency Task Force, through its Interagency Working Group, is not yet in a position to propose a comprehensive, fully integrated restoration plan for the south Florida ecosystem until it has incorporated state, local, and tribal interests. It is able, however, to outline and recommend restoration vision as well as management objectives to support this vision. It can recommend steps the federal community can take to reinforce existing restoration efforts and to initiate new efforts.

Already changes are underway. Indeed, the manner in which Federal agencies do business in south Florida has been revamped. The action underway in the Federal sector represented on

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▲ Visitors to Everglades National Park's Shark Valley are able to observe life in the Shark River Slough from narrated tram buses.

# National Ocean Service hydrographic data

## *New CD-ROM provides access to 44 million digital bathymetric soundings from U.S. regions*

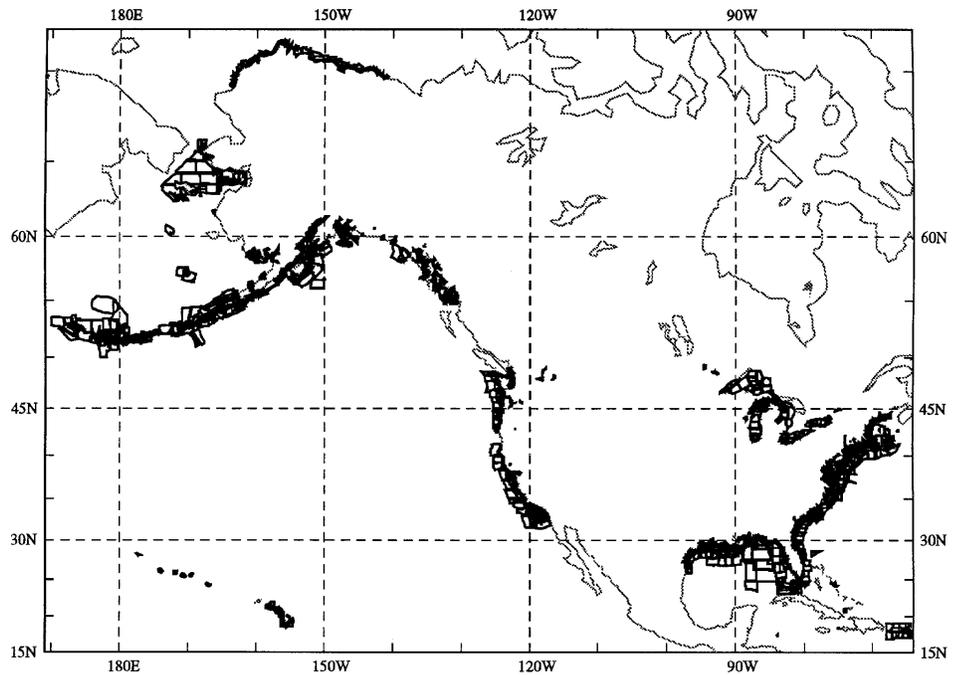
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The "Survey of the Coast", the nation's oldest scientific agency, was established by President Thomas Jefferson in 1807 to conduct hydrographic (bathymetric) surveys off the coasts of the United States in the interest of navigation safety. Until recently the agency was known as the U.S. Coast and Geodetic Survey, and is now part of NOAA's National Ocean Service (NOS). The agency objective remains the same; to collect quality water depth data from the oceans, coast, waterways and harbors. Each survey represents a unique and comprehensive record of the position of the coastline and the bottom configuration of adjacent waters. These data have been collected primarily for navigation as part of NOS's mission to produce nautical charts for the mariner and maritime commerce.

However, there are many secondary uses for these data. The survey bathymetry (water depth data) give a clear and detailed picture of bottom topography for: modeling of ocean currents; geological studies; oil, gas, and mineral exploration; coastal planning, and ecosystem evaluations. These data even have recreational uses such as guiding SCUBA divers to wrecks and bottom features.

Until the late 1960s, survey data were stored on paper media in the archives at the National Ocean Service. In the early 1970s, a massive project to digitize bathymetric soundings from these paper surveys was carried out. In this project, which was active for only a few years, over three thousand surveys containing some 26 million soundings were converted from paper to digital media. Many high-quality older (mostly pre-1930) surveys still exist only on

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▲ Figure 1. Data locations for NOS hydrographic surveys.

paper media, and recently digitization of these older data was restarted and continues at present. Historical surveys are important because they give a detailed record of changes brought about by natural and cultural causes through time. Effects of events such as earthquakes, storm surges, and dredging can be seen by comparing survey bathymetry of the same areas collected at different times. Beginning in the 1960s and continuing today, hydrographic data are collected digitally using high-tech computer equipment and satellite navigation.

### Meeting user needs

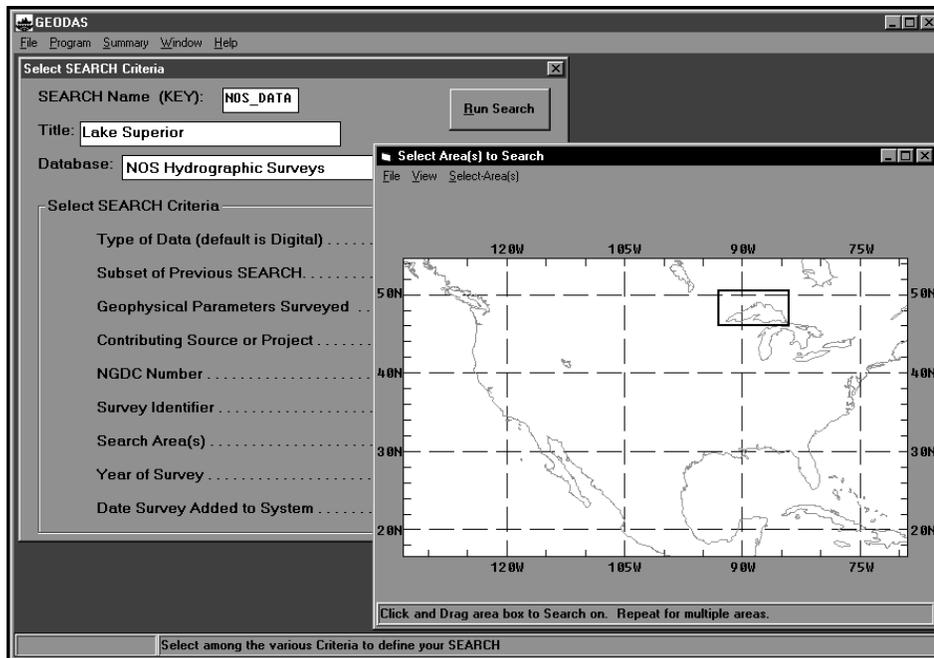
Hydrographic survey data existing only on paper was and still is supplied to customers by manually copying paper-to-paper as a custom product on demand. This process is time consuming and expensive both for the customer and the archivist. Beginning about 1980, digital hydrographic survey data has been available to the public, but access has been cumbersome because of the large volume of data.

Now, for the first time, the complete NOS hydrographic data set existing in digital form is available to anyone who has a personal computer

and a CD-ROM reader. The NOS hydrographic survey data provide the most extensive digital bathymetric data available for the coastal waters of the continental United States, Alaska, Hawaii and Puerto Rico/Virgin Islands (Figure 1).

Digital data holdings include over 44 million depth soundings from 4964 surveys (totaling 1.7 gigabytes of data), and all of these data are packed onto two CD-ROM disks. The NOS digital set consists of depths and navigation features digitized from hydrographic surveys completed between 1930 and 1965, and hydrographic survey data acquired digitally in the field since 1965. These data were collected by the National Ocean Service, its predecessor, the Coast and Geodetic Survey, and, prior to 1976 in the Great Lakes, the U.S. Army Corps of Engineers.

The CD-ROM set was designed to make coastal U.S. bathymetric data readily available to the public at a reasonable price. To meet this need, a comprehensive inventory system was designed and is included on the CD-ROM. To satisfy a wide range of user needs, a variety of data search options are included. The user interface allows a user to search the entire database with



▲ Figure 2. Search window of the GEODAS search software.

mouse clicks and pull-down menus. The window-driven interface simplifies data searches and guides users with an on-line windows-style help system.

Ready availability to so many potential users of such a large data set, valuable for so many applications, initiates a new era for utilization of the NOS coastal hydrography collected from U.S. offshore waters. Instant access to the NOS data will promote increased productivity for a much larger number of data users conducting more useful work on an increased number of applications. The data are affordable to a broad cross-section of users; and researchers, environmental decision-makers, and others have unlimited access and don't have to wait for a custom product to arrive. Already sales have increased 70% since announcement of the CD-ROM set.

#### Software and metadata

Custom menu-driven software called GEODAS (GEOphysical Data System), developed at the National Geophysical Data Center (NGDC) specifically for managing geophysical and hydrographic data is included on the CD-ROM. This software can operate under the Windows and UNIX operating systems. With this software, a user can search areas of interest and extract data from the CD-ROM interactively. Searches can be performed according to several criteria: platform, year of sur-

vey, survey identifier, and date the survey was added to the system. Zooming capabilities are supported, with each zoom defining a narrower search area. Map outlines are graphically displayed and as the user zooms in, a better resolution coastline makes it easier to identify areas. In order to capture data for a geographic area, a user outlines an area with mouse clicks or drags the mouse to define a region (Figure 2).

In addition to the survey data which gives a position (latitude and

longitude) and depth, a header record details how the survey was compiled. The header record includes the following: survey id, platform name, type of survey, survey scale, specific location of survey, position determination method, and horizontal and vertical datum. The header record is readily accessible and easily viewed on the screen or saved to a text file for later analysis.

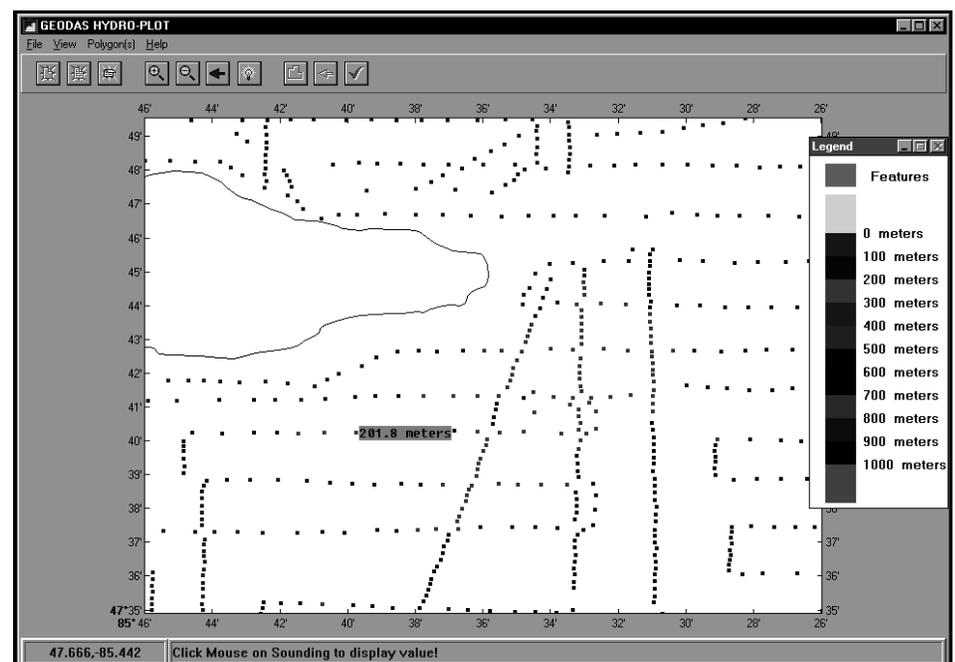
NGDC visualization software called Hydroplot is included as an add-on enhancement. Hydroplot was designed as a visual interpretation tool for the NOS hydrographic data. Assigning colors to depth ranges produces an image which can then be plotted directly to the screen as color coded dots representing depth values.

Zooming capabilities are also supported as well as the ability to click on individual color dots displaying depth value and corresponding latitude/longitude position (Figure 3).

#### Data use

Digital hydrographic survey data from the U.S. offshore regions, which constitute a detailed record of bottom topography of these regions, is of great interest to a large number of commercial and scientific users. For example, users of this database have acquired digital NOS survey data for the following:

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▲ Figure 3. Hydroplot program display.

# Colonial era archive data project

## *Antique manuscript data yields wealth of information on historical climatic conditions*

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For much of the underdeveloped world there is a dearth of early historical digital climate data. The well-known plots of global temperature trends from 1850 to the present could really be thought of as primarily representing the U.S. and Europe prior to perhaps 1930. To illustrate this, Figure 1 shows all Global Historical Climatology Network (GHCN) version 1 stations in Africa with digital temperature data prior to 1930. The GHCN version 1 was created by combining many well-known data sets and still yielded very little early climate data from less developed countries.

If more historical climate data from Africa and other data sparse regions were available in digital form, climatologists could produce more robust global temperature trends, put current droughts into better historical perspective, and improve our understanding of regional climate change in these areas. In addition, links between these changes and the climate in other parts of the world such as the strong relationship between west African precipitation and Atlantic hurricanes, would be better understood.

While there is a paucity of digital climate data prior to 1930 for Africa and many other regions, a considerable amount of manuscript data does exist. We have been locating early climate data and metadata available in European Colonial Archives and digitizing

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▲ Figure 1. African stations in GHCN version 1 with temperature data prior to 1930.

them to extend the existing digital climate record back in time for much of the world. The vast majority of colonial data and metadata in the Portuguese *Anais Meteorológicos das Colónias*, the French *Annales du Bureau Central Météorologique de France*, the British *India Monthly Weather Review* (which contains a far reaching "Extra India" section), and other European colonial publications do not exist in digital form. The data are clearly printed in yearly bound volumes, many of which now reside in the NCDC. Additionally we have been scouring several different libraries for additional data.

European Colonial Archive data and metadata constitute a valuable, largely unexploited resource. From the late 1800s to the end of the Colonial Era, each European colonial power typically produced annual publications listing climate (and often population and economic) data for its colonies. Some of these publications, such as the *Anais Meteorológicos das Colónias* included data from many colonies while others were individual colony publications. In addition, many of the publications we are using are early publications from independent countries not colo-

nies. To provide an example of what some of these Colonial Era publications are like, Figure 2 is a page of data for January 1894 for the east African station of Tabora taken from the *Deutsche Ueberseeische Meteorologische Beobachtungen in Deutsch-Ost-Afrika*. Clearly there was a meticulous observer in Tabora at this time and these observations have been carefully preserved for posterity. NCDC has 23 volumes of this particular publication, from 1883-1914, covering approximately 30 stations. By contrast, GHCN version 1 has less than 80 temperature stations with data prior to 1930 for the entire continent of Africa, so these sources represent a wealth of data.

The title page on this volume of German East Africa data indicates that it was received by the U.S. Weather Bureau Library. The title page from a different Colonial Era publication, the *Mauritius Meteorological Results 1884* was stamped received by the U.S. Naval Observatory, Washington, December 29, 1896 and is now in NOAA's care. We have located many Colonial Era publications in the NOAA library and NCDC's Foreign Data Library. Additional titles and volumes to fill in gaps

in some NOAA library series have been located in a few other archives such as the National Meteorological Library of the British Meteorological Office and the Koninklijk Museum voor Midden-Afrika in Brussels. While more archival search work remains, we now have a large collection of bound Colonial Archive volumes on hand at NCDC and possess hundreds of pages photocopied from non-U.S. libraries. See the Colonial Archive Project's web page under NCDC's home page (<http://www.ncdc.noaa.gov>) for a list of Colonial Era publications currently available in NCDC's Foreign Data Library. While these publications were consolidated from NOAA sources, the World Meteorological Organization's (WMO) Archival Survey for Climate History (ARCHISS) project is uncovering additional valuable historical meteorological observations stored in many different archives around the world.

Colonial Era publications contain a variety of metadata. Some are general statements such as the 1904 British East Africa *Meteorological Records* indicating that "in the past the instruments have been exposed under a great variety of conditions ... it is hoped to provide all stations with an exposure cage ... fixed above the ground on posts and sheltered by a grass hut." While some are specific such as the *Climatic Observations at Colonial and Foreign Stations: Tropical Africa 1900-1902* (E.G. Ravenstein, Meteorological Office, London, 1904) indicating that the Wadelai Sudan "maximum thermometer #1868 [was] reported out of order April, 1902" (which is important because observations were continued nevertheless and given in tabular form) and that the Entebbe, Uganda "thermometers [were] kept formerly under the veranda and not in a screen, but since July 15, 1902 are within a lath-screen under a grass shed in open ground." And some provide insights into the observers. For example, apparently during this era German thermometers were often kept under the shelter of an eave on the north wall of a house because we uncovered one German East African station where this north wall tradition was continued despite being South of the Equator.

Our approach to this project is fairly straightforward. It starts with

Professor John Griffiths locating Colonial Era Archives and other early foreign meteorological data publications in U.S. libraries and, through foreign collaboration, overseas libraries as well. Where possible, we request these publications to be transferred temporarily to the NCDC Foreign Data Library.

Since there are far too many Colonial Era data available to digitize all of them, we determine the period of record for each station in the Colonial Era Archive so that we digitize only selected, geographically well distributed, long-term stations that are not already available in GHCN. We are also limiting ourselves to three meteorological parameters: monthly total precipitation and minimum monthly maximum and minimum temperature, though mean temperature is digitized if maximum and minimum temperature data are not available.

The data are then hand copied from the bound volumes to a paper form by University of North Carolina-Asheville students working at NCDC. The data are not digitized directly because of the way the data are organized: often only a few numbers from each page will be copied and each volume will have data from many stations but only for one year. Each station's data are digitized only after they are all collected in one place. As a check on the

data, the digitizing is done by meteorology students at Texas A&M University who know approximately what to expect based on the location of the station. Most of the work from photocopied material sent from foreign libraries is done at Texas A&M University.

Once the data and selected metadata are digitized, they are incorporated into the Global Historical Climatology Network. In fact, the original purpose of the Colonial Era Archive project was to fill in gaps in GHCN data. Incorporating the data into GHCN subjects them to GHCN's quality control, homogeneity testing and adjustments, and makes these digital historical data available to researchers worldwide. These data will provide opportunities for observed climate change analyses that have never existed before. As the quantity of digital Colonial Era data increases, we and other scientists will use them in a variety of analyses including analysis of regional trends and multi-decadal variability in temperature and precipitation designed to gain insights into our planet's climate and to demonstrate the robustness of (or identify problems with) these data.

GHCN is produced cooperatively by NOAA's National Climatic Data Center, the Carbon Dioxide Informa-

- continued on page 16

Januar T A B O R A. 1894.

φ = 5° 3' S. Br. λ = 32° 53' O. Lg. Gr. Seehöhe = 1230 m.

Datum	Luft-Temperatur					Luft-Feuchtigkeit relative					Richtung und Stärke des Windes			Bewölkung		Niederschlag		Bemerkungen				
	7a	2p	9p	Maxim.	Minim.	7a	2p	9p	7a	2p	9p	7a	2p	9p	7a	9p	7a		9p			
1	18.7	20.7	17.6	24.9	17.8	15.2	13.9	14.0	95	77	93	ENE 1	Still	0	Still	0	9	6	1	III <		
2	18.8	23.3	17.7	28.3	16.4	14.8	17.1	14.1	92	81	94	Still	0	Still	0	3	8	0	12.1	III R; F30 p. R; 7 p. T < < < dann T < bis in d. Nacht		
3	17.6	27.6	17.9	28.9	15.8	14.2	15.6	14.3	95	57	94	"	0	NW 2	"	0	7	5	4	III R; F30 p. R; 15 p. < bis nachts		
4	17.6	28.1	22.4	31.8	15.8	14.0	15.5	15.0	91	56	78	"	0	Still	0	0	2	4	0	III <		
5	21.0	29.5	23.9	33.9	17.8	15.9	16.6	15.6	87	55	71	"	0	E 2	"	0	1	5	4	III <		
6	19.4	19.5	18.4	23.8	18.1	15.6	14.9	14.8	82	80	94	"	0	NNE 3	"	0	10	8	4	I ( ) III < 17-9 a. @ 10 a. bis 0 p. @ abs. <		
7	18.1	27.4	22.0	28.7	17.3	14.7	16.7	16.9	95	62	87	N	1	WSW 1	"	0	9	4	0	abends <		
8	19.0	35.1	19.5	27.7	17.3	15.0	15.9	14.5	91	68	87	Still	0	SE 1	SW 2	7	8	0	abends <			
9	17.5	23.7	20.3	27.8	17.0	13.5	14.6	15.0	91	68	85	ESE 2	SW 2	Still	0	9	9	0	abends <			
10	18.5	25.7	21.9	28.0	17.0	14.5	15.8	15.6	91	65	80	Still	0	NW 2	"	0	10	5	0	abends <		
11	18.3	25.3	18.3	26.0	17.4	14.2	17.0	14.5	90	71	93	"	0	N 2	S 2	1	9	0	9	645 a. T <		
12	17.9	27.0	19.5	27.6	17.2	14.7	16.3	14.7	96	61	88	NE 1	W 2	Still	0	10	8	0	0	0		
13	18.1	23.0	19.7	27.6	16.3	13.9	15.2	14.9	96	72	88	Still	0	NE 3	"	0	2	9	1	0		
14	18.4	29.1	22.6	30.2	15.8	14.5	17.6	15.8	93	50	78	"	0	NE 1	"	0	0	4	3	0		
15	19.3	22.7	18.9	25.3	18.3	14.7	16.6	13.8	89	81	86	N	1	NNE 1	"	0	7	7	0	19.4		
16	17.9	28.6	20.4	29.6	16.2	14.5	17.3	15.6	95	60	86	Still	0	NW 1	"	0	2	5	1	abends < 215 p. @		
17	19.9	29.3	23.4	30.8	17.3	14.9	16.4	15.7	87	55	74	"	0	NE 2	"	0	1	3	7	0		
18	18.7	29.1	21.0	30.2	17.4	15.5	17.9	15.1	97	59	82	"	0	Still	0	0	4	1	0	abends < in W		
19	19.6	30.4	22.3	31.6	18.0	14.0	14.8	10.9	183	46	55	E	1	NNE 2	"	0	0	3	1	215 p. @ T		
20	20.6	28.5	22.9	31.2	18.8	12.5	12.4	11.4	70	42	55	NE 1	SE 2	E 1	2	5	1	0	0	0		
21	21.2	30.3	23.1	31.3	19.7	11.9	13.8	15.5	64	43	74	E	3	SE 3	Still	0	2	3	6	215 p. @ T		
22	21.4	30.1	19.8	32.1	16.1	13.3	14.7	15.2	70	47	69	ESE 4	NE 2	"	0	2	9	9	17.1	320-430 p. @ T < < < Wind E 9, abends < < < angebl. abends < 6 p. @ < < < Fa und p.m. staus-		
23	19.5	28.9	19.8	30.1	17.8	15.5	15.4	14.0	91	53	81	NNE 1	NW 1	"	0	1	3	1	0	830-945 p. R; 3-330 p. T < < (ariges Entleben 8-1030 p. @ R)		
24	18.9	27.9	18.0	29.7	18.8	15.3	16.3	14.4	94	59	93	NE 1	SSE 1	"	0	0	4	10	0	2		
25	18.3	26.6	19.7	29.0	17.1	14.6	14.7	14.7	93	57	96	Still	0	NE 1	"	0	4	2	10	2		
26	18.4	26.9	21.0	28.2	16.9	14.7	16.0	16.2	93	62	88	E 1	Still	0	"	0	2	2	5	6 p. Regentropfen; bis nachts R SW		
27	16.5	20.6	19.7	27.2	16.8	13.2	15.8	14.3	95	62	81	Still	0	E 2	"	0	10	3	1	a. m. @ 915-930 p. @ <		
28	18.9	26.4	20.4	28.1	16.8	14.9	16.1	15.4	91	64	87	N	1	NE 3	"	0	8	5	1	3'4' 0'		
29	19.6	28.5	21.3	29.3	17.3	14.8	12.9	13.7	88	45	73	EST 2	ESE 3	"	0	0	2	1	1	0		
30	20.1	29.3	22.9	30.5	18.3	11.9	14.2	13.4	68	47	66	Still	0	NE 1	"	0	0	1	2	0		
31	18.9	29.9	23.4	30.8	16.5	12.3	12.5	12.3	76	39	58	ENE 1	NE 1	"	0	0	1	1	4	0		
Summen	18.9	26.9	20.6	29.0	17.2	14.3	15.5	14.6	88	60	82	0.7	1.6	0.1	4	5.5	0.3	3	27	6.139	7	
																						167.3

▲ Figure 2. A sample of data from a Colonial Era Archive publication, the *Deutsche Ueberseeische Meteorologische Beobachtungen in Deutsch-Ost-Afrika*.

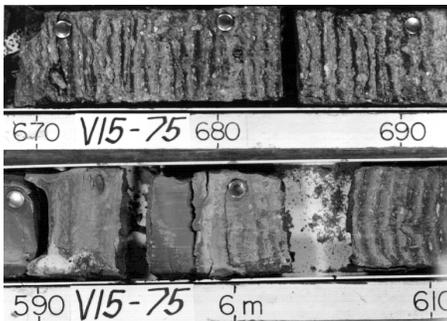
# Curators of marine geological samples gather at NGDC

## *Twenty years of cooperation results in worldwide access to global ocean floor samples*

Carla Moore

Marine Geology & Geophysics Division  
National Geophysical Data Center  
NOAA/NESDIS

On May 6-8, 1996 in Boulder, CO, the National Geophysical Data Center (NGDC) and the collocated World Data Center-A for Marine Geology and Geophysics (WDC-A MGG) hosted a meeting of the Curators of Marine Geological Samples. This landmark meeting begins the twentieth year of continuous collaboration between the Curators' group and NGDC/WDC-A MGG on the global "Index to Marine Geological Samples" database. The Curators' group is a unique forum for organizations responsible for curation of seafloor samples (Figure 1), originally convened by the National Science Foundation (NSF).



▲ **Figure 1.** Sample core from the collection of the Lamont-Doherty Earth Observatory, courtesy of the Observatory.

The May 1996 meeting included representatives from the Alfred Wegener Institute for Polar and Marine Science and the GEOMAR Research Center for Marine Geosciences in Germany, the Centre National de la Recherche Scientifique in France, the Lamont-Doherty Earth Observatory, the

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Limnological Research Center of the University of Minnesota, the international Ocean Drilling Program, Oregon State University, the Scripps Institution of Oceanography, the U.S. Geological Survey, the Woods Hole Oceanographic Institution, and NGDC/WDC-A MGG.

### A pivotal meeting

Results of the meeting included major changes to the Curators' database to take advantage of new technologies and to include additional information about sample collections. Plans were made to modify the database to include lacustrine and terrestrial samples, reflecting changes in the types of material being archived.

An international subcommittee, chaired by Dr. Wolfgang Berger of the Scripps Institution of Oceanography was formed to review the current sedimentary classification scheme, and Mr. James Broda of the Woods Hole Oceanographic Institution was tasked with organizing a revised sampling device codes list. The original fixed-field multi-card format was replaced with a flexible, delimited form more compatible with spreadsheets and relational database management systems commonly used by researchers.

Other important issues addressed in a session chaired by Ms. Rusty Lotti of the Lamont-Doherty Earth Observatory included the projected impacts of newly proposed national and international research projects, and the relationship of databases maintained at participating institutions to the main database at NGDC. Ms. Chris Mato of the Ocean Drilling Program led a session in which curation techniques were shared, as were concerns about declining funds available to the repositories to curate both existing collections and material resulting from new projects.

Also as a result of the meeting, NGDC is considering becoming a mirror site for the Sediment and Paleoclimate Network (SEPAN) global marine sediment database, operated by the Alfred Wegener Institute in Germany.

### A global database of seafloor samples

The composition of seafloor sediment and underlying basement crust provide researchers key information on the evolution of life, ocean-atmosphere dynamics, and Earth's tectonic processes. Funding agencies, including NSF and NOAA, have spent millions of dollars collecting sediment and rock samples from oceans to better understand how the Earth works. Once samples are collected and analyzed, they are stored in repositories, where, if properly curated and made available, existing sample material can reduce the need for expensive new expeditions.

As late as 1976, there was no central database or common scheme for describing cores, grabs, dredges, and drill samples available from curatorial repositories. Researchers had to contact individual institutions to discover where sample material existed.

In 1977, Dr. Floyd McCoy of the Lamont-Doherty Earth Observatory of Columbia University, chaired a series of Curators' meetings<sup>(1)</sup> to design a common "exchange format" to address this need. NGDC was asked to implement and maintain the resulting database. In 1991, the Curators, led by Dr. Steven Carey of the University of Rhode Island and Dr. Martin Fisk of Oregon State University (currently on assignment to NSF) reworked the format to provide a more detailed classification scheme for rock dredges.

In 1994, the Intergovernmental Oceanographic Commission (IOC) endorsed<sup>(2)</sup> the Curators' database and urged member nations to join the effort. Partially in response to this endorsement, the Curators' group now includes representatives from the United Kingdom, Germany, Canada, Russia, and most recently, Australia. Twenty-two organizations worldwide (Table 1) currently participate in the Curators' group and database.

The "Index to Marine Geological Samples Database" contains information for nearly 91,000 seafloor samples worldwide and is constantly growing.

**Table 1. Participating institutions, May 1996.**  
(\* = new member with no data in database)

- Alfred Wegener Institute for Polar and Marine Research
- Antarctic Marine Geology Research Facility, Florida State University
- Australian Geological Survey Organization\*
- Bedford Institute of Oceanography
- Centre Des Faibles Radioactivites, Centre National de la Recherche Scientifique\*
- GEOMAR Research Center for Marine Geosciences, Christian Albrechts University
- Lamont-Doherty Earth Observatory, Columbia University
- Limnological Research Center, University of Minnesota\*
- National Oceanic and Atmospheric Administration
- Ocean Drilling Program/Deep Sea Drilling Project
- College of Oceanic & Atmospheric Science, Oregon State University
- Rosenstiel School of Marine & Atmospheric Sciences, University of Miami
- Scripps Institution of Oceanography, University of California
- School of Ocean and Earth Science & Technology, University of Hawaii
- Southampton Oceanography Centre
- United States Geological Survey
- Graduate School of Oceanography, University of Rhode Island
- University of Southern California
- University of Texas Institute of Geophysics
- University of Wisconsin
- Woods Hole Oceanographic Institution
- WDC-B Marine Geology & Geophysics, Russia\*

It is searchable by any parameter or combination of parameters. Data are coded at the curatorial facility and include ship, cruise, sample identifier, latitude, longitude, water depth, date of sample collection, sampling device, storage method, core diameter and length, interval within core, geologic age, sediment or rock lithologic composition, sediment texture, principal investigator, physiographic province, rock mineralogy, and comments.

A few U.S. institutions continue to receive funding from NSF to prepare data on their holdings, but funding from all sources has decreased over the past decade for both sample curation and data preparation.

#### Cross-platform and WWW access

To encourage cooperation between repositories, the Curators' group operates a list server at NGDC for discussions related to sample curation. A World Wide Web (WWW) page pro-

vides global access to the database (<http://www.ngdc.noaa.gov/mgg/curator>) at NGDC. Data are available for online selection, viewing, subsetting and download through a forms-based graphic interface (Figure 2). In the past year, over 6250 individual users from 58 countries connected one or more times to the Curators' WWW page. Over 80 online searches per month were made on the database.

Any field or combination of fields can be searched. Data browse and download options include a variety of forms from delimited, coded files to plain English descriptions. Lists of values from which users can choose are offered for each parameter in the database. For maximum flexibility, there is a "power user" option where search strings can be hand-edited for custom searching. Sites selected can be plotted on

the screen, providing a powerful visualization tool, or saved as a graphics file. Online help is available.

The same search libraries that provide online access to the database are used to provide CD-ROM and local access for both PC-compatible and Macintosh platforms. The SEADAS (SEAFloor Data Access System) WWW and Macintosh interfaces were developed at NGDC in cooperation with Dataware Technologies, Inc., based on their Record ReferenceBook<sup>(tm)</sup> libraries<sup>(3)</sup>. Database and view files are created on a PC using Dataware

authoring tools, and are also used by the Mac and UNIX SEADAS interface. The access software offers similar features across platforms, including pull-down menus and multiple browse and output views.

Access is constantly under development. NGDC is working on a new enhanced Java interface for WWW access and an Oracle version of the database. The Oracle version will provide more searching flexibility and online cross-correlation of Curators' data with other analytical data available from NGDC. A CD-ROM of the Curators' database with cross-platform access software is expected in late 1996.

For more information about the Curators' database, please contact:

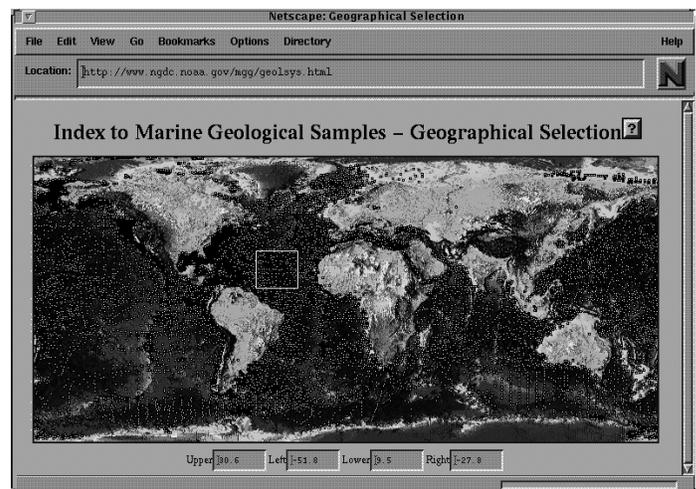
Carla Moore  
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325 Broadway  
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Fax: 303-497-6513  
E-mail: [cmoore@ngdc.noaa.gov](mailto:cmoore@ngdc.noaa.gov).

#### Notes

(1) McCoy, Floyd W., 1977, At Scripps, Marine Curators Gather, *Geotimes*, December 1977, p. 26-28.

(2) The International Oceanographic Commission (IOC) Committee on International Oceanographic Data & Information Exchange (IODE), Resolution IODE-XIV.2

(3) Record ReferenceBook<sup>(tm)</sup> is copyrighted by Dataware Technologies, Inc. ■



▲ Figure 2. Geographic WWW search screen for the "Index to Marine Geological Samples," May 1996.

# NOAA/NSORS/GOES Internet information system

*WWW site provides user access to GOES-8 and GOES-9 imagery and information*

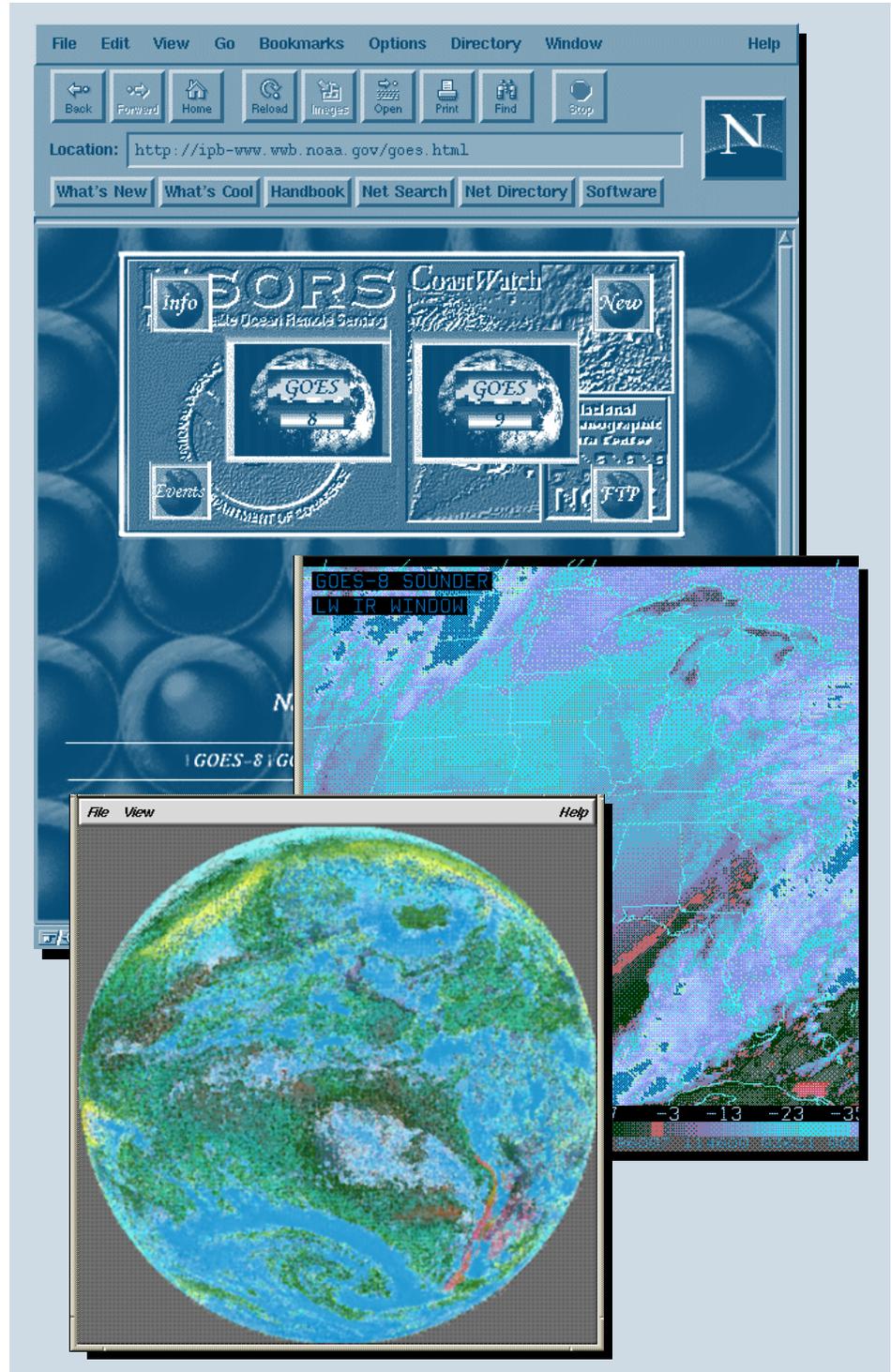
David Trush

Satellite Services Division  
Office of Satellite Data Processing  
and Distribution  
NOAA/NESDIS

The Interactive Processing Branch (IPB) of NOAA's National Environmental Satellite, Data, and Information Service (NESDIS) currently maintains a World Wide Web (WWW) site on the Internet to make available images and information regarding the GOES-8 and GOES-9 satellites. This Internet Information Server (IIS) was created for the NOAA CoastWatch program and the current NOAA Satellite Ocean Remote Sensing (NSORS) Mission. The NSORS/GOES IIS serves as a central location for disseminating geostationary satellite images and information. It uses an easy-to-read graphic and text combination format that has been tested to perform on multiple Internet WWW browsing platforms (Figure 1).

The NSORS/GOES IIS system provides quick and direct access to imagery from the coastal areas of the mainland contiguous United States as well as the Gulf of Alaska and Hawaii on a timely basis. Automated networking and image enhancement code was created to run in conjunction with the McIDAS (Man computer Interactive Data Access System) workstation software program made available by the Space Science and Engineering Center (SSEC) of the University of Wisconsin-Madison.

"McIDAS...is a sophisticated, video-interactive set of tools for acquiring, managing, analyzing, displaying and integrating environmental data." More details regarding the current work and future plans for McIDAS can be retrieved from SSEC's home page site: <http://www.ssec.wisc.edu>. Currently, customers are able to view remapped

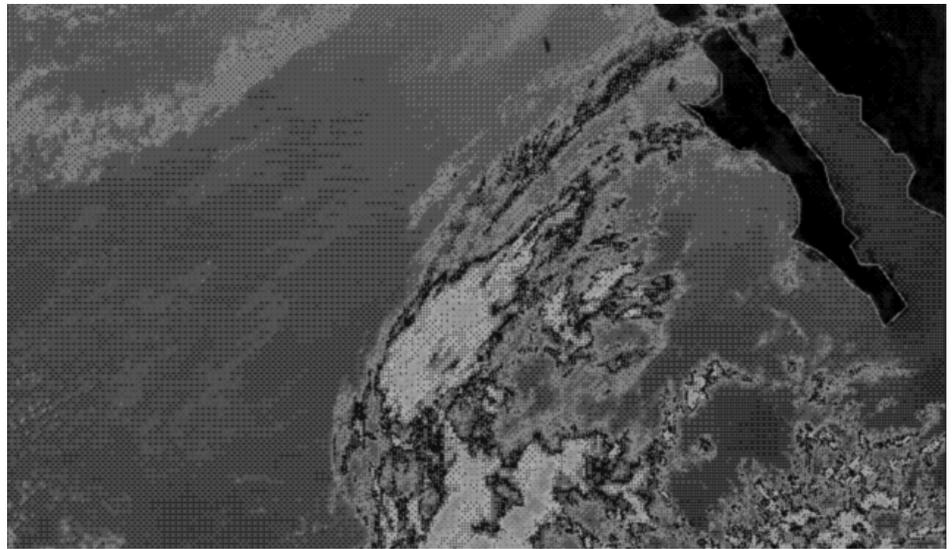


▲ Figure 1. The NSORS/GOES Internet Information Server (NSORS/GOES IIS) as viewed via Netscape and two grayscale renditions of color-enhanced GOES satellite imagery. This World Wide Web (WWW) site was designed to perform on multiple browsing platforms, and provides quick, direct access to recent imagery from the coastal U.S., including Alaska and the Hawaiian Islands.

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NOAA Science Center  
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GOES-8 and GOES-9 imagery (Figure 1), view new releases (Figure 2) such as image loops of special events as well as a colorized GOES-9 image, check for updates on image production status and the state of each satellite, transfer data directly back to their own sites, and find out how the data was created and made available on the WWW.

For further information about the NSORS/GOES IIS system, please contact the NSORS IPB Central Operations Team at 301-763-8142 or send e-mail to: [nsors@ssd.wv.noaa.gov](mailto:nsors@ssd.wv.noaa.gov). An interactive e-mail module is also available from the parent NSORS home page: <http://psbsgi1.nesdis.noaa.gov:8080/nsors.html> which will automatically send completed messages to the NSORS IPB Central Operations Team. ■



▲ Figure 2. Greyscale rendition of color-enhanced satellite imagery of cloud cover approaching western coast of U.S.

## NODC announces new CD-ROMs

The National Oceanographic Data Center (NODC) is pleased to announce the release of Version 8.0 of the NODC Taxonomic Code. The NODC Taxonomic Code is the largest, most flexible, and widely used of the various coding schemes developed to adapt the Linnean system of biological nomenclature to modern methods of data storage and retrieval. Version 8.0 contains approximately 244,000 records, about 38,000 more than version 7.0, which was released in 1993. This version of the NODC Taxonomic Code is designed to serve as a transition to a new system and includes both the older numerical codes (up to 12 digits) as well as new codes that are referred to as Taxonomic Serial Numbers (TSNs).

In the older system taxonomic information was built into the codes through the use of 2-digit couplets to

represent one or more levels of the taxonomic hierarchy. Over the years the problems and shortcomings created by this approach have become more apparent. Therefore, no new codes being added to this older system and Version 8.0 presents the final state of the old code numbers. As new taxa are added from now on, they will be assigned only a TSN under the new system. The Taxonomic Serial Numbers remain with each taxon even if that taxon goes in or out of synonymy or is entirely reclassified. This new system allows the inclusion of multiple levels of taxonomy and greatly improves the overall management of the NODC Taxonomic Code.

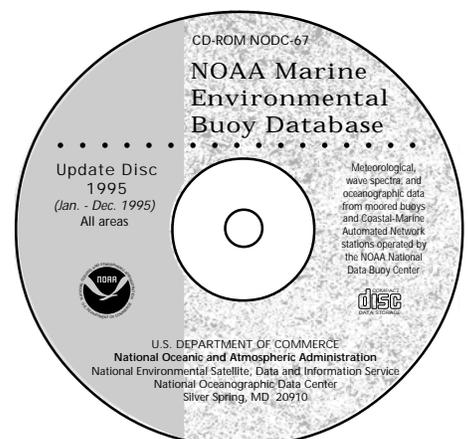
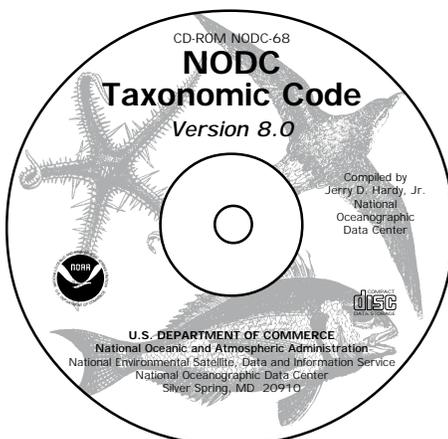
The NODC has also released the eighth in a series of update discs that follow the original 14-disc set of CD-ROMs holding the NOAA Marine Environmental Buoy Database through July 1992. The new update disc contains all the data from the network of moored buoys and Coastal-Marine Automated Network (C-MAN) stations operated by the NOAA National Data Buoy Center for 1995. The data files on this disc are compressed to enable all the data for 1995 to fit on one CD-ROM. Each file was compressed separately and decompression software is included.

Parameters reported by both moored buoys and C-MAN stations include air temperature and pressure, wind speed and direction, wind gust,

and sea surface temperature. Some buoys also report wave data, including directional wave spectra. The NODC now makes the more recent buoy and C-MAN data available through the NODC Home Page on the World Wide Web (at URL <http://www.nodc.noaa.gov/BUOY/buoy.html>). Therefore, it is no longer necessary to issue these data on CD-ROM so frequently to make them accessible to users.

To order either of these new NODC data products, contact:

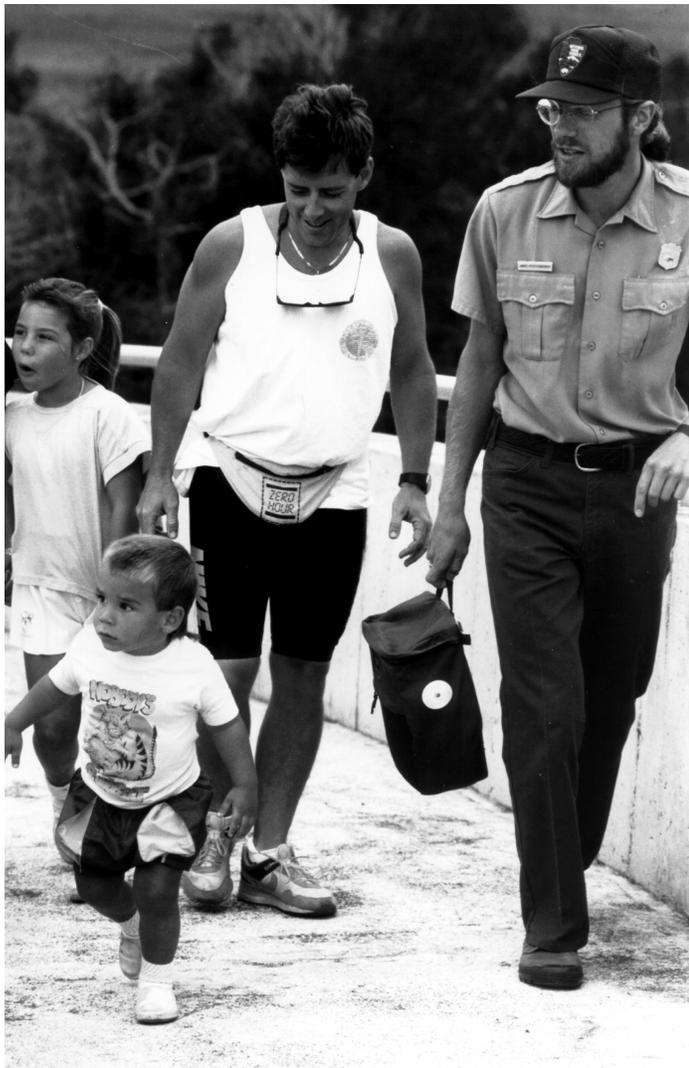
National Oceanographic Data Center  
User Services Group  
NOAA/NESDIS E/OC1  
SSMC3, 4th Floor  
1315 East-West Highway  
Silver Spring, MD 20910-3283  
Telephone: 301-713-3277  
Fax: 301-713-3302  
E-mail: [services@nodc.noaa.gov](mailto:services@nodc.noaa.gov)



**Everglades, from page 5**

new way of doing things. Agencies, that operated more or less on their own prior to the Interagency Work Group configuration, have become aware of what their colleagues are doing, and now are working to avoid overlapping tasks. Increased communication is taking place across agency lines, making it possible for restoration to proceed within an environment of mutual support.

Investing now in the south Florida ecosystem—determining necessary changes to current practices and the best ways to carry them out— helps to ensure that this region of sawgrass and sloughs, wading birds, and open sky will retain its regional character while providing more equally for the plants, animals, and human living within its boundaries.



▲ Park ranger naturalists escort visitors on one of the many nature trails in Everglades National Park.

**Priorities of Interagency Task Force**

Priorities established by the Task Force include:

- 1) Provide consolidated federal objectives on ecosystem restoration to the Corp of Engineers reconnaissance study for the redesign of the Central and South Florida Project and continue to provide timely support.
- 2) Establish research priorities and implement a process for coordinating research on the south of Florida ecosystem, including Florida Bay, which includes development of a base line scientific condition assessment and indicator monitoring program, and appropriate biological and hydrological modeling to evaluate ecosystem restoration objectives and programs (Table 1).
- 3) Establish partnerships with the state and local agencies to support land acquisitions initiatives in the south Florida ecosystem.
- 4) Support development of an effort to integrate actions essential for the recovery of threatened and endangered species, and undertake a multi-species recovery plan with the South Florida Ecosystem Restoration Program.
- 5) Support expedited implementation of Corps projects in the Everglades ecosystem including Shark Slough, Taylor Slough, and Kissimmee River.
- 6) Support development of a comprehensive wetlands permit mitigation strategy for south Florida that furthers ecosystem restoration.
- 7) Develop an

**Table 1. Researchers in the Florida Restoration Project.**

*Current research activities listed below are part of a multi-agency program to restore the Everglades.*

- **Zooplankton Study**  
Dr. Peter Ornter, NOAA/AOML  
Dr. Michael Dagg, LUMCON
  - **Water Quality Study**  
Dr. Geoffrey Scott, NOAA/NMFS
  - **Mercury Assessment and Modeling Project**  
Dr. David Evans, NOAA/NMFS  
Dr. David Engel, NOAA/NMFS
  - **Currents Survey of Florida Bay Channels**  
Dr. Elizabeth Johns, NOAA/AOML  
Dr. Douglas Wilson, NOAA/AOML
  - **Habitat Assessment Project**  
Dr. Donald Hoss, NOAA/NMFS  
Dr. Gordon Thayer, NOAA/NMFS  
Dr. Michael Robblee, NOAA/NBS
  - **Phytoplankton Measurement, Habitat Assessment Project**  
Dr. Patricia Tester, NOAA/NMFS
  - **Rainfall Modeling Project**  
Dr. Mark Powell, NOAA/AOML
  - **Rainfall Validation Project**  
Dr. Paul Willis, CIMAS
  - **Coral Reef Assessment Project**  
Dr. Larry Brand, Univ. of Miami, RSMAS  
Dr. Alina Szmant, Univ. of Miami, RSMAS
  - **Circulation Modeling Project**  
Dr. Frank Aikman, NOAA/NOS  
Dr. George Mellor, NOAA/GFDL
  - **History Climatology Project with Sediment Cores**  
Dr. Terry Nelson, NOAA/AOML
  - **Ocean Modeling Project**  
Dr. Chris Mooers, Univ. of Miami, RSMAS
  - **Water Nutrients**  
Dr. Wayne Gardner, NOAA/GLERL
- AMOL- Atlantic Oceanographic and Meteorological Laboratory  
CIMAS - Cooperative Institute for Marine and Atmospheric Studies  
GFDL - Geophysical Fluid Dynamics Laboratory  
GLERL - Great Lakes Environmental Research Laboratory  
LUMCON - Louisiana Universities Marine Consortium  
NOS - National Ocean Service  
NBS - National Bureau of Standards  
NMFS - National Marine Fisheries Service  
RSMAS - Rosenstiel School of Marine and Atmospheric Sciences

- continued on page 16

### Complete magnetic data collection released on CD-ROM

The National Geophysical Data Center (NGDC) has released the complete Project MAGNET data collection on CD-ROM. Project MAGNET, a U.S. Navy program conducted from 1951 to 1994, collected vector aeromagnetic survey data to support the U.S. Defense Mapping Agency's world magnetic modeling and charting program. The compact disc contains approximately 640 megabytes (4.1 million statute miles) of tracking data in binary form and over 9000 metadata files. Geo-Vu browse and selection software accompanies the CD, permitting access on SUN UNIX, PC, and Macintosh platforms. *Contact:* NGDC

### Joint NCDC and NWS/NDBC CD-ROM set released

The National Climatic Data Center (NCDC) is now distributing a 2-disc CD-ROM set entitled "C-Man and Buoy Reports and Summarized Elements" (dubbed "Sea breeze.") This joint NCDC-National Weather Service/National Data Buoy Center (NWS/NDBC) product contains data and summaries for 197 marine stations. The data include all available hourly buoy and Coastal Marine Automated Networks (C-MAN) station elements (except for spectral wave data) through 1993. The summaries include tables of frequency of occurrence of elements, bivariate distributions of wind speed and direction and wave period and height (by month and season,) and year-month time series means and extremes. *Contact:* NCDC

### NGDC announces first release of data from GLOBE Project

The National Geophysical Data Center (NGDC) is pleased to announce the first release of data from the Global Land One-Kilometer Base Elevation (GLOBE) Project. This project is an international effort to develop a global digital elevation model (DEM) on a nominal 1-kilometer grid. The goal is to represent Earth's entire land surface. Project scientists will compile available DEMs at a gridding of 1-km or smaller; the remaining areas will be covered by the best available data.

GLOBE Version 0.1 covers approximately 60% of Earth's land surface, using a 30 arc-second latitude-longitude grid (somewhat finer than one kilometer spacing on the ground.) These data were de-

## Data products and services

veloped cooperatively between the U.S. Defense Mapping Agency (DMA) and NGDC for the GLOBE Project.

The data are available on a set of two CD-ROMs, and consist of 11,478 individual file blocks, each covering one degree by one degree of latitude and longitude. Each 30-arc-second GLOBE grid cell is based on 100 original 3-arc-second DTED grid cells. The highest, lowest, and average values from these 100 original DTED values are stored in three separate directories of data on the compact discs. GLOBE goes beyond traditional DEMs by providing three parameters describing terrain for each currently available 30-arc-second squared area on the land surface.

The release of Version 0.1 is appropriate for people who want early access to GLOBE data. Users who want to work with areas larger than one-degree by one-degree file blocks may mosaic these blocks with various computer programs.

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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/>

A global mosaic of these data should be available from NGDC later in 1996. By 1997, the GLOBE Project hopes to have its first completed hybrid global 1-km grid. *Contact:* NGDC

### NOHRSC completes production of snow water equivalent CD-ROM

The National Operational Hydrologic Remote Sensing Center (NOHRSC) has recently completed production of the 1995 airborne snow water equivalent and satellite snow cover data CD-ROM. The data coverage includes major portions of the United States, including Alaska, and Canada. CD-ROMs are also available for the 1990, 1991, 1992, 1993, and 1994 snow mapping seasons.

Each CD-ROM includes: 1) airborne snow water equivalent data and the digitized flight line network; 2) calibrated AVHRR and GOES satellite data; 3) classified snow cover images based on AVHRR, GOES, and SSM/I satellite data; 4) national and regional areal extent of snow cover and snow water equivalent products; and 5) national surface air temperature products. For more information, including prices, please contact NOHRSC at 612-361-6610 ext. 232 or e-mail [khusnik@nohrsc.nws.gov](mailto:khusnik@nohrsc.nws.gov). NOHRSC products for the 1996 snow season are available through a World Wide Web site at: <http://www.nohrsc.nws.gov>. *Contact:* NOHRSC

### NGDC's surface of the Earth icosahedron globe

The National Geophysical Data Center (NGDC) is offering Surface of the Earth Icosahedron Globe, a cut-out and fold-up model in full color which demonstrates the utilization of flat, regular polygons to create a solid object (the icosahedron, composed of 20 triangles, is the best "flat" sphere available).

Each face of the Icosahedron displays a part of the (nearly-spherical) Earth's surface as a flat map in the Gnomonic Projection, tangent at the centroid of the triangle. The relief of the continental surface and the sea floor is depicted by shaded colors representing slope and elevation. Overall size of an assembled globe is approximately 4.5 inches. The figure is available for viewing in a miniature form on the World Wide Web at URL: [http://www.ngdc.noaa.gov/mgg/announcements/announce\\_icosahedron.html](http://www.ngdc.noaa.gov/mgg/announcements/announce_icosahedron.html). *Contact:* NGDC

**Everglades, from page 6**

integrated, long-term proposal and budget for ecosystem restoration, maintenance, and protection detailing current activities, achievements, and projected accomplishments.

8) Implement a continuing process that identifies and integrates immediate management goals, priority projects, and funding needs for south Florida ecosystem.

9) Fully integrate the state and South Florida Water Management District into the task force and build partnerships with appropriate local and tribal governments.

To date the Task Force has been successful in accomplishing several of these initial goals. Priority 9 in list has been accomplished by amending the charter to add these new members. Each of the other goals have been assigned to subgroups for implementation. Progress is being made on all priority tasks. ■

**Archive data project, from page 10**

900R21956), and Arizona State University. It is a WMO Global Baseline data set and is currently funded, as is the Colonial Archive Project, by NOAA's Climate and Global Change and Environmental Science Data and Information Management programs.

A beta release of GHCN version 2's maximum, minimum, and mean temperature data bases will soon be available online at NCDC (<http://www.ncdc.noaa.gov/ghcn/ghcn.html>). This release will incorporate data from about 100 Colonial Era Archive stations, mostly in Africa. More stations are continuing to be digitized from Africa, Central and South America, Asia, and various islands and will be incorporated into future versions of the Global Historical Climatology Network. ■

**Hydrographic surveys, from page 7**

- migration and habitat studies of fish and marine mammals;
- delineation of bottom features for commercial fishermen;
- earthquake and fault studies;
- sediment and pollutant studies;
- studies of storm surge and tsunami effects;
- oil, gas and mineral exploration;
- coastal planning and ecosystem evaluations;
- color imaging and animation (fly-bys).

The NOS data are well suited for Geographic Information System (GIS) and mapping applications. Data can easily be downloaded from the CD-ROM and imported as a layer in a GIS. Data are represented in geographic coordinates so points can be plotted independent of scale and projection.

Because the data are historical and may not reflect current conditions, the database cannot be used for navigational purposes. Consult the NOS Nautical Chart series for navigational needs. For on-line WWW access to information on bathymetry data and other data at the National Geophysical Data Center use URL: <http://www.ngdc.noaa.gov/mgg/mggd.html>.

For more information or purchases of the NOS hydrographic CD-ROM set, contact:

**Orders**

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