

U.S. Fish and Wildlife Service

**The Wetlands Master Geodatabase
Annual Report 2006**



**U.S. Fish and Wildlife Service
Division of Habitat and Resource Conservation
Washington, D.C.**

Program Contacts

David J. Stout
Chief, Division of Habitat and Resource Conservation
U.S. Fish and Wildlife Service
703-358-2161

Martin Kodis
Chief, Branch of Resource Management Support
U.S. Fish and Wildlife Service
703-358-2161

Thomas E. Dahl
Chief, National Standards and Support Team
U.S. Fish and Wildlife Service
608-783-8425

David McCulloch
Chief, Cartographic Applications and Processing Program
Office of Water Information
U.S. Geological Survey
608-238-9333



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The Wetlands Master Geodatabase

Wetlands are some of the Nation's most ecologically and economically important habitats, and provide benefits for fish, wildlife, and people. Emerging conservation issues such as global warming, sea-level rise, increasing storm severity, drought, energy development, species declines, and expansion of infrastructure are driving the need for contemporary geospatial resource information.

In response to these needs, the Fish and Wildlife Service (Service) has modernized its geospatial services to meet demands for wetlands data. The **Wetlands Geodatabase** and the **Wetlands Mapper**, as an Internet discovery portal, provide technological tools that allow the integration of large relational databases with spatial information and map-like displays. The information is made available to an array of federal, state, tribal, and local governments and the public. The wetlands layer of the National Spatial Data Infrastructure (NSDI) is an important component of Department's geospatial line of business portfolio and actively supports the E-government initiative through the *Geospatial One-Stop* and *The National Map*.

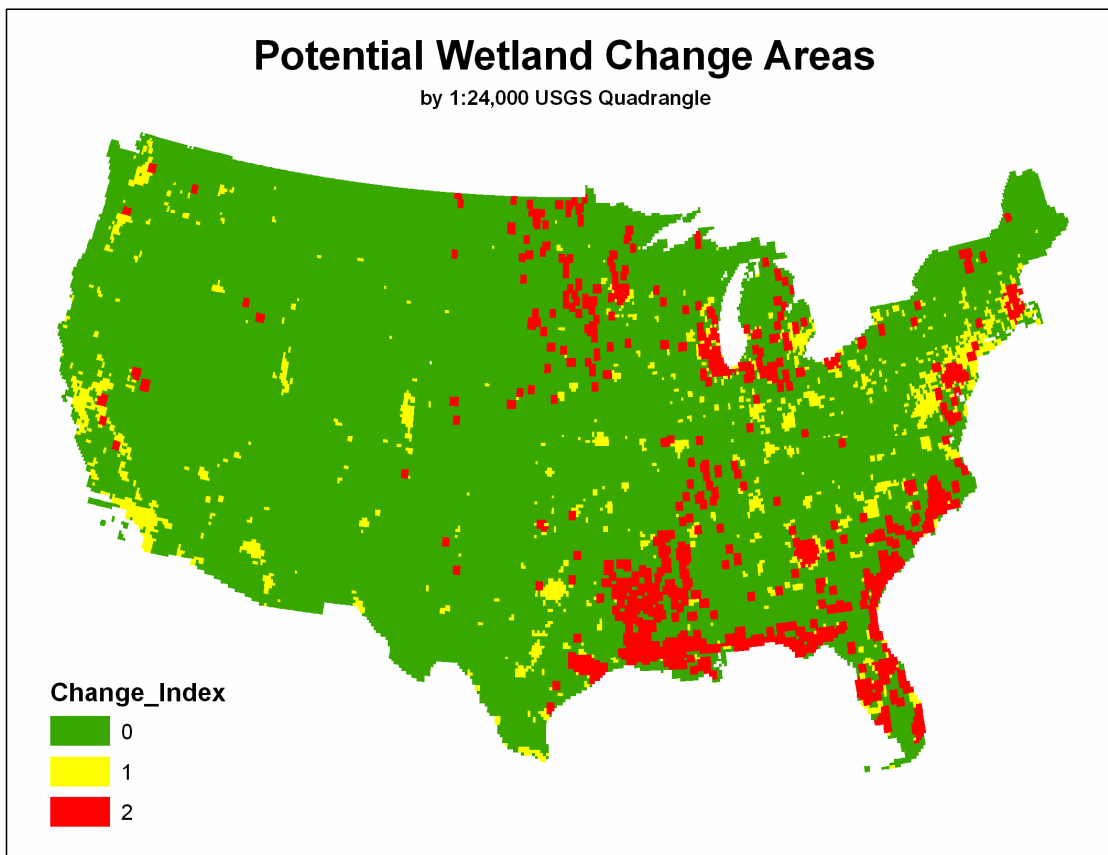
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Strategic Habitat Conservation, GIS and the Need for Wetlands Data

In 2006, the Service released a Strategic Habitat Conservation plan to guide agency resource management decisions. Strategic Habitat Conservation practices hinge on integrating biological and geospatial information at the landscape level to achieve conservation objectives. Technological advances in geospatial data capture and management continue to change and improve the way biological planning, inventory and assessments are conducted.

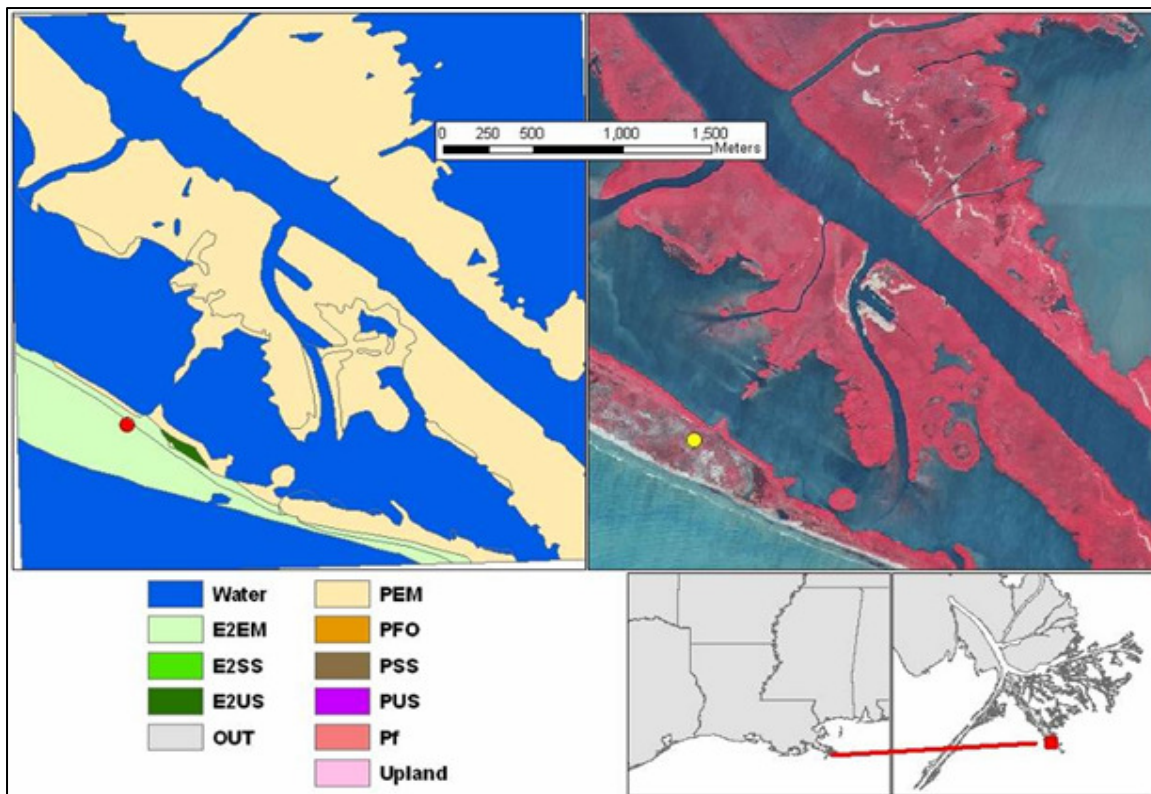
Geospatial wetland map data combined with other biological information are important decision support tools as part of the Strategic Habitat Conservation approach. The Service's habitat conservation actions will increasingly rely on geospatial habitat and trend information to help guide, prioritize, and assess species recovery, wildlife resource management, wetland threats and habitat restoration project actions.



Geospatial wetlands data combined with other information can help managers decide which conservation measures apply to a given landscape.

The Service continues to develop state of the art geospatial data and tools and provide these to partner organizations who need digital wetlands data to perform varied geospatial analyses and habitat assessments. In 2006, there were a number of Federal agency applications for the wetlands data. The most noteworthy included a request from the Center for Disease Control and the *U.S. Department of Agriculture's Centers for Epidemiology and Animal Health (APHIS)* related to avian influenza (Bird Flu). Because of the human health threats posed by potential pandemic, infectious disease specialists wanted to develop a model to assess the threat level based on transmission of avian influenza virus spread through wild populations of migratory waterfowl or water birds. To conduct these analyses disease specialists needed to know where and how many wetlands and surface water bodies might serve as staging areas for migrating birds. They requested the Service's assistance in acquiring digital wetlands data in the Service's Wetlands Geodatabase. The Service accessed and provided its entire wetlands digital dataset for the conterminous United States (40+ gigabytes) for the avian influenza study.

The Service is also collaborating with the *Environmental Protection Agency (EPA)* on a Gulf of Mexico coastal wetlands study designed to evaluate survey design features to assess wetland condition on a regional scale. In the future, EPA will conduct a National Wetland Condition Assessment that will compliment the Service's wetlands Status and Trends monitoring study. These collaborative efforts will for the first time, provide scientific information on the current status of wetland quantity and quality in the United States. Such an effort would not be possible without the wetlands geodatabase information



Digital plot information from the Service provides wetland type and extent (left) and are transferred to EPA for on-the-ground sampling to assess wetland condition in a portion the LA coastline.

Maintaining Strong Technical Partnerships

The Service has developed and maintains a close working relationship with the U.S. Geological Survey's (USGS) Office of Water Information's Cartographic Applications and Processing Program. Through this partnership the USGS assists the Service with emerging technologies, geographic information science, database management and support. USGS continues to assist the Service with integrating updated information into the database, providing data summaries for special projects and technical assistance regarding data manipulation and verification.

Memorandum of Understanding with USGS - *The National Map* is a seamless, continuously maintained set of geographic base information that will serve as a foundation for integrating, sharing and using other data. Through partnerships, USGS is incorporating important information layers. The wetlands map data have been incorporated into ***The National Map*** <http://nationalmap.gov/> as a catalog layer (Hydrography). The Service's Division of Habitat and Resource Conservation signed a Memorandum of Understanding with the Geospatial Office of USGS - ***The National Map***. Although, there has been a long standing working relationship with USGS and ***The National Map***, this document recognizes important ongoing work and establishes a framework for continuing cooperative efforts.

Geodatabase Status – 2006

The **Wetlands Geodatabase** contains five units (map areas) that are populated with digital vector data and raster images. These units include Conus (conterminous U.S.), Alaska, Hawaii, Puerto Rico and the U.S. Virgin Islands and, the Pacific Trust Territories. Each unit of the geodatabase contains seamless digital map data in ArcSDE geodatabase format. Data are in a single standard projection (Albers Equal-Area Conic Projection), horizontal planar units in meters, horizontal planar datum is the North American Datum of 1983 (also called NAD83), and minimum coordinate precision of one centimeter.

The **Wetlands Geodatabase** also contains other propriety Service datasets and developmental data, feature classes or information.

The Service's wetlands geodatabase is believed to be one of world's largest polygonal datasets (in the civilian sector). The information is increasingly popular and widely used to help identify, conserve, and restore wetland resources across the American landscape.

Geospatial Data Status - Wetlands: Currently the **Wetlands Geodatabase** contains over 30,743 7.5 minute map areas in a seamless ArcSDE geodatabase. This represents wetland map data for approximately 59.0 percent of the conterminous U.S.; 26.5 percent of Alaska; 100 percent of the windward islands of Hawaii; 62.1 percent of Puerto Rico and the U.S. Virgin Islands and; 100 percent of Guam and Saipan in the Pacific Trust Territories. By the end of 2006 the **Wetlands Geodatabase** contained 45 gigabytes of data including 14.2 million polygonal features.

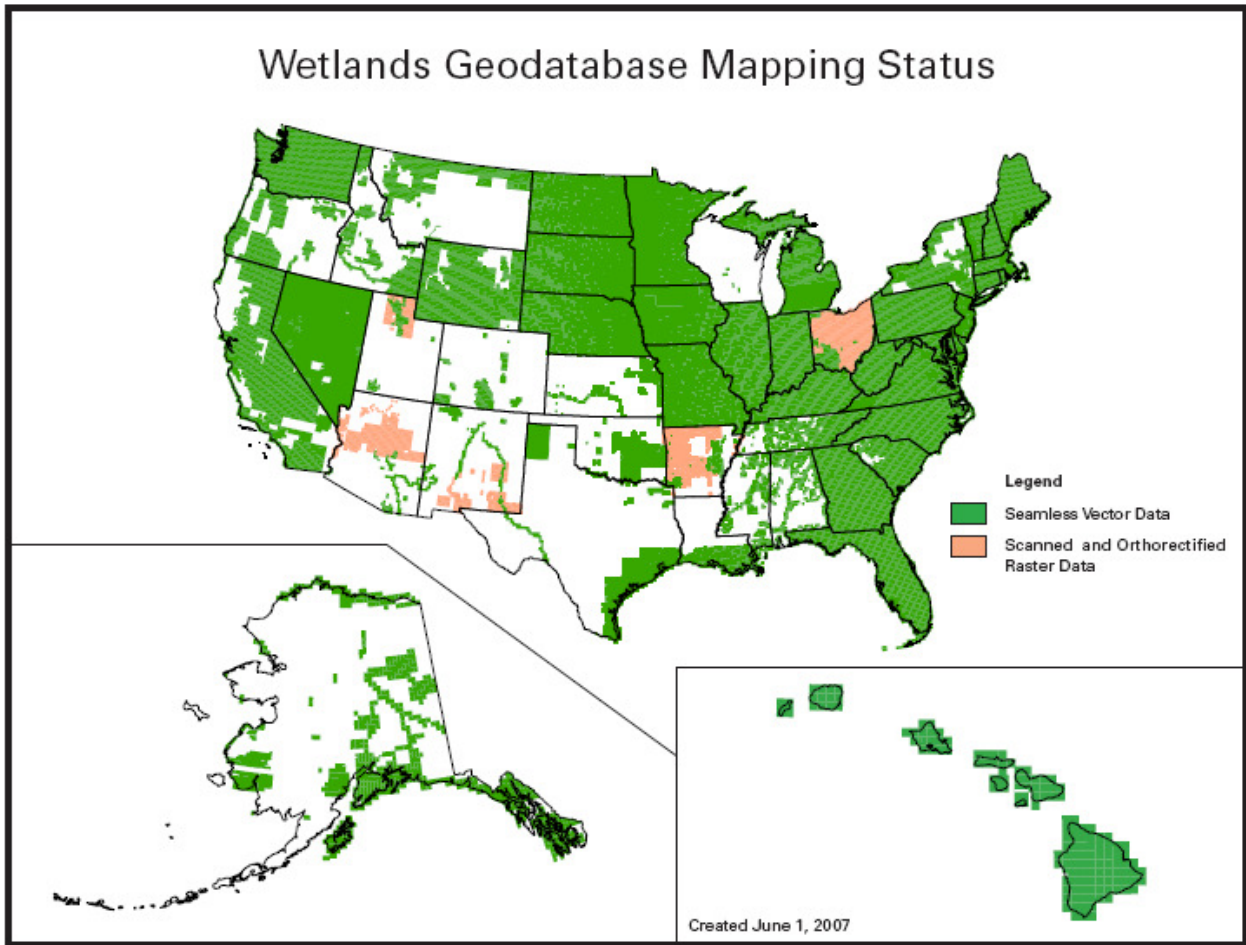
These data can be accessed at the following site: <http://wetlandfws.er.usgs.gov/index.html>

The Wetlands Geodatabase is one of the largest polygonal datasets and supports over 14 million features in a seamless ArcSDE format.

The Wetlands Data Layer of the NSDI

The National Spatial Data Infrastructure (NSDI) was envisioned as a way of enhancing the accessibility, communication, and use of geospatial data to support a wide variety of decisions at all levels of society. Under the Office of Management and Budget Circular A-16, revised August 19, 2002, responsibility to coordinate wetlands data related activities has been assigned to the Department of Interior, U.S. Fish and Wildlife Service. The Service provides stewardship for the wetlands data that compose the *Wetlands Layer of the National Spatial Data Infrastructure*. In partnership with the U.S. Geological Survey, the Service makes these data available via the Internet. All digital wetlands data are in a seamless format for the conterminous United States and its territories. This provides resource managers and the public with digital wetland information that can be used in geographic information systems, as well as in key assessment reports to address complex conservation issues.

OMB Circular A-16 section 8.d.(4)(b) requires lead federal agencies to provide a performance report, at least annually, that documents data theme activities and implementation status, including progress toward identified goals. The following status information (map shown below) was provided to indicate progress being made to complete the Wetlands Layer of the NSDI. The wetlands layer of the NSDI currently has wetlands geospatial digital data for over 1.9 billion acres of the United States.



Status of the Wetlands Layer of the National Spatial Data Infrastructure as reported to the Federal Geographic Data Committee and Office of Management and Budget for 2006.

These data were developed in partnership with numerous organizations and cooperators and are made available over the Internet via the Service's **Wetlands Mapper** and through *The National Map*. The digital wetland data are also part of the E-government's Geospatial One-stop, Geodata.gov <http://gos2.geodata.gov/wps/portal/gos>

In the future, contributed data from partner organizations and collaborators will be important in maintaining a viable data layer. The Service is taking steps to facilitate the submission, verification and acceptance of contributed digital wetland data.



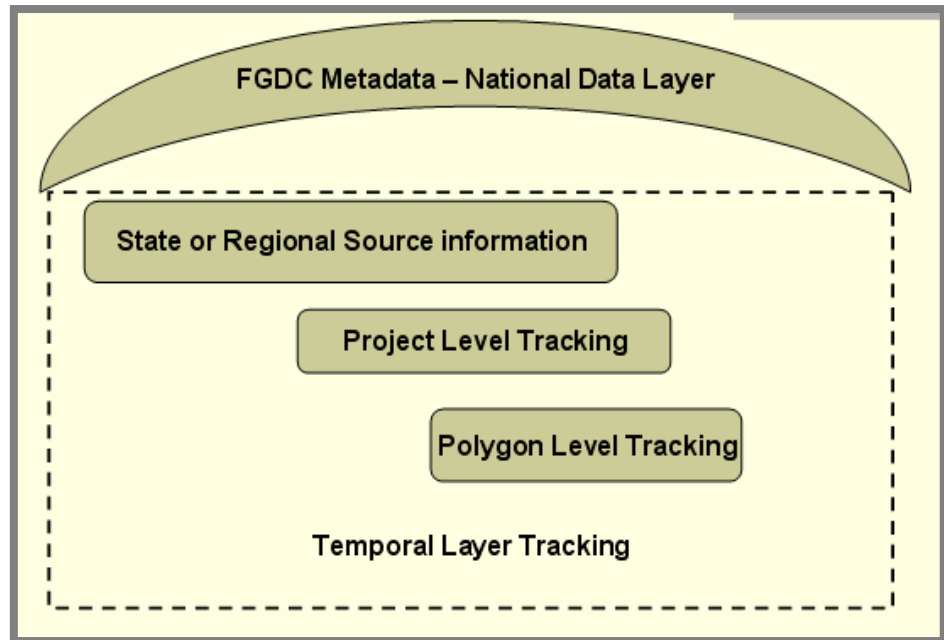
Expanding Access, Metadata and Data Delivery Options

Several new geodatabase developments are providing access to more wetland information and offering expanded data delivery options for users. In 2006, the capability to download wetland map data at 1:24,000 scale and 1:100,000 scale were added; raster image scans, metadata and download capability were added to the on-line services; historic mapping report information collected when wetlands were originally mapped by the Service were made available for 389 study areas in the lower 48 states; and the geodatabase model was finalized to track the history of wetland features as they are updated through time.

Improvements and redesign of the type of metadata available for the Service's digital wetlands map holdings now enable users to access the Federal Geographic Data Committee compliant metadata, as well as project level metadata (for specific updated project areas) and "historic" metadata collected when the original mapping was completed.

Supplemental metadata linked to individual polygon features in the database allow the incorporation of contributed data to be added to the wetlands layer. This will be especially important as data are contributed to the database by other state, federal and partner organizations.

The **Wetlands Geodatabase** fuels an important Internet data delivery tool used by the Service to reach a larger user audience. The outcome of this effort provides mission critical habitat information in state-of-the-art digital formats to help guide the conservation and stewardship of the nation's wetlands and aquatic resources. The **Wetlands Mapper** is the Internet data discovery mechanism designed to promote greater awareness of wetlands map data applications and deliver easy to use, map-like views of America's wetland resources. The **Wetlands Mapper** is both Section 508 and OGC (Open GIS Consortium) compliant, which allows outside site administrators the ability to include wetlands in their own ArcIMS viewers as background layers.



In 2006, the *Wetlands Mapper* website exceeded 43 million user requests.

Web Accessible Wetland Geodatabase Documentation and Information:

Automated Information System and Data Project Charter

<http://wetlandfws.er.usgs.gov/NWI/supplemental.html> The purpose of this document is to provide a project charter in compliance with Federal Information Resources Management Regulations.

National Standards and Quality Components for Wetlands, Deepwater and Related Habitat Mapping

<http://wetlandfws.er.usgs.gov/NWI/supplemental.html> This document presents the revised mapping and data automation standards as well as the protocols for map data collection and dissemination. This will serve as an operations tool but also help fulfill requirements for updated information quality information.

Addressing Information Quality Guidelines, U.S. Fish and Wildlife Service, Wetlands Master Geodatabase

<http://wetlandfws.er.usgs.gov/NWI/supplemental.html> This report meets the requirements of Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554) for Federal agencies to publish Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by a Federal agency, and to provide administrative mechanisms allowing the public to seek and obtain correction of information maintained and disseminated by the agency.

Plan for a Wetlands Master Geodatabase - Executive Summary

<http://wetlandfws.er.usgs.gov/NWI/supplemental.html> This presents the overall project strategy, planning steps and development sequence taken until the MGD became operational.

Wetlands Master Geodatabase - Wetland Resource Attribution and Verification Tools Version 2.5.1

<http://wetlandfws.er.usgs.gov/tools/index.html> These are customized attribution and verification tools for resource mapping using geodatabases in ArcMAP and have been developed in a cooperative effort between the U.S. Fish and Wildlife Service and the U.S. Geological Survey. The tools, installation instructions, user information and technical help are available for download at:

Fact Sheet - Wetlands Master Geodatabase

<http://wetlandfws.er.usgs.gov/NWI/supplemental.html> Fish and Wildlife Service fact sheet (#0015.2004) that describes the MGD purpose and characteristics. March, 2004.

Fact Sheet - Digital Wetlands Data - Interagency Cooperation

<http://wetlandfws.er.usgs.gov/NWI/supplemental.html> Joint Fish and Wildlife Service and USGS fact sheet on managing and web serving digital wetlands data. May, 2004.

Strategic Plan Implementation: Advances in Providing Digital Wetlands Data -
Presentation to the Organization of Fish and Wildlife Information Managers, September,
2004. Available on line at:

http://www.ofwim.org/docs/2004/PPT/Dahl_Allord_OFWIM_2004.ppt

**Design of the Wetlands Geodatabase: Questions and Answers - MGD Technical
Document 03-04.** June, 2003.