



FWS Wetlands Database and Wetlands Status and Trends

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Wetlands Database

- FWS Wetlands Mission
- Cooperation
- History of Wetlands Mapping
- Status of the Wetlands Geodatabase
- Wetlands Mapper
- Future Directions
- Wetlands Status and Trends
- Questions

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Go to
Wetlands Mapper



Service's Wetlands Mission

- The U.S. Fish and Wildlife Service is the principal Federal agency that provides information to the public on the extent and status of the Nation's wetlands.
- Under the Office of Management and Budget Circular A-16, revised August 19, 2002, responsibility to coordinate **wetlands data** related activities is assigned to the Department of Interior, U.S. Fish and Wildlife Service.





Service's Wetlands Mission

- FWS has maintained a wetlands mapping effort for over 30 years
 - National Wetlands Inventory
- FWS wetland definition is the FGDC standard
 - Provides classification, location, and extent of wetlands and deepwater habitats; no attempt to define the proprietary limits or jurisdictional wetland boundaries of any Federal, State, or local agencies.
- FWS Wetlands Geodatabase forms the framework for NSDI wetlands spatial data layer





Agency Cooperation

- FWS – Division of Habitat and Resource Conservation
 - Wetlands Status and Trends
 - National Wetlands Inventory
- USGS – Office of Water Information
 - Cartographic Applications and Processing Program – CAPP
 - Technological Knowledge
 - GIS expertise
 - Wetland knowledge
 - Worked on prior Wetlands Status and Trends projects
- ESRI
 - Database review
 - System architecture review





Historic NWI wetlands data

- Data inconsistency
 - Different map projections and datum
 - Inconsistent data fields and schema
- Static system (data archive)
- File based access
 - Inefficient storage and distribution
- Insufficient documentation
- Technology outdated





FWS Wetlands Geodatabase

- Standardized data storage and schema
- Improved quality of mapping process
- Standardized data updates and additions
- Integration of supporting information
- Seamless storage of data
 - Improved public interface
 - Improved data distribution
 - Improved geographic analyses
 - faster, more efficient, larger data extent
 - improves backup and archiving

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Wetlands Mapper

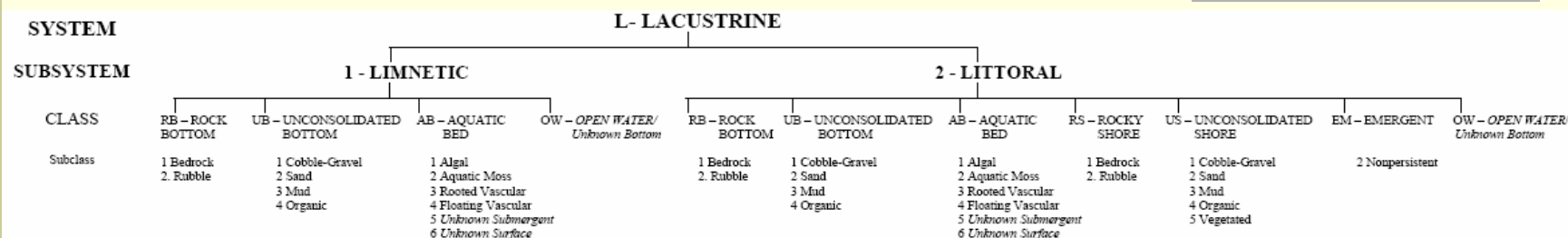


Service's Wetland Standards

- Cowardin et al. (1979) wetlands classification
- 1:24,000
 - reconnaissance level topical overlay
- Digital spatial data product
 - Preferably shapefiles or geodatabases
- Albers Equal Area Projection
- Topology
- QAQC Verification Tools
- FGDC metadata and metadata footprint



Cowardin Wetland Classification



SYSTEM

P - PALUSTRINE

CLASS	RB - ROCK BOTTOM	UB - UNCONSOLIDATED BOTTOM	AB - AQUATIC BED	US - UNCONSOLIDATED SHORE	ML - MOSS-LICHEN	EM - EMERGENT	SS - SCRUB-SHRUB	FO - FORESTED	OW - OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	1 Moss 2 Lichen	1 Persistent 2 Nonsupersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	

MODIFIERS

In order to more adequately describe the wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.

WATER REGIME		WATER CHEMISTRY			SOIL	SPECIAL MODIFIERS
Non-Tidal	Tidal	Coastal Halinity	Inland Salinity	pH Modifiers for all Fresh Water		
A Temporarily Flooded B Saturated C Seasonally Flooded D Seasonally Flooded/ Well Drained E Seasonally Flooded/ Saturated F Semipermanently Flooded G Intermittently Exposed	H Permanently Flooded J Intermittently Flooded K Artificially Flooded N Intermittently Flooded/Temporary Y Saturated/Semipermanent/ Seasonal Z Intermittently Exposed Permanent U Unknown	K Artificially Flooded L Subtidal M Irregularly Exposed N Regularly Exposed P Irregularly Flooded	*S Temporary-Tidal *R Seasonal-Tidal *T Semipermanent-Tidal *V Permanent-Tidal U Unknown	1 Hyperhaline 2 Euthaline 3 Mixohaline (Brackish) 4 Polyhaline 5 Mesohaline 6 Oligohaline 0 Fresh	7 Hypersaline 8 Eusaline 9 Mixosaline 0 Fresh	a Acid r Circumneutral i Alkaline
					g Organic n Mineral	b Beaver d Partially Drained/Ditched f Farmed h Diked/Impounded r Artificial Substrate s Spoil x Excavated

*These water regimes are only used in tidally influenced, freshwater systems.



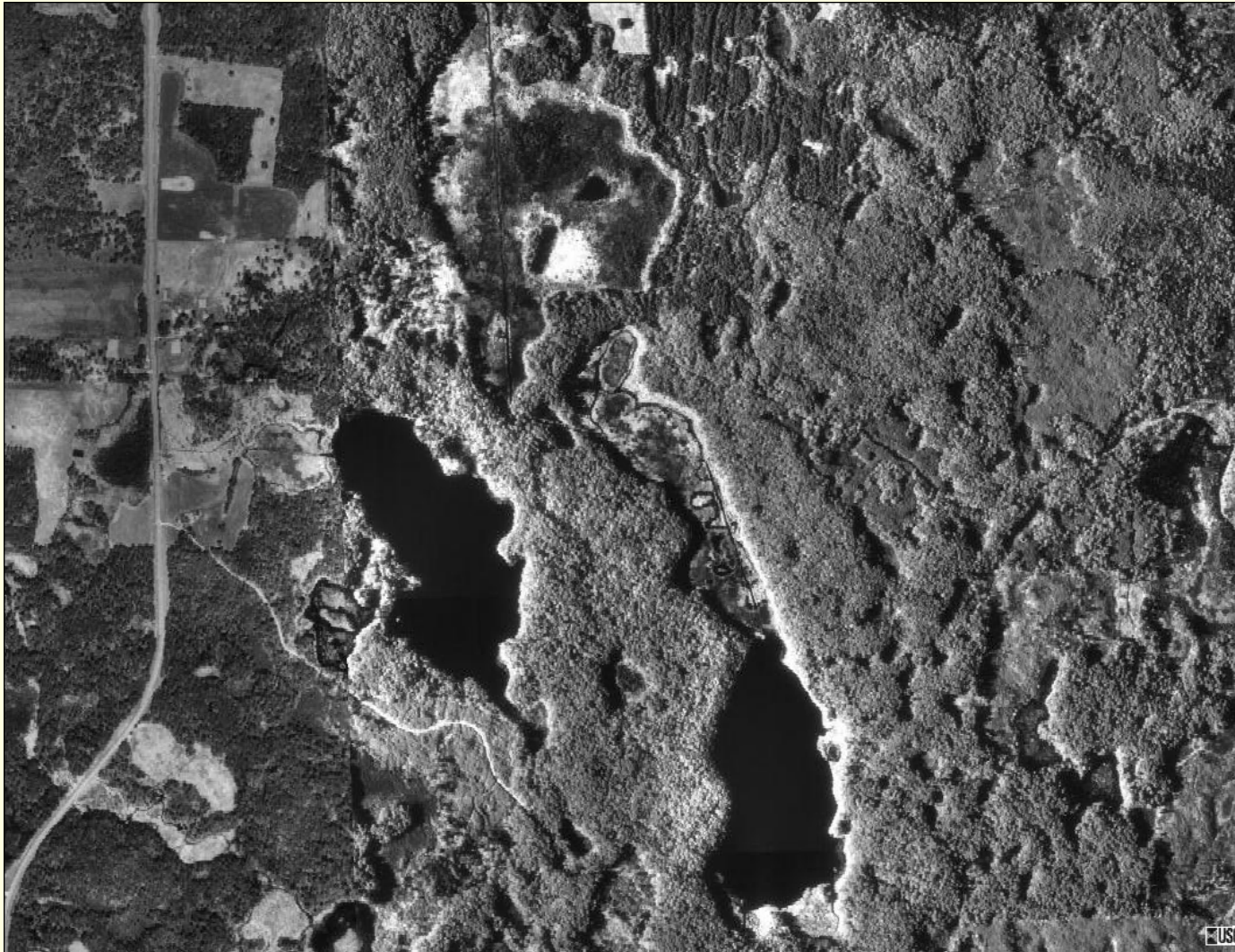
Cowardin Wetland Classification

- PUBGx = P – UB – G – x
 - Palustrine, Unconsolidated Bottom, Intermittently Exposed, Excavated
- L2AB4Hh = L – 2 – AB – 4 – H – h
 - Lacustrine, Littoral, Aquatic Bed, Floating Vascular, Permanently Flooded, Impounded
- PFO4/EM1Ad = P – FO – 4 / EM – 1 – A – d
 - Palustrine, Forested, Needle-leaved Evergreen, with Emergent, Persistent, both are Temporarily Flooded, Partially drained/ditched



FWS Wetlands Mapping

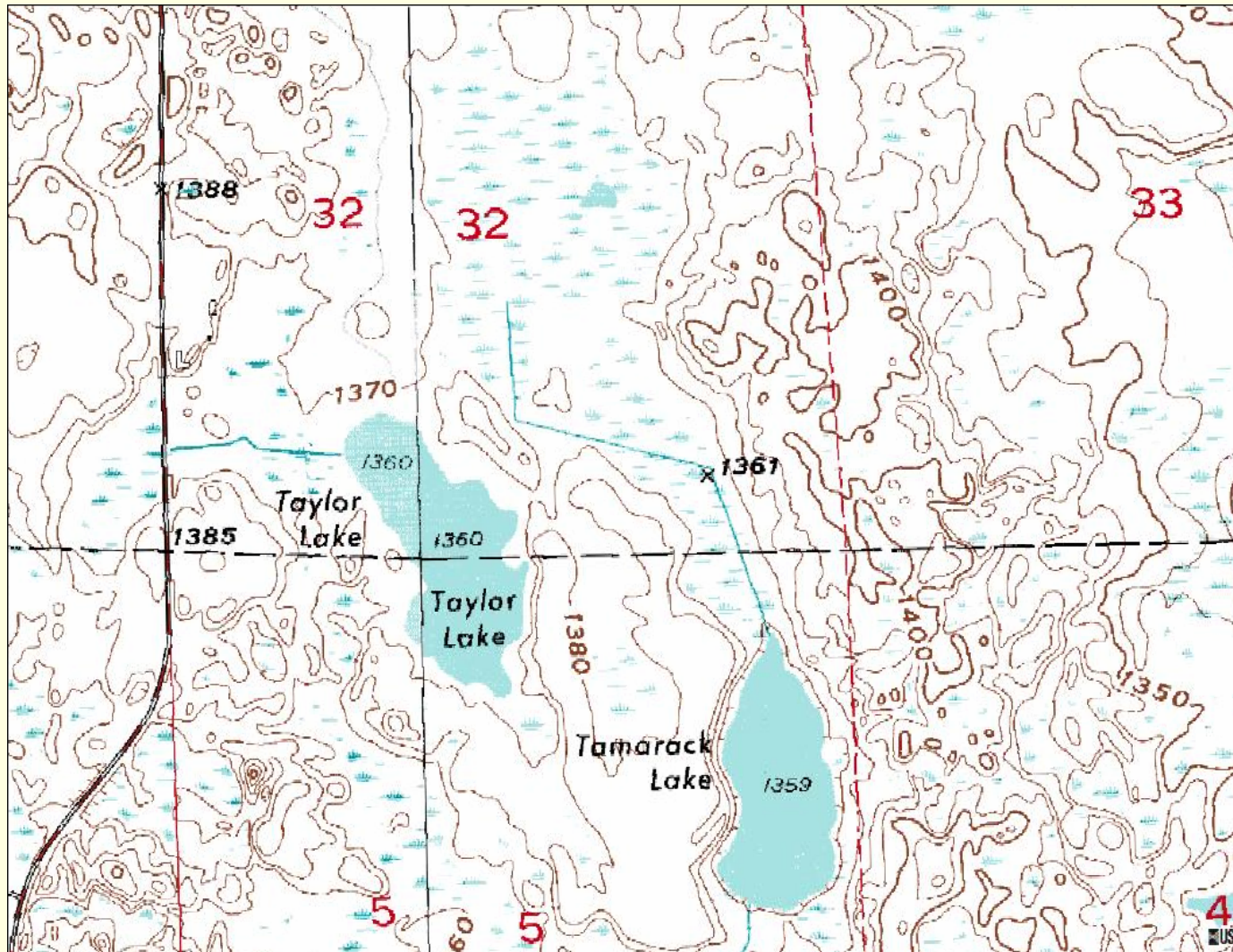
Northern Minnesota Lake - Imagery





FWS Wetlands Mapping

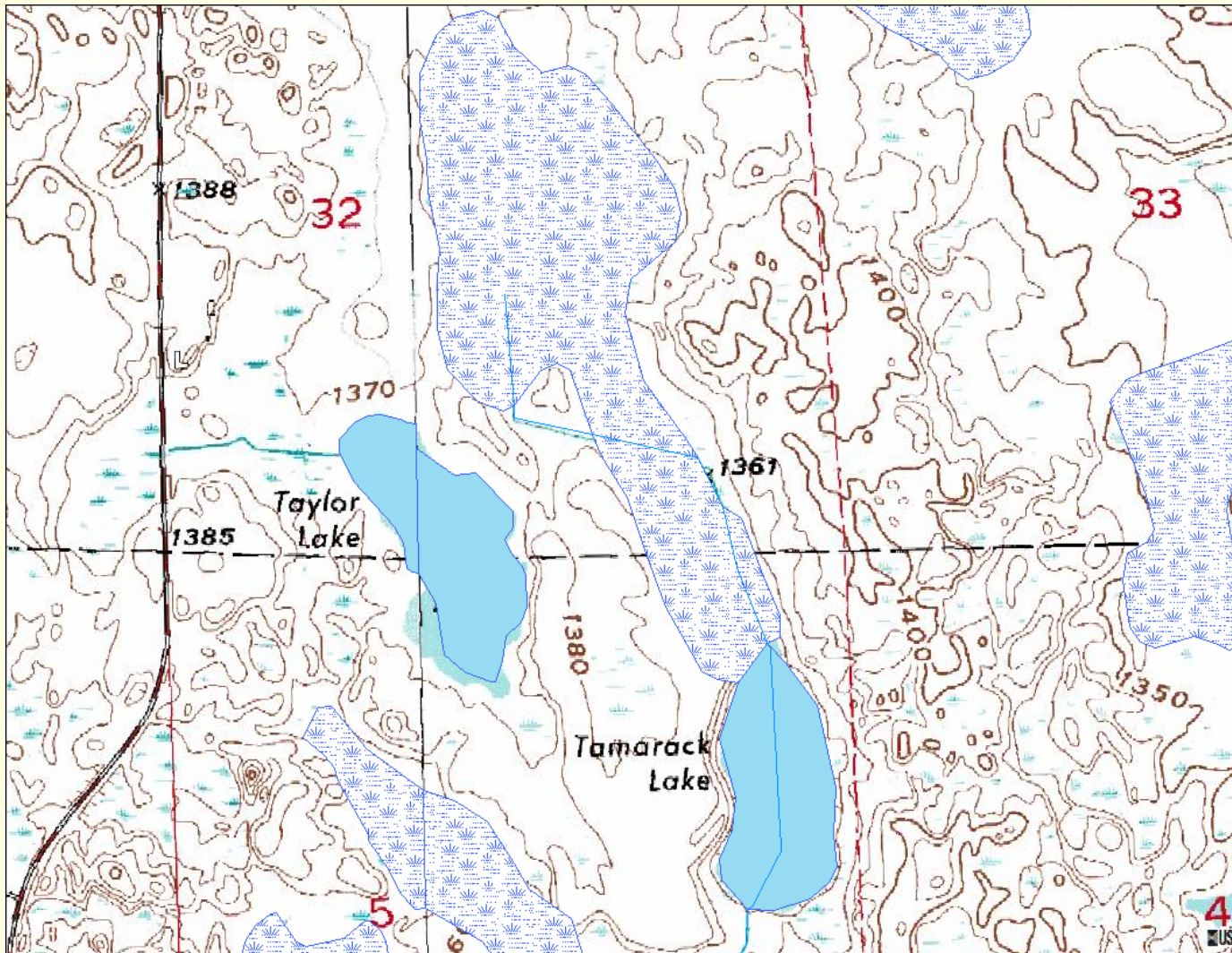
Northern Minnesota Lake - Topographic Map





FWS Wetlands Mapping

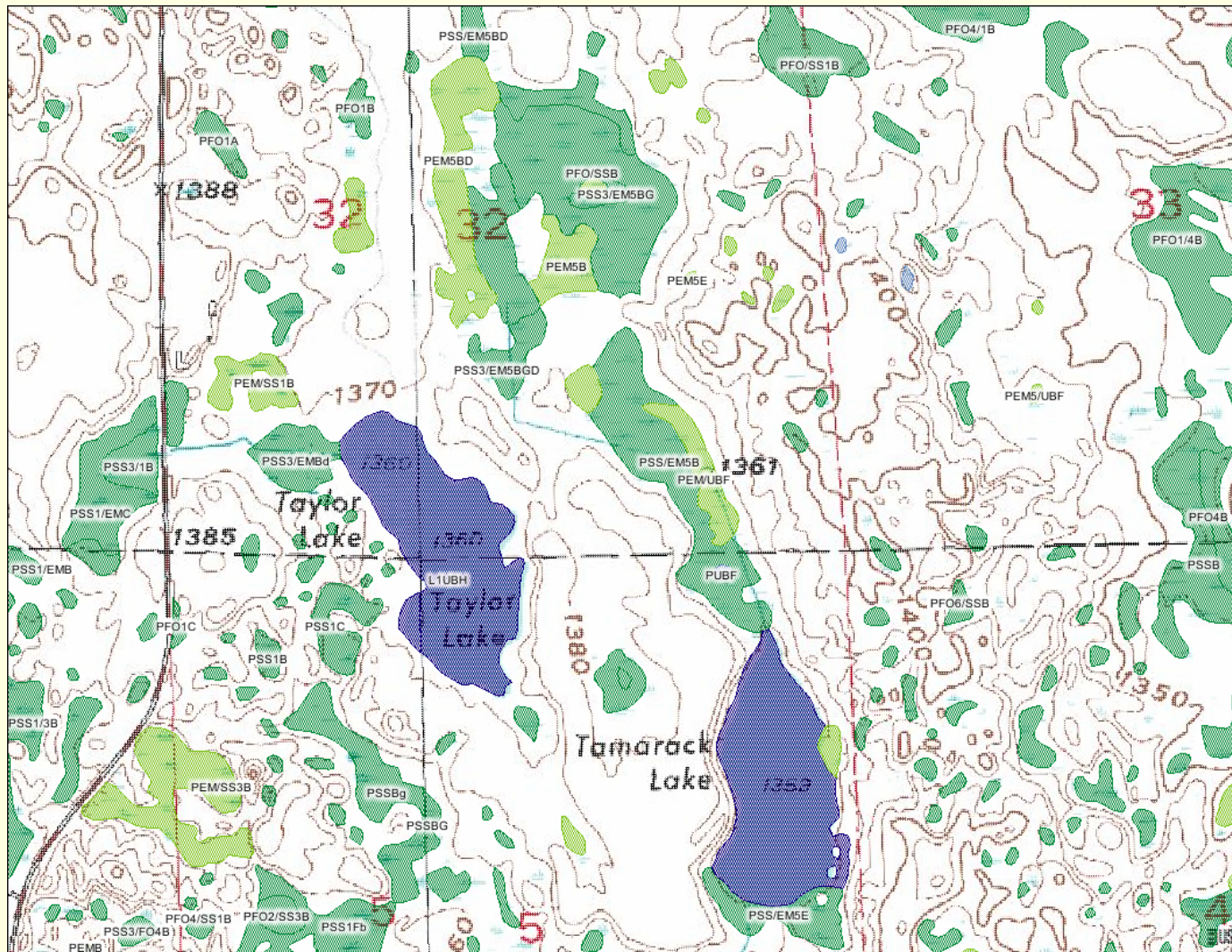
Northern Minnesota Lake - Topographic Map and 100k NHD





FWS Wetlands Mapping

Northern Minnesota Lake - Wetland Polygons





FWS Wetlands Mapping

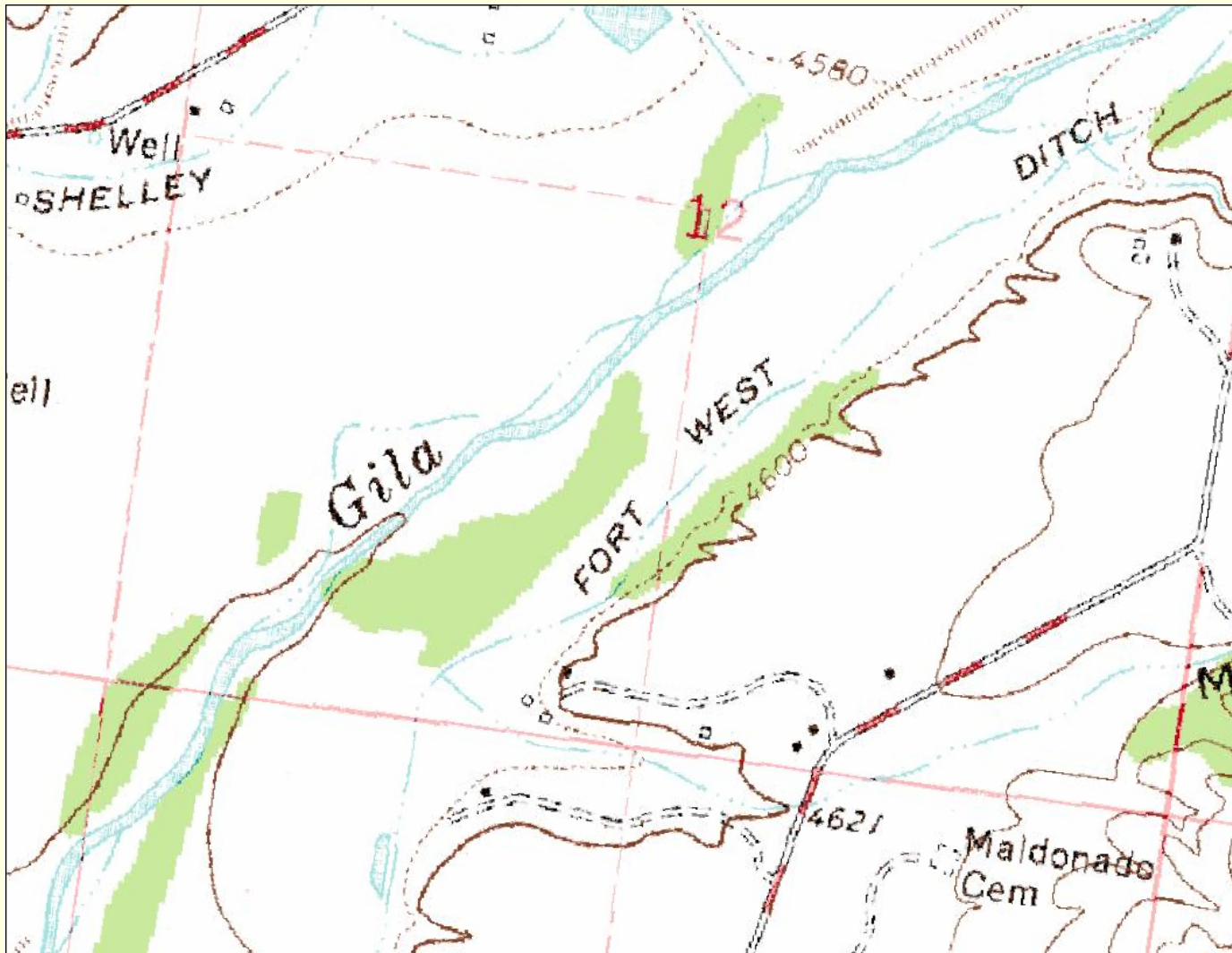
Gila River, New Mexico - Imagery





FWS Wetlands Mapping

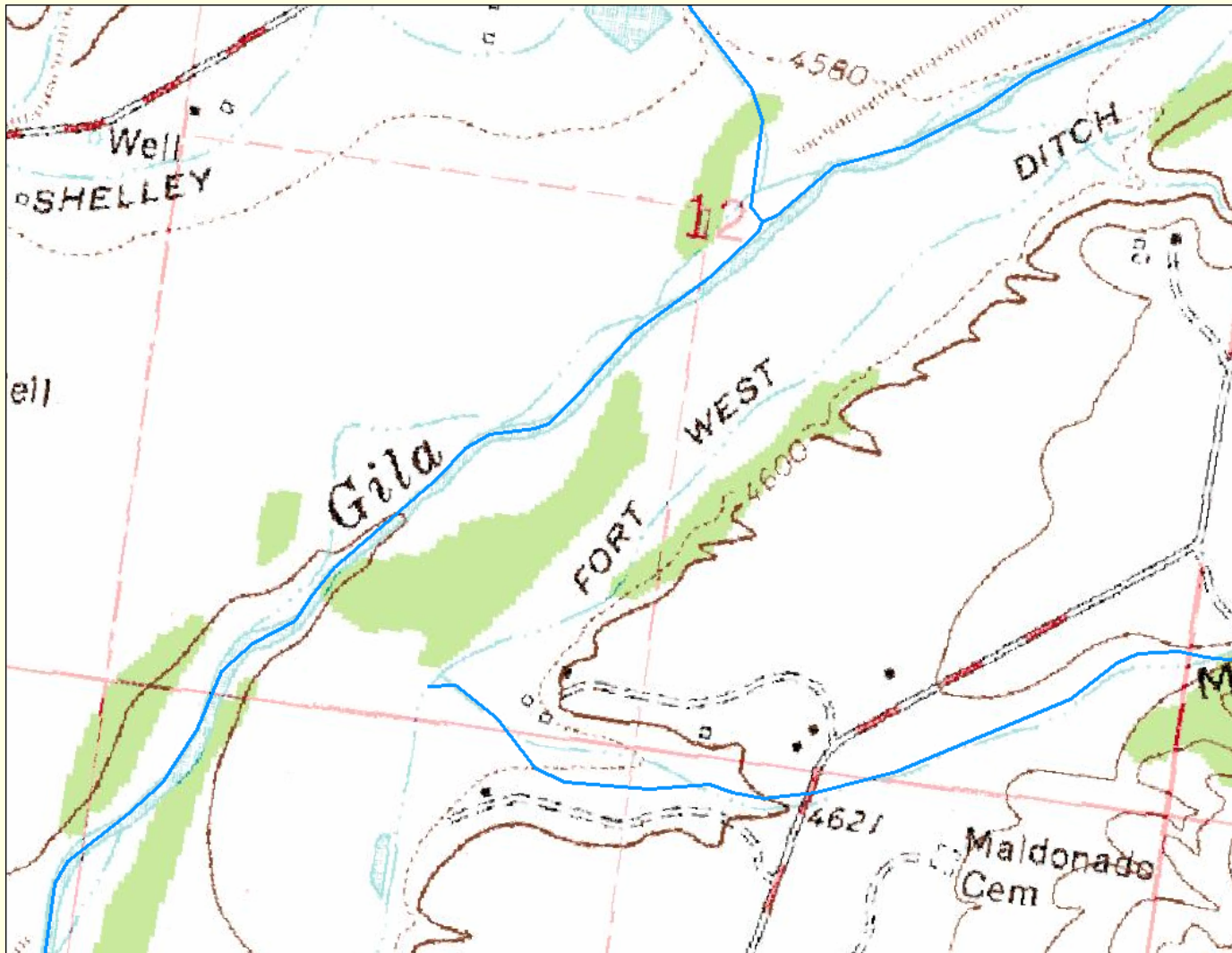
Gila River, New Mexico - Topographic Map





FWS Wetlands Mapping

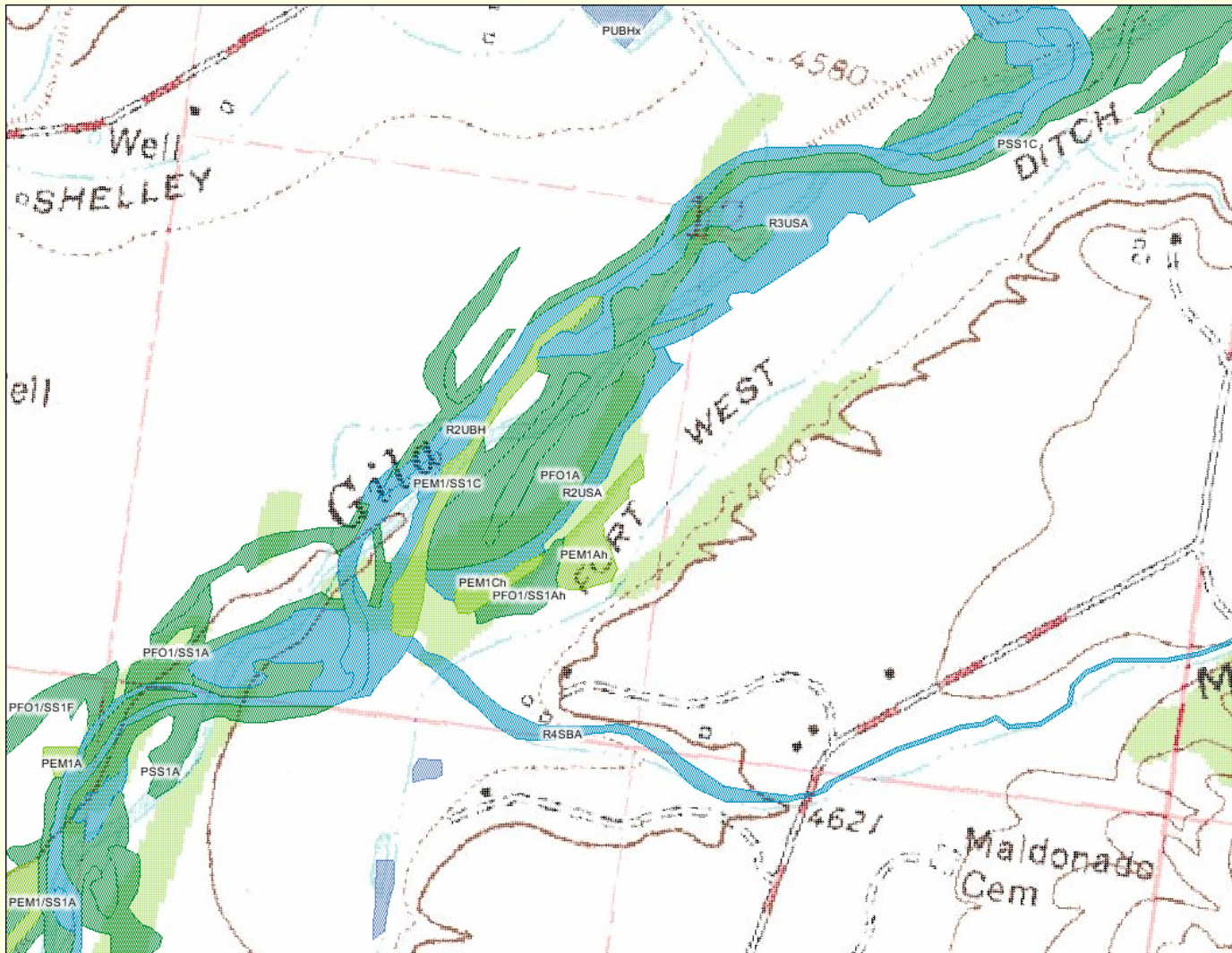
Gila River, New Mexico - Topographic Map and 100k NHD





FWS Wetlands Mapping

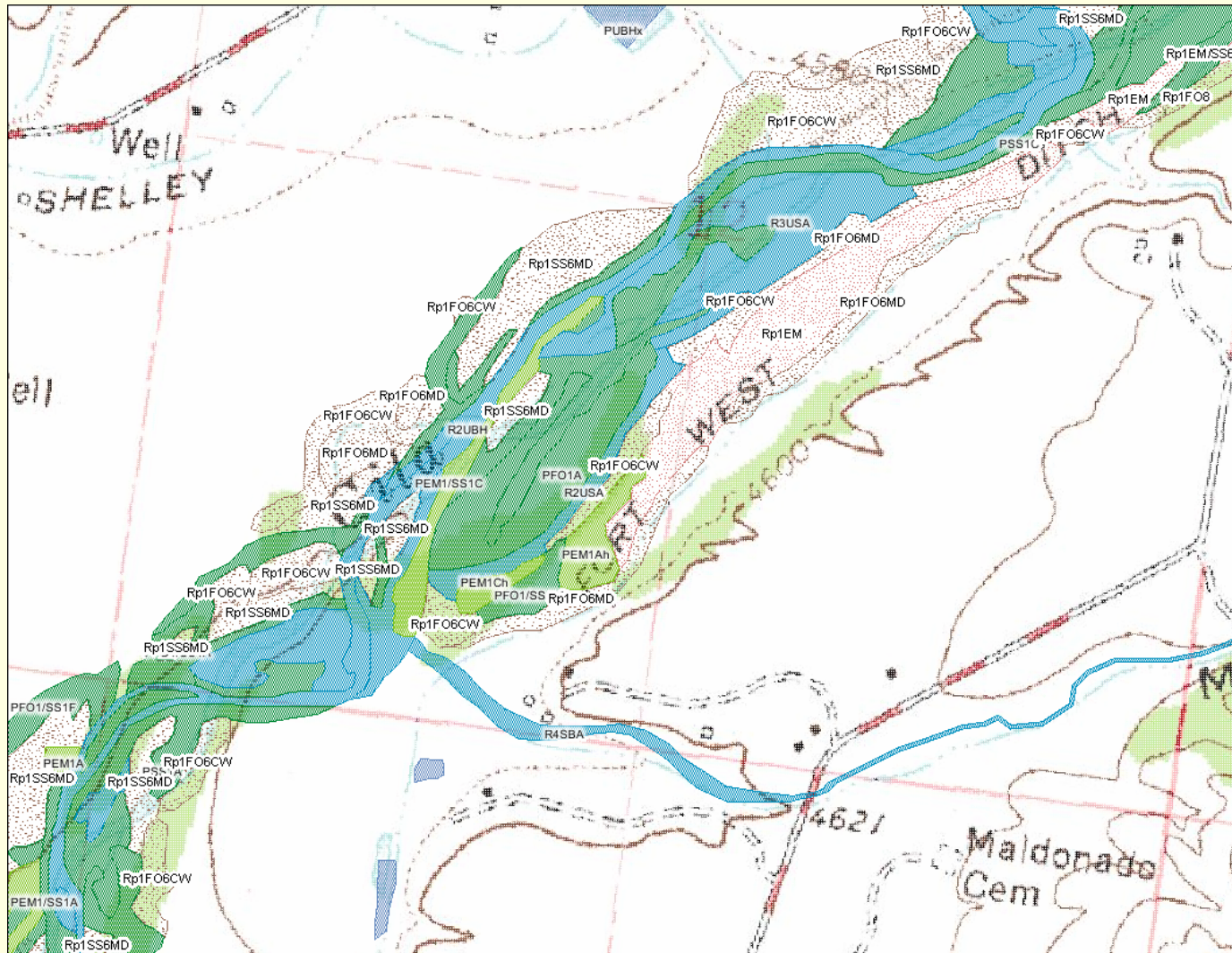
Gila River, New Mexico - Wetland Polygons





FWS Wetlands Mapping

Gila River, New Mexico - Wetland and Riparian Polygons



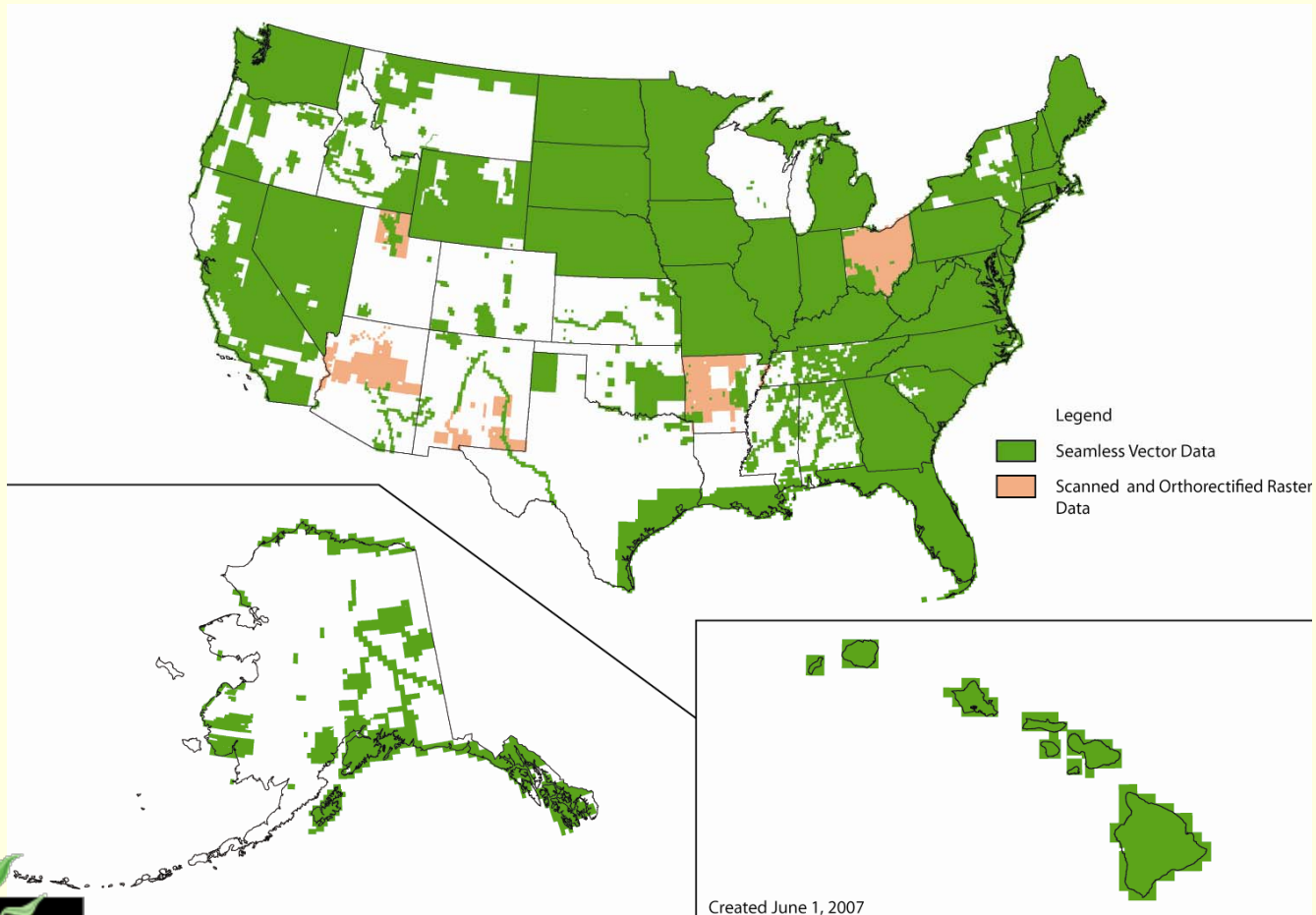


FWS Wetlands Data Status

- 55% of Nation digitally mapped
- 14.4 million wetland polygon features
 - Over 13.6 million in Lower 48
- 3.4 million wetland linear features
- 1 million archival wetland features
- 60+ GB
 - Oracle and SDE
- 26 Feature Datasets
- 106 Feature Classes



FWS Wetlands Data Status



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FWS Wetlands Mapper



U.S. Fish & Wildlife Service

Division of Habitat and Resource Conservation

Wetlands Geodatabase

Providing Wetland Information to the American People

Wetlands Digital Data

[Wetlands Mapper](#)

[Download Wetlands Data](#)

Wetlands Mapper Information

[Introduction](#)

[Layers and Metadata](#)

[History and Changes](#)

[Map Creation and Mapper](#)

[Display](#)

[Wetlands Codes](#)

[OGC Web Map Service](#)

[Disclaimer](#)

[Supplemental Information](#)

[MGD Info Quality Guidelines](#)

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Wetlands Mapper](#)

Wetlands Digital Data

Build, search, query, and download custom digital maps and data in the area you choose:

[Go to the Wetlands Mapper](#)

[Download Wetlands Digital Data](#)





FWS Wetlands Mapper

http://wetlandsfws.er.usgs.gov - Geocortex Internet Mapping Framework - Mozilla Firefox

U.S. Fish & Wildlife Service
Wetlands Online Mapper

About Home Layers Legend Key Map Locate Contact Us Print PDF Help Exit

Advanced tools

Jump To: Select a theme to view

Map Layers

- Interactive Layers
- Wetlands Data
 - ☒ Wetlands Data Availability
 - Scale > 1:100,000
 - Digital (vector data)
 - Scan (raster data)
 - Non-Digital (hardcopy only)
 - Unmapped Area
 - Scale < 1:100,000
 - Digital (data will display)
 - Scan (data will display)
 - Non-Digital
 - Unmapped Area
 - ☒ Digital Wetland Polygons (Vector) *
 - ☒ Wetland Scan Data (Raster, 1:24k) *
 - ☒ Wetland Project Area Metadata *
 - ☐ Historic Wetlands Map Info
 - ☐ AZ/NM 100k Scans (use i for PDF link)
 - ☐ Base Data
 - ☐ WMS Display Layers (not printable)

☒ Automatically Refresh Map
☒ Show Legends

Notes:
Please refer to the following for descriptions of the functions of the controls in the layer list above.

- Click folder to show or hide contents.
- Click to turn on all layers in the associated folder.
- Click to turn off all layers in the associated folder.
- Click the check box to turn layer on and off.
- If the check box is grayed out, the layer is not available at the current scale.
- This is the active identify layer.
- Click to make the layer be the active identify layer.
- There is a legend available for this layer. Click to turn the legend for this layer on.
- Click to turn this layer's legend off

Scale: 1:22,861,173 go Map Tool: Zoom In

Done

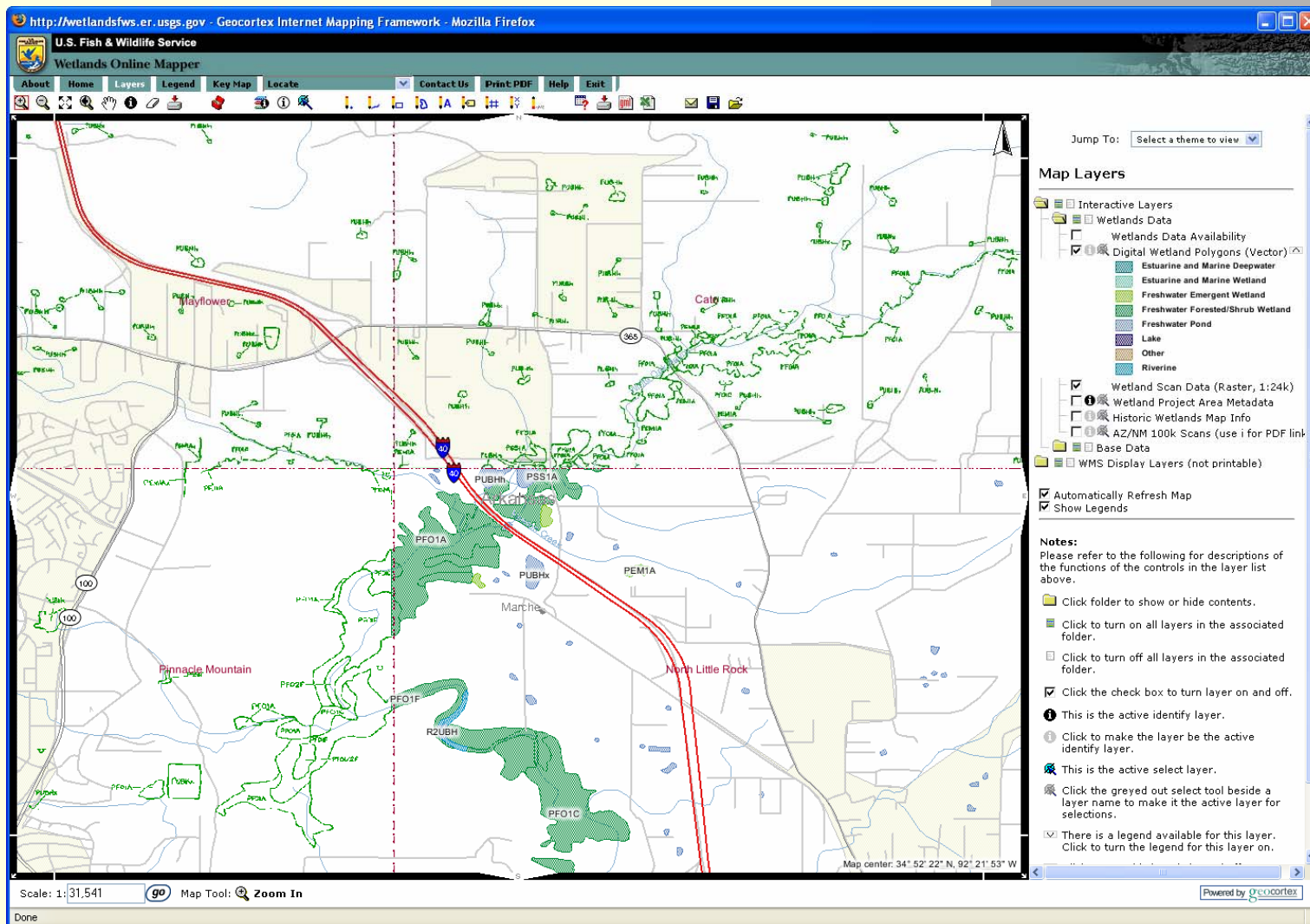
Map center: 39°9' N, 95°30' W

Powered by Geocortex





FWS Wetlands Mapper



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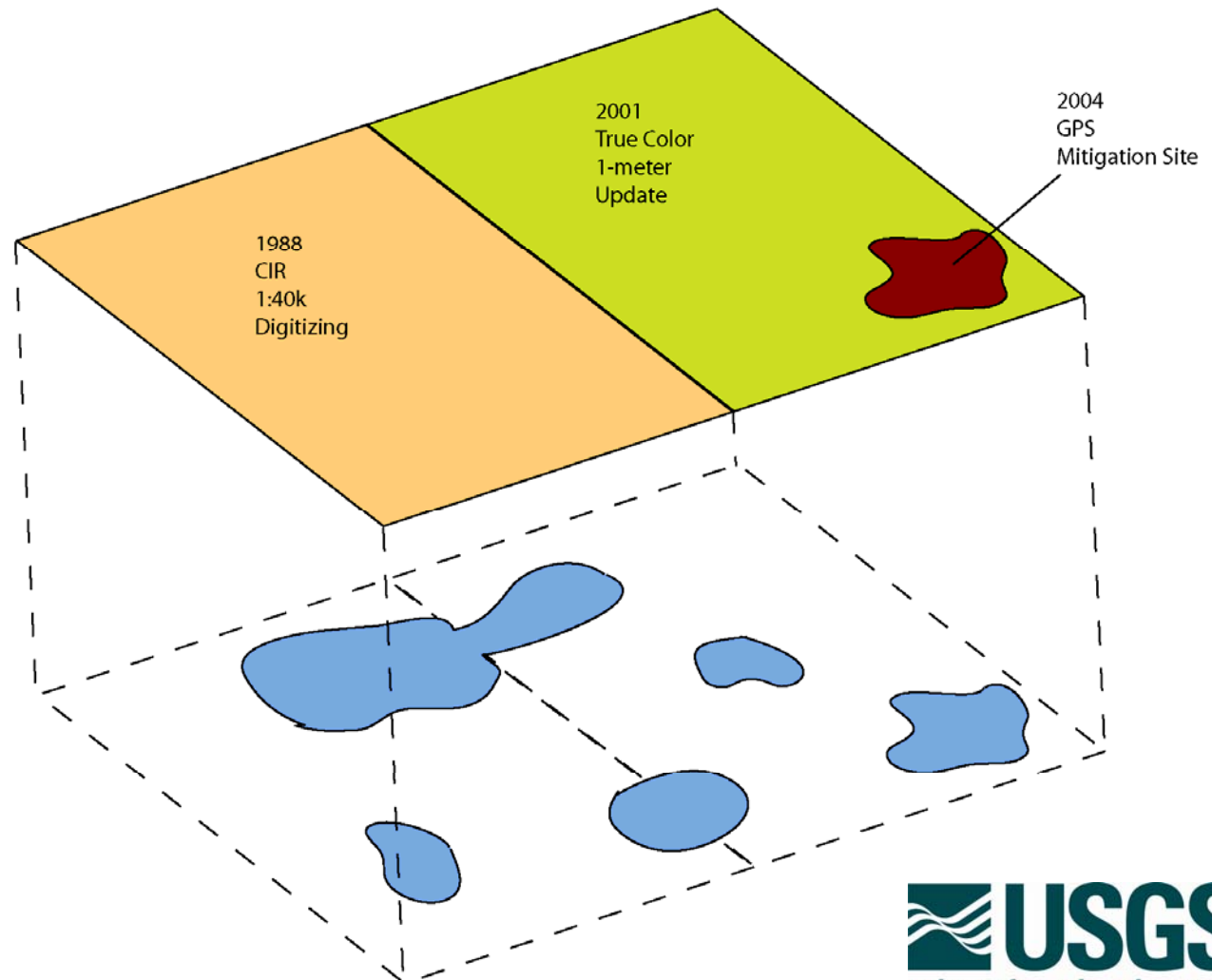


FWS Wetlands Metadata

Metadata 'Footprint' – Seamless Wetlands Data

Public
Metadata
Layer

Wetlands
Layer



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Wetlands Mapper



Wetlands Data Extraction

http://wetlandsfws.er.usgs.gov - Geocortex Internet Mapping Framework - Mozilla Firefox

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Wetlands Online Mapper

About Home Layers Legend Key Map Locate Contact Us Print PDF Help Exit

Extract

Extract operation successful.

A zip file containing the selected features in shapefile format has been created for you to download. It will only be available for a short time.

[download the zip file]

Scale: 1:58,852 90 Map Tool: Pan

Done

Map center: 26° 55' 15" N, 81° 9' 12" W

Powered by geocortex





Wetlands Data Extraction



U.S. Fish & Wildlife Service

Division of Habitat and Resource Conservation

Wetlands Geodatabase

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Wetlands Data Extraction Tool

California ▼

Lower 48 USGS 24K Quads ▼

Point_Loma ▼

Shape information is available for the selected areas.

[Extract Shapefile](#)





Mapper Statistics - FY07

- 57.9 million website requests
- 1.9 million map requests
- 652 GB data transferred
- 5050 Data extraction Requests





Wetlands Mapper Users

- Wetlands Mapper and Data
 - Wetland Resource Managers
 - Landowners
 - Realtors
 - Utilities
 - Universities
 - Federal Agencies
- Web Mapping Service - WMS
 - EPA
 - Army Corp of Engineers

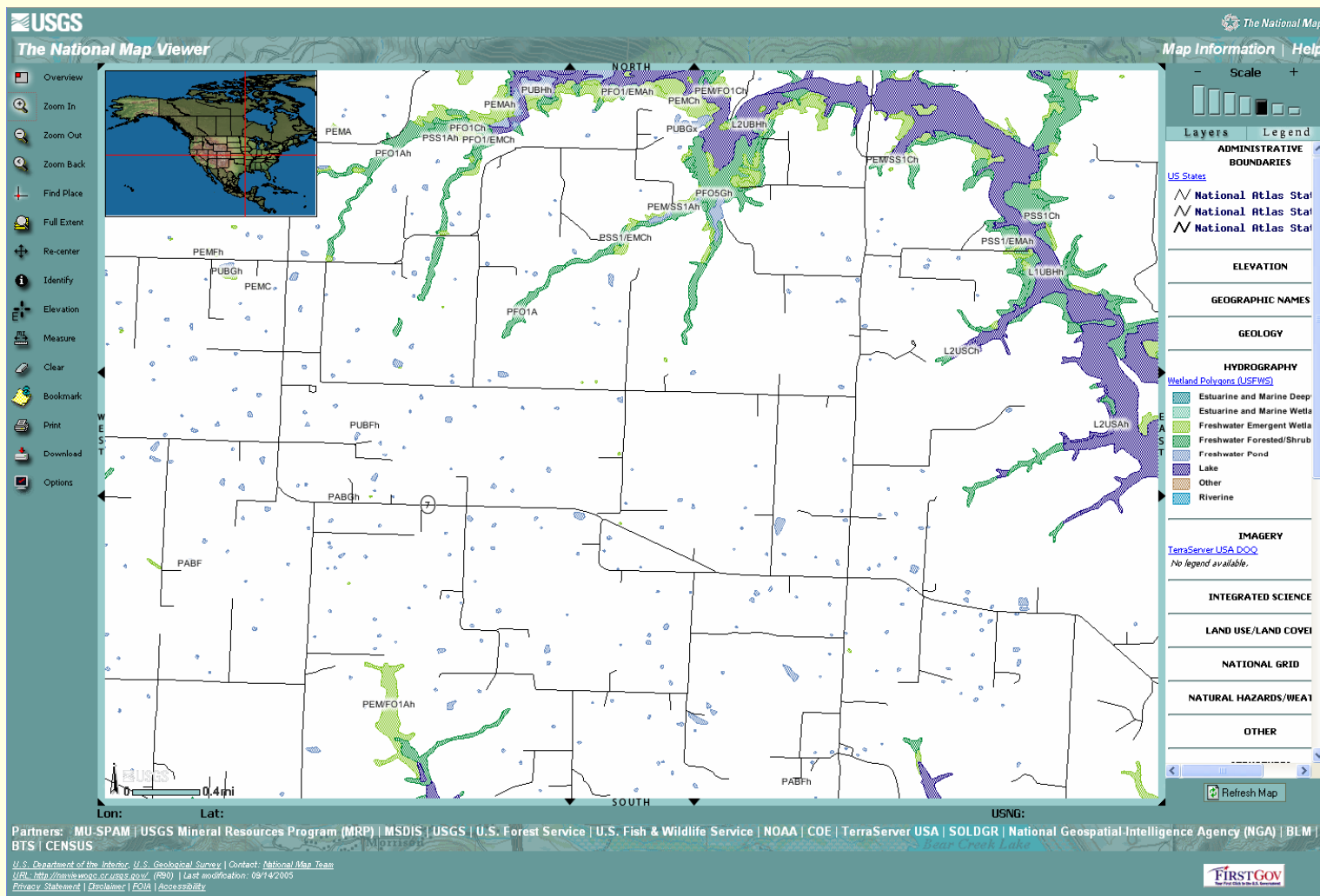




The National Map



**The
National
Map**





FWS Wetland KML Script

Google Earth

File Edit View Tools Add Help

Search

Fly To Find Businesses Directions

Fly to e.g., 94043

Places

My Places

Temporary Places

FWS Wetlands Data

Click for information!

Layers

Lower 48 States

Click here for Metadata

Status Map

Wetland Polygons

Wetland Scans

Alaska

Click here for Metadata

Status Map

Wetland Polygons

Hawaii

Click here for Metadata

Status Map

Wetland Polygons

Puerto Rico & US VI

Click here for Metadata

Pacific Trust Islands

Click here for Metadata

Status Map

Wetland Polygons

Legend

Click for information!

US Fish and Wildlife Service

Wetlands

- Freshwater Forested/Shrub wetland
- Freshwater Emergent wetland
- Freshwater pond
- Estuarine and Marine wetland
- Riverine
- Lake
- Estuarine and Marine Deepwater

Image NASA

Image © 2007 TerraMetrics

Image © 2007 DigitalGlobe

© 2007 Google™

Pointer 38° 00' 00" N 100° 00' 00" W

Streaming 100%

Eye alt 5485.89 mi

URL: http://wetlands.fws.gov/index.html

U.S. Fish & Wildlife Service

Branch of Habitat Assessment

Wetlands Information

What's New?

Mapping project metadata and historic map footprint data are now available on the Wetlands

Wetlands Digital Data and Mapping

Wetlands Digital Data





Wetlands Geodatabase

Future Directions

- New Layers
 - Historic Wetlands
 - Hydric Soil identified wetlands
 - LLWW (Landscape Position, Landform, Water Flow Path)
- Improved Database Intelligence
 - Parsed codes and descriptions
 - Plant List
 - Significant Wetland Areas





Wetlands Geodatabase

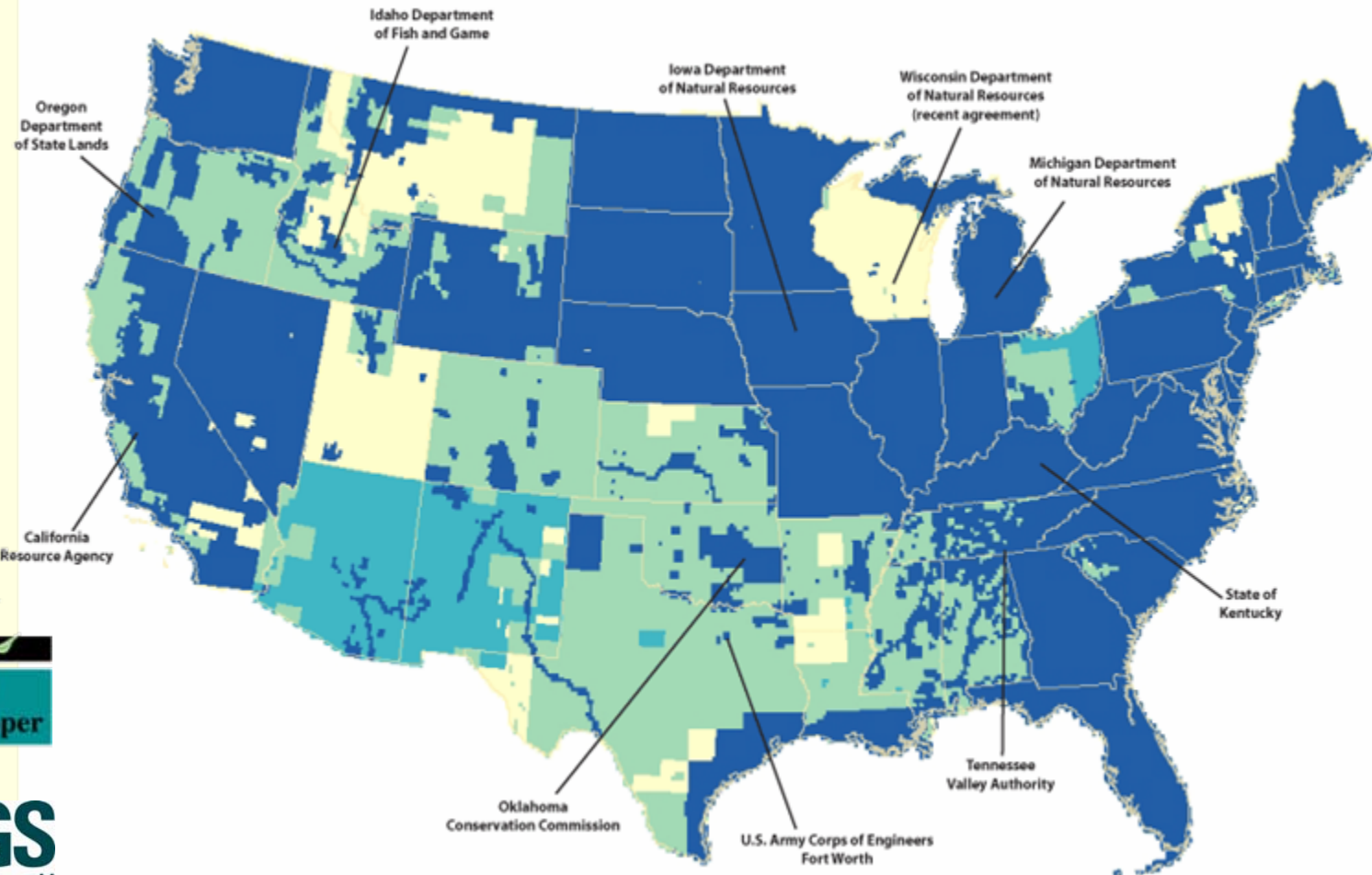
Future Directions

- Improved Data accessibility
 - Feature Services
 - CAD
- Analysis
 - Serving of Data Models
 - [Isolated data Model](#)
 - Watershed Analysis
 - Prairie Pothole Basin Analysis
 - ArcServer capabilities





Wetland Data Contributors



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Wetlands Geodatabase

Providing Wetland Information to the American People

**Wetlands
Digital Data**

[Wetlands
Mapper](#)
[Wetlands
data by
Quadrangle](#)

**Wetlands
Online
Mapper**
[Wetlands
Mapper
Homepage](#)

Contribute your Data to the Wetlands Master Geodatabase

Introduction

Organizations or individuals have the opportunity to contribute wetlands data to the wetlands geospatial data layer maintained by the Fish and Wildlife Service. The wetlands data layer is the featured layer on the [Wetlands Mapper](#), forms a catalog component to [The National Map](#) and is registered through the [Geospatial One-Stop](#).

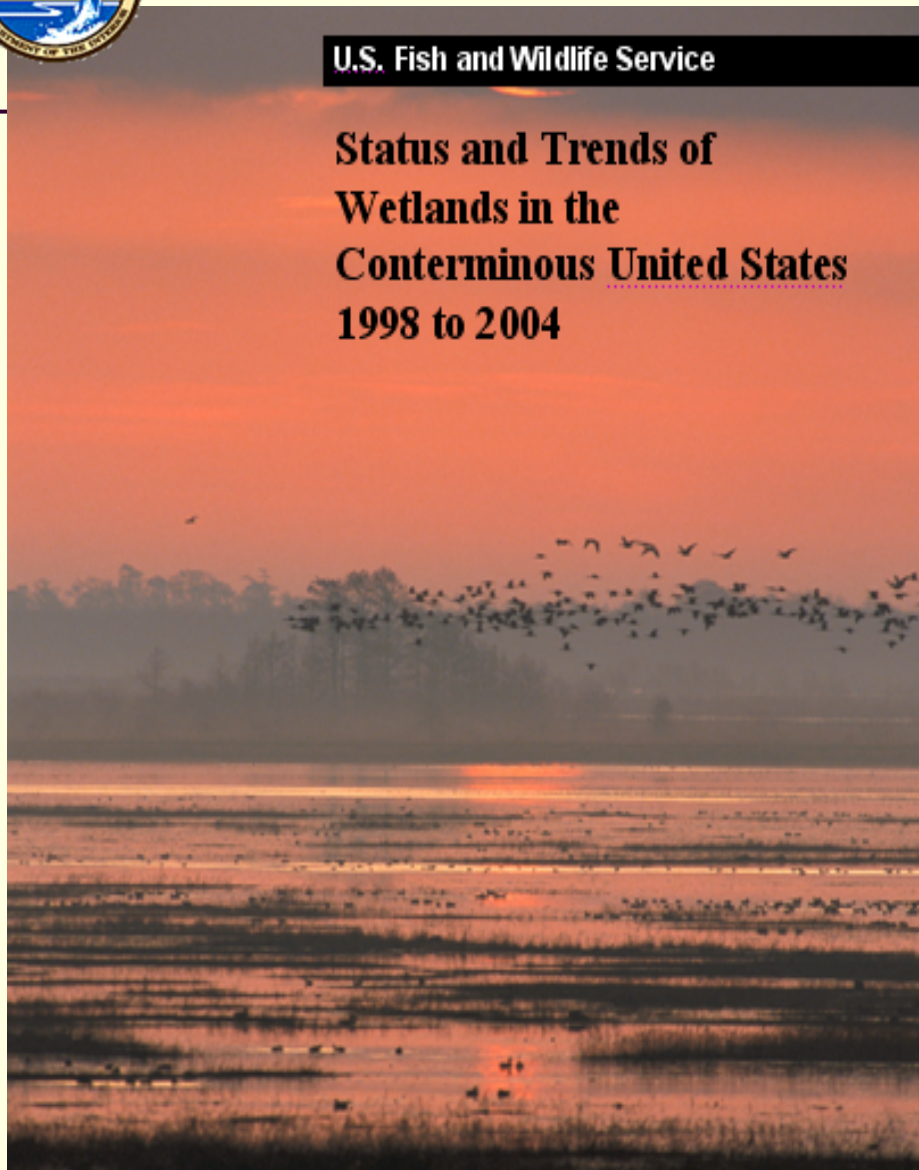
Click here
Go to
Wetlands Mapper



U.S. Fish and Wildlife Service

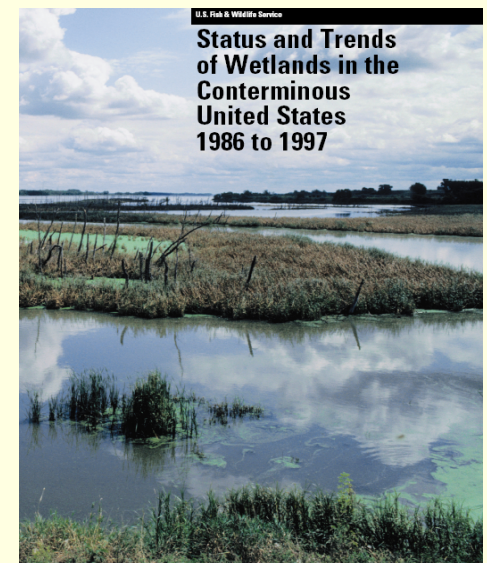
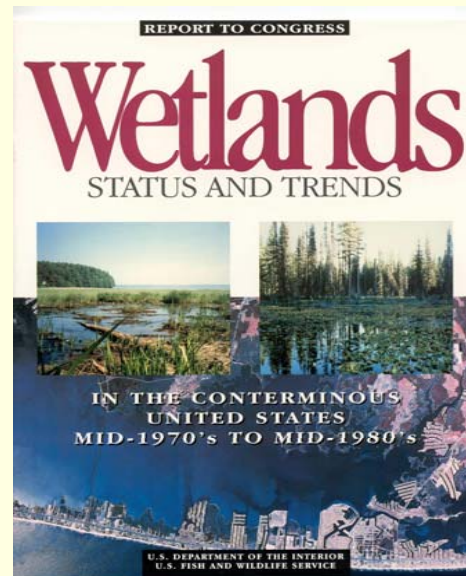
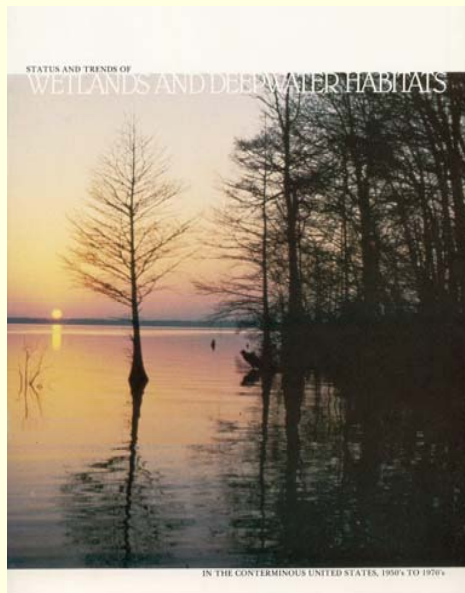
U.S. Fish and Wildlife Service

Status and Trends of Wetlands in the Conterminous United States 1998 to 2004



Introduction

- Fourth National Report - prior reports for:
 - 1950s to 1970s
 - 1970s to 1980s
 - 1986 to 1997



No Net Loss of Wetlands (area)

- Emergency Wetlands Resources Act 1986 - Requires the FWS report to Congress on the status of wetlands every 10 years.
- Our Nation's wetlands goals have traditionally been based on wetland acreage. This standard has and will continue to serve us well as we strive to achieve sustained net gains of wetland acreage.

Environmental Quality

Council on

Wetlands Status and Trends

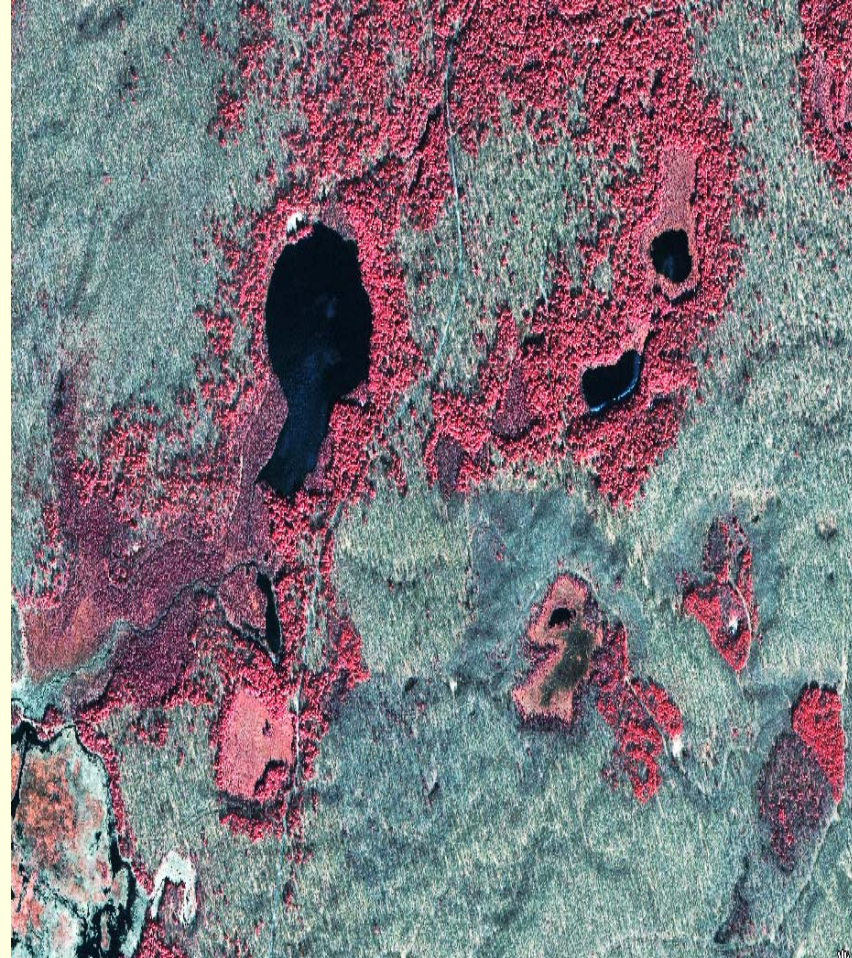
Study Goal:

Determine the status and trends of wetlands in the United States and produce comprehensive, statistically valid acreage estimates of the Nation's wetland resources.

Wetlands Status and Trends:

Key Study Elements

- Scientific approach
 - biological definition (not regulatory), Federal Standard (FGDC)
- Monitor all wetlands
 - measure gain and loss of wetland acreage by type
- Statistical estimates
 - published standard error rates



Wetlands Status and Trends:

Key Study Elements

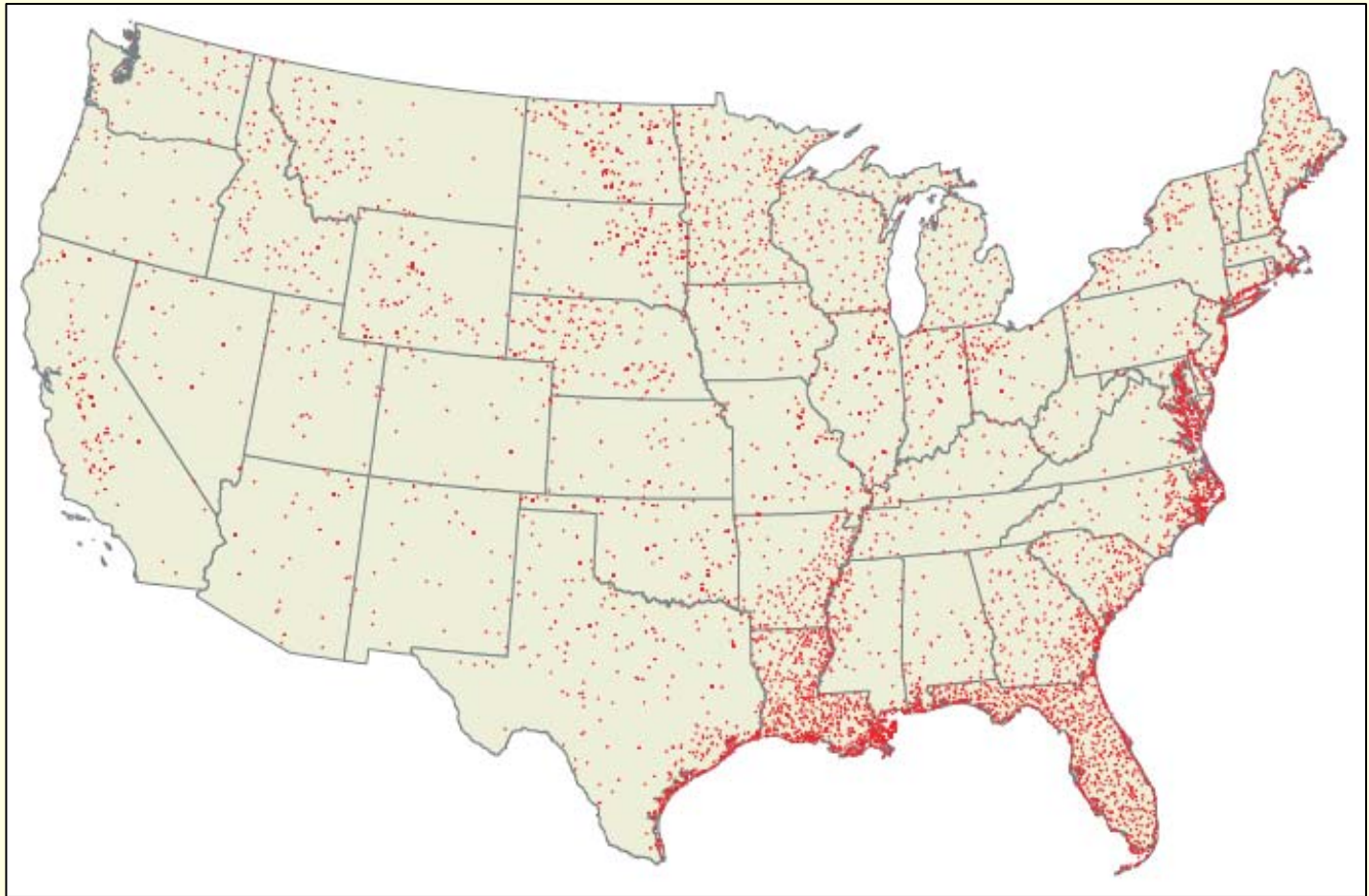
- Use remotely sensed imagery in combination with field verification work (compare T1 vs. T2)
- ***Not National Wetlands Inventory maps***
- Digital imagery and data format



Statistical Design

- Simple random distribution
- Stratification by physiographic regions
 - Hammond land surface forms (35)
- Sample plots = 4 sq. mi.
- Sample all lands regardless of ownership
- Include 11 categories of wetland
- Track all wetland gains and losses

Current population of sample plots - 4,682

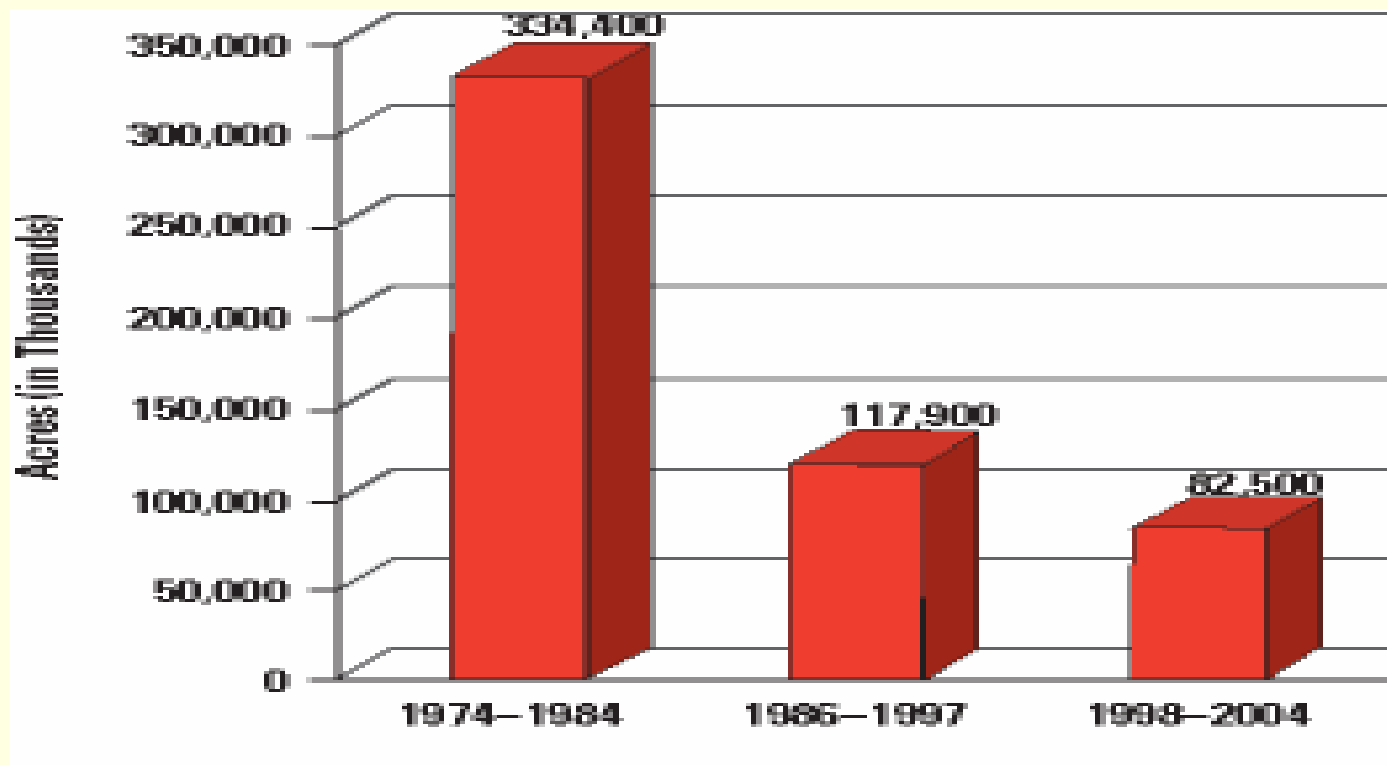


Major Findings (1998 -2004)

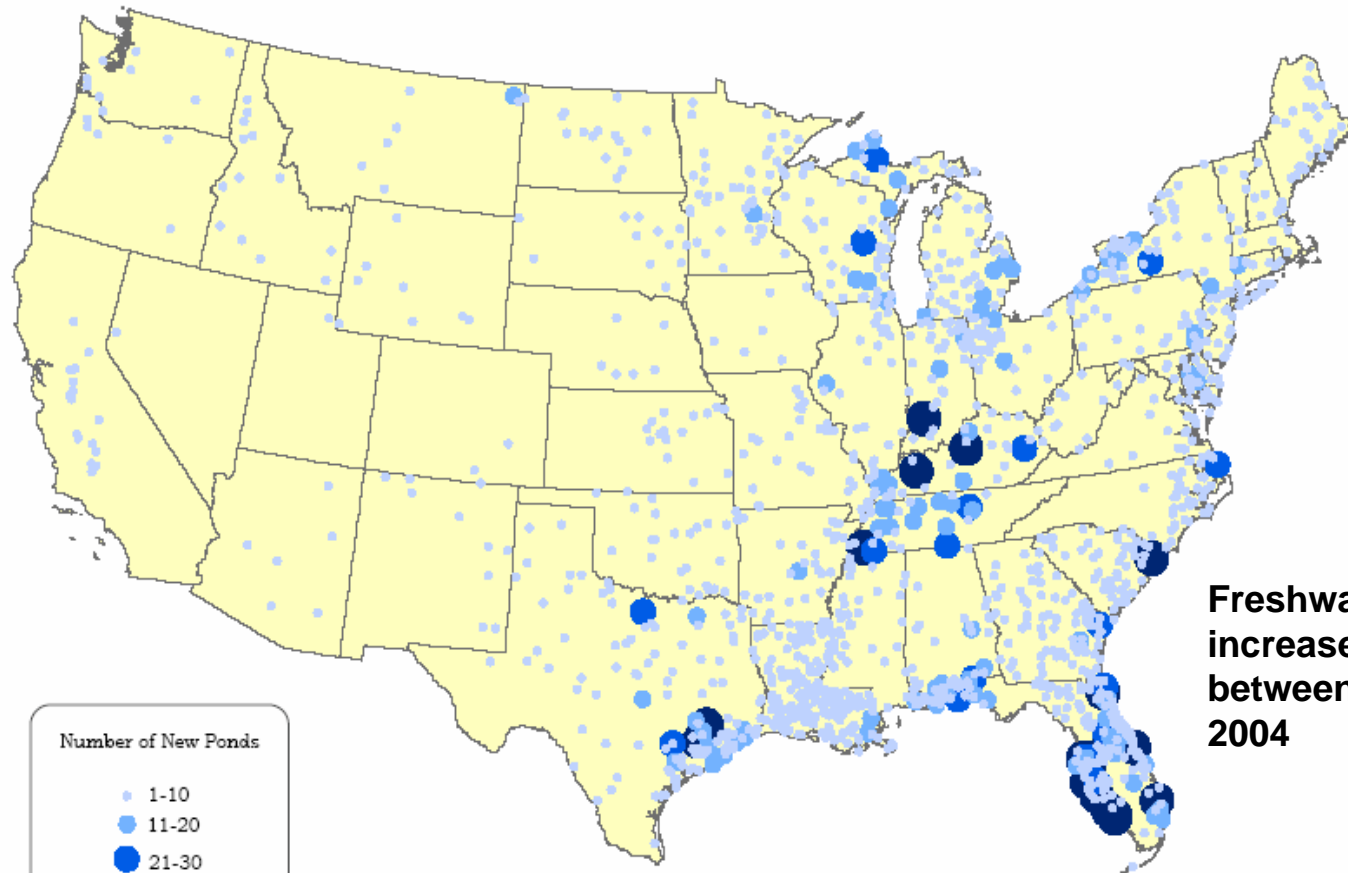
- Estimated 107.7 million acres of wetlands in the lower 48 States
- Estimated wetland gain of 191,750 acres between 1998 and 2004
- Gains were attributed to:
 - Creation of freshwater ponds
 - Restorations on idle and active agricultural lands
 - Restorations on conservation lands

Major Findings

Estimated rate of loss for freshwater vegetated wetland



Major Findings



Freshwater ponds increased 12 percent between 1998 and 2004





Working with EPA

- Develop a strategy to provide additional information or descriptors for freshwater ponds
- Search existing literature for information about ponds
- Test pond descriptive categories in pilot effort

Further Descriptors for Ponds

- Descriptive categories should provide additional information about pond characteristics and numbers
- Determination of wetland functional assessment is beyond the scope of the Service's Study
- Must consider the statistical design and retain sampling integrity
- Additional categories of ponds determined using remotely sensed data



FWS Wetlands Geodatabase

FWS Wetlands Mapper Home:

<http://wetlandsfws.er.usgs.gov>

FWS Wetlands WMS layers:

<http://wetlandswms.er.usgs.gov>

bergeson@usgs.gov

Questions?

