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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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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.

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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

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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

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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- Technology outdated

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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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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

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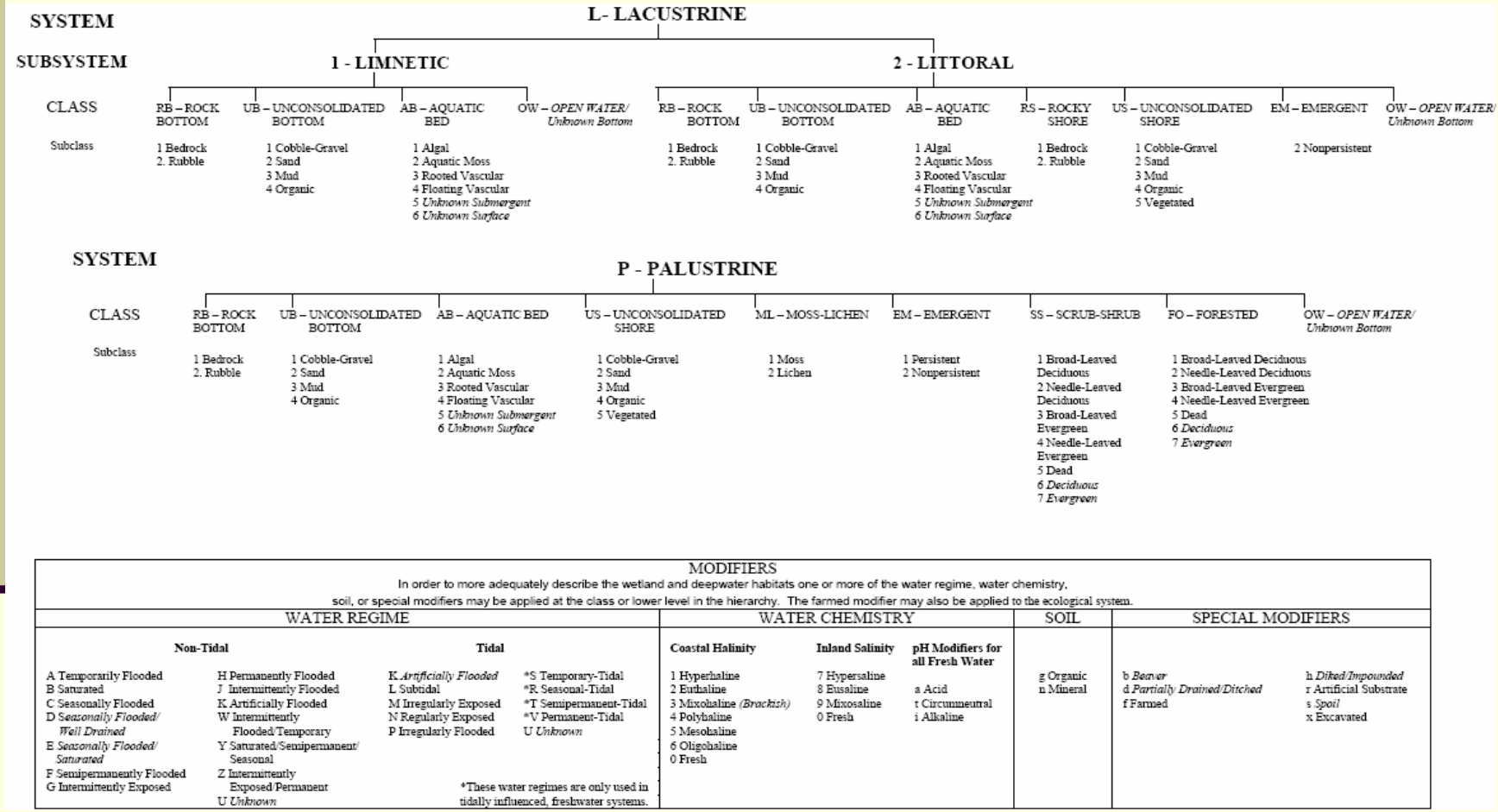
Cowardin Wetland Classification



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

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

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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

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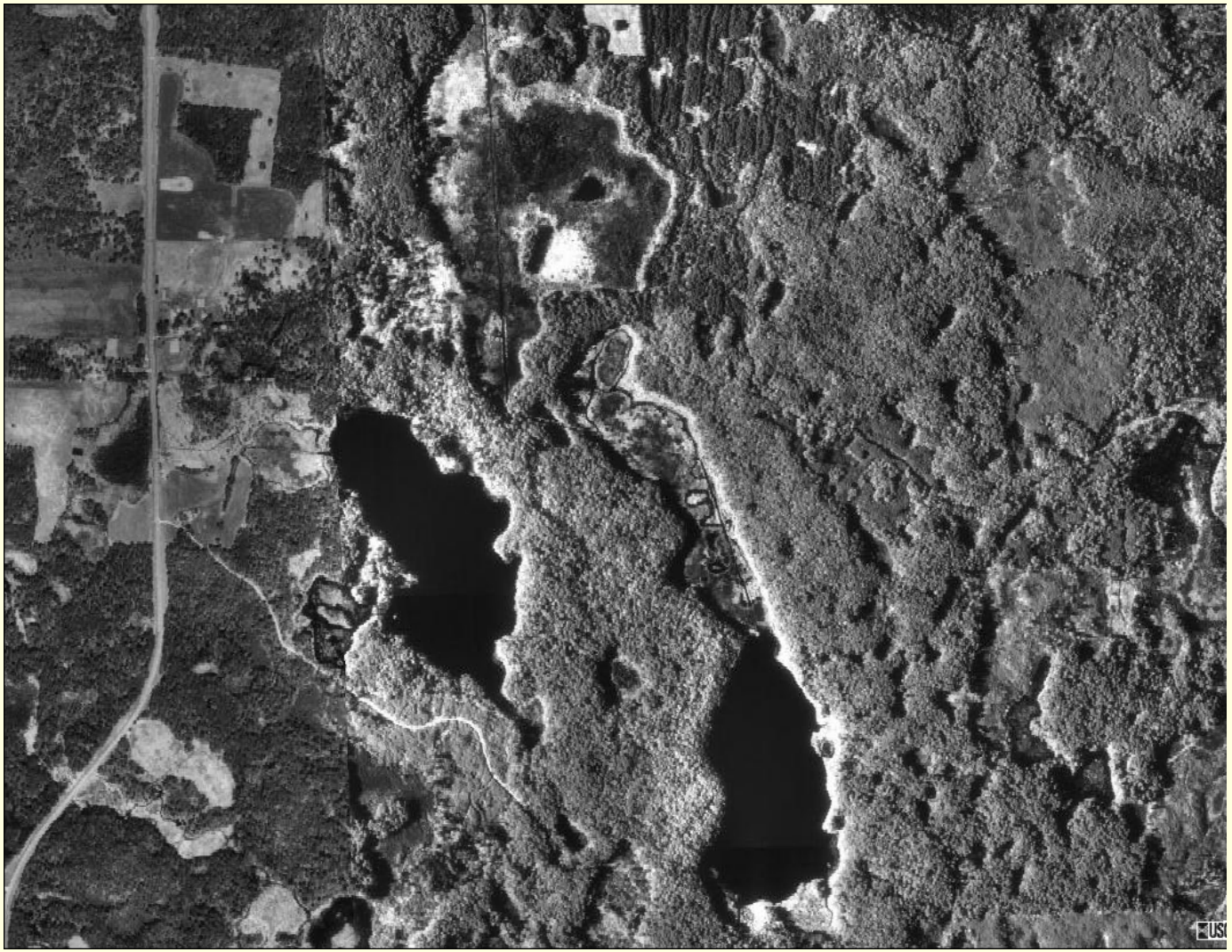
Northern Minnesota Lake - Imagery



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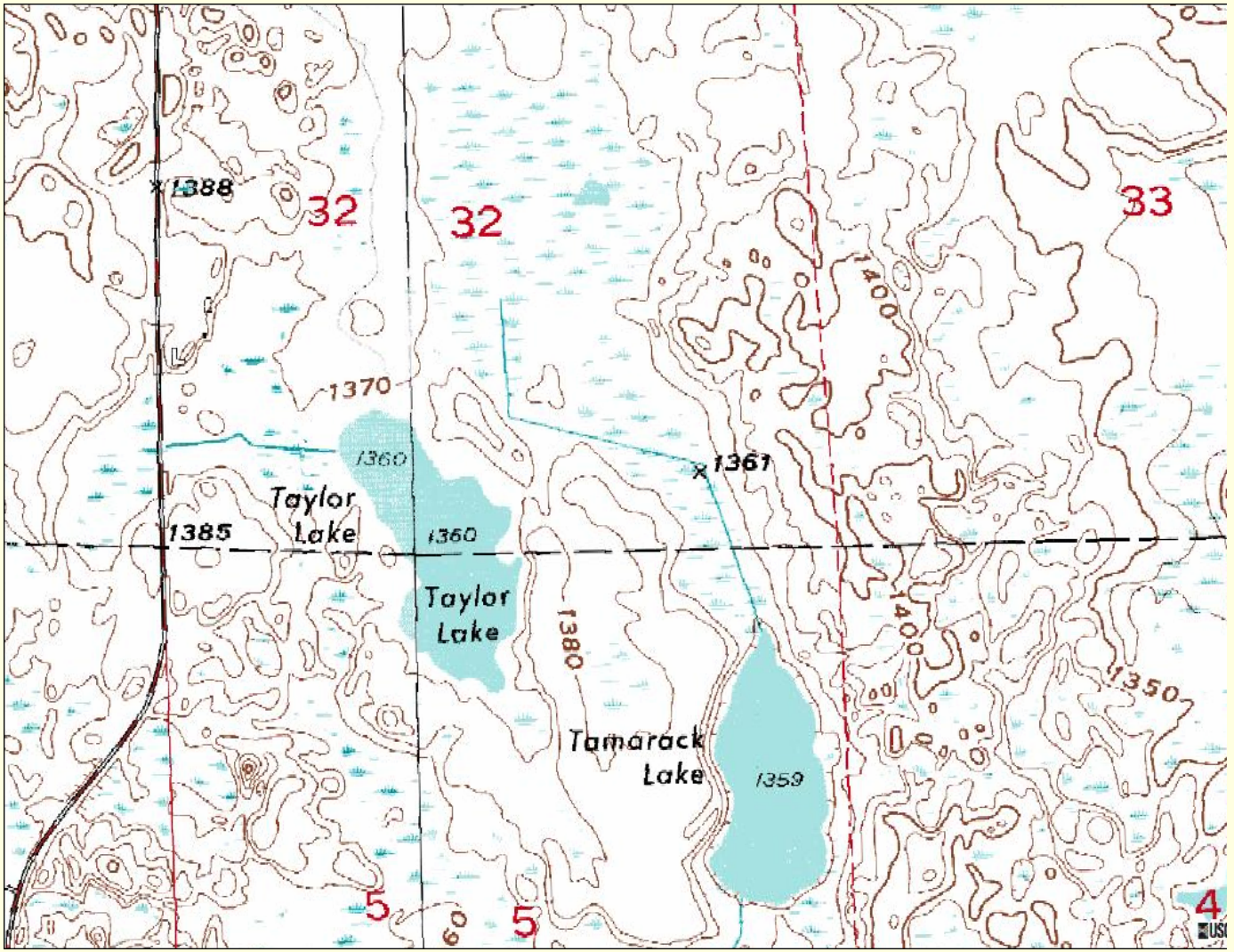
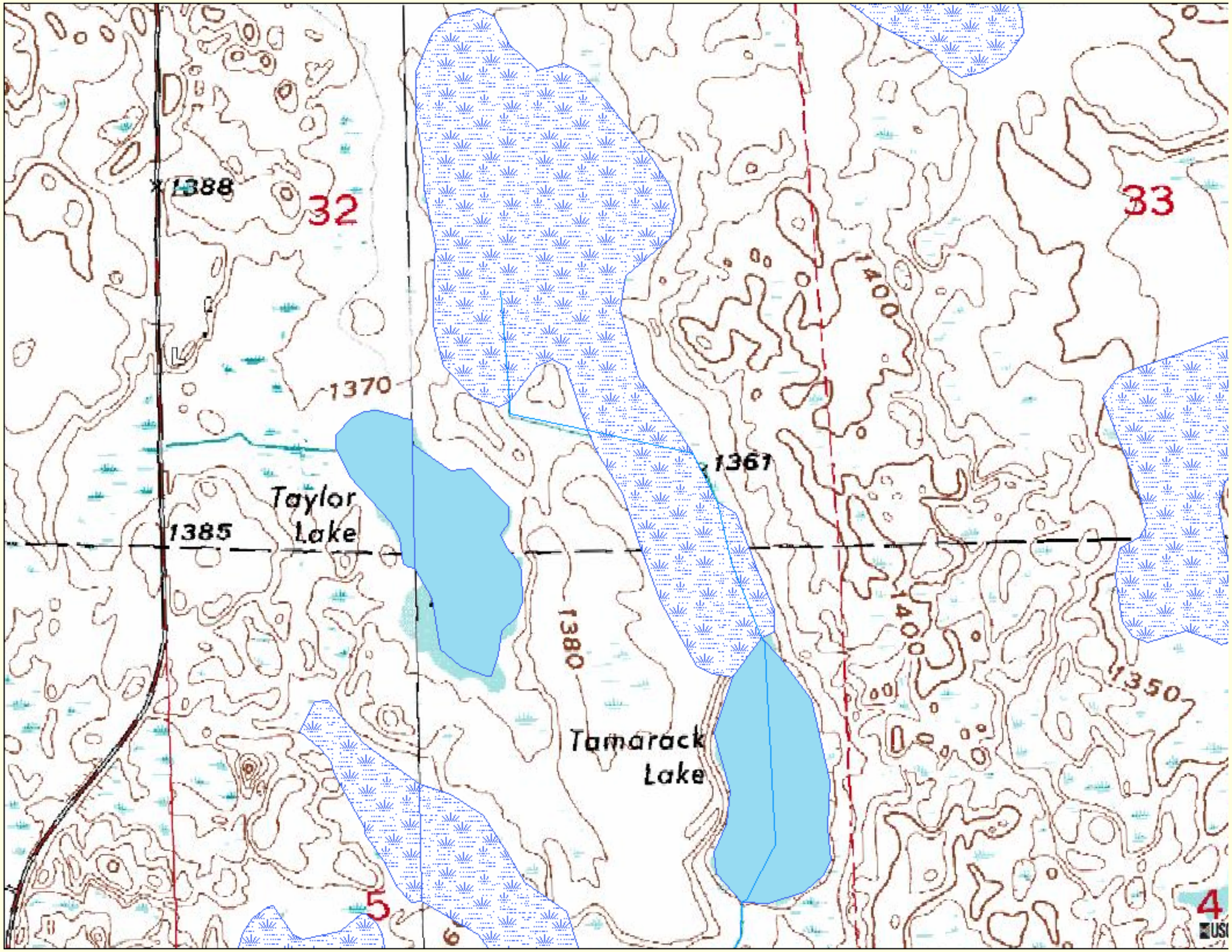
FWS Wetlands Mapping

Northern Minnesota Lake - Topographic Map



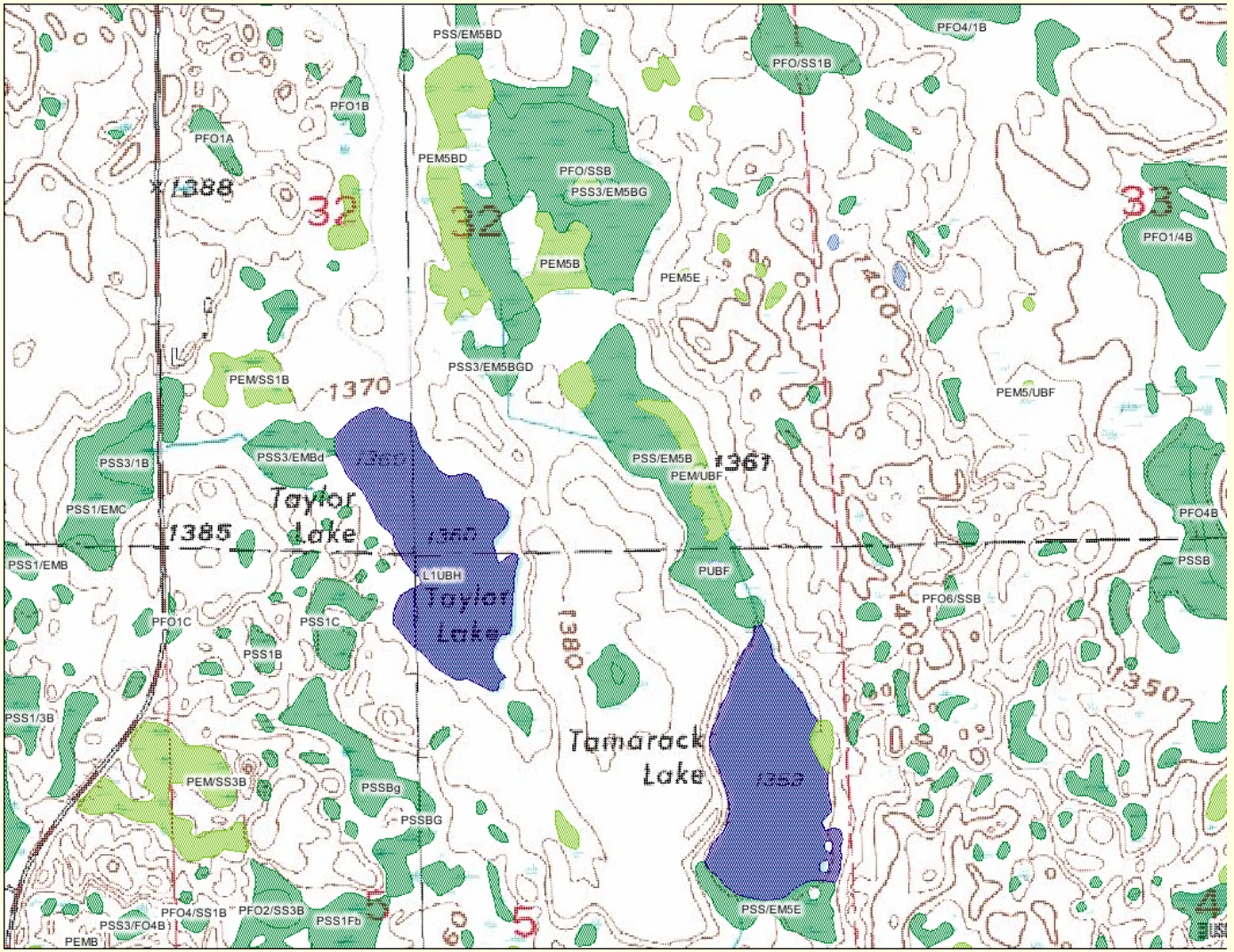
FWS Wetlands Mapping

Northern Minnesota Lake - Topographic Map and 100k NHD



FWS Wetlands Mapping

Northern Minnesota Lake - Wetland Polygons



FWS Wetlands Mapping

Gila River, New Mexico - Imagery

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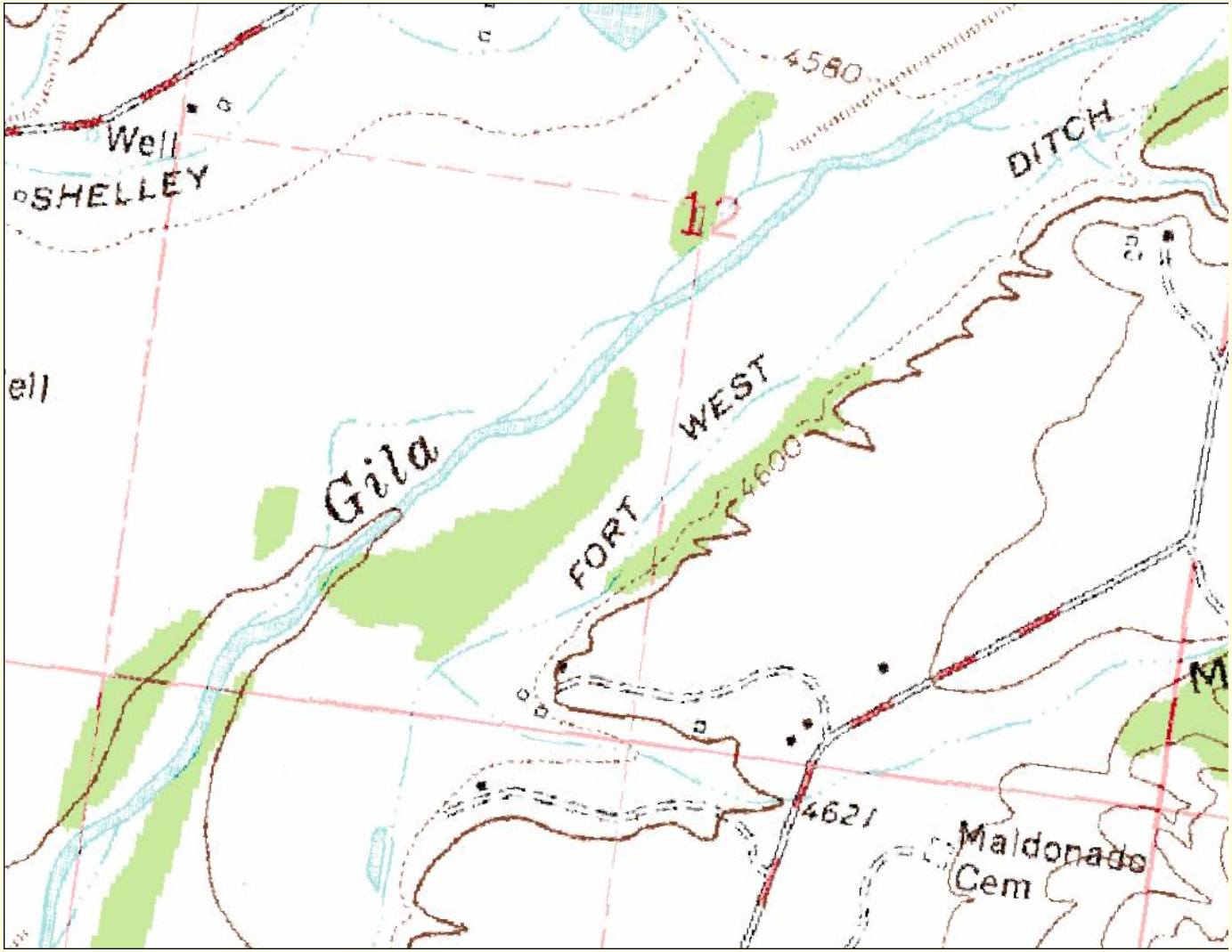
FWS Wetlands Mapping

Gila River, New Mexico - Topographic Map



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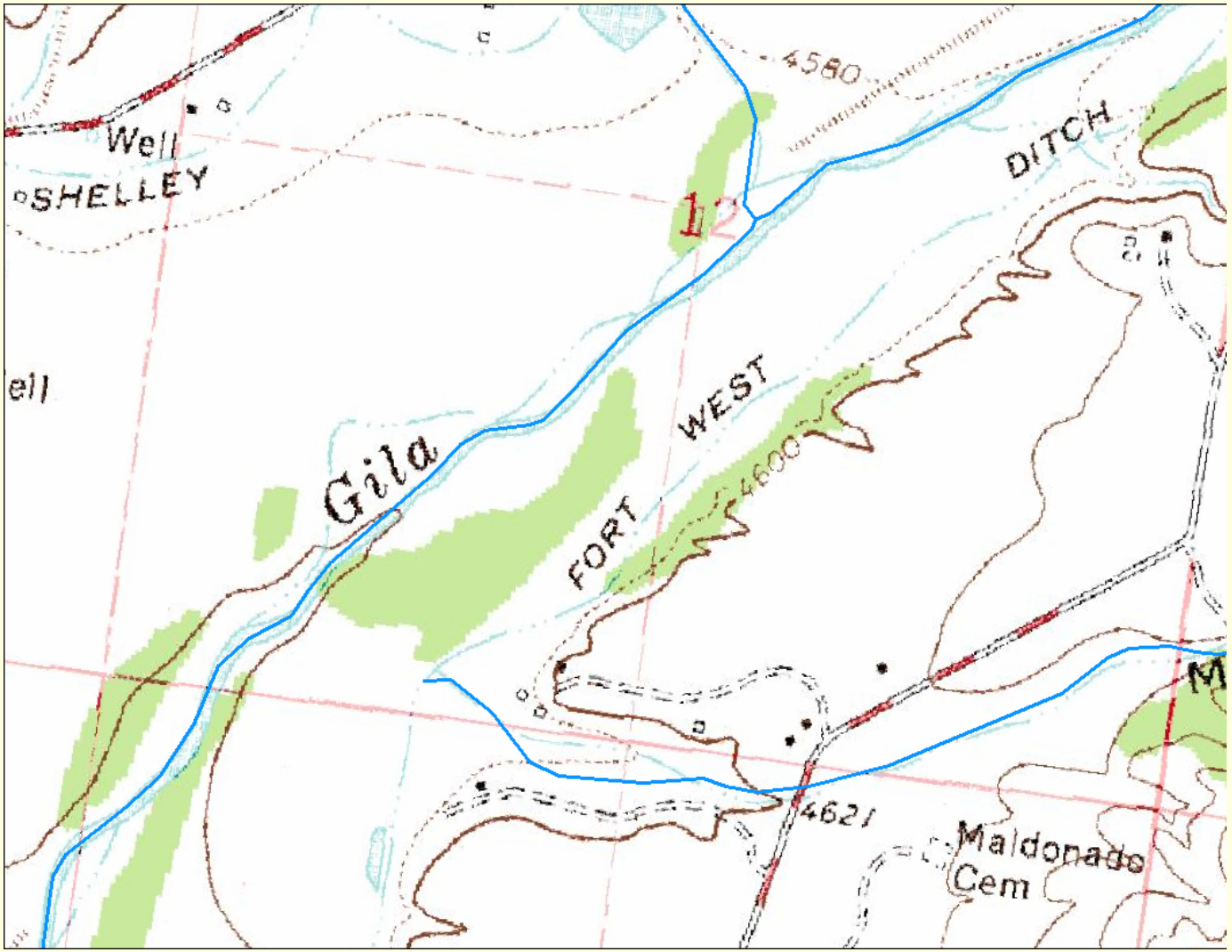
FWS Wetlands Mapping

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



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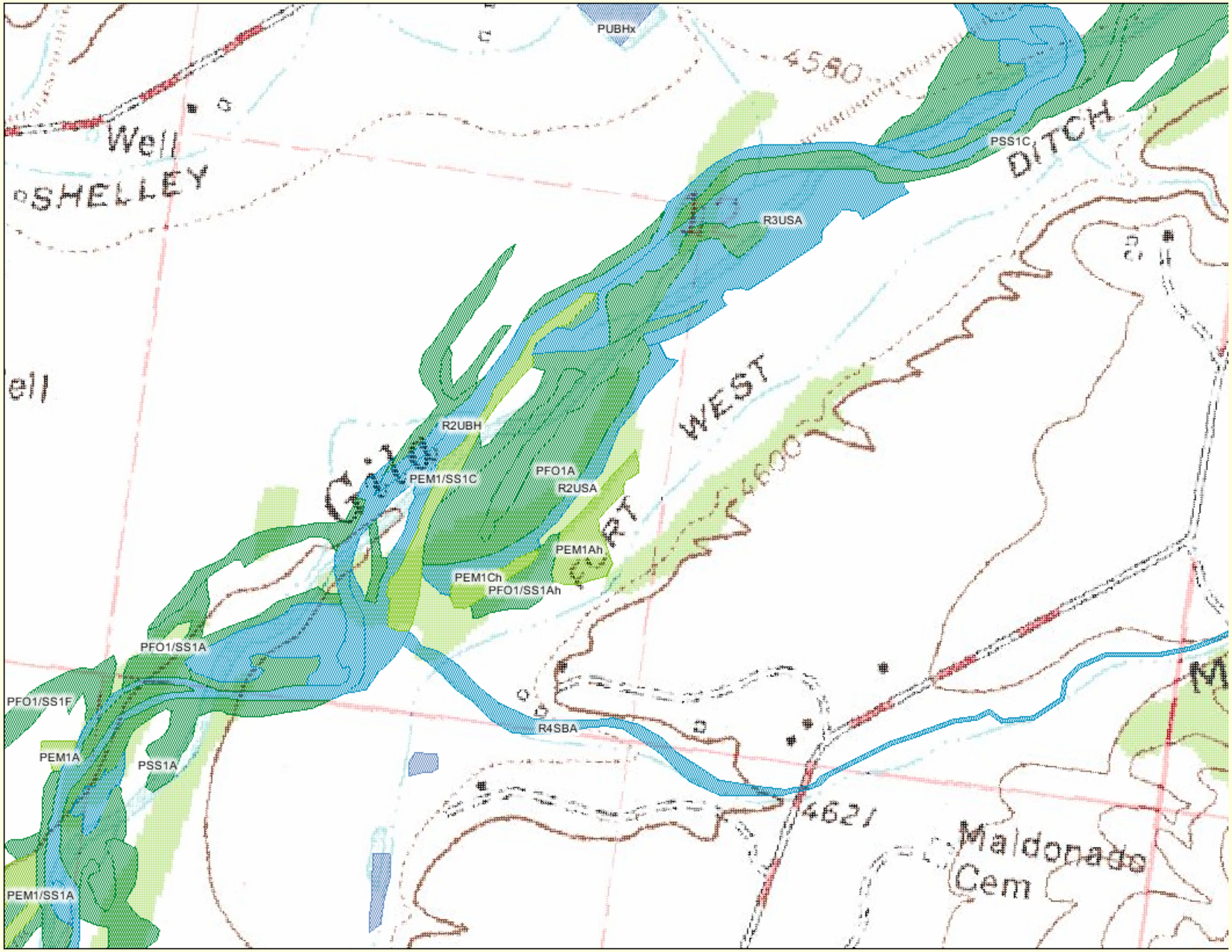
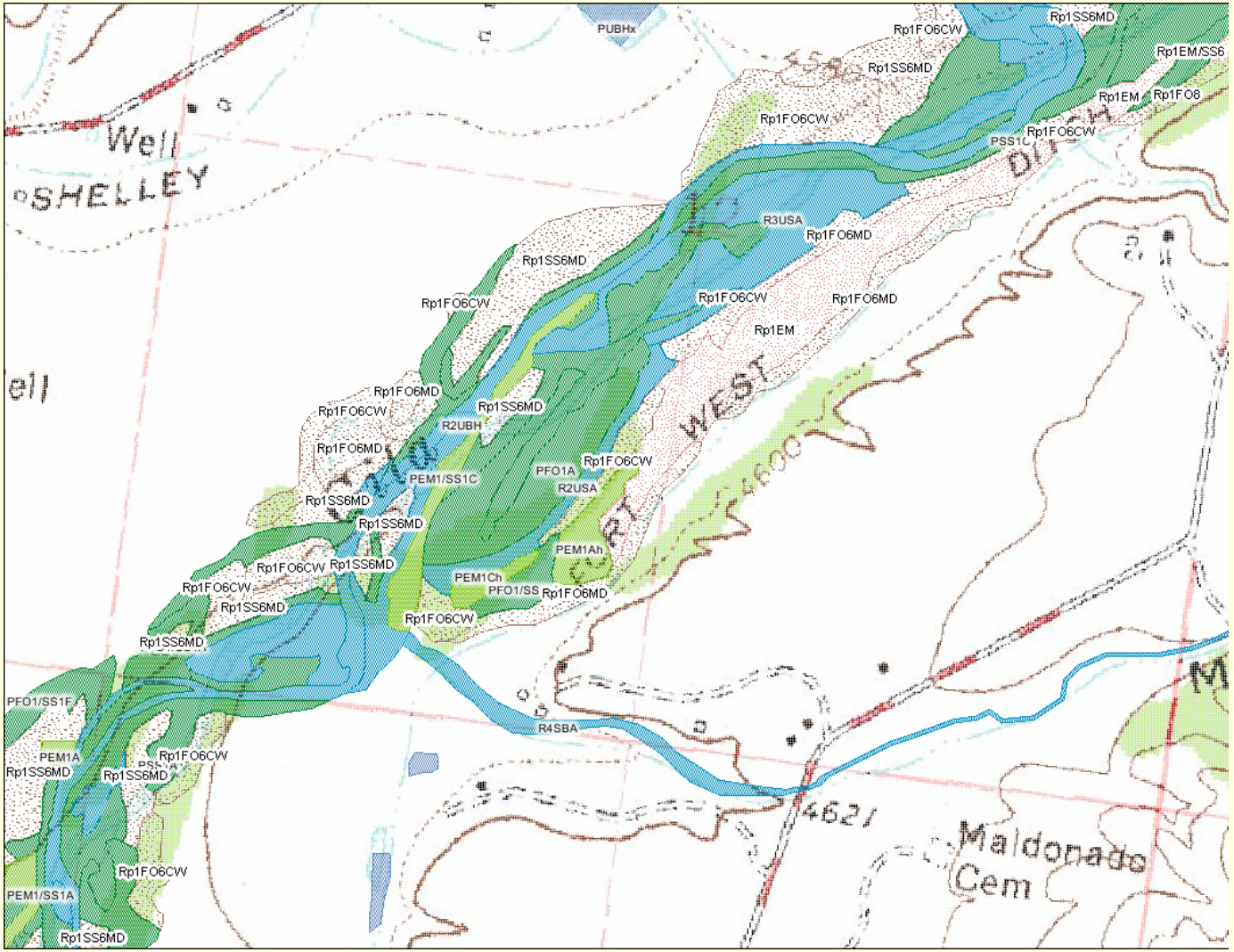
FWS Wetlands Mapping

Gila River, New Mexico - Wetland Polygons



FWS Wetlands Mapping

Gila River, New Mexico - Wetland and Riparian Polygons



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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

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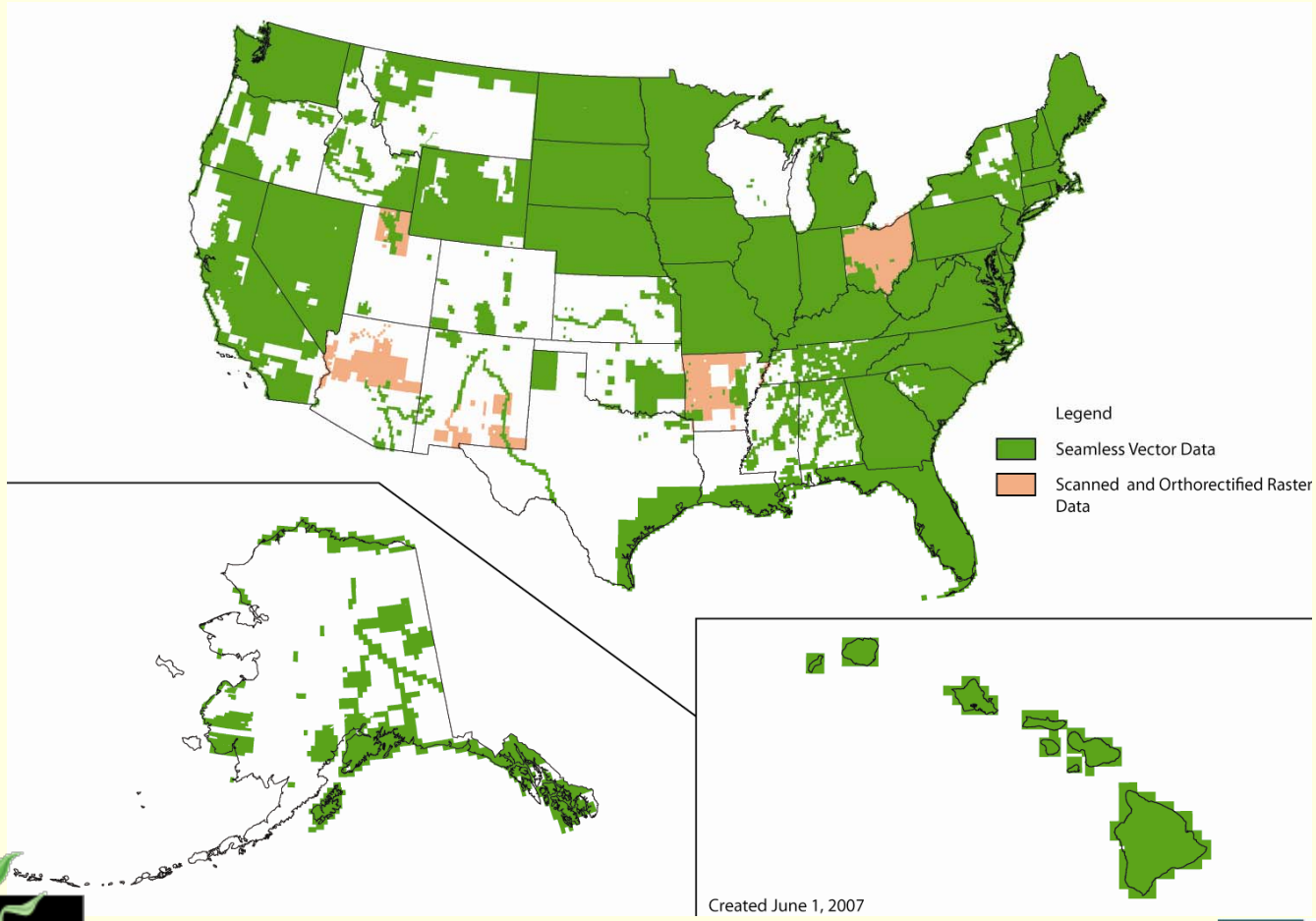
FWS Wetlands Data Status



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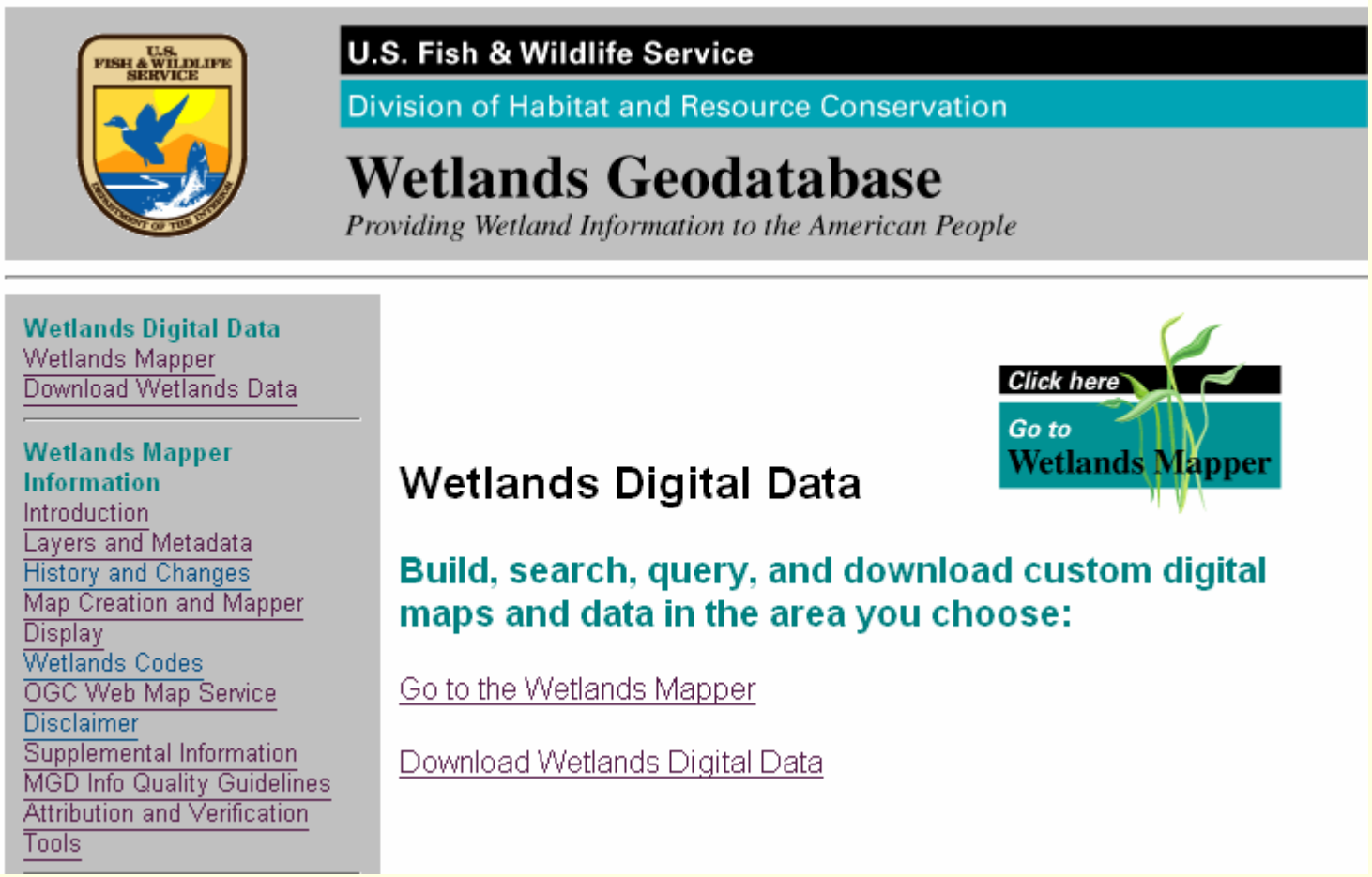
FWS Wetlands Mapper



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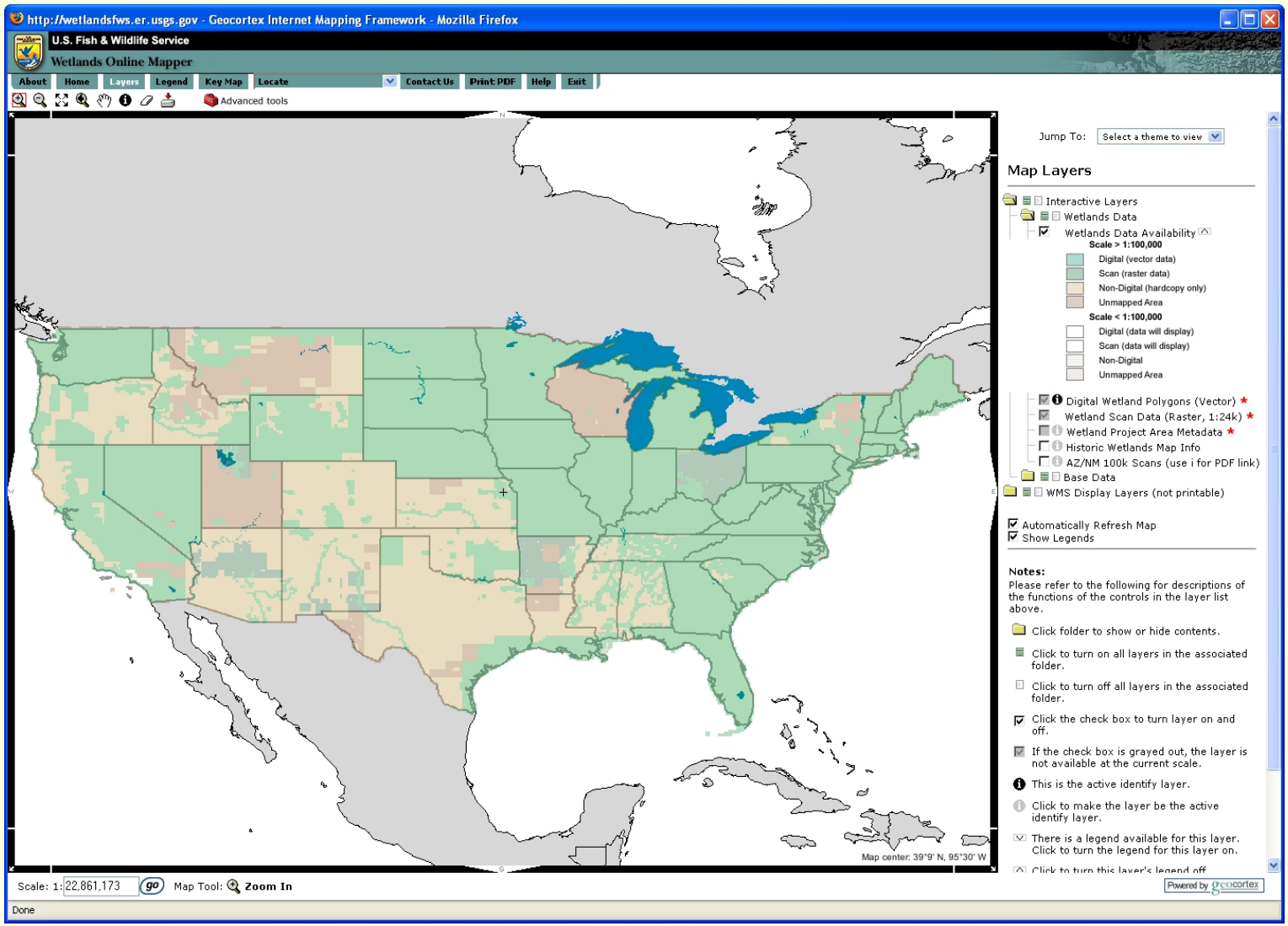

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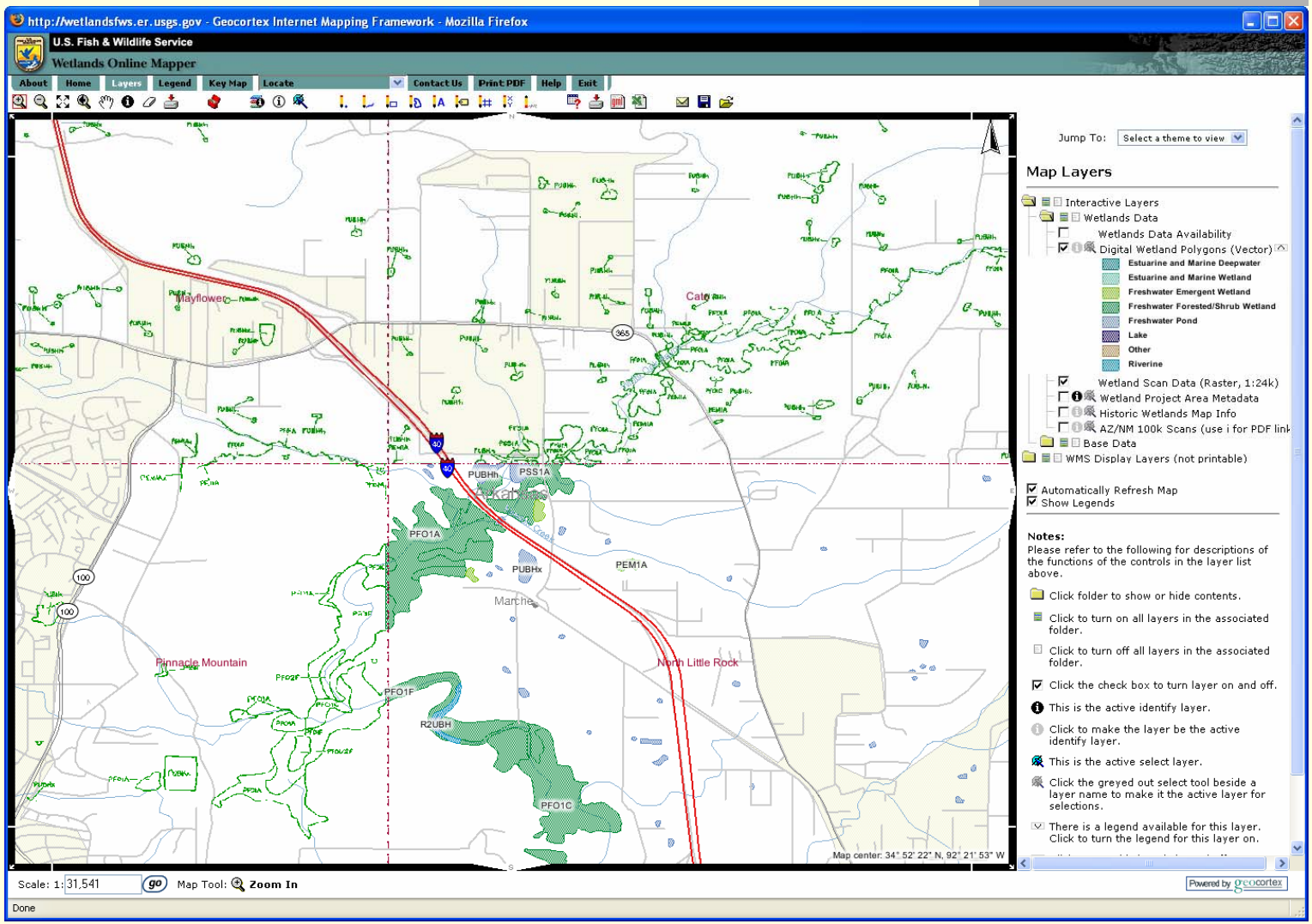
FWS Wetlands Mapper



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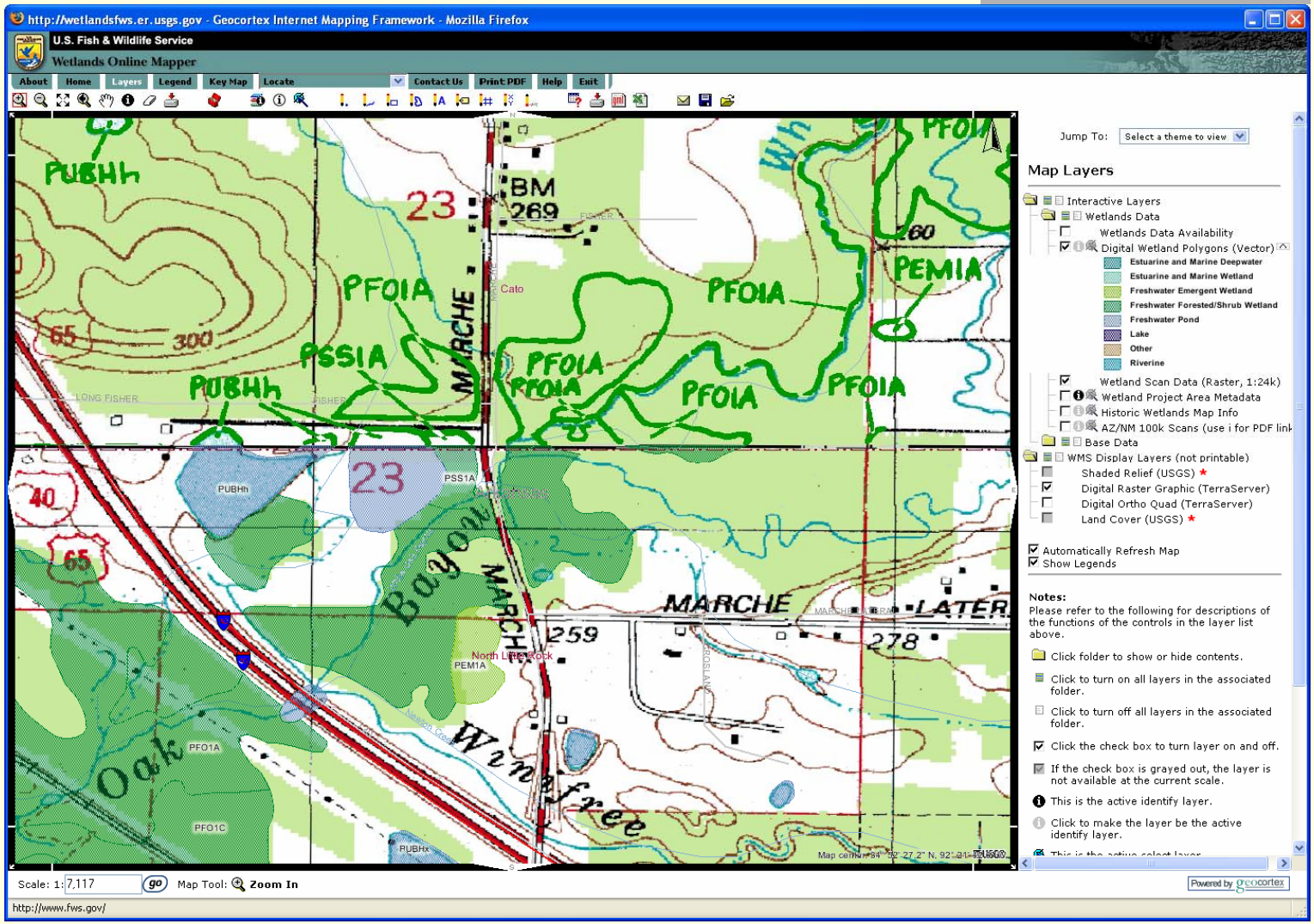

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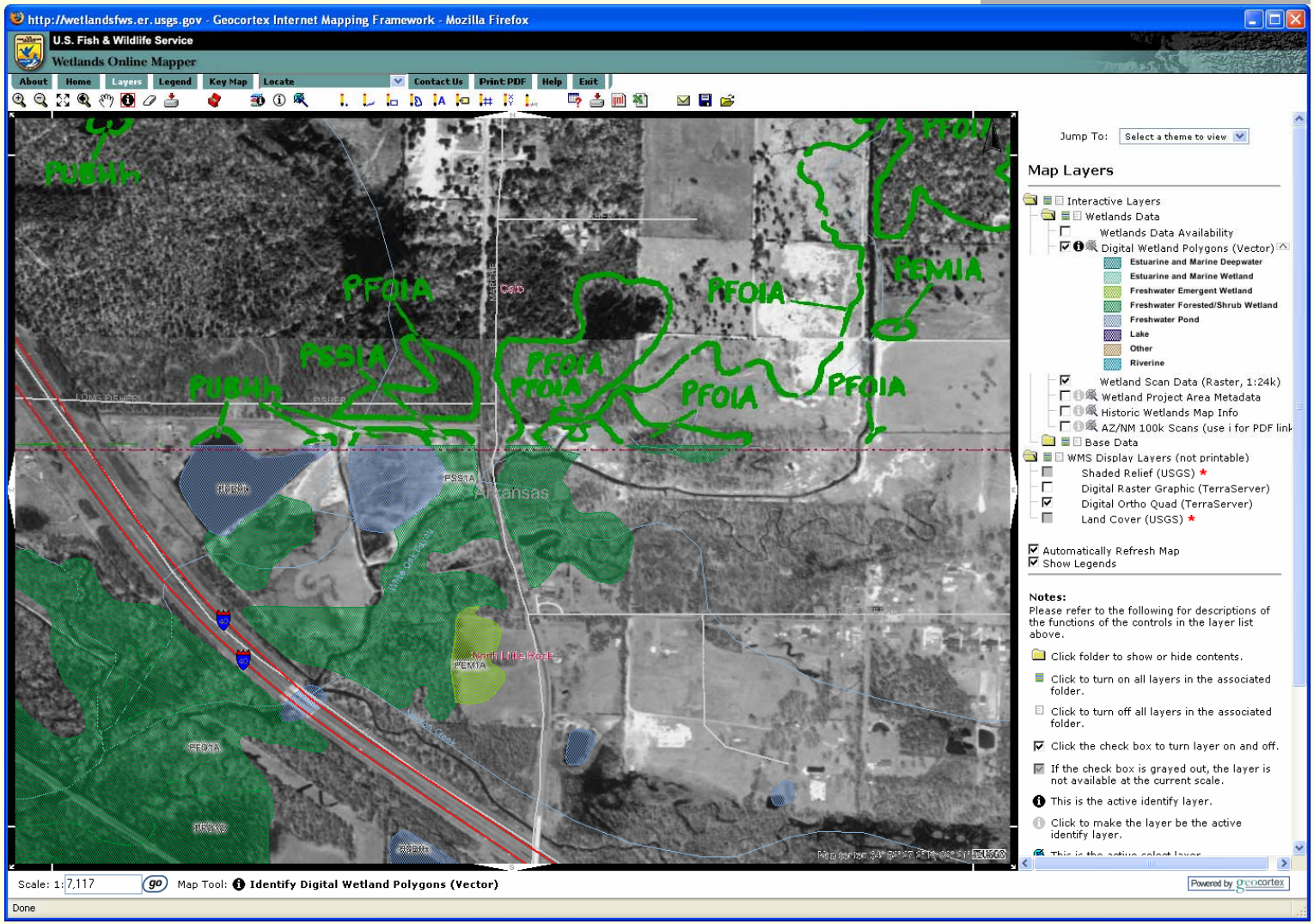

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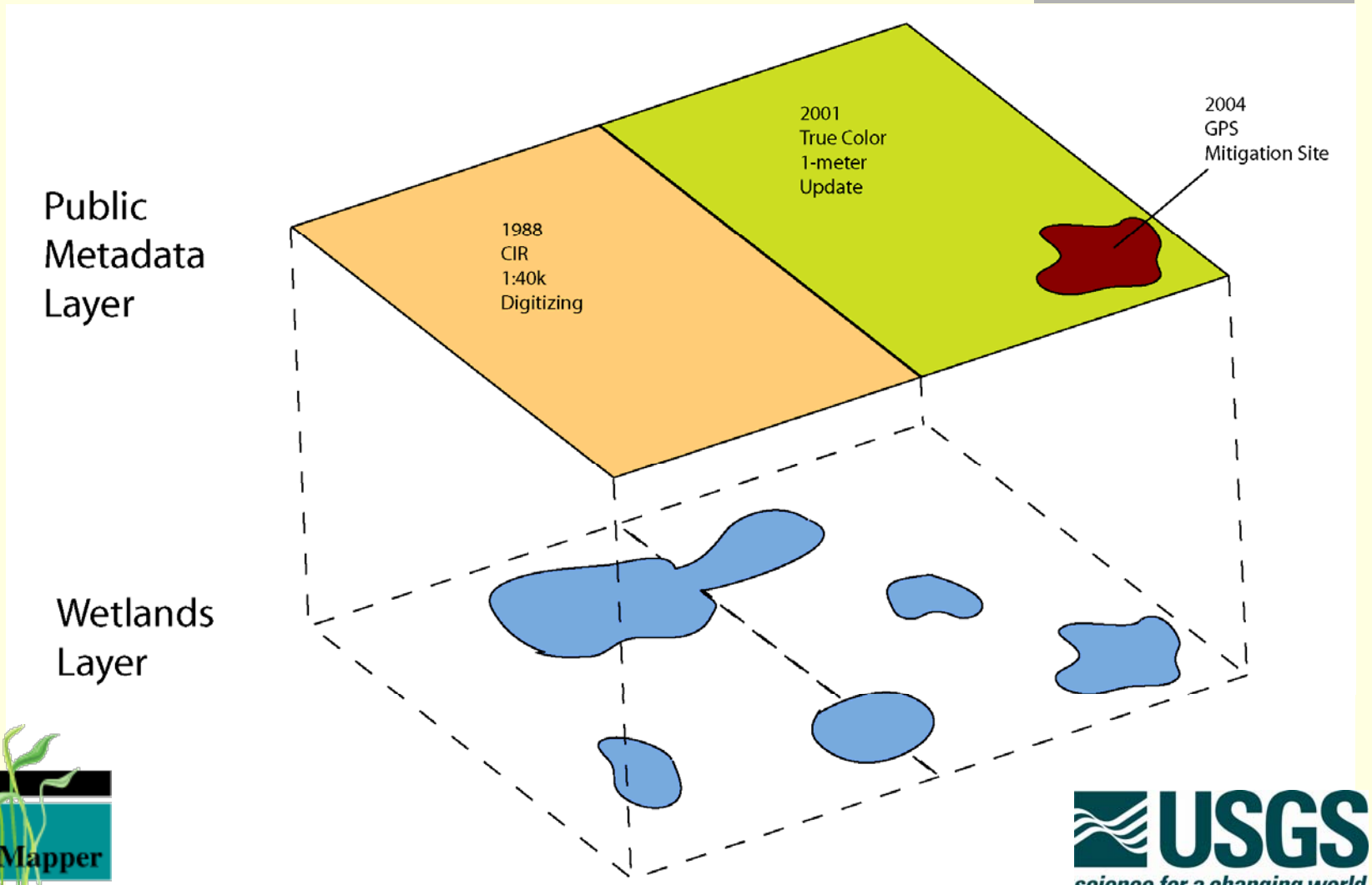
FWS Wetlands Metadata

Metadata 'Footprint' – Seamless Wetlands Data



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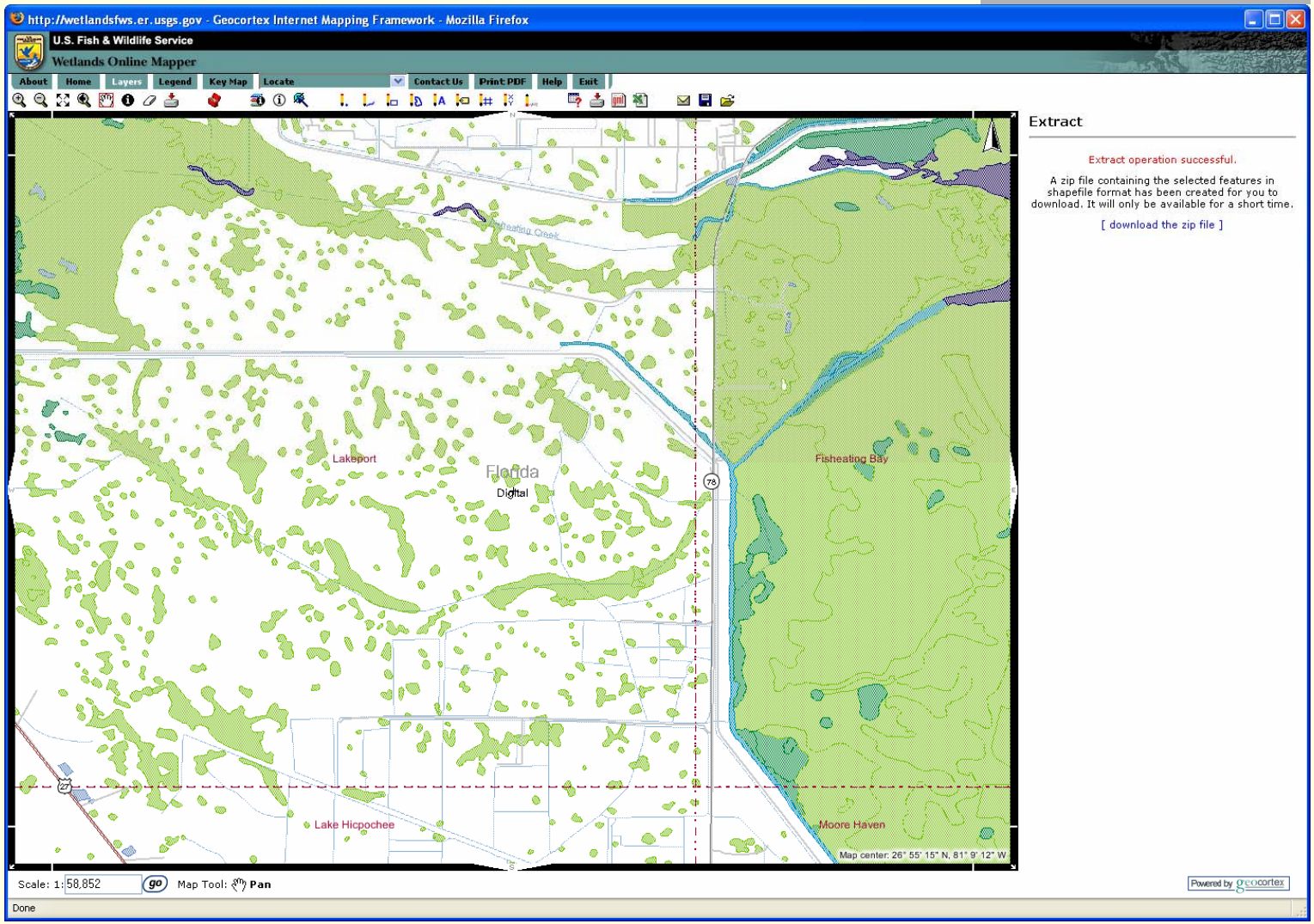
Wetlands Data Extraction



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Wetlands Data Extraction

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Mapper Statistics - FY07

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

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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

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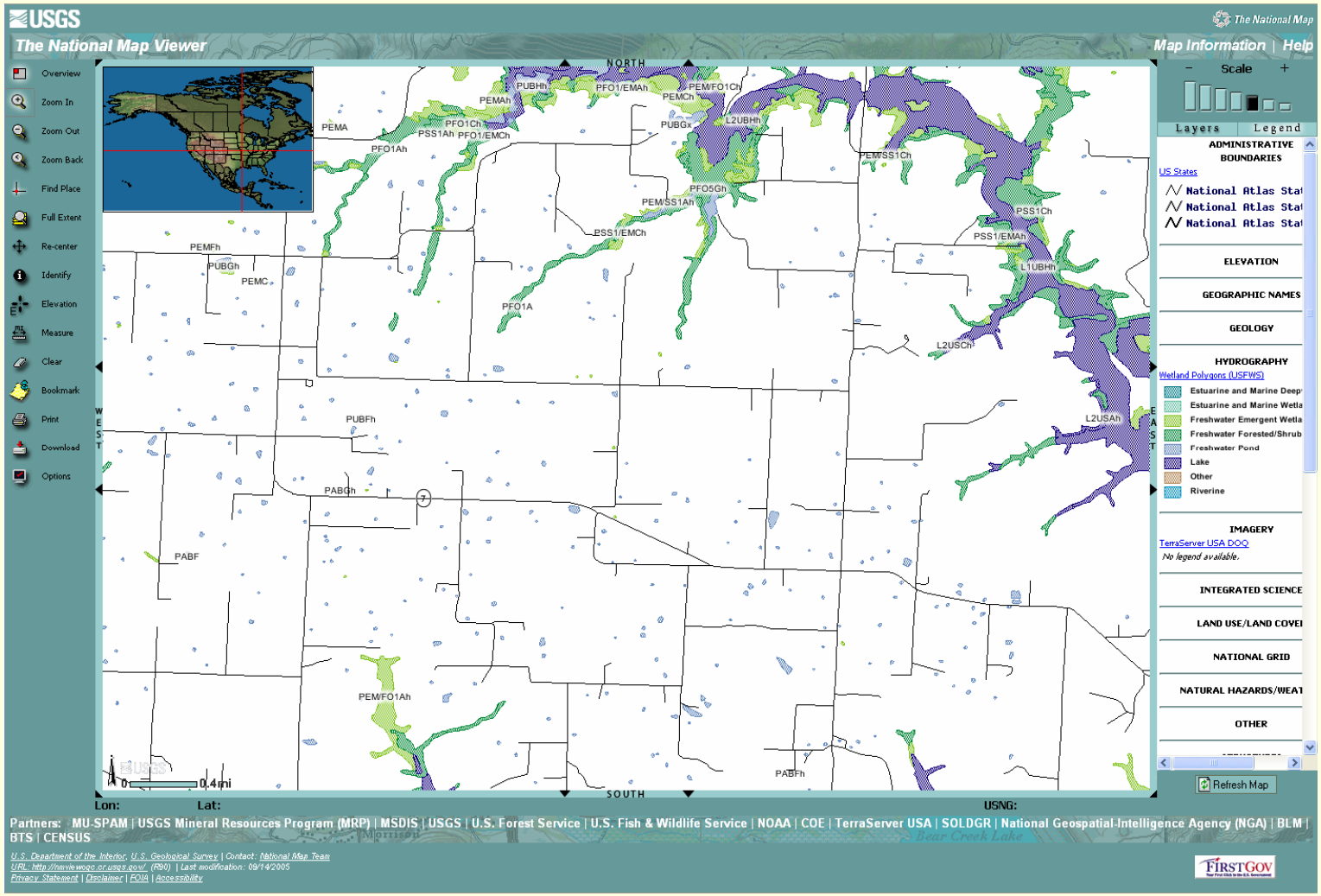
The National Map



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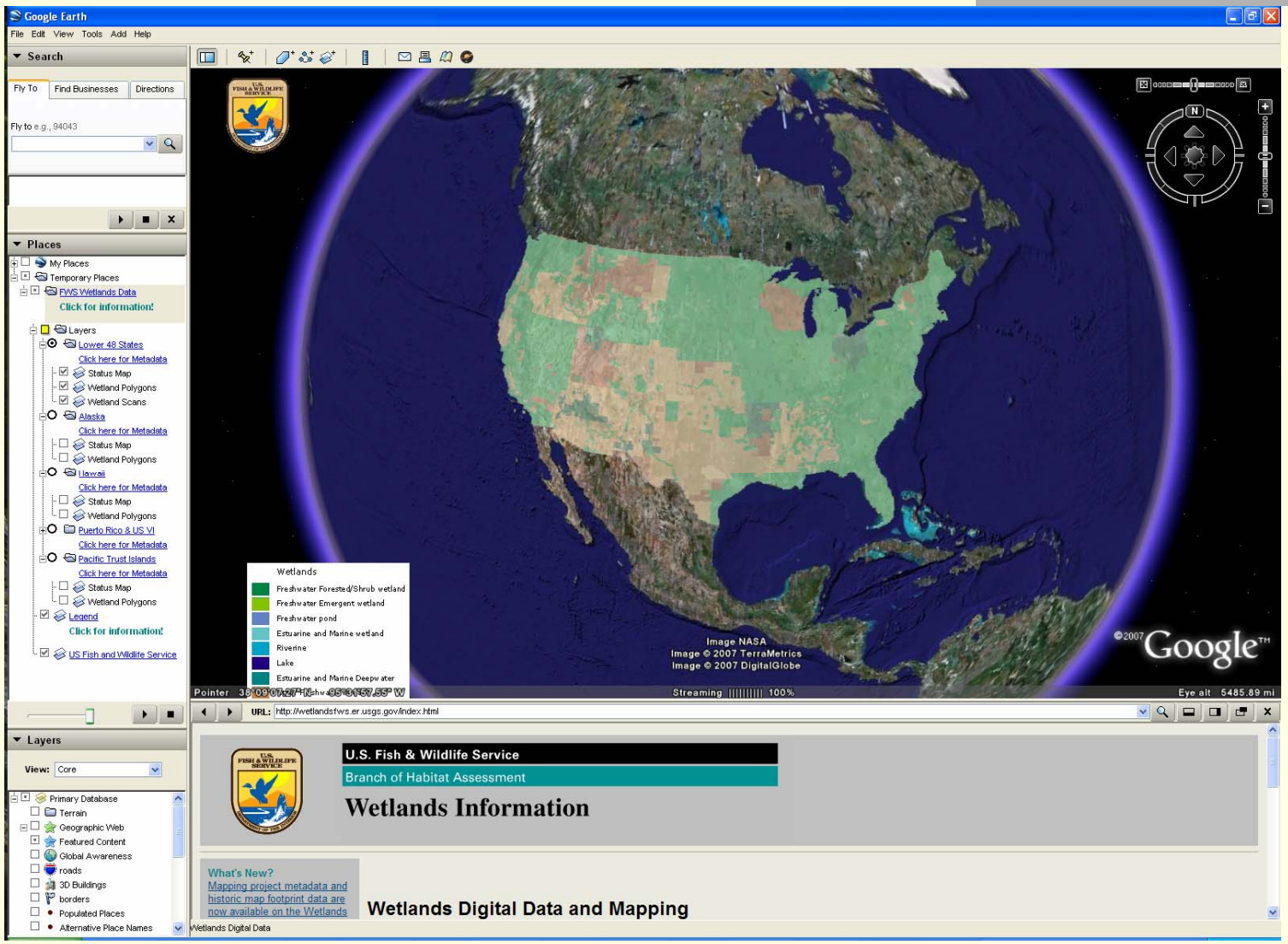
FWS Wetland KML Script



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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

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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

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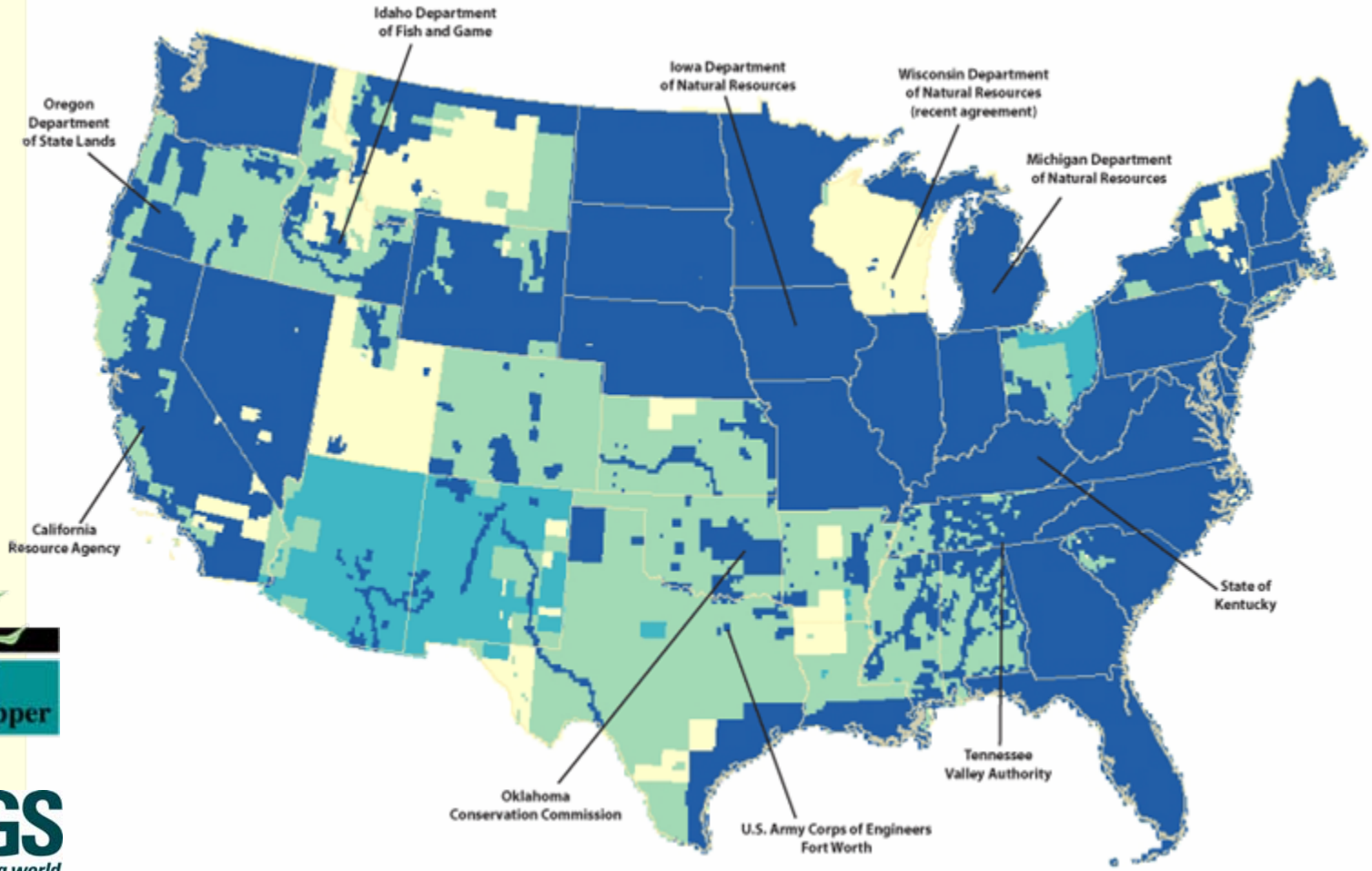
Wetland Data Contributors



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Wetland Data Contributors

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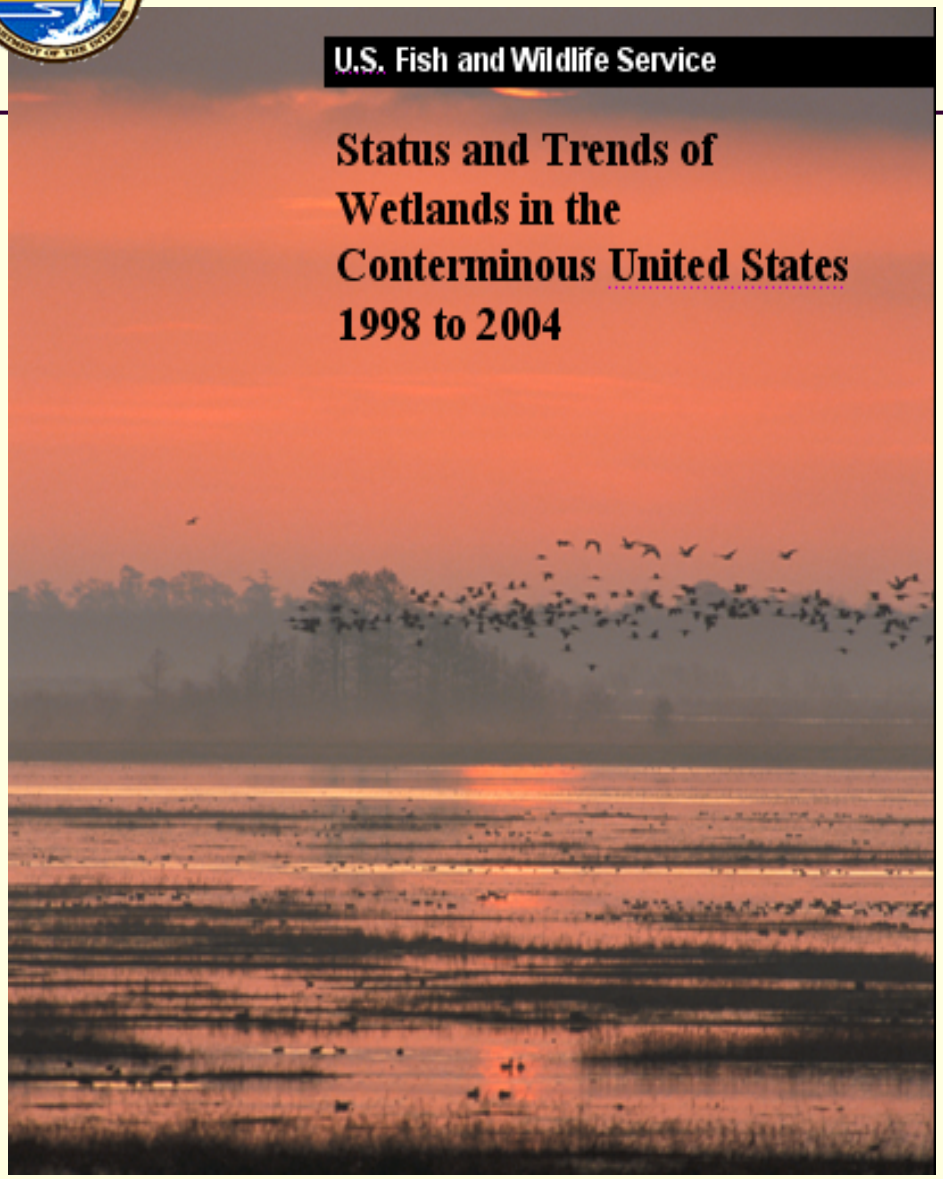
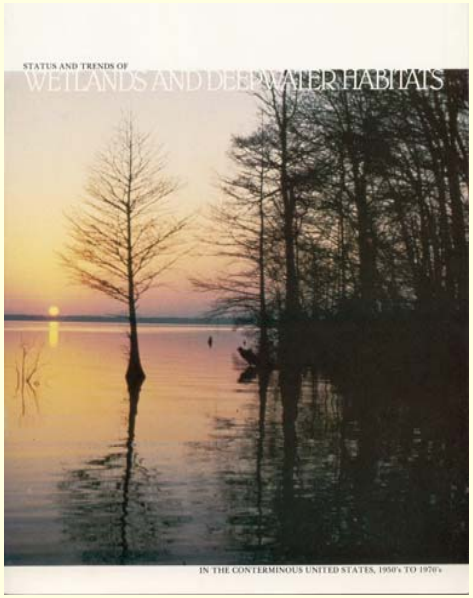
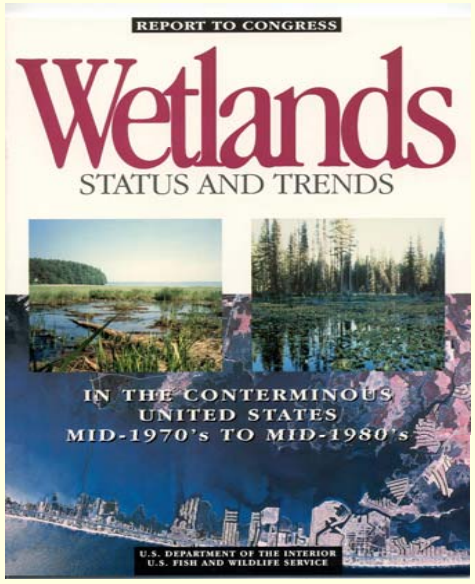
U.S. Fish and Wildlife Service

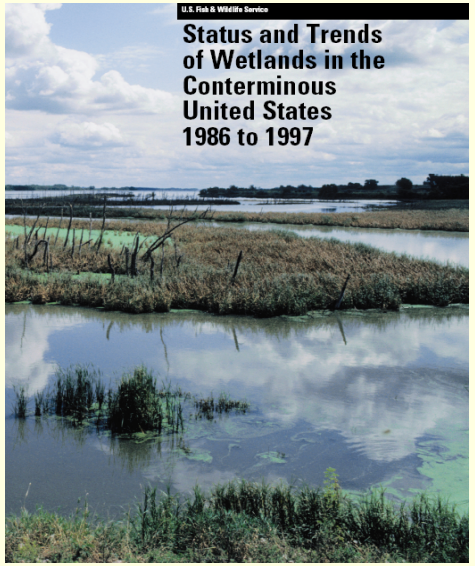


Introduction

- 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. Council on Environmental Quality

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

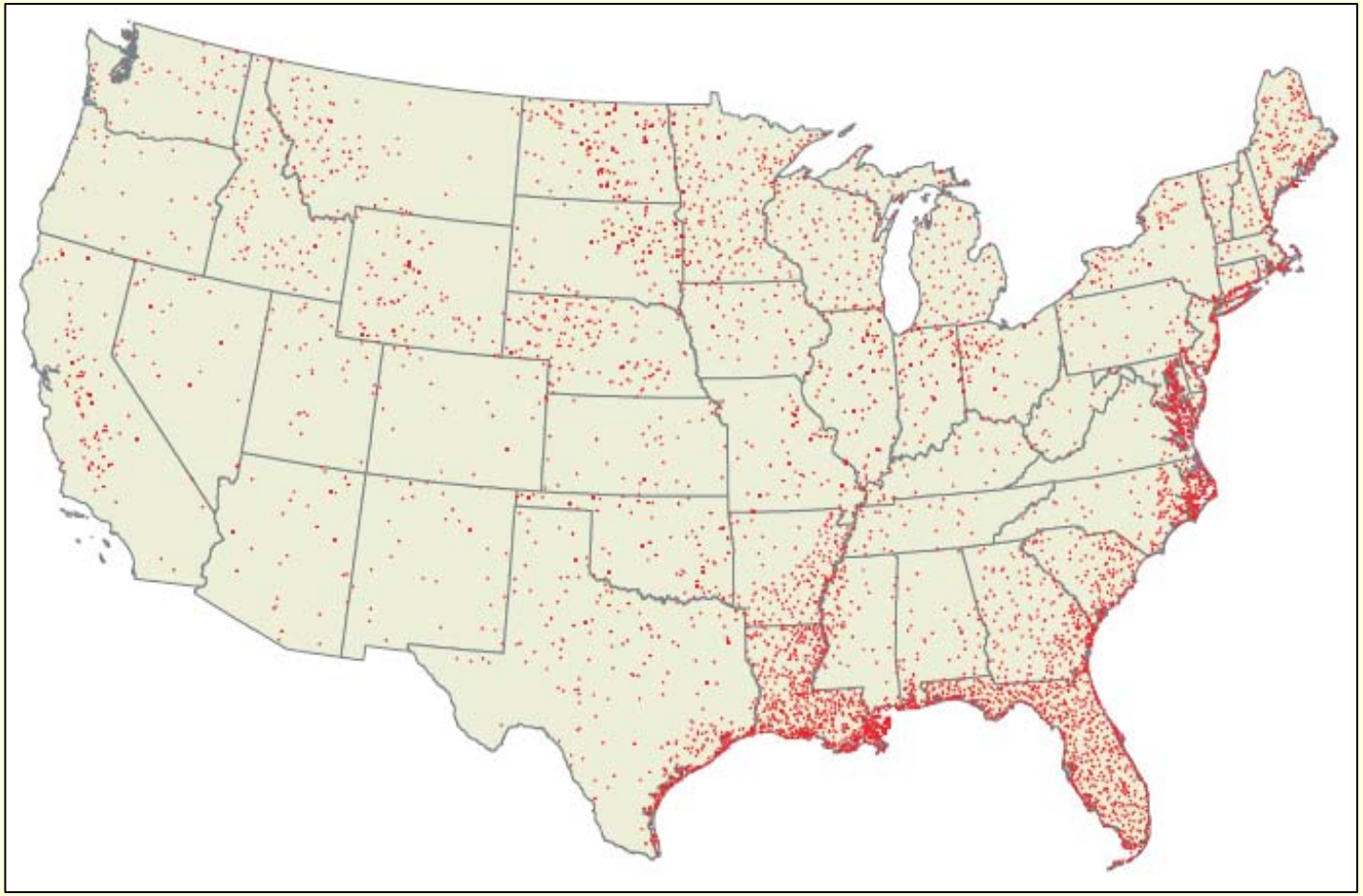
Wetlands Status and Trends: Key Study Elements

- 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

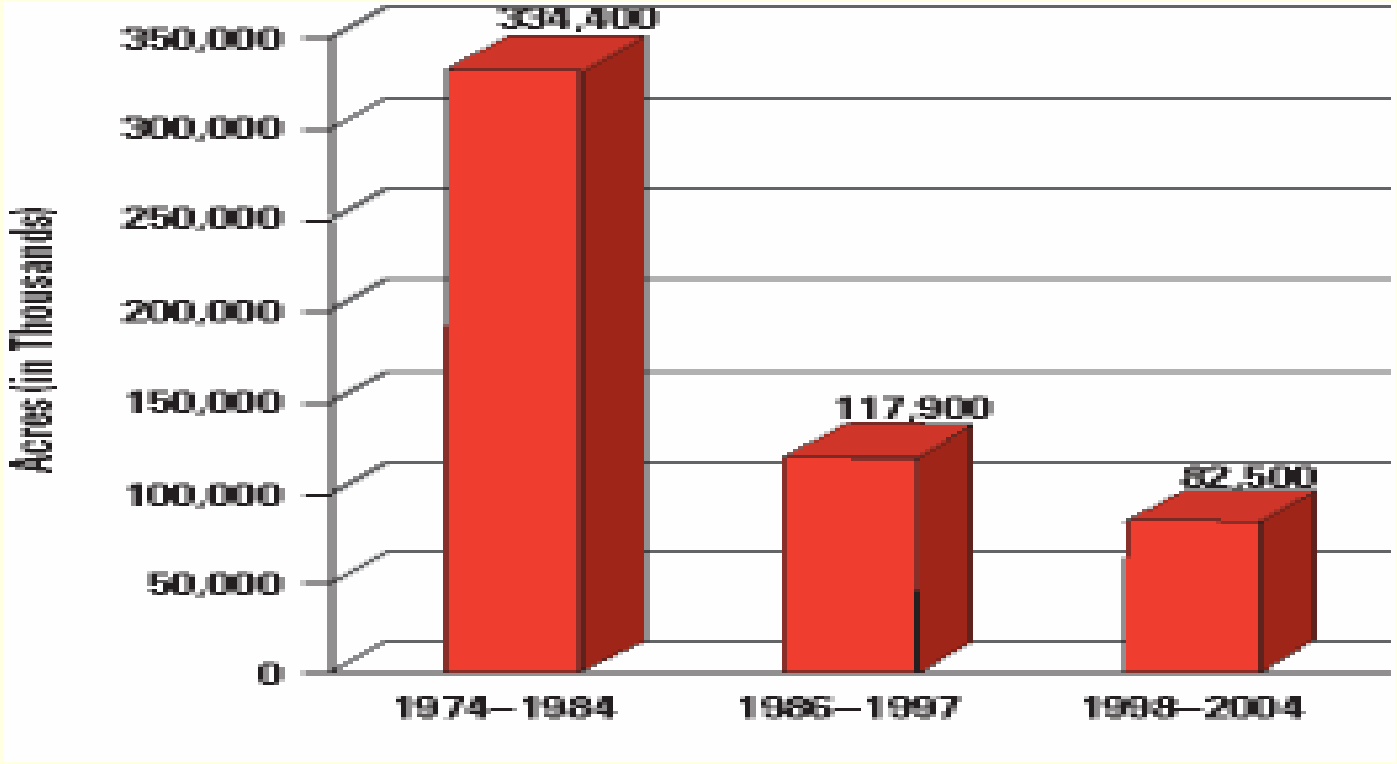


Major Findings (1998 -2004)

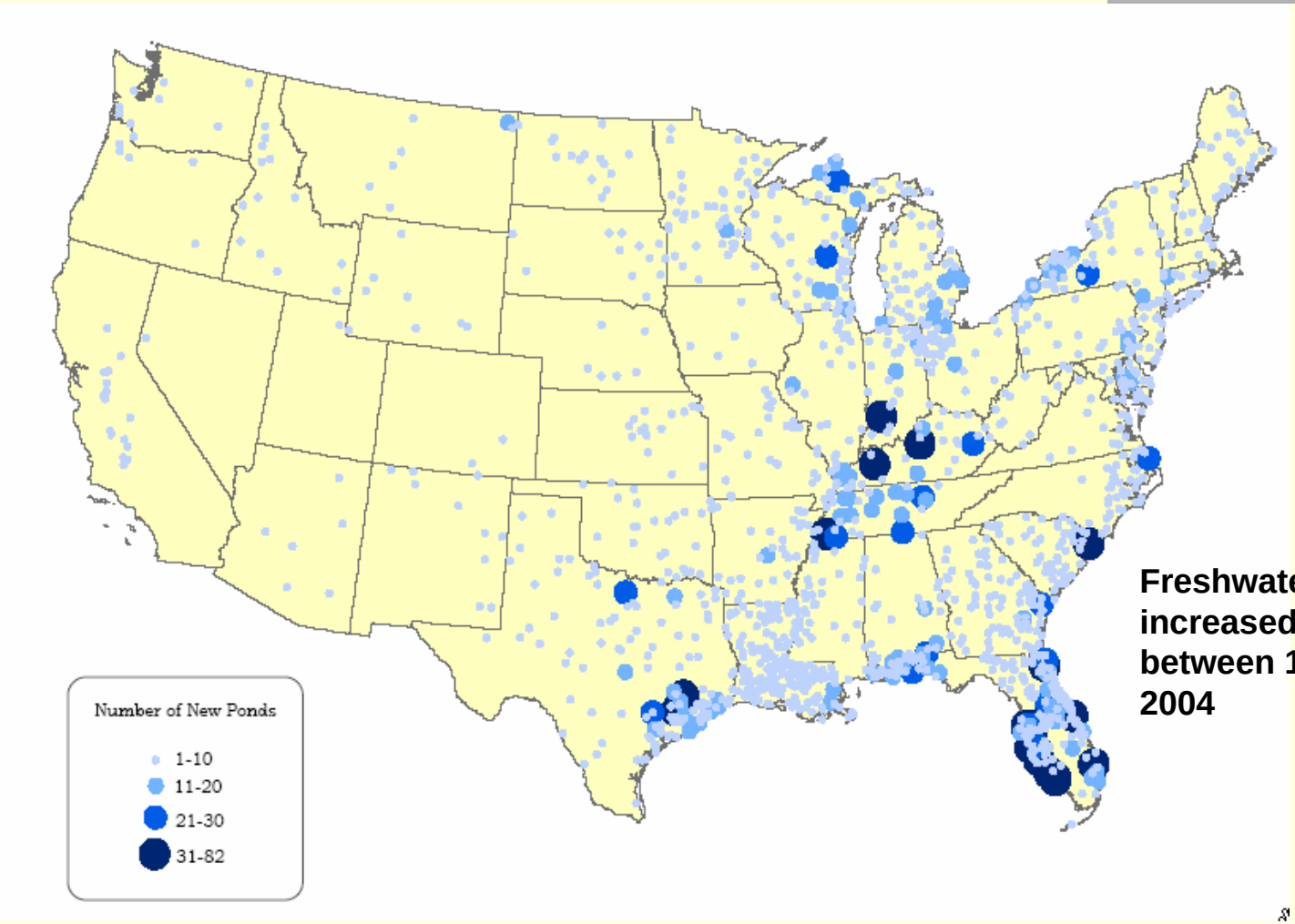
- Estimated 107.7 million acres of wetlands in the lower 48 States
- Estimated wetland gain of 191,750 acres between 1998 and 2004
- Gains were attributed to:
  - Creation of freshwater ponds
  - Restorations on idle and active agricultural lands
  - Restorations on conservation lands

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?

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