



U.S. Fish & Wildlife Service

# Geographically Isolated Wetlands: *A Preliminary Assessment of Their Characteristics and Status in Selected Areas of the United States*



*North Dakota Pothole*

## Background

Geographically isolated wetlands are vital fish and wildlife habitats that are also important to people. They may be the most vulnerable wetlands because they are surrounded by uplands, and adjacent land use practices often pose harm to them. Many people do not realize how important isolated wetlands are, or the proportion of the Nation's wetlands that they may represent. The Service prepared this report to provide a basic ecological and geographic introduction to the isolated wetland resources of the United States.

## About the Report

The Service compiled descriptions of 19 types of isolated wetlands and their functions. Maps with estimates of the number and acreage of isolated wetlands in a variety of physiographic settings across America are also presented in the report for 72 areas across the country.

This report does not address the regulation of wetlands, and the maps do not depict isolated wetlands for jurisdictional purposes.

## How are Isolated Wetlands Defined in the Report?

Isolated wetlands were defined by landscape position as "wetlands with no apparent surface water connection to perennial rivers and streams, estuaries, or the ocean." These geographically isolated wetlands were surrounded by dry land. Streamside wetlands where the stream disappeared underground or entered an isolated (no outflow) lake or pond (as in karst topography) were also classified as isolated. Wetlands along intermittent streams connected to perennial streams were designated as non-isolated.

## How are Isolated Wetlands Formed?

Regional differences in climate, physiography, hydrology, and other factors have led to the formation of a

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diverse assemblage of wetlands across the country. A number of distinct wetland types are typically isolated (e.g., playas, potholes, vernal pools, and wet dune swales), while others (e.g., Carolina bays and kettle-hole wetlands) may be either isolated or connected to streams and other surface waters (including adjacent wetlands).

Some wetlands on former floodplains (e.g., oxbow lakes) were once inundated by seasonal river flows but due to changes in river courses are now isolated. In other cases, the isolation of former floodplain wetlands has been caused by construction of levees to provide flood protection or by upstream dams that reduce flow regimes.

Other isolated wetlands have also been produced by human actions. Most of these are probably ponds built for a variety of reasons including aesthetic appreciation, livestock watering, irrigation, aquaculture, and stormwater management. Other isolated wetlands have been created by fragmentation from development, and now represent remnants of once larger wetland complexes.

## Profiles of Isolated Wetlands

The report highlights 19 types of isolated wetlands. Most of these wetlands occur in a specific region of the country, such as Prairie Pothole wetlands, playas, Rainwater Basin wetlands, Nebraska Sandhills wetlands, salt flat and salt lake wetlands, wetlands of Washington's Channeled

Scablands, desert spring wetlands, Delmarva potholes, Carolina Bay wetlands, pocosin wetlands, cypress domes, West Coast vernal pools, and Great Lakes alvar wetlands. A few are more widespread and occur in several regions where favorable environmental conditions exist, such as wetlands on former floodplains, woodland vernal pools, Coastal Plain ponds, and coastal zone dune swale and deflation plain wetlands.

### The GIS Analysis

To produce estimates of isolated wetlands in selected areas, the Service used geographic information system (GIS) technology. Two primary digital data sources were: 1) U.S. Fish and Wildlife Service's National Wetlands Inventory digital map data for wetlands, and 2) U.S. Geological Survey's digital line graphs for hydrology data (e.g., streams). These data were combined to link wetlands with watercourses.

Seventy-two study sites were evaluated in 44 States across the country. This analysis covered nearly 19,000 square miles. Study areas were located in all major U.S. watersheds and in more than 20 ecoregions. These areas offered a broad view of the extent of isolated wetlands across the country. The analysis did not produce estimates of isolated wetlands at national, regional, or state levels.

### GIS Analysis Results- Extent of Isolated Wetlands in Selected Areas

Geographically isolated wetlands appeared to be most extensive and abundant in the subhumid to arid regions of the country where mean annual precipitation is less than 24 inches (U.S. Geological Survey 1970) and in Florida's karst topography, with few exceptions.

Eight of the study areas had more than half of their wetland acreage designated as isolated: 1) Four Mile Flat, Nevada (salt flat wetlands), 2) Lincoln County, Washington (Channeled Scablands wetlands), 3) Tahoka, Texas (playa wetlands), 4) Tokio, Texas (playa wetlands), 5) Bluffton, Indiana (mostly forested wetlands), 6) Black Thunder, Wyoming (emergent wetlands), 7) Clark, South Dakota (prairie pothole wetlands), and 8) Rainwater Basin, Nebraska (Rainwater Basin wetlands).

All of these sites except Bluffton had nearly 80 percent or more of their wetland acreage classified as isolated. Fourteen other areas had from 25-50 percent of their acreage identified as isolated. Only 19 of the 72 sites (or 26%) had less than 10 percent of their wetland acreage isolated. From a numeric standpoint (i.e., number of wetlands), all study areas except Green River (Utah) had more than 20 percent of their wetlands designated as isolated.

Over 50 sites had more than 50 percent of their wetlands isolated. For most areas, isolated wetlands tended to be smaller than the non-isolated wetlands; hence they represented a higher proportion of the total number of wetlands than they did in regard to the total wetland acreage.

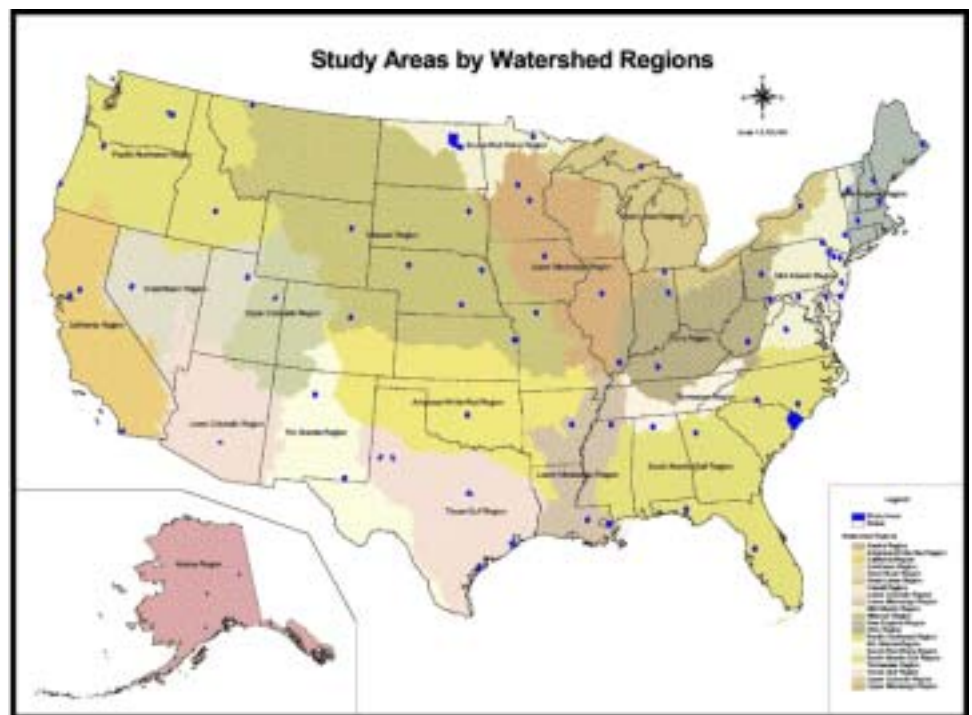
Nine study areas had more than 90 percent of their wetlands classified as isolated: 1) Tokio, Texas, 2) Tahoka, Texas, 3) Four Mile Flat, Nevada, 4) Devils Lake, North Dakota, 5) Kenai, Alaska, 6) Lincoln County, Washington, 7) Clark, South Dakota, 8) Lake Alexander, Minnesota, and 9) Dade City, Florida.

### Values of Isolated Wetlands

Although the national extent of isolated wetlands remains unknown, this report highlights many areas where isolated wetlands are abundant. The profiles of isolated wetlands show that many of the functions and benefits (e.g., water storage, nutrient retention and cycling, sediment retention, and wildlife habitat) ascribed to non-isolated wetlands are performed by isolated wetlands.

Moreover, their geographic isolation and local and regional distribution place isolated wetlands in a rather unique position to provide habitats crucial for the survival of many plant and animal species (e.g., endemism and breeding grounds for numerous amphibian and bird species). Isolated wetlands are vital natural resources, important for maintaining the Nation's biodiversity and wetland-dependent wildlife and for providing a host of other functions.

The information in this report was developed by the Service to help people gain insight into the values, types, locations, and relative abundance of isolated wetlands in selected areas of the United States.



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