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Biodiversity at Risk in Isolated Wetlands

What are we losing when we fail to regulate wetlands with legally debatable connections to navigable waters? Experts often answer this question with estimates of the monetary value of services such wetlands provide or the probable costs, in terms of flood damage or pollution, of failure to regulate. Here, researchers offer a new, concrete, and sobering response.

BY PATRICK COMER AND KATHY GOODIN

In 2001, the U.S. Supreme Court decision known as the SWANCC holding (*Solid Waste Agency of Northern Cook County vs. U.S. Army Corps of Engineers*) and a federal guidance issued pursuant to it placed wetlands and other waters considered "geographically isolated" from navigable waters outside the jurisdiction of the Clean Water Act. Since then, wetland managers and policymakers have struggled to understand the implications of the holding for the nation's wetland resources. Here, we describe a recent investigation of the holding's impact on biological diversity that can provide guidance to federal agencies, states, tribes, and local governments charged with protecting these valuable wetland resources.

NatureServe and its network of member natural heritage programs are well positioned to provide insights into the possible implications of the SWANCC holding for biodiversity. Since the 1970s, this network of institutions has conducted inventories of species and communities of conservation concern in all 50 states and the Navajo Nation. The network includes hundreds of field biologists, ecologists, mappers, conservation planners, and information managers. We use standard methods and tools to map locations, or "occurrences," of each species of concern and its habitat. These data allow us to systematically document a species' status and trends and readily identify species that are at risk.

We began our research using a nationally standardized classification of wetland ecological systems. A standard ecological classification, which establishes a framework for identifying and mapping ecological units, is an essential first step in comparative analysis of wetland types. It also provides a practical framework for documenting indicators of wetland statuses and trends. (For more information about NatureServe's classification system, please see http://www.natureserve. org/explorer.)

We next established a project-specific definition of the term "geographically isolated." For our purposes, geographically isolated wetlands are ecological system types that, in most examples, are predominantly wetland and have neither apparent surface water inlets nor outlets. With this definition, we created a final list of wetland ecological systems nationwide that tend to be geographically isolated from navigable waters.

Next, we reviewed scientific literature, consulted with 130 regional experts, and examined existing species location data to identify at-risk plant and animal species supported by these isolated wetland types. We defined "at-risk species" as those species considered rare, imperiled, or critically imperiled under NatureServe standard criteria (Master et al. 2000). We adapted commonly applied definitions of the wetland affinities of plants to describe the relative association of all at-risk species with isolated wetland systems:

- *Obligate to Isolated Wetlands*: These species almost always occur in isolated wetland systems (estimated probability is >99 percent) under natural conditions.

- *Facultative to Isolated Wetlands*: These species usually occur in isolated wetland systems (estimated probability is 67–99 percent) but occasionally occur in systems that are not isolated.

We listed some species for which knowledge is limited as "closely tied" to isolated wetland habitats but could not distinguish whether they are obligate or facultative to these habitats.

We used the best currently available information to complete this assessment. Because comprehensive wetland maps are not available nationally, the study focused on documenting the number and/or diversity of isolated wetland types, rather than on the acreage these wetland types occupy. We informed our characterizations with natural heritage program location data and documented knowledge of isolated wetlands and their associated at-risk species. However, although natural heritage programs are a well-recognized source of biological inventories in the United States, their work is far from comprehensive. States vary widely in the completeness of their wetland and rare species inventories. Thus, in the study we documented not only the knowledge available concerning isolated wetland systems and associated at-risk species, but also the data gaps. We surveyed ecologists and biologists from natural heritage programs in each state to ascertain the data needs associated with isolated wetlands and biodiversity.

Key Findings

Of 276 wetland ecological system types we identified in the United States, 81 (29 percent) met our definition of "geographically isolated." These 81 isolated wetland types amount to 13 percent of the 636 natural and "near-natural" terrestrial ecological system types in the

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At-Risk Species Tied to Isolated Wetlands

	Obligate	Facultative	Unknown	Total
Mammals	0	2	0	2
Insects	2	1	2	5
Amphibians	4	2	0	6
Crustaceans	12	7	1	20
Plants	77	141	23	241
Total	95	153	26	274

United States (both upland and wetland) currently classified and described by NatureServe.

The study found that isolated wetland ecological systems support high levels of biodiversity, including significant numbers of at-risk species. For example:

- Isolated wetlands support 274 at-risk plant and animal species; more than one-third (35 percent) of these at-risk species apparently are restricted to these wetland types. A greater proportion of at-risk animal species are dependent on isolated wetlands than are at-risk plant species; more than one-half of the at-risk animals considered in this study appear to be obligate to isolated wetland habitats.

- At-risk plant species with a strong habitat requirement for isolated wetland types far outnumber animal species with a strong habitat requirement for isolated wetland types, with 241 plants, or 88 percent of the 274 total species assessed, strongly reliant on isolated wetlands. On average, 6 percent of the at-risk plant species in a given state are directly supported by isolated wetlands.

- Isolated wetland habitats support 86 plant and animal species currently listed as threatened, endangered, or candidates for listing under the federal Endangered Species Act. This number represents about 5 percent of all plant and animal species listed under the act. A majority (52 percent) of the 86 listed species are completely dependent on isolated wetland habitat for survival. Nearly half of the isolated wetland types (35 of 81, or 43 percent) our research identified support at least one species listed under the Endangered Species Act.

- Nearly one-quarter of U.S. counties (725 counties, or 23 percent) harbor at least one at-risk species associated with isolated wetland habitats. Eighty of these counties have five or more such species. A total of 18 counties, located in Alabama, California, Georgia, Hawaii, Nevada, North Carolina, and South Carolina, each have 10 or more at-risk species associated with isolated wetlands. Merced County, California, has 20 at-risk species tied to isolated wetland habitats.

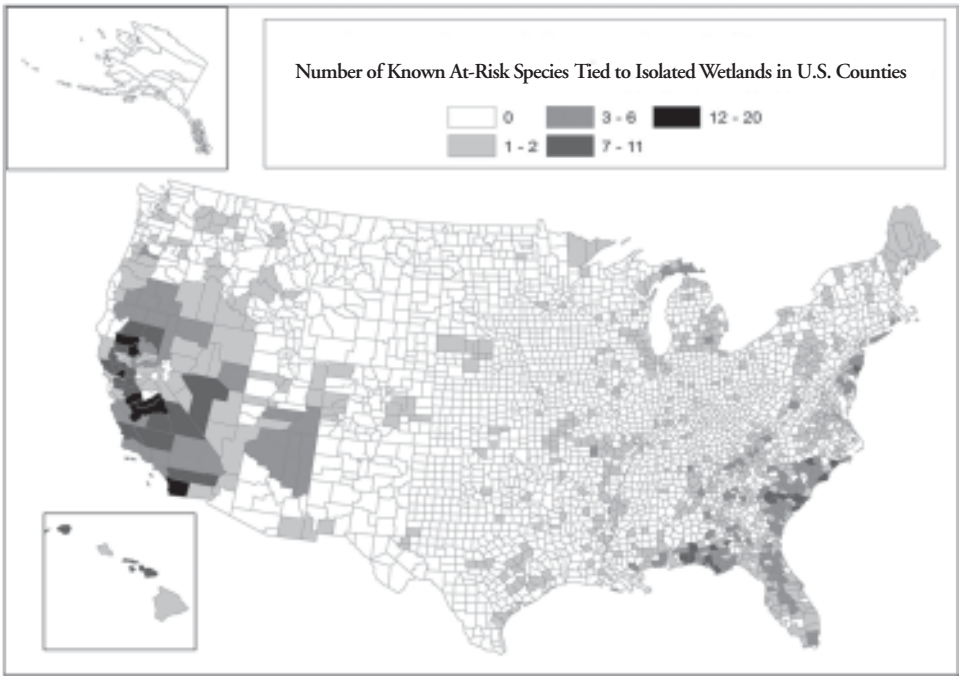
- While some U.S. counties rich in isolated wetlands and associated at-risk species are in regions with relatively low development pressures (e.g., Inyo County, California; San Juan County, Utah; and Covington County, Alabama), a significant proportion of the 725 counties highlighted above are among the fastest-growing counties in the nation (e.g., Riverside County, California; Clay County, Florida, and Gwinnett County, Georgia). Responsibility for conserving biodiversity in geographically isolated wetlands is by no means evenly spread across the nation.

Knowledge and Data Gaps

Much of the uncertainty stemming from the SWANCC decision has two sources: vaguely defined regulatory definitions of the term "geographically isolated" and our inability, because of inadequate mapping data, to document baseline statuses and trends in wetlands. The difficulty of assessing the decision's impacts on biodiversity is compounded by incomplete inventories, on both the state and national levels, of wetlands by type and their associated rare species.

Federally Listed Species Tied to Isolated Wetlands

	Obligate	Facultative	Total
Animals	8	5	13
Plants	37	36	73
Total	45	41	86



Because the United States lacks comprehensive mapping information, it was challenging for us to categorize wetland types as "geographically isolated" using the project-specific definition we developed. Given the incomplete location data and inadequate information concerning the extent of some wetlands' interaction with other waterbodies, some wetland types remain difficult to categorize. It is possible that with additional mapping and information about hydrological connectivity, the list of wetlands we consider "geographically isolated" could shift. At this time, we cannot predict the direction of the shift (i.e., whether there will be greater or fewer wetland types considered isolated).

This study made use of existing natural heritage program species location data and documented knowledge. Location data concerning species that may occur in isolated wetlands vary from quite good for some high-profile species to poor for many others. Of the 45 state and tribal natural heritage programs that responded to our 52-program survey, 18 programs reported that the majority of at-risk plant and animal species associated with isolated wetlands within their jurisdictions have occurrence data that program scientists would rate as either medium (50–75 percent) to high (>75 percent) in completeness. These programs were in Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Indiana, Maine, Massachusetts, Missouri, Montana, the Navajo Nation, Nevada, New Jersey, New York, Rhode Island, Virginia, and Wisconsin. However, inventory work is still needed for most species supported by isolated wetlands, particularly invertebrates, cryptic vertebrates, and many plant species.

Summary and Conclusions

Wetlands that can be considered "geographically isolated" significantly contribute to the ecological diversity of the United States and provide habitat for a considerable portion of the nation's flora and fauna. Significant loss of isolated wetland habitats could seriously affect opportunities for the survival and recovery of many rare or endangered species.

Following the SWANCC decision and the federal guidance that interpreted it, an unknown but potentially significant number and acreage of these wetlands lost protection under the Clean Water Act. The Supreme Court's upcoming rulings in two Clean Water Act cases stand to further affect the extent of federal jurisdiction over wetlands.

Some of these wetlands and the biodiversity they sustain may continue to receive protection from voluntary incentive initiatives such as the U.S. Department of Agriculture Swampbuster program, or from other federal regulatory mechanisms such as the Endangered Species Act. States, tribes, and local governments also will increasingly be in a position to decide the fate of wetlands left outside Clean Water Act jurisdiction.

The information and analyses in this study are intended to help policymakers and federal, state, and local land managers better understand the biodiversity value of isolated wetlands and plan for their conservation. Responsible conservation depends on data that locate and identify sensitive resources. These data allow stakeholders to minimize impacts and support mitigating actions. Our research is a start, but substantial new investments are needed to inventory the nation's wetland resources systematically and to document more fully their biodiversity values. Such investment in field inventory is perhaps the most efficient means of acquiring information on wetland biodiversity values that is sufficiently detailed to support sound land-use planning and resource management. ■

Resources

The complete report describing NatureServe's study of at-risk species and isolated wetlands is available for download on the organization's website, http://www.natureserve.org/publications/isolatedwetlands.jsp

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