The Status of Wetlands in Indiana

Wetland Functions and Benefits

Wetlands provide Hoosiers with many vital physical, ecological, and economic functions and benefits that are listed below under general headings. Most of these functions and benefits overlap; for instance, the *Flood Control* and *Water Quality* functions that are listed under the *Water Resources* heading could also be listed under the *Economic* heading. In the interest of space and clarity, functions and benefits are only listed under a single heading.

For the purposes of this plan, the term *wetland loss* refers to the loss of these functions and benefits. The land itself is not gone, and in fact the wetland nature of the land may still remain, but the functions and benefits are lost—at least temporarily. There are many different ways that wetlands are impacted or *lost*, and some are more permanent than others. For instance, it would be much easier to restore the functions and benefits of a wetland that was tiled and farmed than one that was drained, filled, and covered with concrete.

"The environment is benefited by wetlands all the way around."
—John McNamara,
St. Joseph County Surveyor

It should be noted that not all wetlands perform all of the functions listed below. It is also worth mentioning that the effects of wetland losses are poorly understood. In most cases it is not clear how much loss can be sustained before the functions and benefits are degraded or lost.

Water Resources

Flood Control: During heavy rains, wetlands store massive amounts of water and slow down the flow of surface water. This function reduces the danger of flooding during peak water flow, when potential flood damage is highest. By storing storm water, wetlands dampen the sharp peaks of water runoff into slower discharges over longer periods of time.

Water Quality: Wetlands play a major role in maintaining Indiana's water quality. Wetlands absorb excess inorganic and organic nutrients such as farm fertilizers and septic system runoff, filter sediments such as eroded soil particles, and trap pollutants such as pesticides and some heavy metals. These materials can seriously degrade the quality of groundwater and surface water resources, but wetlands trap and hold them, "recycling" some of them within the wetland system.

Wetlands have a great capacity for assimilating treated sewage. Therefore, there is significant interest in the use of created wetlands in wastewater treatment—particularly for animal waste. Early studies by the Purdue Agricultural Research Program and others suggest that constructed wetlands can substantially reduce or eliminate the impact of animal waste runoff from livestock operations. There also has been some interest in constructing wetlands for municipal or domestic wastewater treatment, which has been done successfully under certain circumstances. This plan does not advocate the use of existing, natural wetlands for wastewater treatment—these are roles for constructed or "artificial" wetlands.

"Wetland conservation is an important priority in Indiana."
—Tim Maloney,
Hoosier Environmental Council

Groundwater Discharge and Recharge: It is generally accepted that wetlands are sites of groundwater discharge (i.e., where groundwater moves laterally or upward to reach the surface). The reverse is also thought to be true—that wetlands recharge the aquifers and groundwater systems that provide the water many of us get from our faucets. The recharge potential of wetlands is affected by many factors including wetland type, location, season, soils, and precipitation, and appears to be more important in small wetlands than large ones. Nationwide, wetlands are an increasingly important source of ground and surface water near large urban centers.

Biological/Ecological

Fisheries: Wetlands support Indiana fisheries by providing habitat and a variety of food sources for fish. Most freshwater fish can be considered wetland-dependent because they use the wetlands for spawning and as nursery grounds.

Wildlife: About 900 species of vertebrate animals require wetlands at some time in their lives. Muskrats and beavers are examples of Indiana mammals that are totally dependent on wetland environments. Wetlands provide the principal habitat for virtually all species of waterfowl nationwide, and also for many other birds, mammals, and reptiles. In Indiana, 11 species of waterfowl use wetlands for nesting, and 28 species use wetlands as migration/wintering habitat.

Nationwide nearly 35 percent of all rare and endangered animal species depend on wetlands for survival, although wetlands constitute only about 5 percent of the nation's lands. More than 60 wetland-dependent animal species are listed as endangered, threatened, or of special concern in Indiana. Even animals not dependent on wetlands for survival find them to be excellent habitat. For instance, bottomland hardwood forests have been found to support nearly twice as many white-tailed deer per unit area as do upland forests, primarily because of the abundance of food in wetlands.

Plants: Fish and wildlife are not the only living things that require wetlands for survival. A great variety of plants thrive in wetlands as well, and some of the valuable functions and benefits that wetlands provide are due to the plant communities that live there. In addition, because so many wetlands have been lost or degraded, there are more than 120 species of wetland plants in Indiana that are endangered, threatened, or rare.

Erosion Control: Wetland systems help stabilize shorelines and prevent soil erosion. The roots of wetland plants bind the soil, holding it in place, while the above-ground portions of these plants absorb wave energy, slowing the water's flow. Wetlands also trap sediments suspended in moving water. Wetlands with emergent plants (such as cattails) can remove up to 95% of the sediments from flood waters.

In northern Indiana, many natural lakes have experienced serious shoreline erosion due to the wake wash from the growing number of boats and other pleasure craft. Wetlands fringing these lakes shield the shorelines from wave action, providing important erosion control that protects lakefront properties.

Economic

Food Production: Wetlands provide habitat for fish, waterfowl, shellfish, and other animals that are harvested for food. Healthy and functioning wetland ecosystems are necessary to maintain the resource base for this food production economy. Because of their high productivity, wetlands also have unrealized food production potential through the harvest of vegetation and aquaculture.

Wood Production: Forested wetlands often contain high-value tree species, and under proper management, are an important source of timber and other forest products. In Indiana, more than half of the remaining wetland acres are forested. Indiana ranks third nationally in hardwood lumber production, contributing $5 billion annually to the state's economy.

Trapping: Although it is not a major economic activity in Indiana, the harvest of fur-bearing animals does generate revenue for trappers. All of the economically significant furbearer species in Indiana are wetland-related.

Recreation: Many recreational activities take place in or around wetlands, including hunting, fishing, sightseeing, nature study, photography, bird-watching, canoeing, and boating. Some of these activities are directly dependent upon wetlands. Nationwide over $10 billion is spent annually by an estimated 50 million people on fishing, hunting, boating, nature study, photography, and swimming. In Indiana, duck and goose hunting alone provide approximately 75,000 user days of recreation annually, and a survey by the U.S. Fish and Wildlife Service suggests that Indiana wetland habitats generate more than a million user days of nonconsumptive recreation each year.

"Wetlands are one of the most important conservation issues we face in Indiana at the moment. They are some of the most diverse ecosystems we have."
—Jon Voelz,
Indiana Wildlife Federation

Other: Economic benefits of flood control, drought mitigation, groundwater recharge, water quality, public and private water supply, and soil conservation are large. For example, wetlands help prevent costly flood and drought damage. In addition, water taken for public water supplies requires less expensive treatment if the water has been filtered by wetlands.

Intangible Benefits/Existence Value

In addition to physical, ecological, and economic values, wetlands also provide other, less tangible benefits that may be referred to as *existence* values.

Ethical: Many people feel a strong sense of stewardship for the natural world—that regardless of economic value, all forms of life deserve respect. Many also believe that humans have a moral responsibility to maintain natural ecosystems for ourselves and for future generations.

Future Options: Human understanding of the many values of the natural world is incomplete. Healthy wetland ecosystems may contain a treasure trove of as yet undiscovered benefits for agriculture, industry, medicine, and recreation. The best option for preserving this potential is to maintain the biodiversity present in healthy wetland ecosystems.

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Indiana's Wetland Resources

Wetlands occur in and provide benefits to every county in Indiana (Figure 1). The lack of quantitative information on some aspects of Indiana's wetland resources is a major obstacle to improving wetland conservation efforts.

The most extensive database on wetland resources in Indiana is the National Wetlands Inventory developed by the U.S. Fish and Wildlife Service. In 1985, the Indiana Department of Natural Resources, Division of Fish and Wildlife entered into a cooperative agreement with the U.S. Fish and Wildlife Service to share the costs of mapping Indiana's wetlands.

Indiana's National Wetlands Inventory maps were produced primarily from interpretation of high-altitude color infrared aerial photographs (scale of 1:58,000) taken of Indiana during spring and fall 1980-87. Map production also included field investigations, review of existing information, quality assurance, draft map production, interagency review of draft maps, and final map production.

National Wetland Inventory maps indicate wetlands by type, using the classification system developed by Cowardin *et al.* (1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31. 104 pp.). The minimum wetlands size on National Wetland Inventory maps is generally one to three acres. Very narrow wetlands in river corridors and wetlands that were cultivated at the time of mapping are generally not depicted, and forested wetlands are poorly discriminated.

The most recent and complete analysis of this database was conducted in 1991 by the Indiana Department of Natural Resources. According to the report, Indiana had approximately 813,000 acres of wetland habitat in the mid-1980s when the data were collected. The extent of wetland loss or gain since that time is unknown.

Wetland habitats	Acres	% of total
scrub-shrub	42,131	5.2%
forested	504,336	62.0%
wet meadow	55,071	6.8%
shallow marsh	67,564	8.3%
deep marsh	20,730	2.5%
open water	98,565	12.1%
other	24,633	3.0%
total wetland habitats	813,032	100.0%

From Rolley, R. E. 1991. Indiana's Wetland Inventory. IDNR Wildlife Management and Research Notes no. 532. 6 pp.

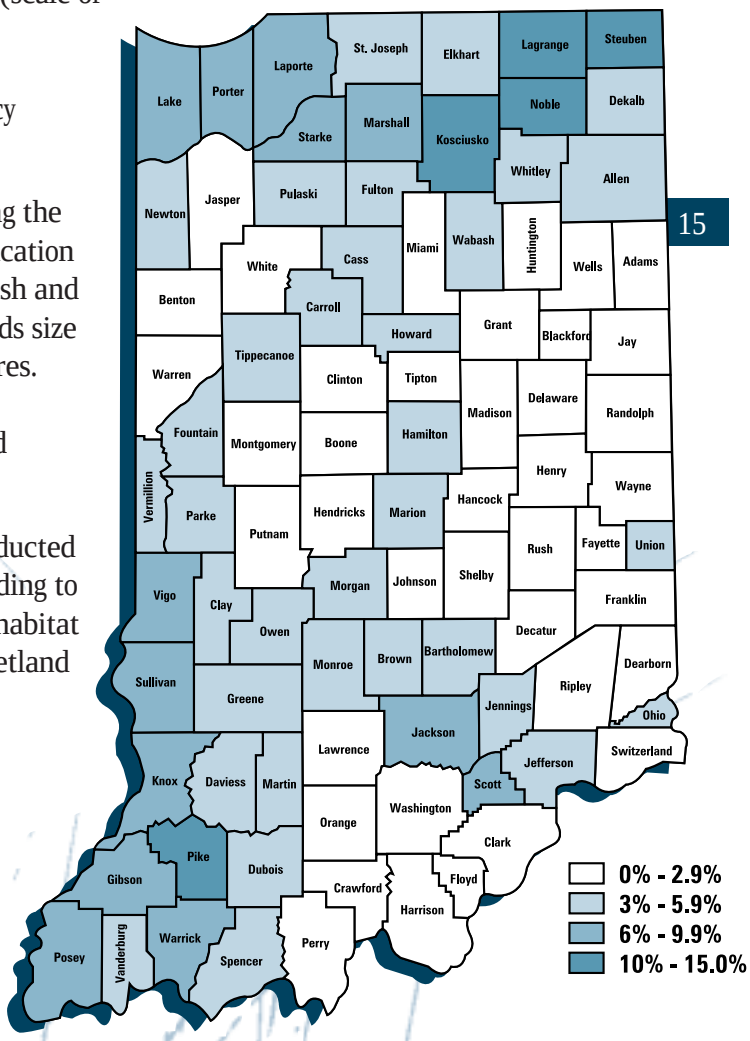

Figure 1. Distribution and density (percent acreage) of wetlands and deepwater habitats in Indiana by county, based on the National Wetland Inventory.

Map by Shelley Liu, IDNR-MIS, 1996

Historic Wetland Losses

The best estimate of the wetlands in Indiana prior to settlement 200 years ago is an assessment based on hydric soils (soils that indicate the presence of wetlands) conducted by the USDA Soil Conservation Service (now the Natural Resources Conservation Service). Based on an analysis of this data by the Indiana Department of Natural Resources, Division of Outdoor Recreation in 1989, there were approximately 5.6 million acres of wetlands in Indiana 200 years ago. Combining the information from the National Wetlands Inventory and the Division of Outdoor Recreation yields the following summary:

- Total land area ---------- 23,226,240 acres
- Estimated wetlands circa 1780s -------- 5,600,000 acres
- Percent of surface area in wetlands circa 1780s ---------- 24.1%
- Existing wetlands ---------- 813,000 acres
- Percent of surface area in wetlands today ---------- 3.5 %
- Percent of wetlands lost ---------- 85%

Among the 50 states, Indiana ranks 4th (tied with Missouri) in proportion of wetland acreage lost. (Dahl, T.E. 1990. *Wetland losses in the United States, 1780s to 1980s.* U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 13 pp.). The vast majority of the 85% of wetlands lost was due to drainage for agricultural production.

The rich, productive soils available as a result of these drainage activities have contributed significantly to the thriving agriculture industry in Indiana. In 1994, Indiana ranked first in the nation in popcorn production, second in spearmint, fourth in soybeans, fifth in corn for grain, and sixth in overall crop cash receipts.

Current Wetland Losses

Indiana's wetlands are being lost or impacted today in a variety of ways, including agricultural activities, commercial and residential development, road building, water development projects, groundwater withdrawal, loss of instream flows, water pollution, and vegetation removal. Comprehensive data for the current extent and causes of wetland loss at the state level are not available.

Existing Wetlands Conservation Programs

A variety of wetlands conservation programs are administered by state and federal agencies, non-profit conservation organizations, businesses, and individuals. The following is not an exhaustive list, but in cases where myriad programs do exist, one or more examples are given. Programs are listed here, followed by the administrating agency/organization and a phone number. General information including a contact person is given for each program in a separate document titled *A Summary of Wetlands Conservation Programs in Indiana.*

Incentive Programs

Federal

- Agricultural Conservation Program (Farm Service Agency, 317-290-3030)
- Conservation Easement Program (Farm Service Agency, 317-290-3112)
- Conservation Reserve Program (Farm Service Agency, 317-290-3030)
- Federal tax benefits for land trust donations (Internal Revenue Service, 800-829-1040)
- Forestry Incentives Program (NRCS, 317-290-3202)
- National Natural Landmark Program (National Park Service, 402-221-3418)
- Partners for Wildlife (U.S. Fish & Wildlife Service, 812-334-4261)
- Water Quality Incentive Program (NRCS, 317-290-3202)
- Watershed Protection and Flood Prevention Program (NRCS, 317-290-3202)
- Wetlands Reserve Program (NRCS, 317-290-3202)

Abbreviations Used:
- NRCS (Natural Resources Conservation Service)
- DNR (Department of Natural Resources)
- DEM (Department of Environmental Management)
- EPA (Environmental Protection Agency)

State

- Appalachian Clean Streams Initiative (Indiana DNR, 812-354-6728)
- Indiana Classified Forest Program (Indiana DNR, 317-232-4105)
- Classified Wildlife Habitat Act (Indiana DNR, 317-232-4080)
- Forest Stewardship Program (Indiana DNR, 317-232-4105)
- Lake and River Enhancement Program (Indiana DNR, 317-233-3871)
- Clean Water Act, Section 319, Nonpoint Source Management Program (Indiana DEM, 317-308-3208)
- State Nature Preserve Dedication (Indiana DNR, 317-232-4052)
- Stewardship Incentives Program (Indiana DNR, 317-232-4105)
- Wildlife Habitat Cost-Share Program (Indiana DNR, 317-232-4080)

Private/Local

- Indiana Tree Farm (Indiana Hardwood Lumbermen's Association, 317-342-3851)
- Southern Lake Michigan Conservation Initiative (The Nature Conservancy, 219-473-4312)
- Wildlife at Work (Wildlife Habitat Council, 301-588-8994)
- Focus Area Projects (these might also be considered as acquisition programs)
  examples: Blue River (The Nature Conservancy, 219-665-9141)
  Fish Creek (The Nature Conservancy, 219-665-9141)

Cooperative

- Natural Areas Registry (The Nature Conservancy, 317-923-7547; Indiana DNR, 317-232-4052)

Education Programs

Federal

- Environmental Education Grants (U.S. EPA, 312-353-3209)
- Environmental Software (U.S. EPA, 312-353-6353)
- Enviroscape watershed model (U.S. EPA, 312-353-7314)
- Wetlands Information Hotline (U.S. EPA, 800-832-7828)

State

- Project Learning Tree (Indiana DNR, 317-290-3223)
- Project WILD (Indiana DNR, 317-290-3223)

Private/Local

- Know Your Watershed
  (Conservation Technology Information Center, 317-494-9555)
- National Wetlands Conservation Alliance
  (National Association of Conservation Districts, 202-547-6223)
- Partners for Wetlands Protection Kit (Izaak Walton League, 301-548-0150)
- The Wetlands Project (Indiana Sierra Club, 317-231-1908)
- WOW! The Wonders of Wetlands (Environmental Concern, Inc., 410-745-9620)
- Soil and Water Conservation Districts (SWCD)
  example: Exploring Wetlands (Clark County SWCD, 812-256-6171)
- County Parks
  example: We Need Wetlands Activity Pack for Educators
  (St. Joseph County Parks, 219-654-3155)

Cooperative

- Integrated Environmental Curriculum Wetlands Component
  (Sierra Club Wetlands Project, U.S. Fish & Wildlife Service,
  Indianapolis Zoo, 812-334-4261)

Acquisition Programs

Federal

- National Forest Land Acquisition Program (U.S. Forest Service, 812-275-5987)
- National Park Service Land Acquisition Program
  (National Park Service, 202-343-8124)
- National Wildlife Refuge System (U.S. Fish & Wildlife Service, 812-334-4261)
- North American Waterfowl Management Plan
  (U.S. Fish & Wildlife Service, 812-334-4261)

State

- Indiana Heritage Trust (Indiana DNR, 317-232-4080)
- Land and Water Conservation Fund (Indiana DNR, 317-232-4070)
- Wetland Conservation Areas (Indiana DNR, 317-232-4080)

Private/Local

- MARSH (Matching Aid to Restore States' Habitat)
  (Ducks Unlimited, No. of SR 26, 219-463-4353; So. of SR 26, 812-397-2740)
- Hoosier Landscapes Capital Campaign: Saving *Our* Last Great Places
  (The Nature Conservancy, 317-923-7547)
- Waters of Life Campaign (The Nature Conservancy, 317-923-7547)
- Focus Area Projects (these might also be considered as incentive programs)
  examples: Limberlost Swamp Remembered (219-997-6494)
  Little River Wetlands Project, Inc. (219-429-4565)
- Land Trusts
  examples: Acres, Inc. (219-422-1004)
  Oxbow, Inc. (513-471-8001)
  Sycamore Land Trust (812-336-5257)

Cooperative

- Indiana Natural Heritage Protection Campaign
  (The Nature Conservancy, 317-923-7547; Indiana DNR, 317-232-4052)

Regulatory Programs

Federal

- Clean Water Act, Section 404, Permit Program (U.S. EPA, 312-886-0241; U.S. Army Corps of Engineers, Detroit District, 313-226-6828; Louisville District, 502-582-5607)
- Clean Water Act, Section 401, Water Quality Certification (Indiana DEM, 317-233-2482)
- Wetland Conservation (Swampbuster) Provision (NRCS, 317-290-3202)

State

- Indiana Flood Control Act, IC 14-28-1 (Indiana DNR, 317-232-4160)
- Lakes Preservation Act, IC 14-26-2 (Indiana DNR, 317-232-4160)
- Lowering of Ten Acre Lakes Act ("Ditch Act"),
  IC 14-26-5 (Indiana DNR, 317-232-4160)
- Indiana Navigable Waterways Act, IC 14-29-1 (Indiana DNR, 317-232-4160)
- Indiana Water Quality Standards, 327 IAC 2-1 (Indiana DEM, 317-233-2482)

Private/Local

- City Councils
  example: City of Auburn Wetlands Conservation Ordinance
  (City of Auburn Department of Building, Planning & Economic Development, 219-925-6449)

Issues and Concerns in Wetlands Conservation

To be effectively implemented, or implemented at all, development of a wetlands plan must involve the people who will implement the plan as well as the people who will be affected by its implementation. In addition, an effective plan must address the major issues or concerns important to both the people implementing the plan and the people who will be affected by its implementation.

The issues and concerns relating to wetlands conservation in Indiana were identified through the:

- Wetlands Advisory Group
- Technical Advisory Team
- Project reviewers
- Public opinion survey (see next section)

Given the complexity of wetland ecosystems and wetland conservation efforts, it is not a surprise that the list of issues and concerns is a long and varied one. The major issues and concerns on which much of the *IWCP* is based are summarized below. They are not listed in priority order.

Wetlands Laws and Regulations

A host of concerns with current state and federal wetlands conservation regulations exist from a diverse array of interests—from regulations being too strict (and not strict enough) to inconsistencies in enforcement (and too little enforcement) to problems with the permitting processes.

Wetlands Definition

Different definitions are used in different situations causing confusion and misunderstanding.

Positive Incentives

The need to provide positive incentives versus a focus on restrictions and regulations.

Comprehensive Plan

The lack of a plan to guide efforts on a statewide basis.

Mitigation

The lack of a comprehensive mitigation program that specifically includes (or specifically does not include) mitigation banking.

Quantitative Information on Indiana's Wetland Resources

The lack of quantitative information on some aspects of Indiana's wetland resources is a major obstacle to improving wetland conservation efforts.

Dispute Resolution

The lack of a process or forum for regulators and regulatees to work through disputes to find mutually beneficial solutions.

Education

In a broad sense, the lack of knowledge for and appreciation of the critical functions provided by wetlands among different segments of the public.

Property Rights

There is concern about the impact regulations and other management activities have on private property rights.

"This issue of property rights is a very real concern for anyone with urban or rural property."
—Gordon W. Barnett, Oakland City, Indiana

Prioritization

The lack of priorities for conserving wetlands hinders the effectiveness of programs.

Access to Resources

A concern that conservation programs will close wetland areas off to any type of use resulting in negative economic impacts. Also, the concern that wetland conservation efforts will take valuable agricultural land out of production.

Access to Information

There is a tremendous amount of information on wetlands, but this information is often not readily available to the people who need it. Also, people may not be aware that the information exists.

Focus on Conservation

Concern that public agencies will bow to political pressure and not do what is needed for wetlands conservation.

Wetlands and Public Health

Concern that increasing wetlands in the state may increase the incidence of diseases such as malaria.

Indiana Residents' Opinions on and Attitudes toward Wetlands Conservation

Following are summarized results of a survey concerning Indiana residents' opinions on and attitudes toward wetlands and wetlands conservation. This survey was conducted in November 1995 by Responsive Management, Inc. through telephone interviews with 600 randomly selected Indiana residents. Complete survey results are available in a separate document titled *Indiana Residents' Opinions on and Attitudes toward Wetlands Conservation.*

Hoosiers were asked if they were aware that there are wetlands in Indiana:

79% yes
21% no

Those who said they are aware of Indiana's wetlands were asked how much they had heard about wetlands:

4% nothing
48% little
31% moderate amount
17% great deal

Those aware of Indiana's wetlands were asked what they thought was the status of Indiana's wetlands:

19% don't know
61% declining
19% healthy and stable

When asked what benefits, if any, they associated with wetlands, Indiana residents responded (this question was open-ended, meaning no choices were provided, but people gave their own responses, and multiple responses were allowed):

53% wildlife habitat
21% don't know
17% part of ecosystem
13% no benefits
6% recreation
6% pollution control
14% other (responses included: aesthetic, maintenance of groundwater levels, flood control, and educational)

When asked what drawbacks, if any, they associated with wetlands, Indiana residents responded (this question was open-ended):

43% no drawbacks
22% don't know
11% takes farmland out of production (17% of respondents who listed their residence as rural stated this response)
11% mosquitos
13% other (responses included: development, increased public ownership of land, disease, can't do anything with land, flooding, and increased crop damage)
10% other (no specific responses given)

When asked their opinions about protecting wetlands:

80% of Indiana residents (69% of rural respondents) said they strongly or moderately support efforts to protect Indiana's wetlands (15% said neither/don't know, and 5% said they strongly or moderately opposed such efforts)
88% think it is very or somewhat important for the state to protect Indiana's wetlands (8% said don't know, and 5% said not at all important)

Hoosiers were asked who should be responsible for protecting Indiana's wetlands:

45% state government
16% don't know
9% everyone
9% private landowners
6% other
5% federal government
11% private groups, municipalities, DNR, or no one

When asked their opinions about methods of protecting wetlands (choices were: strongly oppose, moderately oppose, neither, moderately support, strongly support):

52% strongly or moderately support tax breaks to private landowners who protect wetlands on their property

68% strongly or moderately support private conservation groups providing compensation to private landowners who protect wetlands on their property

72% strongly or moderately support the state of Indiana purchasing land containing wetlands

76% strongly or moderately support private conservation groups purchasing land containing wetlands

78% strongly or moderately support state regulations designed to protect wetlands

Residents were asked how they thought wetland conservation efforts should be paid for (this question was open-ended):

27% don't know
25% voluntary donations
19% redistribute state revenues
17% increase state taxes
14% private conservation groups
15% other (responses included: user fees, lottery, increase property tax, shouldn't be protected, and hunt/fish licenses)
4% other (no specific responses given)

Residents were asked where they get their information about wetlands (this question was open-ended):

39% newspapers
23% television
22% magazines
19% no information
15% personal experience
13% family/friends
23% other (responses included: school, private conservation organization, radio, Indiana DNR, hunting experience, farming experience, books, work, don't know, cooperative extension service, and library)
5% other (no specific responses given)

When asked which source of wetlands information they considered most credible, Hoosiers responded:

43% Indiana DNR
21% private conservation groups
19% U.S. Fish & Wildlife Service
9% farmers
9% none of these, friends/family, or celebrities