

COMMON QUESTIONS:
**WETLAND
CONSERVATION
AND THE
PROTECTION OF
MIGRATORY BIRDS**



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In Cooperation With:

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PREFACE

This guide is designed for local government officials, land trust staff, staff of watershed councils, state and federal agency staff, landowners and others interested in protecting and restoring wetland bird habitat. A selected bibliography and list of web sites provide the reader with more information concerning specific subjects. The guide draws upon a variety of documents listed in the bibliography and in the list of websites. It draws upon a national symposium, Wetlands 2004, which was conducted by the Association of State Wetland Managers and a broad range of cooperating parties in Kansas City, Missouri on October 19-22, 2004. Thanks much, folks, for the information.

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COMMON QUESTIONS: WETLAND CONSERVATION AND THE PROTECTION OF MIGRATORY BIRDS

Why are wetlands important to migratory birds?

A. More than one third of the 1900 North American bird species use wetlands for breeding, nesting, as a source of drinking water and for shelter, social interactions and rearing their young. Eighty percent of U.S. threatened and endangered bird species rely on wetlands or wetland functions. Some bird species like the American widgeon, use wetlands for only part of their lives. Others, like grebes, require wetlands within their geographic range to survive. For wetland-dependent species, habitat loss in breeding areas may directly result in loss of birds. Such habitat losses may take the form of drainage (most common), fills, diversion and pumping of water, pollution and excessive sedimentation, vegetation and timber removal, grazing, other human disturbance (e.g. off road vehicles) and, in some instances, flooding or water level stabilization which prevents beneficial draw downs or flooding.

What types of birds live in or utilize wetlands?

A. Some birds which require access to wetlands during their life cycle are “wetland dependent”. Other species preferentially use wetlands but feed, breed or nest in upland areas if wetlands are not available. Of the 1,900 bird species that breed in the United States, at least 138 are wetland dependent.

Typical types of birds which are wetland dependent or more broadly utilize wetlands include:

- Song Birds. Examples include the Common Yellowthroat, Limpkin, Red-winged Blackbird, Swamp Sparrow, Yellow Rail, Red-bellied Woodpecker, Connecticut Warbler, Golden-crowned Kinglet, Lincoln’s Sparrow, Nashville Warbler, Olive-sided Flycatcher, Palm Warbler, Red-breasted Nuthatch, Winter Wren, Yellow-bellied Flycatcher
- Shorebirds. Examples include Willets and Common Snipes
- Water birds. Examples include the Ruddy Duck, Bufflehead, Common Goldeneye, American Black Duck, Canada Goose, Canvasback,
- Raptors and Other Predators. Examples include the Barred Owl and Red-shouldered Hawk.



What wetlands are most used by birds?

A. All types of wetlands and related ecosystems are used by birds although the types and intensities of use differ. An inventory of wetlands of value to waterfowl in the 1950's indicated that of the 74 million acres of wetlands in the United States, 8.8 million acres had high value for waterfowl, 13.6 million acres were of moderate value, and 24.1 million acres were of low value. These numbers would be higher if all bird species were considered. The three areas of highest value to waterfowl include the Mississippi River Corridor and westward along the Texas gulf coast, the eastern coast, and the northern mid-west. The Prairie Pothole region produces about 50% of the continents duck populations although it includes only about 10% of the total duck-breeding habitat.

Some wetland types most heavily used by birds include:

- Depressions, particularly Midwestern potholes. These are heavily used by waterfowl and many other types of birds.
- Coastal and estuarine marshes. The coastal marshes along the eastern and Gulf coasts are used particularly by waterfowl and shorebirds.
- Wet tide and mudflats. Shorebirds feed in these areas.
- Playas and flats. Large numbers of waterfowl and shorebirds congregate in saline freshwater wetlands such as the Cheyenne Bottoms and Quivera preserves in Kansas.
- Riverine, lake, pond, reservoir fringe. Waterfowl, songbirds, and many other types of birds use these wetlands which are distributed throughout the Nation. Riparian habitat is particularly important for songbirds in the West.

Do birds utilize wetlands year-around?

A. Some bird species use wetlands primarily for resting on their northerly migrations or for breeding (e.g. many Alaska wetlands). Others feed, breed and live in wetlands year around. This is particularly true in the South.



Birds often use wetlands only a portion of the year

Are many wetland birds “migrants” to Canada, Mexico and other countries?

A. Yes, most of the shorebirds such as sandpipers, plovers, and terns are migratory. A few types of waterfowl such as teal are international in their migrations. Many song birds which utilize wetlands a portion of the time such as warblers, thrushes, tanagers, and vireos are migratory. Common species wintering in South America include Red-eyed Vireos, Purple Martins, and Bobolinks.

What wetland characteristics are most important to birds?

A. This depends, in part, upon the bird species. Wetland hydrology including water levels and timing of fluctuations are among the most important characteristics for all bird species because hydrology determines all other wetland characteristics including water depth and vegetation. For example, some migrating waterfowl need wetland feeding and resting areas in the Midwest during the spring and fall when there may be water in ephemeral wetlands but not during the middle of the summer when they are nesting in the far north.

However, the value of a wetland to a particular bird species depends upon not only the overall wetland features but the landscape context. Examples of more specific wetland characteristics important to birds include:

- **Location of the wetland.** Wetlands in flyways, in nesting areas, and in fall and winter feeding areas are most important to migratory birds. Wetlands adjacent to other water bodies (lakes, streams, estuaries) and other wetlands are often most attractive for waterfowl. So are wetlands with adjacent upland buffers. Riparian habitat along rivers and streams is particularly important as songbird habitat.
- **Hydroperiod.** Timing of ground saturation or open water is often critical for resting and feeding of migratory birds and for nesting for resident species. For example, ground saturation or open water in fall and spring are critical to many nesting birds.
- **Presence of open water.** Some bird species such as waterfowl seek wetlands with open water.
- **Depth of water.** Depth of water is important to waders and swimmers. Deep water cannot be used by waders but can be used by swimmers. Depth also often determines vegetation type which, in turn, determines food sources and cover.
- **Size of the wetland.** Larger wetlands often offer more diverse habitat for a wide range of species and for various life stages of a particular species. Also, larger wetlands in disturbed landscapes may contain better buffered and less altered areas at their centers. However, small wetlands are also very significant for birds which depend upon regional mosaics of habitat.
- **Fragmentation.** Fragmentation of wetlands often reduces wetland food sources such as fish and the use of the wetlands by birds which depend upon those sources. For example, birds like Herons and Osprey depend in part upon fish which swim into and out of wetlands from adjacent lakes, streams, and coastal waters where wetlands have not been isolated by dikes, highways, dams and fills. Fragmented wetlands also often offer less protection from predators and other types of disturbances.
- **Vegetation type and condition.** Vegetation type and condition are extremely important. Vegetation provides food sources and shelter from predators and the wind. Birds eat tubers, leaves, and fruits of plants and algae in the water.



Waterfowl seek open water

- **Buffers and adjacent lands.** Buffer areas and uplands adjacent to wetlands are important feeding, nesting and resting areas for many wetland birds which make use of wetlands but spend much of their time elsewhere. Plants, vegetation and invertebrates in these areas provide food for birds. Some birds forage in the wetland soils, some feed on vertebrates and invertebrates in the water column, and some feed on vegetation or wild life in adjacent areas.
- **Nearby nesting habitat.** Many birds nest in trees and shrubs adjacent to wetland areas.
- **Predators.** Predators like foxes, raccoons, snapping turtles, large mouthed bass, snakes and domestic cats prey particularly on young birds. Wetlands with few predators and safe nesting, resting and feeding areas are higher quality habitat.
- **Water quality.** Pollutants are causing wetland degradation in many areas of the nation. Pollutants both directly and indirectly threaten birds. For example, concentrations of selenium from agricultural runoff killed thousands of birds at Questerson Wildlife Refuge. Nutrients and sediments from agriculture, urban runoff, industries and other sources entering Chesapeake Bay have increased algal blooms, decreased oxygen levels, and decreased invertebrate populations. This has decreased sea grasses and populations dependent upon sea grasses such as the canvasback duck population.

Have treaties been signed by the U.S. to protect wetland and bird habitat?

A. A variety of treaties between the U.S. and other countries protect migratory birds. Principal treaties include the Migratory Bird Treaty and the Convention on Wetlands of



International Importance especially as Waterfowl Habitat. The Migratory Bird Treaties which the U.S. adopted in 1918 recognized U.S. conservation responsibilities for more than 800 species of birds shared by the U.S. and Canada. The U.S. has also designed 19 major wetlands or wetland complexes as internationally significant pursuant to the “Convention on Wetlands of International Importance, known as the Ramsar Treaty.

What have federal wetland agencies done to protect wetlands serving as habitat for migratory birds?

Congress and federal agencies have done much to protect wetland bird habitat. Examples of federal activities to protect wetland-related migratory birds include:

- **Establish the National Wildlife Refuge System.** Many refuges contain important wetlands or wetlands complexes and are designed to protect migratory birds.
- **Establish Ramsar Sites.** The federal government has established 19 wetland “Ramsar” sites for wetlands of international significance to migratory birds.
- **Establish Joint Ventures Pursuant to the North American Waterfowl Management Plan.** Joint ventures between various groups now cover all of the U.S.

- **Initiate many types of bird planning.** The U.S. Fish and Wildlife Service in cooperation with a broad range of federal and state agencies and private organizations such as the Audubon Society have underway a variety of bird planning activities.
- **Adopt the Bird Protection Executive Order (Administration).**
- **Implement regulatory efforts such as the Section 404 Program which requires permits for activities in most wetlands with a goal (among many) of protecting habitat.** This Program is implemented by the U.S. Army Corps of Engineers in cooperation with the U.S. Environmental Protection Agency, the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, the USDA Natural Resources Conservation Service and other agencies.
- **Implement public land management planning and plan implementation activities to protect wetlands and riparian areas (e.g., the Forest Service, Bureau of Land Management, Bureau of Reclamation, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service).**
- **Provide grants for private, state and local fee and easement acquisition of wetland/bird habitat.** Many if not most of the wetland fee and acquisition and restoration efforts of the Wetland Reserve (USDA) and Partners for Wildlife Program (USFWS) are designed, in part, to protect and restore bird habitat.

What have state, tribal, and local governments done to protect wetland habitat for migratory birds?

A. States, tribes and local governments have also done much. Examples of efforts designed to protect wetland habitat for migratory birds (and to serve other objectives as well) include:

- **Establish refuges and parks.** State, tribal, and local governments have established wildlife and game refuges and parks throughout the nation although the number differ greatly from state to state.
- **Wildlife management.** States throughout the nation have established wildlife management programs for fish, waterfowl, deer and other game species, non game species, and endangered species. These include state and local “all bird” protection initiatives.
- **Establish Heritage programs.** State “Heritage” programs which have identified biodiversity areas and others areas of special ecological importance have been established throughout the nation.
- **Adopt regulations.** State, tribal and local wetland regulatory programs have been quite broadly adopted regulations, particularly for coastal and estuarine wetlands and wetlands adjacent to lakes and streams. These programs have been adopted, in part, to protect bird habitat.
- **Establish education efforts.** State, tribal, and local governments have adopted wetland education efforts for landowners, public officials, and the general public (brochures, handbooks, seminars, workshops).
- **Adopt landowner incentive programs.** Many states have adopted real estate tax incentive statutes which provide tax breaks for wetlands. Some states have adopted waterbank (e.g., Minnesota), and other landowner incentive programs.

What are some of the limitations upon existing wetland/bird habitat protection and restoration efforts?

- Many bird/wetland protection and restoration plans are, as yet, not implemented.
- Many “isolated” wetlands important to birds are not regulated or otherwise protected from fills, drainage, or development.
- In some instances, restored or protected wetlands have become toxic to migratory birds. The problems with selenium at Questerson National Wildlife Refuge are particularly well known. There is a fear that many stormwater and constructed wetlands may become toxic over time.
- Both private and public wetlands are subject to pollution, ground water pumping, off the road vehicle use from adjacent lands and waters which decrease the size and quality of wetlands as bird habitat.
- Invasive and nuisance plant and animal species which affect bird feeding and nesting are a problem in an increasing number of wetlands.
- Wetland managers are often unaware of the specific management needs for particular species of birds.
- Wetlands and birds may be protected from hunters, predators, pollution and other activities at one site but not at others over their yearly migration.
- Climate change including sea level rise and increased temperatures threaten many wetlands along the coasts and in the central portion of the U.S.



Many plans are not implemented

How can wetland managers better protect birds?

A. Federal, state, and local wetland managers need to better protect the full range of migratory bird species. See also the suggestions for bird habitat managers below which often apply equally to wetland managers. Some suggestions for wetland managers include the following:

- **Educate themselves.** Managers should educate themselves with regard to the protection and management needs for particular species and groups of birds; consult with birding groups.
- **Bring bird conservationists and birding groups into management planning through advisory committees.**
- **Target bird species and groups of species for protection.** Managers should target specific bird species and groups of bird species in wetland planning, protection, management, restoration, creation, and enhancement efforts.
- **More fully consider bird protection in regulatory permitting.** Managers should consider bird conservation protection in evaluating permit application and determining mitigation needs including mitigation ratios, the types of wetlands restored or created, and the characteristics of wetland sites.

- **Protect wetland buffers.** Managers should more actively protect adjacent uplands which are often critical to bird species.
- **Control invasive species.** Managers should more actively manage invasive species which limit use of wetlands by birds.
- **Plant food crops.** Managers can establish native plants that provide food for target bird species in managed wetlands and on adjacent lands.
- **Control cutting or disking or burning grasses during nesting season.** Managers should control cutting of grasses and trees, particularly during the nesting season to avoid disturbance of nesting birds.
- **Restore, create, and enhance wetlands which are prime bird habitat; incorporate bird restoration measures into restoration plans.** Managers can more fully incorporate bird conservation into restoration efforts.

How can birder conservationists and birding conservation organizations better protect and restore wetlands important to migratory birds?

A. Bird conservationists and birding organizations can help wetland managers better protect and restore wetlands important to migratory birds through a variety of activities:

- **Educate legislative decision-makers.** Bird conservations can educate legislators at national, state, tribal, and local levels concerning wetland habitat restoration efforts and programs which support such efforts (e.g., Wetland Reserve Program, Partners for Wildlife).
- **Identify bird/wetland areas of special significance; communicate this information to wetland managers.** The National Audubon Society in cooperation with other birding groups is doing this. Ducks Unlimited, the Manomet Center for Conservation Sciences and many other organizations are also identifying areas. These efforts should be continued with continued emphasis upon communication.
- **Summarize the technical literature.** Bird conservationists could more fully summarize the research and literature concerning the wetland characteristics and management needs for particular species of birds and groups of birds. They should also provide this information to wetland managers.
- **Prepare bird protection, restoration and management plans.** Bird conservationists could prepare more specific protection and management plans for specific species and groups of species; and communicate this information to federal, state, and local wetland managers. This is, to some extent, already being done but the results are not being fully communicated to wetland managers.



Birders can help wetland managers

- **Educate landowners.** Bird conservationist can help educate wetland landowners with regard to bird nesting, resting, breeding and feeding in these wetlands; enlist their help in protection and restoration.
- **Document use of wetlands by birds.** Bird conservationists may document use of publicly and privately owned wetlands by birds; present this information in zoning hearings, hearings on wetland permits, public land management planning hearings, etc.
- **Review and comment on wetland management plans.** Bird conservationists can review and comment on wetland management plans prepared by Refuge Managers, Fish and Wildlife staff, not for profits and others.
- **Conduct birding festivals.** Bird conservationists in cooperation with other organizations can organize and carry out birding festivals with wetland protection and restoration as one component to raise public awareness and develop support for wetland habitat initiatives.
- **Establish birding and wetland trails.** Bird conservationists along with other groups can establish wetland/birding trails with wetlands as a component to raise public awareness and develop support for wetland habitat protection.
- **Help provide access to wetlands on private and public property.** Bird conservationists can help provide access to wetlands through trails and boardwalks so that the public may be educated with regard to wetland and birding functions and values. They can work with local land trusts, departments of parks and recreation, state departments of conservation and natural resources, federal land management agencies, etc.
- **Control use of pesticides.** Bird conservationists can control the use of pesticides on their own lands. They can also help monitor and reduce use by public land management agencies, infrastructure agencies, and private landowners.
- **Report violations.** Bird conservationists can monitor wetlands and report violations of regulations to federal, state, and local regulators.
- **Participate in hearings.** They can participate in public hearings on permit applications to alter or destroy wetlands. They can contact local Corps of Engineer's office and request notices of any Section 404 and Section 10 permit applications within the area. Watch for notices for development permits (local zoning, state wetland permits) in local newspapers.
- **Work with land trusts.** Bird conservationists can work with local land trusts to better protect wetland and bird habitat. They can volunteer time, encourage landowners to donate wetlands or wetland easement on lands with important wetland and bird habitat, and help land trusts develop management plans.



Boardwalks provide access

How can wetland and birding communities better work together?

A. The wetland and birding communities have much in common. Yet, birding and wetland communities have often not coordinated their efforts. Improved communication and joint projects are key to improved future efforts. Examples include:



- Bird conservationists and wetland managers need to work jointly to develop and implement wetland/watershed protection, restoration and management **plans** for bird habitat on public lands (e.g., National Wildlife Refuges).
- Bird experts (academic, agency, not for profit) and wetland managers need to conduct joint **research** to determine the habitat requirements of various bird species and the effectiveness of various wetland management techniques in protecting and restoring bird habitat.
- Birders, bird experts and wetland managers need to jointly conduct wetland/bird **education and outreach** efforts for children, teachers, landowners, and the general public.
- Birders and wetland managers need to **work together to document use** of wetlands by various migratory birds, report violations to regulations, and manage restoration sites.

Where can wetland managers find out more about bird protection and restoration? Birders and birding groups find out more about wetlands?

A. See selected bibliography and web sites below.

SUGGESTED READINGS

Readings: Birds, Birding Organizations, Bird Habitat Requirements

A Citizens' Guide. Restore America's Estuaries, Washington, D.C. Available for free from Audubon Society Wetlands Campaign. Contact the National Audubon Society Wetlands Campaign for additional resources and materials to help you protect and conserve wetlands.

Audubon Society Wetlands Campaign. 1998. Funding for Habitat Restoration Projects: A Compendium of Current Federal Programs with Fiscal Year 1996-1998 Funding Levels.

Bateman, R., A. Diamond and R. Schreiber. 1989. Save the Birds. Breakwater Books. Large-format, color, fact-filled - lots of information about individual species and ideas for saving them.

Greenberg, R. and J. Reaser. 1995. Bring Back the Birds. Stackpole Books. How to help protect birds including volunteer opportunities to help with bird surveys, advocacy strategies, international partnerships, and a summary of some of the key federal laws intended to help protect birds.

- Laubhan, M. and L. Frederickson. 1993. "Integrated Wetland Management: Concepts and Opportunities". 323 Trans. 58th N.A. Wildl. & Natur. Resour. Conf. (1993)
- Millar, N. (Undated.) How to Organize a Birding or Nature Festival. American Birding Association. <http://www.americanbirding.org/programs/consfestmanual.htm>
- Parson, K, S. Brown, R. Erwin, H. Czech and J. Coulson (eds.). 2002. Waterbirds, Managing Wetlands for Waterbirds: Integrated Approaches. Special Publication 2. Vol. 25. Journal of the Waterbird Society.
- U.S. Geological Survey. 1996. National Water Summary on Wetland Resources. Water-Supply Paper 2425. Washington, D.C. Available at: <http://water.usgs.gov/nwsum/WSP2425/>. An excellent compendium of wetland science and management issues. Includes an informative overview of birds and wetlands by Robert E. Stewart. This may be obtained from the U.S. Government Printing Office, Superintendent of Documents, MS. SSOP, Washington, D.C., 20402-9328. Some articles concerning wetlands and birds also available on the USGS website at <http://www.usgs.gov/>.

Readings: Wetlands

- Bartoldus, C. 1999. A Comprehensive Review of Wetland Assessment Procedures: A Guide for Wetland Practitioners. Environmental Concern, Inc. St. Michaels, MD.
- Burke, D., E. Meyers, R. Tine, Jr. & H. Groman, 1988. Protecting Nontidal Wetlands. American Planning Association, Washington, D.C.
- Conservation Foundation. 1988. Protecting America's Wetlands: An Action Agenda. Washington, D.C.
- Kusler, J. & M. Kentula (eds.). 1990. Wetland Creation and Restoration: The Status of the Science. Island Press, Washington, D.C.
- Mitch, W. & J. Gosslink, 2nd Ed. 1993. Wetlands. Van Nostrand Reinhold, New York
- National Research Council. 1992. Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy. National Academy Press. Washington, D.C.
- National Research Council. 1995. Wetlands: Characteristics and Boundaries. National Academy Press. Washington, D.C.
- Strand, M. 1996. Wetlands Deskbook. Environmental Law Institute, Washington, D.C.
- Tiner, R. 1999. Wetland Indicators: A Guide to Wetland Identification, Delineation, Classification, and Mapping. Lewis Publishers, Washington, D.C.
- U.S. Environmental Protection Agency. 1990. Water Quality Standards for Wetlands. Office of Water Regulations and Standards. EPA/440/S-90-011. Washington, D.C.
- Want, W. 2004 update. The Law of Wetland Regulation. Clark Boardman Callaghan
- World Wildlife Fund. 1992. Statewide Wetland Strategies: A Guide to Protecting and Managing the Resource. Island Press. Washington, D.C.

SUGGESTED WEB SITES

Birds, Birding Organizations, Bird Habitat Requirements

<http://www.ducks.org/>

Ducks Unlimited. Many useful links.

<http://www.audubon.org/>

Audubon. Audubon maintains an important bird area program. Sites are identified based upon objective, scientific criteria. Sites are nominated by Audubon chapters, bird clubs, land trusts, and others.

<http://www.r6.fws.gov/nawm/nawmp.html>

U.S. Fish and Wildlife Service. Joint Ventures in the Mountain-Prairie Region. North American Waterfowl Management Plan.

<http://66.241.214.202/>

U.S. Fish and Wildlife Service. Shorebird Sister Schools Program.

<http://www.partnersinflight.org/>

Partners in Flight - U.S. Many useful links.

<http://www.shorebirdworld.org/template.php?g=6&c=3>

Shorebird Conservation Plans and Related Projects. Coordination is provided by the Manomet Center for Conservation Sciences

<http://www.manomet.org/WHSRN/>

Western Hemisphere Shorebird Reserve Network (WHSRN). This network brings together over 120 wildlife agencies, private conservation groups and other organizations.

<http://www.waterbirdconservation.org/>

Waterbird Conservation for the Americas. The Biological Resources Division of the U.S. Geological Surveys coordinates this effort.

<http://www.bsc-eoc.org/nabci.html>

North American Bird Conservation Initiative (NABCI). NABCI supports regionally-based conservation partnerships.

<http://www.birdsource.org/>

BirdSource. Birding with a Purpose. An interactive website designed and managed by Audubon and the Cornell Lab of Ornithology.

<http://www.birdingamerica.com/links.htm>

Birding Links. Excellent site.

<http://www.americanbirding.org>

American Birding Association. Many excellent materials and links.

<http://www.savingcranes.org/>

International Crane Foundation

<http://www.audubon.org/bird/iba/index.html>

Audubon. Important Bird Areas Program.

<http://www.npwrc.usgs.gov/resource/othrdata/chekbird/bigtoc.htm>

U.S. Geological Survey. Northern Prairie Wildlife Research Center. Bird Checklists of the United States. Excellent site.

<http://migratorybirds.fws.gov/mbstratplan/MBStratPlanTOC.htm> U.S. Fish and Wildlife Service. A Blueprint for the Future of Migratory Birds. Migratory Bird Program Strategic Plan 2004-2014.

<http://www.geocities.com/ntgreencitizen/birdsandwetlands.html>

Birds and Wetlands. If You Care About Birds, You Care About Wetlands.

<http://www.epa.gov/owow/birds/help.html>

U.S. Environmental Protection Agency. Bird Conservation. What You Can Do.

<http://www.epa.gov/owow/birds/basicstoc.html>

U.S. Environmental Protection Agency. Bird Conservation. Good paper on the Basics of Bird Conservation in the U.S.

<http://www.birdnature.com/bogs.html>

Wetlands: Bogs. Birds of bogs.

<http://www.birdnature.com/habitats.html>

Habitats of Birds. Multiple links here.

<http://www.birdnature.com/lakes.html>

Wetlands: Lakes and Ponds. Good list of birds which use wetlands, lakes, and ponds. See also:

<http://www.birdnature.com/marshes.html>: (Wetlands: Marshes and Swamps),

<http://www.birdnature.com/rivers.html>: (Wetlands: Rivers and Streams).

<http://birds.fws.gov/imbd/events.html>

U.S. Fish and Wildlife Service. International Migratory Bird Day 2005

<http://www.audubon.org/campaign/wetland/ecosystem.html>

Booklet setting forth the reasons why small wetlands are important to birds.

<http://www.nmnh.si.edu/BIRDNET/>

BIRDNET. The Ornithological Information Source Presented by the Ornithological Council. Many excellent links.

http://birds.cornell.edu/publications/birdscope/Autumn2003/What_You_Can_Do.htm

Birdscope. What You Can Do. What any motivated person can contribute to bird conservation. Many useful links as well.

<http://birds.cornell.edu/pifcapemay/erwin.htm>

Managing Wetlands for Waterbirds: How Managers Can Make a Difference in Improving Habitat to Support a North American Bird Conservation Plan.

<http://www.epa.gov/owow/wetlands/wqual/ppaindex.html>

U.S. Environmental Protection Agency. Wetlands. Bioindicators for Assessing Ecological Integrity of Prairie Wetlands (includes a section on birds as bioindicators).

<http://www.npwrc.usgs.gov/resource/1998/ripveg/ripveg.htm>
U.S. Geological Survey. Birds as Indicators of Riparian Vegetative Condition in the Western U.S.

<http://shorebirdplan.fws.gov/>
U.S. Fish and Wildlife Service. The U.S. Shorebird Conservation Plan.

<http://www.nabci-us.org/news.html>
North American Bird Conservation Initiative. The All~Bird Bulletin. Bird Conservation News and Information.

<http://www.nabci-us.org/>
Integrated Bird Conservation in the United States.

Web Sites: Wetlands

<http://www.mindspring.com/~rbwinston/wetland.htm>
Wetland Links. The most extensive set of wetland links on the web.

<http://www.whc.org/wetlandfund/>
Wetland Habitat Fund. Financial Assistance for Private Landowners. Wetland and Stewardship Links.

<http://plants.ifas.ufl.edu/search80/NetAns2/>
APIRS Online. The database of aquatic, wetland, and invasive plants.

<http://www.ks.nrcs.usda.gov/programs/wetlands/>
USDA Natural Resources Conservation Service. Better Wetlands.

<http://www.nwf.org/resourceLibrary/details.cfm?officeID=15D39898-FEF7-0077-300221CD0852182F&catID=8137823F-E039-A16A-E5DBAB0718203433>
National Wildlife Federation. Wetland site. Many good articles.

<http://partners.fws.gov/>
U.S. Fish and Wildlife Service. Partners for Fish and Wildlife Program.

<http://www.audubon.org/campaign/wetland/map.html>
Audubon at Work on Wetlands available from the Audubon Wetlands Campaign. A good resource for any wetlands advocate.

<http://www.fb-net.org/fb-links.htm>
Farm Bill Network. Links to wetland-related Farm Bill Programs.



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An electronic version of this brochure is available in PDF at:
http://aswm.org/pdf_lib/13_migratory_birds_6_26_06.pdf