

**ANNOTATED BIBLIOGRAPHY OF SCIENTIFIC STUDIES
IN SUPPORT OF CONSERVATION ORGANIZATION COMMENTS IN
SUPPORT OF A 404(C) VETO FOR THE YAZOO PUMPS
Prepared by American Rivers**

Studies are summarized by issue area for amphibians, birds, cross-cutting ecological issues, fish, mammals, recreation, subsistence fishing, and waterfowl. Hard copies or electronic copies of many of these studies have been inserted into the administrative record for the Clean Water Act 404(c) veto for the Yazoo Backwater Pumping plant.

AMPHIBIANS

Gibbons, J. Whitfield et al. "The Global Decline of Reptiles, Déjà Vu Amphibians." *BioScience* 50.8 (2000): 653-666.

Available: <http://www.uga.edu/srelherp/staff/Winne%20-%20gibbons%20et%20al%202000.pdf>

Summary: The authors survey a wide selection of literature on declining amphibian populations around the world and find evidence for continued annual losses. Habitat loss is the primary factor for population declines.

Semlitsch, Raymond. "Principles for Management of Aquatic-Breeding Amphibians." *The Journal of Wildlife Management* 64.3 (2000): 625-631.

Abstract: <http://cat.inist.fr/?aModele=afficheN&cpsidt=1440994>

Summary: This paper discusses the threats to local and regional amphibian populations and proposes critical elements for an effective management plan. Changes in hydrology are particularly damaging to amphibian populations. Fragmentation of habitat by human activities prevents dispersal of populations and decreases the probability of wetland recolonization.

Snodgrass, Joel et al. "Influence of Hydroperiod, Isolation, and Heterospecifics on the Distribution of Aquatic Salamanders (Siren and Amphiuma) among Depression Wetlands." *Copeia* 1999.1 (1999): 107-113.

Abstract: <http://cat.inist.fr/?aModele=afficheN&cpsidt=9949305>

- Summary: The study finds that occurrence of individual species is positively correlated with the amount of time a wetland holds water during a year.

Snodgrass et al. "Relationships among Isolated Wetland Size, Hydroperiod, and Amphibian Species Richness: Implications for Wetland Regulations." *Conservation Biology* 14.2 (2000): 414-419.

Abstract: <http://cat.inist.fr/?aModele=afficheN&cpsidt=1363837>

- Summary: This study examines relationships between wetland size, wetland hydroperiod, and relative amphibian species richness. It finds that amphibian species richness and species types differ between different hydro-period wetlands. Wetlands with different hydroperiods will contain different species, and short-hydroperiod wetlands support a unique group of amphibian species. It concludes that

“hydroperiod length should be included as a primary criterion for wetland regulations” and advocates conserving a diversity of wetlands that represent the entire hydroperiod gradient.” Some specific findings include: “In wetlands that dry annually but contain water for a relatively long period each year, invertebrate predator populations have time to develop and eliminate rapidly developing, conspicuous feeding species. Slower growing, less conspicuous feeding species are selected for in medium-hydroperiod wetlands but are out-competed and do not have time to develop to drought-resistant stages in ephemeral wetlands. In permanent wetlands, vertebrate predators are present and eliminate all but the most slow-developing, cryptic-feeding species. Slow-developing, cryptic-feeding species are restricted to permanent wetlands by competition with faster developing species and by an inability to reach a drought-resistant stage before wetlands dry.”

BIRDS

Burdick, David et al. “Faunal Changes and Bottomland Hardwood Forest Loss in the Tensas Watershed, Louisiana.” *Conservation Biology* 3.3 (1989): 282-292.

Abstract: <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1523-1739.1989.tb00088.x>

- Summary: The study compares bird populations to assess the impacts of bottomland hardwood forest loss across the Tensas watershed. They find that the number of species and population densities decreased with losses of forested area. They recommend using a cumulative impact management plan to decrease future extinctions.

Burke, D.M. and E. Nol. “Landscape and Fragment Size Effects on Reproductive Success of Forest-Breeding Birds in Ontario.” *Ecological Applications* 10.6 (2000): 1749-1761.

Abstract: <http://www.jstor.org/pss/2641236>

- Summary: This study examines reproductive success of forest-breeding birds in multiple fragmented and continuous forest sites. They find that woodlot size is a key predictor of reproductive success and recommend preservation of large forest tracts to prevent further population declines in these species.

Gabbe, Aaron, Scott Robinson and Jeffrey Brawn. “Tree-Species Preference of Foraging Insectivorous Birds: Implications for Floodplain Forest Restoration.” *Conservation Biology* 16.2 (2002): 462-470.

Abstract: <http://www.blackwell-synergy.com/doi/abs/10.1046/j.1523-1739.2002.00460.x>

- Summary: The authors examine foraging behavior of 13 tree species, many (if not all) of which are present in the Mississippi Lowland Forest Ecoregion. They find that most of the birds foraged selectively in certain trees. Less common bird species were more selective than more common species. Less common trees were the most popular.

Graves, G.R. "Habitat Characteristics in the Core Breeding Range of the Swainson's Warbler." *Wilson Bulletin* 114 (2002): 210-220.

Abstract: <http://cat.inist.fr/?aModele=afficheN&cpsidt=14420909>

- Summary: This study investigates the physiognomic and floristic characteristics of Swainson's Warbler habitat in the southeast. The largest populations were found in floodplain forest with understory thickets and gaps in the canopy.

Guilfoyle, M.P. "Management of Bottomland Hardwood Forests for Non-game Bird Communities on Corps of Engineers Projects." *EMRRP Technical Notes Collection* (ERDC TN-EMRRP-SI21), U.S. Army Corps of Engineers Research and Development Center, Vicksburg, MS, 2001.

Available: <http://el.erdc.usace.army.mil/elpubs/pdf/si21.pdf>

- Summary: This paper discusses the distribution of non-game bird species throughout southeastern bottomland hardwood forests.

Hoover, Jeffrey. "Water Depth Influences Nest Predation for a Wetland-Dependent Bird in Fragmented Bottomland Forests." *Biological Conservation* 127.1 (2006): 37-45.

Abstract: <http://cat.inist.fr/?aModele=afficheN&cpsidt=17269847>

- Summary: The study examines nesting attempts by prothonotary warblers (present in the Yazoo River area) in fragmented bottomland forests. The study finds that nest predation has a strong, negative effect on annual reproductive output. Nest predation decreased as water depth increased, especially over 60 cm of water. Habitat fragmentation, wetland destruction and stream channelization increases nest predation levels.

Lyons, James. "Population Ecology and Foraging Behavior of Breeding Birds in Bottomland Hardwood Forests of the Lower Roanoke River." Ph.D. Thesis. Virginia State University, 2001.

Available: <http://scholar.lib.vt.edu/theses/available/etd-03142001-184756/unrestricted/etd.pdf>

- Summary: This thesis includes an extensive examination of breeding bird populations in bottomland hardwood forests. It includes a discussion of nesting and foraging behaviors.

Mancke, Ralph and Thomas Gavin. "Breeding Bird Density in Woodlots: Effects of Depth and Buildings at the Edges." *Ecological Applications* 10.2 (2000): 598-611.

Abstract: <http://www.jstor.org/pss/2641118>

- Summary: This study analyzes breeding bird populations in relation to the proximity of woodlot edges and buildings. A majority of the 36 species examined had lower densities in closer proximity to woodlot edges and buildings. The authors conclude that it is important to preserve large forest areas in order to preserve bird populations.

Matthysen, Erik and David Currie. "Habitat Fragmentation Reduces Disperser Success in Juvenile Nuthatches." *Ecography* 19.1 (1996): 67-72.

Abstract: <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1600-0587.1996.tb00156.x?journalCode=eco>

- Summary: This study shows that vacant territories in large forests were rapidly colonized by pairs of juvenile nuthatches while vacant territories in forest fragments were less likely to be occupied.

Pashely, David and Wylie Barrow. "Effects of Land Use Practices on Neotropical Migratory Birds in Bottomland Hardwood Forests." In: Finch, Deborah M.; Stangel, Peter W. (eds.). *Status and management of neotropical migratory birds: September 21-25, 1992, Estes Park, Colorado. Gen. Tech. Rep. RM-229. Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, U.S. Dept. of Agriculture, Forest Service: 315-320.*

Available: http://www.fs.fed.us/rm/pubs_rm/rm_gtr229/rm_gtr229_315_320.pdf

- Summary: The article discusses southeastern bottomland hardwood forests, the history of land use and management recommendations. It includes a discussion of microhabitat features that influence the distribution and abundance of Neotropical migrants.

Robinson et al. "Regional Forest Fragmentation and the Nesting Success of Migratory Birds." *Science* 267.5206 (1995): 1987-1990.

Abstract: <http://www.sciencemag.org/cgi/content/abstract/267/5206/1987>

- Summary: The authors find that forest fragmentation increased nest predation and parasitism among cowbirds. They recommend preservation of unfragmented core forest areas to protect migratory bird populations.

Sallabanks, Rex, Jeffrey Walters, and Jaime Collazo. "Breeding Bird Abundance in Bottomland Hardwood Forests: Habitat, Edge, and Patch Size Effects." *The Condor* 102.4 (2000): 748-754.

Abstract: <http://www.bioone.org/perlserv/?request=get-pdf&doi=10.1650%2F0010-5422%282000%29102%5B0748%3ABBAIBH%5D2.0.CO%3B2>

- Summary: The study examines breeding bird densities in bottomland hardwood forests in North Carolina. Patch size and edge did not have a large effect on abundance, but forest type did. A number of species also found in the Yazoo region are included in the analysis.

Snell-Rood, Emilie and Daniel Cristol. "Avian Communities of Created and Natural Wetlands: Bottomland Forests in Virginia." *The Condor* 105.2 (2003): 303-315.

Abstract: <http://www.jstor.org/pss/1370549>

- Summary: The study compares avian communities in a variety of natural and created wetlands. They find that created wetlands have a lower diversity of avian species and fewer species of conservation concern. The authors hypothesize that unnatural hydrology and retarded vegetation development account for the differences.

Twedt, Daniel et al. "Impact of Forest Type and Management Strategy on Avian Densities in the Mississippi Alluvial Valley, USA." *Forest Ecology and Management* 123 (1999): 261-274.

Abstract: <http://cat.inist.fr/?aModele=afficheN&cpsidt=1940806>

- Summary: The authors examine avian territory densities in mature bottomland hardwood stands and young cottonwood plantations in the Mississippi Alluvial Valley. Species richness, diversity and density were higher in the bottomland hardwood stands. Timber harvest within hardwood forests, however, pushed a number of species towards cottonwood plantations. Bottomland hardwood forests are twice as valuable for bird conservation as cottonwood plantations.

Twedt, Daniel et al. "Nest Survival of Forest Birds in the Mississippi Alluvial Valley." *Journal of Wildlife Management* 65.3 (2001): 450-460.

Abstract: <http://www.jstor.org/pss/3803097>

- Summary: This study compares daily nest survival, nest predation and brood parasitism rates of forest birds in bottomland hardwood forests and intensively management cottonwood plantations. While nest success did not differ between the two habitats for some species, average daily survival for 19 species in hardwood forests exceeded that of 18 species in cottonwood plantations over the course of the study. Timber harvests reduced nest success for species that nest in the forest midstory and canopy.

Twedt, Daniel, and R. Randy Wilson. Management of Bottomland Hardwood Forests for Birds. Proceedings of 2007 Louisiana Natural Resources Symposium, 13 Aug. 2007, Louisiana State University Agricultural Center.

- Summary: This study describes desired forest conditions for avian species in bottomland hardwood forests. Many species prefer large trees, gaps in the canopy and a diversity of other species.

Wakeley, JS and TH Roberts. "Bird Distributions and Forest Zonation in a Bottomland Hardwood Wetland." *Wetlands* 16.3 (1996): 296-308.

Abstract:

<http://mdl.csa.com/partners/viewrecord.php?requester=gs&collection=ENV&recid=3963910&q=author%3A%22Wakeley%22+intitle%3A%22Bird+distributions+and+forest+zonation+in+a+bottomland+...%22+&uid=1225470&setcookie=yes>

- Summary: This study samples songbird population throughout the forested wetland of the Cache River in Arkansas. They investigate population distributions in relation to wetness gradient. They find that tupelo/bald cypress areas support a greater number of species than oak-dominated zones.

Weller, M. W. *Wetland Birds: Habitat Resources and Conservation Implications*. Cambridge, UK: Cambridge University Press, 1999.

- Summary: The book describes the behaviors of wetland birds, how they're impacted by a variety of factors including human activity and the implications for conservation efforts. Among other conclusions, the author notes that larger wetlands are more heterogeneous which may create a more diverse bird population.

Whited, D., S. Galatowitsch, J. R. Tester, K. Schik, R. Lehtinen, J. Husveth. "The Importance of Local and Regional Factors in Predicting Effective Conservation Planning Strategies for Wetland Bird Communities in Agricultural and Urban Landscapes."

Landscape and Urban Planning 49 (2000): 49-65.

Abstract: <http://cat.inist.fr/?aModele=afficheN&cpsidt=1446846>

- Summary: The authors find that connectedness of wetlands and road density are important measures for predicting bird assemblages in agricultural areas. Maintaining wetland connections is important for preserving wetland avian diversity.

CROSS-CUTTING ECOLOGY

Ainslie, William B. 2002. Forested Wetlands *in* Wear, David N.; Greis, John G., eds. 2002. Southern forest resource assessment. Gen. Tech. Rep. SRS-53. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 635 p.

- Summary: Summarizes the scientific knowledge regarding the ecological values and services provided by forested wetlands in the southern United States, and the historical losses and current status of these vital resources.

Andrén, H. "Effects of Habitat Fragmentation on Birds and Mammals in Landscapes with Different Proportions of Suitable Habitat: A Review." *Oikos* 71 (1994): 355-366.

Abstract: <http://www.jstor.org/pss/3545823>

- Summary: The study demonstrates that habitat loss has differing impacts on bird and mammal species depending on the degree of fragmentation throughout the area or region. In highly fragmented landscape, loss of habitat is compounded by patch size and isolation, and the impacts on a species are greater.

Constanza, R., et al., The value of the world's ecosystem services and natural capital. 1997. *Nature* Vol. 387: 253-260.

- Summary: Provides an estimate of the value of the ecosystem services provided by the world's natural resources. The study concludes that its estimates are very conservative. It places an average value on swamps/floodplains worldwide at \$19,580 per hectare per year.

Davis, J.A. and R. Froend. "Loss and Degradation of Wetlands in Southwestern Australia: Underlying Causes, Consequences and Solutions." *Wetlands Ecology and Management* 7.1-2 (1999): 13-23.

Abstract: <http://www.springerlink.com/content/w614h70n40rm9151/>

- Summary: Wetland loss has been associated with the direct loss of species diversity due to destruction and lowered recruitment of infringing vegetation communities and displacement of fauna. The effects of the loss or lowered recruitment of these plants ripples throughout the trophic ladder: fauna that depend on wetland plants as a source of food or shelter perish or migrate, resulting in the loss of fauna that are predaceous, and so on.

DeWalt, E.R., C. Favret, D. Webb. "Just How Imperiled Are Aquatic Insects? A Case Study of Stoneflies (Plecoptera) in Illinois." *Conservation Biology and Biodiversity*. Ann. Entomol. Soc. Am. 98(6): 941-950 (2005).

- Summary: Nearly 5,000 historical and contemporary specimen records of stoneflies (Plecoptera) from Illinois demonstrated that this fauna is highly imperiled, and has suffered dramatic losses, boding poorly for aquatic insect communities in North America and elsewhere. Losses include extirpations of 77 total species, a rate of loss that is higher than for either mussels or fish in Illinois. Another 19 species are critically imperiled. Large river habitats and historically prairie regions have experienced the greatest proportional losses of species. "In most cases the losses can be attributed to hydrologic modifications such as levee, lock, and dam construction on the large rivers and channelization, coupled with tiling of fields, in agricultural areas." Stoneflies can be used as a surrogate for other aquatic insect, and this makes it clear that tremendous losses of aquatic insects have already occurred and which continue to occur. *Note*: Stoneflies and other aquatic insects are important food sources for fish, birds, and some mammals.

Gibbs, James. "Wetland Loss and Biodiversity Conservation." *Conservation Biology*. 14.1 (2000): 314-317.

Available: <http://ecology.botany.ufl.edu/adveco/downloads/Gibbs%202000.pdf>

- Summary: This study examines the extent to which wetland loss alters the metrics of wetland mosaics. It argues that preservation of all wetlands larger than 1 acre is required to retain wetland density sufficient to maintain wetland biota.

Haag, Wendell et al. "Occurrence of the Rayed Creekshell, *Anodontoidea radiatus*, in the Mississippi River basin: Implications for Conservation and Biogeography." *Southeastern Naturalist* 1.2 (2002): 169-178.

Available: http://www.srs.fs.usda.gov/pubs/ja/ja_haag002.pdf

- Summary: The study demonstrates the presence of this freshwater mussel in the upper Yazoo River drainage, arguing that the presence of this rare species demands conservation.

Heitmeyer, Mickey and Karen Westphall. "An Evaluation of Ecosystem Restoration and Management Options for the Calhoun and Gilbert Lakes Divisions of Two Rivers National Wildlife Refuges." Puxico, MO: Gaylord Memorial Laboratory Special Publication No. 13, 2007.

Available: <http://www.fws.gov/midwest/tworivers/documents/TwoRiversEvaluation.pdf>

- Summary: This report discusses the Illinois-Mississippi River Confluence ecosystem and impacts from human activities throughout the 19th and 20th century and evaluates restoration options. It discusses how alteration of area hydrology decreased food resources and altered wildlife populations.

Meyer, Judy L. et al., Where Rivers Are Born: The Scientific Imperative for Defending Small Streams and Wetlands (Feb. 2007).

Available:

<http://www.americanrivers.org/site/DocServer/WhereRiversAreBorn1.pdf?docID=182>

- Summary: Discusses the ecological services provided by wetlands and small streams, and makes it clear that they are essential for maintaining the physical, chemical, and biological integrity of the nation's waters.

Robinson, C.T., K. Tockner, and J.V. Ward. "The Fauna of Dynamic Riverine Landscapes." *Freshwater Biology* 47.4 (2002): 661-677.

Abstract:

<http://www.ingentaconnect.com/content/bsc/fwb/2002/00000047/00000004/art00010>

- Summary: The article discusses the distribution of fauna in aquatic ecosystems, emphasizing their dependence on a dynamic and varying seasonal hydrology. It also discusses the relationship between diverse refugia within a riverine ecosystem and biodiversity.

Schramm, H.L., Jr. et al. *Nitrogen and Phosphorus Sequestration in the Lower Mississippi River*

- Summary: This study describes a nitrogen and phosphorus transport model for the lower Mississippi River floodplain that can be used to evaluate the potential benefits of different water management scenarios. The model is based on the fact that alterations to the Mississippi River that have restricted the original floodplain, and reduced the height and duration of the floodpulse and floodplain inundation have reduced the ability of the floodplain to sequester nitrogen and phosphorus. The study concludes that "longer retention of nitrogen- and phosphorus-rich flood water on the floodplain and in floodplain lakes, particularly during warmer seasons, should both accelerate and increase nitrogen and phosphorus removal from the water. Further, protracted inundation and warmer conditions would increase the diversity and abundance of aquatic biota and enhance reproduction and active feeding of fishes adapted to natural annual thermal and hydrological conditions." The study also concludes that "restoring the floodpulse to historic conditions may reduce the downstream transport of nitrogen and phosphorus."

FISH

Brown, A.V., K. B. Brown, D. C. Jackson and W. K. Pierson. 2005. Lower Mississippi River and its tributaries. Pages 231-281 *in* A. C. Benke and C. E. Cushing, editors. Rivers of North America. Elsevier Academic Press, New York.

- Summary: Describes the characteristics of the Lower Mississippi River and its tributaries, including the Yazoo River. It notes that human induced changes, including loss of bottomland hardwood forests and flood protection efforts, have had adverse impacts on fisheries in the region.

Flotemersch, J. E., D. C. Jackson. 2003. Seasonal foraging by channel catfish on terrestrially burrowing crayfish in a floodplain-river ecosystem. *Proceedings of the International Symposium on the Ecology of Fluvial Fishes. International Journal of Ecohydrology & Hydrobiology* 3(1):61-70.

- Summary: This study, carried out on channelized and non-channelized sections of the Yockanookany River in Mississippi finds that “[d]ecoupling floodplains from the river by flood control activities such as channelization, dredging and levee construction can modify channel catfish stock interactions with terrestrially burrowing crayfish and reduce potential benefits from this foraging. Channel catfish stocks in decoupled sections of a partly decoupled floodplain-river ecosystem may exert more energy in search of resources made available by river inundation onto the floodplain; which may depress fish growth and reproduction rates. Therefore, maintaining, restoring, or enhancing the coupling of a river with its floodplain could promote conservation of riverine channel catfish stocks.”

Flotemersch, J. E., D. C. Jackson and J. R. Jackson. 1999. Channel catfish movements in relation to river channel-floodplain connections. *Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies* 51(1997): 106-112.

- Summary: Channel catfish (a generalist) in the Yockanookany River in Mississippi “will move along the continuum to locate foraging opportunities on or emanating from the floodplain and associated backwaters.” The channel catfish studied actively sought reaches of the river that were connected to the floodplain, but the fish studied never swam from a stretch of the river connected to the backwater to a stretch of the river disconnected from the backwater.

Hand, G. R. and D. C. Jackson. 2003. Blue sucker stock characteristics in the upper Yazoo River basin, Mississippi, U.S.A. *Fisheries Management and Ecology* 10:147-153.

- Summary: “Conservation of the blue sucker in the upper Yazoo River basin should include actions that ensure the functional integrity of this floodplain river ecosystem and elimination of channel dredging throughout the basin” because channel dredging reduces overbank flooding and alters other floodplain river ecosystem processes. “Blue suckers depend on the functional integrity of large river ecosystems. In Mississippi’s upper Yazoo River basin, this functional integrity and subsequent fish production capability depend on seasonal flooding” and the incorporation of new land-derived organic material in to the river system, among other things. Readily decomposed materials originating from floodplains and riparian corridors contributes

to fisheries dynamics by providing a direct source of food for fishes and by the processing of these materials by benthic macroinvertebrates that themselves become forage items for fishes both on the floodplain and within river channels. More durable organic materials provide attachment sites for invertebrates, and cover and refuge for fishes.

Jackson, D. C. 2005. Fisheries dynamics in temperate floodplain rivers. Pages 201-212 in L. H. Fredrickson, S. L. King, and R. M. Kaminski, editors. *Ecology and Management of Bottomland Hardwood Systems: The State of Our Understanding*. University of Missouri-Columbia. Gaylord Memorial Laboratory Special Publication No. 10. Puxico, Missouri.

- Summary: “Floodplain river ecosystems are some of the most productive inland fishers in the world.” Life history and production dynamics of fishes in river floodplain ecosystems are linked primarily to hydrologic regimes and heterotrophic processes. For fishes, flooding increases aquatic habitat as well as the amount of inundated organic materials from terrestrial areas (including seasonally inundated lands) that form the foundation for the biological dynamics of most rivers. Hydrologic factors influenced floodplain river fish stocks in the Yazoo River basin more than climatic factors did. The warmer waters found in flooded backwater locations stimulate biological activity of aquatic invertebrates and fishes in these systems. The presence of aquatic invertebrates in the relatively warmer backwater areas encourages spawning of fishes in the inundated floodplain, and the earlier that spawning can take place the longer the fish can remain on the floodplain and the higher the recruitment potential for the rivers’ fish stocks. Flooding also introduces snags which provide important instream habitat for fish and attachment substrates for invertebrates. Studies suggest that reproductive success of early spring spawners will be poorer when there is reduced spring flooding. A 10 year data set for the Yalabousha River showed that channel catfish abundance was positively influenced by flooding and negatively influenced by drought and channel dredging. “In both tropical and temperate rivers, fish yields per unit surface area are considerably greater in rivers with flood pulses and floodplains than in nearby impoundments where flood pulses are reduced or absent.”

Jackson, Donald. *Fisheries Dynamics in the Yazoo River Basin. Sustaining Livelihoods and Biodiversity in the New Millennium*. Vol. II. Ed. Welcomme, L. and T. Petr. Bangkok: Food and Agricultural Organization, 2004.

Available: <http://www.fao.org/docrep/007/ad526e/ad526e0b.htm#bm11>

- Summary: Summarizes the characteristics of fisheries and human populations of the Yazoo River Basin and discusses how human activities have influenced the ecosystem. It concludes that fisheries are negatively impacted by activities that alter stream hydrology, convert riparian zones to cropland and disconnect rivers from floodplains. It cites studies that conclude that the regions’ “backwater fisheries were primarily the domains of African-Americans” while the river channel fishery was primarily the domain of European Americans (page 108).

Jackson, D. C. 2004. Natural history and fisheries. Pages 15-35 in C. Tucker and J. Hargreaves, editors. *Biology and Culture of Channel Catfish*. Elsevier Publishers. Amsterdam.

- Summary: This study summarizes the natural history of channel catfish. It finds that stream channel dredging that causes both in-channel habitat modification and “modifications to hydrological regimes through reduced later exchanges of flood waters onto the floodplain” (i.e., flood-pulses) “can result in significant negative impacts to channel catfish stocks.” Ecosystem and stock recovery times after dredging can vary, but it is estimated to take 20-25 years in the lower Mississippi River Valley. High discharges are “known to enhance fisheries associated with flood-plain river ecosystems.” In the upper Yazoo River basin, lag times of 1-2 years have been documented between flooding and increased channel catfish abundances. These lag times reflect the time for recruitment of channel catfish into the fishery.

Jackson, D. C. and Q. Ye. 2000. Riverine fish stock and regional agronomic responses to hydrologic and climatic regimes in the upper Yazoo River basin. Pages 242-257 in I. G. Cowx, Editor. *Management and Ecology of River Fisheries*. Fishing News Books. Blackwell Science. London.

- Summary: The study demonstrates that flooding does not significantly influence cotton or soybean production in the Yazoo River basin and might actually benefit this production in the long term. The study also shows that flooding benefits fisheries in the area. The study looks at the riverine hydrological and regional climatic regime relationships to agriculture (cotton, soybeans) and the principal riverine fish stocks in the upper Yazoo River basin. Hydrologic factors were found to have a greater influence on fish stocks than climatic factors. There was a positive relationship between flooding and fish stock characteristics (i.e., more and bigger fish) for bigmouth buffalo, smallmouth buffalo and channel catfish, though there was a lag period of 1-2 years between flooding and stock response due to recruitment requirements. Much of the productive potential for fisheries in floodplain river ecosystems is determined by the dynamics overbank flooding and riparian vegetation. “Floods resulted in reduced areas planted (primarily in cotton), but had little influence on crop yield and total annual production.” During the 31 year period from 1964 to 1994, “no factor associated with flood events adversely influence production of cotton and soybeans. However, with regard to soybeans, the amount of area flooded two years prior to a crop was positively related to soybean yield. From a long-term perspective therefore, the data suggest that flooding may benefit agricultural enterprises associated with soybean production.” Over shorter time periods, however, a different pattern appeared to emerge, which may explain the public perception that flooding adversely impacts agriculture in the area. During the 5 year period from 1990-1994, high precipitation was negatively related to area planted in cotton and the percent of the area planted in soybeans that was actually harvested. However, flooding during this period did not significantly affect overall yield of cotton and soybeans. Indeed, cotton yield was positively correlated with maximum area flooded during the same year, likely due to increased soil moisture which is a positive for cotton.

Jackson, J. R. and D. C. Jackson. 1999. Macrohabitat use by catfishes in a southeastern United States floodplain-river ecosystem. Pages 215-222 in E. R. Irwin, W. A. Hubert, C. R. Rabeni, H. L. Schramm, Jr. and T. Coon, editors. Catfish 2000: proceedings of the international ictalurid symposium. American Fisheries Society Symposium 24, Bethesda, Maryland.

- Summary: Relative abundance of yellow bullhead catfish was greater in the oxbow lake than in the main channel of the Yackanookany River in Mississippi. Yellow bullhead tend to be found in pools and backwaters of lotic habitats and in lakes and reservoirs. Catch rates of yellow bullhead were also greatest during the winter when water levels were typically high and the river and backwater areas were connected. "Floodplain-river backwater areas provide habitat for a diverse assemblage of fish species" and can provide quality fishing opportunities that are sometimes overlooked. In efforts to enhance alternative fishing experiences, "fisheries resources in remote backwater habitats of floodplain-river ecosystems should not be overlooked"

Jackson, D. C. 1997. Processes and linkages in southeastern U. S. streams. Proceedings of the Mississippi Water Resources Conference 27:11-13.

- Summary: Describes interactions between rivers and their floodplains that are essential for river and fisheries health. It makes clear, among other things, that floodplain rivers must be allowed to flood because the connection with the floodplain is vital for fisheries and other resources.

Jackson, D. C. 1993. Floodplain river fish stock responses to elevated hydrological regimes in unimpacted stream reaches and stream reaches impacted by clearing, dredging and snagging. Proceedings of the Third International Symposium on the Ecology of Fluvial Fishes. Polish Archives of Hydrobiology 40 (1):73-81.

- Summary: Fish stocks throughout the floodplain reaches of the Yalobusha River in Mississippi "generally responded favorably to high flow regimes and associated overbank flooding. However, in stream reaches impacted by clearing, dredging and snagging, the response was less than that associated with unimpacted reaches, especially for catfishes (Ictaluridae)." Positive relationships have been demonstrated between the area of bottomland hardwood forests susceptible to flooding and fish abundance in the Mississippi River and its tributaries (e.g. the Yazoo River System." "Fish production in floodplain rivers is strongly influenced by the extent and duration of flooding. Productive potentials for stream reaches in floodplain rivers depend on the lateral exchange of water and nutrients between the floodplain and the main channel rather than the inefficient processing of organic materials upstream. Flood pulses generate a moving littoral in the aquatic-terrestrial transition zone which prevents stagnation and allows rapid recycling of organic matter and nutrients. Detrital processing and primary production are subsequently stimulated and in turn establish the energetic foundation supporting the respective fishery." (internal citations omitted).

Jackson, D. C., N. J. Brown-Peterson and T. D. Rhine. 1993. Perspectives for rivers and their fisheries resources in the upper Yazoo River Basin, Mississippi. Pages 255 - 265 in L. W. Hesse, C. B. Stalnaker, N. G. Benson and J. R. Zuboy, editors. Proceedings of the Symposium on Restoration Planning for Rivers of the Mississippi River Ecosystem. Biological Report 19. U.S. Department of the Interior. National Biological Survey.

- Summary: The entire upper Yazoo River basin system in the Delta region of western Mississippi is “an integrated floodplain river ecosystem” that has been modified for flood control purposes, primarily to protect and expand agricultural lands. . . . Flood events, however, still occur, primarily during winter and early spring” and in conjunction with mild climate and soft alluvial soils “this flooding encourages natural restoration of stream habitat features . . . and promotes nutrient exchange dynamics conducive for development and maintenance of exploitable fish stocks.” The study summarizes the significant values of overbank flooding for fisheries including the introduction of allochthonous organic materials and snag substrate; and the stimulation of detrital processing and primary production, which in turn establishes the energetic foundation supporting secondary production and fisheries. “Fish production in floodplain rivers is strongly influenced by the extent and duration of flooding. Flooding stimulates fish production because fish use the floodplain as a spawning ground, food source, and refuge.”

Jackson, D. C., R. V. Kilambi, and P. J. Polechla. 1982. The impact on drought on Lake Elmdale largemouth bass. Proceedings of the Annual Conference of the Southeastern Association of Fish and Wildlife Agencies 36:272-279.

- Summary: Low water levels, sustained high temperatures, and potential increases in predatory pressure adversely affected largemouth bass in a small, shallow, eutrophic impoundment in Arkansas. The study notes that small impoundments provide excellent opportunities to observe the effects of naturally occurring and artificially managed parameters on a fishery.

O’Connell, Martin. “Direct Exploitation of Prey on an Inundated Floodplain by Cherryfin Shiners (*Lythrurus roseipinnis*) in a Low Order, Backwater Stream.” *Copeia* 2003.3 (2003): 635-645.

Abstract: <http://www.jstor.org/pss/1448715>

- Summary: The study finds that prey items for the Cherryfin Shiner are found at significantly higher densities in floodplains than in stream channels. Fishes in small streams can exploit food resources in briefly-inundated floodplains. However, if connectivity between the channel and floodplain is removed, access to food will be reduced.

Schorr, M. S. and D. C. Jackson. 1997. Floodplain fisheries resources under tribal jurisdiction of the Mississippi Band of Choctaw Indians. Proceedings of the Mississippi Water Resources Conference 27:56-62.

- Summary: The study finds that fish stocks exploited by the Choctaw Indians in the Pear River channel and its oxbow lakes in southeast Mississippi are “dependent upon the integrity of an intact floodplain river ecosystem. Flooding recharges shallow aquifers, distributes nutrient-rich materials throughout the floodplain, and stimulates

fish production (via spawning and growth).” The study concludes that the sustained abundance and diversity of these fisheries resources “are dependent on seasonal flooding from the Pearl River.” In floodplain river ecosystems, the “duration and magnitude of flooding and associated river-floodplain exchanges of water, nutrients, and fishes can significantly influence fish production. . . . Fish catches from floodplain river systems are positively correlated with water levels for the current and previous years.” It also finds that data supports the “postulate that most biological activity and the physical storage or retention of nutrients and organic matter may occur in lateral backwater areas.”

Schramm, H.L., Michael A. Eggleton. “Applicability of the flood-pulse concept in a temperate floodplain river ecosystem: Thermal and temporal components.” *River Research and Application* 22: 543-553 (2006).

- Summary: This study discusses the importance to fisheries of overbank flooding occurring for long enough periods of time during the right time of the year so that the floodplain waters reach the optimum temperatures required for sufficient fish growth and feeding. The study shows that protracted flooding when the water temperature is warmer (15 degrees C) results in significant growth increases for blue catfish (a floodplain species). The study concludes that restoration of ecological function should include “strategies designed to detain and warm floodplain waters” in order to recouple the thermal and flood cycles. “Such strategies should include maintaining or re-establishing connectivity of exiting waterbodies within the leveed floodplain. Some detailed information from the study include the following: “The consequences of an earlier and abbreviated flood pulse may be exacerbated in temperate rivers, which show distinct warm-cold cycles.” Cutoffs and levees in the lower Mississippi River “may function to reduce fishery productivity benefits from a more prolonged and thermally desirable flood pulse.” River stage data from Vicksburg, Mississippi shows that the average period of floodplain inundation prior to construction of bendway cutoffs from 1933-1942 (which reduced connectivity to the floodplain), was 4-5 months (early February through early July), compared to 2 months (mid-March to mid-May) following cut off construction. Under current hydrograph conditions in the lower Mississippi River, the duration of floodplain inundation when water temperature exceeds 15 degrees C is only about 1 month per year on average. “The abbreviated period of warm, flooded conditions also would be expected to adversely affect recruitment of numerous warmwater fishes.” Levees along the lower Mississippi River compound this problem by constraining floodwaters and reducing and impeding water warming.

Schramm, H.L., Jr. “Status and Management of Mississippi River Fisheries” U.S. Geological Survey, Mississippi Cooperative Fish and Wildlife Research Unit Mississippi State, Mississippi.

- Summary: Describes the alterations carried out on the Mississippi River for navigation and flood protection and the status of fisheries in both the upper and lower reaches of the river. The study concludes that future fisheries production “may be threatened by loss of aquatic habitat, altered spatial and temporal aspects of floodplain inundation and nuisance species invasions.” It also concludes that

conservation and management of fisheries and aquatic resources in the Mississippi River will require substantial investments in effective programs that would address the management issues outlined in the study.

Shephard, S. and D. C. Jackson. 2005. Channel catfish maturation in Mississippi streams. *North American Journal of Fisheries Management* 25:1467-1475.

- Summary: Biological productivity in floodplain rivers is directly related to soil fertility because soil fertility is a determinant of the existence of extra-channel organic materials that are transported into the river with flooding. Sexual maturity in catfish is reached sooner in systems that have greater fertility or a longer growing season, but this effect is modified by annual climatic variability. For example, “a year of diminished rainfall may restrict floodplain access and associated foraging opportunity and hence limits energy for growth and sexual maturation.”

Turner, Thomas et al. “Temporal and Spatial Dynamics of Larval and Juvenile Fish Abundance in a Temperate Floodplain River.” *Copeia* 1994.1 (1994): 174-183.

Abstract: <http://www.jstor.org/pss/1446683>

- Summary: The study describes the seasonal variance in fish species populations in the floodplain and channel of the Tallahatchie River.

Winemiller, K.O. “Floodplain River Food Webs: Generalizations and Implications for Fisheries Management.” *Sustaining Livelihoods and Biodiversity in the New Millennium. Vol. II*. Ed. Welcomme, L. and T. Petr. Bangkok: Food and Agricultural Organization, 2004.

Available: <http://www.fao.org/docrep/007/ad526e/ad526e0l.htm>

- Summary: Discusses food webs in various types of floodplain river systems and finds that loss of habitat can “have unpredictable effects on food web dynamics and community structure” and that “maintenance of natural flood regimes is important for biodiversity conservation and sustainable harvest of fishes.”

MAMMALS

U.S. Fish and Wildlife Service. Louisiana Black Bear Recovery Plan. Jackson, Mississippi, 1995.

Available: http://www.bbcc.org/web/images/stories/information/pdf/Recovery_plan.pdf

- Summary: This document describes the habitat needs of black bears and recommends a plan for recovery of the population. Remoteness is an important feature of black bear habitat, and it requires preservation of intact bottomland hardwood forests. The study also describes the impacts of human activities on the species.

Van Why, Kyle. "Feasibility of Restoring the Louisiana Black Bear (*Ursus americanus luteolus*) to Portions of Their Historic Range." M.Sc. Thesis. Louisiana State University, 2003.

Available: http://etd.lsu.edu/docs/available/etd-0526103-151738/unrestricted/Van_Why_thesis.pdf

- Summary: This thesis examines the movement and habitat of Louisiana black bears and makes management recommendations.

Weaver, Keith and Michael Pelton. "Denning Ecology of Black Bears in the Tensas River Basin of Louisiana." *Bears: Their Biology and Management* 9.1 (1994): 427-433.

Abstract: <http://www.jstor.org/pss/3872729>

- Summary: The paper describes denning habits of the Louisiana Black Bear over several years. Based on the results, the authors argue for conservation of forested wetlands and den trees.

RECREATION

U.S. Fish and Wildlife Service, Division of Economics. 2007. Banking on Nature 2006: The economic benefits to local communities of national wildlife refuge visitation.

- Summary: This report highlights the recreational opportunities provided by National Wildlife Refuges across the country and analyzes the national and local community economic benefits derived from visitation to 80 National Wildlife Refuges.

Grado S.C., et al. 2001. Economic Impacts of Waterfowl Hunting on Public Lands and at Private Lodges in the Mississippi Delta. *Wildlife Society Bulletin*. Vol. 29, No. 3, (Autumn, 2001), pp. 846-855

- Summary: The study documents expenditures by waterfowl hunters in the Delta of Mississippi during the 1998-1999 waterfowl hunting season. Hunters were surveyed at wildlife management areas, national wildlife refuges, and private lodges within the 6-county study region, and provide us with a 97% response rate. Economic impacts generated from waterfowl hunting expenditures totaled \$71 9,016 for the 1998-99 waterfowl hunting season. This is a conservative estimate as it does not include not include expenditures related to private-land hunting for waterfowl (e.g., lease fees). Extrapolating these expenditures statewide would give a statewide conservative estimate of a total economic impact of waterfowl hunting of \$27.4 million.

Jones, D.W., J.K. Ring, et al. 2006. Land valuation increases from recreational opportunity: a study of Mississippi rural land sales. *Proc. Annu. Southeast. Assoc. Fish and Wildl. Agencies* 60:49-53.

- Summary: The study documents surveyed sales values of private rural lands that were purchased for recreational uses in Mississippi from 2002 to 2005. The majority of land parcels surveyed were located near or in the Mississippi River Delta region and had a dominant cover type of either forest or agricultural crops. The study finds that recreational uses contributed an average increase of 36% (US\$808.73/ha) in property value. Characteristics that influenced sales prices were hectares of bottomland hardwood forests, pine-hardwood forests, and wildlife supplemental food plots. The study concludes that “wildlife and fish recreation contributes to sales values of Mississippi properties” and that “conservation and management of wildlife and fish resources can produce quantifiable increases in land values and that consideration of value added by outdoor recreation is part of a cost-effective approach to sustainable economic development in Mississippi.”

SUBSISTENCE FISHING

Brown, Ralph B. and John F. Toth, Jr. 2001. Natural Resource Access and Interracial Associations: Black and White Subsistence Fishing in the Mississippi Delta, *Southern Rural Sociology* Vol. 12. pp. 81-110.

- Summary: This study uses qualitative to examine “how racial divisions between black and white fishers factor into access, harvesting strategies, and use of natural resources in subsistence fishing activities in the Mississippi Delta.” The study finds that while both races engage in subsistence fishing for many of the same reasons (autonomy and economic independence) that clear differences appear in their access and harvesting strategies and their utilization of fish caught.

WATERFOWL

Delnicki, Don and Kenneth Reinecke. “Mid-Winter Food Use and Body Weights of Mallards and Wood Ducks in Mississippi.” *The Journal of Wildlife Management* 50.1 (1986): 43-51.

Abstract: <http://www.jstor.org/pss/3801486>

- Summary: The study examines the diet and weight of mallards and wood ducks across habitat and seasons. It finds that diets changed with water conditions and conclude that continued drainage of the Mississippi Delta will negatively impact waterfowl foraging.

Heitmeyer, M.E. “The Importance of Winter Floods to Mallards in the Mississippi Alluvial Valley. *Journal of Wildlife Management* 70 (2006): 101-110.

Abstract: <http://cat.inist.fr/?aModele=afficheN&cpsidt=17724341>

- Summary: This study finds that winter floods of bottomland hardwood forests in the Mississippi Alluvial Valley are beneficial to wintering mallards. The author urges protection of rivers and floodplain habitats as a strategy to conserve continental populations.

Kaminski, Richard, Robert Alexander and Bruce Leopold. "Wood Duck and Mallard Winter Microhabitats in Mississippi Hardwood Bottomlands." *The Journal of Wildlife Management* 57.3 (1993): 562-570.

Abstract: <http://cat.inist.fr/?aModele=afficheN&cpsidt=3767319>

- Summary: The study looks at the difference in microhabitat wood duck and mallard populations use in Mississippi bottomland hardwoods. The study quantifies aspects of forest structure, relative availability of potential foods (e.g., acorns and invertebrates), and water depth at microhabitats of wood ducks and mallards in greentree reservoirs in Mississippi during the winters 1988-90. The study found that species' microhabitats did differ. Compared with wood ducks, mallards used microhabitats with greater openness (i.e., less canopy closure, tree density, and understory cover), lower tree species diversity, and shallower water. The study concludes that its "results provide additional support for the continued need to conserve southern forested wetlands."

Reinecke, K.J. et al. "Mississippi Alluvial Valley." L.M. Smith, R.L. Pederson, and R.M. Kaminski, editors. *Habitat Management for Migrating and Wintering Waterfowl in North America*. Lubbock, Texas: Texas Tech University Press, 1989.

- Summary: This chapter discusses migrating waterfowl use of landscapes in the Mississippi Alluvial Valley. It details their biological needs and habitat as well as past management approaches.