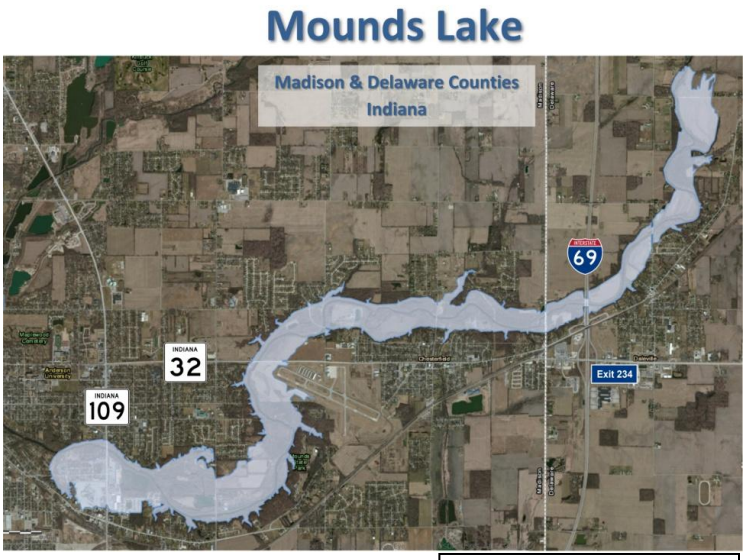
Mounds Lake
Policy Brief and Position Statement
July 2014

Background

The proposed Mounds Lake project would create a reservoir with a surface area of over 2,000 acres by building an earthen dam on the West Fork White River within the city limits of Anderson, backing water up for approximately seven miles into Delaware County. It would affect areas of Anderson, Chesterfield, and Daleville, as well as parts of Madison and Delaware Counties. The main purpose of the reservoir is to provide economic development opportunities for the City of Anderson. Secondary benefits of the reservoir would include: creation of a potable water supply, flood control, and outdoor recreation. The projected cost in 2011 was $300 to $350 million. [1] More recent estimates have increased the cost to $400 million.[2]

West Fork White River in project vicinity

[1] Mounds Lake project site, www.moundslake.com, accessed March 18, 2014
[2] Indiana Finance Authority Financial Aid Agreement with Anderson Corporation for Economic Development, February 10, 2014



Source: Moundslake.com

The Mounds Lake reservoir was first proposed by the Corporation for Economic Development of Madison County (CED)[3] in 2010. The CED completed a Phase I feasibility study in 2011, which was a preliminary conceptual study of the dam proposal. [4] This study concluded that there were no "fatal flaws", from a technical, environmental, or economic standpoint that would prevent the project from going forward.

In October 2013, the State of Indiana awarded $600,000 in state funds which will fund the entire cost for a Phase II study. This second study now underway will include more detailed analysis including an environmental review, information on engineering, community impact, community visioning, and a financial report. [5]

Environmental resources affected by the project

In the area of the proposed Mounds Lake, the West Fork White River is a free-flowing stream. The river has a very modest gradient of 2 to 3 feet per mile. At Anderson, the river's drainage area is 406 square miles. Land use in the watershed includes urban areas – Muncie and Anderson; small towns -- Chesterfield and Daleville; hog and poultry operations and corn and bean production.[6,7]

[3] The Corporation for Economic Development is a non-profit organization which promotes business investment in Madison County and works closely with the city and county governments in this activity. See http://www.cedanderson.com/about/history/

[4] Mounds Lake project site

[5] Mounds Lake project site

[6] Upper White River Watershed Regional Watershed Assessment and Planning Report, November 2011, Center for Earth and Environmental Studies, IUPUI, and Empower Results, LLC

[7] National Agricultural Statistics Service, U.S. Department of Agriculture, http://www.nass.usda.gov/Statistics_by_State/Indiana/Publications/Annual_Statistical_Bulletin/1213/13countydata.asp

The West Fork White River is bordered by a wooded shoreline (riparian zone) consisting of mostly mature hardwood trees, (50-60 years and older) shrubs and other riparian vegetation. This forested shoreline on both sides of the river is largely unbroken along the entire stretch of the river to be inundated by the proposed reservoir, with the exception of a cleared area adjacent to the Anderson airport.[8] Wildlife found along and nearby the river include whitetail deer, beaver, the endangered Indiana bat, and birds including kingfisher, great blue heron, wood ducks and other waterfowl, and a variety of wood warblers.[9]

There are substantial wetland areas along the river in the area affected by the proposed reservoir, based on National Wetland Inventory Maps. However, the exact acreage of wetlands that would be destroyed will need to be determined by field inspections.[10]

The river in Madison County and downstream supports a high quality warm water fishery, as a result of excellent pool, riffle and run structure in the river channel.[11] Native fish species living in this stretch of the river include smallmouth and largemouth bass, crappie, and bluegill. A fishery survey for Madison, Hamilton and Marion Counties reveals an increasing number of darter and minnow species, indicating improving water quality.[12] Five endangered freshwater mussels – clubshell, northern riffleshell, rabbitsfoot, sheepnose, and rayed bean – have been

[8] On site observation, Tim Maloney, May 2013
[9] Indiana County Endangered, Threatened and Rare Species List for Delaware County, Indiana Natural Heritage Data Center, Indiana DNR
[10] National Wetlands Inventory, U.S. Fish and Wildlife Service, http://www.fws.gov/wetlands/Data/Mapper.html
[11] West Fork White River, Madison, Hamilton and Marion Counties, 2011 Fish Research Report, Indiana DNR, 2012
[12] West Fork White River, Madison, Hamilton and Marion Counties, 2011 Fish Research Report

recorded as occurring in the river in Madison and Delaware counties.[13] More field studies are needed to determine the current mussel populations in the river.

Along the river are several public recreational properties, including 290 acre Mounds State Park, which borders the river for about one and three-quarter miles. Other park resources which would be affected by the proposed reservoir include: Walbridge Acres Park in Chesterfield, Bicentennial Park, and Rangeline Preserve, a popular mountain biking area in Anderson.[14]

Mounds State Park contains some of the best examples of mound and earthwork structures in Indiana, with 10 mounds and earthwork features constructed by the prehistoric Adena and Hopewell cultures.[15] Based on expected impacts to the prehistoric sites at Mounds State Park, the Indiana Archaeology Council is opposing the proposed reservoir, stating, "Because of the loss of irreplaceable archaeological sites due to the impoundment of the proposed Mounds Lake, the members of the Indiana Archaeology Council are adamantly opposed to its development."[16]

The West Fork White River is classified as an outstanding river within the reach of the project area. The river qualified because it is a state designated canoe trail, and has been identified by the Indiana natural heritage program as having outstanding ecological importance.[17] This river segment was identified in the Nationwide Rivers Inventory (1982) by the National Park Service as being qualified for inclusion in the National Wild and Scenic Rivers System.[18]

Water quality has generally improved in the West Fork White River, but stretches of the river in Delaware and Madison Counties are impaired for high bacterial levels, PCBs, and diminished aquatic life (known as impaired biotic communities)[19], according to IDEM's draft 2012 303(d) impaired waters list.[20]

[13] Indiana County Endangered, Threatened and Rare Species List for Delaware County and Madison County, Indiana Natural Heritage Data Center, Indiana DNR
[14] Anderson Reservoir Feasibility Study, Anderson Corporation for Economic Development//DLZ, Dec. 8, 2011
[15] Indiana DNR Mounds State Park guide and map, Indiana DNR, February 17, 2010
[16] Indiana Archaeology Council, May 2014
[17] Outstanding Rivers List for Indiana, Indiana Natural Resources Commission, Information Bulletin #4
[18] Nationwide Rivers Inventory, National Park Service, http://www.nps.gov/ncrc/programs/rtca/nri/states/in.html
[19] Biological communities – the fish and aquatic invertebrates, such as insects, in a stream – are indicators of the cumulative effects of activities that affect water quality conditions over time. A stream listing for Impaired biotic communities means that one or both of the aquatic communities are not as healthy as they should be. IBC is not a source of impairment but a symptom of other sources. See http://www.in.gov/idem/nps/3365.htm#ibc
[20] 2012 Indiana Impaired Waters 303d list, Indiana Department of Environmental Management, U.S. EPA http://www.in.gov/idem/nps/2639.htm

Environmental Impacts

Dams "adversely impact the structure and function of river ecosystems."[21] The upstream impacts may be more obvious – converting a river into a lake – but downstream impacts are also severe, although less obvious.

Upstream impacts: loss of river aquatic habitat and changes in aquatic species

When a river ecosystem is replaced by a lake ecosystem, there will be corresponding changes in the species that occupy these systems. Free-flowing water is replaced by slow-moving or still waters. Pool, riffle, and run structures, and the gravel river bottom, are eliminated, replaced by deepwater habitat with a silt-covered bottom. Depending on the depth of the lake, temperature variations based on depth will affect aquatic life that is adapted to the natural temperature cycling in a river. [22]

When free flowing water from the White River or tributaries reaches the new lake, it will slow substantially, allowing suspended sediments to begin dropping out of the water column. Many of the tributaries that drain into the White River at the project area are "ditches", stream channels which have been modified to enhance agricultural drainage.[23] Besides surface runoff from crop fields, these ditches also receive subsurface drainage from field tiles which are commonly used in farmlands in relatively flat terrain. These tiles drain excess water laden with sediment, nutrients and pesticides.

Over time, man-made reservoirs become sediment traps, and nutrients that build up in the slow moving water also contribute to growth of blue-green algae, also known as toxic cyanobacteria.[24] Increased algae growth and decomposition of accumulating organic material and sediment depletes oxygen levels, which in extreme cases causes fish kills.[25] This accumulation of sediment and nutrients also leads to excessive growth of aquatic vegetation such as American lotus, water lily and milfoil, which choke shallow water areas and make them unsuitable for water recreation.

The only remedy for sediment accumulation is periodic dredging, which is very costly. For example, a project to dredge a reservoir --much smaller than the proposed Mounds Lake --in Charlottesville, Virginia, cost roughly $3.5 million to remove forty years of accumulated

[21] Poff, N. Leroy, and Hart, David, How Dams Vary and Why It Matters for the Emerging Science of Dam Removal, *Bioscience*, August 2002
[22] Poff and Hart
[23] Anderson Reservoir Feasibility Study, Anderson Corporation for Economic Development//DLZ, Dec. 8, 2011
[24] Center for Earth and Environmental Studies, IUPUI, Algae Information Resources, http://cees.cs.iupui.edu/Research/Water_Resources/CIWRP/Algae_Information/index.htm
[25] Wisconsin Department of Natural Resources, Blue-Green Algae, http://dnr.wi.gov/lakes/bluegreenalgae/

sediment.[26] Periodic dredging will be needed to keep new sediment from accumulating in the future.

Downstream impacts

The Michigan Department of Natural Resources sums up the downstream effects of a dam on a river as follows: "Rivers emerging downstream of a dam may be substantially altered from the character of the river entering an impoundment above a dam. Aquatic community health is closely linked to water temperature tolerances and impounded waters may discharge at significantly higher or lower temperatures than normally encountered in the stream. Flow patterns reflecting normal high and low water conditions over time may also be fundamentally altered, affecting stream channel configuration, fisheries habitat, and many other physical and biological processes. Stream changes induced by dams and other watershed conditions are often reflected in the fish community. Native and desirable stream species are almost always displaced in river segments affected by dams. Dams also limit the normal movement of fish, other aquatic organisms, and system organic material."[27]

During dry periods or droughts, the presence of a dam will exacerbate the impacts of low water levels downstream by restricting flow[28], unless the dam owner is required to release water to maintain adequate in-stream flows to protect water quality and aquatic life.

The U.S. Fish and Wildlife Service, in April 2014 comments on the Mounds Lake project, said, "The project will devastate 7 miles of riverine aquatic habitat, converting it into lake habitat which is unsuitable for many river fish and mussel species."[29]

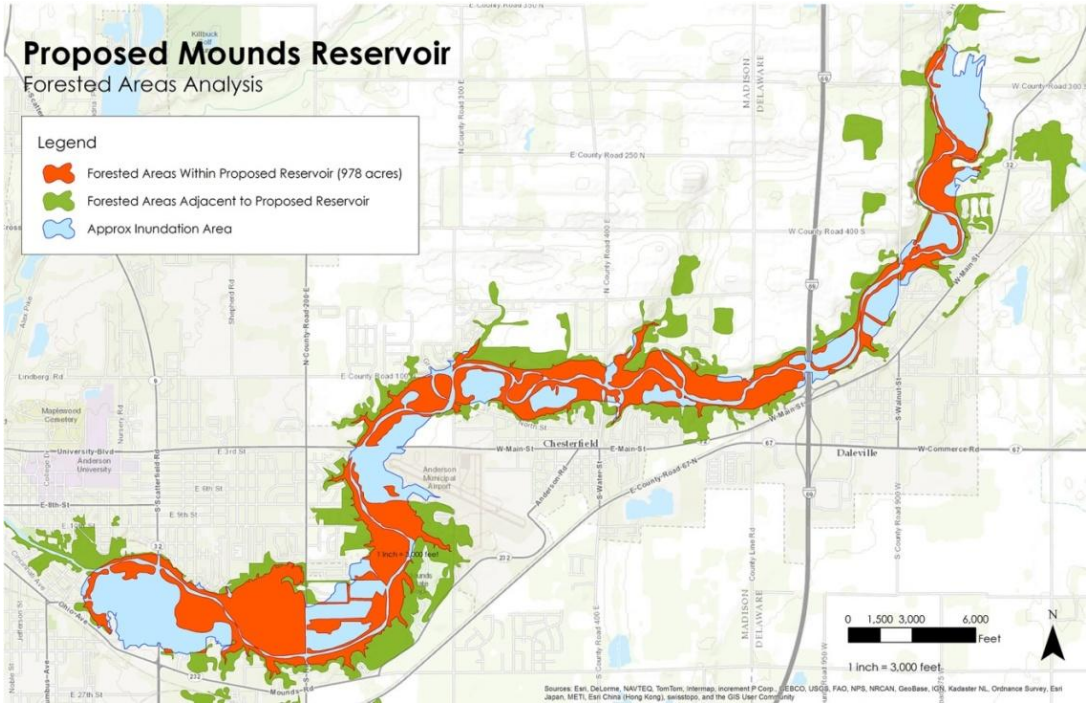
Loss of forest, wetland, and other riparian habitat

Besides impacts to the aquatic ecosystem, the neighboring terrestrial habitats will be dramatically altered as well. Hundreds of acres of mature riverine hardwood forest will be lost once the lake is filled. Forested wetlands along the river, among the most productive ecosystems known[30], will be flooded and destroyed. An analysis prepared by the ecological consulting firm Sensible Ecology estimated that the proposed Mounds Lake will destroy roughly 978 acres of hardwood forest. See map on following page.

Mounds State Park will be severely affected by the proposed reservoir. In addition to the loss of the park's mature floodplain forest which extends for one and three-quarter miles along the

[26] Rivanna Water and Sewer Authority, http://www.rivanna.org/dredging/index.htm
[27] Michigan Department of Natural Resources, Environmental Impacts of Dams, http://www.michigan.gov/dnr/0,4570,7-153-10364_52259_27415-80298--,00.html
[28] Low water flows in rivers result in less dilution of pollution discharges, and lower levels of dissolved oxygen which is essential to aquatic life.
[29] U.S. Department of Interior, Fish and Wildlife Service, Comments prepared under the authority of the Fish and Wildlife Coordination Act, submitted to DLZ Indiana, LLC, April 24, 2014.
[30] With ample water, and the intersection of several different habitat types – aquatic and terrestrial –wetlands typically contain high numbers of species, as well as rare species adapted to wetland habitats.

river, the proposed lake will drown the sixteen acre Mounds Fen Nature Preserve, which protects an extremely rare and fragile natural community – a "hanging" fen – with a floristic quality comparable to the best natural sites found in Indiana.[31,32]



These impacts will require mitigation, but this does not mean that what is lost is replaced. New forest can be planted along the lake shoreline, but a field of seedlings or saplings will not replace the loss of mature floodplain forest for 100 or more years.[33] Nor do stable lakeside habitats replace the dynamic and complex natural systems found along rivers and their floodplains. Wetland mitigation – restoring or re-creating wetlands -- is an inexact science that often does not replace the full function and value of wetlands destroyed by a development project. For example, an Indiana Department of Environmental Management review of ten years of mitigation site outcomes revealed that one-fifth of the 345 sites reviewed had not been completed, and mitigation work at another one-fifth of the sites had not even been attempted.[34]

[31] Mound Fen Nature Preserve information sheet, Indiana Department of Natural Resources Div. of Nature Preserves

[32] Tungesvick, Kevin, Ruch, Donald, Torke, Byron, Badger, Kemuel, Rothrock, Paul, Additions to the flora of Mounds State Park and Preserve, Madison County, Indiana, Indiana Academy of Science, July 20, 2012

[33] Wetlands and Habitat Mitigation Guidelines, Indiana Natural Resources Commission, Information Bulletin #17,http://www.in.gov/legislative/register/20061213-IR-312060562NRA.xml.pdf

[34] Robb, James T., Indiana Wetland Compensatory Mitigation Inventory, Final Report, IDEM, revised May 2000,

Water supply issues

In recent decades, central Indiana has had sufficient water supply to meet its needs, for residential, commercial and industrial consumption. The region's principal water utility, Citizens Water, obtains 84% of its water supply from surface waters, and about 16 % from groundwater.[35] Even with constant population growth in the region, baseload customer demand, principally for indoor use – drinking water and other household or business use—has been declining, largely due to increased water fixture and appliance efficiency: showerheads, toilets, and washing machines. Seasonal water use, such as irrigation for lawns, varies from year to year but contributes to peak demand levels occurring during dry summer months.[36]

Citizens, and other area water utilities such as Carmel Water Utility, are undertaking projects to reduce demand, improve system and infrastructure efficiency. For example, Citizens has adopted both a Waterwise water conservation plan, and a drought management plan.[37] It is also working to reduce water loss throughout the system – by upgrading its distribution system to reduce leaks from water pumps and pipes. It is undertaking efforts to reduce peak demand, when seasonal water use such as lawn irrigation is at its highest, and surface water sources at their lowest flow. Citizens' average daily water production exceeds average daily water demand. During times of drought, peak daily demand can approach production capacity, so addressing peak use and demand should be a priority for the system.

Water utilities generally need to address both the demand for water – reducing peak consumption through smarter irrigation systems, more efficient water fixtures and appliances, customer education, and adoption of customer rate structures that encourage conservation; and on the supply side – improving their distribution systems to reduce water loss and by matching supply with existing demand; and by enhancing supply through lower cost strategies such as targeted reuse of wastewater and better use of existing sources. Major new investments in supply, such as a new reservoir, should only be considered once all the above strategies have been implemented.

However, further study of water supply and demand in central Indiana is warranted, and is the subject of several studies underway at this time. The Indiana General Assembly has, for several years, reviewed the topic of statewide water supply and the adequacy of existing water supply and use data. In 2012, the General Assembly in Senate Enrolled Act 132 directed the Indiana Utility Regulatory Commission (IURC) to survey water utilities in Indiana about levels of water use by their customers, and needed infrastructure investments. The recommendations of the IURC's 2013 report to the General Assembly urge that the state:

- Begin integrated water resources management;
- Promote efficiency, sound management and best practices for water utilities;

[35] Citizens Water Drought Management Plan, September 2013
[36] Citizens Water Drought Management Plan
[37] Citizens Water

- Require drought planning by utilities;
- Determine if it is cost effective to develop more precise statewide water supply data. [38]

The Indiana Chamber of Commerce has commissioned its own water supply study, in light of areas of the state they believe are already low on water resources, and expected population growth in Indiana. The Chamber study aims to identify water sources and how to get water to areas of the state that need it.[39]

Conclusion and position statement

Based on the foregoing, the Hoosier Environmental Council finds:

1. Constructing a dam and impounding roughly seven miles of the West Fork White River will have substantial adverse environmental impacts;
2. There is no demonstrated need for a major new reservoir to meet water demands in the foreseeable future;
3. The proposed project would have significant impacts on the recreational, tourism, and fisheries economy, and impair valuable ecological services that the river and its watershed provide to this region.
4. A free flowing river and adjoining natural lands can provide sustainable economic development opportunities which need to be more fully explored as an alternative to the Mounds Lake project.

Therefore, the Hoosier Environmental Council recommends that an alternative to a dam and reservoir be pursued that creates a sustainable plan for protection and enjoyment of the West Fork White River in Delaware and Madison counties.

[38] Indiana Utility Regulatory Commission, 2013 Water Utility Resource Report: A Look at Indiana's Water Supply and Resource Needs, http://in.gov/iurc/files/Water_Utility_Resource_Report-_FINAL-_8282013_with_cover%281%29.pdf

[39] Indiana Chamber of Commerce Studying Water Resources, WIBC radio, October 28, 2013, http://www.wibc.com/news/story.aspx?ID=2068810