

State of the Fox River Report

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State of the Fox River Report 2004

An introduction to the State of the Fox River Report

The Fox River and its tributaries stand at a critical crossroads. In February 2004, over 150,000 residents in Aurora were required to boil their water as a result of high coliform bacteria levels in the Fox River. Recent studies have documented the extirpation of aquatic macroinvertebrates including certain species of freshwater mussels and winter stoneflies from the Fox River system. In the 2004 State of the Fox River Report, we discuss how the deterioration of the Fox River is negatively affecting the quality of life for area residents, as well as the biodiversity within the watershed. The report also describes how the lack of a holistic approach to decision making in the watershed has perpetuated the river's deteriorating condition, and suggests ways we can take a more holistic approach. Finally, the report outlines the actions that must be taken now by stakeholders at all levels in order to protect the river.

An overview of the Fox River watershed and its threat

The Fox River originates in southwest Wisconsin, near Menomonee Falls, travels 70 miles through Wisconsin and an additional 115 miles in Illinois before joining the Illinois River at Ottawa. In Illinois, the Fox River drains 1,720 square miles and includes parts of 11 counties. The Fox River has three major segments in Illinois. The upper portion of the river is the most pristine part of the watershed. It is considered a Resource Rich Area by the Illinois Department of Natural Resources (IDNR). The landscape along the upper Fox River is relatively flat. Abundant glacial lakes are found in this region, and the Fox River is buffered by wetlands in many areas. The middle portion of the watershed contains the most urban/built up land, and includes six Kane County cities with populations ranging from 15,000 to 150,000. Here the Fox River travels through a relatively narrow river valley. The landscape of the lower portion of the Fox contains the most row crops and grasslands. It is in this lower portion of the river that canoeists can explore the sandstone "dells."

The Fox River is a valued natural resource providing over 200,000 Illinois residents with drinking water and many others with a wide range of recreational opportunities including power boating, paddling, hunting, fishing, and wildlife watching. The Fox River - Chain O' Lakes region is one of the United States' busiest inland recreational waterways with over 27,000 boat stickers issued yearly. The watershed is also a valuable ecological resource as a home to hundreds of species of plants and animals including over 140 Illinois threatened and endangered species. Illinois' rarest



The Fox River provides drinking water for over 200,000 people in the Fox River Valley. Photo Credit: S. Bennett, Friends of the Fox River

wetland communities, including fens and bogs, are found in the watershed.

While the Fox River is a valued natural resource, it also faces threats from urban development, excess nutrients, and dams. One of the major threats to the Fox River is rapid population growth and subsequent urban development. For example, the population of Kane County is predicted to grow from 404,119 in 2000 to 692,346 in 2030, an increase of 71%. Population growth and subsequent urban development can result in nutrient enrichment of the Fox River and its tributaries from both runoff from urban landscapes and increases in wastewater discharges that do not treat for nutrients. High levels of nutrients, such as phosphorus and nitrogen, negatively influence drinking water quality and dissolved oxygen levels.

In Illinois, the Fox River has 15 dams, and between the Chain O' Lakes and Dayton, dams have impounded nearly 47% of the river's length. The impoundments (i.e., pools) behind dams have a less diverse animal community and poorer water quality relative to free-flowing portions of the river. For example, impounded portions of the river have fewer species and individuals of fish, and daily dissolved oxygen levels are more likely to be below Illinois Environmental Protection Agency (IEPA) standards at impounded sites.

As a result of rapid urban development, nutrients, dams, and other factors, in the 2002 Illinois Water Quality Report, the IEPA categorized the entire Fox River from the Wisconsin state line to the river's mouth at Ottawa as "impaired." Frequent causes of impairment of different segments of the Fox include the presence of polychlorinated biphenyls (PCBs) in fish tissue, flow alteration (caused by dams), habitat alteration, siltation, organic enrichment, low dissolved oxygen, suspended solids, and nutrients (nitrogen and phosphorus).



The Fox River is deteriorating and is affecting the quality of life of its residents

Rapid urban development, nutrients, and dams already pose a threat to the economy and well-being of the watershed's residents. As a result of high levels of total coliform bacteria in the drinking water, from February 2 - February 15, 2004, residents of Aurora were subjected to a precautionary boil order. In February, levels of ammonia and coliform bacteria were at extremely high levels in the Fox River, and the levels of chlorine used at the water treatment plant in Aurora were not high enough to disinfect the coliform levels present. The boil order resulted in the closure of restaurants, and the distribution of bottled water at local schools. A report prepared by Weston Solutions indicated that the majority of the blame for the boil order could be placed on the deterioration of water quality in the Fox River.

Pollution in the Fox River also limits citizens' consumption of fish species such as channel catfish and carp. Specifically, high levels of PCBs have been found in the tissue of these fish species, and high levels of PCBs can negatively impact child development.

High levels of nutrients in the Fox River also influence the economy and well-being of residents. During low flow periods (July - October), the Fox River has been found to carry a high nutrient load. From South Elgin and through the remaining downstream segments of the Fox, total phosphorus levels are near the 90th percentile for Phosphorus Zone 4 Midwestern streams recommended guidelines. High levels of nutrients, such as phosphorus, can lead to increased algae populations. Increased algae populations, in turn, reduce drinking water quality. More specifically, most of the off tastes and odors that are associated with river water are due to algal biosynthetic compounds such as methyl-isoborneol (MIB) and geosmin. Odor and taste problems caused by algae can be controlled with treatment with carbon; however, it is not without substantial costs incurred at water treatment plants for taste and odor control.

Another unwanted by-product of algae is that they can release algal toxins into the water. High concentrations of potentially toxic cyanobacteria are present in raw water samples, and these algae can produce liver toxins and neurotoxins that can affect the heart, brain, and respiration.

Rapid urban development also affects the frequency and severity of flooding. Clearly, a large amount of rain in a short period of time is the major cause of flooding. However, the loss of open space such as riparian habitat along the banks of the river and tributaries, and the draining of wetlands, has eliminated the natural flood control the Fox River ecosystem would normally provide. The effect that the loss of riparian habitat has on communities can be examined by comparing the severity of May 2004 flooding in the highly urbanized Des Plaines River watershed to the east, which was named a state disaster area, with the less urbanized Fox River watershed to the west. For example, flooding in Gurnee



Citizens can become more involved in improving the health of the Fox River by participating in a clean-up event near their home.

along the Des Plaines River resulted in damage to dozens of buildings, road closures, and school closings. Much of the Des Plaines River and its tributaries are now categorized as D-streams or limited aquatic resources. The Fox River, on the other hand, is predominately a C-stream, a moderate aquatic resource, with many tributaries in the upper watershed considered B-streams, highly valued aquatic resources. Big Rock Creek and the North Branch of Nippersink Creek are A-rated streams, unique aquatic resources. There is no reason to expect that the Fox River will not follow the Des Plaines River's fate of being a limited aquatic resource and experiencing an increased susceptibility to flooding if action to mitigate the negative effects associated with rapid urban development is not aggressively pursued in the watershed.

About Friends of the Fox River

Friends of the Fox River is a non-profit organization dedicated to building a watershed of caretakers in the Fox River Valley. We are concerned citizens taking action to protect and improve the quality of the Fox River and its tributaries. We attend and testify at public hearings on water quality issues, and review and comment on permits for municipal and commercial discharges in the Fox and its tributaries. Friends of the Fox River sponsors the Fox River Watershed Monitoring Network. The Monitoring Network encourages environmental action through education by providing water quality monitoring training, lending equipment, compiling water quality data collected by its volunteers, and taking action to protect water quality when negative trends are identified through monitoring efforts. Our organization also organizes semi-annual, watershed-wide Fox Rescue river cleanups that remove 6,000-8,000 pounds of garbage each year, hosts special events such as Monitor with your Mother and water quality education programs, and distributes a quarterly newsletter.



The Fox River is deteriorating and is affecting the biodiversity in the watershed

Rapid urban development, nutrients, and dams already pose a threat to the biodiversity found within the watershed. The effects of pollution are vividly illustrated by the dramatic decline of freshwater mussel and winter stonefly populations in the Fox River watershed. Schanzle et al. (2003) compared the freshwater mussel fauna collected by Matteson from 1957-1958 with the Schanzle et al. study from 1997-2001. At the same ten stations used in both studies, there was a 63% decline in mussel abundance and a 30% reduction in species. In recent decades, species such as the hickorynut, purple wartyback, sheepnose, and wavy-rayed lampshell have become extirpated from the Fox River. The study mentions point and non-point source pollution, dams, siltation, development of tributary corridors, and loss of fish hosts as possible contributing factors.

Donald Webb (2002) examined 100 years of change in winter stonefly populations in Illinois. Webb reported that three of six species of winter stoneflies recorded since 1900, *Allocapnia granulata*, *Paracapnia angulata*, and *Strophopteryx fasciata*, have not been collected in the Fox River system in recent decades. However, a fourth species, *Taeniopteryx nivalis*, was first recorded in the Fox system in the 1960's and is currently expanding its range.

Both freshwater mussels and stoneflies are considered indicator species. The presence and abundance of indicator species is a good predictor of overall habitat quality because these species are sensitive to changes in their environment. When these species decline or become extirpated, it means that the ecosystem itself is declining in quality.

The Fox River is deteriorating as a result of a lack of a holistic approach

Currently, decisions that affect the entire watershed appear to be made with little consideration for the watershed as a whole. There is a lack of coordination within and between government agencies to solve the well-documented problems that the Fox River faces, and several organizations are pursuing policies that will further perpetuate the deteriorating condition of the Fox River. Below are four case studies of where a lack of holistic approach to decision making is negatively affecting the Fox River watershed, and the quality of life for its residents.

Case study: City of McHenry and the South Waste Water Treatment Plant

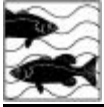
Found in the upper portion of the watershed, the City of McHenry is experiencing rapid population growth, and the sewage treatment plant needs to be expanded. The IEPA made an initial decision to modify a five-year National

Pollutant Discharge Elimination System (NPDES) permit to expand the South Waste Water Treatment Plant in McHenry without requiring the treatment plant to regulate nutrients. As justification for the decision, the IEPA Public Notice Fact Sheet states: "The Fox River, Waterbody Segment DT-23, is found on the draft 2002 Illinois 303(d) list [i.e., impaired waters list]. The use impaired for this segment was fish consumption." Segment DT-23 is not impaired due to nutrients, and therefore the IEPA did not require nutrient regulation.

However, the IEPA fact sheet fails to recognize that nutrients released in McHenry impact stream segments downstream that are currently impaired as a result of high nutrients. High levels of nutrients in lower Fox River segments are a result of the collective loading of nutrients occurring throughout the watershed including Segment DT-23 in McHenry. By not requiring the South Waste Water Treatment Plant to regulate nutrients, the Illinois Environmental Protection Agency is in effect allowing the treatment plant in McHenry to perpetuate the continued impairment of the Fox River, thereby ignoring the agency's own 2002 Illinois Water Quality Report.



The Fox River travels 185 miles through Wisconsin and Illinois. Graphic Credit: R. Linke, Watershed Resource Consultants, Inc.



Fortunately, after a public hearing on this proposal, the City of McHenry agreed to operate their expanded plant to remove phosphorus. We are waiting for the IEPA to issue their report of the hearing and a modified permit which includes a condition requiring phosphorus removal.

Case study: City of Yorkville and the Glen D. Palmer Dam

Since the dam's construction in 1961, over a dozen people have drowned at the Glen D. Palmer dam in Yorkville. In order to reduce the safety risk, the IDNR considered dam modification or dam removal. Complete removal of the dam would cost \$4.1 million, while remodeling the dam to include canoe/fish passage and a series of steps behind the dam will cost \$5.9 million, a 44% increase. At the Glen D. Palmer dam, the IDNR accepted the recommendation of a local committee, "Yorkville area Citizens Advisory Committee," to proceed with dam modification over removal so as to both keep the impoundment and reduce the safety risk to the dam.

Unfortunately, the IDNR has no published plans to mitigate the negative effects caused by the dam in Yorkville on water quality including low dissolved oxygen levels. Low dissolved oxygen level is one of the factors that contributed to the Fox River being placed on the impaired waters list by the IEPA. Thus, the IDNR decision to accept the recommendation of the "Yorkville area Citizens Advisory Committee" to modify rather than remove the dam in Yorkville ensures that the Fox River remains on the impaired waters list established by the IEPA. More specifically, in Yorkville, the IDNR is in effect requesting that state taxpayers spend a premium to perpetuate the continued impairment of the Fox River while offering no solutions to the regional problem of removing the Fox River from the impaired waters list. Why should state taxpayers pay for a structure that is not as safe as if the dam were removed, costs more than dam removal, and does not mitigate the negative environmental consequences caused by dams?

Case study: Illinois Association of Wastewater Agencies and dissolved oxygen

In April 2004, the Illinois Association of Wastewater Agencies (IAWA) submitted a proposal to the Illinois Pollution Control Board proposing to lower the state's water quality standard for dissolved oxygen from 5.0 mg/l to 3.5 mg/l during the months of July through February. IAWA is an organization whose members are "concerned with clean streams and are responsible for wastewater collection and treatment in the State of Illinois." Members of IAWA include several water reclamation districts in the Fox River watershed. The proposed reduction in dissolved oxygen criteria will not improve the condition of Illinois streams such as the Fox River; rather it may have the opposite effect by further degrading water quality and harming aquatic life.

In 2002, the Fox River was categorized as impaired by the IEPA, and reasons for the impairment include low dissolved oxygen. The effects of low dissolved oxygen in rivers such as the Fox are well documented. At extremely low levels, fish kills result. Low dissolved oxygen levels also negatively affect fish species such as smallmouth bass as a result of delayed development, reduced growth, and lower juvenile survival.

The condition of the Fox River is affected by multiple stressors, and as these stressors become intensified the ecosystem deteriorates. The aquatic fauna in the Fox River is already threatened by deteriorating water quality, with several species becoming extirpated from the watershed in recent decades. The proposed rule change by IAWA will not clean streams such as the Fox River, but it has the potential to accelerate its declining condition.

Case study: Illinois RiverWatch Program

One of greatest needs for the Fox River watershed is increased monitoring of water quality to establish trends and identify problems. For example, increased monitoring activity, and communication between agencies, might have prevented the Aurora boil order. Citizen stream monitoring helps fill data gaps left by the limited monitoring that state agencies can undertake. One program that effectively and efficiently accomplished this task was the IDNR RiverWatch program.

Formed in 1995, the RiverWatch program was established as part of the Critical Trends Assessment Program in Illinois that determines the state of Illinois' environment. The RiverWatch program involved over 1,500 volunteer citizen scientists to conduct biological monitoring protocols and surveys of habitat to determine the health of over 200 Illinois streams including many Fox River tributaries. Though several local water quality monitoring initiatives are active throughout Illinois, RiverWatch had



The Fox River provides a wide range of recreational opportunities including paddling, fishing, and wildlife watching.

Photo Credit: S. Bennett, Friends of the Fox River



Teachers learn how to monitor water quality at a Friends of the Fox River Watershed Monitoring Network stream monitoring training workshop.

statewide coverage, and the program had developed a quality assurance project plan for their monitoring efforts, making the results of the volunteer efforts similar to those found by professional biologists.

Unfortunately, in October 2004, RiverWatch was dissolved and all of the employees of the program were laid off, eliminating one of the state's most accurate and efficient means to assess the status of Illinois streams at a time when more monitoring, not less, is needed in rapidly developing regions such as the Fox River watershed.

Taking action now to protect the Fox River - creating a holistic approach for the Fox River watershed

In order to protect and restore the Fox River watershed, a holistic approach to decision making must occur. State agencies must support efforts for the protection, restoration, and management of the watershed that will remove and keep the Fox River from the impaired waters list. Much of the groundwork is already underway. For example, the Fox River Ecosystem Partnership has created the "Integrated Management Plan for the Fox River Watershed in Illinois," and the Fox River Study Group is modeling the watershed to determine the most cost-effective means to mitigate current problems and prevent future ones.

Potential projects to improve the watershed now include the following: 1) increasing the level of funding and providing new funds for the acquisition and restoration of critical habitat. For example, increased funding of the IDNR's Conservation 2000 Ecosystems program is imperative. Since its inception in 1997, \$2.1 million in state funds have been matched by \$6.5 million in local funds for projects in the Fox River watershed. Moreover, there is a need to support legislation and funding for the protection of isolated wetlands and floodplain restoration; 2) enhanced

strategies for promoting best management practices for local landowners. Means to achieve this goal include education of citizens through an education coordinator and the creation of an informational website. The state could also provide technical assistance and cost-share incentives for residential, zero-runoff projects such as rain gardens; 3) promotion of watershed-friendly development standards and support of planning efforts in tributary watersheds expected to experience rapid development in the near future. The Tyler Creek and Nippersink watersheds are currently seeking funding for such efforts through a grant program of IEPA moneys administered by the Northeastern Illinois Planning Commission. These plans, in turn, could serve as a reference for other sub-watersheds in developing their own plans; 4) increased enforcement of existing laws. This could be accomplished by educating citizens on environmental protections through an education coordinator and website, and hiring more staff for inspection related to NPDES construction permits by Soil and Water Conservation Districts; and 5) implementing urban restoration projects. For example, the IDNR is proceeding with plans to remove the north dam in Batavia, and the south dam in Batavia has breached. Funding is needed to remove these dams, and restore floodplain habitat upstream of these dams.

A second way to achieve a holistic approach is to establish state-wide initiatives to protect all Illinois watersheds from common threats. For example, Illinois currently has no water quality standards for nutrients and does not require dischargers to streams to remove nitrates or phosphorus. The Illinois Environmental Protection Agency has recently proposed that new and expanding sewage treatment plants that discharge more than 1 million gallons a day reduce phosphorus in their effluent to 1 milligram per liter. Regulation of nutrients, such as phosphorus, should increase the quality of our drinking water, improve water quality for the native flora and fauna, and help remove the Fox River from the impaired waters list.

In May, the Illinois General Assembly passed the Illinois Energy Efficient Commercial Building Act. The act requires all new construction or rehabilitation of existing buildings to meet the International Energy Conservation Code standards. An analogous code for the construction of buildings and homes in sensitive areas of a watershed may protect the Fox River watershed and other watersheds throughout the state in perpetuity from the negative consequences of urban development.

Finally, the state can provide incentives for the adoption of open space plans at the county and township level. For example, Nunda Township in McHenry County recently proposed a \$20 million bond initiative to acquire natural areas. Open space plans protect natural resources such as riparian areas and wetlands that serve in flood control. In addition, unique natural areas can also receive permanent protection. Adoption of open space plans positively benefits all watershed residents.



Taking action now to protect the Fox River - what citizens can do

Protecting the Fox River not only requires actions of governments, but also needs citizen involvement, and citizens can take action now to protect the Fox River and its tributaries. Citizens can minimize the use of fertilizers on lawns and utilize low or no phosphorus fertilizers, plant deep-rooted native plants that improve absorption of rain water into the ground, and maintain septic systems that can pollute groundwater that feeds other water bodies if not maintained properly.

Citizens can become active participants in groups such as Fox River Ecosystem Partnership, Sierra Club (Illinois Chapter and Valley of the Fox Group), and Friends of the Fox River that address issues at the watershed level. At a local level, the Fox River has numerous organizations concerned with the protection and restoration of tributaries including Big Rock Creek, Blackberry Creek, Boone Creek, Fish Creek Drain, Flint Creek, Nippersink Creek, Poplar Creek, Sequoit Creek, Tyler Creek, and Waubonsie Creek.

One of the activities supported by these organizations is the monitoring of water quality. Friends of the Fox River sponsors the Fox River Watershed Monitoring Network. Since January 2000, the Monitoring Network has trained over 400 adult citizens or teachers to monitor water quality. Monitoring Network sponsored programs reach over 7,500 youth and adults annually, with over 2,000 students, teachers, and adults at stream sites monitoring water quality at over 80 stream sites. Other activities promoted by watershed organizations include river cleanups, community celebrations of the river, educational events and programs, guest speakers on river topics, and newsletters.

Concluding Remark

In the 21st century, we know the problems the Fox River faces, and we have the knowledge to solve them. The rapid degradation of the Fox River watershed not only has resulted in the extinction of indicator species, but also threatens the economy and well-being of its residents. In February 2004, 150,000 Aurora residents were subjected to a precautionary boil order as a result of high levels of total coliform bacteria in the drinking water. A report by Weston Solutions indicated that the majority of the blame for the boil order could be placed on the deterioration of water quality in the Fox River. Action must be taken now to protect the Fox River watershed from further degradation in water quality, to prevent extirpation of additional species, and to improve the quality of life for the watershed's residents. The most effective, long-term solution is to develop a holistic approach to the protection, restoration, and management of the Fox River watershed, through increased involvement from state agencies to individual citizens.



Resting on sphagnum moss, the green frog is one of hundreds of species of animals for which the Fox River watershed is their home.

Photo Credit: D. Horn, Friends of the Fox River

Bibliography

Critical Trends Assessment Program. 2001. Critical Trends in Illinois Ecosystems. Illinois Department of Natural Resources, Springfield, Illinois.

Horn, D. J., R. Linke, C. Skrukud, and S. Bennett. 2003. State of the Fox River Report 2003. Friends of the Fox River, Crystal Lake, Illinois.

Santucci, Jr., V. J., and S. R. Gephard. 2003. Fox River Fish Passage Feasibility Study Final Report. Max McGraw Wildlife Foundation, Dundee, Illinois.

Schanzle, R. W., G. W. Kruse, J. A. Kath, R. A. Kloczek, and K. S. Cummings. 2003. The freshwater mussels (Bivalvia: Unionidae) of the Fox River Basin, Illinois and Wisconsin. Illinois Department of Natural Resources and John G. Shedd Aquarium, Springfield and Chicago, Illinois.

Webb, D. W. 2002. The winter stoneflies of Illinois (Insecta: Plecoptera): 100 years of change. Illinois Natural History Survey Bulletin 36:195-274.

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