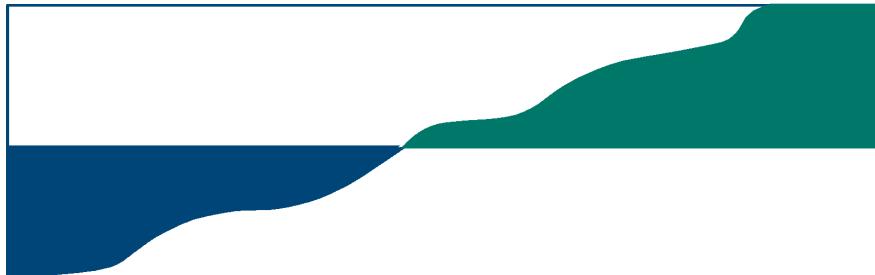




Watershed Events



A Bulletin on Sustaining Water Resources and Ecosystems

In This Issue...

This issue of *Watershed Events* focuses on partnership efforts to protect and restore the Mississippi River Basin and the Gulf of Mexico. Protecting and restoring North America's largest river system is one of the most important challenges facing federal, state, and local agencies in the 31 states and 77 tribes within the system.

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The Mississippi River or "Father of Waters"

The North American Indians that once populated the banks of the Mississippi River called it "Messipi" ("Big River"), and it was also known as the "Mee-zee-see-bee" ("Father of Waters"). It is hard to imagine that the mighty Mississippi, the river that inspired Mark Twain's marvelous stories of steamboats and adventure, originates as a tiny outlet stream from Lake Itasca in northern Minnesota. This tiny stream goes on to become one of the world's greatest river systems, draining all or parts of 31 states and 2,350 square miles before it finally reaches the Gulf of Mexico. Few rivers have played such an integral role in shaping our nation's historical, cultural, and economic heritage.

Years of human alterations and uses have, however, taken their toll. The locks and dams that allowed our early agrarian and industrial society to thrive and prosper have also altered the river from its original meandering state, affecting fish and wildlife habitat and contributing to costly flooding. The separation of the river from its original floodplain and the loss of millions of acres of wetlands, many drained for agricultural purposes, have further hindered the river's ability to absorb and protect against the torrents of

spring floodwaters. Although billions have been spent to tame the river and reduce flood damages, recent floods have cost taxpayers billions and resulted in significant loss of life. Nutrients discharged from the river system into the Gulf of Mexico have contributed to a "dead zone."

Nevertheless, the river today is as popular as ever with recreationists, and it still supports an amazing diversity of aquatic life. More than 400 species of wildlife call the Mississippi their home, including some of the most ancient lineages of fish. Forty percent of North America's duck, goose, swan, and wading bird populations rely on the river as a migration corridor.

Balancing the demands of navigation, agriculture, recreation, industry, and wildlife is not easy. However, a number of collaborative partnerships are fostering a better understanding of this dynamic ecosystem, and coordinated actions are under way to address some of its most pressing problems. This issue of *Watershed Events* describes some of the federal, state, and local efforts to protect and restore a great American treasure—the Mississippi River Basin.

The Hypoxia Action Plan: A Win-Win Strategy for the Gulf and the Mississippi

After years of investigating the complex causes of the low-oxygen hypoxic zone in the Gulf of Mexico, scientists have pinpointed excessive nutrients coming from the Atchafalaya and Mississippi River Basin; physical changes in the basin, such as the loss of wetlands and vegetation along the banks; and the natural stratification of waters of the Northern Gulf caused by the interaction of fresh river water and the saltwater of the Gulf. Fish, shrimp, crabs, zooplankton, and other important fish prey are significantly less abundant in bottom Gulf waters that experience hypoxia. Although the size of the hypoxic zone is seasonal and varies over time, scientists estimate that between 1996 and 2000 the zone of midsummer bottom-water hypoxia averaged 5,454 square miles.

Recognizing that hypoxia can pose serious economic and environmental threats, Congress passed the Harmful Algal Bloom and Hypoxia Research Control Act in 1998. The law charged federal agencies to work with the states and other interested stakeholders to assess the causes of hypoxia and to develop an integrated assessment and plan to reduce and control hypoxia in the Gulf. *The Action Plan for Reducing, Mitigating and Controlling Hypoxia in the Northern Gulf of Mexico*, released in January 2001, reflects a consensus-based national strategy to tackle this challenging problem. A Task Force composed of federal, state, and tribal governments produced the final action plan, with input from diverse interests throughout the 31-state basin. The plan provides ambitious long-term goals for the entire river ecosystem (see box).

Nutrient loads will be reduced through the development and imple-

Gulf Hypoxia Action Plan

Coastal Goal: By the year 2015, reduce hypoxic zone to below 5,000 square kilometers.

Within Basin Goal: Restore and protect the waters of the Basin states and tribes.

Quality of Life Goal: Improve social and economic conditions in the Basin.

Summary of Implementation Actions

- #1 By December 2000, prepare integrated budget proposal for additional funds
- #2 By summer 2001, establish Sub-basin Committees
- #3 By fall 2001, develop a Hypoxia Research Strategy
- #4 By spring 2002, expand the long-term monitoring for the zone
- #5 By spring 2002, expand the monitoring within the Basin
- #6 By fall 2002, develop strategies for nutrient reduction for each subbasin
- #7 By December 2002, Corps of Engineers (COE) study of nutrient reduction from COE projects or operations
- #8 By January 2003, reduce loadings from point sources
- #9 By spring 2003, increase assistance to landowners for voluntary actions
- #10 By spring 2003, increase assistance to agricultural producers/businesses for best management practices
- #11 By December 2005 and every five years thereafter, the Task Force assesses results.



mentation of subbasin watershed strategies that encourage voluntary, cost-effective actions. Preliminary efforts to establish the subbasin committees responsible for developing the strategies have started this year. Because many of the Basin states are faced with significant river miles degraded by excessive nutrients, including groundwater contamination from excess nitrates, the strategies are expected to result in improvements in water quality for the freshwater resources of the Basin as well as the Gulf. The Task Force recognizes that nutrient

cycling and transport within the Mississippi River ecosystem is complex, and therefore an adaptive management framework, which involves continual feedback of information and improved management actions every five years, is central to the plan.

The Task Force has noted that new legislative authorities and additional appropriations are necessary to carry out the plan. In addition, revisions to the Farm Bill may provide additional incentives for nutrient reduction management.

Integrated Assessment of Hypoxia in the Northern Gulf of Mexico

The primary resource used for the Action Plan was the findings from the Committee on Environment and Natural Resources' "Integrated Assessment of Hypoxia in the Northern Gulf of Mexico." The Integrated Assessment is based on six peer-reviewed science reports and public comment. It examines the distribution, dynamics, and causes of hypoxia in the northern Gulf of Mexico; its ecological and economic consequences; the sources and loads of nutrients transported by the Mississippi River to the Gulf of Mexico; effects of reducing nutrient loads; and the social and economic benefits of such methods.

For copies, contact the National Oceanic and Atmospheric Administration at (301) 713-3388; e-mail: coastalocean@cop.noaa.gov. The report is also available at www.nos.noaa.gov/products/pubs_hypox.html.

Visit www.epa.gov/msbasin to download a full copy of the Action Plan or to learn more about efforts to protect and restore the Mississippi River Basin.

Watershed Events

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Watershed Events provides updated and timely information to professionals and others interested in the development and implementation of the watershed approach and in achieving watershed goals. Please direct any questions or comments to:

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Delegates to National Watershed Forum Make Recommendations

Nearly 500 delegates, representing local watershed organizations, business groups, and local, state, tribal, and federal agencies, gathered at the National Watershed Forum on June 28th through 30th in Arlington, Virginia. Delegates recognized the need for a significant federal role as well as active state and private sector participation in support of local watershed efforts. Their suggestions included the development of a national watershed strategy for delivery of technical assistance to watershed groups, a clearinghouse for dissemination of information on watershed protection and restoration, and a media campaign to increase general awareness of watershed issues. EPA, USDA, CH2MHILL, and the Department of the Interior were major sponsors of the Forum, and issued a joint letter of support indicating their interest in considering the delegates' recommendations. A report summarizing Forum deliberations and outlining the recommendations will be available in four to six weeks. Additional information about the Forum can be obtained at www.epa.gov/owow/watershed/conferences.html or by contacting the Meridian Institute at connielewis@merid.org.

It's Not Just How High; It's How Clean: Sampling the Spring 2001 Flood in the Upper Mississippi River Basin

Floods can cause water-quality problems because of the large amounts of contaminants (sediment, nutrients, pesticides, and bacteria) that can be transported by floodwaters. During the flood on the Upper Mississippi River in 2001, water-quality and water-quantity data were collected during near-record streamflow. This is the first time that samples for determining organic wastewater contaminants (pharmaceuticals, hormones, and industrial/household use compounds) and pesticide degradates have been collected during a flood of this magnitude.

Sampling the Floodwaters

March and April 2001 brought to the upper Mississippi River Basin a succession of heavy rains that coincided with the melting of an unusually large snow pack. The resulting flood was unusually long, lasting from early April through mid-May. It produced river levels and flows from central Minnesota and western Wisconsin to southern Iowa that generally were the second- or third-highest on record, with recurrence intervals in the range of 50 to 100 years. Although

the upper Mississippi River was closed to all boat traffic for more than 400 river miles during the flood peak, the U.S. Geological Survey (USGS) was given special permission to collect data during this time. The rapid response and data-collection efforts under less-than-ideal field conditions were possible because established streamflow and water-quality monitoring sites were used (fig. 1 on page 4).

These stations are operated as part of the USGS National Stream Quality Accounting Network (NASQAN), National Water-Quality Assessment Program (NAWQA), other state and local cooperative projects, and the Long-Term Resource Monitoring Program (LTRMP). Samples in the last program were collected in cooperation with the five upper Mississippi River system states (Illinois, Iowa, Minnesota, Missouri, and Wisconsin) and the U.S. Army Corps of Engineers. The success of the sampling effort also was the result, in part, of having specialized equipment, training, and sampling protocols in place in preparation for such a flood. For example, acoustic Doppler technology was used to measure streamflow across flooded channels. During this flood, channels were as much as 1 mile wide and 48 feet deep.

See flood, page 4

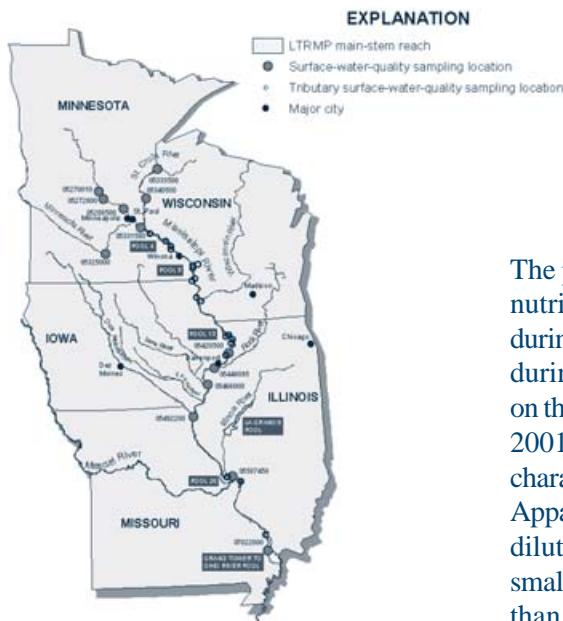
Flood, from page 3

During the flood, water-quality samples were collected at 10 stations and along five study reaches (approximately 150 sites per reach) on the Mississippi River, and 20 stations and sites on major tributaries. Several cities, including LaCrosse, Wisconsin, and Davenport, Iowa, were unable to treat their sewage as a result of flood conditions; therefore, some of the sewage was discharged directly into the Mississippi River. Accordingly, samples also were collected for bacteria and wastewater constituents to evaluate the effects of this sewage discharge.

Typically, samples were collected by using USGS protocols for equal width- and depth-integrated samples and clean-sampling procedures (often called parts-per-billion, or ppb, protocols).

Organic Wastewater Contaminants

In addition to collecting measurements for dozens of chemical and physical water quality parameters (e.g., dissolved oxygen, nutrients, sediments, water-soluble pesticides and pesticide degradates), samples at 10 locations were analyzed for a broad spectrum of organic wastewater contaminants. Target compounds included prescription and nonprescription drugs, antibiotics, hormones, fecal sterols, and household and industrial wastewater products. Because few comprehensive investigations of organic wastewater contaminants have been conducted, it is unknown whether flooding conditions will increase (because of inundation of septic fields, storage lagoons, etc.) or decrease (because of dilution) the likelihood of detecting compounds in streams. Background data on organic wastewater contaminants for selected sites in Minnesota



On April 23, 2001, about 2040 tons per day of nitrate was being transported by the Mississippi River at Clinton, Iowa. This load is about 40 percent higher than the peak nitrate load measured at this site during the flood of 1993.

during differing seasons and flow conditions are available for comparison. The data for these flood samples are expected to be available this summer.

Preliminary Results

Even though soil conditions had prevented most farmers from applying fertilizers since the autumn of 2000, concentrations of nitrate in the Mississippi River and its major tributaries were elevated. They ranged from about 0.1 mg/L (milligrams per liter) in the headwaters to about 4 mg/L downstream and generally exceeded the 75th-percentile concentration for the long-term record at each site. On April 23, 2001, about 2,040 tons per day of nitrate was being

transported by the Mississippi River at Clinton, Iowa. This load is about 40 percent higher than the peak nitrate load measured at this site during the flood of 1993.

The preliminary data indicate that nutrient concentrations and loads during the 2001 flood exceeded those during the 1996 and 1997 spring floods on the upper Mississippi River. Like the 2001 flood, the 1997 flood was characterized by heavy snowmelt. Apparently, the snowmelt had little net diluting effect. Snowmelt was a smaller component of the 1996 flood than of the two later floods.

Initial results from the bacteria sampling indicate that the sewage discharge did not pose an immediate health threat because concentrations of fecal indicator bacteria (fecal coliforms and *Escherichia coli*) were very low (less than 100 colonies per 100 milliliters).

In conclusion, a rapid response by trained water-quality sampling crews with an existing network of stations produced a unique set of samples of river water during the near-record flooding in the upper Mississippi River Basin in April 2001. Preliminary data indicate that the flood carried a large load of nutrients. When all of the analytical results are available, they will provide answers to some important questions about the effects of this flood on water quality in the basin.

For more information about USGS water-quality programs, please visit <http://water.usgs.gov/owq> and www.umesc.usgs.gov/ltrmp.html. Or contact Glenn Patterson, United States Geological Survey, 412 National Center, Reston, VA 20192. Phone: (703) 648-6876; e-mail: g patter@usgs.gov.

Restoring Wetlands and Habitat

Louisiana Builds a River Structure to Protect Its Wetlands

Wetland loss along the Louisiana coastal zone is one of the state's most pressing environmental problems. Although numerous factors have contributed to this loss, many consider the leveeing of the Mississippi River for flood control to have had the greatest impact. The levee blocks the river's historical spring overflows and thus impedes the rush of marsh-supporting freshwater, nutrients, and sediment to the coastal zone.

Coastal Louisiana is losing, on average, between 25 and 35 square miles of land annually—more than one football field every 30 minutes. Much of the land lost contains valuable wetlands. In fact, Louisiana holds 40 percent of the lower 48 states' coastal wetlands has experienced 80 percent of the nation's total wetland loss. These wetlands provide valuable nursery grounds for fisheries, a buffer to protect developed areas from storm surges, and a filtering system for pollutants carried in urban runoff.

The Gulf of Mexico Program (GMP), working with local agencies and organizations, has begun to take action to reverse the trend of wetland loss in Louisiana through the Davis Pond Freshwater Diversion Project. The project, led by Jefferson Parish, is a partnership that includes the GMP, the U.S. Geological Survey, Louisiana State University, the Louisiana Universities Marine Consortium, and the U.S. Army Corps of Engineers. Funding for this effort was obtained through EPA's Environmental Monitoring for Public Access and



Community Tracking (EMPACT) Program.

The diversion project involves building a structure to divert freshwater and sediments from the river to renourish and restore coastal wetlands where flow has been cut off. Scheduled to be on-line this summer, it will be the largest freshwater diversion project built to date, capable of diverting up to 80,000 gallons per second of river water. The freshwater diversion will imitate historical spring floods by providing a controlled flow of freshwater and nutrients into the Barataria Bay estuary, which is located southwest of New Orleans. A similar structure farther down river, called Caernarvon, has reversed the loss of freshwater and brackish vegetation while enhancing the productivity of the area. It is expected that the Davis Pond Diversion will similarly benefit the Barataria estuary.

There are concerns that the freshwater diversion will have a negative impact on the estuary. Some people are worried that nutrient-rich river water will cause algae blooms. Some of these blooms can be toxic; they can also contaminate seafood and have human health impacts. Commercial fishermen are worried that massive amounts of river water may deteriorate the water quality in the lakes and bays where they make

their living. Communities south of the diversion site worry that water levels will increase and cause flooding during high wind-driven tides. And scientists even debate the wisdom of introducing more nutrients into an already eutrophic system and wonder what changes might occur as salinity levels are altered in the upper estuary.

Partners in the project expect that monitoring conducted through the EMPACT project will offer answers to these questions by providing valuable "before and after" data. To collect background data before diverting the water, the EMPACT project team began monitoring the water quality in Lake Salvador and Lake Cataouache (both of which are downstream of the diversion and are part of the Barataria Bay system) in August 1999. Analyses of pre- and post-diversion water quality data will be used to determine the effects of river water diversion on the estuary and operate the structure such that the timing and amount of the releases have the maximum benefit for the wetlands and the people that use them.



For more information, contact Drew Puffer, Gulf of Mexico Program, at (228) 688-3913. Or visit the Gulf of Mexico web site at www.gmpo.gov. Click on the "projects" bar at the bottom of the page. Look for the link to the Lake Salvador project.

Experimental Mississippi River Drawdown Should Improve Habitat

Ironically, as the Mississippi River at La Crosse recedes from a near-record flood, the Wisconsin Department of Natural Resources (WDNR) staff at the Onalaska Field Station are working on an experimental drawdown in Navigation Pool 8 in the Mississippi River. Pool 8 is part of a complex system of locks and dams along the Mississippi that, in addition to dredging, help maintain the 9-foot depth required for navigation. It is hoped that the drawdown will help improve vegetation, subsequently enhancing fish and wildlife habitat.

The dams create slack-water pools for navigation during periods of low and medium flows. The locks open and close to pass river traffic from one pool to another, like a stairway of water. The average person might think of a dam as a huge solid structure used to block the flow in a river and form a lake. This is not true of navigation dams like those on the upper Mississippi. These dams are not solid but are a series of concrete piers across the river with movable gates between the piers. A dam is formed when the gates are lowered, causing the water level upstream of the dam to rise and form a slack-water pool deep enough for navigation.

Many people believe that the navigation pools should be drawn down before periods of high water are expected, to provide storage capacity for incoming flows. Experimental drawdowns have been conducted on a smaller scale, but this is the first drawdown of an entire navigation pool. This multiagency effort includes the U.S. Fish and Wildlife Service, Army Corps of Engineers, U.S. Geological Survey, Minnesota Department

of Natural Resources, and WDNR. The participants hope the drawdown will improve the growth and distribution of emergent and submerged vegetation in Pool 8 of the river. Years of wind and wave action in the pool have harmed aquatic vegetation and caused turbidity that has disturbed the delicate sediment structure. The experimental drawdown will help consolidate sediments along the shorelines, increase plant growth, and enhance waterfowl and fish habitat. More plant growth will mean more roots to hold sediments down and provide resistance to wave action.

EPA joined the effort recently by providing \$10,000 to monitor vegetation in four lower-pool backwaters of Pool 8. WDNR and its partners will monitor water quality and mussels, waterfowl, and other organisms to determine the effects of the drawdown, which might prove to be a cost-effective system-wide tool for improving fish and wildlife habitat.

For more information, contact Terry Dukerschein, Wisconsin Department of Natural Resources, Pool 8 Field Station, 575 Lester Avenue, Onalaska, WI 54650. Phone: (608) 783-6169.

Corps's St. Paul District Leads the Way in River Stewardship

The U.S. Army Corps of Engineers' St. Paul District balances commerce and conservation on the Upper Mississippi River—from north of Guttenberg, Iowa, to Minneapolis, Minnesota. This mission provides an opportunity for the St. Paul District to share stewardship of natural resources and commerce with diverse and sometimes competing interests. One of the most important opportu-

nities for stewardship is the District's channel maintenance program, which includes comprehensive long-range planning with the active involvement of partnering agencies. Since the early 1970s, changes in channel maintenance have resulted in a 50 percent reduction in annual dredging requirements. These changes include closer monitoring of channel conditions, reduced dredging dimensions, and adjustments to channel control structures. In addition, the District places 95 percent of the sandy material dredged where it can be used for environmental enhancement, recreational use, land development, construction, or road maintenance.



Pool 8 Island Complex 99 Aerial

In 1986 the St. Paul District began a new Environmental Management Program (EMP) to ensure coordinated ecosystem development and enhancement of the river. Through the EMP, the District constructs habitat projects and monitors natural resources on the Upper Mississippi River system upstream of Cairo, Illinois. The St. Paul District, along with the Rock Island and St. Louis Districts, manages the EMP in partnership with the states of Minnesota, Wisconsin, Iowa, Missouri, and Illinois and the U.S. Department of the Interior (U.S. Fish and Wildlife Service and U.S. Geological Survey). Habitat projects include dredging backwater areas and

channels, constructing dikes, creating and stabilizing islands, and controlling side channel flows and water levels. The St. Paul District began the first habitat project in 1987 and has completed 37 more since then. Another 23 are under way.

The St. Paul District also displays river stewardship in its regulatory (permit) program. The District's

responsibility for waterway and wetland permits in Minnesota and Wisconsin covers tens of thousands of square miles that drain into the Upper Mississippi. Many construction and agricultural projects reviewed could potentially harm the river by adding sediments and nutrients. The St. Paul District carefully modifies or adds conditions to requested projects

to minimize harm from streambank erosion, loss of vegetative cover, and wetland degradation. Last year, the District required wetland creation to replace 90 percent of the wetland losses it permitted. For more information, contact Mark Davidson, U.S. Army Corps of Engineers, St. Paul District, (651) 290-5201.

Managing Nutrient Runoff

Farmers—Your Partners and Stewards of the Land

by Gary Edwards, Iowa Corn Growers Association

Like most Americans, I think clean water is a good thing. But as a farmer, I've got additional reasons to care about our watersheds and waterways. Almost 90 percent of rain falls on privately owned land before it enters lakes, streams, groundwater, and estuaries. This is working land, used for crops, livestock, or timber production, and to those interested in water quality, the bottom line is: *A working partnership with farmers and land managers can improve the environmental quality enjoyed by all.*

Others worry because excessive erosion or nutrient runoff harms the ecosystem. I've got a more immediate concern—not only do we need safe water to drink, wash our hands and cook our food, but erosion means my farm will be less productive and less profitable. Nutrient runoff means I've spent money to nourish my crop, but my crop won't benefit. Erosion and runoff threaten my environment, but they also threaten my ability to support my family and preserve my farm.

So it's no wonder that most farmers are good stewards of the land. Spend time with us and you'll hear us discuss buffer strips, tillage methods, tiling systems, and all the other steps we take to retain soil and preserve our environment.



Iowa's corn growers have funded research into nitrogen use to guide application practices, reduce our costs, and reduce nitrogen runoff. We've funded a nutrient management task force to develop practical solutions that growers will be glad to adopt because they work both economically and environmentally. When the science is solid, growers will use it.

Last winter, the Iowa Corn Growers Association reached over a thousand growers with Crop Fairs that provided guidance adapted to local needs. That's important because

each watershed area will have different factors at work—the types of soil, the type of agriculture, the resources available. That's also why the best approach to solving water problems is not a blanket regulation.

The best solutions will make use of our commitment to the environment by involving us in a public-private partnership. Why not help growers develop a "leadership corps" of growers at the local level, working with their neighbors to solve water pollution problems? A "Watershed Leadership Corps," providing solid research and education, could be EPA's best ally in helping growers improve water quality.

When water leaves my farm, I want it to be as clean as when it entered my farm. Every neighbor I know feels the same way and takes this into consideration when they plant. We are your partners and stewards of the land.



For more information, contact Gary Edwards, Iowa Corn Growers Association, 4533 Edwards Road, Anamosa, IA 52205, Phone: (319) 462-4658.

Editorial

Natural Nitrification Reduces Need for Commercial Fertilizers

Growing plants with commercial nitrogen rather than effectively using safe atmospheric nitrogen has become a common practice in most areas of North America. However, excessive nitrogen use has led to some serious pollution problems, including hypoxia in the Gulf of Mexico.

Since 1955 Growers Chemical Corporation of Milan, Ohio, has promoted a fertility program that includes reducing the use of applied nitrogen. Many agricultural operations and some nonagricultural operations (such as lawn care) have successfully used the program, which has two basic components—supplying adequate amounts of calcium to the soil profile and using high-grade, balanced fertilizer solutions.

Why calcium? Some bacteria in the soil are able to fix nitrogen from the air. In the course of a year the members of one genus of bacteria, *Azotobacter*, can fix 15 to 40 pounds of atmospheric nitrogen per acre! Therefore, it's important to create a soil environment that promotes these nitrogen-fixing bacteria. Increasing the available calcium helps stimulate bacterial nitrogen fixation. Calcium also helps prevent the increased solubility of iron and aluminum, which negatively affect nitrogen fixation. In addition, calcium makes the soil more porous, allowing for better air infiltration and exchange, and adequate levels of oxygen are important in the conversion of nitrogen to a form that can be used by plants. Finally, earthworms flourish best in soils that contain a continuous supply of calcium, and improved earthworm activity is critical for the optimum success of bacteria. (Earthworms shred organic matter, making it more available to the bacteria.)

The second part of the Growers soil program is use of a small amount of a high-grade, balanced plant food solution on the seed at planting. While providing crop nutrition, the food also promotes the efficiency of the bacteria in the fixation of nitrogen. Foliar feeding of crops with this same material means less applied nitrogen is needed to supplement the native nitrogen.

By using this program, farmers have significantly lowered their use of applied nitrogen while maintaining sound economic productivity. Growers Chemical boasts that clients have experienced higher grain test weights, better produce flavor and shelf life, and fewer veterinarian visits for their livestock. For additional information, contact James L. Halbeisen, Director of Research, Growers Chemical Corporation, P.O. Box 1750, Milan, OH 44846; Phone (419) 449-2508.

Somerset Plantation, Louisiana: A Demonstration of Agricultural Nutrient Management in the Mississippi Delta

Water quality in the Tensas River watershed in the Mississippi Delta is poor. According to the Louisiana Department of Environmental Quality (LDEQ), the Tensas River only partially meets its designated uses because of sediment, nutrient, and pesticide loading and low dissolved oxygen conditions. Most of these problems stem from one land use—agriculture. An estimated 85 percent of forestland in the basin has been cleared and converted to row crop agriculture. Addressing problems caused by various agricultural activities while maintaining the overall, long-term sustainability of the industry presents special challenges, but one farmer in the Tensas

River watershed is tackling the problem head on.

Jay Hardwick, Ph.D., who owns Somerset Plantation, is working with the Northeast Delta Resource Conservation and Development Area, the Gulf of Mexico Program, LDEQ, the Tensas River Basin Technical Steering Committee, and other partners to implement a locally led and voluntary site-specific demonstration project to reduce nutrient inputs to the basin. This project will demonstrate the advantages of site-specific nutrient management. It is also designed to demonstrate how the agricultural community and the environmental community can work together to develop "win-win" strategies that will reduce nutrient contributions from agriculture while improving the return on investment for the producer.

Site-specific nutrient management in farming operations (precision farming) provides fertilizers only where needed and has the potential to reduce overapplication of fertilizer, thereby reducing or eliminating fertilizer runoff to rivers and streams, while maximizing yields or return on investment.

Dr. Hardwick is implementing precision farming methods and showing others how such practices can reduce or prevent sediment and nutrients from degrading the Tensas River. So far, he has incorporated the following practices into his farming operation:

- Detailed grid sampling to give an accurate picture of nutrient variation within a field and allow for more precise application of fertilizer.
- Differential global positioning systems to identify exactly where soil samples are being taken and to know exactly where to apply fertilizers.

- Computerized records in conjunction with geographic information system technology to organize and analyze the information available, perform cost analyses, and optimize the site-specific nutrient management plan.
- GIS technology to visualize and interpret the information available and link that information, using a map, to specific points in each field.
- Yield monitors on board the harvesting equipment to obtain site-specific information about yield that can be related to other factors, such as fertilizer application and soil type.
- Water quality monitoring, including flow and rain gauge measurements, to understand the impacts of practices on the streams and water bodies in the project area.
- Education and outreach to inform the agricultural community of the results and encourage other landowners to implement similar nutrient management methods.

Landowners like Hardwick depend on fertility adjustments to provide maximum realistic yields, and most landowners are willing to implement new conservation practices if the practices make economic sense. For more information, contact Larinda Tervelt, Bldg 1103, Rm 202, Stennis Space Center, MS 39529-6000, Phone: (228) 688-1033.

WRI Explores Market-based Solutions to Reduce Nutrient Loadings

To effectively tackle problems like the “dead zone” in the Gulf of Mexico, cooperation and communication among the key stakeholders, government agencies, and policy makers are essential. The

World Resources Institute (WRI) has been working with a number of other nongovernmental organizations (NGOs) to bring the “dead zone” issue to the public, the agricultural community, and policy makers. With the Mississippi River Basin Alliance (MRBA), Clean Water Network (CWN), and Mississippi Riverwise Partnership, WRI has worked to foster public awareness of hypoxia, its causes, and its consequences. WRI and its partners have disseminated information to the public, met with key stakeholders, and taken advantage of media opportunities as they have arisen.

In addition to increasing public awareness, reducing hypoxia will require viable and cost-effective solutions and policy changes that target the problem. To support this effort, WRI is conducting a national-scale analysis of various nutrient reduction policies that address the issue. The policy scenarios, their feasibility, and their impact are being developed and tested in conjunction with organizations within the MRBA and CWN and through discussions with the agricultural and legislative communities.

One of the more promising market-based solutions to reducing nutrients causing hypoxia is nutrient trading.

Nutrient trading is a cost-effective solution to the problem because it allows farmers who have low costs of reducing nutrient loss to trade nutrient reduction credits with those whose costs may be substantially higher, such as municipal wastewater treatment plants.

With its partners, the Michigan Department of Environmental Quality, Chesapeake Bay Commission, and USEPA Region 10, WRI has been developing an e-marketplace to help implement nutrient trading. This web site is being customized to address the local watershed conditions for three pilot trading programs under development in Michigan, the Chesapeake Bay, and Idaho. These pilot programs will provide important information on how to best extend nutrient trading to watersheds in the Mississippi River Basin to address the dead zone.

It is through these types of cooperative efforts that effective solutions to environmental problems like the dead zone in the Gulf of Mexico can be recognized, developed, and implemented. For more information, contact Suzie Greenhalgh, World Resources Institute, Phone: (202) 729-7786, e-mail: suzieg@wri.org.

Corps of Engineers Agrees to Retool Navigation Study

The Army Corps of Engineers has agreed to create an independent review team to revisit a \$60 million study launched in 1993 to examine whether the lock-and-dam systems on the Upper Mississippi and Illinois Rivers should be expanded for navigational purposes. Preliminary results of the Navigation Study found justification for a billion-dollar expansion.

Controversy over the study led the Department of the Army to request the National Research Council (NRC) of the Academy of Sciences to conduct an independent review. The Council made a number of recommendations to improve the study, including consideration of less costly and less environmentally damaging methods to address barge traffic congestion and better incorporation of environmental issues in planning, design, operations, and analysis. To address the NRC recommendations, the Corps recently convened an interagency group consisting of Washington-level representatives from the Department of Agriculture, Environmental Protection Agency, Fish and Wildlife Service, Maritime Administration, and Army Corps of Engineers to re-scope the Upper Mississippi River and Illinois Waterway System Navigation Study.

Furthermore, Lt. Gen. Robert B. Flowers, the Corps's military commander, pledged to change the way the Corps evaluates major construction proposals. He said he would establish a review panel to assess the merits of large, complex or controversial studies.

Watershed Assistance Grants Strengthen Landowner Stewardship

Using funds from the U.S. Environmental Protection Agency, the National Audubon Society awarded 42 Watershed Assistance Grants in the Upper Mississippi River Basin in July 2000. Dan McGuiness, Director of Audubon's Upper Mississippi River Campaign, announced the awards at the first five-state Upper Mississippi River Watershed Roundtable in September 2000.

The goal of Audubon's small grants program is to provide local watershed groups financial assistance to raise landowner awareness about nonpoint source pollution and to develop solutions that are tailored to communities' needs. In the 305-county, 189,000-square-mile Upper Mississippi watershed, agricultural lands constitute 67 percent of the landscape. Some 253,000 farms (mostly family farms) are located in the 16 subwatersheds of the basin. Here are a few examples of projects under way:

- In Iowa, the Northeast Iowa Resource Conservation and Development (RC&D) office conducted a water quality assessment of the Upper Iowa River and is using the information to inform landowners about stewardship needs. Water quality parameters for nitrate-nitrite-nitrogen, phosphorus, atrazine, membrane fecal coliform, ammonia, and turbidity are being tested. The results will be available later this year. Meanwhile, the group surveyed farmers in the watershed to identify the barriers to improved land management. Fifty percent of the landowners reported that "confusion about conservation practices" was a major barrier to implementation. And 85 percent of landowners reported that cost was a barrier to implementation of conservation measures.
- In Illinois, the Nature Institute is developing a landowner education program to improve land practices on fragile bluffs along the Mississippi River. Audubon and the Institute kicked off the education program in October 2000 with a folk concert, press conference, and exhibits on the waterfront near their bluffs office in Godfrey, Illinois.
- The Mississippi Headwaters Board in Minnesota held a Youth Watershed Congress in March 2001, bringing more than 100 students together to learn how to monitor water quality. With Audubon and EPA funds, the Board provided scholarships and travel expenses to students in need. Each school made a presentation summarizing the results of its work. Students will participate in other events, including a 500-mile canoe trip on the *Audubon Ark* from the headwaters at Lake Itasca, Minnesota, down to Fort Snelling State Park in Minneapolis, Minnesota.
- In Wisconsin, the River Country RC&D is promoting buffer strips along the highly erodable Lower Chippewa River. Project organizers hope to contact 800 local landowners and establish 1,500 acres (124 miles) of buffer strips by 2003. This is a grassroots project involving a consortium of 30 diverse organizations and individuals. It has \$12,000 in hard dollars and \$64,000 in volunteer in-kind dollars.

Because of the tremendous interest and enthusiasm for this program, Audubon plans to expand the small grants program by tenfold by leveraging government, foundation, and private dollars. Their goal is to expand the program from the start-up amount of \$30,000 to \$300,000 by 2003. For more information, contact Dan McGuiness at (651) 290-1695; e-mail: DMcGUINESS@Audubon.org.



USGS Nitrogen Studies Expand River Knowledge

Although we have a good understanding of how excess nutrients affect lakes and other enclosed water bodies, we know little about nitrogen cycling in large river systems like the Mississippi. This lack of understanding prevents managers and policy makers from developing effective management strategies. Scientists at the U.S. Geological Survey (USGS) Upper Midwest Environmental Sciences Center in La Crosse, Wisconsin, are conducting several studies on nitrogen cycling in the upper Mississippi River and its floodplain to expand our understanding of this challenging issue.

The main objective of the studies is to determine how the various forms of nitrogen (particularly nitrate and ammonia) are delivered, transformed, and transported within this complex riverine system. The size and scope of these investigations require extensive collaboration.

Research partners include scientists from the USGS's Water Resource Division, as well as faculty and students from the University of Wisconsin-La Crosse and Winona State University in Winona, Minnesota. In addition, water quality data are being supplied by the Long-Term Resource Monitoring Program, which is run cooperatively by the U.S. Army Corps of Engineers, USGS, and five states in the upper Midwest. The program has amassed more than 10 years of data on trends in water quality and biota in the upper Mississippi River system.

The data show that in many reaches of the Mississippi River, rates of nitrate removal are below the maximum potential rates because backwater lakes and marshes, which are optimal habitats for nitrate

removal, receive little nitrate. Most of the nitrate-rich water remains in the main channel except during floods or where main-channel water has been intentionally rerouted to backwaters for habitat rehabilitation projects.

Scientists at the Center are also collaborating with scientists from the National Park Service to evaluate the effects of ammonia in sediments on survival of native mussels in the St. Croix River National Scenic Waterway. The St. Croix River, a tributary of the Mississippi River, has one of the few remaining healthy and diverse populations of mussels in North America. The proximity of the St. Croix River to the expanding Minneapolis-St. Paul metropolitan area might lead to greater inputs of

nitrogen and the potential for toxic levels of ammonia in river sediments—the habitat for native mussels. Scientists are studying concentrations of ammonia in sediments that are detrimental to juvenile mussels. Through this effort, they hope to determine where problem areas might exist, both now and in the future, and the overall risk of ammonia toxicity to this highly sensitive group of organisms throughout the St. Croix River and other rivers in the eastern United States.

For more information, contact Dr. William Richardson, USGS Upper Midwest Environmental Sciences Center, 2630 Fanta Reed Road, La Crosse, WI 54603. Phone: (608) 781-6231; e-mail: william_richardson@usgs.gov.



Protecting Green Space

Minneapolis Envisions Riverfront Greenspace

More than a century ago, farsighted city leaders established the first “Minneapolis on the Mississippi” riverfront at Minnehaha Falls and the Lower Gorge. Throughout the decades that have followed, the city has recognized the value of providing public access to the river as well as protecting the river’s health. The city is working in partnership with the Minneapolis Park and Recreation Board and other agencies to implement this vision by systematically buying up continuous riverfront greenspace under its new master plan.

Key to this effort is educating the public on the importance of public ownership of the river’s edge. Public ownership enables the citizens of Minneapolis to preserve and restore the ecological health of the river as a legacy for future generations. Using this approach, the downtown-adjacent Central Riverfront area has been transformed from a mid-70s landscape in industrial decline to a vital, expanding district of parks, residences, and other uses.

Above the Falls: A Master Plan for the Upper River in Minneapolis extends this legacy to the city’s Upper River area. Completed in 2000, *Above the Falls* is a comprehensive master plan guiding land use, the creation of continuous riverside trails and greenspace, riverbank restoration, and innovative storm water handling methods within a 5^{1/4}-mile corridor along the Mississippi River in the northern section of Minneapolis. The plan is intended to stimulate neighborhood economic revitalization and sustain-

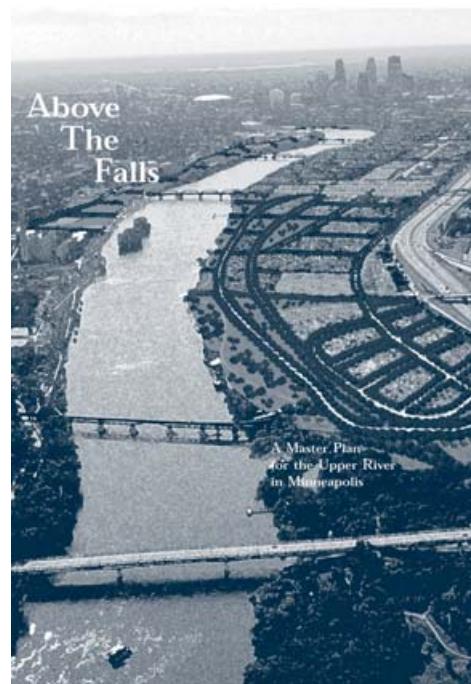
able development through a shift in land use away from private ownership of the shoreline (often by heavy industry) to new residential neighborhoods, office space, and light industrial development in conjunction with greenways and riverfront trail systems.

Above the Falls has received a number of prestigious awards, including an international Honor Award from The Waterfront Center, a Planning Award from the Environmental Design Research Association, and an Honor Award from the Minnesota chapters of the American Planning Association and American Society of Landscape Architects (ASLA). The project is truly a model of public involvement and multiagency partnerships: more than 2,500 residents were involved in a 2-year series of public meetings. The Minnesota Legislative Commission on Minnesota Resources, Hennepin County, and several Minneapolis city agencies provided funding for the meeting.

For more information, contact Rachel Ramadhyani, ASLA, Project Manager, Minneapolis Park and Recreation Board, 200 Grain Exchange, 400 South 4th Street, Minneapolis, MN 55415. Phone: (612) 661-4814; e-mail: rachel.b.ramadhyani@ci.minneapolis.mn.us.

“The Mississippi River is not only the grand natural feature which gives character to your city and constitutes the mainspring of its prosperity, but it is the object of vital interest and the center of attraction to intelligent visitors from every quarter of the globe.”

Landscape Architect H. W. S. Cleveland



Protecting Lands Through the Blufflands Alliance

“**B**ack in 1993, we found that many studies and groups focused on the Mississippi River itself—but they’d mention the land around it only as an afterthought,” says Mark Ackelson, president of the Iowa Natural Heritage Foundation (INHF), a private land trust. “Many of us knew that a river can’t be truly protected without protecting the adjoining lands, but we also knew that one state or one land trust can’t do it alone.” And that is how the Blufflands Alliance, a coalition of land trusts in Iowa, Minnesota, Wisconsin, and Illinois, was born.

The “blufflands” are the hilly region adjoining the upper Mississippi River and its tributaries. The bluffs extend some 200 miles down the river, affecting 23 counties in four states. The area supports one of the nation’s key

migratory flyways, several threatened and endangered species, a dwindling number of earthen mounds built by a long-lost native culture, and a tourism and recreation economy valued at \$1.2 billion annually. The region borders the Upper Mississippi Wildlife and Fish Refuge, which receives more than 3 million visits annually—10 percent of the total visits to the entire national refuge system. Some areas of the bluffed lands provide a last-chance filter for water entering the Mississippi River.

Alliance partners range from long-established land trusts to recent start-ups and include the INHF, Wisconsin Farmland Conservancy, Mississippi Valley Conservancy (Wisconsin), Standing Cedars Community Land Conservancy (Wisconsin), Minnesota Land Trust, Natural Land Institute, and Jo Davies Conservation in Illinois. The National Audubon Society's Upper Mississippi River Campaign is also a member. The organizers set out to protect the bluffed lands' local, natural, cultural, historical, and agricultural resources through methods like voluntary land protection (from easements to acquisitions), individual landowner visits and public education, registry programs, and demonstration projects.

The group presented a joint funding proposal to The McKnight Foundation, which offered start-up funds in 1994 and has provided significant annual support ever since. McKnight provides matching funds to support each group's "capacity" to work in the bluffed lands (e.g., staff, training, workshops). Though some McKnight money goes directly to land projects, most acquisition funds come from other private and

public sources. The Bluffed Lands Alliance has already protected 10,000 acres and another 10,000 are in negotiation. Member groups take turns exploring pilot projects. Minnesota has taken the lead on conservation-friendly development. Illinois's Natural Land Institute is designing multiuse preserves. Iowa is developing new kinds of conservation easements. And one of Wisconsin's land trusts, the Wisconsin Farmland Conservancy, is focusing on protection of farmland and natural land adjacent to farmland.

Another Bluffed Lands Alliance member, the Mississippi Valley Conservancy (MVC), established a priority protection area around the Wisconsin Department of Natural Resources' (DNR) Rush Creek Natural Area, near Ferryville, Wisconsin. Last December, MVC signed a conservation easement to protect 280 acres, including more than a mile of streambank. In the Sugar Creek watershed, MVC permanently preserved land and streambank. Securing money from Wisconsin DNR's Stewardship fund, the McKnight Foundation, the Stry Foundation, and private individuals, MVC bought 113 acres for permanent protection. In addition, MVC helped landowners to enroll 80 acres in its Registry Program. This Program is designed to provide landowners with an understanding of the biological value of their land through a site visit by a knowledgeable resource manager. Landowners that agree to become a part of the Registry Program work to conserve the natural values of their land and are recognized by MVC.

Meanwhile, the Bluffed Lands Alliance is expanding its vision. "We've done

well with this regional approach, but now we're talking about attracting significant national funding to our work," says Ackelson. "Farm runoff from Iowa and other states causes hypoxia in the Gulf of Mexico. Just as the Mississippi River ecosystem can't be addressed from one state alone, it's not covered by a four-state alliance either."

Headwaters to Backwaters

Consequently, the Alliance is working with other organizations down the river, from Minnesota to New Orleans. Together they've helped launch the Headwaters to Backwaters program, for which each group submitted project needs and contributed toward hiring someone to condense that information into a national proposal. The final package will be distributed to major national funders and the U.S. Congress.

That kind of global vision and local action is what Ackelson most values about the Bluffed Lands Alliance: "I see this kind of alliance as a nested approach to conservation," he says. "A single organization is nested within a regional group of organizations, all working on the same landscape but in different service areas. And then that regional effort can be nested inside a larger national initiative."

For more information, contact Cathy Engstrom, Iowa Natural Heritage Foundation, 505 Fifth Avenue, Suite 444, Des Moines, IA 50309. Phone: (515) 288-1846; e-mail: cengstrom@inhf.org or Gretchen Benjamin, Wisconsin Department of Natural Resources and MVC, 3550 Mormon Coulee Road, La Crosse, WI 54601. Phone: (608) 785-9982.

Partners Work Together to Bring Back the Splendor of the River

Chouteau Island is a complex of three Mississippi River islands located between the main river channel and the Chain of Rocks navigation canal just north of downtown St. Louis, Missouri, and East St. Louis, Illinois. Public entities, including the U.S. Army Corps of Engineers (USACE), Illinois Department of Natural Resources (IDNR), and Madison County, Illinois, own extensive portions of this 5,600-acre area. A collaboration of seven nonprofit organizations known as the Confluence Greenway, in conjunction with the city of Madison, Illinois, IDNR, and USACE, has developed a vision for Chouteau Island to be preserved as urban open space to provide recreational opportunities for the local and regional population.

Chouteau Island lies in the path of the proposed Confluence Greenway. Once completed, the Confluence Greenway Project will result in a 40-mile riverside recreation and conservation area on both banks of the Mississippi, extending from the Gateway Arch in downtown St. Louis to the river's meeting points with the Missouri and Illinois Rivers. Project organizers hope that its parks and trails will offer access to the waterfront for hiking, biking, fishing, birdwatching, riverwatching, and much more. It will also stimulate regional economic growth, enhance civic pride, and present unique education opportunities. And even better yet, the Greenway will restore and protect environmentally sensitive land, plants, and wildlife, while helping to keep our rivers clean,

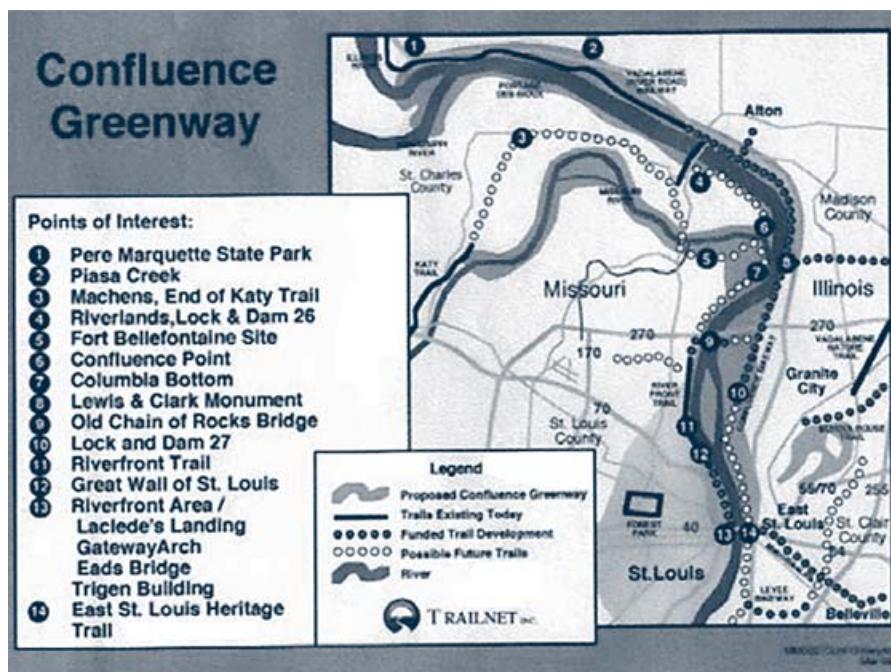
control flooding, and reduce storm runoff. Another partner, the National Parks Service Rivers Trails and Conservation Assistance Program, is looking at creative approaches, such as creating wetlands areas along the floodplain at Columbia Bottom.

Restoration of native plant communities and wildlife habitat is proposed to enhance the existing conditions. Protecting the land on Chouteau Island provides a unique opportunity to enhance and make accessible to the public the last remaining natural reach of the Mississippi River, an area that is ecologically rich. The Chain of Rocks canal bypasses several miles of the Mississippi, providing barges and other river traffic an alternative route past the Chain of Rocks

rapids, thus preserving a section of the river in a natural condition. Renovation of the Old Chain of Rocks Bridge, once part of historic Route 66, as a bicycle/pedestrian crossing of the Mississippi River, has provided access to Chouteau Island, linking it to numerous recreational trails on both sides of the river.

When preserved as open space, Chouteau Island will provide a haven of open space and outdoor recreation in the heart of an urban area, benefitting both humans and wildlife.

For more information, contact Kathi Weilbacher, Media Manager, at (314) 416-9930 or Laura Cohen, Confluence Greenway Project Manager, at (314) 436-1324, ext. 108.



Getting the Public Involved

Wisconsin's Watershed Approach to Nonpoint Source Pollution

The bluffland region of Minnesota and Wisconsin has been described as one of the most scenic stretches of the Upper Mississippi River not only because of the presence of the towering bluffs, but also because of the relatively intact forested floodplain, much of which is part of the Upper Mississippi River National Wildlife and Fish Refuge. Even in this stretch, however, sedimentation is one of the river's most serious problems.

In Wisconsin, the Chippewa, Wisconsin, and Black Rivers contribute the most sediment to the Mississippi River. Many of the smaller tributaries also carry a sediment load and other nonpoint source pollutants, particularly during flood events. Typical sources of sediment include croplands, streambank pastures, highway construction, and home and commercial construction sites. Much of the agriculture along the river consists of intensive dairy operations, many of which are located on steeply sloped coulee topography. Because of the steep slopes, flat cropland is at a premium and barnyards are therefore located on land not ideal for cropland. Frequently, this is land adjacent to a stream, and the result is that barnyard nutrients enter the streams.

As a result of farming practices employed on steep slopes until the 1930s, the depth of accumulated sediment reached 12 to 15 feet in some valleys, burying roads, buildings, and bridges.

Today, soil conservation techniques such as contour plowing, terraces and strip cropping, woodland management, and pasture management have minimized the problems associated with hillside erosion. But the sediment remains, and if stream banks are not protected by vegetation or are heavily grazed, the sediment is easily mobilized, especially during flood events.

Statewide Approach to Nonpoint Source Pollution

To address these types of nonpoint source pollution problems at their source, in 1979 Wisconsin instituted a pollution abatement program called the Priority Watershed Program. Funding for the program was dispersed on a watershed basis through each county's Land Conservation Department. Landowners and municipalities that voluntarily participated received educational and technical assistance plus 50 to 70 percent state cost sharing to install best management practices (BMPs); the landowner or the county had to come up with the balance. Five of the fifteen watersheds directly adjacent to the Mississippi River have had or currently have Priority Watershed Projects.

Recently the program was changed to target smaller areas and to focus on waters on the state's impaired waters list. However, local municipalities and townships on streams that are not on the impaired list also face problems stemming from non-point source pollution. A partnership approach to address this situation was used successfully by the Town of Onalaska, along the Mississippi River near La Crosse, Wisconsin.

A Partnership Approach to Nonpoint Pollution Problems on a Small Tributary of the Mississippi

Halfway Creek and Sand Lake Coulee Creek watersheds drain approximately 28,000 acres into Lake Onalaska, a large backwater of the Mississippi River. Both watersheds have long been affected by sedimentation and erosion, which have caused the backup of water into homes and businesses, flooding of highways and railroad tracks, and inundation of wetlands and farm fields with sand and silt.

On the nearby Upper Mississippi River National Wildlife and Fish Refuge, sedimentation in the marshy outlet of the creeks has damaged valuable fish and wildlife habitat. Sedimentation was also threatening the longevity of a highly acclaimed fish and wildlife habitat restoration project near the mouth of the creeks. This multimillion-dollar project was designed to restore habitat diversity within Lake Onalaska that had been lost because of island loss and sedimentation of deeper-water areas.

A study funded through a grant to the Town of Onalaska was completed in 1995 to evaluate causes of and possible solutions to these watershed problems. The final report provided development density, storm water, and sediment management recommendations. A partnership of private citizens, conservation groups, and local, state, and federal agencies is now undertaking projects aimed at solving the area's flooding and erosion problems. Members of the partnership provide funds, in-kind donations, and other contributions.

See Wisconsin, page 16

Wisconsin, from page 15

The first phase involved the construction of the Upper Halfway Creek Marsh Project, which is located on the Refuge. The goals of the project are to reduce the amount of sediment reaching Halfway Creek Marsh and Lake Onalaska, restore and enhance wetland and upland habitat, and increase opportunities for wildlife observation and education.

Three pools connected by water control structures were constructed to meet these goals. Pool A is an upland sediment trap that captures fine-grained sediment (and attached nutrients) during flood events. It is managed as a shallow, moist soil area. Pools B and C will be managed as temporary seasonal wetlands. Pool C allows water to flow back into Halfway Creek through a water control structure. The project was completed last October, and in just one spring it has already demonstrated its effectiveness at meeting the three goals. In addition to removing sediment from the creek, concentrations of nearly 1,500 ducks, 300 swans, and more than 200 Canada geese have been observed on Pool A.

Work continues on the watershed to eliminate or improve some of the worst sites. Two streambank stabilization projects have been completed on targeted stretches of Halfway Creek, involving more than 2,200 linear feet of streambank. Severe bank slumping was the primary source of sediment to the creek. The banks were reshaped and riprapped, and the excess soil was removed. Lunker structures were installed on one stretch, which helped to stabilize the streambanks, narrow and deepen the creek, and also provide overhead cover for trout.

Partnership streambank stabilization projects, which can ultimately prevent sediment from reaching the Mississippi River, are routinely being conducted in other Wisconsin counties bordering the Mississippi River, particularly Vernon County. Though individually small in size, these projects demonstrate how partnerships formed among different agencies, all levels of government, conservation groups, the public, and landowners can solve large-scale problems step by step. For more information, contact Ruth Nissen, Wisconsin DNR, 3550 Mormon Coulee Road, La Crosse, WI 54601.

Big River Journey Teaches Science in the Main Stream

In St. Paul, Minnesota, some 2,400 students from 28 elementary schools studied science from a floating classroom on the Mississippi River. The *Harriet Bishop*, a modern four-deck paddleboat named for St. Paul's first school-teacher, is a science school in motion, featuring hands-on learning stations. Lessons on board and in the classroom teach fourth, fifth, and sixth graders how to care for the "big river" by caring for the watershed where they live.

Now 5 years old, Big River Journey is coordinated by the Mississippi National River and Recreation Area (National Park Service) and operates in partnership with eight other public, private, and nonprofit organizations in the Twin Cities metropolitan area (see box). Partnering groups collaborate to provide educational programming on the Mississippi River, as well as to support schools' and teachers' efforts to bring the Mississippi River into the classroom. Scholarships support cultural and economic diversity among the program participants. Among the partners are a private

tour boat operator, a nonprofit science center, a nonprofit environmental education group, a nonprofit friends group, and federal, state, and regional agencies.

At six onboard learning stations, park rangers, naturalists, science educators, and a riverboat captain immerse students in river science topics. Students peer through microscopes at aquatic bugs while learning of the bugs' significance in assessing water quality. Using binoculars, some groups of students observe bird adaptations firsthand, as others explore the meaning of a floodplain ecosystem or analyze river litter while learning about watersheds. Many of the students also disembark to discover the rich archaeology at the confluence of the Minnesota and Mississippi Rivers. After returning to school, children take their learning to the streets and engage in service projects. The lessons add up to one big take-home message: the Mississippi River is an intricate wellspring of life that requires our stewardship.

For more information, contact Lyndon Torstenson, National Park Service, 111 East Kellogg Blvd., St. Paul, MN 55101-1256. Phone: (651) 290-3030, ext. 232.

Big River Journey Partners

Friends of the Mississippi River
Hamline University, Center for Global Environmental Education
Metropolitan Council Environmental Services, Metropolitan Environmental Partnership
Minnesota Department of Natural Resources (Adopt-a-River, Fort Snelling State Park, and Project WET)
Minnesota Historical Society, Historic Fort Snelling
Padelford Packet Boat Co., Inc.
Science Museum of Minnesota
U.S. Fish & Wildlife Service, Minnesota Valley National Wildlife Refuge

Legislation

Farm Bill/Conservation Security Act

The House Agriculture Committee recently began a series of hearings to examine the conservation title of the Farm Bill. A number of commodity and conservation groups have been pushing Congress to increase funding for conservation programs and expand the enrollment acreage. New legislation, the Conservation Security Act (CSA), introduced on May 22, 2001 by a bipartisan group of lawmakers, is likely to receive consideration during the Farm Bill debate. The CSA allows landowners and operators to enter into contracts and receive payments based on the type of conservation practices they willingly implement and maintain. Conservation practices include soil and residue management, contour farming, and cover cropping as well as comprehensive farm plans that take into account all the resource concerns of the agricultural operation. CSA establishes three tiers of progressive conservation practices, plans, and payment levels. Under the legislation, a participant may also receive payments based on established practices and for adopting innovative practices and systems or for pilot testing new technologies and new conservation techniques.

Upper Mississippi River Basin Conservation Act

On May 10, Rep. Ron Kind (D-WI) introduced H.R. 1800, the Upper Mississippi River Basin Conservation Act. The bill aims to reduce sediment and nutrient loadings to the Upper Mississippi River Basin through better coordination, expanded research and monitoring efforts, and targeted financial and technical assistance. It establishes a new sediment and nutrient monitoring network as well as a new

modeling program to identify major sources of sediment and nutrient loadings. H.R. 1800 also creates a grant program to demonstrate new and innovative best management practices. Finally, the bill calls for enhanced federal coordination through an Interagency Task Force. The bill has 21 cosponsors.

Conservation and Reinvestment Act

More than 190 House cosponsors have joined Rep. Don Young (R-Alaska) in support of H.R. 701, the Conservation Reinvestment Act (CARA). While scaled-back CARA language was incorporated into last year's appropriations bills, supporters vowed to fight this session for a stronger and more permanent authorization. H.R. 701 establishes a generous trust fund from oil and gas production royalties to help support a variety of wildlife and conservation projects.

Environmental Education Act

The Senate recently passed legislation to reauthorize the Environmental Education Act. The bill provides \$13 million in support of a broad range of environmental education and training programs, including \$4.5 million in EPA environmental education grants and \$1 million for the National Environmental Education and Training Foundation grants program. These programs help primary and secondary schools, colleges and universities, and nonprofit organizations educate young people about environmental issues. The bill also continues the President's Environmental Youth Awards for K-12 students and creates a new award program for teachers that demonstrate excellence in advancing environmental education at the grade school level.

The legislation also establishes the John H. Chafee Memorial Fellowship Program and the Theodore Roosevelt Environmental Stewardship Grant Program. The first is a competitive fellowship program for college students that choose to pursue a field of environmental studies. The Theodore Roosevelt Grant Program will award competitive grants to a consortium of colleges and universities to promote participation in environmental stewardship among college students, and between college students and the communities in which their college campuses are located.

Adopt Your Watershed Now Offers On-line Updates

In 1998 EPA worked with a number of partners to establish a national, on-line database of watershed groups, volunteer monitoring organizations, schools, and others working to protect and restore our nation's water resources. Currently more than 3,000 organizations are listed in the *Adopt Your Watershed* database, which is just one of several searchable databases available in the new *Watershed Information Network* (www.epa.gov/win).

All groups that are signed up now have the option of going on-line at <http://yosemite.epa.gov/water/adopt.nsf/update> to update their information. Watershed partnerships not currently listed can join by going to the *Adopt Your Watershed* homepage (www.epa.gov/adopt) and clicking on "Join Now." The goal is to provide citizens with an easy way to learn about opportunities to get involved in their community, as well as to provide a network for groups to share information, tools, and resources.

New Resources

New Training Modules

The Watershed Academy Web recently announced several new Web-based training modules, including "Agricultural Management Practices for Water Quality Protection." This module describes at an introductory level good agricultural practices advocated by the U.S. Department of Agriculture as part of its "CORE 4" outreach program. Another new training module, "Wetland Functions and Values," reviews the extraordinary contributions wetlands make to our water quality, economy, recreation, environmental health, and other areas. Watch for a new module on forest best management practices! The URL for the Watershed Academy Web is www.epa.gov/watertrain.

Training Opportunities Booklet

EPA's Watershed Academy has published an updated *Watershed Training Opportunities* booklet, which includes descriptions of the four main activities of the Watershed Academy—training courses, publications, watershed management facilitation services, and Web-based training. The booklet is available at www.epa.gov/owow/watershed/wacademy/wtopps.html. Hard copies can be obtained from the National Service Center for Environmental Publications (NSCEP) at (513) 489-8190 or (800) 490-9198. Please provide the document number EPA 841-B-01-002 when ordering.

Dam Removal Toolkit

Many conservation groups and river ecologists consider selective dam removal to be one of the most significant river restoration opportunities of the 21st century. In the coming years, thousands of communities across the United States will be faced with deciding whether to repair or remove an old dam. Experience has shown that selective

removal of old, unsafe, and uneconomical dams, especially smaller dams, can eliminate safety hazards and result in significant cost savings to dam owners, which are often the communities themselves.

The nation's leading river conservation groups have collaborated to produce *Taking a Second Look: Communities and Dam Removal*, a 22-minute video designed to increase awareness among local businesses, public officials, dam owners, and community members. In addition, a new 126-page handbook, *Dam Removal: A Citizen's Guide to Restoring Rivers*, offers a step-by-step process for pursuing selective small dam removal as a river restoration tool. It provides information on getting to know a dam, issues to consider during the decision-making process, laws and policies affecting dam removal, strategies and tactics to advocate for removal, restoration work after removal, and more.

To request a copy of the video, contact Trout Unlimited at (608) 250-2757, bgraber@tu.org, or American Rivers at (202) 347-7550, shiggs@amrivers.org.

To order a copy of the handbook, contact the River Alliance of Wisconsin at (608) 257-2424, wisrivers@wisconsinrivers.org, or Trout Unlimited at (608) 250-2757, bgraber@tu.org.

Department of Transportation Citizens Guidebook

The Federal Highway Administration and Federal Transit Administration have developed *A Citizens Guidebook to Transportation Decision Making*. The guidebook is designed to help citizens understand how transportation decisions are made at the local, state, and national levels. The better people understand the

transportation decision-making process, the more certain it is that the transportation system will be safe, efficient, and responsive to the public's needs and concerns. The new guidebook is available on the World Wide Web at www.fhwa.dot.gov/planning/citizen/index.htm.

EPA Report on Land Use, Transportation, and Air Quality

EPA's Office of Policy, Economics and Innovation has released *Our Built and Natural Environments: A Technical Review of the Interactions Between Land Use, Transportation, and Air Quality*. The report documents the many direct and indirect interactions between the built environment and the natural environment. The report also suggests a number of development practices that can reduce environmental impacts and is a valuable resource for analysts, citizens, and communities. The document is available on the Web at www.smartgrowth.org. The report (EPA 231-R-01-002) is also available from the NSCEP at (513) 489-8190 or (800) 490-9198.

Big Darby Creek Case Study

EPA's Office of Wetlands, Oceans and Watersheds recently issued a report examining protection of the Big Darby Creek (Ohio) watershed, one of the finest warmwater systems in the Midwest. *Big Darby Creek Case Study: A Profile of Watershed Threats and Protection in a Midwest Landscape* examines major threats (dams, agricultural practices, urbanization) over a 25-year period through 1996. It specifically examines the roles of government and nonprofit institutions, science, funding, and other factors in responding to threats. The report will be available soon from the NSCEP at (513) 489-8190 or (800) 490-9198. Ask for EPA publication 841-B-00-004.

Events ...

June 2001

- 27-July 1 *National Watershed Forum*, Arlington, VA. Contact Todd Barker, Meridian Institute. Phone: (802) 899-2625; e-mail: tbarker@merid.org; web site: www.merid.org.

July 2001

- 20-21 *Northeast Watershed Roundtable III* Northfield, Mt. Hermon School, Northfield, MA. Contact Peter Raabe or Pat Munos at River Network. Phone: (202) 364-2550.
- 30-Aug 2 *Managing River Flows for Biodiversity: A Conference on Science, Policy, and Conservation Action*, Fort Collins, CO. Contact Nicole Rousemaniere at nrousemaniere@tnc.org or visit the web site at www.freshwaters.org/ccwp/home.html.
- 31-Aug 2 *Western Regions/States NPS Meeting*, San Diego, CA. Contact Marquieetta Davis, Tetra Tech, Inc., 10306 Eaton Place, Suite 340, Fairfax, VA 22030. Phone: (703) 385-6000; fax: (703) 385-6007; e-mail: davisma@tetrattech-ffx.com.

August 2001

- 4-8 *Soil and Water Conservation Society: 2001 Annual Conference*, Myrtle Beach, SC. The conference will focus on how conservation of natural resources is linked to local, regional, national, and global concerns. Visit the web site at <http://swcs.tripod.com/2001agenda.html>.
- 14-15 *Southeast Watershed Forum Meeting* (by invitation only). Contact Marjan Peltier, EPA Region 4. Phone: (404) 562-9420.
- 27-30 *Ninth National Nonpoint Source Monitoring Workshop: Monitoring and Modeling Nonpoint Source Pollution in the Agricultural Landscape*, Indianapolis, IN. Contact Tammy Taylor, Conservation Technology Information Center, 1220 Potter Drive, Suite 170, West Lafayette, IN 47906. Phone: (765) 494-9555; fax (765) 494-5969; e-mail: taylor@ctic.purdue.edu.
- 27-30 *Wetlands Engineering and River Restoration Conference 2001*, Reno, NV. Contact J. Craig Fischchenich, General Conference Chair. Phone: (601) 634-3449; fax: (601) 634-4263; e-mail: fisched@wes.army.mil; Visit the web site at www.asce.org/conferences/wetlands2001.

September 2001

- 7-8 *Colorado Watershed Assembly 2nd Annual Conference*, Frisco Holiday Inn, Frisco, CO. Contact Chris Rowe. Phone: (308) 291-7437.
- 18-19 *EPA Region 6 Nonpoint Source Watershed Conference*, Dallas, TX. Contact TIAER at info@tiae.tarleton.edu. Phone: (254) 968-9585.

October 2001

- 3-5 *Addressing Animal Production/Environmental Issues: An International Symposium*, Research Triangle Park, NC. Contact Dr. Leonard S. Bull, Animal and Poultry Waste Management Center, Box 7608, North Carolina State University, Raleigh, NC 27695-7608. Phone: (919) 515-6836; fax: (919) 513-1762; e-mail: Leonard_bull@ncsu.edu; web site: www.cals.ncsu.edu/waste.mgt.
- 13-17 *WEFTEC 2001. Water Environment Federation's 74th Annual Conference and Exposition*, Atlanta, GA. Contact WEFTEC. Phone: 1-800-666-0206 or e-mail: confinfo@wef.org; web site: www.wef.org.
- 16-19 *Fourth Annual North Carolina Stream Restoration Conference—Stream Repair and Restoration: A Focus on the Urban Environment*, Raleigh, NC. Visit the web site at www5.bae.ncsu.edu/programs/extension/wqg/sri.
- 17-19 *Rocky Mountain Watershed Assembly*, Caper, WY. Contact Ellen Wolfe. Phone: (406) 994-1910.
- 23-26 *The Association of State Drinking Water Administrators Sixteenth Annual Conference*, Baltimore, MD. Contact ASDWA, 1025 Connecticut Avenue, NW, Suite 903, Washington, DC 20036. Phone: (202) 293-7655; fax: (202) 293-7655; e-mail: asewa@erols.com; web site: www.asdwa.org.

November 2001

- 7-10 *North American Lake Management Society's 2001 Conference: A Lake Odyssey, Bridging the Gaps Between Science, Policy, and Practice*, Madison, WI. Contact Dr. Richard Lathrop, UW Center for Limnology, 680 North Park Street, Madison, WI 53706. Phone: (608) 261-7593; fax: (608) 265-2340; e-mail: rlathrop@facstaff.wisc.edu; web site: www.nalms.org/symposia/madison.
- 12-15 *American Water Resources Association's Annual Water Resources Conference*, Albuquerque, NM. Contact Michael E. Campana, Conference Chair, University of New Mexico, Water Resources Program, 1915 Roma, NE, Albuquerque, NM 87131-1217. Phone: (505) 277-5249; fax: (505) 277-5226; e-mail: aquadoc@unm.edu.

The Changing Face of the Watershed

A new report entitled *The Changing Face of the Upper Mississippi River Basin* was released by the National Audubon Society at its first Watershed Roundtable in September 2000. The report, funded by a grant from the U.S. Environmental Protection Agency, describes and analyzes, for the first time, farming and farmland characteristics based on watershed boundaries in this basin. The report compares changes in land use patterns by county, by watershed, and over time, using data from the U.S. Department of Agriculture's Census of Agriculture and the Natural Resources Conservation Service's national inventory. Following are the key findings of the report:

- Average farm size in the basin has nearly tripled since 1920, going from 141 acres to 318 acres in 70 years
- Thirty percent of all farms in the basin are larger than 1,000 acres in size
- The acreage of farmland that is in family corporations has doubled since 1987

The report will be used as the focus of a joint five-state conference sponsored by the Soil and Water Conservation Society and the National Audubon Society in the spring of 2002. Conference participants will look at how the information can be used to better deliver conservation services and programs to a changing clientele in the river basin.

To view the report, visit the Upper Mississippi River Basin Stakeholder Network web site at www.umbsn.org. It is also available on CD in pdf format for a cost of \$10.00. To obtain a copy of the CD, contact Jessie Meschievitz at the National Audubon Society, Upper Mississippi River Campaign, 26 East Exchange Street, Suite 110, St. Paul, MN 55101 or call (651) 290-1695.

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