

In Defense of Clean Water: How Iowa and Its Neighbors Protect Watersheds

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By Peter Weyer, PhD

Introduction

The U.S. Environmental Protection Agency (EPA) defines watershed as *the area of land where all of the water that is under it or drains off of it goes into the same place*. The World Bank includes the receiving water body in its definition: A watershed is *the specific land area that drains water into a river system or other body of water*. Depending on the scale of the receiving water body, watersheds can include thousands of square miles of drainage area (e.g., Mississippi River watershed) or only a few square miles (e.g. Ralston Creek watershed, Johnson County, Iowa). Regardless of the size of any given watershed, receiving water bodies may be highly vulnerable to contamination from a variety of natural as well as anthropogenic sources, and water quality in receiving waters can vary seasonally as well as spatially.

Wildlife populations and domestic animals can negatively impact water quality depending on the number of animals and their proximity to water sources. Human activities and land uses within a watershed may impact water quality in streams and lakes and can affect wildlife habitats as well as humans who use those water sources for recreation (fishing, swimming) and as drinking water sources (for municipal water supplies). In the Midwest, intense agricultural activities including row cropping and livestock production may have impacts on water quality within watersheds over broad geographic areas, depending on seasonal precipitation patterns and conservation practices. Larger metropolitan areas as well as smaller urban areas can contribute significant contaminant loads to surface waters within watersheds.

Ambient surface water quality in the United States became a national concern during the late 1960s and early 1970s, resulting in grassroots level efforts to identify problems and legislative action to establish watershed protection programs. More than 30 years after the passing of the *Federal Water Pollution Control Act (1972)*, efforts to limit point sources of contaminants to surface water sources have been considered very successful, although some problems remain. Point sources of pollution are defined as *“any discernible, confined and discrete conveyance, including but not linked to any pipe, ditch, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.”* Nonpoint source contaminants include any sources of water pollution that do not fit within the point source definition.

Nonpoint contaminants have been more difficult to identify, quantify and prevent than point sources and federal funding is not adequate to tackle the vast number of impacted watersheds across the nation.

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Background

During the 1960s and early 1970s, the general deterioration of U.S. surface waters, mainly from industrial point sources, was receiving heavy coverage by the media. The Cuyahoga River fire in 1969 and the “ecological death” of Lake Erie are two prominent examples. The heightened level of awareness combined with a new sense of environmental stewardship in the general public led to a grass roots movement calling for increased federal oversight of U.S. water resources. Federal guidelines and regulations for water quality protection in surface waters were promulgated in the early 1970s, following the establishment of EPA. These were the initial attempts to identify watershed scale impacts on rivers, streams and lakes. In 1972, the U.S. Congress passed the *Water Pollution Control Act*, which made it illegal to discharge pollutants without permits and also established the goals of making the nation’s waters fishable and swimmable by 1983 by eliminating discharges to waterways. As amended in 1977, this law became known as the *Clean Water Act (CWA)*.

The main objective of the CWA was to “*restore and maintain the chemical, physical and biological integrity of the Nation’s waters.*” The CWA was re-authorized by Congress in 1987, at which time the Section 319 Nonpoint Source Management Program was established. The purpose of Section 319 is to provide funding to support activities aimed at nonpoint source pollution prevention at the watershed level. This includes technical and financial assistance, education, training, technology transfer, demonstration projects and monitoring.

Other sections within the Act became the basis of support and guidance for state-level watershed protection programs. Section 106(e)(1) required the collection of pertinent water quality data by mandating that “*states carry out...the establishment and operation of appropriate devices, methods, systems, and procedures necessary to monitor, and to compile and analyze data on the quality of navigable waters and to the extent practicable, groundwaters including biological monitoring.*” Section 303(d) provided for the use of innovative technologies and clean-up/restoration of impacted water sources by requiring states “*to identify waters which will not attain applicable water quality standards with technology-based controls and establish a priority ranking for such waters.*” In accordance with this goal, Section 303(d) established guidelines for water quality standards and laid the groundwork for the eventual development of Total Maximum Daily Load (TMDL) programs. A TMDL is “*a calculation of the maximum amount of a pollutant that a water body can receive and still meet the existing water quality standard.*” TMDLs are used in the development of restoration plans to improve impaired water bodies. Section 305(b) established reporting requirements related to water quality conditions, use attainability, and the effectiveness of pollution control programs. 303(d) and 305(b) reporting requirements play a central role in watershed protection efforts at the state level, both in terms of program development and planning activities.

Watershed Approaches

Watersheds *per se* became a focus of federal regulatory efforts with the passage of the 1997 *National Clean Water Action Plan*. This statute, under the jurisdiction of EPA and the Department of Agriculture (USDA) required states to “*focus on watersheds with the most critical water quality problems and take a cooperative approach in developing and implementing effective strategies to solve those problems.*” Underlying aims of the Plan are to “*increase protection from public health threats posed by water pollution; more effective control of polluted runoff; and promotion of water quality protection on a watershed basis.*” The Plan addressed budget concerns by calling for cooperation and collaboration between federal and

state agency programs, development of private/public partnerships, inclusion of the general public in determining program direction and development of outreach for information dissemination to stakeholders and the public.

An example of a watershed approach is necessary at this point. An example from a surrounding state demonstrates how a voluntary partnership program aimed at nonpoint pollution prevention is inherently different, but equally as effective as, regulating dischargers and requiring them to reduce pollution into a water body.

The Mackinaw River Project – a successful watershed partnership

The Mackinaw River Project is a model for watershed protection and restoration efforts in an agricultural setting. The Mackinaw River flows west for 130 miles through central Illinois from near Sibley to where it joins the Illinois River near Pekin. The watershed covers about 740,000 acres, is home to 87 species of fish and 28 species of mussels, and is mainly agricultural in nature. Water quality problems have historically been related to bank erosion and flooding resulting in heavy sediment load transport to the Illinois River. Concerns over deteriorating water quality in the watershed brought the Nature Conservancy of Illinois together with the Illinois Environmental Protection Agency (IEPA) in 1991 to develop a watershed management plan. Funding to develop the plan came from the IEPA Section 319 Program, U.S. EPA, the Atlantic States Legal Fund, the Illinois Department of Natural Resources (ILDNR) and the Wildlife Preservation Fund.

Numerous stakeholders and technical resource groups gathered in a series of planning meetings involving over 100 landowners and watershed residents, the Resource Conservation and Development, the Mackinaw River Valley Improvement Association, local Soil and Water Conservation Districts, local Farm Bureau chapters, the Illinois Natural History Survey, Illinois State University, and ILDNR. The discussions centered initially on flooding concerns and property rights. Cooperation within the group was vital for success. Agency representatives quickly recognized the importance of property rights, while landowners accepted the need for flexibility in order to avoid regulation. A mission statement was developed which is reflective of this cooperation: *“to preserve and enhance the natural resources of the Mackinaw River watershed through education, good management practices and voluntary cooperation while respecting property rights.”*

Planning teams and action teams each had representation from different geographic areas within the watershed. Teams included Municipal Actions, Education, Agricultural Practices, Agency Coordination, Property Rights and Biological Diversity. The watershed management plan was completed in 1998 and was presented to the public through outreach efforts including slide shows and speaking engagements, and distribution of fliers, newsletters and informational packets. Plan objectives were to reduce water volume, velocity and frequency of extreme flood events; reduce bank erosion; increase stream bank protection/vegetation; increase biodiversity; reduce sediment loads; reduce soil erosion; and reduce untreated sewage loads.

In 1996, the Mackinaw River Project was designated an Ecosystems Partnership by ILDNR. Conservation Reserve and Enhance Program (CREP) funds and Environmental Quality Incentive Program (EQIP) funds are providing support for projects. Numerous grants have been awarded for implementation and education activities in the watershed, including an EPA Environmental Education grant (1997) and Illinois Conservation 2000 Ecosystem Program

grants (2000, 2003). Current Mackinaw River Partnership projects include restoring 500 acres to wetlands, creating a greenway of water and open space in a two-mile corridor to protect biological diversity, and protecting and restoring a functioning oxbow slough and its surrounding areas.

By 2000, the Mackinaw River had attained full support status for aquatic life per the Illinois EPA. The success of watershed protection efforts like the Mackinaw River project relies largely on inter- and intra-agency cooperation and collaboration, grassroots program involvement, public/private partnerships, innovative funding mechanisms and regulatory or voluntary compliance practices.

A watershed-based approach to surface water quality continued to grow in the late 1990s. The Clean Water Initiative (1998) was a multi-agency approach to watershed protection and improvement. Goals were to increase progress towards watershed management through “...*cooperative, intergovernmental and public process to assess watershed condition....restore watershed health on a watershed basis through increased federal resources.... (and) building watershed partnerships to speed protection and restoration of all watersheds...*”. In 2002, EPA established the Watershed Initiative, a competitive grants program to fund innovative strategies for watershed protection and restoration. In 2003, this program funded projects developed by 20 watershed organizations at a total cost of about \$15 million. In 2004, this program was re-named the Targeted Watershed Grant Program. Projects funded in 2003-2004 in Iowa and surrounding states are presented below.

Year	Name	Location	Award	Projects
2003	Greater Blue Earth Watershed	South-central Minnesota, North-central Iowa	\$800,000	Wetland restoration, install riparian buffers, educational awareness program, promote existing conservation programs
2003	Upper White River Basin	NW Arkansas, Southwest Missouri	\$300,000	Integrate separate watershed plans, innovative on-site wastewater system, monitor w/geographic information system (GIS) – target critical areas
2003	Rathbun Lake Watershed	South-central Iowa	\$600,000	Implement best management practices, promote farmer enrollment in watershed protection agreements, conduct monitoring
2004	Upper Sangamon River Watershed	Central Illinois	\$1,290,000	GIS software and precision ag technology, drainage water management, economic/env. benefits from soil testing
2004	Mississippi R. Des Moines Lobe	North-central Iowa	\$1,000,000	design integrated wetlands and controlled drainage systems to optimize NO3 reduction at watershed scale

In 2003, EPA began work on a *Draft Watershed Rule* that would effectively combine required reporting for 303(d) and 305(b) into an integrated report. This report would provide a summary of the status of surface waters within a state. Key components of the report include geographic referencing of all water resources, categorization of waters according to water quality attainment status, prioritization and scheduling of waters needing TMDLs, and identification of waters where information is not sufficient to determine a water’s status.

The other federal agency heavily involved in water quality and watershed protection is USDA. USDA watershed programs are under the general umbrella of the Natural Resources Conservation Services (NRCS). USDA programs initially focused on flood prevention (*Flood Control Act of 1944*; *Watershed Protection and Flood Prevention Act of 1954*) and developed programs to reduce soil loss from agricultural fields and sedimentation of major rivers and streams. Separate programs were responsible for watershed planning and surface water surveys. In 1996, these watershed activities were combined to form the Watershed Surveys and Planning Program. Current NRCS programs that involve watershed protection and water quality include the Conservation Reserve Enhancement Program (CREP), the Conservation Security Program (CSP) and the Environmental Quality Incentives Program (EQIP). All three programs award funds to landowners and all focus on soil and water conservation related to production agriculture and environmental quality.

Study Aims

Iowa has a number of watershed protection, restoration and improvement programs. This process of environmental protection through focusing on watersheds has been ongoing for long enough to evaluate their effectiveness. This study compares watershed programs in Iowa to those in surrounding states. The underlying aim was to determine what programs and approaches have been successful regarding water quality improvement and other more subjective measures. This comparison was not undertaken in order to rank state programs in any way, but rather to assess what types of programs have been and continue to be successful from each state's perspective. A secondary aim was to develop recommendations on how Iowa watershed programs might be improved, using successful approaches from surrounding states as examples. The study looked at a number of areas including legislative basis for programs, funding mechanisms, research and education approaches, public/private partnerships, program evaluation techniques and planning activities.

Study Approach

Comparison group

Iowa, Missouri, Nebraska (EPA Region 7), and Illinois, Minnesota and Wisconsin (EPA Region 5) comprise the comparison group for watershed protection, restoration and improvement programs. These states represent a diverse geographic group (Interior Plains, Great Lakes, Ozark Plateau) but are all heavily agricultural in nature.

Data collection

Information on watershed protection, restoration and improvement programs in Iowa, Missouri, Nebraska, Illinois, Minnesota and Wisconsin was collected by 1) a review of web-based information on state agency and other programs; 2) a mail-out survey and collection of pertinent brochures, fact sheets and reports; and 3) conversations with key stakeholders in some states.

Review of web-based information — A review of state agency web sites revealed substantial information on watershed programs for each state, including general background on program development, program description and examples of program components, key personnel, funding mechanisms and, in some instances, links to water quality databases. Review of legislative web sites produced information on historical background, including pertinent legislation, important dates, and annual fiscal data on state appropriations. Pertinent non-

governmental organizations (NGOs) and federal agency (EPA, USDA, etc.) web sites were also reviewed for information and water quality data. A list of web sites and other references that provided information for this study are appended.

Mail-out survey — A survey instrument was developed to collect information that was not available on the web sites. The survey also asked for other comments or information the respondent thought may have been of interest to the study. Key state personnel identified in the website review were contacted by e-mail and invited to participate in the survey. The following agencies agreed to complete the survey:

- Iowa Department of Natural Resources
- Illinois Environmental Protection Agency
- Minnesota Pollution Control Agency

Surveys (and instructions) were either e-mailed or U.S.-Mailed to environmental agencies in all six states. A number of follow-up contacts by e-mail and telephone were made in an effort to persuade key agencies to participate in the survey. Information presented on Missouri and Nebraska programs is based solely on review of state agency and other program websites.

The survey requested information on:

- main issues driving state watershed programs
- most important watershed programs and enabling legislation
- lead agencies on watershed programs
- nature of programs: regulatory or voluntary, research/education/demonstration
- public/private partnerships within watershed programs
- use of federal funds
- state appropriations and private sources of funding for programs
- adequacy of funding levels over time
- efforts to solicit public participation in program planning
- collaborative/cooperative efforts between states
- planning activities
- program evaluation measures

Agencies were also asked to provide (either web links or hard copies) brochures, fact sheets and annual reports on watershed programs. The survey is appended.

Personal Conversations — Conversations with key stakeholders in Iowa and Wisconsin produced additional information on planning activities and state efforts aimed at increasing funding opportunities for watershed programming, as well as information on developing public/private partnerships on local, regional and state levels. Stakeholders represented NGOs, drinking water utilities, Extension Service programs and university-based research groups.

Information/data review and synthesis

Program information gathered from website reviews and responses from the mail-out survey provided input to the overviews of state programs presented below. Survey respondents also provided opinions on / level of enthusiasm for programs. In some cases, review of annual reports containing water quality data provided a more objective evaluation of improvements

within watersheds by comparing baseline data with more recent data to see whether any positive or negative trends in water quality were apparent. Information gathered from NGOs on watershed programs and activities provided additional input regarding subjective review in some states.

State Program Overviews

Overviews of state watershed protection, restoration and improvement programs follow. Some states provided much more detail in their survey responses than others. Iowa programs and activities are presented in greatest detail. Summaries of surrounding state programs are not intended to be comprehensive in nature, but rather present highlights and examples.

EPA Region 7

Iowa

Iowa (population 2.9 million) has over 71,000 miles of streams and more than 161,000 acres of lakes, ponds and wetlands. Primarily an agricultural state, less than 1 percent of Iowa's total land area is covered with water. Water quality protection in Iowa was initially driven by federally-mandated programs such as the 1972 CWA. The 1987 *Groundwater Protection Act* was the first state mandate for establishing programs aimed at groundwater source protection through research, education and demonstration projects. Surface water quality protection was specifically addressed in 1999, when the Iowa legislature established the Watershed Protection Program, which included a Watershed Task Force planning group and funding for watershed protection programs in local communities. The main issues behind state watershed protection, restoration and improvement programs in Iowa are water quality and habitat, environment and ecology concerns. Recreation, tourism (about \$4.3 billion in 2002) and economic development issues have played a secondary role in driving watershed protection efforts.

Watershed Programs

The Iowa Department of Natural Resources (IDNR) is the lead agency for many watershed programs. The Section 319 Program supports implementation, education and demonstration projects. Most projects are 3-5 years in duration and involve nonpoint source information and education, best management practice (BMP) demonstrations of innovative and alternative methods for pollution control, and implementation of nonpoint source controls in priority lake and trout stream watersheds. Examples include the Walnut Creek Watershed and Water Quality Monitoring Project, and the Sny Magill Watershed Project. Both watersheds are essentially agricultural in nature. These projects focus on improving agricultural management practices; Walnut Creek includes a large scale natural prairie restoration approach while Sny Magill is implementing major sediment reduction practices to local streams.

The TMDL program and water quality assessments under Section 305(b) CWA are under IDNR's jurisdiction. IDNR also administers the federal Targeted Watershed Program in Iowa. The Rathbun Land and Water Alliance was awarded \$600,000 as one of 20 national recipients in FY 2003. This project uses geographic information system (GIS) to assess potential changes to the landscape that may have positive impacts on water quality. The Alliance is described in the box below.

The Iowa Department of Agriculture and Land Stewardship (IDALS) is the lead agency for a number of programs affecting watersheds, mainly through its Soil and Water Conservation Division. An example is the Water Quality Protection (WQP) Program, in which soil and water conservation districts use a watershed approach to address local water quality problems.

Rathbun Lake Watershed	Rathbun Land and Water Alliance
Covers 354,000 acres in Appanoose, Clarke, Decatur, Lucas, Monroe and Wayne counties	Est. 1996, to foster a voluntary approach driven by landowners, water users and public and private organizations to protect and enhance land, water and economic resources in the Rathbun region.
1/3 covered by highly erodable crop land, 1/4 grassland. 400 cow/calf operations; 300 livestock feeding operations. 800 farms and 9 communities	Partners: federal, state, county and local govt., municipal water, ag organizations, university-based groups, NGOs
Includes Chariton River, Bobwhite Lake, Corydon Lake, Colyn Wetlands	Projects: watershed assessment, water surveillance and monitoring, water quality education, GIS, Farm*A*Syst, resource-based rural development

IDALS also administers the USDA Wetlands Reserve Program (WRP) and the Emergency Wetlands Reserve Program (EWRP). The goal of these programs is to re-establish Iowa's wetland ecosystems. Watershed restoration programs are concentrated mainly in the north central section of the state. The CREP and CSP programs, federal programs included in Farm Bills, involve watershed protection through installation of buffer strips and other pollution prevention measures. IDALS' Watershed Protection (WSP) Program (1999) uses a combination of federal and state funds to build the capacity of local communities to sponsor watershed protection efforts, and provide resources to leverage funding at the federal and local levels. Projects focus on implementation and achievement of watershed objectives, and include assessment, monitoring or evaluation, GIS, education and/or public information and outreach. Projects are located in watersheds above publicly owned lakes, streams, high use recreation areas, urban developments and aquifer recharge areas. An example of a WSP Program project is the Lake Fisher Water Quality Project in Davis County, which involves reducing sedimentation in the lake by establishing terraces, sediment control basins and constructed wetlands in over 900 acres of agricultural land in the watershed, implementing demonstration projects on alternative sewage disposal systems, and providing educational programs for watershed residents.

Most watershed programs in Iowa are voluntary in nature, with little or no regulatory oversight provided by IDNR or IDALS. The TMDL program is an exception.

Funding Sources

Several sources of funding for Iowa watershed programs exist at the state and federal levels. No dedicated sources of state funds are available. Rather, funding comes from the Iowa General Fund (tax receipts) and the Iowa Environment First Fund (Iowa gaming receipts), both of which are appropriated annually. The Iowa Environment First Fund was created by the Legislature in 2000 to “provide funding for the protection, conservation, enhancement or improvement of natural resources or the environment.” The Legislature appropriates money from the Environment First Fund directly to IDNR and IDALS for various environmental programs. The level of state funding has generally been lower than initially intended when programs were first established, either because of legislatively mandated reductions in funding levels or because of delays in funding approval and dispersal. Current funding levels do not match needs related to watershed programs and general water quality improvement.

The Iowa Resource Enhancement and Protection Fund (REAP, 1989) is funded through the Iowa Environment First fund and from the sale of natural resource license plates. Authorized to receive \$20 million per year until 2021, REAP has only reached that level of funding once (1991). The Legislature sets the annual amount of REAP funding, which is currently at about \$11 million. REAP funds support eight different programs; 20 percent of the funds go to soil and water enhancement projects. Recent annual REAP funding levels for soil and water enhancement projects are shown below.

FY2000 – \$2,207,000	FY2002 – \$1,554,300	FY2004 – \$2,237,000
FY2001 – \$2,207,000	FY2003 – \$ 0	FY2005 – \$2,237,000

Funds are distributed for soil and water conservation and enhancement projects and practices involving reforestation, woodland protection and enhancement, wildlife habitat preservation and enhancement, protection of highly erodible soils, and water quality protection. IDNR, IDALS and other agencies administer REAP funds. Soil Conservation Districts designate high priority watersheds for REAP funding through IDALS’ Division of Soil Conservation.

The Water Protection Fund (WPF), administered by IDALS, is funded through REAP (about \$600,000 in FY2003). IDALS also funds watershed programs through the soil and water conservation cost share program (over \$5 million in FY2004). CREP, WRP and EQIP funds (all federal) are often used to support watershed improvement projects on regional and local scales. Many watershed projects are funded through a combination of state and federal sources. For example, WQP projects are funded through REAP and Section 319 grants. IDNR has awarded about \$5.3 million annually over the past few years through Section 319 funds.

The Clean Water State Revolving Fund (SRF) is an important source of federal aid for implementing CWA goals. This program provides annual grants for capitalizing loans for which states are required to provide a 20 percent match. Loans are now available in Iowa through the SRF General Nonpoint Source Projects area, which includes nonpoint water quality improvement projects that do not fall under other set-aside programs in SRF. Historically, Iowa state matching funds for SRF funding have not been fully distributed. The Iowa Policy Project reports that since 1999, only 62 percent of available SRF funds have been disbursed and only 72 percent of available funds have been committed to projects. This amounts to approximately \$124 million uncommitted to water quality projects. The FY2005 Intended Use Plan details the intent to distribute previous years’ funds. One new project (\$500,000) has been recommended

for FY2005 funding under this new program. Other examples of SRF loans earmarked for nonpoint source/watershed projects include \$175,000 to investigate the sources of high bacterial counts along the Des Moines and Raccoon Rivers, and a \$350,000 set-aside in FY2003 to develop an interactive website on local source water protection information.

Private funds are used in all programs requiring a cost share, as grant recipients must demonstrate other sources of committed funding. Numerous private organizations are involved in providing funding for watershed protection efforts such as buffer zone development and educational activities. Examples include Iowa Pheasants Forever – over \$2 million raised for wildlife habitat development in 2003, Iowa Ducks Unlimited – over \$100,000 awarded to wetland restoration projects since 2000, and the Iowa Farm Bureau Federation – over \$110,000 awarded for watershed protection projects and education programs since 2000. The Iowa Natural Heritage Foundation (INHF) is perhaps the best example of a private organization in Iowa working to improve water quality through conservation practices. Since 1979, INHF has raised more than \$41 million for conservation projects and activities, has worked with partners to protect over 76,000 acres of land, and has worked with numerous local partnerships to improve Iowa surface water quality.

A proposal is being developed by a coalition of Iowa drinking water utilities to use the sales tax on drinking water, which currently goes into the state's General Fund, for watershed protection programs. The proposal calls for 10 percent of the tax to be used administratively within IDNR, 40 percent to be allocated for watershed project grants, and 50 percent to be used as part of the SRF loan program at the state level. On average, the sales tax on drinking water brings in about \$18 million annually.

Partnerships and Public Participation

The geography of Iowa limits the opportunity for partnering on watershed projects with other states, as the Missouri and Mississippi Rivers are the receiving waters for most regional watersheds. However, smaller-scale cooperative planning efforts are in place with South Dakota in the Big Sioux TMDL project and with Minnesota on the Upper Iowa River project. Public participation in voluntary citizen water monitoring efforts has been very successful through the IOWATER Program within IDNR. Participation by Iowans in planning and implementing local and regional watershed projects is encouraged and supported by IDNR and IDALS. Fundraising efforts for matching support have also been effective on the local level. Formal advisory groups are usually the approach used for local input on programs, but general public opinion has been gathered on a few projects, including the Cedar Lake and Briggs Woods lake/watershed projects. WQP projects involve partnering between federal, state and local agencies and organizations. These projects have a high level of community support and include strong public information and education programs.

An example of a local, state and federal cooperative effort is the WRP program, which includes IDALS, IDNR, the U.S. Fish and Wildlife Service, INHF, county conservation boards, soil and water conservation districts, Iowa Pheasants Forever and Iowa Ducks Unlimited as partners. An example of an urban partnership for watershed protection is the Des Moines Urban Environmental Partnership, comprised of the Des Moines Water Works, the Des Moines Metro Waste Authority, the City of Des Moines and surrounding suburbs. Another successful watershed partnership is the Agricultural Clean Water Alliance, which provides funds for

monitoring, supports educational activities, and has developed a strategic plan for the Raccoon River watershed.

Public input and participation on determining funding priorities for watershed projects is present in REAP at the county and regional levels (REAP committees and assemblies, respectively) and with the state level REAP Congress. The REAP Alliance is an advisory group made up of a coalition of 31 private NGOs; the alliance advises on future program directions. An excellent example of public participation in an effort to measure opinion on Iowa water quality is the Iowa Lakes Valuation Project, which is being conducted by the Iowa State University (ISU) Department of Economics, Department of Ecology, Evolution and Organismal Biology, and the Center for Agricultural and Rural Development. The project is “*an economic study of the use and value Iowans place on water quality in Iowa lakes.*” Participants are being asked about their “willingness to pay” for water quality improvements, and are also surveyed regarding how often they visit Iowa lakes, what lake features are important to them, and their perception of how important lakes are to their local economies. The EPA-funded project is a five-year effort running through 2006.

Watershed Planning Activities

The 2001 Watershed Task Force Report was a joint state-federal planning effort that resulted from the 1999 Watershed Protection Program. The mission of the task force was to “*study the condition of watershed protection in Iowa, with the intent to develop a framework for enhanced cooperation and coordination between state, federal and local government, the private sector and the public regarding multi-objective needs for soil conservation, water quality protection, flood control and other natural resource conservation issues in the state’s watersheds.*”

The Governor’s Water Summit in 2003 highlighted watershed needs by targeting specific sub-watersheds in an attempt to maximize environmental impacts of available funding. The summit involved the participation of the public, private organizations, academia and state agencies. The state agencies agreed to target their funds toward priority areas that were identified by a number of working groups. As a result of the summit, the Governor recommended that \$5 million in new money be earmarked in the Environment First Fund for water quality programs in FY2005. Of this, \$2 million was to help form local groups to plan restoration and improvement of watersheds. The \$5 million request was not approved by the Legislature.

A successful partnership for watershed protection

Winterset, Madison County

Cedar Lake (10,000 acres) provides drinking water for Winterset but is threatened by sedimentation and high nitrate and atrazine levels.

The city of Winterset is working with local landowners to implement riparian buffers, nutrient and pest management programs, and erosion control basins and terraces. USDA and EPA are providing funds for these improvements, and Winterset Municipal Utilities is planning a bike and hiking trail as well as fishing and picnic areas around the lake.

New housing developments around the lake are also in the planning stages.

Watershed Program Evaluation

Iowa watershed programs are generally evaluated by measures of activity or output rather than by measures of outcome. For example, number of acres implementing BMPs for erosion control may be used rather than actual measurements comparing baseline water quality parameters to those same parameters following implementation of BMPs. Another example is statistical modeling of tons of soil saved after project implementation instead of measuring turbidity or loads delivered to streams. The WRP Program lists *“most noticeable benefits are increases in wildlife, educational use, recreational use, and in many cases reduced damage from flooding.”* In some instances, more objective outcomes are used to evaluate programs, such as natural reproduction of fish populations or measurements of water quality improvement (secchi depth) in lakes.

The mission of IDNR’s Ambient Water Monitoring Program (established in 1999) is to *“develop and deliver consistent, unbiased information about the condition of Iowa’s surface and groundwater resources so that decisions regarding the development, management and protection of these resources may be improved.”* This program has developed a database of baseline information on surface water quality that will be used to evaluate watershed protection programs. Ongoing data collection will allow water quality trend analyses that can be used in planning future activities for watershed protection.

There are numerous sources of ambient water quality data that could be better utilized by the state for watershed protection planning and programs, including many drinking water utility laboratories and university-based research units. These databases may provide pertinent information for watershed program planning. For example, the Iowa Lakes Information System within the Limnology Laboratory at ISU contains analytical data on 132 Iowa recreational lakes. This system also incorporates data from previous surveys of Iowa lakes that can be used for water quality trend analyses. U.S. Geological Survey (USGS) data on surface water quality are also available. With respect to federally funded programs, annual reports in compliance with Section 305(b) of the CWA describe the general conditions of Iowa’s surface water quality. Section 319 Program reports present project descriptions, funding amounts, BMP implementation summaries and water quality assessment results.

Missouri

Missouri (population 5.6 million) has 902,000 total acres of water including 292,000 acres of lakes and over 20,000 miles of rivers and streams. There are 45 watersheds within Missouri’s borders. Water quality and watershed protection are important to Missouri’s economy; tourism accounted for \$7.5 billion income in 2001. In addition to federal programs driving water quality protection, the Missouri Legislature has been active on environmental protection and water quality. In 1989, the *Water Resources Law* mandated that the state *“develop, maintain and periodically update a state water plan for a long-range comprehensive state-wide program for the use of surface water and groundwater resources of the state, including existing and future needs for drinking water supplies, agriculture, industry, recreation, environmental protection and related needs.”* Components of the State Water Plan include collection of water quality data through monitoring programs, production of plans and recommendations to address obligations laid out under the law. The law also directed the Missouri Department of Natural

Resources (MoDNR) to ensure public participation in the development and revision of the State Water Plan.

Watershed Programs

MoDNR is the lead agency for many watershed protection, restoration and improvement programs. MoDNR's Water Protection Program is responsible for Section 303(d), Section 319 and Section 305(b) programs under the CWA. The Missouri NRCS supports and administers soil conservation projects aimed at improving watershed conditions. For example, the Agricultural Nonpoint Special Area Land Treatment (SALT) program (established in 1986) provides support for local soil and water conservation districts to work with landowners to reduce soil erosion on crop, pasture and woodlands, targeting special assistance in priority watersheds. Over 170 locally led SALT projects have been completed. Another example is the Bootheel Watershed Program, selected as one of the nation's 18 priority watersheds in 2004 for CSP funding.

The Missouri Department of Conservation (MDC) is responsible for watershed inventories and assessments, which include information on land use, water quality and use, hydrology, geology/geomorphology, habitat conditions, biotic community, and management problems and opportunities.

Funding Sources

Federal sources of support for Missouri watershed programs include 319 Section grants, SRF loans, and CRP, CSP and EQIP funds. Nonpoint Source minigrants (up to \$5,000) are also available; these require a 40 percent non-federal match. Missouri provides a number of funding programs for municipal drinking water and wastewater projects, including the Rural Drinking Water and Rural Sewer Grant and Loan Programs, the Small Borrowers Water Program, and various storm water and water pollution control programs.

Partnerships and Public Participation

A number of partnerships promote development of Missouri watershed plans and provide access to information on research activities and education programs. The Missouri Watershed Management Assistance (MoWMA) is a cooperative effort between the University of Missouri Extension Service, the USDA NRCS Program, MoDNR and MDC to provide communities with a variety of resources related to watershed management. The focus of MoWMA is to *“assist communities in their efforts to conserve, improve, and protect ground and surface water through comprehensive watershed management.”*

A federal/academic partnership related to water quality and watersheds exists within the Cooperative State Research Education and Extension Service (CSREES) Heartland Regional Water Quality Coordination Initiative. CSREES is a collaboration between the USDA, U.S. EPA Region 7, Iowa State University, Kansas State University, the University of Nebraska and the University of Missouri Extension to *“coordinate research-based information, education and extension resources of the land-grant universities related to water quality and the management of agricultural nonpoint source pollutants.”*

The Missouri Watershed Information Network (MoWIN) was established in 1997 to provide assistance in locating and accessing information on Missouri watersheds. MoWIN (a

partnership of state and federal agencies, NGOs, natural resource interest groups and private industry) acts as a clearinghouse for information on current watershed events and meetings, ongoing watershed projects, local watershed contacts, funding sources, technical assistance, educational resources and natural resource facts and reports.

Public participation in voluntary citizen monitoring programs is very strong. Examples are the Citizen Water Quality Monitoring Program (MoDNR/MDC), the Lakes of Missouri Voluntary Monitoring Program and the Sierra Club Water Sentinels Program.

Watershed Planning Activities

The State Water Plan focuses on prioritization of watersheds, identification of needs and issues within each watershed and actions needed to address those needs. Goals include providing a basis for decision and policy making, identifying important issues on regional and watershed scales, providing a basis for prioritization, matching resources to needs and identifying responsibility for proposed projects. The plan also determines project evaluation methods, fosters communication and coordination across programs and agencies and provides mechanisms that ensure public involvement in process. Local watershed planning is a process where stakeholders assess their natural resource conditions and needs, set goals, identify programs and other resources to meet those needs, develop proposals and recommendations, implement solutions, and measure successes. These plans are developed for watersheds or other geographical areas on an annual basis.

Watershed Program Evaluation

MoDNR monitors surface water quality related to CWA guidelines, and coordinates monitoring activities with other agencies conducting monitoring, including USGS, the U.S. Army Corps of Engineers, EPA, MDC, the USDA Agricultural Research Service and the Missouri Department of Health and Human Services. The Missouri Watershed Inventory and Assessment Project (MoWIAP) maintains a site that allows web-based linkage to various databases on water quality in several watersheds within the state. MDC provides electronically accessible summary data on watershed inventories and assessments as described above. With respect to federally-funded programs, annual reports in compliance with Section 305(b) of the CWA detail general improvements in Missouri's surface water quality. Section 319 Program reports present project descriptions, funding amounts, BMP summaries and water quality assessment results.

Nebraska

Nebraska (population 1.7 million) has 2,500 small lakes, 13 major river basins and lies totally within the drainage basin of the Missouri River. Portions of 71 watersheds are found within state borders. Groundwater is a major resource, with almost 1.9 billion acre-feet of water residing in aquifers under the state. In 1992 the Nebraska Department of Environmental Quality (NDEQ) developed goals for integrating and prioritizing activities and funding through comprehensive watershed management. Nebraska's Statewide Watershed Management Approach was initiated that year by NDEQ's Water Quality Division. In 1993 the Surface Water and Permits and Compliance Sections established a framework grouping the state's major river basins into five groups that would operate on a five-year management cycle. This included a detailed basin management cycle, statewide schedule, basin plan format and

criteria for setting management priorities and responsibilities. Water quantity is a major concern in Nebraska for both surface water and groundwater supplies. The Interrelated Water Management Fund was created in 1996 to address quantity issues, but was not funded.

Watershed Programs

NDEQ is the lead agency for surface water programs in Nebraska including the Section 319 Program of the CWA. A Basin Management Approach was developed in 1994 by NDEQ's Division of Water Quality with the completion and implementation of a strategic monitoring plan for the Lower Platte River and Nehema River basins. Stream management teams, developed under the leadership of the Nebraska Game and Parks Commission, provide expertise to establish management needs and strategies at the local level. NDEQ programs recently increased emphasis on watershed and groundwater management planning, targeting 303(d) listed impaired waters and community participation in project development and implementation. Examples of projects include investigative water quality evaluations, detailed watershed assessments and effectiveness evaluations of already implemented NPS management measures.

The Nebraska Department of Natural Resources (NDNR) is the lead agency for Nebraska's groundwater programs and maintains data on droughts, flow, moisture index and stream gaging for surface water sources. The Nebraska Soil and Water Conservation Service administers the state's CREP, WRP and EQIP programs.

Funding Sources

NDEQ distributes grant funding under the Section 319 Program to units and sub-units of government, education institutions and NGOs to carry out projects that will help protect the state's drinking water sources. NDEQ also administers SRF loans for nonpoint source pollution control projects. A partnership between NDEQ, Nebraska Health and Human Services, the Nebraska Rural Water Association and Natural Resource Districts provides funding for source water protection projects. NRCS provides support via a cost-sharing mechanism through the Nebraska Soil and Water Conservation Program (NSWCP) and the EQIP program.

A unique source of funding for environmental programs is the Nebraska Environmental Trust. The Trust was established in 1992 *"to conserve, enhance and restore the natural environments of Nebraska."* It was created on the conviction that *"a prosperous future is dependent upon a sound natural environment, and that Nebraskans could collectively achieve real progress on real environmental issues if seed money were provided."* Annual grants are funded mainly through proceeds from the Nebraska Lottery. The Nebraska Environmental Trust receives 49 _ percent of the profits of the Nebraska Lottery after the first \$500,000. The Trust was guaranteed (by legislation) at least \$9.7 million annually for grant assistance through 1/1/08. Water quantity programs are partially funded through the Water Resources Trust Fund, which has a property tax levy as its dedicated funding source.

Partnerships and Public Participation

Partnerships for watershed programs and projects exist in several areas across Nebraska. An example is the Platte River Watershed Program, which involves federal and state agencies and numerous local stakeholders. This program uses a comprehensive ecosystem approach

to address concerns related to potential pesticide, nitrate and toxics contamination of waterways and resulting habitat destruction and alteration.

Public participation in voluntary citizen monitoring is found in the Nebraska Sierra Club Water Sentinels Program.

Watershed Planning Activities

The primary guidance document for the Section 319 Program is the Strategic Plan and Guidance for Implementing the Nebraska Nonpoint Source Management Program – 2000-2015. The Continuing Planning Process required under Section 303(e) addresses activities involving impaired waters lists, TMDLs, watershed planning and nonpoint source pollution programs. The Nebraska Water Policy Task Force (mandated by statute in 2004) called for a proactive approach by NDNR on the integrated management of surface water and groundwater, and requires that NDNR annually review river basins to determine which are “fully appropriated.” Surface water and groundwater management plans are required for proposed water uses.

Watershed Program Evaluation

USGS maintains surface water quality data for Nebraska. Section 319 Program, CREP and other programmatic data are available from NDEQ and NRCS. For example, NDEQ’s surface water monitoring program uses a rotating basin strategy, targeting 2-3 river basins each year. During a five-year cycle, all 13 river basins are intensively monitored. With respect to federally-funded programs, annual reports in compliance with Section 305(b) of the CWA describe general improvements in Nebraska’s surface water quality. Section 319 Program reports present project descriptions, funding amounts, BMP implementation summaries and water quality assessment results.

EPA Region 5

Illinois

Illinois (population 12.4 million) contains the southwest shoreline of Lake Michigan and has over 2,500 lakes and some 82,000 ponds. There are seven major river basins in Illinois that include 33 major watersheds; these can be further divided into 800 sub-watersheds. Environmental quality in Illinois was first addressed by legislation in 1970, when the state Legislature passed the *Environmental Protection Act*. The purpose of the Act is to “*establish a unified, statewide program...to restore, protect and enhance the quality of the environment... in order to protect health, welfare, property, and the quality of life.*” The Illinois Environmental Protection Agency (IEPA) was established by the Act. Illinois water quality protection was also addressed in 1970 with the initiation of a surface water monitoring program. In 1987, the Legislature passed the *Groundwater Protection Act*, which established a unified groundwater protection program and provided for monitoring surveys, mapping and assessments. IEPA developed its first Water Monitoring Strategy in 1996, and in 1998 watershed restoration priorities were developed by IEPA in conjunction with NRCS. Watershed protection efforts are related mainly to habitat, environment and ecology concerns, as well as drinking water and related public health issues. Tourism (\$22 B income in 2002), recreation and economic development are lower priority issues driving watershed program efforts in Illinois, per IEPA.

Watershed Programs

IEPA is the lead agency for many watershed protection, restoration and improvement programs. The mission of IEPA's Bureau of Water is to *"ensure that Illinois' rivers, streams and lakes will support all uses for which they are designated including protection of aquatic life, recreation and drinking water supplies; ensure that every Illinois Public Water system will provide water that is consistently safe to drink; and protect Illinois' groundwater resource for designated drinking water and other beneficial purposes."* IEPA uses a Targeted Watershed Approach (TWA) to direct funding to watershed programs where the greatest benefit can be achieved, both from human health and ecosystem protection perspectives. This approach includes both water pollution control and drinking water programs and focuses restorative and preventive measures to both surface and groundwater resources. The TWA integrates surface water and groundwater programs for protection of public water supplies; local groups partner with state agencies, in a non-regulatory framework, to identify and respond to physical and biological effects within natural watershed boundaries.

IEPA is also responsible for 303(d) and Section 319 programs under the CWA. The Illinois Clean Lakes Program (ICLP – Conservation 2000), also under IEPA, includes funding and technical assistance to implement the Lake Management Framework Plan, a comprehensive interagency program for improvement of Illinois lake resources within priority watersheds. The Illinois CREP is under the jurisdiction of NRCS and the Illinois Department of Natural Resources; projects focus on implementation. With the exception of the TMDL program, involvement in all watershed programs is voluntary.

Funding Sources

In the past, CWA funds have been used to assist local efforts directed at watershed planning and inventory. Most funding for watershed programs comes from Section 319. While Section 319 funds have increased over time since 1990, funding levels have been flat since 2000. Higher priority is given to watershed projects over single site BMP demonstration projects. The recent emphasis on the TMDL Program has drawn on Section 319 funds that might otherwise be used for watershed projects, and SRF loans are not currently available for watershed projects. Total federal funding distributed by the state is inadequate to cover proposed watershed programs. Private funding (McKnight Foundation, Kellogg Foundation and Grand Victoria Foundation) has provided matches for Section 319 grants. One innovative mechanism of support for watershed projects is the Supplemental Environmental Project (SEP) Fund. The SEP Fund was established in 2003, part of a large enforcement settlement case that provided support for environmental projects in the southwest and central portions of the state. IEPA uses the Fund as an important source of support for environmental projects as state funding diminishes. IEPA set up a "SEP Idea Bank" for suggestions from the public for projects that might be incorporated into future enforcement case settlements.

Partnerships and Public Participation

According to IEPA, the drainage patterns of Illinois and the state boundaries of the Illinois River, the Ohio River and Lake Michigan have reduced opportunities to develop multi-state cooperative projects. However, efforts are under way to work with Wisconsin on the Fox River watershed and with Indiana on the Kankakee River watershed. Public involvement in watershed planning occurs under Section 319-funded projects, which require watershed stakeholders to participate in the process. TMDLs and many of the local plans receive public

comment. There are many watershed projects in Illinois that include local and regional groups partnering with state agencies. Examples include both urban watershed programs (North Branch Watershed Project – Friends of the Chicago River) and rural watershed programs (the Mackinaw River Project).

Illinois residents can participate in voluntary citizen monitoring activities through the Volunteer Lake Monitoring Network (IEPA) and the Illinois Sierra Club Water Sentinels Program.

Watershed Planning Activities

IEPA made a commitment in the 2001 Environmental Performance Partnership Agreement (EnPPA) with Region 5 EPA to develop a Surface Water Monitoring Strategy for a five-year monitoring cycle. The Illinois Water Monitoring Strategy (2002-06) applies to all CWA Section 106-funded monitoring programs. Included are 305(b) assessments, 303(d) lists and TMDL initiatives, and nutrient standards development. ICLP takes a long-term ecosystem approach to conserving, restoring and managing Illinois' lands, soils and water resources. Watershed priorities are re-evaluated by IEPA annually, incorporating new monitoring information to keep the watershed prioritization process current. Watershed priorities are made available for public review and comment; all watershed and ICLP projects have a local co-sponsor or consultant for work done at the local level.

Watershed Program Evaluation

IEPA's watershed programs are in the process of developing an evaluation framework. Until that framework is developed, a sample of projects are evaluated annually using water quality data and load reduction data. As water quality assessment procedures can change over time, long-term trend analysis is difficult. USGS maintains a database of historical concentrations of suspended sediment for 37 rivers and streams in Illinois that can be used as baseline indicators of pollution levels. With respect to federally-funded programs, annual reports in compliance with Section 305(b) of the CWA describe the general condition of Illinois' surface water quality. Section 319 Program results are described in the Biennial Report released in March 2004. Project descriptions, funding amounts, best management practice implementation summaries and water quality assessment results are presented.

Minnesota

Minnesota (population 4.9 million) contains over 14,000 lakes, more than a trillion gallons of groundwater, and 92,000 miles of streams and rivers. The state has 84 major watersheds and about 5,600 minor watersheds. Clean water is vital to Minnesota's economy for recreation and tourism activities, which contribute \$10 billion annually to the economy and support over 177,000 jobs. Watershed protection programs were established for economic concerns, drinking water and public health issues, and habitat, wildlife and ecologic concerns. A series of legislative actions in the 1980s put watershed protection in the forefront of Minnesota environmental programs. In 1985, the Minnesota Legislature passed the *Comprehensive Local Water Management Act* with funds being disbursed to 52 counties for planning efforts in 1987. In 1989, the Legislature passed an ongoing appropriation under the Local Water Resources Protection and Management Program that established block grants at the county level. Water quality continues to be an important issue for Minnesotans. In 1999, a series of citizen forums on the environment, co-sponsored by the Governor's Office and the Minnesota Pollution Control Agency (MPCA), showed clean water as a top priority in all areas of the state.

Watershed programs

MPCA is a lead agency on major watershed protection, restoration and improvement programs. MPCA employs a River Basin (geographically-based) approach to water quality protection and restoration. Major MPCA programs include the Minnesota Clean Water Partnership (CWP) Program and the Section 319 Program, both of which provide project funding, are voluntary in nature and require a local match to the program funds being awarded. The CWP Program is watershed-based and can overlap county lines. Phase 1 of the Program relates to water quality monitoring to determine the severity and sources of water quality pollution. Phase 2 involves implementation of best management practices to resolve water quality problems found in Phase 1.

The Board of Water and Soil Resources (BWSR) administers programs for watersheds and watershed management areas within the Twin Cities seven-county Metro Area, and for watersheds outside the Twin Cities County Metro Area. The Metropolitan Surface Water Management Act of 1982 mandated the preparation and implementation of comprehensive surface water management plans by cities and townships through membership in a watershed management organization within a watershed district.

Minnesota Department of Natural Resource's (MnDNR) Watershed Management Initiative is designed to "*integrate management efforts across disciplines using the watershed as a geographic boundary.*" The program facilitates cooperation between agencies and citizens by identifying ways MnDNR can be involved in county local water planning, providing MnDNR points of contact for watershed based projects, identifying other state and federal resource agencies, local governments and organizations for potential partnering, and educating MnDNR personnel about watershed-based approaches to land and water resource management. Five prototype watershed projects have received funding under the Initiative. These projects serve as models for managing natural resources from a watershed perspective and provide information on successful processes and procedures needing further refinement.

Funding Sources

A variety of funding sources are available for Minnesota watershed programs. CWP funds are annually appropriated by the Legislature; 319 Program funds are also annually distributed. Funding for both these programs fluctuates and is currently not sufficient for program needs. The total amount of funding applied for all CWP/319 applications received with the amount of funding available amounts to about a 3:1 difference. Watershed programs are also eligible for SRF loans and USDA funds (CREP, etc). Since 1990, nonpoint source projects have received a total of \$17.3 million in 319 Program funds, \$15.2 million in CWP funds, and \$24.3 million in SRF funds through MPCA.

The Legislative Commission on Minnesota Resources (LCMR, established mid-1960s) has funded over 1,124 natural resources projects at a total cost of over \$525 million. LCMR oversees the Minnesota Environment and Natural Resources Trust Fund, which a constitutional amendment mandated in 1988. A dedicated percentage of proceeds from the state lottery (about 7 cents of every dollar) goes into this Trust Fund annually. This source of funding is guaranteed through 2024. Watershed projects are eligible for funding on a competitive basis. LCMR reviews proposals and makes funding recommendations to the Legislature. From 1991-2003, the Legislature appropriated \$14,251,000 to water resources projects.

Partnerships and Public Participation

An example of a regional partnership on watershed programs is the Interstate Commission on the Minnesota/Wisconsin St. Croix River Basin. A public/private partnership on watershed protection and data collection is the Citizen Stream Monitoring Program under the guidance of MPCA. Public participation in watershed programming is built into CWP and 319 programs. Public hearings and informational meetings are required prior to CWP rule revisions. The MPCA Citizens Board must approve any rule revisions. A Project Coordination Team advises on rules and guides CWP and 319 programmatic requirements. This team has joint public/private representation and meets monthly.

Minnesotans can participate in voluntary citizen monitoring efforts through the Citizen Stream Monitoring Program (MPCA) and in the Volunteer Stream Monitoring Partnership.

Watershed Planning Activities

Watershed program planning activities are abundant in Minnesota. The Nonpoint Source Management Program Plan for 2001-2005 identifies the current watershed planning and management framework, explains how the different levels of planning interact and influence each other, and identifies the status of planning activities in the major drainage basins.

The State Water Plan 2000 outlines water quality goals on a number of levels. Basin planning provides a geographic level of planning and focuses on water quality issues related to state objectives, which include setting basin level water quality priorities, defining priority water quality pollutants and problem areas, identifying actions and projects to address goals, objectives, priorities and targets, and serving as a mechanism to help secure funding for implementation of plans. Major watershed planning focuses on creating sub-basin plans, establishing specific water-related goals, objectives and priorities for individual environmental pollutants, reducing flood damage, managing and protecting natural resources areas, and implementing watershed plans. County Water Plan and Watershed Management Organization Plans are done by counties, watershed districts and joint powers watershed management organizations. BWSR oversees local water planning activities in coordination with other state agencies. This level of planning focuses on maintaining maximum flexibility over water plan update deadlines, incorporating relevant data assessments, priority issues, target pollutants and watershed goals from statewide, basin and watershed plans by reference into local plans, and endorsing concepts of local water plans, with an emphasis on implementation strategies and establishment of measurable outcomes.

Watershed Program Evaluation

In 2001 the Minnesota Legislature created the Environmental Data Access Initiative in response to concerns on the availability of surface water quality data from MPCA and other agencies. Watershed-specific water quality data have been available on-line since July 2003. An example of surface water quality data in the Environmental Data Access System is the Lake Water Quality Assessment Program, in which MPCA regularly collects and analyzes water samples from over 800 lakes that have high ecological and economic value.

A proposal is being drafted to use a percentage of CWP/319 funding for “effectiveness monitoring” to be conducted after a watershed project is implemented. This change in funding use will require legislative approval. Other evaluation methods include the Local Annual Reporting System (LARS) data mapping for the CWP Program, which presents area

watershed maps of phosphorous, soil erosion and sedimentation reduction. The TMDL Program within MPCA also provides an aggregate measure of watershed program success. After a TMDL implementation program has been applied, water quality is expected to improve to the extent that the water body can be de-listed and removed from the impaired waters list. De-listing is an indicator of watershed program effectiveness.

Between 1997-2002, the CWP Program funded a total of 842 pollution prevention best management practices projects. During the same time frame, the 319 Program funded 296 projects. LARS data documents positive water quality results from those projects: soil loss reductions of 39,000 tons per year, sediment reduction of 11,000 tons per year, and phosphorous reduction of 44,000 pounds per year. MPCA lists achievements of watershed program efforts at the local, state and national levels that are more subjective in nature. Examples are environmental changes including improved water clarity, rebound of fish and wildlife populations and reduced risk of flooding. Improvements in infrastructure include the development of 165 stream monitoring stations, partnerships with the other state agencies, academic institutions and federal agencies, and an on-line data systems. More subjective measures include efficient use of resources, reducing duplication of effort, enhancing creativity in planning, developing communication systems and increasing public awareness of water quality.

Wisconsin

Wisconsin (population 5.5 million) has 15,000 lakes, 57,000 miles of streams, 5.3 million acres of wetlands and about 1.2 quadrillion gallons of groundwater. Wisconsin's 23 major river basins contain 330 watersheds. Clean water is vital to the state's economy, with tourism income at \$11.7 billion in 2003. A constitutional basis for water and other natural resource protection in Wisconsin exists in the *Public Trust Doctrine*, which states that "...the river Mississippi and the navigable waters leading into the Mississippi and St. Lawrence, and the carrying places between the same, shall be common highways and forever free, as well as to the inhabitants of the state and to the citizens of the United States..." The Wisconsin Supreme Court has been active in upholding the Trust Doctrine. In the 1960s, the court noted that the right to clean, unpolluted waters was an important consideration under the doctrine; in 1972 the court ruled that wetlands play a "*vital role in nature*" and that protection of such areas is critical "*not only to promote navigation but also to protect and preserve those for fishing, recreation and scenic beauty.*"

The progressive nature of the state towards water quality is evident in a number of statutes and agency programs. In 1977, the Nonpoint Source Pollution Program was created to protect surface water from runoff by offering cost sharing funds to landowners and communities to prevent pollution from reaching streams and lakes. In 1983, Wisconsin became the first state to achieve the fishable and swimmable goals laid out under the 1972 CWA. The Priority Watershed Program was established by statute in 1978. In 2001, Wisconsin became the first state to pass legislation to restore protection to small wetlands left unprotected as a result of the U.S. Supreme Court ruling. The action protects up to 1 million of the 5 million acres of wetlands left in Wisconsin; in 2002 the Legislature passed the nation's most comprehensive package of rules to reduce polluted runoff from cities, farms, construction sites and roads. Watershed protection is driven by environmental regulations.

Watershed Programs

The Wisconsin Department of Natural Resources (WDNR) is the lead agency for many watershed protection, restoration and improvement programs. A good example is the Priority Watershed Program (1978, noted above), which provided between \$4 million-\$5 million per year to projects at the watershed scale. The projects were structured for two years of planning followed by 10 years of implementation. In 1997, this program was dissolved due to problems evaluating projects. Since 1997, the Targeted Runoff Management (TRIM) Program has provided grants for smaller-scale projects. These projects are generally two years in duration. WDNR's Bureau of Watershed Management uses a basin-wide watershed approach to managing Wisconsin's waters. This approach focuses stakeholders on particular needs and what can be done collectively to meet those needs. This approach involves developing an inventory of issues, a priority system and consensus strategies for implementation of solutions. The Integrated Ecosystem Management Projects within WDNR have also proven successful. An example is the Shoreland Protection and Restoration Project, whose goal is to improve lake and shoreline protection through voluntary conservation and education. WDNR also administers Section 319 and 305(b) programs.

The Department of Agriculture, Trade and Consumer Protection (DATCP) provides technical support and staffing grants for some watershed projects.

Funding Sources

Currently, all Section 319 funds are used for staffing support with WDNR. The Legislature provides an annual match for program and project support. Other state sources of support for watershed programs and nonpoint pollution projects include the Nonpoint Source Water Pollution Abatement Program, the TRM Grant Program and the Urban Nonpoint Source Grant Program, all within the WDNR Bureau of Watershed Management. The WDNR Bureau of Fisheries and Habitat provides support through its River Protection Grant Program. Private sources of funding and technical assistance for water quality projects include Wisconsin Ducks Unlimited, Gathering Waters Conservancy, the Wisconsin Nature Conservancy, and the River Alliance of Wisconsin.

Partnerships and Public Participation

A number of public/private partnerships exist in Wisconsin for watershed protection. In 1990 the WDNR, the Wisconsin Association of Lakes and the UW-Extension established the Wisconsin Lakes Partnership, a collaborative partnership to accomplish watershed restoration and lake protection goals. Another example is the Great Lakes and Watershed Planning Section, which coordinates with partners on all federal and state activities in areas tributary to the Great Lakes. Community-based conservation blossoms in Wisconsin, with more than 600 lake organizations, 100 river and watershed management groups, 60 land trusts and hundreds of angler and conservation groups in Wisconsin dedicated to cleaning up, protecting and enhancing their home waters. WDNR is working on developing more public/private partnerships on pollution prevention, innovation and monitoring.

Wisconsin residents can participate in voluntary citizen monitoring activities through the Self-Help Citizen Lake Monitoring Network (WDNR) and the Wisconsin Discovery Farms/ Water Action Volunteers Program.

Watershed Planning Activities

In addition to ongoing WDNR planning activities, private organizations are very active in watershed program planning. The *Waters of Wisconsin* initiative (Wisconsin Academy of Sciences: 2000-2002) involved agriculture, industry, conservation, business, all levels of government and public agencies, education and Native American tribes to discuss how to best use and protect Wisconsin's waters. They recommended a Wisconsin Water Policy Task Force be established to outline steps towards a comprehensive state water policy; promote public education and participation by assessing statewide water education at all levels. The Report also called for "*water basin and watershed-based approaches to use and management, including support for the DNR's new water basin teams and the establishment of collaborative watershed groups throughout the state.*" Another private planning process was River Works 2003 – A Citizen Action Plan for Wisconsin's Watersheds, which focused on river access; river corridor land use, habitat protection and shoreland protection and water quality. Watershed land use was addressed with respect to property rights and urbanization.

Watershed Program Evaluation

Wisconsin employs a river and lake monitoring and management database to track water quality within watersheds. These data will eventually be linked by GIS applications for planning and research applications. USGS surface water quality data are also available. With respect to federally-funded programs, annual reports in compliance with Section 305(b) of the CWA describe the general condition of Wisconsin's surface water quality. Section 319 Program results describe projects, funding amounts, BMP implementation summaries and water quality assessment results.

Program Comparison Discussion

The underlying aim of this comparison of watershed programs in Iowa and surrounding states was to determine the programs and approaches that have been successful based on both objective and subjective measures. The areas for comparison included program structure and purpose, funding mechanisms, partnerships and public participation, planning activities and evaluation measures. Survey respondents provided opinions on what components within their state's programs are functioning at the level intended when the programs were established, as well as opinions on the components experiencing problems.

In each of these areas of comparison, there are a number of factors or approaches that appear in every state as being either essential for or supportive of program success. A brief discussion of state programs by comparison areas highlights these factors and approaches.

Program Structure and Purpose

All states participate in the nonpoint pollution programs and water monitoring activities mandated by the federal CWA and administered through EPA. Soil and water conservation programs under USDA including CREP, CWP, CSP and EQIP are also active within each state. Of more interest for this comparison are programs that are unique to specific states, which are listed below. The apparent drivers for watershed programs, as well as legislation establishing innovative programs on water protection are also presented.

Iowa: The Water Quality Protection Program and the Watershed Protection Program are administered by IDALS. These programs are related to soil and water conservation, with concerns about agricultural impacts on water quality and the environment as drivers. Water protection legislation was passed in the late 1980s (*Groundwater Protection Act*, REAP) and 1990s (Watershed Protection Program).

Missouri: The Agricultural Nonpoint Special Area Land Treatment (SALT) Program is administered by NRCS. Tourism related to surface water recreational activities is a driver for watershed programs. Water protection legislation was passed in the late 1980s (*Water Resources Law*).

Illinois: The Illinois Clean Lakes Program is administered by IEPA. Illinois has the largest tourism-related economy (includes Chicago) within the comparison states. IEPA does not list the economy as a main driver for watershed programs. Water protection legislation was passed in the late 1980s (*Groundwater Protection Act*). Illinois is unique in that it approaches water quality from the regulatory perspective of a state EPA.

Minnesota: The Clean Water Partnership Program is administered by MPCA. Recreational use of lakes and the related tourism industry is a driver for watershed programs. Water protection legislation was passed in the 1980s (*Comprehensive Local Water Management Act*, Local Water Resources Protection and Management Program).

Wisconsin: The Targeted Runoff Management Program and the Integrated Ecosystem Management Projects are administered by WDNR. The tourism industry related to lakes recreation, coupled with a constitutional basis for clean water (*Public Trust Doctrine*) and water protection legislation since the mid-1970s, has resulted in numerous watershed programs.

In all states, establishment of unique programs was preceded by passage of ground-breaking legislation on water protection; only in Wisconsin does a constitutional basis for water protection exist. With the exception of Iowa and possibly Illinois, water protection programs have a strong basis or driver in state tourism economies related to use of surface water resources. Iowa's unique programs have an economic driver related to the agricultural industry, while IEPA lists water quality as the main driver for Illinois programs.

Funding Mechanisms: Federal Support

All states utilize federal sources of funding including Section 319 funds, SRF loans, CREP and EQIP funds, etc. There are different approaches between states on how federal funds are distributed. Survey respondents indicated that funding levels from federal sources are inadequate for watershed program needs.

Iowa: SRF loans are available for nonpoint water quality improvement/watershed projects. While funds have been earmarked for new NPS projects since FY 2003, SRF funds have not been fully appropriated to date. IPP and INHF studies found that, on an annual basis, about 25 percent of Iowa SRF loans are not distributed.

Illinois: SRF loans are not currently available for watershed projects or programs. Section 319 funding levels have been flat since 2000; a portion of those funds are being redirected to the TMDL Program.

Minnesota: SRF loans are available for watershed projects or programs. Combined CWP/319 funds cover about one-third of the amount needed based on program applications.

Wisconsin: All Section 319 funds are utilized to support FTEs (salaries/fringe) within WDNR. The state Legislature provides an annual match for actual program/project costs.

Funding Mechanisms: State Appropriations and Private Funds

Many states have innovative funding mechanisms for water quality programs that have either been mandated by legislation or are the result of regulatory activities, including dedicated funds from gaming receipts or legal settlements, respectively. Funding from private sources is very active in some states.

Iowa: The REAP Fund (gaming receipts) is partially used for water quality projects. Currently, the annual amount distributed through REAP is half the amount originally intended by the Legislature. Private funding for watershed protection, conservation programs and public education has been very strong in Iowa (INHF, Iowa Ducks Unlimited, Iowa Pheasants Forever, Iowa Farm Bureau Federation).

Nebraska: The Nebraska Environmental Trust (gaming receipts) awards funds for environmental programs including watershed projects. The Legislature mandated an annual amount of support through 2007.

Illinois: The Supplemental Environmental Project Fund is a dedicated source of support for environmental projects; receipts come from a large IEPA enforcement settlement case. Private funding for watershed/conservation programs in Illinois is active as well (e.g., McKnight Foundation, Kellogg Foundation, Grand Victoria Foundation).

Minnesota: The Minnesota Environment and Natural Resources Trust Fund provides support for watershed and conservation programs. The Trust receives an annual percentage of Minnesota Lottery proceeds that is guaranteed through 2024.

Wisconsin: WDNR's Watershed Management Bureau has a number of programs providing grants and matching funds for watershed projects

For watershed projects and programs to be successful, adequate funding levels must be maintained. As federal sources of support are inadequate, states have developed innovative funding sources and strategies. With private funding sources being very active on water protection and conservation, states should encourage and pursue partnering with these groups on watershed program efforts. To maximize private input, states should consider some level of matching funds for all private funds awarded.

Partnerships and Public Participation

Public/private partnerships exist in all states at various levels. These include urban and rural watershed protection groups comprised of a variety of stakeholders, formal advisory groups appointed by state agencies, and independent interest groups. Survey respondents indicated there is room for improvement in coordination between state agencies and private groups, particularly with respect to communicating issues and concerns and being involved in the

development of responses and plans to address those concerns. Examples of successful partnerships are listed below.

Iowa: Agricultural Clean Water Alliance, Des Moines Urban Environmental Partnership

Nebraska: Platte River Watershed Program

Illinois: Friends of the Chicago River, Mackinaw River Project

Minnesota: Interstate Commission on the Minnesota/Wisconsin St. Croix River Basin

Wisconsin: Wisconsin Lakes Partnership, Great Lakes and Watershed Planning Section

Successful partnerships maximize stakeholder ownership of and participation in planning and developing watershed programs. The role of state agencies in public/private partnerships focuses on facilitating program design and development and providing technical advice and expertise on specific program functions.

All states have successful voluntary citizen water monitoring programs. Public participation also involves information dissemination and educational opportunities. While all state agencies have excellent web-based information, some states also support information clearinghouses to aid the public in accessing information, such as the Missouri Watershed Information Network and the CSREES Heartland Regional Water Quality Coordination Initiative.

Planning Activities

All states have planning activities related to mandatory reporting requirements for federal CWA programs. In addition, many states have conducted other exercises that involve numerous stakeholders in planning discussions and drafting of reports. Goals and recommendations outlined in these reports are generally ambitious and have sometimes proven difficult to implement for various reasons. Examples of planning exercises include:

Iowa: 2001 Watershed Task Force, 2003 Governor's Water Summit

Missouri: State Water Plan

Nebraska: Water Policy Task Force

Minnesota: State Water Plan

Wisconsin: Waters of Wisconsin Initiative, River Works 2003 – A Citizen's Action Plan for Wisconsin's Watersheds

While planning activities can result in well-thought-out approaches and recommendations for future work, they cannot be considered successful unless the recommendations are approved and acted upon by state government, working in partnership with stakeholders. In many instances, plans have been shelved due to stalemates during discussions at various levels of government. The ability to compromise and develop creative solutions to apparent roadblocks is paramount to moving forward with water quality protection efforts and watershed programs. The Iowa Lakes Valuation Project is an example of a proactive effort to determine public support for economic investment in water quality programs that can be used for planning purposes. This project involved a survey of 4,400 Iowans (randomly selected from all 99 Iowa counties) on lake usage patterns, perceived economic benefits of lakes and willingness to pay for good water quality in lakes.

Program Evaluation

All states have monitoring systems that provide ongoing evaluation of surface water quality (Section 106(e)(1) CWA) and all comply with federal reporting requirements under Section

305(b). USGS maintains surveillance programs of surface water quality in each state and partners with various agencies to provide data for reporting and planning purposes. Survey respondents indicated that watershed program evaluation measures were, in many cases, more focused on outputs than on outcomes. Additionally, program evaluation was spotty in many instances, with only a sample of programs measured for progress on an annual basis. More global approaches to evaluation are being proposed or are under development in some states.

Respondents also indicated that collaboration between agencies and other entities conducting surveillance activities is lacking in many areas; they suggested that other sources of surface water quality data could be better utilized to evaluate watershed program progress. Drinking water utility laboratories in particular may conduct regular sampling of raw source waters that could provide useful data. University-based water quality databases, such as the Iowa Lakes Information System at ISU, are also excellent sources of data. To enhance state level watershed program evaluation moving to outcome measurements, extant databases should be electronically accessible under an umbrella organization to provide agencies and the public with pertinent water quality data. Unique approaches to providing access to water quality data exist in some states. For example, the Missouri Watershed Inventory and Assessment Project provides web-based linkages to various Missouri water quality databases. Similarly, the Minnesota Environmental Data Access System brings data from a number of Minnesota's agencies under one centralized system, and the Iowa Ambient Water Monitoring Program provides linkages to USGS and other Iowa-based water quality data.

Recommendations for Iowa

A second aim of this comparison was to make recommendations on how Iowa might improve its watershed programs. It is important to note that Iowa has many positive areas and approaches within its existing watershed programs. There are other areas that are lacking and could stand improvement. Using the comparison areas, perceived strengths and weaknesses of various components within Iowa programs and recommendations on how to improve on or remedy those weaknesses are presented. Recommendations are based on the essential or supportive factors for program success that were identified in the previous discussion.

Iowa Programs (Structure and Purpose)

Strengths: Legislative basis for water quality programs; existing IDNR and IDALS programs
Weakness: Drivers for watershed protection are not strong enough to move programs forward

Successful programs in many surrounding states have economic drivers, mostly related to tourism/recreation industries. Iowa's economic drivers are only agricultural; diversifying economic drivers would be potentially more effective. While tourism and recreational use of lakes is important to the economy of some areas in Iowa, lakes-related tourism is not a strong driver for clean water programs statewide, as less than 1 percent of Iowa's land area is covered by water. However, clean water is a high priority for Iowans. Preliminary results from the Iowa Lakes Valuation Project show that Iowans are willing to pay for good water quality in Iowa lakes. Survey participants also believed that clean lakes were important for the general economy of the area. Using this basis of Iowans support for paying for clean lakes, linking watershed protection programs as an underlying component for economic development, including attracting new industries, could be an appropriate driver.

Recommendation: Iowa should approach water quality/watershed protection with new industry development as the driver. This would involve attracting industries with clean water needs (food processing, biotechnology, etc) that would benefit from lower costs related to water treatment. In addition, attracting sizeable white collar industries whose workforces would benefit from clean water related to recreational use would be important. The state should put seed money into clean water/watershed protection programs to attract new industry, perhaps working in concert with the Iowa Values Fund. The long-term result is a larger tax base; some of the new tax receipts could be used for these clean water programs. All Iowans would benefit from the efforts to clean up Iowa's surface water supplies.

Iowa Funding Mechanisms

Strengths: numerous funding mechanisms in place (REAP, federal funds); private funding sources are numerous

Weaknesses: REAP is not fully funded, some federal funds (SRF) are not fully distributed

Funding levels from federal sources are inadequate and dispersal of those funds has not been complete or timely in some cases. Innovative funding mechanisms exist (REAP) but they have not been funded to the level originally intended by the Legislature. Iowa should follow through with legislative intent. Private funding sources are vital to the watershed protection and clean water programs in Iowa.

Recommendation: Iowa should fully fund REAP, and distribute all federal funds (SRF, etc.) annually. The state should develop more partnerships with private funding organizations by maximizing matching funds as incentive for private organizations to increase levels of support for water quality projects. Going back to the discussion on drivers, a portion of the new taxes coming into Iowa from "clean water" industries could be dedicated to a "Clean Water Fund" that would be used for REAP, matching funds for projects funded by private organizations, etc. The seed money mentioned previously might come from under-utilized sources of funds as described in the INHF and IPP studies (SRF, Underground Storage Tank Remediation Fund).

Iowa Partnerships and Public Participation

Strength: Numerous urban and rural watershed program partnerships exist

Weaknesses: Coordination is lacking between state agencies on partnership programs; no umbrella organization for dissemination of watershed program information

While there are several public/private partnerships working on watershed protection in Iowa, some survey respondents indicated agencies need to improve interagency cooperation on those programs. Agency jurisdiction is not clear in some cases, as water quality improvement projects can overlap programmatic criteria and boundaries. Public participation in watershed program development and implementation could be improved by better information dissemination. A central information/data clearinghouse would be beneficial, such as MoWIN in Missouri.

Recommendation: Improve coordination between agencies responsible for watershed partnership efforts, by identifying a lead group to oversee local/regional programs. Local soil and water conservation districts might be an option. Agencies must have the political will to cooperate on this. Identify an umbrella organization to establish a clearinghouse for watershed program information dissemination, probably through a central website. ISU Extension or another University-based education group would be an appropriate leader for this.

Planning Activities

Strength: Strong planning efforts involving agencies and stakeholders have taken place

Weakness: The state has not followed through on planning recommendations

Regular watershed protection/water quality planning exercises have been conducted involving a wide variety of stakeholders from the public and private sectors. These planning exercises have resulted in well thought out recommendations for both urban and rural nonpoint source pollution prevention methods and activities to improve water quality in watersheds. While there has been general consensus within planning groups regarding the need to implement recommendations on some level, there has been limited action within the Legislature to develop bills to address these issues.

Recommendation: State government, including the Legislature, should proactively approach watershed planning recommendations. This will involve identifying and discussing areas of compromise, and creating solutions to apparent roadblocks. The economic development “clean water” approach previously discussed is an example.

Iowa Program Evaluation

Strengths: IDNR Ambient Water Monitoring Program; extant sources of water quality data

Weakness: Limited use of extant water quality databases

A general criticism from respondents was using outputs rather than outcomes as evaluation measures – focusing more on what can easily be measured, such as dollars spent or employment, than improved water quality. Outcome measures, specifically water quality improvements, take time to evaluate, as a baseline of analytical information is necessary. IDNR is doing an excellent job of establishing this baseline through the Ambient Water Monitoring Program. Another criticism was limited use of extant databases of water quality for trend analysis and watershed program planning. Other sources of water quality data exist within the state that should be used for water quality trend analysis and watershed program planning (for example, the Iowa Lakes Information System at ISU).

Recommendation: Develop a partnership between public and private data collection agencies and entities to establish an umbrella organization to link water quality data. (This has been recommended by numerous planning activities over the past several years.) This would be fairly inexpensive to do, as a website could be used to link various agencies, programs and private entities. Either IDNR or a university-based research unit could coordinate this effort.

Conclusion

Active, well-funded watershed programs are essential for surface water quality protection and improvement efforts. Iowa has several examples of watershed programs that can be considered successful based on various criteria. However, much more can and needs to be done. Iowa government must adopt the position that good water quality in our lakes, rivers and streams and the resulting benefits for recreation and business are vital to sustained population growth and a thriving and diverse economy. Inadequate funding at the state level for watershed protection programs is one major concern. A proactive, creative approach can result in solutions on funding and other issues. Iowans pride themselves on being good stewards of the environment. The state should provide the incentives and resources necessary to encourage Iowans to develop local watershed programs to protect and restore good water quality across Iowa.

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