

Watershed Planning for Sustainable Communities

By Richard Acker and L. Blake Lynch

Water and land use are inter-related. Communities cannot develop without sources of drinkable water. Conversely, poorly planned development is often a major cause of water pollution, can result in water shortages, and can be a major factor in both local and regional flooding. In response, some communities have turned to watershed planning to encourage sustainable growth and protect their water resources. This ideas@work provides an overview of watershed planning and how it can be a tool to guide land use decisions and safeguard our water supplies.

Connecting Land and Water

Although planners, naturalists and agricultural experts have long defined land according to its drainage areas, only recently has watershed planning become widely recognized as an important planning tool to connect land-use decisions and water resource protections. The 1987 amendments to the federal Clean Water Act laid the groundwork for modifying water regulatory programs to encourage the use of watershed planning. But much confusion remains about how to use watershed planning effectively to encourage sustainable community design.



OPENLANDS PROJECT

Watersheds vary in size depending on the size of the receiving water body, with the smallest subwatersheds of only a few acres combining to create larger watersheds, which again combine to ultimately form the largest basin watersheds such as the Great Lakes or Mississippi River Basin.

Protecting our Water Supply

With 36 inches of annual precipitation and one of the world's largest freshwater lakes on its doorstep, northeastern Illinois has seemingly abundant water resources. The challenge is making that water available to the public. The six-county greater Chicago

Ideas@work is a series developed by the Campaign for Sensible Growth to showcase innovative solutions and best practices, particularly at the local level. The series covers issues such as:

- fostering transportation alternatives
- incentive packages for housing development
- innovative zoning strategies for sustainability

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Watershed planning can be an important tool for flood prevention.

region alone requires more than 1.3 billion gallons of publicly supplied water every day. Increased population and other regional water needs in the coming years will likely intensify this demand, while legal, financial and natural constraints put limits on the amount of water that is available for consumers in our region. Long-term water supply planning is needed now to prevent shortages such as those already predicted by the Northeastern Illinois Planning Commission (NIPC) in some parts of the region that historically have relied on well water.

How Land Use Affects Water

The way we use our land, including how much of it we cover with impervious surfaces (concrete, pavement and other waterproof surfaces) greatly determines the quality and dependability of our water supply. In northeastern Illinois, the rate of land development over the past two decades has been twice that of population growth, dramatically increasing impervious surface area in our region. A recent study by American Rivers, Natural Resources Defense Council (NRDC), and Smart Growth America estimated that a 15-year regional increase in impervious surface will result in the loss of between 10.2 and 23.7 billion gallons of water per year filtering through the ground to recharge our groundwater aquifers — enough to supply between 280,000 and 650,000 households with water for twelve months.

Rather than filtering through the ground, this water runs off surfaces, carrying oil, sediments and other pollutants from our parking lots, buildings and roads directly into our region's streams, rivers and lakes. This is known as nonpoint source pollution, a major cause of stream bank erosion and a contributor to flooding and beach closings.

Benefits of Watershed Planning

The reason so many communities are turning to watershed planning is that it is the best way to solve flooding, drought and water pollution problems at the same time. When a community prepares a watershed plan, it takes a comprehensive look at all the major factors affecting its streams, lakes, rivers and groundwater. For example, a good watershed plan will identify which factories, sewage treatment plants, and other point sources are discharging pollution directly into the community's waterbodies, what types of pollution they cause, and how much. The watershed plan also will describe where nonpoint source pollution is coming from and approximately how much pollution there is in the lake or stream. The plan will pool information on how healthy the fish, insect and plant life is in local waterbodies, records of floods as well as droughts, and estimates on how much groundwater the community uses and how clean it is.

The greatest benefit of preparing a watershed plan, however, is that it can bring together all the stakeholders in a community to collaborate on



Written watershed plans often vary in style, length and specificity.

specific solutions to protect and improve their water resources. For example, the watershed plan might recommend using vegetated swales, reducing street widths, and preserving existing depressional areas to reduce flooding. The plan might also recommend stabilizing eroding streambanks and planting native vegetation on them, a solution that would improve wildlife habitat and the stream's health. If the watershed planning process includes city and county officials, developers, property owners, environmental and citizen groups, and other key stakeholders, there will be significant buy-in for these solutions. By being at the same table and developing a list of common solutions, all the stakeholders will have an easier time implementing them.

The planning process also can prompt the gathering of more information, which increases the community's knowledge of its water resources and ability to manage them well. Because watersheds usually encompass multiple jurisdictions, watershed planning encourages regional cooperation.

For rapidly growing areas, watershed planning provides the best opportunity to avoid flooding, drought, and water pollution problems in the future by making informed decisions in the present. For areas that have already urbanized, watershed planning is a chance to examine how existing land uses have affected water quantity and quality, and explore creative ways to improve streams, rivers and lakes. For rural areas, watershed planning is an ideal opportunity to promote recreational uses such as hunting and fishing while investigating ways to protect communities' drinking water supplies, keep topsoil in place, and reduce sedimentation in local waterbodies. Whatever a community's situation, watershed planning can bring great benefits.

Technical Assistance and Funding

A number of organizations and governmental agencies can play key roles in helping interested communities develop watershed plans. Some agencies such as the U.S. and Illinois Environmental Protection Agencies (USEPA and IEPA) and the Natural Resources Conservation Service (NRCS) —

an agency of the U.S. Department of Agriculture — and various nonprofit organizations such as the Center for Watershed Protection, have developed specific watershed planning guidance for communities. IEPA in particular is a primary player in many watershed efforts in our region and across Illinois. The agency helps communities develop and implement watershed plans by awarding grants under Section 319 of the Clean Water Act.

While IEPA's primary responsibility is improved water quality, its participation in the watershed planning process is helpful even for communities whose main focus may be flood control. The Illinois Department of Natural Resources (IDNR) also facilitates watershed planning through grant awards, staff outreach, and its Conservation 2000 Ecosystems Partnerships program. IDNR's focus on natural resource and habitat restoration within watersheds distinguishes it from IEPA's focus (on water quality and pollution control).

Finally, NRCS has coordinated and partially funded watershed planning efforts — especially in rural areas — using a set of guidelines developed by the U.S. Department of Agriculture. NIPC, countywide stormwater management commissions (SMCs), and the U.S. Army Corps of Engineers (USACE) also have played key roles in developing and aiding implementation of watershed plans in the region.

Developing a Watershed Plan

There is no one fixed way to prepare a watershed plan. However, the steps outlined below can increase the chances that the process will be successful. Following these steps, which are based on guidance from IEPA and USEPA, also increases the odds that government funding will be available for implementation.

Elements of a Successful Watershed Plan

- 1) Identify stakeholders
- 2) Establish goals and objectives
- 3) Inventory watershed resources and conditions
- 4) Assess waterbody/watershed problems
- 5) Recommend objectives and management practices for prevention and remediation
- 6) Develop effective action plan
- 7) Implement plan and monitor its success



Identify stakeholders

No watershed plan will work if key organizations are not involved. It is especially important to include local stakeholders such as municipal and county officials, property owners, local businesses, developers, residents, and citizen and environmental groups. Not only are these stakeholders most likely to be affected by a plan, they also are most able to implement recommendations.

In addition, a successful watershed planning process will invite certain agencies to participate so that their expertise can be woven into the plan. IEPA and USEPA have extensive experience in watershed planning, and IDNR and NRCS can contribute valuable information on wildlife, native vegetation, and flood reduction. In northeastern Illinois, NIPC is an indispensable partner, able to provide a great deal of technical information and suggest models for local ordinances to protect waterbodies.

Establish goals and objectives

Before any detailed analysis of the watershed begins, the stakeholders should identify a preliminary set of goals. These goals should reflect the concerns and desired outcomes of the stakeholders, particularly the people living and working in the watershed. The range of possible goals is broad and could include reduced flooding, better fishing, more hiking and biking opportunities along rivers, protection of rare species, cleaner drinking water, and so on.

Inventory watershed resources and conditions

Watershed inventories document existing conditions

and problems in the watershed. The inventories should be directed specifically at factors related to the previously identified goals and objectives. Many of the agencies noted above — IEPA, USEPA, IDNR, NRCS, and NIPC — have valuable information to share. It can also be very helpful to ask local landowners, fishing and hunting enthusiasts, environmentalists (the local Sierra Club or Audubon Society chapters are good places to look), and others who know a lot about local waterbodies to share their expertise.

Assess waterbody/watershed problems

A watershed plan should systematically analyze the rivers, streams and lakes in the watershed so that local stakeholders can assess current and future threats. A logical four-step process that IEPA uses in its Clean Water Act programs can also be applied to watershed planning: 1) determine the uses stakeholders would like the waterbody to provide; 2) assess impairments (that is, the ways in which the waterbodies fall short of the desired uses); 3) list the causes of the impairments; and 4) determine the sources of the causes.

For example, a watershed planning team may decide that several desired uses for a river include fishing and canoeing, a swimming area, a source for drinking water, and habitat for rare species. The team would then list impairments, for example, that the fish in the river are unhealthy or that the water is too polluted to support swimming or rare species. The causes of the impairments might be too much nitrogen and phosphorus pollution in the river, and the sources might be runoff from lawn fertilizers and discharges from sewage treatment plants. In addition to analyzing the current threats, the watershed planning team should identify likely future threats, especially in areas that are growing rapidly and are likely to see changes in land use.

Recommend objectives and management practices for prevention and remediation

Once the current and future threats have been analyzed, the watershed planning team is in a good position to recommend solutions. The agencies with technical expertise can help the team sort through

the vast range of potential solutions to choose the most appropriate ones. For example, planting buffers of native vegetation along streams, keeping floodplains free of obstruction, and other "best management practices" could be tailored to specific locations in the watershed. These recommendations should address both existing and anticipated future threats.

Develop effective action plan

An action plan is needed to translate the recommendations into specific actions. Some of the critical considerations of an action plan include what specifically needs to be done, who will do it, and when it should happen. The best plans have all the stakeholders agreeing to perform some of the actions within a given timeframe.

Implement plan and monitor its success

If the preceding steps have been followed, there is a strong likelihood of successful implementation. Once a plan is completed and approved — usually by a watershed planning committee and a sponsoring agency — the work of prioritizing, selecting and funding projects within the watershed begins. Members of the watershed planning group can implement many of the recommendations themselves, and also can apply jointly for funding to realize more recommendations. The members of the group should keep track of their implementation activities and reconvene on a regular basis to evaluate progress and make adjustments to the plan as needed.

What Works in Our Region

Like the development process, there is no single prescription for effective watershed implementation, and plans often are implemented in different ways. The dozens of individual watershed planning efforts underway in northeastern Illinois involve a wide array of projects and timetables for implementation. General lessons learned from a review of watershed plans and project implementation within the region include:

1. The involvement of local elected officials is key to ensuring plan implementation.
2. Successfully implemented plans often identify

potential funding for projects during plan development.

3. The three main governmental agencies involved in watershed planning are IEPA, IDNR and NRCS. Locally driven watershed planning processes that seek the leadership of or partnership with at least one of these agencies are more likely to be successful in obtaining funding for effective plan implementation.
4. Watershed plans are often developed in response to obvious water-related problems affecting the community, including stream water quality impairment or flood control, but can be expanded to address other issues such as natural resource protection or public education on water pollution.

Publications on Watershed Planning

- *Guidance for Developing Watershed Implementation Plans in Illinois*, Illinois Environmental Protection Agency, March 1998
- *NIPC Model Ordinances: Floodplain, Soil Erosion and Sediment Control; Stormwater Drainage and Detention; Stream and Wetland Protection; and Water Conservation*, 1980 - 1996
- *Environmental Considerations in Comprehensive Planning: A Manual for Local Officials*, Northeastern Illinois Planning Commission, 1994
- *Guiding Development to Protect Our Natural Resources*, Northeastern Illinois Planning Commission, October, 2001

Watershed Planning Resources

- Illinois Watershed Management Clearinghouse: www.watershed.uiuc.edu
- Watershed Information Network; www.ctic.purdue.edu/KYW/KYW.html
- Center for Watershed Protection; www.cwp.org
- USEPA's Surf Your Watershed; www.epa.gov/surf

Regional Watershed Technical Assistance and Funding Agencies

- Illinois Environmental Protection Agency (IEPA), Watershed Management page, www.epa.state.il.us/water/watershed
- USDA Natural Resource Conservation Service in Illinois (NRCS), Watershed Protection, Watershed Surveys, and Flood Prevention page, www.nrcs.usda.gov/programs/watershed/index.html
- Northeastern Illinois Planning Commission (NIPC), Publications and Services page, www.nipc.cog.il.us/services.htm
- Illinois Department of Natural Resources (IDNR), Conservation 2000 Ecosystems Partnership Program page, www.dnr.state.il.us/orep/c2000/ecosystem
- U.S. Environmental Protection Agency (USEPA), Watershed Programs page, www.epa.gov/owow/watershed



Case Study

Blackberry Creek Watershed Plan

Incorporating watersheds into comprehensive plans

The plan for Blackberry Creek, a 73-square mile rural watershed in rapidly developing Kane and Kendall counties, has spurred communities to plan ahead for water quality and flood control concerns that are complicated by urbanization. The plan was principally funded through IEPA Section 104(b)(3) grants, which are awarded for projects involving research, investigations, experiments, training, environmental technology demonstrations, surveys and studies related to the causes, effects, extent and prevention of water pollution. The watershed plan's principal goals are to prevent water-related problems that arise from unplanned development and to help avoid costly remediation or flood-damage issues for the area's growing municipalities.

An 18-member watershed resource planning committee comprised of citizens, local governments, conservation groups, and representatives of the agricultural community was assisted by technical advisors from a number of regional, state and federal governmental agencies in developing the plan, completed in 1999. Implementation has been coordinated informally by the Conservation Foundation, which has facilitated project selection and completion with a number of communities. The plan's success has been in providing guidance to communities on how to incorporate watershed planning into their comprehensive development plans. In particular, the City of Aurora has recently used the watershed plan to develop its comprehensive plan for western expansion, while the Village of Montgomery, which experienced serious flooding in 1996, has presented elements of the watershed plan as an amendment to its municipal comprehensive plan.

Blackberry Creek – Blackberry Creek Watershed Committee/The Conservation Foundation • 10 S. 404 Knoch Knolls Rd. • Naperville, Ill. 60565 • phone: 630.428.4500 • www.theconservationfoundation.org/tcf/wp/bbc.asp

Upper DuPage River Watershed Plan

Raising awareness through countywide coordination

With the 253-square mile Upper DuPage River Watershed covering the majority of suburban DuPage County, the participation of the county's Stormwater Management Committee (SMC) has been pivotal to the implementation of projects outlined in this plan. Developed as an IEPA-funded, 'citizen-generated' watershed plan, the Upper DuPage River Watershed planning process was coordinated primarily by the Conservation Foundation, a regional nonprofit land trust and conservation organization. Additional funding came from IDNR, NRCS, the U.S. Fish & Wildlife Service, and private foundations. The plan, completed in 1999, has provided a guide for countywide coordination of municipal waterway restoration projects, as well as for education and outreach efforts on improving water quality through sustainable land use planning and stormwater management. No permanent staffing or centralized coordination of project selection exists, but DuPage County SMC and the Conservation Foundation are assisting municipalities in finding funding for implementation of projects. Finally, the DuPage County Board of Commissioners is considering incorporating elements of the watershed plan into its ordinances, and encouraging community ordinance review for changes that could help meet watershed plan goals.

Upper DuPage River – DuPage River Coalition/The Conservation Foundation • 10 S. 404 Knoch Knolls Rd. • Naperville, Ill. 60565 • phone: 630.428.4500 ext. 114 • www.theconservationfoundation.org/tcf/wp/drc.asp

North Branch of the Chicago River Watershed in Lake County

Section 319 grants as a tool for implementation

In Lake County, a watershed planning effort that started in 1991 has already implemented a number of projects to improve the stream quality of the North Branch of the Chicago River. Through a series of stakeholder workshops and demonstration projects, the nonprofit Friends of the Chicago River (FOCR) raised awareness of the causes of water impairments that were preventing residents of the largely developed watershed from enjoying the river's recreational potential. In the process, it became clear that reduction of nonpoint source water pollution, flooding, and restoration of natural resources were top priorities for the county and communities within the watershed. In 1996, FOCR initiated a formal watershed partnership and planning process with Section 319 grant funding from IEPA.

Through leadership and staffing support from the Lake County Stormwater Management Commission, a detailed plan of nearly 400 pages was completed and approved by the North Branch Watershed Planning Committee. Implementation of specific projects outlined in the watershed plan is currently underway, primarily facilitated through a full-time project coordinator funded through bi-annual IEPA Section 319 grants. A "Best Management Practices Selection Team," comprised of key watershed governmental and non-governmental stakeholders, solicits, reviews and recommends projects for approval to IEPA, which gives final approval of the projects. Funding is dispersed for project implementation more quickly through the "block grant" arrangement. A larger Watershed Planning Committee meets bi-monthly to review overall watershed plan implementation progress. During the first five years of the plan, projects have focused primarily on streambank stabilization and detention basin retrofitting by municipalities.

North Branch of the Chicago River Ecosystem Partnership – Friends of the Chicago River • 407 S. Dearborn St., Ste. 1580, • Chicago, Ill. 60605 • phone: 312.939.0490 • www.chicagoriver.org • Lake County Stormwater Management Commission • 333 Peterson Rd. • Libertyville, Ill. 60048 • phone: 847.918.7693 • www.co.lake.il.us/smc

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Case Study

Mazon River Watershed Plan

Building trust through grassroots involvement in rural watersheds

Unlike more urban watershed plans, the Mazon River Watershed Plan was developed mainly through grassroots involvement of key residents and land owners within the watershed. Located about 50 miles southwest of Chicago and spread across six counties, the 521-square-mile Mazon River watershed is one of the region's large rural watersheds and a good example of the unique land-use and water-related challenges facing our agricultural communities. Nearly 95 percent of the watershed is covered with row crops, grasslands or woodlands, and soil erosion, sedimentation and flooding are of particular concern to its residents. As in many rural areas, watershed plan development was facilitated by state and county offices of NRCS in response to local concern about recurring water-related problems. With a special emphasis on local land-owner involvement, key stakeholders were identified and assembled as a Watershed Planning Committee. After nearly two years, they developed and released a watershed plan in August 2003. The 63-page plan focuses on raising awareness within the watershed of its resources and possible solutions to its water-related problems. Though a technical advisory committee of experts from governmental agencies made management recommendations and developed general strategies to address problems, less emphasis was put on specific project identification.

After nearly a yearlong break, the watershed planning committee has now reassembled to identify key funding opportunities for pilot projects, including streambank stabilization. With a developed watershed plan, the committee also is initiating a more ambitious education campaign, circulating the plan to local landowners and county officials, soliciting project ideas, identifying initial public and private funding sources, and applying for grants from various state programs. One of the main challenges to implementation of watershed plans in rural areas is that they take a more local approach and often have less involvement from state agencies such as IEPA. Consequently, potential project funding sources are often more limited, and implementation in the watershed is less coordinated and more incremental than in some urban or suburban watersheds. As one NRCS employee remarked, "Watershed planning in rural areas is often a grassroots effort focused on initiating and sustaining a face-to-face dialogue with local land owners about their water-related problems and the benefits certain projects can provide. Trust and localized planning are the keys in dealing with rural land owners."

Mazon River – USDA Natural Resources Conservation Service, Grundy County, Morris Field Office, 3585 North Illinois Route 47 • Morris, Ill. 60450 • phone: 815.942.0359 ext. 112

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