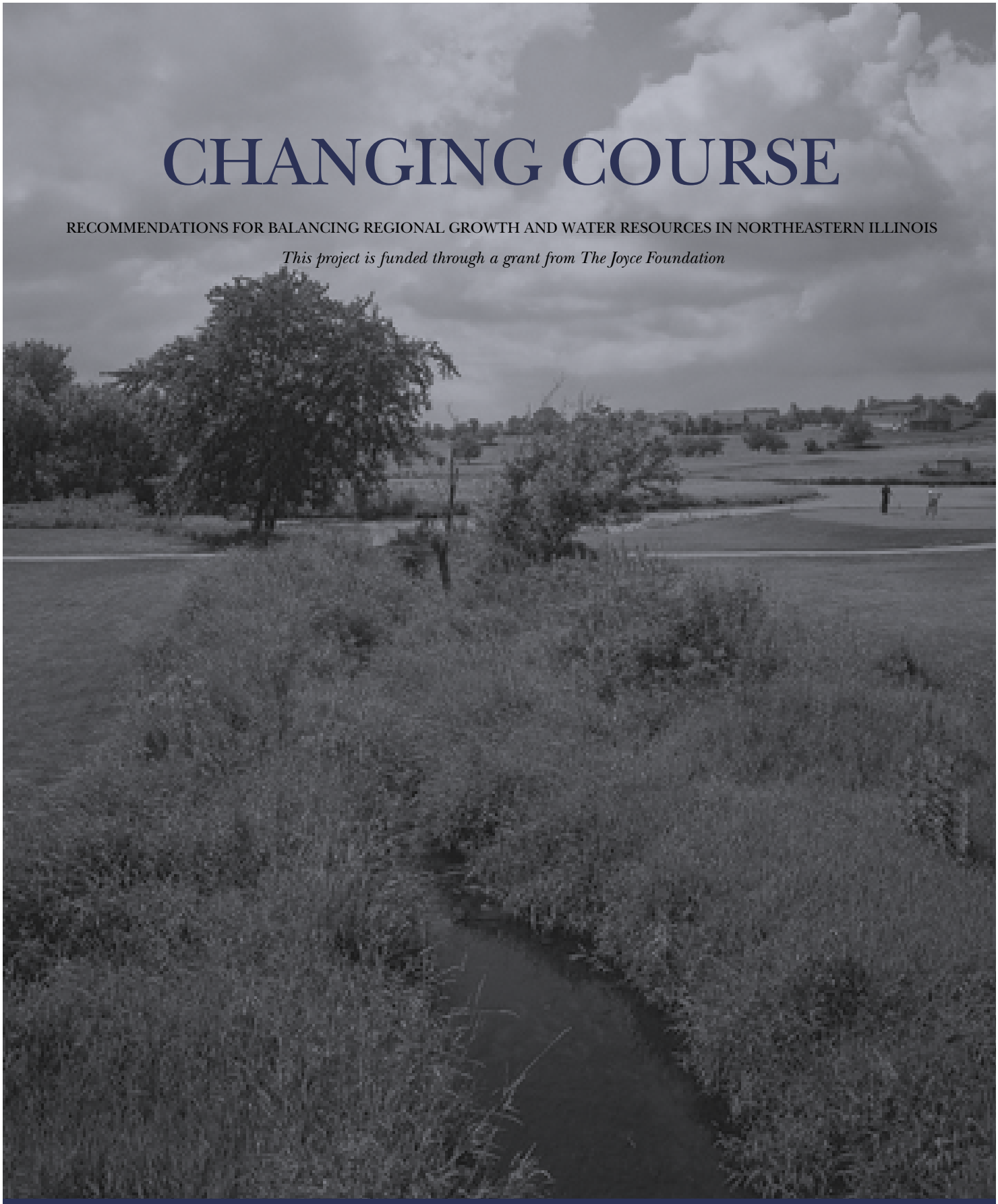

CHANGING COURSE

RECOMMENDATIONS FOR BALANCING REGIONAL GROWTH AND WATER RESOURCES IN NORTHEASTERN ILLINOIS

This project is funded through a grant from The Joyce Foundation

CAMPAIGN FOR SENSIBLE GROWTH

METROPOLITAN PLANNINGCOUNCIL

Openlands Project

Changing Course

An examination of the relationship between development practices and water quality and quantity in a 12-county northeastern Illinois region

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TABLE OF CONTENTS

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In this new era of global environmental concerns and economic competition between the world's metropolitan areas, basic questions about the sustainability of the greater Chicago region must be considered. Foremost among these concerns are the increasing pressures on the supplies of two of our most vital and interrelated resources — land and water.

Factors like the amount of open space, density of new development, and intensity of farming practices greatly affect the quality and quantity of the region's water resources. Conversely, the quality and quantity of the region's lakes, streams, and underground aquifers have a major influence on local land use decisions. Sustainable land use practices are essential to meet increasing demands for clean water. Although the quality of surface water in northeastern Illinois has improved in the past three decades, the supply remains limited by pollution from stormwater runoff, U.S. Supreme Court decisions capping the amount that can be drawn from Lake Michigan, steadily increasing urbanization of the region, inefficient water supply systems, and unregulated groundwater withdrawals.

To determine how to address these problems across a 12-county region in northeastern Illinois, the Joyce Foundation provided support to the Metropolitan Planning Council and Openlands Project, in partnership with the Campaign for Sensible Growth, to undertake a study to examine the relationship between development practices, land use, and water quality and quantity. This study addresses five areas: the state of the region's water resources; the state and federal policies that impact water; regional watershed planning efforts; local development practices and model ordinances; and techniques for reducing the impacts of urbanization on regional water resources.

PART 1: WATER RESOURCES IN THE CHICAGO REGION

Since both the natural resources and the patterns of development in northeastern Illinois stretch well beyond the traditional six-county planning region (Cook, DuPage, Kane, Lake, McHenry, and Will), the Metropolitan Planning Council and Openlands Project expanded the study's scope to the next ring of six counties (Boone, De Kalb, Grundy, Kankakee, Kendall, and LaSalle). These 12 counties were chosen for two reasons:

1) They are currently facing or will soon face intense growth pressures. These counties comprise less than 13 percent of Illinois' land area, but their residents comprise over two-thirds (68.9%) of the state's population. Moreover, recent decades have seen regional land consumption dramatically outpace population growth. Rooftops, pavement, and other impervious surfaces are replacing farmland and open space, increasing harmful runoff to streams and rivers and also causing flooding. Even faster growth is predicted for the next 25 years, especially on the outskirts of the six-county region and into the next ring of counties.

2) They encompass most of the region's major watersheds and share the principal groundwater aquifers that underlie the region. Eight of the 51 major watershed basins in Illinois lie within this 12-county region. These include the Chicago-Calumet, Des Plaines, Kankakee, Kishwaukee, Lake Michigan, Lower Fox, Upper Fox, and Upper Illinois. About 85 percent of this region falls within the larger Illinois River watershed. While withdrawals from Lake Michigan serve the large majority of citizens in Cook, DuPage, and Lake, counties to the west and south depend primarily on groundwater.

OPENLANDS PROJECT

Rooftops, pavement, and other impervious surfaces have replaced nearby farmland and open space, increasing harmful runoff to rivers and streams and often causing flooding. Even faster growth is predicted for the next 25 years, especially on the outskirts of the 12-county region.

The study focused on counties rather than watershed boundaries to better track administration of regulatory programs and land use planning decisions.

Water quantity depends on four factors: water availability from the region's groundwater and surface waters, all of which starts as precipitation; water demand for a variety of uses; water supply from existing delivery systems; and the total actual water used for regional demands, estimated to be about 1.35 billion gallons per day across the 12-county region. While water availability is generally than enough to meet future demand, water use practices are often unsustainable and water supply methods are inefficient, leading to projected shortages. Conventional development practices that increase the amount of waterproof or 'impervious' surfaces such as concrete and pavement degrade regional water supply. Sustainable growth practices such as limiting the amount of new impervious surface area in combination with improved water quality controls and increased public awareness of conservation practices will help ensure a long-term sustainable water supply for the region.

Lake Michigan currently supplies water to a service area including the city of Chicago and the inner suburbs of DuPage, Lake and Will counties and selected other communities. The lake provides about 83 percent of the region's water needs currently and potentially could meet the water demands of the entire study region at its current population. But extending the water delivery infrastructure is often prohibitively expensive, and experts are uncertain what level of withdrawals might negatively impact the Great Lakes system. In addition, a 1980 U.S. Supreme Court decision limited Illinois to just over two billion gallons per day, approximately half of which is used for public drinking water. Although the general health of the Great Lakes has improved modestly over the past two decades, threats to water quality, namely sewage overflows and stormwater runoff that are tied to urbanization, continue. Nonetheless, Lake Michigan remains healthier than many of the region's groundwater aquifers.

Groundwater is the dominant source of water outside the Lake Michigan service areas which currently provides about 15 percent of the region's water needs. Shallow and deep bedrock aquifer (naturally occurring underground layer of rock, sediment, or soil that is filled or saturated with water) groundwater sources underlie the 12-county area, and groundwater long served as the exclusive water supply for much of the region. In recent decades, unsustainable aquifer withdrawals, rapid falloff in supply, and increases in radium and other groundwater pollutants have led to the expansion of the Lake Michigan service area. Nevertheless, withdrawals from the deep aquifer remain above sustainable levels, according to the Illinois State Water Survey (ISWS). As development expands outward and groundwater withdrawals increase, these stresses promise to worsen and shortages are projected to occur. The region's other major water sources – rivers, streams, and inland lakes

– account for about two percent of the region's drinking water supply, and face considerable quality impairments.

The 1980 U.S. Supreme Court decision limiting Illinois' withdrawal rate from Lake Michigan is one of the few regulatory policies that controls regional water supply. Beyond regulating Lake Michigan water withdrawals and maintaining minimum flows in certain rivers and streams, the State of Illinois has few controls in place to protect the amount of water within the region. The Illinois Water Use Act of 1983 established a "beneficial and reasonable use" rule for groundwater withdrawals, but did not attempt to establish sustainable aquifer withdrawal levels.

PART 2: STATE AND FEDERAL POLICIES THAT IMPACT WATER

Programs that stem directly from the federal Clean Water Act of 1972, as well as some statutes and programs unique to Illinois, set the framework for regulating the quality and supply of water. The majority are federal programs delegated to Illinois to protect or improve water quality through regulation. Few state and federal regulations affect the quantity of water available.

The **National Pollution Discharge Elimination System (NPDES)**, created in 1972 by the Clean Water Act, regulates "point source" pollution such as discharges from industrial facilities and sewage treatment plants. All facilities that discharge pollutants from any point source into U.S. waters must obtain an NPDES permit. This program appears to have had minimal influence on new development, but opportunities exist to integrate sensible growth techniques into the NPDES program. When existing permits are renewed and when new permits are requested, there is an opportunity to apply antidegradation requirements and to use (total maximum daily loads) TMDLs to reduce pollutant loadings. The antidegradation program and the establishment of TMDLs are described in more detail below. In addition, in 1987, the Clean Water Act was expanded to include stormwater discharges. Phase II stormwater regulations – which cover hundreds of Illinois communities – have recently come into effect. Model ordinances affecting impervious surface standards, open space requirements, and infill development could be part of communities' efforts to meet Phase II requirements, linking land use with water quality and quantity.

CONCERNS

Concerns about the Phase II regulations of the Clean Water Act include very low IEPA staffing levels, little or no inspection of construction activities with permits, and the lack of any requirement that stormwater plans be submitted to Illinois Environmental Protection Agency (IEPA). Due in part to the inadequate staffing and lack of time to review applications, nearly all applications are accepted.

RECOMMENDATIONS

- The state of Illinois should provide adequate resources for the effective implementation of Phase II regulations, including permit review, site and municipal inspection, and enforcement and technical assistance.

SIERRA CLUB OF ILLINOIS

Recent decades have seen regional land consumption dramatically outpace population growth. Increasing growth without sustainable land use practices can result in harmful flooding.

- IEPA should identify minimum design requirements for best management practices based on the Northeastern Illinois Planning Commission (NIPC) model ordinances or other similar ordinances in the region.

Facility planning areas (FPAs) are the areas where a community may offer centralized wastewater service with sewers. Centralized sewer systems often pose less of a risk to water quality than onsite septic systems and can accommodate denser development since centralized sewer systems remove the need for large residential lots for septic fields. The Clean Water Act established the facility planning process to protect state and federal investments and to examine the environmental and economic costs of different alternatives for wastewater treatment. Communities wishing to expand their FPAs must apply to IEPA or the appropriate regional planning agency (such as NIPC) for review of the expansion plans.

CONCERNS

Concerns about the FPA program include its failure to consider the non-point source pollution expected from upcoming development in the FPA; approval of FPA amendments even when applicants have shown little or no consideration for alternative treatment techniques that better protect streams; the lack of sufficient input from the Illinois Department of Natural Resources (IDNR); approval of FPA expansions that open large areas of wetlands, floodplains, and other sensitive areas to development; approval of FPA amendments even when the applicant lacks strong ordinances for stormwater runoff, soil erosion and sediment control, floodplain management, and stream and wetland protection; and the lack of funding to support administrative staff for the FPA process.

RECOMMENDATIONS:

- IEPA should require information on the non-point source impacts on water quality from the urbanization that results from expanding a specific facility planning area.

- IEPA should identify environmentally sensitive areas for protection from development served by sewers.

- IEPA should require that applicants have adopted and are enforcing ordinances for stormwater runoff, soil erosion and sediment control, floodplain management and stream and wetland protection similar to the NIPC model ordinances.

The **Total Maximum Daily Load (TMDL)** of a pollutant is the maximum amount that a given body of water can assimilate while still meeting water quality standards. For every waterbody that fails a water quality standard, the Clean Water Act mandates a TMDL for each pollutant responsible for the failure. TMDLs have just begun to be set around the country, and none has been set within the 12-county study area, although three are in the final draft stage: the East and West Branches of the DuPage River and Salt Creek. Once TMDLs are established, the state is required to review

NPDES permits and revise them to reduce pollutant loadings consistent with the lower levels established by the TMDL, but this has not occurred yet. TMDLs could impact growth. For example, a TMDL limit on a particular river for nitrogen or phosphorous could make it impossible to build or expand a sewage treatment plant on that river, indirectly impacting development in that area.

RECOMMENDATIONS:

- IEPA should expand its water quality monitoring, and improve its analytical techniques to develop more effective and accurate watershed TMDLs.

- IEPA should develop TMDLs more quickly.

- IEPA should translate the results of TMDL studies into lower pollutant limits for new and renewed NPDES permits, and develop action plans for remediation with specific recommendations.

Antidegradation Standards apply to the Clean Water Act's goal that bodies of water already surpassing water quality standards should not be allowed to deteriorate to the point where they just barely meet those standards. In December 2002, Illinois updated and greatly improved its antidegradation regulations, which now require that any use (such as fishing or swimming) attained in a water body since 1975 must be maintained. Also, water bodies cleaner than existing standards must retain their high quality unless new pollution is "necessary" for "important economic or social development," as defined by the law. If effectively enforced, such requirements would indirectly affect growth by limiting activities that could increase pollution and forcing consideration of more sustainable wastewater treatment and implementation of conservation-oriented development.

CONCERNS

Antidegradation standards are not effectively enforced. In many cases IEPA has not done enough to determine the actual uses of the receiving waterbody and the effect the proposed discharge would have on it. IEPA should scrutinize claims that increased discharges are "necessary" for "important" development. IEPA also approves analyses that give only limited consideration to alternatives.

RECOMMENDATIONS:

- IEPA should publicize its antidegradation requirements to communities and developers.

- Outreach and technical assistance should be provided by IEPA and other organizations on the point and non-point techniques needed to comply with antidegradation regulations.

- When reviewing applications for new and renewed NPDES permits, IEPA should examine more carefully how the proposed discharge will affect the stream, river, or lake, whether the pollution is truly necessary for important development, and whether other less polluting options are feasible.

CONSERVATION FOUNDATION

CONSERVATION FOUNDATION

The region's rivers, streams, and inland lakes account for about two percent of the region's drinking water supply, and face considerable quality impairments.

The **Illinois Groundwater Protection Program** is the state's main program aimed at protecting aquifers. Mandated by the 1987 Illinois Groundwater Protection Act, the program monitors and improves the quality of groundwater, especially in the sensitive, usually shallow aquifers found throughout the 12-county study area. This program is vital to the health of water supplies for many communities, particularly in outlying areas. The program allows IEPA to designate sensitive areas and subject them to groundwater monitoring, eliminate high-pollution activities, and create setback zones around wellheads. The setback zones prohibit certain types of development from occurring within a given distance from wells, which can redirect industrial and commercial developments and change siting decisions.

RECOMMENDATIONS:

- IEPA and IDNR should identify and protect sensitive recharge areas – particularly areas feeding wetlands and high quality streams.

- State legislation should be adopted to implement a permitting system for high-capacity wells and community water supply systems.

Wetland protections are vital because wetlands reduce flooding and erosion, improve water quality, protect streams and lakes, provide habitat for rare plants and animals, and offer recreational opportunities. Illinois already has lost about 90 percent of its wetlands, and many of the remainder are in danger due to a 2001 U.S. Supreme Court decision that restricted the scope of the Clean Water Act. This left millions of acres of wetlands across the country, and more than 150,000 acres in Illinois, without federal protection. It is now up to state and local governments to protect isolated wetlands, but these protections face fierce opposition.

RECOMMENDATION:

- The Ill. General Assembly should pass a wetland protection law that respects the wetland protection ordinances already in place in some of the collar counties, and safeguards isolated wetlands throughout the rest of the state.

State and federal research and monitoring programs are extensive, but substantial information gaps remain. For example, the state's most comprehensive water quality report analyzes less than 20 percent of stream miles and relies on extrapolating data from a relatively small number of points. Moreover, the state only monitors for pollutants once every six weeks, which allows for the possibility that significant pollution could go undetected. Even less is known about groundwater resources, such as the withdrawal rates of the thousands of private wells and the extent to which their water may be contaminated.

RECOMMENDATION:

- The state should significantly increase its monitoring of surface and groundwater resources, and broaden the number of pollutants for which testing occurs.

PART 3: WATERSHED PLANNING

A watershed is the area that drains into a particular body of water. Small watersheds nest inside larger ones based on topography and drainage patterns. Efforts to devel-

BLACKBERRY CREEK WATERSHED ALTERNATIVE FUTURES ANALYSIS PROJECT

"Blackberry Creek Watershed: Alternative Futures Analysis" balances quantitative analysis with practical recommendations to improve development patterns.

op watershed plans that address land use issues and positively impact water quality date back many years. In northeastern Illinois, the need for watershed planning has taken on a new urgency due to a realization that each community on its own cannot individually prevent flooding or protect the quality of water resources that cross jurisdictional boundaries. While many plans have focused on maintaining or improving water quality and ecologic health, some also have addressed issues of flooding and water supply. IEPA, U.S. EPA, and the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) have made recommendations for developing watershed plans. This study adopts the seven-step outline recommended by the state, while also incorporating U.S. EPA elements that call for more thorough quantification of identified problems and measures of success, as well as documentation of how the plan will be monitored.

1. Identify and Assemble Stakeholders

Local stakeholders should drive the planning process, using outside agencies for technical support, coordination and funding. Local citizens, landowners, and elected officials should draw upon federal agencies such as the U.S. EPA, NRCS, and U.S. Army Corps of Engineers; state agencies such as IEPA, which coordinates federal funding for local efforts, and IDNR, which awards grants to local "ecosystem partnerships" to create plans; and regional planning agencies such as NIPC.

2. ESTABLISH GOALS

Stakeholders should establish goals that reflect their concerns, particularly those of residents and workers within the watershed. These goals should identify such outcomes as improved water quality and enhanced recreational access. Stakeholders should also consider strategies for reaching those goals, including better stormwater management and improved education. While initial goals may change over time, they provide the basic direction for the planning steps that follow.

3. INVENTORY WATERSHED RESOURCES AND CONDITIONS

Watershed inventories document existing conditions and problems. They should specifically track the factors related to previously identified goals. In-depth data collection from published reports or through geographic information systems (GIS) databases may be necessary to accomplish this.

4. ASSESS EXISTING AND FUTURE WATERSHED PROBLEMS AND THREATS

To be effective, the watershed planning process must carefully sift through large quantities of data and other information. IEPA's biennial Illinois Water Quality Report suggests considering desired uses of a body of water, identifying impairments of the water, analyzing the causes of impairment, and identifying the sources of pollution.

5. RECOMMEND OBJECTIVES AND MANAGEMENT PRACTICES FOR PREVENTION AND REMEDIATION

Appropriate control objectives and best management practices need to be identified based on the causes of impairment and specific sources that may be contributing.

FOX RIVER ECOSYSTEM PARTNERSHIP

Fox River Ecosystem Partnership has included local governments, environmental, and development interests in this tool kit.

6. DEVELOP AN EFFECTIVE ACTION PLAN (THE WHAT, WHO AND WHEN)

The action plan must consider what specifically needs to be done, who will do it, and when it should be accomplished. Broad stakeholder involvement in developing the plan is critical.

7. IMPLEMENT THE PLAN AND MONITOR ITS SUCCESS

The planning process must continue well after the action plan has been finished, most notably with a mechanism to report back to stakeholders and implementers about progress.

STATUS AND EVALUATION OF WATERSHED PLANNING IN THE REGION

Watershed plans developed in the study region vary from glossy poster-sized lists of best management practices to multi-part plans totaling hundreds of pages. According to a 2001 NIPC survey for IEPA, plans have been or were being developed in 38 watersheds, but less than half of these were completed and active. Eleven of these plans were collected for review in this report: Aux Sable Creek, Big Rock Creek, Blackberry Creek, Fox River, Illinois River, Mazon River, Nippersink Creek, North Branch of the Chicago River, Thorn Creek, Upper DuPage River, and Waubonsie Creek.

Most plans involved a cross-section of relevant stakeholders. Plans funded by IEPA emphasized water quality and aquatic life more than plans funded by other agencies, such as IDNR and NRCS. Most plans relied exclusively on existing data, which can help identify preventative recommendations but can limit remediation and restoration recommendations that require more site-specific or updated information. The plans developed for more urbanized watersheds tended to draw greater local government and conservationist participation and typically emphasized remediating degradation, while the rural plans drew more from the agricultural community.

Plans typically did not document implementation status, but some did report early progress and ongoing activities, and more successful plans showed the ability to attract follow-up funds. Federal and state agencies, however, target more funding toward plan development than implementation, leaving many jurisdictions with few incentives to bring plans to fruition. Most plans contain recommendations with profound implications for land use and development, but whether they go forward depends heavily on whether local government decision makers and major landowners are engaged in the process.

RECOMMENDATIONS:

- The state should coordinate funding across agencies and provide incentives to communities to develop watershed plans.

- Local elected officials and decision-makers should be included in the leadership of watershed planning efforts from the beginning of the process.

- Communities with water quality concerns should develop watershed plans using the seven-step process outlined by IEPA so that they will qualify for funding for implementation of projects identified in the plan.

- Counties and municipalities should incorporate specific recommendations from watershed plans into their comprehensive plans and zoning ordinances.

- Counties and local officials should review new development proposals within the context of the watershed plan to determine whether they are consistent with the goals and recommendations of the watershed plan.

- Federal and state agencies should devote a larger proportion of watershed funding to the actual implementation of watershed plans.

- Federal and state agencies should incorporate a review for consistency with watershed plans into all their programs. The agencies should make inconsistency with watershed plans grounds for possible disapproval of permits, projects, or other actions.

- Watershed planning groups should engage both aquatic biologists and water quality experts in the process.

- The state should support advocacy initiatives that promote better strategies and implement results.

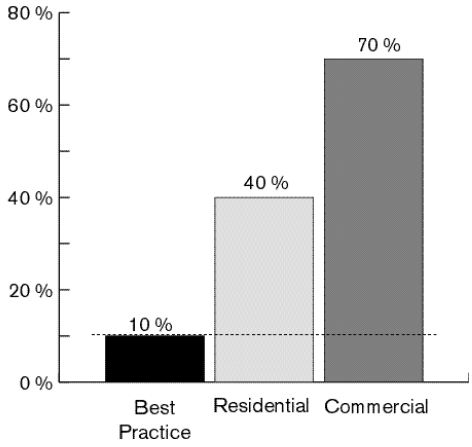
PART 4: REVIEW OF LOCAL PRACTICES AND MODEL ORDINANCES

MUNICIPAL SURVEY

While state and federal regulations set the policy framework, decisions affecting water are made at the local level. In Illinois, local governments – municipalities and counties – control virtually all land use decisions, but have not necessarily thought through the implications of their actions on water quality. In 2004, MPC surveyed all communities of more than 100 people in the 12-county study area to determine the extent to which local governments adopted ordinances that protect water quality and conserve water quantity. Of the 300 governments, 120 returned surveys.

The results of the survey showed that although a majority of the communities polled may indicate concern about stormwater management and development in floodplains, few were enacting the full range of tools and best management practices to increase protection of water quality. Instead, most are relying on traditional zoning, land use, and construction techniques. Only a very small minority of those reporting were concerned about water supply at all.

FIGURE 1
COMMUNITIES ALLOW HIGH LEVELS OF IMPERVIOUS SURFACES



SPECIFIC RESULTS

Planning issues:

- Most communities have plans completed or updated in the past decade. Eight communities had plans that were adopted in 2004; 55 plans were dated from 2000-2003; 27 plans were adopted between 1995 and 1999; and 22 had plans prior to 1994.

- Of the plans, nearly half, 47.6 percent, recommend specific actions for the protection of stream corridors; 55 percent include specific objectives or recommended actions for wetlands; 61 percent for floodplains; and 14 percent for aquifer recharge areas.

- Of those surveyed, 61.8 percent have specific objectives or recommended actions for the regulation of storm water run-off, but only 11 percent for biodiversity, and 15.2 percent for the restoration of ecosystems.

Environmental regulations:

- A majority of respondents, 88.6 percent, expect compliance for environmental regulations through the use of site visits, but most did not answer how many visits were needed to achieve compliance. As one community put it, "enough visits until it is done." Nearly a third, 30.5 percent, reported having administrative penalties for non-compliance, while 14.4 percent issued fines. Despite the question being asked, no community reported how much was collected in fines per year.

Development/Zoning issues:

- Communities reported that almost all private sector development proposals received in the last two full years had been approved.

- Zoning codes limited the impervious area of new development in 55.5 percent (61) of the communities. For residential development, in those communities where impervious surface coverage is regulated, the average impervious surface allowable is 40 percent – far higher than good research recommends; for commercial development, an average of 70 percent is allowable. Studies show that having more than 10 percent of a watershed covered by impervious surface damages its streams and rivers (Figure 1).

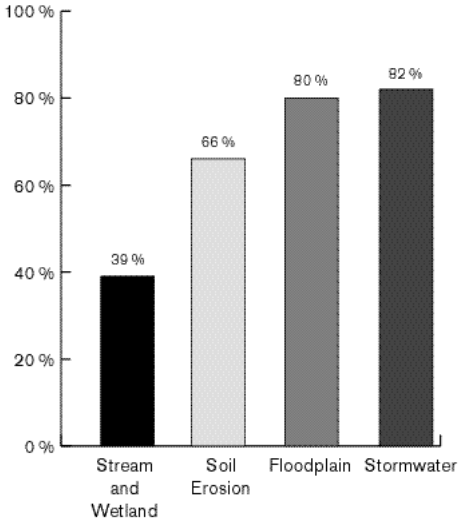
- Curbs and gutters are required for new streets in 85 percent of the communities reporting; 84 percent of communities also chose curbs and gutters as their first line of defense against storm water runoff, even though this can exacerbate flooding and water pollution.

Stormwater and soil erosion:

- Among survey respondents 39 percent have stream and wetland protection ordinances, 80 percent have floodplain ordinances, 82 percent have stormwater draining and detention ordinances, and 66 percent have soil erosion and sediment control ordinances (Figure 2).

FIGURE 2

PERCENTAGE OF COMMUNITIES THAT HAVE ADOPTED MODEL ORDINANCES



- Stormwater management commissions make a difference. Regarding soil erosion and sedimentation in areas undergoing development, nine percent of the communities adopted the NIPC model, 7.5 percent adopted parts of the NIPC model, 32.5 percent drafted their own ordinances, and 35.8 percent use the ordinance developed by the county stormwater management commission.

- Nearly a quarter of the communities, 24 percent, had applied for an FPA extension within the past five years.

- Half of the communities use vegetated swales in their communities to manage storm water; 83 percent use engineered retention or detention facilities; 34 percent have constructed wetlands; 27.5 percent use small, locally sited depressions for infiltration; and 7.5 percent have permeable pavements.

Drinking water/quality issues:

- Lake Michigan provides drinking water to 58 percent of the communities; 28 percent buy water from another municipality (which is often Lake Michigan water); 71 percent use wells or underground water. (Percentages do not add up to 100 percent because many communities have a combination of sources.)

- A full 69 percent of the communities have no concerns about the quality of drinking water.

- Of those communities with concerns about drinking water quality, the issues listed include: "well water requires extensive chemical treatment;" "water needs to be filtered;" "existing wells are used only for lawn watering;" "iron and radium;" "poor taste, high iron content, extremely hard;" "concerned with Fox River Septic System leeching into groundwater along with farm field runoff;" "contamination risks for shallow wells;" "failing septic systems;" and "well levels dropping, sulfur content rising."

RECOMMENDATIONS FOR IMPROVING MUNICIPAL ROLE:

- The state, counties, communities, and watershed coalitions should emphasize water quality and availability, not just preventing flooding.

- State agencies and local organizations must further educate municipal officials on best management practices and why they should be implemented.

- To best manage stormwater, communities should adopt regulations that limit curbs and gutters, allow vegetated swales and other best practices, and use water collection and infiltration rather than storage and removal.

- The state should pass enabling legislation for county-wide stormwater management agencies outside of the six northeastern Illinois counties.

CONSERVATION FOUNDATION

Tremendous efforts have gone into improving farming practices with resulting water quality improvement. The State should provide additional increases for technical assistance to better address agricultural nonpoint source issues and promote agricultural best management practices.

- Comprehensive plans should be updated to include actions to protect natural resources, with state grants giving preference to communities that do so.

FARMLAND AND WATER MANAGEMENT ISSUES

Agriculture remains the nation's largest source of polluted runoff, due to fertilizers erosion and chemical use. Farming practices have improved tremendously around the country, with resulting water quality improvement in some areas. However, when agriculture alters the shape, soils, or vegetation of a watershed, the impact on nearby rivers and streams is profound.

In northeastern Illinois, flood prevention and stormwater runoff from agricultural lands can be particularly challenging due to the region's flat topography and broad floodplains. In the past, intensive agricultural development did not fully consider the long-term consequences of altering the region's landscape.

In 1979, NIPC created its *Water Quality Management Plan for Northeastern Illinois*. The plan addressed pollution from nonpoint sources, including agricultural runoff. In 1997, NIPC reassessed the plan. Agricultural areas continued to experience nonpoint source pollution problems such as: wetlands loss; channelization; and the ongoing effects of nutrient, pesticide, and sediment runoff.

The main tool for controlling nonpoint source pollution is the implementation of best management practices (BMPs). In the agricultural context, BMPs include conservation tillage that limits erosion from farm fields, riparian buffers that prevent nutrients and sediment from reaching waterways, and programs to reduce the use of pesticides and fertilizers. The Clean Water Act seeks to encourage the implementation of BMPs through the non-regulatory Section 319 grant program.

RECOMMENDATIONS FOR IMPROVING AGRICULTURAL MANAGEMENT

- The state should increase education, technical assistance, and cost-sharing assistance at the state and local levels to address agricultural nonpoint source issues better and promote agricultural BMPs.

- Counties and watershed groups in northeastern Illinois should, if possible, develop locally based incentives such as cost sharing for farmers to implement BMPs that can reduce runoff.

- Farmers should aim for the preservation of natural communities by maintaining vegetative filter strips of at least 25 feet adjacent to streams and keeping livestock waste out of streams. Adjacent buffer areas should be installed alongside wetlands and wood lots.

REVIEW OF NIPC MODEL ORDINANCES

During the past 15 years, NIPC has developed model ordinances for new development, redevelopment, and water protection. Poorly planned development, wide variations among the six-county area's 272 communities, and the ineffectiveness of locally developed ordinances all led to this initiative. The model ordinances reflect a belief that a regional approach benefits both local governments and the development community by providing consistency and predictability. Not surprisingly, this study's municipal survey found that those communities within NIPC's six-county jurisdiction were far more likely to have adopted the model ordinances than those in the next ring of counties.

Since the early 1990s, countywide stormwater management commissions (SMCs) have greatly impacted the regulatory landscape. These SMCs are authorized by Illinois law to address stormwater and flooding issues on a countywide basis in the six-county NIPC region. One of the authorities granted to SMCs is the ability to develop a countywide, comprehensive stormwater ordinance. SMCs can mandate that these ordinances be adopted by every municipality in the county as well as the county itself.

To date, DuPage, Kane, Lake, and Will counties have adopted and are now enforcing countywide ordinances, with enforcement authority delegated to qualified municipalities in most cases. McHenry County recently adopted a comprehensive ordinance, and countywide enforcement will begin within a year. These ordinances emphasize flood prevention and traditional stormwater controls. To varying degrees, they also more broadly address the subject areas of the four NIPC model ordinances: floodplain management; stormwater detention; soil erosion and sediment control; and stream and wetland protection.

While community and countywide ordinances have improved greatly and are certainly among the most advanced in the state, improvements are needed to achieve true sustainability that does not exhaust land and water resources. More specifically, most communities do not adequately protect isolated wetlands, build buffers along streams and wetlands, reduce stormwater runoff, effectively inspect and enforce soil erosion and sediment control on most construction sites, or consider the broader array of sensitive natural resources in site planning.

Developed in the early 1970s, the first NIPC **model stormwater ordinance** acknowledged that increased runoff from new development is one of the main drivers of increased flooding. The ordinance has been updated several times in response to major floods and to reflect new practices in water detention, identifying the best designs for retention basins and recommending a hierarchy of runoff techniques.

The ordinance could use further input from hydrologists and soil scientists to determine when existing wetlands could be sustainably modified to accommodate detention, and to provide more detailed approaches on how to design sites and drainage to minimize impervious surfaces and filter runoff, and to infiltrate a greater percentage of stormwater where it lands rather than where it is collected.

CONSERVATION FOUNDATION

Nearly all the streams in urban and suburban watersheds – those with populations at or above 300 people per square mile – showed fair to very poor fish communities, while nearly all rural streams were rated good to excellent.

Detention ordinances need to incorporate longer periods of time for detention ponds to discharge the rainfall. When hundreds of detention ponds along a river or stream system discharge within 24 hours, unstable creek hydrology occurs. Requirements for slowing down water discharge would help.

Membership in the **Federal Emergency Management Agency (FEMA)** national flood insurance program requires that new structures be protected from flood risk. IDNR has a similar emphasis. The **model floodplain ordinance** focuses on more stringent requirements to minimize flood damage and additional water quality, habitat, and recreational concerns. The ordinance should be updated based on current best practices of the SMCs to provide adequate buffers to protect streams and riparian zones.

Federal regulations carried out by the U.S. Army Corps of Engineers focus mainly on protecting wetlands from filling, while state stream and river regulations mostly address how flow is conveyed and flood storage. The **model stream and wetland protection ordinance** uses a simple zoning overlay approach to protect small wetlands, headwater streams, adjacent buffers, and exert local oversight. Since the ordinance's adoption in 1988, "isolated wetlands" (as defined by the federal court) have lost federal protection, while better information is available on wetland and stream quality. The ordinance should be updated to require minimum stream buffers of 25 to 100 feet, provide options for how to avoid hydric soils (characterized by considerable moisture), and address the need for a management entity and performance criteria for protected streams, wetlands, and buffer strips.

NIPC initially developed a **model soil erosion and sediment control** ordinance in 1980, and rewrote it in 1991, in response to an assessment of the effectiveness of municipal and county erosion control programs. This concluded that construction site erosion control throughout the region generally failed to prevent offsite erosion and water quality problems due to inadequate maintenance, inspection, and enforcement of existing ordinances, as well as practitioners' lack of understanding of the issue. The ordinance should again be updated to require inspection, maintenance, and enforcement through a follow-up evaluation of local programs that looks for the most successful examples of programs in the region.

In sum, while communities within SMCs and the NIPC area report they have adopted the model ordinances, there are concerns regarding the follow-through and implementation after adoption. And for communities outside of the NIPC area, it is crucial that the state allow counties to create SMCs. The greatest pressure for new development is quickly moving beyond the six counties, and the region needs to have a consistent, level playing field that protects water quality and conserves water quantity in a much larger region than in the past.

REDUCING IMPERVIOUS SURFACES

Poorly planned urbanization adversely impacts the ecology of the area, beneficial uses of downstream waterbodies, but also the integrity of water supplies. It also exacerbates flooding. Nearly all of the streams in urban and suburban watersheds – those with a population of 300 people or more per square mile – showed fair to very poor fish communities, while nearly all rural streams were rated good to excel-

lent. Point sources, such as wastewater treatment plants and sewer overflows, as well as nonpoint sources due to expanding suburban development, contributed to this degradation. National research, most notably from the Maryland-based Center for Watershed Protection, shows that allowing as little as 10 percent of a watershed to be covered with impervious surfaces causes stream degradation.

Northeastern Illinois is expected to grow by 1.9 million people, to over 10 million, by 2030. The region faces choices on *how* it will grow, not *whether* it will grow. Limiting density in one area pushes the development to another. Without taking a larger, watershed approach, the region will not be able to grow in a sustainable way. The patterns of regional development need to change. There are two complementary approaches to manage this growth to better protect water quality:

1. Guide growth to areas that already have urban infrastructure in place. Waterways in these already developed areas need restoration assistance and pollution control, to meet the Clean Water Act goals to become fishable and swimmable.

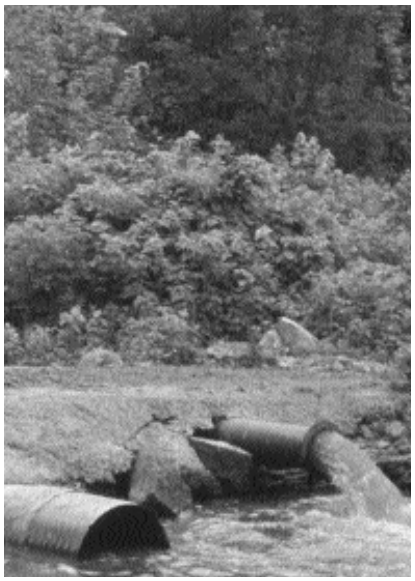
2. Dramatically change the way we develop in greenfield areas. The traditional relationship between density and impervious surfaces can be broken if attention is paid to how development is planned.

As stated in a recent publication of the Funders' Network for Smart Growth and Livable Communities (Beach, 2004):
The central principal of a water resources protection strategy must be to identify watersheds that are less than 10 percent impervious and maintain the most valuable of those in an undeveloped state. The companion principle is that watersheds where impervious surfaces exceed 10 percent or which harbor fewer significant public resources should absorb the majority of growth over the coming decades.

At the regional, macro-watershed level, we need not only to limit development in pristine, currently underdeveloped watersheds, but to protect these environmental, water-based resources by encouraging development in already urbanized areas.

As the Funders' Network paper points out, this does not mean that urban areas should "sacrifice developed watersheds." On the contrary, a number of measures can be taken to improve water quality, reduce flooding, and decrease water consumption in already developed areas as have been seen in the successful efforts to clean up the Chicago River over past two decades. However, it will never be possible to restore these river and water systems to their pristine, natural condition.

There are several methods of land design to achieve lower impervious surfaces. Since studies identify impacts on water quality starting at the 10 to 15 percent level, new, creative approaches to development are needed. For example, at two units per acre, conventional development on half-acre lots results in 36 percent impervious surfaces. Alternatively, conservation style development of the same size house, but on a smaller footprint, with a smaller garage, and using pervious pavers instead of a paved driveway or patio, results in only 15 percent impervious surfaces (See Figure 3).



SIERRA CLUB OF ILLINOIS

Recent decades of regional land consumption dramatically outpacing population growth have resulted in harmful runoff to streams and rivers and exacerbated flooding.

FIGURE 3

SAME DENSITY, DIFFERENT IMPACTS		
	Conventional, single-family house on half-acre lot (sq. ft.)	**Conservation development on 50'x100' lot, plus common open space (sq. ft.)**
HOUSE FOOTPRINT	1,875	1,050
GARAGE	1,350	750
DRIVEWAY AND PATIO	2,550	450
STREET AND SIDEWALK	2,100	92
TOTAL IMPERVIOUS SURFACE	7,875	3,175
PERCENT IMPERVIOUS	36%	15%
IMPACTS		
RUNOFF - GALLONS/YEAR	354,757	143,029
COMMON OPEN SPACE	0	33,400
SINGLE FAMILY ON QUARTER ACRE LOT VERSUS MULTI-FAMILY HOUSING		
	Conventional, single family house on quarter acre lot (sq. ft.)	**Multi-family (6 units per acre)**
HOUSE FOOTPRINT	1,650	1,050
GARAGE	1,350	750
DRIVEWAY AND PATIO	1,650	167
STREET AND SIDEWALK	1,050	925
TOTAL IMPERVIOUS SURFACE	5,700	2,892
PERCENT IMPERVIOUS	**26%**	**13%**
IMPACTS		
RUNOFF - GALLONS/YEAR	256,777	130,280
COMMON OPEN SPACE	0	26,048

Similarly, conventionally planned housing on quarter-acre lots has a much higher impact on water (impervious surface ratio of 26 percent), than multi-family (well-planned townhome) development (13 percent), even at a moderately higher density of six units per acre. While regulatory and new development decisions with conservation standards are a significant part of the water quality and quantity issue, similar weight also needs to be given to approaches and strategies focused on the region's existing development. That would include retrofitting BMPs on development, and property-owner basis, particularly aimed at already suburbanized areas.

The lesson is clear: improving and protecting water quality have as much to do with how we choose to develop as whether to develop. Poorly planned, low-density development will result in more destruction over larger areas than well-planned conservation development in appropriate locations.

From a water resource point of view, the best way to plan for development, and therefore impervious surfaces, is at the watershed level. Watershed plans should identify the areas most appropriate for development and aim for no more than 10

to 15 percent of all land to be impervious. Communities can then guide development to most appropriate areas, consistent with their watershed plans.

LIMITING IMPERVIOUS COVERAGE ON NEW DEVELOPMENT SITES: DESIGN TECHNIQUES

At the project level, local officials and developers can minimize the impact of new development on water supplies through a variety of techniques. To reduce their total impervious area, communities can cluster residential developments, reduce house setbacks and thus shorten driveways, build narrower streets, and reduce the size of parking lots. To reduce effective impervious area, which means reducing the runoff from impervious surfaces, communities can build permeable paving such as porous asphalt, use green roof technology that relies on soil and plantings to soak up rainfall, build vegetated buffer strips at the edge of parking lots or roadways, and build recessed landscape islands instead of conventional storm sewers.

RECOMMENDATIONS:

- Communities should evaluate and revise their subdivision ordinances to reduce street widths, reduce building setbacks from streets, allow smaller parking lots, and cluster residential development.

- Communities should revise their subdivision codes to encourage or require, where appropriate, permeable paving and green roof designs.

- Communities should revise their stormwater and subdivision codes to require site design practices that infiltrate runoff at the edges of impervious surfaces. Such practices should include recessed landscape islands in parking lots, slotted curbs, infiltration trenches, bioswales, rain gardens, and cisterns that collect roof runoff.

- Communities should incorporate preferred (or required) conservation design templates into their zoning/ subdivision ordinances to provide direction on how reduced impervious limits can be achieved for particular land uses.

- Communities should cooperate on a regional scale to encourage or require more compact and contiguous development in watersheds that are already degraded rather than versus in high quality watersheds.

- Communities should coordinate on a watershed scale to ensure that identified development densities are not exceeded for high quality watersheds.

PART 5: IMPLICATIONS AND NEXT STEPS

Despite dramatic improvements in wastewater treatment and combined sewer overflow control in the last 20 years, the conditions of the majority of streams (i.e., water quality, physical habitat, and instream flows) in northeastern Illinois are too disturbed to support high quality fish communities in urban/suburban stream watersheds. Urban, nonpoint source pollution and certain problematic point sources are the principal causes of these impairments.

CONSERVATION FOUNDATION

While there are known problems in rural watersheds associated with agricultural chemicals and erosion, as well as occasional wastewater problems in rural villages, these problems generally do not prevent rural streams in northeastern Illinois from supporting relatively high quality fish communities.

If existing high quality northeastern Illinois streams are to be protected in the face of new development, then dramatic actions must be taken. Effective actions would include some combination of:

- Using watershed planning to tailor needed controls to the specific conditions of each stream or river.
- Planning new development at the watershed and local level to minimize disturbance of water resources.
- Limiting impervious coverage in new development in the context of a broader strategy for both point and nonpoint sources.

Recommended actions are targeted to the protection of stream uses and aquatic life. However, they also will achieve related benefits, specifically protecting groundwater recharge and reducing flooding in a more cost effective way.

IMPROVED AWARENESS AND EDUCATION

It is critical that decision makers be aware of the importance of sustainable development. Elected officials who make decisions, staff who advise them, and consultants to developers should know the latest best management practices and other appropriate techniques. To make this happen, a number of organizations are undertaking efforts to educate and provide technical assistance to local officials.

Various resources are needed to educate **local government officials** including workbooks, multi-media approaches such as Web sites or CDs, hands-on technical assistance and outreach, and peer-to-peer communication.

Educating **municipal engineers and planners** to improve the level of planning to protect green infrastructure first. Technical staff need to be supportive of innovative solutions that can be more efficient, friendlier to the environment, and require less "hard" infrastructure.

Distributing and publicizing **successful case studies** might be the best way to communicate alternative stormwater and site design approaches.

Many practitioners and decision-makers believe innovative drainage and landscaping practices cost more than conventional practices. In fact, the opposite is true. Financial case studies that **document the cost-effectiveness of sustainable designs** will be essential to convince the development community and municipalities of the cost benefits of best practices.

When these three groups, **developers, local governments, and conservation organizations**, work together, sustainable designs such as clustered housing, increased density, and open space are cost-effective, marketable, enhance quality of life, and protect natural resources – providing win-win solutions for developers and communities.

Targeted assistance to communities and developers provided by experts proficient in stormwater management and sustainable development techniques are needed to develop action plans to focus on specific problems in stormwater runoff and retention, native landscaping, and other issues.

NEXT STEPS

The next phase of the work by the Campaign for Sensible Growth, Metropolitan Planning Council, and Openlands Project, will entail a series of activities to:

1) Create an effective statewide watershed program that would coordinate implementation of state and local regulations on a regional scale.
2) Work with two regional watersheds in northeastern Illinois as pilot projects to demonstrate effective models in watershed planning and management.
3) Reach out to officials and the development community on best management practices, water conservation, land use practices, and policies to sustain water resources of the study region.

With more attention to water resource issues than ever before in northeastern Illinois, we look forward to working together to protect our region's scarce resources and plan with people and communities in mind for the future.

DEFINITIONS

Antidegradation standard
A regulation restricting the degradation of water quality in a waterbody due to new dischargers.

Aquifer
A naturally occurring underground layer of rock, sediment, or soil that is filled or saturated with water, usually in large quantities.

Basin
The entire geographical area drained by a river and its tributaries.

Best management practice (BMP)
A practice or combination of practices to reduce the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.

Effluent
Treated or untreated discharged wastewater that flows out of a treatment plant, sewer, or industrial outfall, treated wastes from municipal sewage plants, and coolant waters from a nuclear power plant.

Facility Planning Area (FPA)
The area where a community may offer centralized sewer service.

Fishable, swimmable, drinkable
Three goals that the federal Clean Water Act has established for all waterbodies.

Floodplain
The land adjacent to a body of water or water course that is subject to flooding.

Groundwater
The supply of fresh water found beneath the surface of the earth, usually in aquifers that supply wells and springs.

Hydric soil
Soil characterized by considerable moisture content.

Impervious surface
Surfaces such as concrete, asphalt, and hard roofs that resist penetration by water or plants roots, causing stormwater runoff and nonpoint source pollution. In some instances, soil compacted from construction activity or agricultural cultivation may be considered impervious.

National Pollution Discharge Elimination System (NPDES)
The U.S. Clean Water Act's permit program, which works to control water pollution by regulating point sources that discharge pollutants into waters of the United States. Recently, USEPA initiated Phase II of the NPDES Stormwater Program has been initiated to regulate stormwater from many municipalities and also construction sites.

Non-point source pollution
Water pollution that does not come from a single point (such as a pipe from a factory) but instead from a large area; typical examples include polluted stormwater runoff from roofs, parking lots, roads, farm fields, and lawns that runs into rivers, lakes and streams.

PCB
Polychlorinated biphenyl, commonly used in electrical transformers. PCBs may cause cancer as well as problems with the skin, liver, and with hearing and vision.

Point source pollution
Pollution discharged directly from a specific site such as a municipal sewage treatment plant or an industrial outfall pipe.

Pollutant loading
The amount of a certain pollutant added to a water body.

Recharge
The increase in groundwater storage from precipitation, infiltration from streams, or human activity (artificial recharge).

Runoff
Stormwater that is not absorbed into the ground but instead flows over various surfaces (e.g., lawns, driveways, roads, parking lots, earth) before draining into a river, stream, lake, or detention facility.

Subwatershed
A smaller geographic section of a larger watershed unit.

Surface water
Any body of water above ground, including natural lakes, streams, rivers, creeks, tributaries, and man-made reservoirs.

Sustainable growth
Land development that can continue over the long-term without exhausting available resources, such as open space and water resources.

Sustainable withdrawal
Withdrawals from a surface or groundwater body (e.g. Lake Michigan or the Cambrian-Ordovician) that do not inhibit the long-term health or renewability of the water body or its dependent ecosystems.

Total Maximum Daily Load (TMDL)
The allowable loadings or other quantifiable parameters for a water body to meet water quality standards. U.S. EPA's TMDL program is authorized under section 303(d) of the federal Clean Water Act.

Turbidity
In water bodies, the condition of having suspended particles that reduce the ability of light to penetrate beneath the surface. Some rivers and streams are naturally more turbid than others; soil erosion, runoff, and introduction of wastewater or other pollution into water bodies can increase turbidity.

Watershed
An area of land that drains surface water runoff, sediment, subsurface water, and dissolved materials to a common receiving water body or outlet such as a lake, river, or stream. Depending on the size of the receiving water body, watersheds may vary in size from largest river basins to just acres or less in size.

Wetland
Areas where water exists at or near the land's surface in flooded or saturated soils in sufficient amounts to sustain wetland types of plants.

Wetland polishing
A technique where wetland areas are used to clean or "polish" polluted water.

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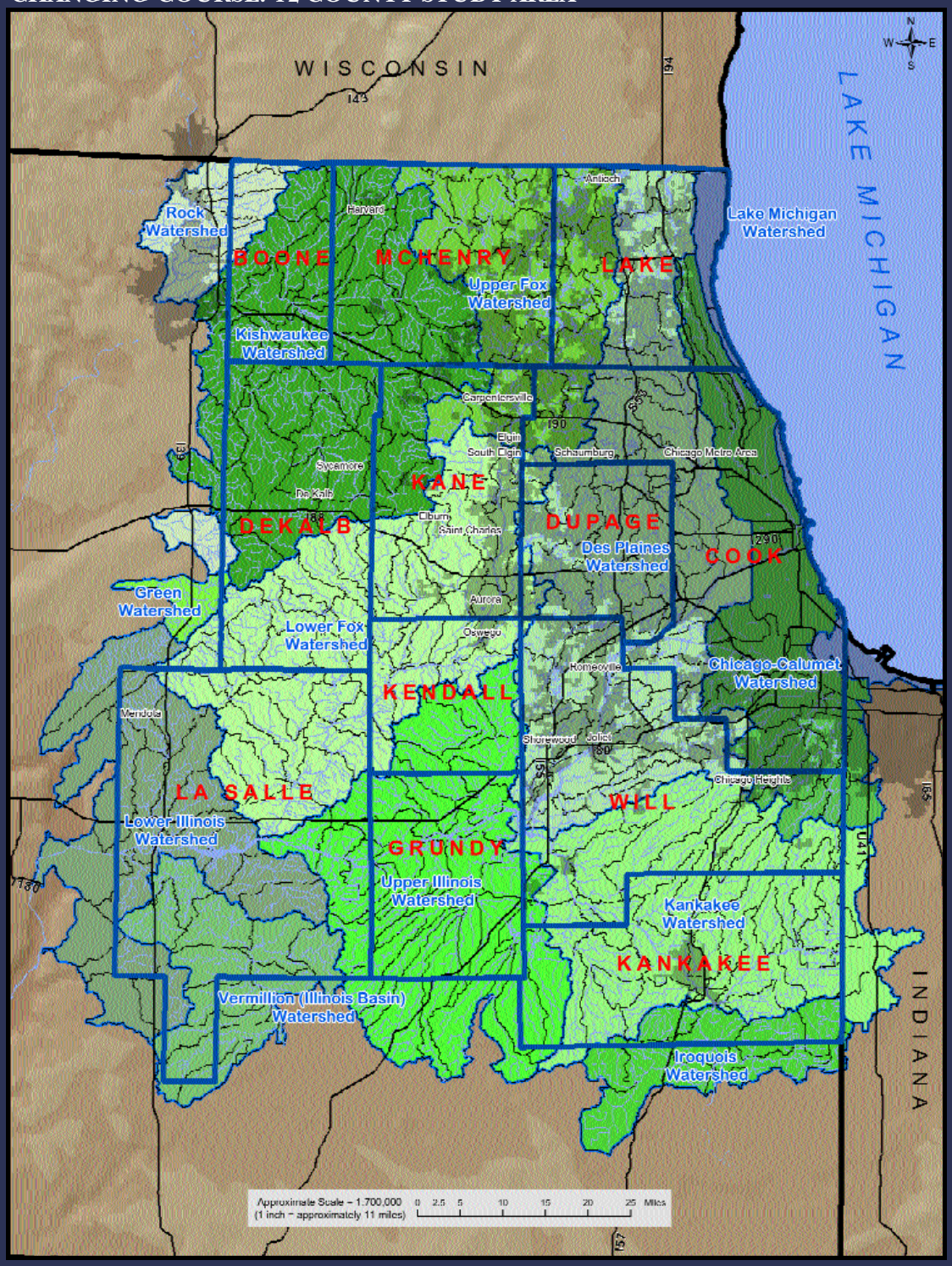
CHANGING COURSE: 12-COUNTY STUDY AREA



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