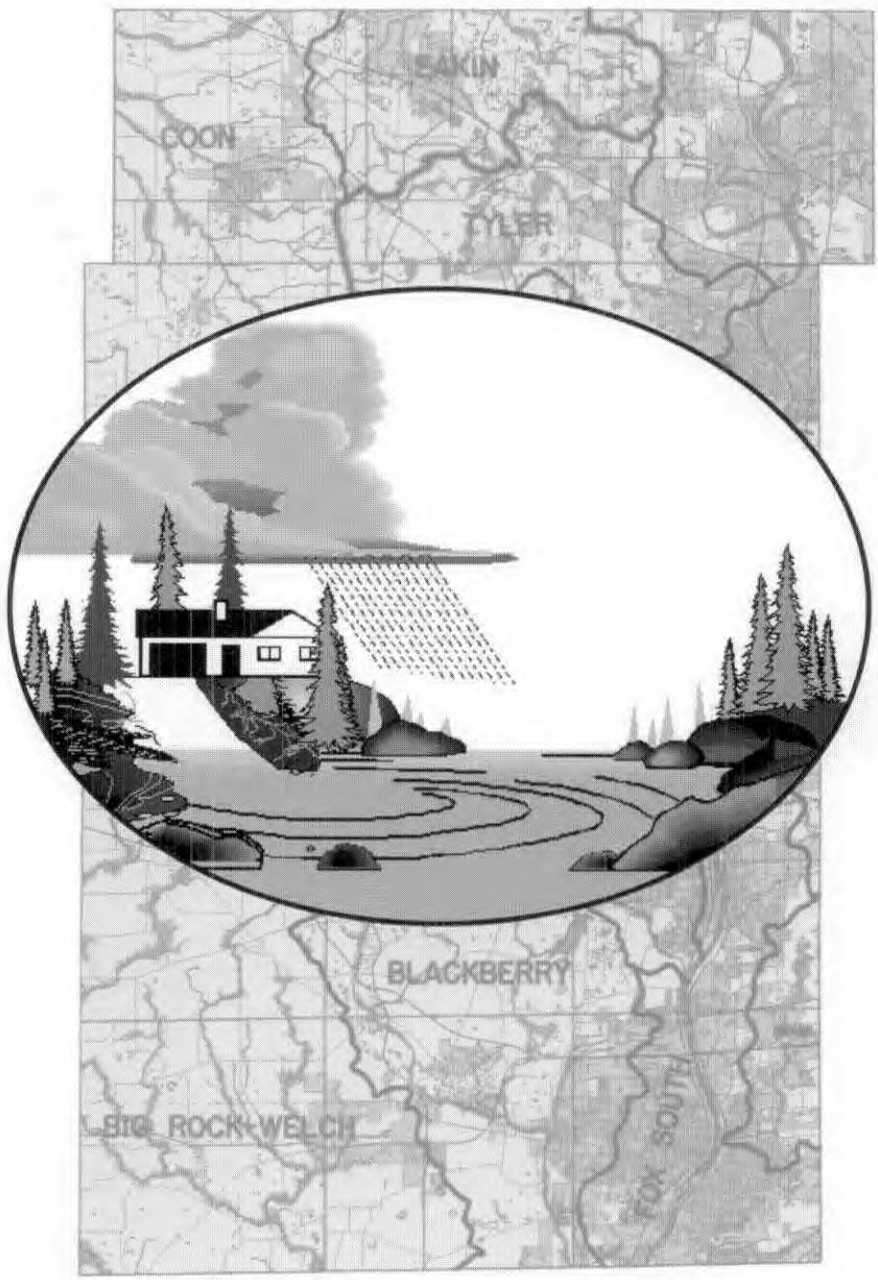
October 13, 1998

COMPREHENSIVE STORMWATER MANAGEMENT PLAN



Kane County, Illinois

COMPREHENSIVE STORMWATER MANAGEMENT PLAN

Kane County, Illinois
October 13, 1998

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KANE COUNTY COMPREHENSIVE STORMWATER MANAGEMENT PLAN

TABLE OF CONTENTS

Executive Summary

Chapter 1 — Authority, Purpose, Goals and Objectives

1.1 Introduction 1
1.2 County Setting 1
1.3 Kane County Stormwater Management Planning Committee 2
1.4 Authority 2
1.5 Organization of the Plan 3
1.6 Goals and Objectives 3

Chapter 2 — Description of Existing Water Resources and Stormwater Management Framework

2.1 Functional Framework 7
2.2 Agency Roles and Resources 8
2.2.1 Local 8
2.2.2 Regional 13
2.2.3 State 14
2.2.4 Federal 19
2.3 Legal and Regulatory Background 22
2.3.1 Illinois Drainage Law 22
2.3.2 Illinois Laws on Drainage Districts 24
2.3.3 Statutory Authority 25

Chapter 3 — Assessment of Water Resource Conditions and Problems

3.1 Watershed Land Use and Floodplains 27
3.2 Soils and Drainage 28
3.3 Agricultural Drainage 32
3.4 Urban Development and Stormwater Runoff 32
3.5 Flooding 36
3.6 Streambank Erosion 38
3.7 Water Quality and Waterbody Use Impairment 39
3.8 Summary and Conclusions 46

Chapter 4 — Assessment of Stormwater Management Activities in Kane County

4.1 Administration and Management 47
4.2 Regulation 49
4.3 Planning 58
4.4 Maintenance 63
4.5 Agricultural Drainage 65
4.6 Summary 65

Chapter 5 — Recommendations for a Countywide Stormwater Management Program

5.1 Stormwater Program Recommendations 67
5.1.1 Administration and Management 67
5.1.2 Regulation 70
5.1.3 Planning 71
5.1.4 Maintenance 74
5.1.5 Summary 74
5.2 Regulatory Standards Recommendations 75
5.2.1 Comprehensive Purpose Statement 75
5.2.2 Floodplain Management 75
5.2.3 Stormwater Drainage and Detention 77
5.2.4 Soil Erosion and Sediment Control 79
5.2.5 Stream and Wetland Protection 80
5.3 Watershed Planning Methodology and Issues 80
5.3.1 Watershed Planning Methodology 81
5.3.2 Comprehensive Watershed Planning Issues 82
5.3.3 Summary 85
5.4 Future Development Design Alternatives and Incentives for Natural Resource Protection 85
5.4.1 Identification of Sensitive Site Features 85
5.4.2 Techniques to Preserve and Enhance the Natural Hydrologic and Pollutant Filtering Functions of the Site. 86
5.4.3 Techniques to Avoid and Enhance Sensitive Areas 89
5.4.4 Implementation of Design Alternatives 91

Chapter 6 — Plan Implementation Considerations

6.1 Adoption of Stormwater Plan 93
6.2 Phasing of Recommendations 93
6.3 Discussion of Phasing 93
6.4 Closing 98

References

LIST OF TABLES

Table 3-1	Kane County 1990 Land Use Area and Population by Watershed	29
Table 3-2	Kane County 1990 Land Use Percentage and Population Density by Watershed	29
Table 3-3	Kane County 1990 Land Use Area within the FEMA Floodplain by Watershed	30
Table 3-4	Kane County 1990 Land Use Area Within the FEMA Floodplain as a Percentage of Total Land Use Area	30
Table 3-5	Kane County 1990 Land Use Area Within the FEMA Floodplain as a Percentage of Total Floodplain Area	30
Table 3-6	Kane County Stream Quality	40-42
Table 3-7	Illinois Biological Stream Characterization	43
Table 4-1	Summary of Selected Local Floodplain Management Standards	51
Table 4-2	Summary of Selected Local Stormwater Drainage and Detention Standards	53
Table 4-3	Summary of Selected Local Soil Erosion and Sediment Control Standards	55
Table 4-4	Flood Control, Drainage, and Water Quality Studies and Plans	61-62
Table 6-1	Prioritization of Plan Recommendations	94

LIST OF FIGURES

Figure 1-1:	Stormwater Management Planning Areas *Foldout following*	2
Figure 3-1:	Watersheds, Wetlands, and Floodplains — Kane County, Illinois *Foldout following*	28
Figure 3-2:	Existing Land Use — Kane County, Illinois *Foldout following*	28
Figure 3-3:	Hydric Soils of Kane County *Foldout following*	32
Figure 3-4:	Effects of Stream Urbanization	33
Figure 3-5:	Biotic Integrity vs Urbanization	43
Figure 3-6:	Fox River and Kishwaukee River Tributaries in Kane County and Their Biological Stream Characterization *Foldout following*	44
Figure 5-1:	Stream and Rain Gage Network *Foldout following*	72
Figure 5-2:	Kane County Stormwater Plan Functional Framework	76
Figure 5-3:	Identifying Critical Areas	86
Figure 5-4:	Reduced Front Yard Setbacks to Lessen Paved Surface Area	87
Figure 5-5:	Cluster Development to Reduce Impervious Area	87
Figure 5-6:	Examples of Directly Connected Impervious Area	88
Figure 5-7:	Cluster Development	90
Figure 5-8:	Site Planning to Avoid Sensitive Areas — Clustering	91
Figure 6-1:	Kane County Stormwater Program Phasing	96

LIST OF APPENDICES

Appendix A: Summary of Stormwater Management Questionnaire
Appendix B: Status of Kane County Flood Insurance Studies
Appendix C: Glossary of Terms
Appendix D: Acronyms

EXECUTIVE SUMMARY

INTRODUCTION

In July 1996, the southern portion of Kane County as well as many areas of the region, experienced record flooding as a result of unprecedented rainfall. In Aurora, almost 17 inches of rain fell in less than 24 hours. The resultant flooding caused massive damages throughout the southern portion of Kane County as well as many other areas around the region. Flood damages were nearly $14 million in the Blackberry Creek watershed alone.

On June 11, 1996 the Kane County Board adopted their 2020 Land Resource Management Plan. This comprehensive plan identifies protection and enhancement of stream, lake, and wetland resources as important elements to preserving the high quality of life in Kane County.

These two events combined with the increasing frequency of drainage complaints from around the County focused attention on the need to perform countywide, watershed based planning for stormwater management. To provide for a more coordinated and comprehensive approach to stormwater and floodplain management, the Kane County Board formed the Kane County Stormwater Management Planning Committee as authorized by State Statute 55 ILCS 5/5-1062. The stormwater committee, composed of six municipal and six County representatives and three ex-officio members, was charged with preparing a plan to form a countywide stormwater management program. At its initial meeting, the Stormwater Management Planning Committee established a Technical Advisory Committee made up of twelve members and three ex-officio members to add technical expertise in preparing the plan.

The principal duties of Stormwater Management Planning Committee were divided into two stages:

Stage 1 Develop a Countywide Stormwater Management Plan for presentation to and approval by the County Board. Upon completion of the Stormwater Management Plan, develop a Countywide Stormwater Management Ordinance.

Stage 2 Undertake any other duties identified in the Plan and as authorized in 55 ILCS 5/5-1062.

As part of the planning effort, the County was divided into 12 watershed planning units as shown in Figure 1. Eight of these watersheds are within the Fox River Basin and three are within the Kishwaukee River Basin. One watershed on the very eastern edge of the County drains to the DuPage River. All of the watersheds west of the two Fox River mainstem watersheds (Fox North and Fox South), are still over half agricultural. The watersheds in the Eastern portion of the County also have significant urban components. The Fox mainstem watersheds and Indian Creek are primarily urban within Kane County.

GOALS

The goals for the Kane County Stormwater Program are as follows:

1. **Establish a unified stormwater management framework with uniform, countywide stormwater management standards.**
2. **Minimize and reduce stormwater damages to existing structures and land use, including agriculture to maximize the protection of public health, safety, and welfare.**
3. **Require adequate stormwater management measures for all new development to minimize increases in stormwater damages.**
4. **Encourage the development of an area-wide, unified emergency program with an emphasis on improved preparation and effective communication capabilities.**
5. **Identify, protect, and improve floodplains, waterways, lakes, ponds, wetlands, and groundwater recharge areas.**
6. **Protect and improve water quality.**
7. **Create, enhance, and promote public awareness and understanding of stormwater management issues to meet the Goals and Objectives of the Stormwater Management Program.**
8. **Identify and develop revenue sources to complete the goals and objectives, and to implement the adopted stormwater management program.**
9. **Develop and maintain a comprehensive data base for each watershed within the County.**
10. **Evaluate and encourage the continuation, where appropriate, of existing drainage districts. Promote and encourage reorganization of watershed based drainage districts which can provide for the implementation of the Countywide Stormwater Management Plan.**

FINDINGS

To identify the extent of existing problems and identify the most important stormwater-related issues, a

questionnaire was distributed to each of the municipalities, park districts, townships, and known drainage districts. The questionnaire was also completed by County agencies and departments. The results of this survey were combined with evaluations of several state and federal agency inventories. The findings are highlighted below.

Stormwater Impacts: Stormwater impacts include flood damages, streambank erosion or siltation, and surface water quality problems. Most all of the information collected on flood damages and streambank erosion problems came from the surveys. Most of the water quality information came from the Illinois Environmental Protection Agency (IEPA).

Although there were considerable flood damages associated with the July 1996 flood event, that event represented a very extreme condition that is unlikely to repeat itself. The July 1996 event aside, damage from flooding was not reported to be a widespread problem. Very few chronic flooding problems were reported along the rivers and creeks of the County. However, each of the communities have at least some areas of flooding related to local drainage. It appears that local drainage flooding is more of a problem in Kane County than overbank flooding in most municipalities and the County.

Although not reported to be a large problem, streambank erosion was reported in a number of locations around the County and in both urban and rural areas. Streambank erosion within municipalities appears to be concentrated on small streams whose watersheds are mostly developed.

The quality of most Kane County streams is not particularly high. However, virtually none of the streams are severely degraded either. Most all of the streams in Kane County have been impacted by either agricultural or urban impacts or both. In general, the stream reaches in the more rural areas of the County are in better condition than those in the more urban areas.

Comparing Kane County streams to those in other rural counties in northeastern Illinois, the rural Kane County streams are generally in worse condition than the rural streams in Will and McHenry Counties. Conversely, the urban streams in Kane County are generally in similar or better condition than the urban streams in McHenry and Will Counties.

Like most areas of the region and the nation, there is a strong relationship in Kane County between the level of watershed urbanization and the degree of flooding problems and stream degradation.

It is virtually always much less expensive to prevent stormwater related problems than it is to remedy them in the future. Further, many of the solutions to address flooding problems, for example, have numerous environmental consequences, including degradation of water quality and destruction of stream and/or wetland habitats when large reservoirs are constructed or channels are modified to accommodate increased flood flows due to urbanization. Finally, many unique wetland and stream habitats are not restorable once they have been significantly impacted by direct modifications or indirect affects of stormwater runoff.

Public Education/Involvement/Issues: This topic considers public information programs that exist within the communities, the level of public awareness of stormwater issues, and the most pressing stormwater issues within the communities.

There is currently no countywide public information program to educate the public on stormwater issues. However, a number of the communities have performed public involvement activities and reported that the public recognizes stormwater management as a significant issue. The local public involvement activities were generally associated with site or event specific issues. A few of the communities have formalized systems for addressing resident complaints.

There are a number of water resource-related stewardship organizations operating in Kane County and several watershed planning groups have been formed. The focus of these groups is generally broad and includes flooding concerns as well as water quality and habitat restoration.

Planning, Maintenance, and Funding: Each community was asked to describe stormwater planning efforts and projects that have occurred within their community. They were also asked to describe maintenance procedures and mechanisms as well as the method of funding these planning and maintenance activities. In addition to the questionnaires, reports on past stormwater and watershed planning efforts were reviewed.

Flood control studies have been performed for a number of municipalities around the County. As a result of two of those studies, a flood control reservoir was constructed on Indian Creek and a levee was constructed along Waubonsie Creek. In most other cases, projects with flood control benefits that exceeded estimated construction costs could not be identified. A number of the municipalities have prepared local drainage studies to address flooding and drainage issues within their communities.

For a number of creeks, relatively comprehensive watershed plans have been prepared or are being

prepared. These plans have addressed flooding, water quality, and stream and wetland protection and enhancement.

In many communities, maintenance of stormwater drainage and detention facilities is the responsibility of the municipality while in other communities, homeowners associations have that responsibility. Although a number of municipalities and townships inspect and maintain stream channels, lack of stream maintenance was cited as a continuing problem. This was particularly true in the unincorporated areas of the County.

Most municipalities use general revenues to fund maintenance, planning, and capital projects. However, a few reported using motor fuel tax revenues. A number of municipalities use Special Service Areas to fund maintenance of stormwater facilities. A few have coordinated with park districts to perform landscape maintenance.

Coordination: Each of the municipalities, townships, and drainage districts were asked to describe coordination efforts.

At approximately the same time that the County Board convened the Kane County Stormwater Management Planning Committee, a couple watershed groups were forming to jointly address flooding and other issues within their watersheds. Outside of those watersheds, few of the municipalities were coordinating with their neighbors to address stormwater drainage or maintenance issues. Most municipalities expressed a need for more regional coordination of stormwater programs and standards.

There is currently little coordination between the municipalities and the townships or the municipalities and drainage districts. The level of coordination is a little greater between the townships and the County and the townships and selected drainage districts. Two of the eight known drainage districts responded to the questionnaire.

Regulations and Standards: This topic addresses four categories of local development regulations: floodplain management; stormwater drainage and detention; soil erosion and sediment control; and stream and wetland protection.

Over the last ten to twenty years, communities have begun to require greater levels of stormwater management to prevent flooding problems. More recently, stormwater management standards have been adopted, in some areas of the County, to address water quality issues as well.

While the state and federal governments have regulations protecting certain elements of wetlands and portions of the floodplain, these standards are not sufficient to prevent increases in flooding problems or overall degradation of stream and wetland quality as the County develops. Neither the state or federal regulations fully protect wetland and floodplain storage to prevent increases in flood flows when these features are modified. Also, no state or federal programs require stormwater management to prevent increases in flood flow rates or volumes as part of new development. The Federal National Pollutant Discharge Elimination System (NPDES) program is beginning to address stormwater runoff quality issues. However, it is likely that the activities of local governments will have a much greater impact on stream, lake, and wetland quality than the federal rules or mandates.

While it may be impossible to fully mitigate all of the flooding and water quality impacts of development, a number of communities in Kane County already have ordinances that should minimize many of those impacts. However, because standards contained within the local ordinances vary between communities, the level of protection varies throughout the County and within watersheds. Because drainage patterns do not follow municipal boundaries, communities that choose to provide a lower level of protection may be impacting their downstream neighbors as much as themselves.

RECOMMENDATIONS

Based on the goals and objectives for this plan and the findings described above, a number of programmatic, regulatory, maintenance, and watershed planning recommendations are presented in this plan. In particular, the plan recommends a more coordinated, unified approach to stormwater management. The County level is the logical level at which this coordination should take place because: 1) the County is large enough to encompass large portions of major watersheds and entire subwatersheds and 2) the state legislature has provided the County with the authority to perform countywide stormwater management planning. Although, it is logical for stormwater management to be coordinated at the County level, the municipalities already have the resources to perform many stormwater management activities. Thus, this plan recommends that those activities continue at the local level but that they be coordinated countywide. The plan recommendations are summarized below.

Countywide Stormwater Ordinance: Because Kane County is projected to experience substantial growth over the coming years and decades (the population is expected to increase by almost 75% between 1990 and

2020), the plan recommends that a countywide stormwater ordinance be developed and enforced to minimize any increases in stormwater-related problems. Development of the ordinance and its enforcement mechanism should be the first recommendations to be implemented.

Ordinance Standards: The ordinance standards recommended in this plan are intended to prevent increases in flood damages and protect and preserve the environmental quality of land and water resources of Kane County. There are four basic components to the recommended standards. They are 1) floodplain management to prevent building in floodprone areas and loss of the natural hydrologic and water quality functions of floodplains; 2) stormwater drainage and detention to minimize increased discharge of runoff volumes and rates and stormwater pollutants associated with development; 3) soil erosion and sediment control to minimize soil loss and associated downstream impacts including degraded water quality and loss of flood storage and conveyance capacity; and 4) stream and wetland protection to protect aquatic and riparian habitat and prevent loss of the stormwater benefits of wetlands including floodwater storage and pollutant filtering.

Ordinance Enforcement: Based on the recommendations of this plan, each municipality will have the option of seeking certification for enforcement of an ordinance within its jurisdiction or deferring to the County for permit review and enforcement. To receive certification, a municipality must adopt an ordinance at least as stringent as the countywide ordinance and demonstrate that it has adequate personnel to review and enforce the ordinance. The personnel may either be in-house staff or consultants. The municipality may collect permit application fees to cover its costs. Certain floodplain and wetland permits should continue to be reviewed by the appropriate state and federal agencies and the municipalities and the County should enforce the standards not addressed by these agencies.

Public Education: To help residents understand the relationship between public and private activities on the landscape and downstream flooding and water quality problems, a countywide public education campaign should be implemented. Property owners adjacent to streams and other waterbodies should be targeted to prevent debris accumulations and associated flooding and drainage problems that can result from dumping of landscape waste. Public education should be an ongoing activity of the countywide stormwater program and should be implemented early to increase awareness of the program and its benefits.

Maintenance: Stormwater infrastructure must be maintained to operate properly. Mechanisms to ensure maintenance of existing and new stormwater infrastructure should be implemented. A number of potential mechanisms are identified in the plan. These mechanisms should be incorporated into the countywide stormwater ordinance.

Excessive accumulation of natural and manmade debris and non-native vegetation in stream corridors can exacerbate flooding and streambank erosion and degrade stream habitat. Guidance for maintaining streams and mechanisms to facilitate maintenance should be implemented.

Planning: Both countywide and watershed planning are necessary to coordinate activities between agencies, to prevent increases in stormwater-related problems, and to develop cost-effective solutions to existing problems.

Countywide planning activities such as floodplain and wetland mapping, collection of hydrologic and stream quality data, and coordination with other County planning activities should be performed in support of the regulatory program and watershed planning.

In later phases of implementing this plan, individual watershed plans should be prepared to address existing flooding and stream and wetland quality problems. It is important that the countywide stormwater ordinance be developed and enforced prior to addressing existing problems to prevent creation of new problems at the same time that existing problems are being addressed.

FUNDING

The County Board has already budgeted the cost of preparing the countywide ordinance and it is envisioned that the cost of enforcing the ordinance will be funded by permit application fees. A number of mechanisms for funding countywide coordination, maintenance, and planning activities are identified in the plan.

CHAPTER 1

AUTHORITY, PURPOSE, GOALS AND OBJECTIVES

1.1 Introduction

In July 1996, portions of Kane County experienced record flooding as a result of unprecedented rainfalls centered around the City of Aurora. Nationally, the 16.91 inches of rain recorded at the National Weather Service cooperator site in the City was the second highest 24 hour rainfall in history outside of hurricane zones. This event resulted in record high flood stages in most of the Creeks and Rivers throughout the southern portion of the County. The flood damages associated with this event were estimated to exceed $20 million in the City of Aurora alone.

While substantial flooding is not unexpected under such extreme rainfall conditions, the event served to focus attention on the massive damage that flooding can cause and the need for coordinated, comprehensive floodplain and stormwater management.

In addition to flooding, the County of Kane has a history of concern for protection of its stream, lake, and wetland resources. A significant focus of the County's 2020 Land Resource Management Plan is on Water Resources. The 2020 Land Resource Management Plan and the July 1996 flooding served as springboards to moving ahead on countywide stormwater planning.

1.2 County Setting

Kane County lies on the western edge of the northeastern Illinois region. The County is approximately 522 square miles in area and had a 1990 population of 317,435 for an overall population density of 606 people per square mile. Like the other outlying counties of the region, Kane County is beginning to experience rapid growth. Between 1980 and 1990, Kane County's population increased by a moderate 14%. However, by 2020, the County is projected to grow to approximately 550,000 — almost a 75% increase over the 1990 population (Northeastern Illinois Planning Commission, 1997). Between 1990 and 1996, the population has already grown 17% to 370,361 people.

The incorporated areas of the County consist of 22 villages and cities — that are primarily in Kane County — ranging in population from 138 to 99,581 (1990 population). There are five additional villages that are primarily in surrounding counties but extend into Kane County. The areas of highest population density



July 1996 flooding looking west along I-88 at Orchard Road in the Aurora area

are along the Fox River in the eastern portion of the County. The population density decreases to the west.

The County has two principal riverbasin watersheds: the Fox River watershed to the east and south and the Kishwaukee River watershed to the west and north. The Fox River flows near the eastern boundary of the County and has its headwaters in Wisconsin. The drainage area of the Fox River within Kane County is 386 square miles. The Kishwaukee River watershed drainage area within Kane County is 136 square miles.

Overbank flood damages occur along the Fox River as well as along some of the smaller creeks in the County. Damages are generally concentrated in a few isolated areas and do not currently appear to be a widespread problem. In many areas of the County, local drainage related flooding problems are greater than overbank flooding problems.

Kane County has some relatively high quality streams with a number being considered "highly valued aquatic resources". The Kane County 2020 Land Resource Management Plan establishes a goal that every stream eventually be rated as a "highly valued aquatic resource" or better. Approximately half the Kane County streams currently meet that standard. Overall, most of the streams are considered to be fully supporting their designated uses. Those streams that are only partially supporting their designated uses have minor impairments, generally, due to agricultural and urban runoff and habitat degradation due to channelization and streambank erosion.

There are relatively few lakes in Kane County and there is very little data on the lakes that do exist. Of the four lakes evaluated by the Illinois Environmental Protection Agency, two are reported to be fully supporting their designated uses overall. One of the others is considered to be only partially supporting its designated uses with moderate impairments. The other is not supporting its designated uses. The impairment of these two lakes is the result of excessive nutrient levels, siltation, organic enrichment, and noxious aquatic plants due to urban runoff, contaminated sediments, and excessive waterfowl.

1.3 Kane County Stormwater Management Planning Committee

In recognition that there is a link between continued urbanization and potential increased levels of flooding and water quality degradation, the Kane County Board reactivated the Kane County Stormwater Management Planning Committee (KCSMPC) in January 1997 after a false start in 1990. The purpose of reactivating the committee was to set in motion the recommendations of the County's 2020 Land Resource Management Plan and improve the management of surface water.

As required by state legislation, the KCSMPC is represented by one municipal representative and one County Board representative from each of six districts with approximately equal population. Figure 1.1 represents the six stormwater management planning areas. In addition, the committee agreed to appoint three non-voting, "ex-officio" members: the County Board chair; the chair of the Kane County Transportation Committee; and a representative from the Farm Bureau.

The KCSMPC appointed a Technical Advisory Committee (TAC) to provide technical expertise and perspective in preparation of the plan. Each voting member of the KCSMPC appointed one member to the TAC. The TAC is composed of governmental engineers, public works directors, consulting engineers, a developer, a surveyor, and County staff. The TAC also has three non-voting, "ex-officio" members: a representative from the Natural Resources Conservation Service; staff from the County Development Department; and a municipal engineer. The TAC, with the assistance of the Northeastern Illinois Planning Commission, prepared this plan for a countywide stormwater program under the direction of the KCSMPC. This plan was adopted by the Kane County Board on October 13, 1998. The intent of the plan is to develop a program to fulfill the goals and objectives presented in Section 1.6

1.4 Authority

The five collar counties in northeastern Illinois (DuPage, Kane, Lake, McHenry and Will Counties) have been granted special powers to manage stormwater and floodplains. The purpose and authority for these powers is outlined in Public Acts 85-905 and 85-1266 (55 ILCS 5/5-1062). The legislation prescribes that a stormwater management planning committee may be established by County Board resolution, and its membership shall consist of equal number of County Board and municipal representatives and such other members as may be determined by the County and municipal members.

Purpose

As stated in the Acts, the purpose of the legislation is to allow management and mitigation of the effects of urbanization on stormwater drainage. The purpose shall be achieved by:

- consolidating the existing stormwater management framework into a united, countywide structure;
- setting minimum standards for floodplain and stormwater management; and
- preparing a countywide plan for the management of stormwater runoff, including the management of natural and manmade drainageways. Such countywide plan may include watershed plans.

Authority

Upon adoption of the countywide stormwater plan by ordinance, the County has the authority to:

- retain engineering, legal, and financial advisors and inspection personnel;
- prescribe by ordinance reasonable rules and regulations for floodplain management and for governing the location, width, course, and release rate of all stormwater runoff channels, streams, and basins in the County in accordance with the adopted stormwater management plan;
- enforce adopted stormwater and floodplain management rules and regulations in municipalities, unless the municipality adopts and enforces a stormwater management ordinance that is consistent with and at least as stringent as the County plan and ordinance;
- levy up to 0.20% of equalized assessed valuation to implement the countywide plan including the design, planning, construction, operation, and maintenance of stormwater facilities;
- issue general obligation bonds for implementing the countywide stormwater plan and watershed plans;

Stormwater Management Planning Areas

Kane County, Illinois

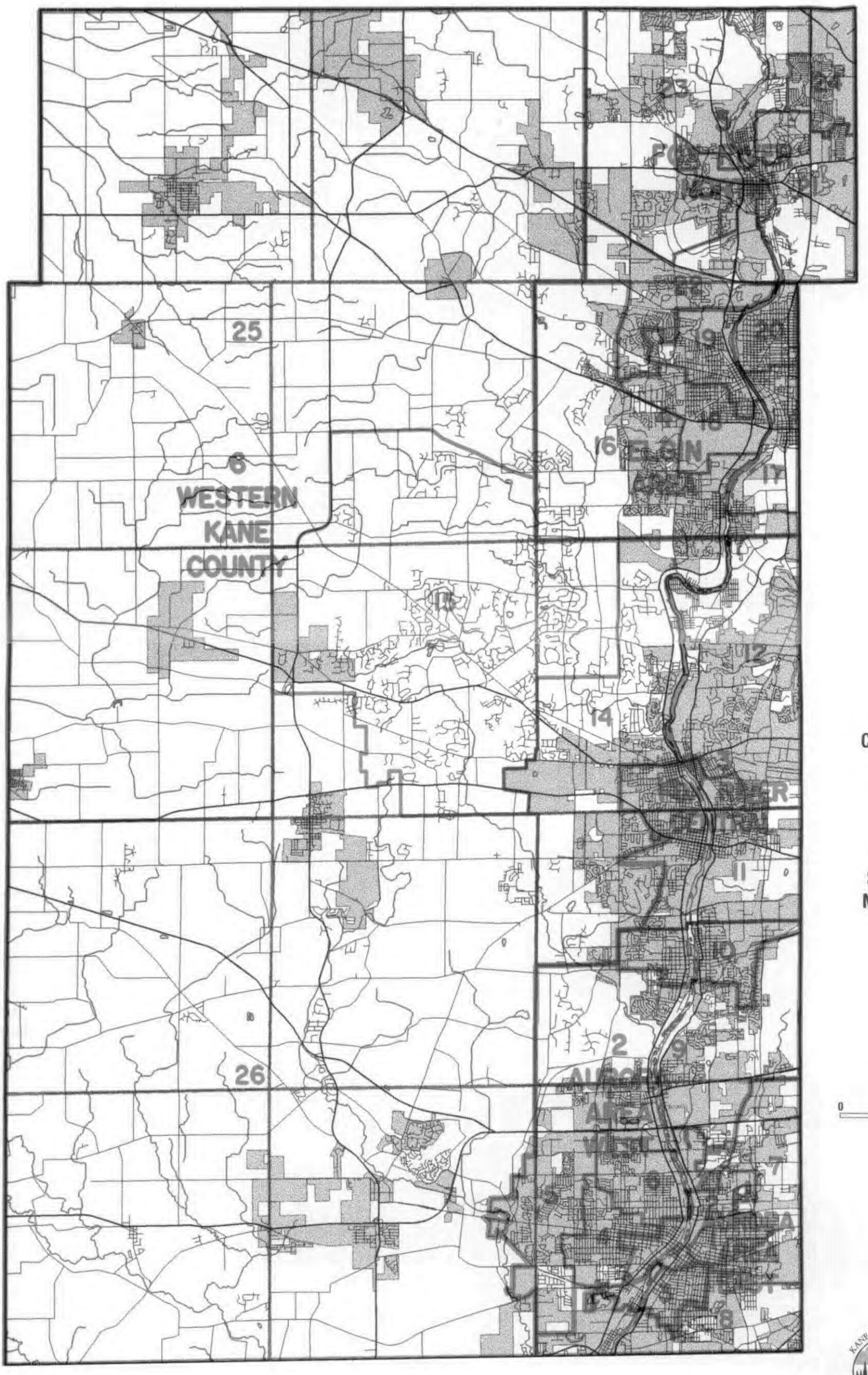


Figure 1.1

- enter upon lands, with 10 day notice, for the purpose of inspecting stormwater facilities or to remove any obstruction to an affected watercourse;
- petition the circuit court to dissolve any and all drainage districts; and
- establish subcommittees of the stormwater management planning committee to serve particular watersheds that have similar stormwater management needs.

Plan Adoption

The Acts specify that during preparation and adoption of the countywide stormwater management plan and watershed plans, the stormwater management planning committee shall:

- coordinate the planning process with each adjoining county to ensure that recommended stormwater projects will have no significant impact on the flood levels or flows in inter-county watersheds;
- submit the countywide plan and watershed plans to the Illinois Department of Natural Resources, Office of Water Resources (formerly under the Department of Transportation), to the Illinois Department of Natural Resources, Office of Realty and Environmental Planning (formerly under the Department of Conservation), and to the Northeastern Illinois Planning Commission for review and recommendations; and
- hold at least one public hearing in the county seat and publish a hearing notice at least 15 days in advance of the hearing date.

A municipality having a stormwater management plan adopted by ordinance may oppose the County plan and submit specific proposals for amendments to the County plan. If the proposed amendments are not included in the County plan, approval of the County plan shall require a two-thirds vote of the County Board.

1.5 Organization of the Plan

The enabling legislation does not specify the content of the County stormwater plans; rather it allows the individual counties to tailor the plan to fit their own needs. Kane County has chosen to prepare this Stormwater Plan for development of a countywide stormwater program but not proceed with detailed watershed planning and project design at this time. Instead, the stormwater program will be implemented in phases as outlined in this Stormwater Plan.

This **first chapter** outlines the authority and purpose for preparation of this Stormwater Plan as well as the goals and objectives for the plan and resulting stormwater program.

The **second chapter** defines a stormwater management framework with four functional categories and then describes the role that local, regional, state, and federal agencies play in each of the four categories.

The **third chapter** is a brief assessment of the physical stormwater conditions and problems in Kane County based on review of existing reports and a problem identification and stormwater program questionnaire sent to each of the municipalities and townships.

The **fourth chapter** is an assessment of the current status of the programmatic and administrative aspects of stormwater management in Kane County based on the questionnaire.

The **fifth chapter** presents recommendations for a countywide stormwater management program.

The **sixth chapter** presents a strategy for implementing the recommendations of the plan. As part of the implementation strategy, priority levels or phases are identified and the recommendations are categorized by priority level.

1.6 Goals and Objectives

Following are the adopted goals and objectives for a Kane County stormwater management program. The goals and objectives were prepared with input from the TAC and adopted by the KCSMPC. The goals and objectives were intended to lay the foundation on which the remainder of this plan, as well as subsequent watershed plans, would be built. The goals and objectives should guide development of the countywide institutional framework as well as the design criteria which will be used to implement the recommendations of the Stormwater Plan.

As evidenced by the goals and objectives, the intent of the stormwater management planning committee is to develop a comprehensive stormwater management program that will establish a countywide framework to comprehensively address stormwater and floodplain management. The goals and objectives address stormwater drainage and flooding as well as protection and enhancement of water quality and stream and wetland resources.

Goal 1. Establish a unified stormwater management framework with uniform, countywide stormwater management standards.

Obj. 1 Consolidate and improve existing stormwater management practices/policies into a unified countywide structure, and require compliance and adherence with the Stormwater Management Program through a certification program.

Obj. 2 Compile and maintain up to date pertinent stormwater management data and relevant studies to ensure consistent management of stormwater runoff within each watershed and throughout the County.

Obj. 3 Comply with rules and regulations of the National Flood Insurance Program and be in compliance with all applicable state and federal laws.

Obj. 4 Coordinate stormwater activities and the implementation of the Stormwater Management Program with municipalities, local governments, and surrounding counties.

Obj. 5 Develop technical reference manual providing guidelines and requirements consistent with the Stormwater Management Program.

Obj. 6 Develop watershed specific plans throughout the County to identify the unique features of each watershed and develop watershed specific strategies to protect and improve the water and land resources of Kane County.

Goal 2. Minimize and reduce stormwater damages to existing structures and land use, including agriculture, to maximize the protection of public health, safety, and welfare.

Obj. 1 Reduce peak stormwater flows to minimize flooding and flood damages throughout the watersheds of Kane County.

Obj. 2 Identify flood prone and problem areas within each watershed and develop methods to reduce damages resulting from existing drainage and flooding problems.

Obj. 3 Where possible, reduce runoff rates from existing developments which lack adequate stormwater control.

Obj.4 Ensure that property owners do not change the natural hydrologic system of their land so as to negatively impact adjoining property.

Obj. 5 Provide and plan for stormwater storage where appropriate in preference to stormwater conveyance.

Obj. 6 Encourage non-structural techniques vs. structural techniques when implementing stormwater Best Management Practices (BMP's).

Goal 3. Require adequate stormwater management measures for all new development to minimize increases in stormwater damages.

Obj. 1 Control runoff rates and volumes from new developments so that instream flow rates are not increased in the downstream watershed and to protect existing land use from increased flooding potential by new development.

Obj. 2 Require adequate provisions for site drainage and stormwater detention for all land development activity, which will include floodplain management and mapping, flood control, centralized stormwater detention siting, water quality, and Best Management Practices.

Obj. 3 Protect the regulatory, historic, and observed floodplain from development.

Obj. 4 Utilize, where possible and feasible, new development to reduce existing flood damages.

Obj. 5 Minimize any adverse effects of stormwater runoff which result from new highways, roads, and streets.

Obj. 6 Establish watershed specific stormwater technical criteria.

Obj. 7 Reduce runoff by minimizing the use and impact of impervious surfaces and maximizing infiltration which includes the use of native plant species.

Goal 4. Encourage the development of an area-wide, unified emergency program with an emphasis on improved preparation and effective communication capabilities.

Obj. 1 Identify public utility infrastructure, particularly water supply and wastewater treatment facilities, that are at risk from overland flow of stormwater and develop early warning and emergency response strategies to protect and reduce damages resulting from drainage and flooding problems.

Obj. 2 Develop a countywide flood response plan to include identification of particular problem areas with a history of flooding where there is a high threat to public safety and health.

Obj. 3 Develop a more efficient communications network to allow for inter-agency communication during emergency events.

Goal 5. Identify, protect, and improve floodplains, waterways, lakes, ponds, wetlands, and groundwater recharge areas.

Obj. 1 Protect and improve natural storage areas, including floodplains, and wetlands, as dedicated open space to manage flood and stormwater flows.

Obj. 2 Protect and improve all water resources and adjacent riparian areas from unnecessary modification.

Obj. 3 Protect groundwater recharge areas to ensure adequate water supplies and maintain groundwater levels in critical areas.

Obj. 4 Require mitigation for all physical and environmental impacts resulting from disturbances or alterations to water resources.

Obj. 5 Improve and update floodplain and wetland mapping.

Obj. 6 Develop maintenance schedules for all rivers, streams, and man-made drainageways.

Obj. 7 Require regular, planned maintenance of stormwater management facilities for all new and existing developments.

Obj. 8 Achieve for every stream in Kane County a Class B or better water quality rating as defined by the Biological Stream Characterization System of the Illinois Environmental Protection Agency.

Obj. 9 Develop a stream monitoring program for all major streams.

Goal 6. Protect and improve water quality.

Obj. 1 Mitigate water quality impacts at the site specific level from new development and evaluate opportunities to mitigate water quality impacts from existing developments and agricultural activities through Best Management Practices.

Obj. 2 Strongly encourage the use of dedicated open space, natural systems, and non-structural techniques to manage stormwater, improve water quality, and enhance groundwater.

Obj. 3 Protect and improve degraded streams, lakes, ponds, rivers, and wetlands to enhance their natural water quality, habitat, and recreational functions for current and future generations.

Obj. 4 Reduce both point source and nonpoint source discharges of pollutants into ponds, lakes, streams, and rivers.

Obj. 5 Protect groundwater recharge areas from contamination by stormwater pollutants and other sources of pollution.

Obj. 6 Minimize the amount of erosion and sedimentation from development and agricultural activity.

Goal 7. Create, enhance, and promote public awareness and understanding of stormwater management issues to meet the Goals and Objectives of the Stormwater Management Program.

Obj. 1 Through public education, foster a better general understanding of our finite and irreplaceable water resources, how they are affected by changes in the natural environment and land development activities, and the benefits of stormwater management.

Obj. 2 Develop educational programs to assist landowners to mitigate on-site drainage problems and improve on-site waterways, and improve the waterway environment, including technical assistance with acquiring all necessary permits and approvals with waterway maintenance and improvement projects.

Obj. 3 Develop educational and technical training programs for public officials, municipal staff, developer and construction entities to achieve compliance with the Goals and Objectives of the Stormwater Management Program.

Obj. 4 Develop community outreach and demonstration programs to promote and achieve the Goals and Objectives of the Stormwater Management Program.

Obj. 5 Educate riparian landowners as well as public entities on proper stream and riparian area maintenance and management.

Goal 8. Identify and develop revenue sources to complete the goals and objectives, and to implement the adopted stormwater management program.

Obj. 1 Work toward establishing the most equitable distribution of program costs and services possible.

Obj. 2 Keep apprized of legislative activity in the area of stormwater management to be fully informed of any potential funding sources.

Obj. 3 Revenues generated from watersheds will be spent to the greatest extent possible within the watershed generating the revenue.

Obj. 4 Regularly assess the administrative, maintenance, regulatory, and capital needs of the County's watersheds and prepare an appropriate budget.

Goal 9. Develop and maintain a comprehensive data base for each watershed within the County.

Obj. 1 Continue to improve and update floodway and floodplain mapping, including the incorporation of documented historic flood data within each watershed.

Obj. 2 Develop a stream gaging program for all major streams and a countywide rainfall monitoring program.

Obj. 3 Complete hydrologic and hydraulic analysis/modeling for each watershed.

Obj. 4 Conduct flood control analysis.

Goal 10. Evaluate and encourage the continuation, where appropriate, of existing drainage districts. Promote and encourage reorganization of watershed based drainage districts which can provide for the implementation of the countywide Stormwater Management Plan.

CHAPTER 2

DESCRIPTION OF EXISTING WATER RESOURCE AND STORMWATER MANAGEMENT FRAMEWORK

The purpose of this chapter is to describe the current stormwater management framework in Kane County and the role of municipal, county, regional, state, and federal agencies as well as various local organizations within that framework. In addition to describing conventional stormwater management responsibilities (e.g., stormwater drainage and detention), descriptions are also provided for related topics such as water quality and aquatic habitat management. Prior to the description, a functional framework is defined which provides the basis for the subsequent discussion as well as the assessments and recommendations in later chapters.

2.1 FUNCTIONAL FRAMEWORK

When discussing the stormwater-related activities of the various local, state, and federal agencies and organizations and assessing their role in meeting the goals and objectives of the Kane County Stormwater Management Planning Committee, it is useful to differentiate between several categories of activities, or functions, performed by the various groups. This allows specific tasks to be organized and the function of the various agencies to be defined in a consistent manner. For the purposes of this plan, the following functional categories will be used.

- Administration and Management
- Regulation
- Planning
- Maintenance

1. Administration and Management

This functional element represents various administrative and management activities that are part of a stormwater management program. It includes establishment of priorities, program plan development, budgeting, identification of funding sources, and management of technical staff. In addition to these basic program management activities, technical assistance, public information, maintenance of a stormwater database, and disaster assistance activities will be placed in this functional category.

2. Regulation

The regulatory element includes administration of a permit program consisting typically of permit review, inspection and enforcement and providing guidance in meeting ordinance standards. It also includes coordination with other regulatory entities such as local municipalities, the Illinois Department of Natural Resources - Office of Water Resources (IDNR-OWR), the Federal Emergency Management Agency (FEMA), the U.S. Army Corps of Engineers, and the Illinois Environmental Protection Agency.

3. Planning

Perhaps the most important planning activity of a countywide stormwater management program is watershed-based planning. Watershed planning focuses on the specifics of the individual watersheds. Comprehensive watershed planning has two basic purposes. One is to identify strategies and provide the tools to prevent increased flooding and degradation of watershed resources. The second is to develop recommendations to remediate existing flooding and other water resource problems and to prepare a strategy to implement the recommendations. Further recommendations regarding the components of a comprehensive watershed plan are provided in Chapter five and Appendix B.

Planning is also important for those activities that are not specific to a particular watershed, including coordination with other planning programs such as transportation and open space and with other counties.

Capital improvement planning is also included under this element. While not all watershed plans will lead to capital improvements, watershed planning is often performed prior to, or as part of, making significant stormwater related capital improvements.

4. Maintenance

Maintenance involves those activities necessary to ensure maintenance and management of both man-made stormwater facilities and natural streams, lakes, and wetlands to ensure that they function as designed and provide the full range of hydrologic and water quality functions.

Stormwater management facility maintenance includes such tasks as cleaning debris from detention ponds, stream channels, catch basins and storm sewers. It also includes inspection and regular upkeep and repair of facilities to maintain system performance. Maintenance and management of the natural drainage system

typically includes inspection and removal of debris from streams, and addressing streambank erosion. More intensive maintenance and management activities focus on stream corridor vegetative management and restoration as well as excessive stream bed erosion and deposition.

2.2 Agency Roles and Resources

Each of the agencies and organizations below are discussed in terms of the activities performed and the resources they can provide within each of the four functional categories defined above. Many of the agencies perform no activities or have no role in one or more of the categories. However, for completeness, all four categories are included in the discussion of each of the agencies. Instead of evaluating the various groups, this section merely describes their current activities specific to Kane County. An evaluation of the current functional framework in meeting the goals and objectives for the Kane County stormwater program is provided in Chapter 4.

2.2.1 Local

MUNICIPALITIES, TOWNSHIPS, AND COUNTY: The municipalities and the County play the primary role in stormwater management in Kane County. Much more detailed discussion of the activities of the municipalities, townships, and the County is provided in Chapter 4 which discusses the current stormwater management program and framework in Kane County.

Administration and Management: Municipalities and the County have primary responsibility for stormwater management and administration within their jurisdiction and essentially operate independently of neighboring jurisdictions. However, numerous other agencies and organizations provide support for certain elements of administration and management functions (particularly training, public education, and emergency management).

Upon adoption of a countywide stormwater plan, the County has legislative authority to levee taxes up to 0.20% of equalized assessed valuation to implement the plan and develop a countywide stormwater program. However, in order to exercise that authority, either other County programs would have to be reduced or a referendum would be required due to the current legislative tax cap.

Regulation: Virtually all municipalities and the County have adopted some form of stormwater and floodplain regulations. Municipalities and the County also have authority to enforce soil erosion and sediment control standards and protect wetlands. However, they are not required to do so by state or federal regulations. The only regulations that must be enforced to participate in the National Flood Insurance Program are floodplain regulations.

In some cases, township boards and/or highway commissioners provide input on new developments being considered by municipalities or the County. By legally objecting to a development, a township can force a super-majority vote by a municipality or the County Board to approve the development.

Upon adoption of a countywide stormwater plan, the County has legislative authority to adopt a countywide stormwater ordinance establishing minimum standards for stormwater management.

Planning: Although assistance from state and federal agencies may be requested, virtually all stormwater planning activities that occur within a municipality or the County are performed by or for that local government. However, project planning assistance on larger waterways (e.g., Fox River) is often provided by state (e.g., Illinois Department of Natural Resources) and Federal (e.g., US Army Corps of Engineers, Natural Resources Conservation Service) agencies. Capital improvements to address local drainage problems are generally made by municipalities. The Kane County Environmental Management Department, with assistance from the Northeastern Illinois Planning Commission, was given the charge to draft this stormwater plan under direction from the Stormwater Management Planning Committee and its Technical Advisory Committee.

Township boards have authority to prepare land use plans. Municipal and county plans in conflict with township plans require a super-majority vote to be approved. Townships also have authority, by referendum, to create and implement open space acquisition plans. Dundee Township passed such a referendum and is currently implementing its plan.

Maintenance: Maintenance of stormwater infrastructure within municipal boundaries is the responsibility of the municipalities. Outside the municipalities, the townships (highway department) and the County generally maintain culverts and ditches within the rights of way of township and County roads. Some of the municipalities maintain the streams that drain through their jurisdictions.

LAKE MARIAN RIVER CONSERVANCY DISTRICT (LMRCD): The Lake Marian River Conservancy District is similar in some respects to a small municipality surrounding the former Lake Marian, north of Carpentersville. The District has a tax levy to support its activities and has a board of trustees. The district also has ordinances controlling certain activities

within the district. The entire district is platted. However, there are individual lots that have not yet been built upon.

Administration and Management: LMRCD has similar authorities as a municipality with regard to administration and management of stormwater programs within the district boundaries.

Regulation: LMRCD has development related ordinances. LMRCD defers to the County Health Department for septic systems. LMRCD defers to Kane County Development Department for stormwater drainage and soil erosion and sediment control regulations.

Planning: LMRCD may have the same authority to plan for stormwater management needs as a municipality. However, LMRCD does not have the 1.5 mile extraterritorial limits of a municipality. The primary use of the small tax levy that the District has is for drainage improvements.

Maintenance: The district performs basic maintenance of its storm drainage system which is composed of open drainage swales and a few storm sewers.

PARK DISTRICTS: Park districts are significant property owners in Kane County and throughout the northeastern Illinois region. Historically, park districts have been concerned with providing active recreational facilities such as ball diamonds and soccer fields. More recently, some park districts have been getting involved in owning and managing detention basins and natural areas, such as wetlands, for passive recreational uses.

Administration and Management: Park districts do not typically play a role in the administration and management of stormwater programs. However, some districts are involved in environmental education programs which educate the public on the many values of stream corridors, wetlands, and other natural areas.

Regulation: Park districts are not involved in regulatory activities. However, park districts take ownership of detention basins and other stormwater features in some areas of the northeastern Illinois region.

Planning: Park districts are typically not involved in stormwater or watershed planning activities. However, park districts are potential land holders of natural areas identified for preservation during watershed planning.

Maintenance: Under agreement with municipalities or homeowners associations, park districts are occasionally responsible for maintenance of detention facilities. Typically the maintenance is limited to mowing and other landscape maintenance activities.

PROPERTY AND HOMEOWNER ASSOCIATIONS: Homeowners associations are becoming increasingly responsible for stormwater management within their subdivisions as municipalities now require detention for most developments and view homeowners association management of these facilities as a way to minimize municipal involvement.

Administration and Management: Homeowners associations are not responsible for administration of stormwater programs.

Regulation: Homeowners associations have no regulatory authority and fall under the authority of the governing municipality or the County. However, covenants may occasionally be placed on individual lots by the developer. Covenants may include requirements to maintain drainage paths, roadside swales, or native vegetation within and adjacent to detention basins, wetlands, and streams that may lie on individual lots.

Planning: Homeowners associations are rarely involved in planning activities and fall under the planning jurisdiction of the municipalities or the County. However, within the northeastern Illinois region, there have been cases where homeowners associations have taken it upon themselves (generally with assistance from state and federal resource agencies) to prepare plans for protection/remediation of a particular resource (typically a lake).

Maintenance: From a regional perspective, many homeowners associations are responsible for maintenance of specific components of the stormwater system, generally detention basins. However, homeowners associations are sometimes also given responsibility for maintaining streams and other drainageways that traverse their property. The amount of maintenance responsibility given to homeowners associations varies between municipalities and policy on this issue is still evolving in many communities. In Kane County, a number of municipalities use special service areas (SSAs) to fund maintenance activities within new subdivisions. In other municipalities, a "backup SSA" is used whereby the SSA is implemented only if the homeowners association is not performing their maintenance duties.



KANE-DUPAGE SOIL AND WATER CONSERVATION DISTRICT (SWCD): The boundaries of this Soil and Water Conservation District (SWCD) covers Kane and DuPage Counties with the exception of

some cities and villages. The SWCD is governed by a board of directors elected from the land owners and occupiers within the district.

Administration and Management: The SWCD provides technical assistance to rural and urban customers. Statewide, SWCDs have limited ability to levy a tax to fund their activities (via referendum approval). However, the Kane-DuPage SWCD is not doing so. The Kane-DuPage SWCD is funded through grants from the Illinois Department of Agriculture and internal programs.

Regulation: SWCDs have no regulatory authority. The Soil and Water Conservation Districts Act charges the SWCDs with providing natural resource information in the administration of zoning ordinances and variances. The Kane-DuPage SWCD administers several Illinois Department of Agriculture programs and assists with several USDA Natural Resources Conservation Service (NRCS) programs. Some SWCDs in the northeastern Illinois region have entered into agreements with municipalities for implementation and enforcement of adequate construction site soil erosion and sediment control ordinances. Also, some SWCD's (including Kane-DuPage) have entered into interagency coordination agreements with the US Army Corps of Engineers to review soil erosion and sediment control plans and conduct site inspections in conjunction with the Section 404 wetland permitting process.

Planning: The Kane-DuPage SWCD has been assisting local agencies and organizations in preparing watershed management plans. A trustee of the SWCD serves on the Stormwater Management Planning Committee.

Maintenance: The SWCD plays no direct role in maintenance activities but does provide technical assistance. The SWCD houses historical aerial photography which is utilized to identify historical drainage patterns by urban and rural customers.

KANE COUNTY FOREST PRESERVE DISTRICT (KCFPD): The KCFPD is responsible for acquisition and management of open space in Kane County with a particular focus on natural areas. The Kane County Board also serves as the Forest Preserve Commission.

Administration and Management: KCFPD is not involved with administration or management of stormwater programs.

Regulation: KCFPD has no regulatory authority but is part of the technical review staff for new development in unincorporated Kane County.

Planning: Historically, KCFPD has played no formal role in stormwater management planning. However, staff from the KCFPD is currently on the Technical Advisory Committee of the KCSMPC that drafted this stormwater plan. Also, significant opportunities may exist to coordinate KCFPD's open space program to acquire areas of regional stormwater significance.

Maintenance: KCFPD maintains streams, lakes, and wetlands within their properties and may be a significant technical resource for appropriate and effective maintenance and restoration practices.

KANE COUNTY DIVISION OF TRANSPORTATION: The Kane County Division of Transportation is responsible for construction, expansion, and maintenance of County roads. The Division is also responsible for transportation planning within the County.

Administration and Management: The Division of Transportation is not involved with administration or management of stormwater programs, other than its own drainage needs.

Regulation: The Division of Transportation has no regulatory authority and does not participate in municipal or County regulatory activities. Although the Division is subject to the rules and regulations of the County, the Division is currently self-policing with respect to the County's soil erosion and sediment control and floodplain standards.

Planning: Although the Division of Transportation performs many transportation-related planning activities, their role in stormwater or watershed planning is limited to highway drainage infrastructure to handle drainage from and onto their right-of-ways.

Maintenance: The Division of Transportation is responsible for maintenance of all County highway drainage systems.

KANE COUNTY HEALTH DEPARTMENT: The Health Department is the agency responsible for the protection of public health. The Kane County Board also serves as the Board of Health.

Administration and Management: The Health Department is not involved with administration or management of stormwater programs. However, the Health Department plays a very important role in disaster assistance and recovery. The Health Department tests water supplies during floods and provides bottled water when necessary. The Health

Department also provides instructions regarding actions that should be taken after the flood to address sanitation concerns.

Regulation: The Health Department is part of the technical review staff for new developments in unincorporated Kane County. The Health Department review is generally focused on elements related to water wells and the disposal of wastewater, including septic systems. The Health Department also has certain authorities to require that property owners maintain their private septic systems.

Planning: The Health Department plays no role in stormwater management planning. However, they maintain data on septic system failures which may be useful during watershed planning.

Maintenance: The Health Department has no stormwater maintenance responsibilities.

KANE COUNTY OFFICE OF EMERGENCY MANAGEMENT (KCOEM): KCOEM is the local emergency management agency for Kane County. Under federal and state mandate, KCOEM is responsible for creating programs that will mitigate, plan for, respond to, and recover from any natural or manmade emergency or disaster that threatens Kane County. Although flooding emergencies are a significant component of their responsibilities, KCOEM is responsible for creating programs that employ the principles of an "all hazard" approach.

Administration and Management: KCOEM plays only an advisory role in the administration and management of local stormwater programs. During presidential disaster declarations KCOEM is part of an Interagency Mitigation Advisory Group (IMAG) that is formed to guide mitigation activities and allocate state and federal disaster assistance funds.

Regulation: KCOEM has no regulatory authority and is not involved in regulatory issues.

Planning: KCOEM has only an advisory role in stormwater management planning activities.

Maintenance: KCOEM is not involved in maintenance activities.

KANE COUNTY STORMWATER MANAGEMENT PLANNING COMMITTEE (KCSMPC): The KCSMPC is an intergovernmental entity established by resolution by the Kane County Board with representation from both municipalities and the County. The KCSMPC is an advisory body to the County Board and is responsible for directing implementation of this Plan. This Plan establishes the recommended role of the KCSMPC and the relationship between the KCSMPC and the County Board and the KCSMPC and local governments, resource agencies, and organizations.

Administration and Management: The KCSMPC is composed of half municipal and half County Board representation. The KCSMPC has authority to establish its own committees and may recommend to the County Board retaining engineering, inspection, legal, and financial advisors and personnel.

The recommendations section of this document (Chapter 5) identifies KCSMPC's long term role related to administration and management of a countywide stormwater management program.

Regulation: The KCSMPC is an advisory body to the County Board and it is planned that the KCSMPC will develop a draft countywide stormwater ordinance for the County Board to consider and adopt. Any County Board changes to the KCSMPC recommended ordinance requires a super majority vote by the County Board. See Chapter 5 for the recommended regulatory role of KCSMPC and the recommended regulatory standards.

Planning: The County is authorized to prepare and implement watershed plans and issue bonds and levy taxes to fund implementation of the watershed plans. It is envisioned that the watershed plans and budgets to implement them will be prepared by the KCSMPC for County Board consideration.

The County assigned development of this stormwater plan to the KCSMPC under the direction of the Environmental Management Department with assistance from the County Board Office. Kane County Development Department also provided technical and cartographic assistance. Both County departments and the County Board Office provided assistance to the local watershed planning initiatives discussed above.

During preparation of this plan, the KCSMPC was largely focused on that task. However, the KCSMPC also advised the County Board on a number of local watershed planning initiatives and, through staff, provided technical assistance to those initiatives. The KCSMPC formed a Technical Advisory Committee (TAC) to provide technical expertise during preparation of this plan.

Maintenance: Upon County Board adoption of a countywide stormwater management plan, state legislation provides the County, or its agents, authority to enter onto private land to perform stream and stormwater maintenance activities.

Adoption of the Stormwater Plan provides authority for the County to develop a mechanism to ensure maintenance of stormwater facilities and the natural drainage system. (See the recommendations in Chapter 5).

During preparation of this plan, the KCSMPC undertook a stream maintenance demonstration project. The KCSMPC also advised the County Board regarding funding assistance to local stream maintenance and stabilization efforts.

DRAINAGE DISTRICTS: Drainage districts are entities organized by landowners, under authority provided by Illinois statutes. As the name suggests, the primary function of drainage districts is to drain the land to improve agricultural productivity. This function is carried out through the construction and maintenance of surface (waterways and ditches) and sub-surface (drain tile) drainage structures. Twenty-six drainage districts were organized in Kane County between 1885 and 1920. The districts range in size from 600 to 8,220 acres. Eight of the drainage districts are still in existence today. Maintaining adequate drainage in appropriate areas is important to maintaining agriculture as a viable industry in Kane County.

Administration and Management: The drainage districts are each administered by three directors. These directors monitor the condition of the district's drainage, develop work plans, levy assessments, and budget resources for their district. The formation and activities of drainage districts are described in greater detail in Section 2.3.2

Regulation: Drainage districts have no regulatory authority related to urban development. However, they do have certain authorities to require that land owners maintain drainage through their properties. Also, individual property owners may be granted or denied access to the district's drainage system.

Planning (Capital Improvements): Drainage districts have historically been responsible for draining the land to improve agricultural productivity. Although most of the many miles of field tile in the County were installed by individual property owners, the regional drain tile system conveying runoff from the private systems was installed by the drainage districts. Many of the channelized streams and drainageways in the County are also the result of drainage district activities. Until recently, drainage district activities have been very limited in the last 20 years. However, the drainage systems have been falling into disrepair and several drainage districts are contemplating reactivation to conduct repairs/improvements. The districts are finding that they must expand their view beyond typical agricultural drainage to include the needs and impacts of urban land uses as well as the impacts of transportation and utility systems.

Maintenance: Active drainage districts are involved in inspection of the drainage system, efforts to keep surface ditches clear of obstructions, maintaining stable channels, and repair of damaged subsurface drains.

SANITARY DISTRICTS: There are two traditional sanitary districts (water reclamation districts) in Kane County: the Fox River Water Reclamation District in Elgin and the Fox Metro Water Reclamation District in Oswego. There are also a number of municipal wastewater treatment plants. More recently, two small sanitary (water reclamation) districts — Wasco and Mill Creek — have been created to treat the wastewater of large planned developments utilizing land application technology. The subdivision-specific water reclamation districts often have responsibility for potable water, wastewater, and stormwater management. Municipal wastewater treatment facilities and regional sanitary districts are not typically involved in stormwater management activities. However, all wastewater facilities have a significant impact on water quality and need to be considered during the watershed planning process.

Administration and Management: Sanitary districts and wastewater facility operators have no involvement in the administration and management of stormwater programs.

Regulation: Sanitary districts and wastewater treatment facility operators have no regulatory authority. However, the discharges from the facilities are regulated and subject to state water quality standards. Also, many wastewater plants are located in the floodplain and expansion and replacement of the plants are subject to floodplain rules.

Planning: Sanitary districts and wastewater treatment facility operators are typically not involved in stormwater planning activities. However, one member of the Technical Advisory Committee that drafted this stormwater plan is from the Fox Metro Water Reclamation District. The more recent land treatment systems have integrated stormwater management and stream and wetland protection into their designs.

Maintenance: Sanitary districts and wastewater treatment facility operators are typically not involved in maintaining stormwater facilities nor the natural drainage system. However, the newer subdivision level water reclamation districts have more comprehensive responsibility including maintenance and repair of the stormwater drainage and detention system.

PRIVATE AND CORPORATE CITIZENS: Although citizens of Kane County may not be specifically responsible for stormwater management activities, it is important for citizens to be involved in watershed planning to ensure that their concerns are addressed. Also, the day to day activities of citizens can have impacts on water quality and stormwater drainage.

Administration and Management: Citizens are not responsible for administration and management of stormwater programs. However, they should be the recipient of public information activities. Citizens need to be aware that the actions on their property affect flooding and water quality downstream. This is particularly true of farmers and developers whose businesses directly involve modifying the landscape and disturbing the soil.

Regulation: Citizens are not responsible for enforcing stormwater regulations.

Planning: As watershed stakeholders, citizens should be encouraged to participate in watershed planning activities to ensure that their concerns are addressed. The watershed planning process is also an excellent opportunity to educate citizens regarding the range and complexity of stormwater and related issues.

Maintenance: Land owners adjacent to streams, lakes, and wetlands are often responsible for maintenance and management of the waterway within their property. Non-riparian land owners are responsible for maintenance of their property including the drainage system. Proper vegetative management can have a significant impact on the quality of stormwater runoff. Proper maintenance of the drainage system can have a significant impact on the number and severity of local drainage problems.

DEVELOPERS AND DEVELOPMENT CONSULTANTS: These individuals have significant influence over the form and function of the landscape in developing areas.

Administration and Management: Developers and their consultants are not responsible for administration and management of stormwater programs. However, they should be the recipients of information and technical education programs to improve their understanding of the goals and objectives of the stormwater plan and the tools necessary to comply with stormwater regulations of the communities and the County.

Regulation: Developers are not responsible for enforcing stormwater regulations. However they, along with plan reviewers and inspectors, are the most important entity in *implementing* the standards within the regulations.

Planning: As watershed stakeholders, developers should be encouraged to participate in watershed planning activities to ensure that their concerns are addressed. Many developers have concerns regarding standards and resource protection issues that may increase development costs or reduce land available for development. However, many developers also recognize that freedom from flooding and high quality lakes, streams, and wetlands have a substantial positive affect on property values.

Maintenance: In most cases developers will only be responsible for maintenance activities during the period of development.

2.2.2 Regional

WATERSHED STEERING COMMITTEES: Watershed steering committees have been formed in a number of watersheds in Kane County, including Tyler Creek, Blackberry Creek, and Waubonsie Creek. Blackberry Creek and Waubonsie Creek involve multiple counties. These committees are typically ad hoc with no officially designated status. These committees can play a very important role in protecting and improving the conditions of their watersheds. The committees are made up of a mix of elected officials, appointed officials, and concerned citizens. At least two of the committees have technical advisory committees composed of public works officials, local consultants, and agency staff.

Administration and Management: The watershed steering committees have no direct role in administering stormwater management programs in Kane County. However individuals and agencies that do administer stormwater programs are members of the steering and technical committees, and the steering committee provides an opportunity for them to coordinate these activities.

Regulation: The watershed steering committees have no regulatory authority. However, individuals and agencies that do have authority are members of the steering and technical committees. Most of the committees are agreeing on regulatory standards for each of the municipalities in the respective watersheds to adopt.

Planning: The primary focus of these committees is preparation of plans to protect and improve the conditions of their respective watersheds. The primary concerns vary from watershed to watershed with flooding being the primary concern in some watersheds and water quality and stream quality being most important in others.

Maintenance: The committees are not currently involved with maintenance activities. However, at least some of the committees are agreeing on

maintenance standards as well as mechanisms to ensure that maintenance activities are performed.

Northeastern Illinois Planning Commission

NORTHEASTERN ILLINOIS PLANNING COMMISSION (NIPC): NIPC is the regional planning agency for the six county Chicago metropolitan area. The Commission is involved in research, planning, technical plan and policy development and review, and local government technical support. As specified by the state stormwater legislation, county stormwater plans are to be sent to NIPC as well as other agencies for review and comment.

Administration and Management: NIPC plays no direct role in the administration and management of stormwater activities in Kane County. However, NIPC provides assistance to local governments to carry out these activities including technical assistance and training opportunities.

NIPC co-sponsors training opportunities including courses and workshops on design and implementation of stormwater best management practices, soil erosion and sediment control, wetland management, and hydrologic computer modeling.

Although NIPC is not a direct source of funding to local governments, NIPC can assist local governments in applying for state and federal grants. In some cases NIPC administers grants to local governments for the state or federal funding agency.

Regulation: NIPC is an advisory agency and has no direct authority to implement its plans or enforce its policies. However, NIPC has developed model ordinances that reflect its policies, including a Model Stormwater Drainage and Detention Ordinance (NIPC, 1990), Model Soil Erosion and Sediment Control Ordinance (NIPC, 1991), Model Floodplain Ordinance (IDNR/NIPC, 1996), and a Model Stream and Wetland Protection Ordinance (NIPC, 1988). NIPC encourages municipalities and counties interested in providing protection in these areas to adopt some or all of these ordinances. NIPC provides technical assistance to local governments and developers in interpreting and meeting the standards of the model ordinances.

NIPC, with the backing of the Illinois Environmental Protection Agency, recommends adoption of nonpoint source pollution prevention standards as a condition of approval of amendments to wastewater treatment facility planning areas.

Planning: NIPC has historically performed watershed planning, in particular, the Areawide Water Quality Management Plan that was developed for all of the major watersheds in northeastern Illinois under Section 208 of the Clean Water Act.

Currently, NIPC does not initiate development of watershed plans. However, NIPC often assists local governments in development of their watershed plans.

Maintenance: NIPC is not involved in stormwater infrastructure maintenance. However, with the assistance of state and federal grants, NIPC has worked with local governments in performing and demonstrating stream and shoreline maintenance and stabilization activities.

2.2.3 State

There are two state agencies most directly involved with stormwater management: The Illinois Department of Natural Resources (IDNR) and the Illinois Environmental Protection Agency (IEPA). The IDNR is composed of several, previously separate state agencies. Those former agencies concerned with stormwater related issues were the Illinois Department of Transportation-Division of Water Resources (IDOT-DWR), Illinois Department of Conservation (IDOC), and the Illinois Department of Energy and Natural Resources. The IDNR was officially created July 1, 1995 and the stormwater-related operational offices under IDNR are identified and discussed below. In addition to IEPA and IDNR, the Illinois Emergency Management Agency and the Illinois Department of Transportation are involved with floodplain management, drainage, and disaster relief issues.

Illinois Department of Natural Resources

ILLINOIS DEPARTMENT OF NATURAL RESOURCES — OFFICE OF WATER RESOURCES (IDNR-OWR): IDNR-OWR (formerly IDOT-DWR) is the regulatory agency for floodplain construction in Illinois. OWR is also the state's flood control and flood mitigation agency. The state stormwater statutes specify that county stormwater plans shall be submitted to IDNR-OWR for review and recommendations.

Administration and Management: OWR plays no direct role in the administration and management of stormwater activities in Kane County. However, OWR sometimes co-sponsors training opportunities.

Regulation: As stated previously, OWR is the state regulatory agency for floodplain construction in Illinois. Their authority is limited to designated

floodways, or where no floodway is defined, they have jurisdiction within the floodplain of a watercourse with a drainage area of at least one square mile in urban/urbanizing areas or at least ten square miles in rural areas. The state will delegate certain aspects of their program to municipalities and counties that have ordinances containing the minimum state standards. OWR has delegated this authority to most of the municipalities in Kane County. OWR, along with NIPC, developed a model floodplain management ordinance for those communities wishing to participate in the National Flood Insurance Program (NFIP) and wishing state permit review authority for activities in the floodplain. OWR provides advice and technical assistance to local permit review officials.

OWR also regulates dam construction. For larger dams and where the risk to life and property is high (Class I, Class II, and certain Class III dams), OWR reviews and issues permits. Certain Class III dams may be non-jurisdictional and may not require detailed review by OWR.

Planning/Capital Improvements: At the request of local governments, OWR will perform flood control studies to identify alternatives and determine financial feasibility to address overbank flooding problems. Historically plans developed by OWR have focused on structural flood control measures. OWR will provide full construction funding for the most economical flood control project where average annual benefits exceed average annual costs provided the local sponsor can help secure state funding for the project. On a case by case basis, OWR will consider construction funding for capital flood control improvements up to an amount equal to the capitalized benefits of those projects where average annual benefits do not exceed average annual costs. OWR generally performs the analysis leading to flood control projects in-house. However, they may also fund projects recommended in local plans and meeting certain criteria.

OWR also has a small projects program that is often used to address local drainage problems and can fund flood related improvements up to $75,000. A less rigorous quantification of benefits is allowed under this program.

OWR has occasionally had flood mitigation funds available for flood proofing and buyout of floodprone structures. OWR also provides assistance in flood mitigation planning and has funded preparation of local flood hazard mitigation plans which are required to receive flood mitigation funds.

Many of the stream gages in Illinois that are maintained by the USGS are jointly funded by OWR. Also, OWR has a few gages that they have installed and maintain themselves.

Maintenance: OWR provides limited technical and financial assistance on stream and channel maintenance on a case by case basis as resources are available.

ILLINOIS DEPARTMENT OF NATURAL RESOURCES — OFFICE OF REALTY AND ENVIRONMENTAL PLANNING (IDNR-OREP): OREP is responsible for natural resource and outdoor recreation planning.

Administration and Management: OREP plays no role in the administration and management of stormwater related programs in Kane County.

Regulation: The Division of Natural Resource Review and Coordination, under OREP, is responsible for administering the Endangered Species Conservation Program. The Illinois Endangered Species Protection Act and the Illinois Natural Areas Preservation Act mandate that every municipality complete a consultation process prior to performing, funding, or authorizing land, air, or water disturbing activities, including new development. If there are any endangered species or State Natural Area Inventory sites being impacted or likely to be affected by the activity, the Division issues a biological opinion stating whether or not there is potential for biological impact and provides guidance on measures that can be taken to minimize any impacts.

Also under the Division of Natural Resource Review and Coordination, is the Permit Review Program. Through this program, the Division reviews all Corps of Engineers and all OWR permits under the provisions of the Fish and Wildlife Coordination Act. The Interagency Wetlands Policy Act is also administered by the Division. Compliance with this Act is needed only when state funds are involved.

Planning: The Division of Planning, under OREP, carries out a variety of outdoor recreation and natural resource planning, program development and management, and policy formulation activities, including greenways corridor planning. The Division helped fund preparation of the "Northeastern Illinois Regional Greenways Plan", its 1997 update, and the "Northeastern Illinois Regional Water Trails Plan".

The IDNR's Ecosystems Program is a program established in OREP in 1994 under Governor Edgar's Conservation 2000 initiative. The program is a voluntary program to provide financial and technical support to groups of individuals, both

public and private, which seek to maintain and enhance ecological and economic conditions in key watersheds. Under the ecosystem program, partnerships are assembled to protect and enhance "resource rich" areas of the state. The partnerships are composed of local governments, land owners, and other stakeholders. After approval of a partnership by the State, the partnership is eligible to apply for grants to implement projects within their ecosystem. Four eligible project types have been identified under the program; 1) habitat protection agreements where conservation easements or other strategies are used to protect specific habitat sites; 2) habitat improvement projects where specific habitat sites are improved using various restoration techniques; 3) research projects to improve understanding of ecosystem processes or strategies for protecting and enhancing ecosystems; and 4) education projects to inform the public of the values of ecosystems and improve stewardship for ecosystems. All of Kane County falls either within the Fox River Ecosystem Partnership or the Kishwaukee River Ecosystem Partnership.

The Critical Trends Assessment Program (CTAP) was a precursor of the Conservation 2000 initiative and is now funded under Conservation 2000. There are a number of components to CTAP including environmental education resources, citizen environmental monitoring programs (e.g., the river watch network), and statewide land cover mapping, as well as assessment of critical trends. CTAP was essentially developed to monitor ecological and environmental trends in Illinois as well as provide scientific support for the Ecosystems Program. This project has identified resource rich areas of the state, developed land cover mapping from satellite images and assembled other natural resource data that will be useful in preparing watershed plans.

Maintenance: OREP is not involved with maintenance activities. However, it appears that Conservation 2000 grants may be available for stream maintenance and management activities that improve water quality and aquatic and wildlife habitat.

ILLINOIS DEPARTMENT OF NATURAL RESOURCES — OFFICE OF RESOURCE CONSERVATION (IDNR-ORC): ORC is responsible for the preservation and enhancement of the natural resources in Illinois and manages the state parks. ORC works with a variety of public and private agencies involved in the protection of natural resources in Illinois.

Administration and Management: ORC plays no role in the administration and management of stormwater related programs in Kane County.

Regulation: Section 404 permit applications for significant wetland disturbances are reviewed by ORC through IDNR's Permit Review Program under the Division of Natural Resource Review and Coordination.

Planning: Under the Division of Fisheries, ORC performs fish surveys as part of their basin survey and biannual sampling programs. Each of the Kane County river basins (Fox River and Kishwaukee River watersheds) are sampled on a five year cycle under the basin surveys. Both the mainstem and tributaries are sampled. Under the biannual program, the Fox River only (not the tributaries) is sampled once every two years. The Division of Fisheries also provides technical assistance to the Ecosystem Partnerships and to local watershed planning groups. The Division of Fisheries has recently performed sampling on Blackberry Creek, Waubonsie Creek, Tyler Creek, and Ferson/Otter Creek in support of planning efforts in those watersheds. The basin survey results are documented in the Illinois EPA 305b report discussed further under IEPA.

In addition to the Fisheries, the other Divisions under ORC (Natural Heritage, Wildlife, and Forestry) provide technical assistance to the Ecosystem Partnerships and watershed planning groups.

Maintenance: All of the Divisions under ORC manage public and private lands and can provide technical assistance within their respective disciplines. Specifically, ORC has provided limited technical assistance to Kane County regarding appropriate stream maintenance and restoration activities.

ILLINOIS DEPARTMENT OF NATURAL RESOURCES — OFFICE OF CAPITAL DEVELOPMENT (IDNR-OCD): OCD is responsible for administration of IDNR grants.

Administration and Management: OCD plays no role in the administration and management of stormwater-related programs in Kane County.

Regulation: OCD has no regulatory authority.

Planning: OCD administers state and federal open space programs. The state's program is entitled Open Space Lands Acquisition and Development (OSLAD) and the corresponding federal program is entitled Land and Water Conservation Fund

(LWCF but also known as LAWCON). These programs provide funding for open space acquisition and development on a 50% reimbursement basis. It may be possible to use these funds to assist in the purchase and enhancement of significant wetland, depressional storage, and floodplain areas that are important to the management of stormwater in Kane County. OCD works closely with the Division of Planning under OREP in reviewing and selecting open space grants.

Maintenance: OCD plays no role in maintenance of stormwater infrastructure or natural drainage systems.

ILLINOIS DEPARTMENT OF NATURAL RESOURCES — OFFICE OF SCIENTIFIC RESEARCH AND ANALYSIS (IDNR-OSRA): OSRA (formerly IDENR) conducts research, provides information, and formulates policy related to Illinois' natural resources.

Administration and Management: OSRA plays no role in the administration and management of stormwater-related programs in Kane County.

Regulation: OSRA has no regulatory authority.

Planning: The OSRA can provide research and technical assistance for projects involving natural resources. The Water Survey, a division of OSRA, conducts hydrologic studies and provides design rainfall data for the state of Illinois. The Natural History Survey, also a division of OSRA, is currently developing new techniques for studying soil erosion and helping to identify Illinois streams which are biologically significant. The Natural History Survey can also perform assessments of flora and fauna of natural areas.

Maintenance: OSRA plays no role in maintenance of stormwater infrastructure or natural drainage systems.

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA): IEPA is the agency responsible for water quality issues including regulation and management of both point and nonpoint sources of pollution.

Administration and Management: IEPA is not directly involved in administration or management of stormwater programs in Kane County except to the extent that they may provide grants to fund certain administrative and management activities.

IEPA (with USEPA funds) has partially funded preparation of a course curriculum to educate designers and permit reviewers in the application of stormwater BMPs on urban development sites. IEPA (also with USEPA funds) has partially funded, as part of other projects, preparation of public education materials such as guidance to riparian land owners.

IEPA provided funding to NRCS to prepare the "Illinois Urban Manual — A Technical Manual Designed for Urban Ecosystem Protection and Enhancement" (USDA, 1995) which provides guidance in designing soil erosion and sediment control as well as stormwater best management practices for new development. This manual is currently being updated with assistance from the Northeastern Illinois Planning Commission.

Regulation: IEPA is the state regulatory agency for water quality and issues National Pollutant Discharge Elimination System (NPDES) permits in the State of Illinois under Section 402p of the Clean Water Act. In 1992, NPDES was expanded to address stormwater discharges, including construction activities disturbing five or more acres. USEPA is currently considering rules that would address construction activities disturbing more than one acre. Under the construction activities program, the developer is required to prepare a "Stormwater Pollution Prevention Plan" addressing construction site runoff as well as post construction runoff and file a "Notice of Intent". The Illinois Urban Manual is intended to guide preparation of the pollution prevention plans. There presently is little state review of prevention plans or inspection and enforcement to ensure compliance with the prepared plans. This program is administered entirely at the state level with no local government involvement required. However, the permit does reference compliance with local government ordinances, in addition to the state requirements.

Certain industries (based on SIC code) also must file for a permit for stormwater discharges, regardless of the time at which the property was developed. The requirements for some industrial discharges are considerably greater than for construction activities. The requirements may include water quality monitoring of selected storm events to characterize the runoff from the site and development of detailed pollution prevention plans that are reviewed by IEPA. Follow-up water quality monitoring may be required after installation of the measures in the pollution prevention plan.

Finally, municipalities with populations over 100,000 are required to file for a permit for stormwater discharges. As with the industrial

stormwater discharge permits, the municipal stormwater permits require monitoring of stormwater runoff and development of pollution prevention plans for discharges that exceed state water quality standards.

U.S. ENVIRONMENTAL PROTECTION AGENCY: The USEPA published proposed rules for Phase II of the NPDES program in the January 9, 1998 Federal Register. Under the proposed rules all census designated "urban areas" will be required to comply under Phase II. Twenty percent of the County is classified as "urban", including all of the communities in the eastern "urban corridor" identified in the 2020 Land Resource Management Plan. Like Phase I, it is likely that Phase II will be delegated to the states.

Although the Corps of Engineers is the agency responsible for issuing wetland permits, IEPA makes determinations regarding water quality impacts of wetland disturbances and issues water quality certification under Section 401 of the Clean Water Act.

Planning: IEPA collects water quality and biological data on streams and lakes throughout the state, including Kane County. The data is reported in their biannual "Illinois Water Quality Report" (305b report). This document reports the level to which waterbodies are supporting their designated uses (i.e., swimming, aquatic life, etc.). For lakes, the data is also reported in an annual Lake Water Quality Assessment Report. Finally, IEPA maintains the Illinois Water Quality Management Plan which includes recommendations for stormwater, soil erosion and sediment control, and stream and wetland BMPs.

USEPA provides grants for water quality-related planning, implementation, and demonstration projects under Section 319(h) and 104(b)(3) of the Clean Water Act. These programs are administered by IEPA and provide funds for local governments to implement projects or prepare plans.

Section 319 is the state nonpoint source program. This program provides grants annually for implementation of nonpoint source control plans and demonstration projects which can include best management practices for urban runoff as well as instream activities to reduce erosion and sedimentation that can lead to degradation of water quality. On the preventative side, activities such as ordinance implementation and preparation of workshops on stormwater best management practices have been funded under Section 319.

Funding under Section 104(b)(3) is sporadic and is the only one of these programs that provides funding for watershed planning. Funding under 104(b)(3) has been used to develop watershed management plans in several watersheds in Lake County, Illinois. These plans recommended both remedial and preventative actions to address water quality and use impairments of Flint and Mutton Creeks and their lakes and wetlands.

The Illinois Clean Lakes Program provides annual grants for Phase I lake diagnostics and alternatives evaluation and Phase II implementation. The focus of the program is on lake remediation projects where there is a realistic opportunity for restoration and on protection projects for high quality lakes. IEPA encourages a watershed approach in addressing lake remediation and protection needs.

Most of the IEPA grants require a local cost share (generally 40%). The cost share can either be in the form of hard dollars or in-kind services.

Maintenance: IEPA is not directly involved in maintenance activities. However, grants have been awarded to local governments to assist in stream maintenance activities that address water quality concerns, including streambank erosion. These grants have partially funded removal of debris from streams, removal of non-native undesirable riparian vegetation, and installation of erosion control measures.

ILLINOIS EMERGENCY MANAGEMENT AGENCY (IEMA): IEMA is the state emergency management agency. Although flood emergencies and floodplain management is a significant component of their responsibilities, IEMA is responsible for managing all hazards.

Administration and Management: IEMA plays no direct role in the administration and management of local stormwater programs. However, during presidential disaster declarations, IEMA is part of an Interagency Mitigation Advisory Group (IMAG) that is formed to guide mitigation activities and allocate state and federal disaster assistance funds.

Regulation: IEMA has no regulatory authority and is not involved in regulatory issues.

Planning: There are two stormwater and floodplain management-related federal grant programs administered by IEMA. The first program is the Hazard Mitigation Grant Program (HMGP) which is initiated by a presidential disaster declaration. This program provides funding after a disaster has been declared and can be used to acquire, relocate, or elevate structures substantially damaged by floods. However, IEMA's first priority is acquisition. A certified hazard mitigation plan is required to be

eligible for these funds. However, in the past, IEMA has allowed an abbreviated plan to be prepared and submitted as part of the application for HMGP funds.

The second program is the Flood Mitigation Assistance Program (FMAP). This program is relatively new and the available funds have been relatively small. The purpose of the program is to provide pre-flood grants to prepare and implement locally prepared hazard mitigation plans. An approved flood hazard mitigation plan is required to be eligible for project implementation funds. The plan can be prepared using local funds or with financial assistance under FMAP. Acquisition, flood proofing, and other FMAP funded activities may occur on insured properties (federal flood insurance) only. Communities must be in the National Flood Insurance Program (NFIP) to be eligible for FMAP grants. Planning and design required to implement specific mitigation projects are likely to be fundable activities under this program.

Both HMGP and FMAP grants provide 75% funding with a 25% (non-federal) match of cash or in-kind services required. Hazard mitigation plans are certified through the IEMA regional coordinator (Region III for Kane County) and approved at the state level.

Maintenance: IEMA is not involved in maintenance activities.

Illinois Department of Transportation

ILLINOIS DEPARTMENT OF TRANSPORTATION (IDOT): Although IDOT's primary responsibility is building and maintaining the state highway system, they often are involved in drainage issues related to stream crossings and drainage of their roadways.

Administration and Management: IDOT plays no role in the administration or management of stormwater programs in Kane County, other than its own drainage needs.

Regulation: IDOT has no direct regulatory authority in regulating stormwater or floodplain activities. However, they do regulate access to their right-of-way through a traffic access permit. Any time there is an encroachment onto highway right-of-way such as grading changes or curb cuts, IDOT reviews drainage plans to ensure that there is no diversion of runoff onto the right-of-way and that there is no increase in flow rate.

IDOT is regulated by IDNR-OWR whenever there is a crossing of a regulatory floodway. IDOT is allowed no more than 0.1 foot of created head at the crossing. New bridge and culvert structures over streams, but not in regulatory floodways, are sized to allow a created head no greater than 0.5 feet and 1.0 feet for the 100-year frequency discharge in urban areas and rural areas, respectively.

The waterway openings of IDOT bridges and culverts are designed based on the 50-year flood. The bridges are sized to have a minimum clearance of 2 feet between the 50-year stage and the low beam of the bridge structure. In addition, highway pavement located within the floodplain must be at least 3 feet above the 50-year flood stage.

IDOT is not required to meet local permit requirements in terms of detention or other stormwater standards. However, IDOT has worked with county stormwater committees and local government councils to try to meet local standards that IDOT deems feasible.

Planning: IDOT is not involved in stormwater or watershed planning activities.

Maintenance: IDOT is responsible for maintaining the drainage system within their right- of-way, including at bridges and culverts.

2.2.4 Federal

US Army Corps of Engineers

U.S. ARMY CORPS OF ENGINEERS: The U.S. Army Corps of Engineers is responsible for the management of navigable rivers, lakes and shorelines. The Corps constructs large flood control projects on regional river systems. The Corps is also responsible for regulating activities which involve the dredging and filling of the waters of the United States, including wetlands.

Administration and Management: The Corps of Engineers plays no role in the administration and management of stormwater programs in Kane County.

Regulation: Section 404 of the Clean Water Act prohibits the discharge of dredged or fill material into waters of the United States without a permit from the U.S. Army Corps of Engineers. As defined by the Clean Water Act, waters of the U.S. include all waters and wetlands that could be important for interstate commerce purposes. The Corps of Engineers also derives authority from Section 10 of the Rivers and Harbors Act of 1899. This Act prohibits the alteration or obstruction of any navigable waterway of the United States without the Authorization of the Corps of Engineers. The Act makes it unlawful to excavate, fill, or in any way modify or alter the channel of a navigable waterway

without authorization. Wetlands with surface water elevations below the ordinary high-water elevation of a connected navigable waterway are also regulated under Section 10. Under this act navigable waterways are those waters that are presently used, have been used in the past, or may be susceptible to use to transport interstate or foreign commerce.

Historically, dredge and fill have been the only activities in wetlands regulated by the Corps of Engineers. More recently, the Corps of Engineers is paying closer attention to other wetland disturbances such as drainage and excavation. Still other wetland disturbances, such as vegetation removal and impoundment, remain unregulated unless part of a dredge and fill activity. Also, the Corps is primarily interested in the flora and fauna of wetlands and does not specifically protect the stormwater storage volume of wetlands. Recently, the Corps reduced the minimum protected wetland size to 1/3 acre.

In a number of northeastern Illinois counties, including Kane, the Corps of Engineers has entered into Interagency Coordination Agreements with the SWCDs to review soil erosion and sediment control plans and conduct inspections on development sites with permitted wetland disturbances. Violations of permit conditions noted by the SWCDs are reported to the Corps of Engineers for enforcement action.

Planning/Capital Improvements: The Corps of Engineers has funding available for flood control projects. After a reconnaissance level study has shown that a project is likely to be cost effective (i.e., benefits exceed costs), the Corps will proceed with project analysis which must be funded locally by 50% matching funds. For approved projects, the Corps funds 75% of design and construction costs with the remaining 25% to be funded locally. Projects are generally limited to structural flood control measures. However, the Corps has also provided design services for floodproofing of residences as part of an overall flood control project. Corps studies are generally performed with in-house staff. However, local government assistance with those studies can be applied to the local cost share.

Maintenance: The Corps of Engineers has maintenance responsibilities for certain navigable waterways (none in Kane County) and their own flood control facilities.

FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA): FEMA administers the National Flood Insurance Program (NFIP). The Federal Insurance Administration, a part of FEMA, produces floodplain maps which are used for both insurance and regulatory purposes.

Administration and Management: FEMA is the lead agency related to disaster assistance in terms of federal funding and technical assistance for relief and recovery programs. FEMA has also participated in and sponsored training programs on the National Flood Insurance Program and flood hazard mitigation activities.

Regulation: FEMA has minimum floodplain standards that must be enforced by local governments to maintain eligibility in the NFIP. Participation in the NFIP allows residents and businesses in the community to purchase flood insurance and makes the communities eligible for federal emergency relief funds if a presidential disaster declaration has been issued. Flood insurance is required for structures located in the floodplain if the owner applies for a federal grant or loan, or federally insured or subsidized loans (e.g., mortgage). In support of the local regulatory programs, floodplain mapping was produced for all communities participating in the program. Most of these maps for Kane County were produced in the early 1980s. However, a number of studies were updated in the early 1990s. A status of the floodplain mapping for each of the Kane County communities is provided in Appendix C.

Planning: FEMA has several flood hazard mitigation funding programs that are administered by the Illinois Emergency Management Agency (IEMA). These programs are described further under the description of IEMA. Funding may also be available from FEMA to update floodplain maps.

Maintenance: FEMA is not involved in maintenance activities.

U.S. DEPARTMENT OF AGRICULTURE — NATURAL RESOURCES CONSERVATION SERVICE (NRCS): NRCS (formerly the Soil Conservation Service or SCS) is primarily concerned with the wise use of soil, water and other related natural resources. The NRCS provides assistance to Kane County and its municipalities in the form of natural resources information and planning, soils data (soil survey, septic suitability, etc.), and floodplain management studies.

Administration and Management: NRCS works through and provides technical assistance to local soil and water conservation districts to assist agricultural, urban, and developing communities.

NRCS also co-sponsors training opportunities including courses and workshops in design and implementation of stormwater best management practices, soil erosion and sediment control, wetland management, and hydrologic computer modeling to support the urban community.

Regulation: NRCS utilizes a voluntary, rather than a regulatory, approach to implement its conservation program authorities. Agricultural producers who wish to participate in USDA programs and receive benefits must implement conservation requirements.

NRCS, along with others, prepared the Illinois Urban Manual to provide guidance in the design and construction of urban best management practices. The NRCS also coordinates with USACE, USEPA, USFWS, IEPA, and IDNR on wetland and floodplain programs.

Planning: Under the Watershed Protection and Flood Protection Act (Public Law 93-566, as amended) NRCS has planned, designed, and constructed flood control facilities to address overbank flooding in the Chicago metropolitan region. Also under this program, NRCS has performed floodplain management studies and updated floodplain mapping for local governments.

In recent years, the NRCS has initiated an urban conservation program because of the need for urban erosion, sediment, and flood control assistance. Under this program, NRCS provides technical assistance (and possibly financial assistance) in urban natural resource planning and restoration. NRCS has assisted counties in preparing advanced identification of wetlands studies. NRCS staff support for many of these activities is through the St. Charles Field Office in St. Charles, Illinois.

NRCS is currently assisting local watershed committees in preparing resource management plans for the Waubonsie Creek, Blackberry Creek, and Tyler Creek watersheds in Kane and neighboring counties as well as a number of watersheds in other counties. An employee of the NRCS is an ex-officio member of the Technical Advisory Committee that drafted this stormwater plan.

Maintenance: NRCS has no maintenance responsibilities but does provide technical assistance to land owners and public works officials regarding the maintenance of streams and stormwater management facilities in both agricultural and urban areas.

U.S. Geological Survey
Water Resources Division

U.S. DEPARTMENT OF THE INTERIOR — GEOLOGICAL SURVEY, WATER RESOURCES DIVISION (USGS-WRD): USGS-WRD is responsible for providing the hydrologic information necessary to achieve the best use and management of the nation's water resources.

Administration and Management: Although USGS plays no direct role in administration and management, USGS has co-sponsored training courses in hydrologic modeling in northeastern Illinois.

Regulation: The USGS has no regulatory authority and is not involved in regulatory activities in Kane County.

Planning: Through a cooperative program, the USGS-WRD (Illinois District) maintains a stream gaging network and publishes an annual report containing daily streamflow data and water quality information for selected sites around the state. The USGS also has funding for site specific hydrologic and water quality data collection and analysis. Some mapping efforts may also be fundable through USGS. USGS funds 50% of project in-house labor and expenses. On a 50% cost basis, the USGS-WRD can provide technical assistance in developing watershed models and other hydrologic and water quality related assistance.

Maintenance: USGS plays no role in maintenance activities.

U.S. ENVIRONMENTAL PROTECTION AGENCY: Protecting the nation's waters from pollution is one of the many concerns of the USEPA. The Clean Water Act enables the USEPA to regulate water quality on a national level.

Administration and Management: USEPA plays no direct role in administration or management of stormwater programs.

Regulation: NPDES authority ultimately rests with the USEPA. However, that authority has been delegated to the IEPA in Illinois (see IEPA for more discussion on NPDES). Although not directly involved in the permitting process, the USEPA works with the U.S. Army Corps of Engineers to establish wetlands policy and has veto authority over Section 404 permits. USEPA has enforcement authority for a number of sections of the Clean Water Act.

Planning: USEPA provides grants for water quality related planning and demonstration projects under Section 319(h) and 104(b)(3) of the Clean Water Act as discussed under IEPA. USEPA also holds national conferences on such topics as urban runoff management, watershed nonpoint source pollution monitoring, ecological restoration, and others.

USEPA has provided technical and financial assistance to counties in northeastern Illinois for preparing advanced identification of wetlands (ADID) studies. Under these studies, wetland resources are inventoried and evaluated in terms of the hydrologic, water quality, and habitat functions that they provide. ADID studies have been completed in Lake and McHenry Counties and wetland evaluation standards have been prepared for DuPage County.

Maintenance: USEPA plays no direct role in maintenance activities. However, USEPA is the ultimate source of grant funds to assist in performing maintenance/restoration activities as discussed under IEPA.

U.S. FISH AND WILDLIFE SERVICE
Ecological Services

U.S. DEPARTMENT OF THE INTERIOR — FISH AND WILDLIFE SERVICE: The U.S. Fish and Wildlife Service (USFWS) is responsible for protection of aquatic and wildlife habitats and is actively involved in water quality and wetland preservation. USFWS also works with numerous agencies, such as IDNR, on a variety of wetland protection projects.

Administration and Management: USFWS plays no role in administration and management of stormwater activities in Kane County.

Regulation: Section 404 permit applications for wetland disturbances on sites which contain federally endangered or threatened plant or wildlife species are reviewed by the USFWS for impacts to fish and wildlife resources.

Planning: The USFWS can provide technical review and support for the planning and design of wetland protection and restoration projects which enhance water quality and wildlife habitat. USFWS has a field office in Barrington, Illinois specializing in urban wetland issues. USFWS has provided technical assistance in the county wetland ADID studies discussed under the description of USEPA.

Maintenance: USFWS may be able to provide technical assistance to land owners performing stream and wetland maintenance and management activities which would enhance their wildlife habitat functions.

NATIONAL PARK SERVICE (NPS): The NPS is charged with preservation of the nation's natural, cultural, and recreational resources through acquisition and technical assistance. The NPS carries out their mission through acquisition, development, and maintenance of the nation's parks and by providing technical assistance to state and local governments as well as private organizations.

Administration and Management: NPS has no role in administration and management of stormwater activities in Kane County.

Regulation: NPS has no regulatory authority.

Planning: The Rivers, Trails, and Conservation Assistance (RTCA) Program provides technical assistance in support of local river conservation projects. NPS staff will work with local governments and private groups on river corridor projects to help them achieve multiple benefits including floodwater retention, wetland protection, habitat restoration, water quality improvements, and recreational opportunities. NPS staff can assist with citizen involvement activities, facilitate local discussion and decision making, and assist in development and implementation of plans. The NPS is currently assisting the Kishwaukee River Ecosystem Partnership in developing goals and objectives and an action plan.

Maintenance: The NPS is not involved in maintenance activities in Kane County.

2.3. Legal and Regulatory Background

The following discussions on legal and regulatory rights and authorities related to agricultural and urban drainage and stormwater management were excerpted and paraphrased from *Model Stormwater Drainage and Detention Ordinance* (NIPC, 1990) and *Illinois Drainage Law* (Uchtmann and Rolf, 1991)

2.3.1 Illinois Drainage Law

Civil Law Rule: Essentially all states adhere to one of three types of drainage law: the common enemy rule, the reasonable use rule, or the civil law rule (also known as the natural flow or natural drainage rule).

The common enemy rule states that a landowner has an unlimited privilege to deal with surface water on his land as he pleases, regardless of the harm his actions may cause other landowners. By the same token, the adjoining property owners can "fight back" and repel waters coming on to their properties however they may choose. Most states which continue to adhere to this rule have modified it so that a landowner can obstruct

surface waters only to the extent that the obstruction is incidental to ordinary use of the land and is not installed maliciously or negligently.

The reasonable use rule, unlike either the common enemy or civil law doctrines, is based on tort law rather than property law. Thus, the guiding concept of this rule is "fair play" rather than "who owns what." The essence of the reasonable use rule is that a person may drain his property only in a manner which is not unreasonably injurious to the interests of other landowners. To determine reasonableness, the courts of jurisdictions subscribing to this rule apply a "balancing test"; they attempt to devise a fair and equitable solution to the specific facts and circumstances of a particular case. The upshot is that the reasonable use rule is unquestionably the most flexible of the three approaches, and arguably the most adaptable to changing contemporary conditions.

The civil law rule, in its original form, holds that a landowner can not interfere with the natural flow of surface waters. Owners of lower-lying land (in legal terminology the "servient estate") were burdened by an "easement" which required them to accept all surface waters naturally flowing from higher land (in legal terminology "dominant estate"). On the other hand, the dominant estate owner could do nothing which increased the flow of waters to servient estates. Because this prohibition impeded agricultural development, the Illinois Court, In Peck versus Herrington (109 Ill. 611 (1884)) and in a series of later cases, declared and gradually defined a "good husbandry exception" to the civil law rule.

The good husbandry exception allowed the owner of the dominant estate to construct drains on his land, in order to promote appropriate agricultural practices, even though such drains increased the flow of water onto the servient estate. Whether the drains consisted of surface ditches or underground tile drains made no difference (Lambert versus Alcorn, 144, Ill. 313, 33 N.E. 53 (1893)). Even under the good husbandry exception, however, the dominant estate owner could not divert the natural course of drainage; that is, he could not cast waters onto lower land which otherwise would have naturally flowed in another direction nor could he discharge runoff at a location different from the natural drainage outlet (Dayton versus Drainage Commission, 128 Ill. 271, 21 N.E. 198 (1889)). The amount of water which could be drained on to lower land, was limited only by the carrying capacity of the stream into which the surface waters were eventually discharged (People versus Peeler, 290 Ill. 451 (1919)). Illinois adheres to the Civil Law rule as modified and clarified by the cases cited above as well as subsequent cases.

Key Elements of Illinois Drainage Law: The following are the key elements of Illinois Drainage law.

1) A landowner may collect surface water, discharge it, and hasten its flow downstream. Under the good husbandry exception, landowners can hasten drainage of their land (and therefore increase flow rates) provided the water is not diverted from another basin and the water enters the servient estate where it would have in a state of nature. The water can be carried by artificial ditches and tile lines and the owners of the lower land cannot object to the increased flow. Although not explicitly stated, this appears to allow concentration of flow in addition to increasing flow.
2) A landowner may drain surface waters into watercourses. Owners of higher ground can drain their land within a natural basin into a natural watercourse even if such drainage does damage to lower ground. Furthermore, owners of a streambank have the right to improve it so long as the improvements do not impair drainage.
3) A landowner has no right to obstruct the flow of surface water from upstream property. The owner of lower land has no right to build any artificial structure that will interfere with the drainage of higher land. However, the owner of higher land cannot compel the owner of lower land to remove natural obstructions that may accumulate and impair drainage. On the other hand, in some circumstances, the owner of the higher land has the right to enter the servient estate to make reasonable repairs and clear the watercourse.
4) Easements of drainage or obstruction. When landowners are harmed by other owners and fail to enforce their rights, the harmful practices themselves become rights or *easements*. The easement is acquired by prescriptive use. The period of use required to obtain the easement by *prescriptive use* is 20 years in Illinois. These easements cannot be acquired against the public (e.g., a highway or school district).
5) A landowner may extend a tile drain across the land of others. Illinois Drainage Code provides that owners may extend their tile drain across the land of others when the extension is necessary to accomplish adequate drainage and when certain conditions imposed by law are met. Owners who install a drain must keep it in good repair so that it will not injure the property through which it passes. To meet this obligation, the tile owners may enter the lands where the drains are located at any time to affect the repair. The owner of the drain is liable for triple damages for willful harm to servient lands.

6) Urban landowners cannot increase drainage flows unreasonably. In 1974, in the landmark case of Templeton versus Huss (57 Ill. 2d 134, 311 N.E. 2d 141) the Illinois Supreme Court very substantially modified the civil law rule of drainage in Illinois. In this case, the defendants owned the dominant estate, which they developed into a residential subdivision. The plaintiff owned the servient estate, a parcel of farmland. Recognizing that natural drainage could be substantially altered by urban development, the court held that the developer of the subdivision was liable for damages to the lower land if the houses and streets interfered so much with natural seepage that the amount and velocity of water running off the developers land was unreasonably increased.

Although the court's reasoning could easily be applied to controversies over agricultural drainage, the criteria of good husbandry still appears to be applicable. Courts have not expressly indicated that Templeton v. Huss altered the good husbandry exception. It could be inferred that, in effect, natural drainage law applies to rural lands and reasonable use law applies to urban lands.

2.3.2 Illinois Laws on Drainage Districts

Natural drainage law did not adequately meet the drainage needs of landowners in many parts of the state. To meet the needs of these landowners, the legislature in 1879 passed the Levee Act and the Farm Drainage Act and in 1956 passed the Illinois Drainage Code. These laws allowed for drainage districts based on a system of assessments but permitted districts to include only lands that benefitted. The courts hold that if people have adequate drainage under natural drainage rules, they do not receive a benefit and their land cannot be included in a drainage district against their wishes. Further, the mere fact that the ditches of a drainage district carry water that originates on their land does not mean, in a legal sense, that the owners are necessarily benefitting from the drainage district. Conversely, drainage districts can be used to force uncooperative landowners, that "benefit", into the district.

Landowners within the district must pay assessments. However, the assessments on land cannot exceed the benefits that the land will receive. Benefits are defined as the value of the proposed drainage works to a particular property and the benefits are not limited to agricultural benefits.

Drainage districts are public corporations charged with specific governmental functions and, if necessary, may acquire rights in land by eminent domain. Drainage districts may be formed to construct, maintain, or repair natural or artificial drains or levees. They may also engage in other drainage or levee work for agricultural, sanitary, or mining purposes.

Formation of Districts: "A drainage district may be organized upon petition signed by 20% of adult owners owning more than one-fourth of the land in the proposed district; or by more than one-fourth of the adult owners owning a major portion of the land." (Illinois Compiled Statutes, Chapter 70, Sec 605/3-3). The petition must include a description of the proposed work and a statement of the necessity of the work, as well as numerous other items. Provision is made for giving notice and holding a court hearing on the petition to allow challenges to the necessity of all or part of the proposed work.

An alternative method of formation is by referendum in the proposed district. The petition for referendum requires signature by at least 10% of the adults who own at least 20% of the land in the proposed district.

A petition for district formation may not include land already in another district. However, *outlet districts* may be formed provided they benefit two or more drainage districts as well as land not already in a drainage district.

If the court approves the petition for district formation, three temporary commissioners are appointed. Two commissioners constitute a quorum. The specific duties of the temporary commissioners are to evaluate the feasibility, costs, and benefits of the proposed work. A report of the findings must be filed with the court. If the benefits of the proposed work do not exceed the costs, the court may find that the district should not be organized.

Powers and Duties of the Commissioners: Some of the more important powers and duties of the drainage district commissioners include the following.

- To file a list of active commissioners with the clerk of the circuit court and to file a map showing all boundaries and locations of all drainage improvements with the clerk of both the circuit court and the county;
- To go upon land, employ necessary assistance, and adopt a plan or system of drainage;
- To obtain the necessary lands and right-of-way by agreement or, if necessary, by eminent domain;
- To let contracts for surveying, laying, constructing, repairing, altering, enlarging, cleaning, protecting, and maintaining of any drain, ditch, levee, or other works;
- To widen, straighten, deepen, or enlarge any ditch or watercourse, and to remove driftwood and rubbish whether the ditch is in, outside, or below the district;

- To cause railroad companies to construct, rebuild, or enlarge bridges or culverts when necessary; (Since the legislature enacted the Farm Drainage Act prior to the invention of the automobile, it is not clear if this right would also apply to highway authorities.)
- To make annual or more frequent reports as required by the court, including an annual financial report; and
- To abandon works no longer useful to the district.

In performing these duties and powers, the commissioners must use all practical means to protect the environment, including trees, fish, and wildlife habitats. Commissioners must avoid eroding land and polluting land, water, and air.

Before a farmer and a drainage district decide to make drainage improvements, they should consider the effects these improvements will have on a farmer's participation in USDA programs. Specifically, farmers must comply with the wetland provisions of the Food Security Act of 1985, as amended by the Food, Agriculture, Conservation, and Trade Act of 1990, to be eligible for USDA program benefits.

2.3.3. Statutory Authority

Municipal Authority: Authorization for municipalities to enact ordinances to better manage stormwater runoff and avoid undue flooding cannot be found in any one section of the Municipal Code (Ill. Rev. Stats. Chapter 24), but must be "pieced together" from a number of sections. The totality of authority granted municipalities, though, is clearly sufficient to permit enactment of effective stormwater control measures. Moreover, in light of Section 1-2-1 of the Municipal Code ("The corporate authorities of each municipality may pass all ordinances and make all rules and regulations proper or necessary to carry into effect the powers granted to municipalities"), the fact that the authority is scattered would not pose any serious impediment to passage of "free-standing ordinances" as opposed to a series of amendments to the local zoning, subdivision, and building ordinances.

Municipalities in DuPage, Kane, Lake, McHenry, and Will counties are bound by stormwater management regulations which may be adopted by county boards as part of the programs authorized by 55 ILCS 5/5-1062.

County Authority: Counties, like municipalities, have various powers which, when viewed together, appear sufficient to adequately control stormwater runoff.

CHAPTER 3

ASSESSMENT OF WATER RESOURCE CONDITIONS AND PROBLEMS

This Stormwater Plan is primarily concerned with development of an institutional framework for stormwater and water quality management. Knowledge of current conditions is needed both to assess the adequacy of existing stormwater programs and to prioritize activities once the framework is in place.

Part of this assessment was performed by reviewing and analyzing existing databases and part was done through surveys. Surveys were sent out to each municipality, township highway supervisor, drainage district, and park district regarding the types and locations of stormwater problems. The survey was also completed by the Kane County Development Department. The findings presented in this chapter reflect the review of the surveys returned by the municipalities, review of local stormwater studies, review of IEPA water quality data, and personal observation of the KCSMPC and those participating in preparation of this plan. Results of these assessments are presented for the following topics:

- Watershed Land Use and Floodplains (Section 3.1)
- Soils and Drainage (Section 3.2)
- Agricultural Drainage (Section 3.3)
- Urban Stormwater Runoff (Section 3.4)
- Flooding (Section 3.5)
- Streambank Erosion (Section 3.6)
- Water Quality (Section 3.7)

3.1 WATERSHED LAND USE AND FLOODPLAINS

For planning purposes, the County has been divided into twelve primary watersheds:

- Coon Creek,
- Eakin Creek,
- Union Ditch,
- Northern Fox River,
- Tyler Creek
- Ferson/Otter Creek,
- Southern Fox River,
- Mill Creek,
- Blackberry Creek,
- Big Rock/Welch Creek,
- Indian/Waubonsie Creek, and
- DuPage River.

The twelve watersheds are shown in Figure 3-1 along with municipal boundaries, state and federal roads, and perennial streams. The DuPage River watershed includes small drainage areas on the eastern border of the County that are outside the Fox River watershed. The DuPage River watershed areas include only a very small portion of the County (0.5%).

The land use and floodplain statistics presented in this section are based on data contained within the Geographic Information System (GIS) database of NIPC. The GIS data layers used for this project include a regional 1990 land use database (NIPC, 1994), digital streams data from the U.S. Geological Survey (USGS, 1986), digital flood insurance rate maps from the Federal Emergency Management Agency (FEMA Q3 data, 1996), digital 1990 population data (NIPC, 1994), and watershed boundaries (Kane County, 1997). The NIPC land use data is based on interpretation of 1990 aerial photographs. The NIPC population data is based on the 1990 census. The Q3 data was prepared from the community Flood Insurance Rate Map (FIRM) panels available through 1995.

Through a digital overlay of the watershed boundaries on the land use and population layers, statistics on land use area and population were computed by watershed. Table 3-1 presents the population and land use areas (in acres) for each of the twelve watersheds (for the watershed area within Kane County). Table 3-2 presents the same information in terms of percentages (and population density). Figure 3-2 depicts incorporated areas and land uses of the County.

Degree of Urbanization: The greatest urban density, both in terms of land use and population are in the Fox River mainstem and Indian/Waubonsie Creek watersheds on the eastern edge of the County, with 53.3%, 69.1%, and 41.2% urban land uses, respectively. The next highest densities occur in the Ferson/Otter and Mill Creek watersheds (28.9% and 27.7%, respectively) followed by the Tyler Creek (20.3%) and Blackberry Creek (17.1%) watersheds in the central portion of the County. The Coon, Union, Eakin, and Big Rock/Welch watersheds in the western portion of the County have only 7.9%, 5.5%, 8.0%, 6.3% urban land uses, respectively.

Degree of Agriculture: All of the watersheds have a significant agricultural component with even the northern and southern Fox River mainstem watersheds still having approximately 22% and 12% agriculture land uses, respectively. The Union Creek watershed is over 90% agriculture and the Big Rock/Welch and Coon Creek watersheds are over 85% agriculture. Overall, the County is 64% agricultural.

Wetlands: Wetlands within the County are shown in Figure 3-1. Wetlands occur throughout the County but are most prevalent (in terms of percent of watershed area) in the Eakin, Tyler, and Ferson/Otter Creek watersheds in the north central portion of the County. Wetlands are least prevalent in the western portion that is primarily in agricultural uses and the eastern portion of the County that is most developed in urban uses. The highest percentage of wetlands occurs in the Eakin Creek watershed (7.5%) and the lowest percentage of wetlands occurs in the Big Rock/Welch watershed (0.8%). Overall, 2.8% of Kane County is covered by wetlands. As a matter of perspective, the other rural counties of Will and McHenry are 2.9% and 7.5% wetland, respectively (based on the same NIPC land use database). It should be noted that only wetlands over approximately 2.5 acres in size are included in the areas of Table 3-1. A more thorough inventory of wetlands, including wetlands smaller than 2.5 acres, would likely result in a higher percentages of the land area covered by wetlands. For example, in McHenry County, the NIPC inventory results in 7.5% of the County being covered by wetland while the ADID inventory results in approximately 11% of the County being covered by wetland.

Floodplains: Floodplains derived from the FEMA Flood Insurance Rate Map (FIRM) panels are shown in Figure 3-1. These 100-year floodplains were digitally overlaid on the land use layer to determine the area of each land use within the floodplain, by watershed. It should be noted that the FIRM layer only includes regulatory floodplain areas. Since only floodplains with greater than approximately one square mile of drainage area are mapped as regulatory floodplain, there is considerably more flood prone area than indicated by the FIRM maps. Also, the floodplains depicted by the FIRM maps may have expanded in some watersheds due to the increased level of urbanization in those watersheds since the late 1970s to early 1980s when many of the flood insurance studies were performed. The discussion of current floodplain regulations in Section 4.2 reviews the status of floodplain mapping further.

Floodplain area is presented in Tables 3-3, 3-4, and 3-5.

- Table 3-3 shows the absolute area of each land use in the floodplain by watershed.
- Table 3-4 shows the area of each land use in the floodplain as a percentage of the total area of that land use in the watershed.
- Table 3-5 shows the area of each land use in the floodplain as a percentage of the total floodplain area in that watershed.

The tables show that mapped FEMA floodplains occupy from 5.8% to 15.6% of the total watershed area, depending on the watershed (excluding DuPage River watershed). Mapped FEMA floodplain occupies 9.7% of Kane County as a whole. Table 3-5 shows that most of the floodplain is located in areas of agricultural, open space, wetland, and water land uses (90% of the total floodplain area). Of these non-urban uses in the floodplain, most is agricultural area. In fact, agricultural land use accounts for 65% of Kane County's mapped floodplain area. This is important considering that, over time, many agricultural areas will be converted to urban land uses.

Substantial urban uses are also located in the floodplain. It should be noted that when an urban land use is found to be in the floodplain through GIS analysis, it does not necessarily mean that structures are located in the floodplain. Inhabited urban land uses account for 9% of the total floodplain area (1% of the floodplain area is in transportation and vacant urban land uses) and 4.2% of Kane County's inhabited urban land use area is in the floodplain. In terms of acreage, most of the urban land use in the floodplain is single family residential (2,019 acres or 68% of the inhabited urban land use in the floodplain). It is notable that 24% of the multi-family land use in the Indian/Waubonsie Creek watershed is in the floodplain and that 15% and 13% of the commercial land use in the Blackberry and Big Rock/Welch watersheds, respectively, is in the floodplain. However, these land uses comprise less than 1% of the watershed area in these watersheds.

3.2 SOILS AND DRAINAGE

The Soil Survey of Kane County, Illinois (USDA, 1979) provides information on drainage patterns and soil types. The surficial geology and soils of Kane County were influenced by the last glaciation that covered the entirety of the County. The glaciers brought ground-up soil and rock from Canada, Wisconsin, and the basin of Lake Michigan. The ground-up material was then deposited either by the ice (glacial till) or by the meltwaters as the ice retreated (glacial outwash). Since then, moving water has exposed limestone bedrock in a narrow band along the Fox River.

Glacial till is very heterogeneous with a wide variety of textures and particle sizes occurring at different

Figure 3.1

Watersheds, Wetlands and Floodplains

Kane County, Illinois

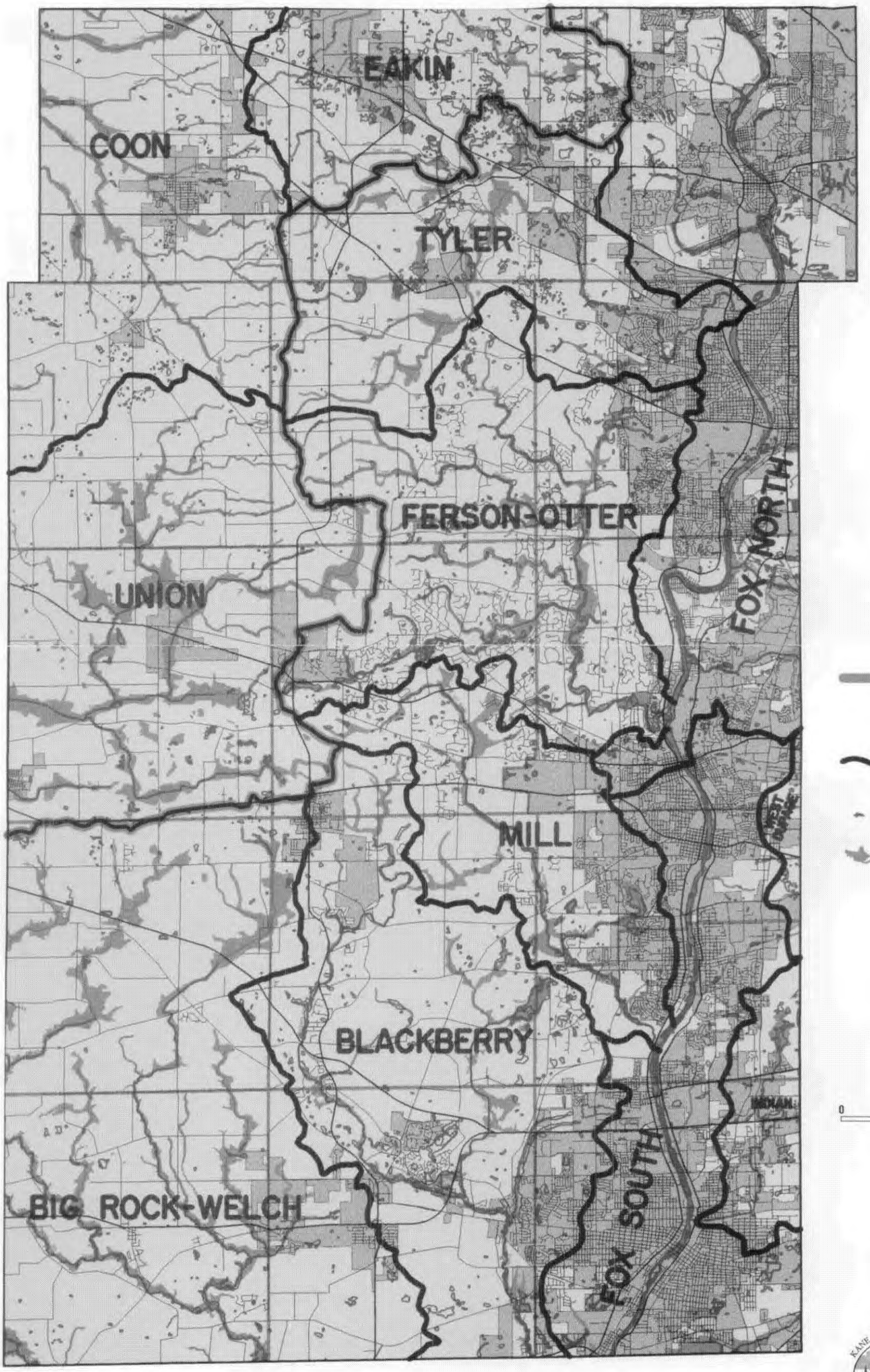


Figure 3.2

Existing Land Use — December 31, 1991

Kane County, Illinois

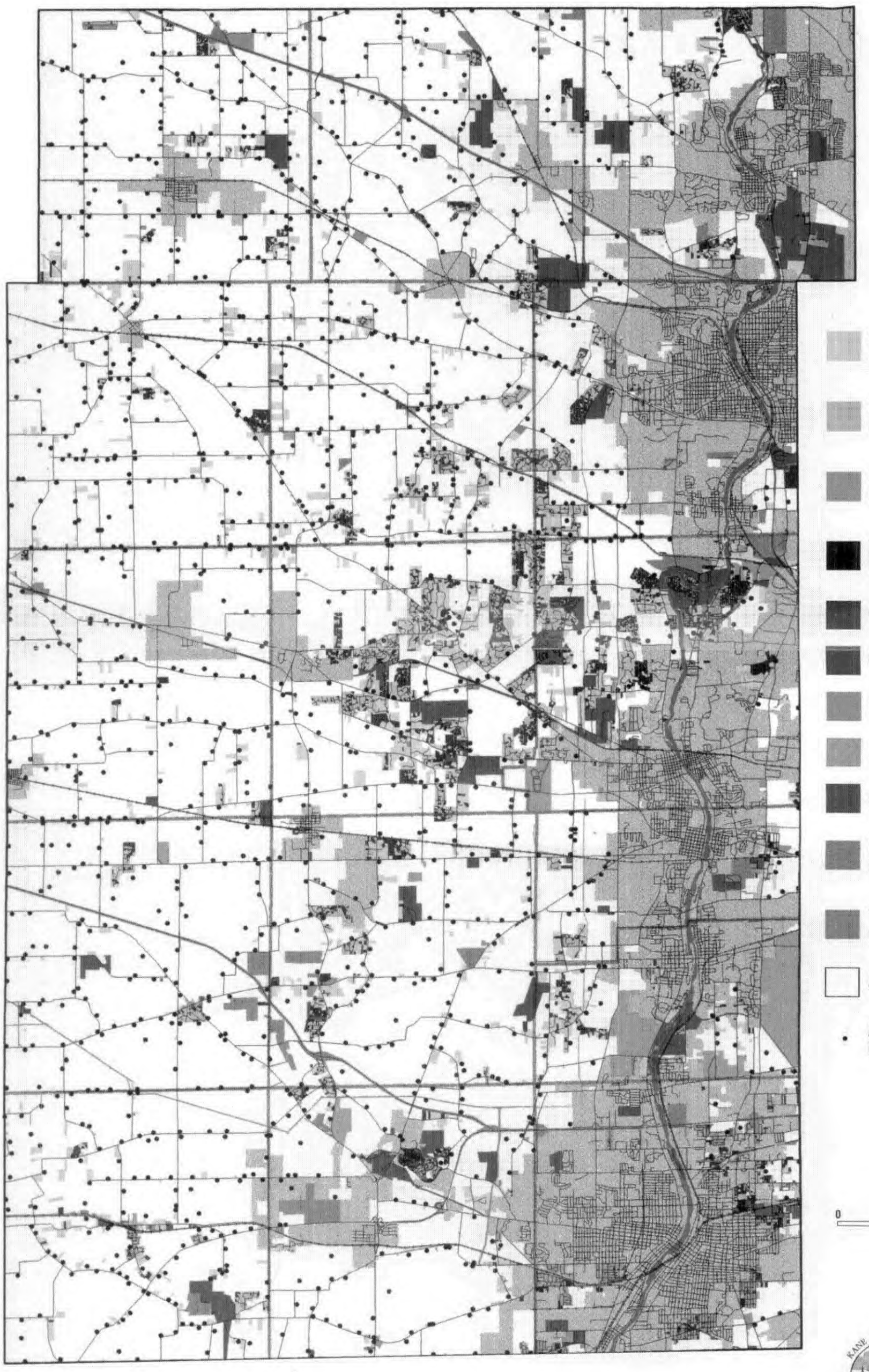


Table 3.1 *Kane County 1990 Land Use Area and Population by Watershed*

	LAND USE AREA BY WATERSHED (acres)												
Land Use	Big Rock-Welch	Blackberry	Coon	Eakin	Ferson-Otter	Fox North	Fox South	Mill	Tyler	Union	Indian/Waubonsie	DuPage River	County Total
Single Family	2,031	4,057	1,503	726	7,855	12,451	10,090	3,504	3,095	1,685	2,014	140	49,151
Multi-Family	8	72	0	0	12	199	239	45	113	0	79	4	771
Commercial	265	270	294	70	286	1,966	1,923	223	431	123	303	66	6,218
Industrial	565	977	176	187	394	3,026	2,343	362	872	65	406	36	9,408
Institutional	142	410	57	0	251	1,099	1,427	694	306	39	431	19	4,876
Transportation/Utility	420	482	178	296	131	637	456	63	108	73	200	0	3,045
Vacant	45	473	195	25	1,029	1,619	558	580	264	228	48	31	5,096
Agriculture	48,418	28,005	26,161	12,394	19,049	8,754	3,009	12,419	16,284	36,524	3,449	1,075	215,540
Forest, Grassland, and Open Space	2,851	3,142	1,257	1,370	3,463	7,227	3,577	1,223	2,523	806	1,197	153	28,788
Wetland	425	1,347	643	1,232	1,817	943	208	566	1,497	469	270	81	9,497
Water	30	170	24	87	194	1,441	810	72	86	19	50	0	2,983
TOTAL	55,200	39,406	30,487	16,386	34,481	39,362	24,640	19,751	25,577	40,031	8,447	1,605	335,373
Population (people)	5,833	19,028	4,370	1,063	21,355	100,705	108,789	13,285	18,040	2,943	21,377	647	317,435

Source: Northeastern Illinois Planning Commission Regional GIS Database

Table 3.2 *Kane County 1990 Land Use Percentage and Population Density by Watershed*

	LAND USE AREA BY WATERSHED (Percent)												
Land Use	Big Rock-Welch	Blackberry	Coon	Eakin	Ferson-Otter	Fox North	Fox South	Mill	Tyler	Union	Indian/Waubonsie	DuPage River	County Total
Single Family	3.68%	10.29%	4.93%	4.43%	22.78%	31.63%	40.95%	17.74%	12.10%	4.21%	23.84%	8.73%	14.66%
Multi-Family	0.01	0.18	0.00	0.00	0.04	0.51	0.97	0.23	0.44	0.00	0.94	0.26	0.23
Commercial	0.48	0.69	0.96	0.42	0.83	4.99	7.80	1.13	1.68	0.31	3.59	4.10	1.85
Industrial	1.02	2.48	0.58	1.14	1.14	7.69	9.51	1.83	3.41	0.16	4.81	2.23	2.81
Institutional	0.26	1.04	0.19	0.00	0.73	2.79	5.79	3.51	1.20	0.10	5.10	1.21	1.45
Transportation/Utility	0.76	1.22	0.58	1.81	0.38	1.62	1.85	0.32	0.42	0.18	2.37	0.00	0.91
Vacant	0.08	1.20	0.64	0.15	2.98	4.11	2.26	2.94	1.03	0.57	0.57	1.95	1.52
Agriculture	87.71	71.07	85.81	75.64	55.24	22.24	12.21	62.88	63.67	91.24	40.83	66.94	64.27
Forest, Grassland, and Open Space	5.16	7.97	4.12	8.36	10.04	18.36	14.52	6.19	9.86	2.01	14.17	9.54	8.58
Wetland	0.77	3.42	2.11	7.52	5.27	2.40	0.84	2.87	5.85	1.17	3.20	5.04	2.83
Water	0.05	0.43	0.08	0.53	0.56	3.66	3.29	0.36	0.34	0.05	0.59	0.00	0.89
TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Population (people/mi²)	68	309	92	42	396	1637	2826	430	451	47	1620	258	606

Source: Northeastern Illinois Planning Commission Regional GIS Database

locations. Glacial till covered the entire County. Glacial outwash, which has a more uniform texture and is stratified in layers, was variously deposited around the County over the till base. In many areas the outwash deposits are less than 20 feet thick and overlays till material. As would be expected, many outwash areas occur in valleys.

After the glaciers retreated to the north, dry conditions and strong winds caused silt to be blown across the state from the Mississippi River floodplain that contained recent sediment. This windblown silt called loess covered the earlier till and outwash deposits. The thickness of the loess varies from 5 feet in the southwestern portion of the County to only several inches in the eastern part. The larger creek and river valleys contain sediments from post glaciation erosion called alluvium.

There are four generalized soil groupings identified in the Soil Survey of Kane County. Along the northeastern portion of the County from the McHenry County line south through South Elgin, the soils are "nearly level to moderately steep soils that are moderately permeable in the subsoil and moderately to very rapidly permeable in the underlying material". This generalized soil category

Table 3.3 *Kane County 1990 Land Use Area Within the FEMA Floodplain by Watershed*

	LAND USE AREA BY WATERSHED (acres)												
Land Use	Big Rock-Welch	Blackberry	Coon	Eakin	Ferson-Otter	Fox North	Fox South	Mill	Tyler	Union	Indian/ Waubonsie	DuPage River	County Total
Single Family	141	160	32	6	401	601	158	179	107	100	134	0	2,019
Multi-Family	0	2	0	0	0	9	12	0	8	0	19	0	50
Commercial	34	41	3	0	8	107	107	3	12	0	21	0	336
Industrial	37	7	2	4	7	157	59	30	28	25	56	0	410
Institutional	12	2	7	0	5	26	21	38	41	1	7	0	161
Transportation/Utility	61	44	21	8	0	23	13	9	2	2	25	0	208
Vacant	0	2	15	0	9	36	0	6	1	4	0	0	73
Agriculture	4,803	1,955	2,277	861	1,474	138	12	1,283	1,781	5,942	514	0	21,040
Forest, Grassland, and Open Space	1,089	675	0	8	148	334	312	41	42	0	177	0	2,525
Wetland	170	515	75	311	924	288	74	392	576	183	137	0	3,645
Water	10	97	2	28	107	1,007	654	55	23	8	6	0	1,997
TOTAL	6,357	3,500	2,434	1,226	3,084	2,726	1,422	2,035	2,621	6,266	1,096	0	32,465

Source: Northeastern Illinois Planning Commission Regional GIS Database

Table 3.4 *Kane County 1990 Land Use Area Within the FEMA Floodplain as a Percentage of Total Land Use Area*

	LAND USE AREA BY WATERSHED (Percent)												
Land Use	Big Rock-Welch	Blackberry	Coon	Eakin	Ferson-Otter	Fox North	Fox South	Mill	Tyler	Union	Indian/ Waubonsie	DuPage River	County Total
Single Family	6.95%	3.94%	2.11%	0.84%	5.11%	4.83%	1.57%	5.10%	3.45%	5.94%	6.65%	0.00%	4.11%
Multi-Family	0.00	2.97	0.00	0.00	0.00	4.34	5.02	0.00	6.84	0.00	24.05	0.00	6.48
Commercial	12.91	15.14	0.95	0.00	2.75	5.43	5.56	1.24	2.90	0.00	6.93	0.00	5.41
Industrial	6.47	0.67	1.23	2.26	1.71	5.18	2.52	8.29	3.16	38.19	13.79	0.00	4.36
Institutional	8.71	0.55	12.33	0.00	2.13	2.40	1.47	5.41	13.48	3.22	1.62	0.00	3.31
Transportation/Utility	14.54	9.13	11.62	2.54	0.00	3.68	2.85	14.25	1.97	2.79	12.50	0.00	6.83
Vacant	0.00	0.45	7.90	0.00	0.89	2.22	0.00	0.99	0.36	1.84	0.00	0.00	1.44
Agriculture	9.92	6.98	8.70	6.95	7.74	1.58	0.40	10.33	10.94	16.27	14.90	0.00	9.76
Forest, Grassland, and Open Space	38.21	21.49	0.00	0.60	4.28	4.62	8.72	3.33	1.66	0.00	14.79	0.00	8.77
Wetland	40.07	38.21	11.71	25.22	50.84	30.53	35.58	69.23	38.51	39.11	50.74	0.00	38.38
Water	33.31	56.82	9.64	31.96	55.23	69.87	80.74	76.94	26.66	40.83	12.00	0.00	66.95
ALL LAND USES	11.52%	8.88%	7.98%	7.48%	8.94%	6.93%	5.77%	10.30%	10.25%	15.65%	12.98%	0.00%	9.68%

Source: Northeastern Illinois Planning Commission Regional GIS Database

Table 3.5 *Kane County 1990 Land Use Area Within the FEMA Floodplain as a Percentage of Total Floodplain Area*

	LAND USE AREA BY WATERSHED (Percent)												
Land Use	Big Rock-Welch	Blackberry	Coon	Eakin	Ferson-Otter	Fox North	Fox South	Mill	Tyler	Union	Indian/ Waubonsie	DuPage River	County Total
Single Family	2.22%	4.56%	1.30%	0.50%	13.01%	22.05%	11.11%	8.79%	4.07%	1.60%	12.23%	0.00%	6.22%
Multi-Family	0.00	0.06	0.00	0.00	0.00	0.32	0.84	0.00	0.29	0.00	1.73	0.00	0.15
Commercial	0.54	1.17	0.11	0.00	0.25	3.92	7.52	0.14	0.48	0.00	1.92	0.00	1.04
Industrial	0.58	0.19	0.09	0.34	0.22	5.75	4.15	1.48	1.05	0.40	5.11	0.00	1.26
Institutional	0.19	0.06	0.29	0.00	0.17	0.97	1.48	1.85	1.57	0.02	0.64	0.00	0.50
Transportation/Utility	0.96	1.26	0.85	0.61	0.00	0.86	0.91	0.44	0.08	0.03	2.28	0.00	0.64
Vacant	0.00	0.06	0.63	0.00	0.30	1.32	0.00	0.28	0.04	0.07	0.00	0.00	0.23
Agriculture	75.55	55.87	93.53	70.25	47.81	5.07	0.84	63.04	67.95	94.84	46.90	0.00	64.81
Forest, Grassland, and Open Space	17.13	19.30	0.00	0.67	4.80	12.26	21.94	2.00	1.60	0.00	16.15	0.00	7.78
Wetland	2.68	14.71	3.09	25.34	29.95	10.57	5.20	19.27	21.99	2.93	12.50	0.00	11.23
Water	0.16	2.76	0.09	2.27	3.48	36.93	45.99	2.73	0.88	0.13	0.55	0.00	6.15
TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Northeastern Illinois Planning Commission Regional GIS Database

also occurs in portions of the Coon Creek and Eakin Creek watersheds in the northern part of the County and portions of the headwater areas of Blackberry Creek and Welch Creek south and west of Elburn. These soils were developed in thin loess over coarse textured outwash and tend to have the highest permeability in the County. Soils on gently sloping to moderately steep slopes are moderately well to well drained while the nearly level areas in depressions and drainageways contain poorly drained, hydric soils. The references to degree of drainage in this and subsequent paragraphs refers to the degree of drainage at the time that the soils were formed. Thus, hydric soils that formed under poorly drained to very poorly drained conditions may no longer be subject to extended periods of saturation due to artificial drainage.

Along a narrow corridor of the Fox River from Valley View south to the Kendall County line occurs "nearly level to moderately sloping soils that are moderately permeable". These soils occur on the Fox River bottomlands and adjacent uplands. About half of this generalized soil category is made up of Dresden soils which are well drained, moderately permeable, and are on the sloping uplands formed in loess over medium to coarse textured outwash. About 15% of this generalized soil category is made up of poorly drained, hydric Millington soils formed in alluvium on the nearly level floodplains. This group also includes the soils with shallow bedrock.

Straddling the narrow corridor of soils along the Fox River described above, from South Elgin to North Aurora occurs "nearly level to moderately steep soils that are moderately slowly and slowly permeable". These are generally the least permeable soils in the County as they developed in thin loess over clayey glacial till. The soils higher in the landscape with moderately steep slopes are moderately well drained. The soils on gentle slopes are typically somewhat poorly drained and the nearly level areas have poorly drained soils that are hydric.

Over the majority of the County, in the western two tiers of townships, occurs "nearly level to moderately steep soils that are moderately permeable". Much of the soil in this generalized soil category is Drummer which is poorly drained having a high water table. Drummer is a hydric soil occurring on nearly level areas and is therefore subject to occasional ponding from upland runoff. Because Drummer soils are moderately permeable, they can and have been artificially drained to increase agricultural productivity. However, this does not remove the hazard of high water tables and ponding during and after major rainfall events. In the moderately sloping to steep areas of this generalized soil grouping, the soils are moderately well to well drained. This grouping includes soils formed in loess over loamy till and loess over medium textured outwash.

Scattered throughout the County are small areas of organic soils (mucks and peats) formed from herbaceous plant remains. These are a special category of hydric soils found in the lowest landscape positions such as closed depressions and are very poorly drained with high water tables for long durations.

Drainage and runoff potential of the soil is dependent on a number of factors including the permeability of the surface and underlying soils, the height of the water table, the slope of the land surface, position in the landscape, and the degree of artificial drainage. To some degree, the water holding capacity of the soils will also affect runoff potential. Soils with high water holding capacity will tend to absorb rainfall from small events during dry periods. They will tend to have higher runoff potential in spring and fall when evaporation and transpiration rates are low and lower runoff potential in summer when evaporation rates are higher. Soils with high water holding capacity also tend to drain more slowly.

In general, higher permeability, coarse-textured soils will tend to pass water through their horizon more quickly and have lower surface runoff potential than soils with lower permeability. However, at lower positions in the landscape, where the water table is at or near the surface, even highly permeable soils will remain wet and tend to have higher runoff potential.

Wetlands tend to occur in areas where the water table is high, which is generally in low lying areas of the landscape. Wetlands also occur in localized depressional areas where soil permeability is very low causing a "perched" water table that is above the more regional water table. Wetlands can even occur on hillsides where the water table intersects the land causing water to "seep" out of the side of the hill. Hillside seeps are quite rare in northeastern Illinois and Kane County and provide unique habitats. While high water table and/or low permeability soils often associated with wetlands would tend to lead to high runoff potential, the depressional topography generally results in very little surface runoff being discharged from wetland areas.

Artificial drainage, such as agricultural drain tiles and ditches, can lower the water table. Drain tiles are used, often in combination with ditching, in many areas of the County. Disruption of the artificial drainage system will generally result in restoration of water levels and hydric conditions. Although many areas with hydric soils no longer contain wetlands, hydric soils formed under saturated conditions and are an indicator of past and present wetlands. (See Figure 3-3 for the Hydric

Soils of Kane County.) Approximately 32% of the County is covered by hydric soils (Kane County, 1996).

The soil groupings described above for Kane County and their permeability provides a relative rating of runoff potential. Those soils formed in loess over coarse outwash will have the lowest runoff potential. Those soils formed in loess over clayey till will have the highest runoff potential. Also, the slope of the land surface will affect runoff potential with greater slopes tending to produce runoff more quickly and nearly level land surfaces producing runoff more slowly. Finally, the presence of level and depressional topography and the intermingling of sloping and level or depressional areas will affect the amount and rate of runoff delivered to a point in the watershed.

3.3 AGRICULTURAL DRAINAGE

Some of the earliest development activity in Kane County was the clearing and drainage of the land for agricultural purposes. Today the soils in Kane County are generally well suited to agriculture, but many of the soils were originally too wet for efficient crop production. Landowners installed drainage systems on their farms and formed drainage districts to cooperatively construct and maintain outlets for these farm drainage systems. Their efforts changed the prairie, woodland, and wetland landscapes to an agricultural landscape.

Wetland areas were abundant under pre-drainage conditions (as evidenced by the presence of hydric soils shown in Figure 3-3) but many of these wetland areas have been lost. Many headwater streams that were broad, sometimes undefined swales were ditched to lower the water table and accept drainage from sub-surface tiles. Also, many streams that formerly meandered through the landscape exhibiting natural pool and riffle patterns, were channelized to better conform to property lines and provide for more efficient drainage. While these activities generally increased agricultural productivity, it substantially changed the drainage patterns of the landscape.

For a number of reasons, including urbanization of the County and the economy's lower reliance on agriculture, many of the original drainage systems are no longer being maintained or are being maintained at a lower level than in the past. In some cases, the lack of maintenance is leading to abandonment of the wettest areas which have become unsuitable for farming. In other areas that have converted to urban uses but still rely on the drainage system, the lack of maintenance and attendant elevating of water tables is leading to wet basements and failed septic systems.

On the positive side, tile failure has resulted in restoration of wetland conditions and lack of maintenance has lead to stream recovery from past channelization efforts. In some areas, this has increased aquatic and wildlife habitat and likely improved water quality and hydrologic conditions.

3.4 URBAN DEVELOPMENT AND STORMWATER RUNOFF

Urban development and stormwater runoff directly and indirectly affect waterbodies and other valuable natural features. These impacts occur both during construction and after the development is complete. Some impacts result from the direct modification or destruction of streams, lakes, and wetlands. Other impacts occur primarily offsite because of changes in the quality and quantity of runoff from the development. Some common effects of development and their environmental impacts are described below.

Construction in Streams, Lakes, and Wetlands

Some developments directly affect sensitive waterbodies and wetlands. Although direct filling of wetlands without mitigation is rare, other modifications and impacts continue. These impacts include conversion of wetlands to detention basins, dredging of wetlands to create open water, removal of native vegetation, and elimination of adjacent buffers. Also, smaller headwater streams are sometimes channelized or rerouted, and floodplains are modified to accommodate additional development. These activities not only destroy critical aquatic habitats; they also impair other valuable environmental functions. These impacts are summarized below.

Destruction of Aquatic and Terrestrial Habitat: Draining, straightening, filling, and dredging of natural waterbodies and wetlands adversely affects habitat for water dependent fish, wildlife, and waterfowl as shown in Figure 3-4.



An example of the filling in of a stream

Hydric Soils of Kane County

Kane County, Illinois

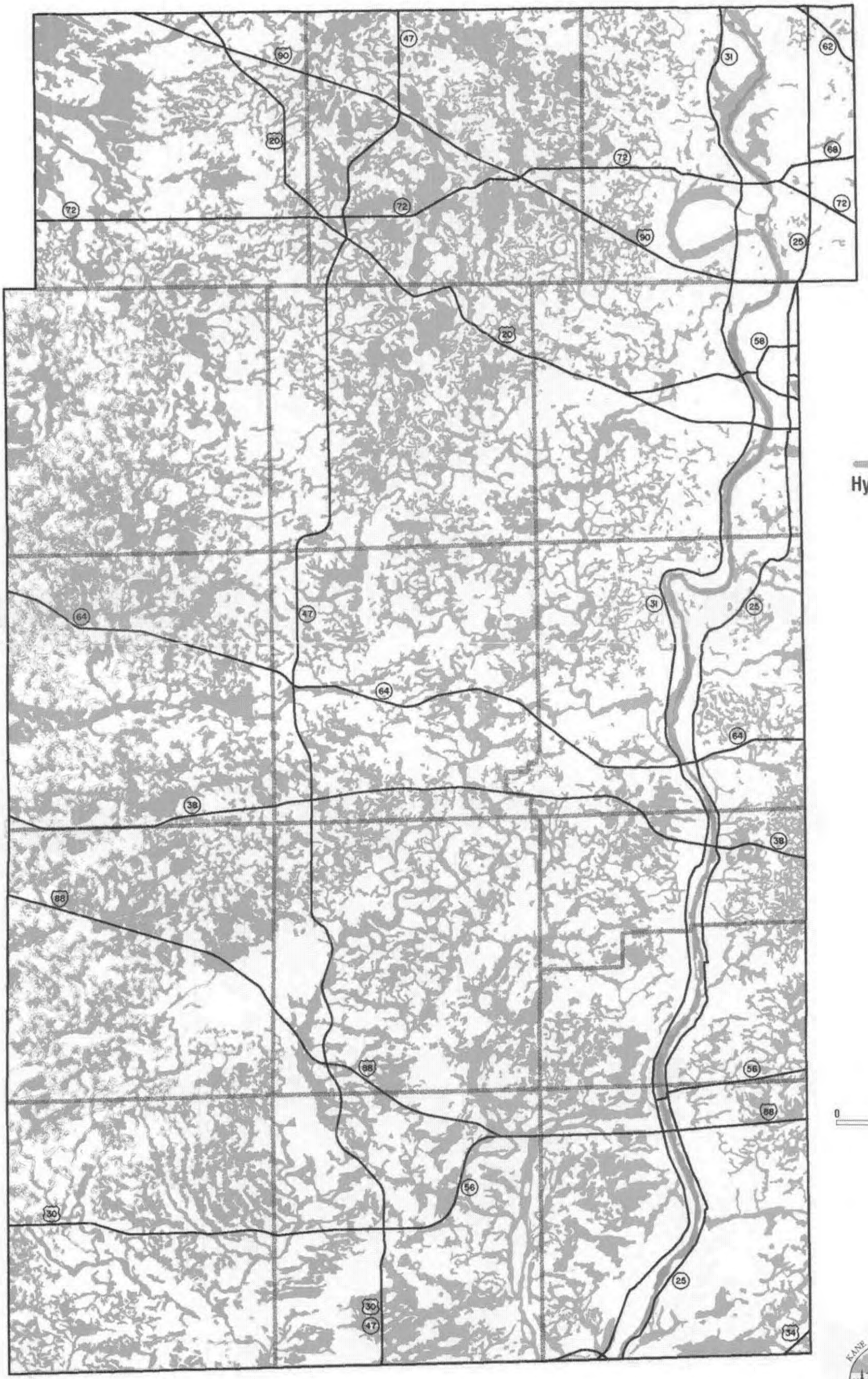
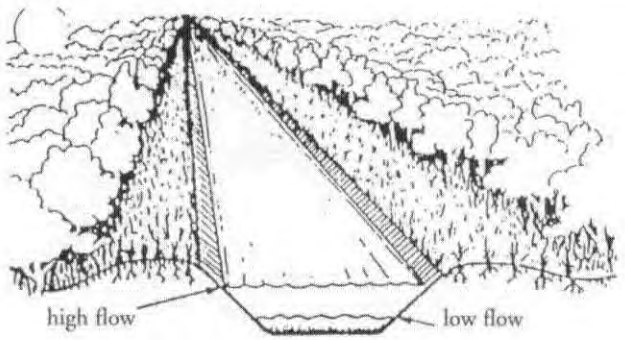
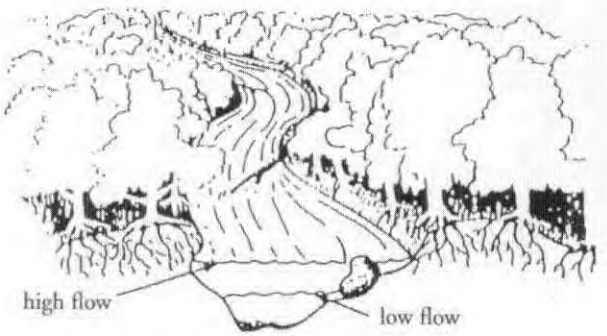


Figure 3.3

Figure 3.4 *Effects of Stream Urbanization*





Channelized stream

- Water velocity and substrate uniform in channel and unsuitable for many forms of aquatic life.
- No shrubs or trees near channel to provide shade, nutrient input or deep growing root structures to control bank erosion.
- Little habitat diversity and thus fewer kinds and amounts of fish and other aquatic life.
- During dry seasons and low flows, insufficient water depths support fewer aquatic life forms.
- Aid in drainage of wetlands and lowering of water tables.
- Encourages unwise development in frequently flooded areas of the floodplain.
- May provide higher degree of flood relief in immediate area but peak flows surge downstream increasing flooding.
- Tends to degrade water quality.

Natural stream

- Water velocity and substrate diversified due to varied channel depths, meanders and instream features.
- Trees and shrubs near channel provide shade which maintains suitable water temperature and provides wildlife habitat.
- Leaves, wood and insects drop into stream providing nutrients for aquatic life.
- Instream rocks and logs and bank undercuts provide cover.
- Trees and shrubs have deep roots that curtail stream bank erosion.
- Habitat diversity formed by pools, riffles and debris provides for numerous kinds and amounts of fish and other aquatic life.
- During dry periods and low flows, sufficient water depth is maintained to support stream life.
- Natural streams replenish water tables and aid in maintaining wetlands and bottomland forests.
- May provide less flood relief in immediate area but retards increased flooding downstream due to slower water flow and temporary water storage in the floodplain.
- Tends to preserve water quality.

Illustration by the Stream Renovation Guideline Committee, The Wildlife Society and American Fisheries Society

In addition to short-term effects caused by construction, significant long-term effects often result from the elimination of spawning and breeding areas, cover, and a general reduction in habitat diversity. Often, the result of construction in a waterbody or wetland is the replacement of native vegetation with man-made structures such as rip rap streambanks or metal retaining walls. Such man-made structures typically do not address the habitat needs of resident aquatic life and wildlife.

Water Quality Impairment: Construction in waterbodies and wetlands affects water quality in both the long- and short-term. The primary short-term effect, erosion, is discussed below. The long-term effects on development in waterbodies and wetlands relate primarily to the elimination of vegetation and other natural materials. The typical consequences of these alterations include reduced shading and a resultant increase in water temperature, reduced capacity for pollutant filtering, and an increased propensity for soil instability and erosion.

Alteration of Natural Storage and Conveyance Functions: While state and federal regulations place

some constraints on the degree of alteration allowed in floodplains and wetlands, significant adverse impacts on natural stormwater storage and conveyance functions may nonetheless result from permitted activities. Typical consequences include reduction in stream roughness and length caused by channel modifications and loss of stormwater storage caused by draining or filling of small wetlands and depressions.

Erosion from Construction Sites

Uncontrolled erosion from construction activities can generate enormous quantities of sediment -20 to 200 tons per acre per year. In comparison, typical erosion rates from cropland range from 1 to 20 tons per acre per year. Measurements of sediment yields in streams have indicated that developing watersheds contribute 5 to 200 times as much sediment as stable, urbanized watersheds (IEPA, 1987). The conveyance of eroded sediment offsite causes several problems.

Water Quality Impairment: Sediment from construction sites reduces water clarity that can limit the presence of game fish and reduce sunlight penetration, thereby limiting photosynthesis of aquatic plants. Sediment washoff also transfers nutrients and other pollutants to downstream lakes and rivers, degrades habitats and spawning areas of aquatic organisms through burial of natural substrates, and increases water supply treatment costs (where the waterbody is a source of drinking water).

Loss of Floodwater Conveyance and Storage: Excess sediment from construction sites fills storm sewers and ditches, detention basins, wetlands, and stream and river channels. This accumulated sediment exacerbates drainage and flooding problems and is very expensive to dredge. Further, increased rates of runoff from construction sites can cause local flooding problems.



Construction site demonstrating the need for erosion/sediment control

Safety and Nuisance Problems: Sediment on roadways, conveyed either by washoff from construction sites or tracked on by construction vehicles can be a traffic hazard. Dust generated at uncontrolled construction sites is a nuisance for adjacent property owners.

Changes in Runoff Rates and Volumes

Developments invariably alter runoff patterns by converting pervious land to impervious surfaces. This results in a shift from groundwater-dominated hydrology to surface water-dominated hydrology and consequently dramatic increases in the rate and volume of storm runoff and reductions in groundwater recharge. Also, compaction of soils, smoother grading, and loss of native vegetation, as well as urban drainage features such as storm sewers and lined channels convey greater volumes of runoff downstream at a much faster rate. This leads to the following consequences.

Increased Flooding: Without adequate stormwater detention, flood flow rates have been shown to increase by 100 to 200 percent or more as a watershed is urbanized. Although conservatively designed detention can essentially eliminate increases in flow rates in small watersheds, cumulative increases in runoff volumes result in decreasing detention effectiveness as watershed size increases (Dreher et. al., 1989). Local drainage problems can also be exacerbated by urbanization. This is particularly true on adjacent rural properties as formerly distributed runoff is concentrated to a single outlet location. As a result of these impacts, flood damages may be sustained by downstream residents and businesses, and governmental agencies may be forced to implement expensive remedial projects.

Stream Channel Erosion: Increased rates of runoff and resultant high channel velocities can destabilize downstream channels leading to excessive bank erosion and/or downcutting of the channel, often threatening adjacent structures. This problem is common in northeastern Illinois streams and is most prevalent in streams that have been previously altered.

Hydrologic Destabilization: Urban development generally results in higher and more frequent storm flows and lower and longer duration low flows. The more frequent high flows and the high velocities that accompany them can sometimes "flush out" natural substrates and bottom dwelling organisms. The reduced low flows tend to concentrate stream pollutants and reduce stream depths necessary for the survival of fish. Extended low flows can also

result in higher summertime water temperatures that further stress fish and other aquatic organisms. Reduced recharge rates also result in lower water levels in lakes and wetlands during critical dry periods. Previously perennial streams may periodically dry up killing bottom dwelling organisms that are an important source of food for fish.

Degraded Quality of Runoff

Urban stormwater runoff samples from numerous locations in northeastern Illinois and around the country have been analyzed. The analytical data show that urban runoff is contaminated with a number of pollutants including sediment, heavy metals, petroleum-based hydrocarbons, nutrients, pesticides, chlorides, bacteria, and oxygen-demanding organic matter. It is becoming apparent that pollution in runoff is more damaging to many waterbodies than pollution from municipal and industrial treatment plants.

Much of the pollutant load is generated from impervious surfaces, particularly roadways and parking lots, and is related to automobile traffic. It is not surprising, therefore, that high-density, high traffic generating developments, such as commercial, industrial, and highway projects, generally contribute higher pollutant loads than lower-density residential developments. Another important factor controlling the level of pollutants in runoff from urban developments is natural vegetative filtering at the site. Unfortunately, most modern developments route impervious runoff directly into storm sewers or paved channels that convey the pollutants without any possibility for infiltration or filtering prior to discharge to receiving waterbodies.

The following are some common water quality impacts of urban stormwater runoff that have been documented in northeastern Illinois.

Sediment Contamination: The bottom substrates of urban waterbodies are typically coated with a layer of contaminated sediment. The physical presence of the sediment buries natural substrates and may interfere with the reproduction and feeding mechanisms of aquatic organisms, including fish. The pollutants in the sediment may be toxic to some sensitive organisms due to elevated concentrations of pesticides, heavy metals, and petroleum-based organic compounds. These pollutants tend to be attached to the smallest particles which are the ones that are most readily entrained and transported by runoff and the most difficult to remove from runoff. Urban runoff sediments may also have a high organic content that exerts an oxygen demand as it decomposes in receiving waterbodies.

Nutrient Enrichment/Eutrophication: Pollutant loads of phosphorus and nitrogen in urban runoff are substantially higher than in runoff from undeveloped lands. High levels of these nutrients in lakes and slow moving rivers can result in excessive growth of algae and other aquatic plants. This growth, known as eutrophication, can impair aesthetics, water quality, and recreational uses of the waterbody.

Toxicity to Aquatic Life: Urban runoff pollutant concentrations often exceed water quality standards. Although existing data are not conclusive in showing that these pollutants (e.g., pesticides, other organic compounds, and heavy metals) occur in concentrations acutely toxic to aquatic biota, evidence indicates that adverse impacts may result from chronic exposure and bioaccumulation of pollutants in the tissue of sensitive organisms. Factors that may exacerbate toxicity include high water temperature (discussed below) and low dissolved oxygen levels. Dissolved oxygen may be reduced to dangerously low levels by the decomposition of organic matter that is washed into the water by storm events, particularly during summer. Low dissolved oxygen levels also may occur during winter ice-cover conditions caused by the oxygen demand of contaminated sediments and decaying plant matter. Occasional fish kills are reported in urban lakes and detention ponds as a result of such factors.

Bacterial Contamination: The water quality standard for fecal coliform bacteria is frequently violated in urban waterbodies following storm events. The violation of this standard generally reflects the presence of significant animal or human waste in the water, and is commonly used as a criterion for the closing of swimming beaches. Additional tests are typically needed to verify whether the contamination is of human origin, typically from faulty septic systems or illicit connections between sanitary sewers and storm sewers.

Salt Contamination: The use of salt as a deicing agent can result in extremely high salinity levels in roadside ditches and downstream waterbodies. While salinity levels are typically not high enough to be acutely toxic to fish and other aquatic organisms, they may adversely affect sensitive plant communities, particularly wetland species.

Impaired Aesthetic Conditions: Urban runoff carries a number of constituents that may impair the visual appeal and clarity of receiving waterbodies. These constituents, including trash and

debris, suspended solids, and oil and grease, reduce the recreational potential of urban waterbodies.

Elevated Water Temperatures: Watershed urbanization has been shown to cause significant increases in summertime temperatures of receiving streams. This effect is due to a number of factors, including the removal of natural shading and the reduction of baseflows. Runoff from impervious surfaces that have been heated by the sun also raises the temperature. The resultant elevated water temperatures are stressful to native aquatic life and exacerbate water quality problems.

Impairment of Water Supplies: Many of the contaminants listed above adversely affect both surface and groundwater sources of water. While surface water impacts can be directly assessed from existing data, it is much more difficult to assess groundwater effects because of the complexity of multiple sources and routes into underground aquifers.

Cumulative Impacts of Development

There is clear evidence from around the country that watershed urbanization has adverse impacts on the ecological integrity and beneficial uses of downstream waterbodies. In northeastern Illinois, this impact is reflected in a relationship documented by the Northeastern Illinois Planning Commission between urbanization (as measured by watershed population density) and stream quality (as measured by the fish-based Index of Biotic Integrity) (Dreher, 1996). Based on the assessment of over forty northeastern Illinois streams and rivers which have been monitored by the Illinois EPA, it has been observed that nearly all streams in urban/suburban watersheds (i.e., with population densities exceeding roughly 300 people per square mile) exhibit signs of considerable impairment of their fish communities, with conditions being described as fair to very poor. In contrast, nearly all rural streams support fish communities that are rated good or excellent. This analysis is discussed further under Water Quality in Section 3.7.

3.5 FLOODING

Flooding is often one of the primary motivators for developing stormwater and watershed plans. Such was the case for this plan. Although Kane County has had an interest in developing a countywide plan for some time, it was recent flooding in July of 1996 and February of 1997 that prompted the County Board to initiate this plan. The July 1996 flood was the result of extremely heavy rainfall over the southern portions of Kane, DuPage, and Cook Counties and Northern Will



July 1996 flooding in residential area in Aurora Township

County. The heaviest rainfall was centered over Aurora where 16.9 inches of rainfall fell in less than 24 hours. This is the second highest rainfall ever recorded, anywhere in the country, outside of areas affected by hurricanes. As reported by the City, the flood caused over $12 million in damages in the two hardest hit subdivisions in Aurora and, citywide, damages likely exceeded $20 million. Despite the fact that heavy rainfall was limited to the southern portion of the County, flood stages on the Fox River were very high — equaling or exceeding the 100-year stage in Aurora. Flooding was even more severe along some of the smaller creeks whose watersheds are primarily in southern Kane County. Essentially all of these creeks experienced record high stages. The stage on Blackberry Creek in Aurora exceeded the 500-year stage published in the flood insurance study.

The February 1997 flood was much different than the July 1996 event. First, the rainfall, while large, was nowhere near as great as in July. The rainfall during the February event was on the order of 3.0 to 3.5 inches which is between a 2-year and 5-year rainfall. However, the rain fell on snow covered and saturated ground causing significant runoff and streamflows which had frequencies rarer than would be suggested by the frequency of the rainfall. In many areas of the County (particularly northern Kane County), the February event produced higher stages on the Fox River than the July event.

Comparing the July and February events illustrates the variety of mechanisms and conditions that produce large flood events. In general, smaller, urban watersheds will respond most to short duration (on the order of a couple of hours), high intensity rainfalls. These types of rainfalls typically are the result of summer thunderstorms. Large watersheds will generally respond to either long duration (on the order of days to weeks) and widespread (geographically) rainfalls and/or to snowmelt events. These types of events typically occur in spring.

Flood damages in Kane County are primarily the result of overbank flooding along streams and rivers and local drainage-related flooding due to ponding in isolated depressions, high water tables, and inadequate stormwater infrastructure. Basement flooding can also occur where sanitary sewer systems accept excess stormwater runoff.

Crop damage also occurs from flooding. Crop losses can be the result of excessively wet spring seasons preventing farmers from planting their fields and from extended duration floods later in the growing season that damage crops established but not yet harvested. Conversely, drought can also cause substantial crop losses.

Flooding should be distinguished from flood damages. Flooding is a naturally, regularly occurring phenomenon. Flooding results in flood damages only when they cause destruction, such as when they inundate developed areas. Floods damage buildings and infrastructure, threaten health and safety, destroy crops, and disrupt business and traffic, making what had been a natural (and often benign) occurrence, a hazard to people and modern development. The following findings are based on the flood damage survey distributed to each of the municipalities and townships with the stormwater management questionnaire. The information provided by the communities was supplemented with information provided by Kane County Development Department, Highway Department, and Forest Preserve District staff, NRCS, and local consultants.

Findings:

- Although each of the Fox River municipalities appear to have an area that is flooded by the Fox River, it appears that, in general, development within the floodprone areas of the Fox is minimal.
- Most municipalities have areas of flooding related to local drainage, some more than others. It appears that local drainage flooding is more problematic than overbank flooding in many municipalities.
- There appears to be somewhat of a relationship between the age of development and the amount of flooding problems. The oldest areas of most of the towns (built prior to the early part of this century) are generally not subject to flooding. The areas of newest development (eighties and nineties) also do not appear to be subject to significant flooding. Those areas developed during the fifties and sixties appear to be most subject to flooding.
- Local drainage problems are often the result of structures located in isolated depressions and former wetlands with no surface outlet. Other local drainage problems are associated with older developments (post WWII and pre-detention) that were constructed without effective stormwater drainage systems. Finally, some local drainage problems, particularly in the rural areas, are related to high water tables which may be the result of field tiles that no longer function properly.
- Urban runoff is sometimes being discharged to agricultural drain tiles and urban construction activities sometimes disrupt drain tiles. Where urban runoff is being discharged to tiles, crop flooding can occur downstream as a result of the excess flow and sometimes the tiles themselves can be damaged from the additional water pressure. Where tiles are disrupted during construction activities, local flood damages (particularly basement flooding) occur since the tile is no longer present to control the water table.
- Approximately 65% of the existing mapped floodplain occurs in land uses that are available for development (agriculture and vacant). New flood damage areas could be created if buildings and roads are constructed within these currently undeveloped floodplain areas. Flood damages could increase downstream if the floodplain storage in these areas is not preserved.

Discussion: Although there are isolated areas of frequent flood damage and very rare storm events can occur which will cause widespread damage, overall, documented flood damages are not severe in Kane County relative to some of the more urbanized counties in the region. Experience in other parts of the region and other parts of the country suggests that as the level of urbanization increases, flood damages will also increase. This is partially because there are simply more damageable structures in an urbanized watershed. However, there are two other primary contributing factors. First, as the watershed urbanizes and associated runoff volumes increase, floodplains expand to include those areas that were previously outside the floodplain. Second, as the intensity of development and value of land increases, the potential for structures to be constructed in inappropriate, flood prone locations increases. Both of these causes of increased flood damage can be minimized through proper planning and regulation.

Flooding of agricultural land is somewhat different than flooding of urban land. In most areas, there are restrictions prohibiting construction of urban land uses in the floodplain. However, there is nothing prohibiting using the floodplain for agricultural purposes. While crop production may be an appropriate use for floodplain areas, those individuals utilizing the floodplain must recognize that there will be flood-related crop losses from time to time.

3.6 STREAMBANK EROSION

Erosion and deposition within a stream are natural processes. In a stable stream, erosion and deposition are in dynamic equilibrium and stream characteristics such as bankfull width and depth and stream slope, sinuosity, and length are relatively constant over time. These stream characteristics are strongly influenced by the bankfull streamflow condition which is typically a 1-year to 2-year flood event in a natural watershed. The processes of erosion and deposition can be greatly accelerated as a watershed urbanizes. Urbanization causes the frequency and duration of bankfull flow conditions to increase and the stream characteristics to adjust to the changing hydrologic conditions.

Streambank erosion can also be problematic in rural areas due to channelization. When a stream is channelized or straightened, the stream slope is increased, increasing the stream's energy and ability to move sediment. The stream will attempt to re-establish its equilibrium bed slope. This can occur either by re-establishing a meander pattern or by head-cutting where the bed of the stream continues to lower and the lowering progresses upstream. In either case, the result is significant streambank erosion as the stream either moves laterally or down or both. Downcutting can also occur downstream of on-stream impoundments that capture the stream's bedload sediment. As the sediment-free discharge from the impoundment attempts to pick up its equilibrium bedload, downcutting often occurs.

Vegetation plays a critical role in the erosion process. Since streambank erosion tends to originate at the toe of the streambank, vegetation along the toe of the slope can create a boundary layer of lower velocity flow that protects the toe of the bank. The other role that vegetation plays is to bind the soil together, effectively increasing the angle of repose (the natural slope that a given soil type can support without slipping). However, for this to be effective, the roots must extend down to the toe of the slope and beyond. Shallow root systems that do not extend past the bottom of the channel (i.e., turf grass and reed canary grass) bind only the top layer of soil and therefore do little to prevent failure that originates at the toe of the bank. Also, excessive woody vegetation that shades the streambanks will prevent growth of desirable herbaceous vegetation that provides both ground cover and stabilizing root systems.

Armoring of streams with hard materials, such as rip rap and concrete lining, can "fix" local erosion but lead to increased erosion downstream. Armoring tends to transmit flow energy downstream rather than absorb energy as vegetation does. While the armored area may remain relatively stable, the area immediately downstream will be subject to higher energy levels and flow turbulence as the runoff discharges from the armored reach and the flow attempts to dissipate its energy.

Excessive streambank erosion is both a water quality concern and an infrastructure concern. In urban areas, severe streambank erosion can result in loss of adjacent private property and can even threaten structures constructed too close to the stream. In rural areas, streambank erosion can lead to loss of valuable cropland.

At the other end of the erosion process is deposition which can lead to reduced conveyance capacity within the stream and blockage of culverts. Deposition is exacerbated by upstream channel erosion as well as erosion from cropland and construction sites.

The following findings are based on information provided by the communities, townships, and county agencies in the flood damage survey distributed with the questionnaire.



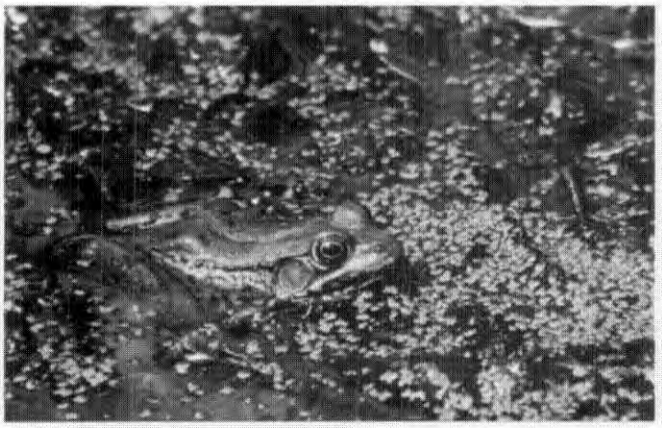


Streambanks in need of stabilization

Findings:

- Although streambank erosion and/or siltation do not appear to be large problems throughout the County, significant problems were identified in a number of areas. In terms of the number of identified locations, the problems appear to be equally distributed between the urban and rural portions of the County.
- Streambank erosion problems within the municipalities appears to be concentrated on small streams whose watersheds are mostly urban.
- It appears that the identified erosion problems occur more in channelized reaches than in natural reaches.
- Debris blockages and vegetation overgrowth were also identified as problems in a number of locations around the County.
- Lack of stream maintenance is reported to be affecting agricultural drainage and contributing to flooding of agricultural lands.
- The maintenance activities of drainage districts will tend to address the overgrowth problems. However, in many cases, these problems are addressed on a very infrequent basis which tends to result in dramatic shifts from heavily wooded streams to barren streams.

Discussion: With development in Kane County concentrated along the Fox River, many of the Fox River tributary watersheds are still largely rural, except at the downstream end. Consequently, the identified areas of excessive erosion along some of the Fox River tributaries may be the result of past channelization and inappropriate riparian vegetation as much as from urban hydrology. Conversely, most of the small Fox tributaries, whose watersheds are largely within urban areas, have excessive erosion problems. This suggests that streambank erosion along the larger tributaries as well as any of the other streams in the County could increase significantly as their watersheds urbanize in the future. As this plan was being prepared, the County initiated a stream maintenance program, including projects on Blackberry Creek, Indian Creek and Mill Creek.



Aquatic life along the Fox River

3.7 WATER QUALITY AND WATERBODY USE IMPAIRMENT

Water pollution problems can be caused by many sources including agricultural runoff, construction site runoff, urban runoff, failing septic systems, and industrial and municipal wastewater discharges. In addition to potential human health concerns, degraded water quality leads to impaired aquatic ecosystems and recreational fisheries. In addition to water pollution, physical changes in a waterbody or watershed such as channelization, removal of riparian vegetation, excessive erosion, dredging, hydrologic destabilization, and loss of wetlands are sources of waterbody impairment.

Related to hydrologic destabilization, protection of groundwater resources is another potential concern. A shift from groundwater-dominated hydrology to surface water-dominated hydrology can significantly affect water temperatures, water chemistry, and flow variability. This can have a profound affect on streams, lakes, and wetlands in terms of their ability to support aquatic and recreational uses. The increase in flow variability and water level fluctuation associated with a shift from groundwater to surface water can also have a significant impact on stream, lake, and wetland morphology through erosion and deposition.

Because of the moderate permeability of the majority of Kane County soils, discharge to the streams in the undeveloped portions of the County is largely via subsurface runoff. A transition from native soil cover to impervious surfaces and lawns that are modified, compacted, and positively graded during construction will likely lead to a shift from streamflows dominated by subsurface runoff to streamflows dominated by surface runoff. The rapidly permeable subsoils in portions of the Eakin Creek, Tyler Creek, Coon Creek and Blackberry Creek watersheds could cause the headwater portions of these creeks to be more susceptible to the negative impacts of impervious cover associated with urbanization. This may also be true of the small northern Fox tributaries, such as Sleepy Creek and Jelkes Creek in the Dundee/Elgin area.

Streambank erosion not only results in loss of property and riparian habitat where the erosion occurs but also results in sedimentation, high turbidity, and burial of natural substrates in slower-moving reaches and lakes downstream.

The information on stream and lake quality in the findings of this section were generally taken from the Illinois Water Quality Report: 1994-1995 (often referred to as the 305b report) prepared by the Illinois

Table 3.6 *Kane County Stream Quality (IEPA, 1996) — continued on next page*

Waterway	Overall Support[1]	Assessment Level and Date[2]	Biological Stream Characterization		
			Rating[7]	Approximate Monitoring Location	Monitoring Date
Coon Creek Watershed					
Hampshire Creek	Full Support	E/HS, 1991	NR	—	—
Burlington Creek	Full Support	E/HS, 1991	NR	—	—
Coon Creek	Full Support	C/PM, 1993	NR	—	—
Eakin Creek Watershed					
Eakin Creek	Full Support	E/HS, 1990	NR	—	—
South Branch Kishwaukee R.	NR	—	B	NW of Huntley	1990
Union Ditch Watershed					
Union Ditch	Full Support in DeKalb Co.	M, 1983	B	East Br. Kishwaukee R., DeKalb County	1983
North Fox Mainstem Watershed					
Jelke Creek	Full Support	PJ, 1995	NR	—	—
Poplar Creek	Minor Impairment	M, 1982	C	Route 25	1982
Poplar Creek	Full Support	C/PM, 1995	C	Villa St., Cook Co.	1982
Brewster Creek	Full Support	VD, 1995	C[4]	Not Reported	1985
Norton Creek	Full Support	M, 1985	C	Severson FP	1985
Fox North	Full Support	C/PM,E/ HS & CS, 1995	C	Kane/McHenry Co. Line	1995
Fox North	Minor Impairment	M, 1982	C	Huntley Road, Carpentersville	1982
Fox North	Full Support	C/PM, 1995	C	Highland Ave., Elgin	1995
Fox North	Full Support	E/HS, 1993	C	Route 20, Elgin	1993
Tyler Creek Watershed					
Tyler Creek	Full Support	M, 1982	B[5]	Randall Road, Elgin	1997
Tyler Creek	Full Support	M, 1982	C	Tyler Creek FP	1982
Ferson/Otter Creek Watershed					
Fitchie Creek	Full Support	PJ, 1995	NR	—	—
Stony Creek	Full Support	M, 1988	B	Not Reported	1988
Otter Creek	Full Support	PJ, 1995	NR	—	—
Ferson Creek	Minor Impairment	M, 1982	B[5]	Leroy Oaks FP	1997

Table 3.6 *Kane County Stream Quality (IEPA, 1996) — continued from previous page*

Waterway	Overall Support[1]	Assessment Level and Date[2]	Biological Stream Characterization		
			Rating[3]	Approximate Monitoring Location	Monitoring Date
South Fox Mainstem Watershed					
Fox South	Minor Impairment	M, 1987	C	Fabyan FP	1987
Fox South	Minor Impairment	M, 1982	C[5]	Wilson St., Batavia	1982
Fox South	Full Support	C/PM, 1995	C[6]	Mill St., Montgomery	1995
Fox South	Full Support	E/HS, 1992	C	Kendall Co.	1992
Mill Creek Watershed					
Mill Creek	Full Support	M, 1982	C	Burnidge Road	1982
Mill Creek	Full Support	M, 1982	B	Near Route 31	1982
Indian/Waubonsie Creek Watershed					
Indian Creek	NR	—	D[4]	Not Reported	1990
Waubonsie Creek	Full Support[7]	—	D[7]	DuPage County Line	1997
Waubonsie Creek	Full Support[7]	—	D[7]	Route 34, Oswego	1997
Waubonsie Creek	Full Support	M, 1982	B[7]	Route 25, Oswego.	1997
Blackberry Creek Watershed					
Lake Run	Full Support	PJ, 1995	NR	—	—
East Run	Full Support	PJ, 1995	NR	—	—
Blackberry Creek	Full Support[8]	—	C[8]	Keslinger Road	1997
Blackberry Creek	Full Support[8]	—	C[8]	Seavey Road	1997
Blackberry Creek	Full Support	M, 1982	—	—	—
Blackberry Creek	Full Support[8]	—	C[8]	Galena Road	1997
Blackberry Creek	Full Support[8]	—	C[8]	Jericho Road	
Blackberry Creek	Full Support[8]	—	B[8]	Kennedy Road, Kendall County	1997
Blackberry Creek	Full Support	C/PM, 1995	—	—	
Blackberry Creek	Full Support	—	B[8]	Yorkville, Kendall Co.	1997
Big Rock/Welch Creek Watershed					
Welch Creek	Minor Impairment	M, 1988	C	Not Reported	1988
East Branch Big Rock Creek	Full Support	M, 1988	C	Not Reported	1988
West Branch Big Rock Creek	Full Support	PJ, 1995	NR	—	—
Big Rock Creek	Full Support	M, 1982	B	Granart Road	1982
Big Rock Creek	Full Support	M, 1982	B	Kendall Co.	1982
Little Rock Creek	Full Support	M, 1982	C	Kendall Co.	1982

Table 3.6 *Kane County Stream Quality (IEPA, 1996) — continued from previous page*

[1] **Overall** Use Support level which is virtually always based on support of aquatic life.

[2] Where assessment is based on monitoring (any assessment type except PJ), the entire upstream reach is assumed to have same use support level as monitoring site.

NR - Indicates assessment method not reported.

PJ - Indicates assessment based on professional judgement.

VD - Indicates assessment based on data collected by volunteers

M - Indicates unspecified monitoring that is more than five years old.

C/PM - Indicates fixed station chemical/physical monitoring , conventionals plus toxics.

E/HS - Indicates ecological/habitat surveys.

CS - Indicates combined sampling of sediment, water, and biota for chemical analysis.

[3] Biological stream characterization based on fish surveys at site indicated.

NR - No biological stream characterization for this reach of stream.

[4] From Biological Stream Characterization Work Group (1996), no rating available from IEPA 1996.

[5] Biological stream characterization from recent but unpublished sampling (Pescitelli, 1997)

[6] Index of Biotic Integrity is in the "B" range at this site but entire Fox River within Kane County considered one reach with a "C" rating.

[7] From Waubonsie Creek Biological Survey (IDNR, 1997). Use Support Rating based on downstream station

[8] From Blackberry Creek Biological Survey (IDNR, 1997). Use Support Rating based on downstream station

EPA. The data in the Illinois Water Quality Report is summarized in Table 3-6. In some cases the data from the Illinois Water Quality Report was supplemented with data from the Biological Streams Characterization Work Group (1996).

Two basic types of stream classifications are presented in the Illinois Water Quality Report. There are use support classifications and indices of biotic integrity. The use support classifications are ratings of the level to which a waterbody is supporting its designated uses. Potential designated uses are fish consumption (i.e., fish are safe for human consumption), aquatic life (i.e., the waterbody supports aquatic life including fish and bottom dwelling organisms), swimming (primary contact), secondary contact (i.e., boating, etc), and public water supply. Virtually all of the streams in Kane County have fish consumption, aquatic life, and swimming as their designated uses. The Fox River also has public water supply as a designated use. In most of the streams, the only evaluated use is aquatic life. In addition to the individual uses, there is an overall use rating. In most cases, if the waterbody is supporting the aquatic life use, it is considered to be supporting its designated uses, overall. For example, there are some streams that are not supporting the swimming use but are still considered to be fully supporting their designated uses, overall, because they fully support the aquatic life use. There are four levels of use support:

- full support;
- partial support/minor impairment;
- partial support/moderate impairment; and
- non-support.

The other type of classification system is biotic indices. There are three separate indices. The first index is the index of biotic integrity (IBI). This index is based on fish surveys. Based on the number of fish and diversity of fish species, as well as the presence of species that are intolerant of pollution, an index on a scale of 12 to 60 is computed. The balance between insectivores (fish that eat insects), piscivores (fish that eat fish), and omnivores (fish that eat both insects and fish) also enters into the calculation of the index. Fish population characteristics integrate the impact of chemical, hydrologic, and physical conditions of a stream and are therefore ideal indicators of overall stream quality. The IBI is reported in both the Illinois Water Quality report and the Biological Streams Characterization Work Group report.

The second index is the predicted index of biotic integrity (PIBI). This index is on the same scale as the IBI but is based on observed habitat conditions rather than actual fish samples. The intent of the PIBI is to be able to predict the IBI when no fish sample data is available. The PIBI could also be used as an indicator of the potential of the stream to support a diverse and balanced population of fish. In many cases the PIBI is higher than the IBI, indicating relatively good aquatic

habitat compared to the fish communities present. This is generally due to low water quality but could also be due to a downstream impediment to fish migration such as an impoundment. The PIBI could also be lower than the IBI if the fish sampling site is in a low quality habitat immediately adjacent to a high quality receiving waterbody.

The final index is the macroinvertebrate biotic index (MBI). The MBI is very similar to the IBI except it is based on sampling of the macroinvertebrates (e.g., insects, crawfish, etc.) in the bottom of the stream rather than sampling of fish. The MBI is on a scale from 1 to 10 with 1 being the best condition and any MBI less than 6.0 indicates a good macroinvertebrate community. Because macroinvertebrates are much less mobile than fish, the MBI can be useful for making upstream/downstream comparisons in the vicinity of features that may be affecting stream quality (i.e., wastewater plant discharges, construction sites, urban developments, etc.).

The IBI is the most commonly used of the biotic indices. Another way to present the IBI is a system referred to as the Biological Stream Characterization (BSC) presented in the Biological Streams Characterization Work Group report. The table below presents the BSC and its relationship to the IBI. The Kane County 2020 Land Resource Management Plan (Kane County Development Department, 1996) refers to the BSC.

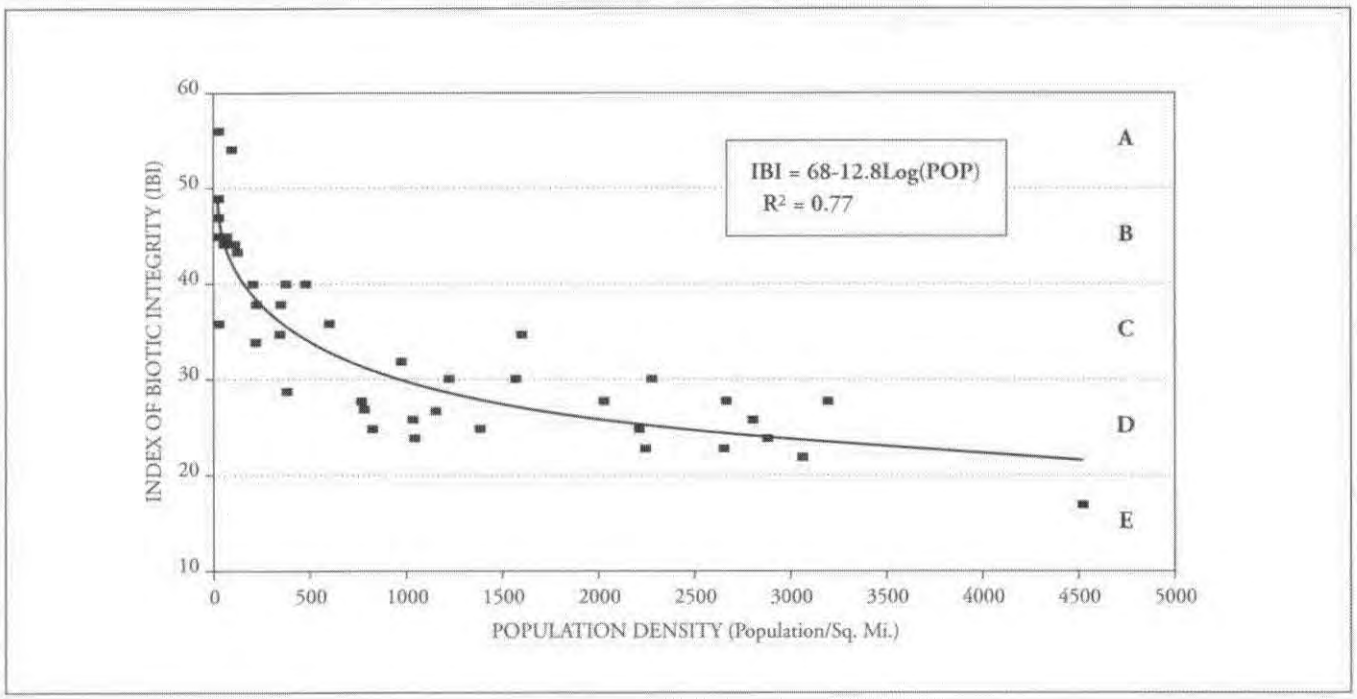
Table 3-7 *Illinois Biological Stream Characterization*

IBI	Rating	Aquatic Resource Description
51-60	A	Unique Aquatic Resource
41-50	B	Highly Valued Aquatic Resource
31-40	C	Moderate Aquatic Resource
21-30	D	Limited Aquatic Resource
<20	E	Restricted Aquatic Resource

As was previously mentioned in Section 3.4, NIPC performed a correlation analysis between stream quality, based on IBI, and watershed population for many headwater streams around the region (Dreher, 1996). The results are shown graphically in Figure 3-5. In that analysis it was found that there were no A streams with watershed population densities above 100 people per square mile and no B streams with population densities above approximately 200 to 300 people per square mile. It is clear that there is a strong correlation between stream quality and population density. It is also apparent that a stream's sensitivity to population density decreases with increasing population density.

Analysis in other parts of the country (Schueler, 1994) has shown similar results when relating watershed imperviousness to stream quality. In general, it was found that stream quality was degraded when watershed imperviousness exceeded 10% to 15%. In both the

Figure 3.5 *Biotic Integrity vs. Urbanization*



NIPC and Schueler reported analyses it is likely that many of the watersheds at least partially developed prior to modern stormwater standards.

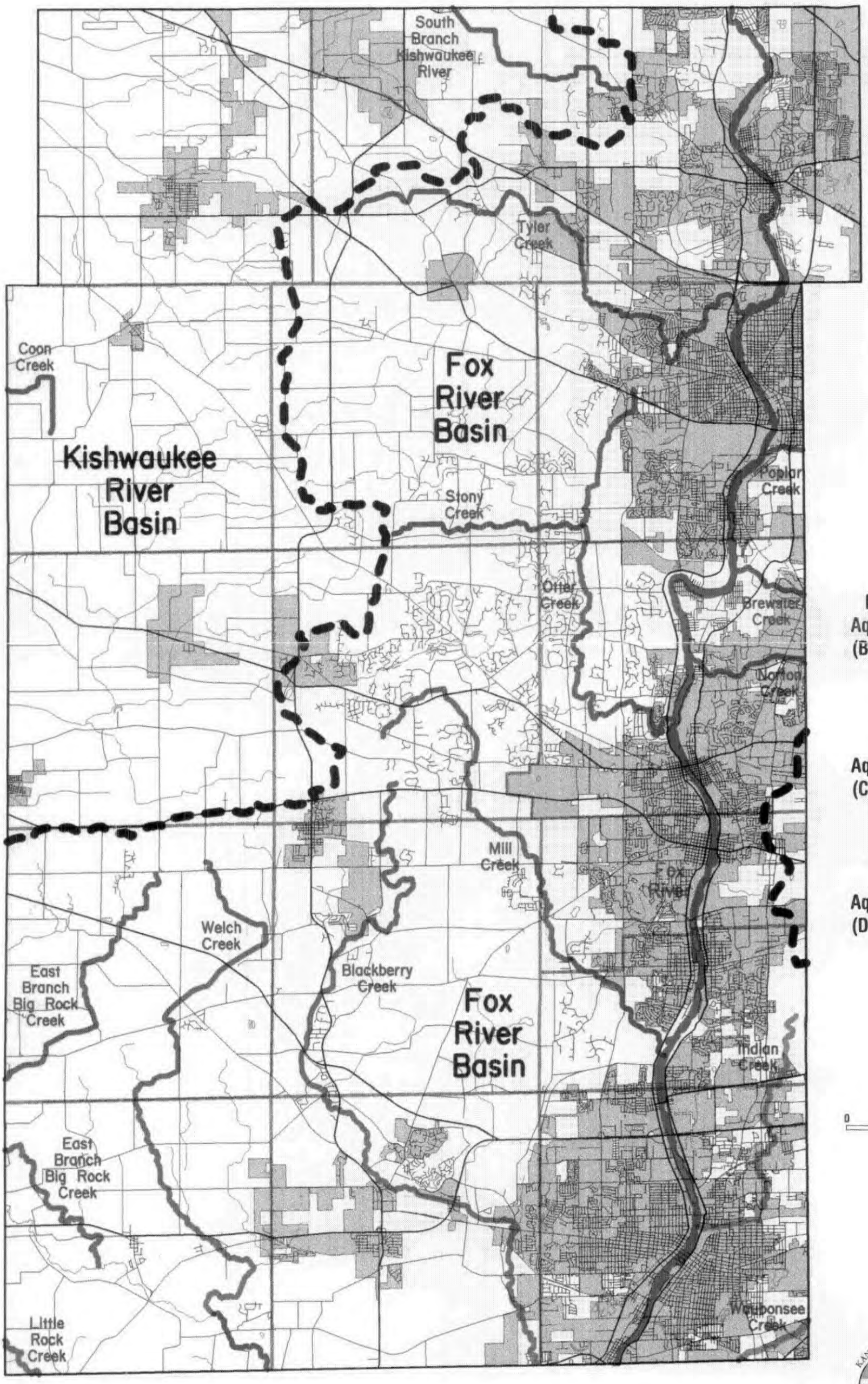
Findings:

- Based on IEPA's designated stream use classification system, all but a few of the streams in Kane County are classified as fully supporting their designated uses, overall. This includes all of the evaluated streams in the Coon Creek, Eakin Creek, Tyler Creek, Mill Creek, and Blackberry Creek watersheds and many of the streams in the other primary watersheds. However, from an aquatic biology perspective, the Illinois Biological Stream Characterization system shows that more than half the monitored stream reaches are only rated as "C" streams (i.e., moderate aquatic resources). All but two of the remaining monitored stream reaches are fairly high quality and rated as "B" streams (highly valued aquatic resource), including most of the mainstem of Big Rock Creek, Stony Creek, Ferson Creek downstream of the confluence with Otter Creek, South Branch Kishwaukee River (Eakin Creek watershed), Tyler Creek upstream of Randall Road, and Mill Creek downstream of Fabyan Parkway. There are no "A" streams in Kane County. However, there are also no "E" streams. There are two low quality stream reaches with "D" ratings in Kane County (Indian Creek and Waubonsie Creek). As a matter of perspective, one of the objectives of this Plan as well as one of the objectives in the Kane County 2020 Land Resource Management Plan is that all Kane County streams achieve a "B" or better rating. (See Table 3-6 and Figure 3-6 for the BSC stream ratings for stream reaches within Kane County.)
- **Comparing the rural watersheds** (less than 100 or 200 people per square mile) of Kane County to the rural watersheds of the other two rural counties in the region shows that McHenry and Will Counties both have a few "A" streams while Kane County does not. Further, the rural Kane County streams are generally "B" or "C" streams while the rural Will and McHenry County streams are generally "A" or "B" streams.
- **Comparing the more urban watersheds** of Kane County to those of Will and McHenry Counties shows that the Kane County streams are as high or higher quality, particularly in comparison to Will County which has a number of "D" streams. From a use attainment perspective, Will County also has a number of moderately impaired and non-support streams while the lowest quality streams in Kane County have only minor impairments.
- Within the **Coon Creek watershed,** all of the streams are identified as fully supporting their designated uses, overall. None of the streams have a BSC rating.
- **Eakin Creek** is identified as fully supporting its designated uses, overall. However there is no BSC rating for Eakin Creek. The South Branch of the Kishwaukee River (which Eakin Creek drains to in McHenry County) is rated as a "B" stream. The South Branch of the Kishwaukee River has no designated use rating in Kane County but is a full support stream downstream in McHenry County.
- Within the **Union Ditch watershed,** none of the streams have designated use or BSC ratings but the creek and many of its tributaries (most referred to as ditches) are very channelized in Kane County. However, the East Branch Kishwaukee River, to which Union ditch drains (in DeKalb County), is reported to be fully supporting its designated uses, overall, and is rated as a "B" stream.
- Within the two **Fox River mainstem watersheds,** the urbanized reaches generally have minor impairments while the non-urbanized reaches are fully supporting their designated uses, overall. The reported causes of impairment include habitat alterations, siltation, and low dissolved oxygen levels resulting from stream modifications, agricultural and urban runoff, and septic systems. The Fox River has a "C" rating throughout Kane County. Poplar Creek, within Kane County, is cited as having minor impairments caused by habitat loss from channelization and streambank erosion. Further upstream, outside Kane County, Poplar Creek is identified as fully supporting its designated uses, overall. Poplar Creek is rated as a "C" Stream. Both Norton and Brewster Creeks are fully supporting their designated uses, overall, and are rated as "C" streams.
- Within the **Tyler Creek watershed,** only Tyler Creek is rated by IEPA. Tyler Creek is considered a full support stream and classified as a "C" stream. However, the monitoring data used to evaluate Tyler Creek is more than five years old. More recent, but currently unpublished information shows that Tyler Creek is a "B" stream between Big Timber Road and Randall Road (Personal Communication with Steve Pescitelli, IDNR, 1997).
- Within the **Ferson/Otter Creek watershed,** Ferson Creek shows minor impairment and based on the published BSC is rated a "C" stream. The reported causes of impairment are nutrients and siltation from agricultural runoff, channelization, and streambank erosion. More recent, but currently unpublished information shows that the downstream end of Ferson Creek is a "B" stream based on monitoring at Leroy Oaks Forest Preserve (Personal Communication with Steve Pescitelli, IDNR, 1997). The remaining rated streams in the watershed (Otter Creek, Stony Creek, and Fitchie Creek) are fully supporting their designated uses, overall. Stony Creek is classified as a

Figure 3.6

Biological Stream Characterization Rating

Kane County, Illinois



"B" stream and Otter Creek is classified as a "C" stream. Ferson Creek upstream of its confluence with Otter Creek has no BSC rating.

- **Mill Creek** is rated as a "C" stream upstream of Fabyan Parkway and as a "B" stream downstream of Fabyan Parkway. Mill Creek is considered a full support stream.
- Within the **Blackberry Creek watershed,** all of the Blackberry Creek mainstem and its tributaries, including Lake Run and East Run are fully supporting their designated uses, overall. Based on recent sampling, Blackberry Creek is a "C" stream within Kane County and then improves to a "B" rating in Kendall County (Rung and Pescitelli, 1997).
- Within the **Big Rock/Welch Creek watershed,** Big Rock Creek, its two branches (East Branch and West Branch), and Little Rock Creek are fully supporting their designated uses, overall. Welch Creek is identified as having minor impairments due to high nutrient levels related to municipal wastewater discharges and agricultural runoff. The mainstem of Big Rock Creek is rated as a "B" stream. Welch Creek and the East Branch of Big Rock Creek are rated as "C" streams.
- Within the **Indian/Waubonsie Creek watershed,** Waubonsie Creek is fully supporting its designated uses based on IEPA data at the downstream end. However, recent fish sampling (IDNR, 1997) shows that Waubonsie Creek is only a "D" stream within DuPage and Kane Counties where the headwaters have been developed, wetlands have been drained, and the stream has been channelized. Near the confluence with the Fox River in Kendall County, Waubonsie Creek is in a much more natural, non-channelized condition and improves to a "B" stream. Indian Creek has not been given a use support rating by IEPA but is rated as a "D" stream. Within Kane County, Waubonsie and Indian Creek are the two lowest rated streams.
- There are relatively few **lakes in Kane County** and there is very little data on the lakes that do exist. Of the four lakes evaluated (Gregory, Jericho, Mastadon, and Patterson), Jericho Lake and Lake Patterson (formerly Oakhurst Lake) are reported to be fully supporting their designated uses, overall. However, Jericho Lake is threatened by organic enrichment and low dissolved oxygen due to agricultural, construction site, and urban runoff as well as shoreline erosion and excessive waterfowl populations. Overall, Mastadon Lake is rated as non-support. The causes of its low quality are reported to be excessive nutrient levels, siltation, organic enrichment, suspended solids, and noxious aquatic plants due to urban runoff, contaminated sediments, and excessive waterfowl. Overall, Gregory Lake is identified as being moderately impaired (second lowest rating). However, it is fully supporting the aquatic life use. The causes and sources of impairment are not reported.

Discussion: Although most of the streams in Kane County are considered to be fully supporting their designated uses, the biological quality is only moderate in a number of the streams as evidenced by their BSC "C" rating. It is not clear why the biological quality in a number of rural Kane County streams tends to be somewhat lower than in a number of the rural McHenry and Will County streams even though the population densities are similar in the rural watersheds of all three counties. However, it is clear that there are a number of other factors, in addition to the level of urbanization, that affect stream quality. The quality of downstream waterbodies can influence the fish populations in the assessed stream, particularly for smaller watersheds. If there is a stable population of fish from a high quality downstream waterbody, the assessed stream can benefit from that source of fish. In Kane County, the Fox River, which is the receiving waterbody for most of the county, has a "C" rating. In Will County, the "A" streams are all tributaries to the Kankakee River which itself is a "B" to "A" stream. Similarly, in McHenry County, the Kishwaukee River is an "A" stream throughout much of its large watershed.

Related to potential sources of fish, some of the Kane County streams have dams on them (Waubonsie Creek, Blackberry Creek, and the Fox River, in particular). Dams can act as barriers to fish migration which can impede re-colonization of otherwise high quality streams after extreme events (e.g., the July 1996 flood event). Also, the degree of channelization and buffering of a stream can significantly influence fish populations. Finally, low gradient streams may naturally have lower biological diversity than steeper streams (Personal communication with Steve Pescitelli, IDNR, 1997) and many of the rural Kane County streams are low gradient streams.

Although many of the Kane County streams appear to be impacted to some degree, streams have a remarkable ability to recover if provided adequate conditions such as re-establishment of riparian buffer areas, removal of impediments to fish migration, and adequate hydrologic and water quality conditions. What is unknown at this time is the relative importance of physical stream conditions (i.e., in-stream habitat and buffers) versus watershed conditions (i.e., stable hydrology and high water quality). However, it is known that these are both important and not independent factors. Degraded watershed conditions lead to degraded in-stream conditions. For example, highly variable hydrology can lead to excessive streambank erosion and destruction of physical habitat. Also, low water quality runoff such as

high sediment loads can lead to burial of natural substrates and further degraded in-stream conditions. Finally, degraded in-stream conditions can also be a source of hydrologic and water quality problems. For example, loss of floodplain storage can cause "flashier" hydrology downstream. Also, streambank erosion can be a significant source of sediment to downstream stream reaches, lakes, and wetlands.

Clearly, intensive use of stormwater best management practices (including stream, lake, and wetland buffering and protecting against physical modifications) should be able to reduce the impacts of development. However, the extent to which the curve relating stream quality to watershed population density can be shifted is currently unknown. With existing data, it is difficult to assess the overall impact of best management practices since there are few, if any, watersheds in which all development has been constructed with adequate BMPs. Also, there are numerous other important factors which may not be related to urbanization such as the degree of channelization and buffering of the stream, watershed soils, and presence of wetlands which also significantly affect stream quality.



Pool and riffle sequence on Blackberry Creek

3.8 SUMMARY AND CONCLUSIONS

Kane County is very diverse in its land uses with portions of the County being quite urban and having relatively high densities and other portions being very rural with very low population densities. The population densities of the twelve watersheds varies from a low of 42 people per square mile (0.07 people/acre) to a high of 2500 people per square mile (3.9 people/acre). Many of the Fox River tributaries exhibit a distinctive development pattern with the majority of the watershed areas being quite rural but the lower portions of the watersheds drain through some of the highest density areas in the County.

Kane County is experiencing the impacts of both agricultural and urban development including increased flood damages, streambank erosion, and degradation of stream quality.

Although flooding is not a widespread problem in Kane County, there are a number of locations where flood damage is severe. In terms of the number of problems areas, local drainage problems are more widespread than overbank flooding problems.

Streambank erosion is a significant problem in selected locations and the problem does not appear to be limited to urban areas. Overgrowth of stream channels by non-native woody vegetation is also a problem in many areas of the County. The overgrowth appears to be contributing to both flooding and streambank erosion problems.

Overall, biological stream quality in Kane County could best be characterized as moderate with no very high quality streams and only two low quality reaches (on the edge of the County). In comparison to other outlying counties, the range of stream quality conditions is relatively narrow (i.e., all of the rated streams in Kane County, except two on the edge of the county, are either "C" or "B" streams).

Less than half the monitored stream reaches are currently achieving the goal of "B" or higher quality. With continued urbanization of the County, it will become increasingly difficult to achieve this goal countywide unless extraordinary protective measures (e.g., stormwater BMPS) are implemented for new development. It will also be difficult to achieve this goal countywide without improved watershed and stream management in the rural areas that will not be experiencing urbanization for some time and are currently not achieving stream quality goals.

CHAPTER 4

ASSESSMENT OF STORMWATER MANAGEMENT ACTIVITIES IN KANE COUNTY

The purpose of this chapter is to assess the current status of stormwater management activities in Kane County. The primary focus of this assessment is on urban stormwater-related activities. However, considering the large amount of agricultural land use in the county, agricultural activities must also be addressed. As in Chapter 2, this assessment is organized into the four functional categories listed below.

- Administration and Management
- Regulation
- Planning
- Maintenance

Each municipality, township, park district, and drainage district, as well as each of the county agencies was requested to complete a questionnaire that was sent out in April 1997. The survey requested information related to the following activities:

- The primary issues facing the community or agency and the level of public involvement;
- Planning and maintenance of stormwater management facilities as well as methods of funding those activities;
- Coordination between municipalities, County, townships, park districts, and drainage districts; and
- Regulatory standards for stormwater drainage, floodplain management, soil erosion and sediment control, and stream and wetland protection.

After a series of follow-up requests, a response to the questionnaire was received from 19 of the 25 municipalities and the County (76%) that have jurisdictional areas within Kane County. Responses were also received from 8 of the 15 townships (53%), two drainage districts, two sanitary districts, 3 of the 9 Park Districts, and the Forest Preserve District. (See Appendix A for a copy of the questionnaire along with summaries of the responses.) The following assessment is based on review of those responses and the agency descriptions in Chapter 2 as well as review of local water resource studies, and input from Kane County staff, the stormwater Technical Advisory Committee (TAC), and NRCS regarding local programs and conditions. The assessment is intended to reflect the adequacy of local programs with respect to achieving the goals and objectives adopted by the Kane County Stormwater Management Planning Committee and in addressing the stormwater conditions and problems identified in Chapter 3.

4.1 ADMINISTRATION AND MANAGEMENT

The findings in this section are primarily based on the questionnaire.

Findings:

Administration

- The municipalities and the County are the primary administrators for stormwater management programs in Kane County. The townships are involved in a few selected locations, but generally the townships play a minor role.

Community Concerns

- In most communities, it was reported that the most significant concerns of the residents as well as the community leaders are drainage problems and overbank flooding. In terms of the number of communities, drainage problems appear to be a more critical concern than overbank flooding. However, in terms of the dollar value of damages, overbank flooding may be the more pressing issue. Significantly fewer communities reported that water quality was a critical issue. However, in four communities water quality was ranked as the first or second most important issue.
- Public complaints appear to be addressed primarily by municipal or County staff or officials. In some cases, particularly for larger, more complicated problems, consultants also become involved in addressing complaints. Some communities have a formalized approach to addressing complaints. In general, complaints are first investigated and the problem assessed by staff. If the problem is minor, staff may immediately address the concern. For larger problems, consultants are involved to identify alternatives and develop a plan to alleviate the problem and then, as appropriate, funds are budgeted to remediate the problem.

Public Education/Involvement

- Almost a third (32%) of the communities indicated that they had performed some form of public education activities and almost 65% indicated that the public recognized stormwater



Children assisting with streambank stabilization project on Tyler Creek

management as a significant issue. Most of the public education appeared to be related to site-specific or event-specific issues (e.g., the July 1996 event).

- Although there has been some informal education of residents by the communities, there are no countywide programs to educate the public on generalized stormwater issues and the role that the residents play in addressing stormwater, flooding, and water quality.
- There are a number of water resource-related stewardship organizations operating in Kane County including Friends of the Fox, Friends of Tyler Creek, Lake Marian River Conservancy District, and Friends of Mastodon Lake. In addition there are a number of watershed committees operating in Kane County including the Fox River Ecosystem Partnership, the Blackberry Creek Resource Planning Committee, the Waubonsie Creek Resource Planning Committee, the Upper Tyler Creek Planning Committee, and the Tyler Creek Watershed Management Committee. The purposes of these groups vary from protection of water quality to flood mitigation.

Coordination

- Only one of the municipalities and the County indicated that they have coordinated their programs with their neighbors to address maintenance or problem remediation needs. More municipalities are beginning to coordinate, particularly regarding stormwater standards, primarily through the Blackberry and Waubonsie Creek watershed committees.
- Two townships have coordinated activities with each other and the County. There appears to be very little coordination between the townships and the municipalities.
- There is very little, if any, coordination between the drainage districts and the municipalities. There appears to be more coordination between the drainage districts and the townships in some areas.
- Two of the eight known active drainage districts responded to the questionnaire. The responses from the two were quite brief but it appears that there is at least some recognition of the need for greater coordination.
- The drainage districts responding to the questionnaire are primarily involved in maintaining drainage ditches. Neither mentioned maintenance or installation of drainage tile as part of their current activities.
- All but one municipality and all the townships felt that there is a need for more regional coordination of stormwater programs and standards. Many felt that countywide was the appropriate level for coordination and that unified stormwater standards and coordination of plan reviews was important. Also mentioned was the need for coordinating stream and drainageway maintenance and management.

Data Collection/Storage

- The County currently has a fairly extensive Geographic Information System (GIS) database. The database contains land use, streams, floodplains, wetlands, and watershed boundaries.
- Although there have been a number of watershed and local drainage studies (as discussed in Section 4.3), there is currently no central repository other than Illinois State Water Survey (ISWS) for these studies to increase their accessibility. Also, there is no central database of development information.

Regional/State/Federal Involvement

- NIPC provides assistance in regional coordination of programs, technical assistance to communities and stormwater planning committees, and sponsors training and technical opportunities but is limited in resources and authority. NIPC has developed BMP design guidance in the form of a course notebook and has assisted other counties in preparing guidance and developing tools for inclusion in their technical reference manuals.
- State and federal agencies are generally not involved in managing or coordinating stormwater programs except to the extent that the state authorized the five Chicago metropolitan collar counties to form stormwater committees and develop and enforce countywide programs. Some state and federal agencies provide technical assistance and sponsor training opportunities as discussed in Chapter 2.

- IDNR and FEMA are becoming more involved in education of citizens and public officials, particularly in relation to flood proofing and enforcement of floodplain rules. Floodproofing workshops were held in Aurora and Naperville in May 1997.
- The KCSMPC is attempting to coordinate stormwater management through development of a countywide stormwater program.

Countywide Program Funding

- The KCSMPC is currently funded by the County to develop this plan as well as to begin other limited stormwater-related activities. The level of support for the countywide committee appears to be high at this time. The funding levels needed to expand the current effort is addressed in Chapter 6 of this plan and will be addressed by the KCSMPC and the County in the future.
- There is currently no outside source of funding for basic administration of a stormwater program. However, as discussed in subsequent sections, there are limited sources of funding to help implement certain elements of the program.

Discussion: The goals relevant to administration and management of stormwater management programs and the extent to which the goals are being met are discussed below.

Goal 1 **Establish a unified stormwater management framework with uniform, countywide stormwater management standards.**

The primary focus of this goal, and specifically objective 1, is consolidation of existing programs and activities into a unified countywide structure. Although certain elements of this goal are being met, it is apparent that there is only limited coordination occurring at this time except in selected watersheds and that a countywide structure would facilitate enhanced coordination. Based on the level of support, expressed in the questionnaire, for more regional coordination of stormwater programs and standards, there appears to be support for development of a countywide framework.

Goal 4 **Encourage the development of an area-wide, unified emergency program with an emphasis on improved preparation and effective communication capabilities.**

There are a number of emergency management agencies at the federal (FEMA), state (IEMA), county (KCOEM), and municipal level. The purpose of these agencies is to respond to floods and other disasters, with the municipalities and the County being the first lines of response. Kane County has an Emergency Operations Plan that is not hazard specific. The County also has a Standard Operation Procedure for sand bagging.

Goal 7 **Create, enhance, and promote public awareness and understanding of stormwater management issues to meet the Goals and Objectives of the Stormwater Management Program.**

Although there has been some public education and training, it has not been consistent and has generally been in response to specific events rather than in a more formalized manner as called for under this goal.

4.2 REGULATION

This assessment is primarily based on the questionnaire which included detailed questions on local regulatory standards, on consultation with state and federal officials regarding their regulatory programs, and on review of Illinois drainage law. Of the 19 municipalities that responded to the questionnaire, only 17 responded to the regulatory questions.

Findings

The Kane County regulatory program is assessed in terms of four categorical areas:

1) floodplain management;
2) stormwater drainage and detention;
3) soil erosion and sediment control; and
4) stream and wetland protection.

General findings related to regulation are also presented.

- **Floodplain Regulation:** Table 4-1 summarizes the floodplain management standards for the 17 municipalities and the County (18 total) responding to the regulatory questions of the survey, as well as information on state and federal standards and requirements. Appendix C presents the current status of Flood Insurance Studies in Kane County including the type and year of study, whether floodways have been delineated, and whether elevations data exists for the floodplains. The information in Appendix C is presented by community. Findings related to state

and regional floodplain management requirements and recommendations, floodplain mapping, and municipal floodplain ordinances are discussed below.

State and Regional Floodplain Management

- The minimum state floodplain ordinance requirements are sufficient to meet the standards for participation in the National Flood Insurance Program.
- The minimum state floodplain ordinance requirements are not sufficient to prevent increases in flood stage over time since no compensatory storage is required for flood fringe fill activities. Also, the state minimum requirements only protect mapped floodways (and mapped floodplains where no designated floodway exists). Generally floodways and/or floodplains are only mapped for stream reaches with drainage areas greater than one square mile in urban areas and 10 square miles in rural areas.
- Although the minimum state floodplain ordinance requires that buildings be elevated to the base flood elevation, there is no freeboard requirement. This could result in flood damages during the base flood due to simple wave action or slight stage increases due to debris blockages or other obstructions.
- The minimum state floodplain ordinance requirements are not sufficient to protect the ecological functions of streams or their floodplains since channel modifications and onstream impoundments are not discouraged and no mitigation is required for these activities.
- The NIPC-recommended standards in the Model Floodplain Ordinance should be sufficient to prevent increases in flood stage related to floodplain fill activities. The NIPC standards also recommend that floodplain mapping be based on future land use conditions so that new structures do not become subject to flooding as the watershed urbanizes. The NIPC standards are also intended to protect the hydrologic, water quality, and ecological functions of streams and floodplain in addition to preventing increased flood damages.

Floodplain Mapping

- Many of the Flood Insurance Studies for Kane County were completed in the early to middle 1980s and the analyses were based on late 1970s and early 1980s conditions. However, some of the streams, such as Blackberry Creek (1989), Ferson/Otter Creek (1994), Hampshire Creek (1992), Indian Creek (1986), Mill Creek (1991), and Tyler Creek (under contract) are currently being restudied or have been restudied in the last ten years. Most of the restudies were done using more sophisticated hydrologic techniques than some of the original analyses. Considering the growth in some parts of the County since 1980, many of the maps may not adequately reflect current land use conditions and consequently, expansions of the floodplain likely have occurred.
- There are a couple of communities that have recently joined the National Flood Insurance Program. There are no flood insurance maps for these communities.
- For many of the smaller and more rural streams in Kane County, no hydrologic or hydraulic analyses were performed to determine floodplain boundaries. In many cases, flood of record maps were used instead. The flood of record could be much lower than the 100-year flood (or possibly greater than the 100-year flood).
- Big Rock Creek and its tributaries (including Little Rock Creek and Welch Creek) do not have floodways delineated nor do they have base flood elevations associated with them. Also, none of the Creeks in the Union watershed have floodways delineated or flood elevations established. Brewster Creek in the North Fox watershed also does not have floodways or flood elevations associated with it. Finally, upstream reaches and small tributaries of various other streams do not have floodways or flood elevations. The remaining streams throughout the County at least have elevations associated with them and many also have floodways.
- Regulating floodplain development without elevations is difficult due to the inexact location of the floodplain boundary, the difficulty in determining safe minimum structure elevations, and the inability to calculate floodplain fill compensatory storage requirements.
- Floodplain map amendments are official changes made to the floodplain boundary based on better information regarding the location of the floodplain (i.e., better topographic data). Similarly, floodplain map revisions are changes made to the official floodplain boundary caused by physical changes to the land that move the floodplain boundary (i.e., floodplain fill activities). Neither floodplain map amendments nor map revisions, since the time of the studies, are included on the maps.
- Floodplain boundaries are generally delineated only for stream reaches with drainage areas greater than one square mile. Although streams and drainageways with less than one square mile drainage area may not be regulated by the state or FEMA, flooding can certainly occur along these stream reaches. Also, non-riverine depressional

Table 4.1 *Summary of Floodplain Management Regulatory Standards*

Municipality	Purpose Statement[1]	Compensatory storage ratio for floodway/flood fringe/depressions	Floodway appropriate uses[2]	Offsite increases in stage or velocity prohibited?	Onstream Impoundments Discouraged?[3]	Are Channel Modifications Discouraged?
Aurora	hf	1.5/1.5/1.0	IDNR	yes	yes	yes[4]
Batavia	hf	1.0/1.5/–	IDNR	no	yes	yes
Burlington						
Carpentersville	hf,wq	1.0/1.5/–	IDNR	no	yes	yes[4]
East Dundee	?	?	?	?	?	?
Elburn[5]	hf,wq,ah,r,a	1.0/1.0/1.0	IDNR	no	no	no
Elgin	hf,wq,ah,r,a	1.0/1.0/–	IDNR	no	no	no
Geneva	hf,wq,ah,r,a	2.0/2.0/2.0	IDNR	no	yes	yes[4]
Gilberts	wq	1.0/1.0/1.0	IDNR	no	yes	yes
Hampshire	hf,wq	1.5/1.5/1.0	IDNR	no	yes	yes[4]
Hoffman Estates	hf,wq	1.5/1.5/–	IDNR	yes	no	yes
Lily Lake						
Maple Park	?	?	?	?	?	?
Montgomery	hf,wq,ah,r,a	1.0/1.5/1.0	IDNR	no	yes	yes
North Aurora	hf,wq	1.0/1.5/1.0	IDNR	no	yes	yes
Pingree Grove						
St. Charles	none	1.5/1.5/1.0	IDNR	yes	yes	yes
Sleepy Hollow						
South Elgin	hf	1.0/1.0/–	IDNR	no	yes	yes
Sugar Grove	hf,wq,ah,a	1.0/1.5/–	IDNR	no	yes	yes
Virgil						
Wayne						
West Dundee	hf,wq,ah,r,a	1.0/1.5/1.0	IDNR	no	yes	yes
County of Kane	hf	1.5/1.5/–	IDNR	yes	yes	yes

[1] Elements included in the Purpose Statement — hf=hydrologic functions, wq=water quality, ah=aquatic habitat, r=recreation, a=aesthetics.

[2] Uses exluded from IDNR list of appropriate uses: dg=detached garages, pl=parking lots, pr=roadways parallel to the water course, stp=new wastewater treatment plants.

[3] Onstream Impoundments discouraged unless in the public interest.

[4] Maintenance of stream length, sinuosity, slope, and pools and riffles required for channel modifications.

[5] From Blackberry Creek Watershed Planning Committee.

? Has ordinance but no standards provided.

areas subject to flooding are generally not mapped as floodplain.

Municipal and County Floodplain Ordinances

- All of the municipalities that responded to the survey and the County (collectively referred to as "communities") have adopted a floodplain ordinance at least consistent with the minimum state requirements.
- One third of the responding communities (six) included protection of hydrologic functions, water quality, aquatic habitat, recreation, and aesthetics in the purpose statement of their floodplain ordinance. However, in one case it appears that the standards in the ordinance are insufficient to actually meet all of these purposes. In a number of other cases (eight), municipalities had standards that would generally protect these functions even though their protection was not in the purpose statement.
- Every community (including the County) that responded requires compensatory storage for fill in the flood fringe (compensatory storage for fill in the floodway is mandated by the State). The compensatory storage ratios vary from 1:1 to 2:1 with most (11) requiring compensatory storage at a ratio of 1.5:1 or higher. Based on the floodplain ordinance questions, less than 50% of the communities require compensatory storage for fill of depressional storage areas. However, based on the stormwater ordinance questions, nearly 65% require protection of depressional storage.
- Approximately 70% of the communities reported that they extend their floodplain protection standards to non-regulatory floodplains (floodplains with less than one square mile drainage area not identified on the FEMA floodplain maps).
- None of the communities that responded limit floodway appropriate uses more restrictively than IDNR. As such, damageable structures such as garages and storage sheds may be constructed in the floodway and are not required to be elevated to the base flood elevation.
- Only four of the communities prohibit offsite increases in stage or velocity.
- All but two of the communities discourage onstream impoundments and channel modifications. However, when channel modifications are necessary, approximately 25% require mitigation, including maintenance of stream length, sinuosity, and pool/riffle patterns.

- **Stormwater Drainage and Detention Regulations:** Table 4-2 summarizes the stormwater standards for the 18 municipalities (including the County) responding to the questionnaire as well as information on state and federal standards and requirements. Findings related to stormwater drainage and detention standards are discussed below.

Federal, State, and Regional Requirements and Laws

- There are no state or federal requirements that communities regulate stormwater drainage and detention.
- Under the federal National Pollutant Discharge Elimination System (NPDES) stormwater permitting program, all communities with population over 100,000 are required to monitor their existing stormwater discharges and address discharges where water quality standards are not being met. The USEPA published proposed rules for Phase II of the NPDES program in the January 9, 1998 Federal Register. Under the proposed rules all census designated "urban areas" will be required to comply under Phase II. Twenty percent of the County is classified as "urban", including all of the communities in the eastern "urban corridor" identified in the 2020 Land Resource Management Plan. Like Phase I, it is likely that Phase II will be delegated to the states.
- Also under the NPDES program, the Illinois EPA requires that all new construction activities disturbing over five acres prepare a stormwater pollution prevention plan. The plan is supposed to address stormwater runoff in addition to construction site runoff. There is no state review of these plans nor field verification that they are being implemented. Under the rules proposed by USEPA, construction activities disturbing over one acre must be addressed.
- Illinois drainage law appears to necessitate that discharge rates not be unreasonably increased over pre-development levels.
- NIPC has a model stormwater drainage and detention ordinance that addresses 100-year and 2-year discharge rates for detention, runoff volumes, water quality, and protection of onsite depressional storage and wetlands.

Municipal and County Drainage and Detention Ordinances

- The County and all of the municipalities (collectively "community") that responded to the survey have stormwater drainage and detention standards.
- All but two of the communities have **100-year detention discharge rates** of 0.15 cfs/acre or lower which should be sufficient to prevent increases in instream flow rates in all but the

Table 4.2 *Summary of Selected Stormwater Drainage and Detention Standards*

Municipality	2-Year release rate	100-Year release rate	Runoff minimization requirements?	Depressional storage protection?	Water quality design requirements?	Onstream/ floodway detention allowed?	Flood fringe detention allowed?	Detention in wetlands allowed?
Aurora	0.04[4]	0.10/0.15[5]	no	yes	no	no/no	yes[1]	yes
Batavia	none	0.10[7]	yes	no	no	yes/yes[1]	yes[1]	yes[3]
Burlington								
Carpentersville	none	0.15	no	no	no	yes/yes	yes[1]	yes
East Dundee	0.04	0.15	no	yes	yes	no/yes[1]	yes[1]	yes[3]
Elburn[10]	none	0.10	no	no	no	no/no	yes	yes
Elgin	none	0.15	no	yes	no	no/yes[1]	yes[1]	yes
Geneva	0.04	0.10	yes	yes	yes	no/no	yes[1]	yes[3]
Gilberts	0.04	0.15	yes	yes	no	no/no	yes[1]	yes[3]
Hampshire	none	0.15	no	yes	no	no/no	yes[1]	yes[3]
Hoffman Estates	none	MWRDGC 3-yr	no	no	no	yes/yes[1]	yes[1]	yes
Lily Lake								
Maple Park	none	?	no	no	no	yes/yes[1]	?	no
Montgomery	none	?	no	yes	no	no/no	yes[1]	yes
North Aurora	none	0.10	no	yes	no	no/no	no	no
Pingree Grove								
St. Charles	none	0.15	no	yes	no	yes/yes[1]	yes[1]	yes
Sleepy Hollow								
South Elgin	none	downstream capacity	no	no	no	yes/yes[1]	yes[1]	yes[3]
Sugar Grove	none	0.15	no	yes	no	yes/no	no	yes[3]
Virgil								
Wayne								
West Dundee[6]	0.04	0.15	yes	yes	yes	yes[2]/no	yes[1]	no
County of Kane	none	0.15[8]	yes	yes	no	no[2]/no	yes[9]	yes[3]

1 Controlled discharge required.

2 Environmental mitigation required for onstream impoundments (no indicates onstream detention allowed only if public benefit).

3 Pre-treatment required prior to discharge to wetlands (no indicates allowed only if wetland is of low quality and detention will improve it).

4 Only for drainage areas greater than 10 acres.

5 0.10 for Indian Creek and Blackberry Creek watersheds, 0.15 for all other areas.

6 Based on review of ordinance.

7 Downsteam capacity or 0.10 cfs/acre, whichever is lower.

8 Use 0.10 cfs/acre in specific watersheds where muncipalities require same.

9 A controlled discharge may be required depending on location in the watershed.

10 From Blackberry Creek Watershed Planning Committee.

? No standard provided.

largest watersheds. However, only 5 (~30%) require **control of the 2-year event** which is important for minimizing increases in stream channel erosion and addressing flooding that may be caused by events less than the 100-year. All of those requiring control of the 2-year event use a release rate of 0.04 cfs/acre.

- Less than 30% (five) of the communities have **runoff volume minimization** requirements. These requirements are important for minimizing increases in rate and duration of in-stream flow rates, particularly for larger watersheds, and for preserving groundwater recharge and stream baseflows.
- Approximately 60% of the communities require that **on-site depressional storage** be protected which is vital for preventing increases in flood flows.
- Less than 20% (three) of the communities require that detention be designed to maximize **water quality** benefits important for protecting the quality of downstream lakes, streams, and wetlands.
- Nearly 45% of the communities allow **onstream detention** and a similar number allow **floodway detention.** However, most require a controlled discharge from floodway detention.
- All but two of the communities allow **detention in the flood fringe** but virtually all require a controlled discharge from flood fringe detention when it is allowed.
- Almost 85% of the communities allow **detention in existing wetlands** and less than 55% of those that allow detention in wetlands require pre-treatment prior to discharge of runoff to the wetland.
- Two of the communities do not specify a **rainfall distribution.** This would allow use of Technical Paper 40 rainfall that predicts substantially lower 100-year precipitation amounts (5.6 inches in 24 hours) than the generally accepted Bulletin 70 rainfall (7.6 inches).

- **Soil Erosion and Sediment Control Regulations:** Table 4-3 summarizes the soil erosion and sediment control standards for 17 communities (including the County) responding to the soil erosion and sediment control standards portion of the questionnaire as well as information on state and federal standards and requirements. Findings related to soil erosion and sediment control standards are discussed below.

State and Regional Requirements

- Under the NPDES stormwater program, the state requires that all development over five acres prepare a stormwater pollution prevention plan to address construction site runoff. There is no state review of these plans nor field verification that they are being implemented.
- NIPC has a model soil erosion and sediment control ordinance. The NIPC model has a minimum regulated development size of 5,000 square feet except in the vicinity of streams, lakes, and wetlands where the minimum regulated development is 500 square feet. The NIPC model also includes all of the provisions in Table 4-3.

Municipal and County Ordinances

- Four of the 17 communities (16 municipalities and the County) that responded to the survey have no soil erosion and sediment control (SESC) standards.
- Four of the 13 communities with ordinances have standards consistent with the NIPC model.
- Seven of the communities apply SESC standards to all development regardless of size. Several of the remaining communities have a 5,000 square foot disturbance limit above which SESC must be applied. Only one of the communities requires SESC on smaller sites when it is in the vicinity of lake, stream, or wetland. One community allows disturbance of relatively large areas (one acre) before SESC standards are applied.
- All but two of the communities have a **list of principles,** such as minimizing the area and time of disturbance, that serve as guidelines when preparing site development and erosion control plans.
- All but two of the communities explicitly require **maintenance of SESC** throughout the duration of the project but seven (50% of the 13 with SESC standards) of the communities do not require inspection at critical stages to ensure that the measures are working properly.
- Three (21%) of the communities do not have **design standards** for SESC measures.
- Based on discussion with NRCS, SWCD, and County staff, design, installation, and maintenance of soil erosion and sediment control plans is problematic. Many of the measures utilized in typical soil erosion and sediment control plans are inappropriate for the situation; many measures identified on the plans are never installed; and measures that are installed initially are often not maintained throughout the construction process.

- **Stream and Wetland Regulation:** Findings related to stream and wetland protection are provided below.

Table 4.3 *Summary of Soil Erosion and Sediment Control Regulatory Standards*

Municipality	Applicability (minimum site area)	Ordinance includes list of principles	Inspection required at critical stages	Explicitly mandated maintenance	Ordinance includes design standards
Aurora	none	yes	no	yes	yes
Batavia	none	no	no	yes	no
Burlington					
Carpentersville	none	yes	no	no	yes
East Dundee	5,000 SF	yes	yes	yes	yes
Elburn					
Elgin	5,000 SF or 250 CY	yes	yes	yes	yes
Geneva	no ordinance				
Gilberts	5,000[1]	yes	no	yes	yes
Hampshire	1 acre	yes	yes	yes	yes
Hoffman Estates	none	no	no	yes	yes
Lily Lake					
Maple Park	no ordinance				
Montgomery	none	yes	no	no	no
North Aurora	none	yes	yes	yes	yes
Pingree Grove					
St. Charles	no ordinance				
Sleepy Hollow					
South Elgin	no ordinance				
Sugar Grove	none	yes	no	yes	no
Virgil					
Wayne					
West Dundee	?	yes	yes	yes	yes
County of Kane	5,000 SF	yes	yes	yes	yes

? No standard provided.

[1] 5,000 SF or 250 CY or within 100 feet of lake, stream, or wetland

Federal and Regional Requirements

- Under Section 404 of the Clean Water Act, the Corps of Engineers regulates the discharge of dredged or fill material into wetlands or other waters of the United States. Once a permit is required, the Corps has the authority to protect many wetland functions. However, the Corps primarily focuses on the "flora and fauna" of wetlands and generally does not review for stormwater functions such as protection of depressional storage. Also, if there is no direct modification of the wetland, the Corps can not regulate discharge of stormwater or construction site erosion into wetlands, encroachment on the periphery of wetlands, vegetation removal, or conversion to open water by impoundment. Also, the Corps has very limited staff resources for enforcement of wetland protection requirements. The Corps is beginning to address the enforcement issue through Interagency Coordination Agreements with some of the SWCDs, including Kane-DuPage.

- NIPC has a model stream and wetland protection ordinance. The ordinance is formatted as an overlay district that essentially zones all or selected streams, lakes, and wetlands, as well as setbacks, as lowland conservancy districts in which only limited activities can occur. This format can reduce the need for professional wetland assistance on the part of the community, but it may allow less flexibility to enhance degraded wetlands (e.g., via mitigation) as part of the development process.

Municipal and County Ordinances

- Of the 17 communities (16 municipalities and the County) responding to the stream and wetland standards portion of the questionnaire, seven reported having stream and wetland protection regulations and one additional community responded positively to selected individual standard questions. Four of the eight communities with ordinances and/or standards appear to have standards consistent with those recommended by NIPC.
- Of the eight communities with protection standards and/or ordinances, all protect stream, lakes, and wetlands from damaging **direct modifications.** However, three of the communities have no setback or buffer requirements to protect these features from **indirect damage** due to adjacent activities. Of the five reporting that they have buffer and setback requirements, three did not report the size of the setback and buffer. One reported requiring a 25 foot buffer and one reported requiring a 75 foot setback. One reported that they require, where practical, that the entire floodplain be kept natural.
- Two communities do not require **mitigation** for approved stream or wetland modifications. Only two specified the required mitigation ratio. One reported a mitigation ratio of 1.0 and the other reported 1.5.
- Seven of the eight communities responding to the stream and wetland protection questions discourage **armoring of stream channels.**
- There is relatively little data on stream and wetland quality in Kane County. This makes it difficult for municipalities (as well as the Corps) to evaluate permit applications for wetland modifications and the appropriateness of proposed wetland mitigation.

- **General:**
  - In virtually all of the communities the village engineer or an engineering consultant have **responsibility for permit review and enforcement.** However, many communities have a broad range of other groups and individuals involved in the process including planning staff, public works, building and zoning officials, plan commissions, and village boards.
  - By far, the regulatory standards most often cited as requiring the most enforcement action were soil erosion and sediment control. The significant need for **enforcement action** related to SESC is a problem throughout the northeastern Illinois region and throughout most of the country. The next most often cited enforcement need was unauthorized floodplain filling.
  - The communities use a number of different **enforcement mechanisms** for non-compliant development activities including stop work orders, court action, withholding building permits, fines, and threat or actual use of letter of credit.
  - Consistent with the KCSMPC goals and objectives, at least a few of the communities have standards tailored to **watershed-specific conditions.** Generally, the detention release rate is reduced in selected watersheds where flooding has been a problem.
  - A few of the communities have been coordinating among themselves and the County to achieve **consistent standards** within watersheds. Most notable are the efforts in the Waubonsie Creek and Blackberry Creek watersheds where communities and two counties are working together to address watershed problems. However, countywide, regulatory standards and enforcement are generally not directly coordinated between municipalities. Some consistency also has been achieved through adoption of some of the NIPC model ordinances by several municipalities.
  - Comments in the questionnaires indicate a desire on the part of many municipalities for consistent countywide standards.
  - **Funding** of local regulatory review and inspection activities is through permit fees (55%) and through general revenues (45%).

Discussion:

The goals that are relevant to a regulatory program and discussion regarding the level at which these goals are being met is provided below.

Goal 1 Establish a unified stormwater management framework with uniform, countywide stormwater management standards.

The objectives under this goal call for coordination of stormwater standards, compliance with the rules and regulations of the National Flood Insurance Program

(NFIP), and development of a technical reference manual in support of stormwater standards.

A certain level of coordination of standards is occurring through the watershed planning activities in two of the County's watersheds. However, the level of protection currently varies from watershed to watershed and even within watersheds where no watershed groups are active.

Most of the municipalities and the County have standards sufficient to meet NFIP requirements. However, many do not have adequate (or any) floodplain maps to properly enforce the standards.

Goal 3 **Require adequate stormwater management measures for all new development to minimize increases in stormwater damages.**

As discussed in the findings, the state and federal regulations are insufficient to prevent increases in flood flows as the watershed develops. In particular, the requirements do not fully protect watershed storage in floodplains and depressional storage areas and do not require detention or other measures to prevent increases in runoff rates from new development.

Although most of the municipal ordinances provide greater protection than the state and federal regulations, not all of them fully protect watershed storage. (In particular, depressional and unmapped floodplain storage is not well protected.) Most of the communities do not have runoff minimization requirements or require control of the 2-year runoff event to prevent increases in streambank erosion. While sufficient standards exist in a few communities, the lack of sufficient standards in other communities will not provide the desired level of protection countywide.

Goal 5 **Identify, protect, and improve floodplains, waterways, lakes, ponds, wetlands, and groundwater recharge areas.**

Although the Corps of Engineers protects wetlands from fill activities, there are a number of other activities that are not regulated unless the activities also include fill. In particular, the Corps of Engineers does not protect stream and wetland buffers, prohibit wetland draining or removal of vegetation, or regulate discharges of stormwater or construction site runoff to wetlands unless a wetland is being filled.

Although IDNR regulates many floodway activities, the primary purpose of those regulations is to prevent flood damage and not the ecological functions of streams. In particular, IDNR does not discourage onstream impoundments or channel modifications and does not require mitigation for these activities except in public waters.

Once again, many of the local ordinances go beyond the state and federal requirements. However, only a few require that natural stream conditions be maintained or restored when stream modifications are unavoidable. Also, only a few have stream and wetland protection standards and most allow detention in wetlands without any pretreatment. Finally, very few have runoff minimization requirements or 2-year detention requirements to minimize damaging changes in surface hydrology and groundwater recharge rates and virtually none require that detention be designed for water quality benefits.

The objective of achieving a Class B or better rating for every stream in Kane County will be challenging. In order to achieve that objective, the County and municipalities will have to actively promote and utilize the recommendations in this stormwater plan and the 2020 Land Resource Plan which includes BMP's, sensitive land planning techniques, and use of open space and buffers. Based on both national and regional analysis of streams, historically, this goal has not been met when watershed urbanization is above certain levels. While intensive, conscientious implementation and enforcement of stringent stormwater management standards should be able to raise the level of urbanization that can occur and at the same time achieve this objective, it is likely that there is an urbanization limit above which the objective simply can not be met. The lack of up to date data on existing stream and wetland quality will make it difficult to monitor progress toward achieving this goal.

Goal 6 **Protect and improve water quality.**

The current NPDES stormwater program is intended to protect water quality by minimizing discharge of pollutants from new

developments. However, due to the lack of state review and inspection, it is unlikely that this program will have a significant impact on Kane County. It is likely that Phase II of NPDES, which will place stormwater quality requirements on municipal discharges, will have greater impact on stormwater management in Kane County.

Protection of water quality from development impacts largely occurs at the local level. Most communities have soil erosion and sediment control (SESC) ordinances. However, proper installation and maintenance of the SESC measures appears to be problematic virtually countywide.

Streambank erosion can be a major source of sediment. However, the fact that few communities require control of the 2-year runoff event or require measures to minimize increases in runoff volumes, suggests that streambank erosion problems will increase. Also, since most communities do not require that detention be designed to capture stormwater pollutants, urban runoff will continue to degrade downstream water quality.

Although most communities have wellhead setback requirements to protect their municipal water supplies, most communities have no general standards regarding protecting groundwater quality to protect private wells, many of which are locally recharged.

Conclusions: Countywide, the current regulatory environment does not provide the level of regulatory consistency, comprehensiveness, or watershed specificity envisioned in the KCSMPC goals and objectives.

The recommended standards in the four NIPC model ordinances, in combination with progressive, environmentally-sensitive land planning, should be sufficient to largely meet the goals cited above. However, the recommended NIPC detention release rates (and possibly other standards) could be refined for watershed-specific conditions.

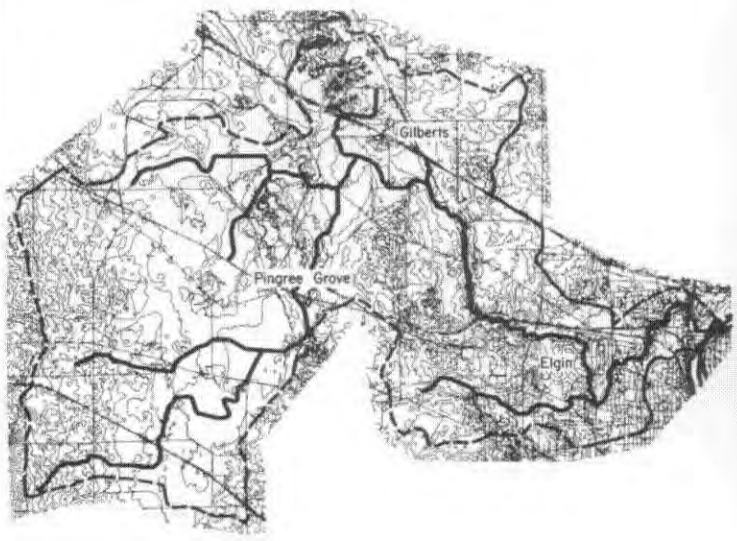
Given the projected growth in Kane County, updated floodplain mapping in certain areas is needed to prevent increased flood damages and loss of floodplain storage to address Goal 3. To address Goals 3, 5, and 6, it will also be important to quickly implement sufficient standards to meet the goals and objectives to ensure that future development is constructed according to those standards and additional problems are not created.

4.3 PLANNING

Until very recently there has not been a substantial amount of local or watershed-based planning in Kane County. The following summarizes some of the more significant historical and ongoing initiatives.

In the late 1970s watershed plans were developed by the Northeastern Illinois Planning Commission as part of the Areawide Water Quality Management Plan (NIPC, 1979). The Fox River and Kishwaukee River watershed studies covered Kane County. Although the primary focus of these studies was on water quality, runoff rates and volumes were also modeled. These studies identified existing (1975) water quality conditions and predicted year 2000 water quality conditions based on several water quality management scenarios. Regionwide, these studies were the basis for several NIPC policies as well as ordinance standards for stormwater and nonpoint source management. Locally, implementation of these plans has focused primarily on wastewater treatment as opposed to nonpoint sources of pollution.

Tyler Creek: Perhaps the most studied watershed in Kane County is Tyler Creek. Openlands Project prepared *Protecting and Restoring Tyler Creek.* The primary focus of that plan is to protect and restore the Tyler Creek stream corridor. However, recognizing that a stream's quality is highly dependent on its watershed, the plan recommends a number of watershed protection measures including minimizing impervious surfaces, protecting natural drainageways and their buffers, utilizing native plant materials in landscaping, and buffering streams and wetlands. The appendices of the plan include a streambank stabilization plan, example BMP retrofits to address runoff from existing developed areas, and an ordinance to create a Tyler Creek preservation commission.



Tyler Creek Watershed

The City of Elgin hired a consultant to evaluate alternatives to a regional, on-stream detention basin that had been planned but was found to be unacceptable due to negative impacts to the stream. The alternatives identified included a number of off-line detention facilities distributed around the watershed. As a follow up to that initial study, the City hired the same consultant to prepare a management plan for the Tyler Creek watershed. The draft plan (dated November 1997) is quite comprehensive and includes assessments of existing water quality, habitat, and flood conditions and inventories of flooded structures, storm sewer outfalls, and open space. The plan recommendations include improved development regulations, proposed detention basin retrofits to improve water quality, proposed streambank stabilization projects, stream corridor management, proposed open space acquisition, and proposed floodproofing projects. The plan primarily focuses on the City of Elgin and the area addressed by its Far West Area Plan. However, it also discusses and provides recommendations for areas outside the detail study area.

The Federal Emergency Management Agency (FEMA) is currently updating the flood insurance study for the Tyler Creek watershed. The study will incorporate the mapping prepared by the City of Elgin and extend the analysis to those areas outside the City's planning jurisdiction, including the Village of Gilberts and Pingree Grove.

The County is currently working with numerous organizations and individuals within the Tyler Creek watershed to develop a "Vision" for Tyler Creek. This will be a visual plan representing the desired future for Tyler Creek, building upon the efforts started by the Openlands Project. It will document the diverse functional values of the watershed, show current watershed efforts, and outline specific future projects to reduce flooding, improve stream quality and holistically manage the water resources of the watershed.

Mill Creek: Mill Creek has also been studied quite extensively. There have been two large projects that have prompted the studies. One is two residential developments which utilizes onsite land application of wastewater. The other is a public "Water Resources Preserve" which is intended to protect and enhance a variety of water resource features.

A number of studies were prepared related to the Mill Creek and Fox Mill Developments and to general recycling of water, wastewater, and stormwater in the Mill Creek watershed. Water quality sampling has also been performed to assess background water quality and changes in water quality over time.

The water resources preserve was originally conceived as a means of eliminating the City of Geneva wastewater discharge to the Fox River and replacing it with a land application type system west of the City. As part of that plan prairies and wetlands are to be restored and recreational amenities developed. Wastewater treatment is no longer part of the plan. However, the restoration and recreational plans are still being pursued.

Blackberry Creek: In the Blackberry Creek watershed, the Natural Resources Conservation Service prepared a floodplain management study in 1989. The primary purposes of the study were to assess the extent of flood damages in the Blackberry Creek watershed, evaluate alternatives for reducing flood damages, and prepare updated floodplain mapping. As part of the study, thirteen significant natural storage areas were identified. The study found that if these natural storage areas are not preserved, 10-year discharges would increase by 3% to 27% and 100-year discharges would increase by 9% to 27%, depending on the location in the watershed. These increases are independent of any changes in land use that will occur as the watershed urbanizes and are substantially greater than the projected increases due to urbanization.

The NRCS study evaluated five potential structural alternatives to reduce (not eliminate) flood damages in the watershed. The average annual damages for the study base condition (1987) was $60,600. The most cost effective project was found to cost four times as much as the value of the flood reduction (benefit/cost ratio =0.25:1). This alternative was expected to reduce average annual damages by only $5,750. The least cost effective alternative had a benefit/cost ratio of 0.03:1. The alternative that reduced damages the most had a benefit/cost ratio of 0.05:1 and was expected to reduce average annual damages by $34,200.

A Blackberry Creek Resource Planning Committee was recently formed with assistance from the NRCS to address a range of watershed concerns from flooding to water quality to stream and wetland protection. The committee is composed of representatives from Kane and Kendall Counties, the municipalities within the watershed, and a number of other interested individuals. The committee formed a number of technical advisory teams to assess current condition and provide recommendations to address the issues identified by the planning committee. The identified issues include: the impacts of past channelization on flood flows, streambank erosion, and aquatic habitat; identification and protection of wetlands and natural storage areas; remediation of existing flooding problems; and developing consistent watershed stormwater standards to prevent additional problems as the watershed develops.

A Watershed Management Plan is scheduled for completion in July 1998.

Indian Creek: A study similar to the NRCS Blackberry Creek floodplain management study was prepared for the Indian Creek watershed by the NRCS. In the Indian Creek watershed, a number of cost effective projects were identified including a flood control reservoir and channel improvements.

As a follow up to the NRCS study, IDNR-OWR (then IDOT-DWR) prepared a flood control plan for Indian Creek. As a result of that study, a flood control reservoir was constructed, but a channel improvement is pending due to easement negotiation.

Waubonsie Creek: A flood control plan was prepared for the Waubonsie Creek watershed. This resulted in construction of a diversion channel, reservoir, and levee to reduce flood damages to a subdivision subject to frequent flooding.

A Waubonsie Creek Resource Planning Committee has been formed with assistance from NRCS. As with the Blackberry Creek committee, the range of issues to be addressed is quite broad. Also like the Blackberry Creek committee, a technical team was formed to analyze problems and provide recommendations.

Miscellaneous Plans: In addition to these watershed studies, a number of local drainage studies have been performed to address local drainage problems as well as streambank erosion problems.

The efforts above for which reports exist are summarized in Table 4-4.

Watershed Planning Data: There are several daily rainfall gages in Kane County but no reliable hourly gages within Kane County supported by National Oceanic and Atmospheric Administration (NOAA). (The closest NOAA hourly gage is at McHenry Lock and Dam. However, this gage is often missing several months worth of data in a given year.) All wastewater treatment plants are required to record daily precipitation as part of their discharge permit. Some of these plants may collect hourly data.

There are USGS streamflow gages on the Fox River at Algonquin and South Elgin, on Blackberry Creek near Yorkville, on Ferson Creek near St. Charles, and on Poplar Creek at Elgin. The gages on Blackberry Creek, Ferson Creek, and Poplar Creek have been operational since 1960, 1960, and 1951, respectively. The gages on the Fox River have been operational since 1915 and 1989 respectively.

IDNR has two streamflow gages on the Fox River at Geneva and Montgomery. These gages were installed in 1962 and 1969, respectively. Precipitation data has also been collected at these gages since 1995.

The County is working with the USGS and IDNR to install stream and rain gages on Blackberry Creek, Mill Creek, and Tyler Creek. These three watersheds, along with the Ferson/Otter watershed that is already gaged, addresses much of the watershed area within the critical growth region identified in the Kane County 2020 Land Resource Management Plan. The gages are scheduled to be operational by July 1998.

Currently the only wetland database for non-agricultural areas in Kane County is the National Wetland Inventory. In many areas, this database is out of date. The inventory has information regarding wetland type but no information regarding wetland quality. The NRCS has a wetland database for agricultural areas in Kane County. This database is updated every five years. The wetland delineations on aerial photographs are available for viewing in the Kane-DuPage Soil and Water Conservation District office.

The Illinois EPA publishes stream quality data in their biannual water quality report as discussed in Chapter 3. There are streams within Kane County for which no biological quality information exists and the streams are evaluated on an infrequent basis.

Findings:

These findings are primarily based on the information discussed above and the questionnaires distributed to the local governments in Kane County.

- The NIPC areawide water quality management plan was relatively comprehensive but did not address flooding issues and did not identify specific local actions for nonpoint source pollution control.
- The Tyler Creek and Mill Creek watersheds have been studied in a relatively comprehensive fashion, addressing flooding, water quality, and stream and wetland protection.
- The plans that result from the efforts of the Blackberry and Waubonsie Creek resource committees have the potential to be reasonably comprehensive in terms of the issues addressed. However, being largely volunteer efforts, the plans do not include detailed hydrologic and hydraulic modeling or flood control evaluations.
- There is currently a lack of precipitation and streamflow data needed to develop hydrologic models in each of the Kane County watersheds. However, Kane County is pursuing the installation of

Table 4.4 *Flood Control, Drainage, and Water Quality Studies and Plans* — continued on next page*

Title	Author, Year	Water Body, Location	Subject
Areawide Water Quality Management Plan	NIPC, 1979	Fox and Kishwaukee Rivers in Kane, Lake, and McHenry Counties	Regional Water Quality Enhancement and Protection.
Tyler Creek Detention Plan	Hey and Associates, 1995 for City of Elgin	Tyler Creek, Elgin	Identification of alternative detention sites.
Protecting and Restoring Tyler Creek: Creating an Ecological Greenway in a Watershed Context	Openlands Project, 1996	Tyler Creek, Elgin, Gilberts, Pingree Grove	Protection and enhancement of Tyler Creek corridor.
Tyler Creek Management Plan	Hey and Associates, 1998 for City of Elgin	Tyler Creek, Elgin	Watershed protection and enhancement plan including stormwater ordinance, floodplain mapping, and problem remediation.
A Resource Management Approach to Planning for the Mill Creek Watershed	Sheaffer and Roland, 1987 for Kane County	Mill Creek, Kane County	Water, wastewater, stormwater recycling plan for Mill Creek watershed identifying appropriate development areas for recycling.
Mill Creek — Kane County IL — Water Quality Study	Sheaffer and Roland, 1992 prepared for Mill Creek Development	Mill Creek, Kane County	Study to determine baseline water quality prior to construction of development with onsite wastewater treatment and recycling.
Water Quality Report — Mill Creek	Hey and Associates, 1996 for Kane County	Mill Creek, Kane County	Continued water quality study to determine impacts of Mill Creek development.
Water Resources Utilization Study, Mill Creek Demonstration Site	Hey and Associates, 1992 for Kane County	Mill Creek, Kane County	Feasibility study for combined wastewater treatment and water resources restoration west of City of Geneva.
Upper Mill Creek Watershed Restoration Plan	Hey and Associates, 1994 for Kane County	Mill Creek, Kane County	Evaluation of background stream conditions and recommendations for stream restoration and monitoring.
Mill Creek Watershed Preserve Concept Plan	Lannert Group, 1995 for City of Geneva	Mill Creek, Kane County	Concept plan for wastewater/water resources restoration west of Geneva including identification of use areas.
Geneva/St. Charles Water Resource Preserve Preliminary Plan	Ennis Engineering, 1996 for City of Geneva	Mill Creek, Geneva & St. Charles	More detailed version of plan above including costs and refinement of concepts.
Blackberry Creek and Tributaries Floodplain Management Study	USDA, NRCS, 1989	Blackberry Creek, Kane County	Floodplain mapping and Flood control study that identified a number of structural and non-structural measures.
Waubonsie Creek	IDNR-OWR, 1979	Waubonsie Creek, Montgomery	Flood control study that resulted in installation of a levee.

* Does not include Flood Insurance Studies which are listed in Appendix C.

Table 4.4 *Flood Control, Drainage, and Water Quality Studies and Plans* — continued from previous page*

Title	Author, Year	Water Body, Location	Subject
Indian Creek Floodplain Management Study	USDA, NRCS, 1986	Indian Creek, Aurora	Floodplain mapping and Flood control study that identified a number of structural and non-structural measures.
Indian Creek Flood Control Plan	IDNR -OWR, 1988	Indian Creek, Aurora	Flood control study that resulted in construction of a reservoir.
Evaluation Report of the Turnberry Road Drainage Problem	Christopher B. Burke Engineering Ltd., 1996 for City of St. Charles	Royal Fox Subdivision, St. Charles	Local drainage investigation.
Report of the Royal Fox Subdivision Flooding	Christopher B. Burke Engineering Ltd., 1997 for City of St. Charles	Royal Fox Subdivision, St. Charles	Local drainage and flood control plan.
Persimmon Fields Drainage Investigation	SDI Consultants Ltd., 1995 for City of St. Charles	Persimmon Fields Subdivision, St. Charles	Local drainage and detention investigation.

* Does not include Flood Insurance Studies which are listed in Appendix C.

additional streamflow and precipitation gages throughout the County with IDNR and USGS.

- Although wetland data exists for the County, it needs to be updated and expanded to include wetland quality. This data is needed in support of watershed planning as well as for regulatory purposes.
- As with wetlands, stream quality data should be updated and expanded. This data is needed in support of watershed planning as well as for regulatory purposes.
- Watershed hydrologic and hydraulic models exist for a number of watersheds throughout the County. However, many are quite old (developed for flood insurance studies) and lack sufficient detail to perform detailed watershed studies. The models produced for the NRCS studies contain sufficient detail for watershed studies but do not reflect current watershed conditions and used precipitation data that is now out of date. The models developed for the more recent flood insurance studies referenced in Section 4.2 may be adequate for use in watershed planning.
- As reported in the questionnaire, funding of capital improvements by municipalities is typically with general revenues. However, some use other sources of funds such as motor fuel tax, grants, and gaming revenues. The County has cost shared some projects with townships and drainage districts.
- Funding is available from a number of state and federal agencies for a variety of watershed and project planning implementation purposes as described in Chapter 2. However, the purposes of each of the individual agencies is relatively narrow, with no one source available to develop or implement plans that comprehensively address flooding, water quality, and habitat protection issues.
- Allocation of IEPA and USEPA funds for nonpoint source pollution control projects is based on a targeted watershed approach and the presence of a locally prepared and IEPA approved watershed management plan. Within Kane County, only the Fox River, from Carpentersville upstream to beyond the county line is Priority 1. The Fox River from Elgin downstream to the north end of St. Charles and from the south end of Batavia downstream past the County line is Priority 2. The remaining reaches of the Fox and all of the streams in the County are either Priority 3 or are not prioritized. Oakhurst Lake is a Priority 1 lake and Mastodon Lake is a Priority 3 lake. (IEPA, 1997) Although many streams do not currently have a high priority rating based on the IEPA system, IEPA encourages local efforts in any watershed. There has been some implication that approval of local plans could elevate the priority and funding eligibility in these watersheds.
- Recently, IEPA has made $15,000 grants available to local watershed groups to assist them in planning efforts. The funding is not sufficient to prepare a full watershed plan but should instead be viewed as "seed" money. Watershed groups that have taken advantage of these funds include the Blackberry Creek and Waubonsie Creek watershed committees in Kane and Kendall Counties and the DuPage River Coalition in DuPage County.
- Funding is available through IDNR under the Conservation 2000 program for the ecosystem

partnership watersheds. Funding is available for habitat acquisition and restoration projects, education projects, and watershed research.

- Federal law makers are currently considering designating the Illinois River — as well as a number of other large rivers in the U.S. — as an American Heritage River. The funding implications of this designation are unknown at this time but at least some funding may be available for watershed planning and implementation activities.

Discussion: The Goals related to watershed planning and the level to which those goals are being met is discussed below.

Goal 1 **Establish a unified stormwater management framework with uniform, countywide stormwater management standards.**

Specifically Objective 6 calls for development of comprehensive and watershed specific plans throughout the County. While efforts have been initiated in a number of watersheds, it is unlikely, at this time, that the watershed plans can be prepared to the level of detail that is needed to meet this objective. The Tyler Creek plan is very comprehensive and detailed but only over the portion of the watershed that the city of Elgin has jurisdiction. The Blackberry Creek and Waubonsie Creek plans cover the entire watershed but do not include detailed modeling needed to perform a number of evaluations. Also, there are many other watersheds and sub-watersheds where there have been no planning efforts.

Goal 2 **Minimize and reduce stormwater damages to existing structures and land use, including agriculture to maximize protection of public health, safety, and welfare.**

The primary focus of this goal is to remediate existing flooding problems. Detailed watershed hydrologic and hydraulic models will be needed to address this goal. Current models with sufficient detail needed to develop flood mitigation strategies exist in only a few watersheds.

Goal 5 **Identify, protect, and improve floodplains, waterways, lakes, ponds, wetlands, and groundwater recharge areas.**

One of the objectives under this goal calls for improved wetland mapping. As discussed in the findings above, the existing wetland mapping is either out of date or does not cover all areas of the county. Also, there is no information on the functions or quality of the individual wetlands. Finally, stream biological quality is evaluated with insufficient frequency to adequately assess trends and there are many streams that are not in the state monitoring network.

Goal 9 **Develop and maintain a comprehensive data base for each watershed within the County.**

The primary focus of this goal is collection of hydrologic data and maintaining up to date floodplain mapping. Existing data is insufficient to achieve this goal. However, the County is currently attempting to address this issue by seeking funding to install a precipitation and streamflow gage network.

Conclusions: Although there are a few good examples, watershed planning is not being performed countywide in a manner consistent with the goals and objectives. In many cases, stormwater is being managed on the basis of political boundaries which are generally too small to encompass major watersheds and in many cases planning and analysis has been done to remediate problems rather than to prevent problems. However, there are particular instances where planning is being done on a watershed (or sub-watershed) basis to address, at least to a limited extent, all or most of the concerns identified in the KCSMPC goals and objectives. The coordination among municipalities, counties, and other interested parties in the Tyler Creek, Mill Creek, Blackberry Creek, and Waubonsie Creek watersheds are good models for future watershed planning efforts. However, additional focus on riparian and aquatic habitat as well as water quality may need to be incorporated into future plans.

4.4 MAINTENANCE

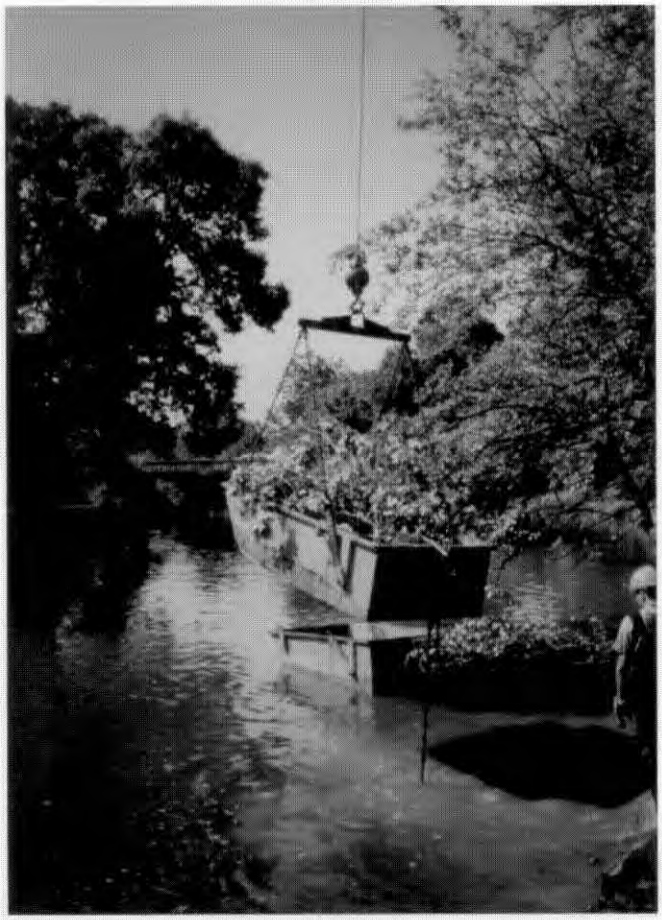
The following findings are based on the questionnaires distributed to the local governments in Kane County.

Findings:

Almost 65% of the municipalities assume responsibility for maintenance of stormwater drainage and detention facilities. In the remaining cases, homeowners associations are generally responsible for maintenance, but in some cases individual lot owners are responsible. In some cases, homeowners associations or individual property owners are responsible for mowing of detention basins, but the municipality is responsible for more involved maintenance such as addressing significant erosion and inspecting outlet structures. In some other cases, the municipalities have assumed responsibility for

maintenance of older detention facilities, but new facilities are the responsibility of homeowners associations. Finally, a number of municipalities utilize a "back-up special service area" where the SSA can be used as the funding source if the homeowners association does not perform the necessary maintenance.

- Two of the municipalities that take responsibility for maintenance, fund maintenance activities using an SSA that is specific to individual subdivisions.
- Two townships and three park districts maintain detention basins. In some cases the park districts maintain the landscape (mowing, etc.) while the municipality maintains the structures.
- Approximately half the municipalities have a scheduled preventative maintenance program. For many, scheduled maintenance is limited to annual inspections. In some cases, particularly critical or failure-prone sites are inspected after each significant event.
- Less than 40% of the municipalities and only one of the townships inspect or maintain stream channels. Of these, most inspect streams on an annual basis. Some inspect culverts more frequently. Some of the communities have cited a need to more routinely inspect and maintain their streams.



Removal of debris during stream maintenance demonstration project

- There are only a few instances of coordination of maintenance activities. In some cases, park districts perform landscape maintenance under agreement with the municipality. Two of the townships coordinate with each other for maintenance and drainage activities.
- Funding of inspection and maintenance activities by municipalities and townships is almost exclusively with general revenues. However, some municipalities use motor fuel tax revenues and two use special service areas as discussed previously.

Discussion: The Goals related to maintenance and the level to which those goals are being met is discussed below.

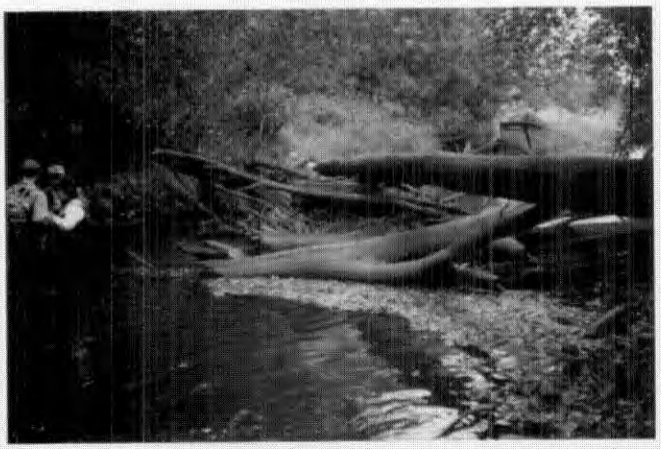
Goal 1 **Establish a unified stormwater management framework with uniform, countywide stormwater management standards.**

Although this goal does not directly address maintenance, the objectives address coordination of stormwater activities. There has been some coordination of maintenance activities between jurisdictions. However, in general, coordination does not occur. Coordination, particularly with respect to natural streams, is important to ensure that those efforts are effective in producing the desired local results while not causing problems for those upstream and downstream.

Goal 5 **Identify, protect, and improve floodplains, waterways, lakes, ponds, wetlands, and groundwater recharge areas.**

Specifically, objective 6 addresses maintenance of rivers, streams, and manmade drainageways. Lack of stream maintenance appears to be problematic. While a few communities perform periodic inspections, most do not. Also, the streams in the unincorporated areas are being maintained to an even lesser degree. Reportedly, limited access to the stream due to private property boundaries restricts maintenance activities by public entities. By state statute, adoption of this plan will provide authority for access to address maintenance needs.

Objective 7 states that regular, planned maintenance should be required for all new and existing developments. Unlike many of the other counties in the region, most of the municipalities in Kane County assume maintenance for stormwater facilities. A



Stream blockage on Blackberry Creek, removed during the stream maintenance demonstration project

couple of the municipalities utilize either special service areas or back-up special service areas to perform or ensure maintenance. Use of SSAs to fund stormwater facility maintenance is relatively unique in the region and appears to be an equitable and effective method. Although many municipalities limit their maintenance to annual inspections, it does not appear that lack of maintenance is a problem.

Conclusions: In general, better coordination of maintenance is needed, particularly for stream maintenance. Guidance is needed on appropriate maintenance methods and standards.

4.5 AGRICULTURAL DRAINAGE

There are eight known drainage districts still operating in Kane County. Those districts are:

- Big Rock Drainage District
- Burlington Drainage District
- Coon Creek Drainage District
- Plato/Rutland Drainage District
- Rob Roy Drainage District
- Sugar Grove Drainage District
- Union Drainage District
- Southside Big Rock Drainage District

Only two drainage districts responded to the questionnaire. However, based on their responses, it appears that the district activities are primarily focused on maintaining drainage ditches. Neither mentioned maintenance or installation of drainage tile as part of their current activities. However, it is reported that Southside Big Rock Drainage District owns and maintains a system of tiles within the town of Big Rock.

It also appears that some drainage districts are becoming more involved with urban drainage issues since one of the districts cited flooded basements and roads as areas of concern.

One of the drainage districts is coordinating with the township road district and is attempting to coordinate with entities in DeKalb County. Despite their efforts in Kane County, problems from DeKalb County are causing water to backup and flood areas in Kane County.

Discussion:

Goal 10 Evaluate and encourage the continuation, where appropriate, of existing drainage districts. Promote and encourage reorganization of watershed based drainage districts which can provide for the implementation of the countywide Stormwater Management Plan.

Long term maintenance and disposition of agricultural drainage tiles needs to be addressed since urban development is increasingly encroaching into areas served by drain tiles. These tile systems were intended to convey groundwater only and not surface water.

4.6 SUMMARY

While the goals and objectives for a countywide stormwater program are not currently being met in a number of areas, creation of the KCSMPC demonstrates a commitment on the part of the County and its municipalities to improve conditions. In many ways, the concerns and issues raised in this and the preceding chapter stem from the lack of a framework to coordinate standards and programs — a framework that this plan is intended to create. Based on comments in the questionnaire, it is apparent that there is increasing recognition at the municipal level that better coordination is needed to address stormwater regulatory, planning, and maintenance needs.

By creating a countywide stormwater committee and program, it is intended that stormwater management will occur at the County and underlying watershed level and at the same time stormwater will be managed more comprehensively. Stormwater quality and stream and wetland protection will be addressed as well as flooding concerns. The next chapter provides recommendations for a countywide stormwater program, for countywide stormwater management standards, and for watershed planning.

CHAPTER 5

RECOMMENDATIONS FOR A COUNTYWIDE STORMWATER MANAGEMENT PROGRAM

This chapter presents recommendations for the Kane County stormwater program. The recommendations are based on the goals and objectives of Chapter One and the findings in Chapters Three and Four. The recommendations are divided into the following categories.

- Programmatic recommendations for a countywide stormwater program (Section 5.1). The recommendations are organized into the four functional categories used in Chapters Two and Four. A discussion of funding approaches is also included in this section.
- Regulatory standards recommendations (Section 5.2) for floodplain management, stormwater drainage and detention, soil erosion and sediment control, and stream and wetland protection.
- Watershed planning recommendations for preparing comprehensive watershed plans (Section 5.3).
- Development design strategies for natural resource protection (Section 5.4).

5.1 STORMWATER PROGRAM RECOMMENDATIONS

5.1.1 Administration and Management

The goals and objectives presented in Chapter One specify a consolidated countywide stormwater management framework to provide a consistent level of service throughout the County. This is particularly important within watersheds since local actions have effects throughout the watershed. In addition, there are certain economies of scale associated with coordinated countywide efforts such as public education and technical training. Finally, the theme among many of the funding agencies is to emphasize watershed approaches. A countywide program will be in a better position to demonstrate that projects for which funding is being sought have been thoroughly coordinated.

Continue and Enhance the Role of KCSMPC: As required by state statutes, the KCSMPC should continue to be composed of half County and half municipal representation. Although an advisory body to the Kane County Board, the KCSMPC, should take the lead role in coordinating stormwater management throughout Kane County as well as drafting ordinances and watershed plans for County Board consideration.

By working with both the urban and agriculture communities and resource agencies, the KCSMPC should coordinate and facilitate stormwater management in Kane County to ensure consistent levels of flood mitigation, water resource protection and enhancement, and improved water quality throughout the County. This will provide a consolidated countywide framework as specified in the Goals and Objectives. The KCSMPC's activities should be categorized into the four functional categories areas identified in Chapter 2:

1) administration and management;
2) regulation;
3) planning; and
4) maintenance.

Assign and Train Staff: The County should assign or acquire appropriate staff to manage the countywide stormwater program and implement the recommendations in this Stormwater Plan. Adequate resources should be allocated to allow periodic training and participation in regional stormwater management forums to ensure that staff remain current on the latest technologies and practices.

In addition to providing staff support to the KCSMPC, the primary roles of staff under administration and management will be development and management of the work program and budget, technical support, public education, professional education, and data management.

Activities of Technical Advisory Committee: The Technical Advisory Committee (TAC) should continue to play a central role in implementing this stormwater plan and act as advisors to the Stormwater Management Planning Committee. Under the current committee, the members were chosen by the KCSMPC. Each municipal and County Board representative to the KCSMPC received one appointment.

The current TAC membership includes: technical staff from municipalities; County agencies such as the Development Department, the Kane County Forest Preserve District, and the Soil and Water Conservation District; private consultants that represent municipal and private clients; and private developers. The TAC should continue to provide input to staff and recommendations to KCSMPC on technical matters such as ordinance development and watershed planning.

Provide Technical Support: One of the most important components of a successful stormwater program is to have knowledgeable staff well trained in all areas of stormwater management. Local officials, staff, and citizens must also be part of the overall technical support program. Since the level of expertise in stormwater and natural resource matters varies among the municipalities, the KCSMPC staff can serve as a technical resource to the individual municipalities as well as to individual citizens. Technical assistance can be provided in such areas as ordinance review and implementation, stream and wetland maintenance and management, and addressing local drainage concerns.

Coordinate Professional Education: To achieve the goals and objectives of this plan as well as the recommended regulatory standards, training will be needed for site planners, design engineers, and landscape architects in methods of BMP and site design to minimize the stormwater-related impacts of development. Training should be provided on such topics as maintenance, emergency management, and flood mitigation. Training opportunities shall be initiated by the KCSMPC and TAC using existing training resources. Several training resources exist in the region including professional organizations (e.g., the American Society of Civil Engineers, Illinois Society of Professional Engineers, and Illinois Association for Floodplain and Stormwater Management), the Northeastern Illinois Planning Commission, the Natural Resources Conservation Service, and the University of Wisconsin Extension.

Develop Public Education Program: Key to long term support for a countywide stormwater program is grass roots public support. A public information program should be established to enlighten local officials and the public regarding stormwater issues and the values of streams and wetlands. The public information program should be coordinated with other County agencies such as the Forest Preserve District, the Soil and Water Conservation District, park districts, schools, and local interest groups. Although it is important to reach all citizens to address urban runoff issues such as proper disposal of household hazardous waste and used motor oil, there are key citizens groups that should be targeted. These citizens groups include those that live adjacent to waterbodies and homeowners associations that may be responsible for management of waterbodies and components of the stormwater management system (e.g., detention basins).



A citizen awareness program on Blackberry Creek

KCSMPC should also provide support for the Kane-DuPage SWCD, NRCS, Kane County Farm Bureau, and Cooperative Extension service to reach rural land owners and farmers. Education should address rural and agricultural issues such as stream corridor management, exclusion of live stock and horses from streams and wetlands, and management of runoff from cropland and livestock management and waste areas.

Develop Funding Mechanism: Developing adequate funding of the stormwater management program should be assigned a high priority. While grants may be used to supplement the program, a consistent source of dedicated local funding must be identified to provide for a consistent level of service and to allow for long term planning and implementation of the program. A discussion of future staffing and funding needs is provided in Chapter 6.

A number of basic funding alternatives exist for Kane County and five are discussed below: 1) the existing county corporate budget, 2) the stormwater taxing authority provided for in the stormwater authorizing legislation, 3) a per capita municipal stormwater contribution, 4) a stormwater service charge considered by the state legislature on a number of occasions, and 5) Special Service Areas (SSAs). Each of these have advantages and disadvantages.

County corporate budget: The source of funding for KCSMPC activities during the current planning stage has been the County's general corporate fund. The primary concerns with this revenue source are the potential need to cut other programs to fund the stormwater program at an adequate level and the annual uncertainty regarding funding level.

Stormwater taxing authority: Upon adoption of a countywide stormwater plan, Kane County has legislative authority to levee up to 0.20% of equalized assessed valuation to fund implementation of the plan. For a $150,000 home with an equalized assessed valuation of 1/3 market value, 0.20% would be equivalent to $100 per year. Based on the current assessed valuation of Kane County of approximately $5.6 billion, the levy could generate up to $11.2 million in revenues. Currently, none of the counties

in northeastern Illinois are assessing at the full 0.20%. Lake County's levee is 0.008% which produces an annual budget of $1.1 million. DuPage County's levee is approximately 0.08% which produces an annual budget of $10 million.

Prior to the 1991 tax cap legislation, the stormwater taxing authority was a straightforward means of funding a countywide stormwater program. While the KCSMPC budget and tax rate are still subject to County Board approval under this taxing authority, this method provides a dedicated source of funds that cannot be diverted to other County uses. Due to the tax cap, a referendum is now required to utilize this funding mechanism, making it more difficult to implement than when the stormwater legislation was originally passed.

A disadvantage to using the County corporate budget or the stormwater taxing authority is that they are both ad valorem based systems in which property owners pay based on the value of their property. However, property value may not correlate well with the contribution of stormwater runoff and stormwater program support needs. Also, these approaches may not allow for variable taxing levels across the County to address variable funding needs among watersheds.

Municipal per capita contribution: Under this funding strategy, each municipality and the County would contribute to the stormwater management program budget based on the population within their jurisdiction. At the 1996 population of approximately 375,000, a $1 contribution would generate $375,000 and a $2 contribution would generate $750,000 per year in revenues. Various incentives could be utilized to encourage contributions, as outlined in this plan and written into the countywide ordinance.

Stormwater service charge (user fee): Legislation has been considered by the Illinois legislature several times to allow a service charge system of funding county stormwater programs. Although attempts to pass the bill, in various forms, are continuing, the bill has not yet passed.

Under a service charge system, individual properties pay based on their contribution to stormwater runoff. Impervious area is generally used as the indicator of stormwater runoff contribution. This is much like any other utility such as sanitary sewer service or electric service with each property owner receiving a monthly or annual bill. (However, the bill does not vary on a monthly or annual basis like most utility bills.) Under this system, the charge per impervious acre can be varied by watershed based on the funding needs of that watershed. Also, incentives for developments that utilize stormwater management measures beyond those required by the countywide ordinance could be built into the fee structure. (For example, residents within developments that utilize natural swale drainage could be charged a lower rate than residents in storm sewered developments.)

The primary disadvantage to this system is the substantial initial investment required to set up and implement the system. Perhaps the most costly aspect of the program is implementing the billing system. First, the runoff contribution for each parcel of land must be calculated (using an indicator such as impervious area). Then, based on the funding needs, as outlined in a financial plan, the charge per unit of runoff and per property must be determined. Finally, a system of sending bills and tracking payment must be established. While a user fee system has many advantages, the substantial up-front investment must be taken into consideration.

Special service area (SSA): Special service areas are often used to fund services provided to subsections of the community. This system has some of the advantages of the user fee approach and is already authorized by state statute. While it may not be appropriate to fund an entire countywide program using an SSA, SSAs could be used to fund watershed-specific activities such as development and implementation of watershed plans, maintenance activities, and flood control projects. In this respect, it allows the watershed variability of the user fee approach. However, like the other approaches, the payment by each property owner is based on property value rather than on the volume of runoff contributed.

Summary: During the initial establishment period of the program, it may be most practical to operate within the current corporate budget. Long term, the following techniques could be applied to countywide and watershed-specific activities.

Funding of countywide activities:

- County corporate budget,
- Countywide stormwater tax via referendum,
- Municipal per capita contribution,
- Countywide stormwater service charge, or
- Countywide special service area

Funding of Watershed Activities:

- Watershed-specific stormwater service charge,
- Watershed-specific municipal per capita contribution,

- Watershed-specific special service area,
- County corporate budget, or
- Countywide stormwater tax via referendum.

5.1.2 Regulation

In a largely rural yet rapidly urbanizing county such as Kane, a primary emphasis of the stormwater management program should be to prevent exacerbation of any problems that currently exist and to prevent any new problems from being created. This is also referenced in the Kane County 2020 Land Resource Management Plan. Two primary preventative tools are acquisition of critical water resource features such as floodplains and wetlands and a comprehensive and consistent regulatory program for development activities. Acquisition is discussed further under Planning (Section 5.1.3) and regulations are discussed here. This section focuses on the procedural elements of the regulatory program while Section 5.2 recommends standards for regulation.

There are two general types of regulatory controls: land use restrictions (e.g., zoning ordinances) and design standards (e.g., subdivision ordinances). Land use restrictions are generally used to protect sensitive landscape features such as floodplains and wetlands. Land use restrictions are intended to preserve the functions of these areas, such as stormwater storage and purification and wildlife habitat, as well as to prevent damages to property that would result if buildings were constructed in those areas. Design standards are primarily used to control the rate, volume, and quality of stormwater runoff and are intended to minimize the impact of development on downstream areas. Most comprehensive regulatory programs make use of both types of controls.

Land use restrictions take the form of land cover based regulations which might restrict the total amount of impervious area allowed in a watershed to a pre-determined level based on the assimilation capacity of the receiving waterbody(s). The Kane County 2020 Land Resource Management Plan establishes a policy of limiting imperviousness to 15% in developing watersheds. A determination regarding the appropriate mix of design standards and land cover restrictions will be completed at the time of ordinance development with potential watershed-specific modifications made.

Prepare and Adopt Countywide Ordinance: To provide a consistent level of protection and to provide equity throughout the County, a program for consistent countywide regulation and enforcement should be developed. Standards should be established at the countywide level and, where appropriate, modified at the watershed level to meet watershed-specific needs. A countywide regulatory program should include a countywide ordinance that applies to both incorporated and unincorporated areas. To be consistent with the KCSMPC goals and objectives, the watershed protection ordinance should be comprehensive, specifying standards for stormwater drainage and detention, floodplain management, soil erosion and sediment control, and stream and wetland protection in a single document.

Many of the FEMA regulatory floodplain maps for Kane County are either inadequate, since they do not include elevations, or out of date due to significant land use changes. During preparation of the countywide ordinance, interim measures such as safety factors or floodplain buffers should be developed to address the shortcomings of the current mapping and FEMA and IDNR should be petitioned to update the least adequate floodplain maps as soon as possible. Criteria should be developed to prioritize floodplain remapping efforts. Criteria should consider the likely level of error in the current maps and the development pressure in the watershed.

Prepare Technical Reference Manual: In support of the countywide watershed protection ordinance, a technical reference manual should be developed to provide guidance in meeting the ordinance. The reference manual should include guidance on intent and interpretation of the ordinance as well as guidance on design methodologies and procedures. The manual should be updated from time to time as new information becomes available and as experience is gained in implementing the ordinance.

Institute Ordinance Implementation and Enforcement Structure: There are several approaches to implementing a countywide ordinance. One end of the spectrum of possible methods would be to have all permitting and inspection carried out under the KCSMPC with very limited involvement by municipal staff. The other end of the spectrum would be to maintain the current system with all permitting and inspection carried out at the local level and no involvement by the KCSMPC except to craft the minimum ordinance to be adopted by all. The first approach would take too much control away from the municipalities and would remove inspection responsibility from those most familiar with the development sites. However, it would provide the greatest level of regional or watershed coordination to ensure that developments are reviewed considering the larger watershed implications. The second approach would be simpler to implement from an administrative perspective but, based on experience in Lake and DuPage Counties, would provide inadequate oversight and lead to inconsistent enforcement. Further, many municipalities may not have sufficient staff and/or

financial resources to adequately enforce a comprehensive ordinance. Finally, the second approach would provide little in the way of watershed coordination of development activities.

The recommended approach is one that is between the two ends of the spectrum described above. It is recommended that KCSMPC maintain responsibility for all permit and enforcement activities but have a mechanism for delegating that responsibility to interested municipalities. Municipalities that adopt requirements that are at least as stringent as the countywide ordinance, and have demonstrated qualifications would receive certification and be responsible for permit review and enforcement within their jurisdictions. To protect those entities that are adequately enforcing the ordinance from the impacts of those that are not, the KCSMPC should periodically review permits and constructed facilities and retain authority to retract certification where enforcement problems exist.

Since most municipalities currently provide permit review and inspection services for stormwater drainage and detention, soil erosion and sediment control, and flood fringe development, it is anticipated that these regulatory elements would be most readily delegated to the local level. The KCSMPC would be responsible for permit review and enforcement for those areas not desiring or qualifying for certification. A variation of this approach, which is used in DuPage and Lake Counties, would be to treat the unincorporated areas as a municipality. Under this variation, the KCSMPC would be separate from the staff of the County Development Department who review permits for unincorporated areas. The recommended approach utilizes the positive aspects of the two ends of the spectrum identified previously. It employs local knowledge and access to development sites combined with KCSMPC oversight to ensure that watershed perspectives are considered and to ensure consistent enforcement throughout the County.

For wetland and floodway modifications, permit applications are currently reviewed and enforced by the Corps of Engineers and the Illinois Department of Natural Resources Office of Water Resources, respectively. Under a countywide ordinance, permit review for these types of development activities could be performed by the KCSMPC. Because of the complexity of these reviews, it is unlikely that the IDNR and the Corps of Engineers would delegate this review authority to lower than the county government level.

For wetland disturbances, the KCSMPC should continue to utilize the Corps of Engineers' review process for wetland modifications allowable under the countywide ordinance. The KCSMPC should also develop a formal coordination mechanism with the Corps of Engineers to expedite reviews. The Corps could principally review for habitat impacts and the KCSMPC could principally review for stormwater and water quality impacts. For floodway disturbances, the KCSMPC should seek delegation from IDNR to perform permit review and enforcement activities in Kane County.

Although most permits are likely to be reviewed at the local level, there should be a provision for a pre-application meeting(s) involving the developer and both municipal and KCSMPC staff, particularly for larger developments. This would provide a degree of watershed review and regional perspective as well as take advantage of the technical expertise of KCSMPC staff. KCSMPC should also maintain a central file of all permits issued within the County. This would provide for a central database which can easily be accessed by municipal and KCSMPC staff as a resource for the pre-application meetings and would streamline incorporation of development data into the watershed planning process.

Fund Regulatory Activities: Like funding to support the administrative and management activities of the KCSMPC, funding of ordinance and technical reference manual development should be through a countywide base. To supplement countywide funding, the KCSMPC should pursue funding which may be available through EPA under Section 319 of the Clean Water Act for development of the nonpoint source components of the countywide ordinance and technical reference manual. The current application deadline for 319 projects is February 1 of each year. KCSMPC should also pursue funding to update floodplain mapping with particular attention given to deficient maps in rapidly developing watersheds.

Once the countywide ordinance is adopted, permit review and inspections performed by KCSMPC and delegated municipalities should be funded through permit application fees. Fees should be established based on such factors as the type and complexity of permit and size of the development or disturbance. The fees should offset expected staff time to review permits, make routine site inspections, and perform enforcement activities. KCSMPC should receive a percentage of each permit application fee to fund their oversight role, including pre-application meetings and periodic delegation reviews. KCSMPC should receive the full permit fee for those developments that it reviews.

5.1.3 Planning

Planning should be carried out both at the countywide level and at the watershed level by the KCSMPC. KCSMPC is the logical entity to coordinate stormwater

planning since it is not constrained by political boundaries. In terms of countywide coordination and planning, the KCSMPC will represent the stormwater interests of the municipalities and the County as a unified voice. In terms of watershed planning, the KCSMPC can more readily perform multi-jurisdictional watershed planning than individual municipalities and can facilitate preventative and remedial projects that consider and benefit both upstream and downstream interests.

Perform Countywide Planning and Coordination Activities: In support of watershed planning and the regulatory program, certain countywide stormwater planning efforts should be undertaken. These include advanced identification of wetlands, coordination with other planning programs (i.e., open space, transportation, etc.), and coordination with other counties.

Coordination with Other County Planning Activities: KCSMPC should coordinate with other County planning activities such as transportation, open space, and emergency management. Transportation systems can have a significant impact on the drainage system and natural resources of the County as well as provide opportunities such as creation of regional stormwater storage areas and wetland mitigation banks.

The Kane County Forest Preserve District has an active open space acquisition program. KCSMPC should coordinate with the district to identify opportunities to acquire areas of regional stormwater significance as part of the District's open space program. KCSMPC should also coordinate with the Forest Preserve District to perform stream monitoring activities as discussed below under stream condition data collection.

The Kane County Office of Emergency Management is responsible for planning for flood and other emergencies. KCSMPC should provide hydrologic data and flood risk information to KCOEM, to support their efforts. KCSMPC and KCOEM should also coordinate collection of high water information during floods for use in watershed computer modeling.

Coordination with Drainage Districts: Where active, drainage districts have the potential to perform many functions consistent with implementation of this plan. For example, drainage districts have the ability to levy assessments to perform stream maintenance and restoration activities. Drainage districts may also be able to address existing and future drainage problems, particularly in rural areas of the County. KCSMPC and the County should encourage future and existing drainage districts to establish and re-establish boundaries based on watershed boundaries.

Hydrologic Data Collection: Kane County is currently pursuing funding to install a streamflow and precipitation gage network within the Fox River watershed and will also be pursuing funding for a similar network within the Kishwaukee River watershed. The proposed rainfall and precipitation gage network is shown in Figure 5-1. Implementation of this network should be continued and a mechanism for long term operation and management of the network and data developed.

Stream Condition Data Collection: One important objective of the stormwater program is to achieve a "B" or higher Biological Stream Characterization rating for every stream in Kane County. To monitor trends in stream quality as well as to monitor the success of the plan in achieving this objective, adequate data on stream quality will be necessary. To obtain data on streams not monitored by IDNR, Kane County should supplement the IDNR network of stream monitoring sites. Kane County should also monitor sites more frequently than IDNR to better assess trends.

A stream monitoring program with standardized protocols should be developed to establish target monitoring frequencies for each of the County's streams, identify resource agencies and volunteer organizations to perform the monitoring, and analyze and report the results of the monitoring.

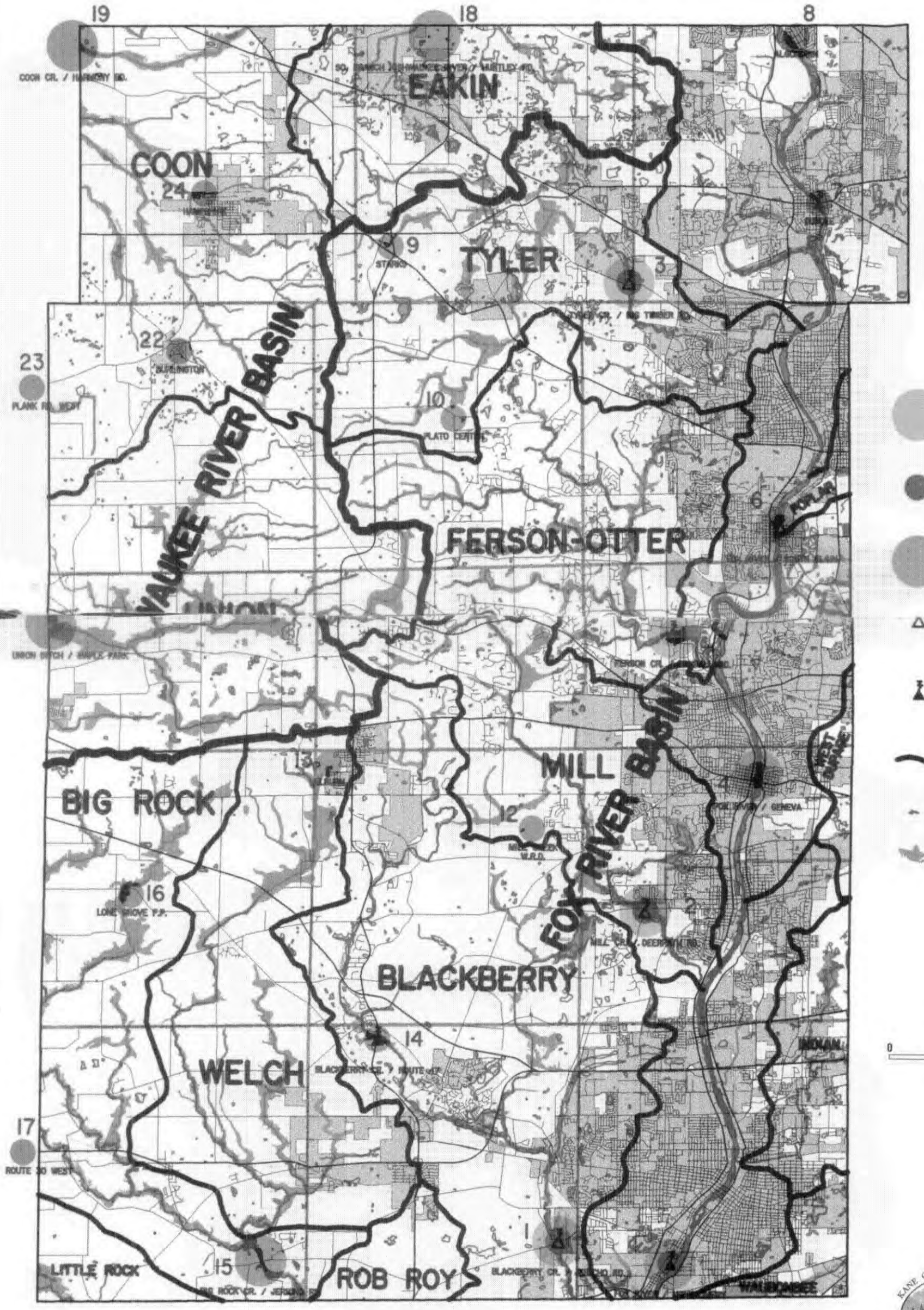
Coordination With Other Counties: Although county boundaries are sufficiently large to facilitate watershed planning, many Kane County watersheds extend beyond the county boundaries. KCSMPC should coordinate with downstream counties to identify their concerns that may be impacted by Kane County's plan. Upstream counties should be made aware of Kane County's plans and encouraged to manage stormwater in a manner consistent with Kane County policies and standards. Watershed planning, floodplain mapping, and flood forecasting should be coordinated with affected counties to facilitate comprehensive and watershed based plans. This plan, as well as the recommended watershed protection ordinance, was circulated among the surrounding counties for review and comment.

Advanced Identification of Wetlands: Advanced identification (ADID) wetland studies have been completed for Lake and DuPage Counties and is currently underway for McHenry County. In Lake and McHenry counties, the ADID study inventoried all county wetlands and evaluated wetland functions.

Figure 5.1

Stream and Rain Gage Network

Kane County, Illinois



KANE COUNTY STORMWATER MANAGEMENT PLANNING COMMITTEE

The studies also identified exceptional quality wetlands, and developed wetland protection and public education strategies.

The ADID evaluation would be very beneficial to an effective wetlands protection program. The information provided in the evaluation would be valuable in making permit decisions both at the local level and at the federal level. The ADID evaluation would also be valuable in coordinating acquisition needs between KCSMPC and the Kane County Forest Preserve District. For these reasons, the KCSMPC should request that USEPA Region 5 initiate an ADID study in Kane County.

Perform Watershed Planning and Coordination Activities: To address the specific conditions of each watershed shown in Figure 3-1, watershed plans should be prepared. These watershed plans should be coordinated with neighboring counties within the watershed. Watershed and sub-watershed plans should be prepared by KCSMPC staff (and staff of appropriate neighboring counties) and/or their consultants to ensure consistency in planning and evaluation procedures among watersheds and to improve staff knowledge of watershed conditions. This section describes the administrative tasks that should be performed to guide and facilitate the watershed planning process. Recommendations regarding an approach to watershed planning and the issues that should be addressed in a watershed plan are provided in Section 5.3.

Prioritize Watersheds: Because development of watershed plans for all of the watersheds in Kane County is a long term process, the watersheds should first be prioritized. The prioritization should consider the following:

- projected change in land use and population in the watershed,
- adequacy of existing floodplain mapping,
- magnitude and frequency of structural damage,
- degree of life/safety concerns,
- degree of traffic damages,
- watershed planning activities already underway, and
- local level of financial participation.

One of the first considerations when prioritizing watersheds should be to prevent future watershed problems from developing. Thus, those watersheds that are expected to experience significant urbanization and do not have adequate floodplain maps should be given high priority. Those watersheds that have significant existing flooding problems should also be addressed relatively quickly to remediate existing damages and prevent further damages from occurring.

Establish Watershed Planning Procedures: Watershed planning procedures should be established to ensure consistency among watershed plans. Watershed planning, where possible, should be coordinated with neighboring counties and consider the following:

- development of improved floodplain maps,
- identification of regionally significant natural storage areas,
- determination of watershed specific detention standards,
- identification of potential wetland mitigation banks,
- identification of groundwater recharge zones,
- identification and prioritization of remediation needs (i.e., flood control, stream stabilization, etc.), and
- include an implementation plan.

Standards for evaluating remedial projects that would apply to all watersheds should also be developed. Section 5.3 presents a recommended watershed planning approach.

Watershed advisory committees should be convened during the watershed planning process to obtain input on watershed specific concerns and objectives and to improve implementability of the watershed plans. The advisory committee should include a variety of stakeholders including representatives from County agencies, municipalities and townships, citizen and watershed organizations, and resource agencies.

Fund Watershed Planning and Implementation Activities: Although funding may be available from several agencies for watershed planning and implementation activities, the missions of the agencies vary. For example, funding is available from IDNR-OWR and the Corps of engineers to address flooding problems and funding may be available from IEPA and IDNR (under the C2000 ecosystem partnership initiative) to address water quality problems, including streambank erosion. Some of the agencies' funding programs, particularly the water quality related programs, are focused on implementing plans rather than preparing plans. Section 2.1 discussed each of the state and federal agencies as well as funding available through those agencies.

Because the resource agencies have variable missions that are limited in scope, utilizing funds from the resource agencies to develop comprehensive watershed plans consistent with the KCSMPC goals, objectives, and watershed planning procedures will require substantial coordination.

Because of the limited amount of funding available from the resource agencies for planning activities, these agencies should not be relied upon when preparing initial work program budgets for watershed planning.

Utilizing funding from the resource agencies for implementation of the recommendations of the watershed plans may be more readily accomplished since the appropriate agency can be approached based on the type of project.

5.1.4 Maintenance

Manmade stormwater facilities should be maintained to ensure that they function as designed. Natural drainage systems should be maintained to prevent excess debris accumulation and erosion to ensure that they provide adequate flood conveyance and support a full range of natural functions.

Develop Maintenance Standards for Stormwater Infrastructure: Appropriate maintenance and inspection standards and schedules should be developed by the KCSMPC for stormwater infrastructure, including detention basins. The standards should include maintenance and inspection schedules as well as a checklist of maintenance activities.

Maintenance easements should be established for all new stormwater infrastructure to allow access and sufficient space to perform maintenance activities

All infrastructure installed as part of new development should consider maintenance as part of the design. For example, urban stormwater drainage systems should not discharge into agricultural tile systems which are difficult to locate and maintain and were not intended to convey surface runoff.

Develop Mechanism to Maintain Stormwater Infrastructure: The KCSMPC should develop a mechanism and provide coordination and training to municipalities to ensure that infrastructure is maintained. There are a variety of methods that may be employed to carry out maintenance activities. The following are some examples.

- Public Works staff financed using SSAs
- Homeowners association with a backup SSA if work is not performed
- Homeowners association with municipal authority to perform and charge for work not performed
- Maintenance agreements with park districts for landscape maintenance and public works inspection of structures

The selected maintenance mechanism(s) should be incorporated into stormwater ordinance language to provide authority to implement the selected mechanisms. In all cases drainage easements should be established to allow maintenance access.

Develop Maintenance Standards for Surface Drainage Systems: Appropriate maintenance and inspection standards and schedules should be developed by the KCSMPC to ensure consistent levels of service throughout watersheds and throughout the County. This is particularly important for stream maintenance where inadequate and inappropriate maintenance activities can lead to downstream problems such as increased flow rates, streambank erosion, and/or water quality degradation as well as greater need for follow-up maintenance.

Develop Mechanism to Maintain Surface Drainage System: Although in an undisturbed environment streams and drainageways systems are self-maintaining, in the human-altered environment, as exists throughout Kane County, management and maintenance is needed to counteract the affects of human influences such as modified hydrology, fire suppression, and introduction of invasive plant species. Mechanisms for implementing maintenance activities according to the standards above should be developed. Separate mechanisms for urban and rural areas may be appropriate. For example, municipalities (possibly in cooperation with park districts) may be the most appropriate entities in urban areas while drainage districts or townships may be the most appropriate entities in rural areas. Because of its inter-jurisdictional nature, stream maintenance should be coordinated and overseen by the KCSMPC within Kane County and coordinated with upstream and downstream counties. KCSMPC may want to consider cost-sharing arrangements to provide incentives for stream maintenance. Grants from IEPA may be available for certain stream maintenance and restoration activities provided an IEPA approved watershed management plan exists. The streams in Kane County should be inventoried and prioritized in terms of maintenance needs to guide this long-term activity.

5.1.5 Summary

This section describes the recommendations for the Kane County Stormwater Program. Figure 5-2 presents the general framework in graphical form with each of

the four functional areas represented. Chapter 6 presents a plan for implementing the recommendations presented in this chapter.

5.2 REGULATORY STANDARDS RECOMMENDATIONS

The regulatory program recommendations (Section 5.1.2) call for a countywide watershed protection ordinance that applies to both incorporated and unincorporated areas. The section also specifies that the ordinance should be comprehensive, specifying standards for stormwater drainage and detention, floodplain management, soil erosion and sediment control, and stream and wetland protection in a single document. As further stated in the regulatory program recommendations, the wetland protection standards should be designed to compliment the Corps of Engineers wetland regulation program and address those areas not currently addressed by the Corps.

While preparation and adoption of ordinance language will be performed during implementation of this plan, recommended ordinance standards for new development and substantial redevelopment are presented here. The standards should apply to private development activities as well as public development activities (including roads, utilities, schools, and parks). Additionally, the KCSMPC will determine during development of the ordinance whether each particular standard can, should, or will apply to agricultural activities. These standards are intended to be the principles upon which explicit and detailed ordinance criteria and specifications will be based.

To achieve the comprehensive objectives of this plan and to further a regional objective of consistency in standards within the northeastern Illinois region, the regulatory standards recommended in this plan are generally based on the following model ordinances of the Northeastern Illinois Planning Commission: Model Floodplain Ordinance; Model Stormwater Drainage and Detention Ordinance; Model Soil Erosion and Sediment Control Ordinance; and Model Stream and Wetland Protection Ordinance. These model ordinances have been identified by the Illinois EPA and/or the IDNR-OWR as the recommended standards for new development in the region.

5.2.1 Comprehensive Purpose Statement

The ordinance should include a comprehensive purpose statement addressing the following concerns and objectives.

- Protect and preserve the quality and environmental values of land and water resources in Kane County.
- Protect and preserve the health and safety of residents of Kane County.
- Encourage development in a manner that promotes orderly, sustainable, and cost-effective utilization of land and water resources consistent with the 2020 Land Resource Management Plan.
- Ensure that new development in Kane County does not cause increases in flood damages, water quality degradation, and habitat loss within and downstream of the County.
- Minimize the need for expenditure of public funds on flood control projects, repairs to flood damaged public facilities, and on flood related emergency services.
- Prevent increases in economic disruption due to flooding and drainage problems.
- Maintain eligibility in the National Flood Insurance Program by equaling or exceeding the program requirements and thereby making federally subsidized flood insurance available at reduced rates.
- Protect and improve the natural hydrologic, water quality, aquatic habitat, recreational, and aesthetic functions of streams, lakes, wetlands, and floodplains.



Persimmon Woods, St. Charles

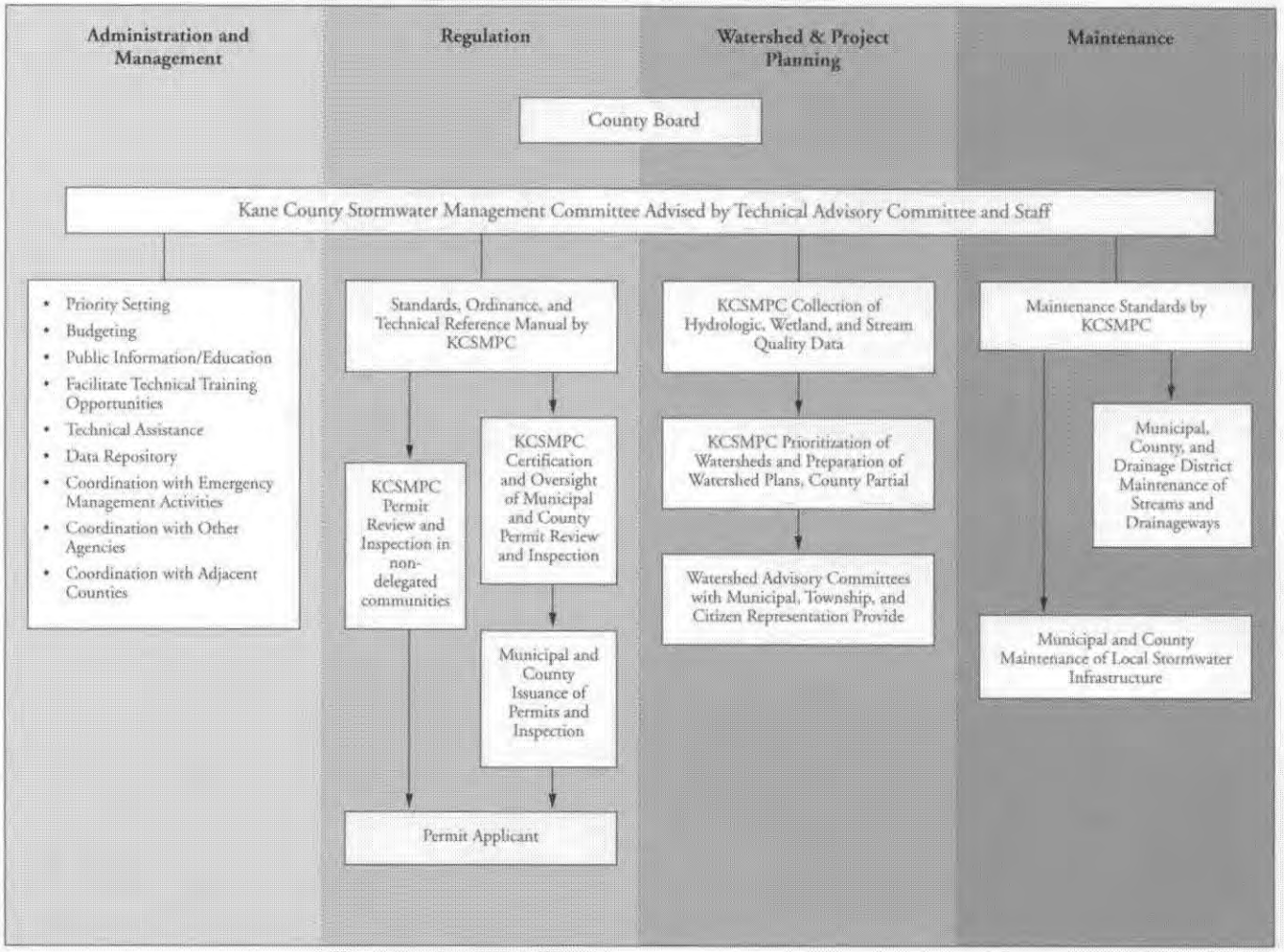
5.2.2 Floodplain Management

The ordinance should address the following standards related to floodplain management.

Ordinance Applicability: The applicability of the ordinance should be extended to include significant drainageways and depressional storage areas with drainage areas less than one square mile. Building in these areas could lead to significant flood damages to the new buildings and to a loss of floodplain storage, resulting in increases in flood flows and damages downstream.

Delineate Floodplains/Floodways Considering Future Land Use: Any modifications to the existing regulatory

Figure 5.2 *Kane County Stormwater Plan Functional Framework*



floodplain or floodway boundary (through map revisions or restudies) should be computed based on the worst case between existing and future land use conditions. In most cases adequate on-site stormwater management should prevent local increases in instream flow rates and flood stages. However, on larger rivers such as the Fox, flows may continue to increase as the watershed becomes more urbanized. To prevent construction and resulting flood damages in areas that will one day be in the floodplain, an assessment should be done to determine the worst case development condition (existing or future) and the regulatory floodplain should be mapped accordingly.

Restrict Floodway Development to Reasonable Appropriate Uses: IDNR-OWR identifies appropriate uses for the floodway in the Model Floodplain Ordinance. Restricting development to these appropriate uses is required to meet minimum state standards.

Floodway appropriate uses should be limited to a restricted list that includes only public flood control projects, public recreation and open space uses, water dependent activities, and roadway and utility crossings. Additional appropriate uses allowed by IDNR-OWR such as wastewater treatment plants, parking lots, accessory structures such as garages, and roadways running parallel to the water course, may result in additional flood damages. These uses also interfere with floodway functions such as water quality mitigation and habitat protection and potentially subject the waterway to polluting substances such as untreated wastewater, gasoline, and household chemicals.

Mitigate Floodway Construction Activities: Floodway modifications can lead to increased conveyance capacity and therefore increased downstream flow rates. Channel modifications can also destroy aquatic habitat and create erosion problems as the modified stream attempts to reestablish equilibrium stream length, slope, and sinuosity.

Onstream impoundments act as sediment and nutrient traps leading to unaesthetic conditions such as low water

clarity (due to high turbidity) and extensive algae blooms. Further, impoundments can impede the natural movement of fish. Also, periodic dredging may be required to maintain desired water depths. Avoidance and mitigation standards for activities in the floodway should include the following:

- Demonstrate that there is no practical alternative to the channel or floodway modification and that onstream impoundments are in the public interest.
- Compensatory storage for floodway fill at a conservative ratio greater than 1:1
- Preservation of the original floodway surface area
- Maintain or improve natural channel conditions such as stream length, sinuosity, pool and riffle pattern, and channel substrates.
- Impoundments must not prevent migration of indigenous fish species or cause degraded water quality conditions.
- A nonpoint source pollution control plan must be implemented throughout the watershed upstream of the proposed impoundment. Permanent pools should not be constructed downstream of wastewater treatment plant discharges.

These requirements are intended to prevent increases in flood flows and stages, minimize substantial maintenance burdens, and to protect the natural hydrologic, water quality, and aquatic habitat functions of streams and floodplains.

Compensate for Lost Storage in the Flood Fringe and Depressional Storage Areas: To prevent increases in flood flows and stages, hydraulically equivalent compensatory storage should be required for all fill activities in the flood fringe and depressional storage areas. As a safety factor, compensatory storage should be provided at a conservative ratio greater than 1:1.

Require a Flood Protection Elevation: To provide a factor of safety and minimize flood damage to those properties within or adjacent to the floodplain, a flood protection elevation (or "freeboard") above the base flood elevation should be required for all structures within the area that would be inundated by a flood at the flood protection elevation.

Require that a Letter of Map Revision (LOMR) be Obtained for all Floodplain Modifications: During the development process, permitted site grading or flow control may result in removal of land from the floodplain. Without a LOMR, those properties within the former floodplain will be required to obtain unnecessary flood insurance. Also, a LOMR provides an official record, filed with FEMA, of floodplain modifications.

5.2.3 Stormwater Drainage and Detention

The ordinance should address the following standards related to stormwater drainage and detention.

Ordinance Applicability: The stormwater drainage and detention standards (with the possible exception of detention requirements) should apply to all development, regardless of size. However, as a practical matter, the requirement that a permit be obtained may be limited to developments over a specified size.

Control the Release Rate from Channel Forming Event: The discharge rate from development sites should be sufficiently low to prevent increases in instream flow rates during channel forming (bankfull) events. A release rate for channel forming events is specified to prevent increases in streambank erosion which is typically the result of increases in the magnitude of 2-year and smaller runoff events. For example, NIPC found that in the Upper Salt Creek watershed in northwest Cook County, consistent use of a 0.04 cfs/acre release rate would have prevented increases in instream 2-year flow rates as the watershed developed (Dreher et al, 1989). As watershed plans are developed, the onsite release rate required to prevent increases in instream flow rates during channel forming events should be computed. Controlling the release rate during channel forming events will also improve pollutant removal within detention basins. A countywide approximation of the channel forming release rate should be computed during development of the countywide ordinance and revised to be watershed specific as watershed plans are developed.

Control the 100-year Release Rate: The 100-year discharge rate from development sites should be sufficiently low to prevent increases in instream flood flow rates and enlargement of floodplains as the watershed develops. For example, NIPC found that in the Upper Salt Creek in northwest Cook County, consistent use of a 0.15 cfs/acre release rate would have prevented increases in instream 100-year flow rates as the watershed developed (Dreher et al, 1989). A 100-year release rate should be included in the Countywide ordinance to prevent increases in instream flow rates and revised to be watershed specific as watershed plans are developed.

Establish Overland Flow Routes: Overland flow routes should be identified and placed in easements to ensure that runoff events in excess of the design event are able to be accommodated with minimal damage to property. For example, detention basins should be designed with overflow structures and a route for the excess flow should be established. This will minimize the potential for flooding of buildings surrounding detention facilities

by allowing excess runoff out of the basin and buildings downstream of detention facilities by preventing embankment failure due to overtopping.

Consider Downstream Drainage Conditions: Site discharges should consider the condition of downstream drainageways. For example, concentrated discharge from a detention basin could cause significant erosion on neighboring properties if runoff previously sheet drained from the site.

Minimize Increases in Runoff Volumes: Increases in surface runoff volumes should be minimized through use of a runoff volume reduction hierarchy which specifies minimization of impervious surfaces, maximization of infiltration opportunities, and use of natural drainage practices, in addition to using detention. Reducing runoff volumes converts surface runoff to beneficial subsurface runoff, enhances groundwater recharge, and minimizes the generation of stormwater related pollutants. Site design methods for minimizing increases in runoff volumes are discussed in Section 5.4.

It should be recognized that detention is very effective in preventing increases in runoff rates but does not prevent increases in runoff volumes. This standard is intended to address this issue. In watersheds with high quality streams, lakes or wetlands, this standard will be particularly important to minimize shifts from subsurface to surface runoff. This standard will also be important in terminal watersheds ending in a waterbody with essentially no surface outlet. In some cases it may be appropriate to establish impervious area targets or limits to supplements to the hierarchy described here.

Development of specific standards for siting, designing, installing, and maintaining infiltration practices should minimize the potential for contamination of groundwater resources with runoff pollutants.

Preserve Onsite Depressional Storage: Existing onsite depressional storage should be preserved independently of required detention volumes. Even with no change in land cover, significant increases in flood volumes and rates will be experienced if watershed depressional storage is eliminated.

Minimize the Discharge of Pollutants: Runoff from urban development is contaminated with a number of pollutants including sediment, heavy metals, oil and grease, bacteria, and nutrients. Water quality BMPs such as constructed wet or wetland detention, drainage swales, and filter strips should be incorporated into stormwater management systems to retain and transform stormwater pollutants onsite. Pollutants should be retained onsite to protect downstream lakes, streams, and wetlands.



An example of buffering with native vegetation

Wet and wetland detention basins have been shown to be much more effective than dry bottom basins in achieving stormwater pollutant removal. Wet basins landscaped with native wetland and prairie vegetation have been found to be particularly effective at removing pollutants and preventing inbasin shoreline erosion.

Discourage Detention in the Flood Fringe: Detention in the floodplain is difficult to design to function properly under all flood stage conditions. When detention must be placed in the flood fringe, compensatory storage should be provided for the entire floodplain volume displaced by the detention basin.

Prohibit Detention in the Floodway: As stated above, detention in the floodplain is difficult to design to function properly under all flood stage conditions. In addition, when in the floodway, the detention basin may block flood flows, reducing the conveyance capacity of the floodway. Finally, pollutants captured by the detention basin may be flushed into the stream when the basin is inundated by large instream flood events.

Prohibit Onstream Detention: Onstream detention should be prohibited unless it provides regional flood control benefits, is in the public interest, and the environmental mitigation discussed under the floodway construction activities section of the floodplain management standards is provided. Unless onstream detention is accompanied by onsite basins or other BMPs designed for stormwater pollutant removal, the stream will act as a discharge zone for runoff pollutants which is inconsistent with the objectives of this Plan and the requirements of the federal Clean Water Act. This standard will avoid the high maintenance costs often associated with onstream facilities as well as prevent degradation of stream resources.

Prohibit Direct Discharge of Stormwater Runoff to Wetlands: Stormwater runoff should be treated and detained prior to discharge to natural and mitigation

wetlands. Excessive pollutant loads and significant changes in the magnitude and frequency of water level fluctuations within wetlands can severely stress wetland plant and wildlife communities. While wetlands are able to provide significant pollutant filtering benefits, excessive pollutant loads can exceed their assimilation capacity.

Detention Should be Designed Using Appropriate Hydrologic Methods: Detention basins should be designed using hydrograph routing techniques and using the most current rainfall data. Currently, the most up to date design precipitation data is from the Illinois State Water Survey Bulletin 70 publication (Huff, 1989). In a study of hydrologic design methods conducted by NIPC, it was found that non-hydrograph based techniques (e.g., the modified rational formula) significantly underestimate detention requirements (Price and Dreher, 1991). It was also found in the NIPC study that detention volumes will be significantly undersized using Technical Paper 40 (Hershfield, 1961) precipitation data.

Require Formal Maintenance Mechanisms for all New Stormwater Facilities: For stormwater infrastructure to function properly it must be maintained in its design condition. Maintenance agreements and easements as well as special service areas are among the methods that can be used to assure maintenance. Maintenance mechanisms for stormwater infrastructure was discussed in greater detail in the maintenance section (Section 5.1.4). Assuring proper maintenance is particularly important for detention basins and infiltration systems.

Prohibit Connection of Stormwater Drainage Systems to Agricultural Tile Systems: Agricultural tile systems were designed to drain groundwater under free flow conditions and were not constructed for maintenance access. Also, many of the tiles were installed up to 80 years ago and were constructed of lower-strength materials than modern storm sewers. Surcharging of drain tiles as a result of discharge of surface stormwater runoff can rupture these tiles that are difficult to maintain and repair and do not have easements associated with them to allow maintenance access.

5.2.4 Soil Erosion and Sediment Control

Accumulated sediment washed from construction sites not only destroys aquatic habitat and leads to degraded water quality conditions, it also fills flood storage areas and reduces stream and culvert conveyance capacity. The ordinance should address the following standards related to soil erosion and sediment control.

Ordinance Applicability: Soil erosion and sediment control measures should be required for land disturbances of all sizes. However, as a practical matter, the requirement that a permit be obtained generally may be limited to those activities disturbing more than 5,000 square feet, unless adjacent to a waterbody or wetland.

Minimize the Area and Time of Disturbance: The area disturbed at any particular time and the duration of disturbance should be minimized through staging of construction activities and through site design which minimizes the area to be regraded.

Require Soil Erosion and Sediment Control Measures Consistent with Established Guidance: The ordinance should include explicit standards for soil stabilization, sediment control measures, conveyance channels, and other important practices. In addition, development of soil erosion and sediment control plans should follow the procedures in the latest amendment of "Illinois Procedures and Standards for Urban Soil Erosion and Sedimentation Control" (the Greenbook) (Association of Illinois Soil and Water Conservation Districts, 1988). Design of soil erosion and sediment control practices should be based on the standards in the latest amendment of the "Illinois Urban Manual - A Technical Manual Designed for Urban Ecosystem Protection and Enhancement" (USDA, 1995). Both of these documents should be adopted by reference.

Require Installation of Sediment Control Measures Prior to Land Disturbance: Sediment control measures such as sedimentation basins and silt fences should be installed prior to significant land disturbance activities to ensure that sediment generated during construction is captured.

Require Early Implementation of Erosion Control Measures: Soil erosion control measures such as temporary seeding, mulching, and erosion control blanket should be implemented soon after the end of



An example of silt fencing

active disturbance of the land and prior to final grading if final grading will not be completed for a significant period of time. This includes stabilization of soil stockpiles.

Require Routine Inspection and Maintenance of All Soil Erosion and Sediment Control Measures: For soil erosion and sediment control measures to be effective they must be routinely inspected and maintained. Although construction activities are only temporary, soil erosion and sediment control measures such as erosion blanket, silt fences, and sediment traps will commonly require maintenance or replacement several times during the construction process.

Provide Effective Enforcement Tools: Without adequate provisions for enforcement, it may be difficult to ensure that measures are adequately maintained. Effective enforcement tools include stop work orders and fines that specify each day as a separate violation and letters of credit that allow the enforcement agency to immediately address an issue using the developer's funds.

5.2.5 Stream and Wetland Protection

The ordinance should address the following standards related to stream and wetland protection.

Avoid and Minimize Wetland Disturbances: The following avoidance and minimization principles should be applied when considering wetland disturbances.

- Prohibit significant disturbance of unmitigatable wetlands.
- Demonstrate that there is no practical alternative to necessary wetland impacts.
- Minimize the wetland disturbance.

Require Protection of Natural Stream Functions: Except when in accordance with other Plan objectives, modification of natural streams should be avoided except to perform stream restoration and maintenance activities consistent with the goals and objectives of this plan and the standards as discussed in Section 5.1.4. Where avoidance is not feasible, environmental mitigation as specified under floodway modifications in the Floodplain Management section (Section 5.2.2) should be required.

Require Buffers Along All Waterbodies and Wetlands: A buffer of appropriate width comprised of native vegetation should be maintained or established along the edge of all streams, lakes, and wetlands. Exceptions to the native vegetation requirement may be allowed to facilitate water dependent activities, maintenance, or recreational access such as for beaches and boat launches, where appropriate. This standard is intended to minimize streambank and shoreline erosion, protect aquatic and riparian habitat, provide filtering of contaminated runoff, and preserve natural aesthetics.



Buffer area (stream)

Require Setbacks Along All Waterbodies and Wetlands: Beyond the buffer described above, a setback should be established along the edge of all streams, lakes, and wetlands. Only limited types of development should be allowed within the setback. The development types should be limited to the following:

- Minor improvements such as pedestrian or bicycle trails and educational signs.
- Maintenance access for utilities
- Parks and recreational areas
- Private and public lawns

This standard is recommended to provide a transition zone between intensive development and the natural features of the buffer. In addition to supporting the previously-stated objectives of a buffer, a setback is recommended for streams in recognition that erosion is a natural process and adequate setbacks are necessary to prevent erosion from threatening structures and their foundations. Setbacks also ease access for critical maintenance needs.

5.3 WATERSHED PLANNING METHODOLOGY AND ISSUES

The purpose of watershed planning is to identify the unique resources and problem areas of a watershed and to develop programs and recommendations to prevent potential future problems and remediate existing problems. This section outlines a recommended planning methodology and the issues that should be addressed in a comprehensive watershed plan.

5.3.1 *Watershed Planning Methodology*

The watershed planning methodology described below should be used in conducting the watershed planning process. Watershed planning, where possible, should be coordinated with upstream and/or downstream counties to allow preparation of plans that address the entire watershed. This methodology should not be viewed as rigid procedural requirements but as a guide to preparation of watershed plans.

1) **Assemble Watershed Advisory Committee:** The KCSMPC and staff should assemble a watershed advisory committee. The advisory committees should include County and local jurisdictions and organizations as well as resource agencies. The groups shown below should be considered for inclusion on the advisory committee. Staff of local governments and local citizens groups will have the greatest knowledge of watershed conditions and be most affected by those conditions. Consultants and resource agencies can provide additional technical expertise and experiences from other watersheds within the region. Also, the resource agencies may have funding and can provide input regarding fundable alternatives.

   The purpose of the advisory committee is to assist the KCSMPC and staff in establishing goals and objectives for the watershed plan and providing input on plan alternatives as well as strategies for implementing the recommendations.

   Local Agencies and Organizations
   - County Representatives
   - Municipalities
   - Townships
   - Park Districts
   - Forest Preserve District
   - County Health Department
   - County Highway Department
   - Citizens Organizations
   - Drainage Districts

   Resource Agencies
   - Kane-DuPage SWCD
   - Northeastern Illinois Planning Commission
   - Illinois Department of Natural Resources
   - Illinois EPA
   - Natural Resources Conservation Service
   - US Fish & Wildlife Service
   - Corps of Engineers
   - USEPA
   - Farm Bureau
   - Developer Associations



A meeting of the Blackberry Creek Watershed Planning Committee

2) **Establish Preliminary Goals and Objectives:** The goals and objectives of the watershed plan should be related to the unique conditions, problems, and opportunities of the watershed. However, the goals and objectives of the watershed should begin with and be consistent with the goals and objectives of the countywide stormwater plan. The objectives identified early in the planning process should be used to guide the direction of the process. However, they may evolve over time as information on watershed conditions is collected.

3) **Inventory Watershed Resources and Conditions:** Previous reports and studies and background data on the watershed should be assembled and inventories of the stream corridor and watershed conducted. Watershed data assembled should include floodplain, wetland, land use/land cover, municipal boundaries, soils, and vegetation maps as well as hydrologic information such as rainfall and streamflow data. This will provide information on watershed conditions and resources that affect stream hydrology and condition.

   In addition to collecting this data, a stream corridor inventory should be conducted to assess the condition of the stream corridor itself and identify problems areas such as severe streambank erosion, significant obstructions, suspicious discharges, and degraded habitat conditions. Stream cross-section, rainfall, and streamflow data will be needed if detailed hydrologic/hydraulic analysis for flood damage assessment and floodplain mapping are to be performed.

   Finally, sensitive natural areas such as Illinois Nature Preserves, sites on the Illinois Natural Areas Inventory, sites with threatened or endangered species, and high quality wetlands should be identified during an advanced identification of wetlands (ADID) study (recommended previously).

4) **Analyze Watershed Characteristics and Opportunities:** Based on the information collected and assembled above, watershed problems can be identified and the sources, causes, and magnitude of the problems analyzed. This step may include detailed quantitative hydrologic and hydraulic modeling and GIS based analysis. The next section (5.3.2) identifies watershed planning issues that should be considered during this component of the planning methodology.

5) **Analyze and Recommend Alternatives for Problem Remediation and Prevention:** Alternatives for remediation and prevention of problems should be developed and should consider both watershed and site-specific measures as well as structural and non-structural techniques. Evaluation of alternatives should also consider impacts to onsite and downstream stream, lake, and wetland resources. Costs and potential funding sources should be developed for each of the alternatives. Considering the watershed goals and objectives, financial resources, and the estimated costs for project implementation, alternatives should be selected and recommended projects should be prioritized.

6) **Develop and Recommend Effective Action Plan:** An action plan should be prepared which identifies and recommends funding sources, the responsibilities of the various parties that will implement the plan, and a schedule for implementation.

7) **Implement Plan and Monitor Progress:** Implementation activities should be monitored to ensure that recommended activities are occurring. The results of plan implementation should also be monitored to assess the adequacy of the plan in meeting its objectives and to identify additional measures that may be necessary to achieve the objectives.

5.3.2 Comprehensive Watershed Planning Issues

A comprehensive watershed plan should identify and address in a comprehensive fashion the problems, needs, and opportunities in the watershed. Subjects which will commonly need to be addressed are discussed below.

Flood Damage and Mitigation Needs: While flood damages may occur in specific locations, flooding is the result of runoff from the entire upstream watershed. Thus, the cause of flood damages, particularly overbank flooding, must be analyzed on a watershed basis. Since watersheds rarely follow political boundaries, analysis of flooding problems must necessarily be addressed on an intergovernmental basis, which will be facilitated through creation of the KCSMPC. In addition to addressing existing flooding problems, potential future problems should also be identified and watershed-specific regulatory standards developed where appropriate.

Emergency Preparedness Needs: Flood damages and life/safety impacts can often be significantly reduced through proper emergency preparedness to facilitate timely evacuations, sand bagging, and moving of valuables to higher levels. In some watersheds it may be appropriate to develop a flood threat recognition and warning system. The system could include flood stage forecast maps which identify areas that are likely to be inundated given the flood stage at a location(s). With real time flood stage information, emergency managers could predict which areas are potentially being flooded and likely to be in need of services. Emergency preparedness needs should be coordinated with Kane County Office of Emergency Management to provide them with the tools that they need.

Floodplain Mapping Status and Needs: The floodplain maps in many areas of Kane County were prepared in the early 1980s. In the more urban areas of the County, the mapping was generally prepared based on hydrologic and hydraulic modeling. In the more rural areas, the mapping was generally developed by more approximate means such as regression equations and using the historic flood of record as the regulatory flood. Due to land use changes, changes in channel conditions, better rainfall information, the level of analytical detail, and greater sophistication in watershed modeling techniques, the accuracy of many of the existing maps is questionable. The current floodplain mapping should be evaluated in terms of:

Changes in land use since the time of the mapping: Changes in land use since the time of the mapping may have significantly altered the flood risk within and adjacent to the currently mapped floodplain.

Changes in hydraulic conditions since the time of the mapping: Installation or removal of significant hydraulic structures since the time of the mapping may have significantly altered the flood risk within and adjacent to the currently mapped floodplain.

Adequacy of the geographic coverage of the mapping: Most regulatory maps do not extend into the headwaters of streams where the drainage area is less than one square mile.

Adequacy of the hydrologic and hydraulic (H/H) analysis supporting the floodplain mapping: Many of the regulatory floodplains in Kane County were studied using approximate methods and do not have elevations associated with them. Also, many of the early hydraulic analyses were performed with an insufficient number of cross sections to adequately represent the channel hydraulics. This was identified as a contributing factor in the flood height increases associated with the Des Plaines River remapping.

Recent flooding experience: Recent experience may help identify inaccuracies in the current regulatory floodplain.

The number and significance of map revisions (LOMRs) and map amendments (LOMAs) that have occurred since the time of the mapping: LOMRs and LOMAs are not shown on existing floodplain maps and information on them can be difficult to obtain from FEMA. Also LOMRs and LOMAs are often not requested for floodplain modifications permitted by IDNR-OWR.

If it is determined that floodplain mapping for the watershed is not adequate, funding to update the maps should be identified and new maps prepared.

Identification of Regionally Significant Storage Areas: Throughout Kane County there exist depressional storage areas that store significant runoff volumes. If these depressional storage areas are lost, substantial increases in downstream flow rates and flood damages may result. In a study of Blackberry Creek it was found that 100-year discharges would increase from 9 to 27 percent, depending on watershed location, if watershed depressional storage was lost (USDA, 1987). The increase was independent of any land use changes in the watershed. Similar findings have been made in other watersheds around the region. Many depressional storage areas may also be groundwater recharge zones important for stabilizing streamflows and lake levels within the watershed. Watershed planning should identify significant depressional areas and develop alternatives for their preservation.

In addition to identifying existing watershed storage areas, opportunities for creation of additional regional storage areas should be identified. For example, regional storage areas could be created behind existing or future roadway embankments to serve as regional detention for portions of the watershed.

Identification of Groundwater Recharge Zones: Many areas of Kane County continue to rely on locally recharged aquifers for water supply. The recharge zones for these aquifers should be identified and protection strategies should be developed. Both water quantity and quality should be considered when developing protection strategies. Infiltration measures that help maintain the supply of water to the aquifer as the area develops could also be a source of pollution that could contaminate the aquifer.

Channel and Shoreline Erosion: Although erosion is a natural process, excessive channel and shoreline erosion often occurs in urban and agricultural watersheds. Streambank and shoreline erosion occurs as a result of both hydrologic changes associated with urbanization and stream corridor factors such as channelization and removal of stabilizing vegetation.

Alternatives to remediate excessive channel and shoreline erosion should consider both watershed measures to address hydrologic destabilization and stream corridor management measures. Watershed measures to address hydrologic destabilization could include retrofitting of existing detention basins to improve runoff rate control during 2-year and smaller runoff events and creation and/or utilization of regional storage areas described previously. Potential corridor management measures include reestablishment of native deep rooted vegetation and bio-technical erosion control measures which use a combination of structural and vegetative measures to control streambank and shoreline erosion.

Alternatives to prevent excessive stream and shoreline erosion should also consider both watershed and riparian corridor management measures. Watershed measures should include adequate stormwater controls to prevent hydrologic destabilization as the watershed develops. Instream measures should include stream corridor management to prevent and address invasion of non-native and undesirable vegetation, prevent disturbance of natural streams that are currently stable, and restore channelized streams that may be unstable. Finally, buffers should be established along streams and shorelines so that normal erosion does not later threaten structures and property that is developed along the stream or shoreline.

Sedimentation: Like erosion, sedimentation is also a natural process. However, excessive sedimentation can reduce the conveyance and storage capacity of stream channels, culverts, and floodplains, increasing flood heights and damages. Sedimentation can also lead to loss or degradation of aquatic habitat. Sedimentation is the result of erosion of upland land surfaces, washoff of pollutants from urban land surfaces, and streambank erosion in upstream reaches. Watershed planning should identify the primary existing or potential causes of excessive sedimentation and identify alternatives to reduce the sources of sediment. Plans should also assess dredging and other sediment removal options once the sources of sediment have been addressed.

Water Quality Remediation and Protection: Water quality problems are typically related to high concentrations of suspended sediment, nutrients, pesticides, oil and grease, organic matter, and heavy metals. Sources of these pollutants include agricultural and urban runoff, upstream channel erosion, failing septic systems, and point sources. Water quality problems can also be the result of conditions within the

waterbody itself such as resident carp populations and certain recreational activities which stir up bottom sediments and lead to high turbidity levels. Watershed planning should identify sources and causes of the problems as well as alternatives to remediate the problems. During evaluation of alternatives to improve water quality, other factors, such as lack of physical aquatic and riparian habitat, should be considered since addressing water quality alone may not be sufficient to meet certain Stormwater Management Plan goals and objectives such as improving recreational fisheries and achieving a Class B stream rating.

High quality waterbodies, particularly those that may be sensitive to increased pollutant loads related to anticipated land use changes, should be identified and alternatives developed to prevent excessive loading. Adequate stormwater best management practices should be sufficient to protect most waterbodies. However, for particularly sensitive waterbodies, land use restrictions in the tributary watershed may also be necessary to provide adequate protection. Considering that water temperature and flow rate fluctuations can also have a significant impact on water quality and waterbody conditions, the quantity and source of runoff (surface vs subsurface) may also need to be addressed.

Important or sensitive groundwater recharge areas should also be identified and protected to prevent contamination of groundwater resources.

Aquatic and Riparian Habitat Restoration and Protection: Impairment of stream, lake, and wetland habitats can be the result of watershed influences, as previously described, or direct physical modifications such as channelization, filling, or vegetation removal. Direct modifications destroy habitat diversity, disturb natural substrates, and can lead to streambank erosion.

As watershed planning is being undertaken, regional restoration opportunities for stream corridors, lakes, and wetlands should be evaluated. There may be opportunities, for example, to accomplish restoration objectives as part of flood control projects, enhancement of regional storage areas, or remediation of streambank erosion. Restoration of aquatic and riparian habitat should consider both watershed induced impacts and direct modifications. Restoration techniques include revegetating riparian areas with native plants and enhancing channel features such as stream riffles and meanders.

Habitat protection planning should also consider potential watershed induced impacts and direct modifications. As discussed previously, particularly sensitive habitats or habitats likely to be significantly affected by projected upstream urbanization should be identified and alternatives to prevent habitat degradation developed. Adequate stormwater best management practices and restrictions on stream and wetland modifications should be sufficient to protect most habitats. However, for particularly sensitive habitats, land use restrictions in the tributary watershed may also be necessary to provide adequate protection, particularly to minimize changes in hydrology which is often the root cause of habitat degradation.

Potential wetland mitigation and banking sites should be identified to enhance wetlands regulation and to provide opportunities to restore lost wetland resources. This should be coordinated with both private and public entities such as the Forest Preserve District and park districts.

Recreational Use: The rivers and lakes of Kane County are used for a number of recreational uses such as swimming, boating, fishing, and hiking. These uses can be impaired due to water quality, aesthetic, and physical conditions. Low water quality and degraded aesthetics (algae blooms, high turbidity, etc) can severely impair swimming uses. Aesthetics and physical conditions (e.g., debris blockages, overly shallow water, etc) can reduce boating potential (such as canoeing). Water quality and physical conditions can reduce fish populations, impairing recreational fisheries. Watershed planning should address water quality, aesthetics, access, and physical conditions particularly in evaluating regional projects. Whenever possible, multi-functional, watershed-based solutions should be identified (e.g., incorporating a trail system into a stream restoration project. When considering recreational use enhancement, it should be recognized that certain recreational uses (particularly power boating) can affect other uses such as habitat and water quality.



Canoers enjoying recreation activities

Coordination Opportunities with Other Programs: There are often opportunities to achieve watershed-based stormwater objectives through coordination with other programs such as open space and transportation planning. Watershed planning should be coordinated with open space acquisition programs to acquire particularly important and/or sensitive natural areas such as high quality wetlands, regional storage sites, critical floodplains, high quality stream corridors, and designated natural areas. As discussed previously, roadways can be designed to create stormwater storage areas or wetlands to benefit downstream areas.

5.3.3 Summary

In summary, the key principles of this watershed planning methodology are to base recommended actions on identified flooding problems and waterbody impairments and to approach the solution of watershed problems in a holistic, comprehensive fashion.

5.4 DEVELOPMENT DESIGN ALTERNATIVES FOR NATURAL RESOURCE PROTECTION

Based on the work of NIPC, Schueler and others discussed in Chapter 3, it is apparent that standard drainage and detention techniques are not adequate to prevent flooding increases, degradation of water quality, and impairment of stream uses. The impacts of development are twofold. First, the change in land cover causes a dramatic change in runoff hydrology and water quality. Second, streams, lakes, and wetlands are often physically modified for the convenience of site design. This section recommends site design techniques to minimize these impacts, allowing development to continue in Kane County while at the same time protecting or even enhancing the water resources of the County. In particular, this section discusses the following site design elements.

- Identification and mapping of sensitive site features early in the planning process.
- Techniques to preserve and enhance the natural hydrologic and pollutant filtering functions of the site.
- Techniques to avoid and enhance sensitive areas.

5.4.1 Identification of Sensitive Site Features

There are a number of important features of a site that should be identified prior to preparing a site plan. These include stream corridors, shorelines, wetlands, woodlands, and steep slopes.

Stream corridors, including the waterway itself and the adjacent riparian lands, provide habitat for fish, aquatic and riparian plants, and a host of aquatic and terrestrial insects and animals. Each of these components are important to a balanced aquatic ecosystem and achieving high stream quality. Direct physical modifications of stream corridors should be avoided except where the intent is to enhance an already degraded corridor.

Shorelines of lakes, ponds, and wetlands provide similar functions as stream riparian zones. In addition, shorelines vegetated with native wetland and prairie species minimize shoreline erosion and help to prevent nuisance level goose populations. Except for water dependent activities such as piers and beaches, direct modifications of shorelines should be avoided except for the purpose of enhancing already degraded shorelines. Also, development activities should be setback from shorelines as discussed in the regulatory standards section.

Wetlands provide many pollutant filtering and hydrologic stabilization functions as well as unique habitat for a variety of plants and animals. As with streams and shorelines, direct modification of wetlands should be avoided, except for enhancing activities, and development setbacks should be provided.

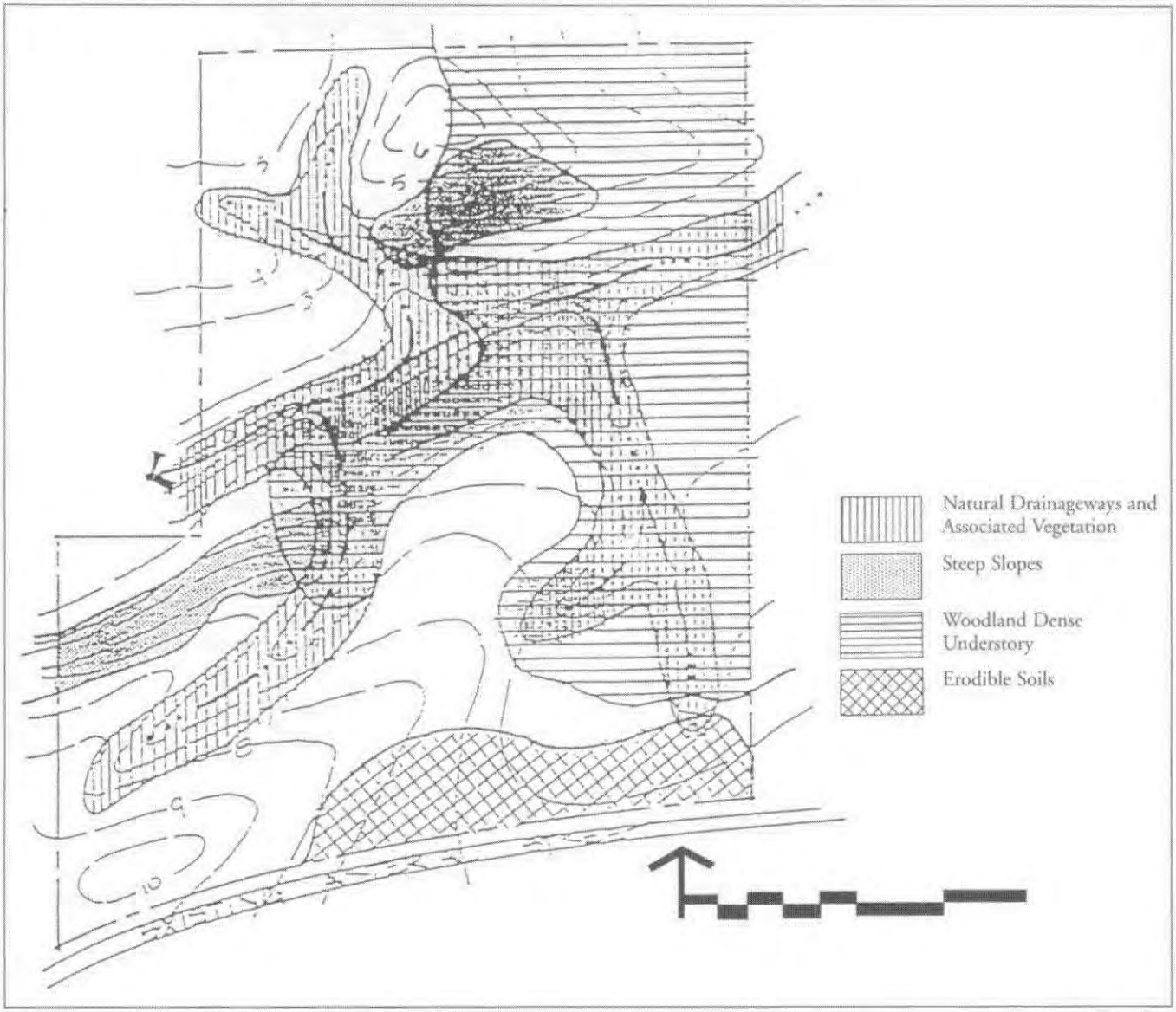
Woodlands also provide a number of water quality and hydrologic functions, in addition to habitat for a variety of wildlife. High quality woodlands stabilize soils, absorb runoff, and take up nutrients from shallow groundwater flow. Further, woodlands provide buffers between developments, moderate air temperatures, and filter air and noise pollution. By the nature of the vegetation, woodlands take a long time to establish and are difficult to replace.

Steep slopes can become unstable and subject to high erosion rates if disturbed by development. Further, it may be difficult to re-establish vegetation on steep slopes. Steep slopes should generally be protected from development activities.

Designated Natural Areas such as Illinois Nature Preserves and sites on the Illinois Natural Areas Inventory should be identified early in the planning process so that they can be avoided during development.

The first step in protecting these sensitive features is to identify and map them. Overlay mapping techniques such as illustrated in Figure 5-3 should be used to identify those areas most suited to development activities and those areas that should be avoided. In the figure, each sensitive area is highlighted with a distinct shading pattern. Areas with the darkest shading (due to overlapping patterns) are the most critical areas to be avoided. Areas with no shading are best suited to development.

Figure 5.3 *A map overlay diagram identifying critical areas*



To protect the most sensitive areas, clustering techniques should be considered to concentrate development activities on the most appropriate areas of the site. Clustering is discussed further in a subsequent section.

5.4.2 Techniques to Preserve and Enhance the Natural Hydrologic and Pollutant Filtering Functions of the Site.

The philosophy embodied in this section is to 1) minimize the amount of impervious area, which in turn reduces stormwater runoff and 2) utilize the landscape to naturally filter in infiltrate runoff before it leaves the development site.

Impervious Area Reduction

Reducing the impervious area in residential and commercial developments can substantially reduce stormwater runoff volumes and pollutant loads. The Kane County 2020 Land Resource Management Plan recommends limiting the amount of imperviousness in developing watersheds to 15 percent. While it may not be possible or even desirable to achieve this limit in every development, each development should minimize its impervious area to achieve the limit watershed-wide.

There are a number of techniques that can be used to reduce impervious areas as outlined below. In addition to reducing the actual impervious area, the effective impervious area can be reduced by allowing impervious areas to runoff onto vegetated pervious areas and thereby promote infiltration and filtration of runoff.

Reducing Building Setbacks: Reducing building setbacks reduces the length of driveways and entry walks and is most readily accomplished along low-traffic streets where traffic noise is not a problem. Figure 5-4

Figure 5.4 *Reduce Front-yard Setbacks to Lessen Paved Surface Area*

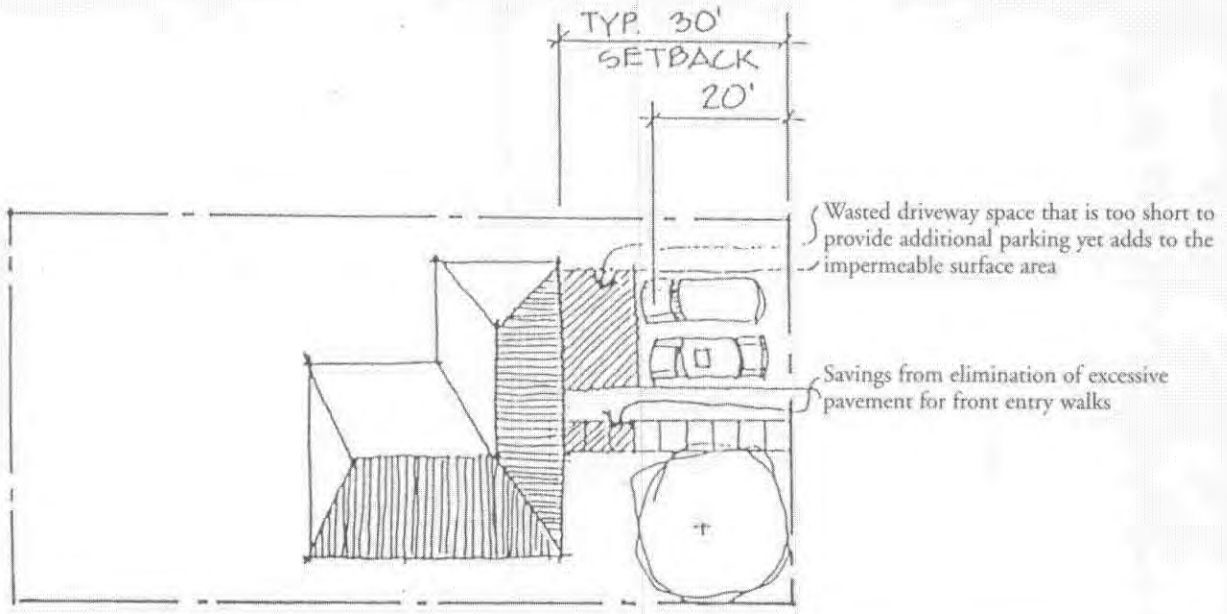
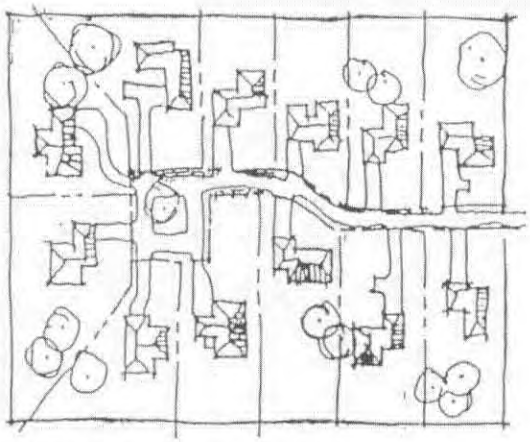
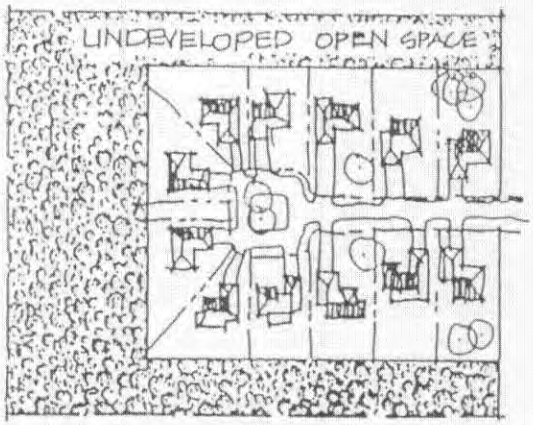


Figure 5.5 *Cluster Development to Reduce Impervious Area*



2 DU/AC Gross Density
2 DU/AC Net Density
12 Dwelling Units on 6 Acres



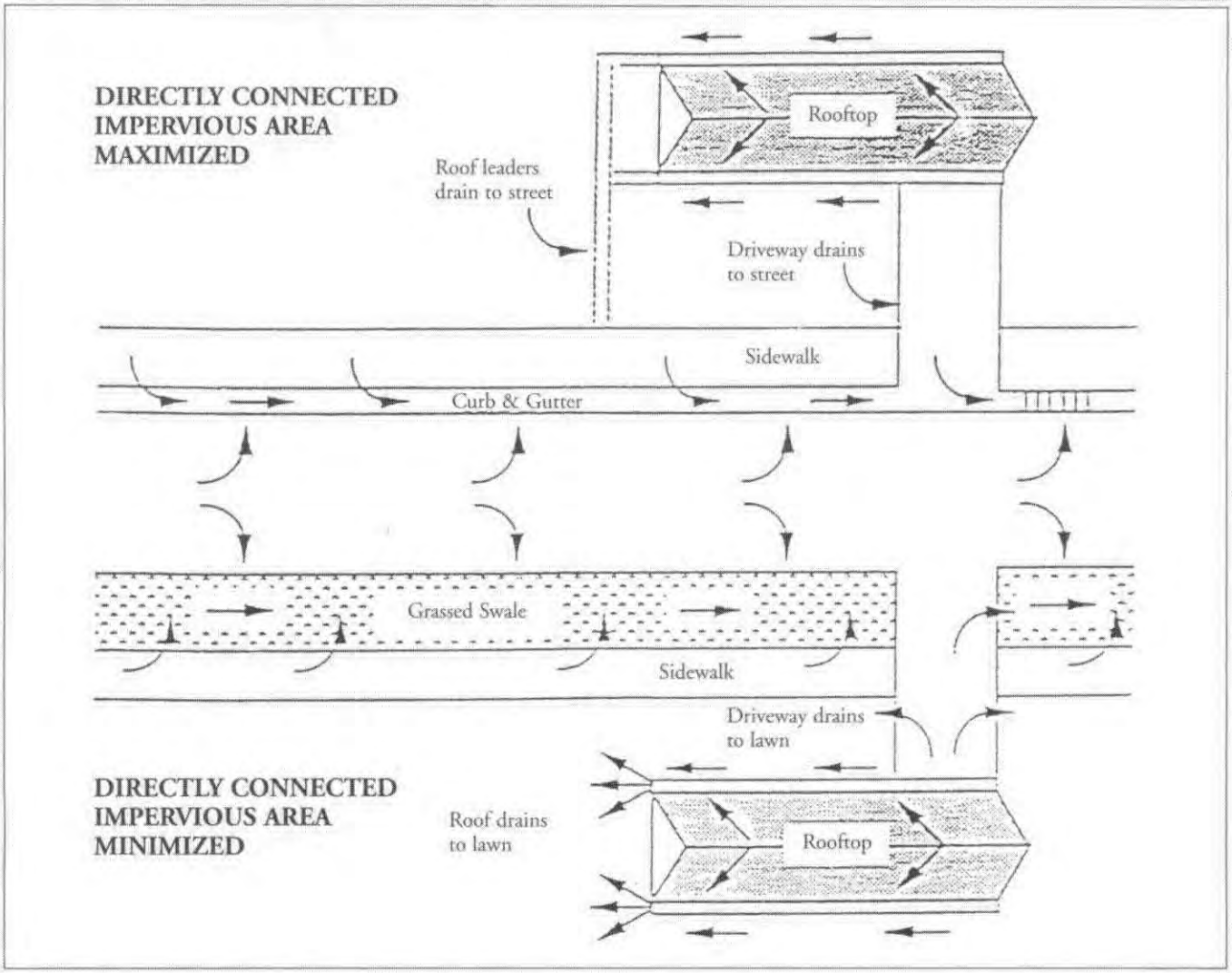
2 DU/AC Gross Density
4 DU/AC Net Density
12 Dwelling Units on 3 Acres

provides a residential example of reducing setbacks to reduce impervious area without losing any driveway parking spaces.

Reducing Street Widths: Reducing street widths can be accomplished by either reducing onstreet parking or by reducing lane widths. Municipal planners and traffic designers are beginning to favor narrower neighborhood streets for non-stormwater reasons that include lower maintenance and replacement costs, improved safety due to lower traffic speeds, and creation of a friendlier residential environment.

Reducing Sidewalks to One Side of the Street: A sidewalk on one side of the street may suffice in low-traffic neighborhoods. The lost sidewalk could be replaced with bicycle/recreational trails that follow back-of-lot lines. Where appropriate, backyard trails should be constructed using permeable materials.

Figure 5.6 *Examples of Directly Connected Impervious Areas*



Reduced Imperviousness via Alternative Parking Lot Designs: Impervious surfaces also can be reduced in parking lots by downsizing individual parking stalls, sharing parking between adjacent users, adjusting peak demand assumptions, and/or banking parking until it is needed.

Constructing Cluster Developments: Cluster developments, discussed in detail later, can also reduce the amount of impervious area for a given number of lots as illustrated in Figure 5-5. The biggest savings is in street length which will also reduce costs for the development.

Using Permeable Paving Materials: Materials such as paving blocks should be considered as alternatives to asphalt and concrete, especially for low use surfaces such as driveways, overflow parking lots and emergency access roads.

Reducing the Hydraulic Connectivity of Impervious Surfaces: Impervious surfaces are significantly less problematic if they are not directly connected to an impervious conveyance system, such as storm sewers. Two basic ways to reduce hydraulic connectivity are to route roof and other impervious runoff over lawns and other vegetated surfaces and to reduce the use of storm sewers. Figure 5-6 illustrates disconnection of impervious surfaces on a typical residential lot.

Routing roof and other impervious runoff over lawns can be easily accomplished in most site designs. Direct connection of downspouts to storm sewers, driveways, or parking lots should be discouraged. Also, driveways and parking lots should be crowned so that runoff discharges to adjacent pervious areas rather than to the street. Use of deep rooted native vegetation on the pervious areas receiving impervious runoff can further enhance runoff volume reduction. The increased infiltration capacity afforded by native vegetation is discussed in a subsequent section.

Reducing the use of storm sewers to drain streets, parking lots, and back yards can greatly enhance the potential for infiltrating and filtrating runoff. This practice requires greater use of swales and will not be practical for some development sites. The practice will require increased education of local citizens and public works officials who have come to expect rapid elimination of runoff, especially from residential lots.

Preservation of Natural Drainage Characteristics

Protection of natural drainage features — particularly vegetated drainage swales, depressional areas, and highly-permeable soils — is desirable because of their ability to infiltrate and attenuate flows and to filter pollutants. However, this objective is often not accomplished in modern developments. In fact, commonly held drainage philosophy encourages just the opposite pattern. Streets and adjacent storm sewers are typically located in the natural headwater valleys and swales thereby replacing natural drainage features with completely impervious systems. Runoff and pollutants generated from impervious surfaces flow directly into storm sewers with no opportunity for attenuation, infiltration, or filtration.

Recommended drainage BMPs include the following:

Natural Drainage Measures: Use of drainage swales, vegetated filter strips, and other natural drainage approaches — in contrast to storm sewers, lined channels, and curbs and gutters — will reduce runoff volumes and greatly enhance the removal of pollutants from runoff water. Site plans which keep roads and parking areas higher in the landscape and locate existing swales along back lot lines within drainage easements help to accomplish this objective. In essence, impervious surface should be designed to drain to pervious surfaces rather than the reverse.

Natural Detention Basin Designs: Natural detention designs incorporate features of natural wetland and lake systems, such as gradual shoreline slopes, a border of wetland vegetation, and areas of open water — in contrast to conventional designs which feature dry bottoms or rip rap-edged wet basins. Natural designs are much more effective in removing stormwater pollutants than conventional wet and dry bottom basins.

Infiltration Practices: Where soils are sufficiently permeable, infiltration trenches and basins dramatically reduce surface runoff volumes and naturally recharge groundwater.

Natural Landscaping: Natural landscaping approaches utilize native plants, particularly wildflowers, prairie grasses, and wetland species, as an alternative to conventional turf grass and ornamental plants, to reduce stormwater runoff and to reduce maintenance needs. Native prairie plant species have substantially deeper root systems (e.g., up to 10 feet) than conventional turf grasses (e.g., 2 to 6 inches). Although data is limited on the runoff volume impact of native plant species in urban landscapes, available information suggests that infiltration capacity may be increased by a factor of two or more. Natural landscaping can be particularly beneficial when incorporated into drainageways and other areas that receive runoff from impervious surfaces.

Preservation of Natural Depressional Storage: Depressional storage areas have no surface outlet and drain or evaporate very slowly following a storm event. They can be commonly seen as ponded areas in farm fields during the wet season or following large runoff events. Traditional development practices eliminate these depressions via filling or draining, thereby obliterating their ability to reduce surface runoff volumes and trap pollutants. The volume and release rate characteristics of depressions should be protected in the design of the development site. This can be accomplished by simply avoiding the depression or by incorporating its storage as additional capacity in required detention facilities.

5.4.3 Techniques to Avoid and Enhance Sensitive Areas

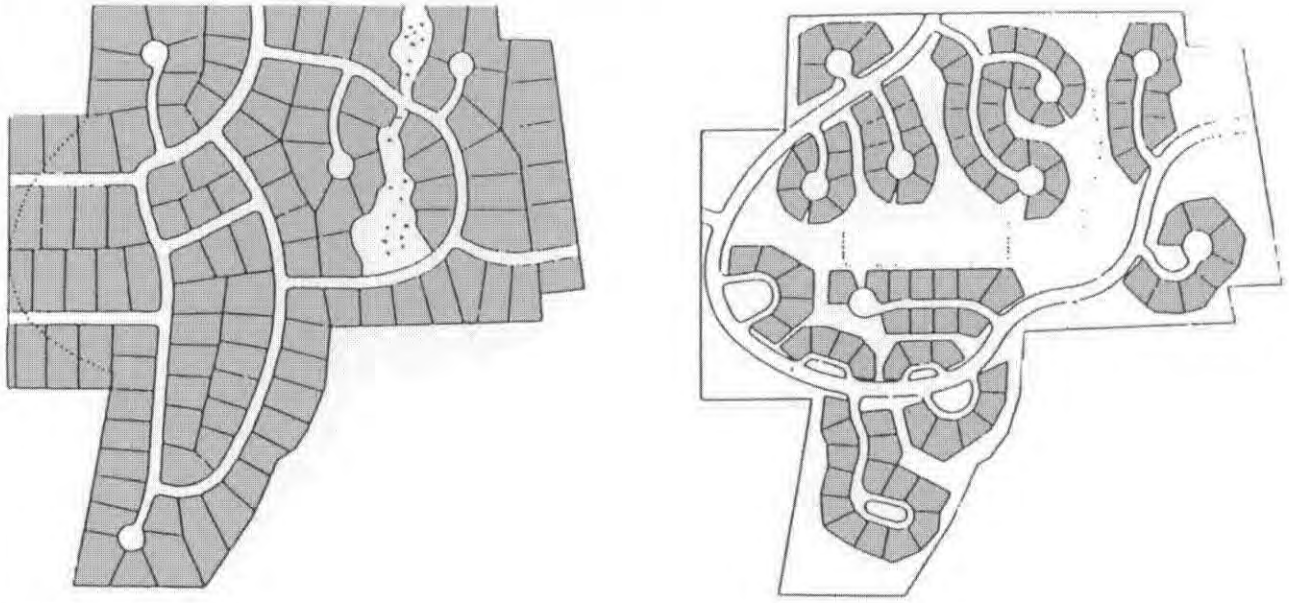
There are a number of techniques which can be used to facilitate avoidance of sensitive areas. These include clustering, transfers of development rights, conservation easements, land donation and acquisition, and others. The techniques are described below. Avoided sensitive areas can remain under onsite ownership and management or they can be owned and/or managed by the Forest Preserve District, park districts, or land foundations and trusts. For high quality sensitive areas, outside management should be encouraged.

Cluster Development

Clustering increases densities on portions of the development site to preserve natural amenities and common open space (Figure 5-7). Cluster development is a key technique for protecting sensitive site features while allowing for reasonable economic use of the land (Figure 5-8). Cluster development also substantially increases flexibility in site layout to preserve and create natural drainage systems and to maximize opportunities to drain impervious surfaces onto vegetated areas.

Clustering concepts can also be implemented on both a micro and macro scale. On a micro scale, clustering is used on an individual development site to facilitate protection of natural site features and minimization of runoff as described above. On a macro scale, the concept

Figure 5.7 *Cluster Development*



Source: Lacy, 1990

CONVENTIONAL SUBDIVISION **CREATIVE DEVELOPMENT**

of clustering can be applied to the watershed as a whole. Watershed development will have the least impact if it is concentrated in those portions of the watershed that have the lowest concentration of sensitive features. Development should also be concentrated toward the municipalities where density is already greatest and the impacts have already been felt. As shown in Figure 3-6 in Chapter 3, the sensitivity of a watershed to increasing population (and therefore imperviousness) decreases with increasing population — the additional population can best be accommodated where the population already exists. Finally, it can easily be shown that the per capita (or per household) impervious area generally decreases with increasing population density.

Applying the concept of clustering to an individual site is relatively straightforward while applying the concept on a watershed scale is much more difficult. On an individual site there is one property owner. On a watershed scale, there are numerous property owners as well as numerous governmental jurisdictions. Clustering development at the watershed scale will require substantial coordination between municipalities and development of watershed plans to identify areas of the watershed that should be protected as well as mechanisms to provide that protection.

Transfer of Development Rights

Under a transfer of development rights a property owner retains ownership and occupancy of the land but sells the right to develop the land for urban uses to another property owner.

Conservation Easements

A conservation easement is similar to a transfer of development rights in that the property owner retains ownership but gives up certain development rights. Conservation easements are often donated to local land foundations and governmental bodies, providing the owner with substantial tax benefit.

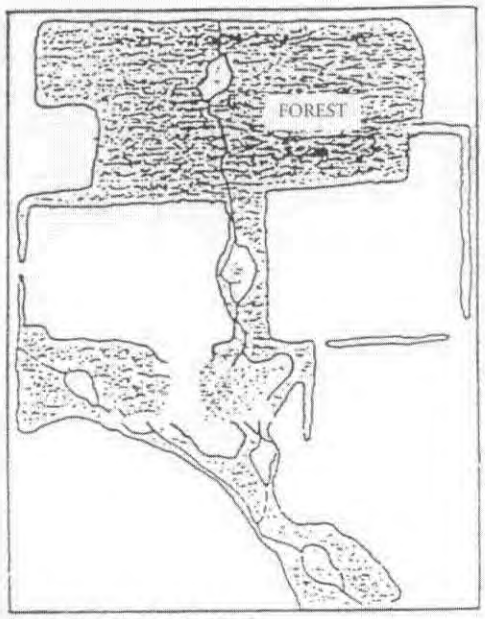
Land Donations and Acquisition

Many municipalities and the County require land donations as part of the annexation and development process. These donations could be targeted toward natural drainageways, wetlands, floodplains, and other sensitive areas to improve the natural resource enhancement and protection value of these donations. Also, open space districts, the Forest Preserve District, land foundations, and park districts should be approached to determine if sensitive areas can be acquired.

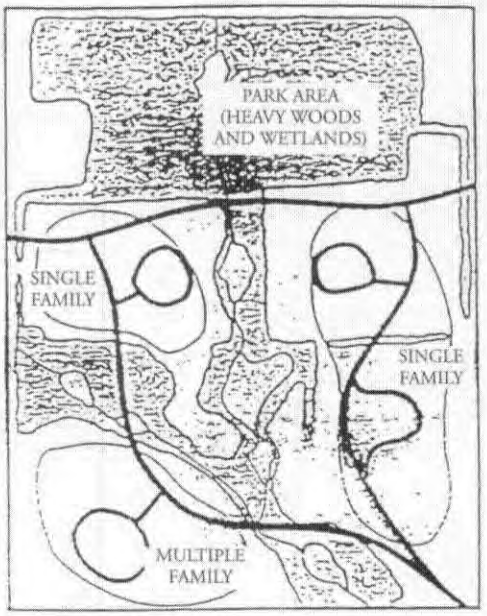
Watershed Conservation Fund

Under a watershed conservation fund, the developer of a parcel would pay into the fund based on the level of imperviousness above the watershed target. The fund would then be used to purchase land outright or to purchase conservation easements to protect offsite

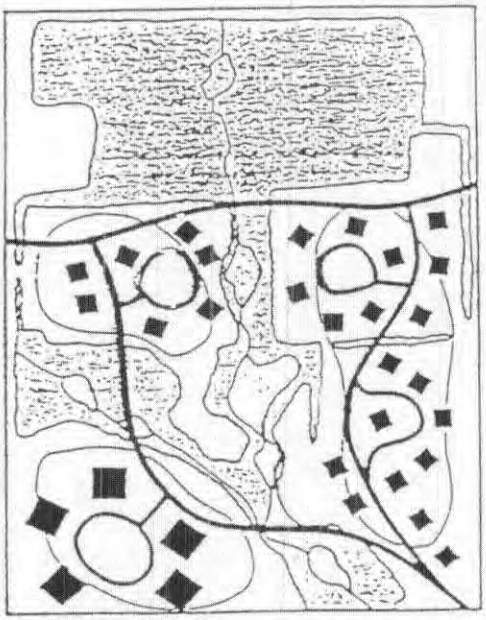
Figure 5.8 *Site Planning to Avoid Sensitive Areas — Clustering*



(A) SITE ANALYSIS



(B) SCHEMATIC PLAN



(C) FINAL PLAN

sensitive areas and reduce imperviousness in other areas of the watershed.

These techniques each have appropriate applications and should be considered as several of many tools available to facilitate watershed natural area protection and imperviousness goals.

5.4.4 Implementation of Design Alternatives

Many of the site design alternatives presented in this section do not lend themselves to ordinance standards and may be difficult to implement via a watershed protection ordinance alone. Instead, a variety of strategies should be considered as discussed below.

Watershed Protection Ordinance

A number of elements in this section can be facilitated or required through a watershed protection ordinance and the associated technical reference manual. These are discussed below.

Identification of Sensitive Site Features: Section 5.4.1 recommends identification of sensitive site features prior to development of a site plan. The ordinance should require that these features be mapped as part of the permit application package. The ordinance technical reference manual should provide guidance on obtaining relevant data and on tools for mapping these areas.

Preservation and Enhancement of the Natural Hydrologic and Pollutant Filtering Functions of the Site: Some of the elements discussed under this topic (Section 5.4.2) do not lend themselves to numerical or verifiable standards. However, a runoff reduction hierarchy in the ordinance can require that they document the planning process used to address each stage of the hierarchy. The ordinance technical reference manual should provide guidance on designing, implementing, and maintaining the alternative site designs discussed in this section. The manual should also outline the resource and cost benefits and implications of the design alternatives.

Avoidance and Enhancement of Sensitive Areas: Ordinance standards such as buffers, setbacks, and avoidance of stream, lake, and wetland modifications should be included in the ordinance. Recommended standards are included in Section 5.2. The ordinance technical reference manual should provide guidance on using clustering and other techniques to avoid sensitive onsite features.

Local Subdivision and Zoning Ordinances

Some local subdivision and zoning ordinances may be in conflict with the recommended Watershed Protection Ordinance standards and the site design alternatives discussed in this section. The KCSMPC should review County ordinances and work with the municipalities to address these conflicts.

Preservation and Enhancement of the Natural Hydrologic and Pollutant Filtering Functions of the Site: Most local ordinances have building setback, road width, and parking space requirements within their subdivision and zoning code. In some cases these requirements may be greater than necessary and could be modified to facilitate reducing the imperviousness of developments. Also, many local ordinances require curb, gutter, and storm sewers for all developments. There are many development types and densities that could be readily constructed without curb and gutter to reduce the impact of impervious areas and provide natural pollutant filtering and runoff volume reduction. Finally, many municipalities have weed ordinances that may discourage use of native landscaping and naturalized detention basins.

Avoidance and Enhancement of Sensitive Areas: Although many municipalities have PUD ordinances that allow cluster development, obstacles remain. In some cases, difficult review and approval processes associated with PUDs discourage their use.

Watershed Planning and Planning Partnership Areas

Through the watershed planning process and Planning Partnership Areas (under the County, 2020 Land Resource Management Plan), KCSMPC should work with the municipalities to outline the benefits and identify area specific strategies to implement the recommendations of this section.

Preservation and Enhancement of the Natural Hydrologic and Pollutant Filtering Functions of the Site: Many local officials may not be familiar with the potential negative impacts of development activities. The watershed planning process provides an opportunity to assess the quality of local waterbodies and illustrate the relationships between activities on the land and flooding, water quality, and shoreline erosion impacts. The Planning Partnership Area work sessions also provide an opportunity to discuss these issues.

Avoidance and Enhancement of Sensitive Areas: In many cases, transfers of development rights, conservation easements, and watershed conservation funds have much greater potential for success if coordinated between local jurisdictions within watersheds. This is particularly true when sensitive watershed features are not proportionately distributed between municipalities. The Planning Partnership Areas and watershed advisory committees provide excellent forums for coordinating these activities.

Coordination of Open Space Donation and Acquisition with Natural Resource Protection

The municipalities and the County should begin to coordinate on an ad hoc basis with open space districts, the Forest Preserve District, land foundations, and park districts to assess their interest in accepting donations and/or acquiring natural resource protection areas within development parcels. The conditions under which these groups would be interested in participating should also be discussed. For example, some agencies may be most interested in linear open space and others may only be interested in areas greater than a certain size. By knowing the requirements of these groups, site layout can be arranged to facilitate donations and acquisition and coordinated into overall open space programs and plans.

CHAPTER 6

PLAN IMPLEMENTATION CONSIDERATIONS

6.1 ADOPTION OF STORMWATER PLAN

The first step toward implementation of this Kane County Stormwater Plan is adoption of the plan by the KCSMPC and approval by the County Board. The steps leading to adoption of the plan are listed below.

1) KCSMPC approval of the draft plan: The final draft plan is presented to the KCSMPC. After incorporating comments from the KCSMPC members, the Stormwater Plan is approved for public review.
2) Public review period: The KCSMPC releases the approved draft plan for public review during which time the plan is sent to the municipalities, IDNR, NIPC, neighboring counties, and other interested agencies and parties for review and comment. A public hearing will be held during this period. Relevant comments received during the review period and hearing are then addressed in the final stormwater plan at the discretion of the KCSMPC.
3) Adoption by the County Board: The County Board adopts, by ordinance, the final Kane County Stormwater Management Plan.
4) Implement Adopted Plan: The County Board begins implementation of the adopted plan through the KCSMPC

6.2 PHASING OF RECOMMENDATIONS

In general, the order in which the stormwater plan recommendations are implemented is dependent on a number of factors including the extent of existing problems, the rate of urbanization, and available funding. Kane County is still rural in many areas, yet the impacts of development are being felt as the urban areas expand. These impacts include increased flooding, streambank erosion, degradation of stream quality, encroachment of the floodplain, and degradation/destruction of wetlands. While the existing problems need to be addressed, the high rate of projected growth in the County (over 75% increase in population over the next 25 years) dictates an urgent need to ensure future growth does not exacerbate existing problems.

The first recommendations to be implemented will be those related to the regulatory program to minimize new problems related to new development and avoid exacerbation of existing problems. However, certain administrative and management recommendations will also be necessary to support the regulatory program. As the regulatory program is being implemented, the KCSMPC will also begin to focus on maintenance and planning needs.

Table 6-1 lists each of the recommendations from Chapter 5 (Section 5.1) along with the phase in which it should be implemented. For simplicity, implementation of the recommendations is divided into three phases. At this time no dates have been assigned to the phases. It should be noted that there will be overlap in the three phases. For example, it would not be advisable to wait until all of the Phase 1 tasks are complete before beginning the Phase 2 tasks.

The phasing of stormwater program activities is illustrated graphically in Figure 6-1. The lines in the figure indicate when activities would be started and completed. Many of the activities are ongoing and would continue indefinitely.

6.3 DISCUSSION OF PHASING

Each of the recommendations and activities are discussed below in terms of the phase or phase(s) in which they are carried out. The staffing and funding recommendations are discussed at the end of each phase description. Refer to Chapter 5 for more in depth discussion of the recommendations.

Phase 1

The Phase 1 recommendations are primarily related to preparation of a countywide Stormwater Ordinance, public education, program coordination, and data collection.

Prepare the Countywide Ordinance: The County has hired a consultant to assist KCSMPC and staff in preparing a countywide ordinance to ensure there are no adverse effects from new development. The KCSMPC should petition FEMA and/or IDNR to update the most inaccurate floodplain maps, and interim measures should be developed and incorporated into the Ordinance to address floodplain mapping that cannot be updated in a timely manner. Although development of a countywide Ordinance is generally a one-time activity, Ordinance revisions will be necessary from time to time.

Table 6.1 *Phasing of Plan Recommendations*

Plan Recommendation	Phase*
Administration and Management Recommendations	
Assign Staff and Provide Training	1-3
Provide Technical Support	1-3
Coordinate Professional Education	2-3
Develop and Implement Public Education Program	1-3
Develop Funding Strategies and Fund Program	1-3
Regulatory Recommendations	
Prepare and Adopt Countywide Ordinance	1
Prepare Technical Reference Manual	1-2
Develop Ordinance Enforcement Structure	1
Enforce Ordinance**	2-3
Planning Recommendation	
Coordinate with Other County Planning Activities	1-3
Coordinate with Drainage Districts	1-3
Collect Hydrologic Data	1-3
Collect Stream Condition Data	1-3
Coordinate with Adjacent Counties	1-3
Prepare Advanced Identification of Wetlands Study	1
Prepare and Implement Watershed Plans	3
Promote Design Alternatives for Natural Resource Protection**	1-3
Maintenance Recommendations	
Develop Maintenance Standards for Infrastructure	1-2
Develop Mechanism to Maintain Stormwater Infrastructure	2
Maintain Stormwater Infrastructure**	2-3
Develop Maintenance Standards for Natural Drainage System	2
Develop Mechanism to Maintain Natural Drainage System	2
Maintain Natural Drainage System**	2-3

* Where multiple phases are given, the first number indicates the phase in which the activity would start and the second number indicates the phase through which the activity would continue.

** These activities are not explicit recommendations from Chapter 5 but are implied by the other recommendations and are obvious components of the program presented in this plan.

Prepare Technical Reference Manual: Preparation of the technical reference manual (with consultant assistance) should begin once the standards in the Ordinance have been established such that the reference manual is available on or before the effective date of the Ordinance. Although development of a technical reference manual is essentially a one-time activity, periodic updates to the manual will be required as the Ordinance is modified and as new information becomes available.

Develop Ordinance Enforcement Structure: This includes determining which regulatory components will be delegated and under what conditions. It also

includes proceeding with the process of delegating Ordinance enforcement to the municipalities. The KCSMPC enforcement structure should be in place before the effective date of the Ordinance.

Provide Technical Support: County staff assigned to the KCSMPC will be the central technical resource for the County in terms of interpretation and enforcement of the Ordinance. This function will be important as the Ordinance is being developed to assist the communities and public in understanding the purpose and standards of the Ordinance.

Develop and Implement Public Education Program: A public education program should begin as soon as practical to develop "grass roots" awareness and support for adequate regulatory standards and increased funding levels that will be required. It is important to generate recognition and interest early in the program to develop a constituency and to provide a central repository for information regarding significant stormwater problems and issues.

Promote Design Alternatives for Natural Resource Protection: The County should begin promoting these site design concepts early in the plan implementation process. During Phase 1, these concepts will be incorporated into the technical reference manual and included in public education activities. The public education activities should target elected and appointed officials throughout the county.

Coordinate with Other County Planning Activities: KCSMPC should coordinate with Forest Preserve District, County Office of Emergency Management, and Division of Transportation planning activities. This should occur on an ongoing basis to ensure consistency with the plan and to identify opportunities to address mutual goals and concerns.

Coordinate with Drainage Districts: KCSMPC should begin coordinating with drainage districts during this phase to ensure that drainage district activities are consistent with this plan and to identify opportunities to coordinate stream maintenance and restoration activities. Also, any reorganizations that may be necessary should begin during Phase 1. This is an ongoing activity that should continue through Phases 2 and 3.

Collect Hydrologic Data: This task has already begun and will continue to ensure that a number of years of data are available for watershed planning.

Collect Stream Condition Data: To begin monitoring trends and assessing accomplishment of plan goals, monitoring should begin in this first phase. Stream condition information and trends will also be needed for development of watershed plans. During this first phase, a monitoring network will be established and streams that currently have no biological data will be targeted.

Prepare Advanced Identification Wetland Study: Preparation of a Kane County wetland ADID study is being pursued to ensure that wetland information needed to support the regulatory program is available when, or shortly after, the Ordinance is adopted.

Assign Staff and Provide Training: Appropriate staff should be assigned to the stormwater program and provided with adequate training.

Develop Maintenance Standards for Stormwater Infrastructure: Having consistent standards for maintenance is important to ensure that stormwater management features are functioning as designed. Standards and responsibilities for maintaining stormwater infrastructure should be addressed in the Ordinance and the technical reference manual.

Coordinate with Adjacent Counties: KCSMPC should coordinate with neighboring counties to ensure consistency with the Kane County Plan and to coordinate watershed planning activities and projects as well as development standards.

Develop Funding Strategies and Fund Phase I: The County, using general revenues, will fund development of the Countywide Ordinance and technical reference manual. KCSMPC will review funding strategies and pursue a long-term Countywide funding source(s).

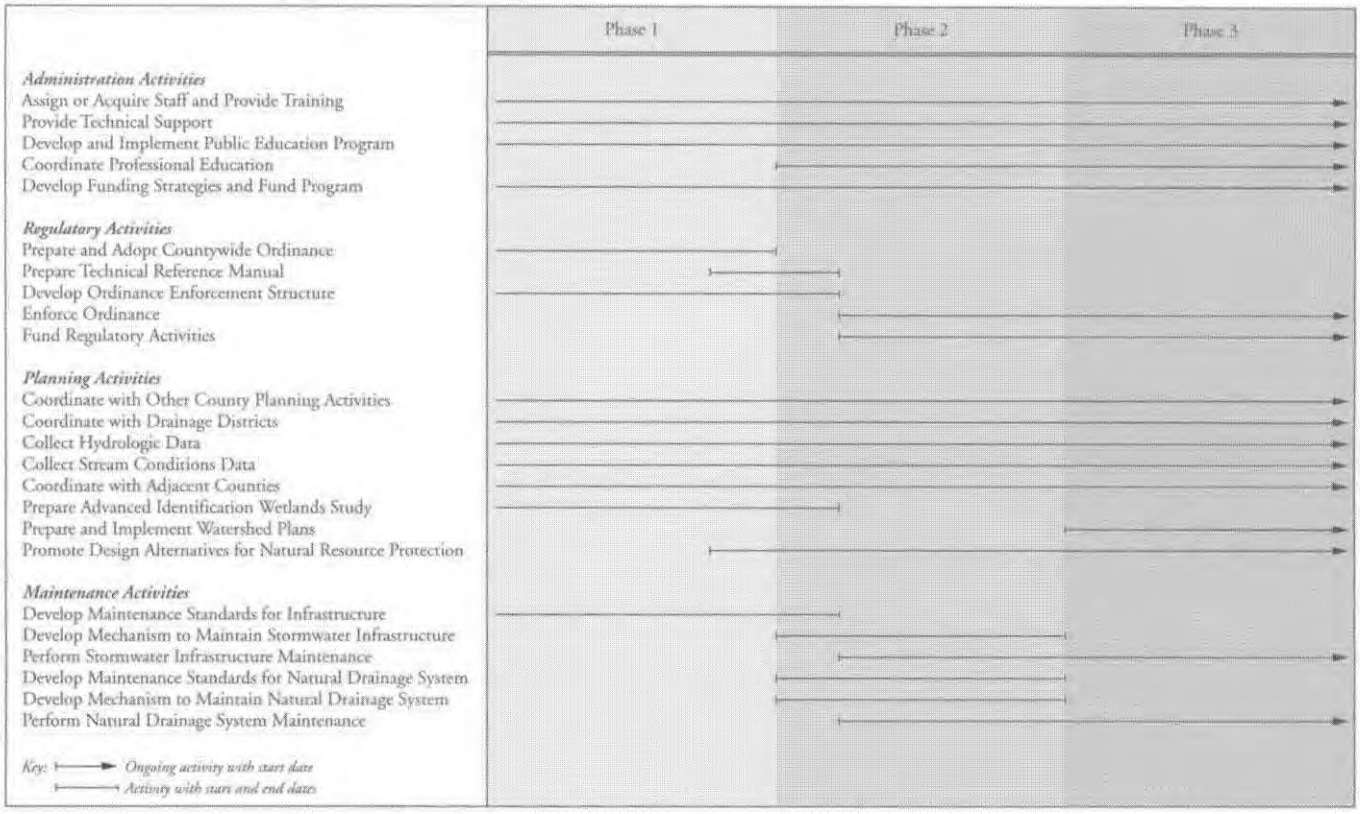
Phase 2

The Phase 2 activities are the phased-in implementation of the Countywide Ordinance and the certification of municipalities to enforce the Stormwater Ordinance.

Adopt and Phase-In Countywide Ordinance: Depending on the number of municipalities that seek Ordinance enforcement authority, portions of this activity will be performed by the municipalities. During Phase 2, much of the effort will be related to the certification process and coordinating with the municipalities.

Adopt and Distribute Technical Reference Manual: Preparation of the technical reference manual will begin in the later stages of Phase 1 and be completed in the early stages of Phase 2. The technical reference manual will define and expand the Stormwater Ordinance.

Figure 6.1 *Kane County Stormwater Program Phasing*



Implement Public and Professional Education Program: This is an ongoing activity that will continue from Phase 1 and will be expanded to include training for design and permit review professionals.

Implement Municipal Delegation of Ordinance Enforcement to Certified Municipalities: Municipalities that have adopted an Ordinance as comprehensive and stringent as the County Ordinance and have demonstrated their ability to enforce the Ordinance may apply to KCSMPC to receive certification.

Promote Design Alternatives for Natural Resource Protection: During Phase 2, promoting these ideas to the public and professional communities will continue from Phase 1. These concepts will also be detailed in the technical reference manual.

Develop Maintenance Standards for Stormwater Infrastructure: Having consistent standards for maintenance is important to ensure that stormwater management features are functioning as designed. Standards and guidance, including schedules, for maintaining stormwater infrastructure will be prepared and contained in the technical reference manual.

Develop Mechanism to Maintain Stormwater Infrastructure: It will be important that a mechanism to maintain the stormwater infrastructure installed with each new development be developed and implemented to ensure the long term functioning of the infrastructure. A number of potential mechanisms were discussed in Chapter 5. Specification of maintenance responsibilities for stormwater infrastructure will be included in the technical reference manual.

Develop Maintenance Standards for the Natural Drainage System: Having consistent standards for maintenance is important to minimize avoidable flood hazards and to discourage maintenance activities that could exacerbate problems elsewhere. Based on local and national guidance as well as experience during projects that may occur during this phase, standards and guidance should be prepared and added to the technical reference manual or other guidance documents. Dissemination of the materials prepared on appropriate standards and procedures should target drainage districts, township maintenance departments, municipalities, and major land owners. Although development of standards is essentially a one-time activity, standards and guidance should be updated from time to time to reflect additional experience gained during future stream maintenance projects.

Develop Mechanism to Maintain Natural Drainage System: A mechanism is needed to implement maintenance activities as discussed in Chapter 5. Grant opportunities should be pursued for certain maintenance activities, particularly stream maintenance to address erosion problems and debris blockages.

Perform Natural Drainage System Maintenance: Natural drainage system maintenance activities should be performed utilizing the mechanisms developed in the previous recommendation. Maintenance of the natural drainage system is an ongoing activity. In certain streams or stream reaches with critical needs, stream maintenance should begin in Phase 2 (or sooner).

Assign Staff and Provide Training: KCSMPC will determine staffing requirements. As Phase 2 gets underway, it may be appropriate to assign or hire a staff person to administer the countywide Stormwater Program. An engineer(s) will also be needed to perform regulatory related functions. These functions include participation in pre-application conferences, municipal regulatory delegation and oversight activities, review of permits, and field inspections. The required number of regulatory engineers will depend on the number of municipalities that are granted Ordinance enforcement authority.

Develop Funding Strategies and Fund Phase 2: The primary program costs during Phase 2 will be for staff, consulting fees to complete the technical reference manual, and ongoing program expenses. As discussed previously, the specific mix of funding sources will be determined by the KCSMPC, County Board, and staff. Much of the permit review and enforcement costs could be covered by permit application fees.

Mechanisms for funding regulatory activities will be developed. In particular, a fee structure for permit review and inspection activities will be developed and funding and assistance for updating floodplain maps will be pursued. Funding of the regulatory program will be an ongoing activity.

Phase 3

Phase 3 is enforcement of the Ordinance and watershed planning and implementation.

Enforce Ordinance: Depending on the number of municipalities that seek Ordinance enforcement authority, portions of this activity may be performed by the municipalities. During Phase 3, much of the effort will be related to Ordinance enforcement of non-certified portions of the County, and audit certification of delegated municipalities.

Prepare and Implement Watershed Plans: The watersheds of the County should be prioritized based on the discussion in Chapter 5 and a schedule for preparing the plans developed. Watershed plans, including hydrologic and hydraulic models, should be prepared using the methodology in Section 5.3 as a guide. Funding and technical assistance should be sought to assist in the development of the watershed plans as well as the supporting hydrologic and hydraulic models.

Audit Certified Municipalities: KCSMPC needs to ensure the Ordinance is being properly interpreted and enforced. Therefore, an audit procedure will be developed and implemented to regularly audit all certified municipalities and the County.

Perform Natural Drainage System Maintenance: Drainage system maintenance is an ongoing activity. In streams or stream reaches with less problems, maintenance activities can be delayed until Phase 3.

Assign Staff and Provide Training: Under Phase 3, additional engineers and support staff will be needed to perform (or oversee) watershed planning and implementation as well as stream maintenance. The number of engineers required to perform watershed planning activities will depend on the rate at which watershed plans are to be prepared and the extent to which consultants are used to prepare the plans.

Develop Funding Strategies and Fund Phase 3: Program costs during Phase 3 will include staff, consulting fees (to assist in watershed plan development), contractor fees (to perform stream maintenance activities) as well as ongoing program expenses. In addition, any capital projects identified during watershed planning will need to be funded. As discussed previously, the specific mix of funding sources will be determined by the KCSMPC, County Board, and staff. Outside sources of assistance will be pursued, including potential grants for stream maintenance and restoration activities and technical assistance from various agencies for preparing watershed plans. Outside sources of funding are also likely to be available for cost effective flood control projects.

As discussed under Phase 2, regulatory activities will be largely funded through permit fees. Implementation of watershed plans and stream maintenance specifically benefit the residents and businesses in that watershed. Thus, it may be appropriate to develop special service areas or other means of generating watershed specific revenue sources during Phase 3.

6.4 CLOSING

By creating this plan for a countywide stormwater management program, the municipalities and County of Kane have demonstrated a commitment to manage stormwater on a more regional and watershed basis. To carry on this commitment to reduce and prevent flooding and to protect and restore the water resources of the County, a county/municipal partnership is imperative. At the same time the citizens of the County must be involved in the process to ensure widespread support and to develop stewards for a concerted protection and enhancement effort.

Now is the time to embark on this effort. The county is currently only 22% urbanized. However, the population is expected to increase by almost 75% over the next 25 to 30 years. With the increase in population will come additional homes and businesses and the attendant roofs, roads, and parking lots. While many benefits can come from population growth, if proper planning and protection efforts are not pursued, the negative consequences can be substantial.

This plan outlines a program by which the positive aspects of growth can be maximized and the negative aspects can be minimized. This will occur through a multi-pronged approach using regulatory strategies, planning strategies, and maintenance and management strategies. While this program will require a financial investment, the return on investment will be substantial as evidenced by averted flood damages, enhanced natural resources, high quality open spaces, and an improved quality of life.



Nelson Lake

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APPENDIX A

SUMMARY OF STORMWATER MANAGEMENT QUESTIONNAIRES

KANE COUNTY PRIVATE STORMWATER MANAGEMENT SURVEY

Municipal Responses

A stormwater management questionnaire was prepared by the Kane County Stormwater Management Planning Committee and the Northeastern Illinois Planning Commission to assess the current stormwater management framework in Kane County. The purpose of the questionnaire was to identify the most critical concerns of the local governments in Kane County as well as local regulatory standards for stormwater drainage and detention, floodplain management, soil erosion and sediment control, and stream and wetland protection. The questionnaire was sent to each of the municipalities, park districts, township road commissioners, drainage districts, and sanitary districts, as well as the Kane County Forest Preserve District and Development Department. The following summarizes the responses received from the municipalities and the County.

After each question, first the number of Yes and No responses are given. Then narrative responses are shown. The individual responses are separated by a semicolon. If the same or similar response was given by more than one municipality, the number of repeats is shown in parenthesis.

The municipalities responding to at least portions of the questionnaire are listed below.

Aurora	Elgin	Maple Park	Sugar Grove
Bartlett	Geneva	Montgomery	Wayne
Batavia	Gilberts	North Aurora	West Dundee
Carpentersville	Hampshire	St. Charles	County of Kane
East Dundee	Hoffman Estates	South Elgin	

Public Education/Involvement/Issues

1. Are there currently any ongoing efforts by your community or agency to educate the public about the causes of stormwater problems and the needs and costs of stormwater management? **Yes (6) No (13)**

   If yes, please describe the format of those efforts, the primary issue(s) that are addressed, and how long the efforts have been in effect. *Aurora has had public meetings and floodproofing open house; Batavia sent out questionnaires after 1996 flood and conducted a public hearing; Montgomery has workshops and discussions at meetings; Annual article in St. Charles newsletter; Attached mailout (Wayne); Bartlett village newsletter*

2. Does the general public within your community recognize stormwater and related water resource concerns as serious issues in terms of water quantity and quality? **Yes (12) No (7)**

   If yes, please describe important local concerns. *Flooding (8); Drainage (4); Through the countywide stormwater program we will need to educate the public on water quality issues (County)*

3. Rank, in order of importance, the most critical elements of stormwater management as they pertain to your community. **(1 = most important, 4 = least important)**

Importance	1	2	3	4
a. Water Quality	1	3	4	11
b. Overbank Flooding	5	5	4	5
c. Drainage Problems	12	6	0	1
d. Erosion/Sedimentation	1	5	11	2
e. Other (describe)	0	0	0	0

   Any further Comments? *Life/safety also a concern (Aurora); Infiltration & Inflow to sanitary sewers #1 problem in St. Charles; Flooding has been brought to the forefront due to the July 1996 event, otherwise water quality would have been ranked number 1 (County).*

4. Are there any water resource related stewardship groups or programs (e.g., Adopt-a-Stream, Friends of ..., etc.) operating within your community? **Yes (7) No (12)**

   If yes, please list the programs and the primary activities that the groups are involved with. *Friends of Mastodon Lake (Aurora); Friends of the Fox (Aurora, Batavia, County, Elgin, Montgomery, St. Charles); Fox River Ecosystem Partnership (County); Blackberry Creek Resource Planning Committee (County); Waubonsee Creek Resource Planning Committee (County); Friends of Tyler Creek (County, Elgin, Gilberts); Dial Earth street clean-up (Montgomery); No, but occasionally civic groups have cleaned along river (East Dundee)*

5. Citizen inquiries and complaints regarding stormwater issues are handled by: (check all that apply)

   Municipal staff *17* Municipal officials *13* Consultants *7*

   Others (please specify) *County staff (1)*

   Please describe the inquiry/complaint follow-up system. Also, please list other agencies, if any, to whom complaints or inquiries are referred. *Staff reviews each complaint and Harza reviewed 1996 flood related problems (Batavia); Inspect, assess problem, report or fix (Gilberts and Elgin); Review problem and if possible make corrections (Maple Park); Inspect, assess, fix with public works or put on Capital Improvement Plan (Geneva); First staff review and then consultant if necessary (St. Charles, South Elgin, Wayne, and North Aurora); Determine if it is dispute between neighbors or more areawide problem and severity of problem. Neighbor disputes are left for neighbors to resolve. County provides technical assistance for areawide problems (County).*

Planning, Maintenance, and Funding

6. Have any drainage, flood control, or other water resource related plans (e.g., lake restoration, stream management, etc.) been prepared (or currently underway) for your community? **Yes (12) No (7)**

   If yes, please briefly describe the purpose and date of the plans and include copy(s) (plans can be returned if necessary). *Harza studying 1996 flooding (Batavia); Have budgeted study to address Lakewood drainage problem (East Dundee); Tyler Creek Management Plan by Openlands and Tyler Creek Stormwater Plan by Hey (Elgin); Tyler Creek Flood Insurance Study; Working with state to do flood buyout (Montgomery); Studying infrastructure rehab in original town (Geneva); Turnberry Road drainage, Seventh Ave., Fox Glen, streambank stabilization (St.Charles); Carpentersville study in 1975 but no action taken; Wayne attached;*

7. Has an inventory of stormwater management facilities (i.e., detention basin and storm sewer locations and specifications) been prepared? **Yes (9) No (10)** Is the inventory updated on a regular basis? **Yes (7) No (1)**

   If yes, please describe the format of the inventory, the date of the last inventory, and the frequency of updates. *Mylar and AutoCad (Aurora); Computer mapping and annual updates (Geneva and South Elgin); Inventory underway (Montgomery); Locations recorded and calculations retained; Keep plans but don't have a separate inventory (Carpentersville)*

8. Does your community or agency assume responsibility for maintenance of stormwater drainage and detention facilities? **Yes (12) No (7)**

   If no, please describe who has responsibility (i.e., homeowners association, individual lot owners, etc.) and what mechanisms (if any) are used to ensure maintenance is being performed. *Yes, however homeowners association responsible for new development (Aurora); Yes, except mowing by homeowners, use SSA for extraordinary maintenance and run street sweeper daily (Batavia); Homeowners association but village can go in and charge back (East Dundee); Homeowners association (St. Charles, Elgin, Wayne, Carpentersville, and Hoffman Estates); Park district (Hoffman Estates); Geneva maintains most using SSA but some are privately maintained; Usually individual lot owners but occasionally homeowners associations. For larger developments with a sanitary district, the district performs stormwater facility maintenance. (County)*

9. If you answered yes to question 8, by which of the following is inspection and maintenance of stormwater facilities (i.e., detention basins, storm sewers, swales, etc.) performed: (check one)

   a) scheduled preventative maintenance program *7*

   b) in response to complaints *10*

   If you checked "a" Please describe the maintenance program and schedule. *Check once a year (spring) except at critical sites that are inspected after each significant event (Aurora); Annual sewer inspection and cleaning, annual inspection of swales and detention (Elgin); Annual inspection and repairs/maintenance as needed (Montgomery); Monthly landscape inspection and annual infrastructure inspections (Geneva); General mowing and visual inspection (Hampshire)*

10. Is stream channel and drainageway inspection and maintenance performed in your community on a regular basis? **Yes (7) No (12)**

    If yes, please explain the nature of these activities and who performs them (staff, individual property owners, drainage districts, volunteer groups, etc.). *Mostly just inspection (Aurora); Annual inspections (Hoffman Estates); Newly established program to be implemented by public works (Montgomery); Annual removal of limbs and other debris and inspections of culverts after significant rainfalls (Geneva); periodic inspection of Carpenter Creek (Carpentersville); Daily inspections of drainageways (Gilberts)*

11. Please describe the source of funding for the following elements of your stormwater management program. (i.e., general revenue, permit fees, homeowners associations, etc.)

    a. Capital Improvements (sewer rehabilitation, local flood projects, etc.) *General revenue (16); Motor Fuel Tax (2); Grants (1); cost share program (County); Riverboat funds (County); NA (1)*

    b. Maintenance and Operations (detention and storm sewer maintenance, street sweeping, etc.) *General revenue 15; Vehicle sticker fund 1; Special Service Area 2*

    c. Regulatory (plan review, construction site inspection, etc.) *General revenue 8; Permit Fees 10; Geneva's permit fee is 1½% of public improvements*

Coordination

12. Has your community or agency made any efforts to coordinate stormwater management regulations and design criteria with adjacent communities? **Yes (6) No (12)**

    If yes, please describe the coordination efforts. *Participating in Blackberry Creek and Waubonsee Creek Watershed Committees, have written letters to neighbors requesting stricter standards (Aurora and Montgomery); Coordinating on McKee Street tributary with Geneva and St. Charles (Batavia); Bartlett within DuPage program; Working with Elgin on Tyler Creek (Gilberts); Usually informally and related to a specific development (County)*

13. Are plans for new development reviewed for potential stormwater impacts to property owners outside your corporate boundaries in addition to being reviewed for conformance with ordinance standards? **Yes (6) No (12)**

    If yes, please describe the procedure used to assess impacts outside your boundaries. *Have requested Kane County concurrence and reviewed North Aurora plans (Aurora); Have special release rate (0.07) for McKee Street tributary and Indian Creek (0.10) (Batavia); Require that plans be submitted to neighboring jurisdiction (Elgin); Evaluate design storm conveyance capacity (Geneva); Comments from adjacent land owners are solicited and sometimes try to fix existing problems. (County)*

14. Have other stormwater management efforts (e.g., maintenance, remedial activities, etc.) been coordinated with neighboring jurisdictions? **Yes (2) No (16)**

    If yes, please describe the coordination efforts and any agreements that may be in place. *Storm sewer maintenance with City of Aurora and Aurora Township (Montgomery); Cost share on drainage projects in cooperation with township road districts (County)*

15. Have efforts been made to coordinate drainage activities (i.e., maintenance activities, channelization projects, etc.) between drainage districts and other relevant entities within your jurisdiction? **Yes (3) No (13) NA (2)**

    If yes, please describe the coordination efforts. *Maintenance activities with Tyler Creek Commission (Gilberts); IDNR-OWR and Kane County regarding stormwater and SESC (North Aurora); Have worked with a Big Rock South Side Drainage District on a project (County)*

16. Do you believe there is a need for more regional coordination (e.g., watershed, county, or multi-county level) of stormwater management programs, standards, and issues? **Yes (16) No (1)**

    If yes, what are the most important issues to be coordinated, at what level should they be coordinated, and who should be responsible for the coordination? *County would be most appropriate level for flooding (8); Stream maintenance at county or state level (2); Drainage districts need to be resurrected (1); Need to create "Watershed Authority" (1); Need unified design standards and coordination of plan review (3); Overbank flooding, stormwater detention, water quality, and soil erosion and sediment control should all be coordinated at the countywide level (1)*

Regulations/Standards

If your agency does not regulate development activities, you may proceed to question 62 on the last page.

Stormwater Drainage and Detention

General Stormwater:

17. Does your community enforce a stormwater drainage and detention ordinance? **Yes (18) No (0)**

    If you answered no to this question, please proceed to the Floodplain Management questions. If you answered yes, please answer the following questions.

18. Which of the following are addressed in the purpose statement of your ordinance? (check all that apply)

    Runoff Volume *12* Runoff Rate *18* Water Quality *5*

19. Are formal maintenance agreements or contracts required for new detention facilities? **Yes (6) No (12)**

    If yes, please provide a sample maintenance agreement or contract. (Please make sure it is labeled as a maintenance agreement.) *Have authority to do work and charge back to owner (Elgin and East Dundee); Special Service Areas*

20. Must existing depressional storage be preserved (in addition to detention storage requirements)? **Yes (11) No (7)**

21. Is there a requirement that concentrated detention basin outflows be discharged to a defined drainageway with adequate capacity? **Yes (13) No (4)**

22. Is there an acreage threshold below which stormwater detention requirements do not apply? **Yes (12) No (4) No Answer (1)**

    If yes, list the minimum sizes for each of the following development types

    Residential *0.5 ac (1); 1.0 ac (3); 2.0 ac (3); 3.0 ac (1); 5.0 ac (3)*

    Commercial/Industrial *0.0 ac (2); 5,000 SF (1) 0.5 ac (1); 1.0 ac (7)*

    Other (please specify) *No minimum but have fee-in-lieu (Batavia); Detention may be required for less than 1.0 acre if conditions warrant (Geneva); Case-by-case for residential (Hampshire)*

23. What recurrence interval storm must be conveyed by the minor drainage system (i.e., storm sewers)? (check one)

    5-Year *6* 10-Year *11*

    Other (please specify) *Not specified (1)*

Detention Sizing Standards:

24. What method of detention sizing is required? (check one)

    Not Specified *3* Modified Rational(MWRDGC) *10*

    Hydrograph routing *7* TR55 graphical method *5*

    Other (please specify) *MWRDGC unless greater than 50 ac, TR20 (Aurora and East Dundee); MWRDGC unless greater than 10 acres (Sugar Grove)*

25. Is a safety factor required on calculated detention volumes? **Yes (3) No (14)**

If yes, please specify *25%, 37½% in Blackberry & Indian (Aurora); 1.25 (Hoffman Estates); 1.5 (W. Dundee)*

26. What is the specified release rate for the 100-Year event? (check one)

MWRDGC Method (3-Year) *2* 0.15 cfs/acre *8* 0.10 cfs/acre *4* Not Specified *2*

Other (please specify) *D.S. drainage capacity (1); 0.15 except in Indian & Blackberry where 0.10 used (Aurora); 0,10 except McKee Street tributary where 0.07 used (Batavia); 0.15 except in cooperation with municipalities where 0.10 is used in critical watersheds (County)*

27. Does the ordinance require detention to control events in addition to the 100-Year? (e.g., the 2-year event) **Yes (5) No (13)**

If yes, please specify:

Size of event *2 yr. (5)*

Release rate *0.04 (5)*

Have negotiated 2-year control into larger and more recent developments (County)

28. What rainfall data source is required? (check one)

Not specified *2* Bulletin 70 *16* TP40 *0*

Other (please specify) *Not specified in South Elgin but consultant requires Bulletin 70*

29. Is the design storm distribution specified? **Yes (8) No (7)**

If Yes, what distribution is specified? (check all that apply)

SCS Type I *0* SCS Type II *7* Huff First *3* Huff Third *6*

Other (please describe) *SCS Type II or Huff (2); Distribution not specified but review applicability of selected distribution (County)*

Detention in Sensitive Areas:

30. Is detention allowed in the floodway? **Yes (8) No (10)**

If yes, is a controlled discharge required? **Yes (7) No (1)**

31. Is detention allowed in the flood fringe? **Yes (14) No (3)**

If yes, is a controlled discharge required? **Yes (14) No (0)**

Have allowed it both ways. Depends on location in the watershed, size of development, etc. (County)

32. Is on-stream detention prohibited unless it provides regional storage? **Yes (9) No (9)**

If yes, please describe any mitigation requirements for allowable on-stream detention. *Not allowed (Aurora); Must provide public benefit and improve water quality (East Dundee); Geneva attached standards; Must provide downstream reduction in flooding (Hampshire); Must use modeling to demonstrate watershed benefit (County)*

33. Is detention allowed in existing wetlands? **Yes (15) No (3)** (Only in low quality wetlands in Sugar Grove)

If yes, is a pre-settling or stilling basin required before discharge to the wetland? **Yes (10) No (5)**

Runoff Volume Control and Water Quality:

34. Does your ordinance emphasize a runoff volume reduction hierarchy which promotes minimization of impervious area, maximization of infiltration, and use of natural drainage practices (e.g., swales, depressional storage areas) over storm sewers? **Yes (6) No (12)**

35. Are detention designs required to maximize water quality mitigation benefits (e.g., preference for wet bottom or wetland basins over dry bottom basins)? **Yes (3) No (15)**

Floodplain Management

36. Does your community enforce a floodplain management ordinance? **Yes (18) No (0)**

    If you answered no to this question, please proceed to the Soil Erosion and Sediment Control questions. If you answered yes, please answer the following questions.

37. Has your community adopted the "Model Floodplain Ordinance for Communities Within Northeastern Illinois" (1996) as required by IDNR-OWR? **Yes (13) No (5)**

38. Which of the following are addressed in the purpose statement of your ordinance? Protection of: (check all that apply)

    hydrologic functions *13* water quality *10* aquatic habitat *5*

    recreation *5* aesthetics *4*

39. Is the list of "Appropriate Uses" for the floodway more restrictive than the full list allowed by the State? **Yes (0) No (16)**

    If yes, what uses are not allowed? (check all that apply)

    Detached garages and other non-inhabitable structures _____

    Parking lots _____ Roadways parallel to the watercourse _____

    New treatment plants _____ Other (please specify) _____

40. Is additional mitigation of floodway construction activities required beyond minimum IDNR/OWR minimums? **Yes (5) No (11)**

    If yes, please answer the following questions.

    a. Is a safety factor required for any compensatory storage needed? **Yes (5) No (0)**

       If yes, please specify *1.5 (5)*

    b. Are off-site increases in stage or velocity prohibited? **Yes (3) No (2)**

    c. Is environmental impact mitigation required? **Yes (0) No (5)**

       If yes, please describe _____

41. Are onstream impoundments discouraged unless in the public interest? **Yes (14) No (2)**

42. Are channel modifications discouraged unless there are no practical alternatives? **Yes (15) No (1)**

43. Is maintenance of stream length, sinuosity, slope, pools and riffles required for unavoidable channel modifications? **Yes (4) No (11)**

44. For the following areas, please indicate whether compensatory storage is required and specify the safety factor.

Flood fringe **Yes (15) No (0)** If yes, safety factor *1.0 (3); 1.5 (11); 2.0 (1)*

Depressional storage **Yes (7) No (8)** If yes, safety factor *1.0 (6); 2.0 (1)*

Wetlands **Yes (10) No (5)** If yes, safety factor *1.0 (6); 1.5 (3)*

45. Do these floodplain management standards apply to non-regulatory streams and floodplains (i.e. those not identified on the FEMA floodplain maps)? **Yes (10) No (4)** (North Aurora uses 1:1 comp storage for non-regulatory)

Soil Erosion and Sediment Control

46. Does your community enforce a soil erosion and sediment control ordinance? **Yes (14) No (4)**

If you answered no to this question, please proceed to the Stream And Wetland Management questions. If you answered yes, please answer the following questions.

47. Is there an acreage threshold below which soil erosion and sediment control standards do not apply? **Yes (6) No (8)**

If yes, please specify the minimum disturbance area *5,000 ft² (2); 5,000 ft² or 250 CY or within 100' of lake or stream; 2500 ft² or 200 yd³; 1 acre*

48. Does the ordinance include a list of principles to establish the objectives of soil erosion and sediment control and convey a project design philosophy to minimize impacts? **Yes (11) No (2)**

49. Does the ordinance specify critical stages at which inspections will be performed? **Yes (6) No (7)**

50. Does the ordinance explicitly require that soil erosion and sediment control practices be maintained throughout the duration of construction? **Yes (12) No (2)**

51. Does the ordinance include soil erosion and sediment control design standards? **Yes (11) No (2)**

Stream and Wetland Management

52. Does your community have stream and wetland protection regulations? **Yes (7) No (11)**

If you answered no to this question, please proceed to the Permit Review and Enforcement questions. If you answered yes, please answer the following questions.

53. Are modifications to high quality, irreplaceable wetlands, lakes and stream corridors prohibited? **Yes (4) No (3)**

54. Are the beneficial functions of streams, lakes, and wetlands protected from damaging modifications including filling, draining, excavating, damming, impoundment, and vegetation removal? **Yes (8) No (0)**

55. Is development within setbacks and/or buffers adjacent to streams, lakes, and wetlands controlled? **Yes (5) No (3)**

If yes, please specify both buffer (only native vegetation allowed) and setback (some landscape alternatives allowed but no significant structures) widths for: *(Batavia requires (if practical) for entire floodplain to stay natural)*

Streams:	Lakes:	Wetlands:
Not specified (3)	*Not specified (3)*	*Not specified (3)*
Buffer 25' (1)	*Buffer 25' (1)*	*Buffer 25' (1)*
Setback 75' (1)	*Setback 75' (1)*	*Setback 75' (1)*

56. Is armoring of channels and banks discouraged unless natural vegetation and gradual bank sloping are inadequate to prevent severe erosion? **Yes (7) No (1)**

57. Are mitigation measures required for approved wetland and waterbody modifications? **Yes (5) No (2)**

If yes, please describe the mitigation requirements including the minimum area ratio, monitoring requirements, etc. *1.0 (1); 1.5 (1); North Aurora who said "N" for #52*

Permit Review and Enforcement

58. Please list the parities (i.e. planning staff, engineering staff/consultant, public works staff, building official, elected officials, planning commission, zoning board, etc.) involved in the review process for the following activities:

a) stormwater drainage and detention. *Engineering staff (11); Planning staff (4); Public Works (5); Plan commission (4); Village Board (4); Engineering consultant (9)*

b) floodplain management. *Engineering staff (11); Planning staff (3); Public works (5); Zoning officer (4); Building inspector (3); Building commission (2); Village Board (2); engineering consultant (7)*

c) Stream/lake/wetland protection. *Engineering staff (10); Planning staff (2); Staff Scientist (1); Public Works (4); Zoning officer (4); Village Board (2); Engineering consultant (6); Corps of Engineers(3); IDNR(3)*

d) soil erosion and sediment control. *Engineering (8); Planning staff(1); Public works (4): Staff Scientist (1); Engineering consultant (8)*

59. Please describe enforcement mechanisms for non-compliant development activities.

Hold building permit (3); Draw on letter of credit (2); Stop work order (7); Fines (3); Court action (4)

60. List the water resource related standards requiring the most enforcement action (e.g., erosion control, floodplain development, etc.)

SESC (12); Dumping yard waste in streams and wetlands (1), Mowing wetlands (1); Detention (3); Floodplain filling (5); Stream and wetland (1)

61. Please use the remaining space to provide other comments and/or suggestions related to stormwater management needs in Kane County or to unique aspects of your program not adequately reflected by the questionnaire.

- *For development not in or near floodplain, basement floors must be 2 ft. above NWL or 1 ft. above 2 yr level, whichever is higher (Aurora);*
- *McKee Street tributary. and Mill Creek should be looked at regionally. At times seems ludicrous that subdivision provides SESC but adjacent farm field erodes away (Batavia);*
- *1) Protect natural storage areas, 2) Designate areas for potential flood control and recreational facilities. Build Partnerships for funding. 3) Focus attention on passive flood control measures vs. Structural, i.e., promote greenways and floodplain protection (Montgomery);*

- *Carpentersville engineering staff enforce more than is in ordinance (such as stream and wetland management) under auspices of "good engineering judgment";*
- *For Bartlett, DuPage County has control of and reviews developments which contain wetlands or floodplains.*
- *While we do not have an ordinance for stream and wetland management, we still work those requirements into the preliminary plan and final approval stages of the project through negotiations an public/private partnerships, dedication of lands to Forest Preserve or Park Districts, establishment of drainage and conservation easements, stream buffers, discouraging of non-native materials (i.e. armoring, non-native plants, etc.) and more. (County)*

KANE COUNTY PRIVATE STORMWATER MANAGEMENT SURVEY

Township Responses

A stormwater management questionnaire was prepared by the Kane County Stormwater Management Planning Committee and the Northeastern Illinois Planning Commission to assess the current stormwater management framework in Kane County. The purpose of the questionnaire was to identify the most critical concerns of the local governments in Kane County as well as local regulatory standards for stormwater drainage and detention, floodplain management, soil erosion and sediment control, and stream and wetland protection. The questionnaire was sent to each of the municipalities, park districts, townships, drainage districts, and sanitary districts, as well as the Kane County Forest Preserve District and Development Department. The following summarizes the responses received from the townships.

After each question, first the number of Yes and No responses are given. Then narrative responses are shown. The individual responses are separated by a semicolon. If the same or similar response was given by more than one township, the number of repeats is shown in parenthesis.

The township responding to the questionnaire are listed below.

Aurora Township Highway Commissioner
Dundee Township Highway Commissioner
Elgin Township Highway Commissioner
Geneva Township Highway Commissioner
Hampshire Township Highway Commissioner
Kaneville Township Supervisor
St. Charles Township Highway Commissioner
Virgil Township Highway Commissioner and Supervisor

Public Education/Involvement/Issues

1. Are there currently any ongoing efforts by your community or agency to educate the public about the causes of stormwater problems and the needs and costs of stormwater management? **Yes (2) No (6)**

   If yes, please describe the format of those efforts , the primary issue(s) that are addressed, and how long the efforts have been in effect. *Neighborhood meetings (Geneva and Aurora)*

2. Does the general public within your community recognize stormwater and related water resource concerns as serious issues in terms of water quantity and quality? **Yes (4) No (3)**

   If yes, please describe important local concerns. *Flooding (Dundee, Virgil, and Geneva); Erosion (Dundee); Most are willing to do whatever is necessary to make the "overall" plan work-even to pay additional dollars to that end (Aurora)*

3. Rank, in order of importance, the most critical elements of stormwater management as they pertain to your community. (1 = most important, 5 = least important)

Importance	1	2	3	4
a. Water Quality	3	0	1	4
b. Overbank Flooding	2	4	1	1
c. Drainage Problems	2	4	1	1
d. Erosion/Sedimentation	1	0	5	2
e. Other (describe)	0	0	0	0

Any further Comments? *Overbank flooding on Mill Creek at Wentworth and McKee roads; Drainageway maintenance shares most important element with WQ-local government must have unrestricted ability to perform stream maintenance (Aurora)*

4. Are there any water resource related stewardship groups or programs (e.g., Adopt-a-Stream, Friends of ..., etc.) operating within your community? **Yes (0) No (8)**

   If yes, please list the programs and the primary activities that the groups are involved with. _____

5. Citizen inquiries and complaints regarding stormwater issues handled by: (check all that apply)

   Municipal staff _____ Municipal officials _____ Consultants *1*

   Others (please specify) *Township highway staff (6)*

   Please describe the inquiry/complaint follow-up system. Also, please list other agencies, if any, to whom complaints or inquiries are referred. *If highway can't handle, he refers it to Kane Co. Development Department (Dundee); Overbank flooding referred to Union Drainage District #3 (Virgil); Inspect site, meet with complainant, take action within statutory and economic limits (Elgin, and Aurora); Problems include poor drainage after heavy rains and standing water in ditches (Elgin)*

Planning, Maintenance, and Funding

6. Have any drainage, flood control, or other water resource related plans (e.g., lake restoration, stream management, etc.) been prepared (or currently underway) for your community? **Yes (4) No (4)**

   If yes, please briefly describe the purpose and date of the plans and include copy(s) (plans can be returned if necessary). *Union Drainage District #3 granted assessment for ditch clearing and repair; Kelly Road drainage — new culverts and cleaning out ditch (Hampshire); Small isolated problems looked at on a an as-needed basis (Geneva); Several drainage improvements have been made (Aurora)*

7. Has an inventory of stormwater management facilities (i.e., detention basin and storm sewer locations and specifications) been prepared? **Yes (1) No (7)** Is the inventory updated on a regular basis? **Yes (1) No (0)**

   If yes, please describe the format of the inventory, the date of the last inventory, and the frequency of updates. *Aurora Township keeps construction drawings and location maps for post-1993 pipes and list is updated as changes are made.*

8. Does your community or agency assume responsibility for maintenance of stormwater drainage and detention facilities? **Yes (2) No (6)**

   If no, please describe who has responsibility (i.e., homeowners association, individual lot owners, etc.) and what mechanisms (if any) are used to ensure maintenance is being performed. *Yes (Hampshire and Aurora)*

9. If you answered yes to question 8, by which of the following is inspection and maintenance of stormwater facilities (i.e., detention basins, storm sewers, swales, etc.) performed: (check one)

   a) scheduled preventative maintenance program *0*

   b) in response to complaints *2*

   If you checked "a)" Please describe the maintenance program and schedule. _____

10. Is stream channel and drainageway inspection and maintenance performed in your community on a regular basis? **Yes (1) No (7)**

    If yes, please explain the nature of these activities and who performs them (staff, individual property owners, drainage districts, volunteer groups, etc.). *Yes, but not as much as should be since most drainage is across private property making access difficult (Aurora)*

11. Please describe the source of funding for the following elements of your stormwater management program. (i.e., general revenue, permit fees, homeowners associations, etc.)

    a. Capital Improvements (sewer rehabilitation, local flood projects, etc.) *General revenue (3); None (1); Cost sharing with county and homeowner association and new development (Aurora)*

    b. Maintenance and Operations (detention and storm sewer maintenance, street sweeping, etc.) *General Revenue (6)*

    c. Regulatory (plan review, construction site inspection, etc.) *None (1)*

Coordination

12. Has your community or agency made any efforts to coordinate stormwater management regulations and design criteria with adjacent communities? **Yes (3) No (4)**

    If yes, please describe the coordination efforts. *Only with county, not with city (Geneva); Efforts are always coordinated with county, municipalities, and park district (Aurora)*

13. Are plans for new development reviewed for potential stormwater impacts to property owners outside your corporate boundaries in addition to being reviewed for conformance with ordinance standards? **Yes (0) No (6) NA (1)**

    If yes, please describe the procedure used to assess impacts outside your boundaries. *Municipalities do not look outside their corporate limits*

14. Have other stormwater management efforts (e.g., maintenance, remedial activities, etc.) been coordinated with neighboring jurisdictions? **Yes (2) No (5)**

    If yes, please describe the coordination efforts and any agreements that may be in place. *Everyone seems to do their own thing; Coordinate with Batavia and Blackberry Townships (Geneva); Joint project with Montgomery (Aurora)*

15. Have efforts been made to coordinate drainage activities (i.e., maintenance activities, channelization projects, etc.) between drainage districts and other relevant entities within your jurisdiction? **Yes (5) No (3)**

    If yes, please describe the coordination efforts. *With Lake Marian Conservancy District only (Dundee); Work with Union Drainage District #3 (Virgil); Work with county development and highway departments (Geneva); Efforts have been made but not much success (Elgin); Coordinate with county and municipalities. However, little of their work comes back to us (Aurora)*

16. Do you believe there is a need for more regional coordination (e.g., watershed, county, or multi-county level) of stormwater management programs, standards, and issues? **Yes (7) No (0)**

    If yes, what are the most important issues to be coordinated, at what level should they be coordinated, and who should be responsible for the coordination? *Uniform maintenance of drainage needed (2); Stream maintenance needed; Flooding; Review of offsite impacts of new development (2)*

Questions 17 through 61 were regulatory standards and enforcement questions not relevant to townships.

62. Please use the remaining space to provide other comments and/or suggestions related to stormwater management needs in Kane County or to unique aspects of your program not adequately reflected by the questionnaire.

There are developers everywhere and governmental units doing their own thing. Stormwater problems are worse than ever before and getting worse, extreme chaos. Famous last statement "There won't be any more water after this development is built." This stormwater effort is a good start but years too late, the damage has already been done. Roads are flooding and being undermined, creeks are full of sediment, and ditches are constantly eroding. Good luck — this is an impossible task. (Dundee)

Virgil Township is drained by drainage ditches only-no natural streams. At one time there were three drainage districts to maintain the ditches but now there is only one and it just recently reactivated. (Virgil)

Need to develop funding mechanisms, such as special levy, to address stormwater problems. Need better communication, education, and public information and relations. (Geneva)

Better coordination is needed between the city and townships to prevent creating problems in the existing subdivisions as the city grows. (Elgin)

Strongly encourage more communication among various agencies involved with development and ongoing maintenance. (Aurora)

KANE COUNTY PRIVATE STORMWATER MANAGEMENT SURVEY

Park and Forest Preserve District Responses

A stormwater management questionnaire was prepared by the Kane County Stormwater Management Planning Committee and the Northeastern Illinois Planning Commission to assess the current stormwater management framework in Kane County. The purpose of the questionnaire was to identify the most critical concerns of the local governments in Kane County as well as local regulatory standards for stormwater drainage and detention, floodplain management, soil erosion and sediment control, and stream and wetland protection. The questionnaire was sent to each of the municipalities, park districts, township road commissioners, drainage districts, and sanitary districts, as well as the Kane County Forest Preserve District and Development Department. The following summarizes the responses received from the park districts and the Forest Preserve District.

After each question, first the number of Yes and No responses are given. Then narrative responses are shown. The individual responses are separated by a semicolon. If the same or similar response was given by more than one municipality, the number of repeats is shown in parenthesis.

Those responding to the questionnaire are listed below.

Burlington Township Park District
Fox Valley Park District
Geneva Park District
Kane County Forest Preserve District

Public Education/Involvement/Issues

1. Are there currently any ongoing efforts by your community or agency to educate the public about the causes of stormwater problems and the needs and costs of stormwater management? **Yes (2) No (2)**

   If yes, please describe the format of those efforts, the primary issue(s) that are addressed, and how long the efforts have been in effect. *Meetings with concerned residents (Fox Valley); Not stormwater specifically, but about water and its role in the ecosystem.*

2. Does the general public within your community recognize stormwater and related water resource concerns as serious issues in terms of water quantity and quality? **Yes (2) No (2)**

   If yes, please describe important local concerns. *Flooding — mostly Cherry Hill subdivision residents; Destruction of natural areas by flooding.*

3. Rank, in order of importance, the most critical elements of stormwater management as they pertain to your community. **(1 = most important, 5 = least important)**

Importance	1	2	3	4
a. Water Quality	1	0	0	2
b. Overbank Flooding	2	0	0	1
c. Drainage Problems	1	1	2	0
d. Erosion/Sedimentation	0	2	1	0
e. Other (describe)	0	0	0	0

   Any further Comments? *After water quality and erosion/sedimentation, the most important is contamination and destruction of natural creeks by flooding.*

4. Are there any water resource related stewardship groups or programs (e.g., Adopt-a-Stream, Friends of ..., etc.) operating within your community? **Yes (2) No (2)**

   If yes, please list the programs and the primary activities that the groups are involved with. *Fox River Ecosystem Partnership; Friends of the Fox, Friends of Tyler Creek, Sierra Club*

5. Citizen inquiries and complaints regarding stormwater issues handled by: (check all that apply)

   Municipal staff _____ Municipal officials _____ Consultants _____

   Others (please specify) *Park board and staff*

   Please describe the inquiry/complaint follow-up system. Also, please list other agencies, if any, to whom complaints or inquiries are referred. *Also refer complaints to the city of Aurora and Village of Montgomery (Fox Valley)*

Planning, Maintenance, and Funding

6. Have any drainage, flood control, or other water resource related plans (e.g., lake restoration, stream management, etc.) been prepared (or currently underway) for your community? **Yes (1) No (2)**

   If yes, please briefly describe the purpose and date of the plans and include copy(s) (plans can be returned if necessary). *Primary purpose of the projects is habitat protection and restoration-we retain and detain water.*

7. Has an inventory of stormwater management facilities (i.e., detention basin and storm sewer locations and specifications) been prepared? **Yes (0) No (3)** Is the inventory updated on a regular basis? **Yes (0) No (0)**

   If yes, please describe the format of the inventory, the date of the last inventory, and the frequency of updates.

8. Does your community or agency assume responsibility for maintenance of stormwater drainage and detention facilities? **Yes (3) No (1)**

   If no, please describe who has responsibility (i.e., homeowners association, individual lot owners, etc.) and what mechanisms (if any) are used to ensure maintenance is being performed. *Yes (Geneva); We maintain landscape (mowing), city and village maintain structures, etc. (done by maintenance agreement with Aurora and Montgomery) (Fox Valley); Yes, for habitat protection.*

9. If you answered yes to question 8, by which of the following is inspection and maintenance of stormwater facilities (i.e., detention basins, storm sewers, swales, etc.) performed: (check one)

   a) scheduled preventative maintenance program *1*

   b) in response to complaints *2*

   If you checked "a)" Please describe the maintenance program and schedule. *Mostly inspection*

10. Is stream channel and drainageway inspection and maintenance performed in your community on a regular basis? **Yes (0) No (3)**

    If yes, please explain the nature of these activities and who performs them (staff, individual property owners, drainage districts, volunteer groups, etc.).

11. Please describe the source of funding for the following elements of your stormwater management program. (i.e., general revenue, permit fees, homeowners associations, etc.)

    a. Capital Improvements (sewer rehabilitation, local flood projects, etc.) *General revenue*

    b. Maintenance and Operations (detention and storm sewer maintenance, street sweeping, etc.) *General revenue*

    c. Regulatory (plan review, construction site inspection, etc.)

Coordination

12. Has your community or agency made any efforts to coordinate stormwater management regulations and design criteria with adjacent communities? **Yes (0) No (2)**

    If yes, please describe the coordination efforts.

13. Are plans for new development reviewed for potential stormwater impacts to property owners outside your corporate boundaries in addition to being reviewed for conformance with ordinance standards? **Yes (1) No (1)**

    If yes, please describe the procedure used to assess impacts outside your boundaries. *Habitat protection.*

14. Have other stormwater management efforts (e.g., maintenance, remedial activities, etc.) been coordinated with neighboring jurisdictions? **Yes (1) No (1)**

    If yes, please describe the coordination efforts and any agreements that may be in place. *Oakhurst Forest Preserve-creation of Patterson Lake-Aurora*

15. Have efforts been made to coordinate drainage activities (i.e., maintenance activities, channelization projects, etc.) between drainage districts and other relevant entities within your jurisdiction? **Yes (0) No (3)**

    If yes, please describe the coordination efforts.

16. Do you believe there is a need for more regional coordination (e.g., watershed, county, or multi-county level) of stormwater management programs, standards, and issues? **Yes (3) No (1)**

    If yes, what are the most important issues to be coordinated, at what level should they be coordinated, and who should be responsible for the coordination? *Flooding*

Questions 17 through 61 were regulatory standards and enforcement questions not relevant to townships.

62. Please use the remaining space to provide other comments and/or suggestions related to stormwater management needs in Kane County or to unique aspects of your program not adequately reflected by the questionnaire.

    We are a small, rural park district. Most of this doesn't pertain to us at this time. If Burlington starts to develop, we will have to watch out for field tiles that carry our water away. (Burlington)

    If the stormwater plan recommends preservation of large wetlands, the Forest Preserve District should be considered. If the issue is conveyance, the district is not interested.

KANE COUNTY PRIVATE STORMWATER MANAGEMENT SURVEY

Drainage District Responses

A stormwater management questionnaire was prepared by the Kane County Stormwater Management Planning Committee and the Northeastern Illinois Planning Commission to assess the current stormwater management framework in Kane County. The purpose of the questionnaire was to identify the most critical concerns of the local governments in Kane County as well as local regulatory standards for stormwater drainage and detention, floodplain management, soil erosion and sediment control, and stream and wetland protection. The questionnaire was sent to each of the municipalities, park districts, townships, drainage districts, and sanitary districts, as well as the Kane County Forest Preserve District and Development Department. The following summarizes the responses received from the drainage districts.

After each question, first the number of Yes and No responses are given. Then narrative responses are shown. The individual responses are separated by a semicolon. If the same or similar response was given by more than one drainage district, the number of repeats is shown in parenthesis.

The drainage districts responding to the questionnaire are listed below.

Burlington Drainage District

Union Drainage District

Public Education/Involvement/Issues

1. Are there currently any ongoing efforts by your community or agency to educate the public about the causes of stormwater problems and the needs and costs of stormwater management? **Yes (0) No (2)**

   If yes, please describe the format of those efforts , the primary issue(s) that are addressed, and how long the efforts have been in effect. _____

2. Does the general public within your community recognize stormwater and related water resource concerns as serious issues in terms of water quantity and quality? **Yes (1) No (1)**

   If yes, please describe important local concerns. *Flooding basements, overbank flooding, highway flooding, extensive ponding. (Union)*

3. Rank, in order of importance, the most critical elements of stormwater management as they pertain to your community. **(1 = most important, 4 = least important)**

Importance	1	2	3	4
a. Water Quality	0	0	0	2
b. Overbank Flooding	0	1	1	0
c. Drainage Problems	2	0	0	0
d. Erosion/Sedimentation	0	1	1	0
e. Other (describe)	0	0	0	0

   Any further Comments? _____

4. Are there any water resource related stewardship groups or programs (e.g., Adopt-a-Stream, Friends of ..., etc.) operating within your community? **Yes (0) No (2)**

   If yes, please list the programs and the primary activities that the groups are involved with. _____

5. Citizen inquiries and complaints regarding stormwater issues handled by: (check all that apply)

   Municipal staff _____ Municipal officials _____ Consultants _____

   Others (please specify) *Drainage district*

   Please describe the inquiry/complaint follow-up system. Also, please list other agencies, if any, to whom complaints or inquiries are referred. *Overbank flooding only.*

Planning, Maintenance, and Funding

6. Have any drainage, flood control, or other water resource related plans (e.g., lake restoration, stream management, etc.) been prepared (or currently underway) for your community? **Yes (2) No (0)**

   If yes, please briefly describe the purpose and date of the plans and include copy(s) (plans can be returned if necessary). *Maintain ditches (Burlington); Union performs ditch clearing using recently awarded maintenance assessment*

7. Has an inventory of stormwater management facilities (i.e., detention basin and storm sewer locations and specifications) been prepared? **Yes (0) No (2)** Is the inventory updated on a regular basis? **Yes (0) No (0)**

   If yes, please describe the format of the inventory, the date of the last inventory, and the frequency of updates.

8. Does your community or agency assume responsibility for maintenance of stormwater drainage and detention facilities? **Yes (0) No (2)**

   If no, please describe who has responsibility (i.e., homeowners association, individual lot owners, etc.) and what mechanisms (if any) are used to ensure maintenance is being performed.

9. If you answered yes to question 8, by which of the following is inspection and maintenance of stormwater facilities (i.e., detention basins, storm sewers, swales, etc.) performed: (check one)

   a) scheduled preventative maintenance program _____

   b) in response to complaints _____

   If you checked "a)" Please describe the maintenance program and schedule.

10. Is stream channel and drainageway inspection and maintenance performed in your community on a regular basis? **Yes (1) No (1)**

    If yes, please explain the nature of these activities and who performs them (staff, individual property owners, drainage districts, volunteer groups, etc.). *Control trees, brush, and weeds (Burlington)*

11. Please describe the source of funding for the following elements of your stormwater management program. (i.e., general revenue, permit fees, homeowners associations, etc.)

    a. Capital Improvements (sewer rehabilitation, local flood projects, etc.) *Levy (Burlington)*

    b. Maintenance and Operations (detention and storm sewer maintenance, street sweeping, etc.) *Levy (Union)*

    c. Regulatory (plan review, construction site inspection, etc.)

Coordination

12. Has your community or agency made any efforts to coordinate stormwater management regulations and design criteria with adjacent communities? **Yes (0) No (2)**

    If yes, please describe the coordination efforts. _____

13. Are plans for new development reviewed for potential stormwater impacts to property owners outside your corporate boundaries in addition to being reviewed for conformance with ordinance standards? **Yes (0) No (2)**

    If yes, please describe the procedure used to assess impacts outside your boundaries. _____

14. Have other stormwater management efforts (e.g., maintenance, remedial activities, etc.) been coordinated with neighboring jurisdictions? **Yes (1) No (1)**

    If yes, please describe the coordination efforts and any agreements that may be in place. *Working with DeKalb County drainage districts*

15. Have efforts been made to coordinate drainage activities (i.e., maintenance activities, channelization projects, etc.) between drainage districts and other relevant entities within your jurisdiction? **Yes (2) No (0)**

    If yes, please describe the coordination efforts. *Coordinate with DeKalb County drainage districts (Union)*

16. Do you believe there is a need for more regional coordination (e.g., watershed, county, or multi-county level) of stormwater management programs, standards, and issues? **Yes (1) No (0)**

    If yes, what are the most important issues to be coordinated, at what level should they be coordinated, and who should be responsible for the coordination? *Inter-county coordination needed for drainage and inter-drainage district coordination needed for same reason.*

Questions 17 through 61 were regulatory standards and enforcement questions not relevant to townships.

62. Please use the remaining space to provide other comments and/or suggestions related to stormwater management needs in Kane County or to unique aspects of your program not adequately reflected by the questionnaire.

    Same verbiage as Virgil Township — it appears that Union Drainage District, Virgil Township, and Virgil Township Road District all worked together on this (a good thing).

APPENDIX B

STATUS OF KANE COUNTY FLOOD INSURANCE STUDIES

Status of Kane County Flood Insurance Studies — continued on next page

Community	Watercourse	Methods of Hydrologic Analysis[1], Year[2]	Floodway Map[3]	Elevations[4]
Aurora	Fox River	Detailed, 1978	Yes	Yes
	Fox River East Channel	Detailed, 1978	Yes	Yes
	Indian Creek	Detailed, 1986	Yes	Yes
	Indian Creek South Trib.	Detailed, 1986	Yes	Yes
	Indian Creek Trib. B	Detailed, 1986	Yes	Yes
	Selmarten Creek	Detailed, 1986	Yes	Yes
	Waubansee Creek	Approximate, 1978	Yes	Yes
	Blackberry Creek	Detailed, 1989	Yes	Yes
	Blackberry Creek Trib A	Detailed, 1989	Yes	Yes
	Blackberry Creek Trib H	Detailed, 1989	Yes	Yes
	Mastadon Lake	Detailed, 1997	NA	Yes
Batavia	Fox River	Detailed, 1981	Yes	Yes
	Mahoney Creek	Detailed, 1981	Yes	Yes
	Mahoney Creek Trib.	Approximate, 1976	No	No
	Mill Creek Trb.	Approximate, 1976	No	No
Burlington	No Maps[7]			
Carpentersville	Fox River	Detailed, 1981	Yes	Yes
	Carpenter Creek	Detailed, 1981	Yes	Yes
	Carpenter Creek U.S. of Spring Street	Approximate, 1976	No	No
	Four Winds Way Creek D.S. of Rt. 31	Detailed, 1981	Yes	Yes
East Dundee	Fox River	Detailed, 1980	Yes	Yes
	Unnamed Creek	Approximate, 1965	No	No
	Ponding Swamp	Approximate, 1965	No	No
Elburn	No Maps[7]			
Elgin	Fox River	Detailed, 1981	Yes	Yes
	Tyler Creek	Detailed, 1998	Yes	Yes
	Tyler Creek Trib.	Detailed, 1998	Yes	Yes
	Poplar Creek	Detailed, 1982	Yes	Yes
	Lords Park Trib. of Poplar Creek D.S. of Hwy 19	Detailed, 1984	Yes	Yes
	Lords Park Trib. of Poplar Creek U.S. of Hwy 19	Approximate, 1982	No	No

Status of Kane County Flood Insurance Studies — continued from previous page

Community	Watercourse	Methods of Hydrologic Analysis[1], Year[2]	Floodway Map[3]	Elevations[4]
Geneva	Fox River	Detailed, 1981	Yes	Yes
	Geneva Creek D.S. of South Street	Detailed, 1981	Yes	Yes
	Geneva Creek U.S. of South Street	Approximate, 1965	No	No
	Unnamed Stream 1	Approximate, 1965	No	No
	Unnamed Stream 2	Approximate, 1965	No	No
	Unnamed Stream 3	Approximate, 1965	No	No
Gilberts	No Maps[7]			
Hampshire	Hampshire Creek	Approximate, 1974	No	No
	Hampshire Creek Trib.	Detailed, 1980	Yes	Yes
Lily Lake	Included in Unincorporated Kane County Study			
Maple Park	Union Ditch No. 2	Approximate, 1989	No	Yes
Montgomery	Fox River	Detailed, 1979	Yes	Yes
	Fox River Trib.	Approximate, 1979	No	No
	Fox River Trib. Eastern Branch	Approximate, 1979	No	No
	Waubansee Creek	Approximate, 1979	Yes	Yes
North Aurora	Fox River	Detailed, 1980	Yes	Yes
	Depression between Oak St. & Airport Rd.	Approximate, 1980	No	No
Pingree Grove	No Maps[7]			
St. Charles	Fox River	Detailed, 1981	Yes	Yes
	Ferson Creek	Detailed, 1981	Yes	Yes
	Seventh Ave. Creek	Detailed, 1981	Yes	Yes
	Seventh Ave. Ck Trib.	Detailed, 1981	Yes	Yes
	State St. Creek	Approximate, 1988	No	Yes
	State St. Creek Trib.	Approximate, 1979	No	Yes
Sleepy Hollow	Jelkes Creek	Detailed, 1981	Yes	Yes
	Sleepy Creek	Detailed, 1981	Yes	Yes
South Elgin	Fox River	Detailed, 1981	Yes	Yes
	Unnamed Fox River Trib. SW of Pitt Rd.	Approximate, 1965	No	No
Sugar Grove	Welch Creek	Detailed, 1988	Yes	Yes
	Welch Creek Trib. 1	Detailed, 1988	Yes	Yes
	Welch Creek Trib. 2	Approximate, 1966	No	No
	Duffin Drain	Approximate, 1966	No	No
	Blackberry Creek	Detailed, 1989	Yes	Yes

Status of Kane County Flood Insurance Studies — continued from previous page

Community	Watercourse	Methods of Hydrologic Analysis[1], Year[2]	Floodway Map[3]	Elevations[4]
Virgil	Included in Unincorporated Kane County Study			
Wayne	Norton Creek	Approximate, 1981	Yes	Yes
	Norton Creek Trib.	Approximate, 1981	Yes	Yes
	Brewster Creek	Approximate, 1976	No	No
	Brewster Creek Trib.	Approximate, 1976	No	No
West Dundee	Fox River	Detailed, 1981	Yes	Yes
	Sleepy Creek	Detailed, 1981	Yes	Yes
Unincorporated Kane County	Fox River	Detailed, 1980	Yes	Yes
	Jelkes Creek	Detailed, 1980	Yes	Yes
	McKee Road Trib. to Mill Creek	Detailed, 1992	Yes	Yes
	Mill Creek	Detailed, 1991	Yes	Yes
	Norton Creek	Detailed, 1980	Yes	Yes
	Norton Creek Trib.	Detailed, 1980	Yes	Yes
	Sleepy Creek	Detailed, 1980	Yes	Yes
	Tyler Creek	Detailed, 1980[5]	Yes	Yes
	Tyler Creek Trib.	Detailed, 1980[5]	Yes	Yes
	Blackberry Creek	Detailed, 1989	Yes	Yes
	Blackberry Cr. Trib. A	Detailed, 1989	Yes	Yes
	Blackberry Cr. Trib. B	Detailed, 1989	Yes	Yes
	Blackberry Cr. Trib. C	Detailed, 1989	Yes	Yes
	Blackberry Cr. Trib. D	Detailed, 1989	Yes	Yes
	Blackberry Cr. Trib. E	Detailed, 1989	Yes	Yes
	Blackberry Cr. Trib. F	Detailed, 1989	Yes	Yes
	Blackberry Cr. Trib. G	Detailed, 1989	Yes	Yes
	Blackberry Cr. Trib. H	Detailed, 1989	Yes	Yes
	Waubansee Creek	Approximate,1980	Yes	Yes
	Brewster Creek	Approximate,1980	Yes	Yes
	North Arm Brewster Creek	Approximate,1980	Yes	Yes
	Brewster Creek Trib.	Approximate, c1975	No	No
	Mahoney Creek	Approximate, 1980	Yes	Yes
	Hampshire Creek	Detailed, 1992	Yes	Yes
	Hampshire Cr. Trib. 1	Detailed, 1992	Yes	Yes
	Hampshire Cr. Trib. 2	Detailed, 1992	Yes	Yes
	Hampshire Cr. Trib. 3	Detailed, 1992	Yes	Yes

Status of Kane County Flood Insurance Studies — continued from previous page

Community	Watercourse	Methods of Hydrologic Analysis[1], Year[2]	Floodway Map[3]	Elevations[4]
Unincorporated Kane County *(cont.)*	Hampshire Cr. Trib. 4	Detailed, 1992	Yes	Yes
	Indian Creek	Approximate, 1980[6]	Yes	Yes
	Poplar Creek	Approximate, 1980	Yes	Yes
	Ferson Creek	Detailed, 1994	Yes	Yes
	Ferson Creek Trib.	Detailed, 1994	Yes	Yes
	Otter Creek	Detailed, 1994	Yes	Yes
	Otter Creek Trib.	Detailed, 1994	Yes	Yes
	Stoney Creek	Detailed, 1994	Yes	Yes
	Bowes Creek	Detailed, 1994	Yes	Yes
	Bowes Creek Trib.	Detailed, 1994	Yes	Yes
	Fitchie Creek	Detailed, 1994	Yes	Yes
	Mill Creek	Detailed, 1991	Yes	Yes
	Mill Creek Trib.	Approximate, c1975	No	No
	Mill Creek Trib. 2	Approximate, c1975	No	No
	Big Rock Creek	Approximate, c1975	No	No
	East Branch Big Rock Creek	Approximate, c1975	No	No
	West Branch Big Rock Creek	Approximate, c1975	No	No
	Big Rock Road Creek	Approximate, c1975	No	No
	Duffin Drain	Approximate, c1975	No	No
	Welch Creek	Approximate, c1975	No	No
	Little Rock Creek	Approximate, c1975	No	No
	Carpenter Creek	Approximate, c1975	No	No
	Harmony Creek	Approximate, c1975	No	No
	Coon Creek	Approximate, c1975	No	No
	Kishwaukee River	Approximate, c1975	No	No
	Kishwaukee River Trib.	Approximate, c1975	No	No
	Nelson Lake	Approximate, c1975	No	No
	Union Ditch No. 9	Approximate, c1975	No	No
	Virgil Creek No. 2	Approximate, c1975	No	No
	Virgil Ditch No. 1	Approximate, c1975	No	No
	Virgil Ditch No. 2	Approximate, c1975	No	No
	Virgil Ditch No. 3	Approximate, c1975	No	No
	Youngs Creek	Approximate, c1975	No	No
	All Rivers and Streams not listed above	Approximate, c1975	No	No

Status of Kane County Flood Insurance Studies — continued from previous page

[1] "Detailed" indicates hydrograph producing methods, "Approximate" indicates regional equations or no computation of flows. Note that this usage differs from FIS which uses these terms in reference to the hydraulic methods used.

[2] "Year" indicates year that Flood Insurance Study was Published. Study completion date is typically several years prior to publication date.

[3] "Yes" indicates that a Floodway Map exists. "No" indicates that only a Flood Insurance Rate Map exists.

[4] "Yes" indicates that elevations are available for the floodplains within that community area. "No" indicates no elevations available and floodplain boundary taken from Flood Hazard Boundary Maps published HUD in mid 1970s, Flood Prone Area Maps published by the US Geological Survey in early to mid 1970s, or Hydrologic Atlases published by the US Geological Survey in late 1960s to early 1970s. Floodplains with no computed elevations are referred to as "approximate" in the FIS.

[5] Currently being restudied.

[6] Restudied in 1986 by NRCS but not reflected in FIS.

[7] No mapping generally indicates that a community is not participating in the National Flood Insurance Program or has only recently begun participating.

APPENDIX C

GLOSSARY OF TERMS

GLOSSARY OF TERMS

The following glossary of terms is intended for use with the Kane County Comprehensive Stormwater Management Plan. In some cases, the definitions included here may deviate from those in federal, state, and local regulations to improve understanding by the casual reader.

Base Flood Elevation: The water surface elevation resulting from the 100-year frequency flood event.

Best Management Practice (BMP): A measure used to control the adverse stormwater-related effects of development. BMPs include structural devices (e.g., swales, infiltration basins, and detention basins) designed to remove pollutants, reduce runoff rates and volumes, and protect aquatic habitat. BMPs also include non-structural urban site design measures such as minimizing impervious surfaces, utilizing native landscaping, and establishing buffers along streams, lakes, and wetlands. Finally, BMPs include institutional measures such as public education efforts to stop dumping of household chemicals into storm drains.

Buffer: A strip of land along a stream, lake, or wetland planted with native vegetation. The width of the buffer is measured from the ordinary high water mark of a perennial or intermittent stream, the ordinary high water mark of a lake or pond, or the edge of a wetland. Development within buffers is typically limited to improvements such as piers or docks necessary to allow access to the water.

Channel: Any river, stream, creek, brook, branch, natural or artificial depression, ponded area, flowage, slough, ditch, conduit, culvert, gully, ravine, wash, or natural or manmade drainage way, which has a definite bed and bank or shoreline, in or into which surface or groundwater flows, either perennially or intermittently.

Channel Modification: Alteration of a channel by changing the physical dimensions or materials of its bed or banks. Channel modification includes damming, riprapping (or other armoring), widening, deepening, filling, straightening, relocating, lining, and significant removal of vegetation. Channel modification does not include the clearing of debris or removal of trash.

Compensatory Storage: An artificially excavated, hydraulically equivalent volume of storage within the floodplain used to balance the loss of flood storage capacity when fill or structures are placed within the floodplain.

Depressional Storage: The volume of storage available below the base flood elevation contained in low lying areas that have no drainage outlet.

Design Storm: A precipitation event that, statistically, has a specified duration and probability of occurring in any given year (expressed as average frequency of occurrence in years or as probability in percent).

Detention Basin: A facility designed to temporarily store runoff either on, below, or above the ground surface, accompanied by controlled release of the stored water.

Development: Any man-made change to real estate by private or public entities including clearing, grading, excavation or fill, construction or reconstruction of buildings, installation of utilities, subdivision, or change in land use.

Discharge: The rate at which water moves through a channel or pipe; measured by volume per unit of time (cubic feet per second).

Dry Detention Basin: A detention basin designed to drain completely after temporary storage of stormwater runoff and to be normally dry over the majority of its bottom area.

Dry Well: An open cell, usually cylindrical, formed below the ground surface, surrounded by and having a bed of granular material for infiltration and disposal of collected runoff into the ground.

Erosion: The general process whereby earth is removed by flowing water, wave action, or wind.

FEMA: The Federal Emergency Management Agency.

Flood Insurance Rate Map (FIRM): A Flood Insurance Rate Map, issued by FEMA that is an official community map, on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community. This map may or may not depict floodways.

Floodplain: A relatively level, continuous area adjacent to a lake or stream channel which is submerged during times of flood; and natural depressions including wetlands which are periodically inundated by stormwater.

Floodway: The channel and that portion of the floodplain adjacent to a stream or watercourse which is needed to convey the anticipated existing 100-year frequency flood discharge with no more than a 0.1 foot increase in stage due to any loss of flood conveyance or storage and no more than a ten percent increase in velocities. In some cases, the floodway may include that portion of the floodplain containing 90% of the floodplain storage volume. Floodways can be calculated based on either existing or future land use runoff conditions.

Floodway Map: Map issued by FEMA that delineates the floodway, 100-year floodplain, and 500-year floodplain. Elevations for the 100-year flood are usually indicated at selected locations.

Flood Control: Flood mitigation measures, usually structural, to reduce the extent (elevation and/or area) of flooding. Generally includes reservoirs, levees, and channelization.

Flood Mitigation: An action or set of actions taken to prevent flooding or mitigate the impacts of flooding. Remedial and/or preventative actions come in the form of stormwater regulations for development, floodplain management, stormwater detention/retention, levees, and non-structural activities such as open space preservation.

Floodproofing: Any combination of structural and non-structural additions, changes or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

Flood Protection Elevation: The elevation above which regulated structures within the floodplain must be elevated. The flood protection elevation is equal to the base flood elevation plus a specified amount of freeboard. The freeboard is typically one or two feet.

Floodplain Management: A set of actions taken to minimize damage to persons and property within the floodplain. These actions often include floodplain development regulations, floodplain acquisition and preservation and floodproofing.

Freeboard: An increment of elevation added to a design elevation or structure to provide a factor of safety for uncertainties in calculations, unknown localized conditions, wave actions, future development, and unpredictable effects such as those caused by ice or debris jams.

Hydrology: The science of the behavior of water, including its dynamics, composition, and distribution in the atmosphere, on the surface of the earth, and underground.

Hydrologic Budget: The components of atmospheric water which include precipitation, evaporation, surface runoff, subsurface runoff, and groundwater recharge.

Impervious Surface: Man-made or natural materials through which water, air or roots cannot penetrate and which prevents the movement of surface water down to the water table.

Infiltration: The passage or movement of water into the soil.

Letter Of Map Amendment (LOMA): Official determination by FEMA that a specific structure is not in a 100-year flood zone; amends the effective Flood Hazard Boundary Map or FIRM.

Letter Of Map Revision (LOMR): Letter that revises the base flood or 100-year frequency flood elevations, flood insurance rate zones, flood boundaries or floodways as shown on an effective Flood Hazard Boundary Map or FIRM.

Major Drainage System: That portion of a drainage system needed to store and convey flows beyond the capacity of the minor drainage system.

Minor Drainage System: That portion of a drainage system designed for the convenience of the public. It consists of street gutters, storm sewers, small open channels, and swales and, where manmade, is usually designed to handle the 10-year runoff event or less.

Nonpoint Source Pollution: Pollution which has no single discharge point or origin. Pollutants are usually comprised of sediment, organic compounds, toxic metals and various pathogens. Sources of nonpoint source pollution typically include urban and agricultural runoff and effluent from septic systems and landfills.

Ordinary High Water Mark: The point on the bank or shore up to which the presence and action of surface water is so continuous so as to leave a distinctive mark such as by erosion, destruction or prevention of terrestrial vegetation, predominance of aquatic vegetation or other easily recognized characteristics.

Peak Flow: The maximum rate of flow of water at a given point in a channel or conduit.

Point Source Pollution: Pollution which is discharged from a single point or structure. Most often, a point source is a pipe delivering effluent from a wastewater treatment facility or industrial facility.

Positive Drainage: Provision for overland paths for all areas of a property including depressional areas that may also be drained by storm sewer.

Receiving Waters: Streams, lakes, wetlands, etc., into which stormwater is discharged.

Retention Basin: A facility designed to completely retain a specified amount of stormwater runoff without release except by means of evaporation, infiltration, emergency bypass or pumping.

Riparian Environment: Land bordering a waterway or wetland that provides habitat or amenities dependent on the proximity to water.

Runoff: Water which moves through the landscape, either as surface or subsurface flow, which originates from atmospheric precipitation, initially in the form of rain or snow. Runoff is that portion of the hydrologic budget which produces surface water in streams, lakes, and wetlands.

Sedimentation: The process that deposits soils, debris, and other materials either on other ground surfaces or in bodies of water or stormwater drainage systems.

Setback: The horizontal distance between any portion of a structure or any development activity and the ordinary high water mark of a perennial or intermittent stream, the ordinary high water mark of a lake or pond, or the edge of a wetland, measured from the structure's or development's closest point to the ordinary high water mark, or edge. Allowable development features within setbacks typically include minor improvements such as walkways and signs, utilities, park facilities, and lawns.

Stormwater: Those waters that run off the land surface which originate from atmospheric precipitation, whether initially in the form of rain or snow.

Stormwater Drainage System: All means, natural or manmade, used for conveying stormwater to, through or from a drainage area to the point of final outlet from a property. The manmade and natural stormwater drainage system includes but is not limited to any of the following: conduits and appurtenant features, canals, channels, ditches, streams, culverts, streets, storm sewers, detention basins, swales and pumping stations.

Stormwater Management: A set of actions taken to store, convey, or otherwise manage stormwater runoff to minimize the negative impacts of runoff from urban surfaces. Broadly interpreted, stormwater management encompasses both structural and non-structural measures to directly manage runoff as well as measures to protect natural water features such as streams, floodplains, lakes, and wetlands.

Storm Sewers: Usually enclosed conduits that transport excess stormwater runoff toward points of discharge, sometimes called storm drains.

Urban Runoff Pollutants: Contaminants commonly found in urban runoff which have been shown to adversely affect uses in receiving water bodies. Pollutants of concern include sediment, heavy metals, petroleum-based organic compounds, nutrients, oxygen-demanding organics (BOD), pesticides, salt, and pathogens.

Watershed: All land area drained by, or contributing water to, the same stream, lake, or stormwater facility.

Wet Detention Basin: A detention basin designed to maintain a permanent pool of water after the temporary storage of stormwater runoff.

Wetlands: Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetland Mitigation: Measures taken to compensate for wetland disturbances such as filling, dredging, draining, impoundment, and vegetation removal. Mitigation measures include enhancement of existing wetlands (including the disturbed wetland) and creation of new wetlands.

2-Year Event: A runoff, rainfall, or flood event having a fifty percent chance of occurring in any given year. On average, an event of this size or larger will occur once every 2 years. Rainfall depths of various frequencies and durations can be found in Bulletin 70 from the Illinois State Water Survey.

100-Year Event: A rainfall, runoff, or flood event having a one percent chance of occurring in any given year. On average, an event of this size or larger will occur once every 100 years. Rainfall depths of various frequencies and durations can be found in Bulletin 70 from the Illinois State Water Survey.

APPENDIX D

ACRONYMS

ACRONYMS

ADID — Advanced Identification of Wetlands Study

BMP — Best Management Practice

BSC — Biological Stream Characterization

EPA, Illinois (IEPA) — Illinois Environmental Protection Agency

EPA, United States (USEPA) — United States Environmental Protection Agency

FEMA — Federal Emergency Management Agency

FEQ — Full Equations Model, a computer model for simulating flow in rivers and streams.

FIRM — Flood Insurance Rate Map

FIS — Flood Insurance Study

GIS — Geographic Information System

HEC-1 — Computer model for rainfall-runoff events

HEC-2 — Computer model for estimating flood heights in rivers.

HSPF — Hydrologic Simulation Program-Fortran, a computer model for simulation extended periods of rainfall-runoff.

HWL — High Water Level

IDNR, OWR — Illinois Department of Natural Resources, Office of Water Resources

KCSMPC — Kane County Stormwater Management Planning Commission

NIPC — Northeastern Illinois Planning Commission

NPDES — National Pollutant Discharge Elimination System

NPS — Non Point Source pollution

NRCS — Natural Resources Conservation Service (formerly known as SCS)

NWL — Normal Water level

PDR — Purchase of Development Rights

SCS — Soil Conservation Service (now known as NRCS)

SWCD — Soil and Water Conservation District

TDR — Transfer of Development Rights

TR20 — Computer model for rainfall-runoff events

USACE — United States Army Corps of Engineers

USCOE — United States Corps of Engineers (same as USACE)

USDA — United States Department of Agriculture

USGS — United States Geological Survey

WSP2 — Water Surface Profiles 2, a computer model for estimating flood heights in rivers.

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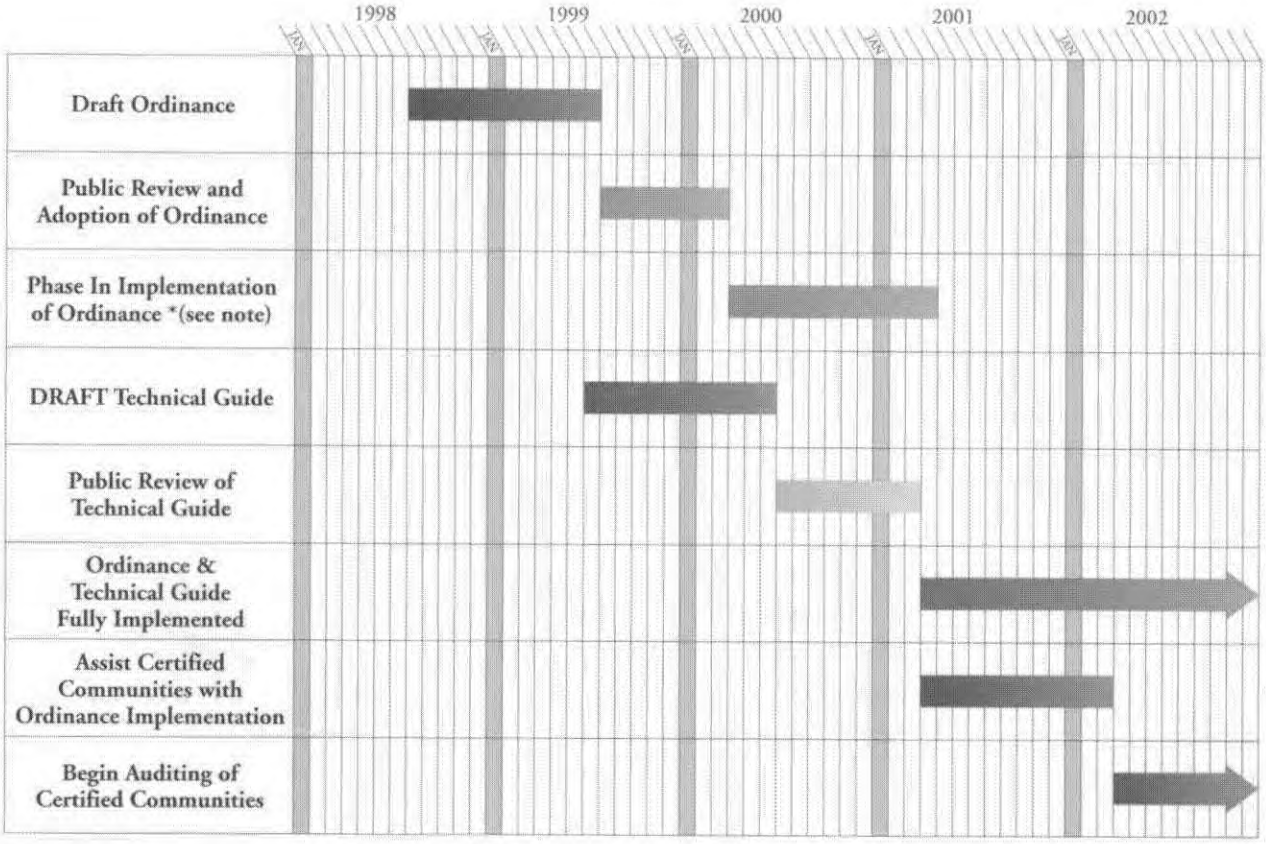
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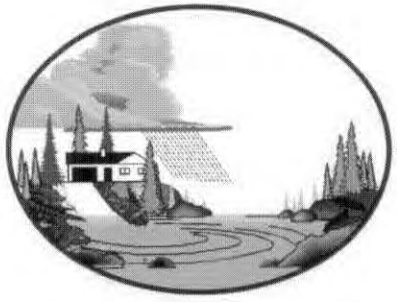
TIMEFRAME TO ADOPT AND IMPLEMENT KANE COUNTY COUNTYWIDE STORMWATER MANAGEMENT ORDINANCE



PHASE IN IMPLEMENTATION OF THE ORDINANCE SHALL CONSIST OF THE FOLLOWING:

- Distribute adopted ordinance with notification that full implementation will occur in 12 months
- Distribute methodology for cities, municipalities, and villages to achieve "Certified Community" status and implement the stormwater ordinance within their respective jurisdictional boundaries
- Cities, municipalities, and villages desiring certified community status will draft, modify, and adopt the Kane County Countywide Stormwater Management Ordinance

  (NOTE: Ordinance modification by certified communities must be as restrictive or more restrictive than the requirements of the Countywide Ordinance)
- Cities, Municipalities, and villages desiring certified community status will request certified community status from the Kane County Stormwater Management Committee
- Approved certified communities will phase in ordinance (variances for certified communities to fully implement ordinance after 3/1/01 will be reviewed by the Stormwater Management Committee)
- Certify consulting engineering firms as certified stormwater reviewers for certified communities will be completed by the Stormwater Management Committee



KANE COUNTY DEPARTMENT OF
ENVIRONMENTAL MANAGEMENT