

## 5 prioritized action plan

While Chapter 4 identifies types of best management practices that can be used in the Dead River watershed, this chapter presents specific recommended action items developed jointly by the watershed stakeholders, Lake County Stormwater Management Commission, and the consultant planning team. This chapter begins by describing the implementation partners (Section 5.1), followed by recommended action items that presented in three sections. The Programmatic Action Plan (5.2) provides general recommendations that should be applied watershed-wide and may also apply to large sites such as the Waukegan Regional Airport and the Zion Nuclear Plant. The Site Specific Action Plan (5.3) presents detailed recommendations for specific problem areas within the watershed as identified during the inventory and assessment. The Information and Education Plan (5.4) specifically identifies the recommended actions that will likely need more outreach and education in order to be implemented.

As a reminder, the eleven most important recommendations are summarized as follows:

1. Stabilize streambanks and ravine slopes to reduce erosion, protect property and infrastructure, improve water quality, and improve habitat.
2. Restore and manage stream corridors by restoring native riparian buffers, reducing the density of trees, removing excessive debris, and stabilizing the stream bed with practices that also enhance habitat.
3. Manage, retrofit, and stabilize the stormwater management system including detention basins and culverts, with focused attention on stormwater discharge points (pipes and ditches), to reduce runoff rate and volume and to improve water quality in the streams and Lake Michigan.
4. Preserve and restore priority green infrastructure areas to provide natural surface water storage areas, provide space for installing best management practices, and preserve an ecologically functioning network of open space, wetlands, streams, and natural areas as part of an interconnected system.
5. Manage and restore watershed natural areas including wetlands, former wetlands / hydric soil areas, and especially Lyons Woods Forest Preserve and Illinois Beach State Park.
6. Develop positive and creative new uses for the Zion Nuclear Power Plant and Waukegan Harbor areas, ensuring that these uses are compatible with protecting and improving watershed resources and Lake Michigan.
7. Remediate existing flood problems and prevent future flooding by reducing stormwater runoff and preserving areas for surface water storage and absorption such as floodplains, depressional storage areas, and wetlands, which also provide water quality improvement benefits.
8. Use better stormwater management, conservation design, and low impact development practices for new and existing development that slows, filters, infiltrates, cools, and cleanses stormwater runoff, especially in Critical Subbasins. This includes source controls and lot level best management practices such as vegetated swales, naturalized detention basins, rain gardens, stream buffers, filter strips, and reduced use of lawn chemicals and fertilizers.
9. Modify and use planning and development standards, policies, and capital improvement plans and budgets to protect and enhance water quality.
10. Provide public education and outreach to enhance understanding and appreciation of watershed resources and problems, to provide solutions, and to provide opportunities for people to get involved in watershed improvement activities.
11. Monitor and evaluate watershed plan implementation and physical watershed conditions to gauge progress towards watershed goals.

### 5.1 IMPLEMENTATION PARTNERS

Throughout the prioritized action plan tables and narrative, responsible parties are suggested for taking the lead or providing a supporting role in plan implementation. This section presents the responsible parties as well as a brief description of their role. Where the roles are identified within tables, parties indicated with bold lettering are the lead party and non-bold parties providing support. Table 5.1 provides a concise reference or key for reviewing the programmatic and site specific action plan tables that follow.

## 5 prioritized action plan

### Beach Park Drainage District (BPDD)

The Beach Park Drainage District maintains drainage ways and addresses local drainage problems within a boundary that covers portions of Beach Park and small portions of other communities as well. The drainage district first tries to address drainage and flooding problems that may cause damage to property and/or structures and then removes debris from stream channels as a secondary goal. Thus, issues related to channel and stormwater management infrastructure should include the BPDD as an implementation partner.

### Chicago Metropolitan Agency for Planning (CMAP)

Formerly the Northeastern Illinois Planning Commission (NIPC) and the Chicago Area Transportation Study (CATS), CMAP provides technical and planning assistance to watershed protection groups. CMAP has developed model ordinances tailored to the region for stormwater management, sediment control, streams and wetlands, and floodplains. CMAP also offers technical assistance and training opportunities to local governments and watershed groups and helps local governments apply for state and federal funding programs.

### Corporate and Business Landowners (CBL)

The active participation of CBLs in the planning process can lead to significant positive impacts on the quality of the Dead River watershed. Businesses can become involved by retrofitting existing facilities, managing their grounds, roof runoff, and parking lots to reduce runoff volume and pollutant loadings, and sponsoring watershed events. With an upfront commitment from the CBL community, new development can also be designed to minimize runoff and pollutant loadings.

### Developers & Homebuilders (DH)

The practices of developers can significantly impact a watershed. Developers should be encouraged or required to employ sustainable development techniques such as conservation subdivision development and other practices described in the Best Management Practice Toolbox. Homebuilders should use BMPs during the construction process, especially those related to soil erosion and sedimentation control. Failure to use BMPs, or improper use, can lead to soil erosion and other pollutant discharges.

### Federal Emergency Management Agency (FEMA)

FEMA is the principal federal agency involved in flood mitigation and flood disaster response. Among its duties, FEMA is responsible for the National Flood Insurance program, helps municipalities develop and enforce floodplain ordinances, develops floodplain maps, and administers funding for flood mitigation plans and projects.

### Golf Courses (GC)

Golf courses are important potential sites for the use of BMPs, primarily due to their location along the stream and their potential impact as sources of pollutants and their contribution as a green infrastructure element. Golf courses can help reduce pollutant loadings, especially nutrients, as well as runoff volume by incorporating BMPs into their golf course management programs.

### Illinois Department of Natural Resources (IDNR)

Several offices within IDNR provide services that will be key to the implementation of the Dead River watershed plan for issues related to water resource management, habitat protection and management, wildlife management, invasive species control, wetland management, and hunting and fishing permitting.

- The IDNR manages Illinois Beach State Park and is responsible for issues relating to water, hydrology and hydrologic connections to Lake Michigan, natural resources, wildlife, wetlands, and beach management in the park as well as North Point Marina.
- The Office of Water Resources (OWR) is the state's lead organization for the regulation of floodplain development as well as for the implementation and funding of structural flood control and mitigation.
- The Office of Realty and Environmental Planning (OREP) is responsible for natural resource and outdoor recreation planning. It also administers the Conservation 2000 Ecosystems Program, which provides technical and financial assistance through a grant program to natural resource protection partnerships (e.g., Lake Michigan Watershed Ecosystem Partnership).
- The Office of Resource Conservation (ORC) reviews Clean Water Act Section 404 wetland permits for

Table 5.1 Implementation Partners

Acronym	Responsible Party	General Responsibility
BPDD	Beach Park Drainage District	Drainage system management and maintenance.
CMAP	Chicago Metropolitan Agency for Planning	Technical and planning assistance, training, and funding assistance.
CBL	Corporate and Business Landowners	Grounds management and maintenance.
DH	Developers & Homebuilders	Land development, stormwater management system design and construction.
FEMA	Federal Emergency Management Agency	National Flood Insurance Program, floodplain mapping and enforcement, and mitigation funding.
GC	Golf Courses	Grounds management and maintenance.
IDNR	Illinois Department of Natural Resources	Natural area preservation and management, research, technical and financial assistance.
CMP	IDNR Coastal Management Program	Preserve and manage Lake Michigan coastal resources (if established).
IDOT	Illinois Department of Transportation	Road and highway planning, construction, and maintenance.
IEMA	Illinois Emergency Management Agency	Flood and disaster planning, emergency response, and hazard mitigation.
IEPA	Illinois Environmental Protection Agency	Water resource monitoring, pollution regulation and control, project funding.
LC	Lake County	Land use planning for unincorporated areas, natural resources, drainage system management.
LCFPD	Lake County Forest Preserve District	Manage and maintain green infrastructure, natural areas, and open space.
LCHD	Lake County Health Department	Monitor, manage, and provide technical support for water resources.
LCSMC	Lake County Stormwater Management Commission	Technical and financial assistance for flooding, watershed planning, and water quality.
LMEP	Lake Michigan Ecosystem Partnership	Watershed advocacy and education, technical and financial assistance.
LMGLO	Lake Michigan / Great Lakes Organizations	Great Lakes and Lake Michigan water resource management, education, and outreach.
M	Municipalities (all departments)	Land use and development, technical and financial support, and drainage system management.
NGRREC	National Great Rivers Research & Education Center	Stream, lake, wetland, and coastal data collection, watershed education and outreach.
NRCS / SWCD	Natural Resources Conservation Service / Soil and Water Conservation Districts	Provide natural resource management technical and financial assistance.
PD	Parks and Recreation Districts	Management and maintenance of parks and open space.
PRL / RL	Private Residential / Riparian Landowners	Land management and maintenance including stream channels and riparian corridors.
NSSD	North Shore Sanitary District	Maintain sanitary sewer system infrastructure, stream monitoring.
T	Townships	Road maintenance and support for watershed improvement projects.
USACE	U.S. Army Corps of Engineers	Wetland protection and regulation, wetland restoration funding.
USDA	U.S. Department of Agriculture	Farmland and natural resource technical and financial assistance.
USEPA	U.S. Environmental Protection Agency	Lake Michigan and Great Lakes management and restoration.
USFWS	U.S. Fish and Wildlife Service	Threatened and endangered species, technical and funding assistance for habitat restoration.
CAG	Waukegan Harbor Citizens Advisory Group	Organize and coordinate activities related to Waukegan Harbor contamination and cleanup.
WPC	Watershed Planning Committee	Coordinate watershed plan implementation, education and outreach.

## 5 prioritized action plan

impacts on fish and wildlife resources; it manages threatened and endangered species issues; it also protects fisheries and other aquatic resources through regulation, ecological management and public education.

- The Office of Capital Development (OCD) administers state and federal grants for open space programs.
- The Office of Scientific Research and Analysis (OSRA) conducts research and data collection provides this information to planners and formulates natural resource protection policy.

### **IDNR Coastal Management Program (CMP)**

The IDNR is the lead state agency responsible for establishing the Illinois Coastal Management Program (CMP), which is funded through the National Ocean and Atmospheric Administration (NOAA). If established, the program will support and coordinate partnerships among local, state and federal agencies, and local organizations, share information on coastal care efforts, and preserve, restore, and where possible, enhance coastal resources in Illinois. Upon CMP approval, Illinois will be eligible to receive approximately \$2 million/year, which will fund a grant program to implement local projects. Local and state agencies and non-profit organizations would be eligible to apply for and receive funds. Potential projects that may receive funding under the CMP program include beach access and recreation, waterfront development, shore and bluff stabilization, wetland and natural resource protection and restoration, coastal waters protection (i.e., water pollution control), erosion control, and education and interpretation.

### **Illinois Department of Transportation (IDOT)**

IDOT is responsible for the planning, construction, and maintenance of portions of the transportation network that covers the Dead River watershed. Incorporation of best management practices and sustainable management measures into IDOT projects can help lead to improvements in the environmental quality of the watershed.

### **Illinois Emergency Management Agency (IEMA)**

In Illinois, IEMA is the state agency responsible for flood and disaster planning, emergency response, and hazard mitigation. IEMA works with local governments on flood

mitigation plans and provides operational support during floods. IEMA also administers FEMA-funded programs in the state, including flood mitigation grant programs.

### **Illinois Environmental Protection Agency (IEPA) Bureau of Water**

Under the federal Clean Water Act and state legislation, IEPA is responsible for the protection of the state's water resources and ensuring that Illinois' rivers, streams and lakes will support all uses for which they are designated including protection of aquatic life, recreation and drinking water supplies. Several IEPA activities are important to this plan:

- **Monitoring:** IEPA oversees data collection at various sites (rivers, streams, lakes, etc.) across the state, including the Dead River watershed. The Illinois Water Quality Report (305(b)) summarizes these monitoring efforts.
- **Funding:** IEPA administers several state and federal grant programs. A primary example is Section 319 funding under the Clean Water Act, which helps local governments, non-profit entities, and numerous other state, federal, and local partners to reduce nonpoint source pollution through technical and financial support.
- **Regulation:** IEPA regulates point and nonpoint source pollution discharges into the state's waters through regulatory and non-regulatory programs.

### **Lake County**

The Dead River flows through Lake County, which plays a role in land use planning, development, natural resource protection, and drainage system management in the unincorporated areas of the watershed. Working with the County and its public works, health, and transportation departments, can help ensure that the Dead River enjoys responsible, sustainable land use planning, road and sewer maintenance, and public health policies.

### **Lake County Forest Preserve District (LCFPD)**

The Forest Preserve District of Lake County owns and manages a number of acres of green infrastructure / open space within the Dead River watershed. Issues related to the protection and management of these and potential future



FPD holdings will rely in part on the FPD.

#### **Lake County Health Department (LCHD)**

The LCHD Lakes Management Unit provides technical expertise essential to the management and protection of Lake County surface waters. The goal of the LMU is to monitor the quality of the county's surface water in order to maintain or improve water quality and alleviate nuisance conditions, promote healthy and safe lake conditions, and protect and improve ecological diversity. To this end, the LDHC monitors the watershed lakes and has also begun monitoring water quality conditions to provide data on stream health and quality. The LCHD is also responsible for septic system management programs and well testing and monitoring.

#### **Lake County Stormwater Management Commission (SMC)**

SMC's mission is to coordinate the stormwater activities of over 90 jurisdictions throughout the county. SMC provides technical assistance, local knowledge and problem-solving skills to coordinate flood damage reduction, flood hazard mitigation, watershed planning, water quality enhancements and natural resource protection projects and programs. The 2002 Comprehensive Stormwater Management Plan Update guides agency programs and projects. Major components of the Plan include: a) implementation of countywide minimum standards for new development (Watershed Development Ordinance); b) projects to reduce existing flooding and water pollution problems; c) rehabilitation of the existing drainage system; d) flood hazard mitigation; e) interjurisdictional coordination and technical assistance; f) public information.

#### **Lake Michigan Watershed Ecosystem Partnership (LMWEP)**

LMWEP is a public-private cooperative of watershed stakeholders formed in 2005 to preserve, protect, and enhance local natural systems and integrate them into the life and future of the community through coordination and cooperation. The partnership can help with advocacy, management of watershed projects, grant applications and review, and general coordination of watershed activities. The LMWEP includes the involvement of the Great Lakes Alliance, which is described below.

#### **Lake Michigan / Great Lakes Management Organizations and Programs (LMGLO)**

The Great Lakes Alliance focuses its policy, management, and restoration programs on water quality, water conservation, habitat recovery, land use, and education and outreach. The Great Lakes Regional Collaboration, which includes the EPA-led federal agency task force, the Great Lakes states, local communities, tribes, non-governmental organizations, and other interests in the Great Lakes region, is focused on restoring and protecting the Great Lakes. The Great Lakes Initiative is a plan agreed upon by EPA and the Great Lake states to restore the health of the Great Lakes.

#### **Municipalities (all departments) (M)**

Municipalities (i.e., local elected officials and local agency staff) have the principal responsibility for land use and development planning, establishing legislative and administrative policies, adopting ordinances and resolutions, setting zoning standards, establishing the annual budget, appropriating funds, and setting tax rates. There are also opportunities to make others aware of the watershed management planning process through local government newsletters and presentations at board meetings, which are often televised on local cable television networks. Municipalities are therefore crucial to watershed protection efforts. By partnering with municipalities and encouraging the adoption of sustainable zoning and development practices, a watershed protection group can check the increase of water quality impairments. Municipalities are also a key part of any watershed protection strategy because they are responsible for the enforcement of local land use and development ordinances.

#### **The National Great Rivers Research & Education Center (NGRREC)**

The NGRREC's RiverWatch program, formerly under the Illinois DNR, relies on a volunteer base to monitor, collect and record stream, lake, wetland, and coastal data for the state database. It is also a valuable educational resource that can be used to educate others about watershed issues and concerns.

#### **Natural Resources Conservation Service (NRCS) / Soil**

## 5 prioritized action plan

### **and Water Conservation Districts (SWCD)**

NRCS and SWCD provide technical expertise and education on conservation, development, management, and wise use of natural resources to landowners and land managers, county and local governments, and local organizations. Areas of expertise include streambank stabilization and soil erosion/ sediment control, wetland and habitat restoration, community planning, environmental education, agricultural conservation, water quality protection, nonpoint source pollution, stream health, conservation planning, and natural resource maps and reports. NRCS and SWCD also administer several cost-share programs targeted to water quality, wetland restoration, and other watershed priorities.

As part of its watershed protection effort, NRCS administers the USDA Watershed Program (under Public Law 83-566). The purpose of the program is to assist federal, state, and local agencies; local government sponsors; tribal governments; and other program participants in protecting watersheds from damage caused by erosion, floodwater, and sediment; restoring damaged watersheds; conserving and developing water and land resources; and solving natural resource and related economic problems on a watershed basis. The program provides technical and financial assistance to local people or project sponsors, builds partnerships, and requires local and state funding contributions.

### **Parks and Recreation Districts (PD)**

Park and recreation districts often control a large amount of open space in a watershed and maintain recreational facilities and parks. Parks also contain many recreational opportunities and trails, several bordering the Dead River. Partnerships with local park districts can help ensure the preservation of open space while also facilitating recreational and other community opportunities that can help increase support for watershed protection efforts.

### **Private Residential Landowners and Homeowners Associations (PRL)**

The activities of residential landowners, often unknowingly, can have a significant impact on the quality of a watershed. Practices such as excess lawn fertilization, connection of downspouts to the sewer system, or destruction of riparian buffers can be significant sources of nonpoint pollution.

Watershed protection efforts should educate residents on the consequences of their actions and present alternatives. More positively, political pressure from local residents on municipal or county officials can lead to increased emphasis on watershed protection. And many local residents play important roles in watershed planning and protection efforts.

### **North Shore Sanitary District (NSSD)**

The North Shore Sanitary District is a municipal government that provides wastewater treatment service for watershed communities. The NSSD maintains the sanitary sewer system in the watershed, which in some cases follows the alignment of the stream channel, and has also begun a stream monitoring protocol for Kellogg Creek and Dead River watersheds.

### **Townships (T)**

While unincorporated townships generally play a secondary role in watershed protection, they often have responsibility for road upkeep and occasionally sponsor drainage system improvement projects. The use of BMPs by townships, especially for road maintenance, can help improve water quality within the watershed.

### **U.S. Army Corps of Engineers (USACE)**

USACE plays a major role in wetland protection and regulation through Section 404 of the Clean Water Act, which requires USACE to administer permit applications for alterations to wetlands. The USACE Chicago district has also established a Wetlands Restoration Fund, which may be available to the Dead River watershed communities.

### **U.S. Department of Agriculture (USDA)**

USDA's Farm Services Agency (FSA) has several programs that support watershed protection and restoration efforts. Under the Conservation Reserve Program (CRP), farmers receive annual rental payments, cost sharing, and technical assistance to plant vegetation for land they put into reserve for 10 to 15 years. The Conservation Reserve Enhancement Program (CREP) targets state and federal funds to achieve shared environmental goals of national and state significance. The program uses financial incentives to encourage farmers and ranchers to voluntarily protect soil, water, and wildlife

## USEPA watershed-based plan element #3: best management practices and critical areas where those practices are needed (also see Appendices G and H).

resources. The Grassland Reserve Program (GRP) uses 30-year easements and rental agreements to improve management of, restore, or conserve up to 2 million acres of private grasslands. The Conservation Security Program (CSP) is a voluntary program that provides financial and technical assistance to promote the conservation and improvement of soil, water, air, energy, plant and animal life, and other conservation purposes on tribal and private working lands.

### **U.S. Environmental Protection Agency (USEPA)**

The USEPA oversees the environmental protection efforts of the IEPA and is the ultimate source for Section 319 and other environmental improvement programs. Section 404 of the Clean Water Act, which regulates the dredging and filling of wetlands, is jointly administered by USEPA and the U.S. Army Corps of Engineers.

### **U.S. Fish and Wildlife Service (USFWS)**

The USFWS provides technical assistance to local watershed protection groups. It also administers several grant and cost-share programs that fund wetland and aquatic habitat restoration. The USFWS also administers the federal Endangered Species Act and supports a program called Endangered Species Program Partners, which features formal or informal partnerships for protecting endangered and threatened species and helping them to recover. These partnerships include federal partners as well as states, tribes, local governments, nonprofit organizations, and individual landowners.

### **Solid Waste Management**

Many local governments have solid waste programs that address the disposal of solid waste and yard waste. They might also handle the recycling, illegal dumping, and household hazardous waste programs.

### **Waukegan Harbor Citizens Advisory Group (CAG)**

The Waukegan Harbor Citizens Advisory Group was organized in 1990 to help citizens and business leaders concerned about the harbor environment develop plans to identify and clean up contaminated harbor properties. The CAG is composed of business, fishing, recreation, environmental, government, and other interested groups

and individuals. They formed a partnership with the Illinois Environmental Protection Agency to develop the Waukegan Harbor Remedial Action Plan, detailing use impairments and how these impairments could be restored through a cooperative effort. The Waukegan CAG has been instrumental in obtaining cooperation from local parties involving additional investigations. Groundwater monitoring from local parties is being conducted in an area south of the harbor. The CAG helped obtain access from private businesses and federal grant money to install the monitoring wells. A federally funded 319 grant has been released to the Waukegan CAG to develop a watershed plan to reduce nonpoint source pollution and improve water quality in the Waukegan River watershed.

### **Watershed Planning Committee (WPC)**

The WPC, composed of watershed stakeholders, organizes, coordinates, and advises project partners on watershed planning methods and issues, demonstration project selection and provides technical assistance. The WPC also is responsible for helping coordinate the implementation of the watershed plan.

## **5.2 PROGRAMMATIC ACTION PLAN**

To supplement the Watershed Best Management Practice Toolbox, 77 programmatic action recommendations were identified that apply generally throughout the watershed, including measures related to stream and riparian corridors, water quality and stormwater management, drainage, and retention, planning and development standards, green infrastructure, natural areas, land management, food management, and coordination. This Programmatic Action Plan should be considered as general guidance for all watershed stakeholders and plan implementers. Parties that have lead and supporting responsibility for implementing the Programmatic Action Plan are identified for each action recommendation. This Programmatic Action Plan includes remedial, preventative, regulatory, and maintenance action items that are applicable throughout the watershed. An expanded programmatic action plan is included in Appendix G.

## 5 prioritized action plan

### 5.2.1 STREAMS AND RIPARIAN CORRIDORS

Stabilization, restoration, and management of the stream channel, streambank, and riparian corridor are needed throughout the watershed to improve and protect water quality, maintain floodplain functions, and reduce property loss caused by erosion. Of particular importance are remediating the impairments and problems that were identified during the watershed inventory and assessment and preserving the beneficial characteristics of the stream channel such as healthy stream substrates. Streambank and ravine erosion is threatening property, damaging infrastructure, and degrading water quality and habitat. This problem includes significant erosion around and near stormwater outfall and discharge points and hydraulic structures. The most severe streambank erosion problems in terms of threats to property damage are those where the ravine slope is also the streambank. Aquatic and riparian habitat are also in need of restoration, including restoring instream habitat such as pools and riffles, removing excessive debris from the stream channel, establishing naturalized streambanks with native plants, and managing stream corridors by restoring native riparian buffers and reducing the density of trees.

Presently, private landowners, including golf courses, are responsible for maintaining the stream as it crosses their property or flows along a property line. This includes all aspects of management and maintenance, such as debris removal, invasive species control, streambank stabilization, and management of private stormwater outfall pipes. Since problems within the stream and riparian corridor can be the result of land use and other activities upstream of a particular property, it is in everyone's best interest to help ensure that this plan is implemented watershed-wide.

Exceptions to private landowner responsibility exist where the stream passes through public land, including Illinois Department of Natural Resources holdings, or areas within the jurisdiction of the Beach Park Drainage District, which are the responsibility of these public entities. Municipalities have primary responsibility for land use and development decisions within their jurisdiction, including the allowable quantity and quality of stormwater discharge, which dramatically affects the quality of the stream corridor. Municipalities also are responsible, in part, for maintaining drainage system

infrastructure, which includes most stormwater discharge points. Within the Beach Park Drainage District boundary, fees assessed to property owners are used to repair and maintain Bull Creek as a drainage system. The Drainage District is primarily concerned with conveyance and flooding issues, but are also responsible for the maintenance and upkeep of the channel within a 50-foot easement on each streambank. The Lake County Stormwater Management Commission addresses stormwater management issues on a watershed basis throughout the county and can help coordinate multi-jurisdictional stormwater management projects, including those within the stream channel, and provide technical assistance to parties implementing these recommendations. The Illinois and Lake County Departments of Transportation are responsible for maintaining some culverts and bridges along the stream corridor.

Programmatic actions for streams and riparian corridors are listed in Table 5.2.

Table 5.2 Stream and Riparian Corridor Programmatic Actions

#	Actions	Lead Implementation Responsibility	Supporting Implementation Responsibility	Timeframe
1	Stabilize and retrofit stormwater outfall structures and the associated streambanks and channel. Install flow attenuation and outlet protection measures to reduce erosion and improve filtration of stormwater runoff entering the stream.	M BPDD RL	SMC	S
2	Stabilize eroding streambanks, toe, and side slopes using bioengineering practices with deep-rooted native plants to reduce erosion and sediment loads downstream and to reduce property loss. Bioengineering practices include A-Jacks, lunkers, fiber rolls, geotextile mats, live stakes, fascines, brush and branch layers, cribwalls, and vegetated geogrid lifts.	RL BPDD GC	SMC IEPA	M
3	Where feasible, replace failing or crude armoring and concrete lined channels with more sustainable, natural and habitat friendly stabilization measures.	RL BPDD	SMC	L
4	Preserve, enhance or establish native riparian buffers along all unbuffered or inadequately buffered stream reaches using emergent wetland and wet prairie vegetation to stabilize streambanks, filter out pollutants, and enhance aquatic habitat. Development within buffer areas should be strictly limited.	RL BPDD GC	M	S
5	Restore stream channels, streambeds, and aquatic habitat to a healthy condition. This includes instream habitat features, such as natural channel substrates and pools & riffles, to improve water quality and aquatic biodiversity.	RL BPDD	IDNR SMC M	S
6	Where feasible, daylight and re-meander streams that have been contained in ditches or moved underground into culverts or pipes.	RL BPDD	IDNR SMC M	L
7	Modify bridges, culverts, and other hydraulic structures that are directing flow into the streambanks, eroding around the edges, blocking flows and fish passage or otherwise problematic.	RL M BPDD DOT GC	SMC M	
8	Restore hydrologic connections to Lake Michigan to promote recolonization of the aquatic community.	IDNR	CMP	L
9	Develop and implement a regular stream inspection and maintenance program among the Beach Park Drainage District, municipalities, homeowners, and SMC to remove accumulated woody debris and other debris and litter and to target restoration needs.	SMC	BPDD M RL	S
10	For moderately and severely eroded stream reaches, develop a stream restoration plan and cost estimate.	M BPDD RL	SMC	S

## 5 prioritized action plan

### 5.2.2 WATER QUALITY AND STORMWATER MANAGEMENT

As described in the introduction and the watershed inventory stormwater runoff is one of the primary sources of water quality impairment. The causes and sources of water quality problems in the Dead River watershed are primarily urban in nature. These problems are the result of many years of modification of the watershed landscape as it changed from natural to agricultural to urban. These changes have included modification of the stream channel, floodplain, wetlands, riparian corridor, and other water resource-related landscape features. Other changes are the result of the increased watershed impervious cover (e.g., paving, concrete, rooftops) that has led to an increase in the volume and rate of runoff in the watershed. The increased quantity of runoff has caused problems such as excessive stream bank erosion and the deepening of the stream channel due to channel erosion. This erosion causes increased levels of Total Suspended Solids that settle out in the lower gradient reaches within Illinois Beach State Park and impair aquatic habitat. The efficient stormwater system also causes decreased base flows during the drier summer and fall months, which can result in low dissolved oxygen levels that impair aquatic habitat. Conductivity levels, an indicator of chlorides within the water column (also referred to as Total Dissolved Solids or TDS), were also shown to be high, indicating that salt applied to roads for snow and ice control are impairing water quality. Lake Michigan beaches exhibit ongoing problems with fecal contamination due to high gull populations.

To improve this situation, the use of stormwater best management practices and the preservation and natural buffering of the natural drainage system (overland flow paths, streams, wetlands, lakes and floodplain) should be required in all new development and encouraged in areas that are already developed. Drainage and detention in existing developed areas also should be retrofitted to better control runoff rates and to improve water quality. Natural hydrologic regimes and drainage systems should be preserved and/or restored to the extent practicable to reduce the impact of development and hydrologic modification on flooding and water quality and to help achieve aquatic habitat objectives.

All landowners and stakeholders within the watershed can contribute to water quality improvement by managing land and property to prevent or remove pollutants from the landscape before they can be washed into the stream. Management and maintenance of the stormwater management system is primarily the responsibility of municipalities and the Beach Park Drainage District, including both the conveyance system (pipes and drainage swales) and detention ponds, unless management of these features has been assumed by a homeowners association or other party. The implementation of green infrastructure best management practices (BMPs) is the responsibility of all landowners (for existing development) and developers and homebuilders (for new development). However, municipalities must require or encourage these practices to be installed. Preservation of remaining natural drainage and storage (green infrastructure) features of the landscape is the responsibility of municipalities.

Programmatic actions for water quality and stormwater management are listed in Table 5.3.



Table 5.3 Water Quality and Stormwater Management Programmatic Actions

#	Actions	Lead Implementation Responsibility	Supporting Implementation Responsibility	Timeframe
11	Use green infrastructure BMPs such as natural stormwater drainage, infiltration, and detention practices and lot level BMPs in new and existing development to reduce surface runoff volumes, to filter pollutants from stormwater runoff, and to improve infiltration of precipitation into the ground. Stormwater BMPs should use, to the extent possible, native plants that are appropriate for the location in which they are being planted. Reducing runoff rate and volume will also minimize sediment loadings from in-stream and surface erosion and riparian habitat degradation.	M PRL CBL DH	SMC IEPA PD LC	M
11a	Where feasible, convert existing swales and open drainage ways to infiltrate runoff with natural landscaping.	M BPDD DOT	SMC PRL CBL DH LC	S
11b	Retrofit curb and gutter areas along roadways, parking lots, and other impervious surfaces to allow stormwater to enter swales or other naturalized infiltration and infiltration measures such as parking lot and roadside rain gardens.	M CBL DH DOT	LC	M
11c	Install bioswales into parking lots as construction and reconstruction occurs.	M CBL DH DOT	LC	M
11d	Install vegetated filter strips or rain gardens where sheet flow leaves impervious surface to capture pollutants and infiltrate runoff.	M CBL DH DOT	LC	S
11e	Install sand filters, filtration basins, treatment wetlands, other bioretention practices, or other filtration practices downstream of industrial, commercial facilities and other land uses potentially generating a heavy load of pollutants. Install sand filters, appropriate proprietary water treatment units, or settling basins at the storm sewer inlets in parking lots.	M CBL DH DOT	LC	M
11f	Install green roofs where feasible to capture, filter, and evaporate stormwater.	PRL CBL DH	M	L
11g	Reduce the hydraulic connectivity of impervious surfaces by disconnecting roof downspouts from discharging to impervious areas and instead directing the flow into a lawn or naturally landscaped area, raingarden, filter strip, rain barrel, or dry well. Substitute swale and raingarden systems for curbs and gutters to increase infiltration.	PRL CBL DH	M LC	S
11h	When replacing existing pavement, or installing newly paved areas, use pervious or porous pavement or permeable paving blocks for parking lots, emergency access roads, driveways and streets where appropriate to increase infiltration and reduce runoff volumes and pollutant loads.	PRL CBL DH DOT M	PD LC	M
12	Utilize naturalized wet bottom or wetland detention basin designs and retrofit existing single function dry bottom detention basins to provide multiple benefits including reduced pollutant loads, and to provide habitat. Upgrade and maintain existing stormwater detention basins and online water storage ponds to provide water quality benefits and slower release rates where feasible.	M PRL CBL DH GC	DOT SMC BPDD	M
12a	Stabilize eroding shorelines and replace rip rap, concrete and turf pond and detention basin edges with deep-rooted native landscaping for shorelines and buffers.	M PRL CBL DH GC	DOT SMC BPDD	M
12b	Install settling basins upstream of wet and wetland detention where feasible and where the catchment area contains a large amount of impervious surface to capture sediment in runoff. Where settling basins can not be installed upstream, install a forebay in the basin and remove accumulated sediment to maintain detention capacity.	M PRL CBL DH GC	DOT SMC BPDD	M
12c	Monitor, maintain, and clean out stormwater detention facilities, storm drains, and catch basins to ensure effective operation and provide maximum detention, water quality benefits and habitat. Develop a monitoring and maintenance plan that identifies who is responsible, a maintenance schedule, budget and funding source.	M PRL CBL DH GC	DOT SMC BPDD	S
12d	Where possible, restrict discharge rates from detention basins to mimic natural instream flow rates.	M PRL CBL DH GC	DOT SMC BPDD	M
13	Preserve and protect natural drainage and storage (green infrastructure) features of the landscape to filter and infiltrate runoff and to reduce the threat of flood damage, including native vegetation, natural riparian buffers, floodplains, flood prone areas, natural depressional and regional storage areas, and wetlands. Prevent fill, excavation, development, and other modifications. Smaller depressional areas may potentially be incorporated into development as raingardens, bioswales, and other measures that retain runoff rather than releasing it offsite.	M DH PRL	SMC LC	L
14	Maintain the drainage system conveyance including cleaning out catch basins, channel maintenance, swale maintenance, culverts, and removing excess debris, trash, and other obstructions to improve aesthetics maintain flow capacity, and minimize erosion. Some natural elements such as rocks and woody debris should be left as in-stream habitat features.	M BPDD RL	DOT SMC	S

## 5 prioritized action plan

### 5.2.3 PLANNING AND DEVELOPMENT STANDARDS

The Dead River watershed is largely built out, meaning that a very limited amount of developable land remains. The existing developed landscape has and continues to impact watershed resources primarily due to the conversion (and loss) of the natural landscape to urban uses, alteration of the natural drainage and water retention features of that landscape, and the rate, volume, and quality of stormwater runoff.

The Lake County Watershed Development Ordinance provides good standards and practices for addressing some of these impacts, however, the jurisdictional scope of the County is limited, and watershed municipalities, as the primary land use and development decision-making entities, are responsible for adopting and enforcing many of the planning, zoning, subdivision, and development standards that will affect watershed resources. Current municipal planning and development standards do not adequately identify, prioritize, or preserve valuable landscape features nor require (and in some cases, they do not even allow) the use of conservation design, low impact development, or stormwater best management practices.

Watershed and green infrastructure recommendations should be integrated into local policies, plans, and budgets. Standards and policies that protect the natural drainage system from hydrologic modification activities such as clearing, compaction, draining, filling, dredging, and straightening, such as providing overlay zoning for high priority green infrastructure, are needed. These development standards may include changes to zoning regulations, subdivision, commercial, and industrial standards, to include conservation and low impact development techniques by right (rather than as an exception), natural buffers, and green infrastructure protection/management programs.

The parties that are responsible for implementing planning and development standards are primarily those responsible for land use decisions. Thus, the primary responsibility lies with the municipalities and Lake County.

Programmatic actions for planning and development standards are listed in Table 5.4.

Table 5.4 Planning and Development Standards Programmatic Actions

#	Actions	Lead Implementation Responsibility	Supporting Implementation Responsibility	Timeframe
15	Lake County, municipalities, park districts, the Forest Preserve District and other local governments units should incorporate the goals and recommendations of the watershed plan into comprehensive land use plans, development policies (zoning and subdivision regulations) capital improvement plans and budgets, and land preservation/acquisition strategies.	M	BPDD LCFPD SMC T LC	S
16	Use the site development planning and approval process to encourage watershed-friendly development practices and designs that protect watershed resources and water quality by right rather than by exception.	M LC		S
17	Establish incentive programs for developers to implement conservation and low impact development planning and design practices and techniques. These incentives could include expedited permitting and review procedures, density bonuses, tax credits, cost-share, or fee reductions for early projects that serve as demonstrations and free technical assistance.	M LC		M
18	Make it easy for developers and builders to incorporate best management practices recommended by this watershed plan into new developments or redeveloped areas. Modify zoning and development standards to facilitate implementation of the watershed plan recommendations. This could include the following: review and update development standards, add incentives such as density bonuses, park and open space donation credits, and other incentives, for preserving the green infrastructure system. Within new developments, easements or deed restrictions should be placed on lands identified as Category 1 parcels on the Green Infrastructure Plan.	M LC		M
19	Establish and adopt bluff-and-ravine protection standards.	M LC		S
19a	Establish a 30' minimum buffer distance between bluff edges and development.	M LC		S
19b	Require appropriate deep-rooted native plants as ground cover to help stabilize erodible soils on ravine slopes, edges, and buffers. Erodible soils are found in reaches BL02, BL05, BL07, BL08, BL09, BL10, BL11, BL13, BL19, BL20, BL21, BL25, BL26, and BL27. Allow cutting of trees on ravine slopes where appropriate for ground cover vegetative restoration. Require proper removal and proper disposal of cut trees.	M S		
19c	Prohibit dumping of grass clippings, leaves, or other natural or man-made fill or debris that may damage underlying vegetation or prevent re-vegetation on ravine slopes.	M		S
19d	Encourage the use of on site infiltration techniques to reduce direct stormwater flow from impervious surfaces into the ravines. Where stormwater can not be infiltrated on site, prohibit downspout pipe and/or sump pump outlets on or within 10 feet of or on steep ravine slopes. Allow discharge at the bottom of the ravine.	M LC SMC		S
19e	Limit concentrated stormwater discharges to ravines to storm events larger than the 1-year frequency. Level spreaders may be required to distribute concentrated flows across a large area.	M SMC		M
20	Adopt and enforce flexible local zoning and subdivision standards that allow adaptable, nontraditional designs for development that minimize negative impacts from stormwater runoff and nonpoint source pollution. Standards should limit runoff volume increases, minimize impervious surface area, manage stormwater on site using BMPs, and minimize land disturbance during and following construction. This action is most relevant for Highly Vulnerable Critical Subbasin #35, which is at risk for land use conversion that may result in significantly higher imperviousness.	M	LC	M
20a	Reduce minimum street widths to those necessary to carry the expected average traffic volume rather than the maximum traffic volume.	M	LC	L
20b	Use alternative parking lot designs including: ensure that the number of spaces built reflects actual, everyday demand rather than infrequently needed maximums; reduce the dimensions of the normal parking spaces where feasible; convert parking lot islands and landscaping to depressed bioretention areas; allow shared parking between adjacent facilities with alternating times of parking needs (e.g., a church and an office building).	M	LC	M
20c	Allow permeable paving practices for plazas and pedestrian areas, parking, driveways and low volume traffic streets.	M	LC	M
20d	Allow reduced street setbacks, frontages, and lot sizes in areas where riparian or sensitive natural areas need protection and to reduce the impervious surface area for streets and driveways.	M	LC	M
20e	Allow cluster / conservation design development to reduce the disturbed area and preserve green infrastructure (open land) for infiltration and treatment of runoff.	M	LC	M

## 5 prioritized action plan

### 5.2.4 GREEN INFRASTRUCTURE

The green infrastructure network of the Dead River watershed, outside of Illinois Beach State Park, is neither extensive nor well connected. Some large open parcels have been protected as natural areas, such as Illinois Beach State Park (IBSP) and Lyons Woods Forest Preserve, and others are protected for more active use, such as Thunderhawk Golf Club Forest Preserve and Shiloh Park in Zion. While these public holdings form good, large green infrastructure hubs, the connections between those hubs, particularly along the stream corridors where they are most needed, are largely nonexistent. In many cases, the opportunity does not exist to preserve these areas—they are privately owned and already developed. However, a few open parcels do remain, as illustrated in Figure 5.1. The preservation of this green infrastructure system is not only important for preserving environmental resources, but makes good economic sense for the community as well. Green infrastructure helps protect the natural conveyance system, absorb flood waters reducing flood damage, can reduce the continued degradation of stream resources needing expensive remediation, and can preserve high value resources making the community a

healthy and desirable place to live.

A connected green infrastructure network throughout the watershed should be protected and enhanced or restored to improve its functional value. The watershed green infrastructure network primarily consists of the natural drainage system including open parcels along the stream corridor and those prioritized as Category 1 (highest priority) sites. Municipalities, which are primarily responsible for preserving green infrastructure parcels, should identify these areas as important within community plans, policies, and budgets, avoid extending gray infrastructure (roads and utilities) in a way that would impact green infrastructure parcels, and take action to preserve them using planning and development standards described above. Other parties that can support land preservation efforts include the Lake County Forest Preserve District and, for parcels of higher biological quality, the Illinois Department of Natural Resources.

Programmatic actions for green infrastructure are listed in Table 5.5. Prioritized green infrastructure areas, which are described in greater detail in Tables 5.6 through 5.11, are shown in Figure 5.1.

Table 5.5 Green Infrastructure Programmatic Actions

#	Actions	Lead Implementation Responsibility	Supporting Implementation Responsibility	Timeframe
21	Land planning jurisdictions such as municipalities, park districts etc. adopt the Green Infrastructure Plan to use as a tool in prioritizing and implementing green infrastructure preservation and restoration programs.	M PD LCFPD	LC	S
21a	Clearly identify and designate areas prioritized in the Green Infrastructure Plan as green infrastructure conservation areas in county, park district and municipal comprehensive plans and maps.	M PD LCFPD	LC	S
21b	Identify and conserve connecting greenways, especially along streams and other water features. Provide passage and remove or mitigate barriers to fish & wildlife movement (such as highways, dams, and weirs) throughout the corridors and between the green hubs.	M PD LCFPD	LC	L
21c	Avoid development and installation of gray infrastructure through Category 1 green infrastructure system parcels wherever possible.	M LC	T DOT	S
21d	For lands not readily protected through land use planning and zoning, develop a preservation strategy to prioritize and purchase or otherwise protect Category 1 Green Infrastructure parcels and the natural drainage system of stream corridors, and wetland complexes. The strategy may include purchase funds, developer fees and donation funds, conservation easements, purchase of development rights programs, or other measures.	M PD LCFPD	LC	S
22	Actively manage, restore, buffer and expand Category 1 and 2 Green Infrastructure Parcels by controlling non-native and invasive plant species, planting native vegetation, using prescribed burning, and thinning the tree canopy so that a minimum 15% of available sunlight is reaching the ground layer. These areas may include Illinois Natural Areas Inventory sites, forest preserve holdings, private conservation lands, and other public agency lands such as park districts.	PRL CBL M	PD IDNR LCFPD	L

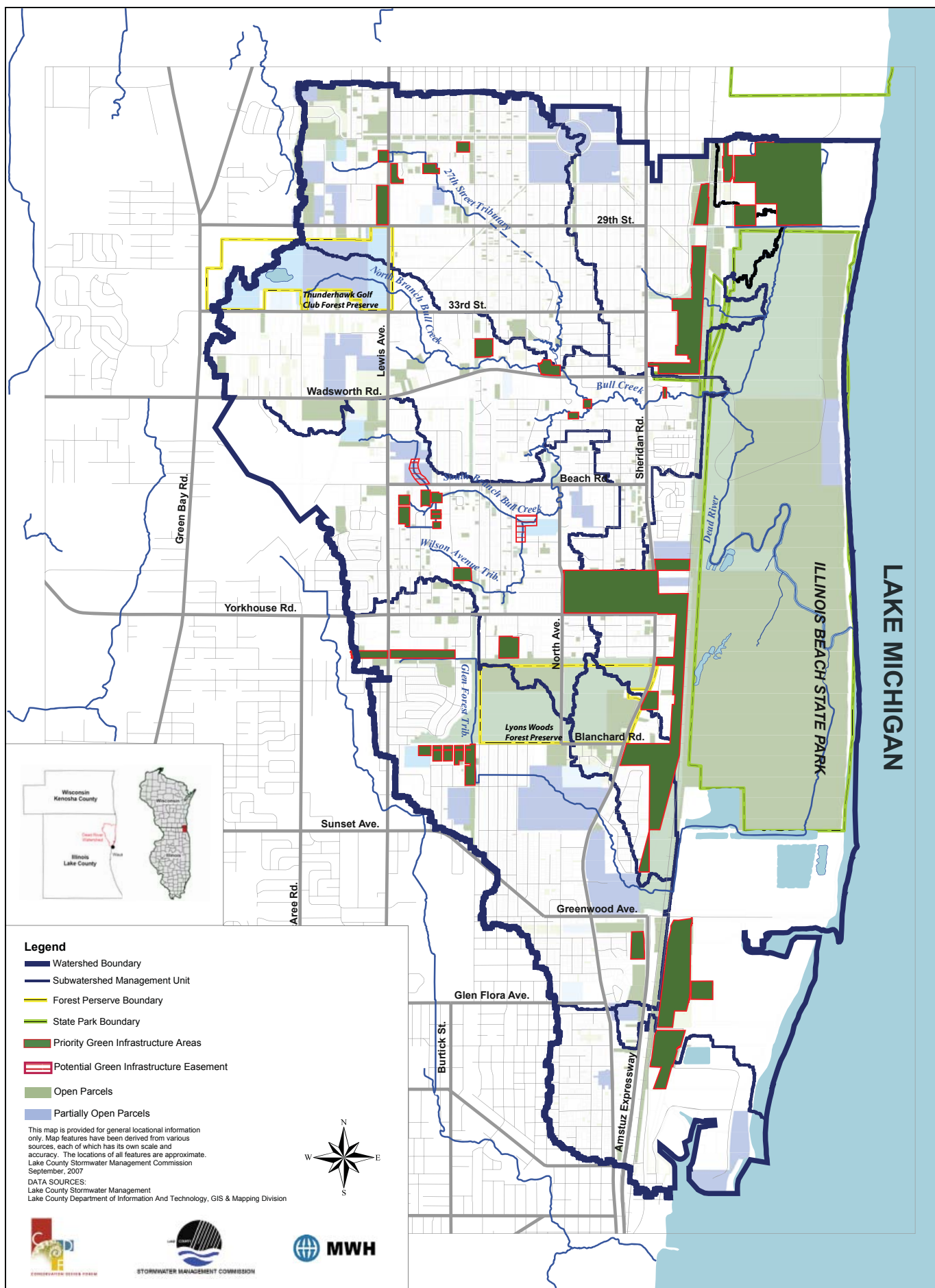


FIGURE 5.1 PRIORITIZED GREEN INFRASTRUCTURE AREAS

## 5 prioritized action plan

### 5.2.5 NATURAL AREAS

Natural areas such as stream and riparian corridors, wetlands, forest preserves, and some of the open and partially open green infrastructure parcels that remain in a natural state provide flood water retention and natural buffering for streams, but are also important to preserve the biological heritage of the watershed, conserve unique habitat found nowhere else on earth, and serve as passive and active recreational spaces for watershed residents and visitors.

Natural areas within the Dead River watershed include Illinois Beach State Park, Lyons Woods Forest Preserve, and parts of Thunderhawk Golf Club Forest Preserve. Lyons Woods and IBSP are some of the most biologically diverse ecosystems in the State of Illinois. The state park has one of the last remaining reaches of natural Lake Michigan shoreline in Illinois. These holdings significant and form a strong foundation for the green infrastructure network. Outside of these areas, natural areas are sparse and found primarily along the Union Pacific railroad corridor, with three remaining open parcels bounded by Yorkhouse Road, North Avenue, and Sheridan Road. Nonetheless, landowners along the stream corridor are responsible for restoring and managing the stream and riparian areas, which are very important to the natural health of the watershed.

Wetland protection, management, and restoration are needed to protect the natural conveyance system, improve water quality, provide stormwater storage, and other natural resource benefits. As recipients of drainage from the entire Dead River watershed upstream, IBSP and Lyons Woods are being degraded by that runoff and are in critical need of restoration and management to protect and enhance their high quality wetlands and natural areas. Upstream watershed management that restores a more natural hydrology and reduces erosion, pollution, and sediment loads to the park and forest preserve will help stabilize the hydrology and preserve rare and highly valued natural communities in the

park and forest preserve downstream.

Erosion of the Lake Michigan shoreline is a problem related to the disruption of the natural transport and deposition of sand that under natural conditions replenishes the beach. While a number of actions have been taken to help reduce erosion and replenish the sand, they have resulted in very limited and temporary success.

Programmatic actions for natural areas are listed in Table 5.6.



Table 5.6 Natural Area Programmatic Actions

#	Actions	Lead Implementation Responsibility	Supporting Implementation Responsibility	Timeframe
23	Actively manage, restore, buffer and expand natural areas (riparian zones, wetlands, and high quality habitat sites) by controlling non-native and invasive plant species, planting native vegetation, using prescribed burning, and thinning the tree canopy so that a minimum 15% of available sunlight is reaching the ground layer. These areas may include Illinois Natural Areas Inventory sites, forest preserve holdings, private conservation lands, and other public agency lands such as park districts.	M IDNR PD LCFPD	CBL PRL	L
24	Protect, and restore degraded, drained, and/or farmed wetlands to improve water quality, provide surface water storage, and improve habitat. Vegetative management, prescriptive burning, invasive species management, and hydrologic restoration can all be used to help improve wetland quality. The strategic removal and/or blockage of wetland drainage tiles, food control structures, or other drainage structures can help restore wetland hydrology. Approximately 754 acres are available as potential wetland restoration sites.	M LCFPD PRL	IDNR PD	L
25	Restore stream channels to natural state by preserving and/or installing pools and riffes, removing excessive debris, stabilizing stream banks and the stream bed.	RL BPDD	IDNR	L
26	Stabilize upstream hydrology to reduce erosion, pollution runoff, and sediment loading to downstream natural areas and preserve valuable and unique resources within Illinois Beach State Park and Lyons Woods Forest Preserve.	M PRL		L
27	Replenish and stabilize the Lake Michigan shoreline to protect this valuable and unique habitat.	IDNR CMP	USACE USFWS	L
28	On private lands, actively manage, restore, buffer and expand on-site natural areas by controlling non-native and invasive plant species, planting native vegetation, using prescribed burning, and thinning the tree canopy so that a minimum 15% of available sunlight is reaching the ground layer.	PRL RL CBL		L

## 5 prioritized action plan

### 5.2.6 LAND MANAGEMENT

In any watershed, the way that land is managed, developed, grown, and otherwise acted upon by the residents and others in the watershed affects the quality of watershed resources. Land uses such as transportation, industrial, and commercial, with large areas of impervious surfaces such as rooftops, roads, and parking lots, contribute significant amounts of pollutants to streams and other water resources. Management of the turf grass areas of residential and other land uses such as schools and parks contribute fertilizers and pesticides, and the disposal of yard waste in or near the stream or other water feature impacts these resources by contributing decomposing organic matter, which reduces dissolved oxygen levels in water. Animal populations, including pets, deer, and gulls along the Lake Michigan shoreline contribute bacterial contamination to the stream and beaches, making them unsuitable for human contact. Construction activities can result in significant site erosion, which sends sediment into the stream system. All of these pollutants eventually end up in Lake Michigan, the source of drinking water and recreation for millions of people.

Appropriate land management practices can help reduce pollutant loading at the source, before pollutants reach streams and other water resources. Road and parking lot maintenance, including street sweeping and the reduction of road salt application in winter, can help prevent toxic materials, sediment, and chlorides from flowing to the stream and impairing water quality. Soil erosion and sediment control practices installed during the development and construction process can significantly reduce the contribution of sediment from these sites. Appropriate landscape maintenance, such as reduced application of fertilizers and pesticides, installation of native landscapes, and appropriate disposal of yard waste, can reduce the concentration of landscaping pollutants in stormwater runoff and the stream. Installing best management practices such as riparian buffers and filter strips can remove pollutants from runoff before they can reach the stream. For example, stream riparian buffers have the potential to remove 75% of sediment and 50% of phosphorous from stormwater runoff. Naturalized swales can remove up to 80% of total suspended solids and 30% of phosphorous.

Three sites within the Dead River watershed present unique challenges and opportunities for land management. The Waukegan Regional Airport, which is planning to expand within the next 10 years, is partially covered by impervious surfaces and requires the use of fluids and chemicals to support the airport activities, some of which are toxic or otherwise harmful to water quality and habitat. The airport implements a Storm Water Pollution Prevention Plan and Spill Prevention, Control and Countermeasure Plan that it should continue to update and apply. The airport should also consider implementing the road and parking lot maintenance recommendations, as well as those related to turf grass and grounds management for those areas not covered by impervious surfaces.

The Zion Nuclear Power Station is scheduled to be decommissioned over the next 10 years and the City of Zion plans the future land use of this area to be single family residential. If feasible, and if all contamination or other nuclear legacy issues can be adequately addressed, this land should be remediated, restored to a natural state, and re-integrated into Illinois Beach State Park and the unique resources found there.

Property owners within the Waukegan Harbor Area of Concern, which includes the harbor and the industrial land uses to the north and surrounding the harbor, should take special land management precautions. Property should be kept clean of debris, fluids, chemicals, and other materials that have the potential to leach or otherwise migrate into streams, Lake Michigan, or other areas. Material piles or storage areas also should be covered or contained.

Programmatic actions for land management are listed in

Table 5.7 Land Management Programmatic Actions

#	Actions	Lead Implementation Responsibility	Supporting Implementation Responsibility	Timeframe
29	Improve road maintenance practices, such as street and parking lot sweeping and reduce application of de-icing salt, to reduce the flow of particulates, sediment, chlorides, and other pollutants into the stormwater system, stream, and ultimately Lake Michigan.	M DOT CBL	T	S
30	Investigate and address potential contamination issues in Illinois Beach State Park and the Dead River. Remediate, cap, cover, or install other controls for any potential sources of toxic or other pollutants including waste storage piles, landfills or facilities, hazardous materials, nuclear contamination sites, and salt piles to prevent stormwater contact or to capture runoff if stormwater contact does occur.	IDNR CMP USEPA IEPA	LCHD CAG LMGLO	L
31	Reduce fecal coliform contamination on Lake Michigan beaches by controlling gull populations, human sewage, and other contributing sources. Further study is needed to identify the non-gull sources of fecal coliform contamination.	LCHD IDNR	IEPA LMGLO	S
32	Use sustainable site and land management practices (including golf courses and agricultural operations).	PRL CBL GC	M PD LCFPD	S
32a	Avoid disposal or burning of yard waste in or near the stream or riparian buffer, which adds excess nutrients to the stream system and kills the plant buffer that stabilizes the streambanks and filters runoff to the stream. Properly dispose of yard and pet wastes, household chemicals, and trash. Do not dispose of these in stormsewers, roadside swales, or the stream.	PRL GC	CBL M PD LCFPD	S
32b	Utilize deep-rooted native vegetation wherever possible for landscaping rather than turf grass to increase stormwater infiltration and evapotranspiration, reduce the need for watering, pesticides and fertilizers, filter pollutants from surface runoff, and provide habitat for native species. Plant native trees appropriate to the local area to increase interception, evapotranspiration, and uptake of precipitation.	PRL CBL GC PD	M	S
33	Protect water resources from sedimentation due to construction site erosion by inspecting and enforcing soil erosion and sediment control standards as required by the Lake County Watershed Development Ordinance. Require an approved SESC plan to help protect water resources from sedimentation by filtering and trapping sediments out of stormwater before it leaves a development site. Assess erosion and sediment control practices after storm events and ensure SESC plan implementation.	M DH LC	NRCS/SWCD	S
33a	Minimize soil compaction, clearing and mass grading to only where absolutely necessary to build and provide access to structures and infrastructure (site fingerprinting). Avoid clearing and grading in or immediately adjacent to water resources and steep slopes. Clearing should be done immediately before construction, rather than leaving soils exposed for months or years.	M DH LC	NRCS/SWCD	S
33b	During construction protect and retain existing vegetation to decrease concentrated flows, maintain site hydrology, and control erosion.	M DH LC	NRCS/SWCD	S
33c	Limit soil exposure by phasing construction so that only a portion of the site is disturbed at any one time to complete the needed building in that phase. Other portions of the site are not cleared and graded until exposed soils from the earlier phase have been stabilized and the construction is nearly completed.	M DH LC	NRCS/SWCD	S
33d	Stabilize / revegetate exposed and disturbed soils including soil stockpiles within 14 days after disturbance with seeding, mulch cover, erosion control blankets, or other stabilization practices. Topsoil stockpiles can be reapplied as a soil amendment to reestablish vegetation following construction.	M DH LC	NRCS/SWCD	S
33e	Employ a soil erosion sediment control treatment train, and install perimeter controls and risers as a last line of defense to retain and filter sediments before runoff exits the site.	M DH LC	NRCS/SWCD	S
34	The Waukegan Regional Airport should continue to update and implement the Storm Water Pollution Prevention Plan and Spill Prevention, Control and Countermeasure Plan, sweep impervious surfaces regularly, and find more environmentally-friendly de-icing compounds for airplanes and runways.	Waukegan Regional Airport		S

## 5 prioritized action plan

Table 5.7.

### 5.2.7 FLOOD MANAGEMENT

Flooding and risk of flooding are fairly common in northeastern Illinois and Lake County, primarily due to the impact of urban development, which increases impervious surfaces, increases the rate and volume of stormwater runoff, and modifies and builds in natural storage and floodplain areas. These factors, coupled with a flat Illinois landscape where excess water tends to spread out over a wide area, has resulted in flooding problems. For this reason, it is important to preserve and not modify existing flood storage capacity of the landscape including depressional areas, wetlands, and floodplains.

While Flood Problem Area Inventory (FP AI) sites within the watershed are not extensive in terms of affected area, flooding within these areas can be extremely destructive and disruptive to those suffering from flood damage. Flooding of roads and intersections, such as those reported by the Illinois Department of Transportation, disrupt travel and economic activity. In addition to these identified flooding problems, potential flood areas have also been identified that may affect up to 270 structures in the 100-year floodplain and 682 structures in the 500-year floodplain.

Addressing current and potential flood problems is important for those affected and for the overall impact of flood damage to society in general. Current flooding issues were due either to a local drainage problem, meaning that the size of the drainage system, whether underground sewer, ditch, or overland flow path, is insufficient to carry the volume of water required, or to sanitary sewer or septic failure, as in the Lake County Gardens Subdivision.

None of these locations fall within the 100-year floodplain, and flood insurance is not an option for these landowners. Increasing the local drainage capacity for these areas will probably require installation of new or larger sewer pipes, larger culverts, or improving or increasing the capacity of the ditch or overland flow path. Installing or increasing local flood storage, such as through installation of detention basins, is another potential solution. Floodproofing options, such as raising the structure above the level of flooding, protection using the surrounding land such as levees, sealing basement windows and doorways in homes, and application

of floodproofing materials to building foundations also exist for these locations.

For sewer backup problems, one-way flow valves are available that allow flow to leave a structure via the sewer pipe but do not allow flow to enter a structure through the same pathway.

For landowners with structures within the 10- or 100-year floodplain boundary, options include flood insurance to help repair damages due to flooding, floodproofing such as raising a structure, and flood buyouts, where a property owner voluntarily sells the land and structure. Under flood buyouts, the structure is typically removed from the property and floodplain and the land is no longer available for development.

Programmatic actions for flood management are listed in Table 5.8.

Table 5.8 Flood Management Programmatic Actions

#	Flood Management Programmatic Actions	Lead Implementation Responsibility	Supporting Implementation Responsibility	Timeframe
35	Adopt and continue to enforce floodplain protection standards within zoning, subdivision, and building codes or a 'stand-alone' floodplain protection standard that prohibits new building and roadway development, fill, or other encroachment within the floodplain.	M LC SMC		M
36	Address Flood Problem Area Inventory and Illinois Department of Transportation flooding sites, and avoid potential flood damage within 10- and 100-year floodplains.	M PRL FEMA DOT	LC SMC	L
36a	Preserve riparian and depressional floodplain and wetlands as open and undeveloped to maximize flood storage and conveyance.	M LC		L
36b	Mitigate flood damages through floodproofing of at-risk structures such as raising the structure, sealing basement windows and doors, floodplain buyouts, and installing landscape features such as floodwalls or levees.	PRL CBL	M LC FEMA	L
36c	Mitigate sanitary sewer backup flood damages through remediation / correction of infiltration and cross connections with the sanitary sewer system and installation of one-way valves.	PRL NSSD		L
36d	Mitigate local drainage capacity flood damage by providing additional flood storage and or maintaining / improving local drainage system through installation of new or larger sewer pipes, larger culverts, or improving or increasing the conveyance capacity of ditches and overland flow path.	PRL M	LC SMC	L

## 5 prioritized action plan

### 5.2.8 STAKEHOLDER COORDINATION

Activities within one area of the watershed can impact watershed resources in areas of the watershed that seem distant or unconnected. For example, appropriate stormwater management practices applied in the western headwaters of the watershed can improve aquatic resources as far away as Illinois Beach State Park and Lake Michigan, and can reduce flooding and streambank erosion problems for downstream communities and landowners. And just as the actions of one stakeholder can impact distant resources, the participation, coordination, and action of all of the stakeholders is needed to create real and lasting improvement of watershed resources. No single party, stakeholder, jurisdiction, or discipline can effectively implement this watershed plan alone.

Coordination across property and jurisdictional lines is critical for implementing plan recommendations that require multiple funding sources and coordination of time and effort beyond a single stakeholder's resources. For example,

municipalities must adopt the green infrastructure plan and coordinate implementation efforts and resources to achieve the most efficient and effective results. Neighbors must work together to address streambank erosion issues that threaten their properties. A strong coalition of dedicated watershed stakeholders, including representatives from all of the municipalities, the county, and residents and landowners must form a new Dead River watershed-based organization to help coordinate and lead watershed plan implementation efforts, provide education and assistance to watershed stakeholders, and make recommendations for project funding. Local, state, and federal agency programs, including voluntary education initiatives, technical and financial support for planning and best management practice projects, and regulatory programs that permit or restrict development activities, can be combined and leveraged for multiple benefits.

Programmatic actions for stakeholder coordination are listed in Table 5.9.



Table 5.9 Stakeholder Coordination Programmatic Actions

#	Actions	Lead Implementation Responsibility	Supporting Implementation Responsibility	Timeframe
37	Form a watershed organization to coordinate and lead watershed plan implementation activities.	SMC M	WPC IEPA	S
38	Coordinate watershed restoration projects and develop cost-share funding for best management practices.	SMC M	WPC	S
39	Establish regular (e.g., quarterly) stakeholder coordination meetings to discuss projects, watershed plan implementation, and land use planning and development activities.	SMC M	WPC	S
40	Incorporate plan recommendations into regional, county, and municipal plans and budgets.	M LC CMAP		S

## 5 prioritized action plan

### 5.3 SITE SPECIFIC ACTION PLAN

In addition to the programmatic recommendations, which generally apply watershed wide, site specific action items and recommendations are tied to a particular location in the watershed: one of the Subwatershed Management Units, one of the stream reaches, or a specific point on the stream. As with the programmatic actions, these site specific recommendations were developed to address watershed problems, to improve watershed resources, and to achieve the watershed goals and objectives.

The process of identifying specific sites that are in need of, or suited to, watershed improvement projects has been ongoing during the planning process and will continue throughout plan implementation. Watershed improvement projects in the site specific plan range from small maintenance and repair tasks, to large wetland restoration and green infrastructure preservation projects.

During development of the watershed-based plan, several methods were used to identify project sites.

1. Members of the Watershed Planning Committee provided site and project recommendations to the planning team during meetings.
2. Sites were identified based on results of previous watershed studies such as the Flood Problem Area Inventory and 2001 Stream Inventory.
3. New data was collected during the field assessment conducted by the planning team.
4. Extensive map analysis using existing data including land use, wetlands, soil, floodplain and green infrastructure overlays. These analyses included green infrastructure prioritization, identification of critical areas, and non-point source pollution loading.

This action plan (Tables 5.10 through 5.15) is organized by the jurisdiction in which the recommendation falls, and includes the information listed below. This structure should allow jurisdictional representatives to easily identify which recommendations are within their sphere of influence and control. The action recommendations have been located

on the Subwatershed Management Unit Maps found in Figures 5.2 through 5.10 and are identified by the three-digit Recommendation ID#. Tables 5.10 through 5.15 are subsets of a more detailed action plan table that is included in Appendix H. Chapter 6 identifies a number of implementation details, such as area and cost, that are essential for understanding the difficulty and extent of putting these recommendations into effect.

**Recommendation Identification # (ID#):** each action is identified by a three-number identification label: (1) SMU, (2) stream reach, and (3) identification number for each action. For example, 2.27.4 would refer to Action #4 along Reach 27 within SMU 2. These ID numbers correspond to those on the SMU maps in Figures 5.2 through 5.10.

**Jurisdiction:** identifies the jurisdiction within which the recommendation falls. Individual jurisdictions are listed first, followed by multi-jurisdictional recommendations.

**Recommendation Description:** narrative explanation of the action recommendation. Those recommendations that address Critical Areas (identified in Chapter 3 Section 17) are shown in italics.

**Goal-Obj:** the Goal and Objective the action item is intended to address.

**Priority:** priority refers to the rank importance of the action. A "1" indicates high priority and "3" indicates lower priority.

**Ease of Implementation:** indicator of how difficult the recommended action is to implement, with "1" indicating a fairly simple action and "3" more complex or difficult action to implement.

**Time frame:** indicator of when the action recommendation is intended to be implemented: Short (1-5 years), Medium (5-10 years), or Long (10+ years).

### USEPA watershed-based plan element #3: best management practices and critical areas where those practices are needed (also see Appendices G and H).

Implementation Responsibility: indicates the lead party that will most likely be responsible for implementing the action recommendation as well as any supporting parties.

The site-specific recommendations in Tables 5.10 through 5.15 reflect the opportunity sites identified by stakeholders, past studies and inventories, and other components of the watershed assessment. However, they do not include all of the opportunities for best management practice projects in the watershed. Figures 5.2 through 5.10 illustrate the location of the site-specific recommendations included in Tables 5.10 through 5.15.

## 5 prioritized action plan

Table 5.10 Site Specific Action Plan for the City of Zion

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
1.0.1	Zion	Preserve Category 1 and 2 green infrastructure open space areas to connect the North and South units of Illinois Beach State Park, enhance recreational opportunities, and expand and restore important rare habitat. Decommission and remove the power plant and associated structures. Acreage count includes private / utility owned land within the area. It is assumed that restoration would address the potential pollutant loading hotspots identified as Critical Subbasins #15 and #74.	C1, C2, C3, E1, E2	1	3	L	IDNR/Utility	Zion
2.0.3	Zion	<i>Manage / minimize runoff impacts of commercial land uses along Sheridan Road, particularly at Sheridan and 33rd St and Sheridan and 27th, 28th, and 29th along the stream. Cost estimate assumes 8400 lf of Sheridan Road frontage treated with improved, 10' swales (approximately 2 acres) as a proxy for on-site source control BMPs.</i>	E1, E2, E7, E9, G1	1	3	S	Zion	Owner Developer
2.0.6	Zion	<i>Stabilize / regrade shoreline using bioengineering practices and plant banks and a surrounding buffer with native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup; address algae / nutrient loads and turbidity / sedimentation by naturalizing the basin; remove excess debris.</i>	E1, E2, E9	2	2	S-M	Owner	
2.0.7	Zion	<i>Stabilize / regrade shoreline using bioengineering practices and plant banks and a surrounding buffer with native vegetation; address turbidity / sedimentation by naturalizing the basin; remove excess debris. This is depressional area #54.</i>	E1, E2, E9	2	2	S-M	Zion Park District	
2.0.8	Zion	<i>Stabilize / regrade shoreline using bioengineering practices and plant banks and a surrounding buffer with native vegetation; address algae / nutrient loads by naturalizing the basin; remove excess debris.</i>	E1, E2, E9	2	2	S-M	Zion Park District	
2.0.9	Zion	<i>Address algae / nutrient loads by naturalizing the basin.</i>	E1, E2, E9	2	1	S-M	Owner	Zion
2.28.1	Zion	<i>Restore stream channel and improve instream habitat by installing pools and riffles.</i>	A1, A10, C3	3	3	S	Zion Park District	
2.28.2	Zion	<i>Restore and manage the channel, native riparian buffers, and ravine woodland system, particularly the reach running through Ophir Park west of Sheridan Road, and Carmel Park east of Sheridan Road. Management practices include controlling invasive species, planting native species, and managing vegetation such as through prescribed burning.</i>	A1, A3, A5, A6, A10, C3, E2, E4	1	2	S	Zion Park District	
2.28.3	Zion	<i>Stabilize and reduce downcutting of the incised channel through Ophir Park, and install a naturalized riparian buffer. Cost estimate assumes stabilization of streambanks with Moderate erosion problem.</i>	A6, A10, A11, B1, B4, C3, E1	1	2	S	Zion Park District	
2.28.4	Zion	<i>Manage the culvert outflow at the upstream end of the reach for energy dissipation and pollutant removal, possibly with a settling basin or small constructed wetland.</i>	A10, A11, B4	2	3	S	Zion Park District	

Table 5.10 Site Specific Action Plan for the City of Zion (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
2.28.5	Zion	<i>Stabilize Moderate streambank erosion along the entire reach using bioengineering stabilization measures, which will help reduce the instream silt / sedimentation load within this reach.</i>	A1, A3, A8, C3, E1	1	3	M	Zion Park District, Owner	
2.28.6	Zion	Remove debris, tires, and logs using American Fisheries Society guidelines.	A10, A11, B4	2	2	S	Owner	SMC
2.28.7	Zion	Remove debris obstructing flow using American Fisheries Society guidelines.	A10, A11, B4	2	2	S	Owner	SMC
2.28.8	Zion	Remove concrete debris and remove or repair failed headwall and outfall pipe.	A10, A11, B4	2	3	S-M	Zion Park District	Zion
2.28.9	Zion	<i>Stabilize major erosion, bank slumping / blowout, and headwall failure at upstream end of the reach near the culvert. Use bioengineering stabilization measures if possible, and more structural measures if necessary. Cost estimate reflects stabilization of severe erosion problem.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Zion Park District	Zion
2.28.10	Zion	<i>Stabilize 4 foot diameter plunge pool erosion below outfall. If feasible use bioengineering measures, though rip rap and structural measures may be necessary.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Zion Park District	Zion
2.28.11	Zion	<i>Stabilize bank erosion caused by stormwater outfall using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Zion Park District	Zion
2.28.12	Zion	Inspect and, if necessary, repair five culverts under trail, which may be crushed and/or failing.	A10, A11, B4	3	3	S	Zion Park District	Zion
3a.0.3	Zion	Preserve approximately 21 acres of wetland and stream corridor open and partially open Category 1 green infrastructure areas and greenways within the headwaters of the 27th St tributary. Target areas are located (1) southwest of 25th St and Galilee, (2) south of Jethro and 26th Street, (3) west of 26th and Lewis, (4) southeast of 26th and Lewis, (5) northwest of 29th and Lewis.	A6, B1, C2, C3, G2, G4	1	3	L	Zion Park District, Zion, Owner	
3a.0.7	Zion	Manage the golf course grounds and detention / water features in Shiloh Park, in the northeast corner of the SMU for water quality and habitat benefits, including installation of a 5 foot riparian buffer along shoreline / banks of water features.	B1, C3, E1, E2, E4, E9, G2, G4	2	1	S	Zion Park District	
3a.0.8	Zion	FPAI site 20-13 experiences local drainage problems due to runoff from the west. Retrofit David Park and the school property west of the problem area with detention or infiltration practices to reduce runoff rate and volume.	B4	2	3	S	Zion	SMC
3a.0.9	Zion	Stabilize / regrade shoreline using bioengineering practices and plant banks and a minimum 5 ft buffer with native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup; address turbidity / sedimentation by naturalizing the basin.	E1, E2, E9	2	2	S-M	HOA	Zion
3a.0.10	Zion	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	

## 5 prioritized action plan

Table 5.10 Site Specific Action Plan for the City of Zion (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3a.0.11	Zion	Retrofit as wet / wetland basin; plant banks and a minimum 5 ft surrounding buffer with native vegetation.	E1, E2, E9	2	2	S-M	HOA	
3a.0.12	Zion	Retrofit as wet / wetland basin; plant banks and a minimum 5 ft surrounding buffer with native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup; remove excess debris.	E1, E2, E9	2	2	S-M	HOA	
3a.0.13	Zion	Retrofit as wet / wetland basin; plant banks and a minimum 5 ft surrounding buffer with native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup; retrofit bottom concrete channel.	E1, E2, E9	2	2	S-M	HOA	
3a.0.14	Zion	Plant banks and a minimum 5 ft surrounding buffer with native vegetation; remove excess debris.	E1, E2, E9	2	1	S-M	HOA	
3a.0.15	Zion	Stabilize / regrade shoreline using bioengineering practices and native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup; address algae / nutrient loads by naturalizing the basin; remove excess debris.	E1, E2, E9	2	2	S-M	Zion Park District	Zion
3a.0.16	Zion	Stabilize / regrade shoreline and plant banks and a minimum 5 ft surrounding buffer with native vegetation; address turbidity / sedimentation.	E1, E2, E9	2	2	S-M	Zion Park District	
3a.0.17	Zion	Plant banks and a minimum 5 ft surrounding buffer with native vegetation; address turbidity / sedimentation by naturalizing the basin.	E1, E2, E9	2	1	S-M	Zion Park District	
3a.27.1	Zion	Restore and manage the native riparian buffer plant communities along this reach within Sharon Park by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning. A wider, partially forested buffer may be appropriate in the lower parts of the reach.	A6, A10, B1, C3, E1	2	2	S	Zion Park District	
3a.27.2	Zion	Address High streambank erosion along entire reach using bioengineering stabilization measures, some of which may threaten buried sewer lines.	A1, A3, A8, C3, E1	1	3	M	Zion Park District	
3a.27.3	Zion	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Zion Park District	SMC
3a.27.4	Zion	<i>Remediate significant erosion and slumping on left bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream.</i>	A1, A3, A8, C3, E1	1	3	M	Zion Park District	
3a.27.5	Zion	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Zion Park District	SMC
3a.27.6	Zion	<i>Stabilize significant erosion and exposure of manhole and sewer infrastructure using bioengineering stabilization measures and other hardscape solutions to ensure protection of the infrastructure elements. Length difficult to determine from photo; assume 100 lf for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Zion	NSSD?, Zion Park District



Table 5.10 Site Specific Action Plan for the City of Zion (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3a.27.7	Zion	<i>Stabilize erosion creating open channel at discharge point using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Zion	Owner (Bd. Of Edu.)
3a.27.8	Zion	<i>Remediate significant erosion and slumping on left bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 150 lf for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Zion Park District	
3a.27.9	Zion	<i>Stabilize erosion at outfall that is creating an open channel using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Zion Park District	Zion
3a.27.10	Zion	<i>Stabilize major erosion, headwall, and outfall pipe failure using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Zion Park District	Zion
3a.27.11	Zion	<i>Stabilize minor channel erosion using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Zion Park District	
3c.22.1	Zion	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	2	2	S	Owner	
3c.22.2	Zion	Remove debris obstructing flow using American Fisheries Society guidelines.	A10, A11, B4	2	2	S	Zion	SMC

## 5 prioritized action plan

Table 5.11 Site Specific Action Plan for the Village of Beach Park

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
1.0.3	Beach Park	Preserve and restore open and partially open green infrastructure bounded by North Ave, York House Road, Sheridan Road, and residential areas to the north (spanning SMUs #1, #3b, and #3c) for natural resource restoration and management and recreation. Preserving two corridors (19 acres) east of Sheridan Road would connect this piece to the larger Illinois Beach State Park system. The area also contains storage area #30 and potential storage area #27, which may help reduce flooding in the area of FPAI 20-02 along Coolidge Ave.	B1, C1, C2, C3, G2, G4	1	3	L	Owner	Beach Park
1.0.8	Beach Park	Monitor IDOT-recorded flooding location at Sheridan and York House Road for further problems.	B4, F7	3	1	S	IDOT	SMC
1.0.9	Beach Park	Monitor IDOT-recorded flooding locations at Sheridan and Beach Road for further problems.	B4, F7	3	1	S	IDOT	SMC
1.0.14	Beach Park	Install filtration and infiltration BMPs for existing commercial properties along Sheridan Road. Cost estimate reflects 10' wide swale improvements (as a proxy for lot level / source control BMPs) along 1500 lf of Sheridan Road frontage.	E1, E2, E7, E9, G1	2	3	S	Beach Park	Owner Developer
1.0.15	Beach Park	Improve any swale and other surface stormwater drainage systems within the developed areas of the western part of this SMU, which is mostly unsewered, and install stormwater filtration and infiltration BMPs. Details reflect 54,000 lf (approximately 12.5 acre) of 10 foot wide drainage swale improvements / lot level / source control BMPs on each side of roads within this part of the SMU.	E1, E2, E7, E9, G1	1	3	S	Beach Park	
1.0.23	Beach Park	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
1.0.24	Beach Park	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
1.0.27	Beach Park	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
2.0.5	Beach Park	Monitor past IDOT-recorded flooding at Sheridan and Wadsworth for further problems and remediate if flooding continues.	B4, F7	3	1	S	IDOT	
3a.25.4	Beach Park	Remove debris obstructing flow using American Fisheries Society guidelines.	A10, A11, B4	2	2	S	Owner	Beach Park, BPDD
3a.26.1	Beach Park	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning. A wider, partially forested buffer is appropriate in the lower parts of the reach.	A6, A10, B1, C3, E1	2	2	S	Owner	
3a.26.2	Beach Park	Restore stream channel and improve instream habitat by installing & enhancing pools and riffles.	A1, A10, C3	3	3	S	Owner	Beach Park, BPDD

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3a.26.3	Beach Park	<i>Address Moderate streambank erosion along entire reach using bioengineering stabilization measures, which may help reduce the silt and sediment load.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3a.26.4	Beach Park	<i>Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.</i>	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	
3a.26.5	Beach Park	Remove chain link fence placed across stream channel.	A1, A10, B4	2	1	S	Owner	Beach Park, BPDD
3a.26.6	Beach Park	<i>Remediate significant erosion using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3a.26.7	Beach Park	Investigate and remediate collapsed pedestrian bridge in the stream channel.	A10, A11	2	2	S	Owner	Beach Park, BPDD
3b.0.2	Beach Park	Consider daylighting and restoring as much of the Wilson Avenue Tributary (not inventoried) as possible through the residential areas. Daylighting and restoration should address concerns about the tank cars and transite pipes that are reported to transmit the flow below ground in this location.	A1, A6, C3, G2	3	3	L	Beach Park	Owner
3b.0.3	Beach Park	Buffer the Wilson Avenue Tributary from encroachment by preserving open Category 2 green infrastructure areas.	B1, C1, C2, C3, G2, G4	1	3	L	Owner	Beach Park
3b.0.5	Beach Park	Restore and manage the wetlands within the open and partially open Category 1 Green Infrastructure areas just north of Lyons Woods Forest Preserve; reconnect these wetlands to the Lyons Woods system.	B1, C1, C2, C3, E1, E2, G2	3	3	L	Owner	SMC
3b.0.8	Beach Park	FPAI site 20-04, in the Village of Beach Park, experiences sewer backup into homes due to an inadequate drainage system. Investigate whether the remedial measure, a large pipe and ditch installed as part of the Monarch Point development to the north, fixed the problem. If not, remedial action should be taken, which may include working with the open areas identified on the SMU map to relieve drainage issues.	B2, B3	2	3	S	Beach Park	SMC
3b.0.9	Beach Park	"FPAI site 20-05, in the Village of Beach Park, experiences road, home, and backyard flooding due to inadequate conveyance capacity of the open ditch and culvert, particularly the culvert under Yorkhouse Road. Remedial action may include retrofit / restoration of open green infrastructure areas to help absorb / store flood water.	B1, B2, B4	2	3	S	Beach Park	SMC

## 5 prioritized action plan

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3b.0.10	Beach Park	The area where BL13, BL14, and BL15 come together is in need of a stream restoration plan to remediate the buildup of debris, concrete lined channels, underground culverts and railroad tank cars, yard waste in the stream channel, and other impacts from nearby residential areas.	A1, A6, A10, A11, C3, E5, E9, G2	1	3	S	Beach Park SMC Owner	
3b.0.11	Beach Park	Stabilize / regrade shoreline using bioengineering practices and plant banks and a surrounding buffer with native vegetation; address turbidity / sedimentation by naturalizing the basin.	E1, E2, E9	2	2	S-M	Waukegan Park District	
3b.0.13	Beach Park	Retrofit as wet / wetland basin; plant banks and a surrounding buffer with native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup.	E1, E2, E9	2	2	S-M	Owner HOA	
3b.0.14	Beach Park	Retrofit as wet / wetland basin; plant banks and a surrounding buffer with native vegetation.	E1, E2, E9	2	2	S-M	HOA	
3b.0.17	Beach Park	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
3b.0.18	Beach Park	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
3b.0.19	Beach Park	Plant banks with native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup; remove excess debris.	E1, E2, E9	2	1	S-M	HOA	
3b.0.20	Beach Park	Convert to wet or wetland basin; plant banks and a surrounding buffer with native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup.	E1, E2, E9	2	2	S-M	HOA	
3b.0.21	Beach Park	Plant banks and a surrounding buffer with native vegetation; remove excess debris.	E1, E2, E9	2	1	S-M	Owner	
3b.12.1	Beach Park	<i>Restore stream channel and improve instream habitat by installing and enhancing pools and riffles.</i>	A1, A10, C3	1	3	S	Owner	Beach Park, BPDD
3b.12.2	Beach Park	<i>Address High streambank erosion along entire reach using bioengineering stabilization measures, which may help reduce the instream silt / sedimentation load.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3b.12.3	Beach Park	<i>Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.</i>	A6, A10, B1, C3, E1	1	2	S	Owner	
3b.12.4	Beach Park	Investigate / inspect failed / broken concrete dam along west of Cheney / North Ave. for impact on stream, and remove impacting dam elements if found be have a negative impact.	A1, A2, A11, C3	3	1	S-L	Owner	Beach Park, BPDD
3b.12.5	Beach Park	<i>Stabilize typical 1-2 foot erosion on right bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3b.12.6	Beach Park	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Owner	Beach Park, BPDD
3b.12.7	Beach Park	<i>Stabilize significant erosion and slumping of right bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3b.12.8	Beach Park	<i>Remove debris and sediment from culvert under Beach Road.</i>	A10, A11, C3, E1, E7, E8, F7	1	3	S	Owner	Beach Park, BPDD
3b.12.9	Beach Park	<i>Remediate erosion of open point discharge channel draining to the creek using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3b.12.10	Beach Park	<i>Remediate erosion of open point discharge channel draining to the creek using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3b.13.1	Beach Park	Manage and restore the wooded ravine along reach BL13. Assumes an area 2500 lf by 150 ft in width for cost estimating purposes.	A6, A7, A10	3	2	S	Owner	Beach Park
3b.13.2	Beach Park	<i>Restore stream channel and improve instream habitat by installing and enhancing pools and riffles and removing numerous debris jams according to the American Fisheries Society guidelines.</i>	A1, A10, C3	1	3	S	Owner	Beach Park, BPDD
3b.13.3	Beach Park	<i>Address High streambank erosion along entire reach using bioengineering stabilization measures, which may help reduce the instream silt / sedimentation load.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3b.13.4	Beach Park	<i>Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.</i>	A6, A10, B1, C3, E1	1	2	S	Owner	Beach Park SMC
3b.13.5	Beach Park	<i>Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.</i>	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	Beach Park SMC
3b.13.6	Beach Park	Inspect footbridges and armored / concrete-lined banks and remediate if found to be negatively impacting the stream.	A1, A10, A11	3	3	S	Owner	Beach Park, BPDD
3b.13.7	Beach Park	<i>Restore channel reach near Wilson Avenue by installing pool and riffle structures and stabilizing streambanks.</i>	A1, A6, A9, A10, C3, E5, G2	1	3	M	Owner	Beach Park BPDD
3b.13.8	Beach Park	Remove concrete debris dumping / fill just upstream of Beach Rd culvert from property / operation at Tewes and Beach.	A10, A11, B4	2	2	S	Beach Park	Beach Park, BPDD

## 5 prioritized action plan

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3b.13.9	Beach Park	<i>Remediate significant erosion and slumping of right bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park BPDD
3b.13.10	Beach Park	<i>Inspect and assess fencing across channel and rock wall armoring and remove if found to impair the conveyance of water.</i>	A1, A10, A11	1	1	S	Owner	Beach Park BPDD
3b.13.11	Beach Park	<i>Remove concrete from channel and restore stream channel by stabilizing streambanks and installing habitat features such as pools and riffles and rootwads. Assumes 150 lf of stream channel needs attention for cost estimation purposes.</i>	A10, A11, A11, B4	1	3	S	Owner	Beach Park BPDD
3b.13.12	Beach Park	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, A11, B4	1	2	S	Owner	Beach Park BPDD
3b.13.13	Beach Park	<i>Remove debris and sediment from culvert under Beach Road.</i>	A10, A11, C3, E1, E7, E8, F7	1	3	S	Owner	Beach Park BPDD
3b.13.14	Beach Park	<i>Address failed concrete wall armoring and major erosion behind the armoring by removing the concrete and using bioengineering stabilization measures. Assumes 100lf of stream channel needs attention for cost estimation purposes.</i>	A1, A3, A11	1	3	S-M	Owner	Beach Park BPDD
3b.13.15	Beach Park	<i>Repair or replace broken concrete and corrugated metal pipe culvert and remove debris obstructing flow.</i>	A1, A3, A11, C3	1	3	S-M	Owner	Beach Park BPDD
3b.13.16	Beach Park	<i>Stabilize erosion at and below outfall using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park BPDD
3b.13.17	Beach Park	<i>Repair failed clay outfall pipe and address erosion around outfall using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park BPDD
3b.14.1	Beach Park	<i>Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.</i>	A6, A10, B1, C3, E1	1	2	S	Owner	Beach Park BPDD
3b.14.2	Beach Park	<i>Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.</i>	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	Beach Park BPDD
3b.14.3	Beach Park	<i>Conduct major channel restoration by removing debris and restoring a natural channel to this concrete-lined drainage ditch.</i>	A1, A10, A11, C3	1	3	S	Owner	Beach Park BPDD



Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3b.15.10	Beach Park	<i>Stabilize erosion around plastic drain pipe outfall using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	1	S-M	Owner	Beach Park BPDD
3b.15.11	Beach Park	<i>Stabilize erosion around plastic drain pipe outfall using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	1	S-M	Owner	Beach Park BPDD, Waukegan
3b.15.12	Beach Park	<i>Remove debris at the outfall discharge points.</i>	A10, A11, B4	1	2	S	Owner	Beach Park BPDD, Waukegan
3b.17.1	Beach Park	Restore stream channel and improve instream habitat by enhancing pools and riffles.	A1, A10, C3	3	3	S	Owner	Beach Park BPDD
3b.17.2	Beach Park	Address Moderate streambank erosion along entire reach using bioengineering stabilization measures.	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park BPDD
3b.17.3	Beach Park	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	2	2	S	Owner	
3b.17.4	Beach Park	Inspect footbridges and armored / concrete-lined banks along this reach for impacts on the stream corridor and remediate if necessary.	A1, A10, A11, C3	3	3	S	Owner	Beach Park BPDD
3b.17.5	Beach Park	Remove broken concrete slab streambank armoring and restore channel to natural channel condition. Length difficult to determine from photo; assume 50 lf and 1 side of stream for cost estimation purposes.	A1, A10, A11, C3	2	3	S	Owner	Beach Park BPDD
3b.17.6	Beach Park	Restore a minimum 5 foot wide, deep-rooted native plant buffer to the stream edge within the golf course.	A6, C3	2	1	S	Waukegan Park District	
3b.17.7	Beach Park	Remove debris at outfall.	A10, A11, B4	2	2	S	Owner	Beach Park BPDD
3b.17.8	Beach Park	Stabilize significant erosion and bank slumping using bioengineering stabilization measures. Length difficult to determine from photo; assume 50 lf and 1 side of stream for cost estimation purposes.	A1, A3, A7, C3, E1	1	3	M	Owner	Beach Park BPDD
3b.17.9	Beach Park	Remove debris blocking culvert and repair, remediate, and/or stabilize the exposed culvert.	A10, A11, B4	2	3	S-M	Owner	Beach Park BPDD
3b.17.10	Beach Park	Stabilize erosion undermining the culvert, preferably using bioengineering stabilization measures but also using more structural measures if necessary.	A1, A3, A5, A8, A11, C3, E1	2	3	S-M	Waukegan Park District	Beach Park BPDD

## 5 prioritized action plan

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3c.0.9	Beach Park	FPAI site 20-02, in the Village of Beach Park, experiences flooding due to inadequate outlets and poor drainage. There is a backyard drainage ditch between Beach and Howard, Sheridan and Geraghty (depressional storage #49) and extending along Coolidge Rd to the north (depressional storage #50) that are likely part of the cause of flooding. Investigate whether the new storm sewer along Coolidge Avenue has eliminated flooding in this location. If flooding persists, additional solutions may include improvement of drainage overland flow paths and installation of additional storm sewer capacity to alleviate the problem.	B4, F7	3	1	S	Beach Park	
3c.0.10	Beach Park	Monitor past IDOT-recorded flooding locations at Sheridan and Wadsworth, Sheridan and Talmadge / Michigan, and Sheridan and Beach Rd. to determine whether flooding is still occurring at these sites. If so, develop and implement flood mitigation strategies.	B4, F7	3	1	S		IDOT
3c.0.14	Beach Park	Stabilize / regrade shoreline and plant banks and a surrounding buffer with native vegetation.	E1, E2, E9	2	2	S-M	Owner	
3c.0.15	Beach Park	Stabilize / regrade shoreline using bioengineering practices and plant banks and a surrounding buffer with native vegetation; address algae / nutrient loads and turbidity / sedimentation by naturalizing the basin.	E1, E2, E9	2	2	S-M	Owner	
3c.0.16	Beach Park	Retrofit as wet / wetland basin; stabilize / regrade shoreline and plant banks and a surrounding buffer with native vegetation.	E1, E2, E9	2	2	S-M	Owner	
3c.0.18	Beach Park	Plant banks and a surrounding buffer with native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup.	E1, E2, E9	2	1	S-M	Owner	
3c.7.3	Beach Park	<i>Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.</i>	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner, Bull Creek Stakeholder Assn.	
3c.7.4	Beach Park	Assess side slope seeps for restoration potential. Restore if possible.	C3	1	3	S	Owner, SMC	
3c.7.5	Beach Park	Remove massive debris jam approximately 300' downstream of Sheridan Road and stabilize channel.	A10, A11, B4	2	3	S	Beach Park, Bull Creek Stakeholder Assn., SMC	
3c.8.1	Beach Park	<i>Address High streambank erosion along entire reach, some threatening homes and property, using bioengineering stabilization measures.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.8.2	Beach Park	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	2	2	S	Owner	

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3c.8.3	Beach Park	Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	
3c.8.4	Beach Park	<i>Repair broken cement outfall pipe and stabilize surrounding erosion using bioengineering stabilization measures. Location is approximately 300' upstream of Sheridan Rd.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Beach Park	Beach Park, BPDD
3c.8.5	Beach Park	<i>Stabilize streambank erosion across from the sewer / manhole stabilization project along the reach near the Garaghty / California intersection. Length of problem is unknown; assume 50 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD, NSSD, USACE,
3c.8.6	Beach Park	<i>Stabilize minor channel erosion and downcutting of channel outfall using bioengineering stabilization measures and energy dissipation measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.8.7	Beach Park	<i>Stabilize major erosion behind headwall and below outfall preferably using bioengineering stabilization measures but may also require more structural measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.8.8	Beach Park	<i>Stabilize moderate channel erosion and downcutting using bioengineering stabilization measures and, if necessary, check dams.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.8.9	Beach Park	<i>Address major erosion and slumping on left bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 50 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.8.10	Beach Park	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Owner	Beach Park, BPDD
3c.8.11	Beach Park	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Owner	Beach Park, BPDD
3c.8.12	Beach Park	<i>Monitor sewer manhole, which rises 6 feet above stream elevation, for leakage and infiltration problems.</i>	F7	1	1	S	NSSD	
3c.8.13	Beach Park	<i>Stabilize major erosion and slumping of ravine bank using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.8.14	Beach Park	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Owner	Beach Park, BPDD
3c.9.1	Beach Park	<i>Restore stream channel and improve instream habitat by installing and enhancing pools and riffles and installing boulders, large rocks, and / or rootwads.</i>	A1, A10, C3	1	3	S	Owner	Beach Park, BPDD

## 5 prioritized action plan

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3c.9.2	Beach Park	<i>Stabilize High streambank erosion along entire reach using bioengineering stabilization measures.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.9.3	Beach Park	<i>Restore the native riparian buffer (manage native riparian plant communities within this reach: control invasive species, plant native species, thin shrub layer to allow more understory growth, and manage vegetation such as through prescribed burning.)</i>	A6, A10, B1, C3, E1	1	2	S	Owner	
3c.9.4	Beach Park	<i>Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.</i>	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	
3c.9.5	Beach Park	<i>Stabilize major erosion with slumping on the left bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 50 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.9.6	Beach Park	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Owner	Beach Park, BPDD
3c.9.7	Beach Park	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Owner	Beach Park, BPDD
3c.9.8	Beach Park	<i>Remove debris around plastic outfall pipe.</i>	A10, A11, B4	1	2	S-M	Owner	Beach Park, BPDD
3c.9.9	Beach Park	<i>Stabilize major erosion on the left bank using bioengineering stabilization measures.</i>	A1, A10, A11, C3	1	3	M	Owner	Beach Park, BPDD
3c.9.10	Beach Park	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Owner	Beach Park, BPDD
3c.9.11	Beach Park	<i>Remove debris obstructing flow using American Fisheries Society guidelines.</i>	A10, A11, B4	1	2	S	Owner	Beach Park, BPDD
3c.9.12	Beach Park	<i>Stabilize major erosion and slumping of the left bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1, E5	1	3	M	Owner	Beach Park, BPDD
3c.10.1	Beach Park	<i>Stabilize High streambank erosion along entire reach using bioengineering stabilization measures, which may help reduce the silt / sediment accumulation within this reach.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.10.2	Beach Park	<i>Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.</i>	A6, A10, B1, C3, E1	1	2	S	Owner	

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3c.10.3	Beach Park	<i>Stabilize major erosion and slumping using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.10.4	Beach Park	<i>Stabilize erosion around capped outfall pipe using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.11.1	Beach Park	<i>Stabilize High streambank erosion along entire reach using bioengineering stabilization measures.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.11.2	Beach Park	<i>Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.</i>	A6, A10, B1, C3, E1	1	2	S	Owner	
3c.11.3	Beach Park	<i>Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.</i>	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	Beach Park
3c.11.4	Beach Park	Remove debris obstructing culverts.	A10, A11, B4	2	2	S	Owner	Beach Park, BPDD
3c.11.5	Beach Park	Remove debris from outfall channel and assess armoring for impact on stream; if negative impact is found, remove armoring and stabilize with bioengineering approach.	A10, A11, B4	2	2	S	Owner	Beach Park, BPDD
3c.11.6	Beach Park	<i>Stabilize major erosion and slumping using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.11.7	Beach Park	<i>Repair / remediate erosion below outfall using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.11.8	Beach Park	Remove debris obstructing flow using American Fisheries Society guidelines.	A10, A11, B4	2	2	S	Owner	Beach Park, BPDD
3c.11.9	Beach Park	<i>Stabilize major erosion occurring behind armoring on the left bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.11.10	Beach Park	<i>Assess wood armoring / retention wall for stability and feasibility of bioengineered approach to bank stabilization. Assumes 100lf of stream channel, both sides for cost estimation purposes.</i>	A1, A3, C3	1	3	M	Owner	Beach Park, BPDD

## 5 prioritized action plan

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3c.19.1	Beach Park	<i>Stabilize Moderate streambank erosion along entire reach using bioengineering stabilization measures.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.19.2	Beach Park	<i>Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.</i>	A6, A10, B1, C3, E1	1	2	S	Owner	
3c.19.3	Beach Park	<i>Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.</i>	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	Beach Park
3c.19.4	Beach Park	Remove debris obstructing flow using American Fisheries Society guidelines.	A10, A11, B4	2	2	S	Owner	Beach Park, BPDD
3c.19.5	Beach Park	<i>Stabilize significant erosion and slumping on the left bank using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.19.6	Beach Park	<i>Stabilize channel erosion and downcutting of discharge channel using bioengineering stabilization measures and check dams or other grade stabilization measures if necessary.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.19.7	Beach Park	<i>Stabilize channel erosion and downcutting of discharge channel using bioengineering stabilization measures and check dams if necessary.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.20.1	Beach Park	Restore stream channel and improve instream habitat by installing and enhancing pools and riffles.	A1, A10, C3	3	3	S	Owner	Beach Park, BPDD
3c.20.2	Beach Park	<i>Stabilize Moderate streambank erosion along entire reach using bioengineering stabilization measures.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
3c.20.3	Beach Park	<i>Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.</i>	A6, A10, B1, C3, E1	2	2	S	Owner	
3c.20.4	Beach Park	<i>Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.</i>	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	
3c.20.5	Beach Park	<i>Stabilize significant erosion and slumping using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD

Table 5.11 Site Specific Action Plan for the Village of Beach Park (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3c.20.6	Beach Park	<i>Stabilize significant erosion and attempted stabilization debris around culvert using bioengineering stabilization measures</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.20.7	Beach Park	Remove debris obstructing flow using American Fisheries Society guidelines.	A10, A11, B4	2	2	S	Owner	Beach Park, BPDD
3c.20.8	Beach Park	<i>Stabilize channel erosion and downcutting of discharge channel using bioengineering stabilization measures and check dams if necessary.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.20.9	Beach Park	<i>Stabilize erosion around culvert using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD
3c.20.10	Beach Park	<i>Stabilize erosion around plastic drain pipe outfall using bioengineering stabilization measures.</i>	A1, A3, A5, A8, A11, C3, E1	1	1	S-M	Owner	Beach Park, BPDD
3c.20.11	Beach Park	Repair or remediate cracked concrete armoring at outfall.	A1, A3, A5, A8, A11, C3, E1	2	3	M	Owner	Beach Park, BPDD
3c.24.1	Beach Park	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	2	2	S	Owner	Beach Park, BPDD
3c.24.2	Beach Park	Remove debris including tires.	A10, A11, B4	2	2	S	Owner	Beach Park, BPDD
4.0.1	Beach Park	Preserve and restore the ravine within the open Category 1 green infrastructure area between Ganster Road and Sheridan Road, just east of Lyons Woods Forest Preserve.	B1, C1, C2, C3, G2, G4	1	3	L	Owner	Beach Park
4.0.6	Beach Park	Expand / enlarge detention basins #28, #75, and #76 to reduce IDOT-recorded flooding locations along Sheridan Road north of Blanchard.	B4, F7	2	1	S	DOT	
4.0.9	Beach Park	Inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup; address algae / nutrients by naturalizing the basin; remove excess debris.	E1, E2, E9	2	2	S-M	FPD	
4.05.3	Beach Park	Remove debris / bricks in channel.	A10, A11, B4	2	3	S	Owner	Beach Park, BPDD
4.05.4	Beach Park	<i>Stabilize bank erosion using bioengineering stabilization measures. Length difficult to determine from photo; assume 50 lf and 1 side of stream for cost estimation purposes.</i>	A1, A3, A8, C3, E1	1	2	M	Owner	Beach Park, BPDD



## 5 prioritized action plan

Table 5.12 Site Specific Action Plan for the City of Waukegan

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
1.0.7	Waukegan	Preserve and restore the green infrastructure areas in the southwest corner of the SMU, east of the Union Pacific rails and west of industrial land uses (Midwest Generation, North Shore Sanitary District, and Outboard Marine Corporation). This area has been identified by the City of Waukegan for restoration as the 'Waukegan Moorlands'.	B1, C1, C2, C3, G2, G4	1	3	S	Waukegan	Owner
1.0.10	Waukegan	Investigate the wetlands adjacent to the Johns Manville lagoons for restoration and remediation potential and as a possible water quality improvement facility for water runoff from nearby industrial sites. Cost reflects standard wetland restoration and management rather than clean up and remediation.	B1, C3, C5, E1, E2, G4	3	3	S	IDNR	
1.1.1	Waukegan	<i>Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.</i>	A6, A10, B1, C3, E1	1	2	S	Owner, Utility, C&NW RR	Waukegan
1.1.3	Waukegan	<i>Restore stream channel and instream habitat by reducing / remediating channelization, possibly through a rereandering and other restoration projects such as installing boulders, large rocks, and / or rootwads.</i>	A1, A10, C3	1	3	S	Owner/ Utility	Waukegan
1.1.5	Waukegan	Inspect and remediate culvert, which is nearly full of water in the inventory photo and may be sediment filled.	A10, A11, C3, E1, E7, E8, F7	3	3	S	C&NW RR	SMC
1.1.6	Waukegan	Inspect and remediate culvert, which is nearly full of water in the inventory photo and may be sediment filled.	A10, A11, C3, E1, E7, E8, F7	3	3	S	C&NW RR	SMC
3b.0.12	Waukegan	Address algae / nutrient loads by naturalizing the basin.	E1, E2, E9	2	1	S-M	Owner	
3b.0.15	Waukegan	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
3b.0.16	Waukegan	Retrofit as wet / wetland basin; plant banks and a surrounding buffer with native vegetation.	E1, E2, E9	2	2	S-M	HOA	
3b.16.5	Waukegan	<i>Stabilize the eroding, 4 foot deep cut channel within the turf grass landscape at the upstream end of BL16, just downstream of the Beach Rd. culvert.</i>	A1, A3, A6, C3, G2	1	3	S	Owner	
3b.16.6	Waukegan	<i>Repair or replace the steel Beach Road culvert that is eroding around the edges and beneath, possibly due in part to the additional plastic drain pipe.</i>	A3, A11	1	3	S-M	Waukegan	
3c.0.3	Waukegan	For Waukegan Airport property, implement the spill prevention and response plan and reduce the use of salt and/or deicers. Install filtration and infiltration BMPs to capture and treat runoff from airport landscapes, particularly impervious surfaces such as runways and fueling areas, before being discharged to the stream system of Bull Creek.	E1, E2, E5, E10	2	3	S	Waukegan Port District	

Table 5.12 Site Specific Action Plan for the City of Waukegan (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3c.0.17	Waukegan	Retrofit as wet / wetland basin; plant banks and a surrounding buffer with native vegetation.	E1, E2, E9	2	2	S-M	Owner	
4.0.5	Waukegan	Improve swale and other surface stormwater drainage systems within the developed areas of the SMU, particularly those residential areas off Miraflores and Montesano, with lot level stormwater filtration and infiltration BMPs. Details reflect 28,000 lf (approximately 6.5 acre) of 10 foot wide drainage swale improvements / lot level / source control BMPs on each side of all roads.	E1, E2, E7, E9, G1	1	3	S	Waukegan, Owner	
4.0.7	Waukegan	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
4.0.8	Waukegan	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
4.05.5	Waukegan	<i>Stabilize and strengthen the incised discharge channel.</i>	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Waukegan
5.0.1	Waukegan	Preserve the ravine within the 7-acre open Category 1 green infrastructure area between Circle Court and the Amstutz Expressway.	A6, B1, C2, C3, G2, G4	1	3	L	Owner/ Utility	
5.0.2	Waukegan	Preserve and restore wetland complexes where these resource remain, including those along the entire length of reach BL04 and those adjacent to Lake County Gardens (depressional storage areas #22 and #23). Wetland / depressional area #23, bordered by Pine, Lorraine, Wilson, and the McClory Bike Trail, contains some elements of a decent quality wetland indicative of good restoration potential. Two additional potential restoration areas are the small park between Butrick and Yeoman and the upstream drainage corridor north of and paralleling Rice St.	A6, B1, C2, C3, G2, G4	1	3	S-L	Waukegan, Owner, Utility	
5.0.3	Waukegan	Preserve the wetlands / stream corridor within Category 1 and 2 open green infrastructure areas between Rice and MacArthur, west of Lewis Avenue, and the area between Pine, Wilson, and the McClory bike path.	A6, B1, C2, C3, G2, G4	1	3	L		
5.0.4	Waukegan	<i>Install filtration BMPs for commercial and institutional uses along Greenwood Avenue and at the York House Rd / Lewis Ave intersection to help reduce pollutant loading in potential pollution hotspot subbasins S13, S14, S43, and S73. Details reflect 10,000 lf (approximately 2.5 acre) of 10 foot wide drainage swale improvements / lot level / source control BMPs on along the road frontage.</i>	E1, E2, E7, E9, G1	1	3	S	Waukegan, Owner	
5.0.5	Waukegan	<i>Install lot level filtration and infiltration BMPs, to help reduce pollutant loading in potential pollution hotspot subbasins S13, S14, S39, S43, and S73. Details reflect 228,000 lf (approximately 52 acre) of 10 foot wide drainage swale improvements / lot level / source control BMPs on each side of all roads.</i>	E1, E2, E7, E9, G1	1	3	S	Waukegan	

## 5 prioritized action plan

Table 5.12 Site Specific Action Plan for the City of Waukegan (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
5.0.6	Waukegan	Stabilize / regrade shoreline using bioengineering practices and plant banks and a surrounding buffer with native vegetation.	E1, E2, E9	2	2	S-M	Golf Course	
5.0.7	Waukegan	Stabilize / regrade shoreline using bioengineering practices and plant banks and surrounding buffer with native vegetation; inspect and remediate inlet / outlet problems by removing clogging and/or debris buildup; address turbidity / sedimentation by naturalizing the basin; remove excess debris.	E1, E2, E9	2	2	S-M	Golf Course	
5.0.8	Waukegan	Stabilize / regrade shoreline using bioengineering practices and plant banks and a surrounding buffer with native vegetation.	E1, E2, E9	2	2	S-M	Golf Course	
5.0.9	Waukegan	Retrofit as wet / wetland basin; stabilize / regrade shoreline using bioengineering practices and plant banks and surrounding buffer with native vegetation.	E1, E2, E9	2	2	S-M	Waukegan, Owner	
5.0.10	Waukegan	<i>Retrofit as wet / wetland basin; stabilize / regrade shoreline using bioengineering practices and plant banks and a surrounding buffer with native vegetation; address algae / nutrient loads and address turbidity / sedimentation by naturalizing the basin. This may reduce pollutant loading within potential pollutant loading hotspot S39.</i>	E1, E2, E9	2	2	S-M	Owner	
5.0.11	Waukegan	<i>Inventory detention basin and identify resolutions to any noted functional problems. This may reduce pollutant loading within potential pollutant loading hotspot S14.</i>	-	3	1	S-M	SMC	
5.2.1	Waukegan	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning. Restoration and management of Bowen Park and the residential areas along Miraflores is important to enhance the habitat quality of this reach.	A6, A10, B1, C3, E1	2	2	S	State of IL / Waukegan Park District, Owner, Utility	
5.2.2	Waukegan	Reduce impacts of surrounding golf course and park property such as landscape waste dumping, turf grass stream edges. Filter and infiltrate runoff from parking lots, such as those within Bowen Park, with BMPs. Details reflect installation of lot level BMPs.	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	2	1	S	State of IL / Waukegan Park District, Owner	
5.2.3	Waukegan	Reduce impacts of residential homes along Miraflores: cease yard waste dumping, replace mown turf grass to the edge of the stream with a minimum 10 foot native vegetation buffer, infiltrate runoff discharge from roof or footing drains with rain gardens or rain barrels, and naturalize the stream channel by replacing poured concrete and rip rap with bioengineering stabilization measures.	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	2	1	S	Owner	
5.2.4	Waukegan	Gully erosion occurring in the ravines of Bowen Park should be remediated through ravine woodland restoration and management along reach BL02. Assumes 4000 lf of stream reach by 500' width. Costs reflect woodland restoration; load reduction reflects Moderate erosion stabilization.	A6, A10	1	2	S	State of IL / Waukegan Park District, Owner	

Table 5.12 Site Specific Action Plan for the City of Waukegan (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
5.2.5	Waukegan	Stabilize erosion around the Sheridan Road culvert and replace the broken stormsewer that is discharging to the opposite streambank.	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Waukegan	
5.2.6	Waukegan	Remove debris obstructing flow using American Fisheries Society guidelines.	A10, A11, B4	2	2	S	Waukegan	Waukegan Park District, SMC, Owner
5.2.7	Waukegan	Remove debris obstructing flow using American Fisheries Society guidelines.	A10, A11, B4	2	2	S	Waukegan	Waukegan Park District, SMC
5.2.8	Waukegan	Stabilize typical 2-4 foot bank erosion using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.	A1, A3, A8, C3, E1	2	3	M		Waukegan Park District, SMC
5.2.9	Waukegan	Stabilize minor erosion of open discharge channel using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	3	3	S-M	Waukegan Park District	
5.2.10	Waukegan	Stabilize significant erosion below outfall using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Waukegan, Waukegan Park District	
5.2.11	Waukegan	Stabilize minor channel erosion below concrete lined channel outfall. Consider removing concrete and stabilizing channel with more habitat-appropriate measures.	A1, A3, A5, A8, A11, C3, E1	3	3	S-M	Waukegan	
5.2.12	Waukegan	Install energy dissipation measures to address the eroding plunge pool created by discharge from the elevated outfall.	A1, A3, A5, A8, A11, C3, E1	1	1	S-M	Waukegan	
5.3.1	Waukegan	<i>Restore a 5 foot wide native riparian buffer and replace turf grass lawn edges to native riparian plant communities as is feasible within the golf course.</i>	A6, A10, B1, C3, E1	1	2	S	Owner	
5.3.2	Waukegan	Glen Flora Country Club: replace or remediate online detention, armored dams and wiers with more habitat appropriate structures that allow fish passage.	A1, A2	3	3	L	Owner	
5.3.3	Waukegan	<i>Stabilize erosion undercutting the concrete-lined channel outfall / dam; if feasible, remove concrete and replace with bioengineered channel stabilization measure.</i>	A1, A2, A3, A5, A10, A11	1	3	S-M	Owner	
5.4.1	Waukegan	Restore stream channel and improve instream habitat by reducing channelization, such as through a re-meandering project.	A1, A10, C3	3	3	S	Waukegan, Lake County DOT	
5.4.2	Waukegan	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, and managing vegetation such as through prescribed burning.	A4, A10, B1, C3, E1	1	2	S	Waukegan, Lake County DOT	

## 5 prioritized action plan

Table 5.12 Site Specific Action Plan for the City of Waukegan (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
5.4.3	Waukegan	Implement the mitigation plan for FPAI site 20-06, in the City of Waukegan, Lake County Gardens subdivision. There also may be opportunities to increase the detention and/or drainage capacity of the drainage system in this area, particularly within the community park to the north. However, improvement of the wetlands to increase their storage capacity may also be an option.	B1, B2, B3, B4	2	3	S	Waukegan	
5.4.4	Waukegan	Restore the upper end of this reach, a fairly undefined channel that is choked with cattails, through invasive species removal and management.	A1, A6, C3	3	2	S	Waukegan, Owner	
6.0.1	Waukegan	<i>Manage and restore the wooded ravine, wetland, and depressional area #3 that lies between the Amstutz and Sheridan Road for storage. Load reduction details reflect impact of restored wetland.</i>	A6, A7, A10, G4	1	3	S	Owner	Waukegan
6.0.3	Waukegan	Open and partially open Category 1 green infrastructure areas between the waste water treatment plant and the Union Pacific tracks should be restored and integrated into the planned Waukegan Moorlands area to the north. Details reflect natural area restoration.	C2, C3	1	3	L	Waukegan, Owner	
6.0.4	Waukegan	<i>Install filtration BMPs for commercial, industrial, and institutional uses in the eastern and southwestern portions of the SMU to help improve water quality in potential pollutant loading hotspot S10, S11, and S75. Details reflect approximately 15,000 lf (approximately 3.5 acre) of 10 foot wide drainage swale improvements / lot level / source control BMPs on along the road frontages of these land uses.</i>	E1, E2, E7, E9, G1	1	3	S	Waukegan	Owner
6.0.5	Waukegan	<i>This SMU is primarily sewer but undetained. Install source controls and lot level filtration and infiltration BMPs, including detention basin improvements, which may help address pollutant loading in potential pollutant loading hotspot S10, S11, and S75. Details reflect 96,000 lf (approximately 22 acre) of 10 foot wide drainage swale improvements / lot level / source control BMPs on each side of all roads.</i>	E1, E2, E7, E9, G1	1	3	S	Waukegan, Owner	

Table 5.13 Site Specific Action Plan for the Illinois Department of Natural Resources

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
1.0.2	IDNR	Develop and implement habitat restoration and management plans for Illinois Beach State Park, including all wetlands, waterways, beach ridge, dune and swale systems, and T&E species habitat.	A8, C3, C4, C5, C6, E1, E7, G4	1	3	S	IDNR	-
1.0.5	IDNR	Restore hydrologic connectivity of Dead River to Lake Michigan and remove those created to carry wastewater to the lake. Assumes that 4 hydrologic connections need to be restored or removed.	C3, C6, G4	3	3	S	IDNR	
1.0.16	IDNR	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
1.0.17	IDNR	Stabilize / regrade shoreline using bioengineering practices and address algae / nutrient loads by naturalizing the basin.	E1, E2, E9	2	2	S-M	IDNR	
1.0.18	IDNR	Address algae / nutrient loads by naturalizing the basin.	E1, E2, E9	2	1	S-M	IDNR	
1.0.19	IDNR	Address algae / nutrient loads by naturalizing the basin.	E1, E2, E9	2	1	S-M	IDNR	
1.0.20	IDNR	Address algae / nutrient loads by naturalizing the basin.	E1, E2, E9	2	1	S-M	IDNR	
1.0.21	IDNR	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
1.0.22	IDNR	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
1.0.25	IDNR	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	
1.0.26	IDNR	Inventory detention basin and identify resolutions to any noted functional problems.	-	3	1	S-M	SMC	

## 5 prioritized action plan

Table 5.14 Site Specific Action Plan for Lake County

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3a.0.6	Lake County	Depressional storage area #78, within the Thunderhawk Golf Club Forest Preserve, may be able to be expanded to provide additional storage if needed, and may also be retrofitted / restored to improve runoff quality from the golf course, provided that runoff can be directed into this area, treated, and then discharged to a receiving water body. Costs reflect restoration of this wet / hydric area.	B1, C1, C2, C3, E1, E2, E4, E9, G2, G4	2	3	S-L	FPD	
3a.0.18	Lake County	Stabilize / regrade shoreline using bioengineering practices; address algae / nutrient loads by naturalizing the basin.	E1, E2, E9	2	2	S-M	FPD	
3c.0.11	Lake County	Stabilize / regrade shoreline using bioengineering practices; address algae / nutrient loads by naturalizing the basin.	E1, E2, E9	2	2	S-M	FPD	
3c.0.12	Lake County	Stabilize / regrade shoreline using bioengineering practices.	E1, E2, E9	2	2	S-M	FPD	
3c.0.13	Lake County	Stabilize / regrade shoreline using bioengineering practices; address algae / nutrient loads by naturalizing the basin.	E1, E2, E9	2	2	S-M	FPD	
3c.23.1	Lake County	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	2	2	S	FPD	
4.0.3	Lake County	Manage and restore the natural resources, including ADID wetland #1831, in the northeastern corner of Lyons Woods Forest Preserve. The southern portion of depressional storage area #28 is within the Forest Preserve boundary and may be used to relieve past IDOT-recorded flooding at Sheridan and York House Road. ADID wetland is approximately 46 acres (4000' by 500' wide) and the total area of Lyons Woods is 264 acres.	B1, C3, E1, E7, G2, G4	2	3	S-L	FPD	



Table 5.15 Site Specific Action Plan for Multiple Jurisdictions

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
1.0.4	Waukegan, IDNR, Lake County	Remediate, cap, or otherwise contain contaminated areas, materials, waste piles, waste ponds, etc. to prevent contaminants from becoming mobilized (via air or water) and entering water resources or sensitive natural areas in Illinois Beach State Park.	C3, C5, F1, F6	1	3	S	Owner IDNR EPA	Waukegan
1.0.6	Beach Park, Waukegan	Preserve Category 1 open green infrastructure areas including a portion of depressional storage area #17 and the utility corridor that can serve as a green infrastructure connector between Illinois Beach State Park to Lyons Woods Forest Preserve.	A7, B1, C1, C2, C3, G2	1	3	L	Owner/ Utility	LCFPD IDNR
1.0.11	Zion, Waukegan, IDNR	Manage the Lake Michigan shoreline and beaches to minimize beach erosion. Details reflect 28000 lf of shoreline at an average width of 150 feet.	C3, C4, C5, E1, E6	3	3	S	Zion, Waukegan, IDNR	
1.0.12	Zion, Waukegan, IDNR	Manage the Lake Michigan shoreline and beaches to minimize E. coli contamination that leads to beach closures. Details reflect 28000 lf of shoreline at an average width of 150 feet.	C3, C4, C5, E1, E6	3	3	S	LCHD	Zion, Waukegan, IDNR
1.0.13	Zion, Beach Park, Waukegan, IDNR	Install drainage swale improvements or other lot level / source control BMPs to capture and treat runoff from commercial and industrial land uses within Critical Subbasins #15, #74, and #76, identified as potential Pollution Hot Spot Critical Areas. Cost estimate reflects the installation of swales (10' wide) or other treatment measures along perimeter of these land uses, approximately 35,000 lf of treatment area.	E1, E2, E7, E9, G1	1	3	S	Waukegan, Zion	Utility
1.1.2	Waukegan, IDNR, Lake County	Restore the natural connection and habitat quality of this reach to Lake Michigan by removing the lagoons through which the reach runs and disconnecting the reach from the Dead River to the north. Since these lagoons may be a component of a remediation or clean up plan, this should be considered a long term recommendation to be implemented when the contamination issues at Johns Manville have been adequately remediated. Details reflect major channel restoration.	A1, A6, A8, C3, C5, C6, E7, G2, G4	1	3	S-L	Owner	IDNR EPA Waukegan
1.1.4	Waukegan, Lake County	Address potential hazardous / toxic runoff from industrial uses to the east through filter strips and other filtration and infiltration techniques installed between the reach and these land uses, or by containing and remediating runoff on site through other means. Cost estimate reflects the installation of 2000 lf of 20' wide infiltration and filtration BMPs.	E1, E2, E7, E9, G1	2	3	S	Owner EPA	
1.6.1	Beach Park, Lake County	Restore stream channel and improve instream habitat by installing pools and riffles and installing boulders, large rocks, and / or rootwads.	A1, A10, C3	3	3	S	FPD Owner	Beach Park, BPDD
1.6.2	Beach Park, Lake County	Restore native riparian buffer by controlling invasive species, planting native species, thinning forest and shrub canopy, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	2	2	S	FPD Owner	Beach Park, BPDD

## 5 prioritized action plan

Table 5.15 Site Specific Action Plan for Multiple Jurisdictions (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
2.0.1	Zionion Beach Park	Category 1 and 2 green infrastructure areas along the western boundary of Illinois Beach State Park and bordering the Union Pacific rails to the west should be preserved as components of the green infrastructure / greenway system that includes Ophir Park, Carmel Park, and Illinois Beach State Park. These areas contain significant low lying depressional storage areas (#55, #56, and #57) that could be used for water quality improvement, wetland / hydric soil complexes, and steep slopes that are unsuitable for development.	A6, A7, B1, C1, C2, C3, G2, G4	1	3	L	Owner, IDNR, Zion Park District	
2.0.2	Zion, Beach Park	Convert the depressional storage complex of #55, #56, and #57 to improve water quality for Critical Subbasin #2, identified as a potential Pollutant Loading Hotspot. Assumes runoff can be directed into this area, treated, and discharged to the Illinois Beach State Park stream and wetland system. Estimated area to be converted is 7000lf by 400ft wide.	B1, C1, C2, C3, E1, E2, G2, G4	1	3	L	Owner, IDNR, Zion Park District	
2.0.4	Zion, Beach Park	Reduce pollutant loading to Critical Subbasin #2, a potential pollutant loading hotspot, by improving swales and other surface stormwater drainage systems and installing stormwater filtration and infiltration BMPs to capture and treat runoff from parking lots, utilities, rooftops, storage areas, and other areas that may contribute pollutants to the stream. Cost estimate assumes 130,000 lf (approximately 30 acres) of 10 foot wide drainage swale improvements as a proxy for on-site source control BMPs.	E1, E2, E7, E9, G1	1	3	S	Beach Park, Zion	
3a.0.1	Zion, Beach Park	Manage and restore the wooded ravine along reaches BL25, BL26, and BL27. Average 5000' x 250' wide.	A6, A7, A10	3	2	M	Owner	Beach Park, Zion
3a.0.2	Zion, Beach Park	Preserve and restore wetlands along drainage channel upstream of the McClory Bike Path and the complex northwest of Lewis and 29th St., wetland #4 east of Lewis Avenue, and wetland #3 in Hermon Park (56 acres total). Regional storage area #77 and the associated wetlands (9 acres) could be restored and / or used to provide storage for this SMU if needed when the upstream area develops. Implementation details reflect wetland / hydric soils preservation and restoration.	A6, B1, C2, C3, G2, G4	1	3	S-L	Zion Park District, Owner	Beach Park, Zion
3a.0.4	Zion, Beach Park	Preserve and restore T&E habitat within the area bounded by Lebanon St., the McClory Bike Path, and 31st St.	A1, A10, C3	3	2	S	Zion Park District, IDNR	

Table 5.15 Site Specific Action Plan for Multiple Jurisdictions (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3a.0.5	Zion, Beach Park	Improve any swale and other surface stormwater drainage systems and/or install source controls and lot level stormwater filtration and infiltration BMPs within the developed areas of the SMU. These practices may help reduce pollutant loading in potential pollution hotspot subbasins S1, S3, S4, and S48. In order to generate cost and pollutant load reduction estimates, road swales are used as a proxy for individual site BMPs. Details reflect 252,000 lf (approximately 58 acre) of 10 foot wide drainage swale improvements on both side of all roads.	E1, E2, E7, E9, G1	1	3	S	Beach Park, Zion	Owner Developer
3a.25.1	Zion, Beach Park	Address Moderate streambank erosion along entire reach using bioengineering stabilization measures.	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD, Zion
3a.25.2	Zion, Beach Park	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning. A wider, partially forested buffer is appropriate in the lower parts of the reach.	A6, A7, A10, B1, C3, E1	2	2	S	Owner	
3a.25.3	Zion, Beach Park	Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	2	1	S	Owner	
3a.25.5	Zion, Beach Park	Inspect hydraulic structure for possible erosion problems and stabilize using bioengineering practices if needed.	A1, A3, A5, A8, A11, C3, E1	3	1	S	Owner	Beach Park, BPDD, Zion
3a.27st.1	Zion, Beach Park	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	2	2	S	Zion Park District	
3b.0.1	Beach Park, Waukegan	Preserve and restore wetlands where these resource remain along drainage channel BL15, BL16, BL17, and along the daylight portions of the Wilson Avenue Tributary. Area is 10,000 lf by 300' wide.	A6, B1, C2, C3, G2, G4	1	3	S	Beach Park Waukegan	Owner
3b.0.4	Beach Park, Waukegan	Preserve greenway easements on Category 1 and 2 green infrastructure areas along BL16, which may help reduce pollution loading in potential pollution hotspot S57. Cost estimate assumes easements of 2000 lf by 100 ft wide (4.5 acres).	B1, C1, C2, C3, G2, G4	1	3	L	Owner	Beach Park Waukegan

## 5 prioritized action plan

Table 5.15 Site Specific Action Plan for Multiple Jurisdictions (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3b.0.6	Beach Park, Waukegan	Depressional storage areas #32 and #43, currently undeveloped and containing current or former wetlands, could be enhanced to improve water quality of runoff from surrounding residential uses within this Critical Subbasin #57, identified as a potential pollutant loading hotspot. Depressional area #43 lies in an open Category 1 green infrastructure area that could be preserved for water quality improvement. Details reflect restoration and enhancement of both areas as wetlands.	B1, C1, C2, C3, E1, E2, G2	1	3	L	Owner	
3b.0.7	Beach Park, Waukegan	Improve swales and other surface stormwater drainage systems and install source controls and lot level BMPs, including detention basin improvements, within the developed areas of potential pollutant loading hotspots S57, S59, and S63. Details reflect 165,000 lf (approximately acre) of 10 foot wide drainage swale improvements / lot level / source control BMPs on each side of all roads.	E1, E2, E7, E9, G1	1	3	S	Beach Park Waukegan	
3b.15.1	Beach Park, Waukegan	Restore stream channel and improve instream habitat by enhancing pools and riffles.	A1, A10, C3	3	3	S	Owner	Beach Park BPDD, Waukegan
3b.15.2	Beach Park, Waukegan	Address High streambank erosion along entire reach using bioengineering stabilization measures.	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park BPDD, Waukegan
3b.15.3	Beach Park, Waukegan	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	2	2	S	Owner	
3b.15.4	Beach Park, Waukegan	Inspect footbridges and armored / concrete-lined banks for impacts on the stream corridor and remediated if necessary.	A1, A10, A11, C3	3	3	S	Owner	Beach Park BPDD, Waukegan
3b.15.5	Beach Park, Waukegan	Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	Beach Park BPDD, Waukegan
3b.15.6	Beach Park, Waukegan	Inspect and, if necessary, repair the culvert under the McClory Bike Trail, which is partially collapsed.	A11	2	3	S	LCDOT	
3b.15.7	Beach Park, Waukegan	Remove debris obstructing flow using American Fisheries Society guidelines.	A10, A11, B4	1	2	S	Owner	Beach Park BPDD, Waukegan
3b.15.8	Beach Park, Waukegan	Stabilize typical 4-6 foot bank erosion using bioengineering stabilization measures. Length difficult to determine from photo; assume 100 lf and 1 side of stream for cost estimation purposes.	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park BPDD, Waukegan

Table 5.15 Site Specific Action Plan for Multiple Jurisdictions (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3b.15.9	Beach Park, Waukegan	Stabilize erosion of the Beach Road steel culvert experiencing erosion around and underneath using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Beach Park Waukegan	Beach Park BPDD, Waukegan
3b.15.13	Beach Park, Waukegan	Stabilize erosion around plastic drain pipe outfall using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	1	1	S-M	Owner	Beach Park BPDD, Waukegan
3b.15.14	Beach Park, Waukegan	Stabilize erosion around plastic drain pipe outfall using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	1	1	S-M	Owner	Beach Park BPDD, Waukegan
3b.15.15	Beach Park, Waukegan	Stabilize erosion around clay drain pipe outfall using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park BPDD, Waukegan
3b.16.1	Beach Park, Waukegan	Restore stream channel and improve instream habitat by enhancing pools and riffles and installing boulders, large rocks, and / or rootwads.	A1, A10, C3	1	3	S	Owner	Beach Park BPDD, Waukegan
3b.16.2	Beach Park, Waukegan	Address Moderate streambank erosion along entire reach using bioengineering stabilization measures, which may help reduce the instream silt / sedimentation load.	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park BPDD, Waukegan
3b.16.3	Beach Park, Waukegan	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	1	2	S	Owner	
3b.16.4	Beach Park, Waukegan	Install residential lot level stormwater BMPs, such as rain barrels or rain gardens, to reduce runoff discharge from roof or footing drains.	A3, A5, A6, A7, A11, C3, D1, E1, E2, E5, E9	1	1	S	Owner	
3b.15.16	Beach Park, Waukegan	Stabilize erosion around two plastic drain pipe outfalls using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	1	1	S-M	Owner	Beach Park BPDD
3b.15.17	Beach Park, Waukegan	Stabilize erosion around concrete drain pipe outfall using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Beach Park Waukegan	Beach Park BPDD
3b.18.1	Beach Park, Waukegan	BL18 flows through and near several publicly owned, open and partially open areas on or adjacent to the Waukegan Regional Airport property southwest of the Wadsworth Rd / Lewis Ave intersection. These areas include depressional storage area #34, which could be expanded and enhanced for stormwater storage and to capture and cleanse water runoff from airport property, which lies in Critical Subbasin #69, a potential pollutant loading hotspot.	B1, C1, C2, C3, E1, E2, G2	1	3	L	Waukegan Port District	

## 5 prioritized action plan

Table 5.15 Site Specific Action Plan for Multiple Jurisdictions (continued)

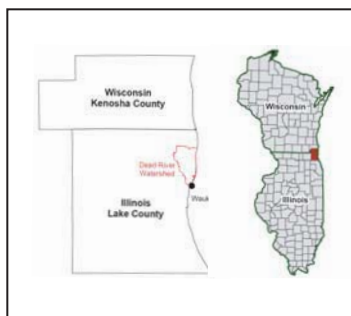
ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3b.18.2	Beach Park, Waukegan	Stabilize Moderate streambank erosion along entire reach using bioengineering stabilization measures.	A1, A3, A8, C3, E1	1	3	M	Waukegan Port District, Owner	Beach Park BPDD, Waukegan
3b.18.3	Beach Park, Waukegan	The culvert draining Waukegan Airport is covered with wire fencing, presumably for security or to prevent animal invasion. However, investigate source and necessity, and remove if fencing impedes flow. It appears that strong flows exit the Airport property in this location.	A10, A11	3	1	S	Waukegan Port District	
3c.0.2	Beach Park, Zion	Manage and restore the wooded ravine along reaches BL07, BL08, BL09, BL10, BL11, BL19, BL20, BL21. Assumes 18,600 lf of stream by average 250' wide.	A6, A7, A10	1	2	S	Owner	Beach Park, Zion
3c.0.4	Beach Park, Zion	Preserve and restore wetlands along drainage channels BL21, BL22, BL23, BL24. Assumes 10,300 lf by 350' wide.	A6, B1, C2, C3, G2, G4	1	3	S	Owner	Beach Park, Zion
3c.0.5	Beach Park, Zion	Preserve Category 1 green infrastructure area bounded by the McClory Bike Path, Clover, Wadsworth, and 34th St. that borders the stream channel to the north. Also preserve three separate areas through which the stream corridor runs: one along BL07 within the ravine, the second at the confluence of BL08, BL09, and BL19, and the third just upstream of this confluence along BL09.	A6, B1, C2, C3, G2, G4	1	3	S-L	Owner	Beach Park, Zion
3c.0.6	Beach Park, Zion, Waukegan	Install filtration BMPs for commercial, industrial, and institutional uses along Sheridan Road, Wadsworth, and Lewis Avenue, which will help reduce pollutant loading in potential pollution hotspot subbasin #64. Details reflect 12,000 lf of road frontage along these uses to be treated with improved, 10' swales (approximately 2.75 acres.)	E1, E2, E7, E9, G1	1	3	S	Beach Park, Waukegan, Zion, Owner	
3c.0.7	Beach Park, Zion, Waukegan	Install lot level filtration and infiltration BMPs within potential pollution hotspot subbasin #64. Details reflect 208,000 lf (approximately 48 acre) of 10 foot wide drainage swale improvements / lot level / source control BMPs on each side of all roads.	E1, E2, E7, E9, G1	1	3	S	Beach Park, Waukegan, Zion	
3c.0.8	Beach Park, IDNR	Preserve the Category 1 open green infrastructure area that contains depressional storage area #45 along the west side of the Union Pacific rails.	B1, C2, G2	1	3	L	Beach Park	
3c.7.1	Beach Park, IDNR	Stabilize High streambank erosion along approximately 25% of this reach not included in the previous stabilization project, some threatening homes and property, using bioengineering stabilization measures.	A1, A3, A8, C3, E1	1	3	M	Owner, Beach Park	
3c.7.2	Beach Park, IDNR	Manage native riparian plant communities within this reach: control invasive species, plant native species, and manage vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	1	2	S	Bull Creek Stakeholder Assn.	
3c.21.1	Beach Park, Zion	Stabilize Moderate streambank erosion along entire reach using bioengineering stabilization measures.	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD, Zion

Table 5.15 Site Specific Action Plan for Multiple Jurisdictions (continued)

ID# (SMU.REACH.ID)	JURISDICTION	RECOMMENDATION DESCRIPTION (THOSE ADDRESSING CRITICAL AREAS IN ITALICS)	GOAL-OBJ	PRIORITY	EASE OF IMPLEMENTATION	TIME FRAME	LEAD IMPLEMENTATION RESPONSIBILITY	SUPPORTING IMPLEMENTATION RESPONSIBILITY
3c.21.2	Beach Park, Zion	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	1	2	S	Owner	Beach Park, BPDD, Zion
3c.21.3	Beach Park, Zion	Repair the discharge point / failed headwall approximately 200' upstream of the McClory Bike Path.	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD, Zion
3c.21.4	Beach Park, Zion	Stabilize channel erosion at outfall, and consider replacing rip rap control measure with bioengineering stabilization practices.	A1, A3, A5, A8, A11, C3, E1	1	3	S-M	Owner	Beach Park, BPDD, Zion
3c.21.5	Beach Park, Zion	Stabilize erosion around plastic drain pipe outfall using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	1	1	S-M	Owner	Beach Park, BPDD, Zion
3c.21.6	Beach Park, Zion	Stabilize erosion around plastic drain pipe outfall using bioengineering stabilization measures.	A1, A3, A5, A8, A11, C3, E1	1	1	S-M	Owner	Beach Park, BPDD, Zion
4.0.2	Waukegan, Beach Park	Manage and restore the woodland ravine along reach BL05. Assumes 5000' by 500' area for cost estimation purposes.	A6, A7, A10	1	2	S	Owner	Beach Park Waukegan
4.0.4	Waukegan, Beach Park	Preserve and restore the wetland complex within the open, Category 1 green infrastructure area along the eastern boundary of SMU 4 west of the Union Pacific rail line. This area creates a physical land connection between Lyons Woods and Illinois Beach State Park, and would also preserve regional storage area #17.	B1, C1, C2, C3, G2, G4	1	3	S-L	Owner/ Utility	
4.05.1	Waukegan, Beach Park	Stabilize Moderate streambank erosion along entire reach using bioengineering stabilization measures, which may help reduce the silt / sediment accumulation.	A1, A3, A8, C3, E1	1	3	M	Owner	Beach Park, BPDD
4.05.2	Waukegan, Beach Park	Restore and manage the native riparian buffer plant communities along this reach by controlling invasive species, planting native species, thinning forest and shrub vegetation to allow more ground vegetation, and managing vegetation such as through prescribed burning.	A6, A10, B1, C3, E1	1	2	S	Owner	
6.0.2	Waukegan, IDNR, Lake County	Remediate, cap, or otherwise contain contaminated areas, materials, waste piles, waste ponds, etc. to prevent contaminants from becoming mobilized (via air or water) and entering water resources or sensitive natural areas in Illinois Beach State Park. This may help address potential pollutant loading hotspot S75	C3, C5, F1, F6, G4	1	3	S-L	Waukegan, IDNR, EPA	



# 5 prioritized action plan



### Legend

- |                        |                                     |
|------------------------|-------------------------------------|
| Forest Preserve        | Watershed Boundary                  |
| State Park             | SMU Boundary                        |
| Wetlands               | Priority Green Infrastructure Areas |
| ADID Wetlands          | Subbasin Boundary                   |
| Critical Region        | Critical Subbasins                  |
| Regional Storage       | Stream Reach                        |
| Detention Basins       | Critical Stream Reach               |
| Hydraulic Structures   | Action Recommendations              |
| Instream Problem Areas | Subwatershed Management Unit        |
| Point Discharges       | FPAI Site                           |

This map is provided for general locational information only. Map features have been derived from various sources, each of which has its own scale and accuracy. The locations of all features are approximate. Lake County Stormwater Management Commission September, 2007

DATA SOURCES:  
Lake County Stormwater Management  
Lake County Department of Information And Technology, GIS & Mapping Division

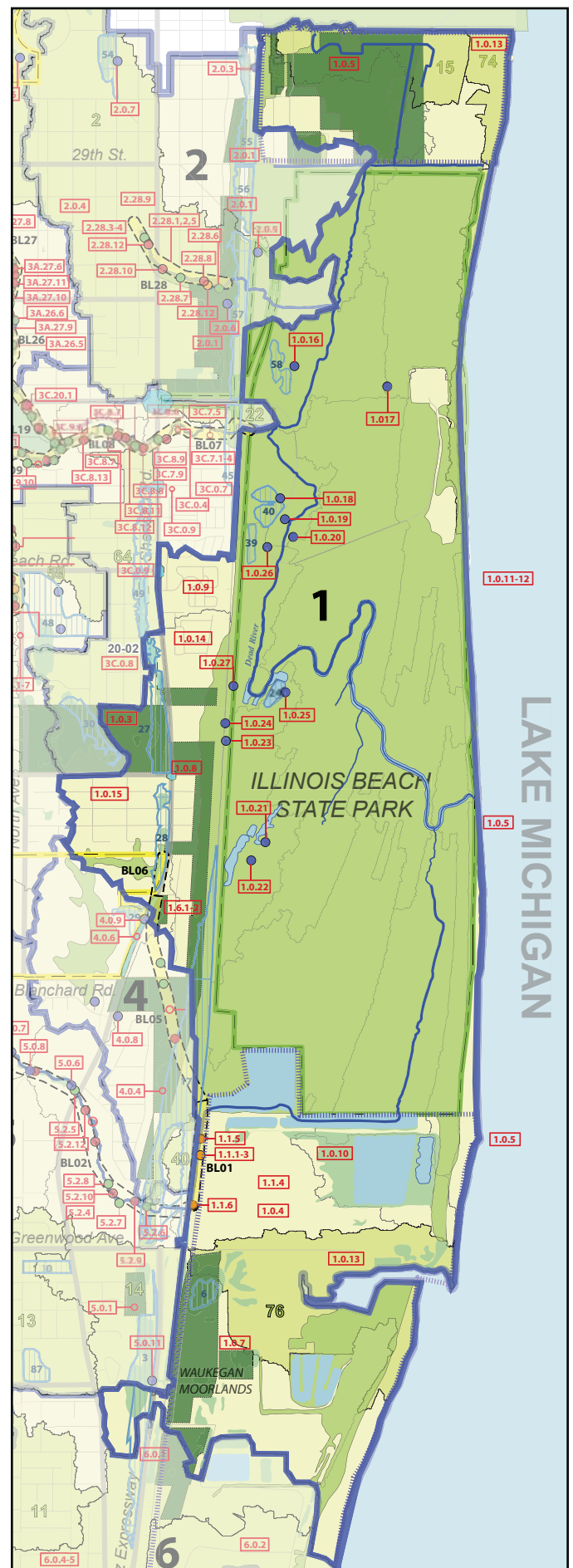
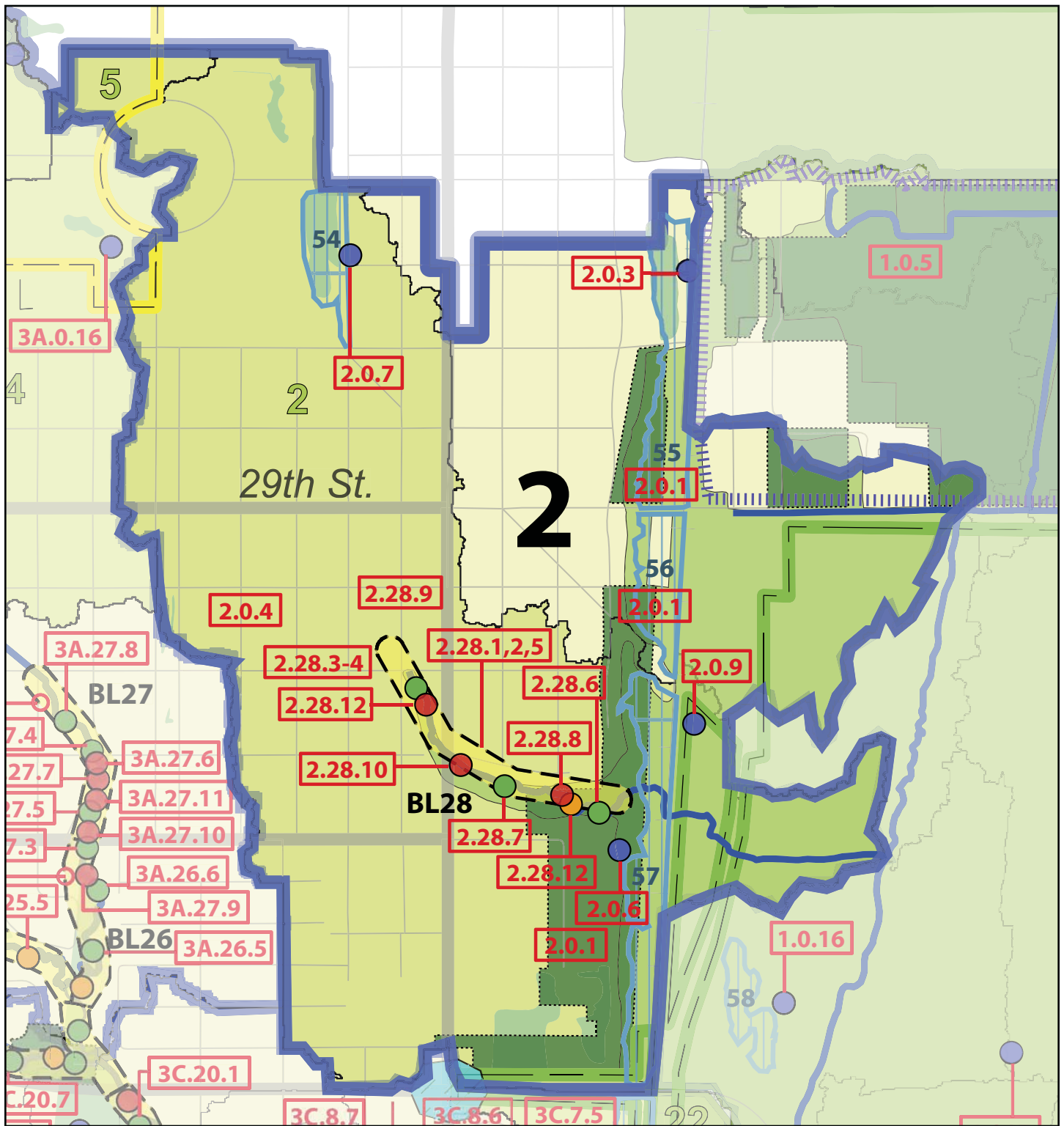


FIGURE 5.2 SUBWATERSHED MANAGEMENT UNIT 1



#### Legend

- |                        |                                     |
|------------------------|-------------------------------------|
| Forest Preserve        | Watershed Boundary                  |
| State Park             | SMU Boundary                        |
| Wetlands               | Priority Green Infrastructure Areas |
| ADID Wetlands          | Subbasin Boundary                   |
| Critical Region        | Critical Subbasins                  |
| Regional Storage       | Stream Reach                        |
| Detention Basins       | Critical Stream Reach               |
| Hydraulic Structures   | Action Recommendations              |
| Instream Problem Areas | Subwatershed Management Unit        |
| Point Discharges       | FPAI Site                           |



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DATA SOURCES:  
Lake County Stormwater Management  
Lake County Department of Information And Technology, GIS & Mapping Division



FIGURE 5.3 SUBWATERSHED MANAGEMENT UNIT 2

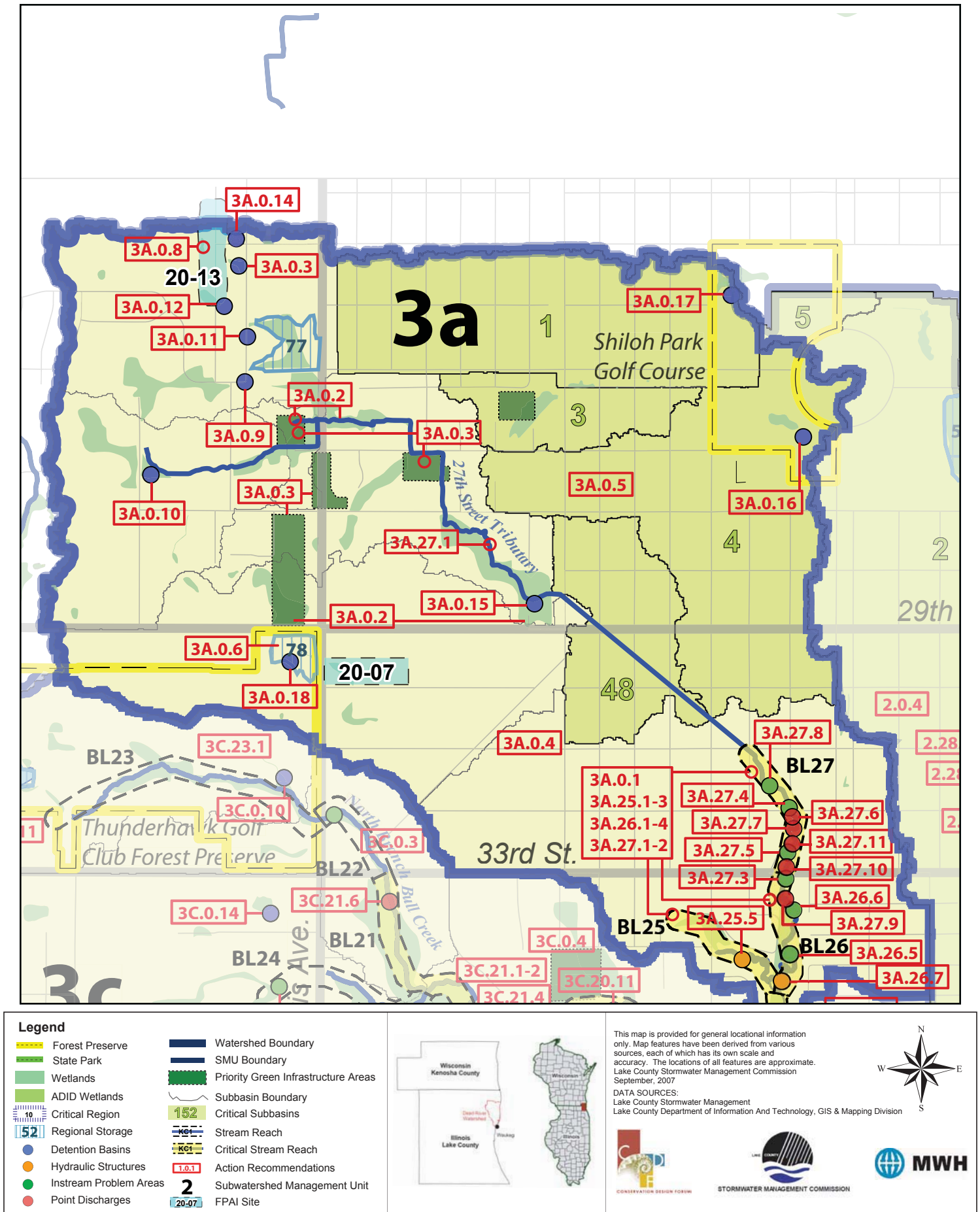
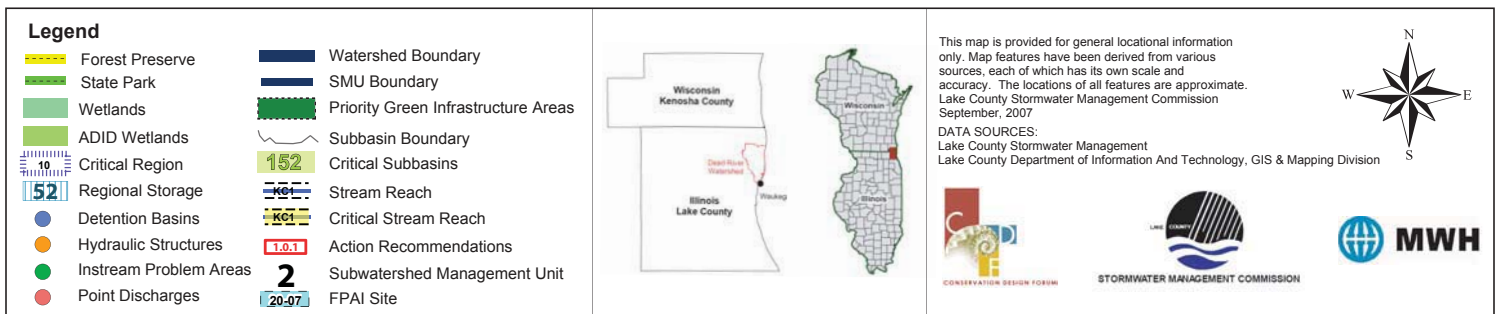
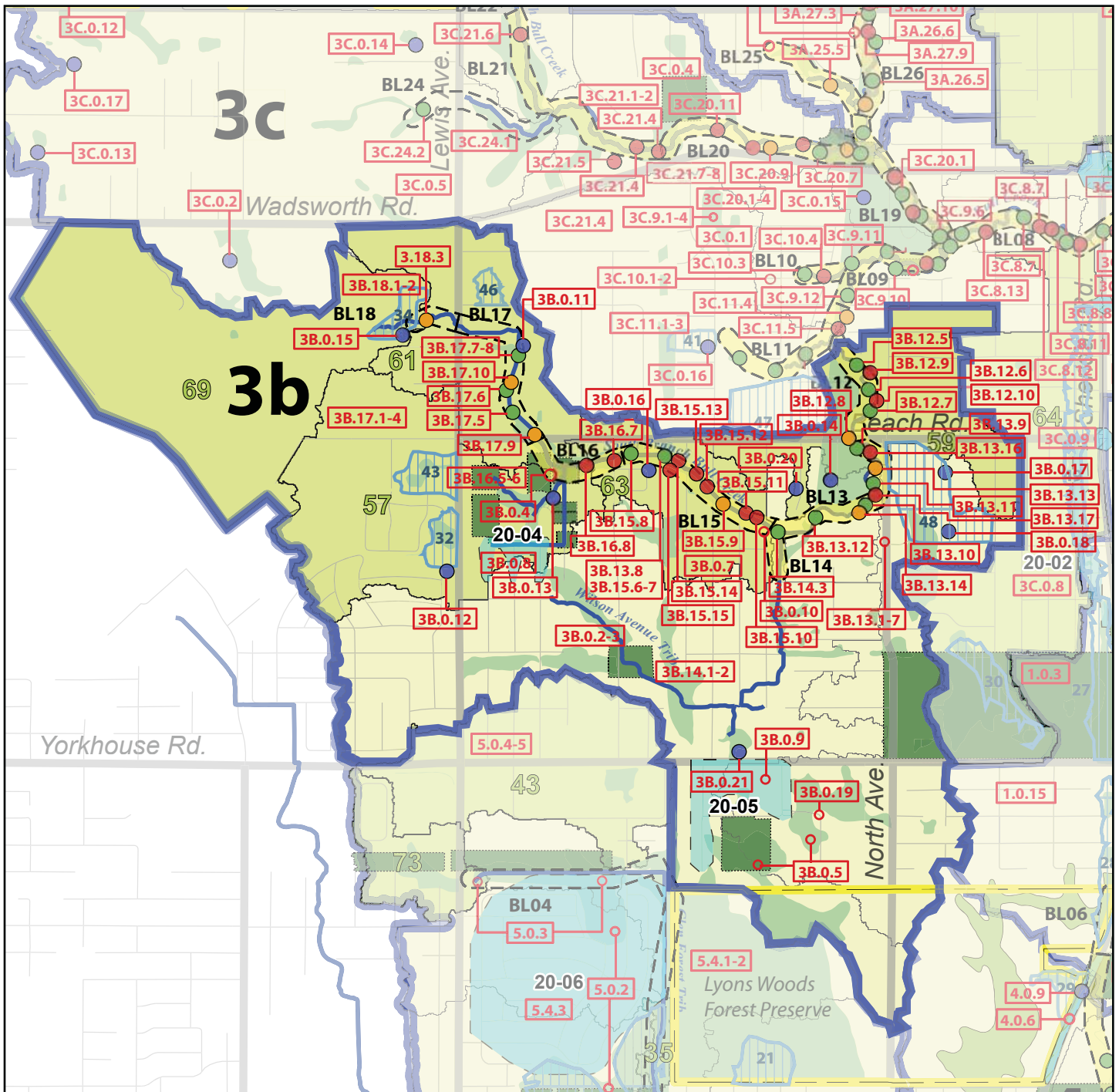


FIGURE 5.4 SUBWATERSHED MANAGEMENT UNIT 3A



**FIGURE 5.5 SUBWATERSHED MANAGEMENT UNIT 3B**