6 plan implementation

This chapter identifies a strategy for moving from planning to implementation of the action plan recommendations. How readily this plan is used and implemented by watershed stakeholders is one indicator of its success. Improvement in watershed resources is another indicator. Successful plan implementation will require significant cooperation and coordination among watershed stakeholders to secure project funding and to efficiently and effectively move the action plan from paper to the watershed.

This chapter also relates some more technical details about the expected results of putting action recommendations in place and the cost of plan implementation. It also presents a plan for monitoring and evaluating plan implementation as a way to determine progress towards watershed goals and objectives.

6.1 PLAN IMPLEMENTATION STRATEGY

The Rock River Ravine study area includes many stakeholders (see Table 6.1.1) that will have to coordinate efforts to implement many of the projects recommended in the action plan. Since no single municipality, district, resident, business, landowner, or organization has the financial or technical resources to accomplish the plan goals and objectives alone, working together will be essential to achieve meaningful results. Combining and coordinating resources, funding, effort, and leadership will be the most efficient and effective means of creating real improvement of watershed resources.

One important step in plan implementation will be the establishment of a committee or organization to step forward as a project leader to help organize and coordinate plan implementation. Responsibilities of this organization would also include administration, coordination of stakeholders to support individual watershed projects, and working with municipalities and other stakeholders to implement recommended policies and programs.

Throughout the watershed planning process, the Watershed Planning Committee has provided valuable input to the plan regarding watershed issues, resources, and priorities. This Planning Committee is encouraged to function as the stakeholder forum for the watershed until a separate organization or committe can be created. The Planning Committee can continue to hold regular meetings, organize watershed field trips, host educational workshops and forums, and bring watershed stakeholders and multiple units of government together to discuss watershed issues and opportunities. The Planning Committee may consider whether a formal staff position is needed to support the efforts of the Committee and to solicit volunteers for the position.

The Planning Committee, or an established watershed organization, is encouraged to work to generate additional stakeholder interest and involvement with watershed plan implementation and stewardship activities. As projects are initiated, and as the positive environmental, aesthetic, and community benefits come to light, projects and participation are expected to increase over time. There are tangible benefits to stakeholder participation in watershed activities, from positive media attention to improved quality of life for community residents. Increased involvement also can yield significant local, state, and federal funding opportunities to help share the cost of project implementation.

The watershed action plan contains a number of general and site specific recommendations and an identification of the parties responsible for leading and supporting the implementation of those recommendations. Some actions, such as the repair or stabilization of a municipal stormwater discharge point, may be considered for addition to municipal or drainage district capital improvement and maintenance plans, budgets, and schedules. This is a fairly quick and easy approach to implementing recommendations within the purview of specific jurisdictions.

In other cases, however, the action recommendation will require the involvement of multiple stakeholders for implementation, such as residents, a municipality, and a county, state, or federal agency to provide financial and technical support. Some actions require cross-jurisdictional coordination for issues, such as streambank stabilization, that span multiple jurisdictions or properties. The establishment of a green infrastructure corridor along the stream channel or ravine, or the preservation and restoration of a large

wetland complex are examples of projects that may require inter-jurisdictional cooperation and may require a longer time frame for implementation.

Other actions will require the cooperation of individual or groups of landowners, whether they are residents, homeowners associations, businesses, or institutions. These actions will often need a leader, or a single champion for the project, that can organize resources and keep the project moving forward. This champion may be the watershed organization, or a single entity such as a landowner or the municipality.

Actions that involve preservation of areas of land or water may also require the involvement of a local conservation organization. These groups can often provide technical or financial assistance for preservation efforts.

In some cases, actions recommend the adoption of new policies, plans, or standards that modify the form, intensity, or type of development or redevelopment in the watershed in a way that better protects watershed resources. These actions will require some effort on the part of municipalities to understand how plans and policies can be modified and to discuss and adopt new, or modify existing, policies, plans and standards. The first step in this effort is to understand how current development practices impact watershed resources and how they can be improved, followed by discussion and debate about possible modifications, and finally adopting policies and standards that will have the desired outcome.

Implementation of this watershed plan and the improvement of watershed resources are ongoing, incremental, and long-term processes. Continuous research and investigation should be conducted to stay current with watershed conditions and resources. Likewise, this watershed plan should be updated regularly to accommodate changes in watershed conditions and resources and to reflect projects and plan implementation.

Clearly there is much to be done and there are many parties to coordinate. However, a dedicated and determined effort will benefit all watershed stakeholders and future generations of residents and visitors.

6.2 IMPAIRMENT REDUCTION TARGETS AND PROJECTIONS

The general and site specific recommendations in Chapter 5 have varying levels of effectiveness in reducing the identified impairments. The ability of each site specific action to reduce an impairment was assessed using a three-point scale as shown in Table 6.2.1.1. These effectiveness ratings are used in Table 6.4.5 where the estimated costs and effectiveness of each of the recommendations are listed.

In order to meet the requirements for a watershed-based plan, the plan must pay particular attention to water quality pollutants and impairments and measures for reducing the impairment. The high priority water quality pollutants for the Rock River Ravines include Total Suspended Solids / sedimentation, low dissolved oxygen, nutrients (phosphorous), and aquatic life toxicity (total dissolved solids, chlorides, and salinity). Additional impairments addressed by the plan include degraded watershed aquatic habitat, an altered hydrology that does not support healthy watershed resources, loss and degradation of wetlands, natural area invasion by exotic species, and impacted or lack of stream buffers and riparian zones. These are the most important impairments needing to be addressed, for the reasons provided below.

Total Suspended Solids / sedimentation impair watershed resources when they settle out in streambeds, wetlands, and natural areas making them uninhabitable by some sensitive plant and animal species. The primary impact of high suspended solids concentrations in streams occurs when these solids settle in depositional areas of the stream system and cover the more desirable gravel substrates. Excessive levels of particulate material also create difficult conditions for gill breathing fish and some of their food sources, including macroinvertebrate organisms. Specifically, sediment is settling out in the low gradient stream reaches and degrading the quality of aquatic habitat. Reducing the flow of sediment into the stream channel, wetlands, and natural areas will help to repair these degraded systems by preventing further sedimentation and beginning the process of natural recovery.

Low dissolved oxygen is problematic because it creates aquatic habitat conditions that only some fish and aquatic organisms can tolerate, causing the diversity of species to

Table 6.1.1 Implementation Partners

Acronym	Responsible Party	General Responsibility
QCWSPC/ RR	Quad City Watershed Planning Committee-Rock River	Facilitate planning, funding, and implementation of the Quad City Watershed Plan
AI	Academic Institutions	Assist with implementation of education plan
BSRC	Bi-State Regional Commission	Planning and technical assistance, grant writing
CBL	Corporate Business and Landowners	Grounds management and maintenance, employee education
DH	Developers and Homebuilders	Land development, stormwater management system design and construction
FEMA	Federal Emergency Management Agency	National Funding Insurance Program, floodplain mapping and enforcement, and mitigation funding
GC	Golf Courses	Grounds management and maintenance, employee education
IDNR	Illinois Department of Natural Resources	Natural area preservation and management, research, technical and financial assistance
IDOT	Illinois Department of Transportation	Road and highway planning, construction and maintenance
IEPA	Illinois Environmental Protection Agency	Funding assistance and regulation
IRCD, NRCS, RICSWCD	Interstate Resource Conservation and Development (IRCD) Rock Island County Natural Resources Conservation Service (NRCS)/ Rock Island County Soil and Water Conservation District (RICSWCD)	Provide natural resource management, technical and financial assistance
M	Municipalities - Rock Island; Moline; East Moline; Silvis; Carbon Cliff	Land use development, technical and financial support, and drainage system management
MWTIP	Municipal wastewater treatment and infiltration plants	Treat municipal wastewater
NPO	Non Profit Organizations	Assist with implementation of education plan, grant writting and submttal for watershed improvement projects and programs
PRL	Private and Residential Landowners	Land management and maintenance including stream channels, ravines and riparian corridors
RIC	Rock Island County	Land use planning for unincorporated areas, natural resources, and drainage system management
RICFD	Rock Island County Forest District	Land and natural resource management
RICHD	Rock Island County Health Department	Monitor, manage, and provide technical support for water resources
RICPZ	Rock Island County Planning and Zoning	Responsible land use planning and management in unincorporated areas
RICWMA	Rock Island County Waste Management Agency	Environmentally sound waste disposal, education
SCWC	Scott County Waste Commission	Environmentally sound waste disposal, education
USACE	United States Army Corps of Engineers	Water protection, regulation and restoration
USDA	United States Department of Agriculture	Agricultural and natural resource technical and financial assistance
USEPA	United States Environmental Protection Agency	Management, regulation and restoration of water resources
USFWS	United States Fish and Wildlife Service	Threatened and endangered species, technical and funding assistance for habitat restoration

be reduced, which is an indicator of an impaired system. Restoring dissolved oxygen levels to levels that are consistently above 5.0 mg/L (the Illinois standard) will help recreate high quality aquatic habitat conditions.

Nutrient loads (phosphorous) can cause algae blooms that impair the habitat quality of water resources and block light from reaching desirable aquatic plants. When the algae dies, the decomposition process can deplete dissolved oxygen levels in the water, impairing the habitat quality for aquatic wildlife. Reducing the flow of phosphorous to watershed water resources can help to restore high quality aquatic habitat conditions necessary for a healthy diversity of species.

Aquatic life toxicity includes Total Dissolved Solids (TDS) such as salt (sodium chloride) used as road deicing material. Road salt can occur at toxic levels in the water column at intermittent times when the weather conditions demand its use. Chlorides are not removed by best management practices, does not decompose or readily change form, and can cause spikes in the water column, typically detected as increased conductivity, making the water uninhabitable by certain aquatic plants and animals. Reducing chloride loading to the stream will help maintain a consitent quality of water that supports healthy aquatic habitat.

Watershed habitat has been degraded and altered due to a number of causes. The lack of aquatic habitat characteristics, including pools and riffles and healthy substrates, means that aquatic species do not have sufficient cover and sources of food. Other habitat alterations that degrade conditions for aquatic organisms include streambank erosion and barriers to the movement of fish upstream and downstream, such as debris buildup or other obstructions. Alterations to watershed hydrology, creating flashy conditions, also impairs habitat because low flow conditions can mean that there is not enough water for aquatic species to live, and that dissolved oxygen levels fall below healthy levels due to the lack of flow and aeration. Restoring natural watershed hydrology, habitat characteristics, and streambank stability are important for recreating habitat conditions that support a healthy diversity of aquatic organisms.

Watershed wetlands have been drained, filled, and degraded, which impairs their ability to absorb and filter stormwater, to improve water quality, and to support wildlife that depend on high quality wetlands. Restoring the remaining wetlands and recreating some former wetlands, is important to replace water storage and retention areas and to improve water quality by restoring their water filtering capacity.

Watershed wetlands and natural areas have been invaded by exotic and invasive species, which crowd out native species and degrade habitat necessary to support threatened and endangered species. Removal and control of exotic and invasive species, including the reintroduction of natural management mechanisms such as prescribed fire, is important to restore the quality and function of watershed wetlands and natural areas.

Natural stream buffers and riparian zones have been removed, converted to turf grass or other uses, or otherwise degraded to a state that does not help filter runoff and improve water quality, stabilize streambanks, nor support a healthy stream system habitat.

For these impairments, the intent of the action plan recommendations is to reduce the impairment to an acceptable level. The ‘acceptable level’ for some pollutants is set by the Illinois Water Pollution Control Board. However, standards only exist for one of these impairments, dissolved oxygen, which is set at a concentration of 5.0 mg/L. For other impairments, reduction targets are set according to professional opinion.

Setting impairment reduction targets and estimating the improvement expected by implementing plan recommendations are important for assessing the effectiveness of watershed plan recommendations for determining whether watershed impairments are being addressed. Targets and reduction estimates also satisfy one of the nine required watershed-based plan elements established by the US Environmental Protection Agency.

6.2.1 IMPAIRMENT REDUCTION TARGETS AND ESTIMATES

Impairment Reduction Targets (shown in Table 6.2.1.1) are based on professional opinion of feasibility and indicate the potential reduction of the indicated impairment based on full (100%) implementation of the recommended action. For example, if all of the recommended actions intended to address sediment / Total Suspended Solids were to be fully implemented, then 75% of the sediment / Total Suspended

Table 6.2.1.1 Three Point Scale for Impairment Reduction Effectiveness (for Table 6.4.5)

Rank	Description of Potential Effectiveness	Range of Effectiveness
++	Fully effective	67-100%
+	Partially effective	34-66%
o	Minimially effective	0-33%

Table 6.2.1.2 Watershed Impairment Reduction Targets and Projections

Impairment	Cause	Degree / Basis of Impairment	Impairment Reduction Target	Estimated Impairment Reduction (from Table 6.2.1.3)
Water Quality	Total suspended solids / sedimentation	Assumed typical urban runoff water quality impairment; 9,644,739 lb/yr of TSS loading (based on non-point source pollution loading model)	75%	57%
Water Quality	Low dissolved oxygen	Assumed due to low flows and typical urban runoff water quality impairment	50%	47%
Water Quality	Nutrients (phosphorous)	Assumed typical urban runoff water quality impairment; 12,429 lb/yr of phosphorous loading (based on non-point source pollution loading model)	50%	49%
Water Quality	Aquatic life toxicity (salinity / chlorides / total dissolved solids)	Assumed typical urban runoff water quality impairment	25%	50%
Habitat degradation and alteration	Lack of habitat characteristics	Observed and assumed typical urban watershed impairment	25%	46%
Habitat degradation and alteration	Hydrologic disturbance / flow alterations	Observed and assumed typical urban watershed impairment	50%	50%
Habitat degradation and alteration	Wetland loss / degradatioin	Analysis of hydric soils and current wetland locations	50%	33%
Habitat degradation and alteration	Exotic and invasive species	Observed and assumed typical urban watershed impairment	25%	28%
Habitat degradation and alteration	Loss / degradation of natural buffer / streamside alterations	Observed and assumed typical urban watershed impairment	75%	64%

Solids impairment, or problem, can reasonably be expected to be addressed. In other words, even under the best conditions, the entire sediment / Total Suspended Solids problem could not be addressed because there will always be some erosion and runoff of sediment from the urban landscape into the stream. Nonetheless, a 75% reduction in Total Suspended Solids / sediment loading would be a successful achievement for watershed improvement.

The watershed impairment reduction estimates, shown in Table 6.2.1.2, are based on typical pollutant loading and flow rates for urban and rural land uses and for stream and riparian corridors. Table 6.2.1.2 shows the estimated percentage of each impairment that is due to these three land use types. The table also displays the percentage of each impairment that is addressed by the general and site specific action plan recommendations. The percentages of impairment addressed for the general recommendations are the middle range values of the three-point scale in Table 6.2.1.1. The product of these two figures for the three impairment sources (stream/riparian, urban, and rural) results in an estmated impairment reduction for the entire watershed. These figures are general estimates of the total improvement in watershed resources that could be achieved if all of the site specific and 75% of the general recommendations were to be implemented.

6.3 PLAN IMPLEMENTATION COST ESTIMATE AND SCHEDULE

Implementation of this plan will require the development of partnerships with local, state, and federal organizations for implementation, technical assistance, and funding. These efforts require the investment of a significant amount of time and resources and, especially, funding. Table 6.3.1 summarizes the estimated amount of funding required for initial and ongoing implementation of the practices recommended in the action plan. Initial costs indicate cost for installation and/ or establishment; annual costs indicate cost for ongoing management and maintenance.

There are numerous sources of funds available to help support projects or provide cost-share to match other sources of funds. A list of numerous local, regional and state funding sources, and the types of projects funded under the various programs, is provided in Chapter 7 of the plan. Most of the programs require a local match of funds or in-kind services. Although these funding sources can provide a good source of revenue, significant local investment of time and financial resources will be required to implement this plan. If fully implemented, however, the quality of the watershed lakes, stream reaches, and wetlands could be significantly improved.

Tables 6.4.1 through 6.4.5 present summaries of the plan implementation details for recommendation priority, schedule, ease of implementation, and technical effort required. More detailed plan implementation cost, scheduling, effectiveness, and implementation responsibilities can be found in Table 6.4.5.

6.4 PLAN IMPLEMENTATION TABLES

The implementation plan Table 6.4.5 relates technical details (cost, priority, area, schedule, etc.) about the action plan recommendations presented in Chapter 5. Some of the recommendations are listed multiple times in this table so that details could be established for each separate part of those recommendations that contain multiple parts. For example, a recommendation to restore wetlands and a stream buffer would be broken up into two rows for detailing, one for wetland restoration and the other for establishing a stream buffer. The part being detailed within each row is indicated with bold lettering. Table 6.4.5 includes the following information:

- Jurisdiction: in whose jurisdiction does the recommendation fall? RI=Rock Island; M=Moline; EM=East Moline; S=Silvis; CC=Carbon Cliff; RIC=Rock Island County.

- ID#: Recommendation identification number that corresponds to the Action Plan recommendation descriptions presented in Chapter 5 and on the Subwatershed Management Unit maps.

- Goals Addressed: Letters indicate which of the six watershed plan goals the recommendation is intended to address. A=watershed planning, implementation, and coordination; B=water quality; C=stream restoration and management; D=stormwater management; E=natural resources and habitat; F=watershed education and stewardship.

Table 6.4 Watershed Impairment Reduction Estimates

	Water quality				Habitat degradation and alteration				
	Total suspended solids / sedimentation	Dissolved oxygen	Nutrients (phosphorous)	Aquatic life toxicity (salinity / chlorides / total dissolved solids)	Lack of habitat characteristics	Hydrologic disturbance / flow alterations	Wetland loss / degradatioin	Exotic and invasive species	Loss / degradation of natural buffer / streamside alterations
% of impairment due to stream / riparian areas	47%	0%	17%	0%	80%	0%	20%	50%	80%
% of stream / riparian area impairment addressed by site specific recommendations	65%	51%	46%	35%	53%	45%	29%	39%	59%
% of impairment due to urban areas	45%	39%	78%	99%	10%	87%	40%	25%	10%
% of urban area impairment addressed by general reccomendations	50%	50%	50%	50%	17%	50%	17%	17%	83%
% of impairment due to rural / undeveloped areas	7%	61%	5%	1%	10%	13%	40%	25%	10%
% of rural / undeveloped area impairment addressed by general recommendations	50%	50%	50%	17%	17%	50%	50%	17%	83%
Total % of the impairment addressed	57%	50%	49%	50%	46%	50%	33%	28%	64%

Table 6.3.1 Plan Implementation Cost Estimate

SMU	Initial Cost	Ongoing Annual Cost
A	$875,000	$262,500
B	$2,756,000	$584,750
C	$2,851,000	$462,100
D	$2,237,000	$448,200
E	$2,972,500	$456,900
F	$3,134,500	$374,700
G	$3,285,150	$583,775
H	$5,275,875	$847,163
I	$6,276,825	$1,497,588
J	$901,130	$164,815
K	$4,389,500	$920,950
Total	$34,954,480	$6,603,440

Table 6.4.1 Plan Implementation Priorities

Implementation Term	Number of Actions
Priority 1A	24
Priority 1B	27
Priority 1C	6
Priority 1	29
Priority 2	13
Priority 3	34

Table 6.4.2 Plan Implementation Schedule

Implementation Term	Number of Actions
Short	59
Medium	32
Long	42

Table 6.4.3 Recommendation Ease of Implementation

Implementation Term	Number of Actions
Easy	1
Moderate	42
Difficult	90

Table 6.4.4 Plan Implementation Technical Effort Required

Implementation Term	Number of Actions
Low	37
Moderate	37
High	59

- Priority: priority refers to the rank importance of the action. A "1" indicates high priority and "3" indicates lower priority. The priority "1" recommendations have been further ranked by the Watershed Planning Committee, with "1A" indicating the highest ranking, "1B" the second highest, and so on. Recommendations with a "1" priority with no ranking letter are considered the lowest priority of the priority “1” recommendations. Within the tables, a green cell indicate priority “1” recommendations, yellow indicates priority “2” recommendations, and red indicates priority “3” recommendations.

- 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).

- 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.

- Status: this blank box is to be filled in by implementation organization as recommendations get underway.

- Quantity and Unit: the area needing to be addressed by the recommendation and how that area is measured, by the acre, linear foot, or as a single item.

- Unit Cost: the initial and annual (ongoing) cost per acre, linear foot, or other unit.

- Estimated Cost: the total initial and annual (ongoing) cost for the quantity indicated.

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

- Technical Effort Required: the complexity / level of technical assistance necessary to implement the recommendation, with “1” indicating low technical effort required and “3” high technical effort required.

- Impairments (shown in the last 9 column headings of the table and beginning with “Water Quality” or “Habitat Degradation”): these column headings are the nine watershed impairments that the watershed plan is intended to address.

- Impairment Reduction Effectiveness: the symbols in these cells represent best estimates and / or ranges of the potential effectiveness of each of the recommendations in addressing the listed impairment as follows (see Table 6.2.1.1.):

"o" = the recommendation minimally addresses (0-33%) the listed impairment;

"+" = the recommendation moderately addresses (34-66%) the listed impairment;

"++" = the recommendation significantly addresses the listed impairment (67-100%).

These estimates are based on professional opinion and on a variety of studies examining the potential effectiveness of different actions and best management practices. For example, streambank stabilization recommendations have “++” in the column for “Water Quality: TSS / sediment” because proper stabilization can significantly reduce the erosion of soil and stream banks into the stream. However, streambank stabilization recommendations have a “o” in the column for “Habitat Degradation: Wetland loss / degradation” because stabilizing streambanks has a minimal, if any, positive impact on wetlands because the stabilization occurs in streams, not wetlands.

Table 6.4.5 Watershed Plan Implementation Tables

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU A							
RI	A1	Retrofit Residential and Industrial Areas with Stormwater BMPs: The majority of the developed portions of this SMU are either industrial or other higher intensity uses (commercial and multi-family) and low density residential use. Retrofit opportunities should be pursued within these areas to help reduce the impact of stormwater runoff on water quality being discharged to the wetlands within and around Sunset Park, Lake Potter, and the Rock River.	B, C, D	1B	10+ yrs	3	3		
RI	A2	Reduce the Impact of Impervious Surfaces: Filter and infiltrate runoff from the industrial land uses within this SMU with filtration and infiltration BMPs before being released to the lake, wetlands and the Rock River to the west. Prevent runoff of toxic and other chemicals and substances from the industrial land uses through the use of appropriate property management practices such as frequent street cleaning, proper material storage and handling, and spill prevention and clean up plans.	B, C, D	1A	10+ yrs	3	3		
RI	A3	Reduce the Impact of Transportation Infrastructure: Reduce the impacts from IL Route 92, its bridge and interchanges, and 31st Avenue where these roadways cross or abut wetlands in the western portion of the SMU. Regularly sweep the streets and reduce / modify salt application for winter snow and ice control to the minimum necessary in these areas that discharge directly to these wetlands.	B, C, D	1	10+ yrs	3	3		
RI	A4	Restore and Manage Wetlands: **Preserve, manage and restore the large wetland and hydric soil complex (approximately 175 acres)** in and around Sunset Park, and extending upstream along the Rock River shoreline, which are considered high quality wetlands by the Bi-State Regional Commission's Special Area Management Plan. Protect these wetlands from the impacts of adjacent recreational and marina uses by installing filters and buffers to capture chemicals and pollutants resulting from marina and boating activities.	B, C, D, E	1B	10+ yrs	3	2		
RI	A4	Restore and Manage Wetlands: Preserve, manage and restore the large wetland and hydric soil complex in and around Sunset Park, and extending upstream along the Rock River shoreline, which are considered high quality wetlands by the Bi-State Regional Commission's Special Area Management Plan. **Protect these wetlands from the impacts of adjacent recreational and marina uses by installing filters and buffers to capture chemicals and pollutants resulting from marina and boating activities**.	B, C, D, E	1B	10+ yrs	3	H		
RI	A5	Restore Natural Areas: Manage and restore the bluff and natural area within the southeastern 'tail' of the SMU that extends to the southeast along the Rock River bluff and shoreline and into Black Hawk State Park property. Details for this recommendation are included in B2 below for Black Hawk State Park.	E	3	5-10 yrs	2	2		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	varies	feet / acres	varies	varies	varies	varies	PRL, CBL, RI	++	++	++	++	o	++	o	o	o
	varies	feet / acres	varies	varies	varies	varies	CBL, RI	++	++	++	++	o	++	o	o	o
	varies	feet / acres	varies	varies	varies	varies	IDOT, RI	++	++	++	++	o	++	o	o	o
	175	acres	$5,000	$1,500	$875,000	$262,500	RI	+	o	o	+	+	o	++	+	o
	varies	feet / acres	varies	varies	varies	varies	Marina, RI	+	o	o	++	o	o	o	o	o
	see B2	see B2	see B2	see B2	see B2	see B2	see B2	see B2	see B2	see B2	see B2	see B2	see B2	see B2	see B2	see B2

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU B							
RI	B1	Retrofit Residential Neighborhoods with Stormwater BMPs: The majority of this SMU is in low density residential use, where residential retrofit opportunities such as rain gardens and 25 foot natural buffers along the top of the ravines should be used to help reduce the impact of stormwater runoff on water quality and on the structural and natural integrity of the ravine system.	B, C, D, E	1A	5-10 yrs	3	2		
RI, State of Illinois	B2	Manage and Restore Black Hawk State Park: Black Hawk State Park shows evidence of moderate habitat quality and a restorable natural system due to the presence of conservative ground vegetation and a soil structure that retains some presettlement characteristics. **Restore to a combination of meadow and open woodland through thinning, invasive species management, and prescribed burning.** Restore wetlands or seeps in areas of hydric soils on the western boundary and along the ravines and drainage corridors along 17th Street. **Also manage the Rock River bluff and shoreline areas south of Blackhawk Road.** Restoration area is equal to total park area (208 acres) minus 15 acres of wetland restoration (detailed below) and 10 acres of park buildings, parking lots, and roads.	B, C, E	1B	5-10 yrs	2	2		
RI, State of Illinois	B2	Manage and Restore Black Hawk State Park: Black Hawk State Park shows evidence of moderate habitat quality and a restorable natural system due to the presence of conservative ground vegetation and a soil structure that retains some presettlement characteristics. Restore to a combination of meadow and open woodland through thinning, invasive species management, and prescribed burning. **Restore wetlands or seeps in areas of hydric soils on the western boundary and along the ravines and drainage corridors along 17th Street (approximately 15 acres)**. Also manage the Rock River bluff and shoreline areas south of Blackhawk Road.	B, C, D, E	1B	10+ yrs	3	2		
--	B3	Manage and Restore Ravine Systems as Part of the Green Infrastructure Network: Minimize surface water runoff and maximize vegetative quality by thinning the forest canopy and establishing deep-rooted native ground cover. This will help stabilize the ravines and enhance their ecological quality. Specifically, manage and restore, as part of the interconnected green infrastructure system for SMU B:	--	--	--	--	--	--	
RI	B3a	The wooded ravine system extending upstream and northeast from Blackhawk State Park along Blackhawk Hills Court. Area is approximately 3000 feet in length by 500 feet wide.	B, C, D, E	1B	10+ yrs	2	1		
RI	B3b	The wooded ravine that extends east along the ravine south of Blackhawk Hills Court and north of Blackhawk Road. Area is approximately 1800 feet in length by 400 feet wide.	B, C, D, E	1B	10+ yrs	2	1		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	varies	feet / acres	varies	varies	varies	varies	PRL, RI	++	++	++	++	o	++	o	o	+
	183	acres	$7,500	$1,700	$1,372,500	$311,100	IL Historic Preservation Agency, IDNR	+	o	o	o	++	o	o	++	++
	15	acres	$5,000	$1,500	$75,000	$22,500	IL Historic Preservation Agency, IDNR	+	+	++	o	++	+	++	++	+
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	34	acres	$8,000	$1,700	$272,000	$57,800	PRL, CBL	++	+	o	o	++	+	o	++	++
	16	acres	$8,000	$1,700	$128,000	$27,200	PRL, CBL	++	+	o	o	++	+	o	++	++

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU B							
RI	B3c	The wooded ravine system extending upstream along 17th Street to 31st Avenue. Area is approximately 3400 feet in length by 300 feet wide.	B, C, D, E	1B	10+ yrs	2	1		
RI	B3d	The west branch of the ravine system northeast from the 31st Avenue confluence, which includes the Trinity Medical Center, Calvary / Chippiannock Cemetery, and Rock Island High School. Approximately 1500 feet by 1200 feet area.	B, C, D, E	1B	10+ yrs	2	1		
RI	B3e	The east branch of the ravine system extending northwest from the 31st Avenue confluence, which includes the Trinity Medical Center. Approximately 2600 feet in length by 250 feet wide.	B, C, D, E	1B	10+ yrs	2	1		
RI	B3f	Support and continue the restoration activities in the ravine near RR2.11, which include canopy thinning and reestablishment of ground plane vegetation. Actual acreage is unknown but estimated at approximately 2 acres.	B, C, D, E	1B	10+ yrs	2	1		
RI	B4	Repair Stormwater Infrastructure: **Repair and stabilize stormsewers, culverts, and outfalls at RR2.3, RR2.10, RR2.13, RR2.14, and RR2.16, and stabilize the surrounding ravine slopes** to prevent further erosion and infrastructure damage. Stabilize ravine downcutting below the outfall at RR2.7, which may present an infrastructure problem if it is allowed to continue to erode. Consider implementing culvert restrictors on the upstream side of road culverts to slow flow rates and reduce the destructive energy of stormwater flow on the ravines.	B, C, D, E	3	0-5 yrs	3	2		
RI	B4	Repair Stormwater Infrastructure: Repair and stabilize stormsewers, culverts, and outfalls at RR2.3, RR2.10, RR2.13, RR2.14, and RR2.16, and stabilize the surrounding ravine slopes to prevent further erosion and infrastructure damage. **Stabilize ravine downcutting below the outfall at RR2.7**, which may present an infrastructure problem if it is allowed to continue to erode. Consider implementing culvert restrictors on the upstream side of road culverts to slow flow rates and reduce the destructive energy of stormwater flow on the ravines.	B, C, D, E	3	0-5 yrs	3	2		
RI	B5	Install Bioengineering Practices to Stabilize Stream Banks: **Stabilize eroding stream banks** and 'blowouts' at RR2.6, RR2.10, RR2.11, RR2.12, RR2.13, RR2.14, RR2.16, and RR2.17 (reported by stakeholder) using bioengineering stabilization practices. At RR2.12, the residential stormwater discharge pipe should be either extended to discharge at the ravine bottom or removed and runoff infiltrated on site.	B, C, D, E	2	5-10 yrs	3	3		
RI	B5	Install Bioengineering Practices to Stabilize Stream Banks: Stabilize eroding stream banks and 'blowouts' at RR2.6, RR2.10, RR2.11, RR2.12, RR2.13, RR2.14, RR2.16, and RR2.17 (reported by stakeholder) using bioengineering stabilization practices. **At RR2.12, the residential stormwater discharge pipe should be either extended to discharge at the ravine bottom or removed and runoff infiltrated on site.**	B, C, D, E	2	5-10 yrs	3	3		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	23	acres	$8,000	$1,700	$184,000	$39,100	PRL, CBL	++	+	o	o	++	+	o	++	++
	41	acres	$8,000	$1,700	$328,000	$69,700	PRL, CBL	++	+	o	o	++	+	o	++	++
	15	acres	$8,000	$1,700	$120,000	$25,500	PRL, CBL	++	+	o	o	++	+	o	++	++
	2	acres	$8,000	$1,700	$16,000	$3,400	PRL, CBL	++	+	o	o	++	+	o	++	++
	5	each	$4,500	$500	$22,500	$2,500	RI, landowners	++	o	o	o	+	o	o	o	+
	1	each	$3,000	$500	$3,000	$500	RI, landowners	++	o	o	o	+	o	o	o	+
	800	feet	$150	$2	$120,000	$1,200	Landowners, RI	++	o	o	o	+	o	o	o	+
	1	each	$1,000	$150	$1,000	$150	Landowner	++	o	o	o	+	o	o	o	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU B							
RI	B6	Remove Yard Waste and Debris: Remove yard waste, concrete, and dumped woody debris from the ravine, culverts, and outfalls at RR2.1, RR2.4, RR2.5, RR2.6, RR2.7, RR2.10. The concrete block placed at the culvert outfalls near RR2.9, RR2.10, and RR2.16, which helps dissipate the erosive energy of water flow and slow erosion, can remain in place.	B, C, E	1	0-5 yrs	2	1		
--	B7	Begin Stream and Riparian Corridor Habitat Restoration: initiate restoration activities at the following locations where restoration potential was observed:	--	--	--	--	--	--	
RI	B7a	RR2.6, RR2.13, and RR2.14, where intact groundwater hydrology and sand, gravel, and rock channel substrates indicate potentially restorable stream systems.	C, E	3	0-5 yrs	3	3		
RI	B7b	RR2.1, RR2.2, RR2.3, and RR2.6, where conservative ground cover species indicate restorable riparian habitat and buffer.	C, E	3	0-5 yrs	3	3		
RI	B8	Implement Riparian and Ravine Management Land Use Recommendations: implement general recommendations for those residential, commercial, office, and institutional areas abutting the ravines and/or stream. Since nearly all of the ravines are bordered by an urban rather than a natural land use, the relevant reaches requiring ravine management by adjacent landowners are not individually listed here or on the SMU map. This is included as a general recommendation applicable to the entire SMU B.	B, C, D, E	1B	0-5 yrs	2	1		
		SMU C							
RI, M	C1	Retrofit Residential Neighborhoods with Stormwater BMPs: The majority of this SMU is in low density residential use, where retrofit opportunities should be evaluated to help reduce the impact of stormwater runoff on water quality and on the structural and natural integrity of the ravine system.	B, C, D, E	1A	5-10 yrs	3	2		
M	C2	Preserve and Restore the Rock River Floodplain: Consider appropriate Best Management Practices that recognize and encourage the value of incorporating natural floodplain, wetland, and other riverine resources into future development plans rather than eliminating and/or ignoring such systems and areas. Also consider park and recreation land uses within the Rock River floodplain wherever possible. Area of consideration is approximately 2000 feet by 850 feet.	C, E	1A	5-10 yrs	3	3		
RI, M, RIC	C3	Restore and Manage Wetlands: Where practical and with consideration of existing development, manage, restore, and expand wetlands within the hydric soil complex along the southern edge of the SMU to provide water quality enhancement and habitat. These wetlands have been designated as High Quality by the Bi-State Regional Commission's Special Area Management Plan. Approximately 50 acres are estimated to be restorable wetlands / hydric soils.	B, C, D, E	3	10+ yrs	3	2		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	6	each	$1,500	$50	$9,000	$300	Landowners	o	+	++	o	+	o	o	o	++
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	6	acres	$7,500	$1,700	$45,000	$10,200	Landowners	o	++	+	o	++	o	o	++	++
	8	acres	$7,500	$1,700	$60,000	$13,600	Landowners	o	++	+	o	++	o	o	++	++
	varies	feet / acres	varies	varies	varies	varies	Landowners, RI	++	++	+	+	o	+	o	o	++
	varies	feet / acres	varies	varies	varies	varies	RI, M, PRL	++	++	++	++	o	++	o	o	+
	16	acres	varies	varies	varies	varies	M, landowners, FEMA, USACE	+	o	++	+	++	++	++	o	o
	38	acres	$5,000	$1,500	$190,000	$57,000	RI, RIC, M, landowners	+	+	++	o	++	+	++	++	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU C							
--	C4	Protect Priority Wetlands and Stream Reaches from Development Impacts: in order to reduce the impact of nearby land uses, particularly commercial and office land uses, consider the use of on-site stormwater BMPs such as permeable paving, parking lot bioretention swales, and green roofs. Also implement facility management practices such as frequent sweeping of parking lots and improved methods of de-icing that require less use of salt for winter snow and ice control.	--	--	--	--	--	--	
RI	C4a	In the area south of Blackhawk Road adjacent to wetlands. Efforts should be focused on water quality protection to reduce wetland impacts.	B, C, D, E	1C	10+ yrs	3	H		
M	C4b	In the primary ravine headwaters, an area bound by 18th Avenue to the north, 46th Street to the west, 2nd Street to the east, and 24th Avenue on the south, efforts should be focused on reducing runoff volumes and rates minimize erosion impacts to the ravine.	B, C, D, E	1C	10+ yrs	3	H		
RI, M, RIC	C5	Restore Stream Reaches: where practical and with consideration of existing development, restore stream reaches between Blackhawk Road and the Rock River (including RR3.7 and RR3.8), which have been significantly modified through channelization and adjacent impervious land uses and are very low gradient. Where the stream channel traverses undeveloped land, restoration efforts should focus on reconnecting the channel to adjacent floodplain and wetlands through introduction of check dams and other measures to encourage overbank flow. This will restore the water quality and habitat function as green infrastructure corridors that link the Rock River system to the ravine systems. Where the channel traverses heavily developed commercial property efforts should focus on stabilization of the banks to minimize erosion.	C, E	3	0-5 yrs	3	3		
RI, RIC	C6	Manage and Restore Ravine Systems as Part of the Green Infrastructure Network: Minimize surface water runoff and maximize vegetative quality by thinning the forest canopy and establishing deep-rooted native ground cover. This will help stabilize the ravines and enhance their ecological quality. Specific to SMU C, expand the green infrastructure hub formed by the Welch Memorial Golf Course by preserving and restoring ravines on its southern and eastern borders. **One corridor extends upstream along the primary SMU ravine from Blackhawk Road to the residential area around Wildwood Drive (near RR3.4)**. The other area includes the minor western ravine and surrounding forested areas from Blackhawk Road (RR3.1) to the golf course southern edge. Within the Welch Memorial Golf Course, restore and expand a minimum 100 foot native riparian buffer along all stream reaches and incorporate native landscape systems into the course design.	B, C, D, E	1A	10+ yrs	2	1		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	varies	feet / acres	varies	varies	varies	varies	CBL, RI	++	o	o	++	+	+	++	o	++
	varies	feet / acres	varies	varies	varies	varies	CBL, M	++	o	o	++	+	+	++	o	++
	6600	feet	$225	$25	$1,485,000	$165,000	Landowners, RI, M, RIC, IDNR	o	++	+	o	++	o	o	++	++
	85	acres	$8,000	$1,700	$680,000	$144,500	PRL, CBL, RIC	++	+	o	o	++	+	o	++	++

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU C							
RI, RIC	C6	Manage and Restore Ravine Systems as Part of the Green Infrastructure Network: Minimize surface water runoff and maximize vegetative quality by thinning the forest canopy and establishing deep-rooted native ground cover. This will help stabilize the ravines and enhance their ecological quality. Specific to SMU C, expand the green infrastructure hub formed by the Welch Memorial Golf Course by preserving and restoring ravines on its southern and eastern borders. One corridor extends upstream along the primary SMU ravine from Blackhawk Road to the residential area around Wildwood Drive (near RR3.4). **The other area includes the minor western ravine and surrounding forested areas from Blackhawk Road (RR3.1) to the golf course southern edge.** Within the Welch Memorial Golf Course, restore and expand a minimum 100 foot native riparian buffer along all stream reaches and incorporate native landscape systems into the course design.	B, C, D, E	1A	10+ yrs	2	1		
RIC	C6	Manage and Restore Ravine Systems as Part of the Green Infrastructure Network: Minimize surface water runoff and maximize vegetative quality by thinning the forest canopy and establishing deep-rooted native ground cover. This will help stabilize the ravines and enhance their ecological quality. Specific to SMU C, expand the green infrastructure hub formed by the Welch Memorial Golf Course by preserving and restoring ravines on its southern and eastern borders. One corridor extends upstream along the primary SMU ravine from Blackhawk Road to the residential area around Wildwood Drive (near RR3.4). The other area includes the minor western ravine and surrounding forested areas from Blackhawk Road (RR3.1) to the golf course southern edge. **Within the Welch Memorial Golf Course, restore and expand a minimum 100 foot native riparian buffer along all stream reaches and incorporate native landscape systems into the course design.** Approxately 5% of 100 acre golf course acreage (or 5 acres) may be restorable.	B, C, D, E	1A	0-5 yrs	1	1		
RI, M, RIC	C7	Repair Stormwater Infrastructure: **Repair and stabilize stormsewers, culverts, and outfalls** at RR3.1, RR3.2, RR3.3, RR3.4, RR3.5, RR3.6, and stabilize the surrounding streambank to prevent further erosion and infrastructure damage. Relocate the residential stormwater drain at RR3.1 to discharge at the bottom of the ravine, or remove this pipe and infiltrate runoff on site.	B, C, D, E	3	0-5 yrs	3	2		
RI	C7	Repair Stormwater Infrastructure: Repair and stabilize stormsewers, culverts, and outfalls at RR3.1, RR3.2, RR3.3, RR3.4, RR3.5, RR3.6, and stabilize the surrounding streambank to prevent further erosion and infrastructure damage. **Relocate the residential stormwater drain at RR3.1** to discharge at the bottom of the ravine, or remove this pipe and infiltrate runoff on site.	B, C, D, E	3	0-5 yrs	3	2		
RI	C8	Install Bioengineering Practices to Stabilize Stream Banks: Stabilize eroding stream banks and ravines, some of them severe and 10 to 20 feet high, at RR3.3 and RR3.4.	B, C, D, E	2	5-10 yrs	3	3		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	45	acres	$8,000	$1,700	$360,000	$76,500	PRL, CBL, RIC	++	+	O	O	++	+	O	++	++
	5	acres	$7,500	$1,700	$37,500	$8,500	RIC, golf course	++	+	O	O	++	+	O	++	++
	6	each	$4,500	$500	$27,000	$3,000	RI, M, RIC, landowners	++	o	o	o	+	o	o	o	+
	1	each	$1,000	$150	$1,000	$150	Landowner	++	O	O	O	+	O	O	O	+
	200	feet	$150	$2	$30,000	$300	Landowners, RI	++	o	o	o	+	o	o	o	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU C							
RI, M, RIC	C9	Remove Yard Waste and Debris: Remove yard waste, concrete, and dumped woody debris (trees) from the stream channel, culverts, and outfalls at RR3.1, RR3.2, RR3.3, RR3.4, RR3.5, RR3.6, and RR3.8.	B, C, E	1	0-5 yrs	2	1		
--	C10	Begin Stream and Riparian Corridor Habitat Restoration: initiate stream and riparian corridor habitat restoration activities at the following locations where restoration potential was observed:	--	--	--	--	--	--	
RI	C10a	RR3.5 where the ravine and riparian corridor was fairly intact, with a wide ravine bottom and thick ground vegetation that helps stabilize the ravine banks.	C, E	3	0-5 yrs	3	3		
M	C10b	The reach near RR3.7, which exhibits a broad ravine bottom with some pool and riffle sequencing and rock banks and substrate, which indicate restorable stream habitat.	C, E	3	0-5 yrs	3	3		
RI, M, RIC	C11	Implement Riparian and Ravine Management Land Use Recommendations: implement general recommendations for those residential, commercial, office, and institutional areas abutting the ravines and stream. Since nearly all of the ravines are bordered by an urban rather than a natural land use, the relevant reaches requiring ravine management by adjacent landowners are not individually listed here or illustrated on the SMU map. This is included as a general recommendation applicable to the entire SMU C.	B, C, D, E	1B	0-5 yrs	2	1		
		SMU D							
M	D1	Retrofit Residential Neighborhoods with Stormwater BMPs: The majority of this SMU is in low density residential use, where retrofit opportunities should be evaluated to help reduce the impact of stormwater runoff on water quality and on the structural and natural integrity of the ravine system.	B, C, D, E	1B	5-10 yrs	3	2		
M	D2	Preserve and Restore the Rock River Floodplain: Consider appropriate Best Management Practices that recognize and encourage the value of incorporating natural floodplain, wetland, and other riverine resources into future development plans rather than eliminating and/or ignoring such systems and areas. Also consider park and recreation land uses within the Rock River floodplain wherever possible.	C, E	1A	5-10 yrs	3	3		
RIC	D3	Restore and Manage Wetlands: Where practical and with consideration of existing development, manage, restore, and expand wetlands within the hydric soil complex south of 52nd Avenue within the Rock River floodplain to provide water quality enhancement and habitat. These wetlands have been designated as High Quality by the Bi-State Regional Commissions Special Area Management Plan.	B, C, D, E	3	10+ yrs	3	2		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	7	each	$1,500	$50	$10,500	$350	Landowners, M, RIC	o	+	++	o	+	o	o	o	++
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2	acres	$7,500	$1,700	$15,000	$3,400	Landowners, IDNR	o	++	+	o	++	o	o	++	++
	2	acres	$7,500	$1,700	$15,000	$3,400	Landowners, IDNR	o	++	+	o	++	o	o	++	++
	varies	feet / acres	varies	varies	varies	varies	Landowners, RI, M, RIC	++	++	+	+	o	+	o	o	++
	varies	feet / acres	varies	varies	varies	varies	M, PRL	++	++	++	++	o	++	o	o	+
	18	acres	varies	varies	varies	varies	M, landowners, FEMA, USACE	+	o	++	+	++	++	++	o	o
	175	acres	$5,000	$1,500	$875,000	$262,500	RIC, landowners	+	+	++	o	++	+	++	++	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU D							
M	D4	Protect Priority Wetlands and Stream Reaches from the Development Impacts: in order to reduce the impact of nearby land uses, particularly commercial and office land uses along 7th Street, John Deere Road, and 52nd Avenue, consider the use of on-site stormwater BMPs such as permeable paving, parking lot bioretention swales, and green roofs. Also implement facility management practices such as frequent sweeping of parking lots and improved methods of de-icing that require less use of salt for winter snow and ice control.	B, C, D, E	1A	10+ yrs	3	H		
M, RIC	D5	Restore Stream Reaches: where practical and with consideration of existing development, restore the stream reach between 36th Ave and the Rock River (RR4.1 and RR4.2), which has been significantly modified through channelization and adjacent impervious land uses and are very low gradient. Where the stream channel traverses undeveloped land, restoration efforts should focus on reconnecting the channel to adjacent floodplain and wetlands through introduction of check dams and other measures to encourage overbank flow. This will restore the water quality and habitat function as green infrastructure corridors that link the Rock River system to the ravine systems. Cease the use of landscape management chemicals on nearby recreational fields, and cease dumping of yard and landscape waste along the stream corridor.	C, E	3	0-5 yrs	3	3		
M	D6	Manage and Restore Ravine Systems as Part of the Green Infrastructure Network: Minimize surface water runoff and maximize vegetative quality by thinning the forest canopy and establishing deep-rooted native ground cover. Specific to SMU D, restore a green infrastructure hub and corridor system along the ravine from 36th Avenue on the south (RR4.3) to approximately 25th Avenue (RR4.6) on the north. Area is approximately 7000 feet long by 300 feet wide.	B, C, D, E	1C	10+ yrs	2	1		
M	D7	Inspect and Repair Stormwater Infrastructure: Stormwater infrastructure elements (stormsewers, culverts, and outfalls) observed during the stream survey were found to be intact and stable. However, all stormsewer outfalls and culverts within this SMU, particularly those that discharge to the ravine system, should be inspected and repaired as needed. Streambanks around these outfalls should also be stabilized to prevent further damage to stormwater infrastructure. Municipalities should consider installing stone or other measure to dissipate the energy of stormwater discharges from these outfalls, which are likely causing erosion problems around the outfalls.	B, C, D, E	3	0-5 yrs	3	2		
M	D8	Install Bioengineering Practices to Stabilize Stream Banks: Stabilize steep, eroding stream banks and ravines observed at RR4.4, RR4.6, RR4.7 and RR4.8.	B, C, D, E	2	5-10 yrs	3	3		
M	D9	Remove Debris Obstructions: Remove debris obstructions found at RR4.4 and RR4.6.	C, E	1	0-5 yrs	2	1		
M	D10	Begin Stream and Riparian Corridor Habitat Restoration: initiate stream and riparian corridor habitat restoration activities within the reach near RR4.3 where some pool and riffle sequencing and intact groundwater hydrology were observed. Consider adding riffles and instream cover such as rocks and root wads to support aquatic species.	C, E	3	0-5 yrs	3	3		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	130	acres	varies	varies	varies	varies	CBL, M	++	o	o	++	+	+	++	o	++
	4000	feet	$225	$25	$900,000	$100,000	Landowners, M, RIC, IDNR	o	++	+	o	++	o	o	++	++
	48	acres	$8,000	$1,700	$384,000	$81,600	PRL, CBL, M	++	+	o	o	++	+	o	++	++
	unknown	each	$4,500	$500	NA	NA	Landowners, M	++	o	o	o	+	o	o	o	+
	400	feet	$150	$2	$60,000	$600	Landowners, M	++	o	o	o	+	o	o	o	+
	2	each	$1,500	$50	$3,000	$100	Landowners, M	+	o	o	o	o	+	o	o	o
	2	acres	$7,500	$1,700	$15,000	$3,400	Landowners, M, IDNR	o	++	+	o	++	o	o	++	++

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU D							
M	D11	Implement Riparian and Ravine Management Land Use Recommendations: Implement riparian and ravine management land use recommendations for the residential areas abutting the ravines and stream. Since nearly all of the ravines are bordered by an urban rather than a natural land use, the relevant reaches requiring ravine management by adjacent landowners are not individually listed here or illustrated on the SMU map. This is included as a general recommendation applicable to the entire SMU D.	B, C, D, E	1C	0-5 yrs	2	1		
		SMU E							
M, RIC	E1	Retrofit Residential Areas with Stormwater BMPs: evaluate the use of rain gardens, vegetated swales, and naturalized detention (where feasible) and other BMPs to help filter and infiltrate runoff, reduce the flow of urban non-point source pollutants to the stream system, and protect the structural and natural integrity of the ravine system.	B, C, D, E	1B	5-10 yrs	3	2		
RIC	E2	Restore and Manage Wetlands: Where practical and with consideration of existing development, manage, restore, and expand existing wetlands within the hydric soil complex west of 16th Street within the Rock River floodplain to provide water quality enhancement and habitat. These wetlands have been designated as High Quality by the Bi-State Regional Commission's Special Area Management Plan.	B, C, D, E	3	10+ yrs	3	2		
M	E3	Protect Priority Wetlands and Stream Reaches from the Development Impacts: in order to reduce the impact of nearby land uses, particularly commercial and office land uses along 52nd Avenue, consider the use of on-site stormwater BMPs such as permeable paving, parking lot bioretention swales, and green roofs. Also implement facility management practices such as frequent sweeping of parking lots and improved methods of de-icing that require less use of salt for winter snow and ice control. Area is approximately 5000 feet by 1200 feet.	B, C, D, E	1A	10+ yrs	3	H		
M, RIC	E4	Restore Stream Reaches: where practical and with consideration of existing development, restore the stream reach between 38th Ave (RR5.7) and the Rock River (RR5.3), which has been significantly channelization and is currently little more than a ditch running along 16th Street and adjacent impervious land uses. Due to significant space constraints, restoration efforts should focus on creation of instream habitat and naturalizing the streambanks since there is no room for expanding or creating riparian wetlands. Instream habitat creation could include installation of artificial riffles in the steeper upstream sections and small wetland pools in the downstream section. Parts of the downstream section are already being colonized by wetland species.	C, E	3	0-5 yrs	3	3		
M	E5	Improve Streambank Stabilization Measures: Consider backfilling gabion basket stabilization measures (RR5.6) with soil and planting riparian vegetation to improve pollutant filtering and improve habitat. When it is necessary to replace sheetpile wall (RR5.7), investigate use of bioengineering streambank stabilization measures instead of replacing the sheetpile..	B, C, D, E	2	5-10 yrs	3	3		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	varies	feet / acres	varies	varies	varies	varies	Landowners, M	++	++	+	+	o	+	o	o	++
	varies	feet / acres	varies	varies	varies	varies	M, RIC, PRL	++	++	++	++	o	++	o	o	+
	32	acres	$5,000	$1,500	$160,000	$48,000	RIC, Landowners	+	+	++	o	++	+	++	++	+
	135	acres	varies	varies	varies	varies	Landowners, M	++	o	o	++	+	+	++	o	++
	7500	feet	$225	$25	$1,687,500	$187,500	Landowners, M, RIC, IDNR	o	++	+	o	++	o	o	++	++
	200	feet	$100	$2	$20,000	$300	Landowners, M	++	o	o	o	+	o	o	o	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU E							
M	E6	Manage and Restore Ravine Systems as Part of the Green Infrastructure Network: Minimize surface water runoff and maximize vegetative quality by thinning the forest canopy and establishing deep-rooted native ground cover. SMU E does not contain many concentrated green infrastructure hubs that could be restored, but a few of the wider forested ravine areas upstream of 38th Avenue (RR5.7), including the public owned parcels northwest of the 16th Street and 36th Avenue intersection, should be managed and restored to help create a green infrastructure network.	B, C, D, E	1A	10+ yrs	2	1		
M	E7	Inspect and Repair Stormwater Infrastructure: Repair and stabilize stormsewers, culverts, and outfalls at RR5.10 and RR5.11 and stabilize the surrounding streambank to prevent further erosion and infrastructure damage.	B, C, D, E	3	0-5 yrs	3	2		
M	E8	Install Bioengineering Practices to Stabilize Stream Banks: Stabilize eroding stream banks and ravines, some of them severe 4 to 8 feet high, at RR5.7, RR5.8, RR5.10, and RR5.11. A property at RR5.11 appears to be in danger of damage due to bank and ravine erosion.	B, C, D, E	2	5-10 yrs	3	3		
M	E9	Remove Yard Waste and Debris: Discontinue dumping of yard waste into the ravine and remove dumped material at RR5.8 and RR5.11. Remove fallen trees and woody debris obstructions at RR5.7, RR5.8, and RR5.9.	B, C, E	1	0-5 yrs	2	1		
M	E10	Begin Stream and Riparian Corridor Habitat Restoration: initiate stream and riparian corridor habitat restoration activities at RR5.10 and RR5.11, where intact groundwater hydrology was observed. Stream restoration should include stabilization of the banks, removal of invasive woody vegetation, and thinning of the canopy to allow sufficient light for colonization by native species adapted to seepage conditions. Where not already present, artificial riffles and other gravelly substrates may be introduced.	C, E	3	0-5 yrs	3	3		
M, RIC	E11	Implement Riparian and Ravine Management Land Use Recommendations: Implement riparian and ravine management land use recommendations for the residential areas abutting the ravines and stream. Since nearly all of the ravines are bordered by an urban rather than a natural land use, the relevant reaches requiring ravine management by adjacent landowners are not individually listed here or illustrated on the SMU map. This is included as a general recommendation applicable to the entire SMU E.	B, C, D, E	1B	0-5 yrs	2	1		
		SMU F							
M	F1	Retrofit Residential Areas with Stormwater BMPs: evaluate the use of rain gardens, vegetated swales, and naturalized detention (where feasible) and other BMPs to help filter and infiltrate runoff, reduce the flow of urban non-point source pollutants to the stream system, and protect the structural and natural integrity of the ravine system.	B, C, D, E	1D	5-10 yrs	3	2		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	125	acres	$8,000	$1,700	$1,000,000	$212,500	PRL, CBL, M	++	+	o	o	++	+	o	++	++
	2	each	$4,500	$500	$9,000	$1,000	Landowners, M	++	o	o	o	+	o	o	o	+
	400	feet	$150	$2	$60,000	$600	Landowners, M	++	o	o	o	+	o	o	o	+
	4	each	$1,500	$50	$6,000	$200	Landowners, M	o	+	++	o	+	o	o	o	++
	4	acres	$7,500	$1,700	$30,000	$6,800	Landowners, M, IDNR	o	++	+	o	++	o	o	++	++
	varies	feet / acres	varies	varies	varies	varies	M, RIC, landowners	++	++	+	+	o	+	o	o	++
	varies	feet / acres	varies	varies	varies	varies	M, PRL	++	++	++	++	o	++	o	o	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU F							
M	F2	Preserve and Restore the Rock River Floodplain: for this area south of John Deere Road, consider appropriate Best Management Practices that recognize and encourage the value of incorporating natural floodplain, wetland, and other riverine resources into future development plans rather than eliminating and/or ignoring such systems and areas. Also consider park and recreation land uses within the Rock River floodplain wherever possible.	C, E	1A	5-10 yrs	3	3		
M, RIC	F3	Daylight Stream Reach: Restore and daylight the stream reach between John Deere Road and the Rock River, which is underground for part of its length. Reconnect this stream reach to the wetlands and the Rock River floodplain, and restore the water quality and habitat functions to create a green infrastructure corridor that links the Rock River system to the ravine system upstream.	C, E	3	0-5 yrs	3	3		
M	F4	Manage and Restore Ravine Systems as Part of the Green Infrastructure Network: Minimize surface water runoff and maximize vegetative quality by thinning the forest canopy and establishing deep-rooted native ground cover. SMU F does not contain many concentrated green infrastructure hubs that could be restored; however, **the wide, forested ravine areas near RR6.1, RR6.2, and RR6.3 upstream of 38th Avenue should be managed and restored** to help create a green infrastructure network within this SMU. The area south of Moline High School, between 36th Street and 41st Street should be restored and used as a 'living laboratory' for students.	B, C, D, E	1B	10+ yrs	2	1		
M	F4	Manage and Restore Ravine Systems as Part of the Green Infrastructure Network: Minimize surface water runoff and maximize vegetative quality by thinning the forest canopy and establishing deep-rooted native ground cover. SMU F does not contain many concentrated green infrastructure hubs that could be restored; however, the wide, forested ravine areas near RR6.1, RR6.2, and RR6.3 upstream of 38th Avenue should be managed and restored to help create a green infrastructure network within this SMU. **The area south of Moline High School, between 36th Street and 41st Street should be restored and used as a 'living laboratory' for students**.	B, C, D, E	1B	10+ yrs	2	1		
M	F5	Reduce Development Impacts on Water Quality: Slow, filter, and infiltrate runoff from commercial and institutional land uses at 41st Street and Avenue of the Cities before flowing into the ravine near RR6.4 to reduce its impact on the ravine system and the contribution of pollutants to water quality degradation.	B, C, D, E	1C	10+ yrs	3	3		
M	F6	Inspect and Repair Stormwater Infrastructure: Repair and stabilize the stormsewer outfall and channel erosion at RR6.4 and stabilize the surrounding streambank to prevent further erosion and infrastructure damage. The eroding stream channel below this outfall has been stabilized with energy-dissipating concrete blocks, which should probably remain in place to help reduce channel erosion until the upstream hydrology can be stabilized.	B, C, D, E	3	0-5 yrs	3	2		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	40	acres	varies	varies	varies	varies	M, landowners, FEMA, USACE	+	o	++	+	++	++	++	o	o
	2000	feet	$575	$50	$1,150,000	$100,000	M, landowners, IDNR	o	+	+	o	++	o	o	++	++
	70	acres	$8,000	$1,700	$560,000	$119,000	Landowners, M	++	+	o	o	++	+	o	++	++
	30	acres	$8,000	$1,700	$240,000	$51,000	Landowners, M, Moline High School									
	varies	acres	varies	varies	varies	varies	M, landowners	++	o	o	+	o	++	o	o	o
	1	each	$4,500	$500	$4,500	$500	M, landowners	++	o	o	o	+	o	o	o	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU F							
M	F7	Install Bioengineering Practices to Stabilize Stream Banks: Stabilize eroding stream banks and ravines using streambank bionengineering methods from RR6.1 to RR6.4, some of them severe with steep banks of 15 to 20 feet high.	B, C, D, E	2	5-10 yrs	3	3		
M, RIC	F8	Restore Poor Stream Habitat: particularly south of John Deere Road. Due to significant space constraints, restoration efforts should focus on creation of instream habitat and naturalizing the streambanks since there is little to no room for expanding or creating riparian wetlands. Instream habitat creation could include installation of artificial riffles in steeper sections and small wetland pools in flatter sections.	C, E	3	0-5 yrs	3	3		
M, RIC	F9	Implement Riparian and Ravine Management Land Use Recommendations: Implement riparian and ravine management land use recommendations for the residential areas abutting the ravines and stream. Since nearly all of the ravines are bordered by an urban rather than a natural land use, the relevant reaches requiring ravine management by adjacent landowners are not individually listed here or illustrated on the SMU map. This is included as a general recommendation applicable to the entire SMU F.	B, C, D, E	1	0-5 yrs	2	1		
		SMU G							
M, RIC	G1	Retrofit Residential Areas with Stormwater BMPs: evaluate the use of rain gardens, vegetated swales, and naturalized detention (where feasible) and other BMPs to help filter and infiltrate runoff, reduce the flow of urban non-point source pollutants to the stream system, and protect the structural and natural integrity of the ravines.	B, C, D, E	1A	5-10 yrs	3	2		
M, RIC	G2	Preserve and Restore the Rock River Floodplain: for this area south of John Deere Road, consider appropriate Best Management Practices that recognize and encourage the value of incorporating natural floodplain, wetland, and other riverine resources into future development plans rather than eliminating and/or ignoring such systems and areas. Also consider park and recreation land uses within the Rock River floodplain wherever possible.	C, E	1A	5-10 yrs	3	3		
M, RIC	G3	Restore and Manage Wetlands: Where practical and with consideration of existing development, manage, restore, and expand wetlands within the hydric soil complex along the southern edge of the SMU within the Rock River floodplain to provide water quality enhancement and habitat. These wetlands have been designated as High Quality by the Bi-State Regional Commission's Special Area Management Plan.	B, C, D, E	3	10+ yrs	3	2		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	2800	feet	$100	$2	$280,000	$4,200	M, landowners	++	o	o	o	+	o	o	o	+
	4000	feet	$225	$25	$900,000	$100,000	M, landowners, IDNR	o	++	+	o	++	o	o	++	++
	varies	feet / acres	varies	varies	varies	varies	M, landowners	++	++	+	+	o	+	o	o	++
	varies	feet / acres	varies	varies	varies	varies	M, RIC, PRL	++	++	++	++	o	++	o	o	+
	190	acres	varies	varies	varies	varies	M, RIC, landowners, FEMA, USACE	+	o	++	+	++	++	++	o	o
	125	acres	$5,000	$1,500	$625,000	$187,500	M, RIC, landowners	+	+	++	o	++	+	++	++	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU G							
M, RIC	G4	Protect Priority Wetlands and Stream Reaches from the Development Impacts: in order to reduce the impact of nearby land uses, particularly industrial land uses at the southern end of 41st Street, consider the use of on-site stormwater BMPs such as permeable paving, parking lot bioretention swales, and green roofs. Also implement facility management practices such as frequent sweeping of parking lots and improved methods of de-icing that require less use of salt for winter snow and ice control.	B, C, D, E	1	10+ yrs	3	H		
--	G5	Manage and Restore Ravine Systems and Natural Areas as Part of the Green Infrastructure Network: Manage and restore ravine systems as part of the green infrastructure network to enhance their stability and ecological quality. SMU G has two areas of potential concentrated green infrastructure that could be restored:	--	--	--	--	--	--	
M, RIC	G5a	The backwater bayous and natural areas near RR7.1 is a major green infrastructure hub, including the Green Valley Nature Preserve and Prairie Restoration area, which showed evidence of potential for restoration to high quality natural systems. Restorable area unknown but estimated to be approximately 150 acres	B, C, D, E	1B	10+ yrs	2	1		
M	G5b	The small, western ravine system, which contains some wider ravine areas that may contain restoration potential.	B, C, D, E	1	10+ yrs	2	1		
M, RIC	G6	Restore Stream Reaches: where practical and with consideration of existing development, restore the stream reach from John Deere Road (RR7.6) to the Rock River (RR7.1), which is highly channelized in a ditch running along 41st Street, as well as the reach between RR7.10 and RR7.11, which is also channelized. Adjacent impervious land uses and the polluted runoff also impact the stream as it flows past. Restoration efforts upstream of the Rock River floodplain and associated wetlands may include enhancement of the narrow, meandering thalweg (lowest stream channel point) that is already forming and establishing the broader ditch bottom as a wetland buffer. Enhancement of the thalweg should include placement artificial riffles that can also serve as grade control to prevent further downcutting. At the downstream end reconnect this stream reach to the wetlands and the Rock River floodplain, and restore the water quality and habitat functions to create a green infrastructure corridor that links the Rock River system to the ravine system upstream. Replace the turf grass buffer with deep-rooted native vegetation.	C, E	1C	0-5 yrs	3	3		
M	G7	Reduce Development Impacts on Water Quality: Protect the stream from the impacts of nearby commercial, residential, and industrial land uses through the use of on-site stormwater BMPs such as permeable paving, parking lot bioretention swales, and green roofs. Also implement facility management practices such as frequent sweeping of parking lots and improved methods of de-icing that require less use of salt for winter snow and ice control.	B, C, D, E	1	10+ yrs	3	3		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	35	acres	varies	varies	varies	varies	M, RIC, CBL	++	o	o	++	+	+	++	o	++
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	150	acres	$7,500	$1,700	$1,125,000	$255,000	M, RIC, landowners	++	+	o	o	++	+	o	++	++
	24	acres	$8,000	$1,700	$192,000	$40,800	M, landowners	++	+	o	o	++	+	o	++	++
	3700	feet	$225	$25	$832,500	$92,500	M, RIC, landowners, IDNR	o	++	+	o	++	o	o	++	++
	12	acres	varies	varies	varies	varies	M, CBL	++	o	o	+	o	++	o	o	o

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU G							
M	G8	Inspect and Repair Stormwater Infrastructure: **Repair and stabilize the culvert** at John Deere Road and nearby channel erosion to prevent further erosion and infrastructure damage. Relocate residential drain pipes observed at RR7.7 and RR7.9 to the bottom of the ravine or remove them and infiltrate runoff on site.	B, C, D, E	3	0-5 yrs	3	2		
M	G8	Inspect and Repair Stormwater Infrastructure: Repair and stabilize the culvert at John Deere Road and nearby channel erosion to prevent further erosion and infrastructure damage. **Relocate residential drain pipes** observed at RR7.7 and RR7.9 to the bottom of the ravine or remove them and infiltrate runoff on site.	B, C, D, E	3	0-5 yrs	3	2		
M	G9	Install Bioengineering Practices to Stabilize Stream Banks: Stabilize eroding stream banks and ravines, and a large stream bank blowout, using streambank bionengineering methods from RR7.6 to RR7.9. An attempt to stabilize the channel at RR7.7, upstream of 34th Avenue should be monitored for stream flow making its way around the rock check dams and causing further erosion problems.	B, C, D, E	2	5-10 yrs	3	3		
M	G10	Install Stormwater Management BMPs: Convert the residential and public right-of-way properties near RR7.7, which are currently in turf grass, into a stormwater management facility designed to slow, filter, and infiltrate runoff entering this stream reach from surrounding development and the road. This may help protect and enhance the intact habitat system found within this reach.	B, D	1	0-5 yrs	3	3		
M	G11	Remove Yard Waste and Debris Obstructions: Remove woody debris from the channel near RR7.6, and wood, concrete, and yard waste from RR7.9. Rock debris at the outfall near RR7.7 should remain in place to help dissipate the energy of water flow and slow erosion.	B, C, E	1	0-5 yrs	2	1		
M, RIC	G12	Implement Riparian and Ravine Management Land Use Recommendations: Implement riparian and ravine management land use recommendations for the residential areas abutting the ravines and stream. Since nearly all of the ravines are bordered by an urban rather than a natural land use, the relevant reaches requiring ravine management by adjacent landowners are not individually listed here or illustrated on the SMU map. This is included as a general recommendation applicable to the entire SMU G.	B, C, D, E	1C	0-5 yrs	2	1		
		SMU H							
--	H1	Utilize Stormwater BMPs and Low Impact Design Principles for New and Existing Development:	--	1B	--	--	--	--	
M, EM	H1a	Consider retrofitting residential neighborhoods and other developed areas with stormwater BMPs, such as rain gardens, vegetated swales, naturalized detention (where feasible), and other BMPs to help filter and infiltrate runoff and reduce the flow of urban non-point source pollutants to the streams.	B, C, D, E	1A	5-10 yrs	3	2		

	Quantity	Unit	Unit Cost		Estimated Cost		Implementation Responsibility	Impairment Reduction Effectiveness								
			Initial ($)	Annual ($)	Initial ($)	Annual ($)		Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
	1	each	$5,000	$0	$5,000	$0	M, landowners	++	o	o	o	+	o	o	o	+
	2	each	1000	150	$2,000	$300	M, landowners	++	O	O	O	+	O	O	O	+
	5000	feet	$100	$2	$500,000	$7,500	M, landowners	++	o	o	o	+	o	o	o	+
	1	acres	$650	$75	$650	$75	M, PRL	++	o	+	+	o	++	o	o	o
	2	each	$1,500	$50	$3,000	$100	M, landowners	o	+	++	o	+	o	o	o	++
	varies	feet / acres	varies	varies	varies	varies	M, RIC, landowners	++	++	+	+	o	+	o	o	++
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	varies	feet / acres	varies	varies	varies	varies	M, EM, landowners	++	++	++	++	o	++	o	o	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU H							
M	H1b	Utilize low impact development principles and practices when urbanizing undeveloped portions of the watershed south of John Deere Road, which is planned for future office and business park uses. It is critical to use conservation design / Low Impact Development techniques and BMPs in new development to prevent increases in stream degradation, erosion, and water quality degradation.	B, D	1	0-5 yrs	3	3		
M	H1c	Implement agricultural land use recommendations for land still in agricultural production or fallow.	B, D	1B	0-5 yrs	2	2		
M	H2	Preserve and Restore the Rock River Floodplain: Preserve, restore, or mitigate wetlands in the area of hydric soils within this SMU, primarily south of John Deere Road. Consider appropriate Best Management Practices that recognize and encourage the value of incorporating natural floodplain, wetland, and other riverine resources into future development plans rather than eliminating and/or ignoring such systems and areas. Also consider park and recreation land uses within the Rock River floodplain wherever possible.	C, E	3	5-10 yrs	3	3		
M	H3	Restore and Manage Wetlands: Where practical and with consideration of existing development, manage, restore, and expand wetlands (and former wetlands) within the hydric soil complex along the southern edge of the SMU within the Rock River floodplain to provide water quality enhancement and habitat. These wetlands have been designated as High Quality by the Bi-State Regional Commissions Special Area Management Plan.	B, C, D, E	1A	10+ yrs	3	2		
M	H4	Protect Priority Wetlands and Stream Reaches from the Development Impacts: in order to reduce the impact of nearby land uses, particularly residential, commercial, and industrial land uses, particularly the industrial land uses at the southern end of 53rd Street, consider the use of on-site stormwater BMPs such as permeable paving, parking lot bioretention swales, and green roofs. Also implement facility management practices such as frequent sweeping of parking lots and improved methods of de-icing that require less use of salt for winter snow and ice control.	B, C, D, E	--	10+ yrs	3	H		
--	H5	Restore Stream Reaches: where practical and with consideration of existing development, restore the channelized / ditched and modified stream reaches from John Deere Road to the Rock River. Channel restoration efforts may include remeandering, a wide native stream buffer, and installation of instream habitat features. Reconnect these streams to the wetlands and the Rock River floodplain, and restore the water quality and habitat functions to create a green infrastructure corridor that links the Rock River to the ravine systems upstream.	--	3	--	--	--	--	
M	H5a	The western drainage system, which includes RR8.1 and RR8.2 and shows elements of a restorable stream system, flows through residential, industrial, and park land uses. The quantity (length) for this recommendation excludes the 1500 feet included in H5ai below.	C, E	3	0-5 yrs	3	3		

	Quantity	Unit	Unit Cost		Estimated Cost		Implementation Responsibility	Impairment Reduction Effectiveness								
			Initial ($)	Annual ($)	Initial ($)	Annual ($)		Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
	varies	feet / acres	varies	varies	varies	varies	DH, M, landowners	+	++	+	o	+	++	o	o	+
	varies	feet / acres	varies	varies	varies	varies	Landowners, M, NRCS / SWCD	++	++	++	o	o	+	o	o	++
	140	acres	varies	varies	varies	varies	M, landowners, FEMA, USACE	+	o	++	+	++	++	++	o	o
	60	acres	$5,000	$1,500	$300,000	$90,000	M, landowners	+	+	++	o	++	+	++	++	+
	270	acres	varies	varies	varies	varies	M, CBL	++	o	o	++	+	+	++	o	++
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4000	feet	$225	$25	$900,000	$100,000	Landowners, M, IDNR	o	++	+	o	++	o	o	++	++

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU H							
M	H5ai	The residential portion flows through a turf grass median that receives flow from upstream and adjacent residential streets and lots. This reach should be retrofit and restored as a demonstration project of how a neighborhood stream can be restored as a healthy and functional stream. Stabilize the outflow from the upstream culvert and restore a wide native riparian buffer where turf grass now exists. Filter and infiltrate runoff from adjacent impervious land uses through the use of filter strips and the buffer system. Install artificial riffle grade control to prevent further downcutting of thalweg.	C, E	3	0-5 yrs	3	3		
M	H5b	The eastern drainage system, from RR8.6 to the Rock River, flows through agricultural and fallow field. Restore a 100' native riparian buffer, While this reach could benefit from greater connection to its floodplain, the channel is deeply incised, making this relatively infeasible.	C, E	--	0-5 yrs	3	3		
--	H6	<u>Manage and Restore Ravine Systems and Natural Areas as Part of the Green Infrastructure Network:</u> Manage and restore ravine systems as part of the green infrastructure network to enhance their stability and ecological quality. Specifically, manage and restore, as part of the interconnected green infrastructure system for SMU H:	--	1A	--	--	--	--	
M, EM	H6a	The wooded ravine system extending upstream from approximately 46th Avenue (RR8.8) to Avenue of the Cities on the north and 53rd Street on the west (RR8.10).	B, C, D, E	1A	10+ yrs	2	1		
M, EM	H6b	The wooded ravine system (and the highly modified stream channel) extending upstream along the eastern drainage system from the Rock River upstream through the semi-natural campus of Blackhawk College, and to 11th Street on the east, Forest Road on the north, and extending to the Rose Lawn Memorial Estate on the west. This large hub depends upon Blackhawk College becoming involved in the watershed restoration effort and engaging in restoration activities on campus, which presents very good opportunities for high visibility demonstration projects and educational opportunities.	B, C, D, E	--	10+ yrs	2	1		
--	H7	<u>Install Stormwater Management BMPs / Demonstration Projects</u>:	--	1A	--	--	--	--	
M	H7a	Install a wide rain garden, swale, or infiltration trench at the downstream (low) end of the parking lot adjacent to the community park just upstream of RR8.1 to intercept and infiltrate runoff.	B, D	1B	0-5 yrs	3	3		
M	H7b	Install bioswales and rain gardens throughout the poorly drained neighborhoods near RR8.4 and RR8.10 to help retain and infiltrate stormwater into the ground and reduce ponding and flooding. Cost estimate assumes installation of 10,000 linear feet by 10 foot wide swales along roads.	B, D	1B	0-5 yrs	3	3		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	1500	feet	$575	$50	$862,500	$75,000	Landowners, M	o	++	+	o	++	o	o	++	++
	5500	feet	$100	$5	$550,000	$27,500	Landowners, M, IDNR	o	++	+	o	++	o	o	++	++
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	95	acres	$8,000	$1,700	$760,000	$161,500	Landowners, M, EM	++	+	o	o	++	+	o	++	++
	230	acres	$8,000	$1,700	$1,840,000	$391,000	Blackhawk College, Landowners, M, EM	++	+	o	o	++	+	o	++	++
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1	acre	$650	$75	$650	$75	M, landowners	++	++	+	+	o	++	o	o	o
	3	acre	$650	$75	$1,625	$188	M, landowners	++	++	+	+	o	++	o	o	o

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU H							
M, EM	H7c	Install rain gardens and bioswales along roads, parking lots, and other impervious surfaces on the Black Hawk College campus to help reduce the rate and volume of runoff and reduce the flow of non point source pollutants to the stream. Cost estimate assumes installation of approximately 16,000 linear feet of 10 foot swales along all roads and in parking lots.	B, D	1	0-5 yrs	3	3		
M, EM	H8	Reduce the Impact of Impervious Surfaces: Install stormwater BMPs to slow, filter and infiltrate the high volume of runoff from the concentration of impervious surfaces along Avenue of the Cities to reduce the impact of high runoff rate and volume on the ravine system (RR8.8 to RR8.10) and the contribution of pollutants to water quality degradation.	B, C, D, E	3	10+ yrs	3	3		
M, EM	H9	Inspect and Repair Stormwater Infrastructure: Repair and stabilize stormsewers, culverts, and outfalls at RR8.3 and RR8.8, and stabilize the surrounding streambank to prevent further erosion and infrastructure damage. Also consider installing structures to reduce the energy of stormwater discharges from these outfalls, which are likely causing erosion problems around the outfalls and elsewhere downstream.	B, C, D, E	2	0-5 yrs	3	2		
M	H10	Install Bioengineering Practices to Stabilize Stream Banks: Stabilize eroding stream banks and ravines using streambank bionengineering methods at RR8.3 and RR8.7. The reach near RR8.2 is experiencing severe erosion that threatens to completely destroy the channel around the 38th Avenue and upstream culverts as well as the adjacent infrastructure and requires immediate structural stabilization measures.	B, C, D, E	3	5-10 yrs	3	3		
M, EM	H11	Restore Stream Habitat: The ravine, riparian, and stream habitat of Rock River Ravine H is generally poor and therefore efforts should be focused on stabilization to reduce downstream sedimentation. Where instream habitat exists, it should be preserved and enhanced as part of the stabilization.	C, E	1	0-5 yrs	3	3		
M	H12	Remove Yard Waste and Debris Obstructions: Remove debris from the channel near RR8.2 and RR8.10. Cease yard waste dumping and remove dumped yard waste at RR8.4.	B, C, E	1	0-5 yrs	2	1		
M, EM	H13	Implement Riparian and Ravine Management Land Use Recommendations: Implement riparian and ravine management land use recommendations for the residential areas abutting the ravines and stream. Since nearly all of the ravines are bordered by an urban rather than a natural land use, the relevant reaches requiring ravine management by adjacent landowners are not individually listed here or illustrated on the SMU map. This is included as a general recommendation applicable to the entire SMU H.	B, C, D, E	1	0-5 yrs	2	1		
		SMU I							
--	I1	Utilize Stormwater BMPs for Existing Developed Areas and Agricultural Land Uses:	--	--	--	--	--	--	

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	4	acre	$650	$75	$2,600	$300	M, EM, Blackhawk College	++	++	+	+	o	++	o	o	o
	140	acre	varies	varies	varies	varies	M, EM, CBL	++	++	o	+	o	++	o	o	o
	2	each	$4,500	$500	$9,000	$1,000	M, EM, landowners	++	o	o	o	+	o	o	o	+
	300	feet	$150	$2	$45,000	$450	M, landowners	++	o	o	o	+	o	o	o	+
	varies	acres	varies	varies	varies	varies	Landowners, M, EM, IDNR	o	++	+	o	++	o	o	++	++
	3	each	$1,500	$50	$4,500	$150	Landowners, M	o	++	++	o	+	o	o	o	++
	varies	feet / acres	varies	varies	varies	varies	Landowners, M, EM	++	++	+	+	o	+	o	o	++
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU I							
EM, S	I1a	Retrofit residential neighborhoods within the upstream reaches with stormwater BMPs, such as rain gardens, vegetated swales, naturalized detention (where feasible), and other BMPs to help filter and infiltrate runoff and reduce the flow of urban non-point source pollutants to the stream.	B, C, D, E	1C	5-10 yrs	3	2		
RIC	I1b	Implement agricultural land use recommendations for land still in agricultural production or fallow south of John Deere Road.	B, D	1	0-5 yrs	2	2		
RIC	I2	Restore the Rock River Floodplain: The Rock River floodplain south of John Deere Road is undeveloped and should remain so by classifying them as park and recreation land uses, which are more compatible with the health and function of the floodplain and prevention of future flood losses. Incorporate the Rock River floodplain and associated wetlands into the overall green infrastructure network.	C, E	1A	5-10 yrs	3	3		
RIC	I3	Restore and Manage Wetlands: Manage, restore, and expand wetlands (and former wetlands) south of John Deere Road to provide water quality enhancement and habitat. These wetlands have been designated as High Quality by the Bi-State Regional Commission's Special Area Management Plan.	B, C, D, E	1C	10+ yrs	3	2		
RIC, EM, S	I4	Manage and Restore Ravine Systems and Natural Areas as Part of the Green Infrastructure Network: Manage and restore the ravine and stream system that runs through the John Deere property and into the Rock River floodplain as a significant hub within the overall watershed green infrastructure system. Minimize concentrated stormwater discharge to the ravine and maximize vegetative quality by thinning the forest canopy, establishing deep-rooted native ground cover, managing invasive species, and prescribed burning to maximize vegetative quality. This system extends upstream along small drainages adjacent to John Deere property.	B, C, D, E	1B	10+ yrs	2	1		
EM, S, RIC	I5	Inspect and Repair Stormwater Infrastructure: Stormwater infrastructure elements (stormsewers, culverts, and outfalls) observed during the stream survey were found to be intact and stable. However, all stormsewer outfalls and culverts within this SMU, particularly those that discharge to the ravine system, should be inspected periodically and repaired as needed. Streambanks around these outfalls should be stabilized as necessary to prevent damage to stormwater and other infrastructure.	B, C, D, E	3	0-5 yrs	3	2		
EM	I6	Install Stormwater Management BMPs / Demonstration Projects: Install parkway rain gardens along Archer Drive (Ravine reach that crosses Archer south of 46th Avenue), where there are broad parkways that provide sufficient space for rain gardens to filter and infiltrate stormwater as it flows down the roadway towards the storm drain before being discharged to the stream. This could serve as a demonstration project. Approximate area is 2000 linear feet of 10 foot swales along the road.	B, D	1B	0-5 yrs	3	3		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	varies	feet / acres	varies	varies	varies	varies	EM, S, PRL	++	++	++	++	o	++	o	o	+
	varies	feet / acres	varies	varies	varies	varies	RIC, landowners, NRCS / SWCD	++	++	++	o	o	+	o	o	++
	540	acres	varies	varies	varies	varies	RIC, landowners	+	o	++	+	++	++	++	o	o
	375	acres	$5,000	$1,500	$1,875,000	$562,500	RIC, landowners	+	+	++	o	++	+	++	++	+
	550	acres	$8,000	$1,700	$4,400,000	$935,000	RIC, EM, S, landowners / John Deere	++	+	o	o	++	+	o	++	++
	unknown	each	$4,500	$500	NA	NA	RIC, EM, S, landowners / John Deere	++	o	o	o	+	o	o	o	+
	0	acres	$650	$75	$325	$38	EM	++	++	+	+	o	++	o	o	o

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU I							
RIC	I7	Remove Debris Obstructions: Remove woody debris from RR9.1 according to Illinois Department of Natural Resources guidelines.	C, E	1C	0-5 yrs	2	1		
		SMU J							
--	J1	Utilize Stormwater BMPs for Existing Developed Areas, the Golf Course, and Agricultural Land Uses:	--	--	--	--	--	--	
S	J1a	Retrofit residential neighborhoods within the upstream reaches with stormwater BMPs, such as rain gardens, vegetated swales, naturalized detention (where feasible), and other BMPs to help filter and infiltrate runoff and reduce the flow of urban non-point source pollutants to the stream.	B, C, D, E	1	5-10 yrs	3	2		
S	J1b	The golf course, which is using some BMPs to protect water quality and the integrity of the stream systems, should install stormwater filtration and infiltration BMPs between the course and the outfalls that discharge to the on site streams.	C, E	1	0-5 yrs	3	3		
RIC	J1c	Implement agricultural land use recommendations for land still in agricultural production or fallow southeast of John Deere Road.	B, D	1	0-5 yrs	2	2		
RIC	J2	Restore the Rock River Floodplain: Preserve as park and recreational land and restore the Rock River floodplain and associated wetlands south of Colona Road and east of the TPC Golf Course in a natural state. Incorporate these areas into the overall green infrastructure network. The wetlands and hydric soils east of the golf course are designated as High Quality by the Bi-State Regional Commission's Special Area Management Plan and should be managed and restored to provide water quality and habitat enhancement.	C, E	1A	5-10 yrs	3	3		
S, RIC	J3	Manage and Restore Ravine Systems and Natural Areas as Part of the Green Infrastructure Network: the ravine system running through the TPC golf course and into the Rock River floodplain is a significant hub within the overall watershed green infrastructure system. The headwaters of this system, which begin upstream of John Deere Road (RR10.1) should also be incorporated into the green infrastructure system. Minimize concentrated stormwater discharge to the ravine and maximize vegetative quality by thinning the forest canopy, establishing deep-rooted native ground cover, managing invasive species, and prescribed burning to maximize vegetative quality. This system extends upstream along small drainages adjacent to John Deere property. Area covers approximately 14,000 linear feet of ravine corridor by approximately 300 feet wide.	B, C, D, E	1A	10+ yrs	2	1		

	Quantity	Unit	Unit Cost		Estimated Cost		Implementation Responsibility	Impairment Reduction Effectiveness								
			Initial ($)	Annual ($)	Initial ($)	Annual ($)		Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
	1	each	$1,500	$50	$1,500	$50	RIC, landowner / John Deere	+	o	o	o	o	+	o	o	o
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	varies	feet / acres	varies	varies	varies	varies	S, PRL	++	++	++	++	o	++	o	o	+
	varies	feet / acres	varies	varies	varies	varies	S, TPC golf course	o	++	++	++	o	+	o	o	o
	varies	feet / acres	varies	varies	varies	varies	RIC, landowners, NRCS / SWCD	++	++	++	o	o	+	o	o	++
	212	acres	varies	varies	varies	varies	RIC, landowners, FEMA, USACE	+	o	++	+	++	++	++	o	o
	95	acres	$8,000	$1,700	$760,000	$161,500	S, RIC, landowners, TPC Golf Course	++	+	o	o	++	+	o	++	++

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU J							
S	J4	Inspect and Repair Stormwater Infrastructure: Repair and stabilize stormsewers, culverts, and outfalls at RR10.1, RR10.3, and one large and one small outfall at R10.6 and RR10.7, and stabilize the surrounding streambank and gulley to prevent further erosion and infrastructure damage. Also consider installing structures to reduce the energy of stormwater discharges from these outfalls, which are likely causing erosion problems around the outfalls.	B, C, D, E	3	0-5 yrs	3	2		
S	J5	Install Stormwater Management BMPs / Demonstration Projects: Install rain gardens and /or other infiltration practices at the downstream end of the neighborhood park (at the end of 12th Street) parking lot at RR10.1 to intercept and infiltrate stormwater runoff before being discharged to the side of the ravine slope. Rock placed to prevent erosion is being undermined and washed away.	B, D	2	5-10 yrs	3	3		
S	J6	Remove Debris Obstructions: Remove woody debris from RR10.6 and RR10.8 that is diverting flows into the adjacent banks and exacerbating erosion.	C, E	1	0-5 yrs	2	1		
S	J7	Install Bioengineering Practices to Stabilize Stream Banks: Stabilize eroding stream banks and ravines, some of which are exhibiting the early stages of erosion and general deterioration due to stormwater runoff from the residential areas and the TPC golf course. Use bioengineering stabilization methods to stabilize streambanks at RR10.1, RR10.2, RR10.3, RR10.4 (minor erosion), RR10.5, RR10.6, RR10.7, and RR10.8.	B, C, D, E	2	5-10 yrs	3	3		
		SMU K							
--	K1	Utilize Stormwater BMPs for Existing Developed Areas and Agricultural Land Uses:	--	--	--	--	--	--	
S, CC	K1a	Retrofit residential neighborhoods and other developed land uses with stormwater BMPs, such as rain gardens, vegetated swales, naturalized detention (where feasible), and other BMPs to help filter and infiltrate runoff and reduce the flow of urban non-point source pollutants to the stream.	B, C, D, E	1C	5-10 yrs	3	2		
CC, RIC	K1b	Implement agricultural land use recommendations for land in the easternmost portion of the SMU that is still in agricultural production or fallow.	B, D	1C	0-5 yrs	2	2		
S, CC	K2	Protect Stream Reaches from the Development Impacts: Slow, filter, and infiltrate runoff from concentrated commercial land uses along John Deere Road before releasing it into the ravine system to reduce its impact on the ravines and the contribution of pollutants to water quality degradation.	B, C, D, E	1C	10+ yrs	3	H		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	4	each	$4,500	$500	$18,000	$2,000	S, TPC Golf Course	++	o	o	o	+	o	o	o	+
	0	acres	$650	$75	$130	$15	S	++	++	+	+	o	++	o	o	o
	2	each	$1,500	$50	$3,000	$100	S, TPC Golf Course	+	o	o	o	o	+	o	o	o
	800	feet	$150	$2	$120,000	$1,200	S, TPC Golf Course	++	o	o	o	+	o	o	o	+
	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	varies	feet / acres	varies	varies	varies	varies	S, CC, PRL	++	++	++	++	o	++	o	o	+
	varies	feet / acres	varies	varies	varies	varies	CC, RIC, landowners, NRCS / SWCD	++	++	++	o	o	+	o	o	++
	225	acres	varies	varies	varies	varies	S, CC, CBL	++	o	o	++	+	+	++	o	++

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU J							
CC, RIC	K3	Restore the Rock River Floodplain and Wetlands: Preserve as park and recreational land and restore the Rock River floodplain and associated wetlands in the eastern end of the SMU. Incorporate this area into the overall green infrastructure network. The wetlands and hydric soils are a mix of High, Medium, and Low Quality wetlands according to the Bi-State Regional Commission's Special Area Management Plan and should be managed and restored to provide water quality and habitat enhancement. In the long term, all structures and infrastructure should be removed from the Rock River floodplain.	C, E	1B	5-10 yrs	3	3		
S, CC	K4	Manage and Restore Ravine Systems and Natural Areas as Part of the Green Infrastructure Network: Manage and restore the ravine and stream systems, particularly the former coal mine area that is forested and undeveloped, as part of the green infrastructure system to enhance its stability and ecological quality. Minimize concentrated stormwater discharge, thin the forest canopy, manage invasive species, and maximize the vegetative quality and structure to help stabilize these systems. This network extends upstream to the east along the southern branch of the drainage system to incorporate the land along the edges of the Greenview Memorial Garden Cemetery.	B, C, D, E	1A	10+ yrs	2	1		
CC	K5	Restore Stream Reaches: Restore the stream reach from 2nd Avenue to the Rock River (RR11.1), which is highly channelized. Between South 2nd Avenue and South 1st Avenue, the ravine is constrained by adjacent homes and should be stabilized in place. Downstream of 1st Avenue there is no development adjacent to the stream but it is quite incised. There may be opportunities in this area to excavate overbank wetlands to improve habitat and water quality. A naturalized buffer should also be included along this reach to create a green infrastructure corridor that links the Rock River system to the ravine system upstream. Replace the turf grass buffer with deep-rooted native vegetation in back yard areas.	C, E	2	10+ yrs	3	3		
S, CC	K6	Inspect and Repair Stormwater Infrastructure: Stormwater infrastructure elements (stormsewers, culverts, and outfalls) observed during the stream survey were found to be intact and stable. However, all stormsewer outfalls and culverts within this SMU, particularly those that discharge to the ravine system, should be inspected periodically and repaired as needed. Streambanks around these outfalls should also be stabilized as necessary to prevent further damage to stormwater and other infrastructure. Municipalities should consider installing structures to reduce the energy of stormwater discharges from these outfalls, which are likely causing erosion problems around the outfalls.	B, C, D, E	3	0-5 yrs	3	2		
CC	K7	Install Bioengineering Practices to Stabilize Stream Banks: Stabilize eroding stream banks and ravines using streambank bionengineering methods at RR11.1 and RR11.5.	B, C, D, E	2	5-10 yrs	3	3		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	255	acres	$5,000	$1,500	$1,275,000	$382,500	CC, RIC, landowners, FEMA, USACE	+	o	++	+	++	++	++	o	o
	240	acres	$8,000	$1,700	$1,920,000	$408,000	S, CC, landowners	++	+	o	o	++	+	o	++	++
	5200	feet	$225	$25	$1,170,000	$130,000	CC, landowners, IDNR	o	++	+	o	++	o	o	++	++
	unknown	each	$4,500	$500	NA	NA	S, CC, landowners	++	o	o	o	+	o	o	o	+
	200	feet	$100	$2	$20,000	$300	CC, landowners	++	o	o	o	+	o	o	o	+

Table 6.4.5 Watershed Plan Implementation Tables (continued)

Jurisdiction	ID# (SMU+ID)	Specific Recommendations	Goals Addressed	Priority	Time frame	Ease of Implementation	Technical Effort Required	Status	
		SMU K							
S, CC	K8	Remove Yard Waste and Debris: Cease yard and landscape waste dumping and remove landscape waste from the stream channel and riparian area near RR11.2, RR11.3, and RR11.5.	B, C, E	1	0-5 yrs	2	1		
S	K9	Naturalize Detention: Naturalize the detention basin near the Wal-Mart on John Deere Road by installing a deep-rooted native vegetation buffer and lower the outflow rate at RR11.4. Although the detention basin will reduce erosive pressures, the flow rates will be sufficiently high and of long enough duration, armoring of the downstream ravine channel should be provided to prevent downcutting of the channel.	B, D	1	0-5 yrs	3	3		
S, CC	K10	Implement Riparian and Ravine Management Land Use Recommendations: Implement riparian and ravine management land use recommendations for the residential areas abutting the ravines and stream. Since nearly all of the ravines are bordered by an urban rather than a natural land use, the relevant reaches requiring ravine management by adjacent landowners are not individually listed here or illustrated on the SMU map. This is included as a general recommendation applicable to the entire SMU H.	B, C, D, E	1	0-5 yrs	2	1		

	Quantity	Unit	Initial ($)	Annual ($)	Initial ($)	Annual ($)	Implementation Responsibility	Water Quality: TSS / sediment (lb/yr)	Water Quality: Low Dissolved Oxygen	Water Quality: Nutrients (Phosphorous lb/yr)	Water Quality: Aquatic life toxicity	Habitat Degradation: Lack of habitat characteristics	Habitat Degradation: Hydrologic disturbance / flow alterations	Habitat Degradation: Wetland loss / degradation	Habitat Degradation: Exotic & invasive species	Habitat Degradation: Loss / degradation of buffer / streamside alterations
			Unit Cost		Estimated Cost			Impairment Reduction Effectiveness								
	3	each	$1,500	$50	$4,500	$150	S, CC, landowners	o	++	++	o	+	o	o	o	++
	1	each	varies	varies	varies	varies	S, landowner	+	o	+	+	o	o	o	o	o
	varies	feet / acres	varies	varies	varies	varies	S, CC, landowners	++	++	+	+	o	+	o	o	++

6.5 PLAN MONITORING AND EVALUATION

6.5.1 MONITORING PLAN IMPLEMENTATION

Continued monitoring and analysis is critical for providing feedback on the progress of implementation of this Watershed Plan. The implementation and effectiveness of the watershed plan and recommendations, and an assessment of whether plan goals are being achieved, can be measured through a process called 'monitoring'. Simply, monitoring is observing and tracking watershed conditions and indicators for positive or negative changes that may be attributed to the implementation of the plan. These indicators can then be compared with water quality monitoring data to determine whether there is a correlation between them. If no discernible correlation can be made, and if satisfactory progress is not being made towards watershed goals, the watershed implementation team should consider whether recommended strategies are having the desired effect or should be modified accordingly.

Recommendations that are physical or structural in nature, such as streambank stabilization or riparian buffers, can be assessed in terms of reduced pollutant loads discharged into the watershed, improved biological and habitat health, and the degree of change in stormwater runoff volume and flow. The effectiveness of non-structural recommendations, however, such as education, policies and regulations, and coordination, can be difficult to measure due to long feedback time. Changes in behavior following the implementation of non-structural recommendations can be assessed by gathering feedback through meetings with implementation partners and tools such as surveys and focus groups, as suggested in Tables 6.5.1 to 6.5.6.

This monitoring strategy is intended to help track and measure the implementation of recommendations made in this plan using a variety of indicators that are monitored regularly, typically on an annual basis or every three years. Progress on overall plan implementation should be reviewed using the milestones and indicators every five years and the plan should be updated as needed.

The monitoring plan includes a monitoring baseline, frequency of monitoring, short, medium, and long term milestones, responsible party, and mode of collection. There are also empty columns for implementers to track the number of actions taken, location of implementation, and percentage complete. The empty cells of the table (number of actions, and location of implementation) are to be filled in by the parties responsible for monitoring as identified in the table. *Number of actions* is the actual data collected, for example, the concentration of phosphorous or the # of floodproofed structures in the floodplain. *Location of implementation* refers to geographical location, such as where streambanks or wetlands were restored. *Percent complete* is a measure of progress toward the goal itself, where 100% would indicate the complete achievement of a goal.

Since water quality is one of the primary goals of this plan, stream and lake water quality impairments should be monitored by regularly collecting and testing water samples, either manually or using constant monitoring equipment. A regular sampling strategy should be initiated and new data should be added to existing data so that trends can be tracked. An expanded water quality monitoring protocol is essential to better locate and identify the causes and sources of impairment that have been identified in this plan.

Some of the impairments also can be monitored visually and anecdotally by those living along the stream and those involved in stream monitoring activities such as the Iowater program and other volunteer watershed monitoring activities. Visual and anecdotal monitoring should be done regularly (weekly in summer months and monthly in winter months is recommended) by trained volunteers. Specifically, increases in nutrient loading may be identified by the increase or presence of algal blooms. Acute aquatic life toxicity may be identified visually by watching for fish kills or other kills of aquatic species such as insects or plant species. Strange smells, slicks, or sheens on the water may also indicate the discharge of a problem pollutant.

6.5.2 EVALUATING PLAN PERFORMANCE

Watershed issues, opportunities, and conditions will change over time. This watershed plan should be evaluated and updated every five years to account for these changes. At each evaluation and update, completed projects can be removed from the plan and new projects should be added.

In addition to this 5-year update, plan implementation should be monitored annually by the Watershed Planning Committee or, if established, the watershed organization.

At the time of the annual evaluation, the committee should assess the list of priorities and identify the top priority actions for the following year.

As projects are implemented, they should be recorded using Tables 6.10 to 6.15, which track the implementation of actions against the watershed plan goals and objectives as a means of monitoring watershed plan implementation.

Table 6.5.1 Monitoring Plan for Issue 1: Watershed Planning, Implementation & Coordination

Issue	Issue 1: Watershed Planning, Implementation & Coordination	Issue 1: Watershed Planning, Implementation & Coordination	Issue 1: Watershed Planning, Implementation & Coordination	Issue 1: Watershed Planning, Implementation & Coordination
Goal	Goal A: Improve coordination and decision-making between public, private, and non-profit stakeholders to implement the watershed plan recommendations and improve watershed resources.	Goal A: Improve coordination and decision-making between public, private, and non-profit stakeholders to implement the watershed plan recommendations and improve watershed resources.	Goal A: Improve coordination and decision-making between public, private, and non-profit stakeholders to implement the watershed plan recommendations and improve watershed resources.	Goal A: Improve coordination and decision-making between public, private, and non-profit stakeholders to implement the watershed plan recommendations and improve watershed resources.
Objective	1. Establish a watershed council with funding and administrative support to guide watershed plan implementation, provide technical assistance to watershed stakeholders, and coordinate multi-partner projects.	2. Help communities and stakeholders secure project funding by disseminating information on funding sources and mechanisms for implementing watershed projects.	3. Pursue cost-sharing arrangements between jurisdictions for watershed preservation/ improvement projects that have broad benefits and impacts.	4. Adopt, strengthen, and enforce standards and guidelines intended to preserve and enhance watershed resources and reduce the impact of development on water resources.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration
Indicators	Establishment of lead organization with budget and executive committee; number of projects advanced/ undertaken under the auspices of the watershed council.	Number of communities and stakeholders receiving funding for watershed improvement projects; number of projects installed / undertaken.	Number of projects funded by multiple jurisdictions and/or stakeholders.	Number of communities that adopt, strengthen, and enforce standards and guidelines.
Frequency of Monitoring	Annual	Annual	Every 3 years	Every 3 years
Baseline (2007)	Watershed planning council (stakeholders group) is organized but not formalized; 0 projects initiated by council.	0 communities; 0 projects	0 projects	Baseline is current set of municipal ordinances and guidelines
Short Term Milestones (2008-2013) (1-5 years)	Watershed council and executive committee established and funded; 1 project / year initiated by council.	2 communities have received funding within 5 years; 1 project funded per year	1 project per year	1 municipality has strengthened guidelines
Mid Term Milestones (2013-2018) (5-10 years)	Watershed council and executive committee established and funded; 3 projects / year initiated by council.	all communities have received funding within 10 years; 3 projects funded per year	3 projects per year	All municipalities have strengthened guidelines
Long Term Milestones (2018+) (10+ years)	Watershed council and executive committee established and funded; 3 projects / year initiated by council.	all communities have received funding within 10 years; 5 projects funded per year	3 projects per year	All municipalities have strengthened guidelines
Party Responsible for Monitoring	Watershed Planning Council, River Action	Watershed Planning Council	Municipalities, Watershed Planning Council	Municipalities, Watershed Planning Council
Mode of Collection	Internal audit / recordkeeping	Internal audit / recordkeeping; contact with municipalities and stakeholders	Internal audit / recordkeeping; contact with municipalities and stakeholders	Contact municipal officials and staff; review policies and regulations
Number of Actions				
Location of Implementation				
Percent Complete				

Table 6.5.1 Monitoring Plan for Issue 1: Watershed Planning, Implementation & Coordination (continued)

Issue	Issue 1: Watershed Planning, Implementation & Coordination	Issue 1: Watershed Planning, Implementation & Coordination	Issue 1: Watershed Planning, Implementation & Coordination
Goal	Goal A: Improve coordination and decision-making between public, private, and non-profit stakeholders to implement the watershed plan recommendations and improve watershed resources.	Goal A: Improve coordination and decision-making between public, private, and non-profit stakeholders to implement the watershed plan recommendations and improve watershed resources.	Goal A: Improve coordination and decision-making between public, private, and non-profit stakeholders to implement the watershed plan recommendations and improve watershed resources.
Objective	5. Watershed municipalities coordinate land use planning and watershed plan implementation activities.	6. Local public agencies incorporate watershed improvement best management practices into ongoing management, maintenance, and infrastructure projects (e.g., streets, drainage system, etc.)	7. Develop and implement a plan to monitor watershed conditions, resources and trends (hydrologic, biologic, and water quality) and implementation of plan recommendations.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration
Indicators	Number of communities participating in cross-jurisdictional coordination and projects.	Number of communities adding watershed improvement practices to ongoing activities, plans, and budgets.	Established monitoring program; record of watershed monitoring data; number of recommendations implemented.
Frequency of Monitoring	Every 3 years	Every 3 years	Annual
Baseline (2007)	Baseline assumed to be 0 municipalities; 0 projects	Baseline assumed to be 0 municipalities	Very little data exists for biological measures; water quality and hydrologic data has not been consistently collected for Rock River Ravines; 0 watershed plan recommendations implemented.
Short Term Milestones (2008-2013) (1-5 years)	2 cross-jurisdictional projects	1 municipality	Annual data collection program established; 3 years of consistently collected biological, hydrologic, and water quality data; 1 watershed recommendation implemented within each SMU
Mid Term Milestones (2013-2018) (5-10 years)	5 cross-jurisdictional projects	All municipalities	8 years of consistently collected biological, hydrologic, and water quality data; 2 watershed recommendations implemented within each SMU
Long Term Milestones (2018+) (10+ years)	10 cross-jurisdictional projects	All municipalities	Ongoing annual data collection program established; 5 watershed recommendations implemented within each SMU
Party Responsible for Monitoring	Municipalities, Watershed Planning Council	Municipalities, Watershed Planning Council	Watershed Planning Council
Mode of Collection	Contact municipal officials and staff; internal audit / recordkeeping	Contact municipal officials and staff; review policies and regulations	Review monitoring databases; internal audit / recordkeeping
Number of Actions			
Location of Implementation			
Percent Complete			

Table 6.5.2 Monitoring Plan for Issue 2: Water Quality

Issue	Issue 2: Water Quality	Issue 2: Water Quality	Issue 2: Water Quality	Issue 2: Water Quality
Goal	Goal B: Improve water quality in streams by reducing pollutants in stormwater runoff and addressing modified hydrology.	Goal B: Improve water quality in streams by reducing pollutants in stormwater runoff and addressing modified hydrology.	Goal B: Improve water quality in streams by reducing pollutants in stormwater runoff and addressing modified hydrology.	Goal B: Improve water quality in streams by reducing pollutants in stormwater runoff and addressing modified hydrology.
Objective	1. All watershed streams meet or exceed state water quality standards.	2. Reduce non-point source pollution loading from existing and new development (streets, parking lots, turf grass lawns, and other impervious surfaces) by controlling inputs and using on-site best management practices.	3. Prevent erosion and flow of chemical pollutants and nutrients (fertilizers, pesticides, organic waste) from farmland, golf courses, parks, and yards into streams.	4. Prevent dumping of inappropriate substances (e.g., yard waste) within the stream channel, riparian corridor, and stormsewer network.
Impairments Addressed	Water Quality	Water Quality	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration
Indicators	Phosphorous < 0.05 mg/L; dissolved oxygen (DO) > 5.0 mg/L; chloride <30 mg/L; total suspended solids (no standard); toxic substances (no standard)	Water quality monitoring data; linear feet / acres of BMPs installed; linear feet of retrofitted drainage swale or other drainage infrastructure for water quality improvement.	Acres / linear feet of BMPs installed and/or implemented across the landscape and along the stream channel; water quality monitoring data.	Number of dumping occurrences detected during rapid stream inventory; dumping reports received by municipalities.
Frequency of Monitoring	Annual	Annual	Annual	Annual
Baseline (2007)	baselines need to be established for phosphorous, chloride, and dissolved oxygen.	Water quality baseline established in objective B1; 0 acres / 0 lf of BMPs installed	TSS (baseline needs to be established); Water quality baseline established in objective B1; 0 acres / 0 lf of BMPs installed	Baseline needs to be established through comprehensive stream survey
Short Term Milestones (2008-2013) (1-5 years)	25% improvement over initial 2-year average for phosphorous, chloride, and dissolved oxygen.	Water quality milestones established in objective B1; 1 acre / 1000 lf of BMPs installed within each SMU	TSS improvement by 25% over initial 2-year average; water quality milestones established in objective B1; 1 acre / 1000 lf of BMPs installed within each SMU	Total of ten or fewer surveyed incidents or reports of dumping per SMU
Mid Term Milestones (2013-2018) (5-10 years)	50% improvement over initial 2-year average for phosphorous, chloride, and dissolved oxygen.	Water quality milestones established in objective B1; 3 acres / 2000 lf of BMPs installed within each SMU	TSS improvement by 50% over initial 2-year average; water quality milestones established in objective B1; 3 acres / 2000 lf of BMPs installed within each SMU	Total of five or fewer surveyed incidents or reports of dumping per SMU
Long Term Milestones (2018+) (10+ years)	90% improvement over initial 2-year average for phosphorous, chloride, and dissolved oxygen.	Water quality milestones established in objective B1; 5 acres / 5000 lf of BMPs installed within each SMU	TSS improvement by 90% over initial 2-year average; water quality milestones established in objective B1; 5 acres / 5000 lf of BMPs installed within each SMU	Total of two or fewer surveyed incidents or reports of dumping per SMU
Party Responsible for Monitoring	Illinois EPA; municipalities	Illinois EPA; Municipality, Landowner	Illinois EPA; municipalities, landowners	Watershed Planning Council should establish the stream survey; municipalities
Mode of Collection	Physical / chemical sampling and / or lab analysis using accepted state protocols	Landowner contact and anecdotal reporting; contact municipal officials and staff	Physical / chemical sampling and / or lab analysis using accepted state protocols; municipal and landowner contact / reports and anecdotal reporting	Comprehensive stream survey; contact municipalities
Number of Actions				
Location of Implementation				
Percent Complete				

Table 6.5.2 Monitoring Plan for Issue 2: Water Quality (continued)

Issue	Issue 2: Water Quality	Issue 2: Water Quality	Issue 2: Water Quality
Goal	Goal B: Improve water quality in streams by reducing pollutants in stormwater runoff and addressing modified hydrology.	Goal B: Improve water quality in streams by reducing pollutants in stormwater runoff and addressing modified hydrology.	Goal B: Improve water quality in streams by reducing pollutants in stormwater runoff and addressing modified hydrology.
Objective	5. Improve infiltration and reduce stormwater flows to improve hydrologic and baseflow conditions. .	6. Reduce the frequency of Combined Sewer Overflows by eliminating or remediating the combined system or reducing stormwater flows so that overflows are minimized.	7. Reduce or modify the use / application of road salt and other chemicals for snow and ice management to reduce the impact of chlorides and toxic substances on water quality.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration	Water Quality	Water Quality
Indicators	Streamflow monitoring data.	Number of combined sewer overflow events per year.	water quality data for chlorides; long-term tracking of salt use road maintenance authorities; number of road maintenance agencies educated regarding de-icing practices.
Frequency of Monitoring	Annual	Annual	Annual
Baseline (2007)	Streamflow baseline needs to be established	Baseline # of overflows per year needs to be established	baselines need to be established for chloride
Short Term Milestones (2008-2013) (1-5 years)	10% greater stability in baseflow over previous 5 year period	10% reduction in overflow events over previous 5 year average	25% improvement over initial 2-year average for chloride.
Mid Term Milestones (2013-2018) (5-10 years)	20% greater stability in baseflow over previous 5 year period	50% reduction in overflow events over previous 5 year average	50% improvement over initial 2-year average for chloride.
Long Term Milestones (2018+) (10+ years)	30% greater stability in baseflow over previous 5 year period	90% reduction in overflow events over previous 5 year average	90% improvement over initial 2-year average for chloride.
Party Responsible for Monitoring	Illinois EPA; USGS; municipalities	Municipalities	Illinois EPA; road maintenance authorities; watershed council
Mode of Collection	Streamflow monitoring data	Internal audit / recordkeeping	Physical / chemical sampling and / or lab analysis using accepted protocols; Internal audit / recordkeeping on salt usage; # of participants in educational seminars
Number of Actions			
Location of Implementation			
Percent Complete			

Table 6.5.3 Monitoring Plan for Issue 3: Stream Restoration & Management

Issue	Issue 3: Stream Restoration & Management	Issue 3: Stream Restoration & Management	Issue 3: Stream Restoration & Management	Issue 3: Stream Restoration & Management
Goal	Goal C: Restore and manage the stream system to preserve and enhance stream and riparian health, function, and conveyance.	Goal C: Restore and manage the stream system to preserve and enhance stream and riparian health, function, and conveyance.	Goal C: Restore and manage the stream system to preserve and enhance stream and riparian health, function, and conveyance.	Goal C: Restore and manage the stream system to preserve and enhance stream and riparian health, function, and conveyance.
Objective	1. Remediate detrimental stream channel conditions with restoration enhancements.	2. Stabilize all moderately and severely eroded streambanks and headcutting using bioengineering stabilization methods.	3. Develop and implement plans and establish partnerships to restore, manage, and maintain the riparian corridor.	4. Reduce the erosive capacity of storm sewer outfalls being discharged into the stream channel.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration	Water Quality
Indicators	Number of sites with detrimental channel conditions addressed by restoration project.	Linear feet of streambanks with moderate or severe erosion stabilized; number of locations of headcutting addressed with grade control structures.	Number of management and restoration plans developed; number of SMUs being addressed by a management and maintenance program.	Number of erosion-inducing storm sewer outfalls, drain tile outfalls, and building drains addressed with erosion-reduction / energy-dissipation measures.
Frequency of Monitoring	Every 3 years	Every 3 years	Every 3 years	Every 3 years
Baseline (2007)	0 channel restoration projects	2 streambank / channel stabilization projects	No plans exist; 0 SMUs addressed by management and maintenance program	0 point discharges addressed
Short Term Milestones (2008-2013) (1-5 years)	1 channel restoration project completed within the watershed	3 streambank / channel stabilization projects completed per watershed	1 plan exists; 1 SMU addressed by management and maintenance program	10% of problem point discharges addressed
Mid Term Milestones (2013-2018) (5-10 years)	3 channel restoration projects completed within the watershed	1 streambank / channel stabilization projects completed per SMU	3 plans exist; 3 SMUs addressed by management and maintenance program	50% of problem point discharges addressed
Long Term Milestones (2018+) (10+ years)	1 channel restoration project completed per SMU	3 streambank / channel stabilization projects completed per SMU	All SMUs addressed by management and maintenance plan and program	90% of problem point discharges addressed
Party Responsible for Monitoring	Municipalities, Watershed Planning Council	Municipalities, Landowners, Watershed Planning Council	Municipalities, Watershed Planning Council	Municipalities, Watershed Planning Council
Mode of Collection	Visual / stream survey; homeowner / landowner contact and anecdotal reporting; municipal contact and records	Visual / stream survey; homeowner / landowner contact and anecdotal reporting; municipal contact and records	Internal audit / recordkeeping; contact public officials and staff; homeowner / landowner contact and anecdotal reporting	Visual / stream survey; contact public officials and staff; homeowner / landowner contact and anecdotal reporting
Number of Actions				
Location of Implementation				
Percent Complete				

Table 6.5.3 Monitoring Plan for Issue 3: Stream Restoration & Management (continued)

Issue	Issue 3: Stream Restoration & Management	Issue 3: Stream Restoration & Management
Goal	Goal C: Restore and manage the stream system to preserve and enhance stream and riparian health, function, and conveyance.	Goal C: Restore and manage the stream system to preserve and enhance stream and riparian health, function, and conveyance.
Objective	5. Preserve and enhance a minimum 100 foot (average width) native riparian buffer / setback zone.	6. Reduce sedimentation and restore stream reaches within low gradient reaches to enhance instream habitat quality.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration
Indicators	Linear feet / acres of riparian buffer restored	Linear feet of stream reaches restored
Frequency of Monitoring	Every 3 years	Every 3 years
Baseline (2007)	0 lf / 0 acres of riparian buffer restored	0 reaches restored
Short Term Milestones (2008-2013) (1-5 years)	1000 lf of riparian buffer restored per SMU	2500 lf of stream restored
Mid Term Milestones (2013-2018) (5-10 years)	2000 lf of riparian buffer restored	5000 lf of stream restored
Long Term Milestones (2018+) (10+ years)	5000 lf of riparian buffer restored per SMU	10,000 lf of stream restored
Party Responsible for Monitoring	Landowners, Municipalities	Municipalities
Mode of Collection	Visual / stream survey; contact public officials and staff; homeowner / landowner contact and anecdotal reporting	Internal audit / recordkeeping; visual / stream survey
Number of Actions		
Location of Implementation		
Percent Complete		

Table 6.5.4 Monitoring Plan for Issue 4: Stormwater Management

Issue	issue 4: stormwater management	issue 4: stormwater management	issue 4: stormwater management	issue 4: stormwater management
Goal	Goal D: Plan, design, install, and retrofit stormwater management infrastructure with best management practices to reduce runoff rate and volume, improve water quality, restore watershed hydrology, and stabilize the stream systems.	Goal D: Plan, design, install, and retrofit stormwater management infrastructure with best management practices to reduce runoff rate and volume, improve water quality, restore watershed hydrology, and stabilize the stream systems.	Goal D: Plan, design, install, and retrofit stormwater management infrastructure with best management practices to reduce runoff rate and volume, improve water quality, restore watershed hydrology, and stabilize the stream systems.	Goal D: Plan, design, install, and retrofit stormwater management infrastructure with best management practices to reduce runoff rate and volume, improve water quality, restore watershed hydrology, and stabilize the stream systems.
Objective	1. Reduce/ minimize the rate and volume of runoff from the developed, developing, and agricultural landscape by installing urban and agricultural BMPs.	2. Retrofit existing stormwater management structures.	3. Clear, repair, or replace blocked, damaged, and failing stormwater infrastructure .	4. All new development incorporates conservation design and Low Impact Development (LID) practices.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration	Water Quality	Water Quality	Water Quality; Habitat Degradation and Alteration
Indicators	Streamflow monitoring data.	Number or acres of retrofitted detention basins; linear feet or acres of retrofitted swales.	Number of structures (culverts, outfalls, and headwalls) cleared, repaired, and replaced; number of blockages / debris jams removed.	Number of stormwater management plans demonstrating maintenance of pre-development hydrology
Frequency of Monitoring	Annual	Every 3 years	Every 3 years	Annual
Baseline (2007)	Streamflow baseline needs to be established	0 detention basin retrofits; 0 lf of swale improved	0 structures addressed; 0 debris obstructions cleared	0 stormwater management plans maintain pre-development hydrology
Short Term Milestones (2008-2013) (1-5 years)	10% greater stability in baseflow over previous 5 year period	10% of detention basins retrofit; 1000 lf of swale improved	10% of structures and 10% of debris obstructions cleared	25% of stormwater management plans maintain pre-development hydrology
Mid Term Milestones (2013-2018) (5-10 years)	20% greater stability in baseflow over previous 5 year period	25% of detention basins retrofit; 2500 lf of swale improved	25% of structures and 25% of debris obstructions cleared	50% of stormwater management plans maintain pre-development hydrology
Long Term Milestones (2018+) (10+ years)	30% greater stability in baseflow over previous 5 year period	50% of detention basins retrofit; 5000 lf of swale improved	90% of structures and 90% of debris obstructions cleared	100% of stormwater management plans maintain pre-development hydrology
Party Responsible for Monitoring	Illinois EPA; USGS; municipalities	Municipality	Municipalities, Watershed Planning Council	Municipalities
Mode of Collection	Streamflow monitoring data	Internal audit / recordkeeping	Visual / stream survey; homeowner / landowner contact and anecdotal reporting; internal audit / recordkeeping	Internal audit / recordkeeping
Number of Actions				
Location of Implementation				
Percent Complete				

Table 6.5.4 Monitoring Plan for Issue 4: Stormwater Management (continued)

Issue	issue 4: stormwater management
Goal	Goal D: Plan, design, install, and retrofit stormwater management infrastructure with best management practices to reduce runoff rate and volume, improve water quality, restore watershed hydrology, and stabilize the stream systems.
Objective	5. Maintain riparian corridors, floodplains and wetlands as open and undeveloped.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration
Indicators	Number of building permits issues in floodplain or wetlands.
Frequency of Monitoring	Annual
Baseline (2007)	Baseline # of floodplain or wetland permits needs to be established
Short Term Milestones (2008-2013) (1-5 years)	50% fewer permits issued
Mid Term Milestones (2013-2018) (5-10 years)	0 permits issued
Long Term Milestones (2018+) (10+ years)	0 new structures and 0 permits
Party Responsible for Monitoring	Municipalities, Watershed Planning Council
Mode of Collection	Contact municipal and agency officials and staff; internal audit / recordkeeping
Number of Actions	
Location of Implementation	
Percent Complete	

Table 6.5.5 Monitoring Plan for Issue 5: Natural Resources & Habitat

Issue	issue 5: natural resources & habitat	issue 5: natural resources & habitat	issue 5: natural resources & habitat
Goal	Goal E: Preserve, restore, and enhance a green infrastructure network of terrestrial and aquatic natural resources including streams, riparian corridors, wetlands, and upland resources.	Goal E: Preserve, restore, and enhance a green infrastructure network of terrestrial and aquatic natural resources including streams, riparian corridors, wetlands, and upland resources.	Goal E: Preserve, restore, and enhance a green infrastructure network of terrestrial and aquatic natural resources including streams, riparian corridors, wetlands, and upland resources.
Objective	1. Identify, prioritize, preserve, restore, and manage important core and connecting green infrastructure elements and buffers to achieve multiple watershed benefits including recreation.	2. Adopt and prioritize watershed plan recommendations in local land use plans, policies, and maps.	3. Preserve and improve ecological and biological quality of aquatic and terrestrial natural resources.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration
Indicators	Acres of natural and open lands / linear feet of stream channel and buffer preserved and restored.	Number of municipalities adopting elements into local land use plans, policies, and maps.	Biological survey data (Macroinvertebrate Biotic Index, Index of Biotic Integrity, and Floristic Quality Index scores), threatened and endangered species populations
Frequency of Monitoring	Every 3 years	Annual	Annual
Baseline (2007)	0 acres of recommended green infrastructure preserved or restored	0 municipalities have integrated watershed recommendations	Baseline needs to be established through biological survey
Short Term Milestones (2008-2013) (1-5 years)	10 acres of recommended green infrastructure preserved or restored	1 municipality	XX% improvement in biological indices. Mean Coefficient of Conservation=; Floristic Quality Index=.
Mid Term Milestones (2013-2018) (5-10 years)	50 acres of recommended green infrastructure preserved or restored	2 municipalities	XX% improvement in biological indices. Mean Coefficient of Conservation=; Floristic Quality Index=.
Long Term Milestones (2018+) (10+ years)	100 acres of recommended green infrastructure preserved or restored	All municipalities	XX% improvement in biological indices. Mean Coefficient of Conservation=; Floristic Quality Index=.
Party Responsible for Monitoring	Municipality, County	Municipalities; Watershed Planning Council	Illinois DNR
Mode of Collection	Internal audit / recordkeeping; review public land records	Internal audit / recordkeeping; public official and staff contact	Physical sampling and natural area / wetland surveys using accepted state protocols and / or Floristic Quality Index
Number of Actions			
Location of Implementation			
Percent Complete			

Table 6.5.6 Monitoring Plan for Issue 6: Watershed Education & Stewardship

Issue	Issue 6: Watershed Education & stewardship	Issue 6: Watershed Education & stewardship	Issue 6: Watershed Education & stewardship	Issue 6: Watershed Education & stewardship
Goal	Goal F: Watershed residents, students, and communities have adequate knowledge, skills, resources, motivation, and stewardship opportunities to take action on implementing the watershed plan.	Goal F: Watershed residents, students, and communities have adequate knowledge, skills, resources, motivation, and stewardship opportunities to take action on implementing the watershed plan.	Goal F: Watershed residents, students, and communities have adequate knowledge, skills, resources, motivation, and stewardship opportunities to take action on implementing the watershed plan.	Goal F: Watershed residents, students, and communities have adequate knowledge, skills, resources, motivation, and stewardship opportunities to take action on implementing the watershed plan.
Objective	1. Increase watershed stewardship opportunities and participation in management, monitoring, and restoration.	2. Convey messages from the education plan with public relations, education, outreach and media vehicles.	3. Provide technical assistance to watershed communities, the development community, residents and other stakeholders.	4. Provide conservation and / low impact development (LID) guidelines and case studies to municipalities and the development community.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration	Water Quality; Habitat Degradation and Alteration
Indicators	Number of watershed stewardship events; number of participants in watershed stewardship activities.	Number of placements and mentions in local and regional media; number of presentations and number of audience members reached by presentations.	Technical and informational items distributed to target audiences; number of participants in technical workshops.	Number of local government officials and staff participating in LID workshops.
Frequency of Monitoring	Annual	Annual	Annual	Annual
Baseline (2007)	Baseline # of stewardship opportunities and participants needs to be established.	Baseline # of mentions and presentations needs to be established.	Baseline # needed for educational materials distributed and participants in technical workshops	0 local government officials and staff participating in LID workshops
Short Term Milestones (2008-2013) (1-5 years)	3 stewardship opportunities and 50 total participants per year	5 mentions, 2 presentations, and 50 participants per year	150 educational material packets distributed per year; 10 participants in technical workshops per year	10 local government participants in LID workshops per year
Mid Term Milestones (2013-2018) (5-10 years)	6 stewardship opportunities and 100 total participants per year	10 mentions, 4 presentations, and 100 participants per year	300 educational material packets distributed per year; 25 participants in technical workshops per year	15 local government participants in LID workshops per year
Long Term Milestones (2018+) (10+ years)	10 stewardship opportunities and 150 total participants per year	15 mentions, 5 presentations, and 200 participants per year	500 educational material packets distributed per year; 50 participants in technical workshops per year	25 local government participants in LID workshops per year
Party Responsible for Monitoring	Watershed Planning Council	Watershed Planning Council	Watershed Planning Council	Municipalities, Watershed Planning Council
Priority	Watershed event reports; review volunteer and monitoring databases; internal audit / record keeping	Internal audit / recordkeeping; news clipping service	Watershed workshop / event reports; internal audit / recordkeeping	Watershed workshop / event reports; internal audit / recordkeeping
Mode of Collection	Contact municipal officials and staff; internal audit / recordkeeping; agency contact	Contact municipal officials and staff; review plans, policies and regulations; internal audit / recordkeeping	Review volunteer and monitoring databases; internal audit / recordkeeping	
Number of Actions				
Location of Implementation				
Percent Complete				

Table 6.5.6 Monitoring Plan for Issue 6: Watershed Education & Stewardship (continued)

Issue	Issue 6: Watershed Education & stewardship
Goal	Goal F: Watershed residents, students, and communities have adequate knowledge, skills, resources, motivation, and stewardship opportunities to take action on implementing the watershed plan.
Objective	5. Educate and involve students through watershed stewardship activities and watershed-based curricula.
Impairments Addressed	Water Quality; Habitat Degradation and Alteration
Indicators	Number of students participating in watershed stewardship activities; number of students reached by watershed-based curricula.
Frequency of Monitoring	Annual
Baseline (2007)	Baseline # of student participants; # reached by curricula needs to be established.
Short Term Milestones (2008-2013) (1-5 years)	50 students participating in watershed activities; 100 students reached by watershed curricula
Mid Term Milestones (2013-2018) (5-10 years)	100 students participating in watershed activities; 500 students reached by watershed curricula
Long Term Milestones (2018+) (10+ years)	250 students participating in watershed activities; 1000 students reached by watershed curricula
Party Responsible for Monitoring	School Districts; Watersjed Planning Council
Priority	Internal audit / record keeping
Mode of Collection	Streamflow monitoring data
Number of Actions	
Location of Implementation	
Percent Complete	