

## 2 goals and objectives

### 2.1 WATERSHED ISSUES AND OPPORTUNITIES

The following list of watershed issues and concerns was identified and prioritized by the Watershed Planning Committee during the initial meetings. Figures in parenthesis indicate the number of votes received. Italicized text indicates votes on issues that were not attributed to a specific watershed, i.e., the dots used to vote did not indicate which watershed the voter represented. Underlined text indicates issues that were added after the initial issue and concern identification. These votes have been added to the issue categories for both watersheds. A number of issues and concerns could have been placed in more than one category. However, for organizational purposes, only one category was chosen for each issue.



Rock River

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#### Rock River Watershed Issues

- A. Planning and Development (31)
  - 1. Watershed plan implementation cost and project funding (10)
  - 2. Development in wetlands and floodplain (9)
  - 3. Lack of planning to identify appropriate areas for development (5)
  - 4. Lack of development practices to protect environmental quality (2)
  - 5. Grading (1)
  - 6. Lack of standardized approach to prioritizing projects and activities and analyzing data (1)
  - 7. Plan geographic scope too small (1)
  - 8. Lack of recreational opportunities (bike paths and boating) (1)
  - 9. Loss of farmland (1)
  - 10. Unknown responsibilities of jurisdictions and homeowners
  - 11. Lack of watershed management coordination mechanism
- B. Water Quality (17)
  - 1. Point sources of pollutants (6)
  - 2. Urban runoff pollution (4)
  - 3. Degraded water quality (3)
  - 4. Unidentified pollutant sources (2)
  - 5. *Golf course runoff (2)*
  - 6. Low dissolved oxygen during low flow
  - 7. Elevated chloride levels
  - 8. Erosion and sedimentation
  - 9. Toxic substances
  - 10. Nutrients
- C. Stream and Riparian Management (12)
  - 1. Dencutting, headcutting, and erosion of stream and channels (7)
  - 2. Debris / obstructions and yard waste dumping in ravines / stream channel (2)
  - 3. Unprotected natural drainage system (1)
  - 4. *Ravine erosion and degradation (1)*
  - 5. *Loss and degradation of aquatic ecosystems (1)*
  - 6. Lack of riparian landowner stormwater, buffer and ravine management
  - 7. Streambank and channel armoring
  - 8. Channelization
  - 9. Loss of stream, riparian, and ravine habitat

characteristics

10. Modified hydrology and stream flow

- D. Stormwater Infrastructure Design and Management (10)
  - 1. Siltation of impoundments (4)
  - 2. Storm water runoff rate and volume impacts (2)
  - 3. Stormwater infrastructure management, maintenance, repair, and retrofit to improve performance and reduce erosion (4)
- E. Natural Resources and Habitat (4)
  - 1. Loss and degradation of habitat / natural resource (4)
  - 2. Loss and degradation of wetlands
  - 3. Invasive species
- F. Watershed Education and Stewardship (4)
  - 1. Watershed education, stewardship, and ownership (3)
  - 2. Citizen participation and access (1)

Duck Creek Watershed Issue Categories

- A. Water Quality (30)
  - 1. Degraded water quality (6)
  - 2. Point sources of pollution (6)
  - 3. Runoff sewage quality (Combined Sewer Overflows) (4)
  - 4. Stormwater infrastructure management, maintenance, repair, and retrofit to improve performance and reduce erosion (3)
  - 5. Urban runoff pollution (3)
  - 6. Unidentified pollutant sources (2)
  - 7. Animal waste / CAFO impacts on water quality (2)
  - 8. *Golf course runoff (2)*
  - 9. *Lack of vegetation species adapted for filtration*



Erosion around a stormwater outfall, Rock River Ravines.

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(7)

- 10. Deicing salt impacts (1)
  - 11. Bacterial contamination
  - 12. Elevated chloride levels
  - 13. Erosion and sedimentation
  - 14. Toxic substances
  - 15. Nutrients
  - 16. Pollutants from agricultural use and practice
- B. Planning and Development (28)
    - 1. Loss of farmland (8)
    - 2. Development in wetlands and floodplain (7)
    - 3. Stormwater management systems in older urban areas needing upgrade (3)
    - 4. Identification of natural areas to be preserved (2)
    - 5. Grading (2)
    - 6. Watershed plan implementation and project funding sources (2)
    - 7. Lack of recreational opportunities (bike paths and boating) (2)
    - 8. Lack of development practices to protect environmental quality (1)
    - 9. Too many layers of regulation (1)
    - 10. Conversion of open or agricultural land to urban uses
    - 11. Unknown responsibilities of jurisdictions and

- homeowners
  - 12. Lack of watershed management coordination mechanism
- C. Stream and Riparian Management (13)
1. Degradation of aquatic ecosystems (5)
  2. Unprotected natural drainage system (2)
  3. Loss and degradation of riparian buffer and corridor (1)
  4. Lack of dam restoration (dredging) (1)
  5. *Tributary headcutting caused by city storm sewers (3)*
  6. *Downcutting and erosion of stream and channels (1)*
  7. Deposition and erosion due to overbank flooding
  8. Streambank erosion
  9. Loss and degradation of stream and riparian habitat characteristics
  10. Sedimentation within the stream and the riparian corridor
- D. Stormwater Infrastructure Design and Management (8)
1. Stormwater runoff rate and volume (7)
  2. Stormwater infrastructure management, maintenance, repair, and retrofit to improve performance and reduce erosion (7)
  3. Modified hydrology and streamflow
- E. Natural Resources & Habitat (5)
1. Preservation of natural resources (3)
  2. Habitat loss and degradation (2)
  3. Loss and degradation of wetlands
  4. Invasive species
  5. Lack of green infrastructure hubs along Duck Creek tributaries
  6. Modified hydrology and streamflow
- F. Watershed Education and Stewardship (1)
1. Citizen participation and access (1)



Severe streambank erosion, Duck Creek.

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In order to streamline the watershed planning process for the Duck Creek and Rock River watersheds, the above lists were combined to create the list below, prioritized based on the sum of the votes cast in similar issue categories. This combined list was used to develop the goals and objectives for both watersheds.

1. Planning and Development (59)
2. Water Quality (47)
3. Stream and Riparian Management (25)
4. Stormwater Infrastructure Design and Management (18)
5. Natural Resources and Habitat (9)
6. Watershed Education and Stewardship (5)

## 2.2 GOALS AND OBJECTIVES

Based on the issues and concerns identified by stakeholders, and on the resources and condition of the watershed, the following goals, objectives, and indicators were established.

### ISSUE 1: WATERSHED PLANNING, IMPLEMENTATION & COORDINATION

**Goal A: Improve coordination and decision-making between public, private, and non-profit stakeholders to implement the watershed plan recommendations and improve watershed resources.**

#### Objectives

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.

Indicators: establishment of lead organization with budget and executive committee; number of projects advanced/undertaken under the auspices of the watershed council.

2. Help communities and stakeholders secure project funding by disseminating information on funding sources and mechanisms for implementing watershed projects.

Indicators: number of communities receiving funding for watershed improvement projects; number of projects installed / undertaken.

3. Pursue cost-sharing arrangements between jurisdictions for watershed preservation/improvement projects that have broad benefits and impacts.

Indicators: number of projects funded by multiple jurisdictions and/or stakeholders.

4. Adopt, strengthen, and enforce standards and guidelines intended to preserve and enhance watershed resources and reduce the impact of development on water resources.

Indicators: number of communities adopting, strengthening, and enforcing standards and guidelines.



A well-vegetated stream corridor.

5. Watershed municipalities coordinate land use planning and watershed plan implementation activities.

Indicators: number of communities participating in cross-jurisdictional coordination and projects.

6. Local public agencies incorporate watershed improvement best management practices into ongoing management, maintenance, and infrastructure projects (e.g., streets, drainage system, etc.)

Indicators: number of communities adding watershed improvement practices and functions (BMPs) to ongoing activities, plans, and budgets.

7. Develop and implement a plan to monitor watershed conditions, resources and trends (hydrologic, biologic, and water quality) and implementation of plan recommendations, including a rapid stream survey every 3 years.

Indicators: established monitoring program; record of watershed monitoring data; number of recommendations implemented.



## ISSUE 2: WATER QUALITY

**Goal B: Improve water quality in streams by reducing pollutants in stormwater runoff and addressing modified hydrology.**

### Objectives

1. All watershed streams meet or exceed state water quality standards.

Indicators: E. coli < 235 organisms (CFU) / 100ml; phosphorous < 0.05 mg/L; dissolved oxygen (DO) > 5.0 mg/L; chloride (no standard); total suspended solids (no standard); toxic substances (no standard)

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.

Indicators: water quality monitoring data; linear feet / acres of BMPs installed; linear feet of retrofitted drainage swale or other drainage infrastructure for water quality improvement.

3. Prevent erosion and flow of chemical pollutants and nutrients (fertilizers, pesticides, organic waste) from farmland, golf courses, parks, and yards into streams.

Indicators: acres / linear feet of BMPs installed and/or implemented across the landscape and along the stream channel.

4. Prevent dumping of inappropriate substances (e.g., yard waste) within the stream channel, riparian corridor, and stormsewer network.

Indicators: number of dumping occurrences detected during rapid stream inventory; dumping reports received by municipalities.

5. (DC) Reduce bacterial contamination by identifying and controlling contributing sources.

Indicators: water quality sampling / fecal coliform data.

6. Improve infiltration and reduce stormwater flows to improve hydrologic and baseflow conditions, which will help increase dissolved oxygen and reduce streambank erosion.

Indicators: streamflow monitoring data.



Sediment is a significant water quality pollutant in both watersheds.

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.

Indicator: water quality data; long-term tracking of salt use by municipalities, county and other road maintenance authorities; number of road maintenance agencies educated regarding de-icing practices.

8. Reduce the frequency of Combined Sewer Overflows by eliminating or remediating the combined system or reducing stormwater flows so that overflows are minimized.

Indicator: number of combined sewer overflow events per year.

### ISSUE 3: STREAM RESTORATION & MANAGEMENT

Goal C: Restore and manage the stream system to preserve and enhance stream and riparian health, function, and conveyance.

#### Objectives

1. Remediate detrimental stream channel conditions such as armoring, channelization, downcutting, widening, sedimentation, and lack of habitat characteristics with restoration enhancements such as remeandering, regrading, bioengineering approaches to stabilization, and habitat structures (pools and riffles, boulders, root wads, etc.)

Indicators: number of sites with detrimental channel conditions addressed by restoration project.

2. Stabilize all moderately and severely eroded streambanks and headcutting using bioengineering stabilization methods.

Indicators: linear feet of streambanks with moderate or severe erosion stabilized; number of locations of headcutting addressed with grade control structures.

3. Develop and implement plans and establish partnerships to restore, manage, and maintain the riparian corridor: address invasive species, sedimentation, dense canopy cover, and inappropriate management by riparian landowners.

Indicators: number of management and restoration plans developed that include a schedule, proposed funding source, responsible parties, and implementation partner; number of stream reaches being addressed by a management and maintenance program.

4. Reduce the erosive capacity of storm sewer outfalls, drain tiles, and sump pump, roof, and footing drains being discharged into the stream channel through on-site infiltration practices and outfall retrofit and stabilization projects.

Indicators: number of erosion-inducing storm sewer outfalls, drain tile outfalls, and building drains addressed with erosion-reduction / energy-dissipation measures (as assessed by rapid stream inventory every 3 years.)



Stream corridors are significantly degraded by stormwater and adjacent land use activities.

5. Preserve and enhance a minimum 100 foot (average width) native riparian buffer / setback zone to preserve the stream corridor from impacts of adjacent land uses and to support wildlife habitat.

Indicators: linear feet / acres of riparian buffer restored.

6. (DC) Manage, maintain, and protect low head dams and/or sewer crossings, including removal of sediment buildup behind these structures.

Indicators: number of structures managed.

7. (RR) Reduce sedimentation and restore stream reaches within low gradient reaches to enhance instream habitat quality.

Indicators: linear feet of stream reaches restored.

## ISSUE 4: STORMWATER MANAGEMENT

**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.**

### Objectives

1. Reduce/minimize the rate and volume of runoff from the developed, developing, and agricultural landscape by installing urban and agricultural BMPs.

Indicators: peak flow data / hydrographs showing reduction in peak flows for the 1-year event; change in rainfall event attenuation time; reduction in stream flow for a given rainfall event.

2. Retrofit existing stormwater management structures such as detention ponds and roadside swales to improve water quality.

Indicator: number or acres of retrofitted detention basins; linear feet or acres of retrofitted swales.

3. Clear, repair, or replace blocked, damaged, and failing culverts, outfall pipes, stream channels, and other stormwater infrastructure to maintain conveyance and reduce erosion and other impacts of an impaired or blocked stormwater system.

Indicators: number of structures (culverts, outfalls, and headwalls) cleared, repaired, and replaced; number of blockages / debris jams removed.

4. All new development incorporates conservation design and Low Impact Development (LID) practices to minimize changes / maintain pre-development hydrology and minimize impervious cover.

Indicator: stormwater management plans demonstrating maintenance of pre-development hydrology.

5. Maintain riparian corridors, floodplains and wetlands as open and undeveloped to maximize storage, conveyance, and filtration of stormwater.

Indicators: Number of building permits issues in floodplain or wetlands.



Stormwater drainage, such as this residential drain pipe, can cause stream bank erosion.

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## ISSUE 5: NATURAL RESOURCES & HABITAT

**Goal E: Preserve, restore, and enhance a green infrastructure network of terrestrial and aquatic natural resources including streams, riparian corridors, wetlands, and upland resources.**

### Objectives

1. Identify, prioritize, preserve, restore, and manage important core and connecting green infrastructure elements and buffers to achieve multiple watershed benefits including recreation.

Indicators: acres of natural and open lands / linear feet of stream channel and buffer preserved and restored (through public ownership, conservation organization ownership, conservation easement, or other preservation measure)

2. Adopt and prioritize watershed plan recommendations in local land use plans, policies, and maps to establish the community direction and intent for natural resource preservation and enhancement.

Indicator: number of municipalities adopting elements into local land use plans, policies, and maps.

3. Preserve and improve ecological and biological quality of aquatic and terrestrial natural resources by improving habitat characteristics, stabilizing watershed hydrology,

improving water quality, reducing coverage of exotic and invasive species, and preserving threatened and endangered species.

Indicators: biological survey data (Macroinvertebrate Biotic Index, Index of Biotic Integrity, and Floristic Quality Index scores), threatened and endangered species populations

## ISSUE 6: WATERSHED EDUCATION & STEWARDSHIP

**Goal F: Watershed residents, students, and communities have adequate knowledge, skills, resources, motivation, and stewardship opportunities to take action on implementing the watershed plan.**

### Objectives

1. Increase watershed stewardship opportunities and participation in management, monitoring, and restoration.

Indicators: number of watershed stewardship events; number of participants in watershed stewardship activities; number of stream reaches covered by a stewardship group.

2. Convey messages from the education plan with public relations, education, outreach and media vehicles to increase public awareness and understanding of watershed issues.

Indicators: number of placements and mentions in local and regional media; number of presentations and number of audience members reached by presentations.

3. Provide technical assistance to watershed communities, the development community, residents and other stakeholders to help them implement watershed plan recommendations.

Indicators: technical and informational items distributed to target audiences (subject matter/messages specified in education plan); number of participants in technical workshops.



Education and outreach, such as this storm drain label, are essential to improving watershed resources.

4. Provide conservation and / low impact development (LID) guidelines and case studies to educate municipalities and the development community about alternative development approaches.

Indicators: number of local government officials and staff participating in LID workshops.

5. Educate and involve students through watershed stewardship activities and watershed-based curricula.

Indicators: number of students participating in watershed stewardship activities; number of students reached by watershed-based curricula.

These watershed goals were used to guide identification of watershed action recommendations and used as the framework for the action and implementation plan.