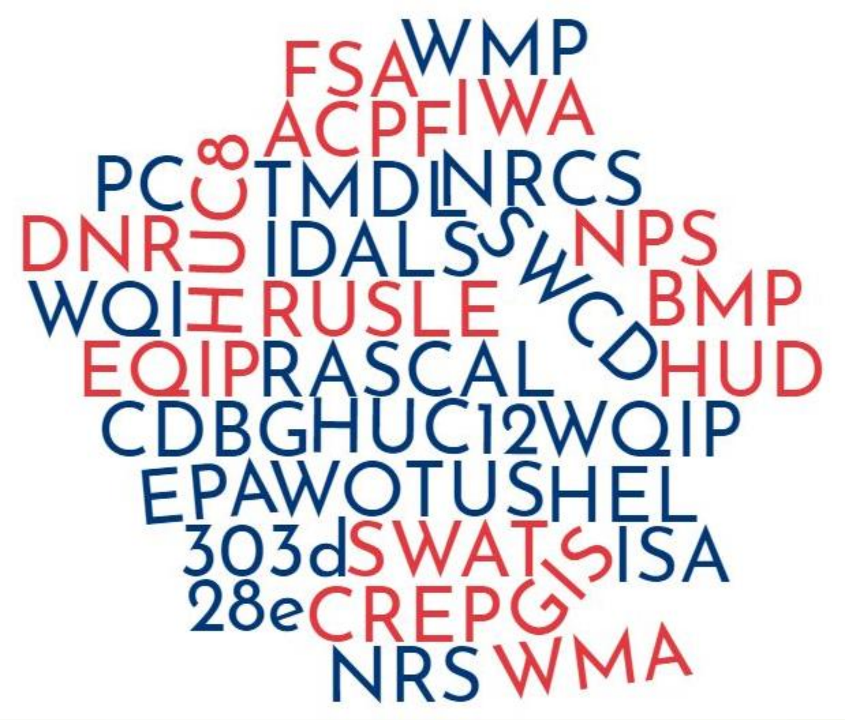
Watershed Planning 101



Mary Beth Stevenson

Iowa DNR

Overview

- Introduce the watershed planning concept
- Watershed plan components
  - Tools / Methods / Data
  - Define terms / phrases
- Case Studies: From Planning to Implementation

Watershed Planning: WHY?

- Develop a road map for watershed improvement
- Get stakeholders on the same page
- Understand the current conditions
- Set goals for watershed health (and identify timelines / action steps)
- Determine what resources are needed to move forward

Role of the PC

- Varies by WMA
- Advice: Use the planning process as an opportunity to get to know your watershed and your stakeholders
  - The WMP will be the key to your next funding source

Geography / Scale

- **HUC12 –> HUC10 –> HUC8**
- Plans with larger geography will lose detail
- Measurable results difficult at HUC8
- With a large area, **multi-level planning** can help
- HUC8 plans:
  - Help prioritize HUC12s
  - Convene stakeholders and leverage resources to a common goal

Watershed Plan Components

- ✓ Stakeholder engagement
- ✓ Problem Identification / Resource Concerns
- ✓ Environmental Inventory
- ✓ Watershed Assessment / Critical Areas
- ✓ Goals & Objectives
- ✓ Action Steps
- ✓ Implementation Strategy
- ✓ Monitoring & Evaluation
- ✓ Funding & Resources

1. Stakeholder Engagement

- ✓ Gather input on concerns for watershed health
- ✓ Tools / Methods:
  - Survey
  - Open House
  - Outreach (go where the people already are)
  - Listening sessions
  - One-on-one interviews
  - Community meetings

2. Problem Identification

- ✓ What resource concerns will your plan address?
  - Flooding? Nutrient loading? Public Awareness? Soil loss? Biodiversity? Impaired water?
- ✓ Tools / Methods:
  - Utilize stakeholder input
  - Prioritize resource concerns
- ✓ Basis for goal setting

3. Environmental Inventory

- ✓ What are the current conditions in the watershed?
- ✓ Tools / Methods
  - Water quality data / information (existing)
  - **Stream classification / designated uses / impairments**
  - Watershed maps
    - Soils, topography, land use, watershed boundaries, etc
- ✓ There may be a lot or a little – need to determine priority information
- ✓ Is assistance needed with data interpretation or acquisition?

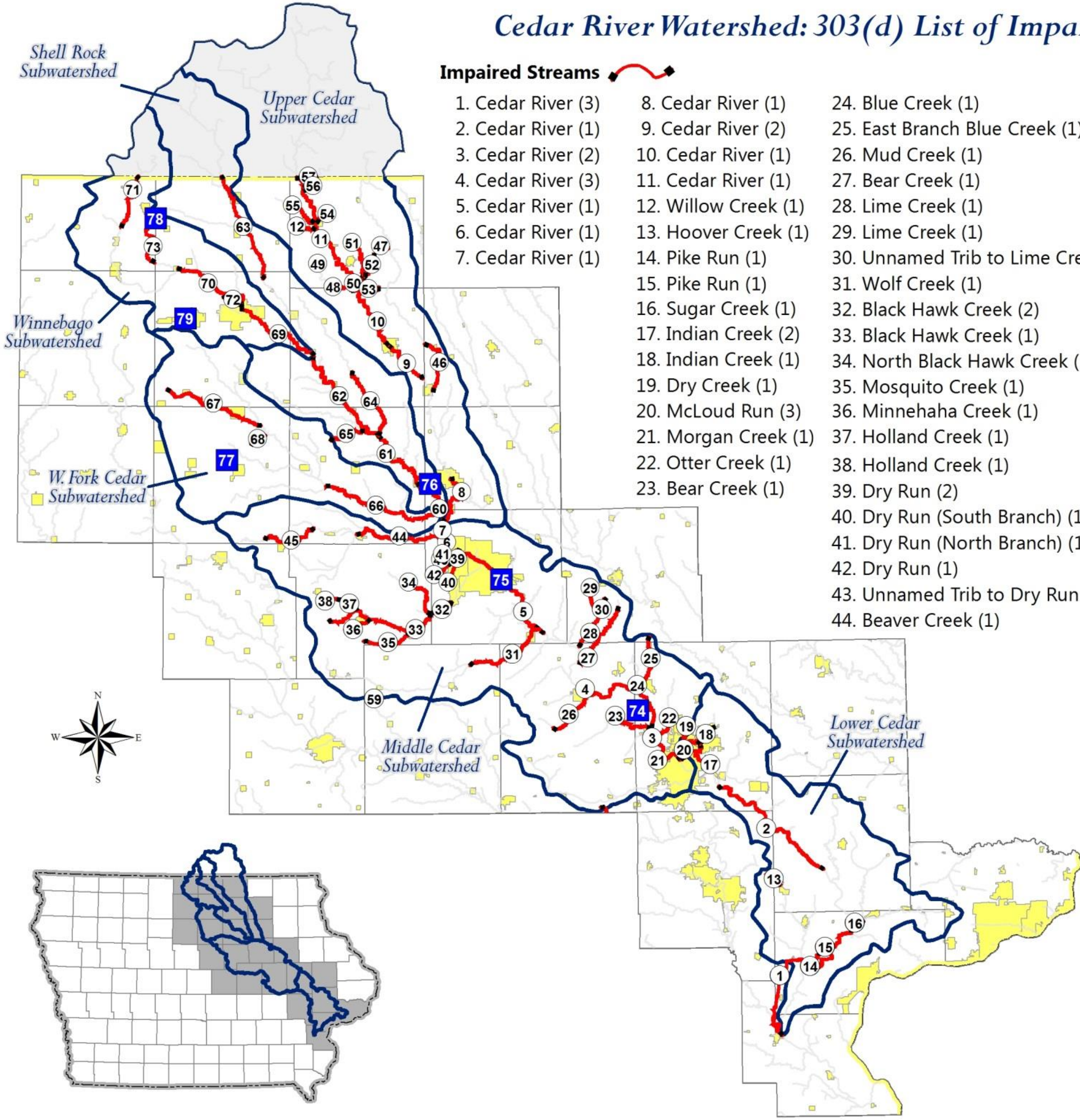
Designated Uses

- All waterbodies have a **use designation**:
  - Class A (recreation uses): primary contact, secondary contact, children's contact
  - Class B (wildlife & aquatic life uses): warm water, cold water, lake / wetland
  - Class C: raw water source of potable water supply
  - Class HH: human health

Impaired Waterbodies

- A waterbody is impaired when its water quality does not fully support its designated uses:
  - Elevated pollutant levels (indicator bacteria, nutrients, sediment, chemicals)
  - Biological (low biodiversity)
- DNR Assessment Database
  - https://programs.iowadnr.gov/adbnet/

Cedar River Watershed: 303(d) List of Impaired Waterways, 2014



Impaired Streams

1. Cedar River (3)
2. Cedar River (1)
3. Cedar River (2)
4. Cedar River (3)
5. Cedar River (1)
6. Cedar River (1)
7. Cedar River (1)
8. Cedar River (1)
9. Cedar River (2)
10. Cedar River (1)
11. Cedar River (1)
12. Willow Creek (1)
13. Hoover Creek (1)
14. Pike Run (1)
15. Pike Run (1)
16. Sugar Creek (1)
17. Indian Creek (2)
18. Indian Creek (1)
19. Dry Creek (1)
20. McLoud Run (3)
21. Morgan Creek (1)
22. Otter Creek (1)
23. Bear Creek (1)
24. Blue Creek (1)
25. East Branch Blue Creek (1)
26. Mud Creek (1)
27. Bear Creek (1)
28. Lime Creek (1)
29. Lime Creek (1)
30. Unnamed Trib to Lime Creek (1)
31. Wolf Creek (1)
32. Black Hawk Creek (2)
33. Black Hawk Creek (1)
34. North Black Hawk Creek (1)
35. Mosquito Creek (1)
36. Minnehaha Creek (1)
37. Holland Creek (1)
38. Holland Creek (1)
39. Dry Run (2)
40. Dry Run (South Branch) (1)
41. Dry Run (North Branch) (1)
42. Dry Run (1)
43. Unnamed Trib to Dry Run (1)
44. Beaver Creek (1)
45. Beaver Creek (1)
46. Little Cedar River (1)
47. Burr Oak Creek (1)
48. Rock Creek (1)
49. Rock Creek (1)
50. Spring Creek (2)
51. Spring Creek (1)
52. Unnamed Trib to Spring Creek (3)
53. Slough Creek (1)
54. Turtle Creek (1)
55. Deer Creek (1)
56. Otter Creek (2)
57. Unnamed Trib to Cedar River (1)
58. Unnamed Trib to Willow Creek (1)
59. East Trib to Union Grove Lake (1)
60. Shell Rock River (1)
61. Shell Rock River (2)
62. Shell Rock River (1)
63. Shell Rock River (2)
64. Flood Creek (1)
65. Palmer Creek (1)
66. West Fork Cedar River (1)
67. Bailey Creek (2)
68. Unnamed Trib to Unnamed Trib of West Fork Cedar River (1)
69. Winnebago River (1)
70. Winnebago River (1)
71. Winnebago River (1)
72. Calmus Creek (1)
73. Beaver Creek (1)

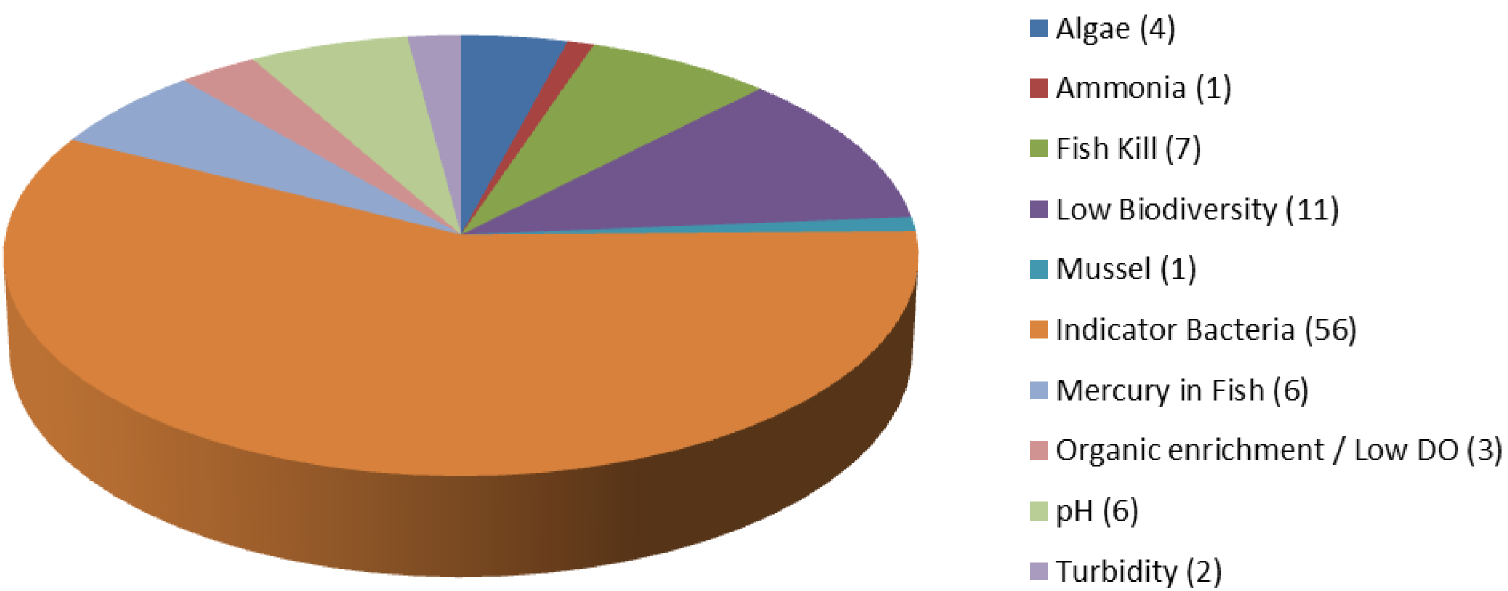
Impaired Lakes

74. Pleasant Creek Lake (1)
75. Meyers Lake (1)
76. Avenue Of The Saints Lake (2)
77. Beeds Lake (1)
78. Rice Lake (2)
79. Clear Lake (1)

DNR

ABA 8/6/2015

Summary of Impairments in the Cedar River Watershed (Draft 2014 List**)



***Category 5: Impaired waters in need of a TMDL*

Maps

- Eye candy = good
- Flip thru watershed plans to get ideas for various maps that are included
- Tools / Methods / Data
  - Model my Watershed
  - Google Earth
  - IWA partners / planning consultants

Water Quality Data

- What are the specific water quality concerns?
  - Beach closures, algae blooms, sedimentation, source water
- Tools / Methods / Data
  - Surface water monitoring
    - Ambient stream monitoring (DNR) – lab analysis
    - IOWATER (DNR) – test strips
  - Tile outlet monitoring
    - Iowa Soybean Association
  - Continuous monitoring
    - USGS
    - IWQIS (UI – IIHR)
  - Groundwater monitoring
    - IDNR source water program
    - Iowa Geologic Survey
    - USGS

Water Quality Monitoring

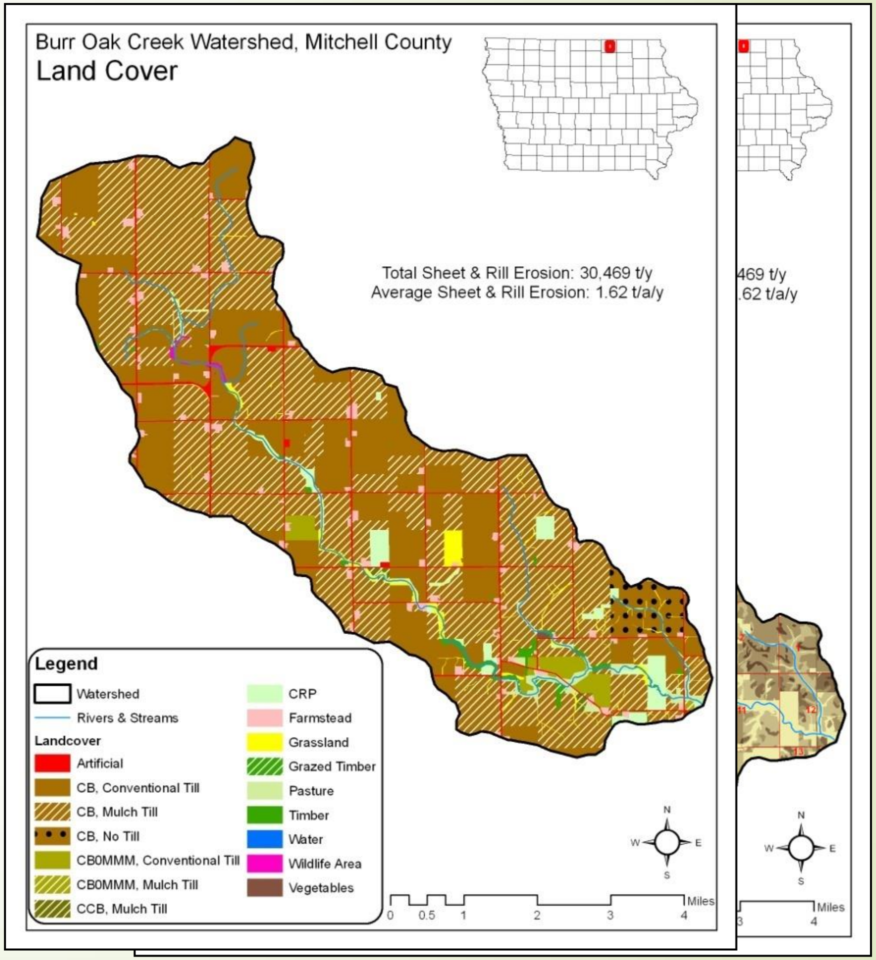
- Careful planning and training
- How will the data be used?
- Establishing baseline conditions is important
- In the case of limited resources – use monitoring to help identify priorities and measure progress
- Ask yourself: What data do we need to guide implementation and track results?

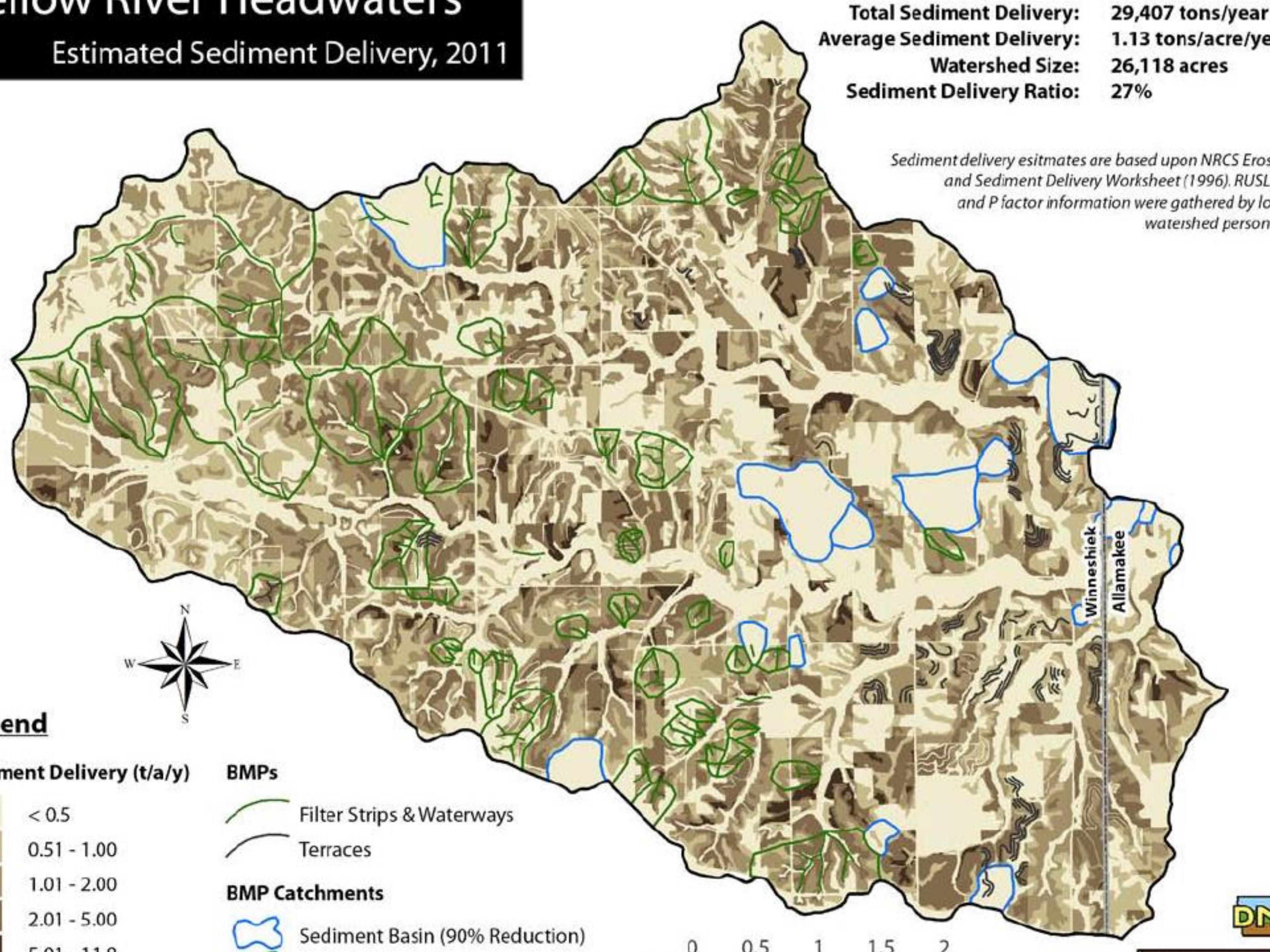
4. Assessment

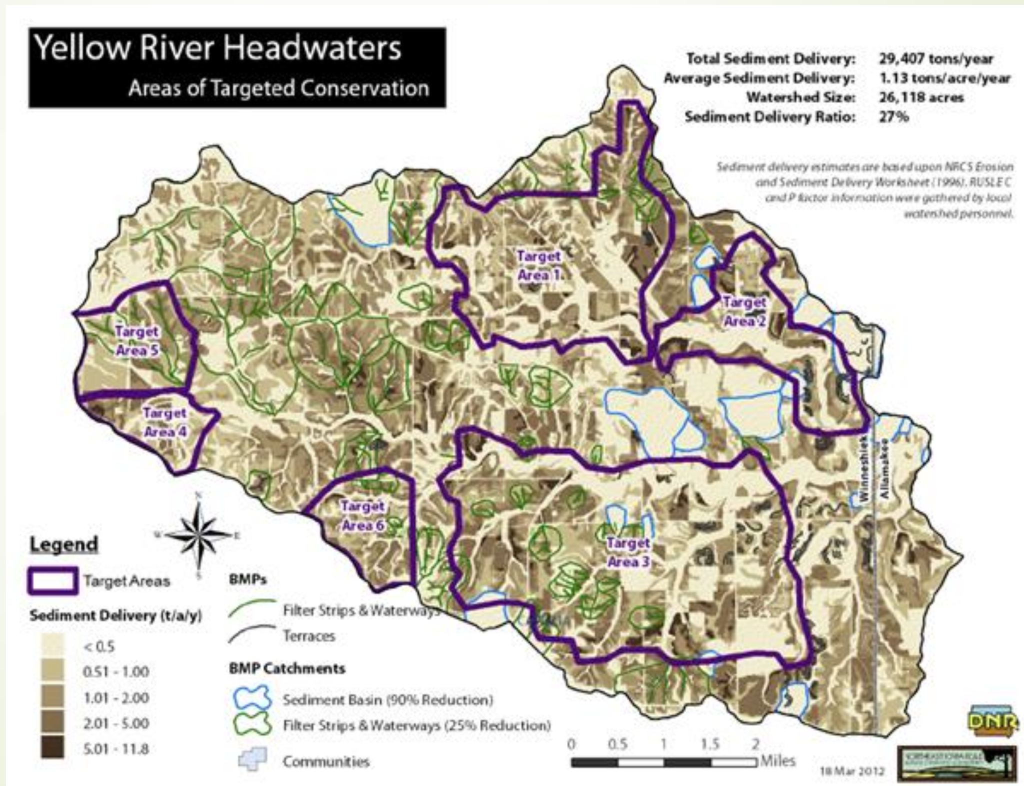
- What are the highest priority areas within the watershed?
- Detailed analysis / data collection to assist with prioritization and targeted implementation
  - Localized water quality data
  - Sources of erosion / soil loss
  - Streambank conditions
  - Gully control opportunities
- Tools / Methods / Data
  - RASCAL
  - Land use assessment
  - Gully assessment
  - Water quality monitoring
  - Social assessment

Watershed Assessment Tools
Land Cover Assessment

- Drive by survey of the watershed collecting information on:
  - Crop rotation
  - Tillage
  - Existing BMPs
- Provides information necessary to calculate soil erosion & sediment delivery




Estimated Sediment Delivery, 2011
Total Sediment Delivery: 29,407 tons/year
Average Sediment Delivery: 1.13 tons/acre/ye
Watershed Size: 26,118 acres
Sediment Delivery Ratio: 27%
Sediment delivery esitmates are based upon NRCS Eros
and Sediment Delivery Worksheet (1996). RUSL
and P factor information were gathered by lo
watershed person
Winneshiek
Allamakee
N
S
W
E
end
ment Delivery (t/a/y)
< 0.5
0.51 - 1.00
1.01 - 2.00
2.01 - 5.00
BMPs
Filter Strips & Waterways
Terraces
BMP Catchments
Sediment Basin (90% Reduction)
0
0.5
1
1.5
2

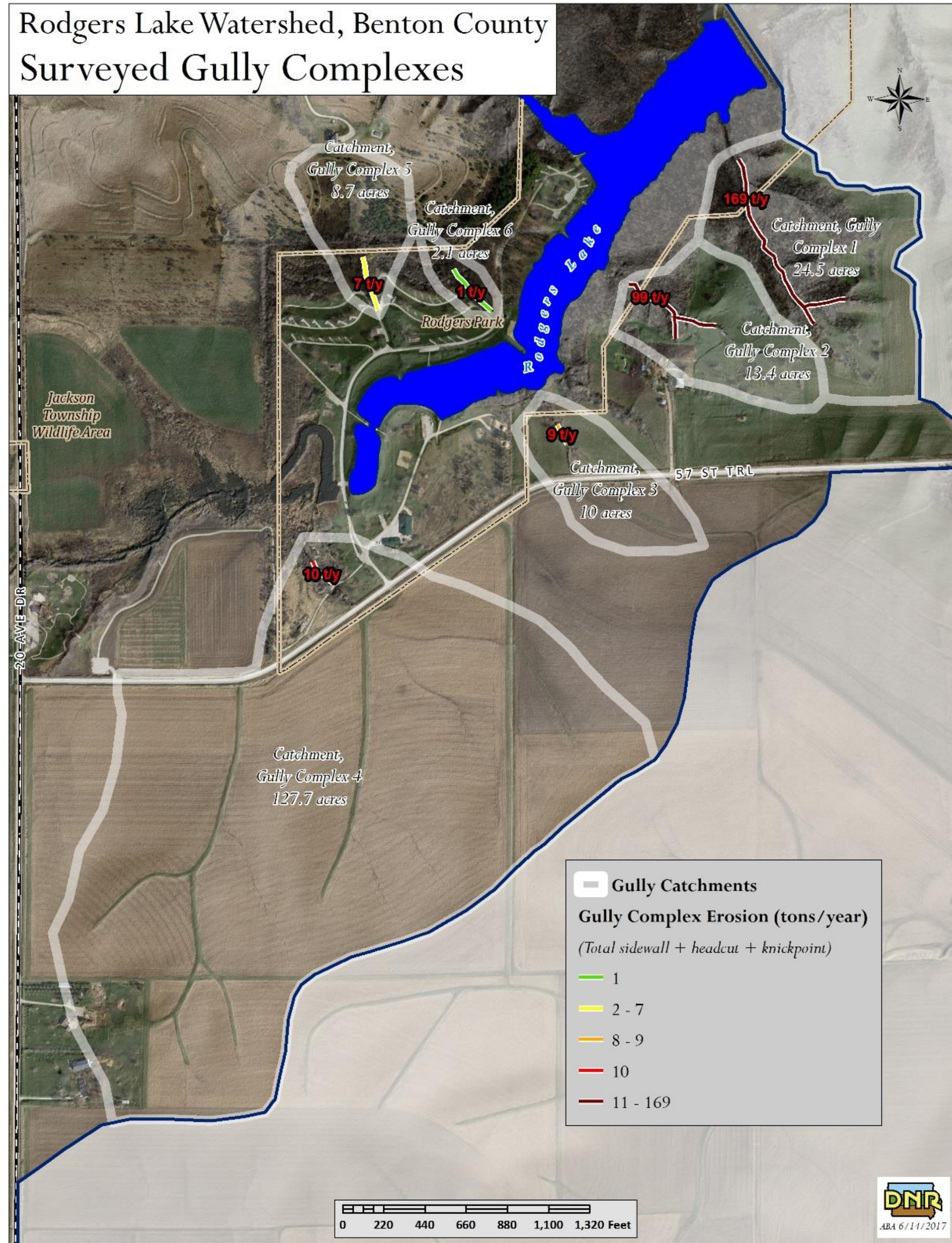


Yellow River Headwaters
Areas of Targeted Conservation
Total Sediment Delivery: 29,407 tons/year
Average Sediment Delivery: 1.13 tons/acre/year
Watershed Size: 26,118 acres
Sediment Delivery Ratio: 27%
Sediment delivery estimates are based upon NRCS Erosion and Sediment Delivery Worksheet (1996). RUSLE C and P factor information were gathered by local watershed personnel.
Target Area 1
Target Area 2
Target Area 3
Target Area 4
Target Area 5
Target Area 6
Winneshiek
Allamakee
Legend
Target Areas
Sediment Delivery (t/a/y)
< 0.5
0.51 - 1.00
1.01 - 2.00
2.01 - 5.00
5.01 - 11.8
BMPs
Filter Strips & Waterways
Terraces
BMP Catchments
Sediment Basin (90% Reduction)
Filter Strips & Waterways (25% Reduction)
Communities
0 0.5 1 1.5 2 Miles
18 Mar 2012
DNR

Watershed Assessment Tools
Gully Assessment

- Visual assessment of gully conditions
  - Height
  - Length
  - Erosion rate
- Provides a ton/year estimate of all gullies assessed


Lake Darling – Washington SWCD


Rodgers Lake Watershed, Benton County
Surveyed Gully Complexes
Catchment, Gully Complex 5 8.7 acres
Catchment, Gully Complex 6 2.1 acres
7 t/y
1 t/y
Rodgers Park
Rodgers Lake
169 t/y
Catchment, Gully Complex 1 24.5 acres
99 t/y
Catchment, Gully Complex 2 13.4 acres
9 t/y
Catchment, Gully Complex 3 10 acres
57 ST TRL
Jackson Township Wildlife Area
10 t/y
20 AVE DR
Catchment, Gully Complex 4 127.7 acres
Gully Catchments
Gully Complex Erosion (tons/year)
(Total sidewall + headcut + knickpoint)
1
2 - 7
8 - 9
10
11 - 169
0 220 440 660 880 1,100 1,320 Feet
DNR
ABA 6/14/2017

Watershed Assessment Tools
Stream & Streambank Assessment

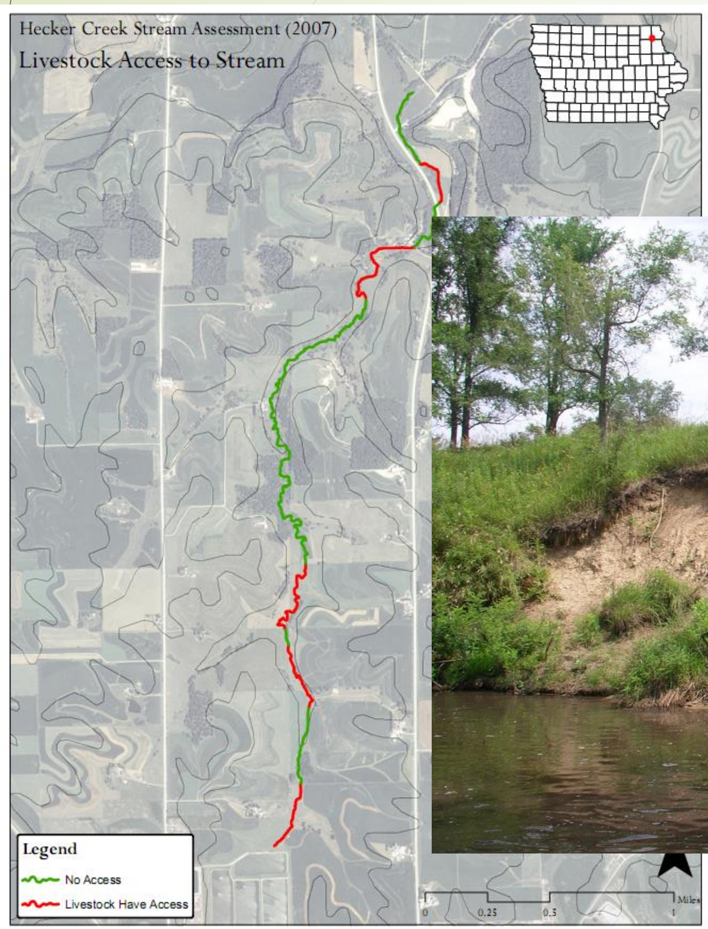
Yellow River – Winn. SWCD

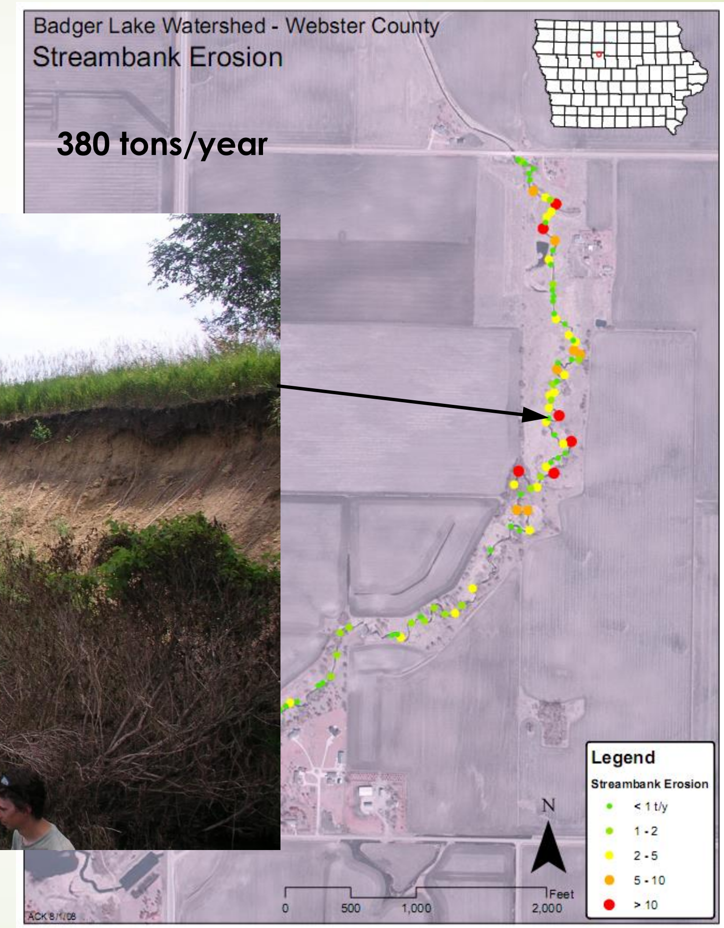
- RASCAL (Rapid Assessment of Stream Condition Along Length
- Visual assessment of stream conditions
  - Stream substrate
  - Bank stability
  - Canopy cover
  - Adjacent land use
  - Livestock access
- Results provide maps of stream conditions and estimate streambank erosion severity

Badger Creek Lake – Madison SWCD

Watershed Assessment Tools

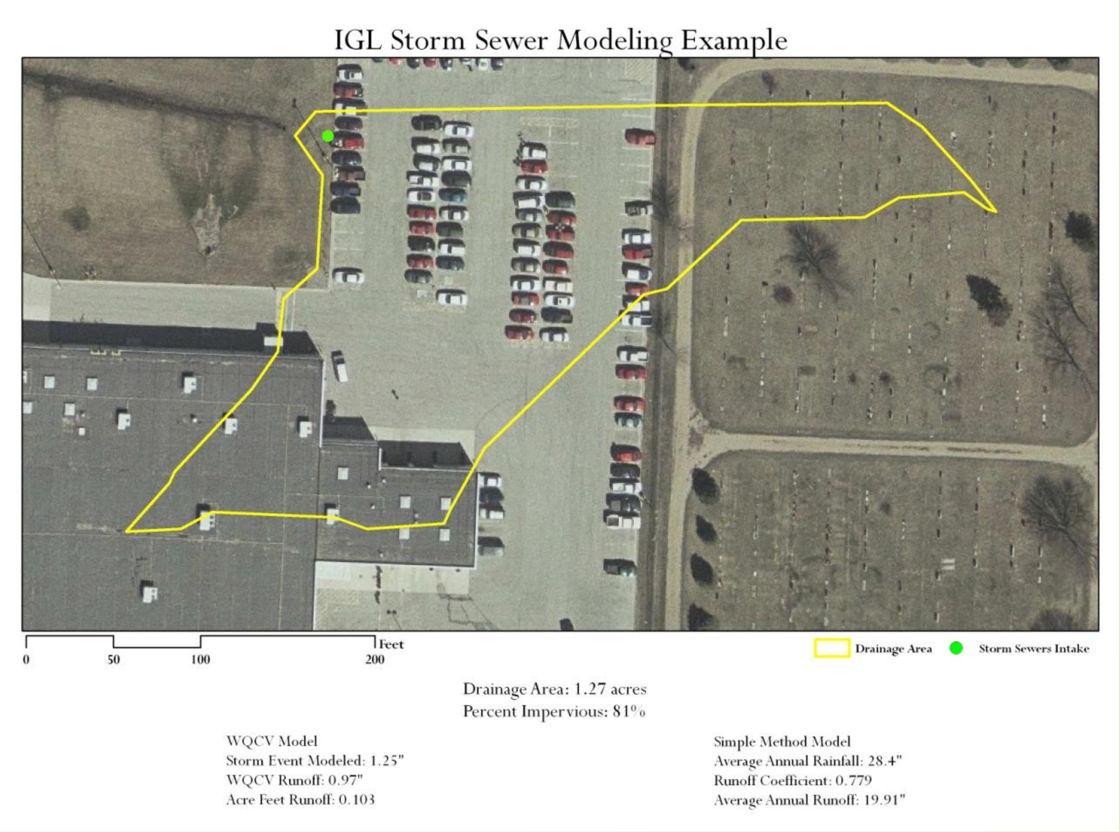
Stream & Streambank Assessment





Watershed Assessment Tools
Urban Assessment

- GPS helps identify location of storm sewers
- Elevation data can calculate intake drainage area
- Modeling can then estimate storm event and annual runoff to each storm sewer



Iowa Great Lake – Dickinson

TMDL

- Total Maximum Daily Load
  - AKA 'Water Quality Improvement Plan'
- Pollution Diet
- Provides modeling and data to establish targeted load reduction
- Required by the Clean Water Act for waterbodies listed as impaired

5. Goals & Objectives

- What is the desired future state for the watershed?

- **<u>Goal</u>**: Over-arching, high level, narrative

"Improve water quality in the Lower Cedar Watershed"

- **<u>Objective</u>**: Specific, targeted, measurable

"Reduce nitrogen by 41%"

"Reduce beach closures by 75% each summer"

"Conduct one outreach event per quarter"

6. Action Steps

- What specific actions need to be taken to reach the watershed goals?
- BMP type, quantity, environmental benefit
- Identify critical areas where actions will be targeted
  - Prioritize HUC12 watersheds
- The more specific, the better!
  - A plan that fails to identify critical areas or BMP recommendations is difficult to utilize for future funding requests

7. Implementation Strategy

- Partner roles / responsibilities
- Timeline
  - Interim milestones
- Costs
  - BMP
  - Coordinator
- Resources / funding

8. Monitoring

- Establish a strategy to monitor progress
- What indicators will be used to evaluate success? How will this be tracked?
  - Water quality
  - Hydrology
  - Social
  - Aquatic life
- Annual report / meeting

9. Evaluation

- Is adequate progress being made towards plan implementation?
- Adaptive management
- Plan review & updates ~ every 5 years

From Planning to Implementation

- Karl Gesch, Iowa Soybean Association
- Josh Balk, Dry Run Creek Watershed
- Neil Schaffer, Silver Creek Watershed