State Street Creek & 7ᵗʰ Avenue Creek Watershed Plan

Addendum to Ferson-Otter Creek Plan

Prepared By:

Cecily Cunz, AICP - Environmental Planner

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Agenda

- Purpose and need of project

- What is watershed planning

- Watershed boundary and early history

- Pre-Settlement, 1930s, and Existing Land Cover, Soils

- Land Use and Demographics

- Subwatersheds and Impervious Cover

- Watershed Inventory

  - Streams

  - Best Management Practices (BMPs)

- Groundwater

- Wastewater and NPDES permits

- Water Quality Preview

Ferson-Otter Creek Watershed Plan

CMAP

Ferson-Otter Creek Watershed Plan

December 2011
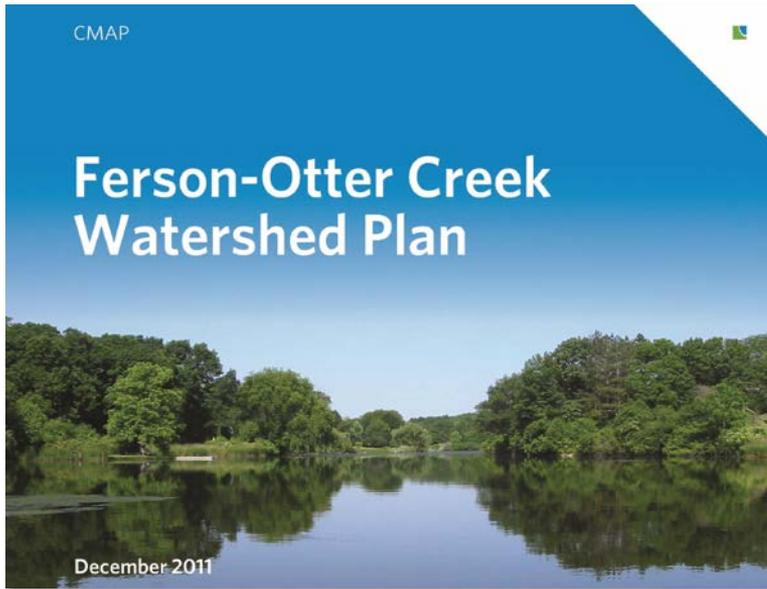
- Addendum to Ferson-Otter Creek Watershed Plan completed by CMAP in 2011.

Legend

- ▭ Ferson-Otter Creek Watershed
- ▭ State Street Creek Watershed
- ▭ 7th Avenue Creek Watershed
- — Streams

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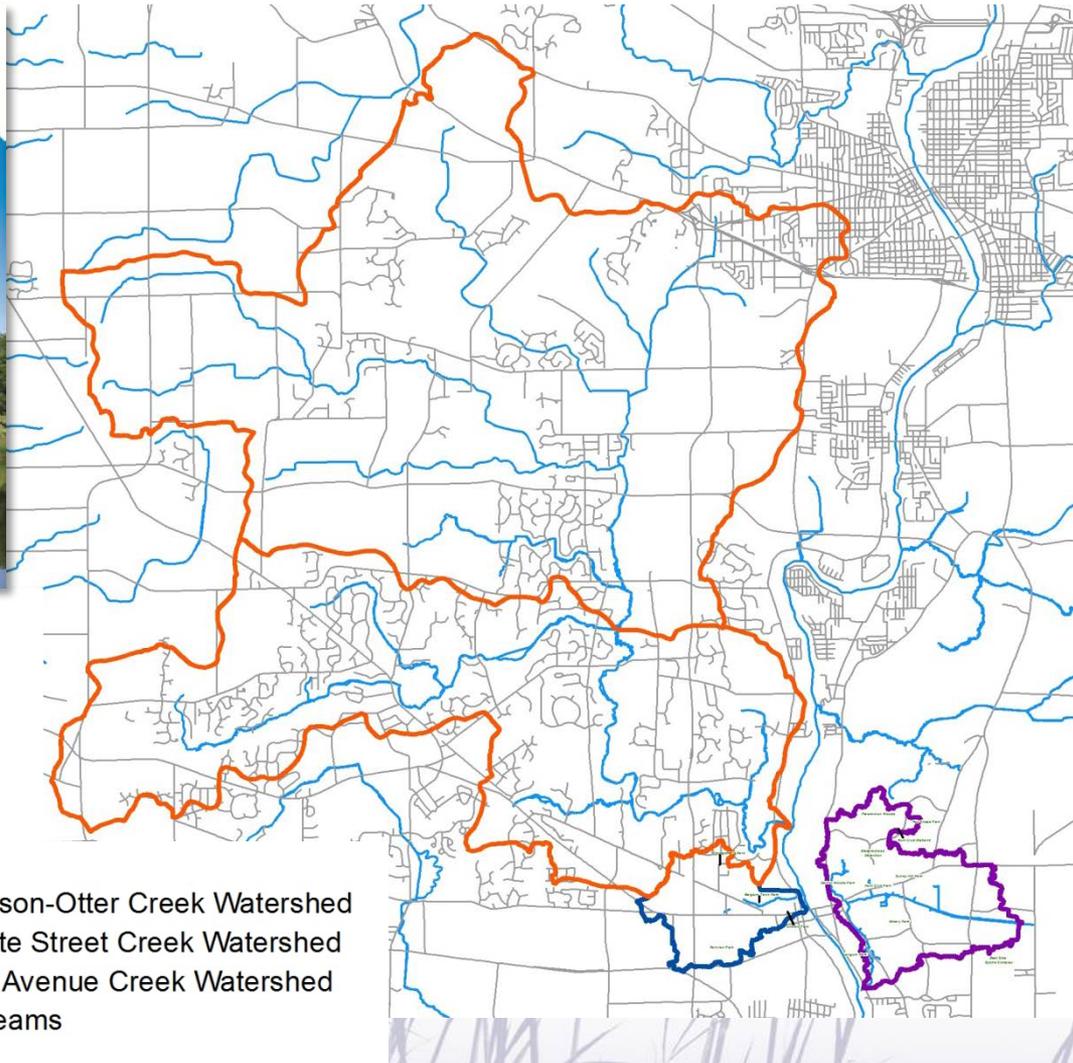
State Street Creek & 7th Avenue Creek

- Both within Lower Fox River Basin (HUC 07120007).
- State Street Creek is in Norton Creek-Fox River subwatershed (HUC 071200070104).
- 7th Avenue Creek is in Town of Geneva-Fox River subwatershed (HUC 071200070106).

Watershed Locator Maps

State Street Creek & 7th Avenue Creek Subwatersheds
St Charles, Illinois
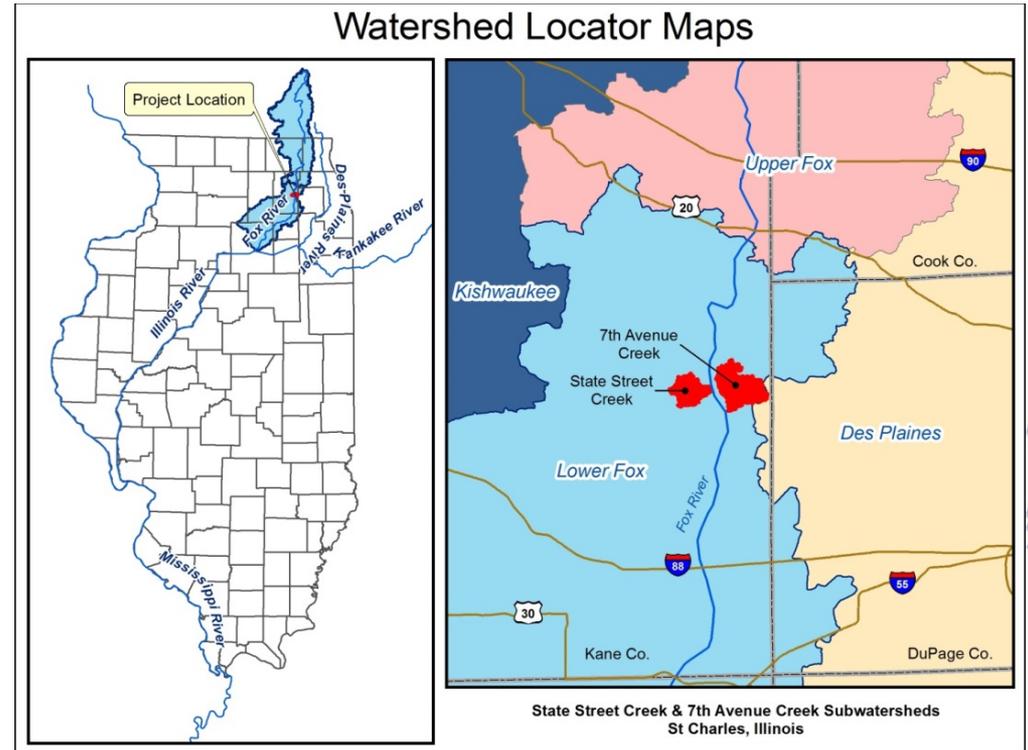
Stakeholders

- *Anyone who lives, works, or plays in the watersheds.*
- City of St Charles
- Kane County
- St Charles Park District
- CMAP
- IEPA
- Conservation Foundation
- Friends of the Fox
- Fox River Study Group
- Fox River Ecosystem Partnership
- Forest Preserve District of Kane County

- Kane County Stormwater
- Kane County Riverboat
- Kane DuPage Soil and Water Conservation District
- Active River Corridor Foundation
- St Charles Township
- IDNR

AES Watershed Planning Experience

AES has completed 10+ watershed plans in the past 10 years
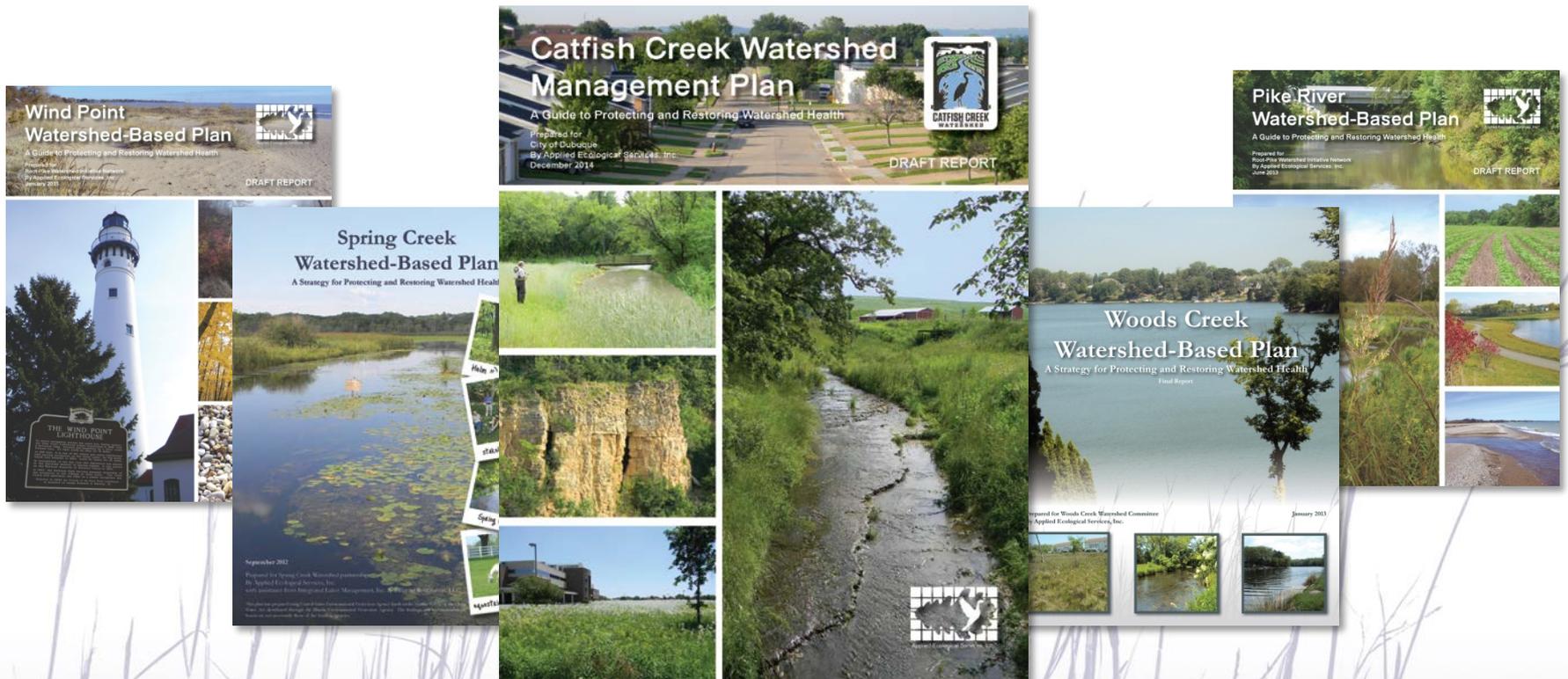
What is Watershed Planning?

Voluntary, community supported approach to protecting and improving water quality in streams, lakes, and wetlands, protecting groundwater resources, restoring habitat, reducing flood damage, and providing recreational & educational opportunities.

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EPA Guidance - Nine Elements

Handbook for Developing Watershed Plans to Restore and Protect Our Waters
        March 2008, EPA 841-B-08-002

Goal: Reduce non-point source pollution

Element A: Identify causes and sources of impairment.

Element B: Estimate pollutant load reductions from Management Measures/BMPs.

Element C: Propose Management Measures/BMPs and identify "Critical Areas"

Element D: Identify technical and financial assistance needs.

Element E: Complete an information/education component.

Element F: Prepare a plan implementation schedule.

Element G: Describe interim, measurable milestones and project outcomes.

Element H: Develop criteria to determine if load reductions are being achieved over time.

Element I: Develop a monitoring plan to evaluate implementation efforts over time.

Watershed Planning Steps
(Addresses EPA Nine Elements)

- Watershed Field Inventory

- Watershed Characteristics Assessment

- Vision, Goals & Objectives

- Causes & Sources of Impairment

- Critical Areas & Reduction Targets

- Action Plan

  - Programmatic Plan   - Site Specific Plan

  - Education Plan   - Monitoring Plan

- Plan Evaluation

**Stakeholder meetings are held throughout.

Nonpoint Source (NPS) Pollution

- Any pollution that does NOT come from a pipe or discreet source.

- Caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, depositing them into lakes, rivers, wetlands, coastal waters and ground waters.

- Many diffuse sources.
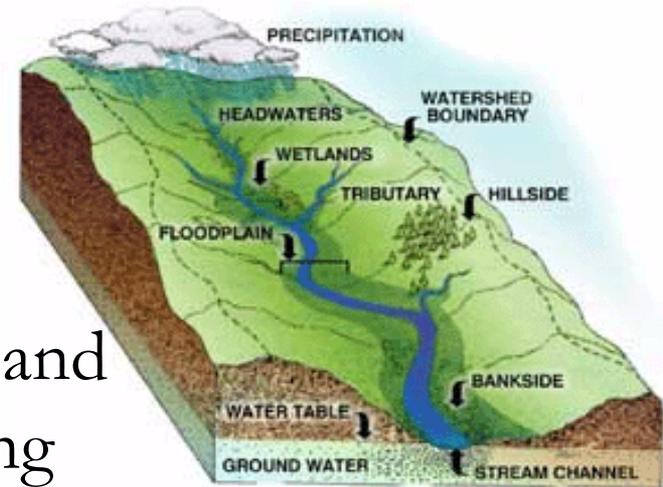
Watershed Boundary & Topography

- Wisconsin Episode glacier 14,000 years ago
- Highest point =840 ft ASL; lowest point = 679 ft ASL
- Boundary delineated using 2-ft topo and stormwater data.
- State St Creek is 1,030 acres
- 7th Ave Creek is 1,885 acres

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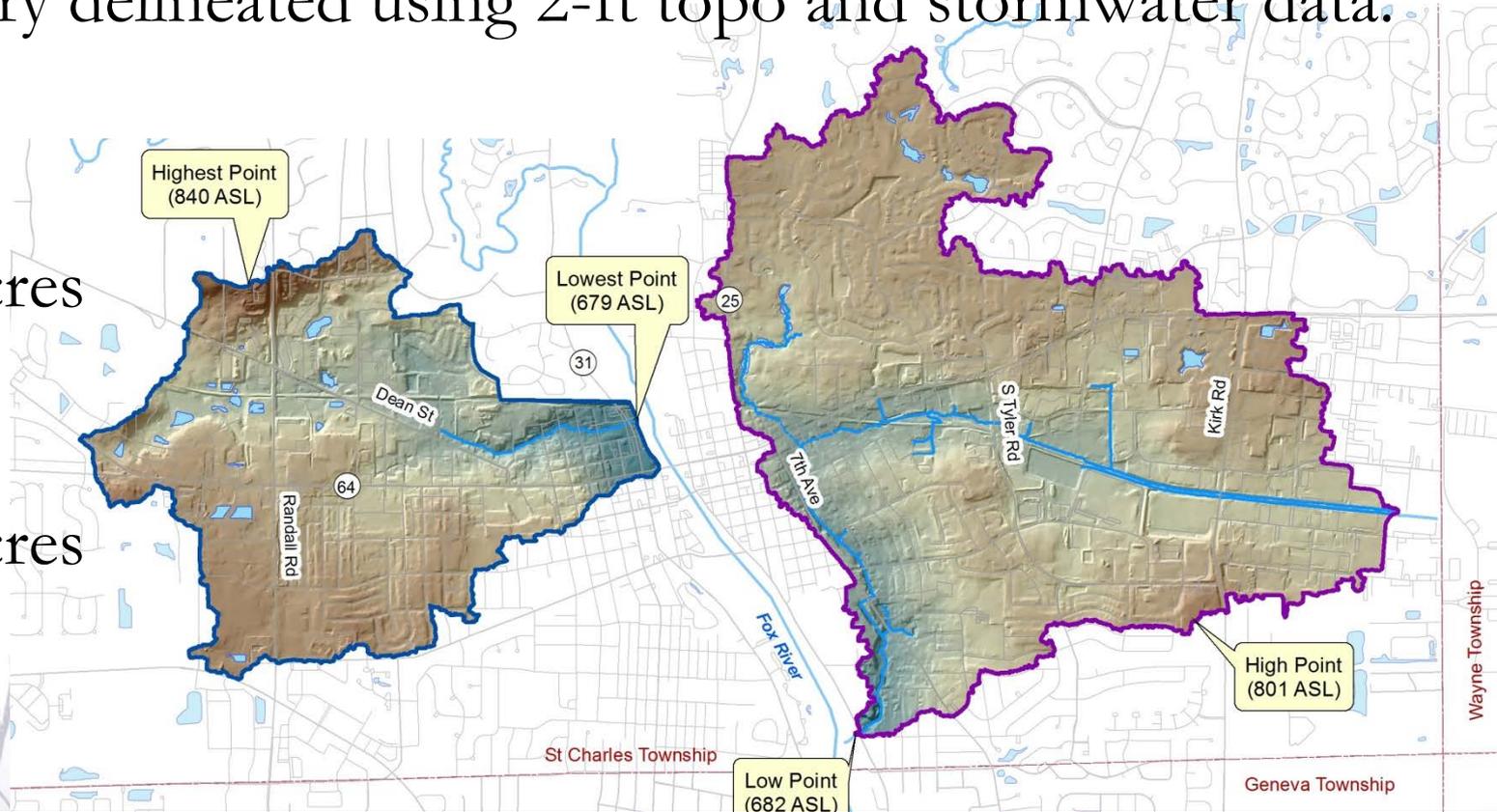
Early History

- Prior to European settlement, Potawatomi maintained two summer camps along the shallowest banks of Fox River.

- By 1833 last of Native Americans removed from the land.

- Charleston (later, St Charles) settled in 1834 on the east bank of the Fox River.

- Early streams used to power lumber mills, gristmills, and wool carding mills.

- By 1836 bridge and dam built and town expands on both banks of the Fox.

Pre-Settlement Land Cover (1830s)

- Watersheds a mix of "Prairie," "Timber," and "Field."
- Defined stream channels seen today were non-existent.
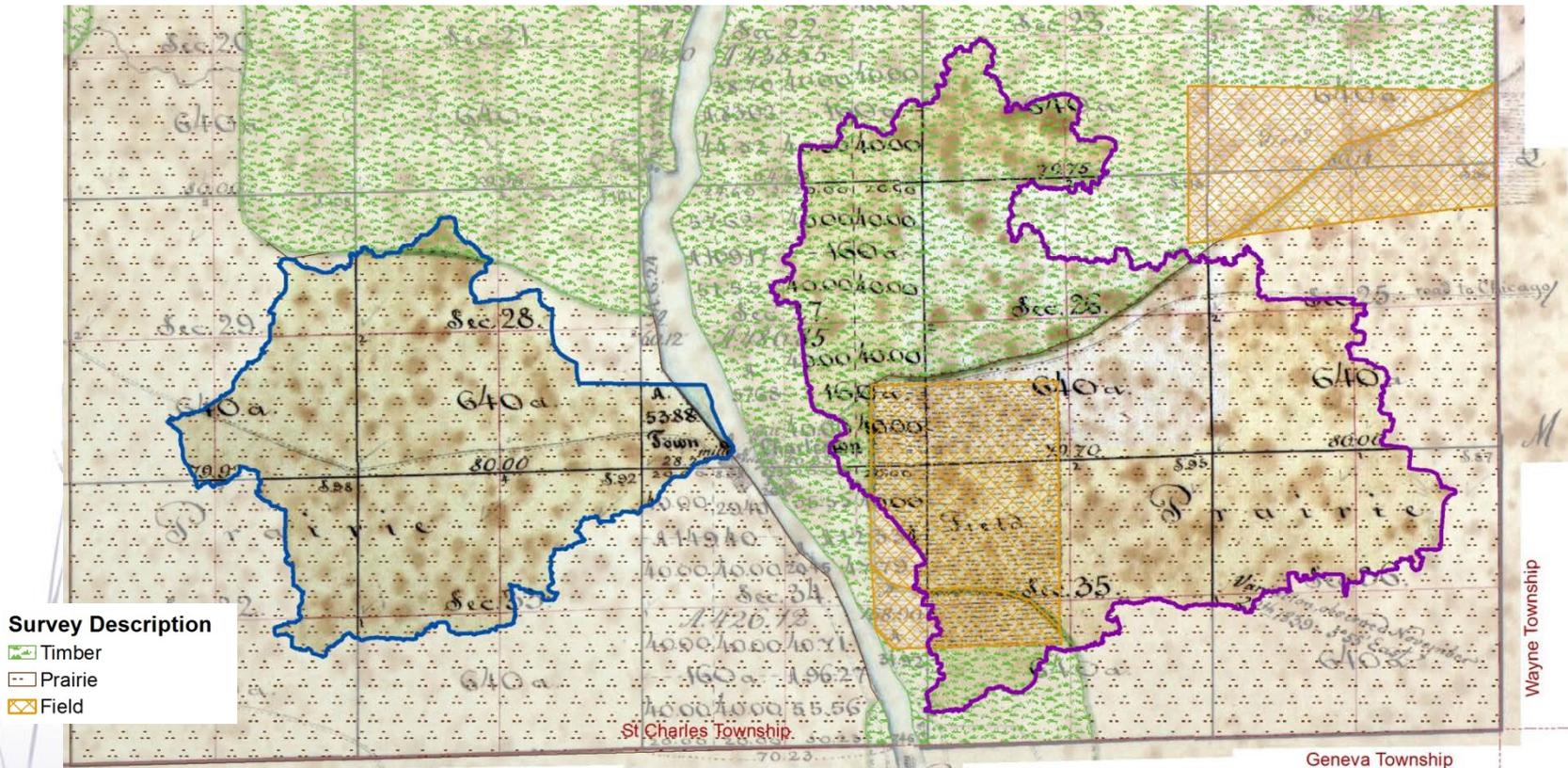
What did the Pre-European Settlement Landscape Look Like?

Prairie Community

Woodland/Savanna Community

1939 Aerial

- Row crop farming is primary land use.

- Most woodland communities were cleared.

- Farmland replaced nearly all prairie communities.

St Charles Township

Wayne Township

Geneva Township
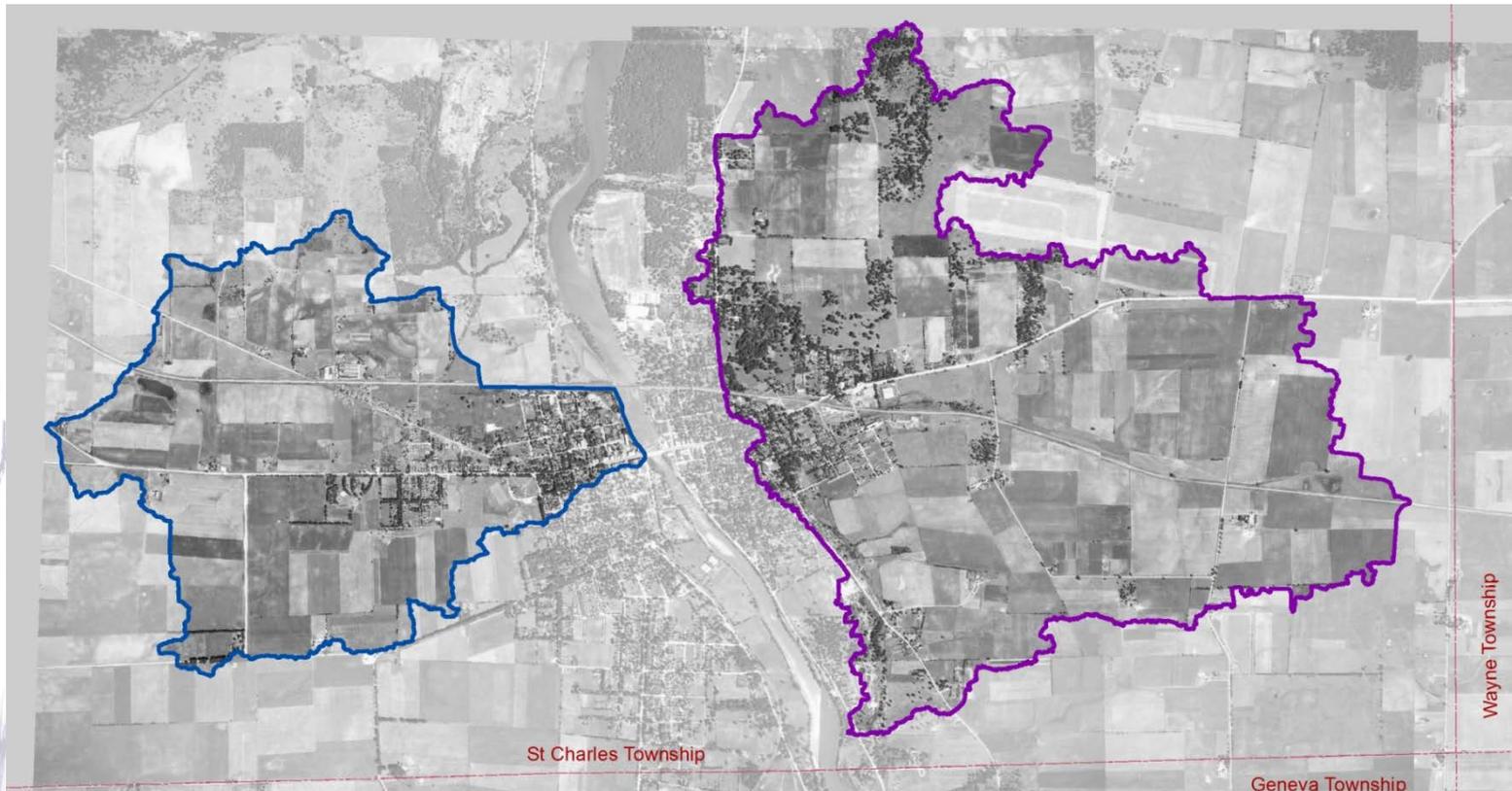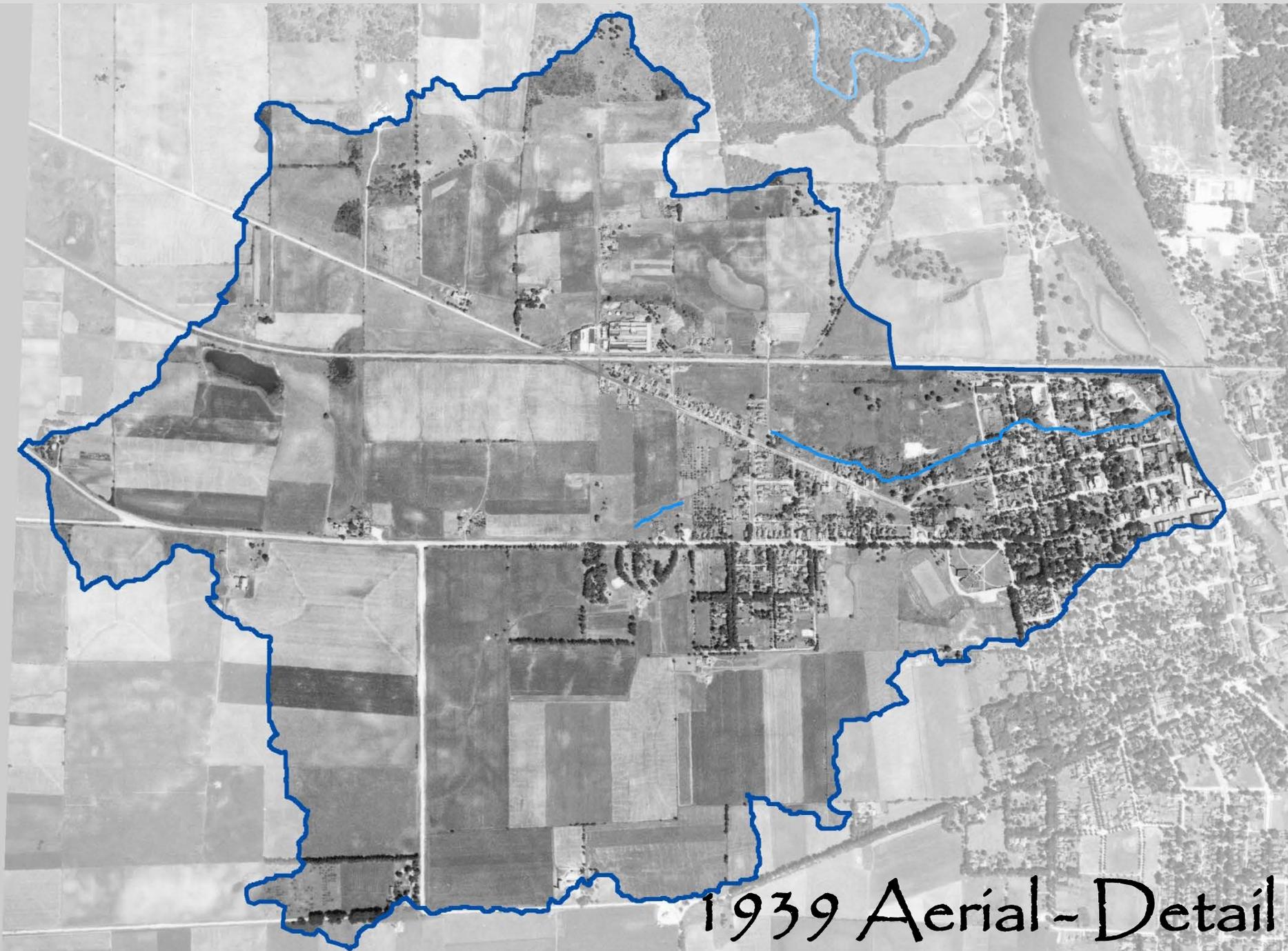
1939 Aerial ~ Detail

2015 Aerial

- Majority of agricultural areas are now urban.

- Residential subdivisions are situated in remaining woodlands.

- State St – upstream drainage buried with development.
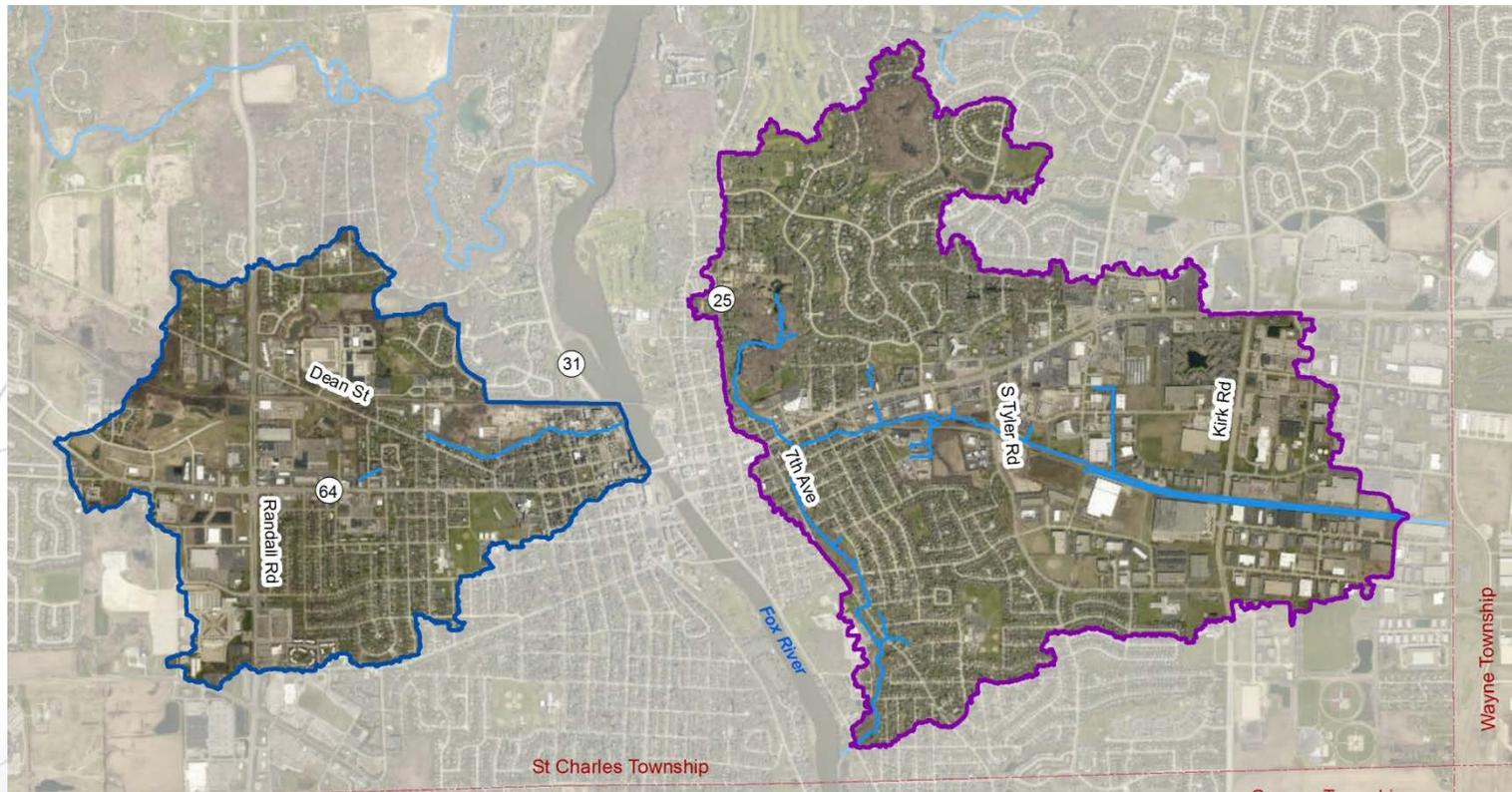
Hydric Soils

- Indication of where wetlands once were located
- 254.5 acres of hydric soils in State Street Creek
- 413.8 acres of hydric soils in the 7th Avenue Creek

Hydric Soil Rating
- All hydric
- Not hydric
- Unknown
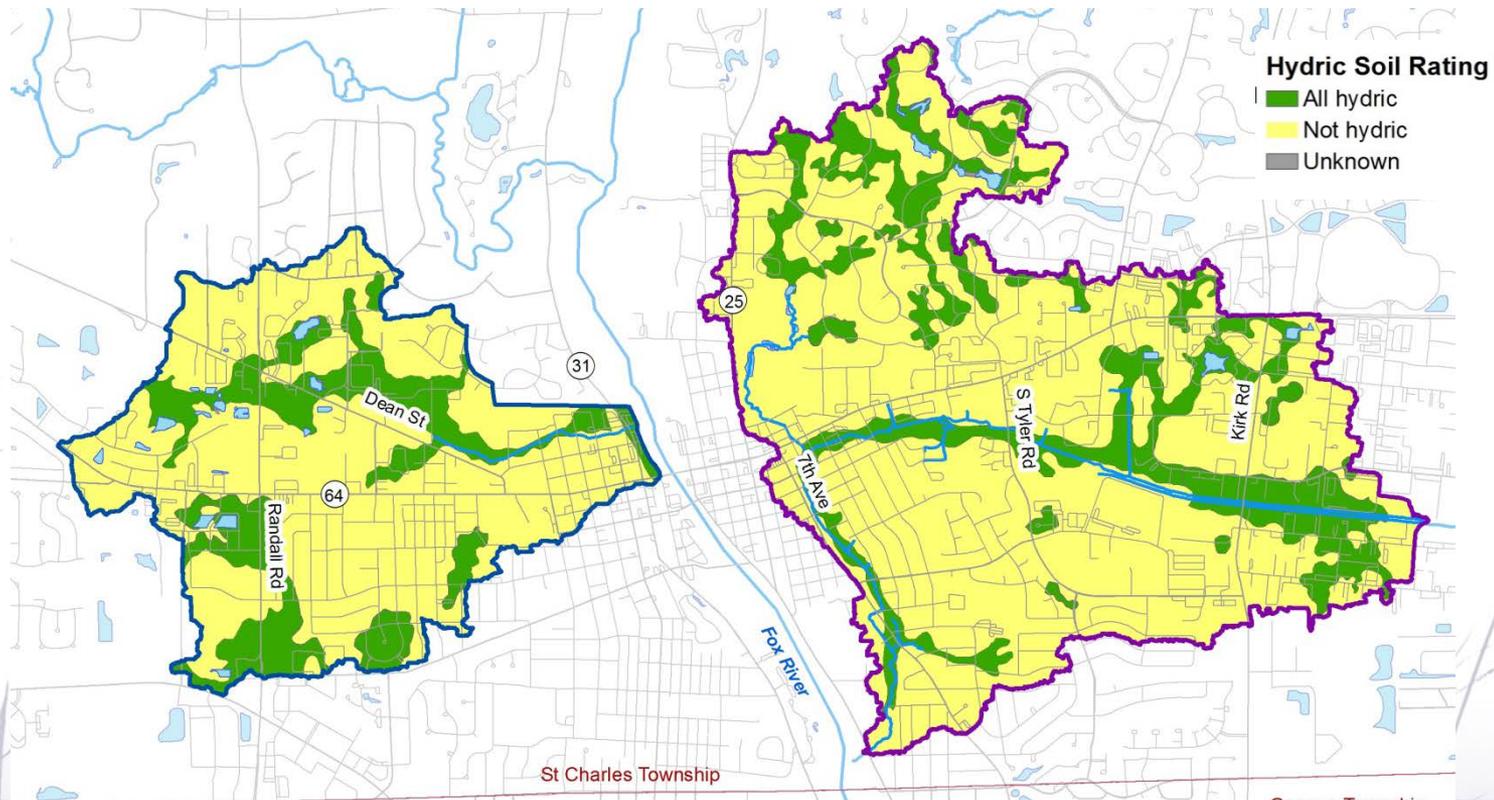
Jurisdictions

City of St Charles makes up:

- 945.8 acres (92%) of State St

- 1,862.2 acres (99%) of 7th Ave

Remaining is St Charles Township

Entirely within Kane County

Protected Open Space

St Charles Park District owns a 136.7 acres within watersheds
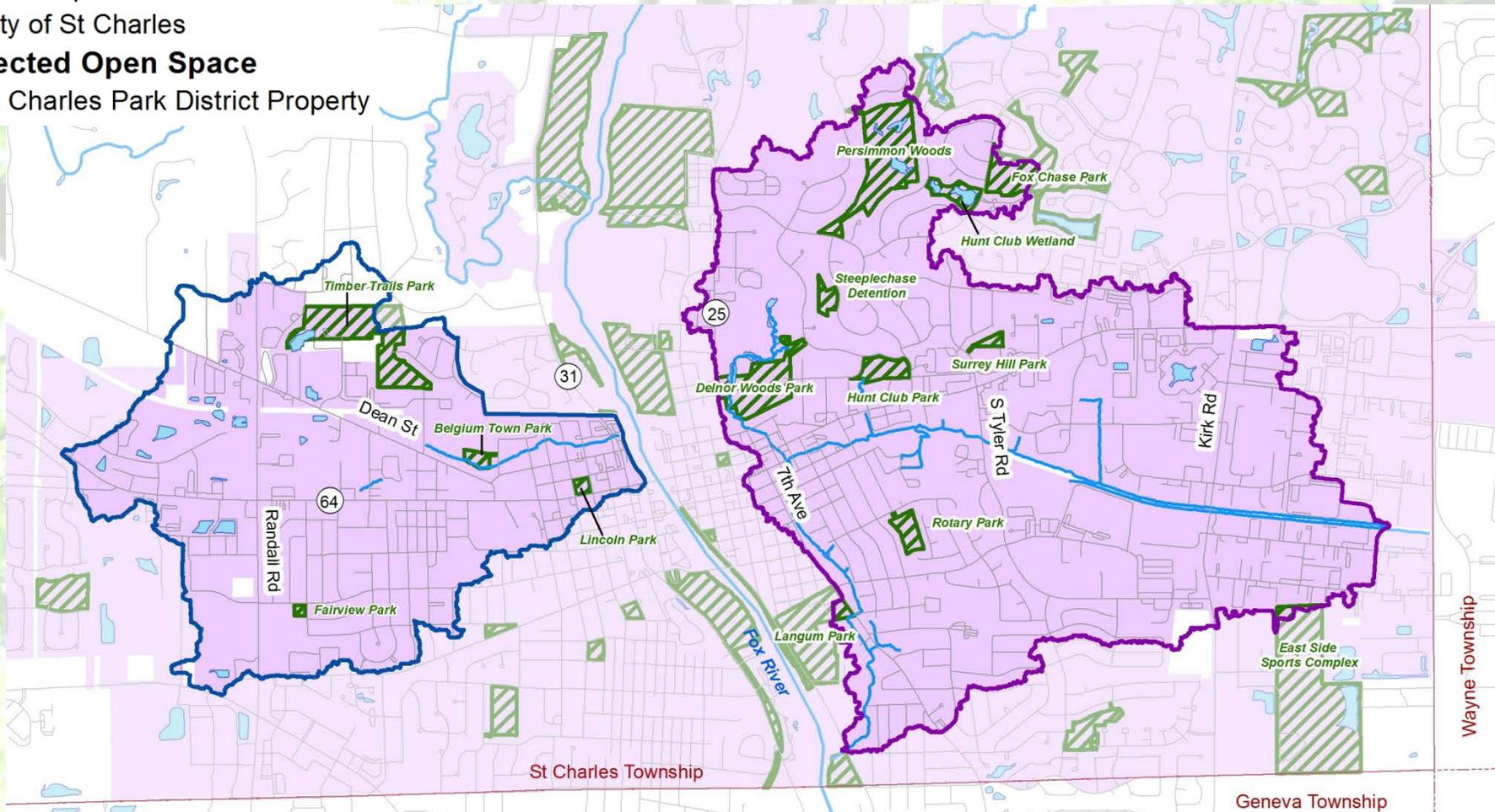
Timber Trails Park

Persimmon Woods Park

Delnor Woods Park

Hunt Club Wetland

## Good Wetlands Make Good Neighbors

This wetland has been part of the neighborhood for longer than the houses and streets that surround it. Over the years, it has turned out to be the ideal neighbor–steady, hard-working and welcoming.

Here's how Hunt Club Wetland makes living nearby a pleasure:

- It cleans run-off water from yards and roads. The roots of the grasses and flowers growing around the wetland filter out pollutants that might otherwise end up in our drinking water supply or the nearby Fox River.
- It keeps homes from flooding. The wetland acts as a sponge to soak up excess rainwater and keep it from ending up in basements.
- Birds, butterflies and other animals make their home in the wetland. You don't have to go far to see nature close up.
- It adds beauty to the neighborhood. The wetland's ever-changing scene of water, plants and animals delight the eyes and lift the spirit.

ST. CHARLES PARK DISTRICT

These signs are given in memory of Dick Williams, whose persistent efforts, with the assistance of the U.S. Army Corps of Engineers and the citizens of St. Charles led to the preservation of these wetlands.

Hunt Club Wetland

Demographics

Data Category	2010	2040	Change (2010-2040)	Percent Change
Population	20,276	24,249	+3,973	+19.6
Household	8,139	9,731	+1,592	+19.5
Employment	16,944	25,049	8,105	+47.8

CMAP, 2040 Forecasts

- **Predominantly white population (89%)**
- **Median household income over $83,000**
- **Approximately 72% of housing units are owner occupied**
- **Median value of owner-occupied housing is $277,800**
- **About 49% of residents hold a college bachelor's degree or higher**
- **69% of the population age 16 years or over is in civilian labor force**

US Census Bureau 2015

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Existing Land Use/Land Cover

Land Use/Land Cover	Acres	% of Watershed
State Street Creek Watershed		
Residential	445.3	43.2%
Business	283.8	27.6%
Manufacturing	109.5	10.6%
Institutional	54.0	5.2%
Open Space and Public Land	48.4	4.7%
Office/Research Park	41.8	4.1%
Municipal	37.2	3.6%
Transportation	9.9	1.0%
Totals	1030.0	100.0%
7th Avenue Creek Watershed		
Residential	819.9	43.5%
Manufacturing	552.6	29.3%
Business	219.3	11.6%
Open Space and Public Land	169.0	9.0%
Agriculture	37.8	2.0%
Institutional	33.5	1.8%
Office/Research Park	27.6	1.5%
Transportation	13.3	0.7%
Municipal	12.0	0.6%
Totals	1884.9	100.0%

Zoning Description
- Municipal Land
- Institutional
- Transportation
- Office\Research District
- Limited Manufacturing District
- Special Manufacturing District
- Local Business District
- Periphery Central Business District
- Community Business District
- Core Central Business District
- Regional Business District
- Agriculture
- Public Land and Open Space District
- Residential - Estate
- Residential - Single Family
- Residential - Single Family & Duplex
- General Residence District
- Residential - Multi Family
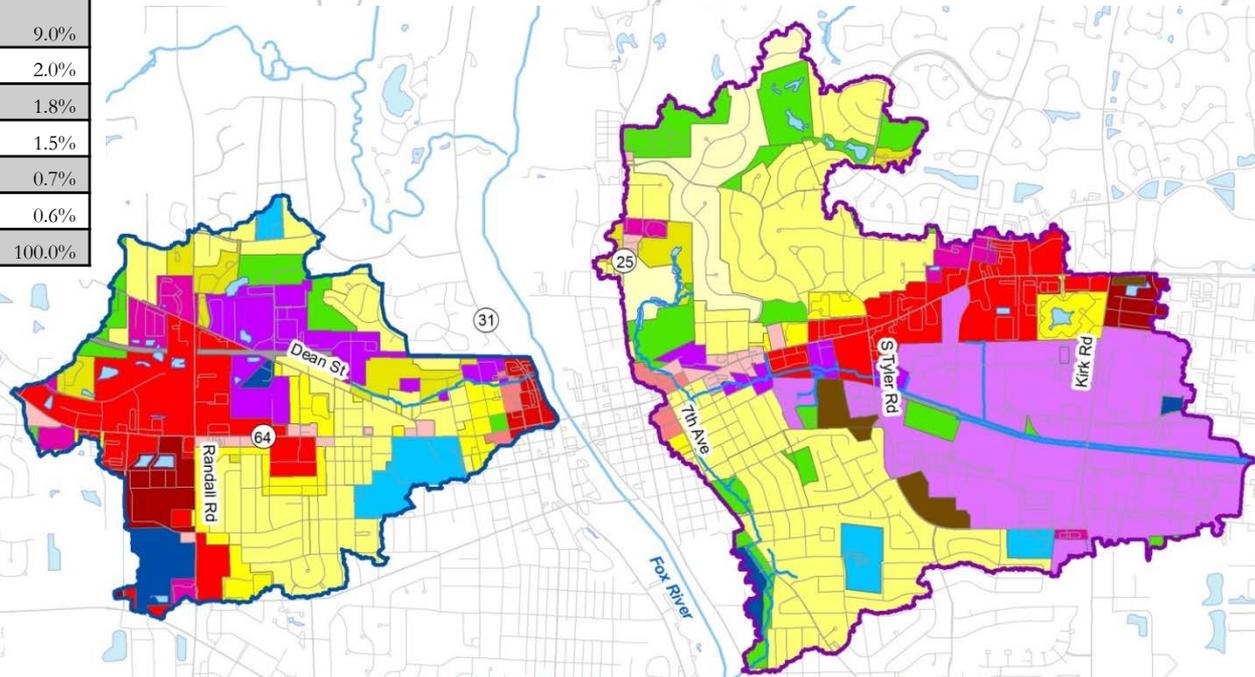
Future Land Use

Land Use/Land Cover	2016 Area (Acres)	2016 % of Cover	2040 Area (Acres)	2040 % of Cover	Change (Acres)	Percent Change
State Street Creek Watershed						
Residential	445.3	43.2%	423.7	41.1%	-21.6	-4.8%
Business	283.8	27.6%	314.7	30.6%	30.9	10.7%
Manufacturing	109.5	10.6%	69.1	6.7%	-40.4	-36.7%
Institutional	54	5.2%	54	5.2%	0	0.8%
Open Space	48.4	4.7%	80.6	7.8%	32.2	66.5%
Office	41.8	4.1%	39.1	3.8%	-2.7	-7.4%
Municipal	37.2	3.6%	38.8	3.8%	1.6	4.6%
Transportation	9.9	1.0%	9.9	1.0%	0	-3.9%
7th Avenue Creek Watershed						
Residential	819.9	43.5%	802.6	42.6%	-17.3	-2.1%
Manufacturing	552.6	29.3%	544.6	28.9%	-8	-1.4%
Business	219.3	11.6%	248.9	13.2%	29.6	13.8%
Open Space	169	9.0%	186.6	9.9%	17.6	10.0%
Agriculture	37.8	2.0%	3.4	0.2%	-34.4	-91.0%
Institutional	33.5	1.8%	33.5	1.8%	0	-1.3%
Office	27.6	1.5%	27.6	1.5%	0	-2.4%
Transportation	13.3	0.7%	13.3	0.7%	0	0.8%
Municipal	12	0.6%	24.5	1.3%	12.5	116.6%

Land Use Type

- Corridor/Regional Commercial
- Industrial/Business Park
- Mixed Use
- Neighborhood Commercial
- Parks/Open Space
- Public/Semi-Public
- Right of Way
- Rural Single Family Residential; Single Family
- Attached Residential; Single Family Detached Residential
- Multi-Family Residential
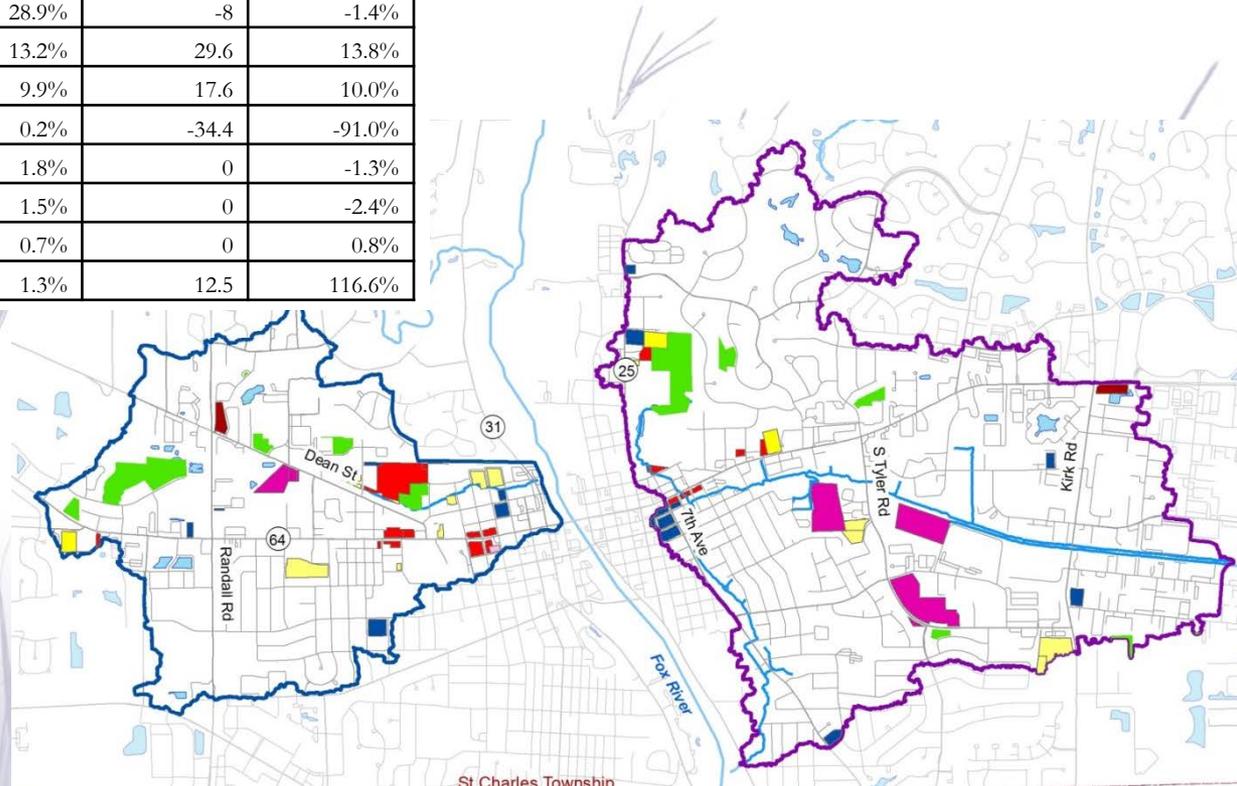
Subwatershed Management Units (SMUs)

- 21 SMUs: range from 53 to 423 acres in size
- 9 in State Street Creek Watershed
- 12 in 7th Avenue Creek Watershed
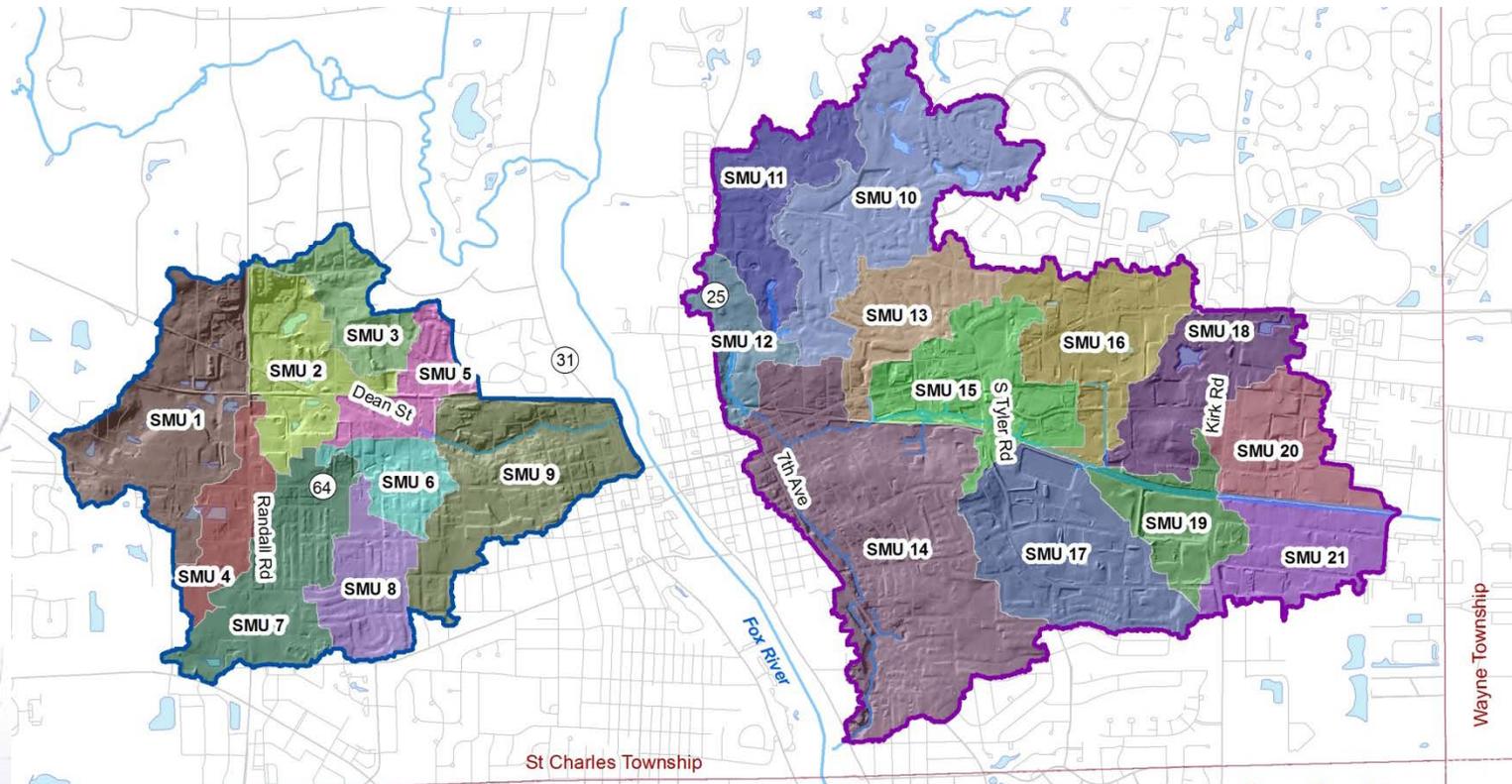
Impervious Cover & Stream Condition

- As impervious cover increases, stream conditions deteriorate
- Higher rates of impervious cover lead to higher pollutant levels, higher flow volumes, habitat degradation, and increased flooding

Category	% Impervious	Stream Condition within Subwatershed
Sensitive	<10%	Stable stream channels, excellent habitat, good water quality, and diverse biological communities
Impacted	>10% but <25%	Somewhat degraded stream channels, altered habitat, decreasing water quality, and fair-quality biological communities.
Non-Supporting	>25%	Highly degraded stream channels, degraded habitat, poor water quality, and poor-quality biological communities.

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Vulnerability Analysis

2016 Impervious Cover by SMU
- Impacted (yellow)
- Non-supporting (red)
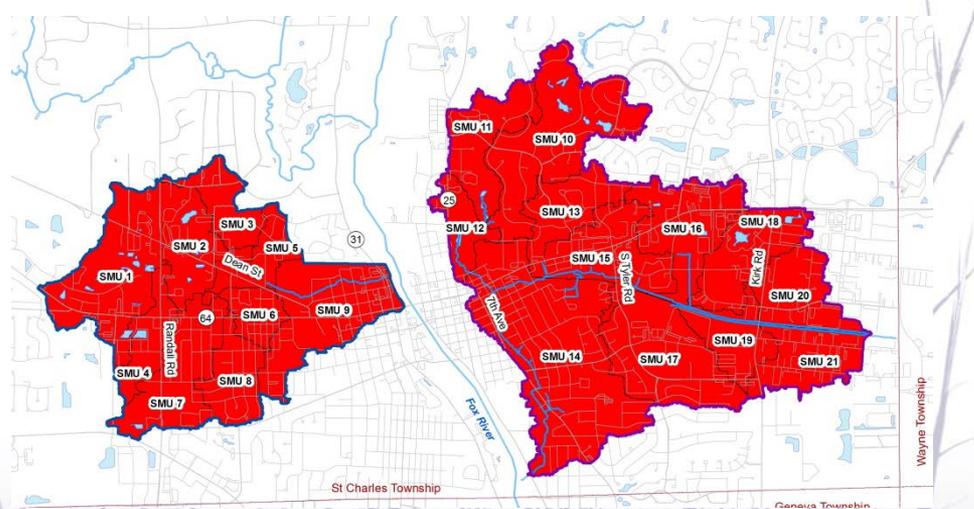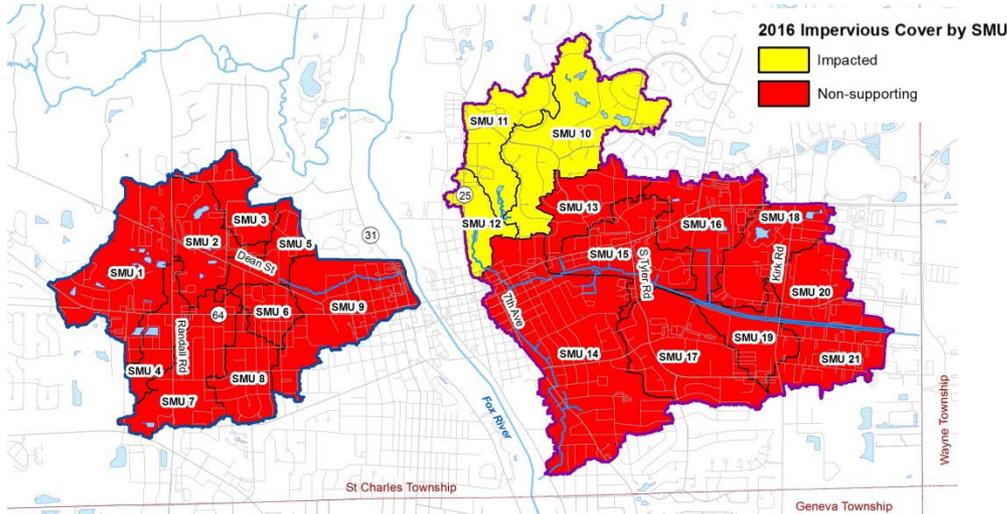
| SMU	Step 1: Existing Impervious %	Existing (2012) Impervious Classification	Step 2: Predicted Impervious %	Predicted Impervious Classification
1	61.0%	Non-Supporting	53.5%	Non-Supporting
2	59.1%	Non-Supporting	59.2%	Non-Supporting
3	29.7%	Non-Supporting	33.8%	Non-Supporting
4	67.9%	Non-Supporting	73.1%	Non-Supporting
5	40.6%	Non-Supporting	44.1%	Non-Supporting
6	33.9%	Non-Supporting	48.5%	Non-Supporting
7	45.2%	Non-Supporting	57.2%	Non-Supporting
8	29.7%	Non-Supporting	38.9%	Non-Supporting
9	39.9%	Non-Supporting	46.0%	Non-Supporting
10	16.6%	Impacted	28.3%	Non-Supporting
11	18.5%	Impacted	27.1%	Non-Supporting
12	21.0%	Impacted	28.2%	Non-Supporting
13	25.8%	Non-Supporting	36.9%	Non-Supporting
14	30.5%	Non-Supporting	42.1%	Non-Supporting
15	62.6%	Non-Supporting	63.2%	Non-Supporting
16	70.9%	Non-Supporting	71.3%	Non-Supporting
17	44.2%	Non-Supporting	59.7%	Non-Supporting
18	62.6%	Non-Supporting	67.6%	Non-Supporting
19	74.3%	Non-Supporting	73.5%	Non-Supporting
20	74.3%	Non-Supporting	74.1%	Non-Supporting
21	73.8%	Non-Supporting	71.7%	Non-Supporting

Subwatershed Vulnerability

Vulnerability to future development for each SMU was categorized as Low, Medium, or High:

- **Low** = no change in classification; <5% change in impervious cover
- **Medium** = 5-10% change in impervious cover
- **High** = classification change and/or >10% change in impervious cover

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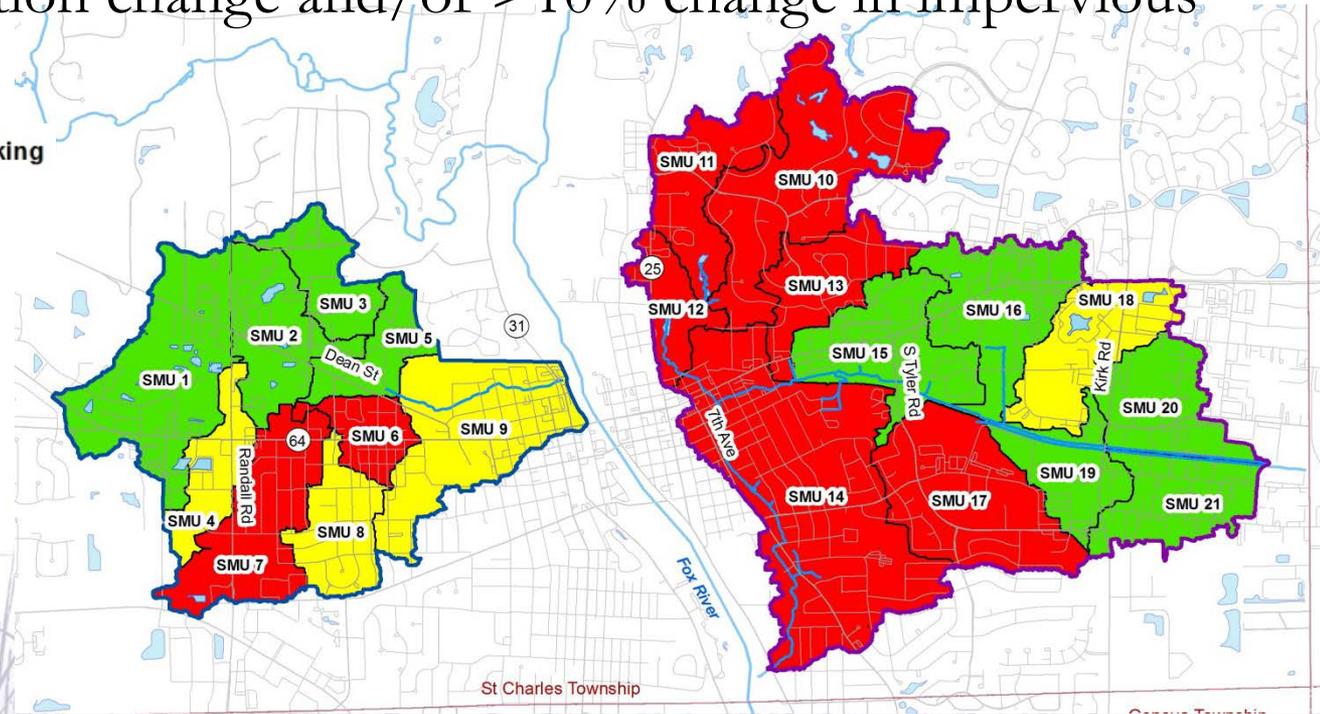
Watershed Field Inventory

- Inventory of watershed features including stream reaches, detention basins, agricultural practices, etc.

- Results used to identify potential watershed improvement projects & verify land uses

- Problems and opportunities identified
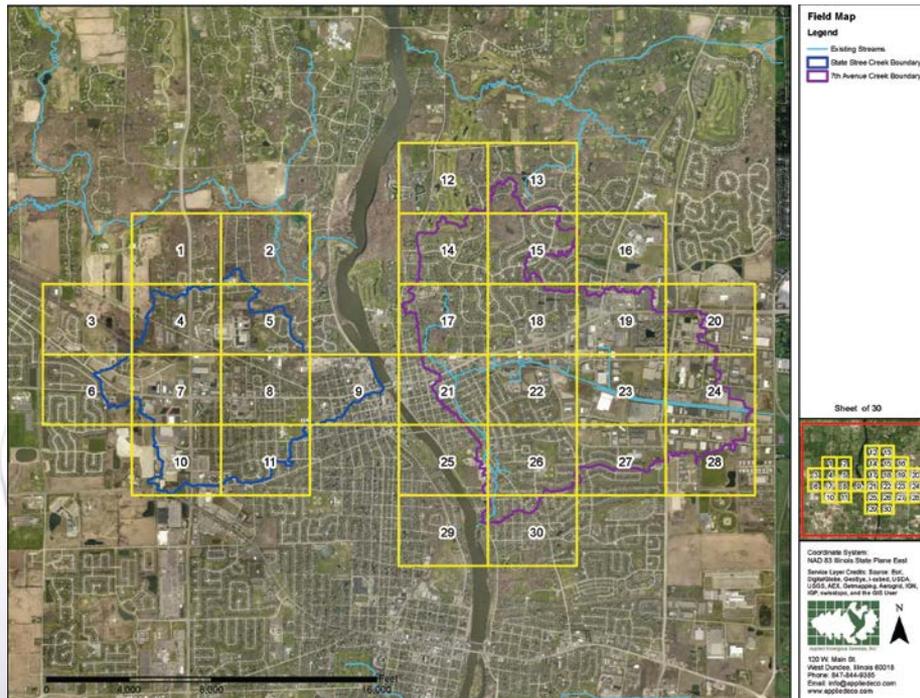
Assessment Methodology

Stream Assessment Data Sheets

Misc. BMP Data Sheets

ST CHARLES WATERSHED STREAM INVENTORY/BMP FORM

STREAM NAME:_____ REACH ID:_____ DATE:_____

REACH BOUNDARIES:_____ OWNER:_____

MAP/AES#_____ PHOTOS_____ APPROX. LENGTH (ft):_____ INVESTIGATOR:_____

CHANNEL CONDITIONS:

CHANNELIZATION: NONE_____ LOW_____ MODERATE____HIGH_____

SPOILS PILES ON BANKS (Left / Right / Both)

CHANNEL SINUOSITY: NONE____ LOW____ MODERATE____ HIGH____

POOL/RIFFLE DEVELOPMENT: NONE____ LOW____ MODERATE____ HIGH____

DEGREE OF BANK EROSION (circle most appropriate):

NONE	LOW	MODERATE	HIGH
Stable; less than 5% of banks affected.	Moderately stable; 5-33% banks have areas of erosion.	Moderately unstable; 33-66% of banks have areas of erosion.	Unstable; 66-100% of banks highly eroded.

MEAN BANK HEIGHT & CHANNEL WIDTH (facing downstream):

LEFT BANK HEIGHT (FT)	MEAN CHANNEL WIDTH	RIGHT BANK HEIGHT (FT)

DEBRIS JAMS: INSTREAM/OVERBANK: LOW _____ MODERATE _____ HIGH _____

SEDIMENT ACCUMULATION: LOW _____ MODERATE _____ HIGH _____

RIPARIAN VEGETATION COVER (facing downstream):

BRIEFLY DESCRIBE RIPARIAN AREA: _____

_____

_____

_____

OVERALL ECO CONDITION OF RIPARIAN AREA: GOOD:_____AVERAGE:_____POOR:_____

BMP RECOMMENDATIONS:
- Invasive Species Removal (Riparian) □ Soil Lifts □ Regrade/Reslope Stream Banks
- Artificial Riffles/Pools □ Native Seeding/Plug Planting □ Hard Bank Armoring (ie Gabions)
- Bioengineered Bank Armoring □ Native Tree/Shrub Planting □ Maintenance (ie debris clearing)

BMP DETAILS: _____

_____

_____

_____

_____

BMP PRIORITY: CRITICAL AREA_____ HIGH_____ MEDIUM_____ LOW_____

Explain Priority: _____

_____

ST CHARLES WATERSHEDS MISC. WATER QUALITY BMP FORM

I.   Site Name: _____ Date:_____ Photos:_____

Approx. Size (ac) _____ Investigators: _____ Owner: _____

Location(s):_____

AES ID# _____ Map Index #_____

II.   Existing Site Conditions:
- □ 1. Woodland (dry – mesic – wet)
- □ 2. Praine (dry - mesic – wet)
- □ 3. Old field
- □ 4. Turf/Park
- □ 5. Scrub shrub (dry – wet)
- □ 6. Marsh/Wetland
- □ 7. Agricultural/Cropland
- □ 8. Dry Bottom Detention (turf–natural)
- □ 9. Wet Bottom Detention (turf-natural)
- □ 10. Wetland Bottom Detention
- □ 11. Pond/Lake
- □ 12. Brownfield (urban land)
- □ 13. Residential
- □ 14. Commercial
- □ 15. Other _____

Comments About Existing Site Conditions:

_____

_____

_____

_____

If Detention what is ecological/water quality condition: Good_____ Average_____ Poor_____

III.   Potential Water Quality BMP Project(s)
- □ Rain Gardens
- □ Bioinfiltration Swales
- □ Wetland Restoration
- □ Naturalization w/ Natives
- □ Green Infrastructure Connection
- □ Rain Barrels/Cisterns
- □ Agricultural BMP (ie filter stips)
- □ Level Spreader
- □ Parking Lot BMP (ie porous pavement)
- □ Grass Swale
- □ Maintenance
- □ Other _____

IV.   Potential Water Quality BMP Project Details:

_____

_____

_____

_____

_____

_____

V.   BMP Priority: High____ Medium_____ Low_____   Critical Area: Yes_____ No_____

If Critical Area Explain Why:_____

_____

_____

Stream Inventory

- 0.8 miles - State Street Creek

- 6.7 miles - 7th Ave Creek and tributaries (inventoried 5.4 miles of main channel and branches)
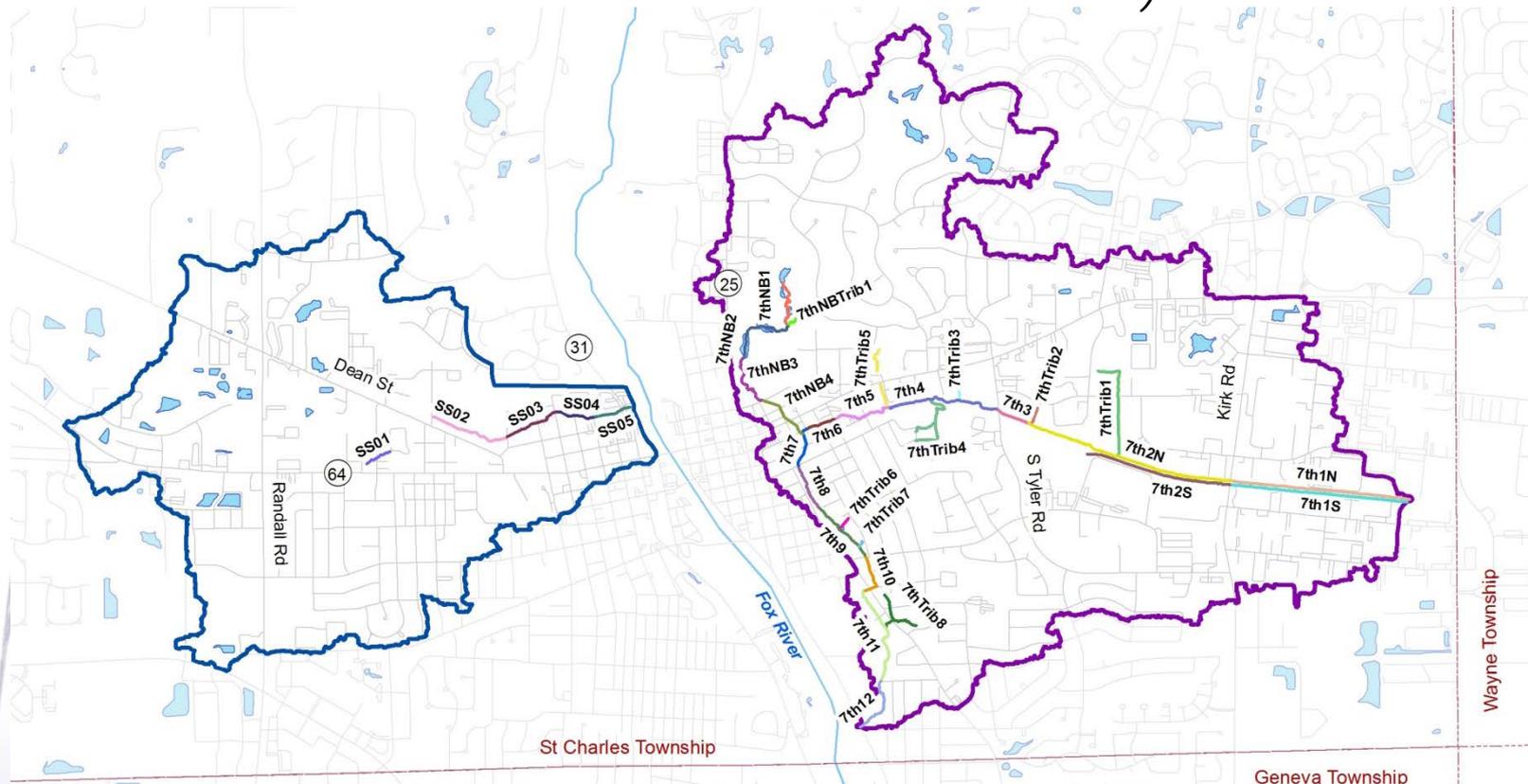
State Street Creek


Reach SS01

Reach SS02

Reach SS02

Reach SS03

Reach SS04

Reach SS05

7ᵗʰ Avenue Creek

Reach 7ᵗʰ 2N

Reach 7th 4

Reach 7th 6

Reach 7th 9

Reach 7th 11

Reach 7th 12

Stream Conditions

Channelization

- Channelized means ditched; berms common along channelized streams
- Channelized streams typically disconnected from floodplain
- Natural streams meander and provide pools and riffles that improve water quality

Erosion

- Result of instability in flow rate or volume, human alteration, or change in streambank vegetation
- Resulting sediment accumulation and transportation downstream can cause significant water quality problems

Riparian Area Condition

- Buffers or corridors on either side of stream
- Filter pollutants, provide beneficial wildlife habitat, and connect green infrastructure

Channelization

- State St entirely channelized
- 7th Ave Creek – 3.9 miles highly channelized

Channelization
— High
— Moderate
— Low
— Not rated

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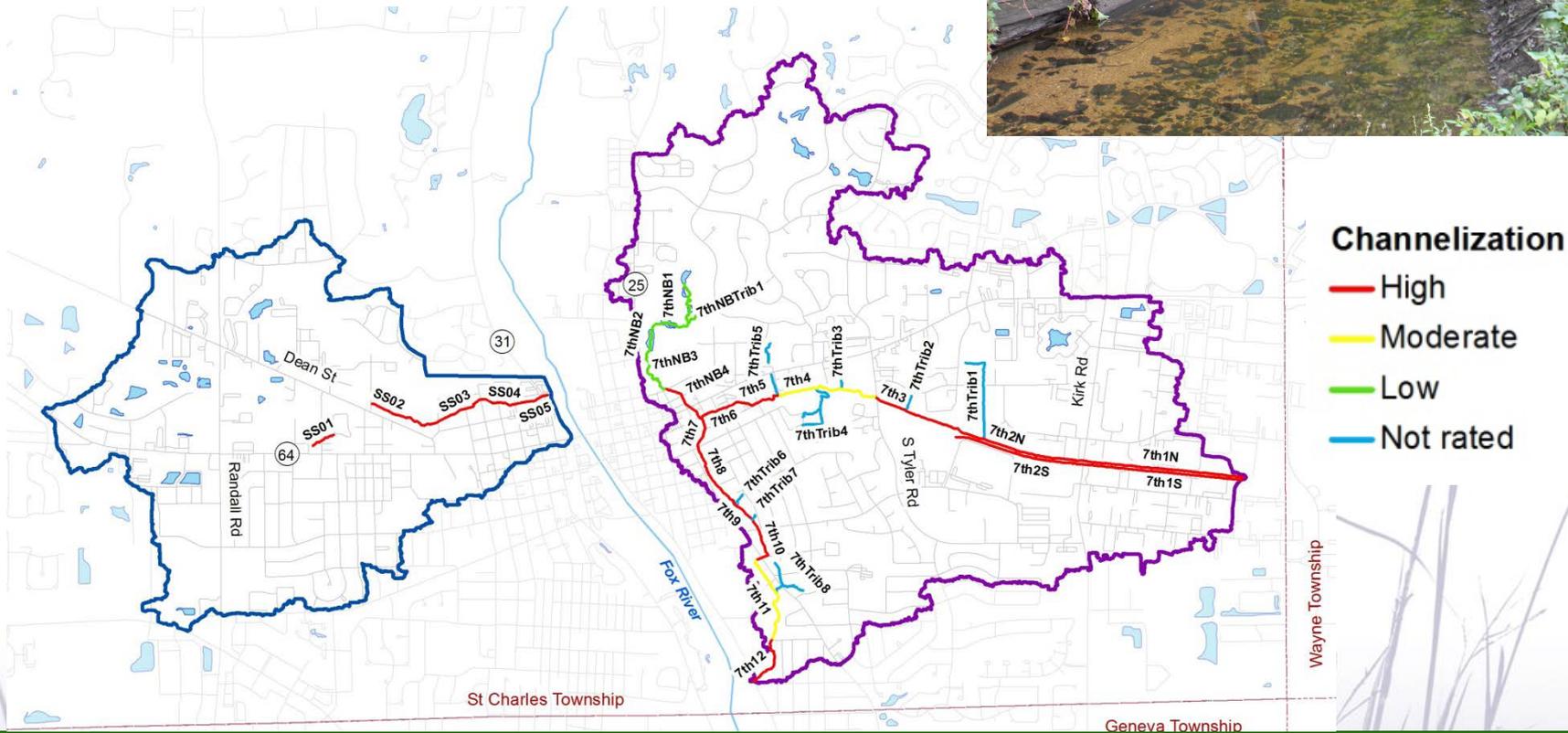
Erosion

- State St - 100% moderately to highly eroded
- 7th Ave Creek – 83% moderately to highly eroded

Riparian Areas

- State St – 100% of riparian areas in poor condition
- 7th Ave Creek – 72% of riparian areas in poor condition

Riparian Condition
— Poor
— Average
— Not rated
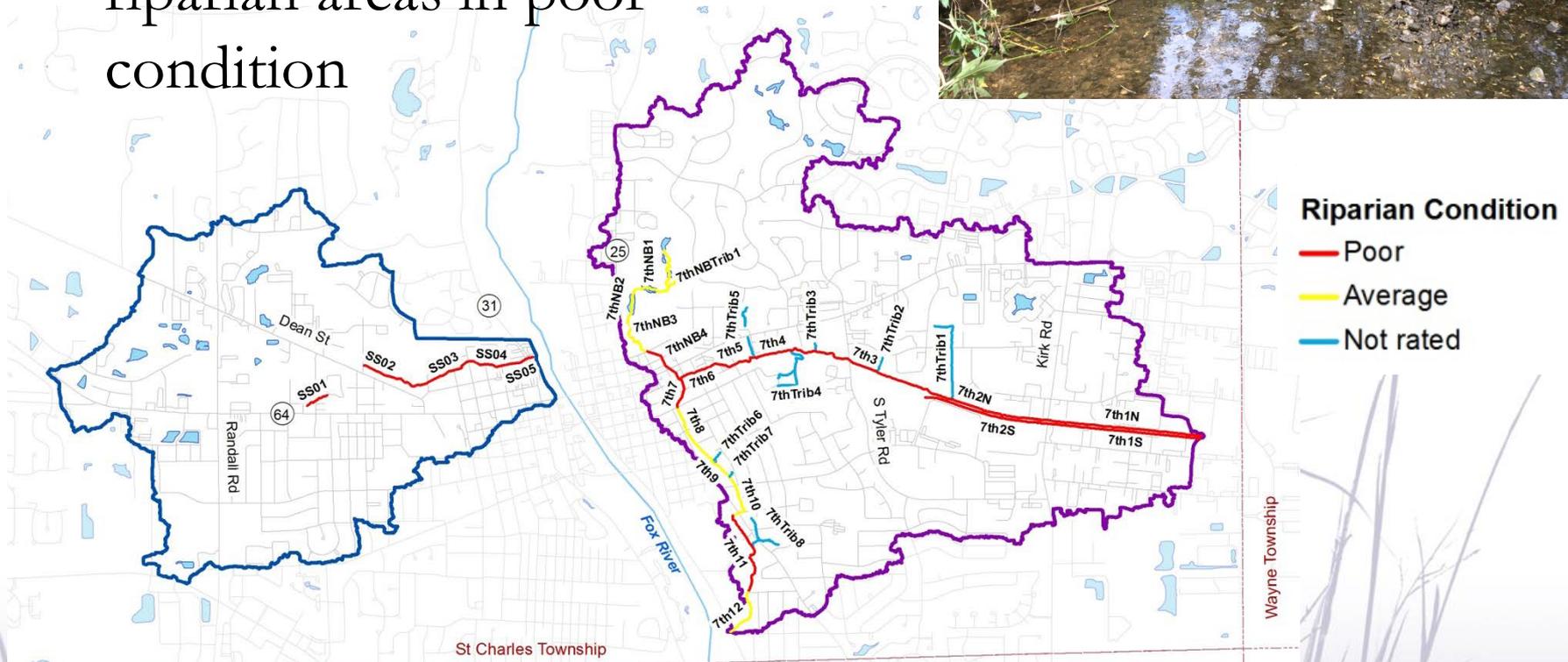
Detention Basins

72 inventoried (86 acres)
- 34 (47%) Dry bottom
- 32 (45%) Wet Bottom
- 6 (8%) Wetland Bottom

Existing Condition
- Dry Bottom Detention
- Wet Bottom Detention
- Wetland Bottom Detention

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Detention Basins

Water Quality Conditions

- 1 (1%) Good Condition
- 18 (25%) Average Condition
- 53 (72%) Poor Condition

Water Quality Condition
- Good
- Average
- Poor

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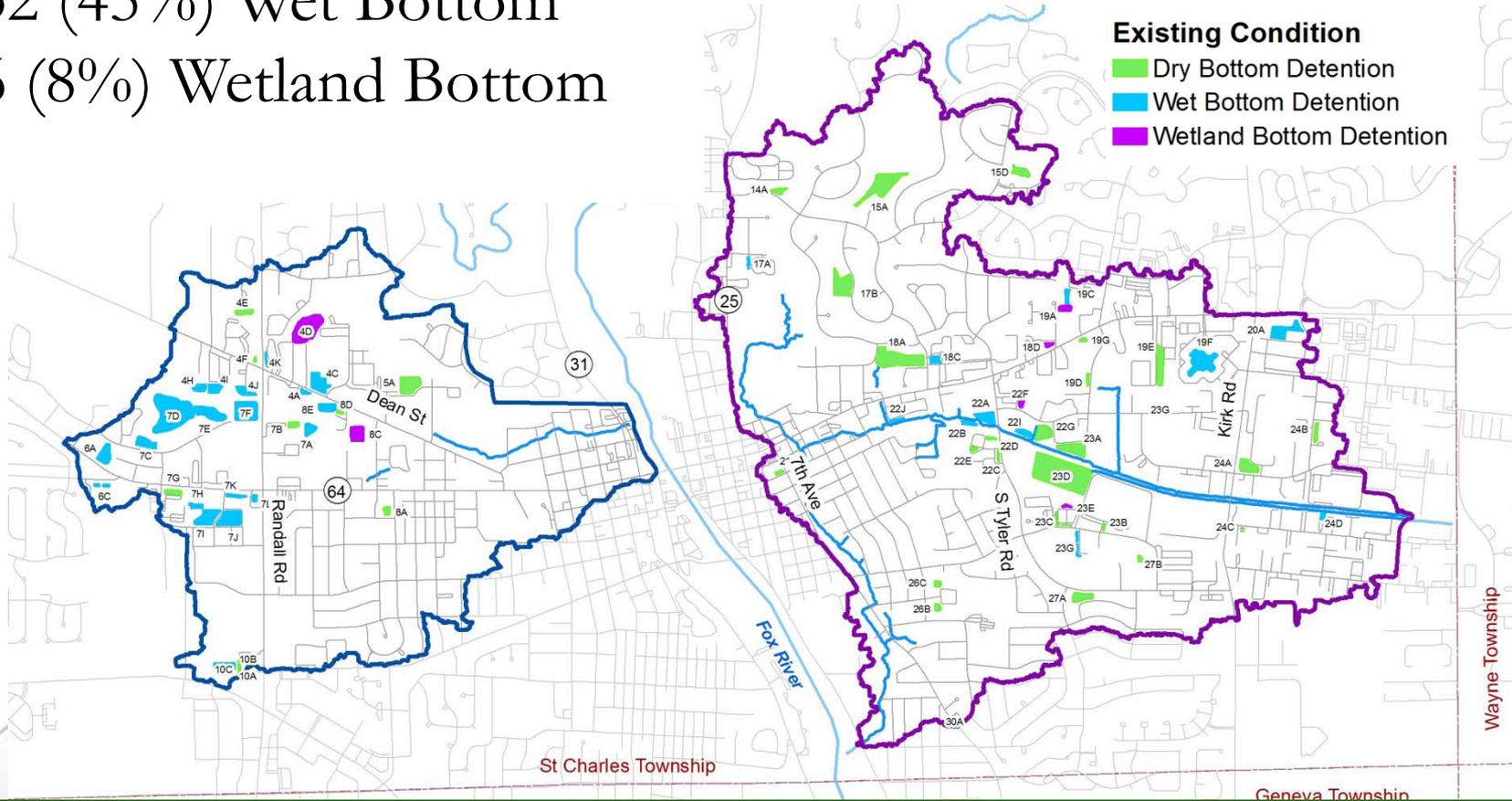
Detention Basins

Many existing basins would benefit from naturalizing side slopes and installation of native buffers

Examples of typical basin types and condition:

**Dry Bottom**

Wet Bottom

Wetland Bottom

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Other BMPs

29 inventoried (114 acres)

Many natural or turf areas that could be managed to improve water quality

Existing Condition
- Brownfield
- Parking Lot
- Woodland
- Scrub shrub
- Old field
- Swale
- Turf/Park
- Wetland

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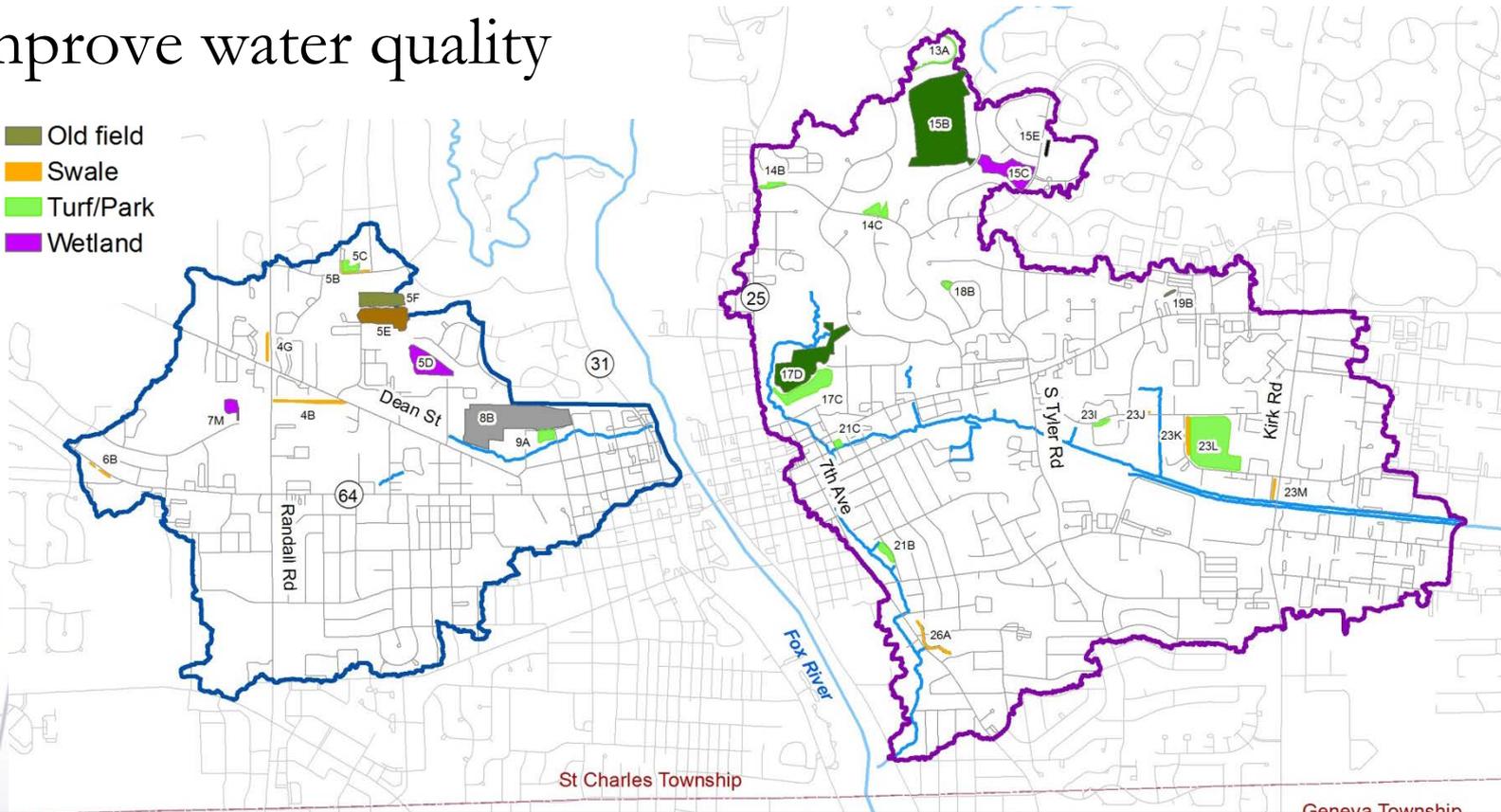
Other BMPs

Swale – 4G

Brownfield – 8B

Savanna Restoration – 5C

Prairie Restoration – 21B

Woodland Restoration – 15B

Parking Lot BMP – 15E

Groundwater

## Aquifer Sensitivity Classification (Kane County)

Potential for Aquifer Contamination
- High Potential
- Moderately High Potential
- Moderate Potentail
- Moderately Low Potential
- Low Potential
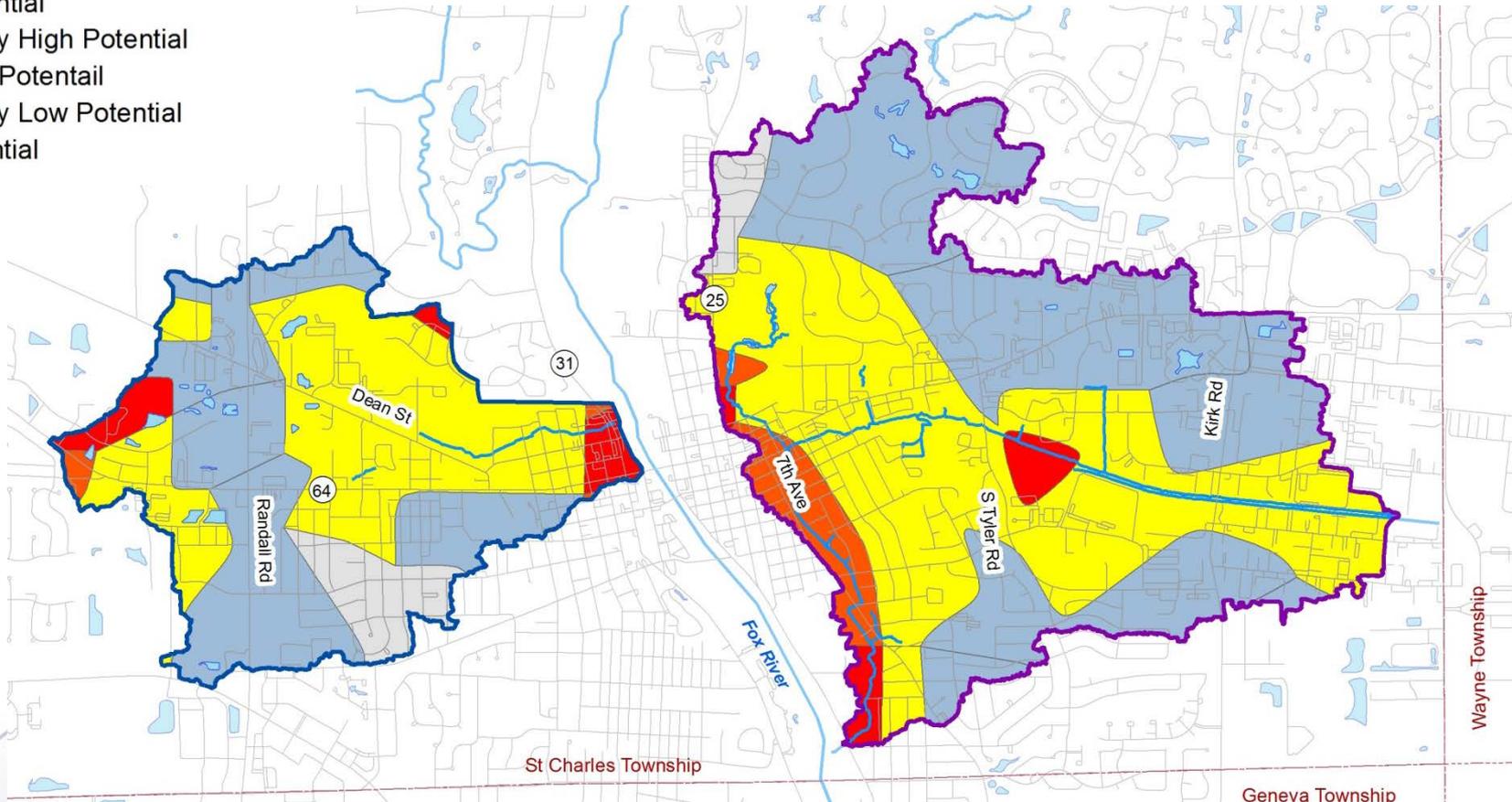
APPLIED ECOLOGICAL SERVICES, INC.

Wastewater and NPDES Permits

2 NPDES permit sites in State Street Creek

8 NPDES permit sites in 7th Avenue Creek

- One is a WWTP
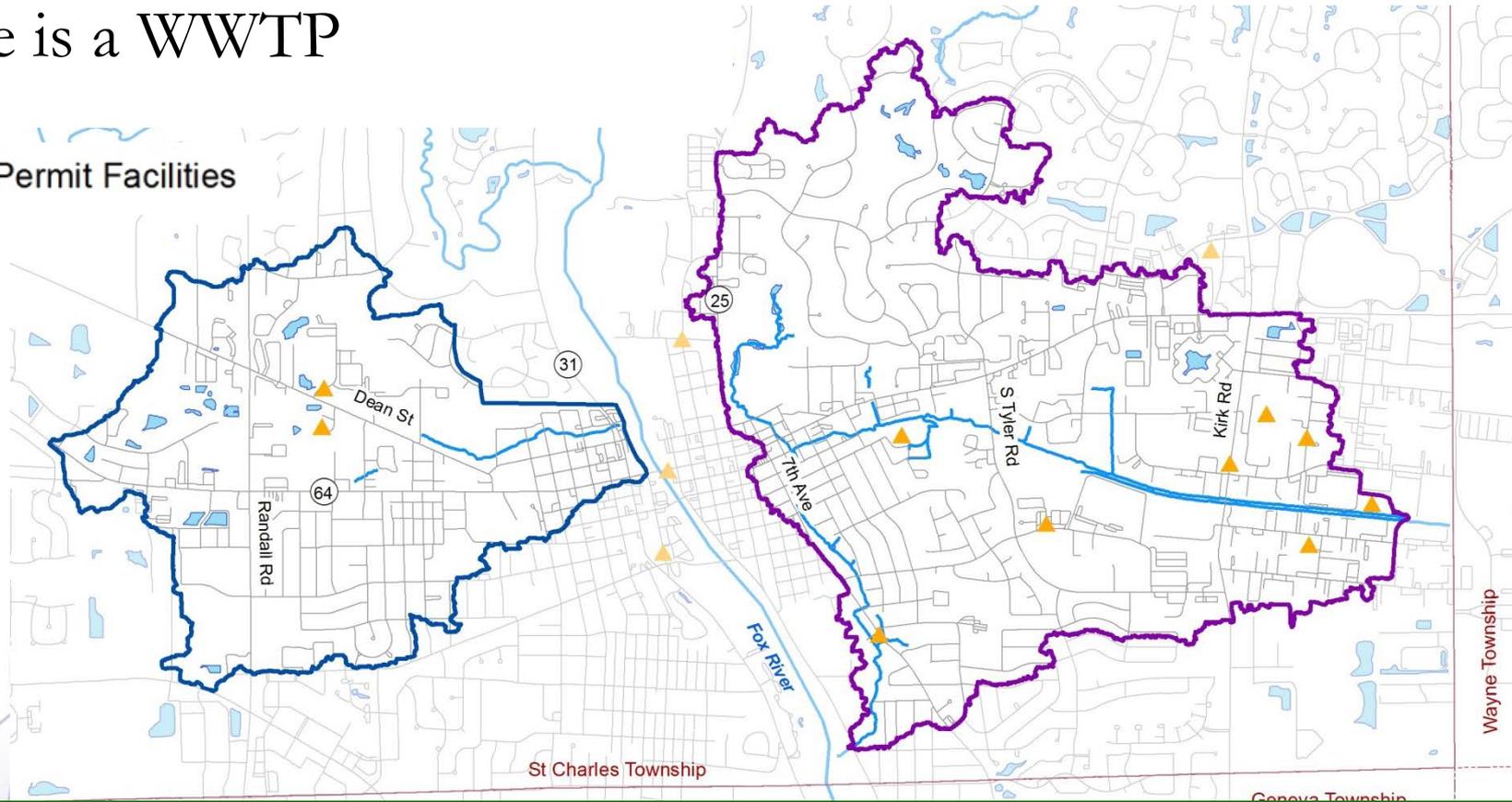
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Water Quality Preview

Neither stream assessed by IEPA

No pre-existing sampling data found

Early water quality sampling results:

State Street Creek

- Impaired for **nitrogen** and **phosphorus**
- Buried streams result in higher nitrogen levels

7th Avenue Creek

- Impaired for **nitrogen**, **phosphorus**, and **total suspended solids**

Watershed Feedback & Goals

- General feedback/input from stakeholders
- Identify locations of flooding/problem areas
- Decide how to handle goals for Addendum

**Goals are general actions,
or better yet, an outcome
towards which we strive.**

Next Steps: Goals?

- Use existing goals in Ferson-Otter Creek Plan?

- Establish our own goals?

- Combination of the two?

Goals were then drafted directly from the concerns expressed by the stakeholders. The final goals were adopted November 23, 2010 and capture the desired outcomes and vision for the watershed. Recommendations throughout the plan will address each of the following goals:

1) Reduce fecal coliform contributions to Ferson and Otter Creek.
2) Reduce nutrients, sediments, and other pollutant contributions to Ferson and Otter Creek.
3) Raise stakeholder (residents, public officials, etc.) awareness about the importance and best management practices of proper watershed stewardship.
4) Promote land use and best management practices that minimize increases in the volume of stormwater runoff and reduce the risk of flood damage.
5) Protect the quality and quantity of our water supplies.
6) Improve the physical condition of our waterways.
7) Develop an effective and lasting Watershed Coalition to foster continuing stewardship efforts in the watershed.

Questions?

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