

# CHAPTER 1

## Identifying and Networking with Local Agencies and Citizens

# Objectives



# Objectives

- Identify watershed concerns



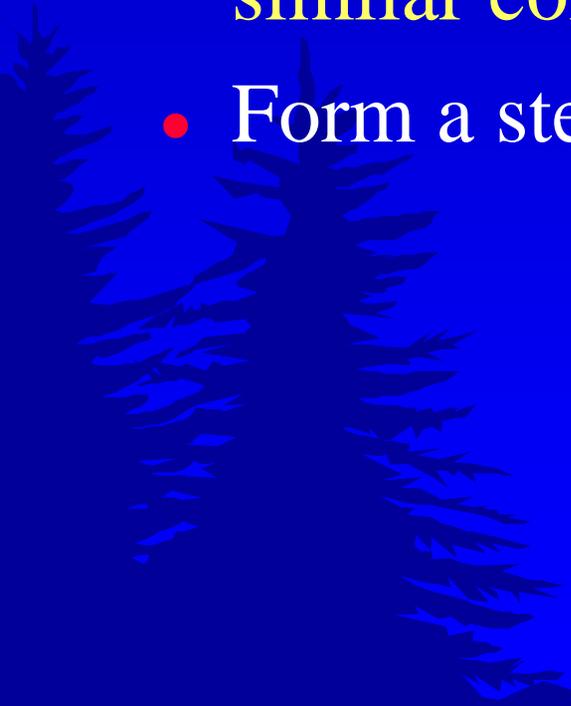
# Objectives

- Identify watershed concerns
- Identify other groups/individuals with similar concerns



# Objectives

- Identify watershed concerns
- Identify other groups/individuals with similar concerns
- Form a steering committee



# Objectives

- Identify watershed concerns
- Identify other groups/individuals with similar concerns
- Form a steering committee
- Identify a lead organization

# Objectives

- Identify watershed concerns
- Identify other groups/individuals with similar concerns
- Form a steering committee
- Identify a lead organization
- Discuss all existing & perceived concerns

# Objectives

- Identify watershed concerns
- Identify other groups/individuals with similar concerns
- Form a steering committee
- Identify a lead organization
- Discuss all existing & perceived concerns
- Define geographic scope of the watershed

# Objectives

- Identify watershed concerns
- Identify other groups/individuals with similar concerns
- Form a steering committee
- Identify a lead organization
- Discuss all existing & perceived concerns
- Define geographic scope of the watershed
- Modify committee membership

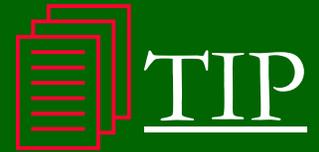
# Objectives

- Identify watershed concerns
- Identify other groups/individuals with similar concerns
- Form a steering committee
- Identify a lead organization
- Discuss all existing & perceived concerns
- Define geographic scope of the watershed
- Modify committee membership
- Begin to develop a resource library

# Identify watershed concerns

- what is it that's motivating you?

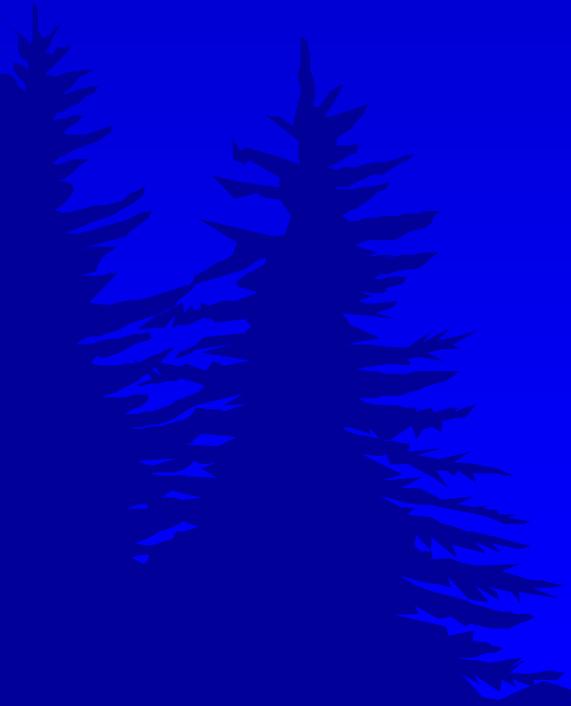
# Identify other groups or individuals with similar concerns



TIP

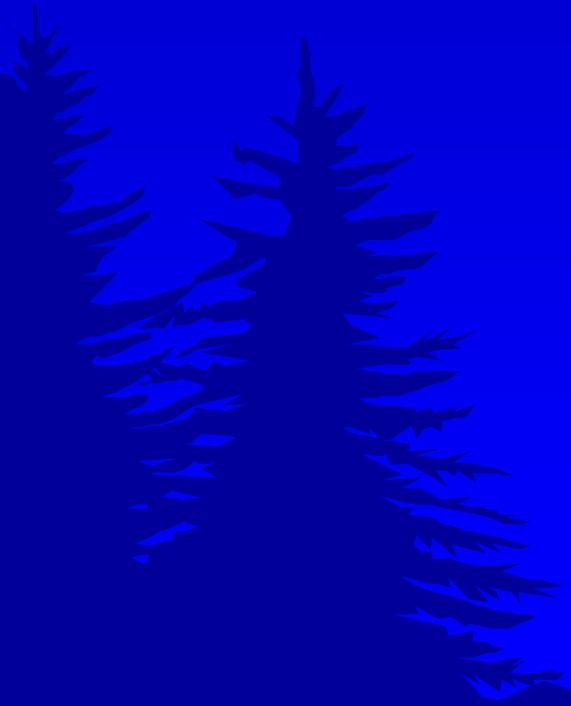
Learn the local political landscape & identify all possible local partners

# FOCUS



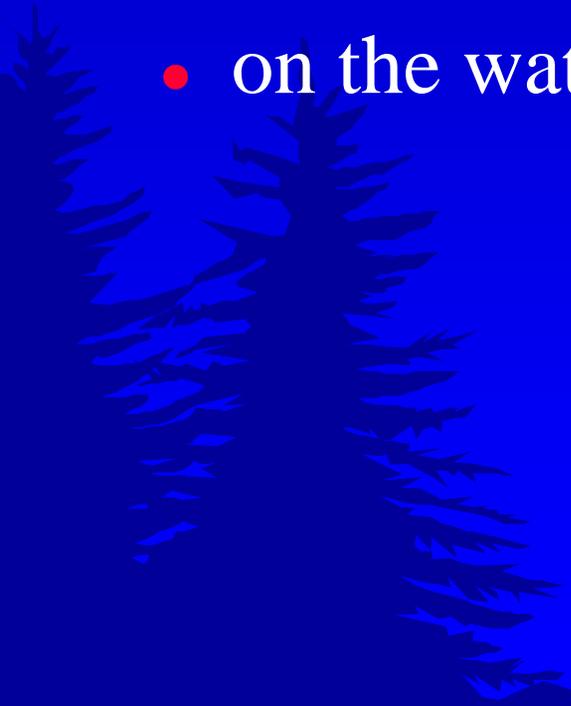
# FOCUS

- on the watershed



# FOCUS

- on the watershed
- on the watershed planning process



# FOCUS

- on the watershed
- on the watershed planning process
- on the concerns that can be addressed through a watershed plan

# Discuss all existing and perceived concerns

- Opportunity for everyone to state their concerns
- Record concerns

# *Example Watershed*

## Stakeholders' Concerns

- Newspaper reports of algal blooms in the summer
- Residents' concerns of eroding roadbed at two different road-stream crossings
- Residents' concerns about livestock in the stream at two farms
- General concerns about adequacy of septic systems

# Form a steering committee



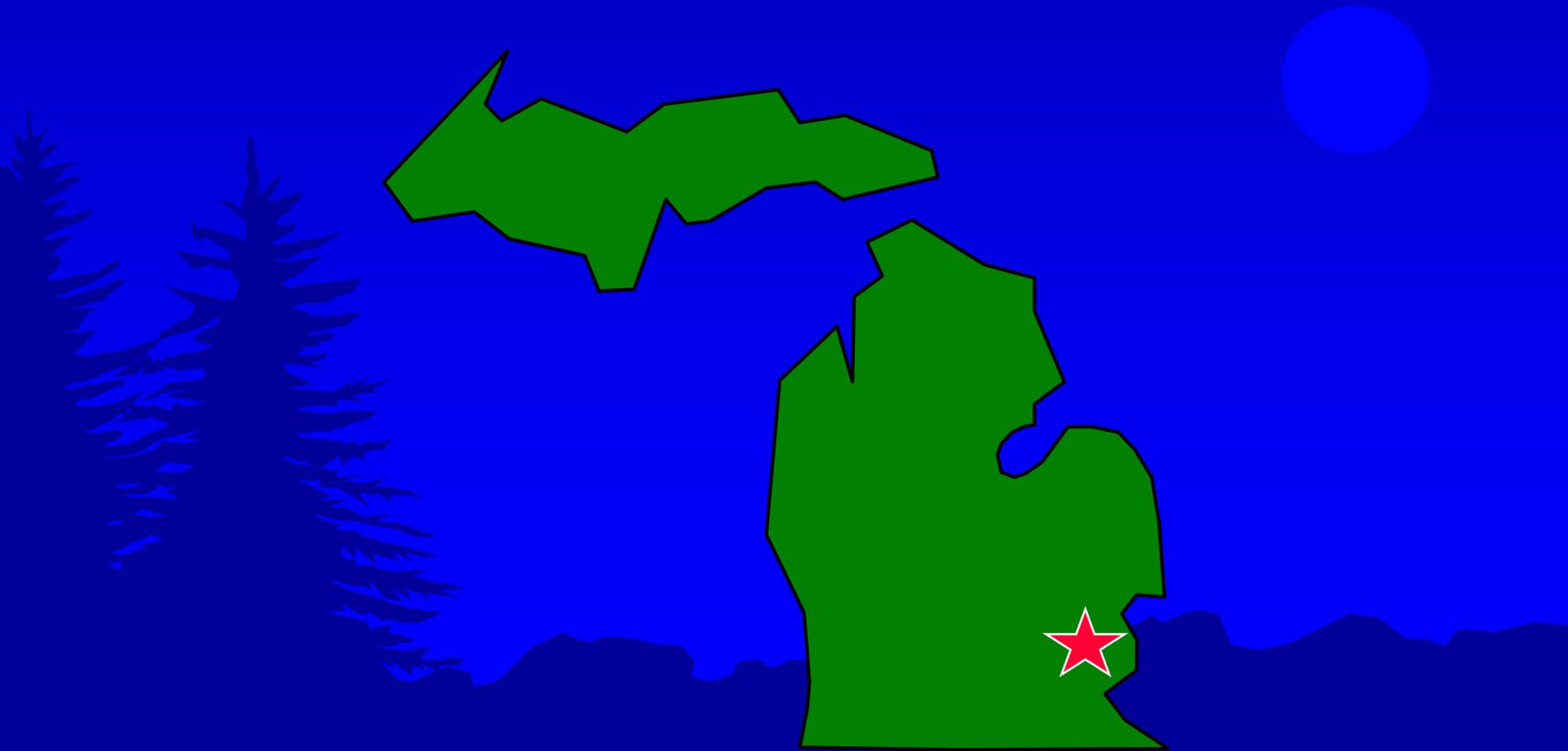
TIP

A steering committee provides overall direction. Members include decision makers and groups affected by the change.

Case study:

*Bear Creek Watershed Project*

Macomb & Oakland Counties



# Case study:

## *Bear Creek Watershed Project*

### Macomb & Oakland Counties

- As much about fostering collaborative relationships as understanding technical aspects
- One on one meeting to build rapport between members and lead organization
- Opportunity to express reservations about watershed planning process in a private setting

# Initial meeting of the Steering Committee

- Review list of concerns
- Add any additional concerns
- Evaluate membership

# Identify a lead organization

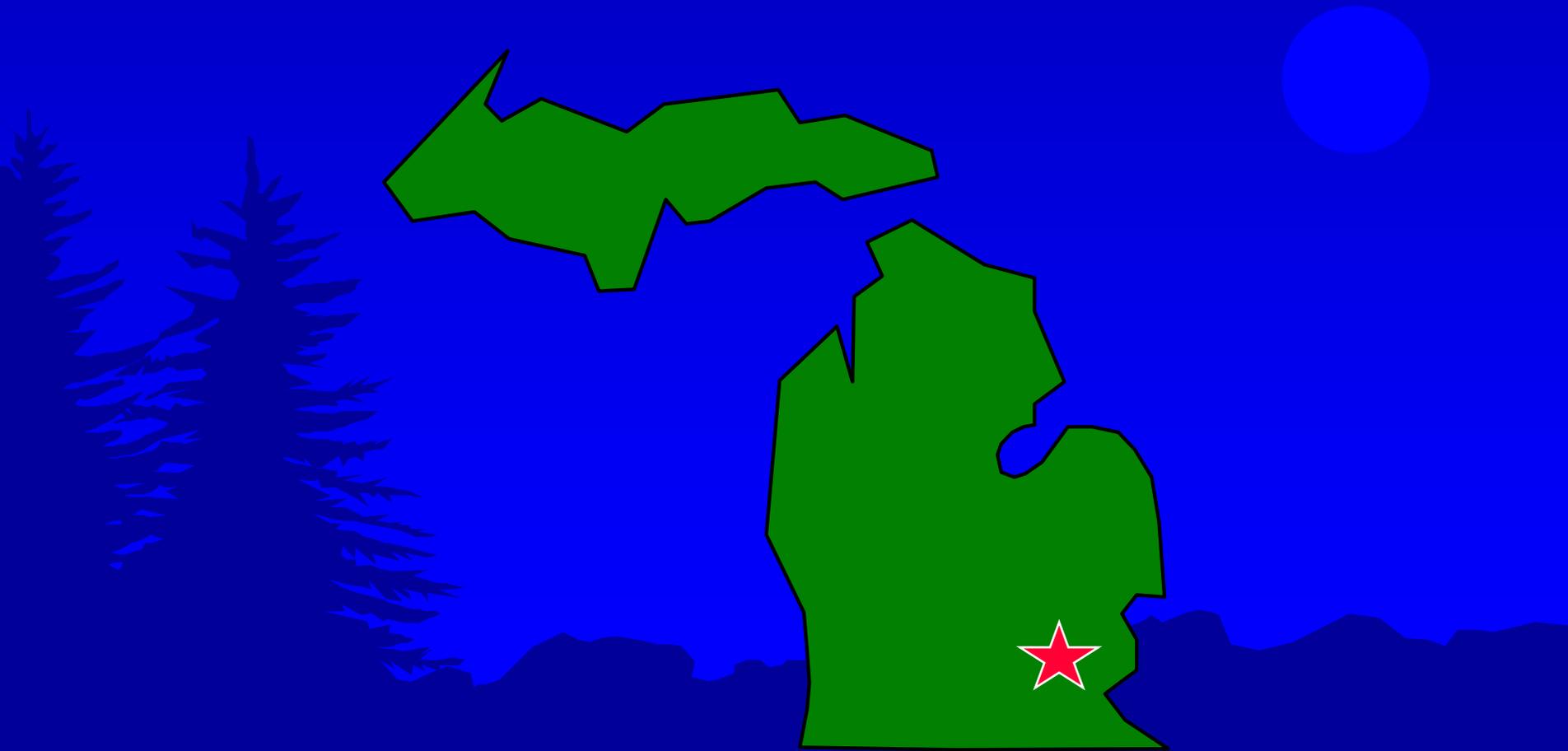
- Ensure planning & implementation moves forward
- Represents entire area
- Has staff & resources
- Based on primary watershed concerns

# Steering Committee Roles & Structure

- Secretary - document decisions & distribute them
- Recorder - easel/chalkboard during meeting
- Decisions - majority vote/ consensus/ other process

Case study:

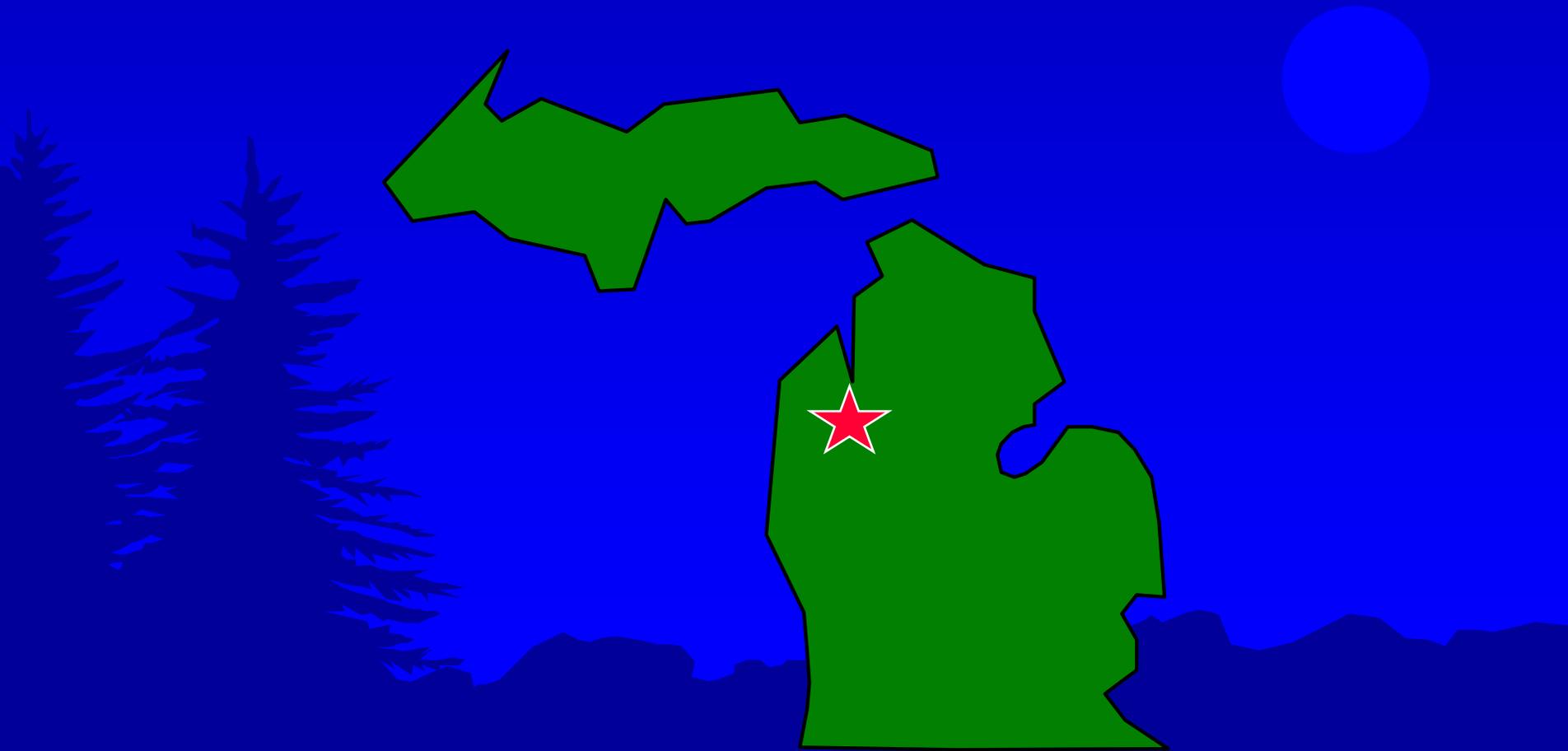
*Huron River Watershed Council*



# Structure of the *Huron River Watershed Council*

- 8 - 40 square mile sub-watersheds
- “Creek Group” which develops local networks & implements plan for the sub-watershed
- Steering committee is selected from “Creek Group” membership

Case study:  
*The Conservation Resource  
Alliance*

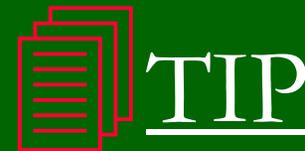


# *The Conservation Resource Alliance*

- Invited all existing local organizations & agencies to participate in the planning process
- formal written partnership agreement stating responsibilities
- each organization represented on steering committee

# Form a technical committee

- May be a subgroup of steering committee
- Professional expertise
- Access to resources (maps, data)



A technical committee provides technical information to the steering committee. Members are experts in one or more fields.

# Determine the boundaries and size of your watershed based on:

- concerns
- watershed characteristics
- manageable size - 2 square miles to several hundred square miles (less than 150 square miles or 100,000 acres is recommended)

# Case study

## *Gallagher Creek*

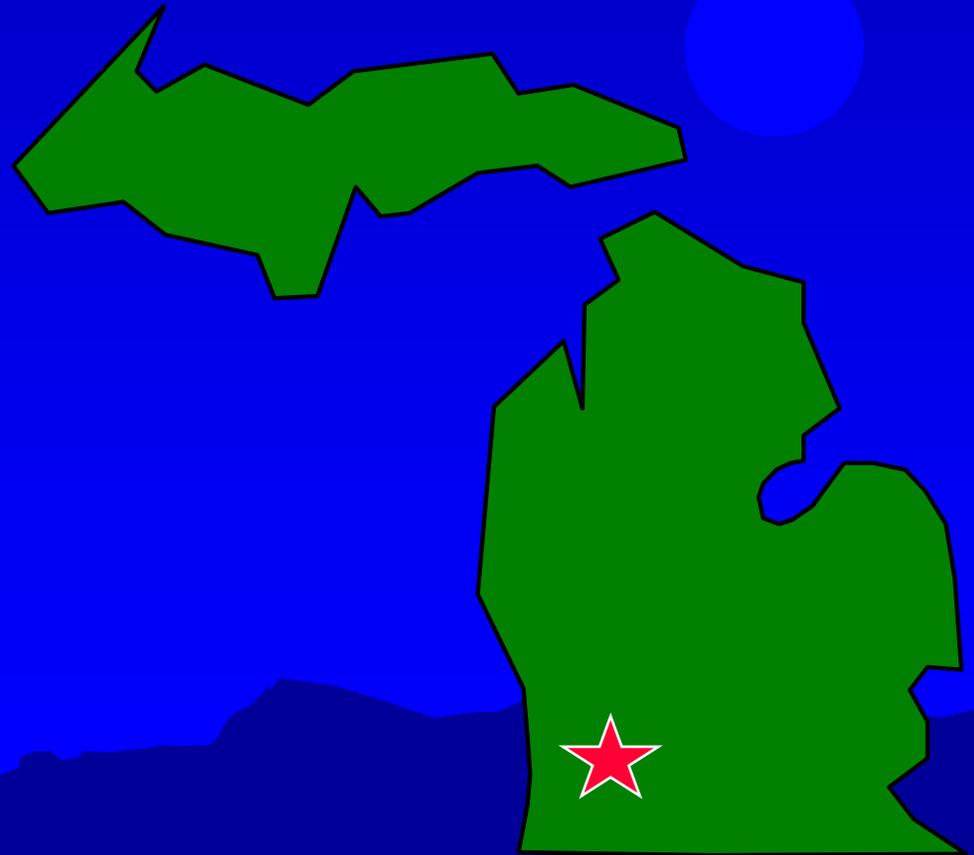
- rapidly developing
- two pollutants -- sediment and warm surface water runoff
- many sources (development projects)
- 2 square miles



# Case study

## *Davis Creek*

- part agricultural, part urban
- many pollutants
- many sources
- 16 square miles



Case study:  
*Boardman River*  
*Grand Traverse & Kalkaska*  
*Counties*

- land use undeveloped, forest
- one pollutant - sediment
- two primary sources -  
stream banks & road crossings
- 295 square miles



# Hydrologically distinct

- entire river system



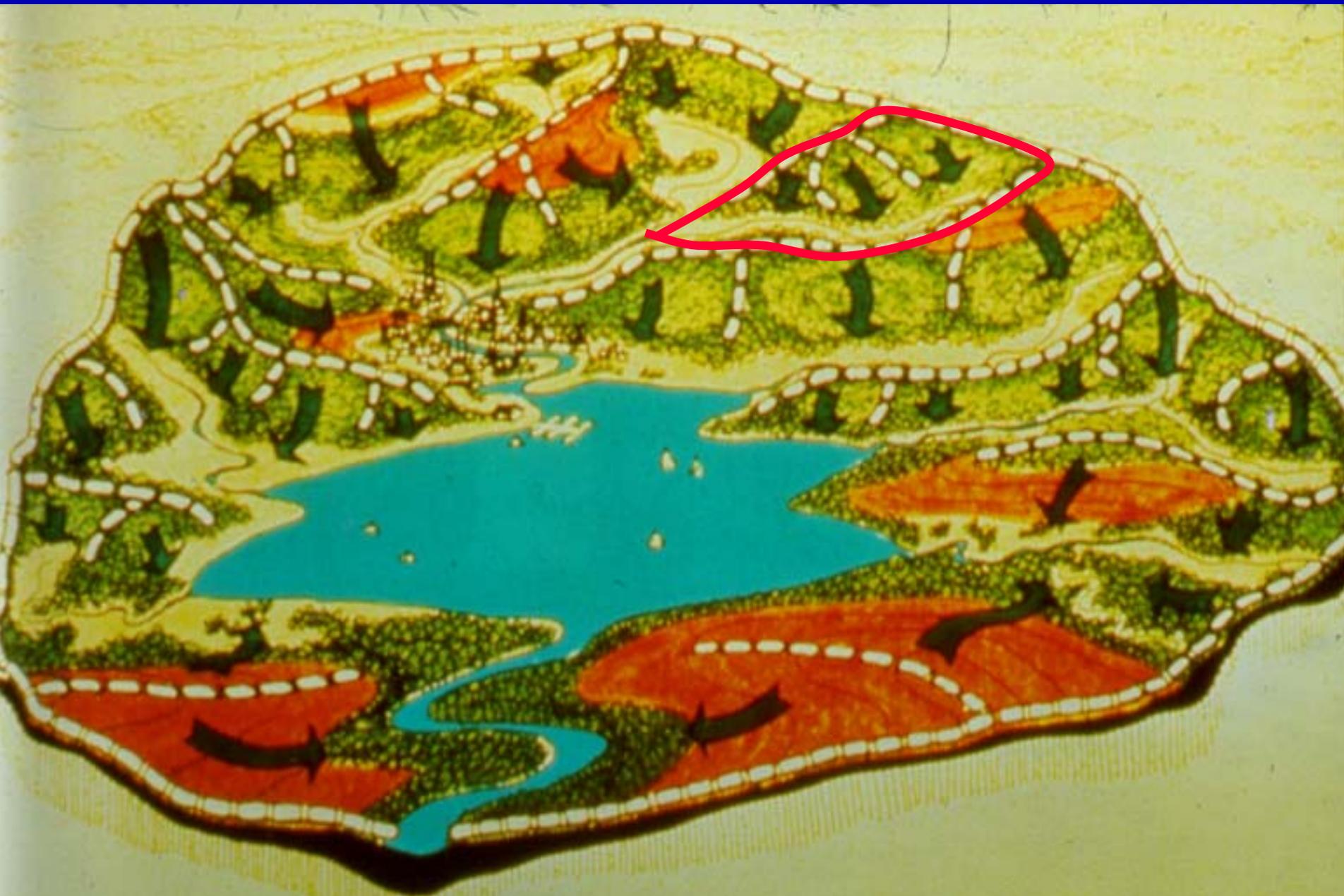


DRAINAGE PATTERN

# Hydrologically distinct

- entire river system
- river tributary from headwaters to point where joins main branch





DRAINAGE PATTERN

# Hydrologically distinct

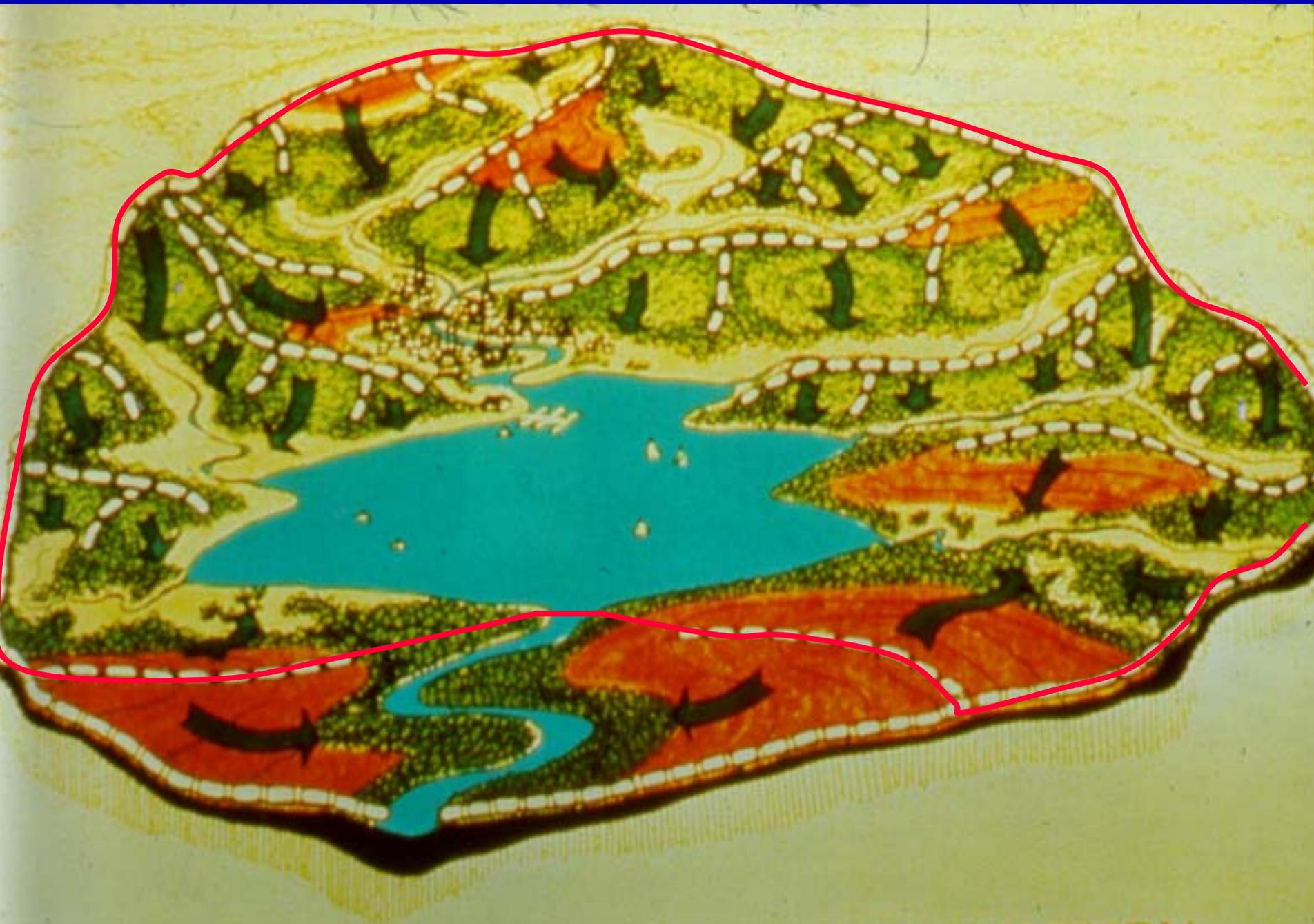
- entire river system
- river tributary from headwaters to point where joins main branch
- segment of river from headwaters to a dam, or where a tributary joins the river



DRAINAGE PATTERN

# Hydrologically distinct

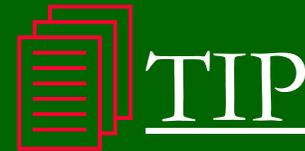
- entire river system
- river tributary from headwaters to point where joins main branch
- segment of river from headwaters to a dam, or where a tributary joins the river
- lake watershed



DRAINAGE PATTERN

# Is your watershed part of a larger project?

- Complement  
broader scale efforts



Review the  
membership of  
your steering  
committee. Are  
all groups  
represented?

# Watershed Map

- Watershed boundaries
- Location of all surface waters (lakes, rivers, streams, wetlands)



# Watershed Description



# Watershed Description

- hydrology



TOOLS

Topographic Maps  
Past studies/reports



# Watershed Description

- hydrology
- rainfall characteristics



## TOOLS

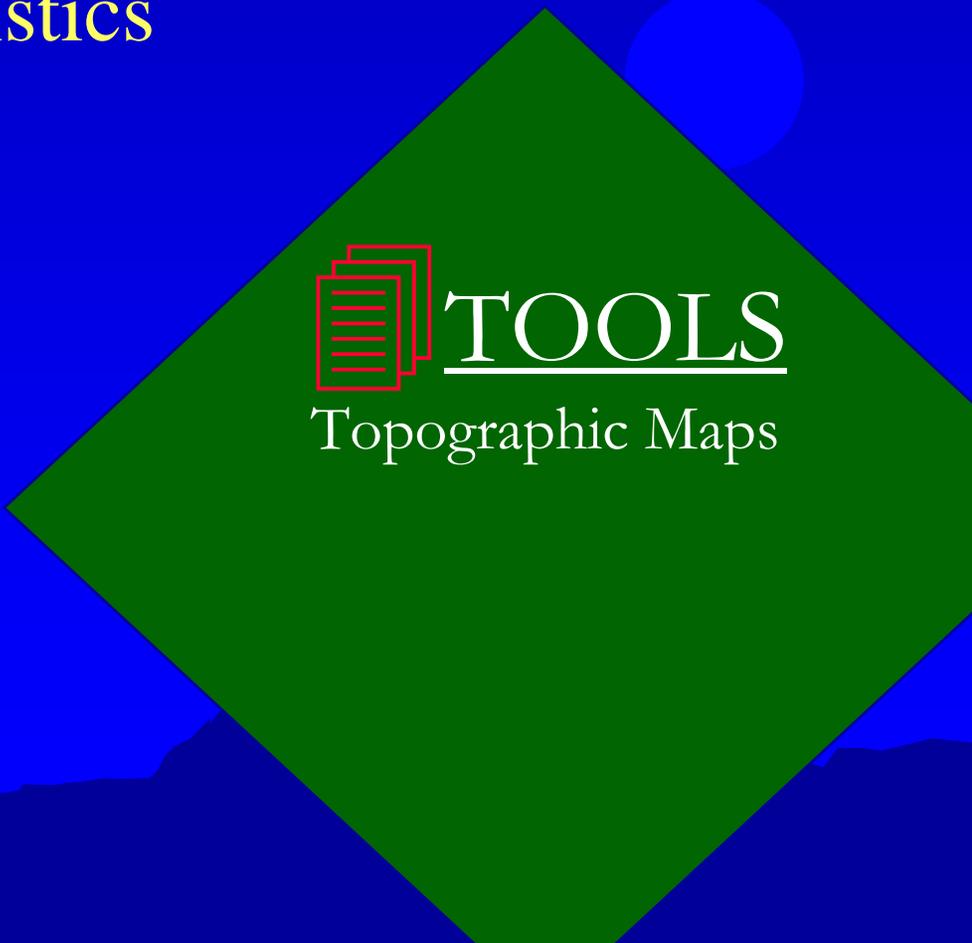
Soil Surveys

Past studies/reports



# Watershed Description

- hydrology
- rainfall characteristics
- topography



 TOOLS  
Topographic Maps



# Watershed Description

- hydrology
- rainfall characteristics
- topography
- soil types



TOOLS

Soil Surveys

Past studies/reports



# Watershed Description

- hydrology
- rainfall characteristics
- topography
- soil types
- land use



## TOOLS

Plat Maps  
News articles  
Aerial photos



# Watershed Description

- hydrology
- rainfall characteristics
- topography
- soil types
- land use
- significant natural resources



# Watershed Description

- hydrology
- rainfall characteristics
- topography
- soil types
- land use
- significant natural resources
- community profile



## TOOLS

Plat Maps  
News articles  
Census data  
Past studies/reports



# Geographic scope

- Description of the watershed
- Map with watershed boundaries and location of all surface waters



# Develop a Resource Library

- All information collected during planning process
- Accessible

# Products

- Steering Committee
- Lead Organization
- Technical Committee
- Geographic Scope
  - ↓ Watershed Description
  - ↓ Map including watershed boundaries
- Resource Library

# CHAPTER 2



## Getting to Know Your Watershed

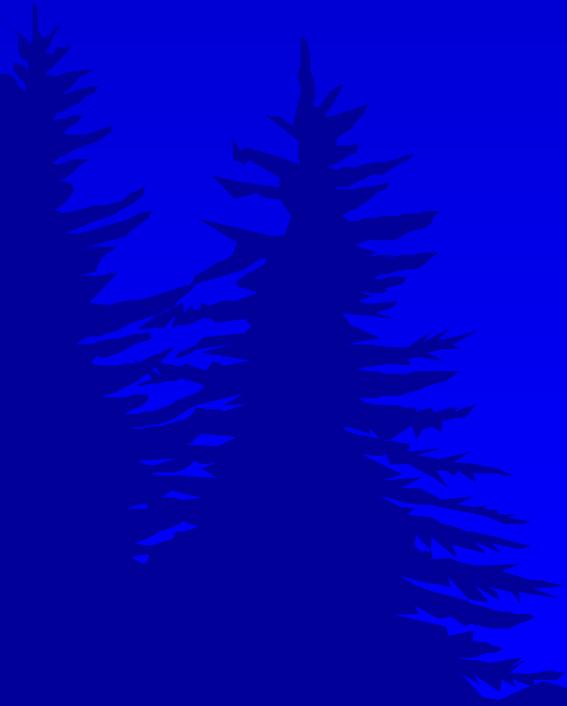


# Objectives



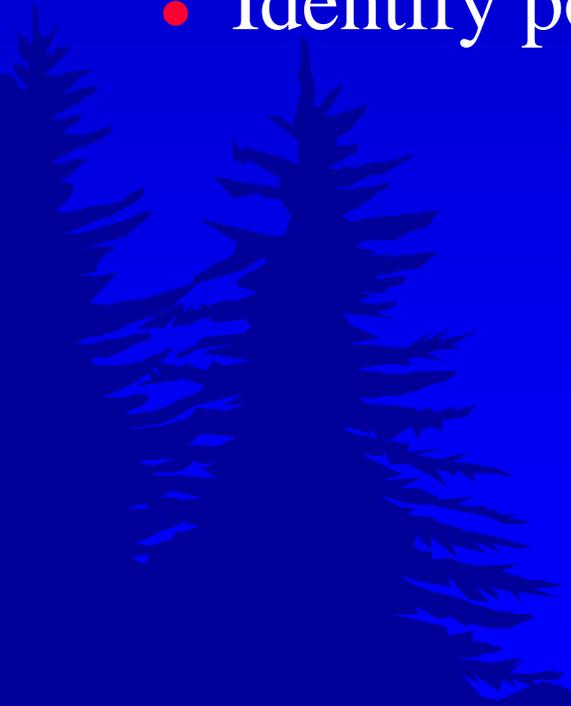
# Objectives

- Identify designated & desired uses



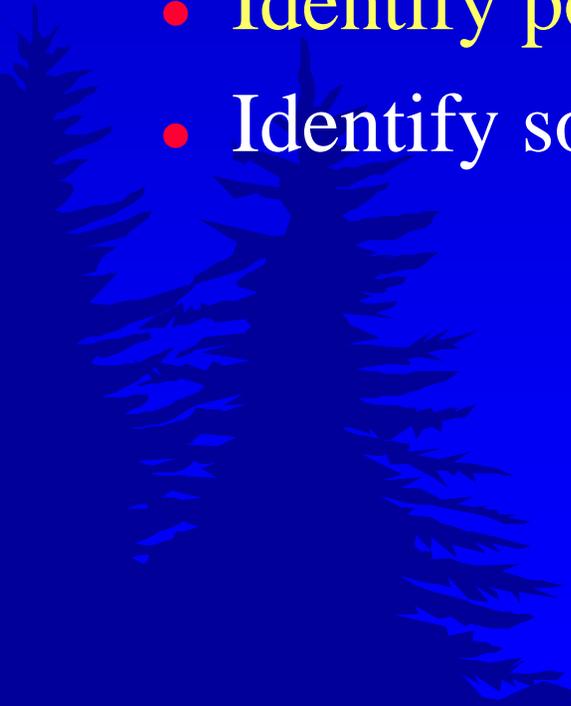
# Objectives

- Identify designated & desired uses
- Identify pollutants



# Objectives

- Identify designated & desired uses
- Identify pollutants
- Identify sources of pollutants



# Objectives

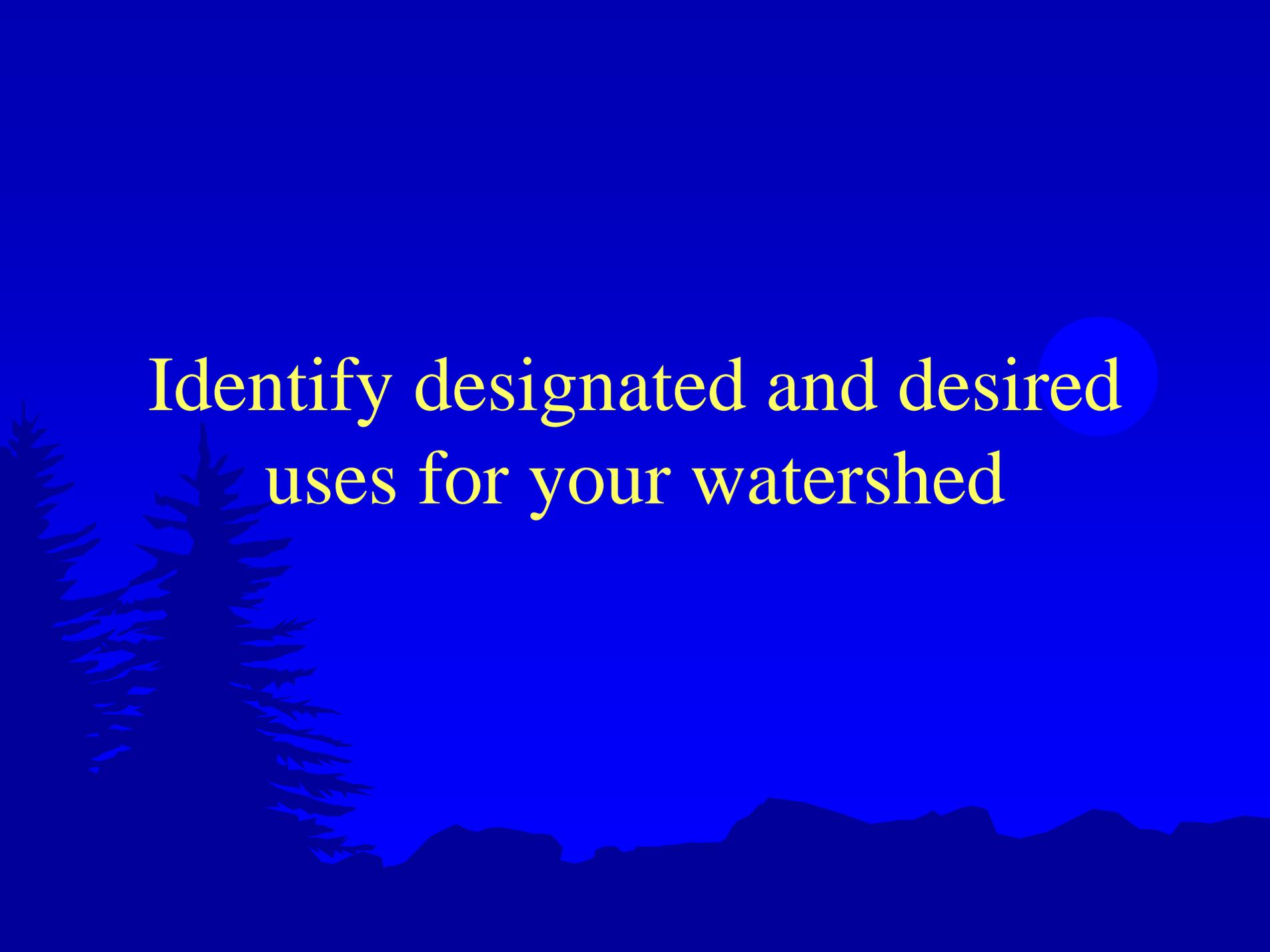
- Identify designated & desired uses
- Identify pollutants
- Identify sources of pollutants
- Identify causes of pollutants

# Objectives

- Identify designated & desired uses
- Identify pollutants
- Identify sources of pollutants
- Identify causes of pollutants
- Develop goals based on designated & desired uses

# Objectives

- Identify designated & desired uses
- Identify pollutants
- Identify sources of pollutants
- Identify causes of pollutants
- Develop goals based on designated & desired uses
- Develop an initial water quality summary



Identify designated and desired  
uses for your watershed

# Designated Uses



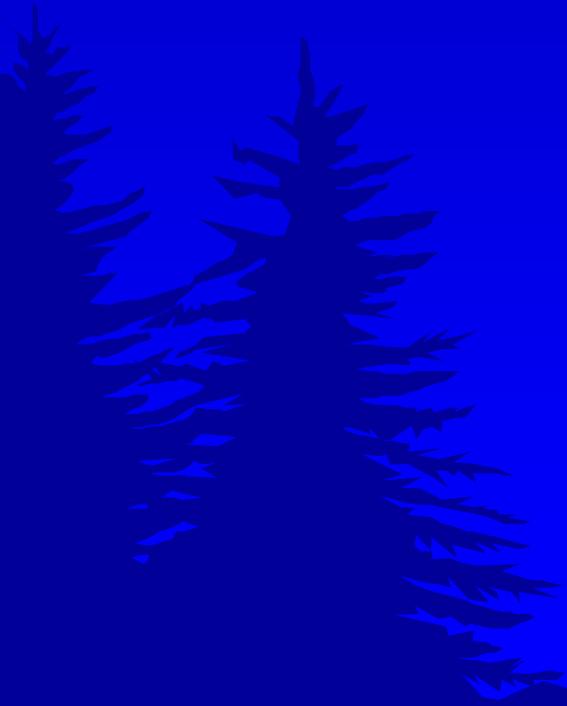
# Designated Uses

- Agriculture



# Designated Uses

- Agriculture
- Industrial water supply



# Designated Uses

- Agriculture
- Industrial water supply
- Public water supply



# Designated Uses

- Agriculture
- Industrial water supply
- Public water supply
- Navigation



# Designated Uses

- Agriculture
- Industrial water supply
- Public water supply
- Navigation
- Warmwater fishery



# Designated Uses

- Agriculture
- Industrial water supply
- Public water supply
- Navigation
- Warmwater fishery
- Other indigenous aquatic life & wildlife

# Designated Uses

- Agriculture
- Industrial water supply
- Public water supply
- Navigation
- Warmwater fishery
- Other indigenous aquatic life & wildlife
- Partial body contact recreation

# Designated Uses

- Agriculture
- Industrial water supply
- Public water supply
- Navigation
- Warmwater fishery
- Other indigenous aquatic life & wildlife
- Partial body contact recreation
- Total body contact recreation (May 1- Oct 31)

# Designated Uses

- Agriculture
- Industrial water supply
- Public water supply
- Navigation
- Warmwater fishery
- Other indigenous aquatic life & wildlife
- Partial body contact recreation
- Total body contact recreation (May 1- Oct 31)

\*Some water bodies - coldwater fishery

# Is your waterbody meeting designated uses?

- Identify designated use that corresponds to each watershed concern
- Determine if the waterbody is impaired



TIP

Contact DEQ staff,  
or local agencies.  
Refer to “Water  
Quality and  
Pollution Control  
in Michigan”

# *Example Watershed*

## *Concerns*

Algal blooms

Eroding road-stream  
crossings, river  
flooding

Livestock in  
streams, poor fishing

# *Example Watershed*

## *Concerns*

Algal blooms

Eroding road-stream  
crossings, river  
flooding

Livestock in  
streams, poor fishing

## *Designated Uses*

Partial body contact  
recreation, warmwater  
fishery

# *Example Watershed*

## *Concerns*

Algal blooms

Eroding road-stream  
crossings, river  
flooding

Livestock in  
streams, poor fishing

## *Designated Uses*

Partial body contact  
recreation, warmwater  
fishery

Aquatic life/wildlife

# *Example Watershed*

## *Concerns*

Algal blooms

Eroding road-stream  
crossings, river  
flooding

Livestock in  
streams, poor fishing

## *Designated Uses*

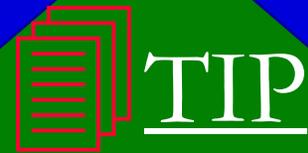
Partial body contact  
recreation, warmwater  
fishery

Aquatic life/wildlife

Warmwater fishery

# Desired Uses

- How you want to use your watershed
- Go beyond water quality concerns



Desired uses are important to the watershed community & should be considered in watershed planning.



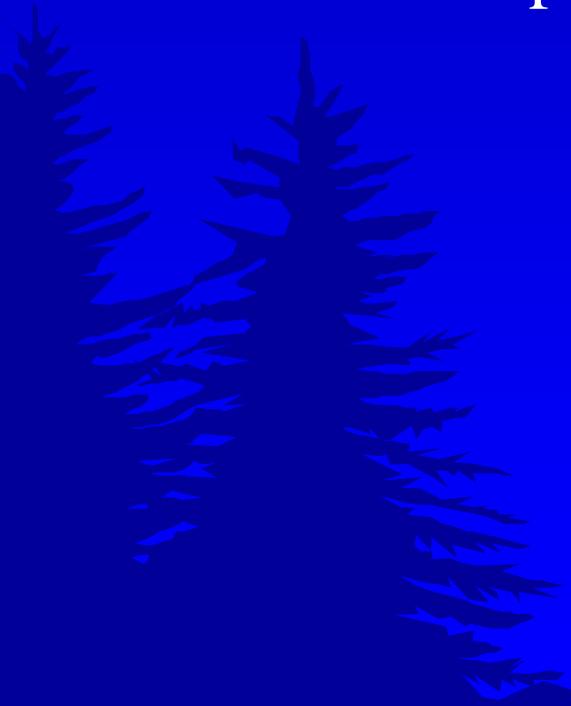
*Example Watershed*  
Desired Uses



# *Example Watershed*

## Desired Uses

- Developing a recreational trail



# *Example Watershed*

## Desired Uses

- Developing a recreational trail
- Protecting a corridor

# *Example Watershed*

## Desired Uses

- Developing a recreational trail
- Protecting a corridor
- Protecting prime agricultural land

# *Example Watershed*

## Desired Uses

- Developing a recreational trail
- Protecting a corridor
- Protecting prime agricultural land
- Protecting unique habitat

# Identify pollutants in your watershed

## Designated Use

Agriculture

Public water  
supply

Navigation

Warmwater  
fishery



# Identify pollutants in your watershed

## Designated Use

Agriculture

Public water  
supply

Navigation

Warmwater  
fishery

## Typical Pollutants

Hydrology

Nitrates



# Identify pollutants in your watershed

## Designated Use

## Typical Pollutants

Agriculture

Hydrology

Nitrates

Public water  
supply

Nitrates

Pesticides

Navigation

Warmwater  
fishery



# Identify pollutants in your watershed

## Designated Use

## Typical Pollutants

Agriculture

Hydrology

Nitrates

Public water  
supply

Nitrates

Pesticides

Navigation

Sediment

Warmwater  
fishery



# Identify pollutants in your watershed

## Designated Use

## Typical Pollutants

Agriculture

Hydrology

Nitrates

Public water  
supply

Nitrates

Pesticides

Navigation

Sediment

Warmwater  
fishery

Sediment

Hydrology



# *Example Watershed*

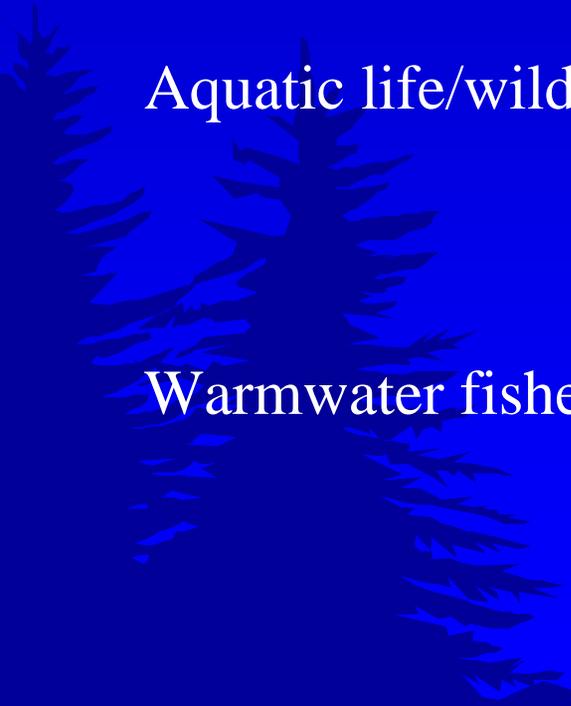
## Known & Suspected Pollutants

### *Impaired Use*

Partial body contact  
recreation

Aquatic life/wildlife

Warmwater fishery



# *Example Watershed*

## Known & Suspected Pollutants

### *Impaired Use*

Partial body contact  
recreation

Aquatic life/wildlife

Warmwater fishery

### *Pollutants*

Nutrients (known)  
E. coli bacteria (known)



# *Example Watershed*

## Known & Suspected Pollutants

### *Impaired Use*

### *Pollutants*

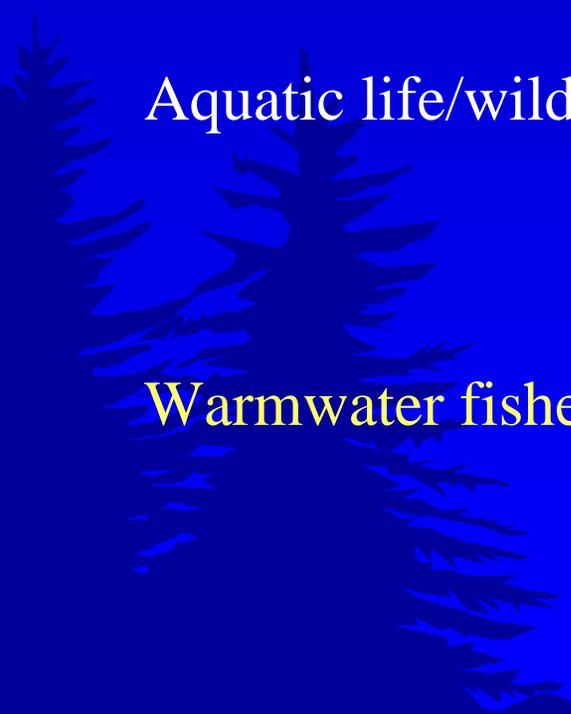
Partial body contact  
recreation

Nutrients (known)  
E. coli bacteria (known)

Aquatic life/wildlife

Sediment (known)  
Nutrients (known)  
Oils, grease, heavy metals (suspected)

Warmwater fishery



# *Example Watershed*

## Known & Suspected Pollutants

### *Impaired Use*

### *Pollutants*

Partial body contact  
recreation

Nutrients (known)  
E. coli bacteria (known)

Aquatic life/wildlife

Sediment (known)  
Nutrients (known)  
Oils, grease, heavy metals (suspected)

Warmwater fishery

Sediment (known)  
Nutrients (known)  
Hydrologic flow (suspected)  
Oils, grease, heavy metals (suspected)  
Pesticides (suspected)

# *Example Watershed*

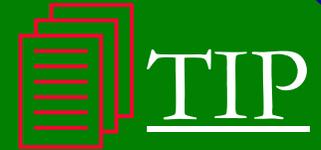
## Known & Suspected Pollutants

### *Threatened Uses*

Public Water Supply

### *Pollutants*

Nutrients (known)



Include non-traditional types of pollutants in your list as well (increased temperature, increased flow).

# Identify sources of pollutants in your watershed

- origin of pollutants
- include known & suspected
- plan to verify suspected sources during watershed inventory

# *Example Watershed Sources*

## *Pollutants*

Nutrients - phosphorus,  
nitrogen (known)

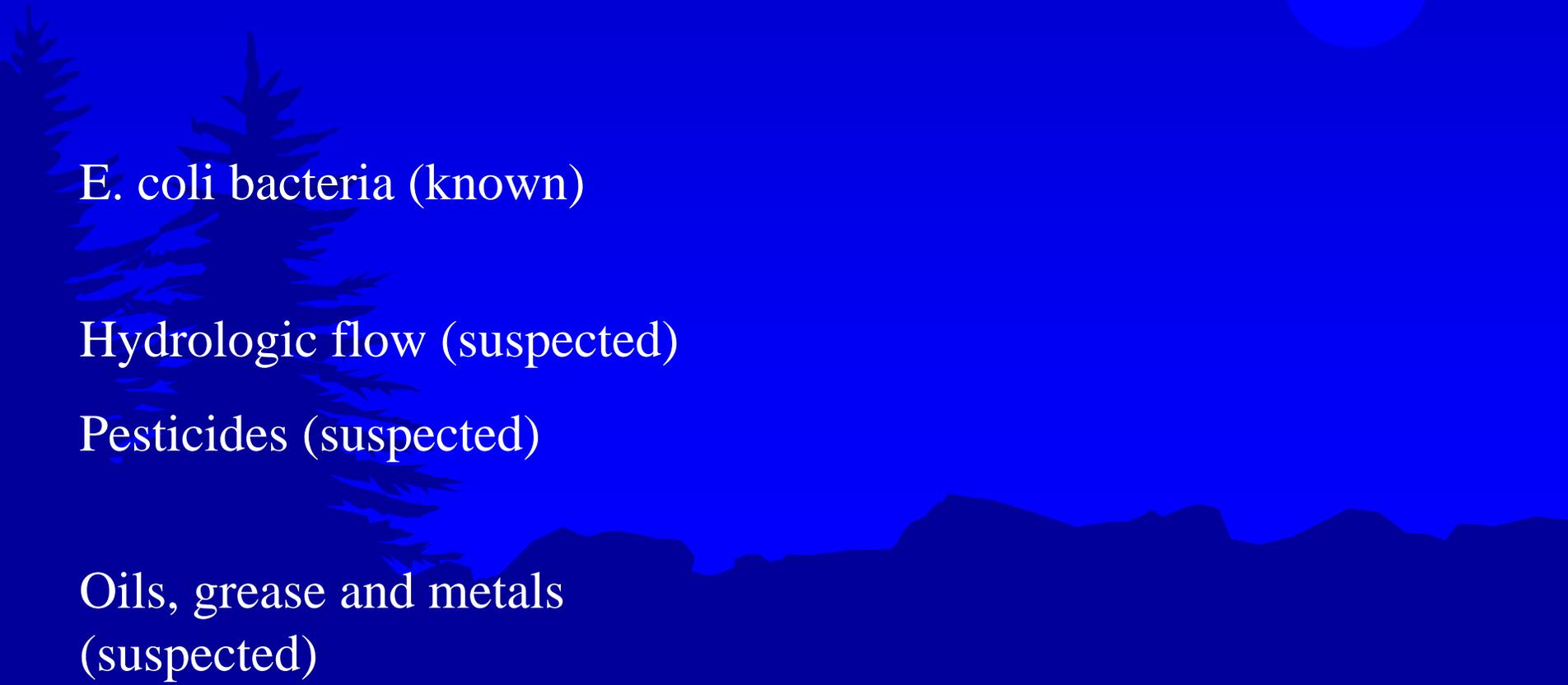
Sediment (known)

E. coli bacteria (known)

Hydrologic flow (suspected)

Pesticides (suspected)

Oils, grease and metals  
(suspected)



# *Example Watershed Sources*

## *Pollutants*

Nutrients - phosphorus,  
nitrogen (known)

Sediment (known)

E. coli bacteria (known)

Hydrologic flow (suspected)

Pesticides (suspected)

Oils, grease and metals  
(suspected)

## *Sources*

Livestock in stream (known)

Failing septic systems (suspect)

Residential fertilizer use (suspect)



# *Example Watershed Sources*

## *Pollutants*

Nutrients - phosphorus,  
nitrogen (known)

Sediment (known)

E. coli bacteria (known)

Hydrologic flow (suspected)

Pesticides (suspected)

Oils, grease and metals  
(suspected)

## *Sources*

Livestock in stream (known)

Failing septic systems (suspect)

Residential fertilizer use (suspect)

Livestock in stream (known)

Road-stream crossings (known)

Stream banks (known)

# *Example Watershed Sources*

## *Pollutants*

Nutrients - phosphorus,  
nitrogen (known)

Sediment (known)

E. coli bacteria (known)

Hydrologic flow (suspected)

Pesticides (suspected)

Oils, grease and metals  
(suspected)

## *Sources*

Livestock in stream (known)

Failing septic systems (suspect)

Residential fertilizer use (suspect)

Livestock in stream (known)

Road-stream crossings (known)

Stream banks (known)

Livestock in stream (known)

Failing septic systems (suspect)

# *Example Watershed Sources*

## *Pollutants*

Nutrients - phosphorus,  
nitrogen (known)

Sediment (known)

E. coli bacteria (known)

Hydrologic flow (suspected)

Pesticides (suspected)

Oils, grease and metals  
(suspected)

## *Sources*

Livestock in stream (known)

Failing septic systems (suspect)

Residential fertilizer use (suspect)

Livestock in stream (known)

Road-stream crossings (known)

Stream banks (known)

Livestock in stream (known)

Failing septic systems (suspect)

Urban storm water (suspected)

# *Example Watershed Sources*

## *Pollutants*

Nutrients - phosphorus,  
nitrogen (known)

Sediment (known)

E. coli bacteria (known)

Hydrologic flow (suspected)

Pesticides (suspected)

Oils, grease and metals  
(suspected)

## *Sources*

Livestock in stream (known)

Failing septic systems (suspect)

Residential fertilizer use (suspect)

Livestock in stream (known)

Road-stream crossings (known)

Stream banks (known)

Livestock in stream (known)

Failing septic systems (suspect)

Urban storm water (suspected)

Agricultural lands (suspected)

Residential gardens (suspected)

# *Example Watershed Sources*

## *Pollutants*

Nutrients - phosphorus,  
nitrogen (known)

Sediment (known)

E. coli bacteria (known)

Hydrologic flow (suspected)

Pesticides (suspected)

Oils, grease and metals  
(suspected)

## *Sources*

Livestock in stream (known)

Failing septic systems (suspect)

Residential fertilizer use (suspect)

Livestock in stream (known)

Road-stream crossings (known)

Stream banks (known)

Livestock in stream (known)

Failing septic systems (suspect)

Urban storm water (suspected)

Agricultural lands (suspected)

Residential gardens (suspected)

Storm drains (suspected)

Impervious areas (suspected)

# Identify causes of pollutants

- The condition that is creating the source of the pollutant
- Allows you to design successful control measures



# *Example Watershed Causes*

## Sources

Livestock in stream (k)

Failing septic systems (s)

Residential fertilizer use (s)

Road-stream crossings (k)

Stream banks (k)

Urban storm water (s)

Agricultural lands (s)

Residential gardens (s)

Storm drains (s)

Impervious surfaces (s)



# *Example Watershed Causes*

## Sources

Livestock in stream (k)

Failing septic systems (s)

Residential fertilizer use (s)

Road-stream crossings (k)

Stream banks (k)

Urban storm water (s)

Agricultural lands (s)

Residential gardens (s)

Storm drains (s)

Impervious surfaces (s)

## Causes

Unrestricted access (k)



# *Example Watershed Causes*

## Sources

- Livestock in stream (k)
- Failing septic systems (s)
- Residential fertilizer use (s)
- Road-stream crossings (k)
- Stream banks (k)
- Urban storm water (s)
- Agricultural lands (s)
- Residential gardens (s)
- Storm drains (s)
- Impervious surfaces (s)

## Causes

- Unrestricted access (k)
- Improperly designed or maintained septic systems (s)



# *Example Watershed Causes*

## Sources

- Livestock in stream (k)
- Failing septic systems (s)
- Residential fertilizer use (s)
- Road-stream crossings (k)
- Stream banks (k)
- Urban storm water (s)
- Agricultural lands (s)
- Residential gardens (s)
- Storm drains (s)
- Impervious surfaces (s)

## Causes

- Unrestricted access (k)
- Improperly designed or maintained septic systems (s)
- Improper application (s)



# *Example Watershed Causes*

## Sources

Livestock in stream (k)  
Failing septic systems (s)  
Residential fertilizer use (s)  
Road-stream crossings (k)  
Stream banks (k)

Urban storm water (s)

Agricultural lands (s)  
Residential gardens (s)  
Storm drains (s)

Impervious surfaces (s)

## Causes

Unrestricted access (k)  
Improperly designed or maintained  
septic systems (s)  
Improper application (s)  
Undersized culverts (k)



# *Example Watershed Causes*

## Sources

- Livestock in stream (k)
- Failing septic systems (s)
- Residential fertilizer use (s)
- Road-stream crossings (k)
- Stream banks (k)
- Urban storm water (s)
- Agricultural lands (s)
- Residential gardens (s)
- Storm drains (s)
- Impervious surfaces (s)

## Causes

- Unrestricted access (k)
- Improperly designed or maintained septic systems (s)
- Improper application (s)
- Undersized culverts (k)
- Livestock access (k)
- Human access (s)
- Flow fluctuations (s)

# *Example Watershed Causes*

## Sources

Livestock in stream (k)  
Failing septic systems (s)  
Residential fertilizer use (s)  
Road-stream crossings (k)  
Stream banks (k)  
Urban storm water (s)  
Agricultural lands (s)  
Residential gardens (s)  
Storm drains (s)  
Impervious surfaces (s)

## Causes

Unrestricted access (k)  
Improperly designed or maintained  
septic systems (s)  
Improper application (s)  
Undersized culverts (k)  
Livestock access (k)  
Human access (s)  
Flow fluctuations (s)  
Poor storm water management  
practices (s)

# *Example Watershed Causes*

## Sources

- Livestock in stream (k)
- Failing septic systems (s)
- Residential fertilizer use (s)
- Road-stream crossings (k)
- Stream banks (k)
- Urban storm water (s)
- Agricultural lands (s)
- Residential gardens (s)
- Storm drains (s)
- Impervious surfaces (s)

## Causes

- Unrestricted access (k)
- Improperly designed or maintained septic systems (s)
- Improper application (s)
- Undersized culverts (k)
- Livestock access (k)
- Human access (s)
- Flow fluctuations (s)
- Poor storm water management practices (s)
- Improper pesticide application (s)

# *Example Watershed Causes*

## Sources

Livestock in stream (k)  
Failing septic systems (s)  
  
Residential fertilizer use (s)  
Road-stream crossings (k)  
Stream banks (k)  
  
Urban storm water (s)  
  
Agricultural lands (s)  
Residential gardens (s)  
Storm drains (s)  
  
Impervious surfaces (s)

## Causes

Unrestricted access (k)  
Improperly designed or maintained  
septic systems (s)  
Improper application (s)  
Undersized culverts (k)  
Livestock access (k)  
Human access (s)  
Flow fluctuations (s)  
Poor storm water management  
practices (s)  
Improper pesticide application (s)  
Improper pesticide application (s)

# *Example Watershed Causes*

## Sources

Livestock in stream (k)  
Failing septic systems (s)  
  
Residential fertilizer use (s)  
Road-stream crossings (k)  
Stream banks (k)  
  
Urban storm water (s)  
  
Agricultural lands (s)  
Residential gardens (s)  
Storm drains (s)  
  
Impervious surfaces (s)

## Causes

Unrestricted access (k)  
Improperly designed or maintained  
septic systems (s)  
Improper application (s)  
Undersized culverts (k)  
Livestock access (k)  
Human access (s)  
Flow fluctuations (s)  
Poor storm water management  
practices (s)  
Improper pesticide application (s)  
Improper pesticide application (s)  
Improper oil disposal and vehicle  
maintenance (s)

# *Example Watershed Causes*

## Sources

Livestock in stream (k)  
Failing septic systems (s)  
  
Residential fertilizer use (s)  
Road-stream crossings (k)  
Stream banks (k)  
  
Urban storm water (s)  
  
Agricultural lands (s)  
Residential gardens (s)  
Storm drains (s)  
  
Impervious surfaces (s)

## Causes

Unrestricted access (k)  
Improperly designed or maintained  
septic systems (s)  
Improper application (s)  
Undersized culverts (k)  
Livestock access (k)  
Human access (s)  
Flow fluctuations (s)  
Poor storm water management  
practices (s)  
Improper pesticide application (s)  
Improper pesticide application (s)  
Improper oil disposal and vehicle  
maintenance (s)  
More roads & parking lots (s)

# Develop goals based on designated and desired uses

- Anticipated future state of the watershed
- Broad and changing as you learn more
- Basis for specific objectives and tasks



# *Example Watershed Goals*



# *Example Watershed Goals*

## *Impaired Uses*

Partial body contact  
recreation

## *Goal*

Restore recreational use by reducing  
nutrient and bacteria loadings



# *Example Watershed Goals*

## *Impaired Uses*

Partial body contact recreation

Warmwater fishery

## *Goal*

Restore recreational use by reducing nutrient and bacteria loadings

Restore the fishery by reducing sediment and nutrients, and reducing peak flows

# *Example Watershed Goals*

## *Impaired Uses*

Partial body contact recreation

Warmwater fishery

Aquatic life/wildlife

## *Goal*

Restore recreational use by reducing nutrient and bacteria loadings

Restore the fishery by reducing sediment and nutrients, and reducing peak flows

Same as warmwater fishery goal

# *Example Watershed Goals*

## *Impaired Uses*

Partial body contact recreation

Warmwater fishery

Aquatic life/wildlife

## *Threatened Uses*

Public water supply

## *Goal*

Restore recreational use by reducing nutrient and bacteria loadings

Restore the fishery by reducing sediment and nutrients, and reducing peak flows

Same as warmwater fishery goal

## *Goal*

Protect the supply by reducing nutrient and pesticide loads

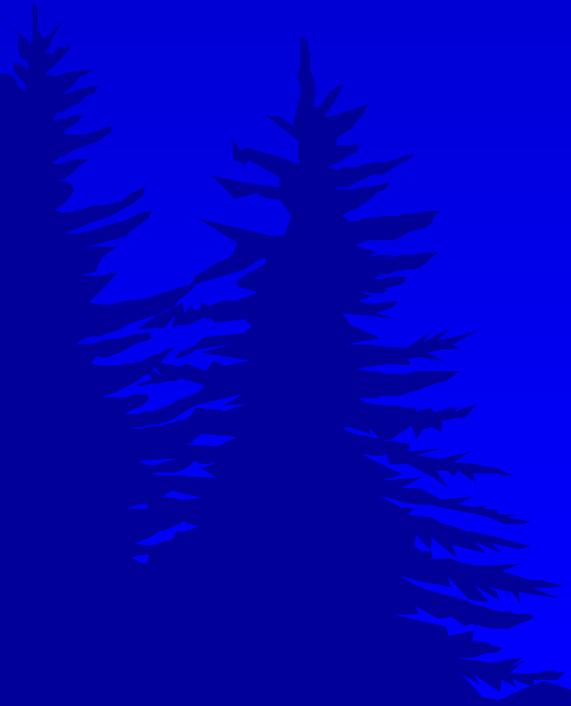
# *Example Watershed Goals (cont.)*

*Desired Uses*

*Goal*

Recreational trail

Establish a trail along the river



# *Example Watershed Goals (cont.)*

## *Desired Uses*

## *Goal*

Recreational trail

Establish a trail along the river

Protect river corridor

Establish conservation easements  
along entire river corridor

# *Example Watershed Goals (cont.)*

## *Desired Uses*

## *Goal*

Recreational trail

Establish a trail along the river

Protect river corridor

Establish conservation easements along entire river corridor

Protect prime agricultural land

Identify and permanently protect prime agricultural lands

# *Example Watershed Goals (cont.)*

## *Desired Uses*

## *Goal*

Recreational trail

Establish a trail along the river

Protect river corridor

Establish conservation easements along entire river corridor

Protect prime agricultural land

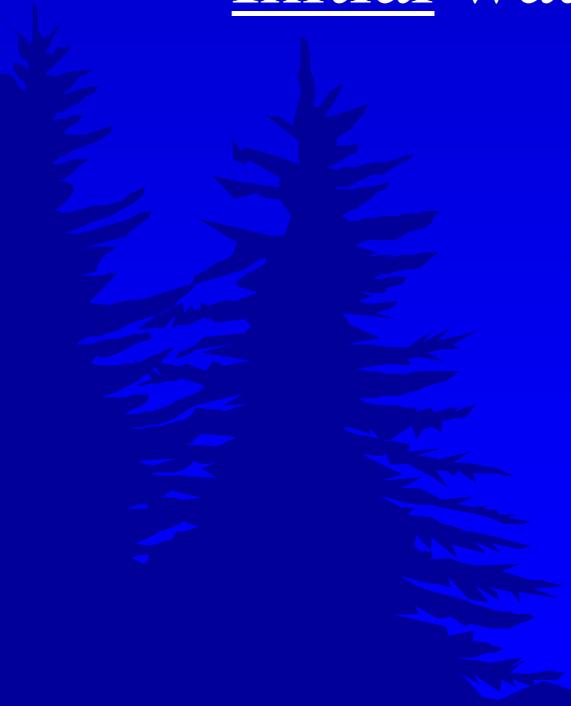
Identify and permanently protect prime agricultural lands

Protect unique habitat

Identify critical habitat for endangered species of concern and ways to protect the habitat

# Product

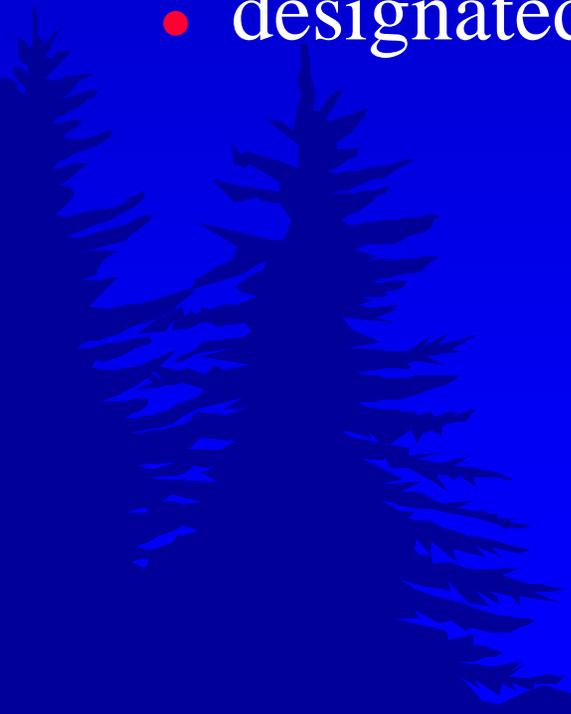
- Initial water quality summary



# Initial water quality summary

Short, clearly written description of water quality in the watershed that includes:

- designated uses addressed in the plan



# Initial water quality summary

Short, clearly written description of water quality in the watershed that includes:

- designated uses addressed in the plan
- desired uses addressed in the plan

# Initial water quality summary

Short, clearly written description of water quality in the watershed that includes:

- designated uses addressed in the plan
- desired uses addressed in the plan
- known & suspected pollutants

# Initial water quality summary

Short, clearly written description of water quality in the watershed that includes:

- designated uses addressed in the plan
- desired uses addressed in the plan
- known & suspected pollutants
- known & suspected sources of pollutants

# Initial water quality summary

Short, clearly written description of water quality in the watershed that includes:

- designated uses addressed in the plan
- desired uses addressed in the plan
- known & suspected pollutants
- known & suspected sources of pollutants
- known & suspected causes

# Initial water quality summary

Short, clearly written description of water quality in the watershed that includes:

- designated uses addressed in the plan
- desired uses addressed in the plan
- known & suspected pollutants
- known & suspected sources of pollutants
- known & suspected causes
- goals of the watershed

# *Example Watershed Water Quality Summary*

The Example Watershed waterbody has three designated uses that are impaired: (1) partial body contact recreation, (2) aquatic life/wildlife, and (3) warmwater fishery. The designated use public water supply is threatened.

The first project goal is to restore partial body contact recreation use by reducing *E. coli* bacteria and nutrient loadings. The second goal is to ...

## ***Recreation:***

The designated use of partial body contact recreation is impaired due to undesirable algal blooms and *E. coli* levels. The only known source of these pollutants is livestock in the stream. Suspected sources include failing septic systems and the misapplication and/or overapplication of fertilizer in residential areas.

Uncontrolled livestock access to streams results in *E. coli* and nutrient deposition directly into the water. When septic systems do not properly treat waste, nitrates can be transported from the septic field area to the waterbody where they can contribute to increased plant growth and dissolved oxygen depletion. The misapplication and/or over application of fertilizers can result in nutrients being transported from the land to the waterbody where algal blooms are formed

# *Example Watershed Water Quality Summary*

The Example Watershed waterbody has three designated uses that are impaired: (1) partial body contact recreation, (2) aquatic life/wildlife, and (3) warmwater fishery. The designated use public water supply is threatened.

# *Example Watershed Water Quality Summary*

The first project goal is to restore partial body contact recreation use by reducing *E. coli* bacteria and nutrient loadings. The second goal is to ...

# *Example Watershed Water Quality Summary*

## *Recreation:*

The designated use of partial body contact recreation is impacted due to undesirable algal blooms. The only known source of these pollutants is livestock in the stream. Suspected sources include failing septic systems and the misapplication and/or overapplication of fertilizer in residential areas.

# *Example Watershed Water Quality Summary*

Uncontrolled livestock access to streams results in *E. coli* and nutrient deposition directly into the water. When septic systems do not properly treat waste, nitrates can be transported from the septic field area to the waterbody where they can contribute to increased plant growth and dissolved oxygen depletion. The misapplication and/or over application of fertilizers can result in nutrients being transported from the land to the waterbody where algal blooms are formed.

# Chapter 3

## Defining the Critical Area in Your Watershed Plan



# Objective

Identify the Critical Area in the Watershed

# What is A Critical Area?

*The geographic portion of the watershed that contributes a majority of the pollutants and is having a significant impact on the water body.*



# What Are the Purposes for Defining the Critical Area?

- 1) Identifies the geographic area that will be inventoried in detail
- 2) Determines the geographic area that will have water quality improvement practices installed.

# How Is the Boundary of the Critical Area Determined?

Start along the water body's edge.

Be Flexible at first.

Study the topography, soil types, land uses and management, drainage patterns, and distance from the source to the water body.

# How is the Boundary of the Critical Area Determined? Cont...

Consider how the pollutants might be reaching the water:

Identify the pollutant sources

Determine where they originate

Assess their movement from the source to the water

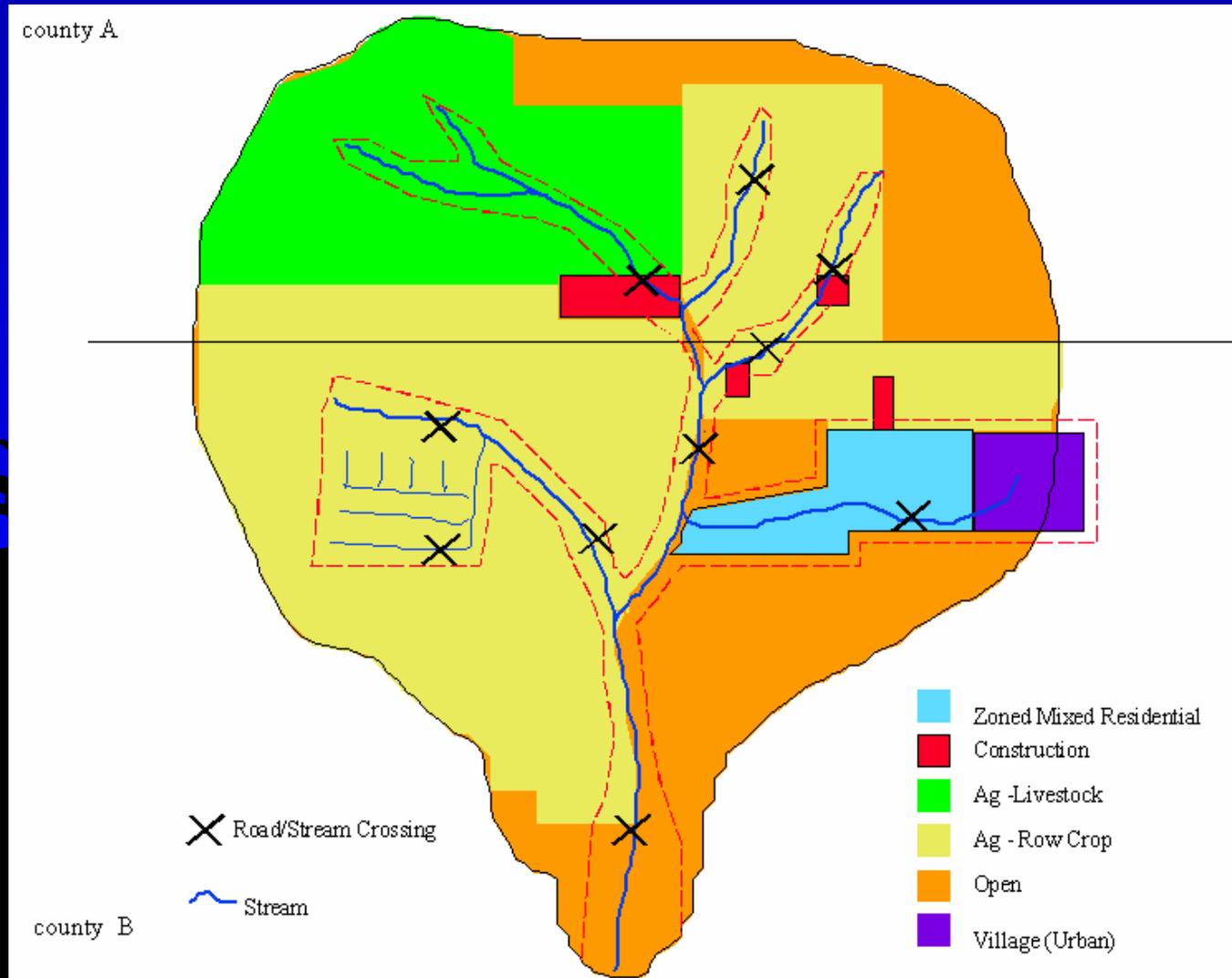
Determining how the pollutant gets to the water body will define the Critical Area

In general,

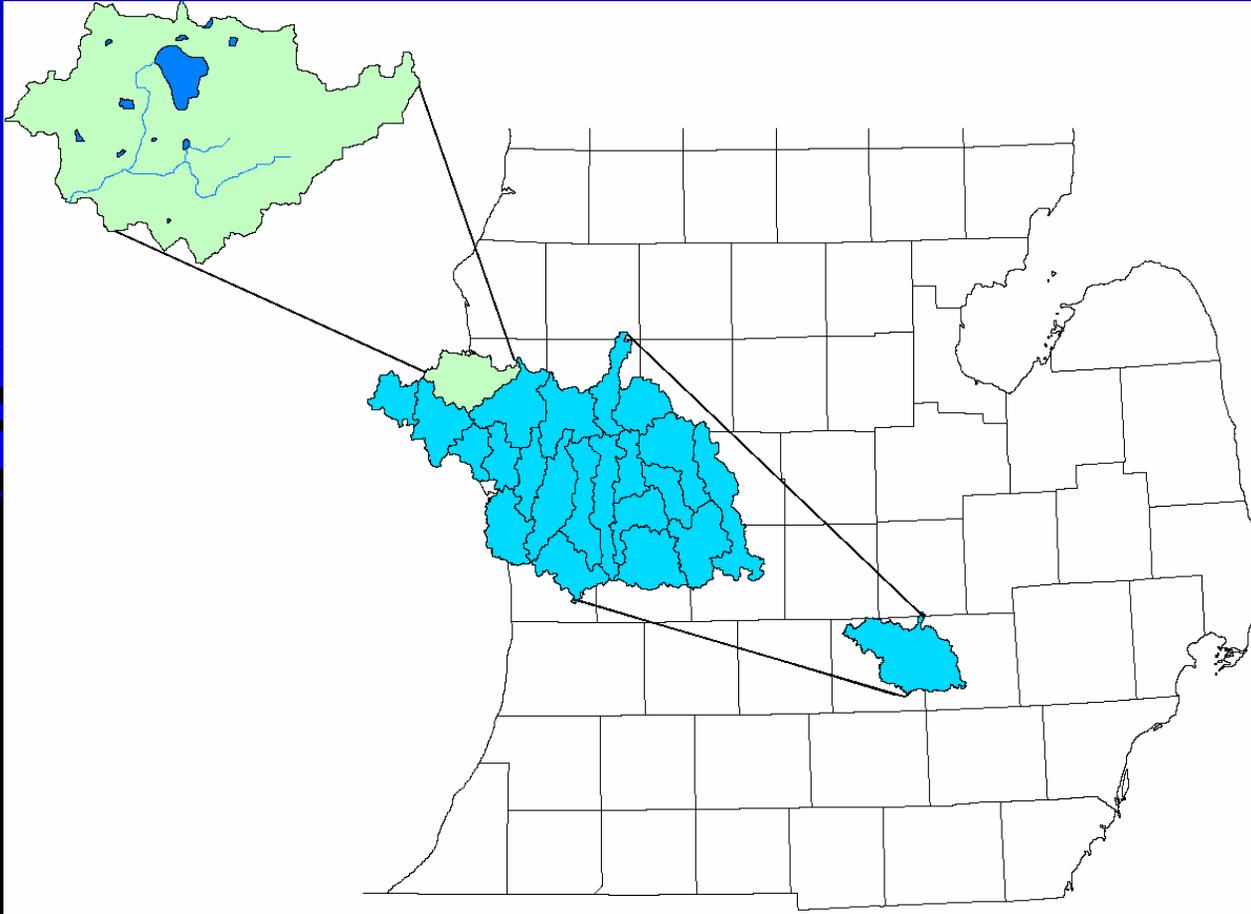
There are several ways to identify the  
Critical Area:

- 1) Corridor
- 2) Sub Watershed
- 3) Entire Watershed
- 4) Combination of two or more of the above

# Corridor Method



# Sub Watershed Method



# Entire Watershed

Gallagher Creek....

Small watershed

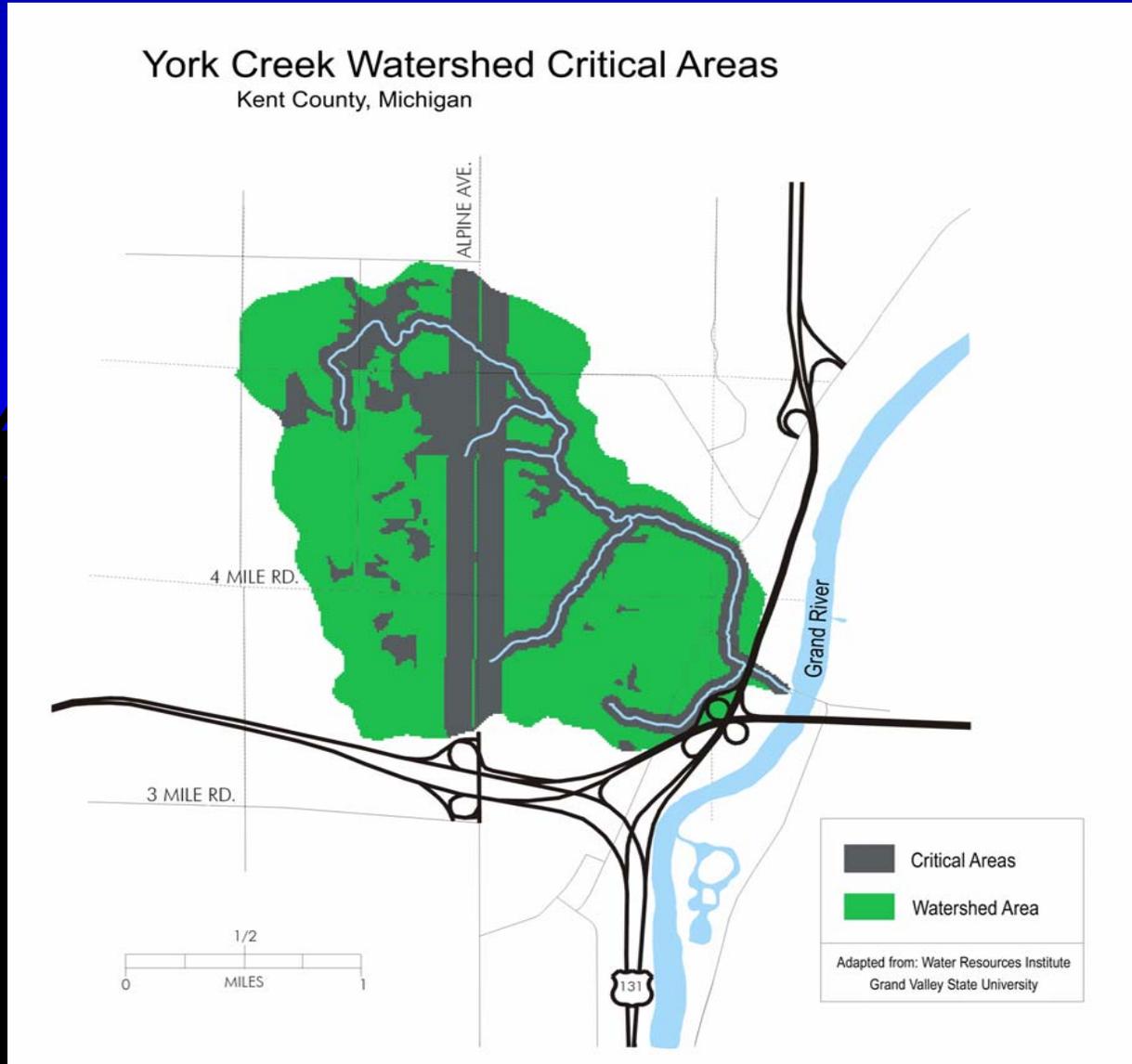
Rolling topography

Several drains and streams

Urban development pressures

Entire watershed contributing sediment

# Combination Method



# Chapter Product

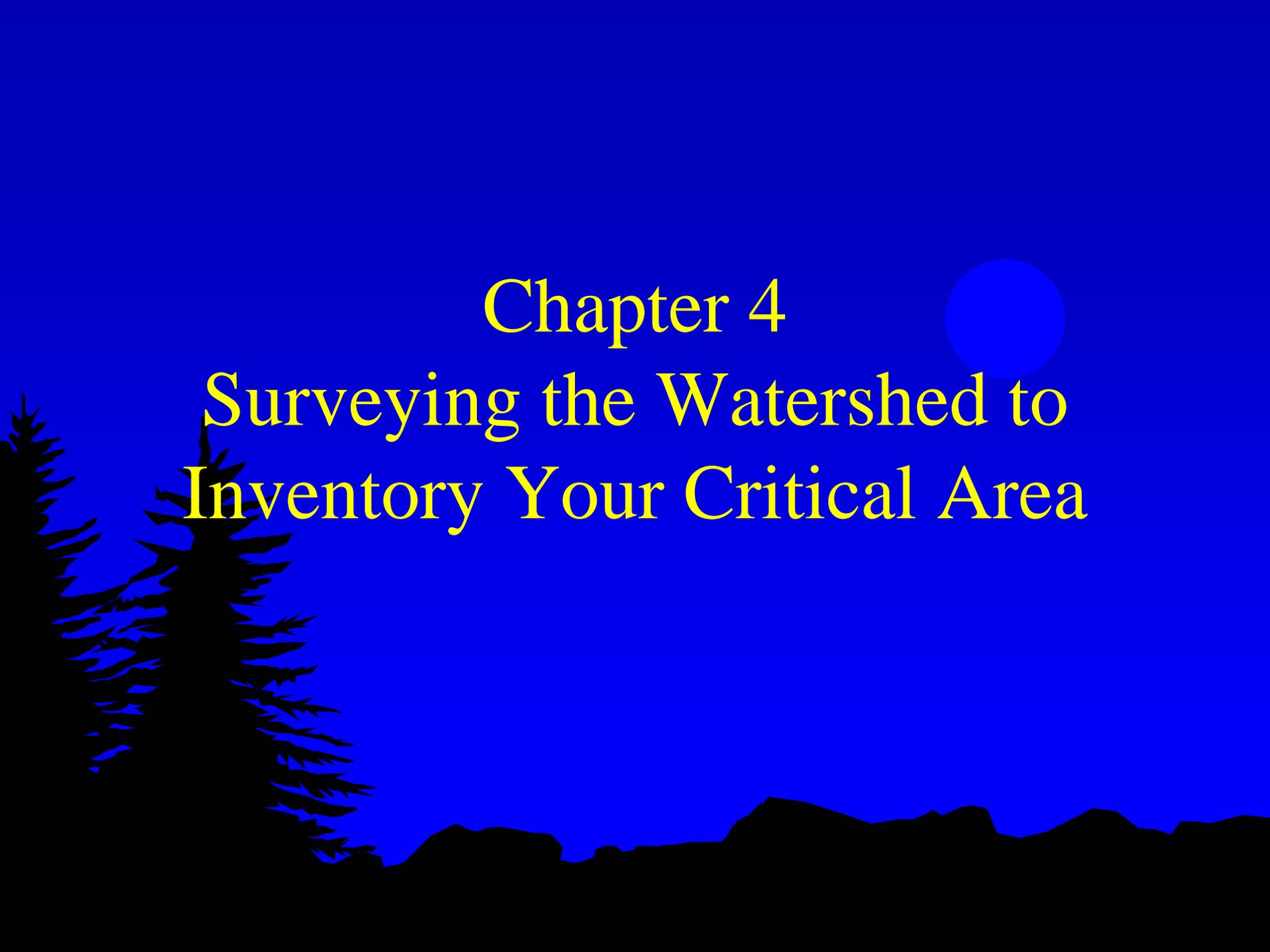
A delineated Critical Area based  
on data analysis such as:



- Designated Uses
- Pollutants
- Sources of Pollution
- Pathway of the Pollutants including Distance to the Water Body
- Topography
- Soils
- Land use and Management

Identify the Critical Area that geographically narrows the scope of the watershed project by focusing attention on the part of the watershed that contributes pollution to the water. This will help you meet the CMI requirement for identifying the sources of pollutants that are critical to control.





# Chapter 4

## Surveying the Watershed to Inventory Your Critical Area

# Objectives

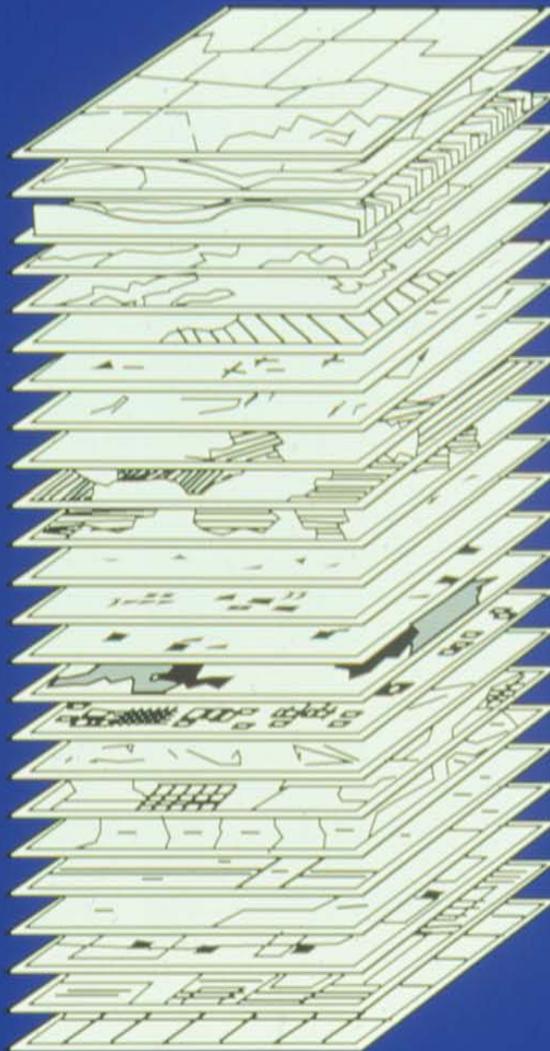
- 1) Survey the Watershed to refine the Critical Area
- 2) Refine the list of known and suspected pollutants, sources and causes
- 3) To locate the Sources of pollution on a Watershed Map
- 4) Quantify the Sources of pollution
- 5) To move the Steering and Technical Committees to a position of knowledge

# Primary Data Collection

- Topographic Map
- Hydrology
- Roads
- Soil Map
- Land Use
- Political Jurisdictions



# GIS LAYERS



BASE MAPS  
LAND USE/COVER INVENTORY  
TOPOGRAPHY/BATHYMETRY  
HYDROLOGY  
WETLANDS  
ENVIRONMENTAL CONCERN AREAS  
UNIQUE FEATURES (ARCHEOLOGY, HISTORY)  
EROSION/RECESSION RATES  
SEDIMENT DEPOSITION AREAS  
SURFACE SOIL TYPES  
GEOLOGIC STRATIFICATIONS  
GROUNDWATER SAMPLING SITES  
CONTAMINATION SITES  
INTAKES AND DISCHARGES  
100/500 YEAR FLOOD ZONES  
STRUCTURE INVENTORY  
BASE FLOOD ELEVATIONS  
PROPERTY BOUNDARIES  
LAND VALUES  
CENSUS TRACTS  
POLITICAL BOUNDARIES  
PERMIT LOCATIONS  
PROJECT DESIGN FILES  
COORDINATE REFERENCE SYSTEMS

# What Methods Are Available For Inventorying the Critical Area?

- Visual Method
- Computer Modeling Method
- Public Survey Method
- Monitoring Method



# Visual Method

- 1) Walk, drive, and/or canoe
- 2) Technical Committee, Steering Committee, Local Stakeholders
- 3) Take lots of photographs
- 4) Standardized data sheets by sources



## Most watershed groups have used an inventory sheet that includes information such as:

- Land Use
- The condition of the stream bank vegetation
- Amount of canopy(i.e., shade)
- The slope of the bank
- The stability of the stream bank
- In-stream water quality indicators such as nuisance algal growth
- Stream bed composition
- The condition of road-stream crossings
- Storm water or drainage pipes discharging into the stream

# Computer Modeling Method

- 1) Simulate real-world conditions
- 2) Predict alternative scenarios



# Public Survey Method

- 1) Survey people who live in Critical Area
- 2) Design and test the survey
- 3) Conducting the survey
- 4) Survey results

# Monitoring Method

- 1) Habitat Monitoring
- 2) Chemical Water Quality Monitoring
- 3) Hydrologic Monitoring



# What is Done With Information That Was Collected?

- 1) Update the list of known and suspected Pollutants
- 2) Update the list of known and suspected Sources
- 3) Quantify the Sources

## Example Watersheds Sources – Following the Inventory

<b>Pollutants</b>	<b>Sources</b>	<b>Causes</b>
Nutrients(P and N) (k)	Livestock in stream (k)	Uncontrolled Access (k)
	Failing septic systems (s)	Improperly sited, designed, and/or maintained septic systems (s)
	Residential fertilizer use (k)	Improper usage

# Products From the Critical Area Inventory

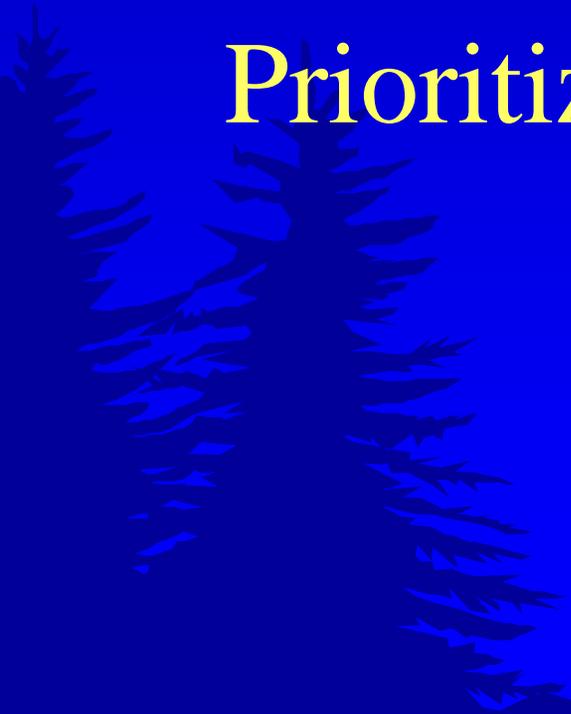
Based on the Inventory of the Critical Area:

- 1) Updated list of verified Pollutants
- 2) Updated list of known Sources
- 3) The number of the Sources
- 4) The Location of the Sources on the Watershed Map
- 5) A display of the data in tabular form
- 6) A brief summary of the method(s) used to conduct the inventory



# CHAPTER 5

## Prioritizing Pollutants, Sources and Causes

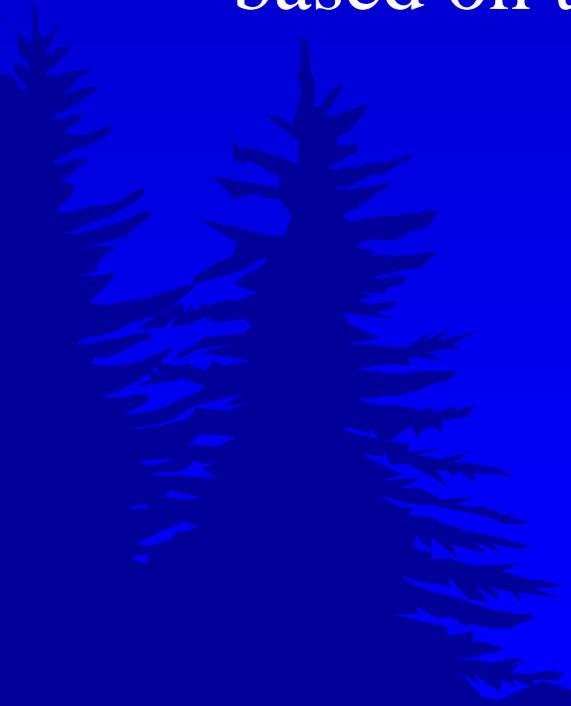


# Objectives



# Objectives

- Prioritize pollutants for your watershed based on the designated uses



# Objectives

- Prioritize pollutants for your watershed based on the designated uses
- Prioritize sources and causes of the pollutants

*Example Watershed*  
Prioritization Process  
for Designated Uses & Pollutants



# *Example Watershed*

## Prioritization Process

### for Designated Uses & Pollutants

#### Designated Uses

- Warmwater fishery

#### Pollutants

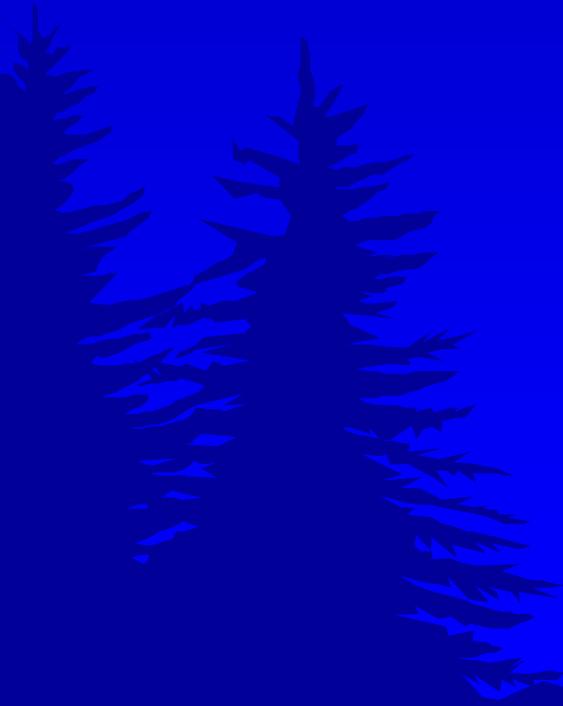
Sediment  
Nutrients  
Hydrologic flow

#### Priority

1

2

3



# *Example Watershed*

## Prioritization Process

### for Designated Uses & Pollutants

<u>Designated Uses</u>	<u>Pollutants</u>	<u>Priority</u>
• Warmwater fishery	Sediment	1
	Nutrients	2
	Hydrologic flow	3
• Other indigenous aquatic life/wildlife	Sediment	1
	Hydrologic flow	2
	Nutrients	3
	Oils, grease & metals	4

# *Example Watershed*

## Prioritization Process

### for Designated Uses & Pollutants

<u>Designated Uses</u>	<u>Pollutants</u>	<u>Priority</u>
• Warmwater fishery	Sediment	1
	Nutrients	2
	Hydrologic flow	3
• Other indigenous aquatic life/wildlife	Sediment	1
	Hydrologic flow	2
	Nutrients	3
	Oils, grease & metals	4
• Partial body contact recreation	<i>E. coli</i> bacteria	1
	Nutrients	2

# *Example Watershed*

## Prioritization Process

### for Designated Uses & Pollutants

<u>Designated Uses</u>	<u>Pollutants</u>	<u>Priority</u>
<ul style="list-style-type: none"> <li>• Warmwater fishery</li> </ul>	Sediment	1
	Nutrients	2
	Hydrologic flow	3
<ul style="list-style-type: none"> <li>• Other indigenous aquatic life/wildlife</li> </ul>	Sediment	1
	Hydrologic flow	2
	Nutrients	3
	Oils, grease and metals	4
<ul style="list-style-type: none"> <li>• Partial body contact recreation</li> </ul>	<i>E. coli</i> bacteria	1
	Nutrients	2
<ul style="list-style-type: none"> <li>• Public Water Supply (threatened)</li> </ul>	Nutrients (Nitrate)	1

# *Example Watershed*

## Prioritization of Pollutants

<u>Pollutants</u>	<u>Priority Ranking</u>
• Sediment	1
• Nutrients	2
• Hydrologic flow	3
• <i>E. coli</i> bacteria	4
• Oil, grease, metals	5

# Prioritize sources and causes of the pollutants

- Consider magnitude of the source
- Consider how readily the pollutant moves



TIP

Criteria commonly used for ranking sources include frequency, degree of degradation, and costs/benefits for addressing

*Example Watershed*  
Prioritization of Pollutants & Sources



# *Example Watershed*

## Prioritization of Pollutants & Sources

<u>Pollutants</u>	<u>Ranking</u>	<u>Sources</u>	<u>Ranking</u>
Sediment	1	Eroding road-stream crossings	1
		Stream bank erosion	2
		Livestock in stream	3



# *Example Watershed*

## Prioritization of Pollutants & Sources

<u>Pollutants</u>	<u>Ranking</u>	<u>Sources</u>	<u>Ranking</u>
Sediment	1	Eroding road-stream crossings	1
		Stream bank erosion	2
		Livestock in stream	3
Nutrients	2	Livestock in stream	1
		Fertilizer runoff	2
		Failing septic systems	3

# *Example Watershed*

## Prioritization of Pollutants & Sources

<u>Pollutants</u>	<u>Ranking</u>	<u>Sources</u>	<u>Ranking</u>
Sediment	1	Eroding road-stream crossings	1
		Stream bank erosion	2
		Livestock in stream	3
Nutrients	2	Livestock in stream	1
		Fertilizer runoff	2
		Failing septic systems	3
Hydrologic flow	3	Urban storm water	1

# Example Watershed

## Prioritization of Pollutants & Sources

<u>Pollutants</u>	<u>Ranking</u>	<u>Sources</u>	<u>Ranking</u>
Sediment	1	Eroding road-stream crossings	1
		Stream bank erosion	2
		Livestock in stream	3
Nutrients	2	Livestock in stream	1
		Fertilizer runoff	2
		Failing septic systems	3
Hydrologic flow	3	Urban storm water	1
<i>E. coli</i> bacteria	4	Livestock in stream	1
		Failing septic systems	2

# Example Watershed

## Prioritization of Pollutants & Sources

<u>Pollutants</u>	<u>Ranking</u>	<u>Sources</u>	<u>Ranking</u>
Sediment	1	Eroding road-stream crossings	1
		Stream bank erosion	2
		Livestock in stream	3
Nutrients	2	Livestock in stream	1
		Fertilizer runoff	2
		Failing septic systems	3
Hydrologic flow	3	Urban storm water	1
<i>E. coli</i> bacteria	4	Livestock in stream	1
		Failing septic systems	2
Oils, grease and metals	5	Storm drains	1
		Parking lots	2

# *Example Watershed*

## Prioritization of Sources & Causes of Sediment



# *Example Watershed*

## Prioritization of Sources & Causes of Sediment

<u>Source</u>	<u>Ranking</u>	<u>Causes</u>	<u>Ranking</u>
Eroding road-stream crossings	1	Undersized culverts	1



# *Example Watershed*

## Prioritization of Sources & Causes of Sediment

<u>Source</u>	<u>Ranking</u>	<u>Causes</u>	<u>Ranking</u>
Eroding road-stream crossings	1	Undersized culverts	1
Stream bank erosion	2	Flow fluctuation (poor storm water management practices)	1
		Human access	2



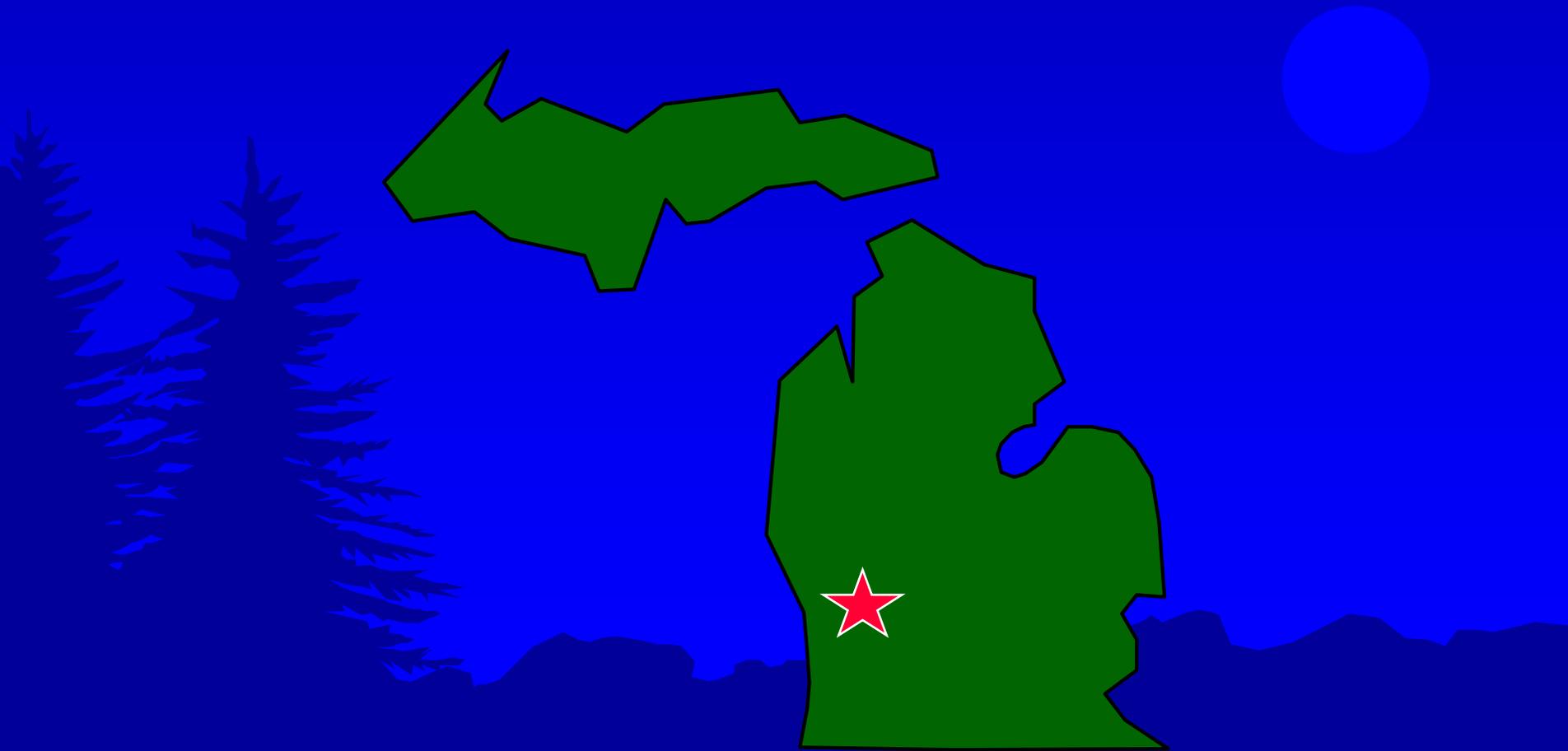
# Example Watershed

## Prioritization of Sources & Causes of Sediment

<u>Source</u>	<u>Ranking</u>	<u>Causes</u>	<u>Ranking</u>
Eroding road-stream crossings	1	Undersized culverts	1
Stream bank erosion	2	Flow fluctuation (poor storm water management practices)	1
		Human access	2
Livestock in stream	3	Unlimited access	1

\*\*\*Continue to prioritize all sources & causes\*\*\*

Case study:  
*Bear Creek Watershed Project*  
*Kent County*



# *Bear Creek Watershed*

## *Kent County*

- Designated Use - Coldwater fishery & partial/total body contact recreation

# *Bear Creek Watershed*

## *Kent County*

- Designated Use - Coldwater fishery & partial/total body contact recreation
- major pollutants - sediment & *E. coli* bacteria

# *Bear Creek Watershed*

## *Kent County*

- Designated Use - Coldwater fishery & partial/total body contact recreation
- major pollutants - sediment & E. coli bacteria
- group sources by category (agricultural or non-agricultural) and evaluate based on criteria





# Criteria

- Degree of the impact of that site to the stream (0-50 points)
- Landowner willingness to cooperate (0-40 points)
- Demonstration ability (0-25 points)
- **TOTAL POINTS POSSIBLE = 115**

# *Bear Creek Watershed*

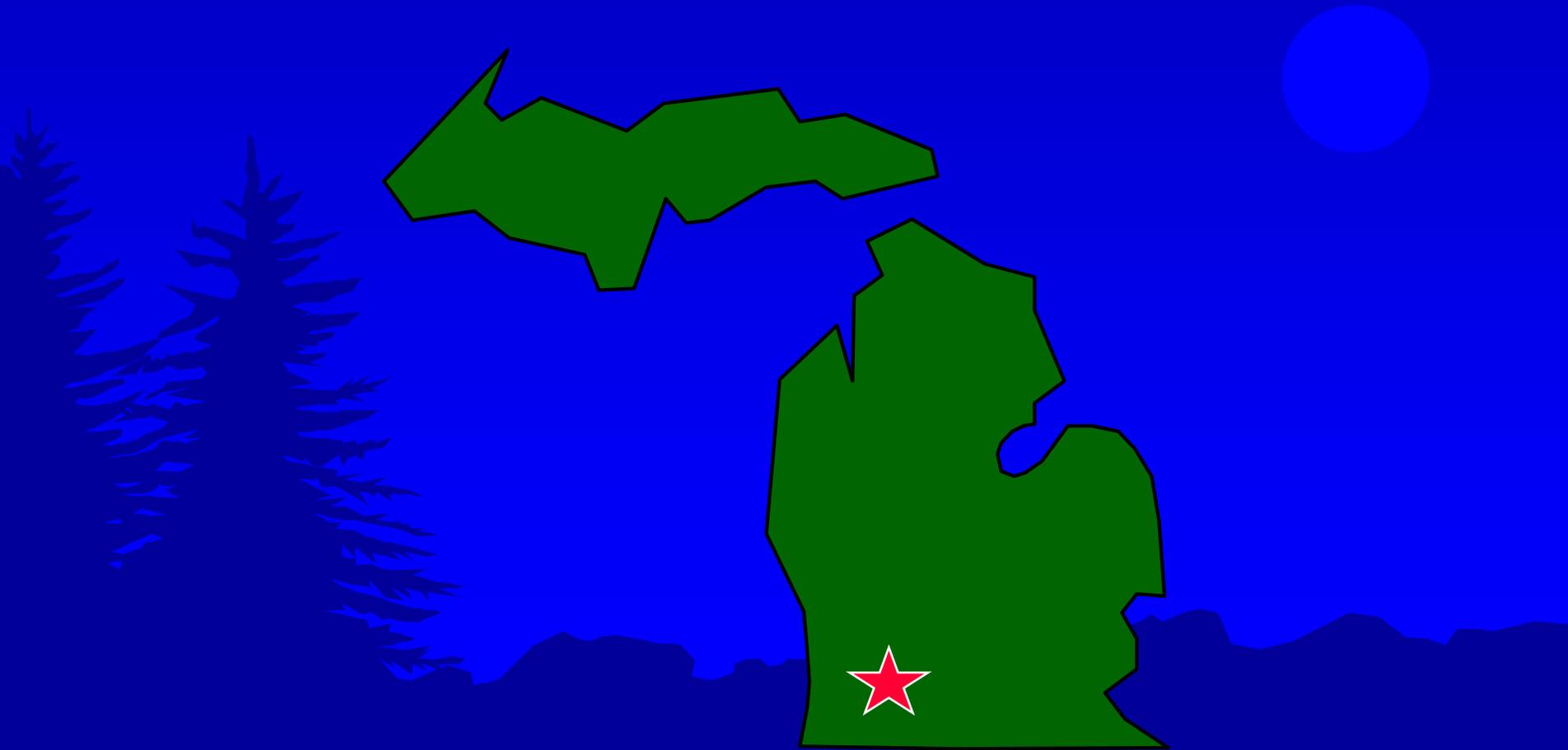
## *Kent County*

- Designated Use - Coldwater fishery & partial/total body contact
- major pollutants - sediment & E. coli bacteria
- group sources by category (road crossing, or agricultural) and evaluate based on criteria
- compare each site with all other sites

# Bear Creek site prioritization

<u>Site #</u>	<u>Total score</u>
• Ag site #13	110
• Non-ag site #2	96
• Non-ag site #7	92
• Non-ag site #5	92
• Ag site #2	91
• Ag site #7	91
• Ag site #11	90

Case study:  
*Davis Creek Watershed*  
Kalamazoo County

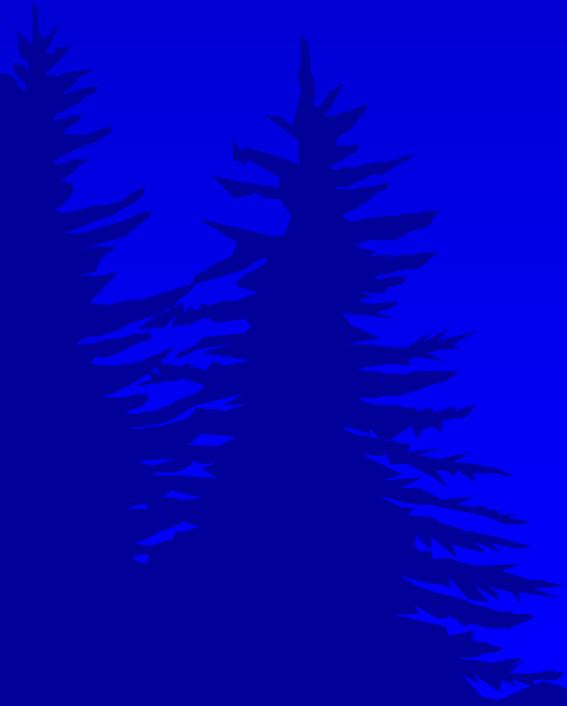


# *Davis Creek Watershed*

- used intensive water sampling and analysis study
- observations by “creek walkers”



The Best Method  
for Prioritizing uses, pollutants,  
sources and causes ....



The Best Method  
for Prioritizing uses, pollutants,  
sources and causes ....  
depends on the characteristics of  
your watershed



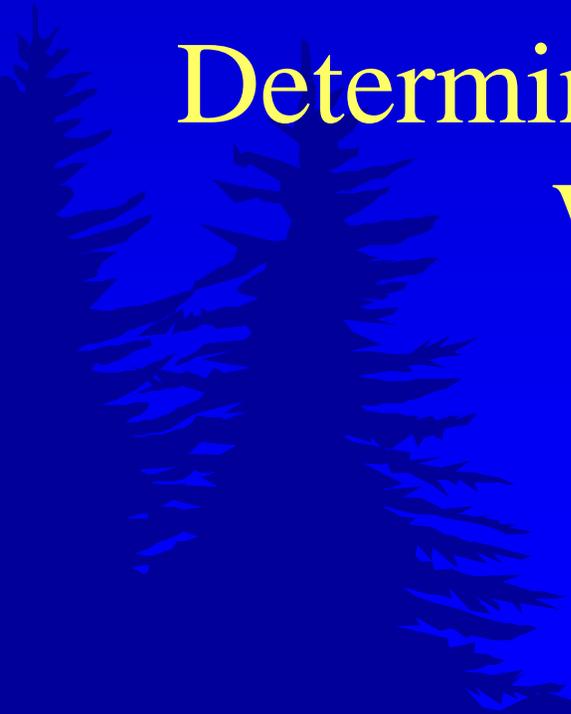
# Product

- A prioritized list of:
  - Designated & Desired Uses
  - Pollutants
  - Sources
  - Causes
- A description of the methods used to prioritize these



# CHAPTER 6

## Determining Objectives for Your Watershed Goals



# At this point you understand:

- Physical characteristics of your watershed
- Pollutants that are impairing & threatening designated uses
- Sources & causes of pollutants
- Desired uses of your watershed

# Develop objectives for each of your watershed goals

- Review initial goals & determine how you will reduce pollution from a source to protect or restore a designated/desired use

# *Example Watershed* Objectives for One Goal

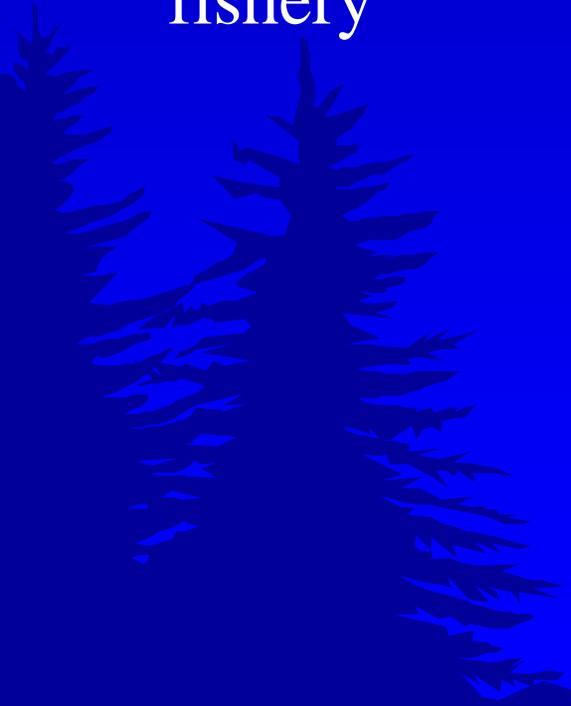
## Goal

Restore the  
warmwater  
fishery

## Objectives

Reduce the amount of sediment

Reduce the amount of nutrients



# *Example Watershed* Objectives for One Goal

## Goal

Restore the  
warmwater  
fishery

## Objectives

Reduce the amount of sediment by:

- Stabilizing eroding road-stream crossings
- Stabilizing eroding stream banks
- Restricting livestock from the stream

Reduce the amount of nutrients by:

# *Example Watershed* Objectives for One Goal

## Goal

Restore the  
warmwater  
fishery

## Objectives

Reduce the amount of sediment by:

- Stabilizing eroding road-stream crossings
- Stabilizing eroding stream banks
- Restricting livestock from the stream

Reduce the amount of nutrients by:

- Restricting livestock from the stream
- Reducing fertilizer runoff from residential lawns

# Product

- Updated water quality summary stating the objectives for each of your watershed goals (designated & desired uses)

“The first project goal is to restore partial body contact recreation use by: (1) *excluding livestock from uncontrolled access and (2) reducing the amount of fertilizer runoff from residential lawns.*”

# Now what?

Decide how to achieve your objectives:

- Implement best management practices
- Modify existing projects, programs & ordinances
- Implement education and information activities
- **EVALUATE**

# Chapter 7

How Are Appropriate  
BMP's Identified?

# Objectives

Identify BMP's for each source or cause of pollution in the watershed

Combine BMP's into Systems

# What Is A BMP?

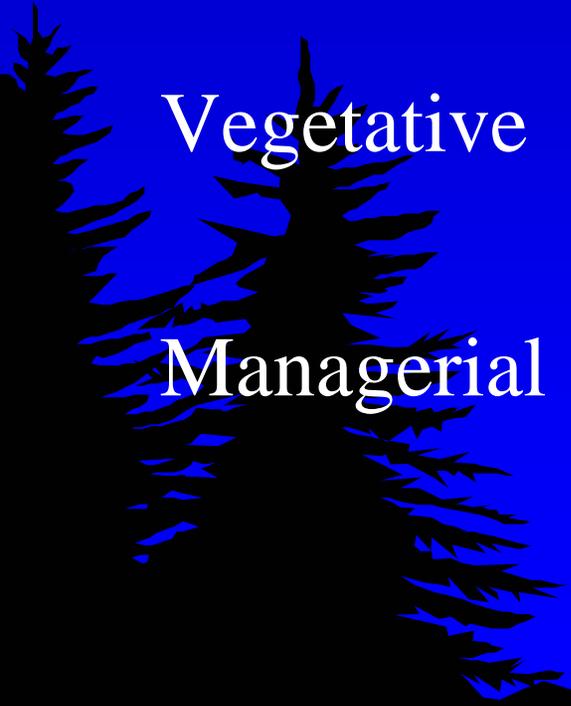
Best Management Practices (BMP) are measures and actions that interrupt the detachment, transport and delivery of pollutants. BMPs prevent or reduce pollution from nonpoint sources.

# Three Types of BMP's

Structural

Vegetative

Managerial



# Structural

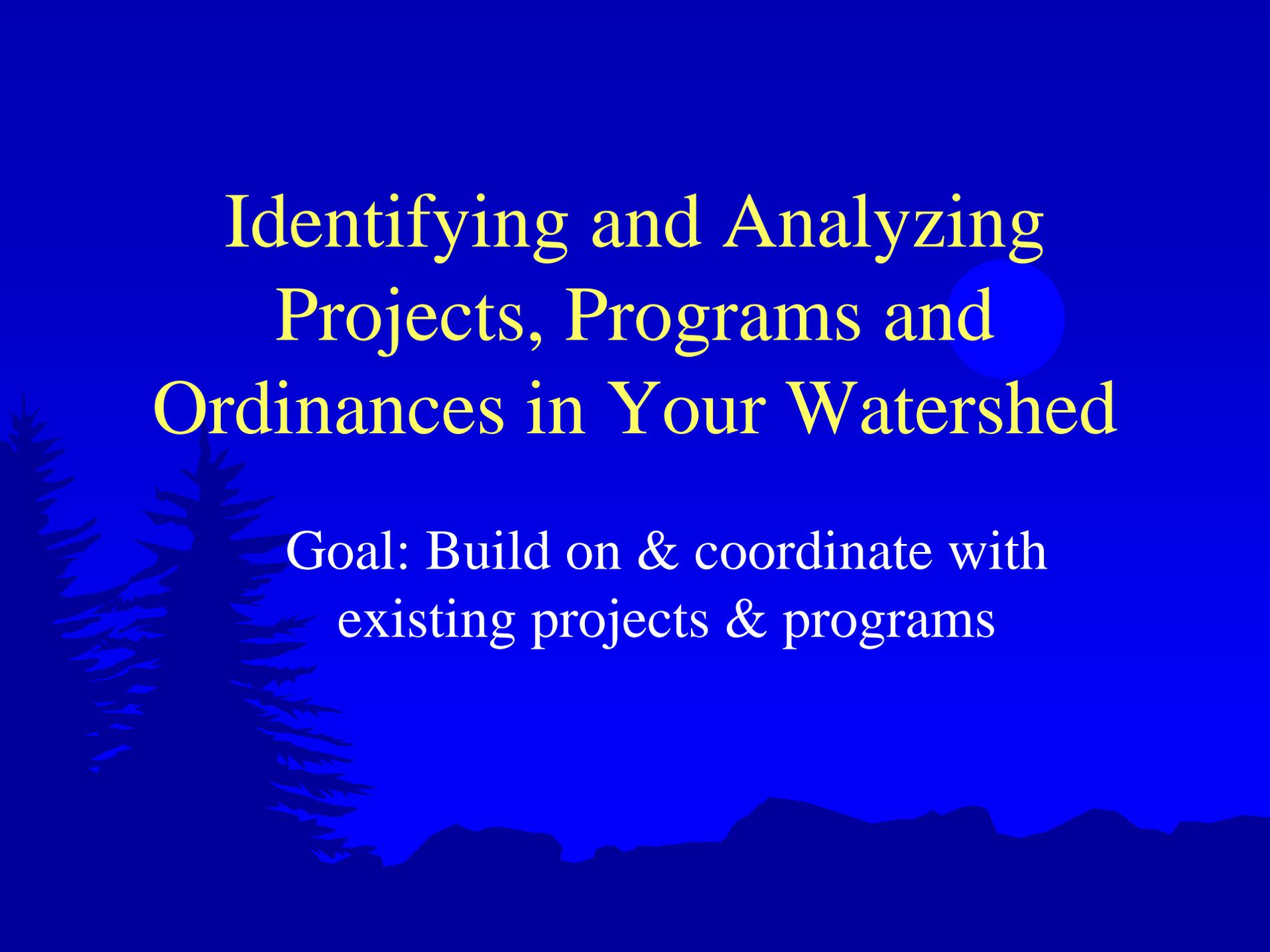


# Vegetative



# Managerial

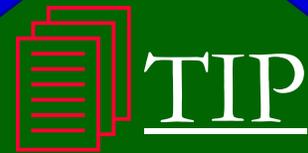




# Identifying and Analyzing Projects, Programs and Ordinances in Your Watershed

Goal: Build on & coordinate with  
existing projects & programs

# Identify the local programs, projects and ordinances that currently address water quality



Ask members of your steering & technical committees. Review newspaper archives for local initiatives. Speak with individuals who represent these initiatives.

# Are existing programs, projects & ordinances consistent with the goals of your watershed plan?

- Relate to the goals of the watershed?
- Effectively addressing water quality? If not, what needs to change?
- What partnerships exist? How well are they working?
- Opportunities for cooperation on new activities?

# *Example Watershed*

Priority pollutant: sediment

Priority source of sediment: road-stream crossing

Observations:

- Some culverts too short
- Some culverts too small
- Some BMPs not being maintained

# *Example Watershed*

## Programs, Projects & Ordinances to Research

Designated/ Desired  
Use

- Warmwater fishery;  
aquatic life/wildlife

Pollutant

- Sediment

Source

- Road-stream crossings

Objectives by Source

- Reduce sediment from  
road-stream crossings

Who to Contact

- Road Commission

Type of Info Needed

- Operational procedures  
and design criteria

# *Example Watershed*

## Programs, Projects & Ordinances to Research

Designated/ Desired  
Use

- Warmwater fishery; aquatic life/wildlife

Pollutant

- Hydrologic flow

Source

- Urban storm water

Objectives by Source

- Reduce flow fluctuations from urban storm water

Who to Contact

- Township, city & county planners & engineers

Type of Info Needed

- Ordinances or procedures addressing storm water

# *Example Watershed*

## Programs, Projects & Ordinances to Research

Designated/ Desired  
Use

- Recreation trail along  
the river

Pollutant

- ---

Source

- ---

Objectives by Source

- ---

Who to Contact

- Township, city &  
county

Type of Info Needed

- Program or process for  
establishing

# Identify opportunities to coordinate with or improve upon existing programs

- Define tasks for coordination/improvement
- Designate responsible individual/organization
- Develop milestones (intermediate accomplishments needed to reach objective)
- Timeline
- Estimate costs

# *Example Watershed*

## Goal: Protect Warmwater Fishery

Objective by  
source

- Reduce sediment from eroding road-stream crossings

Tasks

- Work with local road commissioner to change design criteria to accommodate current stream flows
- Explore methods for improving maintenance practices

Responsible  
Organization

- Lead agency and road commission

# *Example Watershed*

## Goal: Protect Warmwater Fishery

### Tasks

- Work with local road commissioner to change design criteria to accommodate current stream flows

### Milestones

- Set up committee of local engineers to evaluate existing design criteria (1st quarter)
- Recommend new design criteria to commission (2nd quarter)

### Estimated Costs

- \$2,500

# *Example Watershed*

## Goal: Protect Warmwater Fishery

### Tasks

- Explore methods for improving maintenance practices

### Milestones

- Review existing maintenance practices (2nd quarter)
- Meet with union to discuss alternative practices (2nd quarter)

### Estimated Costs

- \$500

# Products

A summary of:

- Existing local projects, programs and ordinances
- Modifications needed to meet the watershed goals

**CMI logo**



# Chapter 9

## Informing and Involving the Public



# Chapter Product

An information and education strategy for the watershed that involves the public and stakeholders



# Objectives

- Identify Target Audiences whose involvement will be needed to meet the goals and objectives of the watershed plan.
- Develop messages for target audiences.
- Select delivery mechanisms for disseminating the messages.
- Use this information to develop an information/education strategy for the watershed

# What is an Information and Education Strategy?

An information and education strategy is a comprehensive plan that is designed to educate the public and motivate them to take action.

It is a coordinated plan that is tailored to the specific water quality concerns and people within the watershed

# What is an Information and Education Strategy?

An information and education strategy is a comprehensive plan that is designed to educate the public and motivate them to take action.

It is a coordinated plan that is tailored to the specific water quality concerns and people within the watershed

# Examples of Watershed Target Audiences

Sources	Target Audiences	Specific Target Audiences	Priority
Septic systems	Homeowners	Riparian homeowners with septic systems, homeowners who live in areas with sandy (vulnerable soils)	4
Residential fertilizer use	Homeowners	All non-agricultural homeowners in the critical area who use fertilizers or commercial lawn care companies	3
Livestock in stream	Agricultural landowners	Riparian agricultural landowners who own livestock	2
Storm drains	Homeowners	Urban residents, individuals who change oil in their cars	5
Eroding stream banks	Recreational groups	Canoeists, canoe livery owners, anglers	1

# Specific Messages for Target Audiences

Messages should answer the following:

“What is the Water Quality Problem?”

“How does it affect me?”

“Why should I care?”

“What can I do?”

# Delivering the Message to the Target Audience

## Delivery Mechanisms:

- One on one contacts
- Presentations to targeted groups
- Press releases and news articles in local papers
- Public service announcements or programs on local cable TV



# Delivering the Message

## Some Pointers from Experience:

- Create an I/E Subcommittee
- Keep the message simple and straightforward
- Use graphics and photos to illustrate
- Events in the watershed give a sense of ownership
- Communicate and build partnerships
- Be visible in the watershed, partner meetings, and media
- Create a logo for the watershed and use it on everything

# I/E Strategy Table

Pollutant	Source/Cause	Target Audience	Messages	Delivery Mechanisms	Potential Evaluation Method
Sediment	Stream bank erosion & Human access	Anglers, Canoeists	Protect your river; use stairs rather than the stream bank	Involve local angler groups and canoe liveries in stream bank stabilization activities; feature activities in local media; post signs at stabilized sites; display posters at local bait shops and canoe liveries	Track the number of groups and individuals participating; conduct focus group session with local livery owners

# I/E Tasks Table

Delivery Mechanism	Tasks	Responsible Organization	Milestones	Timeline	Estimated Costs
Involve local angler groups and canoe liveries in stream bank stabilization activities	Meet with local Trout Unlimited chapter to share project information and discuss how to involve their group	Livery owner on steering committee	Set meeting date; provide written project ideas following the meeting	1 <sup>st</sup> quarter	\$100
	Meet with local canoe liveries to share project information and discuss ways to educate canoeists		Set up one-on-one meetings; develop plan for coordinated education campaign	1 <sup>st</sup> quarter 2 <sup>nd</sup> quarter	\$200

# An Approvable Watershed Plan

Should include an I/E Strategy and a summary of the public participation process used in developing the plan. It should show the opportunity for public comment and how the partners were involved in developing the watershed plan.



# CHAPTER 10

## Developing an Evaluation Process



# Objectives

- Understand why evaluation is important



# Objectives

- Understand why evaluation is important
- Understand methods for evaluation



# Objectives

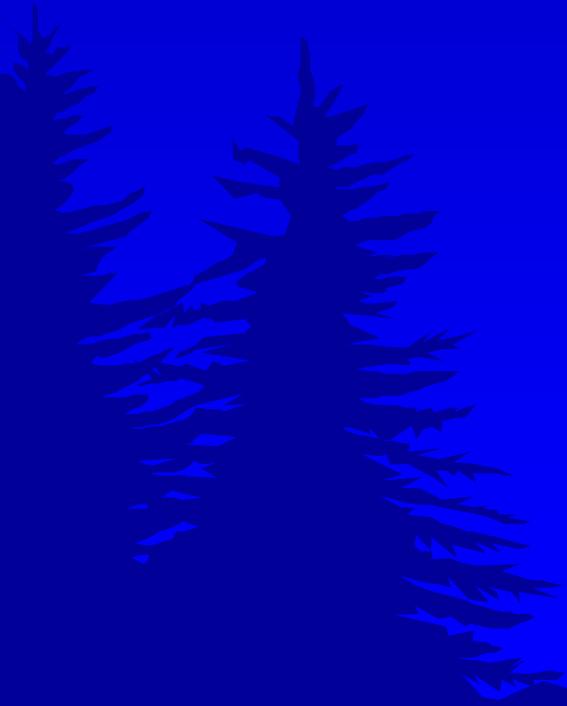
- Understand why evaluation is important
- Understand methods for evaluation
- Select an evaluation method or methods for your watershed

# Why is an evaluation important?

- Tells you whether or not your efforts are successful
- Provides a feedback loop for improvement

# An Evaluation can show

- Changes in knowledge or awareness



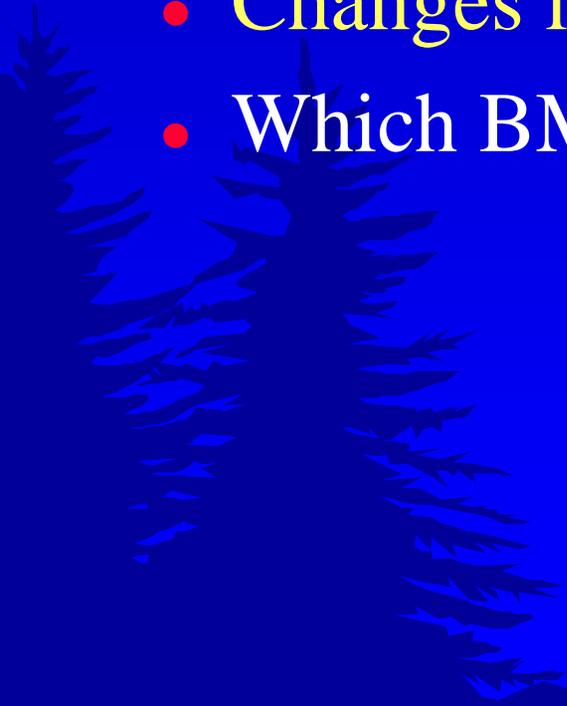
# An Evaluation can show

- Changes in knowledge or awareness
- Changes in attitudes or behavior



# An Evaluation can show

- Changes in knowledge or awareness
- Changes in attitudes or behavior
- Which BMPs were adopted or not



# An Evaluation can show

- Changes in knowledge or awareness
- Changes in attitudes or behavior
- Which BMPs were adopted or not
- Changes in condition of the watershed

# An Evaluation can show

- Changes in knowledge or awareness
- Changes in attitudes or behavior
- Which BMPs were adopted or not
- Changes in condition of the watershed
- Improvements in water quality

# Select an evaluation method that is right for your watershed

- For each objective or task ask: “How can I measure effectiveness?”
- Select an evaluation method that performs the desired measurement.

# Methods Available

## Method

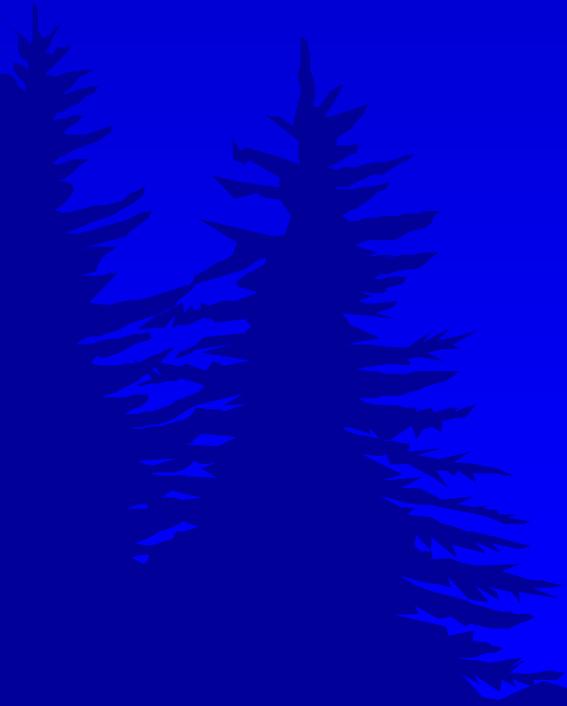
## Measures

## Pros/Cons

- Surveys

- Attitudes, beliefs, behaviors

- \$\$, easy, long-term (3-5 yrs.)



# Methods Available

## Method

## Measures

## Pros/Cons

- |                                                               |                                                                                 |                                                                                    |
|---------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Surveys</li></ul>     | <ul style="list-style-type: none"><li>• Attitudes, beliefs, behaviors</li></ul> | <ul style="list-style-type: none"><li>• \$\$, easy, long-term (3-5 yrs.)</li></ul> |
| <ul style="list-style-type: none"><li>• Focus Group</li></ul> | <ul style="list-style-type: none"><li>• Perceptions, opinions</li></ul>         | <ul style="list-style-type: none"><li>• \$\$, fast</li></ul>                       |

# Methods Available

<u>Method</u>	<u>Measures</u>	<u>Pros/Cons</u>
• Surveys	• Attitudes, beliefs, behaviors	• \$\$, easy, long-term (3-5 yrs.)
• Focus Group	• Perceptions, opinions	• \$\$, fast
• Interviews	• Attitudes, beliefs	• takes time

# Methods Available

<u>Method</u>	<u>Measures</u>	<u>Pros/Cons</u>
• Surveys	• Attitudes, beliefs, behaviors	• \$\$, easy, long-term (3-5 yrs.)
• Focus Group	• Perceptions, opinions	• \$\$, fast
• Interviews	• Attitudes, beliefs	• takes time
• Photographs	• Before & after conditions	• \$\$, easy to implement

# Methods Available

<u>Method</u>	<u>Measures</u>	<u>Pros/Cons</u>
• Surveys	• Attitudes, beliefs, behaviors	• \$\$, easy, long-term (3-5 yrs.)
• Focus Group	• Perceptions, opinions	• \$\$, fast
• Interviews	• Attitudes, beliefs	• takes time
• Photographs	• Before & after conditions	• \$\$, easy to implement
• Calculations/ models	• Physical outcomes	• \$\$, easy to implement

# Methods Available

<u>Method</u>	<u>Measures</u>	<u>Pros/Cons</u>
• Surveys	• Attitudes, beliefs, behaviors	• \$\$, easy, long-term (3-5 yrs.)
• Focus Group	• Perceptions, opinions	• \$\$, fast
• Interviews	• Attitudes, beliefs	• takes time
• Photographs	• Before & after conditions	• \$\$, easy to implement
• Calculations/ models	• Physical outcomes	• \$\$, easy to implement
• Monitoring	• Environmental impacts	• \$\$\$, long-term (7-10 years)

# When do you conduct the evaluation?

- During implementation to provide feedback
- After project activities to measure project effectiveness



## TIP

As a minimum, include a mid-course or annual evaluation so that you can modify the plan to assure that goals are achieved.

# Plan for the evaluation

- Collect baseline information if you will make comparisons
- Make arrangements to collect data effectively

# Who should conduct the evaluation?

- Steering committee
- Outside assistance for complicated methods

# Product

- A description of the process that will be used to evaluate the effectiveness of implementing the plan and achieving its goals.



# Chapter 11

## Assembling Your Watershed Plan



# Objectives

- Add any missing tasks
- Refine the water quality summary
- Assemble the plan



# Missing Tasks

To complete your watershed plan add the following tasks, as appropriate for your watershed:

- Tasks for verifying any remaining suspect pollutants, sources, and causes (see Chapter 4)
- Tasks for achieving desired use goals
- Tasks related to project coordination and administration

Add tasks needed to institutionalize watershed protection



# *Example Watershed Final Water Quality Summary*

The Example Watershed waterbody has three designated uses that are impaired: (1) partial body contact recreation, (2) aquatic life/wildlife, and (3) warmwater fishery. The designated use public water supply is threatened.

## Project Goals

Restore the partial body contact recreation use by: 1) excluding 75% of the livestock from uncontrolled access, 2) instituting a residential nutrient lawn care program that properly manages fertilizer application and reduces the total amount of fertilizer used by 25%.

## ***Recreation:***

The designated use of partial body contact recreation is impaired due to undesirable algal blooms and *E. coli* levels. The sources of nutrients include 1) livestock in the stream, 2) residential fertilizer, and 3) possibly failing septic systems. The sources of *E. coli* bacteria include: 1) livestock in the stream, and possibly 2) failing septic systems.

There are 42 livestock operations in the watershed, but only 17 are located within the critical area. Of those, 12 livestock operations allow uncontrolled access to the waterbody. These are significant sources of both *E. coli* bacteria and nutrients.

# *Example Watershed Final Water Quality Summary*

The Example Watershed waterbody has three designated uses that are impaired: (1) partial body contact recreation, (2) aquatic life/wildlife, and (3) warmwater fishery. The designated use public water supply is threatened.

# *Example Watershed Final Water Quality Summary*

## Project Goals

Restore the partial body contact recreation use by: 1) excluding 75% of the livestock from uncontrolled access, 2) instituting a residential nutrient lawn care program that properly manages fertilizer application and reduces the total amount of fertilizer used by 25%.

# *Example Watershed Final Water Quality Summary*

## *Recreation:*

The designated use of partial body contact recreation is impaired due to undesirable algal blooms and *E. coli* levels. The sources of nutrients include 1) livestock in the stream, 2) residential fertilizer, and 3) possibly failing septic systems. The sources of *E. coli* bacteria include: 1) livestock in the stream, and possibly 2) failing septic systems.

# *Example Watershed Final Water Quality Summary*

There are 42 livestock operations in the watershed, but only 17 are located within the critical area. Of those, 12 livestock operations allow uncontrolled access to the waterbody. These are significant sources of both *E. coli* bacteria and nutrients.

# Assemble the Plan Document

- Provides the “Big Picture” of the watershed
- Describes action-oriented tasks to address water quality in the watershed

# Chapter Product

The Watershed Management Plan document,  
including the Final Water Quality Summary



# Approved



# Watershed

## Plans

Must be detailed, current and include:

- Geographic scope of the watershed
- Designated uses and desired uses
- Water quality threats and/or impairments
- The pollutants causing the impairments or threats

# Approved



# Watershed

## Plans

- The sources of pollutants and those that are critical to address
- A clear statement of the water quality goals
- The tasks needed, estimated costs, and timeline
- A summary of the public participation process
- An evaluation component