Protect
Restore
Enhance
WATERSHED MANAGEMENT PROGRAM
Linking Land, Water, and People

Illinois Environmental Protection Agency
Bureau of Water
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GUIDANCE FOR DEVELOPING WATERSHED IMPLEMENTATION PLANS IN ILLINOIS

Developed by the Illinois Environmental Protection Agency
to Assist Illinois' Citizens in the Development of Comprehensive Watershed Implementation Plans
for Attainment of the Designated Uses of Illinois' Waterbodies

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ACKNOWLEDGMENT

The principal author of this guidance document was Gary K. Eicken of the Water Quality Management/Nonpoint Source Unit within the Bureau of Water's Division of Water Pollution Control of the Illinois Environmental Protection Agency. Technical assistance and review was provided by Joel Cross, Richard Mollahan, Gregg Good, Rick Cobb, and David McMillan.

Review and technical support was also provided by the members of the Natural Resources Coordinating Council's Watershed Management Committee.

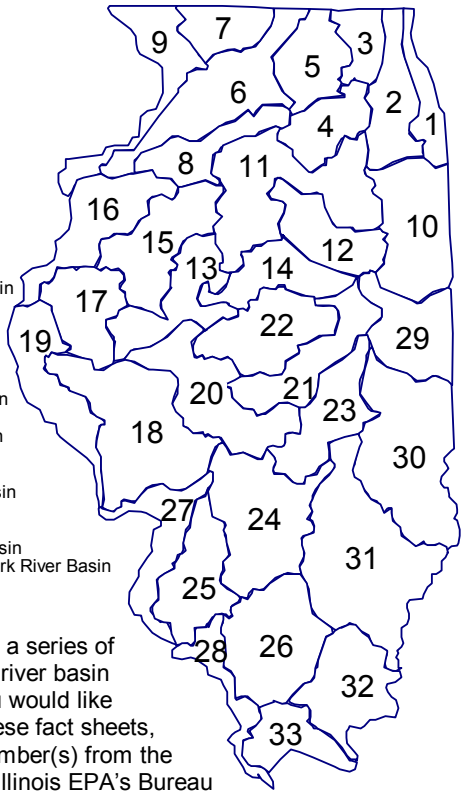
PURPOSE

The purpose of this Watershed Implementation Plan (WIP) "Guidance Document" is to provide local watershed planning groups with a tool to assist them in the development of a comprehensive watershed implementation plan for their watershed. It provides local watershed planning groups with specific information to be included in a WIP, as well as a format for all interested organizations to follow in order to achieve consistency among WIPs developed throughout the state.

The end result of any watershed planning process is the creation of a WIP which identifies all of the resources, identifies the sources and causes of pollutants, and specifies the implementation strategies for protection/restoration for a specific watershed. It will address water quality issues for the purpose of achieving attainment of a waterbody's designated use.

Illinois River Basins

1. Great Lakes/Calumet River Basin
2. Des Plaines River Basin
3. Upper Fox River Basin
4 Lower Fox River Basin
5. Kishwaukee River Basin
6. Rock River Basin
7. Pecatonica River Basin
8. Green River Basin
9. Mississippi North River Basin
10. Kankakee/Iroquois River Basin
11. Upper Illinois/Mazon River Basin
12. Vermilion (Illinois) River Basin
13. Middle Illinois River Basin
14. Mackinaw River Basin
15. Spoon River Basin
16. Mississippi North Central River Basin
17. La Moine River Basin
18. Lower Illinois/Macoupin River Basin
19. Mississippi Central River Basin
20. Lower Sangamon River Basin
21. Upper Sangamon River Basin
22. Salt Creek of Sangamon River Basin
23. Upper Kaskaskia River Basin
24. Middle Kaskaskia/Shoal River Basin
25. Lower Kaskaskia River Basin
26. Big Muddy River Basin
27. Mississippi South Central River Basin
28. Mississippi South River Basin
29. Vermilion (Wabash) River Basin
30. Embarras/Middle Wabash River Basin
31. Little and Lower Wabash/ Skillet Fork River Basin
32. Saline River/Bay Creek River Basin
33. Cache River Basin



The Illinois EPA has created a series of 33 fact sheets, one for each river basin in the State of Illinois. If you would like to receive one or more of these fact sheets, indicate the name(s) and number(s) from the attached map. Contact the Illinois EPA's Bureau of Water, Planning Section at 217/782-3362. they can also be found on the Illinois EPA's homepage at: www.epa.state.il.us/water/water-quality/

INTRODUCTION

A Watershed Approach

In recent years, there has been an increased awareness among natural resource managers regarding the interdependence of natural systems. As a result, a more comprehensive approach to resource management is emerging, using watersheds as the basic management unit. Watershed planning must look holistically at the range of issues that affect a given watershed, taking into account that most watersheds are not experiencing a single problem but are faced with an array of interrelated problems. To be comprehensive, watershed planning must take into consideration all environmental concerns including: needs to protect public health (including drinking water); critical habitats; biological integrity; land use; and ground and surface waters.

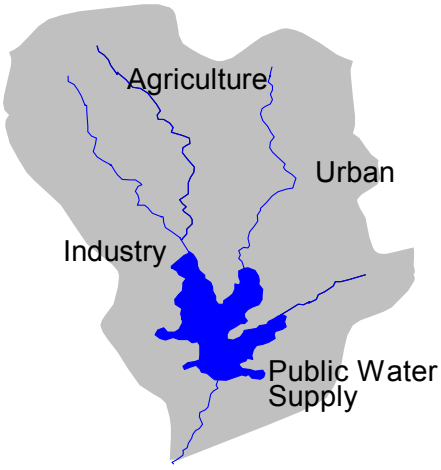
The premise of the watershed approach has is many water quality and ecosystem problems are best solved at the watershed level rather than at the individual waterbody or discharger level. The Illinois Environmental Protection Agency (Illinois EPA) believes the local people within a watershed should take the leadership in developing their own Watershed Implementation Plans (WIP). The Illinois EPA and other natural resource agencies will provide local entities with technical assistance for their planning and implementation efforts.

The objective of a watershed approach and this guidance document is the development of WIPs which: integrate water pollution control and drinking water issues; integrate regulatory and non-regulatory programs; and address surface and ground water resource issues. A watershed approach also creates a holistic process to effectively and efficiently protect, enhance, and restore the physical, chemical, and biological integrity of water resources within a defined hydrologic area.

What is a Watershed?

A watershed is all the area above and below the surface of the landscape that drains into a body of water such as a lake, river, stream, groundwater or wetlands (Figure 1).

Figure 1
Watershed

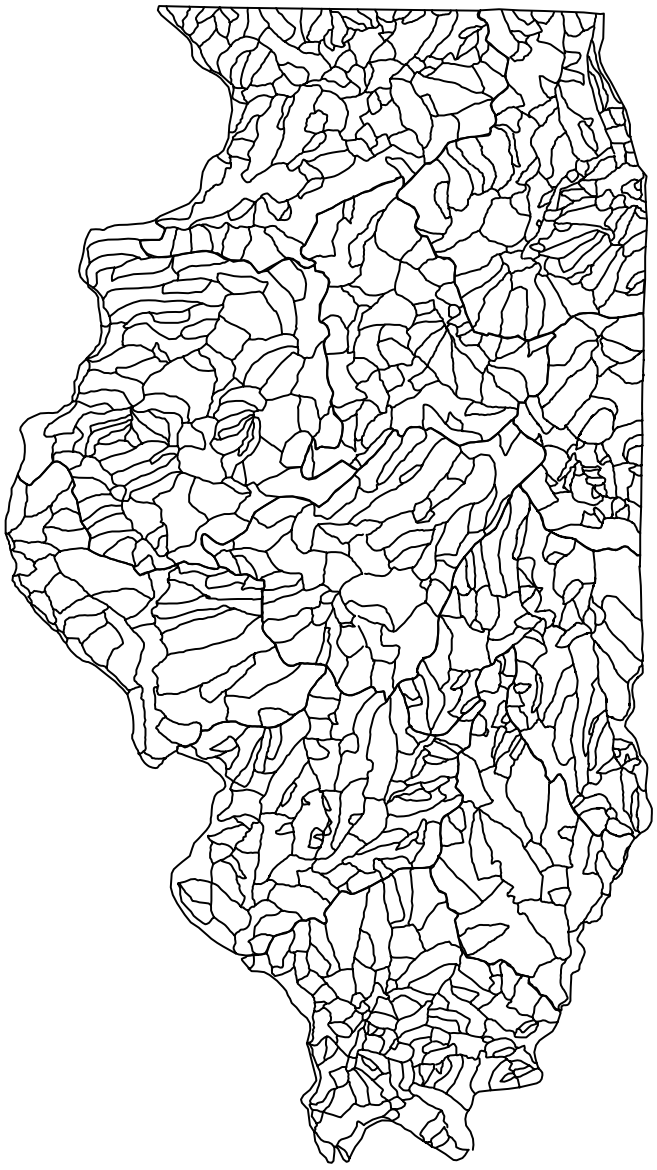


Activities in a watershed have a direct influence on the quality of the water resources and their designated use. What you and others do on the land affects the quality and quantity of the water and natural resources within a watershed. Understanding what a watershed is and the particular components of a watershed are the first

steps in protecting the water and other natural resources. Watershed management can help with the use, protection, and restoration of natural resources, while allowing for sustainable economic growth and development.

The Illinois EPA has delineated the state into 820 watersheds for planning and data management purposes (Figure 2). Approximately 91 percent of the watersheds consist in size of less than 100,000 acres or 156 square miles. Nearly 71 percent (579) of the watersheds are under 50,000 acres or 78 square miles in size. Planning and implementation for watersheds 50,000 acres or less in size is recommended. Many agencies are available to assist a planning committee in subdividing watersheds into manageable units that will lead to a successful planning and implementation effort.

Figure 2
Illinois EPA
Delineated Watersheds

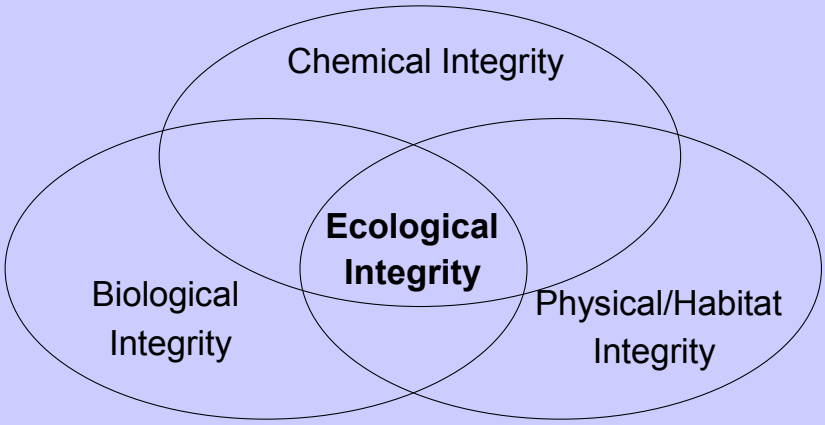


What is Water Quality?

Water quality is the physical, chemical, and biological integrity of our water resources. To address water quality issues, the planning committee must look at all three of these factors.
Water quality is a reflection of the natural and human influences within a watershed.
The relationship of each of these factors and the natural and human influences within the watershed must be established in order to develop strategies that comprehensively address all issues rather than a single issue. A watershed implementation plan must present a broad view so that ecological integrity is

attained (Figure 3). This can only be accomplished by addressing the physical, chemical, and biological/habitat integrity simultaneously.

Figure 3



Elements of Ecological Integrity in Aquatic Systems
(adapted from U.S. EPA, Watershed Protection: A Project Focus
EPA 841-R-95-003, August 1995)

Water Quality Standards

A water quality standard defines the water quality goals for a specific waterbody and serves as the endpoint for establishing water quality based control strategies for controlling point and nonpoint sources of pollution. States have the responsibility for setting water quality standards for purposes of:

⇒ protecting public health and welfare
⇒ restoring and maintaining the chemical, physical and biological integrity of water resources
⇒ providing for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water
⇒ considering the use and values of waters for public water supplies, agriculture, industrial and other purposes

The Federal Clean Water Act (CWA) establishes the statutory basis for the water quality standards program. It further requires states to review and revise water quality standards as needed every three years.

Designated uses are those uses specified in water quality standards for each waterbody or waterbody segment, whether or not they are being attained. In designating uses for a waterbody, a state takes into consideration the use and value of the waterbody for public water supply, for propagation of fish, shellfish, and wildlife, and for recreational, agricultural, industrial, and navigational purposes. The Illinois Pollution Control Board (IPCB) has classified waterbodies for a variety of designated uses that include: General Use, Public and Food Processing Water Supplies, Secondary Contact and Indigenous Aquatic Life Use.

Where specific numerical water quality standards of state criteria are absent, protection of designated uses is based on narrative standards. Such narrative standards are statements that describe the desired water quality goal. The IPCB narrative standard for toxic substance control sets forth procedures to derive water quality criteria for protection of aquatic life, human health and wildlife. To ensure that narrative toxics are attained, states develop implementation procedures addressing all mechanisms used in their attainment. In addition to a narrative standard for toxics, Illinois also has a general narrative for offensive conditions that states: "Waters of the state shall be free from sludge or bottom deposits, floating debris, visible oil, odor, plant and algae growth, color or turbidity of other than natural origin."

Numeric standards for aquatic life have now been developed to protect for both short (acute) and long term (chronic) adverse effects. Older, single number values persist in the IPCB's regulations where newer two number criteria have not yet been developed or where other considerations such as protection of agriculture or aesthetics are a part of the reason for having the standards. Unlike the narrative standard which covers a multitude of toxic substances with a general prohibition statement and a derivation procedure to obtain a numeric criterion, the numeric standards are simply concentrations not to be exceeded in the waters of the state.

Both numeric and narrative standards apply in all waters and portions of waters covered by the use designation unless a mixing zone has been granted by the Illinois EPA in a National Pollutant Discharge Elimination System (NPDES) permit. Mixing zones are small areas in a waterbody that allow for effluent to be diluted down to standards by the upstream water. A stringent set of IPCB regulations dictates the conditions under which mixing zones may be allowed. The foremost of these is that treatment facilities must provide the best degree of treatment technically feasible and economically reasonable before mixing is considered. Ecological restrictions in the mixing regulations prevent harm to the receiving stream due to mixing zones. Mixing is based on the seven day average low stream flow recurring once every 10 years. This is a conservative low stream flow that ensures that NPDES permit limits recognizing mixing take into consideration a drought stream flow when allocating the dilution allowance.

Since the creation of the CWA, water quality standards have played an ever increasing role in controlling water pollution. As water pollution control programs move toward a watershed approach (where traditional point source programs and nonpoint program activities are integrated), water quality standards will need to be expanded to identify the water quality goals within the watershed. This will include the development of biological standards (biocriteria), and wetland criteria to supplement existing chemical specific water quality standards.

Biological Stream Characterization (BSC)

The Biological Stream Characterization (BSC) is a stream classification system developed by the BSC Work Group, composed of biologists from the Illinois EPA, Illinois Department of Natural Resources (IDNR), and the Illinois Natural History Survey (INHS). The BSC Work Group develop a five tier stream classification system in 1984, predicated largely on the attributes of lotic fish communities as measured by the Index of Biotic Integrity (IBI). In the absence of adequate fishery data or information, aquatic macroinvertebrate data may be used to develop stream ratings for "Class C, D, or E" streams. In addition to providing a

state stream classification system, BSC ratings are used for Nondegradation Evaluations, and IBI values developed in conjunction with BSC ratings are used for aquatic life use attainment assessments.

IBI criteria for the five BSC categories which range from Unique Aquatic Resource streams (Class A), to Restricted Aquatic Resource streams (Class E) are presented in Table 1. A detailed report titled "Biological Stream Characterization (BSC): A Biological Assessment of Illinois Stream Quality" (Hite and Bertrand 1989) describes this stream classification system and the ratings through 1989. BSC ratings for Illinois streams have recently been updated through 1993 and a new BSC map and report documenting the updated BSC ratings was published in 1996.

Table 1
Summary of Use Support Assessment Criteria For Illinois Streams

U.S. EPA	Full Support		Partial Support Minor	Partial Support Moderate	Non-Support
GENERAL DESCRIPTION	Good	Good	Fair	Fair	Poor
IEPA/IDNR BIOLOGICAL Stream Characterization (BSC)	Unique Aquatic Resource	Highly Valued Resource	Moderate Aquatic Resource	Limited Aquatic Resource	Restricted Aquatic Resource
FISH/Index of Biotic Integrity (IBI/AIBI)	51-60	41-50	31-40	21-30	<20
BENTHOS/Macroinvertebrate Biotic Index (MBI)	<5.0	5.0 - 5.9	6.0 - 7.5	7.6 - 8.9	>8.9
STREAM Potential Index of HABITAT/Biotic Integrity (PIBI)	51-60	41-50	31-40	<31	
STREAM IEPA Stream Sediment	Nonelevated	Nonelevated -Slightly Elevated	Slightly Elevated	Elevated -Highly Elevated	Extreme

Illinois Water Quality Report [305(b)]

This report is prepared by the Illinois EPA and provides an assessment of the water quality conditions of the state's surface and groundwater resources. It is prepared to satisfy reporting requirements under Section 305(b) of the Federal Clean Water Act. In addition to characterizing statewide water quality conditions, the summary report is supplemented with watershed specific fact sheets addressing general water quality conditions on a more local level. The information found in this report is very beneficial to planning and technical committees for determining preventative or restorative actions when developing a Watershed Implementation Plan.

The Illinois EPA has maintained an effective and efficient surface water monitoring and assessment program since its inception in 1970. Adjustments and additions to the monitoring effort have been undertaken to keep pace with technological advances and broadening environmental concerns. Monitoring activities focus on water and sediment chemistry as well as on physiological and biological data (aquatic invertebrates, fisheries, and habitat). A comprehensive surface water monitoring strategy outlines monitoring programs, quality-assurance activities, laboratory-support needs, and data-management procedures. As a result of these monitoring and assessment programs, data from over 4,000 stations have been utilized in the assessment of surface water quality conditions. In addition, volunteer citizen monitoring data from 300 lakes collected by 600 volunteers as part of Illinois EPA's Volunteer Lake Monitoring Program (VLMP) were incorporated into these water quality assessments.

What is a Watershed Implementation Plan (WIP)?

A Watershed Implementation Plan is the final product of the watershed planning process. It should be developed to address water quality issues for the purpose of attaining a waterbody's designated use. In order to achieve this, a WIP must identify the potential problems and/or existing problems within a watershed and establish appropriate implementation strategies that will prevent potential problems and/or solve existing problems. A WIP will also need to describe how water quality standards will be attained and the methods to be used to show water quality improvement due to the watershed practices implemented. Utilizing a comprehensive and holistic approach means that point and nonpoint sources are addressed for both ground and surface water resources.

Once the watershed community decides to become involved in the process of watershed planning, the success of the initiative will be based not only on the level of commitment to the effort, but also on the process used to achieved the desired goals. It is recommended that any group beginning the planning process seek the assistance of the USDA Natural Resources Conservation Service (NRCS) and the *Resource Planning Process* they have developed. The result of any planning process should be a comprehensive WIP which follows the format of, and contains the information found in the "Components Of A Watershed Implementation Plan" in this Guidance Document.

Watershed Planning Doesn't Happen Overnight

It is important to understand that watershed planning is a demanding and time consuming process when conducted properly. Factors such as size of the watershed, amount of public participation, availability of information, dedication of the planning committee, educational and informational efforts, and resources available to the planning committee all play a role in the time needed to complete a plan. Once the planning process has been completed, implementation may take many years depending on such things as the weather, funding availability, stakeholder participation, size of watershed, and/or type and number of Best Management Practices (BMPs) to be installed.

For Planning, Does the Size of the Watershed Matter?

The size of the watershed for which a WIP will be developed is up to the discretion of the planning committee. But keep in mind that the larger the watershed, the more monumental and difficult the task. There will be more interest groups involved, more issues to address, and more hidden agendas which may make consensus harder to achieve. While planning may and can be accomplished on a large scale (more than 100,000 acres, or 156 square miles), the level of detailed information needed for a comprehensive plan will most likely be lacking. It is also imperative to understand that implementation on a large scale will be a monumental and time consuming effort, both physically and financially, and that demonstrating water quality improvements will be greatly reduced, if not impossible.

A planning committee may and can choose to conduct its planning efforts on a large watershed. Should this be the planning committee's decision, once the plan has been developed, it is recommended that the large watershed then be delineated into subwatersheds for the purpose of obtaining the detailed information needed for a comprehensive Watershed Resource Inventory (WRI). Once subwatershed planning has been conducted, implementation strategies may be developed which are specific for that subwatershed. Subwatershed plans should then be reviewed in relationship to the overall goals of the larger watershed. Planning on the subwatershed level provides the advantage of pin-pointing potential or existing problem(s), or problem areas that may be overlooked when planning on a larger scale. It will also make for a more implementable project which can demonstrate success. As previously stated, it is recommended that planning efforts be initiated on a watershed scale of 50,000 acres (78 sq. mi.) or less.

A Watershed Implementation Plan Must be Comprehensive

Comprehensive watershed planning looks at the multitude of issues, and designs Resource Management Systems (RMS) (a combination of cultural and mechanical practices) that will address multiple issues. Single issue planning and implementation (i.e., just sedimentation or flooding) may solve one problem in a watershed, but does not necessarily achieve holistic protection and/or restoration of all the watershed's resource concerns. By planning for multiple issues, BMPs which address more than one issue can be installed, eliminating the watershed community's need to return at a later date to solve another problem that single issue planning did not initially address. A comprehensive

plan addressing water quality issues for the attainment of designated uses must address the physical, chemical, and biological integrity of the water resource(s).

Why Follow This Guidance Document?

A WIP developed following the format found in this guidance document will provide the planning committee with a plan containing: a comprehensive WRI of natural and human resources in the watershed; a list of goals and objectives; specific implementation strategies which identify best management practices with a description of how these BMPs will protect and/or restore the resources identified, including a timetable for completion; an itemized cost summary (budget); and methods for measuring progress/success.

Utilizing this methodology will result in a plan which includes all of the information needed to meet the initiatives of all the state's natural resource agencies and therefore can be utilized to pursue financial resources from several sources, be it local, state, or federal.

This guidance document provides a format and lists the components to be included in a WIP.

Coordination at the State Level

The Natural Resources Coordinating Council (NRCC) was established by Governor Jim Edgar for the purpose of program coordination among the state's natural resource agencies (Illinois EPA, Illinois Department of Agriculture (IDOA), Illinois Department of Natural Resources(IDNR), Illinois Pollution Control Board (IPCB), Illinois Department of Public Health (IDPH), Illinois Department of Commerce and Community Affairs (DCCA)). Under the authority of the NRCC, the Watershed Management Committee was created to serve a liaison function to assist in the coordination of federal and local involvement in watershed management activities, and to coordinate watershed-based activities among the various state natural resource agencies.

The Watershed Management Committee of the NRCC has established coordination issues for which action items have been developed for watershed management in Illinois. This coordination effort has identified watershed priorities between the state agencies, established the watershed delineations for Illinois, identifies the lead agency for the various issues involved in comprehensive watershed planning, and has established a mechanism for the review and endorsement of WIPs.

Watershed Implementation Plan Acceptance Process

The Illinois Environmental Protection Act of 1970 (ACT) established a unified statewide program for environmental protection and assigned authority to implement purposes of the Act to three entities. A seven-member Pollution Control Board (IPCB) was assigned the responsibility of establishing the basic regulations and standards necessary for the preservation of the environment. The Act also created and established the Illinois EPA as the principal state agency for the implementation of environmental programs. This includes activities such as monitoring, planning, permitting, financial assistance administration, compliance assurance, and program management conducted to prevent, control and abate water pollution in Illinois.

The Illinois EPA is responsible for the maintenance and updating of the State Water Quality Management Plan that identifies the state's goals and objectives pertaining to activities resulting in degraded water quality. The General Assembly designated the Illinois EPA as the state water pollution control Agency for all purposes of the Federal Clean Water Act. Recently incorporated within the Illinois Water Quality Management Plan, the Illinois EPA has implemented a Watershed Management Program to effectively protect and restore natural resources.

The objective of Illinois EPA's Watershed Management Program is to: "develop an integrated, holistic process to effectively and efficiently protect, enhance and restore the physical, chemical, and biological integrity of our water resources within a defined hydrologic area (watershed)." This comprehensive approach will focus on the total spectrum of water resource issues. The Illinois EPA has restructured its program activities utilizing a priority watershed management approach. This restructuring includes both surface water programs and those groundwater activities that are related to public water supply requirements. The Act further established the Illinois Institute for Environmental Quality as the research and education arm of the state's environmental protection apparatus. These responsibilities were assumed by the Department of Energy and Natural Resources, which as of July 1, 1995, is part of the newly formed Illinois Department of Natural Resources.

Because of these authorities given Illinois EPA, it is the Agency's responsibility to review and provide endorsement of watershed plans developed to address water quality issues. This "guidance document" was created to help local watershed planners meet this water quality objective.

Section 4(m) of the Illinois Environmental Protection Act provides Illinois EPA with the authority to "engage in planning processes and activities and to develop plans in cooperation with units of local government, state agencies and officers, and other appropriate persons in connection with the jurisdiction or duties of each such unit, agency, officer or person." Pursuant to this authority, Illinois EPA will review watershed implementation plans for water quality issues. Plans will also be reviewed by the Watershed Management Committee of the NRCC. Each natural resource agency will be responsible for reviewing the plan for the endorsement of issues over which they have delegated authority. Through this process, the multitude of issues in a WIP may be addressed by the appropriate agency with respect to expertise and resources (staff and funding).

COMPONENTS OF A WATERSHED IMPLEMENTATION PLAN (WIP)

The format and information requested in the "Components" on the following pages are provided to assist local watershed planning committees in the development of a WIP. This framework was established to provide the planning committee with what components should be in a WIP, and what information should be included in each component. A comprehensive WIP will contain the following:

⇒ **Component #1** -- *A Mission Statement to keep the planning committee focused.*

⇒ **Component #2** -- *A narrative which provides a description of the watershed.*

⇒ **Component #3** -- *A listing of other protection/restoration, educational/informational, and program activities previously conducted, or currently ongoing in the watershed.*

⇒ **Component #4** -- *A comprehensive Watershed Resource Inventory (WRI).*

⇒ **Component #5** -- *A Problem Statement describing the problems and the specific waterbody(ies) affected.*

⇒ **Component #6** -- *A list of Goals and Objectives based on the problems identified from the WRI.*

⇒ **Component #7** -- *Implementation Strategies to meet the goals and objectives identified.*

⇒ **Component #8** -- *A detailed Cost Summary.*

⇒ **Component #9** -- *Implementation Strategy Selection*

⇒ **Component #10** -- *Identification of methods to be used to document progress towards achieving the Goals and Objectives identified.*

Map Preparations Tips

Maps are an important resource for describing a watershed. A map, or set of maps that overlay, can clearly illustrate how a variety of features interrelate. A detailed map of the watershed may illustrate features such as: administrative boundaries; road network; the principal stream and its tributaries; lakes, ponds, and reservoirs; locations of major wastewater dischargers and other potential pollutant sources; storm drainage networks; land use; topography; and natural features.

Computer mapping systems should also be investigated. In geographic information systems (GIS), various types of data can be formed into map layers, enabling evaluation of different issues. Gather and/or develop as many maps as possible during the planning process and incorporate them into the Watershed Implementation Plan. Maps will not only assist the planning committee in their efforts, but are very useful to anyone reviewing the plan for potential funding.

COMPONENT #1 ⟶ *MISSION STATEMENT*

A mission statement is a self-imposed duty, and should express the desired outcome the planning committee is striving to achieve. The development of a mission statement can provide the planning committee with direction, and a common theme to pursue. It also provides a starting point for the committee in building consensus among its members.

Example Mission Statement

It is the mission of the Water Creek Planning Committee to develop a Watershed Implementation Plan that will provide improvements to water quality needed for attainment of Water Creek's drinking water supply designated use.

A mission statement should be brief and general in nature yet encompassing an overall objective to be accomplished. Provide a mission statement for your WIP.

COMPONENT #2 ⟶ *WATERSHED DESCRIPTION*

To understand the area for which the WIP is being developed, a description of the watershed should be provided. The description should provide for the setting in which the watershed is located. Develop a narrative which provides the information listed below. Providing a map of the watershed and its location may also be beneficial.

⇒ *Location (county or counties it covers); Size (acres and square miles); Watershed Delineation (water body identification, hydrologic unit, stream segment, lake code): Public and/or Private Access*

COMPONENT #3 ⟶ *WATERSHED ACTIVITIES*

All planning and implementation efforts should take into consideration past and present watershed activities. Other activities, projects and/or programs, including educational and informational activities, not only show previous or current commitment, but can also be used to evaluate failures or successes. This information is also beneficial to an individual who may be reviewing an application in which the planning committee is seeking possible funding.

In this section of the WIP, fully describe other activities or programs that have or are occurring in the watershed that contribute, or are related, to your planning and implementation effort. Describe whether each activity did or did not work and the potential reasons for their success or failure.

COMPONENT #4 ⟶ *WATERSHED RESOURCE INVENTORY*

Before an implementation plan listing practices to be applied can be developed, a comprehensive inventory of the natural, human, and man- made resources in the watershed must be completed. This information is essential for the planning committee to be able to make determinations concerning what and where the potential and/or existing sources and causes of impairments are; for developing alternatives for watershed protection and/or restoration; and to establish priorities.

Development of alternatives (specific implementation strategies) is a complex process. The ability to address the appropriate issues within a watershed is entirely dependent on the information available on which to base those decisions. It is therefore critical that the Watershed Resource Inventory (WRI) contain as much information as possible concerning the various resources in the watershed. A comprehensive WRI will also be valuable as a "working" document for use in analyzing proposed future activities and what effect they may have on the watershed. By addressing future issues in a proactive manner, potential problems may be avoided.

Water resources in a watershed include both ground and surface water issues. The interaction between these resources must be considered so that planned activities, in one will not have an adverse affect on the other.

Much of the information needed for a WRI already exists. Finding that information, obtaining it, and incorporating it into a single "hands-on" document is essential (for current and historical water quality information contact Illinois EPA). Some information not readily available may need to be obtained through such methods as mail surveys, aerial photographs, a physical survey of the watershed, watershed monitoring or studies, and/or by conducting public meetings.

> *In some cases, certain information requested in this component #4 may not exist, or may not be relevant to your watershed. In such cases, a written comment or notation should be made within the text of the WRI stating that the resource information is either unavailable, or that the resource, activity, or situation does not exist in your watershed. This allows anyone reviewing the WIP to be certain that the planning and technical committees did consider those issues.* ***It is not expected that WRI will contain information on every resource listed in this component.***

The information listed in this component is provided to help the planning and technical committee gather as much information about the watershed as possible.

Waterbodies

In a narrative format, provide as much information as possible about the following items. Use tables and graphs to illustrate significant information and to summarize important facts.

⇒ ***Lake(s)*** (name(s), location, surface acres, acre feet, volume in gallons); ***Trophic Status; Pond(s)*** (number, acres, life expectancy); ***River(s)*** (miles, conditions, level fluctuation, uses, levees); ***Stream(s)*** (miles, type - i.e., perennial, intermittent, modified); ***Trends; Available Chemical, Biological, Physical Data***

Source(s) for obtaining above information:
Maps, Public Water Supplies, Illinois EPA, Individual Studies, Soil and Water Conservation Districts (SWCD)

Designated Use

Illinois' waters are classified for a variety of designated uses. A waterbody should be capable of supporting the designated use for which it has been classified. The ability of a waterbody to attain a specified use is influenced by the activities within the watershed. Watershed planning and implementation must address this issue and develop strategies to meet the goal of use attainment.

Identify the designated use(s) of the waterbody(ies)

⇒ ***Overall use; Fish Consumption; Aquatic Life; Swimming; Secondary Contact; Public Water Supply***

Source(s) for obtaining above information:
Illinois EPA

Designated Use Support

Once the designated use has been identified, the degree to which the waterbody attains that use must be established. With this information, determinations can be made as to whether the planning efforts and implementation strategies should be directed toward protection or restoration of the water resource.

List the degree of use support identified for the waterbody(ies) in your watershed.

⇒ ***Full; Threatened; Partial Support/Minor Impairment; Partial Support/Moderate Impairment; Nonsupport***

Source(s) for obtaining above information:
Illinois EPA

Impairment(s)

After identification of the designated use(s), and the degree of use support, the potential sources and causes of impairment(s) need to be identified. The first determination using available data would be to determine the causes of

impairment(s), or potential impairment(s). After the causes are determined, available data, land use information, and site evaluation may be used to determine the source of the pollutant.

List and prioritize the causes and sources of impairments identified by the planning and technical committees.

⇒ Causes: ***Sediment; Nutrients; Metals; Dissolved Oxygen; Toxics; Suspended Solids; Oil and Grease; Thermal Modification; Noxious Aquatic Plants; Turbidity; Pesticides; pH; Other(s)***

⇒ Sources: ***Industry; Agriculture; Construction; Hydrologic/Habitat Modification; Urban Runoff/Storm Sewers; Resource Extraction; Silviculture; Other(s)***

Source(s) for obtaining above information:
Illinois EPA, Individual Studies, Illinois State Geological Survey (ISGS)

Groundwater

A Watershed Implementation Plan needs to address both ground and surface water issues. Even if surface water quality is the main objective of the plan, it is important to gain as much knowledge as possible about the ground water resource(s). Understanding the interaction between ground and surface water will be beneficial in making decisions for the applicability of certain practices during the implementation stages of the project. Protection of public water supply wells and their recharge areas should be a component of all Watershed Implementation Plans. A comprehensive plan will address both ground and surface water issues and not concentrate on only one.

⇒ ***Confined Aquifer; Unconfined Aquifer; Capture Zone; Re-charge Area; Wellhead Protection Area; Priority Groundwater Protection Panning Region*; *Water Wells*** *(*abandoned, active, condition); ***Susceptibility to Nitrogen Leaching; Susceptibility to Pesticide Leaching***

Source(s) for obtaining above information:
Illinois EPA, Illinois State Water Survey (ISWS), ISGS

Irrigation

Management practices involved in irrigation may have an effect on water quality for both ground and surface water. It is important to know if nutrients and chemicals are applied through the irrigation system and what effect that may have on the aquifer, and nearby streams. Issues regarding water quantity may also need to be addressed in the planning and implementation process.

⇒ ***Location; Acres; Source; Number of Wells*** (groundwater/surface water); ***Backflow Prevention; Pumpage*** (gallons per minute)

Source(s) for obtaining above information:
ISWS, Maps, Field Reconnaissance

Drainage

Drainage ditches and drainage tile are potential sources for various pollutants. The influence that various drainage systems have on a watershed should be evaluated and factored into the planning and implementation effort.

⇒ ***Effects of Surface Drainage; Effects of Subsurface Drainage; Active Drainage Districts; Extent of Drainage Tile***

Source(s) for obtaining above information:
Local Drainage District, Field Reconnaissance

Floodplain Boundaries

Flooding can create many problems. Not only can it delay planting, damage existing crops, cause urban damage, and threaten life, it may also be a contributor to water quality degradation. When addressing flooding issues, consideration should be given during design of BMPs so that they address not only flooding, but water quality issues as well.

⇒ ***Flooding*** (frequency, history); ***Flood Structures; Flood Plain Boundaries; 100 Year Flood Zone; Flood Damage Estimates***

Source(s) for obtaining above information:
SWCD, Corps of Engineers

Municipal / Industrial

A comprehensive Watershed Implementation Plan should address point source issues as well as nonpoint sources. Identify the point source discharges in the watershed. Other point source issues may exist such as wildcat sewers and malfunctioning septic systems.

⇒ ***Pollution; Stormwater Runoff; NPDES Permitted Sites***

Source(s) for obtaining above information:
Illinois EPA, Field Reconnaissance

Riparian Corridors

The physical characteristics of the riparian corridor have a direct influence on stream biology and habitat. Survey and generate a data base for the following information to help make determinations as to pollutants and implementation strategies.

⇒ ***Streambank Erosion; Existing Vegetation*** (kind, quality, width); ***Filter Strips***

Source(s) for obtaining above information:
Aerial Photos, Field Reconnaissance

Hydrologic Modifications

Identify all areas in the stream system where hydrologic modifications have been made. This information can be obtained at the same time the stream system is being assessed for streambank erosion problems. Hydrologic modification not only increases streambed down-cutting and streambank erosion, but can be detrimental to the biological characteristics of the stream system.

⇒ ***Location; Length; Width; Down Cutting; Effects***

Source(s) for obtaining above information:
Aerial Photos, Field Reconnaissance, Drainage Districts, Corps. of Engineers

Stormwater Management

Stormwater runoff from impervious surfaces can carry dirt particles, grease, oil, metals and other material from paved surfaces. Many people pour or wash solvents, paints, and chemicals down storm drains. Dealing with these issues and understanding the effect stormwater discharges have on the watershed are important elements in the Watershed Implementation Plan for any watershed with urban influence.

⇒ ***Stormwater Ordinance; Stormwater Control Practices Existent*** (do they address water quality, or just runoff/flood control); ***Discharge Location; Combined Sewer Systems and Overflows***

Source(s) for obtaining above information:
Local Government, Illinois EPA

Wetland(s)

Wetlands are a valuable resource which provide many benefits such as contaminate removal, flood reduction, and wildlife habitat. The abundance or lack of wetlands in a watershed may provide valuable information for making determinations and developing implementation strategies.

⇒ ***Type; Condition; Acres***

Source(s) for obtaining above information:
SWCD, NRCS, IDNR

Fish

Some species of fish are more pollutant tolerant than others. Conducting a fish survey, or obtaining existing information from previous fish surveys, can provide the planning committee with an indicator of a stream's water quality.

⇒ ***Species; Fish Size; Fish Kills; Habitat; Population; Stocking***

Source(s) for obtaining above information:
Illinois EPA, IDNR

Priority Waterbody

Various organizations have established priority areas based on program requirements. A watershed is a dynamic unit. Look at all the resources, and understand their interrelationships. Understanding and then listing program priorities regarding selected watershed plan components will assist the planning committee in identifying and seeking technical assistance and possibly obtaining financial support for implementation.

⇒ ***Targeted Watershed Approach; Environmental Quality Incentives Program (EQIP); Resource Rich Region*** (ecosystem partnership); ***"T" by 2000 Transect; Conservation Reserve Program (CRP)***

Source(s) for obtaining above information:
Illinois EPA, NRCS, IDNR, IDOA

Soil Classification

Identifying soils, geology, and land use activities within a watershed and their relationship to the quality of the water resource is essential in the planning and implementation of a watershed protection and/or restoration effort. Understanding soil characteristics and the underlying geologic formations is necessary for making determinations between ground and surface water issues and the development of implementation strategies. The identification of current and forecasted land use activities within the watershed is vital in the development of an implementation strategy.

Soils information is used to determine soil loss and sedimentation rates, and is valuable in making determinations that involve ground or surface water issues based on a soil's leachability and other factors. Selection of best management practices may be influenced by the soils in the watershed; in addition, soils information may be utilized when prioritizing areas within the watershed where implementation of BMPs will occur.

Provide a narrative of the soil types and soil associations in the watershed. The narrative should include information on soil composition (i.e., sand, silt, clay, clay loam, silty clay loam), slope (i.e., gently sloping, steep), water table, permeability, land use capability classification, erodibility index, and hydric soils. Use table(s)

to show such things as acres/percentage of Highly Erodible Land (HEL), prime farmland, and land use capability.

⇒ ***Soil Types*** (names and soil associations); ***Land Use Capability Classes; Highly Erodible Land*** (HEL); ***Prime Farmland; Hydric soils; Erodibility Indexes*** (EI)

Source(s) for obtaining above information:
NRCS, SWCD, U of Illinois Cooperative Extension Service (UICES)

Soil Erosion

Identification and assessment of the types of erosion occurring and the sources and causes within the watershed are essential information to obtain. Available information (i.e., soils, climate, land use, etc.) that is gathered for this inventory will be needed to make this assessment. In many cases it may be necessary to physically walk or drive the watershed to gather accurate information, especially for gully and streambank erosion. Provide a narrative and utilize tables discussing erosion conditions in the watershed. Discuss agricultural and urban issues separately. List erosion rates by soil type, and provide information on sedimentation rates to water bodies. Provide a figure for total soil erosion and sedimentation in the watershed.

When discussing soil loss, planners often refer to it in relation to "T", or "Tolerable" soil loss levels. "T" is based on productivity levels and not water quality. Soil loss equal to "T" will sustain a soils productivity level, but may still be eroding at a level which is detrimental to water quality. To address water quality, the total amount of soil loss needs to be taken into consideration regardless of "T".

⇒ Agricultural: ***Sheet and Rill; Ephemeral; Gully; Streambank; Sedimentation Rates***

⇒ Construction: ***Sheet and Rill; Ephemeral; Gully; Streambank; Sedimentation Rates***

Source(s) for obtaining above information:
NRCS, SWCD

Geology

Knowledge of the geological history of a watershed provides beneficial information for developing an understanding of the dynamics of the watershed. Formation and age of the stream system, underlying materials, depth to the aquifer, and type of aquifer (confined, unconfined) are all determined by the geological characteristics. Geological information in conjunction with soils information can be used for determining sources and causes, potential problems, and BMP selection.

Describe the glacial history and structural characteristics of the region/watershed.

⇒ ***Glacial Influence; Sand Deposits; Gravel Deposits; Limestone Formations; Karst Topography***

Source(s) for obtaining above information:
ISGS

Topography

Topography is the relative position and elevations of the natural or manmade features of an area that describe the configuration of its surface. (Hawley, J.W., and Parsons, R.B. 1980. Glossary of selected geomorphic and geologic terms. Mimeo. USDA Soil Conservation Service, West National Technical Center, Portland, OR. 30p.) The topographic characteristics of the watershed will have a direct influence on the drainage system within the watershed.

Provide a narrative describing the following characteristics. Use tables and charts where applicable to highlight key facts and information. Always give reference to documents used as sources of information.

⇒ ***Elevation; Size; Shape; Drainage Pattern; Drainage Density***

Source(s) for obtaining above information:
NRCS, SWCD, Topography Maps, Aerial Photos

Land Use

Activities in a watershed are influencing factors on water quality, quantity, wildlife, and human health. The potential/existing problems affecting a watershed are directly related to the natural and human activities that alter the natural system. These activities are inherent as we strive to provide food and fiber, income, a place to live, and other opportunities for the type of life we as individuals seek. To determine the problems a watershed is experiencing, and to determine the sources and causes of impairments, a complete inventory of the land uses must be conducted. Because land use activities and land use change will continue, a comprehensive watershed implementation plan that properly addresses these issues is essential.
Provide the information in the form of narrative and tables which identify the land uses in the watershed. Break-out into acres and percentage of watershed.

⇒ ***Cropping rotations; Alternative Crops; Cover Crops; Specialty Crops; Pasture*** (acres); ***Hayland*** (acres); ***Orchards*** (type, size); ***Cropland*** (acres); ***Values*** (average); ***Cash Rent*** (dollars); ***Crop Share; Absentee Landowners*** (number & percent); ***Farm Size*** (average in acres); ***Farmsteads*** (number); ***Confinement Livestock Operations*** (size, location, waste management system, species); ***Open Feedlots*** (number, acres affected, animal units, species); ***Aquaculture*** (number of operations, type of aquaculture, size/acres); ***Woodland Resources*** (species, condition, value, logging, human use); ***Roads*** (types, miles, acres); ***Railroads*** (miles, acres); ***Municipalities*** (with populations past, present, projected); ***County*** (populations past, present, projected); ***Zoning; Industry*** *(*number, type, size, NPDES permit number, density); ***Commercial*** (business types, density, potential for growth); ***Airports*** (size, acres) ***Development*** (current, potential, growth projections, local attitudes); ***Conservation Reserve Program (CRP)*** (acres enrolled); ***Illegal Dumps; Landfills*** (active, inactive); ***Fertilizer/Chemical Facilities; Hunting Areas*** **(public, private);** ***Natural Areas*** (forest or prairies); ***Prime Farmland; Public Lands*** (city parks, county conservation areas, state parks, national forests, national wildlife refuges); ***Septic Systems; Chemicals*** (chemical facilities, agriculture types, urban types, acres affected); ***Mining*** (abandoned mines, active mining operations, reclamation acres, ground subsidence, strip mines); ***Utilities*** (underground cables and pipelines); ***Underground Storage Tanks***

⇒ ***Existing Best Management Practices - Cultural and Mechanical*** (grade stabilization structures, contour farming, conservation tillage, terraces, filter strips, grass waterways, stormwater runoff control, detention/retention basins, sedimentation basins, nutrient management, pest management, livestock waste management, etc.)

Source(s) for obtaining above information:
Aerial Photos, IDNR, Field Reconnaissance, Illinois EPA, Municipal/County Land Development Departments

Air Quality

Air quality should not be overlooked in your planning efforts. Addressing air quality is three-fold; 1) identify activities which pollute the air, or have the potential to pollute the air and address them in the strategies developed for implementation, 2) identify the sources of, or the potential for, pollutants from atmospheric deposition contributing to the degradation of water and/or land resources, and 3) understanding of the potential health affects caused by air borne pollutants on humans and wildlife.
Not only does the planning committee need to know what the sources and causes of air pollution are, but they need to identify potential sources, and be aware of what effect future activities (i.e., industry, transportation, mega-livestock facilities) may have on the watershed.

⇒ ***Atmospheric Deposition; Wind Direction*** (predominant); **W*ind Speed*;** (daily average); ***Pollution Sources and Types; Climate*** (rainfall, temperature)

Source(s) for obtaining above information:
Illinois EPA

Wildlife

Wildlife present in the watershed should be taken into consideration in the planning process. An inventory should be conducted as part of this comprehensive WRI. Strategies which reduce point and/or nonpoint pollution should be developed that will protect and/or enhance wildlife habitat/population. Some restoration activities could be detrimental to wildlife and should be avoided if possible. When detrimental activities cannot be avoided, the planning and technical committee should consider remediation efforts to replace the habitat that has been destroyed. Endangered and threatened species should be identified and factored into the design of the implementation strategies. Any activity which may cause a detriment to endangered or threatened species should be avoided.

Many things can be done and protect to restore water quality while protecting, or enhancing wildlife habitat.

⇒ ***Endangered/Threatened Species*** (macro-invertebrates, fish, animals, birds); ***Wildlife*** (game species, non-game species, populations)

Source(s) for obtaining above information:
IDNR, Illinois Natural History Survey (INHS)

Socio-Economic / Human resources

Socio-economics play a role in the watershed community in achieving consensus on the problems or potential problems a watershed faces, as well as its ability to implement certain strategies. In reviewing the resources in the watershed, land user problems and needs should be considered. For this reason, an inventory of socio-economics should be conducted and used as part of the evaluation process. This information can then be used to evaluate the various problems or potential problems identified in the planning process.

⇒ ***Average Annual Income; Unemployment Rate; Farmer/Non-farmer Relationship; Minorities; Economy*** (major employers - i.e. business, industry, agriculture); ***Jobs; Income; Infrastructure; Agricultural Identity; Rural Atmosphere; Off-site Impacts; Outreach Programs; Limited Resource Producer; Agriculture Organizations; Conservation Organizations; Conservancy Districts; Drainage Districts; Federal Agencies; State Agencies; Local Government; Environmental Organizations; Media/Education Outlets***

⇒ ***Land User Problems; Attitudes Toward Watershed/Waterbody/Current Projects; Number of Farm Operating Units; Number of Owner/Operator vs. Owner/Tenants; Nonfarm Population Watershed to be Impacted; Average Farm Gross Income; Farmers with Off-Farm Employment; Major Off-Farm Employment; Real Estate Average Values/Average Taxes; Land User Average Age; Loss/Retention on People in Area; Family Farm/Corporate Farm Trends; Market Availability for Farm Products; Recreational, Educational Opportunities in Area; Relationship Between Individuals and Their Watershed; Community Support; Volunteers*** (groups, organizations)

Other Resources

Other resources may be considered and included in the WRI that have not been presented in the above component. The above list of resources is not inclusive and the planning and technical committee may be able to identify additional resources which should be included in a WRI.

What's Next?

Once a comprehensive WRI has been completed for the watershed, the planning committee with assistance from the technical advisory committee can begin the process of evaluation. If a list of problems, or potential problems, had been developed prior to the completion of the WRI, review of the existing information will either confirm, eliminate, or present additional problems, or potential problems for the planning committee to focus on for the development of implementation strategies. The WRI will also allow the planning committee to see the inter-relationships between problems allowing for the development of multi-purpose implementation strategies and the design of BMPs which address multiple objectives.

Many times a planning committee forms because of a single issue. Comprehensive watershed planning and implementation requires looking at all the issues in a watershed. A comprehensive WRI forces the planning committee to look at the multitude of issues and their inter-relationships rather than a single issue.

COMPONENT #5 ⟶ *PROBLEM STATEMENT*

The problem statement(s) should describe the problem(s) the WIP will resolve and its relevance to a waterbody's designated use attainment. Each problem statement should identify the type and location of the water resource(s) at risk, or affected; the nature of the problem(s) or water quality impact(s); and the sources and causes of the impact(s). Once this process is completed, the planning committee needs to arrive at a consensus on the prioritization of the problem statements. This can be accomplished by determining the most obvious problem, the most significant problem, and/or by determining in which problem the planning committee has the most interest.

A problem statement should be developed for each problem identified in the watershed and can only be developed once a comprehensive WRI has been completed and analyzed.

Example Problem Statements

Problem #1. *Sediment entering Water Creek Lake is causing turbidity and loss of volume due to construction erosion from new subdivisions being built around the lake.*

Problem #2. *High nutrient levels in Water Creek Lake are causing taste and odor problems (algal blooms), and Maximum Contaminate Level (MCL) violations for the public water supply due to excessive nutrient and sediment runoff from urban lawns and agricultural fields.*

Problem #3. *Wildlife within the Water Creek Lake watershed has decreased due to the destruction of wetlands, and removal of natural vegetation along the stream corridors due to urbanization and agricultural practices within the watershed.*

COMPONENT #6 ⟶ *GOALS / OBJECTIVES*

A goal is the desired change or outcome the planning committee wishes to achieve and is driven by the problem statement. Setting goals in a watershed effort involves getting the stakeholders to define desired changes as measurable and attainable end points.

The planning committee should develop a set of goals that defines the desired change for each identified problem statement. This will help in guiding protection and restoration efforts. Goals should be specific so that setting specific objectives can be accomplished.

In the goal setting process, the planning committee defines the results it wants to achieve. In setting objectives, the planning committee describes how it will do this. The objectives in the WIP should be concise and state how they will achieve attainment of the designated use of the waterbody(ies) being addressed. The specifics of who will do what, what BMPs will be installed, what control options are available for point source dischargers, the timetable, and a long-term maintenance schedule will be developed in Component #7, *Implementation Strategies of the WIP*. Develop an objective for each goal identified.

Utilize the information in the WRI and the established problem statement(s) to prioritize the list of goals and objectives. The purpose for prioritization is to determine phased implementation for conducting protection and/or restoration efforts to address the problems deemed most significant.

Example Goals and Objectives

Goal #1: *To reduce sedimentation entering Water Creek Lake to reduce the turbidity and loss of volume for the public water supply.*

Objective #1*: To develop and apply resource management systems in targeted areas within the watershed to meet the lake's designated use as a public water supply. Provide educational/informational materials on soil erosion control to both the urban and agricultural communities.*

Goal #2. *To reduce the nutrient load to Water Creek Lake thereby reducing taste and odor problems and to remain in compliance with established MCLs.*

Objective #2. *Develop and implement nutrient management systems for agricultural production and create and disseminate informational and educational materials.*

Goal #3: *To increase wildlife habitat in the Water Creek Lake Watershed.*

Objective #3: *To re-establish wetlands and re-vegetate the stream corridors with grasses and native hardwoods.*

COMPONENT #7 ⟶ *IMPLEMENTATION STRATEGIES*

Once the WRI is completed and analyzed, the sources and causes of pollution identified, and the goals and objectives listed and prioritized, the technical committee can begin developing implementation strategies. Alternative strategies should be developed for each objective identified, while taking into consideration a BMP's ability to address multiple concerns and what control options may be needed for point source dischargers.

This section should contain a detailed description of the practices in each alternative. Each implementation strategy listed should contain language explaining the feasibility of the proposed practices in achieving the identified objectives. It should contain an evaluation of the project's effectiveness, operation, and long-term maintenance upon completion. Describe the environmental impacts associated with each alternative developed. Be as specific as possible in listing the type of practices and the quantity needed to implement the watershed implementation plan.

COMPONENT #8 ⟶ *COST SUMMARY*

Identify the projected costs associated with each alternative implementation strategy that has been developed. List BMP(s) and control options for point source issues along with their per unit costs separately. Having individual costs for each BMP and control options will be advantageous in seeking funds for implementation. Cost effectiveness of the practices to be installed should be evaluated for use in determining which BMPs and/or control options will or can be implemented. Developing specific costs is also necessary in order to conduct a cost/benefit analysis. The cost/benefit of the various alternatives may be the determining factor in which alternatives will be selected for implementation. Different funding sources have different requirements and limitations on what can be funded. By listing BMP(s) and control options for point sources individually, rather than showing lump sum totals, allows individual funding sources to review and select eligible practices for possible financial assistance.

At the end of the cost summary section, discuss the local resources available for implementation, and/or as match for state or federal funds. Matching funds to be listed would be hard dollars as well as in-kind services available such as labor, equipment, etc.

COMPONENT # 9 →IMPLEMENTATION STRATEGY SELECTION

Once the alternative implementation strategies and costs for each strategy has been developed, the planning committee can now use this information to select the appropriate strategies that will meet the objectives previously established. The selection process should take into consideration things such as, but not limited to; feasibility of; cost of; effectiveness of; and acceptance for implementation. List the implementation strategies selected and the total cost of the project.

After the implementation strategies have been selected, it is important that the planning committee develop a timetable for project implementation showing planned activities for each project year, who will perform the activities, and projected start and completion dates. List and discuss the role of each agency, government, and/or organization that will be participating in the implementation of the project and the resources available.

COMPONENT #10 ⟶ *MEASURING PROGRESS / SUCCESS*

Measuring and documenting progress and success throughout the watershed implementation process is essential. Funding agencies, landowners, and the general public will want and need to know if the goals and objectives of the watershed implementation plan are being met. The planning committee also needs this information in order to evaluate the project and make appropriate changes throughout the implementation process.

Ambient monitoring serves many purposes in measuring progress and success (i.e., provides baseline information; establishes trends; measures pollutant removal efficiencies of BMPs; demonstrates effectiveness of project; provides long-term information for maintenance purposes). While ambient monitoring may be the best method for measuring progress and/or success, it is also expensive, and time consuming. The design of an ambient monitoring program is critical and requires a specialist in order for the data obtained from the program to be valid. Ambient monitoring also requires years of base data and numerous years of post implementation data in order to arrive at justifiable conclusions. Because of this, ambient monitoring may not fit into short term projects that need to demonstrate results over a shorter time span. Listed below are some methods that may be used to measure progress and success prior to implementation, during implementation, and after implementation has been completed.

⇒ Volunteer Monitoring

⇒ Computer Modeling

⇒ Soil Erosion Reduction Estimates

⇒ Sedimentation Reduction Estimates

⇒ Stakeholder Surveys

⇒ Reduction in Water Treatment Costs

⇒ Reduced Application of Nutrients and/or Pesticides

⇒ Land Use Changes

⇒ Changes in Cropping Practices (i.e., tillage, rotations)

⇒ Periodic written reports, public meetings, and financial records (documentation of shifts in time and resources).*

⇒ Simple tracking forms or data files for each responsible agency to report progress by activity (i.e., educational presentations, irrigation systems evaluations, septic tank installation inspections).*

⇒ Reports, maps, and photographs of specific controls and protection/restoration practices installed (i.e., terraces, waterways, animal waste lagoons, streambank stabilization, stormwater detention ponds).*

⇒ Qualitative and quantitative results of instream monitoring and BMP effectiveness monitoring. Trends in chemical or biological metrics can sometimes be dramatic (even if not at a high confidence level statistically). Visual documentation of waterbody improvements can also be convincing.*

*(adapted from U.S. EPA, Watershed Protection: A Project Focus
EPA 841-R-95-003, August 1995)

GLOSSARY

Alternative Strategies - A set of one or more strategies provided to the planning committee to solve resource problems identified in the planning process to achieve proper management of the resources.

Ambient Monitoring - Providing background monitoring of water quality from a fixed station.

Best Management Practice (BMP) - A practice determined by a state or other agency to be the most effective and practicable (including technological, economic, and institutional consideration) means of reducing the amount of pollution from nonpoint sources to a level compatible with water quality goals.

Biological Integrity - The ability to support a balanced, integrated, adaptive community of organisms having a species composition, diversity and functional organization comparable to that of the natural habitat of the region.

Chemical Integrity - The chemical properties within the water column in a state in which the waterbody is unimpaired.. Chemical features include nutrients, toxics or both.

Discharger - A facility that releases effluent into a waterbody from a pipe, or other point source mechanism requiring a National Pollutant Discharge Elimination System (NPDES) permit. An example of a discharger would be a waste-water treatment plant.

Drainage Density - The ratio of the total length of streams within a watershed to the total area of the watershed; thus drainage density has units of the reciprocal of length. A high value of the drainage density would indicate a relatively high density of streams and thus a rapid storm response.

Drainage Pattern - The configuration of arrangement in plan view of the natural stream courses in an area. It is related to local geologic and geomorphologic features and history.

Ecosystem - An interacting community of living organisms, together with the physical and chemical environment in which they live.

Holistic - Emphasizing the importance of the whole and the interdependence of its parts.

Hydrologic Modification - Any change in the natural stream configuration such as channelization, or dredging.

Implementation Strategies - A plan of action specifying best management practices to be installed to protect and/or restore resources.

Lotic - Of, pertaining to, or living in moving water.

Physical Integrity - The physical characteristics present to characterize lotic systems. Physical features include stream hydrology variables such as flow regime, discharge and velocity, and habitat characteristics such as substrate type and instream cover.

Timetable - A schedule listing the times at which certain events are expected to take place.

Watershed Community - Includes the people who live, work, and play in a watershed along with the natural resources (water, wildlife, minerals) located there.

Appendix 1

Model Bylaws

The following model bylaws were adapted from A Guide to Developing Local Watershed Action Plans in Ohio, which was written and published by the State of Ohio Environmental Protection Agency, Division of Surface Water. The Ohio EPA adopted the bylaws from the Rocky Fork Creek Watershed Protection Task Force Bylaws. This model is to be used as an example of bylaws which can be created by a local watershed planning group.

BYLAWS

_____WATERSHED PLANNING COMMITTEE

1.0 PURPOSE

The purpose of the_____Watershed Planning Committee (WPC) is to develop, promote, guide, and implement a coordinated, comprehensive, and effective watershed protection plan for the _____Watershed.

2.0 MEMBERSHIP

2.1 Membership is open to any individual, family, business, or organization that subscribes to the purposes of the Planning Committee.

2.2 Voting membership shall consist of (number) representatives from each of the following:

⇒ One member from each of the (number) jurisdictional units of local government in the watershed;

⇒ (Number) members from the educational, recreational, and commercial (or other applicable categories, such as agriculture) sectors active in the watershed; and

⇒ (Number) members who are residents of the watershed.

2.3 Each participating state or federal agency may be represented by one (1) ex-officio, non-voting member.

2.4 Voting membership shall be selected as follows:

⇒ Each of the (number) jurisdictional units of local government in the watershed is allowed one designated representative to serve on the Task Force.

⇒ A list of candidates from an open invitation for nominations to represent the educational, recreational, and commercial sectors shall be maintained; an election by written, secret ballot of all members present shall be conducted to elect the (number) voting members.

⇒ A list of candidates from an open invitation for nominations to represent the residents of the watershed shall be maintained; an election by written, secret ballot of all members present shall be conducted to elect the (number) voting members.

2.5 Voting member vacancies shall be filled following the process in Section 2.4, except in the case of the Chair, which vacancy shall be filled pursuant to Section 3.3.

3.0 ORGANIZATION AND OFFICERS

3.1 The officers of the Task Force are the Chair, Vice-Chair, Secretary, and Treasurer. The Chair shall be one of the (number) voting watershed residents.

3.2 The duties of the Chair include, but are not limited to:

⇒ Developing meeting agendas;
⇒ 'Presiding over all meetings of the Planning Committee; and
⇒ Serving as Chair of the Technical Committee and as an ad hoc member of other committees.

3.3 The Vice-Chair may be any member of the Planning Committee. The Vice-Chair shall assume the duties of the Chair for the remainder of that term should that office become vacant, and shall preside at meetings of the Planning Committee and Technical Committee when the Chair is unable to attend.

3.4 The Secretary may be any member of the Planning Committee. The duties of the Secretary include, but are not limited to:

⇒ Maintaining the official records of the Planning Committee;
⇒ Recording and distributing the minutes of the Planning Committee meetings;
⇒ Maintaining a current record of the names and addresses of Planning Committee members; and
⇒ Sending out notices of meetings and any supporting meeting materials at least two (2) weeks prior to scheduled meetings.

3.5 Election of the Chair, Vice-Chair, and Secretary shall be by written, secret ballot. For the initial election, nominations shall be made by the Organizational Committee; in subsequent elections, nominations shall be made by the Steering Committee. Additional nominations may be made by any Task Force member from the floor or in writing to any member of the Organizational Committee (Steering Committee after the first election). It is incumbent upon the nominator to determine willingness of the nominee to serve.

3.6 The Chair shall be elected for a two-year term. The initial Vice-Chair shall be elected for a one-year term; thereafter, the Vice-Chair shall be elected for a two-year term. The Secretary shall be elected for a two-year term. Re-election to these offices is permitted.

3.7 The Steering Committee shall appoint the Treasurer. If it becomes legally necessary for the Treasurer to be elected, the election procedures in Section 3.5 shall be followed.

4.0 COMMITTEES

4.1 Standing Committees:

The following standing committees shall be established by the Steering Committee to address concerns of the Planning Committee:

⇒ Sediment Control and Land Development
⇒ Habitat, Wetlands, Riparian Zone Protection
⇒ Stream Watch
⇒ Groundwater Protection
⇒ Public Relations and Public Involvement
⇒ Funding

4.2 Organizational Committee

The Organizational Committee is established. When the bylaws are adopted by the Planning Committee, the officers elected, and the Steering Committee selected, the Organizational Committee shall cease to exist.

4.3 Other Committees

The Steering Committee may appoint such other Standing or Ad-Hoc Committees as deemed necessary to support the efforts of the Planning Committee.

4.4 Steering Committee

The Steering Committee shall be composed of the Chair and Vice-Chair of the Planning Committee and the Chairs of the established Committees.

The duties of the Steering Committee shall include, but not be limited to:

⇒ Directing the business activities of the Planning Committee;
⇒ Nominating members for elected positions;
⇒ Creating or disbanding Standing or Ad-Hoc Committees;
⇒ Calling emergency meetings without two weeks notice; and
⇒ Recommending projects to Committees.

4.5 Each Committee shall elect a Committee Chair by the end of its second meeting. At the pleasure of its committee, the Committee Chair shall serve as a member of the Steering Committee.

5.0 MEETINGS

5.1 The Planning Committee shall meet as determined by the Steering Committee.

5.2 Notice shall be mailed to all members at least two(2) weeks in advance of all Planning Committee meetings. Notice shall include an agenda and business materials that may be considered or acted upon, whether or not set forth in the agenda.

6.0 DECISION MAKING

6.1 The Task Force shall strive to operate by consensus. Group decisions shall be made by consensus of all members present at any meeting.

6.2 Any member may call for a vote on any issue during the course of any meeting.

6.3 Decisions made by vote shall require a two-thirds majority of the voting members present for passage.

6.4 Voting members may be represented by designated alternatives. Alternates shall be designated by letter or telephone call to the Chair in advance of the meeting. The alternate shall have all the rights and duties of a voting member during the meeting(s) for which they are a designated alternate.

7.0 MISCELLANEOUS PROVISIONS

8.0 ADOPTION AND AMENDMENTS

8.1 These bylaws and any amendments shall be adopted by a simple majority vote of the Planning Committee. Amendments to the bylaws shall be summarized in the notice of the Planning Committee meeting at which the proposed amendments are to be voted on.

Appendix 2

Working with Groups

The following information was adapted from A Guide to Developing Local Watershed Action Plans in Ohio, which was written and published by the State of Ohio Environmental Protection Agency, Division of Surface Water.

Outlined in this appendix are four aspects of working with groups: coalition building; collaborating; setting ground rules; and generating and ranking ideas.

I. Coalitions

(Based on "Building Coalitions" a series of fact sheets developed by the Ohio Center for Action on Coalitions for Families and High Risk Youth, Richard Clark, Ph.D., Director. The Ohio State University. 1992)

A Coalition:

⇒ Involves all key players
⇒ Chooses a realistic strategy
⇒ Establishes a shared vision
⇒ Agrees to disagree on process
⇒ Makes promises that can be kept
⇒ Builds ownership at all levels
⇒ Institutionalizes change
⇒ Publicizes successes

Support Can Come From:

⇒ Obtaining agreement on plans
⇒ Developing awareness of agencies
⇒ Involving officials in problem-solving
⇒ Seeking advice and evaluation
⇒ Sharing planning and implementation support
⇒ Endorsement of plans by officials

Coalitions are weakened by:

⇒ Failure to keep members informed of policies and actions
⇒ Loss of key leaders
⇒ Irreconcilable splits
⇒ Change in conditions
⇒ Delay

Elements for success:

⇒ Common Goals
⇒ Communication
⇒ Importance of each member
⇒ Participation
⇒ Sense of ownership
⇒ Delegation of responsibility
⇒ Effective meetings

⇒ Shared leadership

The Problem-Solving Method:

⇒ Define the problem
⇒ Determine the cause(s)
⇒ Develop alternative approaches
⇒ Assess the consequences

Select A Solution:

⇒ Implement the chosen solution
⇒ Evaluate
  ◊ select issues for analysis
  ◊ determine feasibility of analysis
  ◊ determine measures
    * importance
    * validity
    * uniqueness
    * accuracy
    * timeliness
    * privacy and confidentiality
    * costs of data collection
    * completeness

II. Collaboration

(adapted from Ohio Commission on Dispute Resolution and Conflict Management)

Collaboration:

⇒ A process of joint decision-making among groups, individuals, and organizations that have an interest in the problem; and
⇒ A process through which parties involved in different aspects of a problem constructively explore their differences and search for solutions that go beyond the limits of their individual or agency roles or responsibilities.

Features of Collaboration:

⇒ The involved or affected participants, or stakeholders, are interdependent - they need each other to solve the problem. Collaboration involves building a common understanding of the problem that forms the basis for choosing a collective course of action. Collaboration can turn an adversarial situation into a mutual search for information and solutions that allows all those participating to ensure that their interests are represented.

⇒ Solutions emerge from recognizing and dealing constructively with differences. Because participants' interests vary, as do their resources and skills, they solve a problem by looking for trade-offs and mutually beneficial solutions.

⇒ Participants share direct responsibility for the agreements they make. Joint ownership means implementation is more likely to happen.

⇒ Collaboration is a forum or process in which organizations and groups can evolve through a variety of ways of interacting.

Phases of a consensus-building (collaborative) process (adapted from Collaborating by Barbara Gray, Jossey-Bass Publishers, 1989):

Phase 1 - Plan the process

⇒ frame the problem
⇒ identify stakeholders
⇒ commit stakeholders to the collaborative process
⇒ identify resources

Phase 2 - Conduct the process

⇒ establish ground rules
⇒ agree on common definition of the problem
⇒ set agenda
⇒ organize subgroups
⇒ gather information
⇒ generate options
⇒ communicate with constituencies
⇒ build external support
⇒ reach agreement

Phase 3 - Implement the agreement

⇒ create a monitoring system
⇒ monitor compliance
⇒ modify activities if necessary

III. Ground Rules

(adapted from Ohio Commission on Dispute Resolution and Conflict Management, 1991, and the Conflict Clinic, Inc., 19989)

Ground rules are agreements individuals in a group make to improve their ability to work together effectively. Ground rules:

⇒ establish a general process (and set expectations);
⇒ provide a code of conduct for behavior of participants (including leaders and facilitators);
⇒ create a framework for cooperation;
⇒ help make open communication safe; and
⇒ reduce potential for later disputes.

Agreeing on ground rules at the beginning of every meeting sets a framework to ensure that all business deemed important gets addressed (some items may be deferred or otherwise managed, but everything gets aired to the group's satisfaction). When a group meets regularly, the ground rules may become familiar and need not be revisited at each meeting. It may be useful to periodically review the ground rules, however, to be sure that they still meet the group's needs.

IV. Generating and Ranking Ideas

(adapted from Ohio Commission on Dispute Resolution and Conflict Management)

Nominal Group Technique:

A group process for identifying problems, generating possible solutions, and setting priorities. It assumes that ground rules provide an environment where all participants are respected and can speak freely, and a manageable group size (less than 50).

The leader or facilitator explains the steps in the process (see below), then presents the problem statement or question to the group. As the group gets to each step, the leader should explain it in detail.

Step 1 - (silent generation of ideas in writing) - The leader reads the question aloud; it is written on a flip chart or on paper passed out to the group. Members list their responses or ideas in phrases or brief sentences, working silently or independently for a set time.

Step 2 - (presenting and recording the ideas) - The leader asks each member for one idea at a time, and records it on a flip chart. As each sheet is filled, it is taped to the wall to remain visible. Adding to ideas is encouraged. No discussion, elaboration, or criticism is allowed (these occur in Step 3). The leader continues asking around the group until all ideas are presented. (Alternatively, pass out index cards to record ideas, then collect the cards and write the responses on the flip chart. Another alternative is brainstorming, where people randomly shout out their ideas while one or more recorders or scribes writes them on a flip chart. This is potentially dangerous unless the group has a high level of trust and respect, and everyone feels free to participate; otherwise, some people might not speak up, and their ideas may not be considered.)

Step 3 - (discussion of ideas) - Clarification of ideas takes place at this stage. The leader reads each item aloud, and asks for comments. Similar ideas can be lumped together, and some may be removed from consideration if they are not applicable. Once all ideas have been discussed to the group's satisfaction, this stage ends.

Step 4 - (ranking the ideas) - This is like voting. Each person selects five (or seven, if the number is large: decision by leader) ideas considered most important and ranks them in order, number 1 being most important. Index cards can be used, or sheets of paper. The rankings are collected, tallied, and recorded on the flip chart. Alternatively, distribute colored sticky dots to each person voting (number of dots equals number of votes); voting occurs on the flip charts according to the placement of the dots. A voter can place more than one dot on a preferred idea, or give one vote to each of several ideas.

Step 5 - (discussion and agreement) - Discuss the voting results and significance. Discuss the ranked items and their relative order. If the ideas and order seem acceptable, the leader asks if anyone has reservations about the list. Accept the list as the basis for further activity if there are no objections. If there are reservations or the group is clearly not in agreement, the leader starts a second round of priority setting, using the small list from the first vote. Each person gets three votes or stickers, and votes. Discuss the results and see agreement.

Survey Results:

Uses results of a questionnaire survey designed to get ideas or to rank ideas. Tabulation of survey data can be done by one person or a small working group. Ranking is based on tabulation results. This process may be used in a meeting, but is likely to take more time than would Nominal Group Technique. If carried out by mail or other means of questionnaire distribution, it allows more people to participate.

Appendix 3

Best Management Practices

Access Roads
Aeration/Destratification
Aquatic Vegetation Re-establishment
Artificial Wetlands
Barriers to Divert Runoff from Resource Extraction Work Sites
Bottom Feeding Fish Species Eradication
Bottom Sealing
Buffer Strips
Brush Management
Catchment Basins
Check Dams
Concrete Collection Pit
Confinement Pens
Conservation Cropping Systems
Conservation Reserve Programs
Conservation Tillage
Contour Farming
Cover/Green Manure Crops
Critical Area Planting
Crop Residue Use
Dam, Floodwater Retarding
Dam, Multiple Use
Detention Basins, Dry or Wet
Dewatering Practices
Discharge Flow Regulation
Diversions
Diversion to Treatment Plant
Dike
Diked Floodway Channel
Downspouts and Gutters
Dredging, Retention Site Development, Reclamation
Earth Dike
Earthen Storage Basins
Erosion Control Plantings
Fences Field Borders
Filter Strips
Fire Break
Flow Diversion
Forest Fertilization
Gabions/Wire Mattresses
Grade Stabilization Structures
Grassed Waterway, Swale & Outlet
Greenbelt
Groundwater Recharge Area Protection
Holding Pond/Settling Basin
Hypolimnetic Aeration
Hypolimnetic Withdrawal
Infiltration Pits
Information/Education
Integrated Pest Management Techniques
Irrigation Land Leveling
Irrigation Storage Reservoir
Irrigation Systems
Irrigation Water Conveyance
Irrigation Water Management
Lagoons
Land Application
Land Grading
Land Reconstruction/Reclamation
Land Use Change
Landscaping
Leachate Collection Systems
Liming
Limited Clearing & Snagging
Livestock Exclusion
Macrophyte Harvesting
Mixing/Loading Pads
Mud/Dust Control
Mulching
Open Channel Construction/Improvement
Open Gutter Systems
Open Space Land Acquisition
Outside Concrete Collection Systems
Oxidation Ditch
Pasture/Hayland Management & Planning
Pasture Production
Pasture Rotation
Paved Waterways
Perimeter Dike Swale
Permanent Vegetative Cover
Permit Requirements
Pesticide Applicator Cert. and Training
Phosphorus Inactivation
Pond
Porous Pavement
Protect Existing Vegetation
Regeneration/Reforestation
Replace Leaking Storage Tanks
Reshape Banks/Sides Slopes
Retention Basin
Retards & Jetties
Revegetated Riparian Zone/Corridor
Revegetation with Trees
Riprap
Rock Outlet Protection
Rock Outlets
Runoff Control
Sand Filters
Sealing Bore Holes
Sealing of Water Yielding Fractures
Sediment Filters
Sediment Traps/Basins
Seeding
Sediment Oxidation
Shading and Sediment Covers
Shoreline Protection/Stabilization
Silt Fence
Site Evaluation Requirements
Sodding
Soil Testing/Nutrient Management
Spray Nozzle Refinements
Stabilized Construction Entrance
Stacking Area
Staging of Clearing, Grubbing, Scalping, Grading, and Reclamation Activities
Storm Drain Inlet Protection
Straw Bale Dike
Streambank Protection/Stabilization
Street Sweeping
Strip Cropping (Contour)
Subsurface Drainage
Surface Drainage
Sustainable Management Practices
Swale
Terraces
Topsoiling
Triple Rinsing Pesticide Containers
Tree Planting
Trenches and Ponds
Vegetative Bank Stabilization
Vegetative Deflectors
Vegetative Removal
Vegetative Stabilization
Vegetative Protection/Soil Stabilization
Waste Application (App. on Land)
Waste Storage Lagoons/Pond (various)
Waste Storage/Control Structures
Water Level Drawdown/Refilling
Water/Sediment Control Basins
Well Setback Zones
Well Site Protection
Wetland
Wetland Protection
Wildlife Plantings
Willow Spikes
Windbreaks (Field, Farmstead, Feedlot)
Woodland Improvement
Woodland Pruning
Zoning