Introduction to Watershed Planning

adapted from
CTIC *Know Your Watershed*
guidance documents

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Introduction

Welcome to the *Introduction to Watershed Planning* module. The goal of this module is to introduce a flexible framework for watershed planning and point out key factors that help make planning successful.

Local planning processes generally address problems or may seek to protect or improve quality of life. Watershed planning is no different. Some watershed planning groups convene to address chronic problems like degrading fisheries, while others seek to address acute problems like contaminated mine drainage or heavy erosion along stream banks. Other planning efforts may bring together citizen groups, local agencies and states to work together on plans for community and environmental improvements. The degree of success achieved in watershed planning often depends on having people that can devote substantial time to the effort.

This module begins by taking a look at what's needed for developing a successful watershed plan - especially the kind of watershed group you will need to undertake this effort. The module then lays out the steps to produce a plan (Figure 1). The first phase of the process involves building partnerships and meeting the challenges to make them work successfully. The second phase is following the three stages of plan development and implementation. Much of this material is based on the Know Your Watershed guidance documents developed by the Conservation Technology Information Center (CTIC), with rewrites and additions tailored for broader audiences.
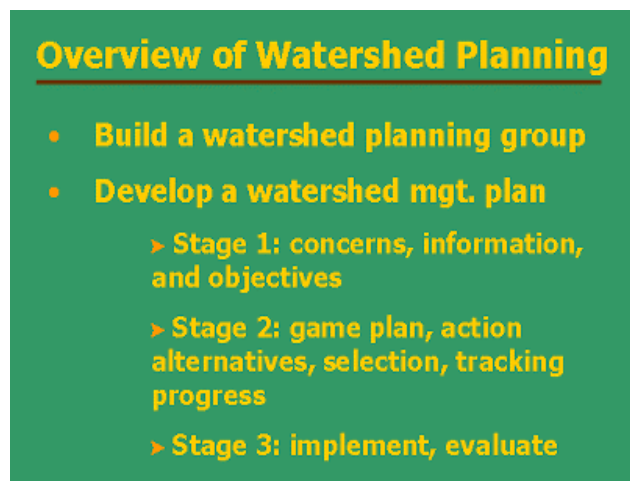
Overview of Watershed Planning

- **Build a watershed planning group**
- **Develop a watershed mgt. plan**
  - ➤ Stage 1: concerns, information, and objectives
  - ➤ Stage 2: game plan, action alternatives, selection, tracking progress
  - ➤ Stage 3: implement, evaluate

Figure 1

Your Watershed Planning Group

Watershed groups (groups and their members are the "you" to whom this module is addressed) may be concerned with a broad variety of problems or threats to many different watershed values - from degraded fisheries to loss of local scenic beauty to algal blooms. As you might expect, the scope and level of detail of plans that watershed groups will develop and implement will vary greatly depending on factors such as the complexity of the group's goals, the capacity of the group to create and carry out a plan, community viewpoints, and others. One size does not fit all; each situation presents its own problems and opportunities.   **(Continued on next page)**

Caveats about planning....

Planning is often much more variable than you might expect. In practice, it may not follow logical, consistent steps, or necessarily result in a published plan (Figure 2).

A classic paper from the planning literature is *The Science of "Muddling Through"* by Charles Lindblom (Public Admin. Review, 1959). In this paper the author points out that despite common guidance to make decisions very methodically, the decision process in reality seldom follows a set pattern. This remains true today: multiple viewpoints come into play in planning and executing any action. Perhaps the best way to view modern-day watershed planning is not as a cookbook with consistent recipes for success, but as a very flexible framework for hearing, evaluating, integrating, and building support from numerous viewpoints and proposals. The planning framework has a logical structure and steps, but its flexibility may be more important than taking every step literally and in sequence.

- **Waste allocation alternatives**
- **Watershed management**
- **Resource management**
- **Ecological restoration**

Although a logistical planning process is a good watershed management tool, the issues are usually so complex that planning must also be flexible to be successful.

Figure 2

Use this module's general planning process as a guide, then, not as a prescription. Keep in mind that what appears to be the orderly progression of steps may not be quite so neat when you actually carry out the process. You should be very careful not to jump to conclusions about solutions before your information is completely analyzed, but it may be difficult to persuade members of the group to delay addressing their goals and their proposed solutions early in the process. Establishing patience may be a crucial part of the group getting to know each other. Maintain as much flexibility as possible, consistent with working out solutions carefully. You may even take on part of the problems (perhaps the easier part) on a first time through the planning process, reserving some more difficult problems for a second round after you've had some success, comfort and confidence.

Getting Started: Building Local Partnerships

To maximize the likelihood of success of your planning effort and produce a plan that will get results, some preparatory work is highly desirable (Figure 3). But don't let it hold you up too long in getting started; you might lose your best time/opportunity for success, or lose the energy and commitment of your best partners.

Partnerships bring different people and organizations together to work on common interests and concerns, which is key to effective watershed management.

Figure 3

Before watershed planning can begin you will need to assemble a local partnership of concerned individuals, local agencies and organizations that have a stake in the condition of their watershed. You may already have a watershed group, but is it functioning like a planning partnership? First, and probably most important, carefully appraise the composition, strengths and maturity of the group. You may want to add members, or fill gaps where some watershed issue or a technical or communications skill is under-represented. Also, think about the place and people that are likely to be affected by a plan. Will the watershed/locality generally welcome your planning effort and its goals? Give some attention to prospective allies the watershed group hopes to enlist in the community.

Partnerships are key to effective watershed planning and management. Through a partnership, different people and organizations work together to address common interests and concerns. Partnerships vary with size, complexity, funding, supporting organization(s), strength of government agency participation, and skill mix, among other things. Developing a watershed management plan is not easy, but a partnership often has improved chances for success because key parties are involved from the beginning.
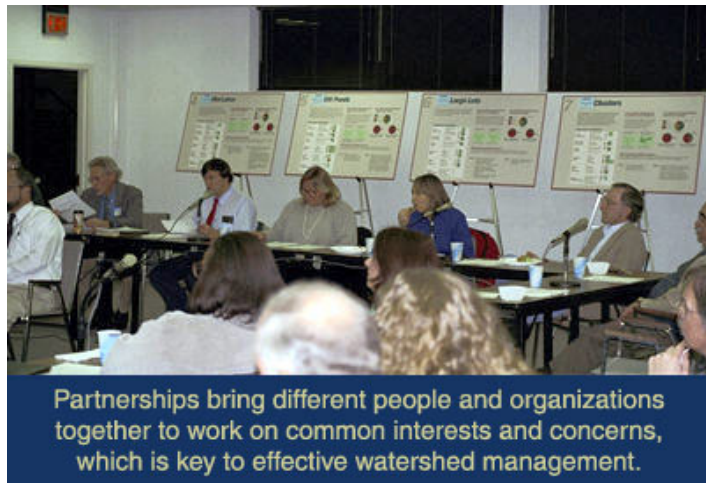
Partnerships often result in:

- More efficient use of financial resources

- A spirit of sharing and cooperation

- More equitable assignment of management responsibilities based on relative impacts to watershed resources

- More creative and acceptable ways to protect natural resources

- Eventual understanding of conflicting viewpoints.

Partnerships can also be challenging. It takes time and skill to create successful partnerships. Maintaining motivation and enthusiasm is another challenge, especially if positive results don't happen quickly. All the stakeholders must believe their efforts are needed. As you build a local partnership, you will encounter these and other challenges. Remember, the benefits of partnerships usually far outweigh the challenges.

Who Should Be Included In Your Partnership?

In short, anyone with a stake in the watershed management plan is a candidate for involvement in your partnership. Success depends on involving a good mix of people and organizations to put together and implement the plan (Figure 4). You will need to find people to play a number of roles, including:

- Technical
- Leadership
- Communication
- Education
- Political liaison
- Public policy

Success depends on involving a good mix of people and organizations who have a stake in the watershed.

Figure 4

A diverse group has a better chance of fulfilling these roles by bringing different talents, interests, concerns, and values to the table (Table 1). Some people who live outside the watershed may even have an important role to play because they benefit from or impact water or other natural resources within the watershed. Its important to realize that no matter who becomes involved in your effort, a successful partnership takes time to develop and you can expect some highs and some lows along the way.

Table 1

Partners	Roles
Civic Organizations	-Unifying force for citizens and community action -Familiarity, known leadership and organization - Helpful links to other community leadership
Landowners	-Very detailed personal knowledge of their land -Frequent long-term observation of stream conditions -Concerns about rights, access, impacts from elsewhere -Emotionally connected to land -Individual effect on watershed environment may vary
Public Lands Managers	-Scientific data -Very detailed personal knowledge of the land -Experience in land management techniques
Consulting Scientists and Engineers	-Scientific data -Scientific data and insights in informal data -Early detection of- possible problems and risks -Insights on costs of action alternatives -Source of expert assistance
Financial Institutions	-Influence over management decisions -Linkage with landowners -Prestige for partnership -Funding for partners
Farm Organizations	-Credibility and visibility for programs -Existing communication channels
Small Woodlot Management Groups	-May have developed management plans -Very detailed personal knowledge of their land -Good candidates for using Best Management Practices
Local Colleges and Universities	-Source of scientific information -Scientific and technical insights informal setting -Early detection of possible programs and risks -Insights on costs of action alternatives -Source of expert assistance -Political leadership and credibility -Land use and resource management decisions -Financial support for projects
Grass Roots River/Watershed Groups	-Enthusiastic volunteer monitors -Skills for writing grant proposals
Outdoor Recreation Clubs	-Familiarity with lands that are accessible -Some have very large membership, activist outlook -Events that can develop group camaraderie
Other Environmental Groups	-Dedication to environmental protection -Activist outlook
Cooperative Extension	-Expertise in education and outreach techniques -Expertise in natural resource management -Respected information source -Information and data
Soil and Water Conservation Districts	-Credibility within community -Expertise in natural resource management -Funding mechanisms -Awareness of issues and solutions
Water Treatment Plants	-Technical expertise -Funding mechanisms -Ability to monitor data
Newspaper, TV, and Radio	-Coverage of watershed events -Human interest stories -Understanding of local information needs -Ability to get information out quickly
Teachers and Students	-Influence over efforts in the future -Time and energy for "repetitive" tasks

Above all, your mix of members will need to understand the place and people that are likely to be affected by the plan. They will need to fairly consider the social and economic situation and community attitudes toward the issues. Give some attention to prospective allies the watershed group hopes to enlist in the community. Will the watershed/locality generally welcome your planning effort and its goals?

Some of the toughest choices may be about whether to include people with extremely divergent viewpoints. Should they be part of the group, in the hope that some understanding can be reached, or would they derail all hopes of making progress at all? Would a limited, more like-minded group make progress because of their consensus, or under-represent the interests of too many others in the watershed? There's no foolproof answer to these questions; you'll just need to give your own local situation very thorough consideration before making any decisions.

Building a Successful Partnership

Building a successful partnership takes skill, time and patience (Figure 5). Here are some specific strategies that will help your watershed group's chances of succeeding:

Identify and Involve the "Right" People

All people with a stake in the watershed (stakeholders) should feel welcome to become a partner. In addition, consider the following three distinct groups.

Building a successful partnership requires members with a common purpose and a commitment to achieving goals.

Figure 5

- Those who are BOTH affected by and interested in watershed protection

- Those who ARE affected, but NOT interested

- Those who are NOT affected, but ARE interested.

Select leadership from within

Leadership should emerge from among the members of the partnership. Someone will have to take the initial responsibility for getting members together. Once members are together, however, consensus regarding leadership will be necessary. Leadership or coordination involves the ability to get people to voluntarily commit to goals and accept responsibilities. A top-down approach will not generally work.

Build a common purpose

An important way to build a partnership is to develop a clear sense of your purpose through a statement. Partners should develop a concise purpose statement that defines general goals and responsibilities. A carefully worded statement will serve as a yardstick for decision-making, for

measuring progress and will provide motivation for high quality. Make sure all partners are comfortable with the statement. Steps to creating an effective purpose statement include:

- Ask for ideas from all partners
- Discuss the ideas and draft a statement
- Revise draft based on discussion
- Write a final statement
- Solicit statements of commitment from all partners
- Incorporate other local groups' goals where these can help build support.

This process may not be easy and will take time. Remember, it's important to keep the statement general enough to encourage widespread support, but specific enough to identify goals and measure progress.

Establish attainable goals

To accomplish the purpose statement the group will need to set short- and long-term goals. These goals should include general strategies (e.g., increase support of watershed protection). Goals for more specific activities will also be needed (e.g., series of newspaper articles, tree planting, etc.).

Focus on the future in setting clear and attainable goals. Partners should assume specific responsibilities to accomplish within a definite time frame. Partnerships often get stuck at this stage because past experience dictates what a group believes they can or cannot do. Do not let the past dictate the future.

Make best use of talents

Build the partnership around members' interests and strengths. Each member should be encouraged to contribute his or her unique talents. For example, some may be responsible for public contact while others will gather resource information. Individuals can provide new ideas and approaches. Yet, the group shares responsibility for decisions and actions, as well as for successes. All members should also be able to express their opinions and offer constructive criticism.

Encourage communication and participation

Successful partnerships are built on clear and open communication. Discussion both during and outside meetings should be honest and open. Partners need to listen to each other and provide constructive feedback. Balanced participation will also promote a spirit of trust and cooperation. Because each partner has an interest in the success of the partnership, each should participate in discussions and decisions. It is also important to agree on decision-making procedures that encourage participation. Most effective decisions are made by consensus. This doesn't mean that everyone will be completely happy, but that everyone can live with the decision and feel decisions are fair.

Set up a flexible organization

There is no single partnership structure that will work in every watershed. Instead, your group should determine how formal the partnership needs to be. Partners can meet on a regular basis or only be contacted as needed. Some division of labor and delegation of responsibility should be

set up to take advantage of resources and expertise. Build on existing community organizations, such as informal groups of land managers, formal organizations and other community organizations. Your local soil and water conservation district, natural resource agencies, extension, conservation clubs, Chamber of Commerce, service organizations (e.g., Lions Club or Jaycees) or a local business can provide valuable advice on organization and facilitation.

Subcommittees can be formed for activities such as media relations, fund-raising or demonstrations. Assignments might depend on the scope of the activities, goals and interests. They can also be organized to deal with specific resource management areas, such as soil erosion, recycling, manure management, storm sewer management or septic systems. It may also be necessary to include representation from more than one county depending on watershed boundaries. If the watershed is very large, the group may want to subdivide it into smaller watersheds with their own partnerships,

Know your capacities, skills and financial resources

As you enter planning, don't "bite off more than you can chew" - at least not much more! Don't skimp on your goals, but try to match your group's resources to their role in attaining those goals. That is, consider carefully the resources that are available to the group both to start and to finish the planning process. Review the technical expertise, experience and capacities of the group. Can you count on the members to provide what's needed, personally, or from their organizations, or by putting up financial resources to hire the technical skills and manpower needed over the course of the planning exercise? If government action will likely be needed, does the group have members from appropriate government units? It's particularly important to have core members of the group who are strongly committed to the goals of the planning, so that you can count on their work and perseverance if the going gets rough and others fade.

Cultivate trust

It will strengthen your basis for planning if your group has been meeting and working together long enough so that members know, trust and accept one another. This may take a year or more. Group tasks need a process for working together that feels feel comfortable - a process in which leadership and talents can flourish in an atmosphere of trust and productivity.

Why Partnerships Succeed

Partnerships are successful for a number of reasons. Your challenge is to determine what motivates people and make sure these motivations are met. Key reasons partnerships succeed include:

- Members enjoy working with others
- Partnership provides opportunities to meet new challenges
- Potential for professional and personal growth
- Sense of accomplishment
- External factors motivate involvement (e.g., public expectations, organizational mandate, job description)
- Members see a chance to address new challenges or expand their skills
- Members want to demonstrate broader abilities to their "home" organizations
- Community interest and support for the group runs high

Additionally, informal social interaction can provide the glue that holds a partnership together. Encourage these types of interactions and build on the motivations.

Why Partnerships Fail

Most people agree with the notion of partnership, at least in principle. However, partnerships may be unsuccessful for a variety of reasons, including:

- Past failures
- Lack of commitment
- Worry about lost independence
- Lack of credit for own contributions
- Personality conflicts
- Power struggles or turf battles
- Partners that do not agree on realistic roles and responsibilities
- Differences in cultural and personal values
- Community interest and support for the group is low, or very controversial
- Rigid attitudes about the problems or possible solutions
- Misunderstandings and incomplete communication

Some of the potential obstacles to success can be overcome by getting started "on the right foot" (Figure 6). Some helpful hints include:

- **Pay particular attention to the early meetings and activities.** First impressions mean a lot. People are often skeptical at the first meeting and may be suspicious of other partners.

- **Set some ground rules.** The group will probably need to set some specific ground rules related to meeting participation, discussion, confidentiality, constructive feedback and expected contributions.

- **Start with a few short-term tasks that have a good chance for success.** Be sure that early projects are realistic and will be seen as "winners" in the eyes of the partners.

The challenge of developing a successful partnership begins with proper planning and organization.

Figure 6

- **Challenge the group regularly with fresh facts and information.** New information (that you will be gathering as a partnership) will help to better understand your situation and improve your effectiveness.

- **Spend time together.** It will take time to get the partnership working effectively. Spend time (outside of meetings if possible) to get to know each other.

- **Use the power of positive feedback, recognition and reward.** People respond to positive incentives in the partnership setting just as they do as individuals.

Developing a Watershed Management Plan

After you have followed the steps for organizing a successful partnership and identifying your group's purpose in support of overall watershed goals, you and your partners will be ready to put together a watershed management plan (Figure 7). A plan identifies broad goals and objectives, describes environmental problems, outlines specific alternatives for restoration and protection, and documents where, how and by whom these action alternatives will be evaluated, selected and implemented.

Watershed management plans vary in scope of effort, geographical area, and objectives. Federal and state agencies, tribes, local groups and corporations might all be in partnership to develop a multi-objective watershed plan for a major river basin. A local government wanting to protect its drinking water supply may need to develop a plan with neighboring jurisdictions that are also situated within a medium-sized watershed. A local watershed association may be trying to solve a sedimentation problem associated with rapid development in a small sub-basin.

Watershed plans may vary as widely as watersheds do. A successful plan will integrate community interests with protection of natural resources and watershed process.

Figure 7

Whatever the scale, the most common, general goal of watershed management is to plan and work toward an environmentally and economically healthy watershed that benefits all who have a stake in it. By now, you and your partners have taken this into consideration in the development of the purpose statement for your group's watershed efforts. Once you and your partners have pulled together as much information as possible about your watershed, you're ready to start putting together a plan.

This process can be broken into three stages (Figure 8).

- **The first stage** includes uncovering concerns, gathering and analyzing information and data, defining challenges/opportunities, developing objectives, and documenting data and decisions.

Watershed Planning

- **Develop a watershed management plan**
  - ▸ **Stage 1:** concerns, information, and objectives
  - ▸ **Stage 2:** game plan, action alternatives, selection, tracking progress
  - ▸ **Stage 3:** implement, evaluate

Figure 8

- **The second stage** includes developing a game plan for addressing the objectives, selecting the best watershed management alternative(s), listing ways (strategies) for implementing the selected alternative(s), and determining how to measure progress.

- **The third stage** includes implementing and evaluating efforts.

Remember, your group's efforts will be based on the best available assessment of the natural, economic and social features of your watershed. It's unrealistic to hope to have all the information you'll need. Be sure to recognize, note and weigh missing information throughout the planning process.

Another key point to remember is that these stages are not always done in rigid order when opportunities arise in a different sequence. For instance, a volunteer group may want to monitor a stream while the watershed partnership continues to determine objectives or develop other strategies.

Stage 1: Challenges and Objectives

During this first stage the group will simultaneously identify concerns/problems and valued watershed features, seek and begin to analyze data, and establish objectives.

Identify Concerns

Your watershed partnership should identify and address concerns that may combine water and other natural resources issues, local economy, and social matters. Since it is sometimes difficult to separate perceived from actual problems, and environmental from non-environmental issues, all concerns need to be heard. If your group is to specialize in natural resources issues, your members as well as the other organizations and agencies you work with should be clear on what types of concerns you will address.

Figure 9

When identifying possible water quality concerns, you may want to check with your state water quality agency to determine the designated water uses for your watershed. Your group may also want to consider how the group envisions future generations using the natural resources within the watershed. Other key aspects to consider are some of the major economic forces. Who are the major employers? Where are they located? What are the trends? How can your group affect their future? How can your group influence the economic future of the watershed? How do the economic, social and natural resources elements of the watershed interact? What is the role of education, now and in the future?
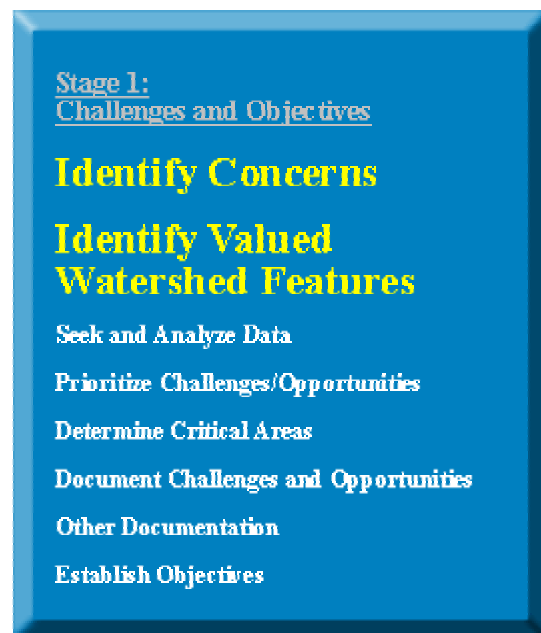
> **Designated water uses:** Water uses such as fishing, drinking water supply, and/or swimming and recreation that are assigned to a water resource and are protected through water quality regulations

During this phase all concerns, regardless how minor, need to be voiced while debate on the merits of the concerns is heard later. Only in this way will all concerns be recognized and the appropriate ones addressed.

Identify Valued Watershed Features

As part of developing your partnership, you considered and then chose an overall watershed goal or set of goals. You can now identify several characteristics of the watershed that are especially valuable ecologically, economically or socially, and help achieve and maintain broader watershed goals. These may be natural features that help give the watershed a sense of identity. For example, they may include landscape traits that symbolize the watershed, such as abundant old-growth forests, or mixed farmland and woodland settings. Or, an urban watershed group may especially value its watershed's greenways -- undeveloped lands that link natural habitats through suburban settings, or stream corridors whose natural surroundings are managed for recreation and avoidance of flood hazards. Or, valued features may include natural events such as an annual spawning run of fish such as perch, shad or salmon may have exceptional ecological, recreational, or cultural significance. Valued watershed features may be very diverse.

These valued features should be identified and weighed against the problems and concerns that are brought to the group's attention. The risk of negative impacts upon a valued feature of the watershed is a good basis for evaluating the concerns that are brought to your group and, later in planning, for setting priorities for action.

Seek and Analyze Data

Once stakeholders have listed all concerns, you and your group will need to combine similar subjects and seek information about the concerns. Many watershed partnerships have advisors or contacts who assist with technical questions. Other groups select a subcommittee to look into each concern and report back to the larger group. Some groups bring in consultants and conduct expensive assessments. Regardless of which way your group decides to go about it, be sure to make use of suitable existing data (e.g. water quality data, land use/cover information, point source data, etc.). The environmental data available will vary considerably from watershed to watershed depending on the extent of past monitoring efforts and resources.

Stage 1:
Challenges and Objectives

Identify Concerns

Identify Valued Watershed Features

Seek and Analyze Data

Prioritize Challenges/Opportunities

Determine Critical Areas

Document Challenges and Opportunities

Other Documentation

Establish Objectives

Figure 10

Prioritize Challenges/Opportunities

After listing concerns and exploring them by gathering and analyzing data, challenges and opportunities will surface. Unfortunately, there are usually not enough funds or time to address all potential watershed management needs. Priorities must be set that target efforts to the most critical problems/opportunities.
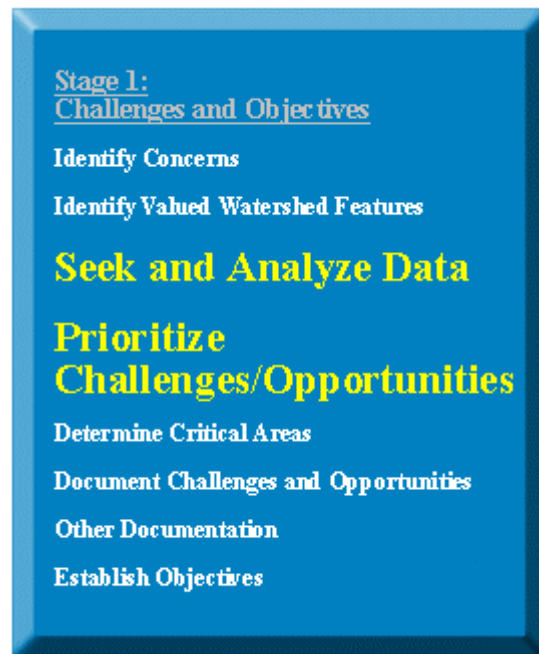
This is why your group will need to strive for consensus on prioritizing which problems/opportunities to pursue. Many groups begin prioritizing problems by establishing criteria. This might include:

Relationship to watershed goals and valued features. Ask yourselves if the problem may alter the watershed's character and condition, or if it poses a risk to some part of the watershed that was identified as a valued attribute. By considering this criterion, your group's priorities and actions are more likely to be consistent and support the watershed traits that are most highly valued, instead of reacting to one unrelated concern after another.

Ability to bring about change. Ask yourselves if the group has the kind of influence realistically needed to overcome the challenge at hand. Pick your battles.

Time between actions and results. Checking with your advisory team, try to determine the amount of time between when changes occur and when results can be seen. For example, it may take decades to see results from changes on the land that ultimately affect a deep aquifer, but changes near a stream bank may quickly affect the quality of the stream's water and the surrounding habitats.

Willingness to change. Ask yourselves if the reasons are strong enough to motivate those who may need to change, and whether any incentives or regulatory tools may be appropriate.

Cost/benefit ratio. Are the costs going to outweigh the benefits or are the benefits going to outweigh the costs?

Determine Critical Areas

Critical areas within a watershed are those areas that play a role in the watershed that is especially important to its ecosystems, to its people, or to both. Despite their important functions, they may or may not have been listed among the valued watershed features identified earlier. Vegetated areas next to a stream or lake, for instance, may not rank high among stakeholders' lists of valued watershed features, but they filter pollution, serve as important habitat, help control flooding, and can be critical sites for protection efforts. Or a critical area might be determined by major water uses such as water supply locations, recreational areas and fragile wildlife habitats. Your group may identify a number of areas throughout the watershed with vulnerable characteristics (e.g., unstable streambanks or shallow groundwater). Your goal in planning for critical areas is first to recognize what they are and where they occur, and then to maintain their greatest benefits.
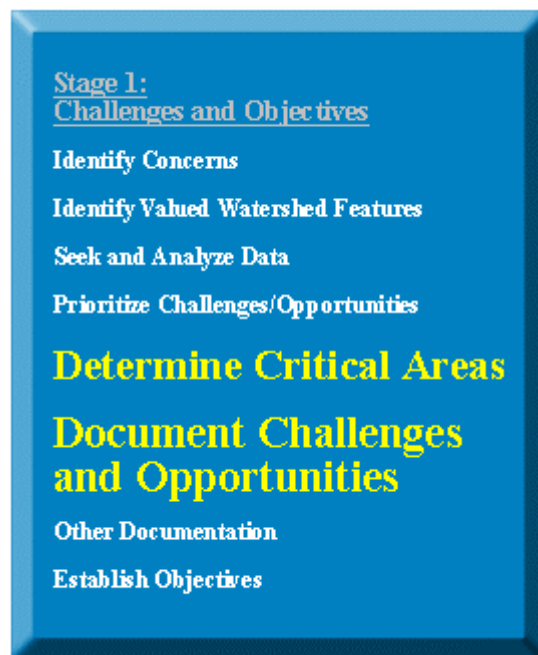

Stage 1:
Challenges and Objectives

Identify Concerns

Identify Valued Watershed Features

Seek and Analyze Data

Prioritize Challenges/Opportunities

Determine Critical Areas

Document Challenges and Opportunities

Other Documentation

Establish Objectives

Figure 11

Documenting Challenges and Opportunities

One of the most important steps in watershed protection is to correctly identify and document challenges and opportunities. A challenge is an obstacle that prevents positive changes on parts of society, the economy, or the environment. In contrast, an opportunity is a condition that can be created to make a positive effect.

By now your group has probably identified several problems and/or opportunities. These will need to be written down so future partners and prospective financial supporters will understand the situation. It may be helpful to document both the resource being affected and the existing condition. It also helps to describe damage in both economic ($20,000 annual loss) and resource terms (30 acres or 750 fish), where possible, although many very significant ecological, aesthetic, and recreational losses are poorly represented by dollar figures alone.

The challenge/opportunity statements should also include who, how, where and what is being affected. See examples listed below.

Hypothetical Examples of Challenge & Opportunity Statements

- Ocean-run Shad and White Perch fishing and related tourism in Blue Creek has been reduced due to turbid waters and sediment resulting from heavy soil erosion (Figure 12). Reduced tourism has resulted in approximately $60,000 annual loss in the local economy; reduced local recreational opportunities are not easily expressed in monetary terms.

- The city of Metropolis issued 14 water alerts warning the young, elderly and others with weak immune systems. The cost of issuing the alerts was $78,000. In addition, area hospitals report 6 cases of people seeking medical attention at the time the alerts were issued.

Stream bank erosion

Figure 12

- Good Lake currently is the seasonal home to more than ten species of migratory ducks including three that are being monitored for population decline. According to the last five surveys, the population is staying level. The watershed contains many landowners of retirement age, and thus demographics and land use patterns may change in coming years. The group wants to prevent changes in the watershed, which might negatively affect the migratory ducks.

Other Documentation

In addition to problem/opportunity statements, all data and other information gathered during this initial phase needs to be well organized, tracked and stored. Maps, scientific measurements, incidental reports, and other types of information will all need to be included. Basically, be sure to include anything that would help a new partner understand the quality of each information source, and how and why the group has made its decisions based on the available information. The maps and other data will probably be needed later when you are developing brochures and other educational tools for your group's plan and presentations.

In addition, if the group tries to obtain outside financial assistance, the documentation will be needed to support the request for funding. Having documentation makes it easier to put together a proposal on short notice, such as when

Figure 13

a new funding source is located or when "opportunity knocks" with a short time for getting the application or grant request submitted.

Establish Objectives

Once your problems/opportunities have been defined and documented, establishing objectives is relatively easy. The main purpose for establishing objectives is to focus and guide the planning actions the group will undertake. Remember these points when establishing objectives:

- Describe the objective in measurable terms (i.e. reduce soil erosion on forested land by 60%, reduce nutrient runoff from agricultural sources by 50%, or reduce sediment loads from urban construction sites by 30%).

- Recognize the objective may change later as more information becomes available. For instance, an initial objective may be to simply "increase trout population." Later your group will have the necessary information to refine the objective to "increase trout population by 225%."

- Existing regulations and legal constraints need to be considered, both as limits to management alternatives and as tools for helping achieve goals.

- Consider all views of those with a stake in the watershed, and seek consensus on how the group envisions the watershed's future.

- Keep objectives acceptable and achievable. Partners need to ask themselves if they can support the objective and if they think it can be done.
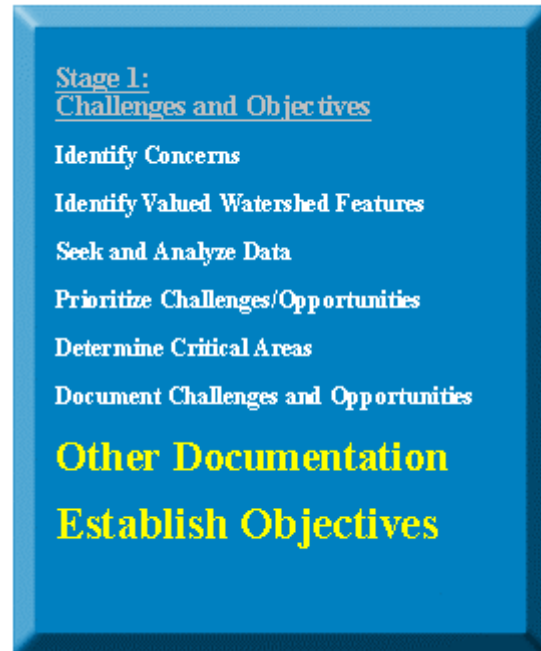
Stage 2: Developing the Plan

The emphasis during the plan development stage is to develop and analyze alternatives and then come to consensus on a game plan that everyone in the partnership can accept. The following segment of this module briefly describes a general approach for selecting the best management alternatives for your watershed.

Selecting Management Alternatives

The first step in selecting management alternatives is to draft a list of management alternatives that could help achieve the objectives (see Selecting Management Alternatives example below). Many watershed partnerships rely on their advisory team to assist them with this. It's important to list several alternatives, but do not try to rank them at this point. Next, using your advisors' help, try to determine the effectiveness of each of the alternatives. In this initial screening process, have the

Figure 14

group consider economic, social, and environmental factors. Keep in mind that alternative selection is just beginning at this point, and may require substantial time and effort to get the information you need to make good decisions. The importance of selecting a good management alternative more than justifies spending significant time and funds on alternative evaluation and selection.

Selecting Management Alternatives: The first list of options may be long and varied. For example:

- Contour strips
- Conservation tillage
- Construction site erosion control
- Filter or buffer strips
- Reduced dumping of oil and/or chemicals in storm sewers
- Terraces
- Nutrient management
- Pest management
- Tree plantings
- Irrigation water conservation
- Home water conservation
- Septic system maintenance
- Alternative livestock watering sources

- Roadside erosion control
- Enterprise zones
- Prime farmland protection
- Private/rural road maintenance
- Storm water management
- Streambank stabilization
- Constructed wetlands
- Rotational grazing
- Riparian zone management
- Land acquisition
- Low impact design for residential, commercial, and industrial development
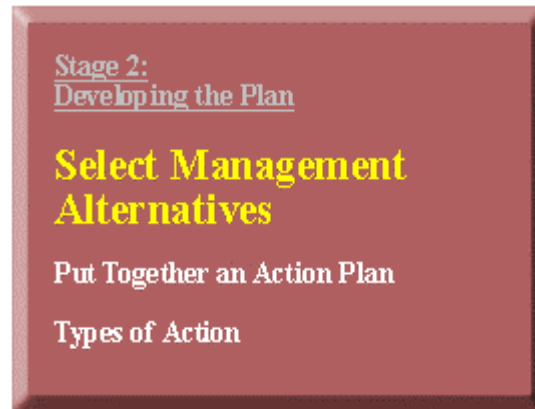- Density zoning

Watershed computer models (Figure 15)
Your advisors may use a watershed model or models to help them understand the relationships within a watershed. Different types of models allow you to study different aspects. For example, one model may look at surface runoff of nutrients and pesticides while another might compare the economics of management practices. The advisors might have to use several models to address both economic and environmental concerns within your watershed. For more detailed information on the use of models to support watershed planning, see the Watershed Monitoring Module (http://www.epa.gov/watertrain/monitoring) or the Introduction to Watershed Modeling Module (http://www.epa.gov/watertrain/modeling).

Figure 15

Models are just the beginning....
Watershed models aren't an end product, but a tool for evaluation. They allow your group to compare model results representing watershed conditions under the different management alternatives. This is done to see what might be the most economically and environmentally effective -- a process called evaluating "what-if scenarios". The partnership should use not only the scientific results of the models but also consider the social acceptability of those results, and other factors.

Don't forget to document!
Be sure to document the alternatives and corresponding advantages/disadvantages by adding this information to the other watershed plan documents. The information may be needed later when you are implementing your group's plan. In addition, if the group tries to obtain outside financial assistance, the documentation will be needed to support the request for funding.

By now you and your partners have come to agreement on a general vision for the watershed's future. You have set objectives and selected management alternatives for achieving those objectives. Now attention needs to be focused on how to make the selected alternatives a reality. Most watershed partnerships begin this process with an Action Plan.

Putting Together an Action Plan

An Action Plan is simply a list of the actions the group decides to do, who is responsible and when it's to be done. To put together an Action Plan, first list all objectives. Under each objective, list the selected management alternatives. Once all the selected alternatives have been listed, leave space for actions, responsibilities and time periods. Make copies for each partner and brainstorm action items as a group. This will get partners thinking about ways to get the job done. Partners may want to take the papers home and fill in the blanks. Set a time for the partnership to get back together to

Figure 16

share their thoughts. When the group completes this activity, record everyone's action ideas in one place. Partners then combine similar actions and select the top choices for each of the selected alternatives. These actions become the partnership's focus.

Next, an individual or small group needs to become responsible for each action. This is a good time to involve groups who haven't been as involved as they would like to be. After responsibilities have been determined, a realistic time period for completing each action can be set. Be sure all groups involved understand their responsibilities and the time frame, especially for those actions whose completion is essential before starting other actions.

Types of Actions

There are four main types of actions in which most watershed partnerships consider becoming involved:

- ➢ Information/education
- ➢ Technical assistance
- ➢ Funding
- ➢ Regulatory
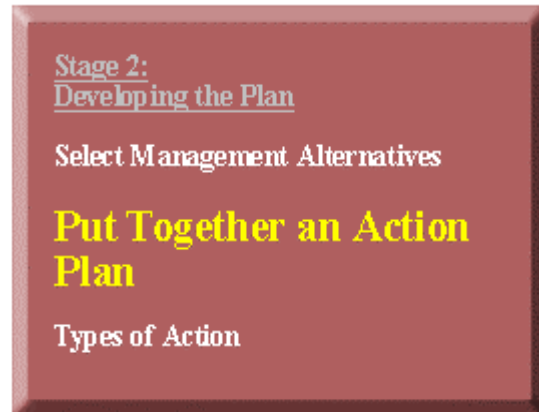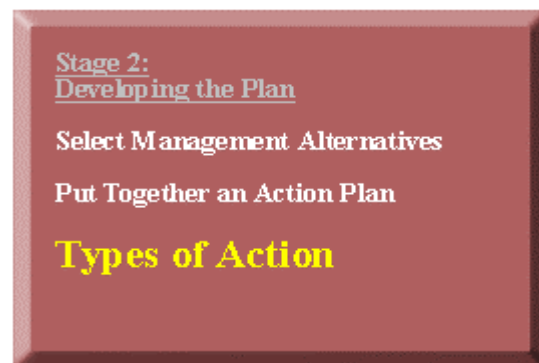

Figure 17

Information/education (Figure 18). Most people start with a fairly negative impression of what they do not yet understand; this impression will not usually change if they are not provided new information. Proposed activities in a watershed need to be backed by clear information, provided early in the process to the people potentially affected by the activity. Few people will make

changes without understanding what changes need to occur, why change is needed, how to make the change, and how the change will affect the individual. Outreach can be one of the most effective activities carried out by watershed partnerships because it counteracts "fear of the unknown." Approaches may vary, but a watershed plan should always include some elements of outreach to provide critical information to key audiences in the watershed.

Figure 18: Public education is a vital component to a successful water quality management program. Stormdrain stenciling teaches citizens not to dump pollutants such as motor oil, fertilizers, and trash into stormdrains and ultimately into the nearest waterbody. Other education tools aimed at protecting valuable water resources include brochures, waterway clean-up events, and adopt-a-stream volunteer groups.

Technical assistance. Many watershed plan development efforts need more than just information and outreach, but also require some type of technical assistance. This may take many forms, ranging from one-on-one discussion or clarification of a minor technical point, to activities like design and implementation of a major restoration project. The group should be sure that they fully recognize the level of technical expertise, and related costs, for any action they consider.

Funding as a management tool. Funds may be needed to compensate landowners in order to accomplish certain types of management alternatives. For example, a landowner may receive money or partial tax abatement in exchange for outdoor recreational access, implementing a better land management practice that will increase his costs, or avoiding disturbance of important ecological features such as unique habitats. Many watershed partnerships include cost-share and other forms of financial assistance in action plans.

Regulatory action. Local ordinances, zoning or other types of regulation can be effective options to consider as planning tools. Zoning has been used for decades as a tool for maintaining a locality's desired character, by guiding land uses into certain areas and away from others. More specific ordinances may address a pattern of activity that has created past problems -- a streamside protection ordinance, for example, may exclude new housing or trailers from areas where flooding has caused losses and cost the government emergency response funds in the past. An effective inspections/monitoring program and enforcement may be needed to support regulatory activities.

Stage 3: Implementing and Evaluating

Funding Your Actions

Some of the actions your group has selected will require little if any money. Often actions require donated time or materials from local individuals, organizations, businesses or industry. The more complex management actions--like cost-share incentives, or implementing technical projects -- do require funding. This is when your group will need to explore funding options.

Locally led planning is typically limited by available funding more than by any absence of ideas or initiative (Figure 20). Obtaining funding to support your management alternatives may seem difficult at first, or local funding may seem limited or hard to obtain. In fact there are many outside sources of grants and other funding that your group can approach with a proposal.
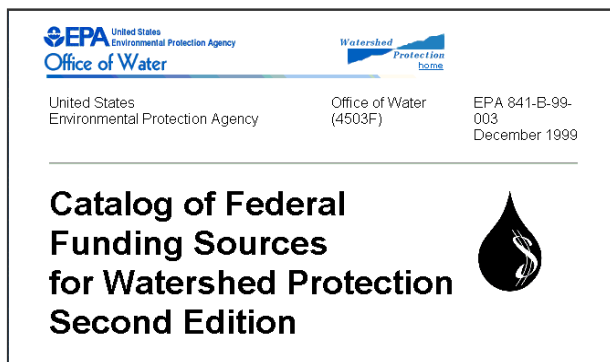
Figure 19

Figure 20: This EPA document on federal funding sources can be found at http://www.epa.gov/owow/watershed/wacademy/fund.html.

Funding for your watershed effort might be found in established federal and state programs. Most small-scale watershed groups, however, start by looking for funding locally. Local utilities, non-profit organizations, municipalities, and others have funded watershed management actions. This is also a good time to ask for assistance in putting together a workshop on grant proposals. Invite local and state specialists to inform your partnership on the art of grant writing. Some organizations are available to conduct workshops specifically on this topic.

Prioritize Actions

It won't take long to list more actions than your group can possibly do, and the group will need to reevaluate priorities. When prioritizing, be sure to consider the following:

- Funds available
- Return on funds to be invested
- Time and other non-financial resources
- Ability to get the action done
- Early successes motivate more action
- Some actions rely on other actions for success

Be sure to include your advisors in this process. They may have experience in determining which actions depend on others and how to get the most return on your investment. For example, it's

important to get preventive actions (such as erosion control practices described below) underway before taking restoration actions (such as dredging the previously eroded sediment out of a lake).

Erosion Control Practices

Figure 21

Strip cropping is a conservation tillage practice used to control erosion from agricultural lands (Figure 21). By alternating contour-plowed strips of row crops and close grown cover crops, farmers decrease the likelihood of soil detachment and erosion caused by concentrated runoff.

Figure 22

Riparian buffer strips preserve the natural stream bank vegetation and allow pollutants (nutrients, sediment, pesticides, etc.) in runoff from neighboring land uses to be filtered by the soil and vegetation (Figure 22). This reduces the impacts of nonpoint source pollutants and protects water quality in the adjacent stream, river, or lake.

Figure 23

Eroding stream banks can contribute significant amounts of sediment to the water and streambed and can also reduce riparian cover (Figure 23). Structural (riprap, wood, rock gabions, etc.) or vegetative methods can be effective in reducing stream bank erosion.

Silt fences, soil cover techniques, and revegetation are examples of construction best management practices (BMPs) designed to control sedimentation and erosion and minimize the impacts of land disturbing activities (Figure 24).

Figure 24

Measure & Report Progress

Your watershed partnership needs to consider how to evaluate the effectiveness of activities that are part of the plan, and how well they represent progress toward the objectives. Unfortunately, many opportunities to learn from successes or failures are missed when groups do not evaluate their projects' success. Specific commitments to track effectiveness should be included in the Action Plan.

Monitoring to track project effectiveness can range from the use of expensive and highly accurate scientific instruments to very low-cost measurements that are simple and inexpensive (Figure 25). Sound scientific monitoring techniques are appropriate for tracking larger and more complex activities. Low-cost, low-tech approaches may provide less accurate information, but are very useful for getting people involved and interested in the watershed's condition. For instance, turbid water can be measured with a simple Secchi disc, and pH can be measured with a pH strip or an inexpensive pH meter. Popular wildlife such as birds can be tracked by conducting an annual count or breeding bird survey. Depending on the objectives of the plan, more sophisticated data collection and measurement techniques may be utilized, such as laboratory analyses fo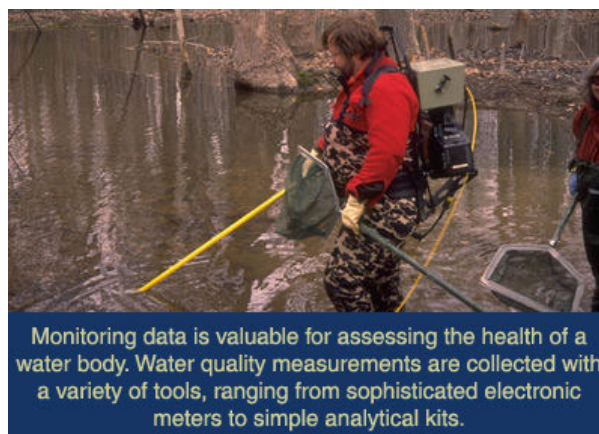r metals, pesticides, or toxic compounds. Additional guidance on indicators and monitoring is presented in the Watershed

Monitoring data is valuable for assessing the health of a water body. Water quality measurements are collected with a variety of tools, ranging from sophisticated electronic meters to simple analytical kits.

Figure 25

Monitoring Module (http://www.epa.gov/watertrain/monitoring)

The methods used for measuring progress should be carefully considered by the watershed partnership with their advisors' technical guidance. Partners may also want to ask for technical assistance from local conservation groups, science teachers, extension specialists, or other local or state technical staff. You may also wish to enlist a youth group, lake association, conservation group or other group as volunteer monitors. It's very important to report progress back to both the partnership and to the community. When everyone sees progress, they will continue to work toward making the plan a success.

Turbidity: Turbidity is the degree of clarity or cloudiness in the water. Turbidity in water is caused by the presence of suspended particles such as clay, silt, organic matter, plankton, and other microscopic organisms.

Secchi disc: A Secchi disc is used to measure turbidity in surface waters. The disc is typically about 8 inches in diameter, divided in black or white quadrants, and attached to a marked string. The disc is lowered into the water until the outline is no longer certain and the resultant depth is recorded off the string. The clearer the water, the deeper the disc can be seen and hence the lower the turbidity.

pH: The pH of a substance is an index of the amount of hydrogen ion present. A pH of 7 is neutral, pH values greater than 7 are considered alkaline (basic), and pH values less than 7 are acidic.

Review the Plan

As seasons go by, the watershed partnership will need to review the plan. Be sure to ask the tough questions like, do we still need to do this? Why? What else can we do? Has our vision changed? Do we have new or additional information that will change the objectives or selected alternatives? What has been successful? Why? What could have been improved? How?

Once these questions have been answered, you can better refine your group's objectives as well as the management options to address them. In this way, the watershed plan is always evolving and adapting to new and improved information, addressing new issues and making progress.

Figure 26

Celebrate Success

Whether it's the 500th fishing license or the 20th mile of streamside buffer or the sighting of the 50th wild turkey or the first measured improvement in water quality, it's important to celebrate. This gives the partnership a feeling of accomplishment. But more importantly, it gives credit to everyone who did their part in managing the watershed for the benefit of the community.

Now that you have successfully completed the module, you can evaluate your understanding by taking the test on the following page.

Self Test for the Introduction to Watershed Planning Module

After you've completed the quiz, check your answers with the ones provided on page 28 of this document. A passing grade is 7 of 10 correct, or 70%.

1. A partnership is the easiest way to develop and implement a successful watershed management plan because they often result in:

☐ A.   Automatic funding from the USEPA

☐ B.   More creative and acceptable ways to protect natural resources

☐ C.   Venues for meeting new people

☐ D.   New regulatory programs to protect water resources

2. Which of the following strategies is not recommended to help your watershed group's chances of success:

☐ A.   Select leadership from outside the group

☐ B.   Build a common purpose

☐ C.   Encourage communication and participation

☐ D.   Establish attainable goals

3. Which of the following groups might have an interest in developing a watershed management plan:

☐ A.   A state agency charged with monitoring and protecting water quality statewide

☐ B.   A federal agency, such as the US Forest Service, assigned to protect national resources

☐ C.   A small community that uses the nearby lake for recreation

☐ D.   All of the above

4. Which of the following is a criterion that a watershed group might use to prioritize concerns:

☐ A.   Involvement of outside contractors

☐ B.   A cost/benefit ratio

☐ C.   Survey of local high school teachers

☐ D.   Proximity to paved roads

5. Which statement is not true about the use of computer models in watershed planning:

☐ A. Models can help in understanding cause and effect relationships within a watershed

☐ B. Models can be used to compare management plan alternatives

☐ C. Computer models are always cost effective and easy to use for planning purposes

☐ D. A computer model can represent a real watershed

6. What should the planning group do when presented with an opportunity that does not fit into the group's recently adopted watershed plan?

☐ A. Take advantage of the opportunity immediately, before it is lost

☐ B. Reject it since it was not addressed in the plan

☐ C. Appoint a committee to begin amending the plan

☐ D. Pursue the opportunity if group members strongly feel it advances the overall goal of the plan

7. Which of the following is *not* one of the four main types of actions that most watershed partnerships consider:

☐ A. Information and education

☐ B. Technical assistance

☐ C. Regulatory action

☐ D. Confrontation and protests

8. As described in the module, obtaining funding can be a very important part of the watershed plan and its implementation. The module provides funding suggestions, including:

☐ A. Seeking donations of time or materials from local individuals, organizations, business, or industry

☐ B. Submitting grant proposals to the state garden club

☐ C. Charging registration fees to stakeholder committee members

☐ D. Implementing a new tax on riparian property owners

9. The partnership needs to consider how to evaluate the effectiveness of the plan and the progress toward the objectives. Which of the following is not considered a commonly used indicator of progress:

☐ A. Water quality measurements

☐ B. Wildlife inventories

☐ C. Property valuations

☐ D. Management practices adopted

10. An important step in watershed planning is to regularly review the plan in order to:

☐ A. Evaluate what actions have been successful

☐ B. See who has not contributed to progress thus far

☐ C. Amend monitoring results to better reflect professional opinion

☐ D. Ensure that no part of the plan has been changed

Answers for Introduction to Watershed Planning Test

Q1: B   Q2: A   Q3: D   Q4: B   Q5: C   Q6: D   Q7: D   Q8: A

Q9: C   Q10: A