



Statewide Watershed Management



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Environmental managers in today's world face tremendous challenges in carrying out their environmental protection, restoration, and management functions. Frequently constrained by inadequate budgets or staff downsizing, managers also feel pressured to meet new expectations to address increasingly complex environmental issues in ways that will not inhibit a growing economy. Decisions must often be made with limited scientific or technical information. It is often difficult to identify true priorities. Additionally, problems such as controlling nonpoint pollution often extend beyond the purview of any single management program, requiring coordination among a myriad of public and private entities with a stake in the outcome. Many environmental managers are searching for a better way of doing business.

This tutorial will show how many of these challenges are being addressed through the development and implementation of statewide watershed management frameworks. The approach is based on some common-sense techniques such as:

- Using watersheds as a context for assessing and managing water resources.
- Strengthening internal programmatic links and relations.
- Strengthening external relations by enlisting and involving stakeholders.
- Targeting and leveraging funds and personnel.
- Using a management cycle to update priorities and action plans.
- Using scientific information in support of more defensible, cost-effective management decisions.

After describing the key components of statewide frameworks, the tutorial summarizes some important lessons learned by states that have pioneered the approach. Additionally, some key challenges to building and implementing a statewide framework are presented, along with tips for meeting these challenges.

Part 1. Why Have Statewide Frameworks Emerged?

Need for Integrated Management

Management of the environment in the United States has traditionally been approached by creating separate programs for the major media - air, land, and water. Policies, programs, and regulations have been developed at the federal, state, and local levels for each of these environmental areas. Such efforts have resulted in reduced pollutant emissions to our air and water, improved design of landfills, remediation of hazardous waste and contaminated groundwater sites, protection of rare and endangered species, design of best management practices to control water and contaminant runoff, and a host of other achievements.

Even though as a nation we have made progress in numerous areas, significant problems remain. Particularly vexing are nonpoint source pollution and habitat degradation, problems that are

responsible for most of the water quality use impairment throughout the United States (EPA, National Water Quality Inventory [305(b)] Report, 1996). One reason these problems still exist is that they are complex and hard to manage. The causes of nonpoint source pollution and habitat degradation frequently cut across program purviews. For example, water quality program managers rarely have land and air program management authorities to deal with land management practices and atmospheric conditions affecting water quality and aquatic habitat. It's becoming clear that we need to apply a more integrated approach to management - one that allows managers to understand the interactions between environmental components and that facilitates joint or complementary actions toward the one common goal, ecosystem integrity (Figures 1 and 2).

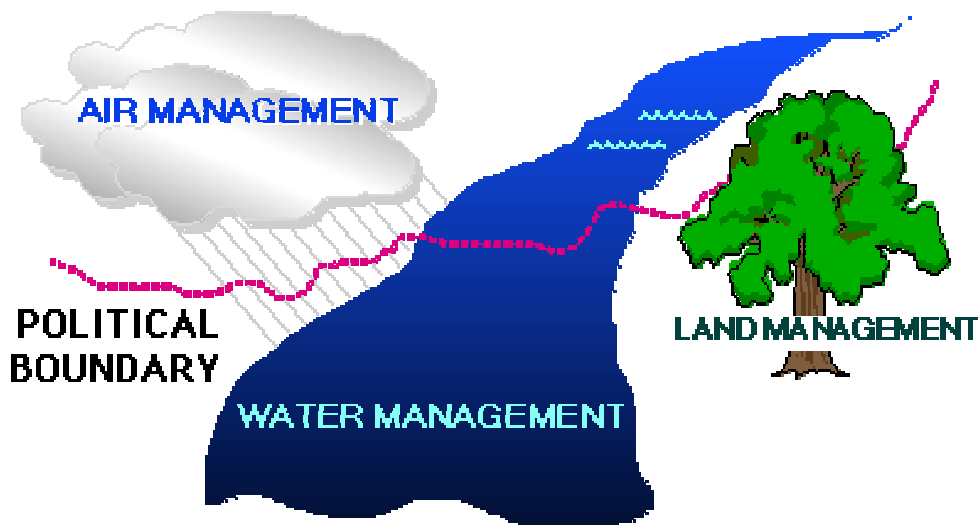


Figure 1. Problems often cross boundaries

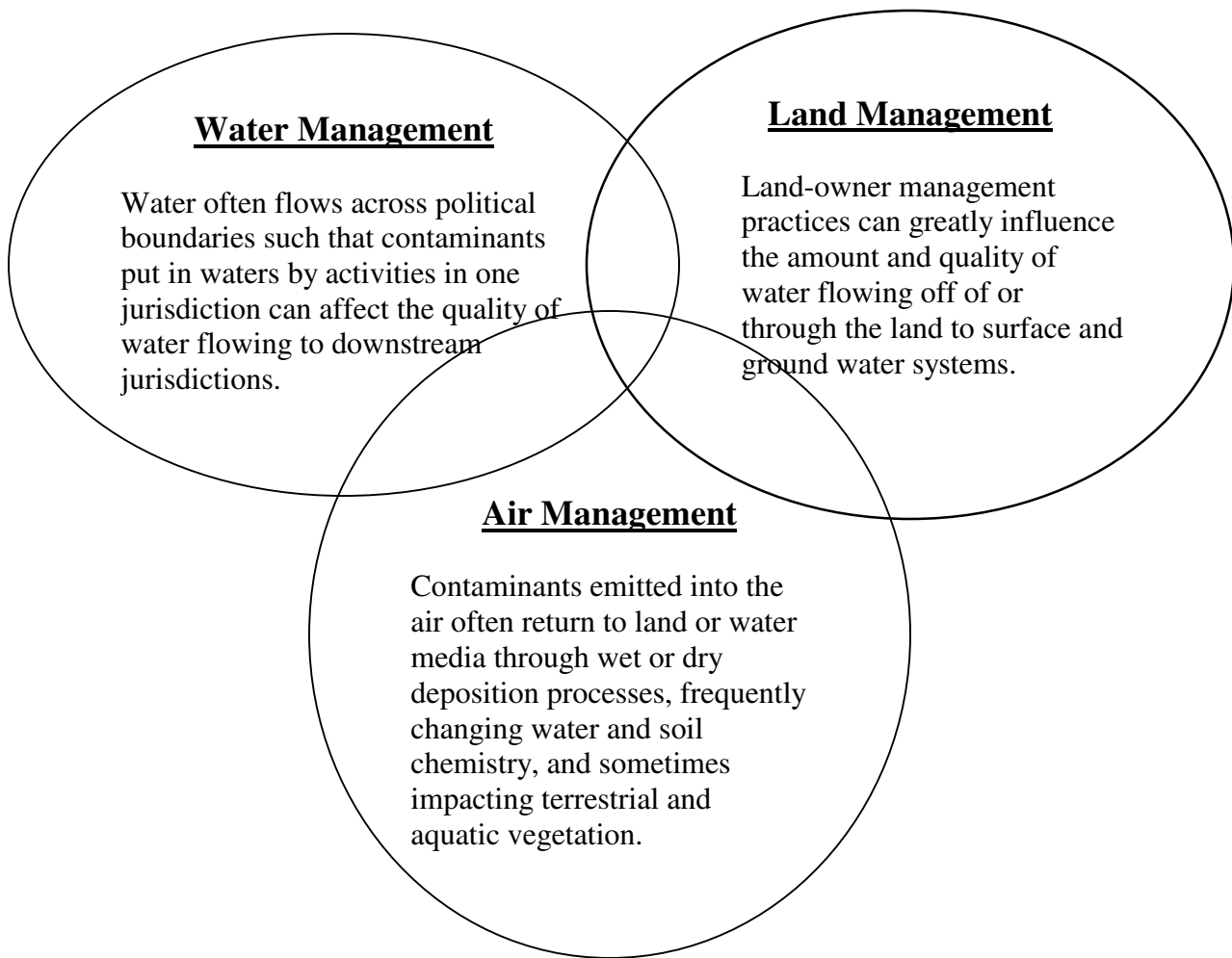


Figure 2

Watersheds Make Practical Management Units

The Emerging Framework

Watershed management is the emerging choice of many organizations to integrate and coordinate efforts. A common definition of a watershed is " an area of land from which all surface and ground water flows from higher elevations downhill to a common body of water such as a stream, river, lake, wetland, estuary, or ocean." In essence, watersheds are landscape units that integrate land-, air-, and water-related ecological processes. This, along with the fact that watershed boundaries can be identified with relative ease, makes watersheds practical management units for integrating efforts (Figure 3).

Environmental managers throughout the nation are acknowledging this practicality by designing and implementing watershed approaches that build on existing management initiatives and programs and offer new management opportunities to get closer to the goal of ecosystem

integrity. Thus, watershed management frameworks represent a new way of doing business with existing programs rather than a new set of programs.

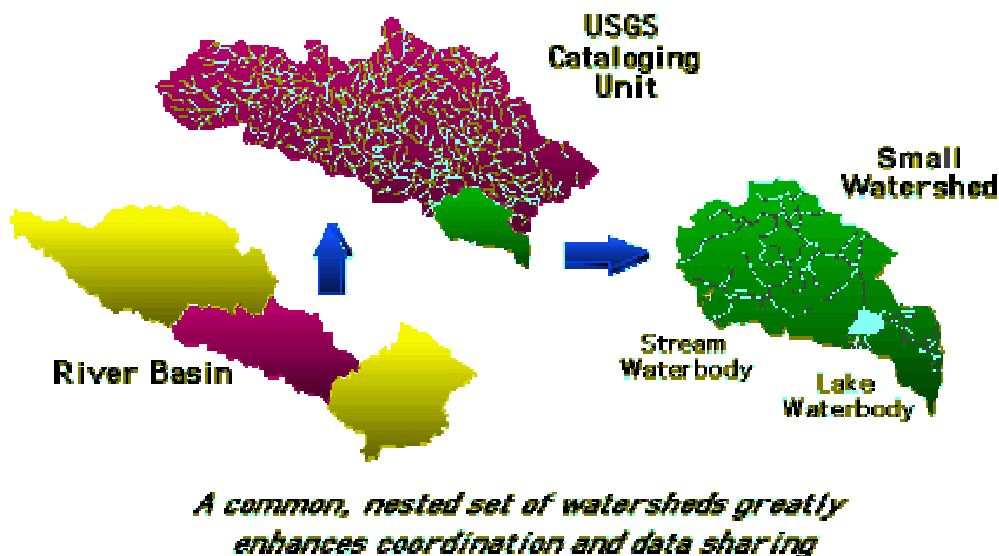


Figure 3. Watersheds make practical management units.

Defining Watershed Management Framework

There is not a single blueprint for a watershed management framework. Frameworks are usually designed and built to meet specific conditions and needs (Figure 4). For example, the components of a local watershed framework designed to protect a municipal water supply might differ substantially from a statewide framework based on broader ecological restoration and protection goals.

Because watershed management needs are ongoing and ever-changing and therefore cannot be addressed by a one-time planning effort, those involved in or affected by management need an organized framework for coordinating efforts over time. Put simply, a watershed management framework is **"a lasting process for partners working together"**. The process can include agreed upon activities to work on together, timelines, operating procedures, and ways to communicate with each other, such as computer links and shared forums. The agencies, organizations, and individuals that work together to build and implement frameworks are referred to as "partners." To ensure that the process moves from paper agreement to daily operation, most frameworks include a support structure of coordination forums that make it easier for partners to work together to meet shared management goals.

This tutorial focuses on one type of framework that is flexible to many needs - the Statewide Watershed Management Approach.

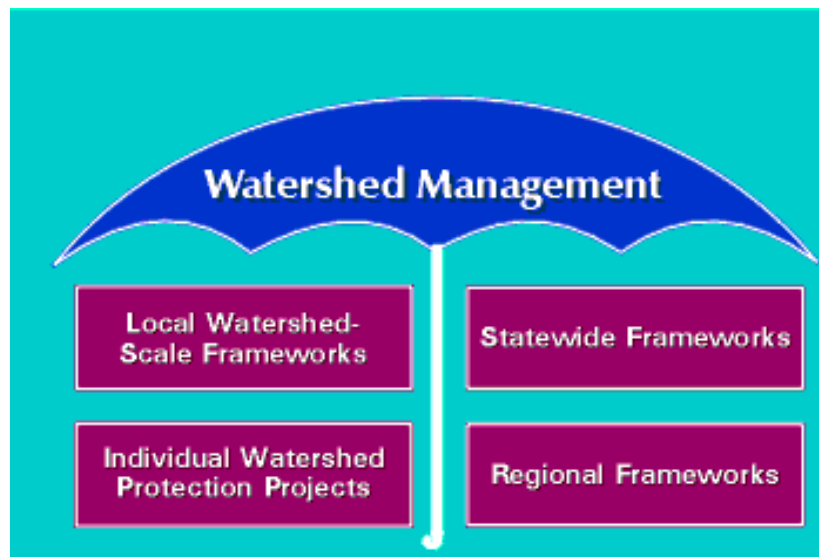


Figure 4. Multiple framework types.

Reasons for Developing Statewide Frameworks

Figure 5 shows a map of states known to be implementing or developing statewide watershed management frameworks. There is no federal mandate requiring states to take this approach. These states, on their own, are switching to watershed-based frameworks as a better means to:

- **Build on Sound Science.** Management decisions can have costly impacts; decisions based on poor information can result in destruction of ecosystem components and functions, or overprotection of resources at extreme expense to certain parties. Frameworks emphasize strong monitoring and assessment efforts to produce sufficient, accurate information that increases understanding of watershed ecosystems and their responses to human activities, supports informed decision-making, and gauges progress toward restoring or protecting watershed resources.
- **Strengthen Communications and Partnerships.** Communication among people and organizations involved in or affected by management decisions (stakeholders) is essential to an effective watershed approach. Stakeholders are more likely to support solutions where they've had a voice in how they spend their time and funds. Watershed management frameworks provide forums to enhance communication and build working relationships that can bloom into long-term partnerships.
- **Produce Cost-Effective Management Solutions.** In a time of shrinking budgets, there is an ever-increasing need to assess problems comprehensively, set priorities, and target funds and efforts toward where they will best achieve goals and objectives. Frameworks provide the means to meet these needs, with emphasis on making the most of limited funds and available time.

This tutorial briefly summarizes the components these state frameworks have in common.

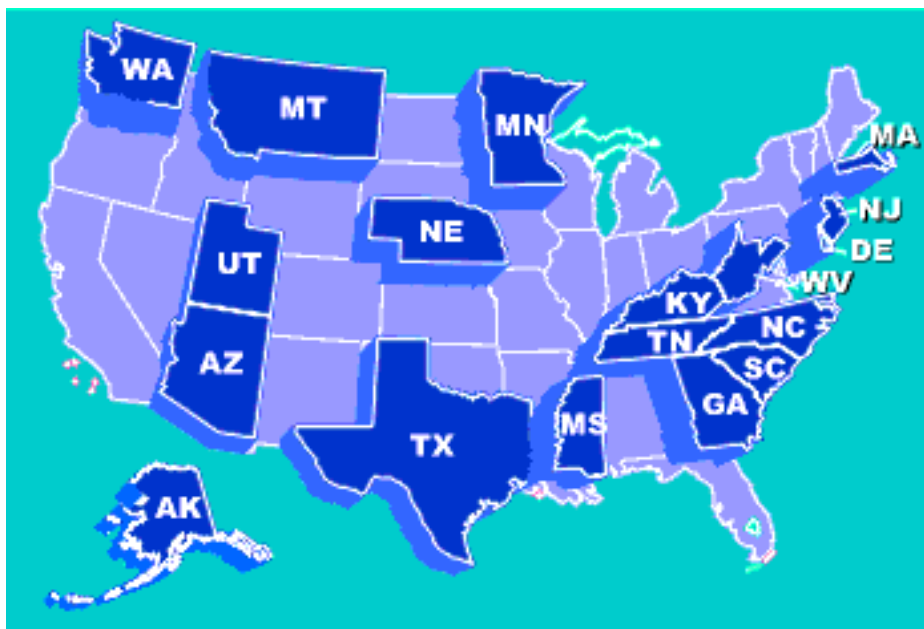


Figure 5. Summary of states developing or implementing a statewide approach

Part 2. What Constitutes a Statewide Framework?

Statewide Framework Components

There are three primary components to most statewide frameworks- geographic management units, stakeholder involvement forums, and a management cycle (Figure 6). These three components help to bring a sense of order and organization for managing a dynamic world within each basin. Each component is described in more detail in the slides that follow.

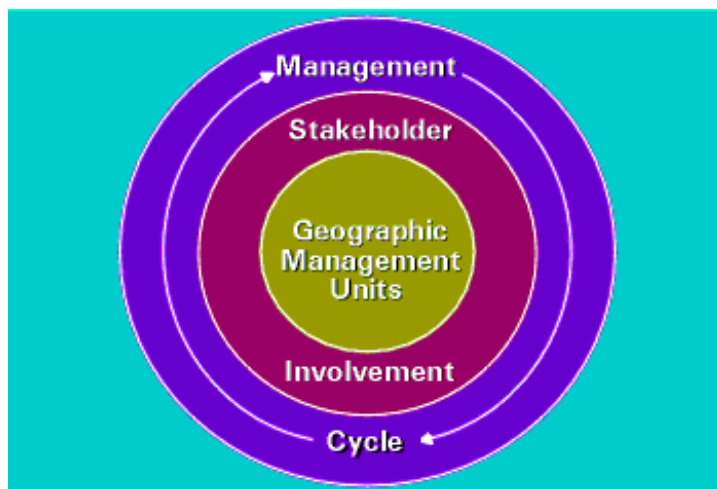


Figure 6. The three primary components of a framework

Component 1. Geographic Management Units

Geographic management units provide the spatial basis for coordinating all watershed management activities within the area covered by the framework. At the statewide level, geographic delineation (dividing up the geography into manageable geographic/hydrologic units) is achieved by first defining relatively large management units such as major river basins. See the South Carolina example presented in Figure 7. Most states delineated major river basins years ago and therefore have an existing base to work from.

Basins are a good basis for statewide coordination among local, state, and federal partners because they enable use of economies of scale. For example, most agencies and organizations that cover a broad area (e.g., region or state) do not have enough personnel to work in every local watershed at the same time. Having large basin management units makes it possible to stagger partner activities statewide, focusing data collection in one part of the state while focusing data assessment in another part, prioritization in another, and so forth. Another important feature of the statewide approach is strategic screening within the large basins to focus intensive efforts on priority issues and priority subwatersheds (smaller watersheds within the basin targeted for collaborative action, using partner-defined criteria). This staggering of activities and zeroing in from large basin to priority subwatersheds allows more efficient use of human and financial resources. The statewide partners rotate through each major unit to cover the entire state over a specific period of time. (More discussion on the management cycle is provided in later slides).

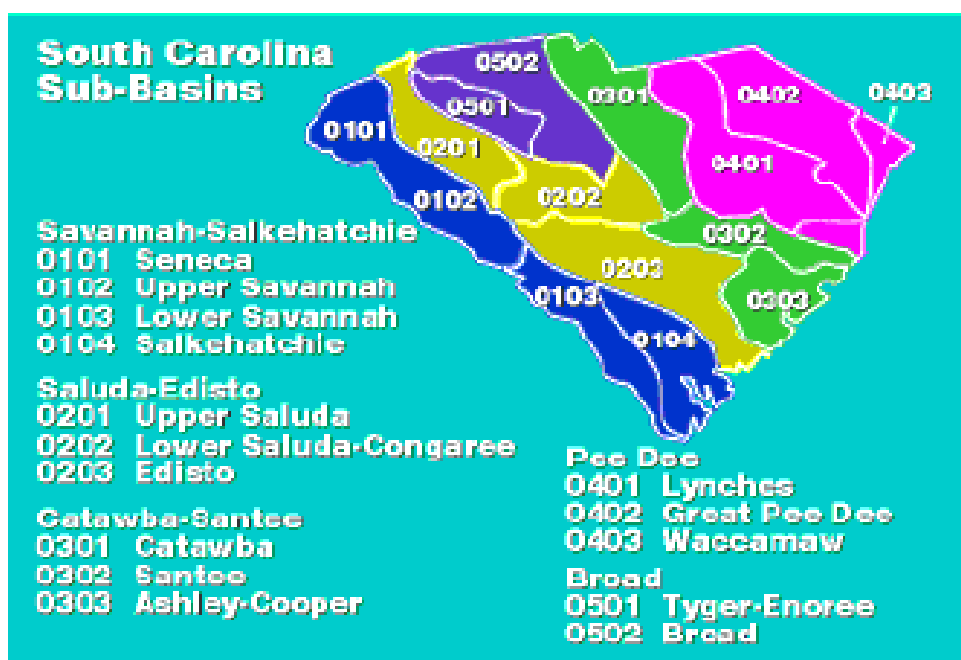


Figure 7. South Carolina Watershed Management Units

To organize and facilitate moving from subwatershed to basin scale, many statewide frameworks divide their basin management units into smaller units using the U.S. Geological Survey's hydrologic unit cataloging (HUC) system (8-, 11-, and 14-digit HUCs, with units becoming smaller as the number of digits increases). Having management units within a range of geographic scale provides a means of focusing down to specific needs within a local area, or aggregating up to the basin level to address larger-scale issues. Together, these nested units provide the spatial basis for coordinating efforts within a statewide framework. The slide on the left shows how South Carolina was divided into five large basin units, with nested subbasins. South Carolina also organizes some activities at the 11-digit hydrologic unit code level (smaller watershed units delineated by the Natural Resources Conservation Service in cooperation with the U.S. Geological Survey that are too small to show in this illustration).

Nationally, 8-digit HUCs average 1,700 square miles in area. The much smaller 11-digit watersheds and 14-digit watersheds average 100 square miles and 30 square miles each, respectively (based on North Carolina mapping).

Component 2. Stakeholder Involvement Forums

Each statewide management framework has its own means, or "forums," to coordinate partners and involve other stakeholders within each management unit. Stakeholders are broadly defined as those involved in or affected by watershed management decisions and actions. Thus, stakeholders include agencies, organizations, the regulated community, business and industry, and citizens living and working in the management unit.

Framework forums typically reflect the different types and levels of interaction among forums. No hierarchical relationship is associated with these forums. They are meant to coexist and address different needs at each of the three geographic levels.



Figure 8. Example stakeholder forums

In Figure 8, the three formal forums are supplemented by a more informal Partner Network that crosses all three scales. The Partner Network is made up of existing forums such as the Chamber of Commerce, conservation districts, Waterways Alliance groups, WaterWatch volunteer groups, and other groups willing to invest their time and resources to learn about watershed management needs, develop and implement strategies to address those needs, and promote public involvement. The emphasis of the Network is to involve people where they live and work, and in forums in which they already participate. People are more likely to participate actively and openly in a setting where they feel comfortable with rather than attending a new, special-purpose forum.

Component 3. Basin Management Cycle

The third primary component of most statewide frameworks is a basin management cycle, which consists of a series of steps on which stakeholders work together to move from identifying priority issues and management goals to implementing actions to achieve those goals. Figure 9 shows a typical flow of steps. Stakeholders first identify what they know about conditions in the basin, along with the most important issues to follow up on for this management cycle iteration (indicated in the graphic to the left as the Scoping & Evaluation phase). Next, data and information are collected strategically to fill information gaps and support further assessment and management strategy development (Data Collection phase). Assessment can produce a clearer picture of relative risks of identified problems and can help stakeholders prioritize areas where joint management actions are most needed and feasible (Assessment & Targeting phase). For targeted areas within the basin, stakeholders use their forums at the local or basin scale to develop (Strategy Development phase) and implement (Implementation phase) specific management strategies that can complement or enhance other ongoing management efforts where they exist.



Figure 9. Phases of the Basin Management Cycle.

Note that the cycle is repeated for each basin at fixed intervals (often 5 years). Using a repeating cycle acknowledges that watershed management is a dynamic process and not a one-time planning process. Basin conditions, management priorities and goals, and management capabilities all change over time, and managers must respond accordingly. Rather than trying to produce the perfect plan, a management cycle emphasizes doing as much as possible with available resources and achievable consensus during each iteration. What is not accomplished in one cycle can be reevaluated for its priority in the next cycle.

Statewide Basin Management Schedule

In the section on geographic management units (see page 8 above), we noted how states use basins to stagger activities and balance workloads from year to year. Many states have developed a statewide basin management schedule that establishes a calendar and sequence for conducting key watershed management activities within each geographic management unit.

Figure 10 demonstrates how a 5-year management cycle works within a statewide basin management schedule. For illustrative purposes, watershed management activities are simplified into five categories (see legend at the bottom of the figure) with equal time allotments. (In practice, time allotments vary across activities.) Activities are sequenced through five basin groups (left side of figure). Basin groups are typically based on factors such as geographic proximity, equal distribution of land area, and equal distribution of workloads for key tasks in the management cycle. During the first 5 years, the schedule of management activities is phased in across the entire state, as follows:

- For Basin Group 1, the 5-year cycle begins in Year 1, is completed in Year 5, and begins again in Year 6.
- The statewide framework is fully initiated after 5 years; that is, some category of statewide management activities is conducted in each basin group every year thereafter.

Of course, cycles other than 5 years can be used. Five-year cycles are often practical, however, because other cyclical activities, such as the following, seem to be based on 5-year intervals:

- Many local governments use 5 years for work planning.
- National Pollutant Discharge Elimination System (NPDES) permitting is on a 5-year cycle.

Additionally, the 5-year cycle roughly equates to covering about 20 to 40 percent of a state in a given activity during any one year, which is considered to be a feasible workload by many states. Fixed-length cycles are not required, but they do offer certain advantages, such as being easier to administer than variable lengths and being easier for the public and partners to follow. Therefore, the schedule can be seen as a planning tool that improves the ability of participating organizations to collaborate on complementary watershed management objectives. The schedule does not restrict participants from undertaking activities other than those listed or from conducting the activities at times other than indicated on the statewide schedule. Rather, the schedule indicates when there is a special emphasis placed on a given activity. For example, a

local utility might monitor water quality in its jurisdiction on an ongoing basis. Once every 5 years, however, that utility would have an opportunity to plan with other framework partners to decide whether any additional monitoring is needed over an intensive period of time to fill data gaps for needed assessments or to support management strategy development.

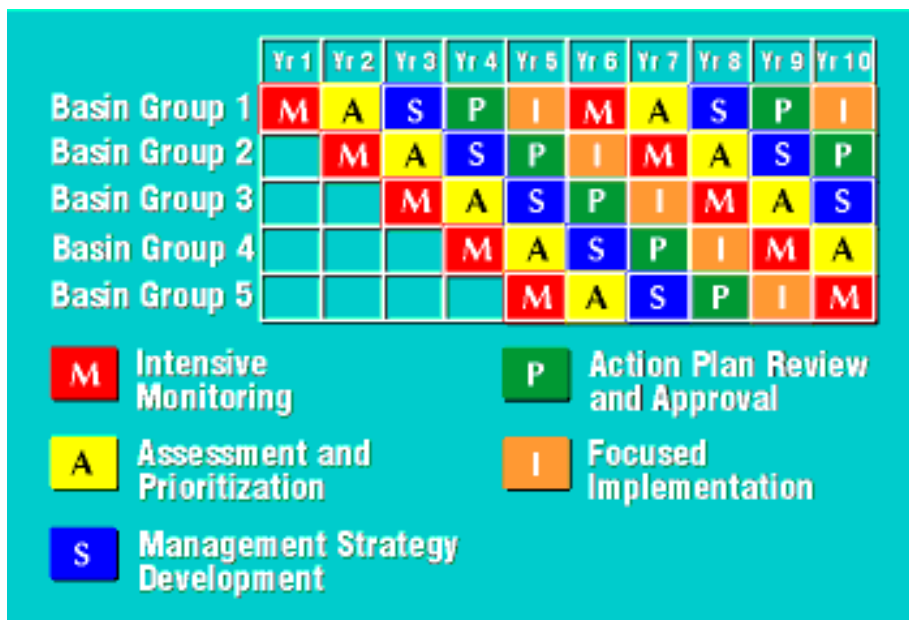


Figure 10. Simplified Example Schedule

Support Structure for a Statewide Framework

Although the three primary framework components are relatively simple in concept, they require a substantial level of effort and support to be sustained. For example, meetings among partners and stakeholders don't just happen by themselves; they require planning, arrangements, agendas, facilitators, and more. A structure to support communication,

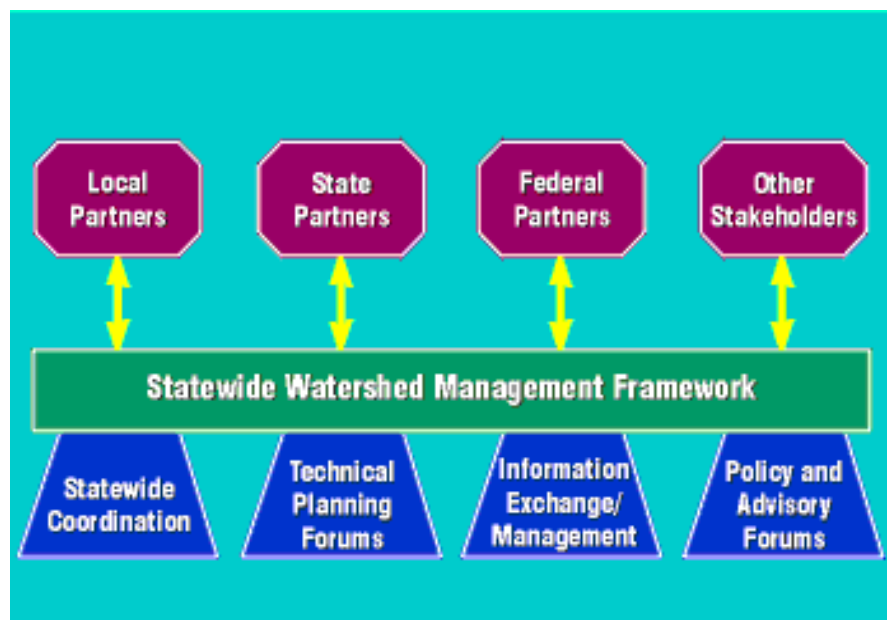


Figure 11. Establish support structure to make partner participation easier and more beneficial

information management, technical planning, and policy development is needed.

Solutions for statewide framework support have included the following:

- **Framework Document:** a reference for all partners in the framework that describes the consensus-based components and operating protocols. Commitment to supporting the approach as described in the framework document is sometimes formalized through a Resolution of Intent or Memorandum of Agreement that is signed by each partner.
- **Basin Coordinators:** persons with strong communication and organizational skills, who facilitate partners' working through the basin management cycle of activities.
- **Public Information Coordinators:** persons with strong written and oral communication skills, who communicate the framework mission and goals with a broad range of audiences and look for ways to involve the public on an ongoing basis.
- **Information Management Systems:** coordinated systems of hardware, software, protocols, and support staff to support integrating and assessing information from diverse sources.
- **Communication Network:** identified means for keeping partners informed of framework activities, such as an Internet web site, mailing lists for document distribution, and newsletters from the Basin Coordinator or Information Coordinator.

The purpose of the support structure is to make it easier for partners to coordinate their efforts, and to make the process more effective and efficient for the partners than working outside the framework. Collaboration requires considerable time and effort, so the rewards must outweigh the costs for partners to be willing to participate. Therefore, it's important to avoid a top-down structure that imposes requirements for operating under the framework. The figure to the left illustrates how the watershed management framework can be founded on support structures that provide key services and opportunities that would be difficult for a single agency or organization to maintain alone. Partners at all scales choose when and to what degree they are willing to participate; the support structure is there for those who want to use it.

Part 3. What Have We Learned To Date?

Framework Development and Implementation Timing

Statewide watershed management frameworks take time to develop and implement, so the process is typically broken down into these four stages (Figure 12):

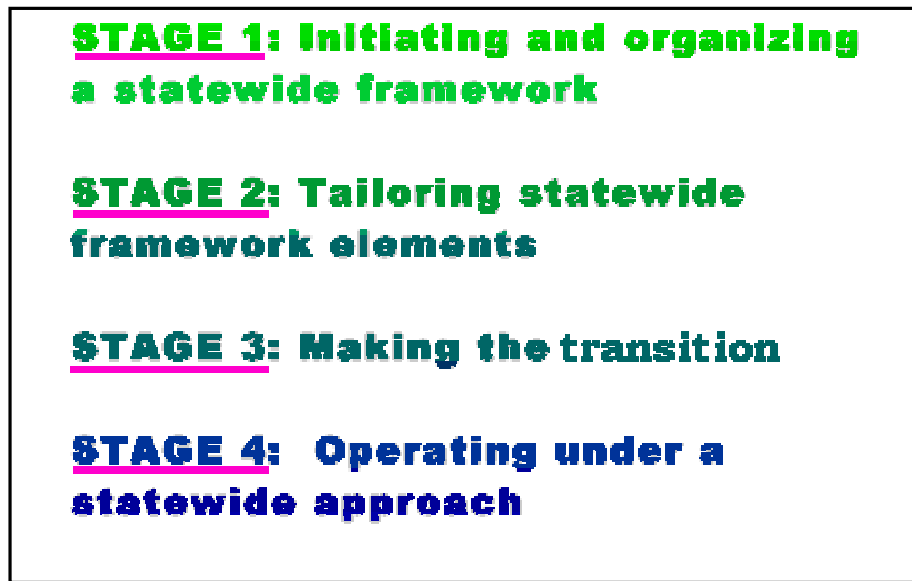


Figure 12. Typical stages of framework development and implementation

- **Organizing Statewide Framework Development.** The first stage focuses on developing an understanding of the underlying concepts of statewide watershed management, a step that is critical for recruiting partners and establishing a common purpose. Participants then determine who will lead the framework development process, what methods will be used to develop framework components (e.g., work groups and committees), the time frame for development, how resources will be directed to support the development process, and how the results will be documented.
- **Tailoring Statewide Framework Elements.** The second stage involves designing or tailoring the components of the framework (i.e., geographic management units, stakeholder involvement forums, management cycles, statewide schedules, and other support structures). As a part of this stage, partners define their roles and responsibilities within the framework.
- **Making the Transition.** The third stage involves taking the steps necessary to install the new framework. Partners and stakeholders need to be oriented to the new approach; outreach and training are critical to this task. Partners might also need to update operating procedures and work plans to carry out framework activities efficiently and effectively. Program self-assessments or reengineering analyses might be needed to work out effective and efficient means. Additionally, new guidance might be needed to help staff learn and conduct new ways of doing business. In some cases, policies or laws that would impede framework implementation might need to be revised. Budgets might need to be developed and new coordinator positions established. Partners need to troubleshoot challenges such as phasing in basin management cycles across the state while addressing management needs that fall outside the management cycle. The framework will continue to evolve during this transition period.
- **Operating Under a Statewide Approach.** The last stage focuses on maintaining and enhancing the statewide framework once the basic framework is in place in every basin

group throughout the state. Emphasis is placed on maintaining schedules, strengthening participation and partnerships, monitoring the progress and effectiveness of framework implementation, and adapting the framework as needed to enhance performance.

Challenges and Recommendations for Developing and Implementing a Statewide Framework

Conducting a watershed management program usually involves changes in the way an agency or organization operates. Organizational managers therefore play a key role in developing and implementing the approach. Anticipating and meeting leadership challenges is thus key to the success of the approach. Some of the key challenges that might be encountered are:

- **Determining who leads and what that entails.**
Watershed management is an unusual statewide program because there is no legislation or mandate for it. Therefore, clear and committed leadership is necessary for partners to participate and cooperate. The leader should be skilled in communication to motivate, encourage discussion and keep commitments.
- **Dealing with resistance to change.**
Many staff will be anxious about or resistant to change. Some might fear an inappropriate approach from another state will be used. Others might fear that established lines of authority will be challenged. Yet others might see a statewide management approach as an unmanageable workload. Deal with these problems immediately to minimize their impact.
- **Overcoming constraints to regulatory and program authority.**
A key challenge to the leadership is to initiate integration of management activities and decisions while not appearing to exceed regulatory or programmatic authority. There might be some who feel that their authority or "turf" is being challenged. Choosing a leader/facilitator with strong communication and mediation skills for framework development is important to starting out on the right track.
- **Synthesizing regulatory and nonregulatory programs.**
The statewide framework can bring together program elements that historically have fundamentally different approaches to fulfilling their missions, and this may concern some participants. For example, regulators often fear that stakeholder-negotiated management strategies might compromise their ability to satisfy regulatory requirements. Nonregulatory program stakeholders may feel that their constituency will be alienated by their association with regulatory programs. The challenge to statewide watershed framework leaders is to negotiate objectives that appease all involved. Leaders can draw from examples from other state frameworks where flexibility and negotiation were successfully used to fulfill multiple objectives.
- **Reaching out to potential partners.**
Some agencies and organizations outside the "community of partners" might be willing to offer support. Strategic integration of new partners is important to avoid overwhelming or upsetting existing partners. Identify critical areas where integration is needed to achieve

objectives, and prepare a unified message that all can use to recruit new partners. Leaders can designate skilled communicators to make initial contact and arrangements with potential new partners.

- **Supporting watershed frameworks despite budgetary constraints.**
Some types of assignments—for example public outreach and coordinating with framework partners—will inevitably be increased under the statewide approach. Frequently, hard choices will need to be made to free up resources to support these increases. Streamlining procedures for other activities can help minimize the impacts of budgetary constraints.
- **Streamlining standard operating procedures.**
Established planning and operating procedures might need fundamental changes to make it easier or possible to coordinate efforts with partners and ensure compatibility where needed (e.g., data collection and analysis methods). One way to achieve this is to have staff do a self-assessment to identify current areas of work that do not match up well with operating goals and mandates. For example, work associated with a program initiative that is not mandated by law and that is not integral to your mission could be reduced or eliminated. Other procedures may need adjusting to become synchronized with the basin management cycle. In some cases, cross-training among partners may help streamline efforts where more than one entity is involved in the management activity.
- **Changing organizational structure.**
If the existing organizational structure(s) form impediments to successful implementation of the watershed management framework, maybe it's time for some reorganization that both satisfies organizational responsibilities and supports the framework. Leaders should consider how their organization matches with the need to participate in framework operational forums, such as statewide steering committees or basin teams.
- **Developing a transition plan.**
Adapting established operations to support the watershed framework cannot happen overnight, but rather must be gradually integrated into each organization. Having a mutually developed organizational plan will encourage buy-in and smooth transition to the new approach. Key components of a transition plan include a strategy for outreach and training in the new approach, a schedule for phasing in new activities, and a budget plan for funding administration of the framework to "keep the ball rolling."

Where Can I Go for More Information?

To find out more about the Statewide Watershed Management Approach, visit EPA's web site for the Watershed Academy (<http://www.epa.gov/owow/watershed/wacademy/wsafacil.htm>) or obtain the following reference documents from the EPA Watershed Academy Information Transfer Series:

- No. 2 Watershed protection: a statewide approach (EPA841-R-95-004)
- No. 8 Statewide watershed management facilitation (EPA841-R-97-011)

Alternatively, attend one of the following Watershed Academy live courses:

- Watershed 102: Statewide Watershed Management (2 days)
- Watershed 104: Executive Short Course: Statewide Watershed Management (1/2 day)

Now that you have successfully completed the module, you can evaluate your understanding by taking the test on page 18.

Self Test for Statewide Watershed Management Module

Check the appropriate response to each question below. After you've completed the quiz, you can calculate your score and compare your answers to the correct answers by checking the answer key on page 21.

1. Watershed partners are forming statewide watershed management frameworks because they want to:

- A. coordinate their efforts to protect and restore natural resources
- B. strengthen internal program and external stakeholder working relationships
- C. establish forums that make it easier to generate defensible, cost-effective management decisions
- D. all of the above

2. A watershed management framework, as defined in this training module, is:

- A. a beautiful piece of artwork to hang on your office wall
- B. a series of concrete structures engineered to control the flow of water in a watershed
- C. a lasting process for partners working together using watershed management units
- D. none of the above

3. Primary components of a statewide watershed management framework typically include:

- A. geographic management units such as basins and watersheds
- B. stakeholder involvement forums such as steering committees, technical teams, advisory groups, and partner networks
- C. a basin management cycle that organizes key activities and promotes adapting management strategies to changes in conditions and priorities over time
- D. all of the above

4. States often use large basin management units in their frameworks to:

- A. stagger partner activities statewide to focus efforts and balance workloads for partners with statewide operations develop a strategy
- B. scan large basins to zero in on priority issues and priority subwatersheds for more efficient use of human and financial resources
- C. both A and B above
- D. neither A and B above

5. Which of the following statements is (are) true regarding stakeholder involvement forums:

- A. Stakeholders generally include agencies, organizations, the regulated community, business and industry, and citizens living and working in the management unit.
- B. Stakeholder forums in statewide frameworks often work at several scales to meet different needs at state, basin, and local watershed levels.
- C. To generate wide public participation, link your efforts to existing groups/forums in the watershed rather than asking people to attend a new, special-purpose forum.
- D. all of the above

6. A basin management cycle, as defined in this training module, is:

- A. a new brand of motorcycle geared for basin managers
- B. an inflexible schedule meant to alienate potential watershed partners and keep them away
- C. a series of steps on which stakeholders work together to move from identifying priority issues and management goals to implementing coordinated actions to achieve those goals
- D. None of the above

7. Example elements of a support structure to sustain a statewide framework include:

- A. a framework document that describes the consensus-based components and operating protocols as a reference for all partners in the framework
- B. coordinators with strong communication and organization skills, who facilitate partners' working through the basin management cycle of activities
- C. an information management system to support storing, sharing, integrating, assessing, and presenting information from diverse sources
- D. all of the above

8. Typical stages of statewide framework development are:

- A. stage right, stage left, and center stage
- B. blast-off, first stage disengagement, second stage disengagement, orbit, and landing
- C. organizing statewide framework development, tailoring statewide framework elements, making the transition, and operating under a statewide approach
- D. none of the above

9. Lessons learned from the states that have pioneered statewide watershed management include

- A. framework development should always be done by teamwork
- B. be patient and commit adequate time to framework development and transition
- C. statewide watershed management won't necessarily require more money, but might require tough choices
- D. all of the above

10. Challenges that might be encountered when developing and implementing a statewide framework include:

- A. dealing with resistance to change
- B. synthesizing regulatory and nonregulatory programs and activities
- C. streamlining standard operating procedures to support the statewide watershed management approach
- D. all of the above

Answers to Self Test of Statewide Watershed Management Module.

Q1. D. Q2.C. Q3. D. Q4. C. Q5. D. Q6. C. Q7. D. Q8. C. Q9. D. Q10. D.