

Statewide Watershed Protection and Local Implementation: A Comparison of Washington, Minnesota, and Oregon

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(ABSTRACT)

In 1991 EPA embraced the watershed protection approach for environmental management. EPA defines watershed protection as “a strategy for effectively protecting and restoring aquatic ecosystems and protecting human health.” To encourage statewide watershed protection, EPA developed the “Statewide Watershed Protection Approach” document, which is designed to aid states in developing their own watershed protection program. The watershed protection approach is not a program or policy required by EPA, rather a flexible framework that outlines the essential elements and components of a comprehensive statewide watershed protection approach. It allows for varying conditions in a state, but attempts to ensure a consistent general approach.

This paper describes the elements and components of EPA’s comprehensive statewide watershed protection framework. It then analyzes Washington, Minnesota, and Oregon’s statewide watershed protection programs, and examines how these state approaches reflect EPA’s framework. In addition, the paper analyzes a case study in each of these states to explore how these statewide watershed management approaches are implemented at the local level. By analyzing states that have successfully implemented a statewide watershed protection approach, this paper aims to identify the critical elements in a statewide watershed protection approach, and identify the issues that are critical to successful local implementation.

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Chapter 1

Introduction

Over the past 25 years, our nation has made significant progress in protecting and restoring the quality of our rivers and streams. The majority of this progress can be attributed to the reduction of point-source pollutants, mainly from wastewater treatment plants and industries. However, a water quality inventory conducted by the Environmental Protection Agency (EPA) in 1994 concluded that approximately 40 percent of our nation's rivers, lakes and estuaries remain too polluted for fishing and swimming, and nearly 21 percent of the watersheds in the United States have serious water quality problems (EPA, 1998). The main reason for these water quality problems is that previous programs have focused specifically on the water quality in individual rivers and lakes by targeting point-source pollution. These narrowly focused programs failed to address non-point source pollution and other sources contributing to ecosystem degradation. "The quality of an ecosystem within a watershed is intrinsically linked to all the activities within that watershed, including wetland destruction, landscape modification, riparian degradation, and agricultural runoff" (Davenport, 1996). Therefore, it makes sense to coordinate water quality management in recognition of the sum of activities.

In 1991 EPA embraced the watershed protection approach for environmental management. EPA defines watershed protection as "a strategy for effectively protecting and restoring aquatic ecosystems and protecting human health." "The premise of this strategy is that many water quality and ecosystem problems are best solved at the watershed level rather than at the individual water body or discharger level" (EPA, 1998). The watershed protection approach

takes into account all the cumulative human and environmental processes that are causing watershed degradation, including land use, chemical water quality, physical water quality, habitat quality, biodiversity, and ground water. “The watershed protection approach recognizes that greater environmental success will be achieved if goals and objectives are formulated in ecological rather than programmatic or administrative terms” (Brady, 1996). EPA’s watershed protection approach parallels the broader trend toward ecosystem management. “The watershed protection approach draws on a collaborative vision of desired future conditions and an integration of ecological, economic, and social factors affecting an area” (Davenport, 1996). The approach attempts to achieve sustainability within a watershed.

To encourage statewide watershed protection, EPA developed the “Statewide Watershed Protection Approach” document, which is designed to aid states in developing their own watershed protection program. The watershed protection approach is not a program or policy required by EPA, rather a flexible framework that outlines the essential elements and components of a comprehensive statewide watershed protection approach. It allows for varying conditions in a state, but attempts to ensure a consistent general approach.

This paper describes the elements and components of EPA’s comprehensive statewide watershed protection framework. It then analyzes Washington, Minnesota, and Oregon’s statewide watershed protection programs, and examines how these state approaches reflect EPA’s framework. In addition, the paper analyzes a case study in each of these states to explore how these statewide watershed management approaches are implemented at the local level. Finally, the paper discusses some of the lessons of both these state and local programs that go beyond EPA’s watershed protection approach.

Principles of EPA's Watershed Protection Approach

The watershed protection approach is not a new concept, it is just a new way of managing environmental programs. “The watershed protection approach is an evolutionary maturation of the existing water quality efforts that build upon the successes of programs implemented since the Clean Water Act” (Brady, 1996). Statewide watershed management approaches may vary among states. However, EPA has identified four principles to a statewide watershed protection approach.

The first principle is the definition and focus on geographic management units based on hydrologic connections. Under EPA's approach, a state is divided into large, hydrologically delineated geographic management units called basins to provide a functional spatial unit for integrating watershed protection efforts in a state (Clements, 1996). “The focus on watersheds ensures that scientific and technical assessments and solutions will be brought to bear efficiently and effectively” (Brady, 1996). By focusing efforts on a watershed scale, it becomes easier to integrate social, economic, and cultural factors into planning and implementation.

Watersheds can vary in scale and EPA's framework does not mandate watershed size or scale. Each State can delineate watersheds or water management areas to the needs of that individual state. The characteristics of a state, political boundaries or existing partnerships may be a factor in determining management units. The size of the watersheds may also determine the roles of the local and state governments. For example, a large watershed may be most effectively managed by state governmental agencies, while smaller watershed may be more

effectively managed by local governments or watershed councils. “Watersheds should be of sufficient size to achieve economic scale, take advantage of local government and technical expertise, and be viable for long-term management” (EPA, 1998).

The second principle of a watershed protection approach is collaboration. Watershed protection is a collaborative effort between federal, state, and local government. The success ultimately depends upon cooperation between state, local, and federal governments and stakeholders. All three levels of government play an essential yet different role in watershed protection. “The watershed protection approach articulates that the States must take the lead, with EPA providing guidance and support” (Davenport, 1996). EPA’s role is to develop national water quality standards, ensure compliance with these standards, provide financial assistance, and assess the national progress. The support EPA provides states can include: improve interagency coordination, provide technical assistance, and funding (Brady, 1996). EPA recognizes that it does not have the resources to actively participate in a comprehensive statewide watershed protection plan.

The role of state government in watershed protection is to design a statewide watershed protection approach framework that coordinates activities to meet the goals and objectives of the state, and provide mechanisms to support local planning and implementation. “The approach should include the overall goals and objectives for participating agencies, a definition of the management units for the state, the management cycle schedule, procedures for developing basin plans, roles and responsibilities of participating programs and agencies, targeting criteria and procedures, and guidelines for public involvement” (EPA, 1998). Additionally, state

governmental agencies should ensure compliance with state and federal water quality standards using traditional measures such as permitting, monitoring, and inspecting.

The role of local government is to form partnerships with local stakeholders to design and implement watershed plans at individual watersheds. “The participation of local organizations ensures that those who are likely to be most familiar with a watershed, its problems, and possible solutions play a major part, often a leadership roles in the development and implementation of watershed plans” (EPA, 1998).

“Besides improving coordination among state agencies, the watershed approach calls upon states to fully engage local government entities, sources of watershed impacts, users of watershed resources, environmental groups, and the public in the watershed management process to help them better understand the problems identify the goals, select priorities, and implement solutions” (EPA, 1998). Watershed protection plans have more credibility and support with stakeholders who participated in the planning process. “If stakeholders perceive that their watershed is a shared finite resource, they will share responsibility for its stewardship” (Adler, 1995).

It is also important to establish partnerships between stakeholders, because partnerships will lead to future success of the watershed protection plan. Bringing stakeholders together can be a difficult task due to polarized viewpoints. Stakeholders commonly agree upon the ultimate goals of the watershed plan, but will differ greatly on the strategies to achieve those goals.

The third principle of a watershed protection approach is integrated solutions. “Integrated solutions combines the knowledge, expertise, and resources of stakeholders and governments” (Richman, 1997). Solutions and strategies must be integrated with existing state

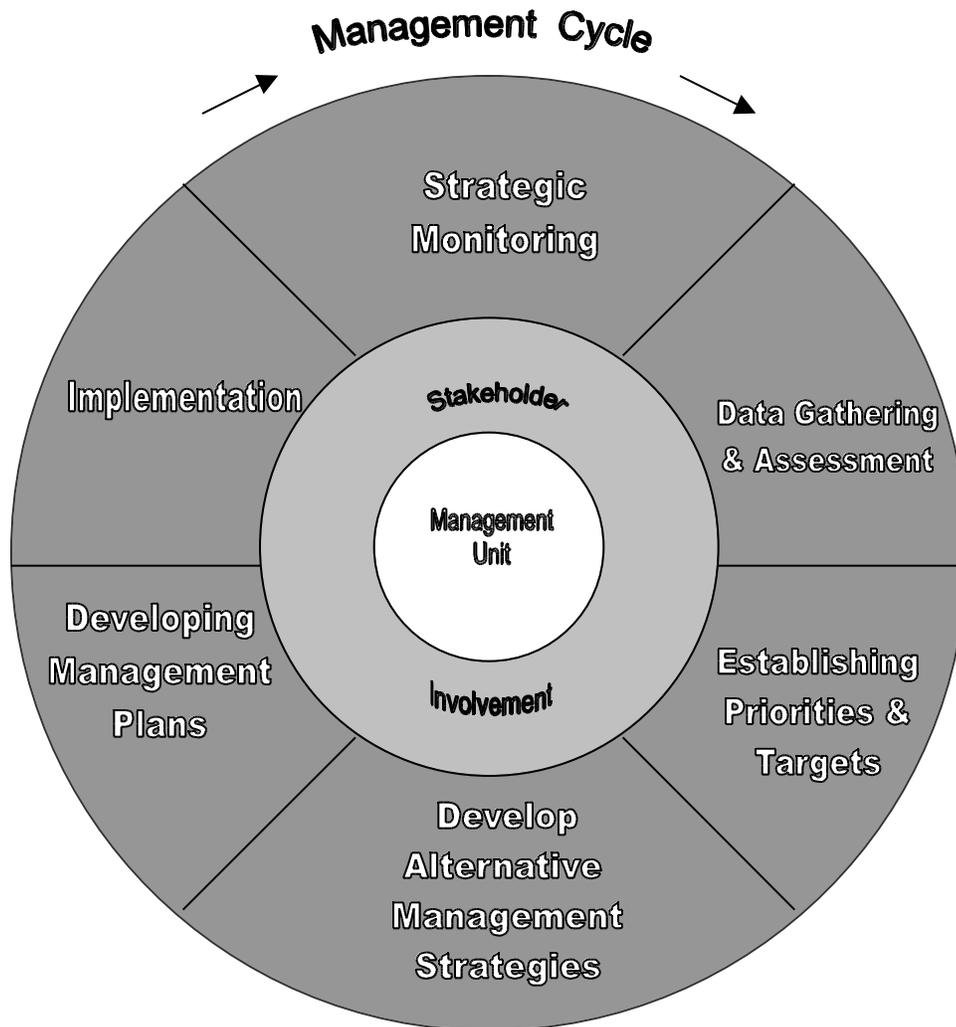
and federal programs, and the goals and objectives of the individual watersheds. An important aspect of watershed protection plans is the implementation of innovative solutions, such as pollution trading, wetland mitigation banking, land use controls, wellhead protection, financial incentives, and education. Watershed protection plans go beyond the traditional methods of water quality protection that have proven unsuccessful in the past.

The fourth principle of a watershed protection approach is monitoring. Monitoring can determine whether strategies that have been implemented are achieving the established goals and objectives of the watershed protection plan, and will help guide future decisions and allocation of resources. Additionally, measuring success of the watershed protection plan is important to stakeholders. Stakeholders want to know that the solutions that have been implemented have been successful and should continue. The implementation of a watershed management plan is not an end game, rather it is an adaptive process that changes and adapts over time.

EPA's Statewide Watershed Protection Approach Planning Process

EPA has developed a six-step planning process for developing a statewide watershed protection plan. Figure 1-2 demonstrates that the watershed protection planning framework does not follow a set of rigid steps, rather it is a continuous process. The core of the planning process is the management unit. The management unit are the geographic units, or watersheds, which the state will implement its watershed protection approach. Additionally, stakeholder involvement is required during each step in the planning process. The watershed protection approach creates opportunities for a broad range of stakeholders to play meaningful roles in the development and implementation of a watershed plan. It is important that stakeholder roles and responsibilities be clearly defined for each step in the planning process.

Strategic monitoring is the process of determining the overall water quality and ecosystem quality in the watersheds. It is important that the most current and effective scientific procedures are utilized to collect the data. "The environmental data that drives the



Source: Adapted from EPA's "Statewide Watershed Protection Approach" (1998)

Figure 1-2: EPA's Six-Step Process for Developing a Statewide Watershed Protection Plan

watershed planning process must be comprehensive, of the best possible technical quality, and understandable to stakeholders” (Brady, 1996). An effective method to collect data and engage stakeholders is through citizen monitoring programs. Strategic monitoring can be a lengthy process, and may take years to complete.

Data gathering and assessment is the stage in the planning process that evaluates the water quality and ecosystem data to identify the sources that are causing water quality and ecosystem degradation. Assessment will determine if water quality standards are being achieved, and if not, determine the gap between the desired water quality standards and the actual conditions. Benchmarks and indicators can be established during the assessment to guide future actions. "Assessment is important because it provides the basis for evaluating the success of past management actions and targeting future management efforts” (EPA, 1998).

Establishing priorities is the process of identifying the goals or main issues that will be addressed in the watershed plan and prioritizing those issues. Specific, measurable, and collaboratively developed goals should be established. Targeting is the process of ranking watersheds and sub-watersheds, and determining how resources should be allocated to address the priority concerns. An important aspect of watershed protection is to identify and prioritize the problems that are causing ecosystem degradation so financial and staff resources can be properly allocated to target those problems.

Developing alternative management strategies is an opportunity to develop innovative solutions that address the watershed problems. When developing management strategies, resources, stakeholders, and characteristics must all be considered. These strategies must integrate the ecological, economic, and social factors within the watershed. Effective statewide

protection approaches provide an opportunities for innovative alternative strategies such as pollutant trading, ecological restoration, and wetland mitigation banking.

Following the development of alternative management strategies, the watershed management plan is developed. The management plan outlines the planning process, the goals and objectives, how the goals will be achieved, the selected alternative management strategies, stakeholder roles, and the process of implementation and evaluation.

Implementation is the process of putting the management plan to work. A seemingly obvious but critical aspect of any statewide watershed protection approach is to focus on implementation not just the assessment process. “A watershed protection approach must not be primarily procedural, it must be substantive” (Aldler, 1995). A watershed protection plan is only successful if the strategies are fully implemented.

The planning process is a not a linear process, rather it is a circular, iterate process. The management plan must continually adapt based on the data collected through monitoring. The stakeholders must evaluate the effectiveness of the planning process and strategies in the management plan, learn from the successes and failures, and iterate the process to make it better in the future.

Potential Benefits of a Watershed Protection Approach

There are many reasons why EPA has shifted their focus toward watershed management. “Much of the momentum behind the watershed management approach derives from its very clear advantages for enhancing water quality” (Taylor, 1996). The first and most obvious benefit of the watershed protection approach is environmental. Watershed management is a holistic approach that achieves real ecological results rather than just administrative requirements. The

watershed protection approach identifies all the issues causing water quality and ecosystem degradation, prioritize these issues, and uses innovative solutions to solve these problems.

The second benefit of a statewide watershed protection approach is cost savings through increased program efficiency. The past water statewide quality programs have been fragmented. Water quality, water quantity, land use, and ground water were treated as separate issues and this lead to inefficient water quality programs that overlapped and left gaps in water quality protection. Under the watershed protection approach, state agencies are able to streamline their programs by coordinating their efforts, thus avoiding duplication of tasks such as monitoring, permitting, sampling, and reporting.

The third benefit of a watershed protection approach is community building. The building blocks of any watershed management plan begins with a collaborative effort involving all of the stakeholders. The involvement of the stakeholders in the design and implementation of the watershed protection plan will lead to greater awareness and support for the program. "Watershed protection approaches build a sense of community and ownership, reduce conflicts, and increase commitment" (Clements, 1996). The stakeholders gain a sense of common purpose in working together, which will lead to long lasting successful program.

Potential Barriers to a Watershed Protection Approach

While the watershed approach provides significant advantages, it can be difficult to implement because it is more complex than traditional water quality programs. There are barriers to the design and implementation of a statewide watershed protection plan. One barrier can be fragmentation among regulatory state agencies. A watershed protection

approach requires state and local agencies work together toward an established shared goals. It can be a difficult task to coordinate various regulatory agencies, because state agencies are accustomed to operating independently, therefore, any change from this independence may be met with skepticism and resistance.

Since watersheds do not recognize political boundaries, fragmentation can also occur among political boundaries. The sources of pollution in a watershed may be from another jurisdictional boundary, therefore, for a watershed protection plan to be successful coordination between multi-jurisdictional boundaries may be necessary.

A second barrier to a watershed protection approach may be the cost of implementation. Funding is often the limiting factor in the implementation of a statewide watershed approach at the local level. Many local government and watershed groups may want to initiate watershed planning but are unable due to lack of resources. State and federal agencies must provide financial assistance to assist local watershed groups with the design and implementation of watershed plans.

Many states have developed statewide watershed protection approaches, and every state has approached watershed protection differently. “Views of watershed protection can vary considerably, and reflect the diverse governmental and other interest groups perspectives” (Alder, 1995). The following chapters in this paper examine the statewide watershed protection approaches in Washington, Minnesota, and Oregon, and explore how these programs are locally implemented. The statewide framework, including the goals, objectives and planning processes, are examined for each state and compared to EPA’s approach. Additionally, a local case study

from each state is used to explore how each statewide watershed protection program is implemented at the watershed level. By analyzing states that have successfully implemented a statewide watershed protection approach, this paper aims to identify the critical elements in a statewide watershed protection approach, and identify the issues that are critical to successful local implementation.

Chapter 2

Washington's Watershed Protection Approach

During the past six years, Washington State has implemented two different statewide watershed protection approaches. In 1993, Washington implemented a statewide watershed approach called "Watershed Approach to Water Quality Management." This watershed protection approach was designed for two main purposes: (1) improve the efficiency of the Washington Department of Ecology (WDOE) and (2) improve water quality throughout the state. The goal of this statewide watershed protection approach was to guide the WDOE toward improving the coordination of water quality programs, assist watershed councils with local implementation, and improve water quality statewide (WDOE, 1997). The watershed approach synchronized water quality monitoring, inspections, and permitting, and supported water protection activities on a geographic basis.

Watershed Approach to Water Quality Management (1993)

The Watershed Approach to Water Quality Management designed by the WDOE closely followed EPA's framework. EPA often referred to Washington's watershed approach as a "model plan" for other states, and used Washington's approach to educate state managers at EPA's Watershed Academy. The elements of the watershed approach include:

- 1) divide the state into manageable areas based on geographic units
- 2) establish a data collection and analysis schedule
- 3) prioritize and target WQMA's
- 4) initiate local watershed planning.

The cornerstones of Washington's approach were the designation of water quality

management areas (WQMAs). The WDOE grouped the 62 watersheds in the state into 23 WQMA's. The WQMA's were established using criteria such as water availability, water use, population growth, geography, permit activities, and staff resources (WDOE, 1997).

The Watershed Approach to Water Quality Management plan established a five year management planning cycle that systematically issued permits, assessed water quality conditions, and focused staff and financial resources toward local implementation of watershed plans in each WQRA. (WDOE, 1997). "Each WQMA went through a five year assessment, which proceeded from monitoring and assessment of data to prioritizing problem areas, developing management plans and simultaneously issuing all permits" (Pelley, 1997). The plan emphasized public involvement during each step. Figure 2-1 displays the planning process.

The first year of the five-year cycle was *scoping*. Scoping is the process in which WDOE staff work along with stakeholders within the WQMA to identify and prioritize water quality issues. "At the end of the scoping process, WDOE prepared a Needs Assessment, which summarized the water quality problems, identified which problems require further analysis, and set priorities for action for the remaining 4 years of the cycle" (WDOE, 1997). The second and third step of the process, which occurs in years two and three of the management cycle, was *data collection* and *data analysis*. During these steps further data collection and monitoring are conducted to further identify and analyze the water quality conditions within each WQMA.

The fourth step in the cycle is the production of a *technical report*. "The technical report addressed the water quality problems, and outlined strategies and management activities needed to reissue permits, and form partnerships with stakeholders" (WDOE, 1997). The

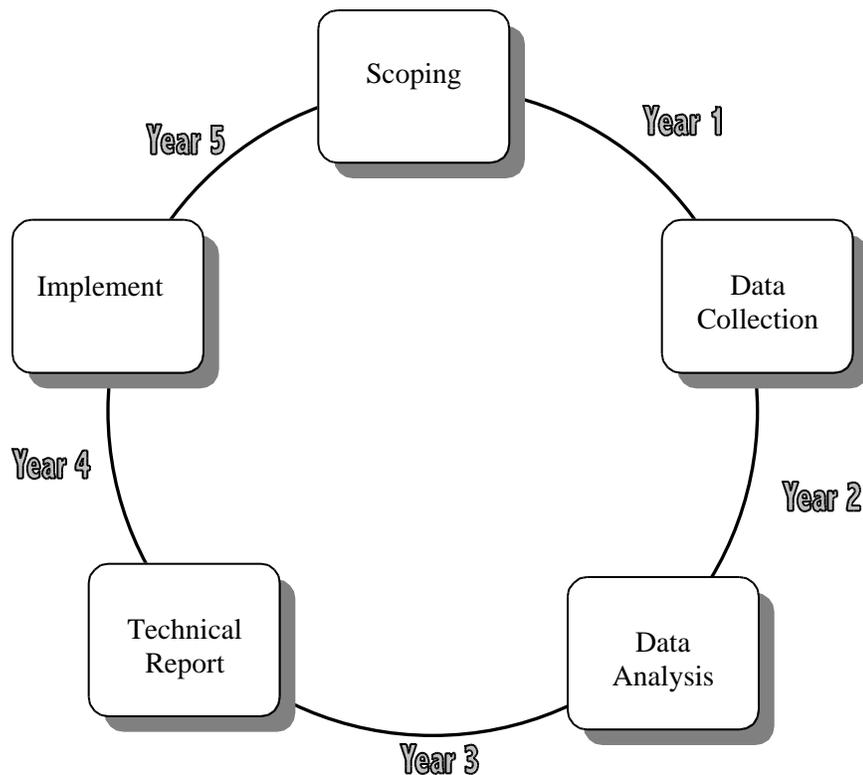


Figure 2-1: Components of Watershed Management to Water Quality

state was able to prioritize the WQMA’s that had water quality problems, and target resources toward those WQMA’s. The last step in the cycle is *implementation*. WDOE reissued permits and worked with local stakeholders to address priority water quality issues and develop strategies to be implemented at the local level.

The Watershed Approach to Water Quality Management was a comprehensive statewide watershed protection approach. This watershed approach focused on geographic units, and aimed to streamline the current waters quality programs and begin to assess the water quality problems at the watershed level. The approach was successful in coordinating

permits, identifying water quality issues, and initiating local watershed planning.

Watershed Management Act (1998)

In 1998, the statewide watershed approach in Washington changed with the enactment of the Watershed Management Act, which replaced the existing watershed protection approach. The Watershed Management Act was enacted in response to two serious issues confronting the state of Washington. The first issue was diminishing water quantity throughout the state. This was a concern because water quantity is necessary to support growth, agriculture, and to restore the declining fisheries. The second issue was decline of salmon due to habitat degradation and low instream flows. Salmon is an important economic and cultural aspect of the state of Washington. Additionally, the state of Washington was concerned that the salmon may be listed as a “threatened” species. A listing would have broad economic and social consequences to the citizens in Washington, ranging from more restricted forest harvest and agricultural practices to stricter water use controls.

The Watershed Management Act is a narrowly focused watershed approach that aims to target two important issues in Washington: water quantity and instream flows. The Act emphasizes getting more water back into streams where and when the needs are most critical to people and fish. The Watershed Management Act intends to initiate watershed planning at the local level, whereas the previous statewide watershed approach was largely initiated by the WDOE.

The goal of the Watershed Management Act is to assist watershed councils to develop local watershed plans that focus on water quantity issues and instream flow. The Watershed Management Act contains few procedural or substantive requirements. Under the Act, planning

units are voluntarily established within each of the 62 water quality resource areas (WRIA), and each planning unit is eligible to receive three phases of grants from the state to develop a watershed protection plan that addresses the water quantity issues in the WRIA. The Watershed Management Act provides state financial and technical assistance to watershed councils to initiate planning and to collaboratively identify and solve water-related issues in each WRIA's" (WDOE, 1999b). Watershed planning units have considerable flexibility to determine the planning process, focus on areas or elements of particular importance to local citizens, assess water resource and needs, and recommend management strategies (WDOE, 1999a). Additionally, the Act requires state agencies to provide technical assistance to watershed councils, such as data collection and monitoring. Figure 2-2 outlines the planning process.

Localities first determine whether they intend to initiate watershed planning. If the locality decides to initiate watershed planning, they may apply for Phase I grants (up to \$50,000 per WRIA), and begin the process of organizing a planning unit. The planning unit must broadly represent the local governments, tribes, and stakeholders. State agencies may be invited to join the planning unit. The planning unit determines the goals and objectives, planning process, assessment and prioritization, and the design of the watershed protection plan.

Following the organization, the planning unit may apply for Phase II grants (up to \$200,000 per WRIA), are allocated for watershed assessment. State agencies provide technical support for the watershed assessment. Phase III in the planning process addresses development of the watershed plan. The watershed plan must address the water quantity issues and provide short-term and long-term recommendations for future water use. "The watershed plan should have strategies to satisfy the minimum instream flows for fish and to ensure that adequate

water supplies are available for agriculture, energy production, and economic growth” (WDOE, 1999).

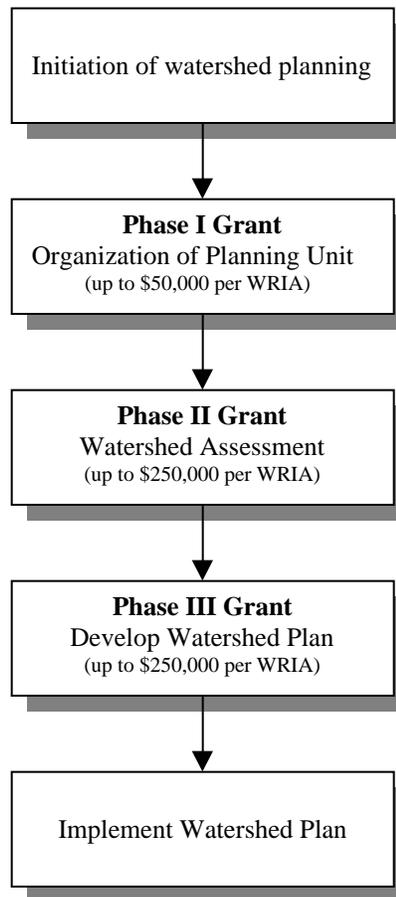


Figure 2-2: The Watershed Management Act Planning Process

Concluding Comments

The Watershed Management Act is a narrowly focused statewide watershed protection approach that specifically targets water quantity issues and instream flow. The strength of the Watershed Management Act is that it encourages planning and implementation of local watershed management plans by allocating financial and technical assistance to assist local

planning groups. The decision-making is placed in the hands of those who have the greatest knowledge and stake in the watershed. The financial assistance provided to local watershed groups is essential to successful local planning and implementation.

A weakness in the Watershed Management Act may be that the approach only focuses on water quantity and instream flows. To some people, the Watershed Management Act appears to be a step backward for watershed protection in Washington. Although water quantity and instream flows are critical to stream ecology and watershed quality, the Act fails to consider other factors that affect the overall watershed quality. The WDOE is currently proposing legislation that would make water quality and habitat a requirement in the watershed planning process.

Case Study: Quilcene-Snow Watershed

Since the enactment of the Watershed Management Act, 24 of the 62 watersheds in Washington have received grants to initiate watershed planning. The majority of the watersheds have applied for grants, however, the state is unable to provide financial assistance to all the watersheds. One of those watersheds that have received watershed planning grants from the state is the Quilcene-Snow Watershed.

The Quilcene-Snow Watershed is located in the northeast portion of the Olympic Peninsula . The rivers and streams in the Quilcene-Snow Watershed begin in the northeastern Olympic Mountains and empty into the Hood Canal, Admiralty Inlet, Discovery Bay, and Sequim Bay. The major rivers in the watershed are the Big and Little Quilcene Rivers.

Forest practices, agricultural practices, flood plain management, and development negatively impact the streams and rivers in the Quilcene-Snow watershed. “Such activities

have changed hydrologic and stream flow patterns, caused water quality degradation, affected instream habitat, created fish passage barriers, and reduced adjacent wetland and estuary complexes (Jefferson County, 1998).” There are twelve creeks and rivers listed as impaired for quality, flow or fish habitat. Additionally there have been conflicts regarding water quantity and allocation. The main water quantity issue results from the significant growth of the city of Port Townsend, which has lead to increased use of the water resources in the watershed.

The Jefferson Water Resource Council

The Jefferson County Water Resource Council was established in 1996. Between 1996-1998, the Jefferson County Water Resource Council began a preliminary assessment of the stakeholders and the water resource issues in the watershed. Following the enactment of the Watershed Management Act, the Jefferson County Water Resource Council applied for Phase I and Phase II grants from the state. The objectives stated in the grant proposal were: (1) increase instream flows and improve salmon runs, (2) provide more efficient management and use of water, and (3) address the long-term water quality and habitat issues in the watershed (WDOE, 1998). The Council was awarded a total of \$242,000 (\$42,000 for Phase I, and \$200,000 for Phase II). The grants provided the necessary resources to form a planning unit and initiate the assessment of the water resource issues in the Quilcene-Snow Watershed.

The Planning Process

The first step in the planning process was the formation of the planning unit. Since the Jefferson County Water Resources Council only represented Jefferson County, a planning unit was formed to represent the entire watershed. The planning unit consists of three

entities: Water Resource Policy Group, Water Resource Council, and a Coordination Team. The role of the Water Resource Policy Group is to develop the planning process, and provide a forum for substantial stakeholder input and consensus-building. The role of the Water Resource Council is to develop implementation strategies and recommendations. Both entities are composed of diverse stakeholders, including government officials, citizens, water resource and fisheries interests, and local tribes. A Coordination Team, composed of representatives of both groups, was established to assist in coordinating the activities of the two groups.

Following the organization of the planning unit, numerous public meetings were held with strong public participation. Through collaboration, the following goals were established for the Quilcene-Snow Watershed:

1. Expand stakeholder involvement in a collaborative forum that allows for resolution of potential conflicts.
2. Develop a framework for long-term watershed assessment and policy development.
3. Compile existing data on water resources, fish habitat, and instream flows.
4. Conduct field studies and collect data from sub-basins where the most potential for natural resource conflict exists.

The second phase (Phase II) of the planning process was watershed assessment. Since the planning unit did not have the technical expertise to perform the watershed assessment, the planning unit received technical assistance from state agencies, mainly the WDOE. The planning unit outlined five tasks to perform the watershed assessment:

Task 1: Review existing water quantity, water quality, habitat, and stream flow data.

Task 2: Establish program to monitor water quantity and quality.

Task 3: Coordinate habitat and fisheries assessment with other programs

Task 4: Establish instream flows

Task 5: Prioritize sub-basins based on assessment.

Concluding Comments

The planning unit in the Quilcene-Snow Watershed is currently in the process of completing the watershed assessment, and will apply for a Phase III grant in the near future to begin the development of a watershed plan. There appears to be three key elements that have aided the local planning in the Quilcene-Snow Watershed: financial assistance, technical assistance, and stakeholder involvement. The grants allocated from the state under the Watershed Management Act were instrumental in initiating watershed planning in the Quilcene-Snow Watershed. It is clear that without these grants, watershed planning would not have progressed this quickly. The technical assistance provided by the WDOE was important in the data collection and watershed assessment. The stakeholders in the planning unit did not have the technical expertise to collect and analyze the data within the watershed. Finally, the planning process actively included all the stakeholders in the watershed, and this strong stakeholder support should enable the planning process to continue.

Chapter 3

Minnesota's Basin Management Approach

In 1996, the State of Minnesota adopted “Basin Management” as a statewide approach to water-quality protection. The goal of the Basin Management Approach is twofold: (1) improve efficiency of the water quality programs, mainly coordinating the monitoring and permitting, and (2) initiate watershed planning on a two-tiered basis. Minnesota's Basin Management is a two-tiered approach to watershed protection and restoration that is implemented at two different levels: the basin, and the watershed. Eighty-four watersheds compose Minnesota's ten major river basins.

A basin-wide management plan, or Basin Plan, is developed for each of Minnesota's ten major river basins, and a Watershed Plan is developed for each of the 84 watersheds in the state. The Basin Plan assesses the water quality in the basin, coordinated the monitoring and permitting, implements basin-wide strategies, and prioritizes and targets watersheds for local planning. The Watershed Plan identifies, targets, and prioritizes the specific water quality issues at the watershed level. The Basin Plan is largely initiated by the state, while the watershed plan is designed and implemented by local watershed groups. "The premise of the plan is that some issues that are wide-spread with a multitude of sources are better solved at the basin level, while smaller more specific water quality issues are best targeted and resolved at the watershed level" (MPCA, 1998a). Due to the characteristics of Minnesota, the Basin Management approach focuses strongly on non-point source pollution from agricultural lands, feedlots, and septic systems.

The Plan is an integrated resource based approach that coordinates resources and efforts on clearly defined water quality goals and objectives within each of Minnesota's river basins (MPCA, 1998a). The Basin Management Plan is based on four principles: (1) establish water resource goals and priorities, (2) integration of programs, (3) stakeholder involvement, and (4) environmental outcomes. These four principles of the Basin Management approach closely resemble EPA's framework for statewide watershed protection. Minnesota stresses the importance of environmental outcomes in the basin plan and watershed plan. Environmental outcomes are goals established during the planning process that are used to evaluate the success of the plans.

Tier One: The Basin Plan

The first tier of the Basin Management planning process is the development of the Basin Plan. Each river basin in the state enters a five-year management planning cycle, and every five years the Basin Plan is evaluated and changed if necessary. Figure 3-1 displays the planning process for the Basin Plan.

The first step in the planning process of the Basin Plan is the development of the Basin Information Document (BID). "The BID contains information about the water resources of the basin, recent and historical assessments of surface and ground water, land use descriptions and a listing of relevant programs and organization (MPCA, 1998a)" Planning teams composed of water resource managers, local government officials, state officials, environmental groups, and citizens are established within the basin. A full range of stakeholders need to be fully involved to ensure shared goals and objectives for water quality within the basin are established (MPCA, 1998a).

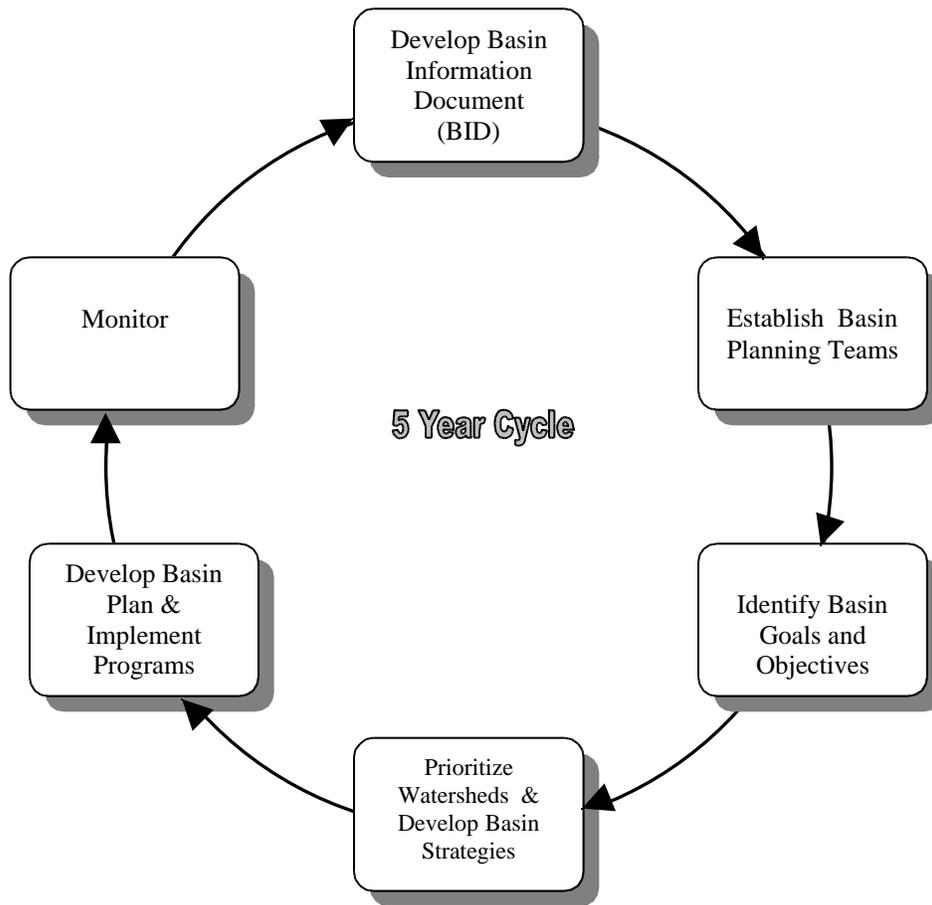


Figure 3-1: Steps of the Basin Planning Process

Based on the monitoring and water quality information gathered, the planning teams develop basin-wide goals and objectives, develop basin-wide strategies, and prioritize and target watersheds with water quality problems. These basin-wide strategies may range from stricter feedlot permitting to wetland restoration. Prioritizing and targeting enables the state to efficiently allocate financial and staff resources toward the watersheds with the water quality problems. The final step in the Basin Plan planning process is to monitor whether the environmental outcomes established in the Basin Plan have been achieved. Monitoring

will also enable the planning teams to modify the strategies in the Basin Plan if necessary.

Tier Two: The Watershed Plan

The second tier of the Basin Management approach is the development of Watershed Plans by local watershed groups. The planning process for the development of the Watershed Plan closely resembles the planning process utilized in the development of the Basin Plan. “The emphasis on the Watershed Plan is on providing local organization with the flexibility and support they need to accomplish their goals for surface and groundwater protection and restoration within the context of a basinwide effort” (MPCA, 1998a). The state realizes that each watershed is unique and the process to development the watershed plan must be designed to meet the goals and objectives of the individual watershed.

The first step in developing a Watershed Plan is to establish a watershed management team composed of diverse stakeholders, including local government officials, landowners, farmers, industries, tribal governments, advocacy groups, citizens, and state agencies. With technical assistance from state agencies, the watershed management team performs a watershed assessment by evaluating water quality data, and land use data. Based on the watershed assessment, the goals and objectives can be established and the main problems in the watershed can be prioritized.

The watershed management team then develops a watershed plan that includes strategies that will target specific watershed problems. The management team must integrate the strategies with Basin Plan, existing state and federal programs, and with each county’s comprehensive local water plans. Financial assistance to aid local planning is available through grants or loans from the Clean Water Partnership. The Clean Water Partnership Loans provide the main

source of state funding for watershed planning in Minnesota.

Concluding Comments

Minnesota's Basin Management approach follows EPA's framework for statewide watershed protection. The Basin Management approach integrates the state agencies, develops Basin Plans that address large scale basin-wide issues, and is able to prioritize watersheds so resources can be targeted toward the initiation of local watershed planning. The approach provides the resources necessary to support the design and implementation of local watershed plans. The strength of Minnesota's two-tiered watershed approach is that large scale, basin-wide problems are addressed by the entity that can best solve these problems, while the specific watershed level problems are addressed by the local stakeholders the have the most knowledge and stake in the watershed. The limiting factor in the implementation of watershed plans throughout the state is funding. Currently the state of Minnesota does not have the financial resources to fund planning in every watershed in the state.

Case Study: Minnesota River Basin

The Minnesota River Basin provides a good case study for examination of the implementation of Minnesota's Basin Management approach at the basin level and the watershed level. The Minnesota River Basin is approximately 16,700 square miles in size and located in southeastern Minnesota. There are 13 watersheds located in the Minnesota River Basin. The Minnesota River Basin provides beautiful scenery, habitat for wildlife, recreational opportunities, and drinking water for many residents. However, during the past several decades the water quality in the Minnesota River Basin has been declining as a result of sedimentation, bacterial contamination, and phosphorus and nitrogen pollution. The Minnesota River has been

identified as one of several relatively high contributors of nitrogen into the Mississippi River (MPCA, 1998b). The problems found in the Minnesota River Basin are widespread, and originate from a multitude of point and nonpoint sources.

The Minnesota River Basin Plan

Following the implementation of the Basin Management Approach in 1993, the state began developing a Basin Plan for the Minnesota River Basin. The Minnesota River Basin was one of three basins that were first targeted by the Basin Management approach. To begin the planning process the MPCA established a basin planning team consisting of state government agencies, local governments, and stakeholders. The planning team began the five-year management planning cycle by evaluating existing data, and developing a comprehensive monitoring program. The planning team assessed the water quality in the basin and the thirteen watersheds, and the MPCA began coordinating their monitoring and permitting programs within the basin. Following a year of data analysis, the MPCA developed a BID for the Minnesota River Basin. The main problems identified in the basin were bacteria, sedimentation, phosphorus, nitrogen, and hydrologic modification. The assessment concluded that point sources contributed approximately 26 percent of the phosphorus and nitrogen loading in the basin, while non-point sources attributed approximately 74 percent (MPCA, 1998b).

Following five years of planning, the planning team developed the Minnesota River Basin Plan in 1998. The Basin Plan implemented large scale basin-wide strategies to achieve the goals established for the Minnesota River Basin. The strategies included BMP's, phosphorus management guidelines, River-Friendly Farmer Program, and education. Improved education was viewed as the most important strategy in the Basin Plan. The MPCA along with other state

and local agencies developed outreach education programs aimed mostly at farmers. The MPCA was also able to prioritize watersheds within the Minnesota River Basin that had significant water quality problems, and allocate resources toward those watersheds to initiate local planning. One of the watersheds targeted was the Blue Earth Watershed.

The Blue Earth Watershed Plan

The Blue Earth Watershed covers approximately 3,000 square miles located in south central Minnesota. Nutrient runoff, soil erosion, feedlots, and increased residential development are the main sources cause significant degradation of the watershed (Blue Earth Watershed, 1997). In 1996, a watershed management team consisting of state agencies, county representatives, soil conservation districts, farmers, advocacy groups, and citizens was established in the Blue Earth Watershed. A coordinator was appointed to coordinate the planning process, bridge communication between local, state and federal agencies, and solicit funding. The goal of the watershed plan was to “achieve ecologically healthy landscapes and sustainable communities in the watershed.” The development of the Blue Earth Watershed Plan occurred simultaneously with the development of the Minnesota River Basin Plan.

The Blue Earth Watershed management team worked closely with the MPCA and the Minnesota River Basin planning team to develop shared goals and objectives. The management team solicited technical assistance from the MPCA and DNR for data collection, monitoring, and data analysis. The management team developed a watershed plan that included strategies and an implementation schedule. The strategies implemented include: stabilize eroding shoreline, vegetative riparian buffers, manure management programs, restore wetlands, educate farmers on BMP’s and erosion controls, and a program to monitor water quality.

Concluding Comments

The Blue Earth Watershed management team attributes its success to three main elements: funding, stakeholder involvement and support, and technical assistance from the state. The management team received financial assistance from the MPCA, DNR, and the Clean Water Partnership. The strategies implemented in the Blue Earth Watershed Plan received local support because these strategies were developed through collaboration. Prior to the development of the watershed plan, the Blue Earth Watershed management team developed trust and relationships among the members, by holding many public meeting and workshops. This provided a forum for stakeholders to voice their opinions and express their concerns. Though this process stakeholders began to understand each other, and developed relationships which laid the groundwork for future success. This laid the groundwork for future success. The state, mainly the MPCA, provided the necessary technical support and aided in the data collection and monitoring.

Chapter 4

Oregon's Watershed Protection Approach

The Watershed Health Program

Oregon first implemented a watershed protection approach in 1993 when the Oregon Legislature created the Watershed Health Program as a strategy to restore the health of the watersheds in Oregon. The Watershed Health Program was not a comprehensive statewide watershed protection approach, rather it was a locally driven program designed and implemented by local watershed councils. The goal of the Watershed Health Program was to assist watershed councils with the local implementation of watershed plans. The Watershed Health Program was managed by the Governor's Watershed Enhancement Board Program (GWEB), which was composed of representatives from various Oregon State agencies. "The primary function of the GWEB was to provide technical assistance, administer a grant program, promote education and public awareness, and support the work of local watershed councils" (Oregon, 1996).

Local Watershed Councils

The cornerstone of the Watershed Health Program was the creation of local watershed councils to work in partnership with local, state and federal agencies to address watershed problems. "Watershed councils are locally organized, voluntary, non-regulatory groups established to improve the condition of watersheds in their local area" (Oregon, 1996). The primary function of the watershed councils is to assess watershed conditions and develop strategies to protect and improve the watershed. The general guidelines for watershed councils are: (1) establishment of a watershed council is voluntary, and (2) the council must represent

the interests of the stakeholders. There are approximately 82 watershed councils in Oregon.

An important aspect of the Watershed Health Program was the financial and technical assistance allocated by Governor's Watershed Enhancement Board to local watershed councils. From 1996-1997, the GWEB administered approximately \$5.5 million to local watershed projects through the Watershed Health Program, \$2.6 million of which came from lottery revenues (Oregon, 1996). The GWEB also provided technical assistance to watershed councils for data collection, monitoring, and watershed assessment.

The Watershed Health Program has few procedural or substantive requirements, and the GWEB did not provide specific direction for the design and implementation of watershed plans. With the aid from state grants, watershed councils independently identified the problems of the watershed, establish goals, and develop strategies to restore and enhance watershed conditions. The only specific requirement in the Watershed Health Program is that public participation be included in all phases of the planning process.

The Oregon Plan for Salmon and Watersheds

Although the Watershed Health Program successfully addressed local watershed issues and initiated local planning through the creation of watershed councils, Oregon did not have a comprehensive statewide watershed protection approach until 1997. A significant event lead Oregon to develop a statewide watershed-based approach. In 1996, federal government officials declared the coho salmon endangered in Central California under the Endangered Species Act, and were prepared to extend the listing to Northern California and Oregon. In order to avoid the negative consequences of a listing in Oregon, Governor John Kitzhaber persuaded the federal government to delay the listing and allow Oregon to implement their own

recovery plan.

Following two years of collaboration between local, state, and federal governments, and stakeholders, Oregon implemented a 3,000 page plan titled “The Oregon Plan for Salmon and Watersheds.” The Oregon Plan’s goal is to restore the healthy function of Oregon’s aquatic systems by protecting and restoring watersheds through locally driven and voluntary efforts. The Oregon Plan is essentially a salmon restoration plan that aims to restore salmon habitat through watershed restoration and protection. “While the Oregon Plan focuses on salmon, the main emphasis is to restore and conserve the crucial elements of natural systems that support fish, wildlife, and people” (Oregon Plan, 1998).

The Oregon Plan recognizes that the health of the salmon is intimately connected to the health of the watersheds. “The factors for the salmon decline will be viewed in a watershed context, and will be implemented at the local level through watershed councils” (Oregon Plan, 1998). The Oregon Plan extends beyond a typical statewide watershed protection approach. The Plan includes elements specifically designed to restore the salmon, such as fish management and harvest practices. The Plan takes a holistic view of all the factors affecting the salmon habitat.

The Oregon Plan is based on three essential elements: (1) coordinated state agency programs, (2) community-based action, and (3) monitoring. Community-based action is the backbone of the Oregon Plan. “The Plan recognizes that efforts to conserve and restore habitats must be planned by communities and landowners with local knowledge of problems and ownership in solutions” (Oregon Plan, 1998). The Oregon Plan provides state financial and technical resources to watershed councils to design and implement local watershed plans that aim to protect and restore salmon habitats. The Oregon Plan does not delineate watersheds

throughout the state, rather the state relies on local watershed councils to delineate their geographic unit. A significant aspect of the Oregon Plan is financial assistance to local watershed councils and state agencies. In 1997, the Oregon Legislature allocated \$32 million to implement the Oregon Plan.

Under the Oregon Plan all government agencies agreed to coordinate their activities so the goals and objectives in the plan can be accomplished effectively and efficiently as possible. “The state governmental agencies facilitate, guide, and support local watershed councils, provide financial support to watershed councils, enforce existing regulations, and coordinate their efforts toward the same goals and objectives” (Oregon Plan, 1998). The Oregon Plan established three teams composed of state agency representatives to coordinate the implementation of the Plan at the local level, and one independent team monitors the success of the Plan.

Science Team: The role of the science team is to develop science-based benchmarks, prioritize watersheds that have water quality problems, and monitor the success of the Plan.

Coordination Team: The role of this team is to coordinate all the agencies toward the same goals.

Public Outreach Team: The role of this team is to engage local watershed councils to develop and implement watershed-based salmon restoration and recovery plans

Independent Science Team: Composed of independent scientists. Their role is to evaluate and provide an independent view of the success of the Plan.

The Oregon Plan emphasizes strong science and monitoring programs that are carried out by local, state, and federal governments. The comprehensive monitoring program enables the state to prioritize the watersheds where the salmon habitat is most threatened, and target those watersheds. Monitoring also enables the state to determine if the restoration strategies are

successful.

Concluding Comments

The Oregon Plan incorporates all of EPA's essential elements for a statewide watershed protection approach. The Oregon Plan is one of the most unique, comprehensive and ambitious statewide watershed protection approaches in the country. The Oregon Plan effectively coordinates the state agencies, and provides a framework that supports local planning. The strength of the Oregon Plan is the substantial state financial and technical assistance allocated to watershed councils to initiate local watershed planning. The Oregon Plan relies heavily on collaboration and locally developed solutions.

It is too early to determine if the Oregon Plan will be successful restoring the salmon populations through watershed protection. The Oregon Plan received a serious setback in August 1998 when the coho salmon was listed as endangered. The main setback was the financial loss to the state as a result of the listing of the salmon. The listing of the salmon cost the state approximately \$6 million in lost timber harvest tax funds, which was previously used toward implementation of the Oregon Plan. A substantial portion of the money to pay for the Oregon Plan was contingent on the salmon not being listed. However, the state of Oregon firmly believes the Oregon Plan will be successful restoring salmon and watersheds, and will continue implementing the plan despite the listing.

Case Study: McKenzie Watershed

The McKenzie Watershed is an excellent example of the design and implementation of a watershed protection approach at the local level in Oregon. The McKenzie Watershed

Council is recognized as one of the most successful watershed councils in Oregon.

The McKenzie Watershed, located in Central Oregon, covers an area of approximately 1,300 square miles. The rivers and streams in the watershed originate in the Cascades Mountains and drain into the Willamette River. Approximately 34,000 acres of the McKenzie is in agriculture, 9,000 acres is residential, 1,000 acres industrial, and 800,000 acres is forest (McKenzie, 1998). The rivers and streams in the watershed provide a multitude of benefits including drinking water for approximately 200,000 people, wildlife habitat, recreation, and hydroelectric power. “Development in the McKenzie Watershed and other pressures have in recent years threatened the capacity of the river to sustain the quality of water” (McKenzie, 1998).

McKenzie Watershed Council

Beginning in the early 1990's, Lane County and the Eugene Water and Electric Board realized that the existing fragmented approach to managing the water resources in the McKenzie Watershed was ineffective. In 1992, Lane County and the Eugene Water and Electric Board developed a partnership and began to organize, seek start-up funds, and provide early support and direction (McKenzie, 1998). Through this partnership, the McKenzie Watershed Council (MWC) was created. The Council consists of 21 members, 15 of which are local stakeholders, and 6 of which are state agency representatives.

Following its creation, the MWC lobbied for and received a \$600,000 grant from E.P.A to support the watershed council and program development. The MWC also received \$250,000 from the Natural Resources Conservation Service, and \$50,000 from the Watershed Health

Program through the Governor's Watershed Enhancement Board. The funding provided the necessary resources to initiate watershed assessment the development of a watershed action plan.

Planning Process

In 1993, the MWC held its first meeting to adopt its charter, rules, planning process and timeline. The mission of the MWC is "to foster better stewardship of the McKenzie Watershed resources, deal with issues in advance of resource degradation, and ensure sustainable watershed health, functions and uses." The MWC held numerous public meetings to better understand the stakeholders issues in the watershed. The MWC identified the following goals and objectives:

- improve communication among effective individuals, citizens, and governments
- establish a framework for coordination, cooperation, and citizen involvement
- provide a forum for resolving conflicts
- develop an integrated comprehensive watershed management program, which includes an action plan, to achieve and maintain watershed health.
- Provide ongoing program evaluation during implementation
- Promote ongoing monitoring of the health of the watershed.

The MWC then solicited technical support from the GWEB and other state agencies to assess the conditions of the McKenzie Watershed. The MWC developed a watershed GIS database to aid in the assessment. The assessment identified four main issues: (1) water quality, (2) fish and wildlife habitat, (3) recreation, and (4) human habitat. A comprehensive evaluation of data on each of the four issues was performed. "Data was analyzed, benchmarks and indicators were established, and actions were recommended (McKenzie, 1997)." In 1997, two action plans for the McKenzie Watershed were developed and implemented. One focused on water quality and habitat, and the other focused on recreation and human habitat.

The Council immediately implemented several programs prescribed in the action plans. A comprehensive watershed-wide water quality monitoring program was put into place to coordinate long-term water quality monitoring. A citizen monitoring program was also implemented. This program engaged volunteers, mainly students, to coordinate weekly monitoring of the watershed. The third program was the Mohawk Watershed restoration project. The Mohawk Watershed is a sub-watershed of the McKenzie Watershed. The MMW has provided technical support, and financial assistance for the implementation of the Mohawk Watershed restoration activities. These projects have ranged from fencing cattle away from streams, to planting trees along riparian areas (McKenzie, 1997). A significant aspect of the planning process and strategies in the action plans was public education. The MWC educated the public through newspapers, newsletters, mailing lists, brochures, and information booths.

Concluding Comments

The MWC is an extremely well organized and effective watershed council. The implementation of the Oregon Plan did not have a significant effect on the MWC, mainly due to the fact that the McKenzie Watershed does not have a significant population of coho salmon, and that the MWC already has implemented a comprehensive watershed action plan. However, the Oregon Plan will provide additional financial assistance in the future.

The success of the MWC can be attributed to four factors. First, financial assistance from the state and federal government aided in the initiation of the watershed assessment and plan. Second, strong support among stakeholders was critical to the success. The MWC emphasizes public participation in every phase of the planning process. The rules established by

the MWC mandated public participation in all planning processes. The third factor was technical support from the GWEB and other state agencies. The fourth factor was the development and implementation of innovation solutions, such as incentives programs for landowners, and outreach educational programs.

Chapter 5

Comparison of Statewide Watershed Protection Approaches

This paper has shown that watershed protection approaches can vary considerably among states. Washington, Minnesota, and Oregon have all approached watershed protection from different perspectives for many reasons including the physical characteristics of the state, main sources of ecosystem degradation, political climate, and cultural and economic factors.

Washington State's first statewide watershed protection approach, "Watershed Approach to Water Quality Management", closely followed EPA's framework. This comprehensive approach coordinated state regulatory water programs focused on watersheds, assessed the water quality in each watershed, and initiated local watershed planning. However, the enactment of the state's Watershed Management Act changed the focus on watershed planning. Washington now has a more narrowly focused, and integrated approach to watershed protection. The Act concentrates resources on two critical issues causing watershed degradation: water quantity and instream flow. The Watershed Management Act provides state technical and financial assistance to watershed councils to initiate local planning.

Minnesota has developed a very structured and comprehensive watershed protection program that closely resembles EPA's framework. Minnesota has a geographically based, two-tiered approach with a specific management planning cycle that focuses on both the large river basins and the individual watersheds. The premise of this approach is that large issues are most effectively addressed by state agencies, and small-scale watershed issues are most effectively addressed by local groups and stakeholders. This approach enables the state to coordinate water

quality programs, assess the water quality in the basins and watersheds, prioritize the watersheds, and the necessary resources to initiate local planning.

The Oregon Plan is the most comprehensive watershed-based approach analyzed in this study. The Oregon Plan extends beyond a typical statewide watershed protection approach. The Oregon Plan attempts to restore salmon habitats through watershed protection. The Oregon Plan is a geographically based approach that integrates state agencies, and provides technical and financial assistance to watershed councils to develop strategies aimed at restoring the salmon habitat. The Oregon Plan is an extremely comprehensive, holistic approach that addresses all the issues in a watershed that are affecting salmon.

Figure 5-1 provides a comparison among Washington, Minnesota, and Oregon State's watershed protection approaches. The matrix compares each state's watershed protection approach to the four elements in EPA's framework. All of states coordinate their efforts focused on geographic units. Washington State delineates the watersheds in the state, Minnesota has a two-tiered or "nested" approach, and Oregon relies on local watershed councils to delineate the geographic units. All of the states in the study integrate their water quality programs, and provide technical and financial assistance to local watershed planning groups. Minnesota is the only state in this analysis that has a structured management planning cycle. Additionally, Washington is the only state in the study that focuses specifically on the water quantity issues within the state. Established watershed councils locally implement Washington and Oregon's statewide approaches, whereas watershed management teams locally implement Minnesota's approach. Finally, all of the states incorporate a comprehensive monitoring program and utilize adaptive management.

	Washington	Minnesota	Oregon
<u>Focus on Geographic Units</u>			
State Designated Watersheds	✓		
Designated “Nested” Watersheds		✓	
Watershed-Based			✓
<u>Integrated Solutions</u>			
State Financial Assistance	✓	✓	✓
State Technical Assistance	✓	✓	✓
Management Planning Cycle		✓	
Focus on Water Quantity Issues	✓		
Focus on Entire Ecosystem		✓	✓
<u>Collaboration</u>			
Watershed Councils	✓		✓
Watershed Management Teams		✓	
<u>Measure Success</u>			
Comprehensive Monitoring	✓	✓	✓
Adaptive Management	✓	✓	✓

Figure 5-1: Comparison Matrix

Chapter 6

Lessons Learned

The intent of EPA's "Statewide Approach to Watershed Protection" document was not to provide specific requirements for a statewide watershed protection approach, rather to provide a basic framework. EPA realized that many factors from the physical landscape to the political landscape vary considerably among states. The voluntary and flexible nature of statewide watershed protection approaches results in different watershed protection approaches between states throughout the country. However, if EPA were to design a rigid national framework it would take away some of the significant advantages of a watershed protection approach. The premise of a watershed protection approach is that it is designed to meet the specific needs and problems of a watershed and focus efforts to solve these problems.

Essential Elements for a Statewide Watershed Protection Approach

From an analysis of these statewide watershed protection approaches, it is clear that the specific components and methods of implementation of a statewide watershed approach can vary among states. A statewide watershed protection approach must provide a framework that integrates efforts focused on geographic units, and provide a mechanism to support local implementation. While there are many elements that can be incorporated into a statewide watershed protection approach, there are three essential elements: (1) targeting and prioritizing, (2) financial assistance, and (3) technical assistance.

An important element to a statewide watershed protection approach is the ability

to prioritize watersheds based on the established goals and objectives. This allows the specific problems affecting the quality of the watersheds to be targeted. Targeting and prioritizing permits state agencies to effectively allocate their staff and financial resources to address these problems.

Financial assistance is often the limiting factor in the design and implementation of local watershed plans. As essential factor in the initiation of watershed planning in the case studies I analyzed in Washington, Minnesota, and Oregon was funding. For example, in Washington's Quilcene-Snow Watershed, the Jefferson County Water Resource Council spent several years slowly assessing the issues in the watershed. Following the enactment of the Watershed Management Act that allocated money to the Quilcene-Snow Watershed, comprehensive watershed planning rapidly progressed. Local government, groups, or watershed councils often would like to initiate watershed planning but do not have sufficient funding to do so. State agencies or legislatures must provide financial assistance through grants or loans to encourage local groups to initiate watershed planning.

Technical support from state agencies to local watershed planning groups is an important to successful implementation of watershed plans. Local watershed groups usually do not have the resources or expertise to conduct comprehensive watershed assessments and monitoring programs. State agencies must allocate sufficient staff and resources to aid local watershed planning groups with watershed assessment.

Essential Elements for Local Implementation

Based on the case studies I analyzed in this paper, there appears to be four for local implementation of watershed plans: (1) stakeholder involvement, (2) innovative solutions,

and (3) measuring success.

A watershed protection approach must collaborative process that actively involves the stakeholders in the design and implementation of the plan. Stakeholders are able to effectively integrate the social, economic, and ecological issues in a watershed. Stakeholders often have the most knowledge of the problems and issues within a watershed. Watershed protection plans have more credibility and support with stakeholders who participated in the planning process. To be successful, stakeholders must trust the planning process and have ownership in the plan.

Watershed protection plans must go beyond traditional regulatory programs and implement innovative strategies. The past has taught us that regulatory programs alone are not enough to protect and restore the quality of our nations waters. Innovative programs, such as wetland mitigation banking, best management practices, riparian protection, land use controls, conservation easements, and educational programs can be more effective and efficient in protecting watersheds.

The final essential element of a watershed protection approach is measuring success of the program, and utilizing adaptive management. Monitoring is essential to evaluate the success of the watershed plan and help guide future efforts and resources. The watershed protection approach is an ongoing process that must continually adapt.

Concluding Comments

Watershed protection is increasing in popularity as more and more states are implementing statewide watershed protection approaches. The Clinton administration has recently developed the “Clean Action Plan”, which supports and emphasizes watershed-based efforts. As the public demands for improved water quality increase while state budgets decrease,

states are faced with the problem of having to do more with less. States are realizing that watershed management is the best approach to improve statewide environment programs. This trend toward watershed management approaches should significantly improve the water quality throughout the country.

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The McKenzie Watershed Council (<http://www.pond.net/~mwc/>)

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