Florida's Rotating Basin Approach: Towards Better Integration, Coordination, and Cooperation

Eric H. Livingston
Bureau of Watershed Management
Florida Department of Environmental Protection
2600 Blair Stone Road (MS3510)
Tallahassee, Florida 32399-2400
Phone: 850/921-9915
Email: eric.livingston@dep.state.fl.us

Introduction

Florida is blessed with a multitude of natural systems, from the longleaf pine-wiregrass hills of the panhandle, to the sinkhole and sand ridge lakes of the central ridge, to the Everglades "River of Grass", to the coral reefs of the Keys. Abundant surface water resources include over 20 major rivers and estuaries along with nearly 8000 lakes. Plentiful ground water aquifers provide over 90 percent of the state's residents with drinking water. Add the state's climate and it's easy to see why many consider the Sunshine State a favored vacation destination and why the state has experienced phenomenal growth since the 1970's. Today, Florida is the fourth most populous state in the nation and continues growing rapidly.

However, Florida's natural systems, especially its surface and ground water resources, are extremely vulnerable and easily damaged. This is partially the result of the state's sandy porous soils, karst geology and abundant rainfall. The negative impacts of unplanned growth were seen as early as the 1930s, when southeast Florida's coastal water supply was threatened by saltwater intrusion into the fragile freshwater aquifer which supplied most of the potable water for the rapidly expanding population. By the 1970s, it was becoming all too clear that unplanned land use, development and water use decisions were altering the state in a manner that, if left unchecked, could lead to profound, irretrievable loss of the very natural beauty that brought residents and tourists to Florida. Extensive destruction of wetlands, bulldozing of beach and dune systems, continued saltwater intrusion into freshwater aquifers, and the extensive pollution of the state's rivers, lakes and estuaries were only some of the negative impacts of this rapid growth.

Fortunately, Florida's citizens and elected officials became educated about these problems and began developing programs to protect and manage the state's natural resources. Florida began serious and comprehensive efforts to manage its land and water resources and growth coincident with the increasing strength of the environmental movement in the nation and the state during the early 1970s. Florida's natural resources management programs have evolved over the past thirty years. Collectively, the individual laws and programs enacted during this time period can be considered "Florida's Watershed Management Program". In many cases, these laws have been

integrated either statutorily with revisions to existing laws or through the adoption of regulations by various state, regional or local agencies.

Even though Florida's watershed program is among the most progressive and effective in the United States, many of Florida's water bodies are impaired and others are threatened by the increasing imperviousness and wastes left within a watershed by everyone who lives, works, plays, or travels in it. Reducing nonpoint sources of pollution such as stormwater runoff, erosion and sedimentation, and leaching from on-site wastewater systems can not be done by government alone. If we are going to succeed in assuring that future generations have clean water, then each person must be part of the solution to "Pointless Personal Pollution". Just as importantly, assessing and managing the cumulative effects requires a comprehensive watershed approach that involves all stakeholders in establishing water body specific goals and the watershed management plans that will set the path to achieve the goals.

The Watershed Approach

The watershed approach is the next logical step toward the coordination and focusing of local, regional, state, and federal resources to protect and restore natural resources in the state. This approach has been encouraged by the U.S. EPA for several years and about 25 states are now using the watershed approach. Additionally, the Florida Watershed Restoration Act of 1999, which provides the legal framework for the development and implementation of Total Maximum Daily Loads, recommends the use of the watershed approach. The watershed approach uses a hydrologic framework, rather than political or regulatory boundaries, and it allows integration and coordination with other watershed programs such as SWIM and NEP. Table 1 describes the general characteristics of the watershed approach. On a basic level, it provides a mechanism to focus resources on specific units (basins). This focusing of resources alone will allow the state's water resource issues to be addressed more efficiently, since DEP staff will be able to concentrate on resolving problems in individual basins.

The watershed approach also provides a structure that allows for the management of entire systems rather than of their separate parts. The process draws together all the participants and stakeholders in each basin to decide what problems affect the basin, which are most important, and how they will be addressed. Through this more holistic approach, a basin's environmental health will improve because individual activities are more likely to be coordinated and will better address cumulative impacts.

The watershed approach also institutes a cyclical process of environmental assessment, priority setting, monitoring, and implementation of management strategies in identified priority basins. This basin management provides a set schedule that both organizes work activities and ensures that all waters are addressed in a timely manner. At the conclusion of the cycle, the process begins anew, allowing participants to respond to changing conditions or adjust strategies that have not performed as anticipated.

Table 1: General Characteristics of the Watershed Approach

- Is place based and defined by hydrologic boundaries, rather than political or social boundaries or individual permittees.
- Through a common framework of Hydrologic Unit Codes (HUCs), addresses water resource issues at different geographic scales within a basin.
- Provides a five-year basin management cycle and a detailed schedule of activities to meet statutory and administrative requirements.
- Coordinates existing activities so that each basin's water resources are managed efficiently and cost-effectively, without duplicated effort.
- Establishes a collaborative, consensus-based process by which a basin's diverse stakeholders can identify shared goals, build a common vision, define and prioritize problems, target resources, and implement management actions.
- Obtains commitments from stakeholders to work on resolving the basin's problems and to take responsibility for specific management tasks.
- Brings together stakeholders in each basin in formal, organized partnerships.
- Creates a process through which political and organizational obstacles to resolving a basin's water resource problems can be overcome.
- Strengthens the use of scientific data as a factual basis for decision making.
- Uses an interdisciplinary approach to identify, prioritize, and solve problems.
- Sets specific, quantifiable goals for restoration and protection.
- Establishes a cooperative monitoring program to measure the effectiveness of management actions and incorporates the results into the next basin management cycle.
- Emphasizes the transfer of information to the public and other governmental agencies to achieve management goals.

While the watershed approach requires a broader management perspective than the traditional regulatory approaches, it does not compete with existing programs. Instead, it integrates them, allowing the Division of Water Resource Management to meet its responsibilities more effectively and efficiently. This framework will establish mechanisms for the Division to define priorities, improve coordination, integrate program goals, and allocate finite resources within these geographic areas. It will also better address the issue of impaired water quality caused by nonpoint sources.

Benefits of the Watershed Approach

The watershed approach—with its cyclical structure, coordinated activities, defined timelines, built-in mechanisms for feedback, and diverse participants—will benefit DEP and other participants and stakeholders. These benefits include the following:

- The watershed approach builds on the existing assessment and restoration efforts of DEP and other agencies.
- The watershed approach focuses a wide array of resources on individual basins' problems, resulting in a more efficient use of and greater accountability for the limited federal, state, local, and private dollars available for environmental issues.
- The watershed approach fosters the coordinated implementation of programs within DEP and other agencies, including the management of programs to control point sources, stormwater runoff, septic tanks, and wetlands protection.

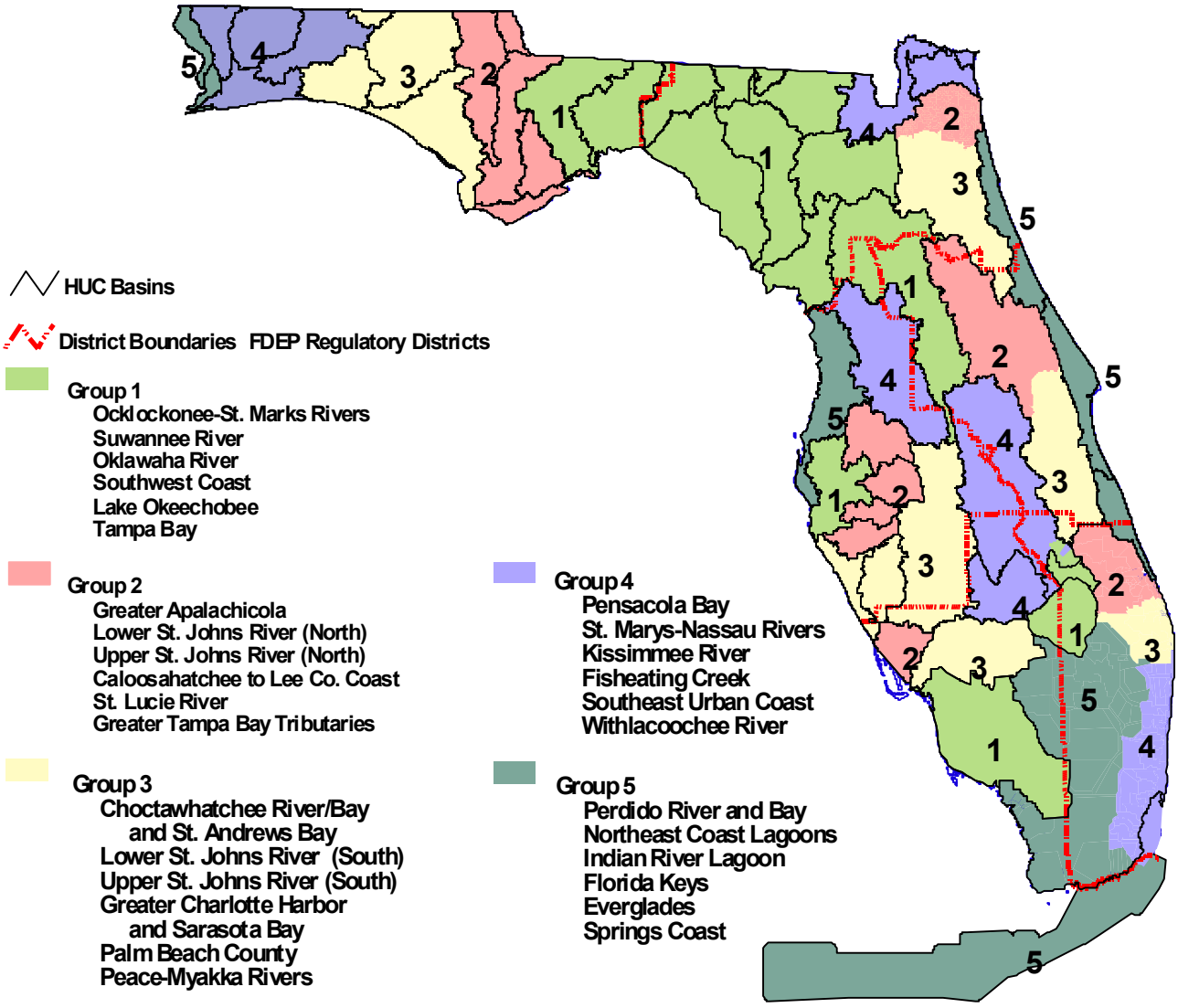
- The watershed approach encourages cooperation among a number of state, federal, regional, and local agencies, since different governmental units and nongovernmental interests build agreements on issues that cut across jurisdictional lines.
- The watershed approach is a tool to educate participants on the complex nature of problems and issues in a basin and the range of concerns that must be addressed. It also allows participants to understand and work within each basin's unique political and organizational environment.
- The watershed approach encourages accountability and the long-term involvement of the public, landowners, and businesses in individual basins.
- Because the watershed approach includes the development of a long-term cooperative monitoring program, built on existing programs, to generate reliable, useful data, participants track progress against specific goals and identify the most cost-effective controls.
- The watershed approach speeds up the implementation of management actions, since participants understand that a plan or policy reflects their input and has been crafted to meet their interests.

Components of the Watershed Approach

The watershed approach is based on the following major components:

- The **basin management unit** is the geographic or spatial unit used to divide the state into smaller areas for assessment—generally groups of Hydrologic Unit Codes (HUCs) as set forth in Figure 1. Florida's 52 HUCs have been combined into 30 groups – five in each of the six DEP district offices.
- The **basin management cycle** is the five-year cycle within which watersheds are assessed and management plans developed and implemented.
- The **Management Action Plan (MAP)**, a document developed over the five-year cycle and subsequently updated every five years, describes the watershed's problems and how participants plan to address them. A key purpose is the equitable reduction of pollutant loadings to meet the TMDL established for an impaired water body.
- **Forums and communications networks** allow participants to collect and evaluate as much information as possible on their individual basins and to reach a consensus on strategic monitoring, priority water bodies, and management strategies.
- The development of a **Planning List of potentially impaired waters** in Phase 1 and the development and adoption of a **Verified List of impaired waters** at the end of Phase 2 of the basin management cycle. TMDLs will be prepared for waters on the Verified List, as will Management Action Plans to achieve the needed reductions in pollutant loadings.

Figure 1: DEP's Watershed Management Groups and HUC Boundaries



Basin Management Cycle

The basin management cycle is the five-year cycle within which watersheds are assessed under the watershed approach. Each individual basin cycle will take five years to complete, and the cycle within that basin will be repeated every five years. Table 2 shows the five phases of the cycle, the proposed schedule, and the activities to be carried out during each phase.

Table 2: Basin Management Cycle

Phase	Schedule	Activities
Phase 1: **Preliminary Basin Evaluation**	Years 1-2	Identify stakeholders/participants Obtain data and enter into Florida STORET Conduct public meeting to introduce cycle Build basin team Primary Product: draft Status Report that includes: • *Evaluation of water body health based on the Impaired Waters Rule (62-303,F.A.C.)* • *Planning List of potentially impaired waters* • *Inventory of existing and proposed management activities* • *Identification of management goals and objectives, resource issues of concern* • *Identification of current monitoring entities and their activities* • *Development of a Strategic Monitoring Plan*
Phase 2: **Strategic Monitoring**	Years 2-3	Carry out strategic monitoring to collect additional data. Obtain data and enter into Florida STORET Evaluate new data and incorporate findings into Assessment Report that will include the proposed Verified List of Impaired Waters
Phase 3: **Data Analysis and TMDL Development**	Years 2-4	Complete TMDLs for verified impaired waters
Phase 4: **Basin Management Action Plan**	Years 4-5	Finalize management goals/objectives Develop draft BMAP, including TMDL allocation Identify monitoring and management partnerships, needed rule changes and legislative action, funding opportunities Develop Monitoring and Evaluation Plans Seek funding Obtain participants' commitment to implement plan
Phase 5: **Implementation**	Year 5+	Implement BMAP Carry out rule development/legislative action

Each of the cycle's five phases has it's own unique products and results. Updated in each subsequent reiteration of the cycle, these products and results document the watershed's most urgent problems and help participants plan to address them. Products include a Status Report and a Strategic Monitoring Plan at the end of Phase 1, data collection, an Assessment Report at the end of Phase 2, BMAPs, and follow-up Monitoring and Evaluation Plans.

Each of the different elements comprises a building block in the final MAP that is the culmination of the basin management cycle. The BMAP evolves out of the first three phases. It focuses the work effort and documents how decisions are made and solutions selected. It also identifies specific management tasks and projects, who is going to do the work, and how the work will be funded.

This management cycle is an iterative process, with additional progress being made in each future cycle to address a basin's problems. In most basins, it will not be possible to address all of the water quality problems in the first basin cycle, and work will focus on priority water bodies in the basin. Priorities have been set in the Consent Decree between the U.S. EPA and the Earth Justice Legal Defense Fund that established the schedule by which TMDLs will be developed in Florida. Even in targeted waters, it will take time for management activities to produce a quantifiable improvement in water quality. As such, the BMAPs will include performance measures, both water resource–related goals and target BMP implementation rates, and monitoring in subsequent cycles will be used to determine the effectiveness of previous management activities.

The Five Phases of the Basin Management Cycle

The components of each phase of the basin management cycle are described below. Each step has its own products, such as reports or plans that result during different stages of the cycle. The order in which these steps are taken is important because the sequence provides a general structure for implementing the cycle. However, the details of each phase may vary from basin to basin, depending on available funding and staffing and each basin's specific issues.

The basin management cycle is an integrated, comprehensive process that is grounded in the basin's physical structure. Each basin management cycle connects and coordinates a series of phased activities among stakeholders. Built into the cycle are mechanisms for obtaining feedback and fine-tuning management activities, based on the information that is collected.

The process is initiated within the Bureau of Watershed Management with an important role played by the watershed staff in the DEP District Offices. However, a more formal structure for organizing activities will evolve. Participants' roles and responsibilities change throughout the cycle. Eventually what develops is a tool for empowering decision making by all participants all the way down to the local level.

The activities and products in each phase include:

Phase 1: Preliminary Basin Evaluation

The preliminary basin evaluation is based on the most recent ten years of data from STORET, EPAs national STOrage and RETrieval data base which has been designated by Florida law as the primary data base for such information. The Status Report will include the following information:

- *Using the process set forth in the Impaired Waters Rule, the general ecological health of the basin and the water quality of its individual water bodies will be evaluated. Water bodies will be classified as healthy, potentially impaired, or needing more data. Major threats to ground water will also be identified.*
- *A Planning List of potentially impaired waters.*
- *Analysis of the major sources of pollution causing water body impairment.*
- *Identification of existing or proposed watershed management activities that can result in reductions in pollutant loads to potentially impaired waters.*
- *Identification of strategic monitoring needs.*

The assessment will also be used to refine the state's 303(d) list of impaired waters that do not meet water quality standards as required under the federal Clean Water Act, prioritize which waters will be studied during the basin management cycle, and develop a verified list for TMDL development.

Source water assessments will also be performed during Phase 1. The SWAP Program will identify source water assessment areas around drinking water systems and inventory potential contamination sources within those areas. A susceptibility determination will be made to assess the threat that the identified sources pose to the drinking water systems which use a ground water supply. More detailed assessments may be conducted during Phase 3 for drinking water systems that use particularly vulnerable ground water supplies or a surface water source.

The key product of Phase 1 is the Status Report. The assessment chapter of the draft Status Report is prepared early in the process as a foundation for subsequent phases. Water quality data in STORET will form the basis for the evaluation that is presented in the Status Report. In some parts of the state, the WMDs and others will also have done a significant amount of work in the SWIM planning process. Rather than duplicate effort in those basins, the basin team will summarize the prior work, including portions of the SWIM plans, and build on it in a collaborative effort. The primary product of the Status Report is the Planning List of potentially impaired waters.

The Management Activities chapter of the Status Report will list existing and proposed activities, including anticipated changes in the basin from land use changes, pollution sources currently under construction such as new facilities or expansions to permitted capacities, and BMPs proposed to reduce NPS pollution. It will also identify management goals and objectives and prioritize resource issues of concern in the basin.

The information in the Status Report will be used as a starting point for watershed monitoring stakeholders to establish a Strategic Monitoring Plan. This plan will summarize the monitoring needs for the basin and specify how they will be met. Priority monitoring needs include:

- Collecting data in waters on the Planning List to verify if they are truly impaired. The Impaired Waters Rule bases the development of the Planning List on a minimum of

ten data points collected over a ten year period of time but requires a minimum of 20 data points within the last five years for a water body to be placed on the Verified List of Impaired Waters.
- Collecting additional data in waters that were on the 1998 EPA approved Florida Section 303(d) list of impaired waters but had less than ten data points available.
- Conducting intensive surveys in waters that will need a TMDL to provide the input for the computer models that will be used.
- Collecting data from the large number of water bodies for which there is either no or very little data available.

The Strategic Monitoring Plan describes the proposed monitoring; outlines which participants will carry out the monitoring; describes how the monitoring will be coordinated among different partners; provides a schedule for completion; defines quality assurance and quality control procedures for sampling, and analysis activities; and identifies specific monitoring activities and needs.

Public meetings will be held in the basin to allow citizens to review and comment on completed chapters of the draft Status Report, including the Planning List list of potentially impaired waters in the basin. Separate meetings will be held with entities that conduct monitoring in the basin to develop and implement the Strategic Monitoring Plan.

Implementation Details. The preliminary basin evaluation will be prepared by the basin team that consists of staff from the Bureau of Watershed Management and the District Offices. They will assess in detail what is currently known about the basin's physical, chemical, biological, and cultural features. This initial assessment provides team members with a common factual basis for measuring future changes, identifying information gaps and major issues, and determining future strategies and actions to preserve, protect, or restore the basin. Understanding the physical framework of each basin allows the basin team to develop a more accurate picture of the areas that are most contaminated or most vulnerable to contamination.

Once the preliminary evaluation of potentially impaired water has been prepared, the team will then broaden its scope, identifying and contacting key participants from other DEP programs such as Water Facilities Regulation, Biology, Water Policy, the district offices, and others. To begin educating participants, the Bureau team will prepare briefing materials and begin a series of presentations that culminate in broader commitments to participate.

In turn, the basin team will identify a broader range of potential participants and stakeholders. These include federal, state, regional, and local governments; various interest groups; and members of the public. The participants and stakeholders are the individuals—each with their own agendas and concerns—that are crucial to the development of a consensus-based BMAP. Notices will be mailed to interested parties, notifying them that DEP is initiating the basin management process for the basin. The basin team will coordinate with DEP staff to access their extensive outreach

mechanisms for recruiting and coordinating with stakeholders and encouraging their involvement early in the basin management cycle. This initial coordination will greatly facilitate the chances of success in Phase 4, when DEP will work with local stakeholders to develop the BMAPs.

The Strategic Monitoring Plan will detail how the monitoring will be carried out and who will fund the monitoring. If needed, the development of these activities could extend into Phase 2, for as the strategic monitoring is carried out, new insights may cause design changes in the monitoring network. Training on proper field sampling techniques may be provided as part of the strategic monitoring effort.

Collaboration with other governmental agencies with jurisdiction in the basin is essential, as information gaps as well as programmatic, management, and data needs may be satisfied by current or proposed monitoring by the WMDs, NEPs, and local governmental programs. Other agencies may also be able to satisfy the monitoring requirements for specific waters either partially or completely. Quality assurance for sampling and laboratory analysis are especially important, given that many different agencies and groups will be carrying out the sampling.

Review and comment from stakeholders and the public will be sought on the draft Status Report. At least one public workshop—or multiple workshops in large, complex, or populous basins—will be held in each basin to educate and inform citizens about the results of the basin evaluation and to receive comments.

Phase 2: Strategic Monitoring

Additional data are gathered based on the Strategic Monitoring Plan, in a coordinated effort with DEP district offices, local programs, and other agencies. DEP's Tier II Assessment Network will be used to provide data. Monitoring will focus on verifying the impairment of waters on the Planning List, collecting additional data in waters on the 1998 303(d) list that have too few data, and collecting data via intensive surveys for TMDL development. Additionally, monitoring of ground water quality and ground water/surface water interactions will be initiated under the Very Intense Study Area (VISA) ground water network.

The Bureau's monitoring will be conducted under an umbrella design plan recently developed for DEP. This Integrated Water Resources Monitoring (IWRM) design uses a three-tiered approach to statewide monitoring as shown in Table 3.

At the end of the monitoring phase, a more comprehensive assessment of the status of water quality in waters within the basin will be conducted. This assessment ultimately will serve as the 305(b) report for the basin. The assessment will be based on two primary data sets that are downloaded from STORET. The first uses the most recent ten years of data to generate an updated Planning List of potentially impaired waters, while the second uses the most five to seven and a half years of data to establish a basin specific Verified List of impaired waters. The proposed Verified List of impaired

waters will be adopted by the DEP Secretary and submitted to EPA as the part of the state's 303(d) list of impaired waters.

Table 3: DEP's Integrated Water Resources Monitoring Design

- ***Tier I*** *(Status Network) uses a probability-based monitoring design to characterize statewide, regional, and specific basinwide conditions of Florida's water resources and determine if those conditions are changing over time. It can provide a statewide reference for comparing similar water resource types. The information from sampled stations can be used to make statistically significant statements on water quality for the entire state. Sampling is performed over five years but begins one year before the implementation of the basin management cycle, so that the information can be incorporated into the basin assessments. Information collected will be used to generate the Status Report in Phase 1 of the basin management cycle. The monitoring is scheduled to start in October 1999.*

- ***Tier II*** *(Assessment Network) monitoring will be conducted to assess, in detail, targeted water bodies in each of the fifty-one hydrologic units or major watersheds of Florida. This tier of monitoring will identify specific water resource problems and determine the extent and severity of the problems. It will collect the additional data identified in the Strategic Monitoring Plan and will comprise Phase 2 of the basin management cycle. An important component will be the redesigned Very Intense Study Area (VISA) ground water network. Originally designed to measure the general effects of broad categories of land use on ground water quality, this network will be modified to address specific issues of ground water quality and the interaction of ground water and surface water.*

- ***Tier III*** *(Compliance Monitoring Network) monitoring will determine if permitted facilities are in compliance with their permits. This monitoring will provide a basis for evaluating the effectiveness of management options.*

- *The* ***Temporal Variability Network*** *for surface water is a fixed station network, assessed at the scale of the state's fifty-one eight-digit HUCs and consisting of water quantity, water quality, and biological monitoring. Sampling locations are major rivers entering Florida, downstream discharges of major rivers to estuaries, and a number of stream and lake locations. The network will provide loading information for estuaries and the state, and measure seasonal variations in support of Tier I sampling. A second temporal variability network for ground water is under development.*

Implementation Details. While most of the key coordination with other agencies involved with monitoring will be carried out during the development of the Strategic Monitoring Plan in Phase 1, continued coordination among the many agencies involved in monitoring will be essential. Basin team members will need to continue meeting regularly to discuss progress on monitoring activities, exchange results, and coordinate on logistics for intensive surveys.

As participants carry out the monitoring, data management will be crucial. Different agencies will need to accept responsibility for collecting, managing, and storing portions of the data collected in Phase 2. Data sharing will be critical, as the basin team will need to obtain data from the numerous agencies responsible for parts of the coordinated monitoring effort. The information will be uploaded to STORET, the EPA's national database on water quality maintained by DEP. Once the data are made available, feedback from a statewide audience will allow the monitoring to the fine-tuned or errors to be corrected.

The first product of Phase 2 will be the basin specific Verified List of Impaired Waters that is developed with extensive public participation. As part of this process an assessment will be undertaken of existing or proposed pollution control programs under local, state, or federal authority that provide reasonable assurance that they will result in the restoration of the impaired designated uses. This provision is set forth in the Florida Watershed Restoration Act providing an incentive for WMDs, local governments, or others to restore impaired waters before a TMDL is developed. During the development of the Verified List of impaired waters, waters may be delisted from the Planning List or from the 1998 303(d) list if data indicate that beneficial uses are now being met. This basin-specific Verified List of impaired waters will be adopted by Secretarial Order, allowing a point of entry for interested parties to challenge DEP's decisions. The adopted Verified List will be submitted to the EPA as the state's basin specific 303(d) list. The second product of Phase 2 will be the Basin Assessment Report that will include the assessment of all waters in the basin in accordance with EPA's guidance for 305(b) reports.

Phase 3: Data Analysis and TMDL Development

Participants compile, assess, and interpret the data identified or collected in Phases 1 and 2 and evaluate whether these data meet the objectives defined in the Strategic Monitoring Plan. This phase can include, for example, an analysis of historical and strategic monitoring data; evaluation of flow data to calculate statistics on worst-case conditions and note differences in flow from long-term averages; or documentation of the results of intensive monitoring, biological assessments, and special studies such as Very Intensive Study Area (VISA) investigations.

The next step is to develop TMDLs for waters on the adopted Verified List. TMDLs establish the assimilative capacity for particular water segments, water bodies or watersheds (based on existing data, the intensive monitoring data collected in Phases 1 or 2, and other relevant information). In other words, they set the maximum discharge of pollutants that will allow the water body to be healthy. TMDLs are developed using modeling techniques that explain the relationship between pollutant loadings and surface water quality. A margin of safety is applied by incorporating conservative assumptions or by not allocating a portion of the TMDLs to pollutant sources. Once completed, the TMDLs for a basin will be adopted by rule by the Secretary of DEP.

Phase 3 also includes the susceptibility determination component of SWAP for drinking water systems using a surface water supply. This determination will assess the threat posed from potential contamination sources in the delineated source water protection area. It will also provide a review of data collected during the strategic monitoring activities.

Implementation Details. The basin team will compile, analyze, and interpret the new data and evaluate whether the data meet the objectives of the monitoring plan. The data analysis will include SWAP susceptibility analyses and VISA results. The Watershed Asssessment Section will take the lead in TMDL development, which will be performed using the intensive survey data collected for waters on the Verified List. The

data from these surveys will first be used to develop a surface water model and then to develop TMDLs. The model will be developed using the water quantity and quality data and loading estimates for parameters of concern from all significant point and nonpoint sources. Models will be calibrated and validated to ensure that they adequately simulate the conditions observed during the intensive surveys. Once calibration and validation are complete, the receiving water design conditions (i.e., critical flow periods) will be simulated with the model to determine the assimilative loading capacity that results in the attainment of water quality standards. During this phase of the modeling, model runs will also incorporate proposed management activities and evaluate whether they will result in the attainment of water quality standards. Depending on the impairment, however, additional reductions in loading (beyond the scope of proposed actions) may be necessary.

The results from modeling the design conditions will be used to allocate the loadings (TMDLs) to the major pollutant source categories (such as point sources, urban runoff, agricultural nonpoint sources, and atmospheric deposition). The modeling procedures and TMDL development results will then be documented in TMDL reports and incorporated into the BMAP during Phase 4. For SWIM waters, it will be essential to coordinate with the WMDs on stormwater Pollutant Load Reduction Goals (PLRGs), a critical element of any TMDL.

Upon completion of the TMDLs, the TMDLs and their allocations will be adopted by rule by the Secretary of DEP. The rule-making process will include several opportunities for public comment, including at least one public workshop in the vicinity of each water body for which a TMDL is being developed.

Phase 4: Basin Management Action Plan

In this phase, a draft Basin Management Action Plan (MAP) is developed that describes actions needed to address water resource impairment in the basin. This BMAP, which will also serve as a TMDL implementation plan, is based on the conclusions reached in Phase 3 and on extensive coordination with local stakeholders developed during the first three phases. It focuses the work effort over the next five years by identifying specific actions needed to address water resource issues and also documents how decisions were made and solutions selected. Portions of the documents created in earlier phases are incorporated into the BMAP.

The BMAP will include performance measures for both water resource monitoring and the implementation of BMPs and other management strategies and controls. To evaluate performance measures, a Monitoring and Evaluation Plan for measuring the effectiveness of various management activities will be developed for use in the next cycle. The MAP will also identify funding sources for planned monitoring and restoration activities, as well as needed rule changes and legislative action.

It should be noted that stakeholder involvement in developing the BMAP is crucial. Participants will be expected to endorse the action plan formally and commit themselves

to implementing certain management actions. Public comments on the draft BMAP will be solicited at public meetings before the BMAP is finalized.

Implementation Details. In Phase 4, the basin team, which includes watershed stakeholders, will finalize its list of management goals, develop a draft BMAP for activities over the next five years, and begin to seek funding for those activities. The BMAP is the road map that specifies where, what, when, and how management activities will be carried out and who will take responsibility for them. Most important, each BMAP will include TMDL implementation plans, as well as methods for measuring the effectiveness of management activities that will allow the team to redefine each basin's problems using new information.

The BMAP focuses attention on those water bodies that the basin assessment and strategic monitoring phases have identified as highest priority. While TMDLs will be developed and allocated to the major categories of pollutant sources in Phase 3, in this phase the basin team will work with major stakeholders in the basin to allocate TMDLs to individual point and nonpoint sources. The allocation of loads to individual sources is a critical step towards providing reasonable assurance that the TMDLs will be achieved.

The allocation process will follow the basic principles set forth in the TMDL Load Allocation Report to the Legislature in February 2001. The Florida Watershed Restoration Act requires allocations to be done in an equitable manner. Allocations will take into account the level of treatment provided by existing treatment facilities and management practices; the impacts that pollutant sources may have on water quality; the availability of treatment technologies, BMPs, and other pollutant reduction measures; the environmental, economic, and technological feasibility of achieving the allocation; the costs associated with achieving the allocation; reasonable time frames for implementation; and the applicability of any moderating provisions such as mixing zones.

The allocation of nonpoint sources of pollution and the subsequent implementation of management activities to control such pollution will be critical to the effective restoration of impaired waters in many basins. DEP has clear regulatory authority for point sources of pollution through the federally delegated NPDES Program and the state's wastewater program, and will implement TMDLs for point sources using NPDES permitting. Additionally, Florida's NPS Management Program provides regulatory authority for many kinds of nonpoint source pollution. However, agricultural nonpoint sources are not regulated. Given the importance of reducing agricultural NPS pollution, the number of landowners, and the complexity of nonpoint issues, a self-implementing, nonregulatory, incentive-based approach for agricultural BMPs is specified by the FWRA of 1999. This approach will require unprecedented coordination with other agencies and consensus with local stakeholders to provide reasonable assurance that the nonpoint components of TMDLs will be fully implemented.

The FWRA requires the FDACS to research and adopt BMPs to reduce agricultural NPS pollution. DEP must then verify the effectiveness of these BMPs. Accordingly,

DEP will work closely with DACS, the WMDs, the Soil and Water Conservation Districts, and the Natural Resources Conservation Service to determine the best mix of BMPs to achieve the desired load reductions. Implementation will be carried out by the parties responsible for the pollutant sources, with assistance from DEP, the WMDs, and DACS. The agencies will work together to establish funding priorities for impaired waters, so that cost-share monies will be available to implement conservation easements and BMPs. They will also work together in the TMDL rule-making process and will coordinate with individual farmers and various commodity groups to develop BMPs for specific agricultural activities and encourage participation in incentive-based programs.

For basins with significant nonagricultural nonpoint sources, DEP will work closely with local municipalities, the private sector, and the WMDs. While NPDES and the state's stormwater program largely provide the regulatory authority for urban nonpoint sources, close coordination will be required to ensure that nonpoint pollutant reductions are implemented. DEP and the WMDs will adopt in their rules basin specific criteria for urban stormwater BMPs or other measures to assure that TMDL load reductions are achieved. Implementation will be carried out by those parties responsible for the pollutant sources, with assistance from DEP and the WMDs. In many cases, municipalities with significant nonpoint sources also have domestic wastewater facilities that discharge to the same basin. Pollutant trading may be considered within individual basins.

Key actions necessary to implement the TMDL allocations will be described in the BMAP, including the activity (such as stormwater retrofits, BMPs to be implemented, restoration actions, or wastewater facility construction), the responsible parties, and potential sources of funding. The BMAP will also summarize other key management activities, including actions described in water supply plans, PLRGs, SWIM plans, and NEP plans for waters in the basin.

Another key activity in Phase 4 is the development of a Monitoring and Evaluation Plan to measure the effectiveness of management activities that are currently being implemented or will be implemented during the upcoming cycle. Participants will agree to performance measures that will provide feedback and allow management actions to be fine-tuned during the next cycle. Performance measures will address both the tracking of management activities as they are implemented (the number of BMPs, for example) and direct measures of water quality improvement in the basin.

Once a draft BMAP is prepared, at least one public meeting will be held to obtain input from the public at large (major stakeholders should be involved throughout the development of the BMAP). To the extent possible, key participants will sign formal agreements to demonstrate their commitment to implementing the management activities described in the BMAP.

Phase 5: Implementation

In Phase 5, participants begin (or continue) implementing the BMAP. Implementation can include any activity that enhances water quality, such as the implementation of

BMPs for agriculture and stormwater, public education, habitat protection and restoration, and the issuance or revision of NPDES permits.

Although it will not be possible during the initial basin management cycles, DEP's long-term implementation goal is to coordinate the permitting cycle for wastewater facilities within the watershed so permits are issued in the fifth year of the cycle. This coordination includes NPDES stormwater permits.

Rule development and/or legislative action will be initiated as needed to strengthen the management tools available for use in later cycles. It is also important in this phase to transfer the information gained during the cycle to the public and governmental entities outside the BWM. Public education to achieve restoration and protection goals is essential if the watershed approach is to succeed.

Implementation Details. While the various pollution sources will take primary responsibility for implementing the proposed management activities, the basin team will continue to be involved. As part of the 319 Nonpoint Source Management Program, staff in DEP's Nonpoint Source Management Section will process grants for implementing BMPs that reduce nonpoint loading, with priority given to projects in impaired waters. In cooperation with other participants, staff in the Water Quality Standards group will take the lead on rule development needed for reclassification of waters in the basin or any changes in standards (such as site-specific alternative criteria). The Bureau's other sections will provide important technical assistance, review projects, monitor progress, and help to troubleshoot problems as needed.

A key long-term goal of the watershed approach is to integrate permitting activities into the basin management cycle so permits within a basin can be renewed during Phase 5. However, this integration will require the synchronization of the permits, which would require permits to either be administratively continued beyond five years or to be issued for less than five years. Given the workload implications of either synchronization method, DEP plans to assess the success of the watershed approach before committing to basinwide permitting.

The watershed approach is an iterative process that will focus on issues incrementally, as resources allow, within each basin management cycle. Not all issues will be addressed in the first cycle. Successive cycles will expand the issues addressed and evaluate performance on work already implemented. Table 4 illustrates how the basin rotation cycle will occur throughout the state's watersheds.

Table 4: Schedule of Activities

	2000 2001	2001 2002	2002 2003	2003 2004	2004 2005	2005 2006	2006 2007	2007 2008	2008 2009	2009 2010
	FY 2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
BASIN GROUP										
GROUP 1	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
GROUP 2		PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1	PHASE 2	PHASE 3	PHASE 4
GROUP 3			PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1	PHASE 2	PHASE 3
GROUP 4				PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1	PHASE 2
GROUP 5					PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5	PHASE 1

Legend:

Group 1	Group 2	Group 3
Ochlocknee/St. Marks Rivers	Greater Apalachicola	Choctawhatchee River/Bay and St. Andrew Bay
Greater Suwannee River/Nature Coast	Lower St. Johns River (North)	Lower St. Johns River (South)
Ocklawaha River	Upper St. Johns River (North)	Upper St. Johns River (South)
Southwest Coast	South Florida–Everglades Agricultural Area/ St. Lucie River	Greater Charlotte Harbor/Sarasota Bay
Lake Okeechobee	Caloosahatchee River to Lee Coast	Palm Beach County
Greater Tampa Bay	Greater Tampa Bay tributaries	Peace/Myakka Rivers

Group 4	Group 5
Pensacola Bay	Perdido River and Bay
St. Marys/Nassau Rivers	Indian River Lagoon
Kissimmee River/Fisheating Creek	Florida Keys
Urban Southeast Coast	Everglades
Withlacoochee River	Springs Coast

Conclusion

Our success in protecting and restoring Florida's valuable but vulnerable water resources ultimately will be determined by the support of all of those who live, work, travel, or play in a watershed. To assure successful collaboration, please remember to keep in mind "the big Cs of watershed management:"

1. **CATCHMENTS**, not individual sites, must be the basic planning unit.
2. **CUMULATIVE** impacts of all potential pollution sources within a watershed must be assessed and potentially managed
3. **COMPREHENSIVE** management of people, land use, natural resources, water resources, and infrastructure throughout a watershed.
4. **CONTINUITY** of stormwater and watershed management programs over a long period is required to correct existing problems and prevent future ones.
5. **CONSISTENCY** in implementing laws, rules and programs nationally and statewide to assure equity and fairness for everyone.
6. **COOPERATION** between federal, state, regional, and local governments, between cities and counties, between the public and the private sectors, and of all citizens is essential.
7. **COMMUNICATION** is essential. Between entities involved in program implementation; between the implementing agencies and the regulated community; with elected officials to obtain their support for the programs; and with all citizens so they will understand how their everyday activities can affect water quality and how they can and must be part of the solution.
8. **COORDINATION** of stormwater retrofitting to reduce pollutant loading and of other natural systems restoration activities is needed with other proposed infrastructure improvements (road projects) or development and redevelopment projects to maximize benefits and cost-effectiveness.
9. **CREATIVITY** in BMP technology, in funding sources, and in our approach to solving these complex, costly problems.
10. **COMMON SENSE** is needed to assure solutions are practical and effective.
11. **CASH** in large amounts and over a long period of time will be needed to correct existing problems and prevent future ones.
12. **CULTURAL CHANGE** is one of the biggest challenges we face since everyday human activities adversely affect water quality and behavioral changes are needed.
13. **CONFESSION** that we all contribute to water resource problems must be admitted before we can become part of the solution.
14. **COMMITMENT to solving our current problems and preventing future ones so that we can assure that our children will have a bright future depends on whether we are willing to put our money where our mouths are.**