

## 6.0 IMPLEMENTATION OF THE MANAGEMENT PLAN

The Groundwater Management Plan will meet its established goals and result in positive actions only to the degree that it is successfully implemented. If the plan is not implemented, then it becomes an “on-the-shelf” document of little value. There are several key factors to consider for plan implementation. These include roles and responsibilities for key agencies and groups, prioritization of actions, implementation schedule, costs, and other major issues affecting implementation to include selection and resourcing of actions in a phased approach. The purpose of this section is to discuss the key factors and set reasonable expectations for successful implementation of the Groundwater Management Plan.

### 6.1 Roles and Responsibilities

The scope of the management plan includes the groundwater activities of the Commission and actions of others that directly relate to the Commission's program. The authority for the Commission to undertake its roles and responsibilities is set forth in the 1971 Susquehanna River Basin Compact, P.L. 91-575, 84 Stat. 1509 et seq., and Commission Regulations (18 CFR Parts 803, 804, and 805).

Compact Section 3.4(2) states the Commission may “establish standards of planning, decision, and operation of all projects and facilities in the basin to the extent they affect water resources....” Section 3.4(9) allows the Commission to “adopt, amend, and repeal rules and regulations to implement the Compact”, and Section 15.2 states the Commission may “make and enforce regulations for effectuation, application, and enforcement of the Compact....” Concerning protection of certain valuable areas (e.g., water preserves), Section 9.4 states that a purpose of the Compact is to effectuate the conservation and management of water resources to preserve and promote the economic and other values inherent in historic, scenic, and other natural amenities of the basin. The basis for dissemination of information to the public and coordination of activities and programs is set forth in Sections 3.4(6) and 3.7, respectively, of the Compact.

Commission Regulations §803.4, relating to projects subject to review and approval under the regulations, and §803.42, relating to the consumptive use of water, states that compensation shall be required for projects using water from any source (including groundwater) during periods of low flow. The Commission's groundwater and surface water regulations state that withdrawals may be denied or limited for a number of reasons, including protection of streamflows and perennial streams, protection of competing supplies, prevention of water quality degradation, and prevention of harm to fish and wildlife. If major changes to programs or regulations flow from the plan, criteria, policies, procedures, and guidelines will have to be developed, as applicable.

The plan includes certain roles and responsibilities for the Commission, the federal government, the states of Maryland and New York, the Commonwealth of Pennsylvania, local jurisdictions, the private sector (e.g., project sponsors), and other groups. A wide variety of capabilities and expertise can be provided by the other groups in support of implementing the plan's recommendations. Some of the diverse groups that can be involved include professional, environmental, and nonprofit organizations; the private sector; and civic associations. Examples of these groups could include the Nature Conservancy, the Pennsylvania Aggregate and Concrete Association, the Eastern and Western Pennsylvania Coalitions for Abandoned Mine Reclamation, and the Pennsylvania Planning Association.

The Commission has lead responsibility for 15 of the 39 recommended actions included in the management plan, a co-leadership role in 17 areas, and a support role for the remaining 7 actions. Similarly, the states have lead responsibilities for 2 recommendations and co-lead responsibilities for another 23. The federal government has a co-lead responsibility for five recommendations, and local

jurisdictions have one lead and seven co-lead responsibilities. Project sponsors, which can be federal or state agencies, local jurisdictions, or private groups, have an important role to play through accomplishment of the analyses (often done by professional consultants) needed to support their proposed projects in line with 12 of the plan's recommendations.

The key agencies in the three member states of the Commission that have groundwater responsibilities include: New York – Department of Environmental Conservation and Department of Health; Pennsylvania – Department of Environmental Protection and Department of Conservation and Natural Resources; and Maryland – Department of the Environment and Department of Natural Resources. The Commission's Groundwater Management Program is complimentary to and aligned with the state programs. As an example, Pennsylvania is actively pursuing groundwater planning and management improvements under its Act 220 Program (State Water Plan). This effort includes water budget analyses which are recognized in this plan as being critical to sound groundwater management in areas of high demand in relation to sustainable water supply. PADEP's Division of Drinking Water Management has offered to assist the Commission in implementing various actions recommended in this Groundwater Management Plan (e.g., those related to well interference, groundwater mining, and loss of aquifer recharge). Their assistance will be coordinated during the implementation phase for this plan's recommended actions.

Table 6.1 summarizes the lead, co-lead, support, and analysis roles and responsibilities for all parties. The “other” designation in Table 6.1 is for local jurisdictions; the private sector; professional, environmental, and nonprofit organizations; and civic associations. Where applicable, the known lead “other” group(s) is noted in Table 6.1.

A lead or co-lead designation means that the group(s) noted would be responsible to see that the action is accomplished, but the actual work can be done by the lead group and/or others in a cooperative effort. A support designation means that the group(s) noted would be able to provide management support and/or technical assistance for actions led by others. Table 6.1 also notes where analyses would be required by project sponsors to address several of the identified problems. Professional consultants would normally do the analyses, and are expected to submit complete and technically correct work. The action items listed in the table are the full set of 39 recommendations (summarized for brevity of presentation in some cases) included as part of the management plan, and are presented in the same order as discussed in Sections 2, 3, and 4, and as presented in Appendix E.

## **6.2 Prioritization of Actions and Schedule**

Effective implementation of the Groundwater Management Plan is enhanced by the prioritization and scheduling of all recommended actions. In order to accomplish this, a priority rating system and implementation schedule parameters were considered for each action.

Factors included as part of the prioritization rating system include importance, coverage under existing programs, timing and sequencing, and ease/difficulty of implementation of the recommended actions. For each factor, professional judgment and experience were used to consider the following types of priority information:

**Table 6.1. Plan Implementation Roles and Responsibilities<sup>1</sup>**

A. Actions to Address Groundwater Resource Issues and Problems	Commission	States	Other
<p>1. <b>Issue:</b> Areas of Intense Growth and Development and Consequent Water Resource Development</p>	<p>Lead</p> <p>Lead</p> <p>Lead</p>		<p>Analysis (project sponsor)</p> <p>Analysis (project sponsors)</p> <p>Analysis (project sponsor)</p>
<p>2. <b>Issue:</b> Intensive Water Use in Small Basins</p>	<p>Co-lead</p> <p>Co-lead</p>	<p>Co-lead</p> <p>Co-lead</p>	<p>Co-lead</p> <p>Co-lead; Analysis (project sponsors)</p>
<p>3. <b>Issue:</b> Watershed “Transfers”</p>	<p>Co-lead</p>	<p>Co-lead</p>	<p>Co-lead</p>

<sup>1</sup>NOTE: A lead or co-lead designation means that the group(s) noted would be responsible to see that the action is accomplished, but the actual work can be done by the lead group and/or others in a cooperative effort. A support designation means that the group(s) noted would be able to provide management support and/or technical assistance for actions led by others. An analysis designation means that the project applicants would be required to analyze problems in line with the recommendations.

Table 6.1. Plan Implementation Roles and Responsibilities (Continued)

A. Actions to Address Groundwater Resource Issues and Problems		Commission	States	Other
4. <b>Issue:</b> Loss of “Clean” Water Input to AMD-Impacted Streams	<p><b>Problem:</b> Degradation of stream quality.</p> <p><b>Recommendation:</b> Evaluate cumulative impacts from consumptive water uses to downstream water quality in AMD-impacted areas.</p>	Lead		Analysis (project sponsors)
5. <b>Issue:</b> Unknown and Unregulated Groundwater Use	<p><b>Problem:</b> Data gaps can prevent evaluation of true sustainability and cumulative impact.</p> <p><b>Recommendation:</b> Collect information on unknown and unregulated withdrawals to improve evaluation for new projects.</p>	Lead		Analysis (project sponsors)
	<p><b>Problem:</b> Loss of base flow during the growing season.</p> <p><b>Recommendation:</b> Perform water budget and cumulative impact analyses, and manage groundwater withdrawals to address any adverse impacts.</p>	Lead		Analysis (project sponsors)
	<p><b>Problem:</b> Interference with existing water sources.</p> <p><b>Recommendation:</b> Perform water budget analyses and consider options to address overdraw.</p>	Lead		Analysis (project sponsors)
6. <b>Issue:</b> Scarcity of Clean Water in Coal-Mined Areas	<p><b>Problem:</b> Preferential development of high quality groundwater sources.</p> <p><b>Recommendation:</b> Manage quantity and quality in non-AMD-impacted watersheds recognizing that water resources are necessary for the economic growth of mining-affected regions; educate local officials and consultants; coordinate with state and federal agencies; and encourage grayfields initiatives.</p>	Co-lead	Co-lead	Co-lead; Analysis (project sponsors)

Table 6.1. Plan Implementation Roles and Responsibilities (Continued)

A. Actions to Address Groundwater Resource Issues and Problems		Commission	States	Other
7. <b>Issue:</b> Drought Impact to Base Flow	<p><b>Problem:</b> Insufficient streamflow to sustain instream flow needs or downstream water supplies.</p> <p><b>Recommendation:</b> Educate local jurisdictions about stormwater management, CARAs, and other BMPs for development, and improve scientific basis for instream use protection.</p>	Co-lead	Co-lead	Co-lead; Analysis (project sponsors)
8. <b>Issue:</b> Impacts of Mining	<p><b>Problem:</b> Water discharged from mining operations is underutilized.</p> <p><b>Recommendation:</b> Encourage cooperative efforts to develop reliable water supplies related to mining operations.</p>	Co-lead	Co-lead	Co-lead
	<p><b>Problem:</b> Extensive aquifer dewatering.</p> <p><b>Recommendation:</b> Delineate the area of influence and capture area for the mine withdrawal and identify the impacts and method of impact mitigation, when needed.</p>	Co-lead	Co-lead	Analysis (project applicants)
	<p><b>Problem:</b> Exceedence of sustainable yield.</p> <p><b>Recommendation:</b> Reduce impacts of mine pumpage through the grouting of water inflow points if economically and technically feasible.</p>	Co-lead	Co-lead	Analysis (project sponsors)
9. <b>Issue:</b> Flow Compensation for Consumptive Water Uses	<p><b>Problem:</b> Need for additional low-flow augmentation to compensate for consumptive water uses.</p> <p><b>Recommendation:</b> Bring together key stakeholders to help promote use of groundwater stored in “artificial” aquifers to offset consumptive water uses and support instream flow needs.</p>	Co-lead	Co-lead	Co-lead
B. Actions to Address Management Issues		Commission	States	Other
1. <b>Issue:</b> Multi-agency Coordination	<p><b>Problem:</b> Coordination among water resource agencies can be ineffective or incomplete.</p> <p><b>Recommendation:</b> Enhance the Commission's water resources procedures and project review coordination activities with involved agencies to avoid conflicting actions.</p>	Lead		

**Table 6.1. Plan Implementation Roles and Responsibilities (Continued)**

<b>B. Actions to Address Management Issues</b>		<b>Commission</b>	<b>States</b>	<b>Other</b>
2. <b>Issue:</b> Changes to Water Resource Utilization Over Time	<p><b>Problem:</b> Water resource management programs can become less efficient with changes in technology and water use.</p> <p><b>Recommendation:</b> Assess water resource utilization periodically and make appropriate changes in policies, procedures, and project review process.</p>	Lead		
	<p><b>Problem:</b> Water supply sustainability and stream low flow conditions can be adversely impacted by lack of the best and most efficient use of groundwater.</p> <p><b>Recommendation:</b> Strengthen water conservation requirements and encourage use of treated wastewater and conjunctive use.</p>	Co-lead	Co-lead	Co-lead
3. <b>Issue:</b> Regulatory Duplication	<p><b>Problem:</b> Change in the regulatory programs of the member jurisdictions may make some of the Commission's regulatory program redundant, inefficient, or inappropriate.</p> <p><b>Recommendation:</b> Maintain close and effective coordination among the Commission, member jurisdictions, and key agencies to include possible formal arrangements such as memoranda of understanding.</p>	Co-lead	Co-lead	Co-lead (EPA)
4. <b>Issue:</b> Increased Knowledge About Groundwater as a Resource	<p><b>Problem:</b> Useful groundwater information is collected by the Commission, agencies, and others, but is not compiled and shared.</p> <p><b>Recommendation:</b> Capture and compile collected data for use by the Commission, agencies, and others.</p>	Lead		
	<p><b>Problem:</b> Lack of fundamental knowledge of groundwater resources by many policy/decision-makers has hindered the understanding of sound groundwater management practices.</p> <p><b>Recommendation:</b> Identify the constituency for an outreach and education program, and develop tools for their decision-making.</p>	Co-lead	Co-lead	Co-lead (GW professionals and local jurisdictions)

Table 6.1. Plan Implementation Roles and Responsibilities (Continued)

B. Actions to Address Management Issues		Commission	States	Other
4. <b>Issue:</b> Increased Knowledge About Groundwater as a Resource (Continued)	<p><b>Problem:</b> Lack of consideration of factors important to groundwater protection and sustainability within the municipal planning process has hindered implementation of sound groundwater management practices.</p> <p><b>Recommendation:</b> Encourage and assist local governments to include groundwater management concepts in planning and land use control.</p>	Co-lead	Co-lead	Co-lead (GW professionals and local jurisdictions)
	<p><b>Problem:</b> Absence of an educational framework to present groundwater concepts and issues to a variety of audiences.</p> <p><b>Recommendation:</b> Incorporate a variety of methods into a multi-faceted outreach and education program.</p>	Co-lead	Co-lead	Co-lead (GW professionals and local jurisdictions)
5. <b>Issue:</b> Plan Performance and Accountability	<p><b>Problem:</b> The management plan will not be productive unless the tasks identified are performed and accountability for accomplishing the tasks is established.</p> <p><b>Recommendation:</b> Provide periodic reporting on implementation of the Groundwater Management Plan and new significant groundwater issues.</p>	Lead		
6. <b>Issue:</b> Review and Update of the Plan	<p><b>Problem:</b> This management plan needs to be reviewed and updated on a recurring basis in order to be current and of continuing value.</p> <p><b>Recommendation:</b> Conduct comprehensive reviews and revisions of this plan at intervals not to exceed 10 years.</p>	Lead		
7. <b>Issue:</b> Funding to Implement the Plan	<p><b>Problem:</b> Adequate long-term funding needs to be made available to implement the actions recommended in the plan.</p> <p><b>Recommendation:</b> Funding to implement the plan's recommended actions should be made available and/or proactively sought by the lead jurisdiction(s) for each action.</p>	Co-lead	Co-lead	Co-lead (EPA, USGS, local jurisdictions)

**Table 6.1. Plan Implementation Roles and Responsibilities (Continued)**

<b>C. Groundwater Management Support Programs</b>		<b>Commission</b>	<b>States</b>	<b>Other</b>
<p><b>1. Issue:</b> Protection of Groundwater Sources of Supply and Aquifers</p>	<p><b>Problem:</b> Contamination of groundwater resources from effects of improper land use planning and zoning.</p> <p><b>Recommendation:</b> Encourage states and local jurisdictions to develop regulations and programs to protect critical aquifers from contamination.</p>	Support	Co-lead	Co-lead (local jurisdictions)
	<p><b>Problem:</b> Lack of comprehensive groundwater quality datasets showing the extent and severity of nonpoint source pollution affecting groundwater resources basinwide, and the lack of management plans necessary for improving conditions.</p> <p><b>Recommendation:</b> Continue and expand monitoring and research in cooperation with states related to nonpoint source contamination, and support the assessment and implementation of such actions, including TMDLs, USEPA's 319 Nonpoint Source Program, and USDA/NRCS water programs.</p>	Co-lead	Co-lead	
	<p><b>Problem:</b> Degradation of water quality conditions in aquifers from point source discharges.</p> <p><b>Recommendation:</b> Support member jurisdictions in their efforts to consider the effect of wastewater discharges on groundwater, including sensitive recharge areas, when issuing NPDES or SPDES permits.</p>	Support	Lead	
	<p><b>Problem:</b> Limited support for local development of source water protection plans.</p> <p><b>Recommendation:</b> Assist communities with groundwater source protection by utilizing existing source water assessment data and aquifer test data to provide educational and technical assistance in formulation of protection plans.</p>	Support	Support	Lead (local Jurisdictions)

**Table 6.1. Plan Implementation Roles and Responsibilities (Continued)**

<b>C. Groundwater Management Support Programs</b>		<b>Commission</b>	<b>States</b>	<b>Other</b>
2. <b>Issue:</b> Water Use and Availability Information	<p><b>Problem:</b> Not all large volume withdrawals are registered (documented).  <b>Recommendation:</b> Require large volume groundwater users (&gt;10,000 gpd) to register (document) their use and to re-register (update documentation) periodically. Coordinate with member states and others to maintain a vibrant data set.</p>	Co-lead	Co-lead	
	<p><b>Problem:</b> Data on large volume users needs to be available for management use.  <b>Recommendation:</b> Maintain a centralized database containing information on large users, and make this data available to planners and managers throughout the basin, subject to security considerations.</p>	Co-lead	Co-lead	
	<p><b>Problem:</b> Well information is not available to all agencies and local managers.  <b>Recommendation:</b> Maintain a centralized database containing well location information, and make the data available to planners and managers throughout the basin, subject to security considerations.</p>	Co-lead	Co-lead	
	<p><b>Problem:</b> Groundwater managers, planners, and decision-makers do not have ready access to important groundwater information.  <b>Recommendation:</b> The Commission should partner with appropriate agencies to develop groundwater availability and yield information and make it available on-line.</p>	Co-lead	Co-lead	Co-lead (USGS and local jurisdictions)
3. <b>Issue:</b> Well Requirements	<p><b>Problem:</b> Improper well construction and abandonment procedures can cause aquifer contamination.  <b>Recommendation:</b> Support state and local programs for well construction and abandonment standards, and improved controls to prevent pollution.</p>	Support	Co-lead	Co-lead (local jurisdictions)



- **Importance**—Recognizing that all recommended actions are essential for sound groundwater management, which actions are most critical or critical versus others that are important?
- **Coverage Under Existing Programs**—What are the significant groundwater management needs that either have little or no, limited, or incomplete coverage under existing programs?
- **Timing and Sequencing** —Are there any considerations, such as developmental time for programs and regulations that require actions to be phased in over time? Do any of the plan's recommendations rely upon another action(s) to be done first?
- **Ease/Difficulty of Implementation**—Given the many parameters to be considered for implementation, which actions are relatively easy versus difficult? Some of the parameters to consider include technology available, staffing, in terms of manpower and subject matter expertise, competing program priorities and workload, legal or policy constraints, and public support.

Each recommended action was evaluated, using the factors listed above, to determine ratings of top priority, high priority, and priority. The importance factor was given added weight by requiring an action to be rated as a top or high priority in importance before it can have an overall rating of top or high priority, respectively. Table 6.2 summarizes the prioritization rating system.

**Table 6.2. Prioritization Ratings System for Essential Groundwater Management Actions**

Rating Factor	Top Priority	High Priority	Priority
Importance	Most critical	Critical	Important
Coverage Under Existing Programs	Little or no coverage	Limited coverage	Incomplete coverage
Timing and Sequencing	No other action required	Other short-term action(s) required	Other long-term action(s) required
Ease/Difficulty of Implementation	Expect fairly easy implementation	Expect fairly easy implementation, but some difficulties possible	Expect some difficulty in implementation
<b>Priority Level for a Selected Action</b>	Importance and two or more other factors rated as Top Priority	Importance and two or more other factors rated as Top/High Priority	Importance and two or more other factors rated as Priority

The specific implementation schedule for each element of the management plan is dependent on the priority and resources given to the elements by the Commission and other lead jurisdictions. For the purpose of this management plan, implementation scheduling was addressed by grouping actions under the following three time frames. Again, professional judgment and experience were used to assign schedule time frames.

- **Continuing Actions**—Those actions of any priority level that should be initiated and/or implemented relatively easily and quickly under existing programs. Full implementation of some initiated actions may take years, however.
- **Short-Term Actions**—Those actions of any priority level that should be initiated and/or effectively implemented within two years. Full implementation of some initiated actions may take longer than two years, however.
- **Long-Term Actions**—Those actions of any priority level that should take from two to five years to initiate and effectively implement.

An example of a continuing action is ongoing program changes such as those that require new information to be submitted to the Commission by project sponsors. Accordingly, an action the Commission can take now is to require that the review of groundwater use applications incorporate a check for consistency with the actions recommended in this plan. Short- and long-term actions, such as additional improvements to the basinwide system of observation wells, will require positive program and budget decisions in the future. The Commission will take a proactive approach to implementing the plan's recommendations in a timely manner. It is anticipated that the other lead jurisdictions also will be proactive in plan implementation. The annual progress report on implementation of the plan will address the schedule of both ongoing work and that work expected to be initiated in the upcoming year, and plans for future work.

The results of the prioritization rating evaluation and assessment of implementation schedules are summarized in Table 6.3. The recommended actions are grouped by the three priority levels and include an implementation time frame for each. There are 10, 20, and 9 top priority, high priority, and priority actions, respectively. From a scheduling perspective, there are 12, 16, and 11 actions that should be implemented as continuing, short- and long-term actions, respectively.

This plan has been prepared to provide a framework to effectively manage groundwater resources in the basin, is broad-based, and is not meant to be a detailed implementation document for all recommendations. However, the 12 continuing actions represent early steps that can be taken without significant further work. The remaining 27 short-term or long-term actions will require implementation measures such as development of new guidelines or regulations, provision of adequate resources, and interagency coordination.

**Table 6.3. Plan Implementation—Prioritization and Scheduling**

<b>TOP PRIORITY ACTIONS</b>		
<b>ISSUE</b> (numbered per Table 6.1) 1/	<b>PROBLEMS AND RECOMMENDATIONS</b>	<b>SCHEDULE</b>
<b>A. Actions to Address Groundwater Resource Issues and Problems</b>		
1. Areas of Intense Growth and Development and Consequent Water Resource Development	<b>Problem:</b> Loss of recharge areas. <b>Recommendation:</b> Base sustainable yields for wells on post-build-out conditions and encourage the use of BMPs to minimize loss of recharge.	Short-Term Action
2. Intensive Water Use in Small Basins	<b>Problem:</b> Loss of perennial streamflow. <b>Recommendation:</b> Evaluate headwater areas for the purpose of managing water quantity and quality.	Short-Term Action
5. Unknown and Unregulated Groundwater Use	<b>Problem:</b> Data gaps can prevent evaluation of true sustainability and cumulative impact. <b>Recommendation:</b> Collect information on unknown and unregulated withdrawals to improve evaluation of new projects.	Short-Term Action
8. Impacts of Mining	<b>Problem:</b> Extensive aquifer dewatering. <b>Recommendation:</b> Delineate the area of influence and capture area for the mine withdrawal and identify the impacts and method of impact mitigation, when needed.	Short-Term Action
<b>B. Actions to Address Management Issues</b>		
1. Multi-agency Coordination	<b>Problem:</b> Coordination among water resource agencies can be ineffective or incomplete. <b>Recommendation:</b> Enhance the Commission's water resources procedures and project review coordination activities with involved agencies to avoid conflicting actions.	Continuing Action
3. Regulatory Duplication	<b>Problem:</b> Change in the regulatory programs of the member jurisdictions may make some of the Commission's regulatory program redundant, inefficient, or inappropriate. <b>Recommendation:</b> Maintain close and effective coordination among the Commission, member jurisdictions, and key agencies to include possible formal arrangements such as memoranda of understanding.	Continuing Action

1/ The issues are numbered in the same manner as for Table 6.1 and for this reason they are not consecutively numbered in Table 6.3.

**Table 6.3. Plan Implementation—Prioritization and Scheduling (Continued)**

<b>TOP PRIORITY ACTIONS</b>		
<b>ISSUE</b> (numbered per Table 6.1) 1/	<b>PROBLEMS AND RECOMMENDATIONS</b>	<b>SCHEDULE</b>
<b>B. Actions to Address Management Issues (Continued)</b>		
4. Increased Knowledge About Groundwater as a Resource	<p><b>Problem:</b> Lack of consideration of factors important to groundwater protection and sustainability within the municipal planning process has hindered implementation of sound groundwater management practices.</p> <p><b>Recommendation:</b> Encourage and assist local governments to include groundwater management concepts in planning and land use control.</p>	Short-Term Action
	<p><b>Problem:</b> Absence of an educational framework to present groundwater concepts and issues to a variety of audiences.</p> <p><b>Recommendation:</b> Incorporate a variety of methods into a multifaceted outreach and education program.</p>	Short-Term Action
5. Plan Performance and Accountability	<p><b>Problem:</b> The management plan will not be productive unless the tasks identified are performed and accountability for accomplishing the tasks is established.</p> <p><b>Recommendation:</b> Provide periodic reporting on implementation of the Groundwater Management Plan and new significant groundwater issues.</p>	Continuing Action
7. Funding to Implement the Plan	<p><b>Problem:</b> Adequate long-term funding needs to be made available to implement the actions recommended in the plan.</p> <p><b>Recommendation:</b> Funding to implement the plan's recommended actions should be made available and/or proactively sought by the lead jurisdiction(s) for each action.</p>	Short-Term Action

1/ The issues are numbered in the same manner as for Table 6.1 and for this reason they are not consecutively numbered in Table 6.3.

Table 6.3. Plan Implementation—Prioritization and Scheduling (Continued)

HIGH PRIORITY ACTIONS		
ISSUE (numbered per Table 6.1) 1/	PROBLEMS AND RECOMMENDATIONS	SCHEDULE
<b>A. Actions to Address Groundwater Resource Issues and Problems</b>		
1. Areas of Intense Growth and Development and Consequent Water Resource Development	<p><b>Problem:</b> Well interference. <b>Recommendation:</b> Use groundwater modeling and/or water level monitoring to evaluate potential well interference. Mitigation may be necessary.</p> <p><b>Problem:</b> Exceedence of sustainable yield. <b>Recommendation:</b> Require groundwater availability analyses for new projects and for areas where sustainable yield has been exceeded. Develop water budgets for all PSAs. Adjust withdrawal rates for sustainability, if needed.</p>	<p>Short-Term Action</p> <p>Short-Term Action</p>
2. Intensive Water Use in Small Basins	<p><b>Problem:</b> Loss of base flow. <b>Recommendation:</b> Educate the public and local officials about the sustainability of headwater areas and the need to properly manage them.</p>	Short-Term Action
5. Unknown and Unregulated Groundwater Use	<p><b>Problem:</b> Loss of base flow during the growing season. <b>Recommendation:</b> Perform water budget and cumulative impact analyses, and manage groundwater withdrawals to address any adverse impacts.</p> <p><b>Problem:</b> Interference with existing water sources. <b>Recommendation:</b> Perform water budget analyses and consider options to address overdraw.</p>	<p>Short-Term Action</p> <p>Short-Term Action</p>
7. Drought Impact to Base Flow	<p><b>Problem:</b> Insufficient streamflow to sustain instream flow needs or downstream water supplies. <b>Recommendation:</b> Educate local jurisdictions about stormwater management, CARAs, and other BMPs for development, and improve scientific basis for instream use protection.</p>	Long-Term Action
8. Impacts of Mining	<p><b>Problem:</b> Water discharged from mining operations is underutilized. <b>Recommendation:</b> Encourage cooperative efforts to develop reliable water supplies related to mining operations.</p> <p><b>Problem:</b> Exceedence of sustainable yield. <b>Recommendation:</b> Reduce impacts of mine pumpage through the grouting of water inflow points if economically and technically feasible.</p>	<p>Continuing Action</p> <p>Continuing Action</p>
9. Flow Compensation for Consumptive Water Uses	<p><b>Problem:</b> Need for additional low flow augmentation to compensate for consumptive water uses. <b>Recommendation:</b> Bring together key stakeholders to help promote use of groundwater stored in “artificial” aquifers to offset consumptive water uses and support instream flow needs.</p>	Short-Term Action

1/ The issues are numbered in the same manner as for Table 6.1 and for this reason they are not consecutively numbered in Table 6.3.

Table 6.3. Plan Implementation—Prioritization and Scheduling (Continued)

HIGH PRIORITY ACTIONS		
ISSUE (numbered per Table 6.1) 1/	PROBLEMS AND RECOMMENDATIONS	SCHEDULE
<b>B. Actions to Address Management Issues</b>		
2. Changes to Water Resource Utilization Over Time	<p><b>Problem:</b> Water resource management programs can become less efficient with changes in technology and water use.</p> <p><b>Recommendation:</b> Assess water resource utilization periodically and make appropriate changes in policies, procedures, and project review process.</p>	Short-Term Action
4. Increased Knowledge About Groundwater as a Resource	<p><b>Problem:</b> Useful groundwater information is collected by the Commission, agencies, and others but is not compiled and shared.</p> <p><b>Recommendation:</b> Capture and compile collected data for use by the Commission, agencies, and others.</p> <p><b>Problem:</b> Lack of fundamental knowledge of groundwater resources by many policy/decision-makers has hindered the understanding of sound groundwater management practices.</p> <p><b>Recommendation:</b> Identify the constituency for an outreach and education program, and develop tools for their decision-making.</p>	<p>Long-Term Action</p> <p>Continuing Action</p>
6. Review and Update of the Plan	<p><b>Problem:</b> This management plan needs to be reviewed and updated on a recurring basis in order to be current and of continuing value.</p> <p><b>Recommendation:</b> Conduct comprehensive reviews and revisions of this plan at intervals not to exceed 10 years.</p>	Long-Term Action
<b>C. Groundwater Management Support Programs</b>		
1. Protection of Groundwater Sources of Supply and Aquifers	<p><b>Problem:</b> Limited support for local development of source water protection plans.</p> <p><b>Recommendation:</b> Assist communities with groundwater source protection by utilizing existing source water assessment data and aquifer test data to provide educational and technical assistance in formulation of protection plans.</p>	Continuing Action
2. Water Use and Availability Information	<p><b>Problem:</b> Not all large volume withdrawals are registered (documented).</p> <p><b>Recommendation:</b> Require large volume groundwater users (&gt;10,000 gpd) to register (document) their use and to register (document) their use and to re-register (update documentation) periodically. Coordinate with member states and others to maintain a vibrant data set.</p>	Long-Term Action

1/ The issues are numbered in the same manner as for Table 6.1 and for this reason they are not consecutively numbered in Table 6.3.

**Table 6.3. Plan Implementation—Prioritization and Scheduling (Continued)**

<b>HIGH PRIORITY ACTIONS</b>		
<b>ISSUE</b> (numbered per Table 6.1) 1/	<b>PROBLEMS AND RECOMMENDATIONS</b>	<b>SCHEDULE</b>
<b>C. Groundwater Management Support Programs (Continued)</b>		
2. Water Use and Availability Information (Continued)	<p><b>Problem:</b> Data on large volume users needs to be available for management use.</p> <p><b>Recommendation:</b> Maintain a centralized database containing information on large users, and make this data available to planners and managers throughout the basin, subject to security considerations.</p>	Long-Term Action
	<p><b>Problem:</b> Well information is not available to all agencies and local managers.</p> <p><b>Recommendation:</b> Maintain a centralized database containing well information, and make the data available to planners and managers throughout the basin, subject to security considerations.</p>	Long-Term Action
3. Well Requirements	<p><b>Problem:</b> Improper well construction and abandonment procedures can cause aquifer contamination.</p> <p><b>Recommendation:</b> Support state and local programs for well construction and abandonment standards, and improved controls to prevent pollution.</p>	Continuing Action
	<p><b>Problem:</b> The observation well network does not have the capability to monitor the dynamic response of aquifers in the basin to changes in precipitation.</p> <p><b>Recommendation:</b> Provide effective maintenance and work toward improvements for the basinwide observation well network with a goal of having real-time monitoring capability in each county in the basin.</p>	Long-Term Action
4. Assessment of State/Federal Groundwater Programs and Program Coordination	<p><b>Problem:</b> State and federal agencies need to ensure their groundwater programs are current and responsive, with management activities well coordinated.</p> <p><b>Recommendation:</b> The Commission's state members should continue periodic assessments of their groundwater programs to identify needed improvements and plan for their implementation.</p>	Continuing Action

1/ The issues are numbered in the same manner as for Table 6.1 and for this reason they are not consecutively numbered in Table 6.3.

**Table 6.3. Plan Implementation—Prioritization and Scheduling (Continued)**

<b>PRIORITY ACTIONS</b>		
<b>ISSUE</b> (numbered per Table 6.1) 1/	<b>PROBLEMS AND RECOMMENDATIONS</b>	<b>SCHEDULE</b>
<b>A. Actions to Address Groundwater Resource Issues and Problems</b>		
3. Watershed “Transfers”	<b>Problem:</b> Wastewater is not returned to the watershed where it was withdrawn. <b>Recommendation:</b> Educate professional groups about the options of maintaining groundwater withdrawals and post-use discharges in the same watershed.	Continuing Action
4. Loss of “Clean” Water Input to AMD-Impacted Streams	<b>Problem:</b> Degradation of stream quality. <b>Recommendation:</b> Evaluate cumulative impacts from consumptive water uses to downstream water quality in AMD-impacted areas.	Short-Term Action
6. Scarcity of Clean Water in Coal-Mined Areas	<b>Problem:</b> Preferential development of high quality groundwater sources. <b>Recommendation:</b> Manage quantity and quality in non-AMD-impacted watersheds recognizing that water resources are necessary for the economic growth of mining-affected regions; educate local officials and consultants; coordinate with state and federal agencies; and encourage grayfields initiatives.	Long-Term Action
<b>B. Actions to Address Management Issues</b>		
2. Changes to Water Resource Utilization Over Time	<b>Problem:</b> Water supply sustainability and stream low flow conditions can be adversely impacted by lack of the best and most efficient use of groundwater. <b>Recommendation:</b> Strengthen water conservation requirements and encourage use of treated wastewater and conjunctive use.	Short-Term Action

1/ The issues are numbered in the same manner as for Table 6.1 and for this reason they are not consecutively numbered in Table 6.3.

Table 6.3. Plan Implementation—Prioritization and Scheduling (Continued)

PRIORITY ACTIONS		
ISSUE (numbered per Table 6.1) 1/	PROBLEMS AND RECOMMENDATIONS	SCHEDULE
<b>C. Groundwater Management Support Programs</b>		
1. Protection of Groundwater Sources of Supply and Aquifers	<p><b>Problem:</b> Contamination of groundwater resources from effects of improper land use planning and zoning. <b>Recommendation:</b> Encourage states and local jurisdictions to develop regulations and programs to protect critical aquifers from contamination.</p> <p><b>Problem:</b> Lack of comprehensive groundwater quality datasets showing the extent and severity of nonpoint source pollution affecting groundwater resources basinwide, and the lack of management plans necessary for improving conditions. <b>Recommendation:</b> Continue and expand monitoring and research in cooperation with states related to nonpoint source contamination, and support the assessment and implementation of such actions, including TMDLs, USEPA's 319 Nonpoint Source Program, and USDA/NRCS water programs.</p> <p><b>Problem:</b> Degradation of water quality conditions in aquifers from point source discharges. <b>Recommendation:</b> Support member jurisdictions in their efforts to consider the effect of wastewater discharges on groundwater, including sensitive recharge areas, when issuing NPDES or SPDES permits.</p>	<p>Long-Term Action</p> <p>Continuing Action</p> <p>Continuing Action</p>
2. Water Use and Availability Information	<p><b>Problem:</b> Groundwater managers, planners, and decision-makers do not have ready access to important groundwater information. <b>Recommendation:</b> The Commission should partner with appropriate agencies to develop groundwater availability and yield information and make it available on-line.</p>	<p>Long-Term Action</p>
3. Well Requirements	<p><b>Problem:</b> Lack of certification program for drillers in Pennsylvania and need for improving existing licensing/certification programs and well driller training in other basin states. <b>Recommendation:</b> Support legislation that works toward the development of a well driller's certification program in Pennsylvania and support the improvement of programs that provide training and licensing/certification for all well drillers in the basin's states.</p>	<p>Long-Term Action</p>

1/ The issues are numbered in the same manner as for Table 6.1 and for this reason they are not consecutively numbered in Table 6.3.

### 6.3 Costs

The implementation costs of the elements of the management plan will vary and need to be addressed for both the short- and long-term. There will be financial requirements for the Commission and other lead jurisdictions, but there are ways to address these. The annual increase in costs can be balanced by a phased approach to implementation. Many of the plan elements are modifications to existing programs of the Commission and its member jurisdictions. It is believed that some program funding can be redirected toward making these modifications in a prioritized and phased approach. This plan can be used to help support and justify increased funding through federal and state appropriations, grants, redirection of available program resources, etc. Continuing major initiatives to obtain additional program and/or specific project funding should be undertaken at all levels with the goal of obtaining long-term sustained funding. In addition to funding actions recommended in this report, there are other significant water resources efforts that can be of benefit to groundwater resources and need sufficient funds. An example of an important program requiring sufficient funding is Pennsylvania's State Water Plan (Act 220) which began in 2002.

A few examples of funding needs are instructive in gaining an appreciation of the magnitude of costs of plan implementation. Water budget analyses are recommended as a means to assess water availability and demand in stressed areas and to protect the groundwater resource. The Commission recently initiated a three-year water budget analysis for a 32,000-acre-groundwater area in northern Lancaster County, Pennsylvania, in partnership with the County Conservation District and five local watershed groups. The total cost of the analysis is \$180,000, and is funded by a \$121,000 grant from PADEP's Growing Greener Program and resources being provided by local interests and the Commission. Additional water budget work would require similar funding for each study, depending on the size and complexity of the study area. However, future water budget analyses will be done selectively for specific areas in the basin where water supply versus demands are a significant issue, local jurisdictions support the need for the analyses, and funding is available. Another example of increased costs is for the addition/modification of 11 observation wells in Maryland and New York to provide real-time monitoring data. This cost is estimated to total approximately \$40,000 in a one-time capital cost for the 11 wells, plus an annual operation and maintenance cost of \$4,000 per well. The costs can be cost shared by the states and USGS. A third example is the additional cost for Commission staff to critically review more detailed and complex analyses required of project sponsors pursuant to certain plan recommendations, e.g., cumulative impact analyses. Estimates of the additional staff costs vary widely, depending on project scope and location, but a typical cost is estimated to be \$1,000 to \$2,000 for each project review. The additional annual cost to the Commission would be \$30,000 to \$60,000, based on 30 project applications involving groundwater use in a typical year.

It must be recognized that significant delays in funding will exacerbate groundwater problems and issues. For instance, if cumulative impacts of groundwater withdrawals are not fully assessed, unexpected adverse effects can occur and be costly to remedy. In another aspect of enhanced management of groundwater resources, the Commission has a policy dealing with violations by water users. Review of projects would be required, as recommended in this plan, to determine when violations occur and enforcement actions are required.

### 6.4 Major Issues

From an implementation standpoint, there are two major issues that the Commission and other lead jurisdictions must address. First, the lead group responsible for each element of the plan must decide on which of the recommended actions to take in a phased and prioritized approach. Second, sufficient manpower and funding resources must be made available, over time, to take the priority actions identified. It is recognized that current staffing and funding may have to be redirected or increased to

accomplish all elements of the plan. A major effort should be made at all levels to obtain sustained long-term funding for addressing groundwater actions. The scope of the recommended actions requires that they be implemented by a combination of management and regulatory program efforts. "Business as usual" through regulatory program requirements will not be adequate to address critical actions, such as public outreach and education.

The Commission has decided to keep its Groundwater Management Plan Team active as a means to continue the process from the planning phase through the implementation phase. The Groundwater Management Plan Team will be recommending and accomplishing annual groundwater program actions to be taken in accordance with this plan's findings. Considerations will include the priorities of actions, funding availability, and competing workload. The goal of the Commission is to implement all recommended actions for which it is responsible in an orderly and efficient manner. Implementation of the recommended actions will remain a long-term Commission priority. Annual progress reports will be made by the Groundwater Management Plan Team to assess the degree of success in taking action. Both the Commissioners and WRMAC will be kept apprised of progress. Other jurisdictions with lead responsibilities on recommended actions are encouraged to take steps similar to that of the Commission in order to focus on plan implementation.

If the essential steps discussed above are not taken, plan implementation will be delayed. Undoubtedly, there also will be technical and administrative issues that will arise. These issues also will need to be effectively addressed so that plan implementation can continue in a timely manner. An example of this is changes in laws and regulations, which will occur and must be addressed with regard to impact on groundwater resources.

## **6.5 Public Review of the Plan**

The Commissioners approved the draft version of this Groundwater Management Plan for public release at their business meeting on June 9, 2004. A full and open 90-day public review and comment period was initiated on June 9, 2004, with a widely distributed news release. For this process, the public was defined as all people, groups, agencies, etc. outside of the Susquehanna River Basin Commission. The Commission's objective was to receive constructive input and comments as a result of public review in order to produce a high quality Groundwater Management Plan.

Three public workshops were held in July 2004 to present the draft plan and provide the opportunity for attendees to make oral comments. The workshops were held in Harrisburg and State College, Pennsylvania, and Owego, New York, with a total of approximately 175 people in attendance. A record of all comments from the workshops was made and is available in Commission files. More formal written comments (by letter and/or e-mail) were also received by the Commission from 21 interested parties during the review period. Over 400 comments were received from the workshops and written submittals.

All comments received were reviewed and addressed. The review comments were organized by the major topics for effective presentation. Appendix F includes a summary of the most significant comments received, organized by major topics, and a summary response for each topic. A concerted effort was made to include representative and significant comments while accounting for numerous similarities in input received from multiple sources at workshops or in written form. The final plan has incorporated additional or revised information, as needed, to reflect changes in response to the comments. The responses in Appendix F state where revisions were made in the plan.

## **6.6 Future Review and Revision of the Plan**

It is recognized that the Groundwater Management Plan will take years to be fully implemented. During this time, new issues, changed conditions, and technological advances are likely to occur. It is prudent that a comprehensive review of the plan be done and revisions made, as needed. A recommendation included in the management plan calls for a comprehensive review and revision of the plan at an interval not to exceed ten years. This action will help ensure that the plan is current and remains viable as a tool for managing groundwater resources.