

# Groundwater Protection Spending Proposal



Minnesota Pollution Control Agency

January 2010

## Legislative Charge

*The statutory requirement for this report is found in the Clean Water, Land, and Legacy Funding Bill (House File 1231, Session Law Chapter 172. Article 2, Section 4, paragraph (m) states: “\$5,000,000 the second year is for groundwater protection or prevention of groundwater degradation activities. By January 15, 2010, the commissioner, in consultation with the commissioner of natural resources, the Board of Water and Soil Resources, and other agencies, shall submit a report to the chairs of the House of Representatives and senate committees with jurisdiction over the clean water fund on the intended use of these funds. The legislature must approve expenditure of these funds by law.”*

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# Executive Summary

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The 2009 Legislature appropriated \$5 million to the Minnesota Pollution Control Agency (MPCA) in FY2011 for “groundwater protection or prevention of groundwater degradation activities”. The appropriation language requires that the MPCA, in consultation with the Department of Natural Resources (DNR), Board of Water and Soil Resources, and other agencies, submit a report by January 15, 2010, to the chairs of the House of Representatives and Senate committees with jurisdiction over the Clean Water Fund on the intended use of these funds.

The \$5 million appropriation for groundwater protection was part of the \$13.6 million total Clean Water Fund dollars appropriated by the 2009 Legislature for drinking water protection activities during the FY2010-2011 biennium. Other funded activities include enhanced groundwater monitoring, accelerated wellhead protection planning and implementation, enhanced efforts to address nitrate problems and promote and evaluate fertilizer best management practices (BMPs), and implementation of elements of the Twin Cities Metropolitan Area Master Water Supply Plan.

To determine the proposed use of the \$5 million appropriation, an MPCA staff team first reviewed existing documents to identify common themes about threats to groundwater resources and groundwater protection needs in Minnesota. The team then conducted a series of meetings with an interagency workgroup and MPCA staff and leadership to identify and refine the spending proposal.

The MPCA staff and interagency workgroup discussed groundwater protection needs and current activities underway at the state and local level to protect groundwater. Based on these discussions, and in consideration of the one-time nature of the \$5 million appropriation, the group focused on groundwater protection activities that will fill immediate needs and pilot approaches that will inform future protection efforts. This focus on immediate needs also recognizes the many planning activities underway that will further inform groundwater protection efforts, ranging from the DNR’s legislative report on surface water and groundwater protection to the University of Minnesota’s effort to develop a framework for sustainable water management.

The following groundwater protection activities are the focus of this spending proposal:

1. Implement groundwater protection practices at the local level and evaluate the effectiveness of those practices;
2. Develop a model approach for enhancing groundwater protection planning at the local level; and
3. Provide for better groundwater data access and sharing.

The specific activities in this proposal will help fill immediate needs in groundwater protection, particularly at the local level where groundwater practices can best be implemented, and will improve the ability of state agencies to assist local government in planning and implementing protection practices. The approval and implementation of this spending proposal will result in stronger groundwater protection, and will provide state agencies with the information and experience needed to develop a long-term implementation plan for groundwater protection.

### Summary of Groundwater Protection Spending Proposal

Activity	Funding Amount	State Agency FTEs	Outcomes
<b>Implementation:</b>			
Local Groundwater Protection Grants	\$3,000,000	2-3 (contracting, project management, technical assistance)	<ul style="list-style-type: none"> <li>Accelerated local implementation of priority groundwater protection practices.</li> <li>Better understanding of local capacity and needs for implementing groundwater protection.</li> </ul>
Effectiveness Evaluation	\$750,000	0.5-1 (contracting, project management)	<ul style="list-style-type: none"> <li>Enhanced understanding of prevention effectiveness.</li> <li>Guidance for refining practices to strengthen the effectiveness of groundwater protection</li> </ul>
<b>Planning:</b>			
Local Groundwater Protection Planning	\$750,000	2 (contracting, project management, technical assistance)	<ul style="list-style-type: none"> <li>Three to five model local water plan enhancements.</li> <li>A model approach for amending local water plans to enhance groundwater protection.</li> <li>A proposed approach for scaling-up the local planning effort to all vulnerable aquifers not addressed by wellhead protection.</li> </ul>
<b>Data Sharing and Access:</b>			
Interagency plan for enhanced data coordination and access	\$350,000	0.5 (contracting, project management)	<ul style="list-style-type: none"> <li>Implementation plan for enhanced data coordination and access.</li> <li>Common data format for accessing and sharing groundwater data.</li> </ul>
CWI enhancement	\$150,000		<ul style="list-style-type: none"> <li>Incorporation of existing monitoring well construction records into the County Well Index.</li> </ul>

# Introduction and Background

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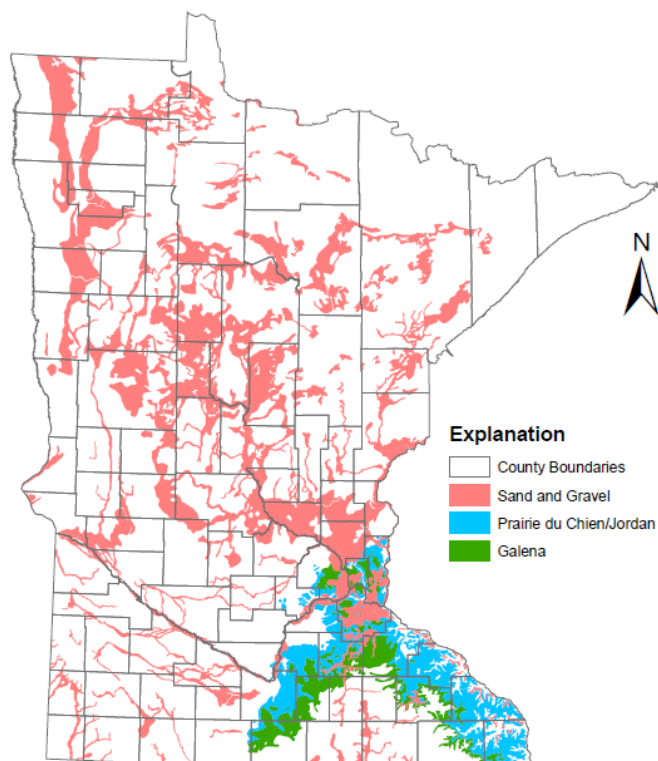
The 2009 Legislature appropriated \$5 million in fiscal year 2011 to the Minnesota Pollution Control Agency (MPCA) for “groundwater protection or prevention of groundwater degradation activities.” The appropriation language requires that the MPCA consult with other agencies and submit a report to the legislature by January 15, 2010 that identifies the intended use of the funds.

This Groundwater Protection Spending Proposal (proposal) was prepared to meet the legislative requirement. The proposal describes the process used to develop the proposal elements to address groundwater protection needs, describes those activities and the proposed funding amount, and identifies the outcomes that will be achieved by the protection activities. The proposal was developed by the MPCA with significant input from an interagency workgroup consisting of representatives from the Minnesota Department of Health (MDH), Minnesota Department of Agriculture (MDA), Minnesota Department of Natural Resources (DNR), Board of Water and Soil Resources (BWSR), Metropolitan Council (Met. Council), Environmental Quality Board (EQB) and Minnesota Geospatial Information Office (MGIO).

## Groundwater status and threats

Groundwater is a vitally important resource in Minnesota that provides at least 73 percent of Minnesotans with their primary source of drinking water. Groundwater is the source of water for 932 of 954 community water supply systems across the state. Groundwater also supplies a majority of water for the irrigation of crops and is the base flow for the state’s streams, lakes and wetlands.

Overall, groundwater quality in Minnesota is considered to be good; however, studies of vulnerable aquifers (see Figure 1) have shown that certain land use practices can impact groundwater and lead to contamination that may affect the suitability of groundwater for its intended use.



**Figure 1. Minnesota’s Vulnerable Aquifers**

In many of these vulnerable aquifers the source of contamination has been attributed to non-point sources including agricultural fertilizers and pesticides, urban runoff, manure applications, septic systems, road salt and stormwater infiltration. Some of the most common contaminants detected include nitrates and pesticides in rural settings, and volatile organic compounds, petroleum compounds and road salt in urban areas. In addition, new chemicals of potential concern to groundwater quality are being identified, such as endocrine disrupting compounds.

## **Groundwater protection in Minnesota**

Minnesota employs a multi-agency approach to groundwater protection to manage both the quality and quantity of groundwater resources. Responsibility for protection of groundwater quality lies with the MDH, MDA and the MPCA. Groundwater quantity is addressed by the DNR. Several other agencies also have integral roles in groundwater protection including BWSR, Met. Council and the EQB. Cooperatively, these agencies work with local units of government (LGUs) to protect Minnesota groundwater resources.

Concerns over the impacts that land use, improper waste disposal practices and increased demand have on groundwater quality and quantity have resulted in broad-based groundwater protection laws in Minnesota, including the Groundwater Protection Act (GWPA, Minnesota Statutes Chapter 103H). Key groundwater protection activities include:

- Mapping and monitoring to understand the quality and quantity of groundwater.
- Planning activities, such as wellhead protection planning and the state's Pesticide Management Plan, which identify groundwater quality threats and mitigation strategies.
- Implementation activities to protect or improve groundwater quality (for example, sealing abandoned wells or adjusting land management practices to prevent pollution).
- Remediation activities to address problems that have occurred (such as a spill or chemical release that is threatening a groundwater aquifer) and prevent future problems.
- Compliance and enforcement activities to prevent contamination of groundwater.
- Management and permitting activities to ensure groundwater supplies are used wisely.

The accomplishments stemming from the GWPA and other laws are numerous; however, as existing groundwater problems are resolved, new ones spring up. The changing landscape of groundwater protection requires that we enhance current protection strategies where needed and pilot new strategies to address gaps in our existing management programs.

## **Current groundwater protection activities**

As noted above, the GWPA establishes a foundation for groundwater protection in Minnesota. In more recent legislation, groundwater protection was included as an element of the Clean Water, Land and Legacy Amendment passed by Minnesota voters on November 4, 2008 (Amendment).

The need for enhanced understanding and protection of Minnesota groundwater resources is further reflected in the \$13.6 million total dollars appropriated by the 2009 Legislature for drinking water and groundwater protection from the Clean Water Fund (CWF, established by the Amendment). Funded activities include enhanced groundwater monitoring, accelerated wellhead protection planning and implementation, enhanced efforts to address nitrate problems and promote and evaluate fertilizer best management practices (BMPs), and implementation of elements of the Metro Master Water Supply Plan. In addition to these activities, several planning efforts are underway that will inform groundwater protection statewide, ranging from the DNR's legislative report on surface water and groundwater protection to the University of Minnesota's effort to develop a framework for sustainable water management.

With all of these activities underway or ramping up, the state is well on its way to enhanced protection of its groundwater resources. However, gaps still exist, particularly in the areas of supporting and funding local protection planning efforts, implementing protection practices, and enhancing data sharing and access.



## Proposal development process

The groundwater protection proposal was developed in consideration of the ongoing activities funded by the Clean Water Fund and the various roles agencies play in groundwater protection. In light of the one-time nature of the \$5 million appropriation, the approach taken was to develop a proposal that would help fill in immediate gaps in tools and understanding, and pilot planning and implementation activities that will inform future groundwater protection activities (including future funding requests).

To accomplish this, MPCA staff first reviewed groundwater monitoring reports and protection plans to identify 1) threats to groundwater resources in Minnesota, 2) activities being implemented to protect groundwater resources, and 3) recognized gaps in state and local protection efforts. The documents reviewed included county groundwater protection plans, state agency reports, and other planning documents and needs assessments.

This review identified several reoccurring needs in groundwater protection that fell into four main categories:

1. Long-term monitoring;
2. Data access/integration;
3. Support for planning activities at the state and local level; and
4. Implementation of groundwater protection activities with a focus on vulnerable aquifers and wellhead protection areas.

These “theme” areas became the foundation for the elements of this spending proposal. The MPCA staff conducted a series of meetings with the interagency workgroup and internal staff and leadership to identify more specific activities within the themes that would be viable groundwater protection proposal elements. The proposal elements were refined in an iterative fashion through discussion with the interagency workgroup and MPCA staff. The following section identifies the specific groundwater protection proposal elements developed through this process.

# Groundwater Protection Proposal Elements

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## Groundwater protection implementation (\$3,750,000 – 75 percent of the total)

Effective groundwater protection ultimately relies on a strong understanding of the best practices needed to prevent pollution and protect groundwater, and the availability of resources to implement those practices. All of the planning documents reviewed identified the need for accelerated implementation of groundwater protection practices. Input from MPCA staff, the interagency workgroup and the Clean Water Council also all suggested that most of the funding available for groundwater protection be focused on the following:

- Local groundwater protection grants to implement priority groundwater protection practices, and
- Evaluating the effectiveness of groundwater protection practices.

This proposal directs the majority of the \$5 million CWF appropriation towards enhancing groundwater protection implementation activities in Minnesota, and furthering our understanding of which practices are the most effective in preventing groundwater degradation.

## Local groundwater protection grants (\$3,000,000)

The MPCA would provide pass-through funding via a competitive Request for Proposal (RFP) to local units of government to implement priority groundwater protection activities. This RFP would complement the wellhead protection effort by focusing on implementing activities outside of wellhead protection areas and enhancing local government support of wellhead protection efforts. CWF resources have already been appropriated to MDH for developing and implementing wellhead protection plans, which focus on protecting public water supplies. As Figure 1 illustrated, there are significant areas of the state where underlying aquifers are vulnerable to pollution from land-use practices and activities; most of those areas do not fall within wellhead protection areas.

Prior to the release of the RFP the state agencies, in consultation with local government, will use groundwater sensitivity mapping, guidance developed by the DNR, and existing information about land-use practices and pollutants of concern to identify priority implementation practices by geographic region. Those priorities would be reflected in the RFP, and would likely include activities such as the following:

- Well sealing to prevent direct introduction of contaminants into groundwater systems via unused wells.
- Identification and mapping of potential contaminant sources in vulnerable areas to aid in land-use planning and spill prevention and response.
- Piloting enhanced water conservation activities to reduce water demand and the potential for associated contaminant migration or impacts to groundwater-dependent resources.
- Accelerated, site-specific projects to implement best management practices that prevent groundwater impacts due to land-use activities (e.g. controlling urban storm water, agricultural runoff, etc.).

The effectiveness of using this approach to focus resources on local implementation of priority groundwater protection practices based on aquifer sensitivities will be evaluated by a team of state and local agencies. The findings of this team will be used to determine if modifications to this approach are needed, as well as identify the future resource needs for continued local implementation of groundwater protection practices.

Outcomes:

- Development of a matrix of priority groundwater protection practices, by geographic region, that is referenced to aquifer sensitivity, land-use categories and pollutants of concern. This matrix will guide the RFP development.
- Accelerated local implementation of priority groundwater protection practices, resulting in significant groundwater protection benefits in the areas of greatest vulnerability. While the exact mix of practices to be funded will depend on the priorities identified and the response to the RFP, by way of example if all the

proposed pass-through funding were focused on well sealing, as many as 3,000 unused wells could be identified and sealed in the state.

- Better understanding of local capacity and needs for implementing groundwater protection, including an evaluation of the roles and resource needs of local governments in implementing priority groundwater protection practices.

### **Evaluating the effectiveness of groundwater protection practices (\$750,000)**

In addition to accelerating local implementation of groundwater protection practices, the state is in need of better information about the effectiveness of these practices as well as the effects of surface water management practices on groundwater resources. To help meet this need, MPCA would coordinate with the other state agencies to contract with local units of government, research institutions, consultants and state/federal agencies to evaluate the effectiveness of efforts to prevent the movement of contaminants into groundwater systems from land-uses such as stormwater management, subsurface sewage treatment systems, and agricultural activities.

Outcomes:

- Enhanced understanding of the effectiveness of key protection practices in preventing groundwater degradation.
- Guidance for refining and implementing practices to strengthen groundwater protection effectiveness.

**Summary of Groundwater Protection Implementation Proposal**

Activity	Funding Amount	State Agency FTEs	Outcomes
Local Groundwater Protection Grants	\$3,000,000	2-3 (contracting, project management, technical assistance)	<ul style="list-style-type: none"><li>• Accelerated local implementation of priority groundwater protection practices.</li><li>• Better understanding of local capacity and needs for implementing groundwater protection.</li></ul>
Effectiveness Evaluation	\$750,000	0.5-1 (contracting, project management)	<ul style="list-style-type: none"><li>• Enhanced understanding of prevention effectiveness.</li><li>• Guidance for refining and implementing practices to strengthen the effectiveness of groundwater protection</li></ul>

### **Groundwater protection planning (\$750,000 – 15 percent of the total)**

The need for enhanced groundwater protection planning at the local level was also a common theme in the plans reviewed; strong local planning and engagement has also been identified by the Clean Water Council as key to the success of protection efforts. As noted above, MDH has received Clean Water Fund dollars to accelerate wellhead protection planning and implementation in Minnesota, but protection is also needed for vulnerable aquifers outside of wellhead protection areas. Although these areas are covered by local water plans, those plans typically focus on surface water protection and restoration and do not consider groundwater protection needs. There is a need to enhance local efforts to incorporate groundwater protection strategies into local water plans to further protect groundwater in vulnerable areas not covered by wellhead protection plans.

To begin to address this need, an interagency team led by BWSR would be convened to develop and pilot strategies for amending local water plans to more fully address groundwater protection needs in areas not covered by wellhead protection plans. The effort would include a needs assessment to identify the local support needed, and pass-through funding to 3 to 5 local units of government (LGUs) interested in developing and testing strategies to enhance their local plan.

One of the local planning efforts would involve the effort to develop a coordinated protection plan for the Buffalo aquifer located primarily in Clay County, Minnesota. The Buffalo Aquifer is a “sole source aquifer” (the only readily available groundwater drinking water supply in an area with few or no alternative sources).

Enhancing the groundwater protection aspects of local water planning would further protect this critical groundwater resource and provide a model for other sole source aquifers in the state.

The remaining local projects would be selected based on the goal of including a broad representation of aquifer vulnerability, land-use settings, and local government approaches to allow for the development of a more comprehensive model(s) for enhancing local water plans. In the metropolitan area, where county-level groundwater protection planning is being conducted in several counties, the focus would be on more fully integrating existing surface water and groundwater protection plans. Additional issues and opportunities to be explored through the pilot efforts include:

- Strategies for understanding and managing impacts due to groundwater-surface water interactions.
- Opportunities and tools to enhance local conservation efforts.
- Tools and approaches for facilitating civic engagement in local groundwater planning efforts.
- Coordination of aquifer management needs with local water planning.
- Where multiple groundwater protection-related plans exist (i.e. wellhead protection plans, water supply plans, watershed plans, county local water plans), explore how best to facilitate and integrate groundwater protection across those plans, including the best scale at which to facilitate planning.

Outcomes:

- Three to five new or enhanced local groundwater protection plans that will serve as a model for other Minnesota LGUs. In addition to the Buffalo aquifer plan, it is anticipated that one plan will be from within the 11-county metropolitan area and at least one more from greater Minnesota.
- Based on the pilot efforts, a model approach for amending local water plans to more fully address groundwater protection needs.
- An analysis of the resources needed to enhance local groundwater planning statewide (including state agency technical support, local expertise and resource needs, data and information needs, and management tools) and a proposed approach to meeting the identified resource needs.
- Tools developed or enhanced during the pilot projects would be available to other local units of government to assist in their efforts to enhance local groundwater protection.

#### Summary of Local Groundwater Protection Planning Proposal

Activity	Funding Amount	State Agency FTEs	Outcomes
Local Groundwater Protection Planning	\$750,000	2 (contracting, project management, technical assistance)	<ul style="list-style-type: none"><li>• Three to five model local water plan enhancements.</li><li>• A model approach for amending local water plans to enhance groundwater protection.</li><li>• A proposed approach for scaling-up the local planning effort to all vulnerable aquifers not addressed by wellhead protection.</li></ul>

## Groundwater data sharing and access (\$500,000 – 10 percent of total)

Many of the existing groundwater protection plans consulted noted that access to up to-date groundwater data is vitally important in making informed decisions. Agencies have made significant progress in recent years enhancing access to environmental data through Web portals such as the MPCA's Environmental Data Access site (which also includes MDA monitoring data) and the use of data standards such as MDH's County Well Index (CWI) unique well number. However, more progress is needed to ensure that resource managers and decision-makers have access to the information they need to understand and protect groundwater.

This proposal element would build upon databases and data management systems within state agencies to further coordinate access to existing data, and identify and prioritize remaining gaps. MPCA would contract with an information technology service provider to:

1. Identify the users of state groundwater data and their information needs,
2. Develop business, technical and functional requirements for a data sharing system, and
3. Develop a data sharing format that will enhance access to groundwater data.

The project would also include an analysis of the effectiveness of existing databases and delivery systems, a gaps analysis to identify priority areas for future data collection and system development, and the creation of an implementation plan for improving data sharing and access. The implementation plan would guide future data sharing and access projects, including funding requests. A state agency steering team would be established to guide the project that includes MPCA, DNR, MDA, MDH, BWSR, EQB, Met. Council and MGIO. This proposed approach is also consistent with the MGIO legislative report submitted as required by SF 2082<sup>1</sup> to recommend statutory changes to legislation in light of the creation of MGIO in 2009.

Funding would also be used to contract with the Minnesota Geological Survey to enhance the CWI to provide electronic access to monitoring well construction and location information; this was a high-priority database enhancement identified by the interagency workgroup. Any remaining funding would be used for an additional data or information enhancement project identified by the gaps analysis and prioritization effort.

Outcomes:

- An implementation plan for enhanced data coordination and access that includes the system requirements, gaps analysis and prioritized list of needs, agency roles and responsibilities, and a work plan and cost for filling gaps and implementing identified improvements.
- A common data format for accessing and sharing groundwater data.
- The incorporation of existing monitoring well construction records into the CWI.

#### Summary of Groundwater Data Sharing and Access Proposal

Activity	Funding Amount	State Agency FTEs	Outcomes
Interagency plan for enhanced data coordination and access	\$350,000	0.5 (contracting, project management)	<ul style="list-style-type: none"> <li>• Implementation plan for enhanced data coordination and access.</li> <li>• Common data format for accessing and sharing groundwater data.</li> </ul>
CWI enhancement	\$150,000		<ul style="list-style-type: none"> <li>• Incorporation of existing monitoring well construction records into the County Well Index.</li> </ul>

## Groundwater monitoring and information, and emerging contaminants (\$0)

Although the need for long-term groundwater monitoring and improved information about aquifer characteristics, geology, climate impacts, etc. was repeatedly mentioned in existing protection documents and the interagency discussion, this proposal does not include any efforts in these areas because Clean Water Fund resources have been appropriated separately to enhance groundwater monitoring and to fill data gaps.

The potential need for additional efforts regarding emerging contaminants was also discussed. An immediate gap that was identified is the need to develop the capability to analyze emerging contaminants, such as endocrine disrupting compounds, at the MDH and MDA analytical labs. Currently, the analytical capabilities for these chemicals are primarily housed in research labs and the United States Geological Survey lab, which have limited capacity for analyzing samples. However, given the one-time, one-year nature of this funding, it was determined that the groundwater protection proposal was not a good fit for addressing this need.

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<sup>1</sup> SF 2082: "By January 15, 2010, the chief geospatial information officer must provide a report to the chairs and ranking minority members of the legislative committees with jurisdiction over the policy and budget of the office. The report must address all statutes that refer to the Minnesota Geospatial Information Office or land management information system and provide any necessary draft legislation to implement any recommendations."

# Summary

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In light of ongoing groundwater protection activities and the one-time nature of the \$5 million appropriation, this proposal will fill immediate gaps in groundwater protection planning and implementation at a local level and on a statewide basis, and improve the access to groundwater data needed to make informed water management decisions. The successful outcome of these proposed activities will inform future groundwater protection efforts, including future funding requests. The overall goals are to:

1. Implement pilot projects to enhance protection of vulnerable aquifers that can serve as a model for groundwater protection across the state.
2. Develop an approach to incorporating groundwater protection into local water planning efforts.
3. Fund activities that will support informed management decisions, at both the state and local levels, through improved access to water quality data.

The ultimate goal of this effort is to provide the state with the information needed to develop a long-term implementation plan for enhanced groundwater protection. The approval and implementation of the proposal outlined here, together with the ramped-up groundwater monitoring and protection activities already in progress as a result of other CWF appropriations, will allow for that goal to be accomplished in a coordinated, collaborative manner that recognizes the important roles of the state agencies charged with groundwater protection responsibilities and the local government units involved in land-use planning and decision-making.