



**Richard E. Dunn, Director**

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September 7, 2017

**MEMORANDUM**

To: Richard E. Dunn, Director  
Environmental Protection Division

From: James A. Capp, Chief  
Watershed Protection Branch

Subject: Responses to Comments Received During the Public Comment Period Regarding  
Review of Current Regulations Relating to Aquifer Storage and Recovery

On July 14, 2017, EPD issued a public notice requesting comments on a report prepared pursuant to House Resolution (HR) 1198, which was adopted during the 2016 session of the Georgia General Assembly. HR 1198 encourages the Environmental Protection Division (EPD) to review its current regulations as they relate to aquifer storage and recovery (ASR) to ensure that they are sufficient to provide for the protection and preservation of the state's aquifers, to revise such regulations when necessary, and to consider the availability of other water supply sources in the permitting of any potential aquifer storage and recovery project.

HR 1198 also urges EPD to issue a report detailing its review of current regulations relating to aquifer storage and recovery to the Board of Natural Resources. Note that, at this time, EPD does not have any applications for an ASR project and is not aware of any ASR projects in Georgia in the design or planning stages.

A draft report with an overview of current regulations and preliminary findings was prepared for public review and comment. A public hearing was held at 10:00 a.m. on July 31, 2017 at the EPD Training Center located at 4244 International Parkway, Suite 116, Atlanta, Georgia 30354. The public comment period ended August 14, 2017.

During the comment period, EPD received a total of 49 sets of comments: 40 sets of comments submitted by individuals on their own behalf and 9 sets of comments submitted on behalf of organizations (6 environmental organizations, 2 consulting firms, and 1 business organizations). A summary of the comments received and EPD's responses to the comments is attached. The draft report was revised in light of public comments received.

**1) Comment:** Georgia does not have a coordinated program regarding ASR. The lack of a coordinated program can result in permit applicants or EPD missing critical issues or information, and cause permitting discrepancies that could result in harm to underground water supply. An ASR project must be regulated from start to finish in a coordinated program with applicants and regulators working to include important pertinent information.

**Response:** Among others actions, HR 1198 directed EPD to review current regulations as they relate to ASR to ensure that they are sufficient to provide for the protection and preservation of the state's aquifers. Based on that review, EPD concluded that current regulations and the authorities they provide are sufficient to protect water supplies, including underground drinking water, and provide for the protection and preservation of the State's aquifers. The EPD report summarizes how existing laws and rules function to regulate the entire ASR process and concludes that more coordination is needed in their implementation. The report identifies actions to facilitate a more integrated and transparent approach to implementing existing authorities and therefore provide for a more coordinated approach for evaluating and regulating potential ASR projects. As such, the end result will be a coordinated program regarding ASR.

**2) Comment:** EPD should be more proactive and adopt ASR-specific regulations to better protect our underground drinking water resources. The actions identified by EPD in the draft report do not fix significant gaps in existing regulations (and could make permitting quicker and easier), which could result in adverse impacts to underground water supplies. While existing regulations address the individual components of ASR, there is no "big picture" consideration of ASR. Some ASR-specific regulation is warranted while maintaining regulatory flexibility.

**Response:** At this time, EPD does not have any applications for an ASR project and is not aware of any ASR projects in Georgia in the design or planning stages. The actions to be undertaken by EPD, as described in the final report, are expected to better integrate permitting activities and therefore make regulation of ASR projects more effective. These actions will be undertaken over the next 12 months. Given that EPD is not aware of projects currently in development and is uncertain about future need for regulatory response, EPD believes the actions described in the final report are responsive to HR 1198 and consistent with agency resources. Further, the commenters did not identify any gaps that would be remedied by ASR-specific regulations that could not also be remedied by EPD's proposed approach. If, while EPD takes the actions identified in the final report, additional information becomes available that demonstrates rule changes are necessary, a rulemaking process can be undertaken at that time.

**3) Comment:** The moratorium on ASR in the Floridan should be reinstated because the risks posed by ASR in the Floridan far outweigh any possible benefit. The state should either significantly expand upon and make more specific its laws regarding who will be able to engage in ASR, how much water they will be entitled to retrieve, and how much knowledge the public will have of the proceedings, or consider disallowing the process altogether. EPD should recommend a legislative ban on ASR statewide. A ban is the best course of action to protect Georgia's pristine groundwater resources.

**Response:** The topics of a moratorium on ASR or changes in state law regarding ASR are beyond the scope of the activities that EPD was directed to undertake under HR 1198. Those activities are to review current regulations as they relate to ASR to ensure that they are sufficient to provide for the protection and preservation of the state's aquifers, to revise such regulations when necessary, and to consider the availability of other water supply sources in the permitting of any potential ASR project.

**4) Comment:** Existing laws fail to provide sufficient opportunities for public notice and comment on an ASR project as a whole. While some of the individual permits have public notice and comment requirements, the underground injection control (UIC) permit does not. Public notice should at least be required for well permits for an ASR project (Class V UIC permit). Though EPD contends that the project-specific roadmap may allow for coordinated public notice on groups of ASR permits, EPD indicates that such coordination may not always be possible. The lack of an enforceable, binding process for seeking approval of an ASR project means that applicants may exploit gaps in existing regulations to avoid public notice requirements.

**Response:** While changes in existing laws are beyond the scope of activity directed by HR1198, public notice and comment is clearly important to inform agency decisions and is recognized as such in the regulations that guide EPD activities. Going forward, EPD fully intends to require joint or coordinated public notice for all of the permits required for an ASR project, and the activities recommended in EPD's report provide the vehicle for this approach. EPD's report has been revised to state this explicitly.

**5) Comment.** Control over injection of water should be extremely strict to prevent any possibility of damage to our aquifers. Extreme caution should be exercised before permitting any proposal to inject water, even treated to drinking water standards, into aquifers that are heavily relied upon by large numbers of people. Some exceptional waterbodies should have extraordinary permit conditions or protections, possibly including complete prohibition of ASR. The Upper Floridan Aquifer in coastal Georgia is an outstanding resource with unmatched water quality that supplies high quality water for millions of Georgia residents (drinking water and water for agricultural, industrial and utility use). EPD should consider strict permit conditions for withdrawals and injected water, monitoring requirements, and new permit time limits.

**Response:** EPD's final report discusses the multiple statutes and rules that are designed to protect water supplies, including underground drinking water, and that provide for the protection and preservation of the state's aquifers. Those existing authorities will inform EPD's evaluation and permitting of proposed ASR projects; they provide the flexibility to adapt to the specifics of different circumstances and provide requirements designed to be protective under those circumstances. ASR project evaluations would include source water assessment and underground injection control requirements that, among other requirements, include a focus on protecting water quality. A complete prohibition on ASR is beyond the scope of HR 1198.

**6) Comment:** ASR can result in groundwater contamination, such as increased levels of arsenic that exceed drinking water standards or the potential introduction of bacteria, pathogens and

disinfection byproducts. Disinfection byproducts were cited as a particular concern when water must be disinfected before injection. The injection of treated water may also bypass natural processes that might be expected to remove remaining contaminants in the water. Potential risks include permanently contaminating an aquifer and causing the partial or total loss of that critical resource. Injecting anything into aquifers that millions of people in our state depend on without being 100% certain the water quality of the aquifer will not be impacted should not be done, and our state's regulations around any such proposal should be as clear and as strict as possible. A better review process and stricter regulations are needed when it comes to ASR.

**Response:** The potential for groundwater contamination underscores the importance of site-specific analysis and site-specific requirements as emphasized in the approach to be undertaken per EPD's final report. For example, disinfection requirements would be determined on a case-by-case basis and the potential for disinfection byproducts or mobilization of trace metals would be considerations in the evaluation. Chlorination may be the most-cost effective method, but another method may be effective and necessary, and those costs would have to be built into the cost of the project.

Current regulations provide considerable flexibility to adapt requirements to the specific characteristics of a site and a particular project on that site. While it is impossible to guarantee 100% certainty, current regulations allow detailing of advance evaluation of project-specific technical information, monitoring and reporting requirements, operational conditions, and potential adjustments during operations, all of which address the risks cited in this comment. Accomplishing this will require better integration and coordination in rule implementation through the actions that EPD commits to taking in the final report.

7) **Comment:** The unknowns are concerning. The potential harm that could be caused by injecting water into our aquifers is not yet fully understood or quantifiable, and it might far outweigh the benefits. Any potential benefits do not even approach the scale of the risks involved to critical aquifer resources. There is not enough data on the leakiness of Georgia aquifers, the connection between surface flows and aquifer levels, and the long-term impacts of ASR to fully evaluate the impacts and the feasibility of ASR projects in Georgia. The proposed benefits of ASR do not add up when you consider the enormous energy and tax dollar costs associated with transporting and pumping the water into the ground, along with the fact that we do not even know what percentage of the water would actually be retrievable.

**Response:** The existing regulations and EPD's permitting processes are designed to identify and quantify the type of information noted by the commenters during an evaluation of a potential ASR project. The particular characteristics and potential benefits or risks of an ASR project are dependent upon site-specific conditions and the actions to be undertaken by EPD are designed to improve the project-specific technical information that is available to support decision making. This information would then be evaluated during permitting processes that incorporate public review and input.

8) **Comment:** Past experience in Georgia and other states shows that ASR doesn't work and can result in groundwater contamination. Two ASR experiments in Georgia failed to meet

expectations and were terminated. Some comments provided information on the number or percent of projects in other states that are active or fully functional versus those that are inactive or abandoned. Others summarized problems seen at different projects, including arsenic mobilization, excessive operational costs, or the inability to recover stored water.

**Response:** Past experience with ASR projects, both within and outside of Georgia, underscore the site-specific nature of ASR. For example, at test wells completed at two sites within Georgia, site-specific groundwater yields did not justify further ASR development at those locations. Experiences in other states can inform the EPD actions to be undertaken over the next 9-12 months, which will support future evaluation of proposed ASR projects based on site-specific conditions.

9) **Comment:** Experience in other states shows that ASR works and is a proven and cost-effective technology. There are numerous operational ASR projects in the United States. South Carolina, for example, has been using ASR since the 1990s. In South Carolina and North Carolina, ASR projects are tightly controlled and well regulated, and supported by regular sampling and a robust system of monitoring of water levels and groundwater from the ASR well and affected aquifer systems. A thorough review of how ASR has been managed and performed elsewhere can position Georgia well to determine if, where, when, and how to apply it as a strategic management tool.

**Response:** Again, experience in other states underscores the site-specific nature of ASR. Experience in other states can inform the EPD actions to be undertaken over the next 9-12 months, which will support future evaluation of proposed ASR projects based on site-specific conditions. As appropriate and based on agency resources, such a review may be conducted while the actions outlined in the EPD report are undertaken.

10) **Comment:** Seeking more sources of supply, often at unjustified risk and/or expense to the citizens of Georgia, while failing to achieve greater efficiency in existing use of water is a fundamental flaw in Georgia's approach to water resources. Neither existing regulations nor EPD's suggested actions require consideration of how water conservation and efficiency measures could impact the need for an ASR project. Water conservation and efficiency measures are far cheaper to implement and can reduce the need for additional water storage or eliminate that need altogether. EPD should consider the actual versus the perceived need for ASR. At some point in the permitting process, applicants should have to demonstrate the true need for the project.

**Response:** The overall approach to meeting Georgia's water supply needs is beyond the scope of activities called for by HR 1198. Regarding demonstration of need, all water withdrawal applications require an assessment of need before a withdrawal permit is issued. For municipal use, for example, assessment of need starts with documentation of population growth and consumptive loss of water; existing interconnections, service delivery agreements, and estimates of water demands over the next five decades are then verified. Under DNR rules, water supply efficiency is considered for public water systems that serve at least 3,300 individuals and apply for an increase in permitted drinking water service connections or a modified or renewed water

withdrawal permit. These systems are required to demonstrate progress toward improving water supply efficiency.

**11) Comment:** ASR technology can play an important role in meeting water supply needs, providing an opportunity to manage water resources seasonally. It can also provide other benefits (e.g., control of saltwater intrusion; improving regional groundwater levels; reducing adverse impacts on coastal ecosystems). One of ASR's principal advantages is its small footprint within an aquifer compared to above-ground storage, and monitoring is commonly done along the periphery of the area where ASR water is stored to ensure that stored water or potential chemical reactions between the stored water, aquifer matrix, and native groundwater remain on site.

**Response:** The role of ASR in meeting water supply needs is beyond scope of the review directed by HR 1198. The site-specific approach taken in EPD's report is consistent with the second part of the comment.

**12) Comment:** Implementation of ASR is highly site-specific and local hydrogeology is a major consideration. Development of a successful ASR program requires careful site and aquifer selection. Because of the uncertainties associated with injection, recovery, and interaction with native water and the host aquifer, permits for ASR should require substantial pilot testing and only be issued upon successful completion of the pilot testing. A phased approach, with an initial site feasibility assessment followed by phased implementation of full-size ASR wells, is recommended.

**Response:** The regulations currently in place provide the flexibility to adapt to site-specific conditions and the ability to ensure some phasing in development. For example, repeated cycles of injection and withdrawal, known as cycle testing, may be required to assess potential water quality impacts and evaluate full-scale operation. The provisions of the final underground injection control permit would be based on the findings from the cycle testing. The actions specified in EPD's report are intended to ensure that site-specific considerations and the phasing required to work with them are defined appropriately through early communication with applicants and then coordinated effectively across permits.

**13) Comment:** The report's overall findings and the actions proposed in the report are valid. Additional guidance, procedures and clarity would be beneficial, and ensuring that sponsors are aware of regulatory issues at the outset would enable the cost burden to be better managed. The requirements of specific permits do provide protections for sources of drinking water sources and aquifers as described in EPD's report. EPD should have maximum flexibility in consideration of actions to effectively manage the state's water resources.

**Response:** The actions to be undertaken by EPD, as described in the final report, are expected to provide regulatory clarity to benefit the agency, entities interested in executing an ASR project, and local jurisdictions and other parties interested in the protection and preservation of the state's aquifers and the protection of underground drinking water.

**14) Comment:** One comment suggested that legal concerns related to an injector’s right to withdraw a specific quantity of water may arise, and recommended that revisions to Georgia law be considered to address this. Another suggested that permits may create an ‘illusion’ of a property right that runs counter to Georgia’s system of water regulation, recommending that permits clearly state that they do not create or convey any property rights of exclusive privilege in the recoverable water.

**Response:** State law and regulations do not create nor convey property rights of exclusive privilege of water; they simply provide for the permitting of reasonable use of state waters. An entity holding a permit to withdraw water for recovery from an ASR system would, by virtue of having been granted a permit to do so, have a right to withdraw water up to the amount specified in the permit. That right would be subject to the permit’s conditions as well as the permitting authorities under which the permit was issued. These provisions are clearly stated in withdrawal permits and withdrawal permits associated with an ASR project would be no exception.

**15) Comment:** EPD should clarify why the withdrawal permits associated with an ASR project could be of different types (i.e., non-farm or farm use), given that ASR changes the timing of water availability, not the end use. Farm use withdrawal permits are less stringent than non-farm (M&I) withdrawal permits. EPD should adopt a rule that requires all water withdrawal permits for ASR projects to be permitted for non-farm use, even if the project is designed to provide water solely for irrigation or other farm uses.

**Response:** The statutes that authorize permitting of groundwater and surface water withdrawals distinguish between farm and non-farm withdrawals, and EPD permits those withdrawals accordingly. For an ASR project, the withdrawal of source water does not meet the statutory definition of farm use. It would be permitted with a non-farm or M&I withdrawal permit with the purpose of “underground reinjection into a specified aquifer or aquifers” or similar language. For recovery of stored water, the type of withdrawal permit would depend on the use of that withdrawal. If the use meets the statutory definition of farm use, a farm use permit would be required. If not, a non-farm or M&I permit would be required.

Beyond these statutory requirements, EPD’s approach starts from the recognition that ASR is best regulated based on the facts of each individual project – this allows for EPD’s regulations to place controls on the activities for which they are designed. Whether the recovery step occurs for farm use or non-farm use, there are still numerous steps and potential risks in an ASR project, and permitting should be done in a coordinated manner with a full appraisal of the process and stringent permit conditions where needed. EPD’s commitment to coordination amongst the steps in the process, and to early communication with the applicant, is designed to make sure that regulatory gaps are identified early and mitigated to achieve the goals as stated in the EPD report.

**16) Comment:** The draft report does not indicate that EPD is required to implement any of the actions described in the report nor does EPD commit to doing so. Without a more firm commitment and more details on the specifics, actions that could streamline the permitting of ASR projects and make EPD more willing to approve an ASR proposal remain a concern. If changes are not made in laws or rules, the EPD Director should issue a formal ASR policy

memo that provides clear and binding procedures for all applicants.

**Response:** The final report has been revised to state EPD's commitment to undertake the specified actions over the next twelve months. The goal is to produce draft documents for public review and comment in nine months and finalize the products three months after that. As specified in the final report, these actions are designed to improve the technical information base, coordination, and communication in order to reach better outcomes in ASR regulation.

**17) Comment:** Ensure that bank filtration projects are adequately governed by existing statutes and rules.

**Response:** Bank filtration is an alternative for pre-treating water prior to injection and existing regulations adequately govern the results of this and other treatment methodologies. The regulations focus on the quality of the water that would be injected, not specific treatment methodologies.

**18) Comment:** Applications for source water withdrawal permits should be required to include information on both the interim use (injection and storage underground) and the final proposed use of the water to ensure that EPD and the public understand that the permit application is part of an ASR project as a whole.

**Response:** The pre-application project checklist to be developed by EPD and completed by the applicant will include: 1) project purpose, including end uses and any interim uses of the stored water; 2) project design specifics, including source water and target aquifer(s), anticipated volumes of storage and recovery, sequencing of injection and recovery, and recovery cycle (short or long-term); and other elements. This information will inform subsequent regulatory steps, including permit applications.

**19) Comment:** Under the UIC rules, monitoring requirements for injection wells associated with ASR projects are determined on a case-by-case basis and "may" be included as permit conditions. This gives EPD too much discretion. Given the importance of our aquifers and their designations as underground sources of drinking water, the UIC rules should be revised to mandate frequent monitoring, testing, and reporting both before and after injection.

**Response:** As noted in the EPD report, UIC permits are site-specific and the general requirements provide flexibility to tailor a permit on a case-by-case basis. Site-specific information on source water chemistry, project design and operation, and aquifer characteristics are used to inform water quality evaluations and permit requirements designed to preserve groundwater resources for present and future users by preventing significant deterioration. This includes monitoring and reporting requirements, and the same approach would be applied to any permit required for an ASR permit.

**20) Comment:** Because adverse impacts may only be detected after an ASR project has been operational for some time, permit applicants should post a bond or provide some other evidence of financial assurance demonstrating their ability to implement corrective action if needed. ASR projects would involve UIC Class V wells, and UIC permittees for Class I, II,



and III wells must demonstrate the financial ability to close, plug, and abandon their injection operations in a similar manner.

**Response:** Under current regulations, permits for UIC Class V wells include a requirement to demonstrate adequate financial assurances to plug the wells covered by the permit. Going beyond this to demonstrating an ability to implement corrective action may require additional authority. Additional information is needed and this can be considered for future rulemaking, if warranted.

**21) Comment:** For water withdrawal permits that recover stored water, existing regulations do not require applicants to include information about the amount of stored water that may actually be recovered from the aquifer. Permit applicants should be legally required to develop and run models that show the leakiness of the storage aquifer, how much of the injected water could be recovered following injection, and when that water could be recovered. Recovered water withdrawal permits must be linked to the source water withdrawal permits and the underground injection control (UIC) permits and have corresponding recoverable water quantity and time limits.

**Response:** This comment is consistent with the coordinated, site-specific approach emphasized in EPD's report. The type of modeling described in the comment can be required under current regulations and expected recovery is one of the critical factors to be evaluated when assessing an ASR project. Coordination of limits and conditions across permits for a specific project is one of the purposes of the actions specified in the report.

**22) Comment:** Any surface water that would be injected as part of an ASR project would otherwise naturally go to streams, rivers, and lakes. The biological, chemical, and physical integrity of those surface waters are dependent upon low flows, seasonal high flows, and localized flooding, and alterations in these flows are already evident in some systems. Permit applicants should be required to discuss and analyze the extent to which their proposed diversions of surface water for later use disrupt critical natural processes.

**Response:** The surface water withdrawal permit application process currently includes analysis of downstream impacts and consideration of the impacts of reduced flows on the surface water source.

**23) Comment:** Existing regulations do not require an assessment of the energy needs required for an ASR project and the associated water loss. Any ASR proposal should be considered in the context of the additional consumptive water loss and additional carbon emissions that would arise from the electricity use associated with pumping and treating.

**Response:** Based on our statutory charges and existing regulations, EPD evaluates the reasonable use of water at the location and for the purpose identified when considering a proposed surface water or groundwater withdrawal. Information regarding water consumption that would directly result from the proposed use would be an important factor in analyzing the reasonableness of that use. Existing regulations do not call for a broad environmental impact analysis that might include consideration of items such as energy needs, water consumption

during energy production, and carbon emissions. Some of those items, however, may be very important factors to a project applicant and may inform the overall viability of a proposed project based on their associated costs.

**24) Comment:** There was insufficient private sector and consumer input on the development and administration of ASR regulation. Reports of potential and real health effects versus potential and real benefits of ASR should be publicized in newspapers and other media. This information should be researched and vetted extensively in the private sector, not just by government agencies.

**Response:** EPD believes that it has followed an open and public process regarding its charge from HR 1198 to review current regulations as they relate to ASR to ensure that they are sufficient to provide for the protection and preservation of the state's aquifers. A draft report regarding this review was publicly noticed, a public meeting was held to provide information and to answer questions, and a 30-day public comment period was provided. Some of the comments received came from the private sector (e.g., from one business organization and two consulting firms) and many came from concerned citizens and environmental organizations who represent consumers in the state. Some of the comments included information regarding the impacts or benefits of past ASR projects, both within and outside of Georgia. While EPD has no control over the type of ASR-related research that might be conducted in the private sector, the comments received indicate that private sector research exists and is applied in development, evaluation and public review of individual ASR projects.