



Union of Concerned Scientists Offers Approach to Achieving SGMA Groundwater Sustainability Goals

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Last year, the California Legislature passed the historic Sustainable Groundwater Management Act (SGMA, or the Act), which for the first time established the foundation for a statewide effort to comprehensively and sustainably regulate groundwater. While the Act requires local groundwater sustainability agencies (GSAs) to develop groundwater sustainability plans ("GSPs") by 2020, it offers little guidance as to how to set measurable objectives. In an effort to fill this gap, the Union of Concerned Scientists (UCS) released a report earlier this month, entitled *Measuring What Matters: Setting Measurable Objectives to Achieve Sustainable Groundwater Management in California*. The report provides a summary of best practices for setting effective measurable objectives as well as recommendations for incorporating these practices into California's regulatory framework.

Best Practices for Setting Measurable Objectives

Based on review of current literature and existing groundwater management practices, the UCS set forth six effective measurable objectives that groundwater agencies should incorporate into their GSPs to achieve SGMA's sustainability goals. First, objectives should define clear and consistent baselines for undesirable groundwater conditions. Currently, GSAs have significant discretion when setting these baselines, which could lead to inconsistent results. To prevent these inconsistencies, the UCS report recommends regulations that limit local discretion in order to ensure fairness, transparency, and avoid the potential for conflict resulting from varying definitions of the starting point for groundwater management.

Second, objectives should use quantitative thresholds for determining when unacceptable groundwater outcomes are reached. The UCS's review of current groundwater management plans found that they often use qualitative statements, but these are disfavored because they are difficult to measure and track over

time and do not clearly define success. (UCS Report, p. 7) Quantifiable targets are preferred for two reasons: (1) progress can be monitored, and (2) agencies can be alerted to performance that deviates from objectives and respond accordingly. The UCS report offers a range of examples of quantifiable thresholds organized around the six undesirable conditions identified in SGMA. (See UCS Report, Table 1, p. 10.)

Third, objectives should incorporate protective triggers as a warning system that communicates negative progress toward undesirable effects. Triggers provide a measureable and adaptive framework for decision-making by identifying in advance when and how to take preventative action. As one example, the report suggested identifying quantifiable triggers along a continuum (green-, yellow-, and red-light triggers). Whatever method is selected, the UCS stressed that it should be directly tied to responsive management action.

Fourth, objectives should incorporate regular measurement and monitoring. Implementing a monitoring strategy ensures responsive resource management and lessens the sort of guesswork associated with trial and error. The UCS report offers examples of a number of direct and indirect approaches to measurement, but warns that indirect techniques, such as monitoring proxies for groundwater levels, are more likely to suffer from higher levels of uncertainty. (See UCS Report, Table 3, p. 15.)

Fifth, objectives must account for uncertainty. Uncertainty is inherent in any long-term planning process, but it is particularly applicable to groundwater management since groundwater cannot be seen, frustrating the interest in precision and accuracy. The UCS recognized that developing GSPs will be an imprecise endeavor since agencies will be relying on incomplete historical data and conjectures about aquifer geology, future land and water usage, and the impact of climate change. Sustainability planning allows managers to cope with uncertainty, and the UCS stressed the importance of recognizing where uncertainty lies and addressing it explicitly.

Lastly, agencies should be prepared to adapt to changing conditions and new information. SGMA does not explicitly call for adaptation, but it does include various requirements that correspond with an adaptive management approach. (See UCS Report, Table 4, p. 18 [citing Wat. Code § 107272.2, which sets 5-year milestones that track progress and provoke change as needed].) The UCS acknowledged that adaptive management is as much a scientific process as it is a social one. Thus, in order to achieve both short- and long-term sustainability goals, governance frameworks must also be adaptable in order to facilitate managers' abilities to respond to changing conditions. Adaptive management coupled with adaptive governance will help ensure sustainable outcomes.

UCS's Recommendations

Through collaboration with the California Water Foundation and feedback gleaned from multi-stakeholder roundtable meetings, the UCS included four recommendations to inform the state's development of a regulatory framework that will help define measureable objectives. First, the UCS advised the development of a common state framework for thresholds, triggers, and interim milestones that rely on existing standards and policies and establishing new rules and methodologies where there are no state standards.

Second, the report recommended that the state play a role in identifying existing data sources to be used in GSPs as well as lead efforts to improve groundwater monitoring where the quality of available groundwater data is limited or inconsistent.

Third, the state must define common assumptions that will go into modeling projections for sustainable yield. Because SGMA requires basins to achieve sustainable yield by 2040, groundwater management approaches will likely rely on models to project how changing conditions, water usage, and other factors will affect groundwater budgets. Thus, establishing a common set of assumptions for these models will be critical.

Finally, the state must develop common metrics and transparent data management and reporting protocols. Doing so will provide guidance to local agencies, ensure standardized reporting, ease the development of water budgets, and promote transparency in public reporting.

Conclusions

The challenges of implementing a sustainable groundwater management program will be significant, particularly as the state authorities seek to balance the need for common standards against the need for local flexibility. Each GSA will also be challenged as they attempt to develop GSPs and then effectively manage groundwater to avoid undesirable results. The UCS report provides an approach to achieving a result that would incorporate effective measurement objectives to help agencies know when they are making progress and when they are off track.