

2022 ITRC Final Proposal Template

Proposed Project Title

Managed Aquifer Recharge and Modelling

Abstract

Aquifer recharge is a growing practice in response to water scarcity concerns and remedial driven withdrawals. However, there is a lack of consistency in how these practices are described, implemented and managed. This team seeks to better define and standardize the range of active aquifer recharge actions and develop best practices for the recharge options and modeling applications. To fully utilize managed aquifer recharge (MAR) systems, collaboration is needed between all stakeholders (e.g., landowners, local, state, tribal, and federal agencies) to develop guidelines and practices that will ensure the protection and sustainability of groundwater resources.

Problem Statement and Highlight of the Importance to the States and to the Broader Environmental Community

Managed aquifer recharge (MAR) represents both a practical supply-side solution to the Nation's need for additional water resources, and a resource management approach to achieve aquifer sustainability in response to seasonal or climatic drought and demand or remedial over draw. Augmenting groundwater storage through managed recharge into aquifers represents a cost-effective way of increasing the availability of source water, as a barrier to saltwater intrusion or as a method to stabilize the water table in stressed systems. The use of these approaches such as MAR or Enhanced Aquifer Recharge (EAR) are also a potential best management practice (BMP) to control flooding in urban/ suburban areas by diverting stormflow away from flood prone areas using distributed recharge infrastructure. Although MAR has been demonstrated at a limited number of locations and geological settings, they tend to be limited to traditional infrastructure practices.

There is a need to examine and standardize innovative recharge infrastructure that could be utilized for MAR and to define the appropriate geologic settings and tools needed for characterization and design. The proposed team will evaluate the potential uses of MAR, the factors for the safe and successful implementation, innovative characterization and modelling tools that can be used to appropriately place MAR infrastructure. A need also exists to establish MAR reference sites where technologies and tools for monitoring MAR systems, groundwater quality, characterizing sub-surface geology and modelling/visualization software could be tested for Project Management teams and Stakeholders.

(716885224) One proposed site would be the existing EAR demonstration site located near Ada, OK. This site is a collaboration of the City of Ada, USEPA, Oklahoma State, and the Chickasaw Nation. The site can be utilized as both a field and online training facility for MAR characterization, approaches, and model validation. It is currently being utilized as an Oklahoma Limited Scale Aquifer Storage and Recovery facility for these purposes and can be extended for national and international training purposes. We expect the online portion to be coordinated with the National Groundwater Association University program if possible.

Project Deliverables

Document Products:

- Tech Reg Guidance Documents, including case studies.
- Fact sheets:
 - MAR Design Approaches
 - Field Monitoring Methods for MAR
 - Predictive fate and transport modeling in aquifers
- Advancements in 3-D visualization software for Conceptual Site Model development applicable to MAR.
- An online tool embedded in the Tech Reg Guidance Document to filter the type and applicability of a given software program or modeling framework to provide model programming resources to regulatory decision-makers and technical staff. Advanced modeling tools are infrequently utilized at the regulatory level due to the barriers of education, experience, cost, and time. Providing these materials across the environmental industry will reduce these barriers significantly, improving site and resource management. Applying appropriately scaled model tools for cost effectiveness and site complexity could provide the decision-maker with the right tool for the job with confidence in achieving desired project outcomes.

Training Products:

- Online Training Class (1-2 hours): One or more MAR modules created for ITRC may be coordinated with the offerings of NGWA University (more discussion needed with the Board).
- Training Videos or Modules
- In-person Classroom Training Curricula: Reference sites will provide opportunities for in-person and online education. For example, a course on field monitoring practices for MAR systems.
- Presentation Slides for previously listed courses and conference presentations
- Training materials:
 - course on field monitoring practices for MAR system,
 - course EAR design approaches, and
 - 3-D visualization software tutorials