

CASE STUDY 1

Inyo County: Monitoring Groundwater Dependent Vegetation to Inform Groundwater Management



Summary: Inyo County and the City of Los Angeles have shown innovative and progressive leadership in the protection of groundwater dependent ecosystems in Owens Valley, and thanks to a landmark agreement between Inyo County and the Los Angeles Department of Water and Power (LADWP), the outlook for groundwater dependent ecosystems (GDEs) in this area is promising. In 1991, the Inyo/Los Angeles Long-Term Water Agreement (Agreement) established an elaborate system to manage groundwater pumping by LADWP to avoid substantial declines in groundwater dependent vegetation in the Owens Valley. Implemented to settle the County's 1971 CEQA challenge of LADWP's proposed method to fill its second aqueduct, the Agreement resolved years of litigation between the County and LADWP.

The Agreement reduces environmental impacts while providing a reliable supply of water to Los Angeles and Inyo County. It establishes baseline vegetation conditions as a standard to control future groundwater pumping and it prescribes regular, comprehensive monitoring to prevent impacts to groundwater dependent vegetation. Soil water and vegetation monitoring results are used to regulate pumping from LADWP wells by comparing available root zone water with the water requirements in the Agreement.

The Agreement also prescribes mitigation measures to reconcile some of the deleterious effects of past pumping. Although the Agreement is complex and expensive to administer, it creates more certainty for water supply and better conditions to support critical GDEs. The Agreement also works well to keep the valley basin full, since it is based on keeping the water table close to the plant roots.

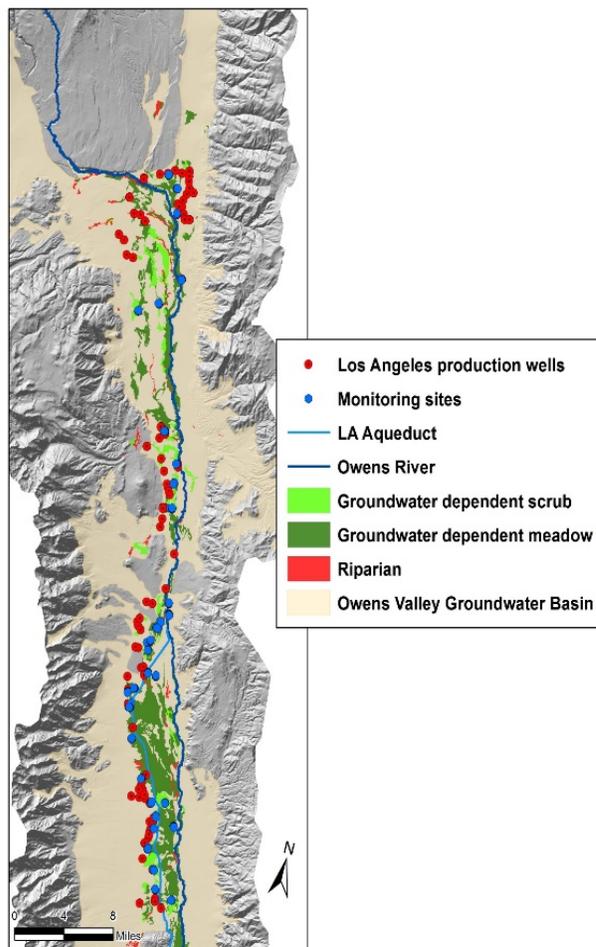


Photo Credit: Inyo County

Noteworthy Items: Groundwater management that incorporates protection of GDEs is made possible by the identification of baseline vegetation conditions,

hydrologic characterization of GDEs, and monitoring critical metrics in GDE health (specifically, groundwater levels, soil water in root zone, and vegetation type and vigor). The baseline conditions, hydrologic characterization of GDEs and monitoring can then inform how to regulate groundwater pumping.

Program: Owens Valley in Inyo County, just east of the Sierra Nevada, lies at the western edge of the Basin and Range province. Characteristic of the region, is a north-to-south oriented alluvium filled valley lying between two faults. Recharge into Owens Valley originates as snowmelt on the steep eastern slope of the Sierra before infiltrating through stream channels on alluvial fans. The Owens River enters the north end of the valley and flows to its natural terminus at Owens Lake. For the entire groundwater basin, recharge is about 250,000 acre-feet per year, roughly equal to the unregulated pumping capacity of the City of Los Angeles, the principal land owner in the valley. Current extraction is about 120,000 acre-feet per year, with 70 percent attributable to the City of Los Angeles. Owens Valley is now a SGMA-designated adjudicated basin (Medium Priority) . Los Angeles’s groundwater pumping has been regulated since a court-enforceable agreement between Inyo County and the City of Los Angeles was established in 1991.



Three types of native groundwater dependent vegetation communities exist in Owens Valley—groundwater dependent meadow, groundwater dependent scrub, and riparian, with the majority being groundwater dependent meadows. These phreatophytic communities depend on shallow groundwater to maintain plant populations. Precipitation alone is inadequate to meet transpiration requirements of these species.

The management strategy is to allow nearby wells to operate if there is enough soil water for the groundwater-dependent vegetation. Located throughout the valley, about 100 production wells are linked to 22 vegetation and soil monitoring sites. Each site has 100-meter vegetation transects and detects soil water using neutron probe access tubes. The vegetation transects are measured annually (around the summer

solstice), and the plant water requirement is computed from the measured leaf area by species. The transpiration rate for that species is then summed across the species present on the transect. Available soil water for a site is determined from neutron probe measurements across the root zone, where grass dominated communities are assumed to have a 2-meter root zone, and shrub dominated communities are assumed to have a 4-meter root zone. If there is sufficient available soil water to satisfy the plant water requirement, then production wells can pump. However, if soil water is insufficient, the linked wells cannot pump. Under the Agreement, factors such as expected winter precipitation are considered in determining the operational status of production wells.

This practice of monitoring vegetation requirements and available soil water helps keep the water table near the root zone and contributes to not only the survival of the GDEs, but also sustainable groundwater management and a more reliable long-term water supply. While this program responds to the specific concerns in Inyo County, there are parallels with the provisions of SGMA related to identifying GDEs and the managing groundwater levels to prevent adverse impacts to beneficial uses. These methodologies have been tested and refined, and other local groundwater management agencies may wish to consider adapting this Owens Valley program to meet their needs under SGMA. Based on lessons learned from implementation of the Agreement, the Director of the Inyo County Water Department, Bob Harrington, recommends establishing a groundwater management system that maintains specified water levels to simplify management and reduce costs. Management based on a well-designed monitoring system and a numerical groundwater model would also enable adaptive management of a basin. Other components that have proven important include management objectives oriented to a quantitative set of baseline measurements, and an explicit dispute resolution process.

Status: The monitoring of GDEs in Inyo County is well established with proven results. According to Bob Harrington, the Agreement has resulted in limitations on groundwater extraction that has kept the basin relatively full and the water table near the rooting depths of groundwater-dependent vegetation in most areas; although it requires resources for administration, it achieves Inyo County's groundwater management objectives.

Additional Resources:

<https://www.inyowater.org/documents/governing-documents/water-agreement/>

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