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Spring-Supported Wetland and Riparian Habitat, a Core for Managing Bedrock Ground Water

Wells drawing ground water from bedrock joints may provide adequate yields for municipal water systems but uncertainty as to the capacity of the aquifer is a risk which often constrains projects at both investment and permitting levels. Unlike sediment basins and alluvial valleys, predicting storage in fractured and jointed bedrock is inherently difficult to impossible, even with extensive field work and considerable data available for analysis. Conventional methods of modeling these aquifers may fundamentally be inapplicable or, when useful, have high levels of uncertainty..

Montara Water and Sanitary District is contending with a number of challenges unique to coastal water systems, especially those with aging infrastructure that rely on the collection of local ground-water supplies. The District has recently completed a bedrock well that unlike many other bedrock wells in San Mateo County is very high yielding and draws ground water from deep, regional joints in Montara Mountain, an aquifer that is only slightly developed. Several independent lines of evidence indicate that the well appears to draw on a large body and/or interconnected sources of ground water within the mountain, and nearly all of the contributing area has little or no potential sources of contamination.

One way of responsibly approaching the effects of well drawdown to the springs, riparian vegetation and wetlands in the vicinity of the well would be to limit drawdown at indicator sites to a level known to not be harmful to riparian species. Such guidelines were developed for similar granitic soils and alluvium along the Carmel River by the Monterey Peninsula Water Management District, which has used them successfully over the past 18 years. The guidelines have short-term as well as seasonal thresholds of significance for drawdown. Given that the highest drawdown rate occurs following the onset of pumping, the rate of pumping is to be ramped up gradually after June 1 to avoid exceeding short-term thresholds of significance, otherwise nominal effects are anticipated prior to this date when soil water is readily available. An adaptive management program is proposed, beginning with applying the guidelines, monitoring responses, and using the results to evaluate whether further drawdown might be tolerated. To implement this program, the District is monitoring shallow wells near springs and creeks, and developing a wetland and riparian vegetation monitoring scheme to assess drawdown responses while pumping the well. Additional monitoring is also proposed for outlying watersheds.