

Exemplary Ecosystem Initiative Application

Madera Pools Restoration and Mitigation Site



Madera County, California. The Madera Pools project restored, enhanced, and created vernal pool habitat to establish a multiple project mitigation site for impacts to vernal pools from Caltrans road construction projects. Mitigation that was once segmented across different projects is now centralized in one mitigation site for Caltrans' impacts to vernal pool habitat in Madera, Fresno, and Kings Counties in California's Central San Joaquin Valley. This project is one of the first of its kind at Caltrans. The project has resulted in a significant cost savings to the state in the implementation of environmental mitigation. It is an innovative example of successful collaboration between Caltrans, the Federal Highway Administration, the California Department of Fish and Game, and other permitting agencies and organizations. It is a model of functional efficiency; consolidating resources for maximum ecological gain with long-term sustainability.

Background and History

Several species associated with vernal pools are protected by the Federal Endangered Species Act. Listed species such as vernal pool fairy shrimp (*Branchinecta lynchi*), California tiger salamander (*Ambystoma californiense*), and San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*) occur in vernal pool habitat, seasonal depressions, roadside ditches and other areas that tend to pond water in the Central San Joaquin Valley.

Prior to the completion of this project, road construction projects that required mitigation for vernal pool impacts often involved purchasing additional right of way or constructing habitat restoration near each isolated project location. While this method was successful at meeting the goal of impact mitigation, it produced segmented, discontinuous habitat, resulting in biological setbacks. The ideal habitat for these species is clustered and continuous as it occurs naturally.

In addition to the biological setbacks, this impact mitigation methodology was also expensive and consumed a large amount of resources for acquiring land, construction, and monitoring of the individual mitigation sites. Mitigation opportunities for the disturbance of vernal pool habitat are limited and require Caltrans Environmental staff to invest substantial time negotiating and securing preservation agreements with land owners and regulatory staff for each individual impact. While private vernal pool mitigation banks have become available statewide, their availability in the Central Valley has been limited and remains an expensive option.

Compatibility with and Enhancement of the Environment

The Madera Pools project, located on approximately 198 acres, included:

- *Connecting* all restored, enhanced, and created vernal swales and pools to existing vernal swales;
- *Re-contouring* degraded vernal pools, vernal swales, seasonal pools, and seasonal swales;
- *Collecting* dry vegetation material from project site enhanced pools during the dry-season for use as inoculum in the restored, enhanced, and created wetlands.

Innovative Design and Construction

Design and construction of the vernal pools site required meticulous earthwork, at times removing only inches of soil from the surface to create specific landforms conducive to vernal pool habitat. In order to

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ensure successful habitat creation Caltrans hired a consulting firm that specializes in wetland restoration. The consulting company provided essential guidance from the early planning stages of the project through the design phase to produce a final product that would be successful in providing habitat to the listed species. During construction, the consultant continued to work closely with Caltrans staff and the contractor to provide guidance on surveying and earth movement. Overall, the teamwork between all participants during this project was the linchpin to its success.

Conservation of Natural Resources

Under a collaborative effort with the California Department of Fish and Game (DFG), California State University Fresno, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service the Madera Pools project provides a bank of credits toward mitigation of habitat for listed species associated with vernal pools of California's Central Valley. This mitigation bank will provide future conservation of natural resources. These credits can be used as mitigation toward current and future Caltrans projects in Madera, Fresno, and Kings Counties. This project was one of the first of its kind at Caltrans. It established a multiple project mitigation site for the purpose of providing compensatory mitigation for vernal pool impacts from future Caltrans road projects.



Photo 1 - Aerial view of vernal pools ten months after construction

Functional Efficiency

The functional efficiency of the project was greatly enhanced by centralizing vernal pool mitigation efforts into one large parcel mitigation site. Combining these costs by creating multiple wetlands on one parcel that can be monitored uniformly has saved significant resources for Caltrans. The project has resulted in:

- Significant savings in staffing resources;
- An increase of approximately 12 acres of vernal pool habitat and 181 acres of upland habitat for California tiger salamander;
- Advanced preservation of approximately 5 acres of high quality vernal pools;
- Listed species have greater populations than preconstruction conditions;
- More biologically beneficial conditions for long-term habitat success;
- Inquiries from other agencies and municipalities in the establishment of mitigation banks for impacts related to their activities.

Cost Benefit Ratio

The biological mitigation associated with this project has resulted in a 290% increase in property value. This cost-benefit ratio was derived from comparing the current market value of the property to the initial

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cost of acquiring the land, and including the following current average rates for creation credits and preservation as shown below:

\$250,000/acre for vernal pool creation credits,

\$120,000/acre for vernal pool preservation,

\$15,000/acre for upland habitat for California tiger salamander.

Maintenance and Operational Factors

The project site requires minimal long and short-term maintenance efforts by Caltrans. Because it is an area of environmental mitigation, the site is monitored for presence of species and sequestered to evolve into a naturalized, sustainable habitat. Following the 5-year monitoring and maintenance period, the Madera Pools will be relinquished to the DFG for periodic monitoring and maintenance as necessary.



Photo 2 - Madera Pools site during a storm event

Visual Appeal and Quality of User Experience

The project site harmoniously blends in with the surrounding undeveloped land and provides an area of open space for future generations to enjoy. An important aspect of the project was to ensure that the highway user has dynamic vistas and views of the adjacent Sierra Mountains.

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Project Location Map

