

Report of the Independent Peer Review Panel

Groundwater Management, Monitoring, and Mitigation Plan (GMMMP) For The Cadiz Valley Groundwater Conservation, Recovery And Storage Project

San Bernardino County, California

Presentation to:



FENNER VALLEY
WATER AUTHORITY

February 28, 2019

Review Prepared For



Panel Members

- Anthony Brown, **aquilogic**
- Mark Wildermuth, **Wildermuth Environmental**
- Dave Romero, **Balleau Groundwater**
- Tim Parker, **Parker Groundwater**

Panel Objectives

- Was the GMMMP sufficient to ensure that the proposed pumping at the Cadiz Project would not result in Potential Significant Adverse Impacts to Critical Resources (“Undesirable Results”) that could not be effectively mitigated
- Assess whether the GMMMP:
 - Provided sufficient management and monitoring to identify any Undesirable Results
 - Provided effective Corrective Measures (i.e., mitigation) to address any Undesirable Results that do occur
- Where deemed necessary, provide recommendations for additional monitoring and mitigation and additional work to improve the overall understanding of the hydrology of the Cadiz Project area

Critical Resources

- Six Critical Resources were identified in the GMMMP :
 1. Basin Aquifers
 2. Springs within the Fenner Watershed
 3. Brine Resources at Bristol and Cadiz dry lakes
 4. Air Quality
 5. Project Area Vegetation
 6. Colorado River and its Tributary Sources of Water

Overall Conclusions

- The monitoring in the GMMMP is appropriate to identify potential Undesirable Results
- The monitoring thresholds that trigger mitigation are appropriate
- Together, the monitoring and trigger thresholds are protective of Critical Resources
- The overall adaptive management approach is appropriate
- The mitigation in the GMMMP is practical and appropriate
- While the GMMMP is appropriate, the Panel has provided complementary recommendations to supplement the GMMMP in an effort to address any remaining doubt as to whether the Project can avoid or mitigate Undesirable Results

Intent of Recommendations

- The Panel has recommended a number of complementary additions that could be made to the GMMMP, if feasible
- Recommendations are intended to allay any concerns that opponents to the Cadiz Project may still have, improve public confidence in the Cadiz Project, and are provided in an abundance of caution
- The recommendations are not intended to alter the analyses or findings regarding the environmental impacts of the Cadiz Project described in the FEIR, or contain any significant new information
- None of the recommendations are associated with a failure of the GMMMP to provide sufficient management, monitoring, and mitigation of Undesirable Results

Focus of Recommendations

- Identifying and quantifying any Undesirable Results
- Further assessing the degree of hydraulic connection, if any, between Bonanza Spring and the alluvial aquifer in Fenner Valley below
- Monitoring brine water conditions beneath Bristol and Cadiz dry lakes
- Mapping the migration of the saline-fresh water interface over time
- Identifying changes in vegetation in riparian habitats below springs
- Evaluating the cause of any impacts (e.g., the proposed pumping at the Cadiz Project, climatic conditions, other factors)
- Determining the type, nature, magnitude, and duration of Corrective Measures that could be implemented
- Assessing the effects of any implemented mitigation

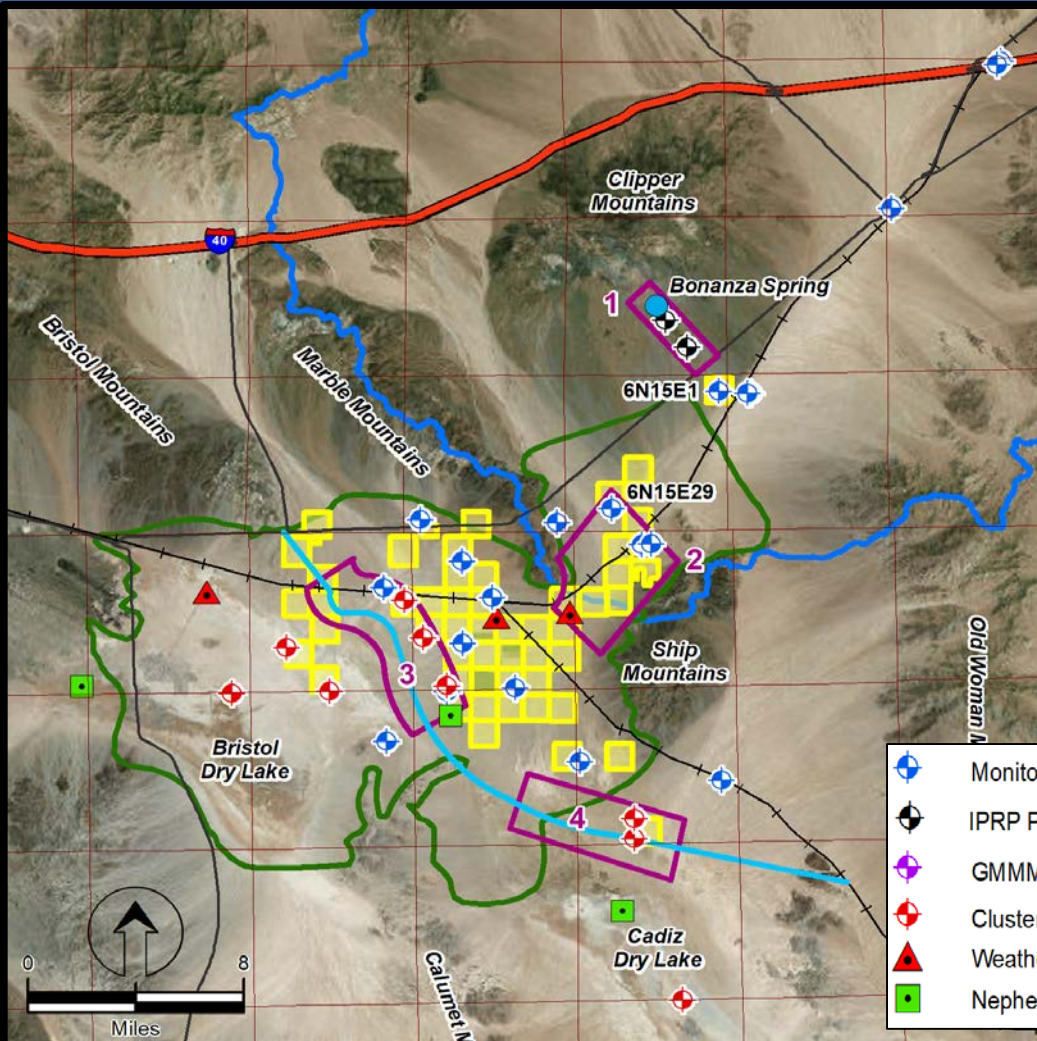
Recommendations

1. Detailed Plans
 - monitoring plan, QAPP, DMS, repository
2. Geological Understanding
 - geophysics at Bonanza Spring and Fenner Gap
3. Hydrogeologic Understanding
 - monitoring wells at Bonanza Spring
4. Weather Conditions
 - rain-gauge at Bonanza Spring
5. Spring Monitoring
 - transducer at springs

Recommendations

6. Vegetation Monitoring
 - detailed mapping at springs
7. Groundwater Monitoring
 - higher frequency monitoring
8. Third-Party Wells
 - higher frequency monitoring
9. Saline Migration
 - geophysics
10. Subsidence
 - increased InSAR analysis
11. Groundwater Modeling
 - defined updates and recalibration

Geophysics and Monitoring Wells



- | | | | |
|--|---------------------------------|--|---|
| | Monitoring Wells | | Springs |
| | IPRP Proposed Monitoring Wells | | Cadiz-Owned Properties |
| | GMMMP Proposed Monitoring Wells | | Limits of Maximum Projected 20ft Drawdown |
| | Cluster Wells | | Current Saline/Freshwater Interface |
| | Weather Stations | | IPRP Proposed Geophysical Surveys |
| | Nephelometers | | Fenner Watershed |
| | | | Railroad Lines |

Additional Mitigation Options

12. Several additional mitigation options should be evaluated

- Bonanza Spring – The injection of water at the edge of the alluvial aquifer to “cut-off” the propagation of the cone of depression
- Bonanza Spring – The injection of water into water-bearing fractures above Bonanza Spring to maintain groundwater levels
- Bonanza Spring – the temporary provision of water for flow and habitat maintenance (e.g., a water tank and pipe to the spring head)
- Brine Resources – the injection of water at the saline-fresh water interface to “cut-off” the propagation of the cone of depression beyond the injection area (this injection could also halt the migration of the saline-fresh water interface)
- Air quality – the spraying of water on areas prone to dust generation

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