

Appendix 2 – Monitoring and Mitigation Plan

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Monitoring and Mitigation Plan For San Luis Water District's Exchange of Groundwater from Modesto Properties for Refuge Level 2 Water

WATER QUALITY MONITORING

In an effort to minimize ambient surface water quality degradation associated with the San Luis Water District (District) exchange of groundwater for Level 2 refuge water supplies, water quality monitoring will consist of both surface and groundwater quality monitoring. Additionally, this groundwater exchange will provide refuge Incremental Level 4 water supplies to South of Delta Refuges. The District, in collaboration with Modesto Properties, will be responsible for implementing this Monitoring and Mitigation Plan (Plan).

Surface water quality monitoring will consist of instantaneous sampling (grab samples). Monitoring will include sampling water in Bear Creek from a location upstream of the discharge points to determine the background constituent concentrations, a location downstream of the discharge points, and at each wellhead. Additionally flow meters at each of the outlets will characterize amount of water being released in cubic-feet per second and total flow in acre-feet. Data will be recorded and included in the District's monthly reports to the Bureau of Reclamation (Reclamation) in conjunction with monthly wellhead meter readings. Instantaneous water quality monitoring will be accomplished through grab sample analysis of the ambient surface water quality upstream and downstream of the discharge points as well as the groundwater quality at the wellhead. The upstream, downstream and wellhead water will be sampled and analyzed (EC, pH, and temperature) by San Luis Water District (District) or their contractor on a weekly basis during the well operational period and recorded in a weekly log.

Grab samples will also be collected at the discharge points, upstream of the discharge points, downstream of the discharge points (where the input of the delivered well water is mixed with the receiving water), and at each wellhead on a monthly basis and analyzed for selenium, boron, and Total Dissolved Solids (TDS) concentrations by a Reclamation approved laboratory. The Reclamation-approved lab used to analyze selenium will provide a maximum reporting limit (RL) of 0.4 micrograms per liter ($\mu\text{g/L}$). Boron analysis requires a maximum RL of 0.01 mg/L and TDS a maximum RL of 10 milligrams per liter (mg/L). Physical measurements of EC, temperature and pH will be completed in the field using calibrated field instruments.

If the water quality data indicates that the use of a well(s) may adversely impact water quality, the mitigation measures described later in this Plan (and incorporated into the Proposed Action) will be implemented. If groundwater is found to contain constituent concentrations above the Central Valley Regional Water Quality Control Board's (CVRWQCB) surface water thresholds, the well production rate will be reduced and/or discharge rate into Bear Creek curtailed for purposes of the Proposed Action until flow conditions improve and water quality objectives can be achieved. The mitigation measures below will ensure that the groundwater supply developed during this Proposed Action will not significantly adversely impact surface water quality. If the monitoring indicates that threshold values are exceeded, mitigation measures will be implemented within 24 hours of identifying an exceedance.

Water Quality Threshold and Reporting Limits – Laboratory Analysis

Analyte	Water Quality Goal (Threshold Value)	Maximum RL
Boron (mg/L)	Not to exceed 4 mg/L in conveyance	.01 mg/L
TDS (mg/L)	Maximum 200 mg/L increase from upstream to downstream of discharge points	10 mg/L
Selenium (µg/L)	Not to exceed 2 µg/L in conveyance/not to exceed 5µg/L at the wellhead	0.4 µg/L

Water Quality Monitoring and Sampling Schedule

Location	Sample Frequency				
	EC, Temp, pH	FLOW	SELENIUM	BORON	TDS
Upstream	Weekly		Monthly	Monthly	Monthly
Wellhead	Weekly	Continuous	Monthly	Monthly	Monthly
Downstream	Weekly		Monthly	Monthly	Monthly
Discharge Point	Weekly	Continuous	Monthly	Monthly	Monthly

Water Quality Mitigation Measures

For the EBCU to accept water from any of the project wells triggering the exchange of water the following water quality characteristics must not be exceeded

- Maximum of 5.0 µg/L for selenium at each wellhead

The District, in cooperation with Modesto Properties, will modify or cease operations under this Proposed Action until flow conditions improve if any of the following downstream water quality thresholds are exceeded:

- Maximum increase of 200 mg/L TDS upstream to downstream of discharge points in Bear Creek
- Maximum of 2.0 µg/L for selenium downstream of discharge points in Bear Creek
- Maximum of 4.0 mg/L for boron downstream of discharge points in Bear Creek

In the event that the water from any of the discharge points from Modesto Properties increase TDS levels in Bear Creek downstream by more than 200 mg/L, the discharge rate will be reduced or operation curtailed for Proposed Action purposes until flow conditions improve and downstream water quality objectives can be achieved.

Modesto Properties has quantified flow conditions required to meet downstream water quality objectives for each of the wells based on individual wellhead water quality sampling data.

Each well and discharge point into Bear Creek, as it is operated for Proposed Action purposes, will be monitored for selenium, boron, TDS, EC and flow. Flow will be measured by a flow meter capable of recording instantaneous flow in cubic-feet per second and total flow in acre-feet.

The groundwater delivered to Bear Creek will be a blend of groundwater produced by all Project wells. This groundwater will blend with existing surface water flowing in Bear Creek. Monitoring of downstream locations will determine the combined flow and chemistry of the blended water. The sites shall be adequate distance from the well discharges to assure proper blending for grab sample collection. All water quality data will be kept at the District's Office. As soon as practical (generally within 7 days of the District's receipt of information from the water quality testing laboratory), the District will ensure that Reclamation receives electronic copies of the complete data reports submitted by the laboratory. The District, in cooperation with Modesto Properties, will also provide a monthly water quality summary report, including volumetric data on wellhead production, within 60 days of sample collection.

GROUNDWATER LEVEL MONITORING

In an effort to minimize any potential significant impact on groundwater aquifers associated with the development of groundwater as part of this Proposed Action, groundwater levels will be measured prior to pump operation for the Proposed Action using an electronic water level meter referenced to GPS coordinates and elevation at each wellhead. Subsequently, well drawdown related to the operation of each well will be measured in the middle of the proposed pumping period, and at the end of the pumping period prior to well shutdown. Groundwater recovery will be measured approximately 24 hours after pump shutoff. Groundwater level data will be recorded and provided to Reclamation with 30 days of completion of Proposed Action. If the mid-pumping period groundwater level data indicates a significant decline in groundwater levels in the vicinity of the proposed wells, different from the levels of decline typically seen during operation of Modesto Properties' wells, and if any such decline is not directly attributable to a cause other than the operation of the proposed wells during the Proposed Action pumping period, the District, in cooperation with Modesto Properties, will modify or terminate pumping associated with this Proposed Action to avoid any significant adverse groundwater impacts. The District, in cooperation with Modesto Properties, will take all measures necessary to avoid third party well impacts.

LAND SUBSIDENCE MONITORING

Reclamation's San Joaquin River Restoration Program monitors land subsidence in the Merced subbasin. Five of the seven groundwater wells utilized for the Proposed Action pump from the intermediate zone, above the Corcoran Clay. Two of the wells pump groundwater from both above and below the Corcoran Clay, thus the groundwater within these wells is a blend of the two sources. These two wells, however, will only be used as secondary supply to maintain a discharge rate of at least 10 cfs into Bear Creek in order to maintain water deliveries to the EBCU's pumping plant. Although land subsidence has been measured within the Merced Subbasin, most of it has occurred south of Modesto Properties and has been associated with pumping from the lower zone, beneath the Corcoran Clay. Reclamation and the District will review results of land subsidence monitoring programs in the area and collaborate to the extent practical to mitigate problems associated with land subsidence attributable to the Proposed Action.