Chapter 8 Groundwater Resources

8.1 Introduction

This chapter describes the environmental setting, methods of analysis, and impact analysis for groundwater resources (including groundwater quality) that would potentially be affected by the construction and operation of the Project. Groundwater resources are defined as groundwater aquifer systems, including groundwater infrastructure (i.e., existing groundwater wells and their distribution facilities in the vicinity of the Project). The study area for groundwater resources consists of the groundwater basins and subbasins that could be directly affected by construction and operation of Project facilities. Tables 8-1a and 8-1b summarize the CEQA determinations and NEPA conclusions for construction and operation impacts, respectively, between alternatives.

Table 8-1a. Summary of Construction Impacts between Alternatives

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Impact GW-1: Violation of water quality standards or waste discharge requirements or otherwise substantial degradation of groundwater quality			
No Project	NI/NE	-	NI/NE
Alternative 1	LTS/NE	-	LTS/NE
Alternative 2	LTS/NE	-	LTS/NE
Alternative 3	LTS/NE	-	LTS/NE
Impact GW-2: Substantial decrease in groundwater supplies or substantial interference with groundwater recharge			
No Project	NI/NE	-	NI/NE
Alternative 1	LTS/NE	-	LTS/NE
Alternative 2	LTS/NE	-	LTS/NE
Alternative 3	LTS/NE	-	LTS/NE
Impact GW-3: Conflict with or obstruct implementation of a sustainable groundwater management plan			
No Project	NI/NE	-	NI/NE
Alternative 1	LTS/NE	-	LTS/NE
Alternative 2	LTS/NE	-	LTS/NE
Alternative 3	LTS/NE	-	LTS/NE

Notes:
NI = CEQA no impact
LTS = CEQA less-than-significant impact
NE = NEPA no effect or no adverse effect

Table 8-1b. Summary of Operation Impacts between Alternatives

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Impact GW-1: Violation of water quality standards or waste discharge requirements or otherwise substantial degradation of groundwater quality			
No Project	NI/NE	-	NI/NE
Alternative 1	LTS/B	-	LTS/B
Alternative 2	LTS/B	-	LTS/B
Alternative 3	LTS/B	-	LTS/B
Impact GW-2: Substantial decrease in groundwater supplies or substantial interference with groundwater recharge			
No Project	NI/NE	-	NI/NE
Alternative 1	LTS/B	-	LTS/B
Alternative 2	LTS/B	-	LTS/B
Alternative 3	LTS/B	-	LTS/B
Impact GW-3: Conflict with or obstruct implementation of a sustainable groundwater management plan			
No Project	NI/NE	-	NI/NE
Alternative 1	LTS/NE	-	LTS/NE
Alternative 2	LTS/NE	-	LTS/NE
Alternative 3	LTS/NE	-	LTS/NE

Notes:
NI = CEQA no impact
LTS = CEQA less-than-significant impact
B = NEPA beneficial effects
NE = NEPA no effect or no adverse effect

8.2 Environmental Setting

This section summarizes the existing conditions for groundwater resources in the study area which consists of the Funks Creek and Antelope Creek groundwater basins, and the Red Bluff, Colusa, and Yolo Subbasins of the Sacramento Valley Groundwater Basin (Figure 8-1). Table 8-2 shows the alternative component/facility and corresponding groundwater basin or subbasin, regulatory agency, depth to basin aquifer, and total annual groundwater use. A detailed description of the existing conditions in the study area is provided in Appendix 8A, *Groundwater Resources Basin Setting*.

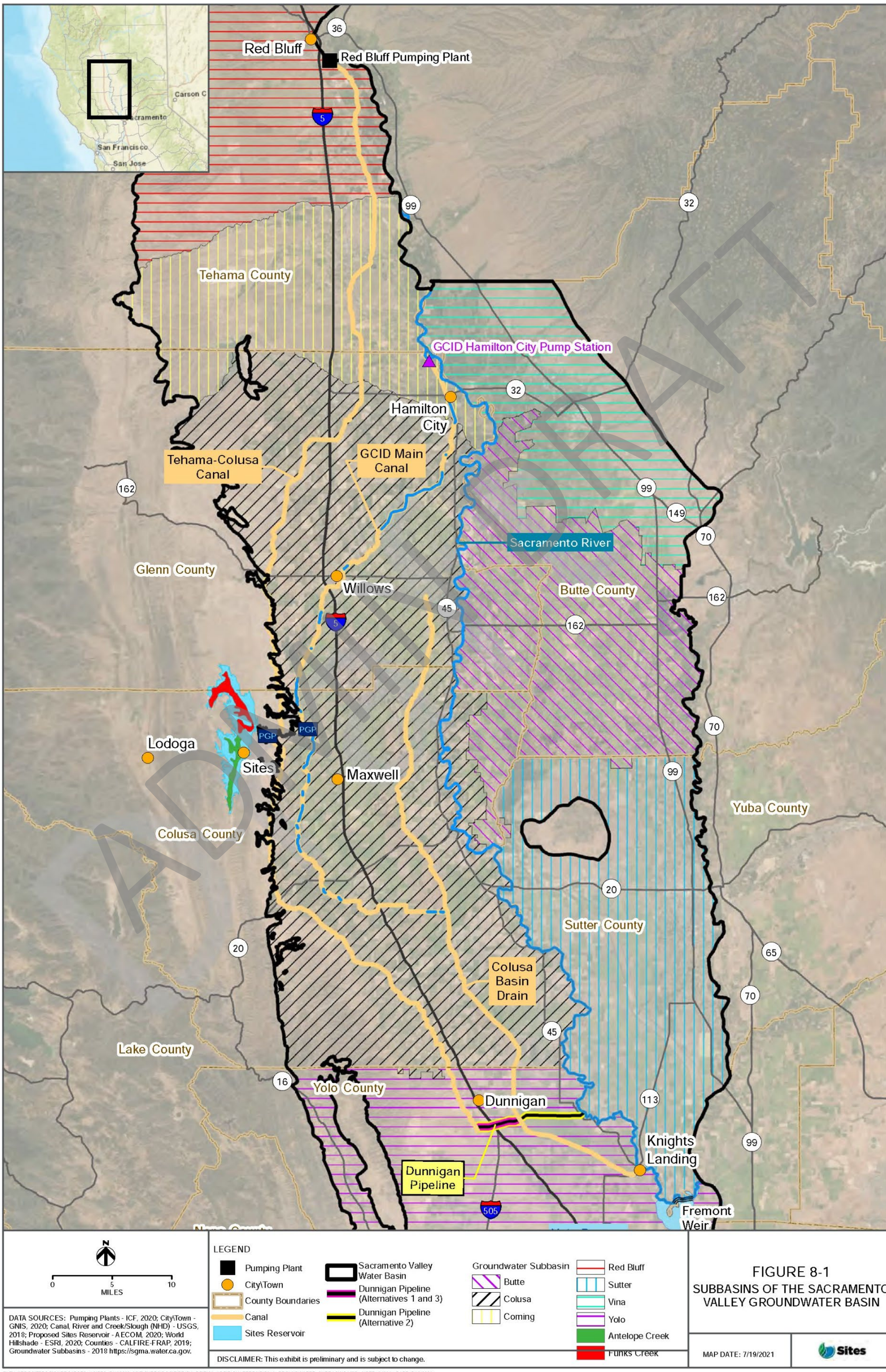

FIGURE 8-1
SUBBASINS OF THE SACRAMENTO VALLEY GROUNDWATER BASIN

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Table 8-2. Summary of Groundwater Resources in the Study Area

Alternative Component/Facility	Groundwater Basin or Subbasin	Regulating Agency	Groundwater Basin Depth [a] (feet bgs)	Groundwater Basin Surface Area [b] (Acres)	Local Groundwater Infrastructure and Use [c, d]				Groundwater Quality [c, e, f]	
					Well Type	Well Depth (feet bgs)	Depth to Shallow Groundwater (feet bgs)	Yield (gpm)	Specific Conductance (µS/cm)	Primary MCL Exceedances
Sites Reservoir and adjacent roads Recreation Areas	Funks Creek and Antelope Creek Basins	Glenn and Colusa Counties	100	5,054	15 Domestic 15 Stock	100 to 201	1 to 30	0 to 60	680 to 2,190	None
RBPP and TC Canal Diversion	Red Bluff Subbasin	Groundwater Sustainable Agency of Tehama County	200	271,794	32 Domestic 9 Irrigation 5 Production 3 Public Use	45 to 600	55	20 to 2,080	158 to 707	None
TRR East and West, TRR East and West Pipelines	Colusa Subbasin	Colusa Groundwater and Glenn Groundwater Authorities	200	723,824	17 Domestic 3 Irrigation	70 to 400	4 to 20	70 to 200	444 to 1,104	None
Administration and Operations Building, Maintenance and Storage Building, Funks Reservoir, and Transition Manifold	Colusa Subbasin	Colusa Groundwater and Glenn Groundwater Authorities	200	723,824	20 Domestic 2 Stock 3 Industrial	22 to 440	15 to 207	3 to 75	–	Arsenic
SD1,2,3-Z3 Quarry 2, GG-Z3 Quarry 2, and Sites-Z3 Quarry	Colusa Subbasin	Colusa Groundwater and Glenn Groundwater Authorities	200	723,824	10 Domestic 2 Industrial	28 to 300	–	2 to 50	–	None
CBD Outlet, Sacramento River Discharge, Dunnigan Pipeline	Yolo Subbasin	Yolo Subbasin Groundwater Agency	20 to 420	540,693	20 Domestic 65 Irrigation 1 Stock 2 Industrial 2 Public Use	51 to 1,000	20 to 293	4 to 5,467	361 to 781	Total Dissolved Solids Nitrates

Table Notes:
a = California Department of Water Resources 2020a
b = California Department of Water Resources 2019
c = based on a 1-mile radius from Alternative Component/Facility
d = California Department of Water Resources 2020b
e = California Water Boards 2020
f= California Department of Water Resources 2007
– = No data
bgs = below ground surface
gpm = gallons per minute
MCL = Maximum Contaminant Level
µS/cm = microsiemens per centimeter

8.3 Methods of Analysis

Data, published reports, modeling results, and best professional judgement were used to identify and evaluate the potential impacts on groundwater resources from Project implementation. The groundwater quality impact analysis focuses on Project construction and operation activities that have the potential to substantially degrade groundwater quality. The impact analysis considers potential violations of groundwater quality standards and evaluates wastewater discharge effects that may occur from Project construction and operations. The BMPs described in Appendix 2D, *Best Management Practices, Management Plans, and Technical Studies*, are incorporated into the analysis of potential Project construction and operations impacts on groundwater resources. The BMPs incorporated are:

- BMP-5, Decommissioning of Natural Gas Wells, requires following state regulations when decommissioning or plugging a gas well, including compliance with plugging guidelines.
- BMP-6, Decommissioning of Water Wells, requires following local regulations when decommissioning water wells to appropriately fill and seal wells.
- BMP-9, Siting and Design of Onsite Wastewater Disposal Systems, design wastewater system at the administration and operations building to overcome limiting soil and groundwater conditions.
- BMP-11, Management of Dredged Material, determine the suitability of dredged material for beneficial use and compliance with water quality standards.
- BMP-14, Obtainment of Permit Coverage and Compliance with Requirements of Central Valley Regional Water Quality Control Board Order R5-2022-0006 (National Pollutant Discharge Elimination System No. CAG995002 for Limited Threat Discharges to Surface Water) and State Water Resource Control Board Order 2003-0003-003-DWQ (Statewide General Waste Discharge Requirements For Discharges To Land With A Low Threat To Water Quality), sets water quality requirements for pumped groundwater discharged into surface waters or onto land, respectively.
- BMP-15, Performance of Site-Specific Drainage Evaluations, Design, and Implementation, requires evaluation of local drainage features during final Project design and incorporation of necessary design features (e.g., low impact development practices, bioswales, infiltration basins) to result in equivalent functioning of existing drainage system.

Impacts associated with accidental spills and releases of hazardous materials, which could affect groundwater quality, are discussed in Chapter 27, *Public Health and Environmental Hazards*. BMPs associated with minimizing accidental spills and releases of hazardous materials include BMP-30, Development and Implementation of Hazardous Materials Management Plans, and BMP-13, Development and Implementation of Spill Prevention and Hazardous Materials Management/Accidental Spill Prevention, Containment, and Countermeasure Plans (SPCCPs) and Response Measures.

8.3.1. Construction

Construction activities, such as dewatering and groundwater use, have the potential to affect groundwater resources. Dewatering would occur during excavation for Sites Reservoir, quarrying, GCID system upgrades, road construction and improvements, pipeline and transition manifold installation, and Funks Reservoir dredging. Groundwater would be required for uses such as moisture conditioning of fill materials, batching concrete, grouting, and dust suppression for haul roads, stockpiles, disposal areas, quarries, and borrow areas. The potential impacts of construction-related dewatering on groundwater resources are evaluated qualitatively based on the number and location of wells that may be affected by construction activities. The potential impacts of groundwater use during Project construction were evaluated qualitatively. Groundwater use for construction of the Project is summarized in Table 5-33. For the purposes of the groundwater analysis, 1,000,000 gallons per day of groundwater for 365 days over the period of construction was assumed for the Sites Reservoir complex. This assumption provides a conservative evaluation of construction impacts on groundwater in the study area because actual use is likely to be less than this total volume.

8.3.2. Operation

The administration and operations building and the maintenance and storage building would use groundwater from new or established wells during operations. It is estimated the administration and operations building would require roughly 61,000 gallons of water per year, while the maintenance and storage building would use approximately 25,000 gallons of water per year (Chapter 26, *Public Services and Utilities*). Operations have the potential to affect groundwater resources by altering groundwater quality, groundwater recharge, groundwater/surface water interaction, and groundwater flow direction and volume. The potential impacts on groundwater resources from operation of the Project were analyzed using publicly available data, modeling results, and operation practices (Appendix 8B, *Groundwater Modeling*).

Potential variations in groundwater flow direction were evaluated to determine if Project operations would result in the migration of lower quality groundwater into areas of higher quality groundwater. Existing groundwater quality conditions were compared to existing surface water quality to determine infiltration effects from Project conveyance systems and reservoirs.

Surface water and groundwater systems are connected within the Sacramento Valley Groundwater Basin and are highly variable spatially and temporally. In general, the Sacramento and Feather Rivers act as drains and are recharged by groundwater throughout most of the year, except for areas of depressed groundwater elevations attributable to groundwater pumping (inducing leakage from the rivers) and localized recharge to the groundwater system. Project operations would change current surface water management and could affect groundwater/surface water interaction.

A CALSIM II surface water routing model and Central Valley Hydrologic Model (CVHM) were used to determine potential impacts on groundwater resources from Project operations. The CALSIM II model determined how much water would need to be diverted to fill and maintain Sites Reservoir assuming a reservoir capacity of 1.8 MAF. While this modeled reservoir capacity is greater than the reservoir capacities proposed under Alternative 1 or 3 (1.5 MAF) and Alternative 2 (1.3 MAF), groundwater modeling results used to evaluate effects on groundwater resources are valid for Alternatives 1, 2, and 3. First, the incremental groundwater effects associated with the Project operations as simulated for the 1.8 MAF reservoir model run are unlikely to be materially affected by changes in hydrological conditions under the No Project Alternative. Second, the models used represent a highly conservative (i.e., beyond-worst-case condition) for evaluating effects on groundwater/surface water interaction because Alternatives 1, 2, and 3 have smaller reservoir sizes.

In addition, the CALSIM II simulation was also used as input to the CVHM groundwater model to ascertain changes to groundwater/surface water interaction at the TC Canal and GCID Main Canal diversions from operations over the life of the Project. The CVHM model utilized historical groundwater conditions from April 1961 through September 2003 for the simulation. The CVHM model results presented changes in groundwater levels at 4.2 years, 24.8 years, and 39.2 years near the points of diversion, as well as between 7 and 12 miles downstream. Changes to surface and groundwater exchange at the TC Canal and GCID Main Canal diversions over the life of the Project were also simulated and included in model results (Appendix 8B, *Groundwater Modeling*).

A SACFEM$_{2013}$ model was used to determine the potential impacts of long-term reservoir seepage on groundwater levels near Sites Reservoir. Similar to the above discussion, the model assumed a larger reservoir capacity of 1.8 MAF with an associated seepage rate of 2,150 gallons per minute and that the reservoir was filled to the maximum capacity over the life of the Project. Because this reservoir size and seepage rate would be greater than those conditions under Alternatives 1 and 3 (1.5 MAF) and Alternative 2 (1.3 MAF), the model is highly conservative for evaluating seepage effects on groundwater levels near Sites Reservoir from Project operations. The analysis compared groundwater levels from the modeled 1.8-MAF reservoir capacity seepage against historic conditions over 17 years (Water Year 1970 to Water Year 1985; Figure 10A-1 in Appendix 8B).

The SACFEM$_{2013}$ model was also used to assess the potential impacts on groundwater recharge within the TRR East complex from seepage. TRR East and West would be constructed using a liner system to prevent seepage; the liner may reduce surface water infiltration and could affect groundwater recharge in the area. The model determined average hydrological conditions using Water Year 2005 that were utilized to estimate existing deep percolation from precipitation in TRR East (Sites Project Authority and Bureau of Reclamation 2017). Impacts on groundwater recharge from the TRR West liner were qualitatively analyzed using the Water Year 2005 annual precipitation to determine possible changes at the local and landscape scale.

8.3.2.1. Implementation of the Sustainable Groundwater Management Act

Project construction, operation, and maintenance may affect the implementation of the Sustainable Groundwater Management Act (SGMA) by conflicting with or impeding local Groundwater Sustainability Plans (GSPs). Counties which have medium- or high-priority groundwater basins, as designated under the SGMA, are required to draft a GSP with the goal of having a sustainable groundwater aquifer within 20 years after plan adoption and implementation (further details regarding SGMA are in Appendix 4A, *Regulatory Requirements*). The Colusa and Yolo Subbasins have been designated as high priority and are regulated by the Colusa Groundwater Authority (CGA), Glenn Groundwater Authority, and the Yolo County Flood

Control and Water Conservation District. The Red Bluff Subbasin is designated as a medium-priority subbasin and regulated by Groundwater Sustainable Agency of Tehama County. Red Bluff, Colusa, and Yolo Counties have developed GSPs containing measurable objectives, minimum thresholds, defined undesirable results, and project management actions to achieve the overall goals of the SGMA (GEI Consultants, Inc. 2022; Davids Engineering, Inc. et al. 2021; Luhdorff & Scalmanini Consulting Engineers 2022). This analysis compares the Project effects on the overarching SGMA goals, as well as current county-specific GSPs (see Appendix 8A, *Groundwater Resources Basin Setting*, for further details).

8.3.3. Thresholds of Significance

An impact on groundwater resources (including groundwater quality) would be considered significant if the Project would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade groundwater quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin.
- Conflict with or obstruct implementation of a sustainable groundwater management plan.

8.4 Impact Analysis and Mitigation Measures

Impact GW-1: Violation of water quality standards or waste discharge requirements or otherwise substantial degradation of groundwater quality.

No Project

Existing conditions and the future No Project Alternative were assumed to be similar given the rural nature of the study area and limited potential for growth and development in Glenn and Colusa Counties. As a result, it is anticipated that the No Project Alternative would not entail material changes in groundwater conditions as compared to existing conditions. Under the No Project Alternative, the operations of the existing TC Canal, RBPP, and GCID Main Canal would continue. These facilities have not been shown to degrade or otherwise adversely affect groundwater within the Sacramento Valley Groundwater Basin. In addition, there is no known water quality contamination in the study area.

Significance Determination

The No Project Alternative would not result in a violation of water quality standards or waste discharge requirements or otherwise substantial degradation of water quality because no new facilities would be constructed and operated. There would be no impact/no effect.

Alternatives 1, 2, and 3

Many of the same Project facilities are included in Alternatives 1, 2, and 3. These facilities would involve the same types of construction methods and operation activities and would largely result in the same potential construction and operation impacts related to groundwater quality. The potential construction and operation impacts discussed below pertain to all Project alternatives unless otherwise stated.

Construction

The footprint of Alternatives 1 and 3 would differ from that of Alternative 2, but construction means and methods would be the same between these alternatives, resulting in the same effects related to groundwater quality.

Dewatering

Temporary dewatering would be required during construction for a variety of activities (e.g., during quarrying, installation of the Dunnigan Pipeline). Dewatering would not change the permeability of the ground surface where construction activities would occur. Therefore, dewatering would not affect groundwater quality during construction.

Temporary dewatering would be required for construction of the TRR East or TRR West pipelines and Funks pipelines leading to the I/O tunnel. In addition, dewatering would be required for the tunnel between the main reservoir and extension reservoir of TRR West. Pipes used to transport water during construction of the TRR East or TRR West may be buried several feet below ground at heavily trafficked intersections and require temporary dewatering. There is one groundwater well within 1 mile of these facilities with a Primary Maximum Containment Level exceedance for arsenic, and there is a low probability of arsenic affecting groundwater quality in the study area (California Water Boards 2020). Prior to construction, piezometers may be installed along Dunnigan Pipeline, near TRR East, and at Funks Reservoir to inform the volume and quality of shallow groundwater near Project facilities. An onsite water treatment facility, including a settling basin, would be located near the I/O Works. The facility would treat the pumped groundwater for oil/grease, settable solids, pH, and turbidity. This treated water would then be used for dust suppression or discharged into Funks Creek (Appendix 2C, Section 2.14, *Inlet/Outlet Works*). Groundwater discharged to surface waterbodies would comply with RWQCB Order No. R5-2022-0006 (BMP-14). No groundwater would be pumped directly into any surface waterbody (Chapter 6, *Surface Water Quality*). Groundwater encountered in other areas during dewatering would be stored on site in bermed areas or Baker tanks, as needed, and then utilized for dust suppression or applied to suitable land where it would infiltrate back into the water table. Groundwater discharged to land would comply with State Water Resource Control Board Order No. 2003-0003-003-DWQ (BMP-14). Potential contamination of groundwater from dewatering will be avoided through BMP-14. In addition, if groundwater contamination is suspected, water testing would be implemented prior to disposal as part of BMP-14. Based on the lack of extensive, documented groundwater contamination near the TRR East or TRR West pipelines, I/O Works, and Funks PGP, as well as the implementation of BMP-14, dewatering during construction of these facilities would not result in a violation of water quality standards or waste discharge requirements or otherwise substantially degrade groundwater quality.

Funks Reservoir would be dredged to restore its design capacity. Dredged material from Funks Reservoir would initially be stockpiled adjacent to the reservoir for dewatering and potential reuse or disposal. The requirements in BMP-11 for storage of dredged materials would be followed, including a chemical evaluation of Funks Reservoir water and sediment to identify any chemical contaminants and to help inform potential requirements for onsite water treatment. Onsite water treatment would likely include containment and dewatering facilities to avoid direct discharge of dredged material or effluent to surface waters. Groundwater quality would not be adversely affected due to BMPs discussed above, as well as reduced seepage and percolation since this is a temporary activity and soil permeability is low in the area.

Abandoned Wells or Septic Systems

There are approximately 26 wells, 10 existing plugged natural gas wells, and numerous septic systems located in the Sites Reservoir inundation area. There are approximately 20 groundwater wells and one plugged dry natural gas well within a 1-mile radius of the TRR East and TRR West, and their associated pipelines. Because natural gas wells are dry and previously plugged, there would be no effect on groundwater quality. Other water wells, septic systems, test wells, or boreholes may also be located along or adjacent to other Project facilities. All well types, boreholes, and septic systems would be located, identified, and decommissioned before or during construction to avoid possible groundwater contamination. There has been no reported groundwater contamination as a result of septic systems in the study area (Appendix 27A, *Environmental Records Search*). In accordance with BMP-6, the wells and borehole type and condition will be determined, with any obstructions identified. Wells and boreholes will then be filled with impermeable materials in accordance with county groundwater authority requirements to prevent contamination of groundwater by outside sources. With the implementation of BMP-6 and the lack of reported contamination from septic systems, groundwater quality would not be degraded or result in a violation of groundwater quality standards due to abandoned wells or septic systems in the study area.

Concrete Batch Plants and Onsite Water Treatment Plants

Three concrete batch plants would be used to construct the I/O Works, main dams and saddle dams, and diversions and would require groundwater use during operations. Due to variable water quality in the Antelope Creek and Funks Creek Basins, it is anticipated that groundwater used would meet water quality standards provided in ASTM C1602, *Standard Specifications for Mixing Water Used in Production of Hydraulic Cement Concrete*, prior to mixing concrete. To achieve ASTM C1602 water quality standards, groundwater may be filtered through a pressurized sand filter system to remove suspended solids. Water used for mixing concrete would not be discharged back into the environment, as it would be bound to the concrete. Therefore, groundwater used for concrete mixing would not violate water quality standards or otherwise degrade groundwater quality during construction.

Operation

Reservoirs

Despite the grouting of the underlying rock formations in some limited areas, water may leak from the inundation area and potentially affect groundwater quality in nearby areas. There would be a lower potential for this to occur for Alternative 2 compared to Alternatives 1 and 3 because it would have a smaller inundation area. Surface water from the Sacramento River, which would be used to fill the Sites Reservoir, has an electrical conductivity (EC) averaging 130 microsiemens per centimeter (µS/cm).[1] Though this salinity could increase due to water evaporating and increasing the concentration of salt in the remaining liquid, local creek discharges, and/or Salt Pond seeps, it should remain well below the current EC levels for groundwater quality of 680 to 2,190 µS/cm in the Sites Reservoir footprint. The weight of the reservoir could force additional percolation of surface water into the reservoir soils, resulting in higher quality surface water seeping into the reservoir floor and the shallow groundwater layer. This surface water would then alter the shallow groundwater chemistry in and immediately adjacent to the reservoir by reducing salinity.

Because Alternatives 1 and 3 have a larger surface water capacity than Alternative 2, these alternatives would potentially store more fresh water and result in more water weight on the reservoir floor, which could lead to more groundwater percolation and greater changes, or improvements, to shallow groundwater quality. The model results show minor changes to the extent of groundwater flow, which would result in minor groundwater freshening that would be primarily contained along the eastern margin of the Sites Reservoir.

TRR East or TRR West would be constructed with an ultraviolet-resistant polyvinylchloride or high-density polyethylene liner to minimize seepage over the reservoir footprint. Therefore, there would be no to limited interaction between the existing groundwater table and reservoir surface water resulting in a low likelihood that groundwater quality would be degraded or that water quality standards would be violated due to seepage in the TRR East or TRR West complex.

Salt Pond

A saline seep is present approximately 4 miles north of the community of Sites near the Salt Lake Fault. The saline seep, Salt Pond, is within the inundation area. Based on the geology and topography of the inundation area, surface water would percolate into the shallow aquifer under the reservoir floor, formed from alluvial deposits, and then flow to the west. Due to saline density the saline seep would stay near the bottom of the reservoir floor where it would mix with fresh water close to the Golden Gate Dam. Mixing with surface water would increase during periods of inflow from the bottom outlet of the I/O tower. During periods of low storage levels, 200 TAF of surface water, the annual volume of saline water from the Salt Pond, would be roughly 0.04% of the total volume in the reservoir (Impact WQ-2, *Sites Reservoir and Salt Pond*). Based on modeling (assumed a maximum reservoir capacity during the wettest simulated Water Year; see Section 8.3.2, *Operation*), groundwater elevation would increase along the western margin of the reservoir but would not result in any difference in the reservoir groundwater discharge area when compared to existing conditions. Fresh water would dilute the saline water column within or near the Salt Pond, improving water quality somewhat within that column as compared to the No Project Alternative. Groundwater would move laterally and be discharged in the same area as existing conditions (Appendix 8B, *Groundwater Modeling*). As mentioned above, groundwater near Sites Reservoir has higher salinity levels than are anticipated for reservoir surface water and as such the inundation area would not result in increasing salinity or decreasing groundwater quality.

[1] For water quality purposes, electrical conductivity is correlated to salinity because salt increases a solution's ability to conduct an electrical current (New South Wales Government Department of Primary Industries 2005).

Wastewater Collection or Disposal Systems

An onsite wastewater disposal system, which would include a septic tank or other alternative system, will be installed at the administration and operations building in accordance with BMP-9. The septic system will be sited and designed to avoid harmful contamination. Specifically, the final design of a septic system will involve soil testing, and, if needed, an alternative wastewater disposal system, such as a mound system or pressure dose system, will be implemented to overcome potential limiting soil and groundwater conditions. Therefore, the onsite wastewater disposal system at the Funks PGP administration and operations building would not result in a violation of wastewater discharge requirements or otherwise substantially degrade groundwater quality.

Vault toilets would be installed at all the recreation areas. These vault toilets would not include a leach field and would not dispose of wastewater on site. This wastewater would be pumped and transported offsite for treatment at a licensed facility and so would not result in a detrimental effect to groundwater resources or a violation of waste discharge requirements.

Recreation Areas

During operation of recreation areas, increased vehicle traffic and use of the recreation areas by recreationists could introduce contaminants (e.g., fuels, oils, and herbicides) which could enter the environment and subsequently compromise groundwater quality. Potential contamination of groundwater from hazardous materials via this route would be low due to the depth of the groundwater aquifer within the basin (100 feet below ground surface [bgs]). Therefore, increased vehicle traffic or use of recreation areas would not degrade groundwater quality or result in a violation of water quality standards.

CEQA Significance Determination and Mitigation Measures

Groundwater degradation from contaminants during dewatering would be unlikely due to depth to the groundwater aquifer within the study area. Abandoned wells would be decommissioned as described in BMP-6. Specifically, prior to well decommissioning, the condition and construction will be investigated with possible obstructions identified; all wells will be filled and sealed with suitable materials per County regulations that will protect the aquifer. There are no documented reports of contamination from septic tanks. Per the requirements of BMP-14, an onsite water treatment facility and settling basin will be utilized during dewatering for the I/O Works. The treatment facility will treat pumped groundwater for oil/grease, settable solids, pH, and turbidity prior to discharge. Pumped groundwater suspected of contamination will be tested prior to discharge in accordance with BMP-14. BMP-14 requires that groundwater that could be discharged to surface waterbodies or land will be compliant with the Requirements of RWQCB Order No. R5-2022-0006 and State Water Resource Control Board Order No. 2003-0003-003-DWQ, respectively. Implementation of these BMPs will ensure groundwater dewatering would not substantially degrade groundwater quality. There would be a less-than-significant impact on groundwater quality or violation of water quality standards during construction for Alternative 1, 2, or 3.

Sacramento River fresh water would alter the shallow groundwater chemistry in and immediately adjacent to the reservoir by reducing salinity, resulting in a less-than-significant impact from

Alternative 1, 2, or 3. Alternative 1 or 3 would have a greater impact as compared to Alternative 2 because these two alternatives have larger reservoir capacities. Because TRR East and TRR West would both have a liner to prevent groundwater/surface water interaction, they would have a less-than-significant impact on groundwater quality from Alternatives 1, 2, and 3.

Due to saline density of the Salt Pond, saline water would stay near the bottom of the reservoir floor where it would mix with fresh water close to the Golden Gate Dam. This fresh water would dilute the saline water column, improving water quality. Therefore, Alternatives 1, 2, and 3 would have a less-than-significant impact on groundwater quality when compared to existing conditions.

Administration building wastewater disposal systems would not contaminate groundwater and would be in compliance with county regulations under operating conditions. Wastewater from vault toilets in recreation areas would be pumped and treated offsite at a licensed facility. Hazardous materials from increased traffic and use of recreation areas would be unlikely to reach the basin aquifer because of the depth to the aquifer and the existing sediment layers and geology. Therefore, operation of these facilities under Alternative 1, 2, or 3 would not result in wastewater discharge violations and would have a less-than-significant impact on groundwater quality.

NEPA Conclusion

Construction and operation effects would be the same as those described above for CEQA. Construction of Alternatives 1, 2, and 3 would not result in wastewater discharge violations or cause substantial degradation of groundwater as compared to the No Project Alternative. Groundwater degradation from contaminants during dewatering would be unlikely due to depth to the groundwater aquifer within the study area, and abandoned wells would be decommissioned as described in BMP-6. Per the requirements of BMP-14, an onsite water treatment facility and settling basin will be utilized during dewatering for the I/O Works. Operation of Alternatives 1, 2, and 3 would not violate discharge standards or degrade groundwater quality as compared to the No Project Alternative. Sacramento River fresh water would alter the shallow groundwater chemistry in and immediately adjacent to the reservoir by reducing salinity as compared to the No Project Alternative. Administration building wastewater disposal systems would not contaminate groundwater and would be in compliance with county regulations under operating conditions. Wastewater from vault toilets in recreation areas would be pumped and treated offsite at a licensed facility. The effects of construction would not be adverse, and the effects of operation would be beneficial as a result of the potential to reduce salinity levels in the study area.

Impact GW-2: Substantial decrease in groundwater supplies or substantial interference with groundwater recharge that would impede sustainable groundwater management of the basin.

No Project

Under the No Project Alternative, the operations of the existing TC Canal, RBPP, and GCID Main Canal would continue. These facilities have been shown to act as a source of groundwater recharge within the Sacramento Valley Groundwater Basin that would continue under the No Project Alternative.

<u>*Significance Determination*</u>

The No Project Alternative would not result in a substantial decrease in groundwater supplies or substantial interference with groundwater recharge that would impede sustainable groundwater management of the groundwater basins and subbasins because no new facilities would be constructed and operated. There would be no impact/no effect.

Alternatives 1, 2, and 3

The footprint of Alternatives 1 and 3 would differ from that of Alternative 2, but construction means and methods would be the same between these alternatives, resulting in the same effects related to groundwater elevation or flow direction. The construction impacts discussed below pertain to Alternatives 1, 2, and 3 unless otherwise stated.

<u>*Construction*</u>

<u>Groundwater Use</u>

The average volume of construction water required for the Sites Reservoir complex, including adjacent roads and recreation areas, is estimated to be 750,000 to 1,000,000 gallons per day and would be supplied from existing or new groundwater wells over a period of 4.5 years (Table 5-33). Total groundwater volume data for Funks and Antelope Creek Basins are not available. Construction is not expected to deplete groundwater stores because the combined surface area of both basins indicates the corresponding aquifer and related groundwater volume is large enough to provide the required construction groundwater without substantial depletion to the aquifers (Table 8-2). In addition, use of groundwater from construction would be temporary. Over time, the water used during construction would be replaced. Groundwater recharge would come from the surface water in the inundation area infiltrating into the floor of the reservoir; surface water infiltration from runoff in nearby creeks such as Grapevine Creek, Funks Creek, and Antelope Creek; and from precipitation. Therefore, use of groundwater for the construction of the Sites Reservoir complex would not result in a substantial decrease in groundwater supplies or substantial interference with groundwater recharge in these basins.

Construction of the Dunnigan Pipeline would require approximately 20,000 to 30,000 gallons of water per day from existing wells or dewatering efforts (Table 5-33). The required daily construction use would be less than 1% of the 2018 groundwater pumped for total groundwater use within the Yolo County Subbasin (Table 8-2). The use of groundwater for the construction of the Dunnigan Pipeline would not result in a substantial decrease in groundwater supplies or substantial interference with groundwater recharge in this subbasin.

<u>Dewatering and Redirected Surface Water</u>

Temporary dewatering would be required during construction and could affect the surrounding groundwater levels. Dewatering practices will include the BMPs identified in Impact GW-1 and described in Appendix 2D.

Some of the GCID Main Canal would be dewatered during siphon improvements. This construction would occur during the regularly scheduled annual maintenance period for the canal and would not adversely affect groundwater flow directions or quality. Construction of the new GCID Main Canal head gate would not require temporary dewatering (Appendix 2C, *Construction Means, Methods, and Assumptions*). The GCID Main Canal system upgrades would have no impact on groundwater supplies or recharge when compared to existing conditions.

The flow of Stone Corral and Funks Creeks would be temporarily redirected and reduced during construction of the main dams. The redirection of creek flows and stormwater management measures may result in a minor reduction of groundwater recharge due to potentially altering the volume infiltration of surface water and potentially changing groundwater flow directions. However, it is anticipated that any reduced potential for groundwater recharge would not be at a rate that would affect surface water infiltration into groundwater aquifers or significantly change the existing deep percolation.

Three quarries located to the east of Sites Reservoir and two within the inundation area would be excavated to access aggregate material for dam construction. Quarries can disrupt the existing movement of surface water/groundwater exchange by interrupting the natural water recharge. In addition, groundwater flow can also be disrupted as quarry dewatering lowers the water table and changes groundwater flow direction (Green et al. 2003:216, Ekmekci 1990:4). After construction, quarries outside the inundation area would be decommissioned, graded to have positive drainage to quarry bottoms, and act as recharge areas upon construction completion.

Dredging Funks Reservoir would require dewatering that would result in a short-term reduction in groundwater levels and recharge in the nearby area. There are 25 wells located within 1 mile of Funks Reservoir with depths between 22 to 440 feet bgs and depths to water between 15 to 207 feet bgs. Temporary dewatering during construction would not affect these wells because the average well depth and total depth to water would be able to compensate for any reduction in nearby groundwater levels. In addition, Funks Reservoir is currently annually dewatered in the winter under the standard operations and maintenance activities. Dewatering required to dredge Funks Reservoir would not result in a substantial decrease in groundwater levels or substantial interference with groundwater recharge.

Constructing the TRR East or TRR West, TRR East or West pipelines, pipelines to convey water during TRR East or TRR West construction, transition manifold, and Dunnigan Pipeline may require dewatering. Quarrying associated with dam construction may also require dewatering. Under Alternatives 1 and 3, construction of the TRR East embankment, TRR East PGP, and the TRR East electrical substation would require excavation between 40 to 50 feet bgs. Under Alternative 2, TRR West would be excavated to a depth between 20 to 60 feet bgs, with a maximum depth of 120 feet near the TRR West PGP on the western side of the reservoir. TRR West PGP and electrical substation would also require excavation between 40 to 50 feet bgs. Under all three alternatives, the TRR pipelines and transition manifold would be installed approximately 6 feet bgs. Within 1 mile of TRR East or TRR West and their associated pipelines, the average well depth for domestic and agricultural wells is typically 260 feet bgs (California Department of Water Resources 2020b). Dunnigan Pipeline may require dewatering to a depth of 30 feet bgs. The average well depth for domestic and agricultural wells within the

Yolo Subbasin is typically 100 feet bgs, with well screens starting around 50 feet bgs (California Department of Water Resources 2020b). Clay soils in rice fields adjacent to the Dunnigan Pipeline would act as a barrier between the construction dewatering depth and basin aquifer. Alternative 2 would require more dewatering over a larger area during installation of the Dunnigan Pipeline compared to Alternatives 1 and 3 (10 miles versus 4 miles).

Groundwater encountered during excavation would be stored on site in bermed areas or Baker tanks within the Project footprint before being discharged onto suitable land where it would infiltrate back into the water table. Encountered groundwater may also be used for dust suppression or moisture conditioning of embankment fill materials, which would reduce reliance on pumped groundwater. These groundwater storage and discharge practices, the temporary nature of the dewatering, and the average well depth and total depth to water would therefore compensate for any localized reduction in groundwater levels during construction (Table 8-2). Specific to Dunnigan Pipeline, based on the typical depth to groundwater for local infrastructure wells and soil type within the Yolo Subbasin, the pipeline installation would not result in a substantial decrease in groundwater supplies or substantial interference with groundwater recharge.

Operation

Project operation would differ under Alternatives 1, 2, and 3, but the differences in water deliveries would largely have the same effects on groundwater resources under all alternatives. Therefore, the operation impacts discussed below pertain to Alternatives 1, 2, and 3 unless otherwise stated.

Sacramento River Diversion, Conveyance to Regulating Reservoirs, and Conveyance to Sacramento River

The timing and magnitude of changes at the two points of diversion on the Sacramento River vary between the alternatives but generally include periods of increased diversion flow during winter months to fill or maintain Sites Reservoir.

Model-simulated Sacramento River groundwater elevations were almost identical to average historic conditions or conditions under the No Project Alternative. The largest decrease in groundwater elevation near the RBPP and GCID Main Canal was 2.5 feet, with average annual volumetric differences in groundwater exchange for the TC Canal and GCID Main Canal noted as 0.22% and 2.3%, respectively (Appendix 8B, *Groundwater Modeling*; Figures 10A-8 through 10A-11). Because diversions required to operate a larger reservoir capacity would have minimal effects on groundwater elevation and groundwater/surface water interaction (Section 8.3.2, *Operation*), it is reasonable to assume these effects would be even smaller under Alternatives 1, 2, and 3 because less water would be diverted for operations. In addition, diversions would occur during high-flow events when excess surface water is available and would have minimal interference with groundwater recharge.

Alternative 2 would have the least effect on groundwater levels, as well as groundwater/surface water interaction, because it would require less water to fill and maintain the Sites Reservoir (1.3 MAF as compared to 1.5 MAF under Alternatives 1 and 3). Alternative 3 would affect groundwater level and groundwater/surface water interaction the most due to increased filling and releases during operation compared to the other alternatives.

Model-simulated groundwater/surface water interaction downstream of diversions indicated that the largest change in groundwater recharge was up to 3 cubic feet per second 10 miles downstream in the TC Canal from the RBPP 20 years after the start of operations. After this increase, groundwater recharge matched existing conditions along the 12 miles of the TC Canal over the life of the Project (approximately 40 years). Groundwater recharge 7 miles downstream from the GCID Main Canal head gate remained largely the same as existing conditions over the 40 years simulated (Appendix 8B; Figure 10A-11). Because water diversions required to operate the Sites Reservoir under Alternatives 1, 2, and 3 would be less than that needed for a larger reservoir capacity, as described in Section 8.3.2, the effects on groundwater recharge for these alternatives would be less than was modeled. Therefore, Project-related diversions would not substantially interfere with groundwater recharge.

Alternative 2 would have the least effect on groundwater recharge because it would involve the lowest volume of water to fill and maintain Sites Reservoir (1.3 MAF as compared to 1.5 MAF under Alternatives 1 and 3). Alternative 3 would have the greatest effect on groundwater recharge due to increased groundwater/surface water interaction during operation compared to Alternatives 1 and 2.

Pipeline operation could affect the surrounding groundwater levels due to pipeline seepage along the I/O tunnel, TRR East or TRR West pipelines, Funks pipelines, and Dunnigan Pipeline. The I/O tunnel would be constructed using pre-excavation grouting to reduce groundwater flow into the tunnels. The tunnel would be lined with concrete to prevent seepage between the transition manifold and the I/O tower and would not change groundwater levels or flow direction. Construction of the tunnel and pipelines would not result in a substantial decrease in groundwater supplies or substantial interference with groundwater recharge.

The TRR East or TRR West pipeline, Funks pipelines, and Dunnigan Pipeline would be constructed using a large diameter welded steel pipe to prevent or minimize seepage between the prospective pipeline inlets and outlets. There would be no change in groundwater levels or flow direction associated with these pipelines and their installation would not result in a substantial increase in groundwater supplies or substantial interference with groundwater recharge. Based on the length of Dunnigan Pipeline under Alternative 2, there is a greater possibility for increases in groundwater levels compared to Alternative 1 or 3 if pipeline joints weakened over the life of the Project.

Reservoirs

It is estimated the administration and operations building would require roughly 61,000 gallons of water per year while the maintenance and storage building would use approximately 25,000 gallons of water per year (Chapter 26, *Public Services and Utilities*). Based on current groundwater storage, groundwater use in the Colusa Subbasin, and groundwater recharge, there is sufficient groundwater to support these water needs (Table 8-2).

A portion of the water retained in the Sites Reservoir under operating conditions would infiltrate into the subsurface materials, acting as a new source of recharge to the underlying groundwater system (as described above in Impact GW-1). In the nearby Colusa Subbasin, additional groundwater recharge would be beneficial during dry periods when groundwater levels are generally low but could adversely affect adjacent land uses in the study area that are susceptible to seepage in wetter years when groundwater levels are generally higher. Modeling showed that simulated groundwater levels would begin to increase as compared to historic levels or levels under the No Project Alternative. In most years, the reservoir seepage inflow to groundwater would provide a benefit in terms of additional shallow groundwater. During critical drought years, groundwater levels were projected to be between 30 to 20 feet higher along the western margin of the Colusa Subbasin immediately adjacent to Sites Reservoir, with the highest groundwater elevation modeled near Funks Creek. This increase was reduced to approximately a 5-foot gain 4 miles to the east near TRR East (Appendix 8B, *Groundwater Modeling*; Figure 10A-3A). During Very Wet Water Years, groundwater levels were modeled to be from 1 to 25 feet higher along the western margin of the Colusa Subbasin immediately adjacent to Sites Reservoir with the highest groundwater elevation modeled near Funks Creek (Appendix 8B; Figure 10A-3B). Similar to the Critically Dry Water Years, the 2017 model simulation showed that expanded areas of higher groundwater elevations would be limited. Wet Water Years did result in additional discharge to streams and/or low-lying areas as compared to Normal or Dry Water Years. Although modeled groundwater levels were higher than existing conditions, simulated hydrographs indicated even during Wet Water Years, groundwater levels were forecasted to be approximately 10 feet bgs near Funks Creek with little chance of flooding orchard land (Appendix 8B; Figure 10A-2B).

Changes to nearby groundwater levels from Sites Reservoir seepage under Alternatives 1, 2, and 3 would be less than those modeled for the 1.8-MAF capacity but would still result in changes to groundwater levels and recharge as compared to existing conditions. Alternatives 1 and 3 would have a greater recharge potential in that aquifer when compared to Alternative 2 because they have a larger reservoir capacity (1.5 MAF as compared to 1.3 MAF). In addition, Alternative 1 would have a greater recharge potential in the shallow groundwater aquifer as compared to Alternative 3 because more water would be consistently stored in the reservoir during Alternative 1 operations (Alternative 3 operations would have a more reservoir fluctuation). Operation of Sites Reservoir would increase shallow groundwater levels abutting the inundation area, resulting in a slight increase in groundwater supplies and recharge when compared to existing conditions.

Conversion of irrigated agriculture to the lined TRR East would result in temporary lowering of groundwater levels in the proximity of TRR East due to the reduction in deep percolation from precipitation and seepage from irrigation canals. The estimated deep percolation from precipitation alone over the TRR East footprint, under average hydrologic conditions (Water Year 2005), was estimated at approximately 225 AF per year. This represents less than 0.1% of the average deep percolation within the Colusa Subbasin (400,700 AF per year) based on the average hydrologic conditions included in the 2017 model (Sites Project Authority and Bureau of

Reclamation 2017). In addition, there is no irrigated agriculture in the TRR West footprint, and it is on flat lands or sloping foothills. Natural groundwater recharge is primarily driven from precipitation events, approximately 19.36 inches near Colusa (Water Year 2005). This precipitation represents a lower volume and less constant rate of water than seepage from irrigation canals near the TRR East footprint. The relative magnitude of the loss of groundwater recharge for TRR East or TRR West would be minimal compared to conditions in the subbasin, and operation of TRR East or TRR West would not result in a substantial decrease in groundwater supplies or substantial interference with groundwater recharge.

Recreation Areas and Roads

Under Alternatives 1, 2, and 3, the Project would add 46 miles of paved and unpaved roads. Alternative 2 would involve an additional 30 miles of paved roads for the realigned portion of Huffmaster Road and new South Road. These new roads could slightly diminish groundwater recharge but not to an extent that would affect existing uses of nearby wells because the increase of hard surface areas is negligible when compared to the surrounding permeable area. Furthermore, a site-specific drainage evaluation or study along the South Road would be prepared as part of final Project design (BMP-15). Finally, these roads would not be in a high groundwater recharge area (The Nature Conservancy 2020).

Groundwater would not be used as a potable water source in the recreation areas. Therefore, operation activities associated with the recreation areas would result in similar groundwater conditions as under the No Project Alternative or 2020 groundwater levels.

Stone Corral Creek and Funks Creek

Releases from the reservoir would be made downstream of the dams to maintain habitats in the streams comparable to existing conditions pursuant to terms and conditions of Sites water right and California Fish and Game Code Section 5937. These releases would continue to infiltrate as they currently do.

CEQA Significance Determination and Mitigation Measures

Total estimated groundwater use for construction of Sites Reservoir and Dunnigan Pipeline over the life of the Project would be between 1% to 15% of the total annual groundwater use within the basin or subbasin and would result in a less-than-significant reduction in groundwater supply.

Based on the average well depth and total depth to water of local well infrastructure, nearby wells would be able to compensate for reductions in groundwater levels associated with dewatering during construction. Water diverted from Stone and Funks Creeks during construction would remain in the same watershed, resulting in minimal to no change in deep percolation or recharge within the basin. In addition, changes in groundwater levels or recharge will be minimized through implementation of BMP-14 (identified in Impact GW-1). Alternatives 1, 2, and 3 would result in a less-than-significant impact on groundwater levels and recharge in the study area.

Pipeline operation could affect the surrounding groundwater levels due to seepage under Alternative 1, 2, or 3. Based on the length of the Dunnigan Pipeline under Alternative 2, there is a greater chance for increases to groundwater levels as compared to Alternative 1 or 3. All pipelines would be constructed using materials to effectively prevent or minimize pipeline seepage, resulting in a less-than-significant impact on groundwater levels.

All diversions would primarily take place during high flows when excess surface water would be available. In addition, modeling has shown little to no effects on existing groundwater recharge due to diversions. Effects on groundwater recharge would be greatest under Alternative 3 and lowest under Alternative 2. Based on high-flow conditions and modeling, diversions would have a less-than-significant impact on groundwater recharge or supplies under Alternative 1, 2, or 3.

Inundation in previously unsaturated areas would result in higher groundwater in the shallow aquifer along the western margins of the Colusa Subbasin in the immediate vicinity of the Sites Reservoir. Groundwater levels and recharge potential would increase the most under Alternative 1, which would consistently store the most surface water. Alternative 2 would result in the lowest change in potential recharge or groundwater levels when compared to existing conditions. Increased shallow groundwater levels and recharge would be limited and not result in inundation to local orchards. Therefore, Alternatives 1, 2, and 3 would have a less-than-significant impact on groundwater recharge and supply.

Reduced infiltration from the TRR East, TRR West, roads, and recreation areas would not be considered a significant change when compared to the surrounding landscape. Alternatives 1, 2, and 3 would have a less-than-significant impact on groundwater recharge.

Discharges would be made to Stone Corral Creek and Funks Creek under operating conditions; therefore, operation of Alternatives 1, 2, and 3 would have less-than-significant impacts on groundwater recharge through these creeks.

NEPA Conclusion

Construction and operation effects on groundwater supplies and groundwater recharge would be the same as described above for CEQA. Construction and operation of Alternatives 1, 2, and 3 would not cause a substantial decrease in groundwater supplies or substantial interference with groundwater recharge as compared to the No Project Alternative. Total estimated groundwater use for construction of Sites Reservoir and Dunnigan Pipeline over the life of the Project would be between 1% to 15% of the total annual groundwater use within the basin or subbasin, and wells would compensate for localized reductions in groundwater levels. Operation of Alternatives 1, 2, and 3 would have little to no effects on existing groundwater recharge due to diversions as compared to the No Project Alternative. Surface water from the operation of Sites Reservoir has the potential to improve nearby shallow groundwater aquifer levels as compared to the No Project Alternative. The construction effects of Alternative 1, 2, or 3 would not be adverse, and the operation effects would be beneficial.

Impact GW-3: Conflict with or obstruct implementation of a sustainable groundwater management plan.

No Project

Under the No Project Alternative, the operations of the existing TC Canal, RBPP, and GCID Main Canal would continue. The operations of these facilities do not conflict with or obstruct the implementation of a sustainable groundwater management plan (e.g., county GSP).

Significance Determination

The No Project Alternative would not conflict with or obstruct the implementation of a sustainable groundwater management plan. There would be no impact/no effect.

Alternatives 1, 2, and 3

Red Bluff, Colusa, and Yolo Counties have developed GSPs containing measurable objectives, minimum thresholds, defined undesirable results, and project management actions to achieve the overall goals of the SGMA (see Appendix 8A, *Groundwater Resources Basin Setting*, for further details) (GEI Consultants, Inc. 2022; Davids Engineering, Inc. et al. 2021; Luhdorff & Scalmanini Consulting Engineers 2022). This section discusses GSP measures that may be affected by the implementation of Alternative 1, 2, or 3. Construction and operation would similarly affect GSP measures, and the potential construction and operation impacts discussed below pertain to all Project alternatives unless otherwise stated.

Construction

Construction activities would result in no to less-than-significant impacts on groundwater resources throughout the study area (discussed in Impacts GW-1 and GW-2) during the construction period. Construction would not conflict with or impede GSPs developed by county groundwater authorities.

Operation

Operation could affect GSPs through changing the surface water management practice in the Sacramento Valley Groundwater Basin by increased diversions from the Sacramento River and storage of up to 1.5 MAF at Sites Reservoir. Under Alternatives 1, 2, and 3, water would be released from Sites Reservoir for use by storage partners during Dry to Critically Dry Water Years. Releases under Alternative 3 are likely to be more frequent. Operations are unlikely to affect groundwater levels, flows, or water quality (discussed in Impacts GW-1 and GW-2) so they would not impede or conflict with the overarching SGMA goals. Project facilities would not impede the installation or use of groundwater monitoring wells, which is a GSP measure under the monitoring network expansion project management action.

Alternatives 1, 2, and 3 would increase diversions from the Sacramento River. Because GSPs are in the initial stages of implementation, the surface water requirements for Managed Aquifer Recharge (MAR) areas are unknown. Project facilities are largely not in areas identified as excellent recharge areas by the CGA and operation would not conflict with current or future MAR projects (The Nature Conservancy 2020). Diversions would be highest under Alternative 3, with Alternative 2 having the lowest diversions from the Sacramento River. Diversions would not significantly reduce recharge or groundwater levels (Impact GW-2) and would therefore not impede likely GSP measures for sustainable groundwater levels.

Operation would improve water supply and reliability by creating additional surface water storage to be used by SWP and CVP contractors. This increased water storage aligns with county GSP sustainability goals. Alternatives 1 and 3 would provide more surface water storage than Alternative 2. Under Alternative 3, Sites Reservoir would typically be below full capacity. Operation under Alternative 3 would result in less seepage as compared to Alternative 1, reducing the beneficial effects on nearby groundwater levels.

Alternatives 1, 2, and 3 would provide a more reliable surface water supply for agricultural use, lowering dependency on groundwater pumping for crop irrigation in the Sacramento Valley and the San Joaquin Valley for Storage Partners. Surface water use could increase deep percolation that would subsequently increase groundwater storage and improve groundwater quality because surface water has been shown to have better water quality than groundwater, especially in the San Joaquin Valley. This increase in groundwater storage could also reduce land subsidence and disconnections from surface water. The increased surface water use for agriculture would also decrease dependency on micro-irrigation systems, which rely on groundwater pumping and have been shown to result in little to no groundwater recharge and a buildup of salt in the upper layers of the soil profile, both due to lack of deep percolation (Fahey 2012).

CEQA Significance Determination and Mitigation Measures

Construction and operation under Alternatives 1, 2, and 3 would not conflict with or obstruct implementation of GSPs. Construction and operation would not result in a violation of water quality standards or waste discharge requirements or otherwise substantial degradation of groundwater quality (Impact GW-1). There would be no substantial decrease in groundwater supplies or interference with groundwater recharge (Impact GW-2). Operation would improve surface water reliability and increase its use, which would reduce groundwater pumping in the Sacramento Valley Groundwater Basin and San Joaquin Valley. Alternative 1, 2, or 3 would have a less-than-significant impact on GSP implementation.

NEPA Conclusion

Construction and operation effects would be the same as described above for CEQA. Construction and operation under Alternatives 1, 2, and 3 would not conflict with or obstruct implementation of GSPs as compared to the No Project Alternative. Construction and operation would not result in a violation of water quality standards or waste discharge requirements or otherwise substantial degradation of groundwater quality (Impact GW-1). There would be no substantial decrease in groundwater supplies or interference with groundwater recharge (Impact GW-2). Operation would improve surface water reliability and increase its use as compared to the No Project Alternative, which would reduce groundwater pumping in the Sacramento Valley Groundwater Basin and San Joaquin Valley. The construction and operation of Alternatives 1, 2, and 3 would have beneficial to no adverse effects on GSP implementation.

8.5 References

8.5.1. Printed References

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