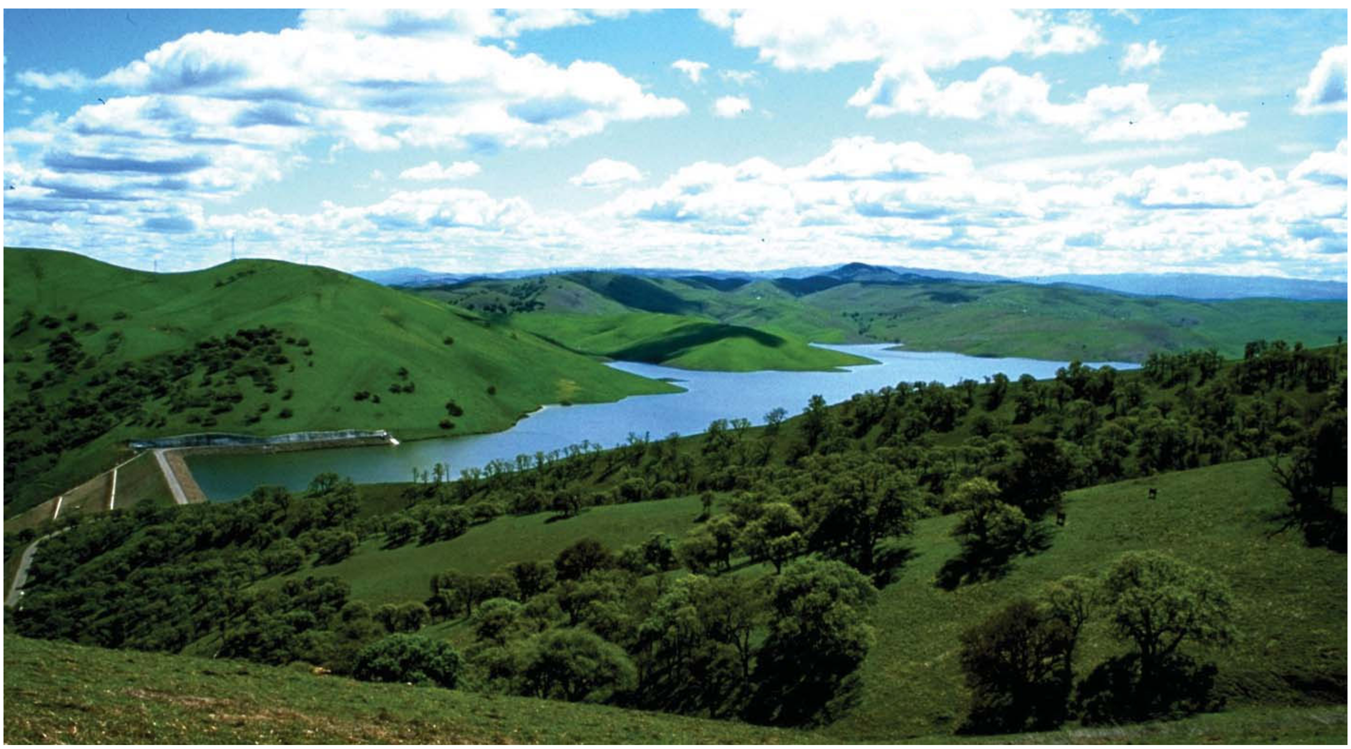
BUREAU OF RECLAMATION

Final – Volume 4 of 4

Supplement to the Final Environmental Impact Statement Final Environmental Impact Report

Los Vaqueros Reservoir Expansion Project
California State Clearinghouse No. 2006012037



CONTRA COSTA WATER DISTRICT

The Estimated Lead Agency Total Cost Associated with Developing and Producing this Final Supplement to the Final EIS/EIR is $75,000

U.S. Department of the Interior

February 2020

Mission Statements

The Department of the Interior (DOI) conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

The mission of the Contra Costa Water District is to strategically provide a reliable supply of high quality water at the lowest cost possible, in an environmentally responsible manner.

Supplement to the Final Environmental Impact Statement Final Environmental Impact Report

Los Vaqueros Reservoir Expansion Project
California State Clearinghouse No. 2006012037

Prepared for Reclamation and Contra Costa Water District by Environmental Science Associates under contract to Contra Costa Water District.

Cooperating Agencies
California Department of Water Resources
National Marine Fisheries Service
United States Army Corps of Engineers
United States Fish and Wildlife Service
Western Area Power Administration

Cover Photo: Los Vaqueros Reservoir, Contra Costa County. (Contra Costa Water District)

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U.S. Department of the Interior February 2020

APPENDIX A
Facility Refinements Assessment

TABLE A-1
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.2: Delta Hydrology and Water Quality			
4.2.1: The Phase 2 Expansion alternatives would not adversely alter deliveries of water to other users.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.2.2: The Phase 2 Expansion alternatives would not result in significant adverse changes in Delta water quality causing the exceedance of a water quality standard.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.2.3: The Phase 2 Expansion alternatives would not result in changes to Delta water quality that would result in significant adverse effects on beneficial uses.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.2.4: Diversions of Delta water under the Phase 2 Expansion alternatives would not result in a significant reduction of Delta water levels.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.2.5: The Phase 2 Expansion alternatives would not result in a cumulatively considerable contribution to significant adverse cumulative effects on deliveries of water to other users, changes in Delta water quality, changes in Delta water levels, changes in groundwater recharge due to changes in Mokelumne River flows, and changes in flooding potential due to changes in Mokelumne River flows.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.2.6s: The Phase 2 Expansion would not result in changes in Mokelumne River flow that would significantly affect groundwater recharge.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.2.7s: The Phase 2 Expansion would not result in changes in Mokelumne River flow that would significantly increase the potential for flooding.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.3: Delta Fisheries and Aquatic Resources			
4.3.1: In-channel construction activities associated with the new Delta Intake structure would increase short-term localized suspended sediment, turbidity, and possibly contaminant concentrations within Old River, which would increase exposure of various life stages and species of fish to temporarily degraded water quality conditions.	n/a	Because the location of the Neroly High Lift Pump Station would not affect elimination of the new Delta Intake and Pump Station from the Phase 2 Expansion, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.2: Underwater sound-pressure levels generated during cofferdam installation for the new Delta Intake could result in behavioral avoidance or migration delays for special-status fish species.	n/a	Because the location of the Neroly High Lift Pump Station would not affect elimination of the new Delta Intake and Pump Station from the Phase 2 Expansion, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.3: Delta Fisheries and Aquatic Resources (cont.)			
4.3.3: Dewatering of the cofferdam for the new Delta Intake could result in stranding of fish.	n/a	Because the location of the Neroly High Lift Pump Station would not affect elimination of the new Delta Intake and Pump Station from the Phase 2 Expansion, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.4: The new Delta Intake structure and associated fish screens in Old River would physically exclude fish from a small area of existing aquatic habitat and modify existing aquatic habitat.	n/a	Because the location of the Neroly High Lift Pump Station would not affect elimination of the new Delta Intake and Pump Station from the Phase 2 Expansion, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.5: The new Delta Intake structure and associated fish screens in Old River would modify hydraulic conditions next to the intake structure, but would not disorient special-status fish or attract predatory fish.	n/a	Because the location of the Neroly High Lift Pump Station would not affect elimination of the new Delta Intake and Pump Station from the Phase 2 Expansion, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.6: Operation of the Phase 2 Expansion would not result in changes to Delta hydrologic or hydrodynamic conditions that affect Delta fish populations or quality and quantity of aquatic habitat within the Sacramento-San Joaquin River system, including the Delta.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.7: Operation of the Phase 2 Expansion would not significantly affect direct entrainment or impingement of fish.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.8 Fish screen maintenance activities would not significantly increase fish entrainment at the new Delta Intake or the expanded Old River Intake.	n/a	Because the location of the Neroly High Lift Pump Station would not affect elimination of the new Delta Intake and Pump Station from the Phase 2 Expansion, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.9: The Phase 2 Expansion, when combined with other planned projects or projects under construction in the area, could cumulatively contribute to substantial adverse impacts to fisheries and aquatic resources.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.10s: Operation of the Phase 2 Expansion would not result in changes to Delta hydrologic or hydrodynamic conditions that affect the growth of algal blooms.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.11s: Operation of the Phase 2 Expansion would not significantly reduce migration habitat for adult fall-run chinook salmon and steelhead in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.12s: Operation of the Phase 2 Expansion would not significantly reduce spawning and rearing habitat for fall-run chinook salmon and steelhead in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.13s: Operation of the Phase 2 Expansion would not significantly reduce outmigration for juvenile fall-run chinook salmon and steelhead in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.3: Delta Fisheries and Aquatic Resources (cont.)			
4.3.14s: Operation of the Phase 2 Expansion would not significantly reduce floodplain habitat for native fish species in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.15s: Operation of the Phase 2 Expansion would not significantly reduce flows that support native fish species habitat in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.16s: Operation of the Phase 2 Expansion would not significantly reduce fish habitat in Pardee and Camanche Reservoirs.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.17s: Operation of the Phase 2 Expansion would not significantly affect water temperature for coldwater fish species in Pardee and Camanche Reservoirs.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.18s: Operation of the Phase 2 Expansion would not significantly affect water temperature for migration, spawning and incubation of fall-run chinook salmon in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.19s: Operation of the Phase 2 Expansion would not significantly affect water temperature for rearing, smoltification, and emigration of juvenile fall-run chinook salmon in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.20s: Operation of the Phase 2 Expansion would not significantly affect water temperature for migration, spawning and incubation of steelhead in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.21s: Operation of the Phase 2 Expansion would not significantly affect water temperature for rearing, smoltification, and emigration of steelhead in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.3.22s: Operation of the Phase 2 Expansion would not significantly affect water quality for fall-run chinook salmon and steelhead in the lower Mokelumne River.	n/a	Because the location of the Neroly High Lift Pump Station would not substantially affect the Phase 2 Expansion's operation, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.4: Geology, Soils, and Seismicity			
4.4.1: The Phase 2 Expansion could expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking or seismic-related ground failure, including liquefaction and landslides.	No	The western site would present the same ground shaking, liquefaction, and landslide risk as the eastern site. CCWD Standard Practice No. 03.1-08 would apply to the Neroly High Lift Pump Station regardless of location. No change in conclusions or mitigation.	No change in effects relative to eastern site.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.4: Geology, Soils, and Seismicity (cont.)			
4.4.2: During construction and operations, the Phase 2 Expansion could result in substantial soil erosion or the loss of topsoil.	No	The western site could present an increased potential for topsoil erosion because it is in an undeveloped area, compared to the eastern site within the Randall-Bold Water Treatment Plant footprint. However, the same mitigation measure would apply to reduce potential impacts to less than significant. No change in conclusions or mitigation.	Increased effect relative to eastern site, mitigable to less-than-significant level.
4.4.3: Phase 2 Expansion components could be located on expansive or corrosive soils or on a geologic unit or soil that is unstable or could become unstable as a result of the project or construction activities; with mitigation, those components would not likely result in onsite or offsite landslides, lateral spreading, subsidence, liquefaction, or collapse, and would not create substantial risks to life or property.	Yes	The western site has high to very high expansion potential, compared to the moderate expansion potential of the eastern site. However, CCWD Standard Practice No. 03.1-08 would apply to the Neroly High Lift Pump Station regardless of location and would be effective in reducing the potential risk to life and property resulting from construction on expansive soils. Corrosive soils and landslide potential would be the same as described in the Draft Supplement. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.4.4: The Phase 2 Expansion would not make a cumulatively considerable contribution to cumulative effects associated with erosion, topsoil loss or increased exposure to seismic or other geohazard risks.	No	Like the Neroly High Lift Pump Station at the eastern site, the facility at the western site would be designed in accordance with CCWD Standard Practice No. 03.1-08 and would not provide a cumulatively considerable contribution to cumulative impacts related to seismic and other geologic hazards. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.4.5s: The Phase 2 Expansion would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.	n/a	The Neroly High Lift Pump Station would not include a septic system; therefore, this impact statement is not applicable to this facility at the western site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.5: Local Hydrology, Drainage, and Groundwater			
4.5.1: During construction, the Phase 2 Expansion alternatives could violate water quality standards through increased erosion and sedimentation to local waterways, release of fuels or other hazardous materials during construction, or dewatering of excavated areas that could result in substantial water quality degradation.	No	The western site would present the same potential to violate water quality standards through increased erosion and sedimentation, release of fuels, or dewatering. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.5.2: Construction and operation of the Phase 2 Expansion alternatives could deplete local groundwater supplies or interfere with groundwater recharge.	Yes	As described in the Draft Supplement, although the Neroly High Lift Pump Station would introduce new impervious surfaces, water would run off to adjacent open areas surrounding the western site and would not change existing groundwater recharge in the area. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.5.3: Phase 2 Expansion alternatives could substantially alter drainage patterns and reservoir expansion would increase the reservoir shoreline area subject to erosion.	Yes	As described in the Draft Supplement, although the Neroly High Lift Pump Station would introduce new impervious surfaces, water would run off to adjacent open areas surrounding the western site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.5.4: Phase 2 Expansion alternatives could create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff during operation.	Yes	As described in the Draft Supplement, although the Neroly High Lift Pump Station would introduce new impervious surfaces, designing the facility in accordance with Mitigation Measure 4.5.2 would reduce the discharge of stormwater during operations and would also limit water quality effects. No change in conclusions or mitigation.	Increased effect relative to eastern site, mitigable to less-than-significant level.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.5: Local Hydrology, Drainage, and Groundwater (cont.)			
4.5.5: Phase 2 Expansion could place structures within a 100-year flood hazard area as mapped on a federal Flood Insurance Rate Map, which could impede or redirect flood flows.	No	The pipelines associated with the Neroly High Lift Pump Station at the eastern site would not be constructed. The western site is not within the 100-year floodplain. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.5.6: The Phase 2 Expansion alternatives would not substantially increase the exposure of people and/or structures to risks associated with inundation by dam or levee failure.	No	The Neroly High Lift Pump Station at the western site would not affect the dam or any levees in the vicinity of Phase 2 Expansion components. Therefore, construction of this facility would not alter the risk of inundation from dam or levee failure. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.5.7: Construction and operation of the Phase 2 Expansion alternatives would not make a cumulatively considerate contribution to cumulative effects on drainage, flooding, groundwater recharge, or water quality degradation in the project area.	No	Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be the same as those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.6: Biological Resources			
4.6.1: Phase 2 Expansion construction may affect NCCP habitat types (CDFW sensitive plant communities in parentheses) Natural Seasonal Wetland (i.e., bulrush-cattail series, northern claypan vernal pool, bush seepweed and saltgrass series), Valley/Foothill Riparian (i.e., Fremont cottonwood series and valley oak series), and Grassland (i.e., purple needlegrass series).	n/a	The Neroly High Lift Pump Station western site does not include sensitive plant communities; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.2: Phase 2 Expansion construction could affect potentially jurisdictional wetlands or water, and streambeds and banks regulated by CDFW.	n/a	The Neroly High Lift Pump Station western site does not include potentially jurisdictional wetlands or water, or streambeds or banks regulated by CDFW; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.3: Phase 2 Expansion construction could affect populations of special-status plant species including brittlescale, San Joaquin spearscale, and Brewer's dwarf-flax.	n/a	The Neroly High Lift Pump Station western site does not include special-status plant species; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.4: Phase 2 Expansion construction would result in impacts on California red-legged frog and California tiger salamander, including aquatic breeding habitat and upland aestivation habitat for these species.	No	Similar to the eastern site, although the western site for the Neroly High Lift Pump Station is a highly disturbed site, the surrounding area includes potential habitat for California red-legged frog in the unnamed channel and annual grassland located between the Neroly Blending Facility and the Randall-Bold Water Treatment Plant. Additional potential habitat for California red-legged frog is also present in the unnamed channel downslope from the Neroly Blending Facility west of SR 4. The western site is closer to potential habitat west of SR 4 than the eastern site. As described in the Draft Supplement for the eastern site and the Brentwood Pipeline, impacts would be significant, but could be mitigated to a less-than-significant level through avoidance and minimization measures. Mitigation Measure 4.6.4a would avoid and minimize take of individual frogs, and Measure 4.6.4b, which provides for habitat compensation and enhancement, would reduce the impacts on California red-legged frogs to a less-than-significant level. No change in conclusions or mitigation.	Increased effect relative to eastern site, mitigable to less-than-significant level.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.6: Biological Resources (cont.)			
4.6.5: Phase 2 Expansion construction would result in direct and indirect impacts on existing populations of and habitat for the western pond turtle.	n/a	The Neroly High Lift Pump Station western site does not include populations of or habitat for the western pond turtle; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.6: Phase 2 Expansion construction would result in direct and indirect impacts on listed vernal pool fairy shrimp and their habitat, and on the non-listed midvalley fairy shrimp.	n/a	The Neroly High Lift Pump Station western site does not include populations of or habitat for vernal pool fairy shrimp or midvalley fairy shrimp; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.7: Phase 2 Expansion construction would have temporary and permanent impacts on potential San Joaquin kit fox habitat and permanently reduce potential regional movement opportunities in one location for this species.	n/a	The Neroly High Lift Pump Station western site does not include populations of or habitat for the San Joaquin kit fox; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.8: Phase 2 Expansion construction would result in temporary and permanent loss of habitat for burrowing owls.	No	The western site is a highly disturbed site, and would not include potential habitat for burrowing owls. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.9: Phase 2 Expansion construction and operation activities would result in direct and indirect impacts on existing populations of and habitat for the golden eagle, bald eagle, and Swainson’s hawk.	No	The western site in the vicinity of the Contra Costa Canal would present the same potential for temporary, construction-related disruptions to foraging habitat for Swainson’s hawk and golden eagle. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.10: Phase 2 Expansion construction and increased reservoir water levels would result in temporary and permanent loss of potential and occupied habitat for Alameda whipsnake.	n/a	The Neroly High Lift Pump Station western site does not include populations of or habitat for the Alameda whipsnake; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.11: Phase 2 Expansion construction activities could result in direct and indirect impacts on the valley elderberry longhorn beetle and its habitat.	No	The Neroly High Lift Pump Station western site would not require the development of the Neroly to Los Vaqueros Pipeline connection. Potential habitat for valley elderberry longhorn beetle in this area would not be disturbed under this option, and the adverse impact would be somewhat reduced. However, in the larger context of the Phase 2 Expansion, there would be no change in conclusions or mitigation.	Somewhat reduced adverse effect relative to eastern site.
4.6.12: Phase 2 Expansion construction activities could affect active bird nesting sites.	No	The western site would present the same potential for temporary habitat disturbance or permanent habitat loss within or near potential nesting habitat for birds protected under the federal Migratory Bird Treaty Act. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.13: Phase 2 Expansion construction activities could affect designated critical habitat for listed species (vernal pool fairy shrimp and Contra Costa goldfields).	n/a	The Neroly High Lift Pump Station western site does not include designated critical habitat for vernal pool fairy shrimp or Contra Costa goldfields; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation	No change in effects relative to eastern site.
4.6.14: Phase 2 Expansion construction activities could affect nonlisted special-status reptile species (San Joaquin coachwhip and coast horned lizard).	No	The western site is a highly disturbed site, and would not include potential habitat for San Joaquin coachwhip and coast horned lizard. No change in conclusions or mitigation.	No change in effects relative to eastern site.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.6: Biological Resources (cont.)			
4.6.15: Phase 2 Expansion construction activities could affect nonlisted special-status mammal species (American badger, special-status bats, and San Joaquin pocket mouse)[1].	No	The western site would present the same potential to adversely affect nonlisted special-status mammal species, including nonbreeding bats. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.16: Draining the reservoir during Phase 2 Expansion construction could affect Pacific Flyway species, including waterfowl and shorebirds.	n/a	The Neroly High Lift Pump Station would not affect the Los Vaqueros Reservoir and would be unrelated to the draining of the reservoir; therefore, this impact statement is not applicable to this facility at the western site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.17: The Phase 2 Expansion would not result in conflicts with local and regional conservation plans, or local plans or ordinances protecting biological resources.	No	Similar to the Neroly High Lift Pump Station at the eastern site, the western site would not result in conflicts with local and regional conservation plans, or local plans or ordinances protecting biological resources. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.6.18: Phase 2 Expansion construction would not make a cumulatively considerable contribution to cumulative effects on special-status species and habitats.	No	Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be the same as those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.7: Land Use			
4.7.1: The Phase 2 Expansion alternatives would not physically divide an existing community.	No	The Neroly High Lift Pump Station at the western site would be constructed within land already owned by CCWD and in use for water utility purposes, and would not encroach on or impede access to or through nearby residential communities. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.7.2: Facility siting and operation under the Phase 2 Expansion alternatives would not conflict with any applicable land use plans.	No	Like the Neroly High Lift Pump Station at the eastern site, the facility at the western site would be located within the Secondary Zone of the Delta as defined in the Land Use and Resource Management Plan. With respect to city General Plans, the Neroly High Lift Pump Station at the western site would be located in Antioch within the East Lone Tree Specific Plan Focus Area, in the Residential/Open Space designation in the City of Antioch General Plan (2003). The Neroly High Lift Pump Station at the western site would be within land already owned by CCWD and in use for water utility purposes, and would be consistent with applicable land use plans. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.7.3: Construction activities within designated Airport Land Use Compatibility Zones near the Byron Airport could cause potential temporary height impacts by conflicting with FAR Part 77 surfaces during construction.	n/a	The Neroly High Lift Pump Station at the western site would not be located within designated Airport Land Use Compatibility Zones near the Byron Airport; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.7.4: Construction activities within the AIA for Byron Airport could cause potential temporary flight hazards through the creation of glare or distracting lights; the generation of dust or smoke, which could impair pilot visibility; or could attract an increased number of birds.	n/a	The Neroly High Lift Pump Station at the western site would not be located within Airport Influence Area (AIA) for Byron Airport; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.

1 When the Final EIS/EIR was published in 2010, the San Joaquin pocket mouse was identified by CFDW as a California Species of Special Concern. CDFW has since dropped this designation, leaving the mouse with no protective status.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.7: Land Use (cont.)			
4.7.5: The Phase 2 Expansion alternatives would not contribute to cumulative land use impacts.	No	Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be the same as those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions.	No change in effects relative to eastern site.
Section 4.8: Agricultural Resources			
4.8.1: Construction of Phase 2 Expansion Alternatives would temporarily impact the agricultural uses of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance.	n/a	The Neroly High Lift Pump Station at the western site would not impact agricultural uses of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.8.2: Phase 2 Expansion alternatives would permanently convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance.	n/a	The Neroly High Lift Pump Station at the western site would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance; therefore, this impact statement is not applicable to this facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.8.3: Phase 2 Expansion alternatives would not conflict with zoning for agricultural use or a Williamson Act contract.	n/a	The Neroly High Lift Pump Station at the western site would not conflict with zoning for agricultural use or a Williamson Act contract; therefore, this impact statement is not applicable to this facility. No change in conclusions.	No change in effects relative to eastern site.
4.8.4: Phase 2 Expansion alternatives would involve changes in the environment that, due to their location or nature, could contribute to cumulative impacts from conversion of Important Farmland to non-agricultural uses.	No	Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be the same as those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.9: Transportation and Circulation			
4.9.1: Phase 2 Expansion construction activities would intermittently and temporarily increase traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways.	No	Neroly High Lift Pump Station construction activities would generate a similar, temporary increase in traffic congestion due to vehicle trips generated by construction workers and construction vehicles on area roadways regardless of location. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.9.2: Phase 2 Expansion construction activities would intermittently and temporarily impede access to local streets or adjacent uses, including access for emergency vehicles and could substantially increase traffic hazards due to construction in or adjacent to roads or due to possible road wear.	No	Access to the western site for project construction would be through the Antioch Service Center operations and maintenance entrance on Neroly Road. The intersection at the service center entrance includes Neroly Road, the maintenance drive, a gated Union Pacific Railroad crossing, and the Delta de Anza Regional Trail (bicycle and pedestrian use). The convergence of vehicular, construction vehicle, train, bicycle, and pedestrian foot traffic at this intersection could result in a substantial increase in traffic hazards due to construction. This effect would be adverse and potentially significant. Implementation of Draft Supplement Mitigation Measure 4.9.2c would require the installation of traffic control devices as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones to maintain safe driving and travel conditions. This measure would include the use of signage to alert motorists/bicyclists/pedestrians of construction activities, potential hazards and travel detours as well as the use of flaggers when appropriate to ensure pedestrian, bicyclist, and driver safety. Implementation of the mitigation measure would reduce the construction traffic hazard to less than significant.	Increased effect relative to eastern site, mitigable to less-than-significant level.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.9: Transportation and Circulation (cont.)			
4.9.2 (cont.)		Although this impact would be increased compared to the eastern site, it would represent one among several construction sites where such an impact would occur, and implementation of mitigation already identified in the Draft Supplement would reduce this impact to less than significant. Therefore, this impact is not new or significantly more severe than discussed in the Draft Supplement.	
4.9.3: Traffic associated with operation of Phase 2 Expansion facilities, including the expanded recreation facilities, would not exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.	No	Traffic associated with maintenance and inspection of the Neroly High Lift Pump Station would be incorporated into the existing system operations and maintenance effort regardless of location. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.9.4: Construction of Phase 2 Expansion alternatives, when combined with construction of other future projects, could contribute to construction-related short-term cumulative impacts to traffic and transportation (traffic congestion, access, and traffic safety).	No	Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be the same as those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.10: Air Quality and Greenhouse Gases			
4.10.1: Construction of Phase 2 Expansion alternatives could generate short-term emissions of criteria air pollutants: ROG, NOx, CO, PM2.5 and PM10 that could contribute to existing nonattainment conditions and further degrade air quality. However, Phase 2 Expansion alternatives would not exceed federal general conformity *de minimis* standards for emissions.	No	The quantity of emissions of criteria air pollutants would be the same for constructing the facility at the western site as for the eastern site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.10.2: Operation of Phase 2 Expansion alternatives would not result in emissions of criteria air pollutants at levels that would substantially contribute to a potential violation of applicable air quality standards or to nonattainment conditions.	No	The quantity of emissions of criteria air pollutants generated by facility operations would be the same for the facility at the western site as for the eastern site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.10.3: Construction and/or operation of Phase 2 Expansion alternatives would expose sensitive receptors to substantial pollutant concentrations.	No	The location of the western site would be closer to sensitive receptors with long-term exposure potential, with the nearest receptors being residential uses on Le Conte Circle and Nelson Ranch Park, approximately 800 feet to the northwest, which may result in increased exposure to Diesel Particulate Matter (DPM) from construction activities. However, Mitigation Measure 4.10.3 would require construction equipment with either Tier 4 engines or particulate filters which would reduce exposure levels to DPM to less than significant. No change in conclusions or mitigation. The proposed pump station would be electrically powered and operation of the facilities would have no direct pollutant emissions that could affect sensitive receptors.	Increased effect relative to eastern site, mitigable to less-than-significant level.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.10: Air Quality and Greenhouse Gases (cont.)			
4.10.4: Operation of Phase 2 Expansion alternatives would not create objectionable odors affecting a substantial number of people.	No	While the location of the western site would be closer to sensitive receptors than the eastern site, there would be no odor sources associated with the pump station. Diesel exhaust from construction equipment could generate some odors. However, construction-related odors would be temporary and would not persist upon completion of construction. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.10.5: Construction and operation of Phase 2 Expansion alternatives would result in a cumulatively considerable increase in greenhouse gas emissions.	No	The quantity of emissions of greenhouse gases would be the same for constructing and operating the facility at the western site as for the eastern site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.10.6: Construction and operation of the Phase 2 Expansion alternatives could result in cumulatively considerable increases of criteria pollutant emissions.	No	A project's individual emissions contribute to existing cumulative air quality conditions, and the thresholds by which they are assessed represent a cumulatively considerable contribution to air quality. As described in Impact 4.10.1 and 4.10.2 above, construction and operation of the pump station at the western site would have the same criteria air pollutant emissions as at the eastern site, and would be below thresholds. Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be similar to those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.11: Noise			
4.11.1: Construction of facilities under the Phase 2 Expansion alternatives could generate noise levels that exceed the applicable county or city noise standards at nearby sensitive receptors if construction activities are carried out during noise-sensitive hours, causing sleep disturbance and/or annoyance.	No	The location of the western site would be farther from sensitive receptors than the eastern site, with the nearest receptors being residential uses on Le Conte Circle and Nelson Ranch Park, approximately 800 feet to the northwest, while the Laurel Ridge Church would be 600 feet from the eastern site. However, there would be no berm present between the western site and the nearest receptor, although there would be some topographical separation. These residential receptors are exposed to traffic noise from SR 4, which is the primary existing noise source. Based on traffic volumes provided by Caltrans and an 850-foot distance, the Traffic Noise Model of the Federal Highway Administration estimates existing daytime noise levels of approximately 64 dBA. Estimated construction noise levels at this receptor are 58 dBA, as calculated by the Roadway Construction Noise Model. The resultant noise would therefore be the logarithmic sum of these which is 65 dBA. Consequently, the increase associated with construction noise would be less than 5 dBA, and therefore less than significant at this location. Therefore, construction noise at the western site would be similar to expected construction noise levels at the eastern site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.11.2: Operation of the Phase 2 Expansion alternatives would generate traffic, stationary source, and area source noise similar to existing noise associated with operation of Los Vaqueros Reservoir system and would not exceed County noise requirements.	No	The location of the western site would be farther from sensitive receptors than the eastern site, with the nearest receptors being residential uses on Le Conte Circle and Nelson Ranch Park, approximately 800 feet to the northwest, while the Laurel Ridge Church would be 600 feet from the eastern site. However, there would be no berm present between the western site and the nearest receptor, although there would be some topographical separation.	No change in effects relative to eastern site.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.11: Noise (cont.)			
4.11.2 (cont.)		Without noise controls or an enclosure, pump station equipment could result in noise levels in the range of 78 to 88 dBA at 3 to 5 feet from the source depending on the type and size (USEPA, 1971). Such noise levels would attenuate by distance to about 43 dBA Leq at the nearest residence, which when added to the existing ambient noise level results in a noise level of 55.3 dBA. This would be an increase of less than 0.1 dBA over existing monitored conditions, which would not be noticeable. Similar to the eastern site, the western site would be sufficiently distant from existing noise sensitive receptors to not result in a noticeable increase in ambient noise levels from pump operations. No change in conclusions or mitigation.	
4.11.3: Phase 2 Expansion construction would not expose persons to or generate excessive ground-borne vibration or ground-borne noise levels.	No	The location of the western site would be farther from sensitive receptors than the eastern site. Vibration levels at these receptors would not exceed the potential building damage threshold of 0.2 PPV or the annoyance threshold of 80 RMS. As with the eastern site, the western site would not generate excessive ground-borne vibration or noise levels. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.11.4: The Phase 2 Expansion alternatives would not make a cumulatively considerable contribution to noise levels during either construction or operation.	No	There are no other identified developments or public works projects proposed for construction during the same timeframe as, and in close proximity to, the western site. Based on review of probable future projects, construction activities at the western site would not produce noise effects to cause cumulatively significant daytime noise impact. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.12: Utilities and Public Service Systems			
4.12.1: Construction or operation of Phase 2 Expansion alternatives could temporarily disrupt utilities and public service systems such that a public health hazard could be created or an extended service disruption could result.	No	Like the Neroly High Lift Pump Station at the eastern site, the facility at the western site would be constructed on existing CCWD property (i.e., Neroly Blending Facility). The pipelines associated with the Neroly High Lift Pump Station at the eastern site would not be constructed, reducing adverse impacts associated with potential underground utility disturbances and service disruptions. The western site would reduce the potential for disruption of existing utility lines (surveyed or unsurveyed) or public services. However, in the larger context of the Phase 2 Expansion, there would be no change in conclusions or mitigation.	Somewhat reduced adverse effect relative to eastern site.
4.12.2: Phase 2 Expansion alternatives would not require or result in construction of new or expanded utility infrastructure or public service facilities that would result in substantial adverse physical impacts.	No	Like the Neroly High Lift Pump Station at the eastern site, the facility at the western site would be constructed on existing CCWD property, would not require new wastewater facilities for employees, and would not result in increased demand for fire protection, emergency medical, or law enforcement services. The western site would continue to drain as it currently does; features (e.g., swales) would be put in place to attenuate flows to match current stormwater drainage rates. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.12.3: Construction of the Phase 2 Expansion alternatives could increase solid waste generation such that the capacity of local landfills would be exceeded or the project would not comply with state regulations related to solid waste.	No	Excavation for construction of the western site would generate similar amounts of clean fill as the eastern site. Similar to the proposed side, clean fill would be stored and reused as backfill or sent to a recycling facility. No change in conclusions or mitigation.	No change in effects relative to eastern site.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.12: Utilities and Public Service Systems (cont.)			
4.12.4: Construction of the Phase 2 Expansion alternatives could make a cumulatively considerable contribution to cumulative effects on public services and utilities, or local landfill capacity.	No	Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be similar to those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.12.5s: The Phase 2 Expansion would not result in the wasteful, inefficient, or unnecessary consumption of energy or require the construction of additional energy infrastructure facilities that would have significant environmental effects.	No	The western site would utilize similar amounts of concrete and other construction materials as the eastern site, and would result in similar indirect energy consumption levels as a result of the energy required to produce the construction materials. Contra Costa County Ordinance 2004-16 would apply to the Neroly High Lift Pump Station regardless of location. Operational energy consumption for the pump station would be similar regardless of location. As with the eastern site, the western site would be located at an existing CCWD facility, resulting in negligible employee-related transportation fuel consumption associated with facility maintenance. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.13: Hazardous Materials / Public Health			
4.13.1: Construction of the Phase 2 Expansion alternatives would disturb subsurface soils and groundwater; if hazardous substances are present in the disturbed areas, construction workers and the public could be exposed to these substances.	No	As with the Neroly High Lift Pump Station at the eastern site, the facility at the western site would be constructed on existing CCWD property (i.e., Neroly Blending Facility). As noted in the Draft Supplement, the closest hazardous materials database site is the La Paloma High School/ Liberty Union Continuation High School site (a "no further action" site since 2007) in Brentwood, approximately 6 miles from the western site. The western site would be similarly distant from the database site as the eastern site. Development of the Neroly High Lift Pump Station would comply with hazardous materials and stormwater regulations regardless of location, and would be effective in reducing the potential adverse effects associated with transport, use, storage, and disposal of hazardous materials. The pipelines associated with the Neroly High Lift Pump Station at the eastern site would not be constructed, reducing potential adverse impacts associated with disturbance of subsurface soils and groundwater and possible exposure of unknown hazardous substances. Overall, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site.
4.13.2: Phase 2 Expansion construction and operation could, through routine transport, use or disposal, accidentally release hazardous materials, thereby exposing construction workers, project personnel, and the public to hazardous materials, or accidentally releasing hazardous materials into the soil, groundwater, and/or a nearby surface water body.	No	The western site would present the same potential as the eastern site to expose people and the environment to accidental releases of hazardous substances. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.13.3: Improper handling or use of flammable or combustible materials such as internal combustion equipment could result in wildland fires, exposing people or structures to a significant risk of loss, injury, or death.	No	The western site would present the same potential as the eastern site to expose people and structures to wildland fires due to construction-related activities such as welding, re-fueling, and use of fuel-motorized equipment. No change in conclusions or mitigation.	No change in effects relative to eastern site.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.13: Hazardous Materials / Public Health (cont.)			
4.13.4: Construction and operation of power supply facilities would not locate electrical transmission facilities within 150 feet of a school.	n/a	The Neroly High Lift Pump Station would not be located near a school; therefore, this impact statement is not applicable to this facility at the western site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.13.5: The Phase 2 Expansion alternatives would not contribute to cumulative impacts associated with release of hazardous materials or other hazards.	No	Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be the same as those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.13.6s: The Phase 2 Expansion alternatives would emit hazardous emissions or involve the handling of hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.	n/a	The Neroly High Lift Pump Station would not be located near a school; therefore, this impact statement is not applicable to this facility at the western site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.14: Visual/Aesthetic Resources			
4.14.1: The Phase 2 Expansion alternatives would not have a substantial, demonstrable negative aesthetic effect on a scenic vista or from a county-designated scenic highway or route.	No	The visual character of the landscape surrounding the Neroly High Lift Pump Station western site is generally open space, characterized by rolling grassland hills and low-density light industrial, residential, and institutional development on either side of the SR 4 corridor. To the west of Neroly Road, the landscape is characterized by the Union Pacific Railroad corridor; the four-lane SR 4; the one-story, industrial-type structures of the CCWD Neroly Blending Facility and Antioch Service Center; water storage tanks partially screened by a perimeter of trees; residential development tucked behind sound walls; and distant, rolling, and mostly undeveloped grassland hills. The visual quality of the area is representative of landscapes in the vicinity of SR 4 within portions of Antioch and Oakley. As described in the Draft Supplement for the eastern site and the Brentwood Pipeline alignment, the Neroly High Lift Pump Station western site would be within the foreground view from SR 4, which generally has high traffic volumes. Views toward the western site would be somewhat obstructed by terrain, but from vantage points near the western site on SR 4, the western site would be clearly visible and inclusive of views of the existing CCWD blending facility and Antioch Service Center. The duration of views would be limited, as motorists would be traveling at highway speeds. As described in the Draft Supplement Table 4.14-1, visual sensitivity from SR 4 would be low. Similar to the eastern site, the Neroly High Lift Pump Station at the western site would be located on CCWD property among existing Neroly Blending Facility and Antioch Service Center structures, and near existing large water storage tanks. The visual character of the blending facility and service center site is industrial in appearance featuring six one-story, concrete and steel structures, maintenance and materials storage yards, parking areas for maintenance trucks and employee vehicles, and denuded vegetated areas. The pump station would be built on the easternmost portion of the CCWD property in a vegetated area, approximately 400 feet west of SR 4.	Increased effect relative to eastern site, impact remains less than significant.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.14: Visual/Aesthetic Resources (cont.)			
4.14.1 (cont.)		Permanent above-ground structures would include an approximately 7,500 square foot, one-story facility, comprising an approximately 5,300 square foot pump room and an approximately 2,200 square foot electrical room. Buildings would be clad in split face and smooth face concrete masonry surfaces. Drivers along SR 4 could see these one-story structures in the foreground views. However, because the pump station structures would be similar to existing structures along SR 4 at this location, the visual contrast would be weak. The pump station structures would be in a low-lying area, and would be visible during a brief interval from SR 4. Therefore, the introduction of these new structures would result in a weak visual contrast with existing facilities, but would be briefly prominent in views from SR 4. The pump station facilities would not obstruct views of rolling hills from the highway. Therefore, the relative change in the views from SR 4, a County-designated scenic route, would be moderate. Given that the visual sensitivity is low, based upon the guidelines in Draft Supplement Table 4.14-2, the overall effect of the change would be Adverse, but Not Significant. Thus, like the eastern site, the Neroly High Lift Pump Station at the western site would result in a less-than-significant impact. No change to conclusions or mitigation.	
4.14.2: The Phase 2 Expansion alternatives would substantially degrade the existing visual character or quality of the site and its surroundings.	No	Nelson Ranch Park and the Delta de Anza Regional Trail are located near the Neroly High Lift Pump Station western site. Depending on the vantage point in Nelson Ranch Park, the western site would either be clearly visible (e.g., near the eastern basketball courts) or somewhat obscured from view due to distance and intervening topography (e.g., the playground). As described for the Brentwood Pipeline in the Draft Supplement, the western site would be in the foreground view from the Delta de Anza Regional Trail. In fact, placement of the pump station at the western site would require a minor rerouting of the trail around the western site (see Figure 2-12a). Views from the trail would be direct and generally unobstructed. The duration of views would be limited, as trail users would be in motion, walking, jogging, or cycling along the trail. As described in the Draft Supplement Table 4.14-1, visual sensitivity from the Delta de Anza Regional Trail would be moderate. During the 36-month pump station construction period, construction equipment, construction materials, and excavated stockpiled soils could degrade the existing visual character or quality of the site and its surroundings. As described for the eastern site, these impacts would be temporary, limited to the construction period. Construction activities largely would be visible to the public and recreational users, although site topography would provide some visual screening for nearby park uses and residences. The construction area would be fenced around the perimeter and screened from view. In addition, the visual appearance of the pump station construction would visually blend with maintenance and operations activities at the Antioch Service Center, including the use of the facility by large maintenance and construction vehicles and the construction stock yard appearance of the existing on-site materials storage facilities. As a result, the relative change in the fenced perimeter views of the pump station construction area from the Delta de Anza Regional Trail would be moderate. Given that the visual sensitivity of the trail is	Increased effect relative to eastern site, impact remains less than significant.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.14: Visual/Aesthetic Resources (cont.)			
4.14.2 (cont.)		moderate, based upon the guidelines in Draft Supplement Table 4.14-2, the visual effect of pump station construction at the western site would be Adverse, but Not Significant. As described under Impact 4.14.1 above, the pump station would include two one-story buildings clad in concrete masonry. Similar to the eastern site, the facility at the western site would be located on a denuded lot within an existing CCWD facility. Existing structures at the blending facility and service center include six one-story, industrial-style structures, maintenance and materials storage yards, parking areas for maintenance trucks and employee vehicles, and denuded vegetated areas. Similar to the eastern site, the Neroly High Lift Pump Station at the western site would be situated among and appear similar in scale and finish to these existing structures. Given its scale, construction, and location relative to existing structures, the new pump station would have weak visual contrast and would visually blend with existing facilities at this location. The relative change in visual/aesthetic character would be moderate. Given that the visual sensitivity of the Delta de Anza Regional Trail is moderate, based upon the guidelines in Table 4.14-2, the overall effect of the change would be Adverse, but Not Significant. Thus, like the eastern site, the Neroly High Lift Pump Station at the western site would result in a less-than-significant impact. No change to conclusions or mitigation.	
4.14.3: The Phase 2 Expansion alternatives would not create a new source of substantial light or glare.	No	Similar to the eastern site, the exterior lighting at the western site would not vary substantially from what is currently used at the existing site (i.e., the Neroly Blending Facility and Antioch Service Center). Exterior lighting would be generally shielded or downcast, such that the light is directed downwards. As with the eastern site, the western site would not create a new source of substantial light or glare. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.14.4: The Phase 2 Expansion alternatives would not make a cumulatively considerable contribution to adverse effects on visual/aesthetic resources in the project area or broader region.	No	Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be similar to those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.15: Recreation			
4.15.1: The Phase 2 Expansion alternatives would result in a short-term reduction of recreational opportunities in the project area due to closure of the watershed to the public during the construction period and other construction activities outside the watershed, but would enhance recreational opportunities in the long-term.	No	Development of the Neroly High Lift Pump Station at the western site would require permanently relocating approximately 500 linear feet of the Delta de Anza Regional Trail to the east of the project site (see Figure 2-12a). The disruptions to bicyclists and pedestrians due to temporary closure of a 0.5-mile segment of this trail (inclusive of the 500-foot linear segment affected by the western site) associated with construction of the Brentwood Pipeline was addressed in the Draft Supplement. Disruptions to trail access associated with construction at the western site would be similar to those addressed by the Brentwood Pipeline; however, the 500-foot segment trail closure associated with the western site construction would be lengthier because the pump station construction would extend over a 36-month period. Similar to the effects of closure of the	Increased adverse effect relative to eastern site, mitigable to less-than-significant level.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.15: Recreation (cont.)			
4.15.1 (cont.)		Los Vaqueros Watershed to recreational uses during construction in the Watershed, this extended trail closure could be a significant impact. The adverse effect on trail users would be offset by amendments to Mitigation Measure 4.15.1d, which would require CCWD to construct the re-routed portion of the Delta de Anza Trail prior to construction of the pump station to minimize disruptions to trail access for trail users. If the Delta de Anza trail is rerouted, CCWD also shall provide the EBRPD with a GIS data layer of the reroute to update regional trail maps to provide wayfinding directions to recreationists. The Neroly High Lift Pump Station western site would be located approximately 800 feet southeast of Nelson Ranch Park in Antioch. However, the pump station would not impede visitor use of Nelson Ranch Park, and would not affect visitor vehicle access to Nelson Ranch Park. The park entrance to Nelson Ranch Park is located on Wild Horse Road. Construction access to the Neroly High Lift Pump Station western site would be from the existing Diablo Water District service road that leads to the water storage tank site, located south of the western site, with service road access from Neroly Road. The effect on recreational opportunities at Nelson Ranch Park due to the development of the Neroly High Lift Pump Station at the western site would be less than significant Mitigation Measure 4.15.1d would be revised as follows: **Mitigation Measure 4.15.1d:** Before any portion(s) of the Delta de Anza Regional Trail is closed for work related to the Brentwood Pipeline <u>and/or Neroly High Lift Pump Station</u>, and/or if EBRPD's proposed Marsh Creek Trail extension to Discovery Bay is developed and open to the public before or during construction of the ECCID Intertie Pipeline, CCWD shall consult with EBRPD to prepare and implement a public outreach program to inform current and potential future trail users of the temporary closure<u>/rerouting</u> of the Delta de Anza Trail and/or Marsh Creek Trail extension, and inform potential trail users of detours accessible to pedestrian, bicyclists, and wheelchair users. The outreach program for the Delta de Anza Trail and/or Marsh Creek Trail extension closures shall be coordinated with EBRPD and shall include provisions for the posting of signage in the vicinity of the subject trail segment notifying users of impending trail closure and construction activities. The signs shall include information regarding the nature of construction activities, dates and duration of closure, and detour information. Signage shall be composed of or encased in weatherproof material, posted in conspicuous locations (e.g., park message boards, existing wayfinding signage, or kiosks), and maintained in good condition for the duration of the closure period. At the end of the closure period, CCWD or its contractors shall retrieve all notice materials. <u>Should the Delta de Anza Regional Trail require rerouting around the Neroly High Lift Pump Station (western site), CCWD shall construct the re-routed portion of the Delta de Anza Trail or shall provide an alternative temporary route during construction to maintain</u>	

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.15: Recreation (cont.)			
4.15.1 (cont.)		prior to construction of the pump station to minimize disruptions in trail service to recreationalists. In addition, if the Delta de Anza trail is rerouted, CCWD shall provide EBRPD with a GIS data layer of the reroute after construction is completed.	
4.15.2: The Phase 2 Expansion alternatives would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	No	Similar to the eastern site, construction of the Neroly High Lift Pump Station at the western site would not be expected to increase use of existing regional parks or recreational facilities. However, as described in the Draft Supplement related to construction of the Brentwood Pipeline, development of the Neroly High Lift Pump Station at the western site would require temporary closure of and rerouting of the Delta de Anza Trail. During closure periods, trail users would be displaced and expected to use nearby trails, sidewalks, and roadways. Displaced users would generally be small in number, and would not increase the use of existing facilities such that substantial physical deterioration of the facility would occur or be accelerated. The effects would be less than significant. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.15.3: No other reasonably foreseeable future projects would also reduce recreational opportunities in the project area, similar to those opportunities affected by the Phase 2 Expansion alternatives, or increase the use of existing neighborhood and regional parks or other recreational facilities; therefore, there does not appear to be the potential for the Phase 2 Expansion alternatives to contribute to a cumulative effect on recreation facilities, opportunities or experience.	No	Because the project-specific effects of the Neroly High-Lift Pump Station at the western site would result in temporary and localized impacts on recreational resources similar to those at the eastern site and for Brentwood Pipeline, the incremental contribution to cumulative impacts also would be similar. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.16: Cultural and Paleontological Resources			
4.16.1: Construction and management of Phase 2 Expansion components would cause a substantial adverse change in the significance of a historical and/or unique archaeological resource as defined in Section 15064.5 or historic property or historic district, as defined in Section 106 of the NHPA (36 CFR 800), or in a previously undiscovered cultural resource.	No	Similar to the eastern site, there is a low potential for undiscovered buried cultural resources within the western site footprint. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.16.2: Ground-disturbing activities could encounter and destroy paleontological resources in certain geologic formations underlying the Phase 2 Expansion area.	No	Similar to the eastern site, there is a low potential for undiscovered buried paleontological resources within the footprint of the western site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.16.3: Construction and management of Phase 2 Expansion components could disturb human remains, including those interred outside of formal cemeteries.	No	Similar to the eastern site, there are no known burial sites and a low potential for undiscovered buried cultural resources within the footprint of the western site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.16.4: Construction and management of Phase 2 Expansion components would contribute to adverse cumulative impacts to cultural and/or paleontological resources.	No	The western site would not increase the potential to contribute to adverse cumulative impacts on cultural or paleontological resources or on human burials. No change in conclusions or mitigation.	No change in effects relative to eastern site.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.17: Socioeconomic Effects			
4.17.1: Phase 2 Expansion construction could temporarily generate new income and local employment that could benefit Contra Costa County's economy.	No	Construction-related spending at the western site would generate similar levels of new income and local employment benefitting Contra Costa County's economy as at the eastern site. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.17.2: Loss of agricultural land use associated with Phase 2 Expansion construction and development could affect Contra Costa County and Alameda County's economy.	No	Similar to the eastern site, the Neroly High Lift Pump Station at the western site would be built on existing CCWD property, and would not adversely affect Important or Prime Farmland. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.17.3: Short-term loss of recreation income associated with Phase 2 Expansion construction could affect Contra Costa County's economy.	No	Construction of the Neroly High Lift Pump Station at the western site would involve rerouting approximately 500 feet of the Delta de Anza Regional Trail east of the project site (see Figure 2-12a). The regional bicycle trail would be rerouted prior to construction to avoid disruption to pedestrian and bicycle access. There is no fee collection associated with use of this regional trail. Rerouting this trail would not result in an economic or socioeconomic impact. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.17.4: Construction of the Phase 2 Expansion alternatives, when combined with construction of other future projects, could have a potentially beneficial effect on income and local employment.	No	Because the project-specific effects of the Neroly High Lift Pump Station at the western site would be the same as those at the eastern site, the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.17.5: Construction of the Phase 2 Expansion alternatives, when combined with construction of other future projects, could have a potential cumulative effect on Contra Costa County's economy as a result of permanent loss of agricultural land uses.	No	Similar to the eastern site, the Neroly High Lift Pump Station at the western site would be built on existing CCWD property, and would not adversely affect Important or Prime Farmland. The project-specific effects of the Neroly High Lift Pump Station at the western site would be the same as those at the eastern site, and the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
4.17.6 Construction of the Phase 2 Expansion alternatives, when combined with construction of other future projects, could have a potential cumulative effect on Contra Costa County's economy as a result of temporary recreational impacts.	No	The project-specific effects of the Neroly High Lift Pump Station at the western site would be the same as those at the eastern site, and the incremental contribution to cumulative impacts also would be the same. No change in conclusions or mitigation.	No change in effects relative to eastern site.
Section 4.18: Environmental Justice			
4.18.1: Construction and operation of the project alternatives would result in air quality, noise, and/or other environmental impacts related to traffic and other construction activities that would not disproportionately affect nearby minority and/or low-income communities.	No	The western site would be closer to sensitive receptors in Census Tracts 3020.09 and 3080.02 in Antioch, both of which have minority populations over 50 percent, which may result in increased exposure to Diesel Particulate Matter (DPM) from construction activities for these minority communities. The nearest receptors are residential uses on Le Conte Circle and Nelson Ranch Park. However, implementation of Mitigation Measure 4.10.3 described in Draft Supplement Section 4.10 would require construction equipment with either Tier 4 engines or particulate filters which would reduce exposure levels to DPM. This would reduce the impact on sensitive receptors such that the disproportionately high and adverse effect would be avoided. No change in conclusions or mitigation.	Increased effect relative to eastern site, but mitigable to less than significant.

TABLE A-1 (CONTINUED)
IMPACT ASSESSMENT FOR NEROLY HIGH LIFT PUMP STATION WESTERN SITE

Environmental Impact	Addressed in Draft?	Neroly High Lift Pump Station Western Site Impacts	Change in Impact
Section 4.18: Environmental Justice (cont.)			
4.18.2: Construction and operation of the project alternatives would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project.	No	Because the location of the Neroly High Lift Pump Station would not affect the Phase 2 Expansion's potential to affect local employment opportunities, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site
4.18.3: Construction and operation of the project alternatives when combined with construction of other past, present, and probable future projects, would result in air quality, noise, and/or other environmental impacts related to traffic and other construction activities that would not disproportionately affect nearby minority and/or low-income communities.	No	No other projects have been identified that would overlap in time and space with the Neroly High Lift Pump Station construction to generate cumulatively higher air pollutant and/or noise levels than this Phase 2 Expansion component alone; therefore, no cumulative air quality or noise impact would occur that would disproportionately affect nearby minority and/or low-income populations. No change in conclusions or mitigation.	No change in effects relative to eastern site
4.18.4: Construction and operation of the project alternatives, when combined with construction of other past, present, and probable future projects, would not disproportionately affect local employment opportunities for minority and/or low-income communities in the vicinity of the project.	No	Because the location of the Neroly High Lift Pump Station would not affect the Phase 2 Expansion's potential to affect local employment opportunities, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site
Section 4.19: Indian Trust Assets			
4.19.1: The Phase 2 Expansion would not affect Indian Trust Assets.	n/a	No change in effects on Indian Trust Assets since neither the east site nor the west site would affect Indian Trust Assets. No change in conclusions or mitigation.	No change in effects relative to eastern site
Section 4.20: Growth-Inducing Effects			
4.20.1: Construction and operation of the Phase 2 Expansion project would not result in direct or indirect growth-inducing effects.	n/a	Because the location of the Neroly High Lift Pump Station would not affect the Phase 2 Expansion's potential to induce growth, there would be no change in conclusions or mitigation.	No change in effects relative to eastern site

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RECLAMATION

Appendix B – Updated Modeling

Los Vaqueros Reservoir Expansion Project
Final Supplement to the Final Environmental Impact Statement
Final Environmental Impact Report

U.S. Department of the Interior February 2020

APPENDIX B
Updated Modeling

B-1 Updated Modeling Analyses

B-2 Updated EBMUD Component of Los Vaqueros Reservoir Expansion Project

B-3 Updated EBMUD Model Study Description and Assumptions; Model Results for Project at 190MGD versus Baseline at 190MGD

B-4 Updated EBMUD Model Results for Cumulative with Project versus Cumulative without Project

Note: In the Draft Supplement, analysis of the East Bay Municipal Utilities District (EBMUD) components of the Project was provided in Appendix A, with summaries of impact analyses for hydrology and water quality provided in Draft Supplement Section 4.2 (i.e., Impacts 4.2.6s and 4.2.7s, corresponding to "Impact WR-1" and "Impact WR-2," respectively in Draft Supplement Appendix A) and summaries of impact analyses for fisheries and aquatic resources provided in Draft Supplement Section 4.3 (i.e., Impacts 4.3.11s through 4.3.22s corresponding to "IMPACT MOKFISH-1" through "IMPACT MOKFISH-13," respectively in Draft Supplement Appendix A).

For this Final Supplement, the update to the Draft Supplement Appendix A EBMUD analysis is provided here as Appendix B-2 and throughout Appendix B-1, there are references to Appendix B-2 where updates to Impacts 4.2.6s, 4.2.7s, and 4.3.11s through 4.3.22s can be found.

EBMUD's modeling assumptions, updated modeling output and figures from the model simulations for evaluating the Existing Condition are in Appendix B-3. The updated modeling assumptions, modeling output and figures from the model simulations for evaluating the Cumulative Future Condition are in Appendix B-4.

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APPENDIX B-1
Updated Modeling Analyses

CCWD and the Local Agency Partners, in conjunction with Reclamation and the Refuge Water Supply Program, have made minor modifications to the assumptions regarding Alternative 1B operations analyzed in the Draft Supplement, in light of the California Water Commission's preliminary funding decisions for the Water Storage Investment Program announced in August 2018. New operations modeling that reflects these modifications has been completed, with the results presented here. This appendix is organized as follows:

Section B-1.1, Alternative 1B Operations Modeling Refinements: Description of the modifications to Alternative 1B that have been made since release of the Draft Supplement, and refined operations modeling related to these modifications. Some key modifications are:

- Removal of ECCID's pre-1914 water right as a potential source for water stored in Los Vaqueros Reservoir
- Modification of operational preferences for BAWSCA, EBMUD, and SFPUC, and addition of specific operational preferences for three SLDMWA member agencies: Del Puerto Water District (DPWD), San Luis Water District (SLWD), and Westlands Water District (WWD)
- Addition of third-party water transfers from willing sellers as a potential source of water for BAWSCA, Zone 7, and the Refuge Water Supply Program as well as ACWD and the SLDMWA member agencies, and analysis of the potential impacts of third-party water transfers to the Local Agency Partners and Refuges

These modified operational assumptions are also described in Section 5.2 of this Final Supplement.

Section B-1.2, Environmental Consequences Refinements: Updated Alternative 1B impact analysis for those impacts that have the potential to be affected by the modified operations. These include impacts on Delta hydrology and water quality (previously presented in Section 4.2 of the Draft Supplement) and on Delta fisheries and aquatic resources (Section 4.3 of the Draft Supplement). Because the text changes related to the analysis of greenhouse gas emissions resulting from refined operations assumptions are minor, the updated impacts analysis for greenhouse gases (previously in Section 4.10 of the Draft Supplement) is presented in Chapter 5 of the Final Supplement with other text revisions.

The updated fisheries impacts analyses in this Appendix include additional tables of modeling results as requested by the California Department of Fish and Wildlife (CDFW) in their comments on the Draft Supplement. Each of the additional modeling analyses suggested by CDFW was performed for Alternative 1B. In all cases, the results of the additional modeling analyses were consistent with and supported the conclusions of the Draft Supplement. This indicates that the modeling performed for the Draft Supplement is appropriate and adequately characterized the impacts of each of the Action Alternatives. Therefore, the additional modeling analyses have not been repeated for the remaining Action Alternatives.

The updated modeling and impacts analysis presented here indicate that the Draft Supplement captured the environmental impacts associated with Alternative 1B. The updated modeling does not indicate any new or substantially more severe significant impacts.

B-1.1 Alternative 1B Operations Modeling Refinements

This section describes the refinements to the operations modeling for Alternative 1B undertaken since the release of the Draft Supplement. The other action alternatives are not changed.

B-1.1.1 Bay Area Water Supply & Conservation Agency and San Francisco Public Utilities District

The refined operations modeling modifies the manner in which water would be delivered to BAWSCA and SFPUC, as well as adjusting the demands of SFPUC. SFPUC's need for water in all water year types remains 16.7 TAF/year, but the previously requested additional demands in drier years are no longer modeled. Alternative 1B seeks to meet this demand in all years with direct deliveries of Delta Surplus water. In the drier years identified by SFPUC, this demand would also be met using deliveries from Los Vaqueros storage. BAWSCA's water needs remain the same as described in the Draft Supplement, with an additional request to evaluate the ability to facilitate water transfers from willing sellers to help meet their dry year needs.

Water from the Phase 2 Expansion would be delivered to the SFPUC Regional Water System for SFPUC and BAWSCA through the Milpitas Intertie, or through exchange with ACWD's Hetch Hetchy water. In certain drought years, BAWSCA could also receive water through the Hayward Intertie.

B-1.1.2 East Bay Municipal Utility District

The refined operations modeling changes the preferred manner in which EBMUD would receive water delivered from the Phase 2 Expansion. The refined Alternative 1B prioritizes delivery of water to EBMUD through exchange, where CCWD uses EBMUD's water stored in Los Vaqueros Reservoir in lieu of diverting CCWD's CVP Contract water from the Delta and EBMUD diverts CCWD's CVP Contract water at Freeport Intake. Delivery of water through the EBMUD-CCWD Intertie that connects CCWD's Los Vaqueros Pipeline and EBMUD's Mokelumne Aqueduct #2 would only occur if the Freeport exchange mechanism was unavailable.

B-1.1.3 East Contra Costa County Irrigation District

The refined operations modeling does not include diversions of ECCID's pre-1914 water right to storage in Los Vaqueros Reservoir. This change is reflected in the updated Table 2-5 included in

Section 5.2 of this Final Supplement. Water stored for ECCID's water quality blending needs would be diverted under the other water rights identified in Table 2-3 of the Draft Supplement.

B-1.1.4 San Luis & Delta-Mendota Water Authority

The refined modeling for Alternative 1B includes specific operations of the Phase 2 Expansion for three SLDMWA member agencies (DPWD, SLWD, and WWD) as described in Section 5.2 of this Final Supplement. Phase 2 Expansion facilities would be used to help these agencies manage their existing water supplies by storing water in Los Vaqueros Reservoir when it is available for diversion from the Delta and delivering it during the irrigation season. The water delivered to DPWD, SLWD, and WWD would be diverted under their own CVP contracts or as transfer water acquired from Local Agency Partners or other willing sellers.

B-1.1.5 Third-Party Transfers

The use of the Phase 2 Expansion Project to facilitate third-party transfers for the Local Agency Partners, described in Appendix C of the Draft Supplement, are included in the impacts analysis for the refined operations of Alternative 1B. BAWSCA and Zone 7, as well as ACWD and SLDMWA as described in the Draft Supplement, specifically requested evaluation of the available capacity in Phase 2 Expansion operations and facilities to accommodate water transfers from willing sellers north of the Delta. The Refuge Water Supply Program also requested evaluation of using Phase 2 Expansion facilities to deliver up to 12.3 TAF/year of transfer water acquired from north-of-Delta sellers to meet south-of-Delta wildlife refuge Incremental Level 4 obligations in non-wet water years (i.e., above normal and drier years). The refined CalSim II results for Alternative 1B were post-processed to determine the potential amount of water transfers that the Phase 2 Expansion could facilitate for the south-of-Delta partners in general, without assigning specific priorities to any individual agency or wildlife refuge.

The Excel spreadsheet used to post-process the CalSim II operations modeling results for the Draft Supplement was updated and used to determine the maximum available capacity in the Los Vaqueros system to divert and store and deliver transfer water to the Local Agency Partners and Refuge Water Supply Program for the refined Alternative 1B under Existing, Future without Climate Change, and Future 2030 with Climate Change scenarios. Transfer water is assumed to be available between April and September each year, and the analysis was performed for the entire 1921-2003 CalSim II planning study period (compared to the shorter 1969-2003 period used in the Reclamation and SLDMWA's 2015 Long-Term Water Transfer Final EIS/EIR). Transfer water is diverted when intake water quality allows, in addition to when there is unused intake and pipeline capacity. Demands for transfer water south of the Delta were assumed to be essentially unlimited, so as not to constrain potential operations, even though in reality it is not expected that the all available capacity to facilitate water transfers would be fully utilized at all times, since there would not always be demand for or availability of transfer water. The maximum available capacity represents an upper bound on the amount of transfer water that could be delivered by the Phase 2 Expansion, subject to the necessary approvals and agreements involving the State Water Resources Control Board, willing sellers, individual Local Agency Partners, the Refuge Water Supply Program, and other regulatory agencies and stakeholders. This conservatively high estimate of diversions and use of facilities for water transfers is used in the analysis of potential impacts of Alternative 1B in this Final Supplement.

B-1.2 Environmental Consequences Refinements

This section updates the analysis of potential impacts on waterside resources of Phase 2 Expansion operations based on the refinements to the operations modeling for Alternative 1B. Only operational and not construction or facilities-related impacts are covered because the operational refinements do not include changes to any aspects of the construction of the Phase 2 Expansion facilities and therefore there are no changes to the construction impacts described in the Draft Supplement. The refinements to the proposed operations result in a slightly different timing, location, and quantity of Delta diversions by the Phase 2 Expansion, and the revised analysis of potential impacts of these operations to Delta hydrology and Delta fisheries and aquatic resources are discussed in this Appendix. The revised analysis of the potential impacts on greenhouse gas emissions due to the refinements to the operations of the Phase 2 Expansion facilities for Alternative 1B is discussed in Section 5.2 of this Final Supplement.

The methodology used to analyze the potential impacts of the revised Alternative 1B is the same as described in the Draft Supplement for the action alternatives. The Los Vaqueros Reservoir Expansion Project module of the CalSim II modeling platform was updated to incorporate the refinements to the operations, and the No Project/No Action Alternatives and the refined Alternative 1B operations scenarios were run for the Final Supplement using the updated operations model. The post-processor spreadsheet tool used to evaluate the ability of the Phase 2 Expansion to facilitate water transfers was also updated. The water transfers analysis provides an upper bound to the maximum available capacity to deliver transfer water to the Local Agency Partners and the Refuge Water Supply Program. Use of this maximum capacity is included in the revised Alternative 1B operations in order to provide an upper bound to the potential impacts on waterside resources.

The revised analysis does not result in changes to the impact determinations of the Draft Supplement; the refined operations do not result in new significant impacts or a substantial increase in the severity of previously identified impacts. Since the operational refinements do not result in changes to the impacts on Delta hydrology, no changes to the impacts on Delta water quality would follow, and therefore, the DSM2 Delta water quality modeling was not updated. The Delta water quality impacts analysis provided in the Draft Supplement remains valid. Because the impacts for Alternative 1B in the existing, future without climate change, and future with climate change conditions are all unchanged, the sensitivity studies run for the Draft Supplement to examine the cumulative effects of the Phase 2 Expansion with climate change (Chapter 5 of the Draft Supplement) and California WaterFix (Appendix B of the Draft Supplement) also were not updated.

B-1.2.1 Delta Hydrology and Water Quality

This section updates the impacts analysis for the Alternative 1B on Delta hydrology presented in Section 4.2 of the Draft Supplement to reflect the refinements to Alternative 1B. Potential impacts on Delta water quality are unchanged from those presented in the Draft Supplement since there is no change in the significance of the potential impacts on Delta hydrology due to the refined operations. Therefore, Tables 4.2-3 and 4.2-4 in the Draft Supplement remain unchanged.

Revised analysis for Impacts 4.2.1 through 4.2.5 is provided below. Revised analysis for Impacts 4.2.6s and 4.2.7s is provided in this Final Supplement in Appendix B-2, Updated EBMUD Component of Los Vaqueros Reservoir Project (see "Impact WR-1" and "Impact WR-2," respectively).

Impact 4.2.1: Neither the Phase 2 Expansion nor the Total Project would adversely alter deliveries of water to other users. (Less than Significant Impact)

The revised Tables 4.2-5 and 4.2-6 show the changes to diversions at CCWD and EBMUD intakes, Los Vaqueros storage, and deliveries to CCWD, Local Agency Partners, and Refuges based on the updated operations modeling results for refined Alternative 1B. The diversions and deliveries are shown both with and without the maximum possible use of Phase 2 Expansion facilities to move third-party transfer water, as described above in Section B-1.1.5. The increase in diversions and deliveries not including third-party transfers compared to the results shown in the Draft Supplement is largely due to the updated Local Agency Partners demands, which translate to more diversions of available water during Delta excess conditions. Carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that other beneficial uses of water would not be adversely impacted by the additional diversions to facilitate water transfers.

The revised Tables 4.2-7 through 4.2-20 show that the changes to Delta surplus, exports, carryover storage, Delta inflow, and Delta outflow are very small and similar to the modeling results shown in the Draft Supplement. The amounts of Delta surplus water diverted reported in revised Tables 4.2-7 and 4.2-8 in the No Project/No Action Alternatives are higher than reported in the Draft Supplement, because these values have been corrected to include all water diverted under Delta excess conditions at CCWD's Delta intakes; the total annual average amount diverted is 17 to 23 TAF higher across all the scenarios than was reported in the Draft Supplement. A large part of the increase in Delta surplus diverted under the refined Alternative 1B scenarios is due to this same correction in the calculation, with the remaining difference being due to the refined operations requested by the Local Agency Partners. Changes to Delta inflow and Delta outflow are also presented as monthly averages in revised Tables 4.3-8 through 4.3-11. In response to comment S_DWR_03, deliveries through the Transfer-Bethany Pipeline to the California Aqueduct are summarized by month in the new Tables 4.2-30 and 4.2-31 for the refined Alternative 1B operations both with and without potential third-party transfers (Draft Supplement Tables 4.2-21 through 4.2-29 remain unchanged). Phase 2 Expansion deliveries to Local Agency Partners and Refuges south of the Delta are very small relative to the capacity of the California Aqueduct near the Bethany Reservoir and would not impact other users of the California Aqueduct. Because the changes to these parameters are substantially the same as those disclosed in the Draft Supplement, the impact conclusion of Less than Significant is unchanged.

REVISED TABLE 4.2-5
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/NO ACTION ALTERNATIVE
SUMMARY OF DIVERSIONS, STORAGE, AND DELIVERIES (AVERAGE OVER ALL WATER YEAR TYPES)

		Rock Slough Intake Diversion [TAF/yr]	Old River Intake Diversions [TAF/yr]	Middle River Intake Diversions [TAF/yr]	Freeport Intake Diversions [TAF/yr]	Mokelumne Surplus Diversion [TAF/yr]	Diversions to Los Vaqueros Storage [TAF/yr]	Los Vaqueros Releases [TAF/yr]	Total Diversions from the Delta [TAF/yr]	Total Project Deliveries [TAF/yr]
Existing Condition	**100-TAF No Project/ No Action Alt**	**87**	**8**	**32**	**0**	**0**	**18**	**12**	**127**	**121**
	Alt. 1B without Transfers	143	17	46	12	5	38	28	219	209
	Alt. 1B with Transfers	145	42	57	12	5	43	28	256	240
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**108**	**9**	**37**	**0**	**0**	**20**	**14**	**155**	**149**
	Alt. 1B without Transfers	158	20	50	11	5	37	27	238	228
	Alt. 1B with Transfers	159	44	61	11	5	43	27	274	258

REVISED TABLE 4.2-6
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/NO ACTION ALTERNATIVE
SUMMARY OF DIVERSIONS, STORAGE, AND DELIVERIES (AVERAGE OVER ALL WATER YEAR TYPES)

		Rock Slough Intake Diversion [TAF/yr]	Old River Intake Diversions [TAF/yr]	Middle River Intake Diversions [TAF/yr]	Freeport Intake Diversions [TAF/yr]	Mokelumne Surplus Diversions [TAF/yr]	Diversions to Los Vaqueros Storage [TAF/yr]	Los Vaqueros Releases [TAF/yr]	Total Diversions from the Delta [TAF/yr]	Total Project Deliveries [TAF/yr]
Existing Condition	**160-TAF No Project/ No Action Alt**	86	9	34	0	0	20	12	129	121
	Alt. 1B without Transfers	143	17	46	12	5	38	28	219	209
	Alt. 1B with Transfers	145	42	57	12	5	43	28	256	240
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	107	10	39	0	0	23	15	157	149
	Alt. 1B without Transfers	158	20	50	11	5	37	27	238	228
	Alt. 1B with Transfers	159	44	61	11	5	43	27	274	258
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	107	10	40	0	0	25	17	157	149
	Alt. 1B without Transfers	155	19	51	11	5	39	28	236	226
	Alt. 1B with Transfers	156	47	63	11	5	45	28	277	260

REVISED TABLE 4.2-7
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT / NO ACTION ALTERNATIVE
SUMMARY OF DELTA SURPLUS WATER AVAILABLE AND THE AMOUNT OF DELTA SURPLUS WATER DIVERTED

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Existing Condition	**Delta Surplus Water Available [TAF]**		**2222**	**2393**	**2090**	**1376**	**867**	**336**	**58**	**21**	**18**	**24**	**178**	**998**	**10582**
	Delta Surplus Water Diverted [TAF]	100 TAF No Project/ No Action Alternative	5	5	0	12	11	7	1	1	3	0	2	4	52
		Alt. 1B	18	21	21	9	11	12	3	3	3	1	5	13	120
Future, Without Climate Change	**Delta Surplus Water Available [TAF]**		**2209**	**2373**	**2070**	**1396**	**856**	**325**	**56**	**19**	**14**	**24**	**168**	**988**	**10499**
	Delta Surplus Water Diverted [TAF]	100 TAF No Project/ No Action Alternative	6	7	1	14	13	7	1	1	3	0	3	5	62
		Alt. 1B	18	22	21	11	13	11	3	3	3	1	5	13	124

NOTE: Delta Surplus Water Diverted under Alternative 1B is the same with and without third-party transfers, which do not count as Delta Surplus water.

REVISED TABLE 4.2-8
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/NO ACTION ALTERNATIVE
SUMMARY OF DELTA SURPLUS WATER AVAILABLE AND THE AMOUNT OF DELTA SURPLUS WATER DIVERTED

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Existing Condition	**Delta Surplus Water Available [TAF]**		**2222**	**2392**	**2090**	**1377**	**866**	**336**	**58**	**20**	**18**	**24**	**178**	**998**	**10580**
	Delta Surplus Water Diverted [TAF]	160 TAF No Project / No Action Alternative	5	5	0	12	11	7	1	1	3	0	2	4	51
		Alt. 1B	18	21	21	9	11	12	3	3	3	1	5	13	120
Future, Without Climate Change	**Delta Surplus Water Available [TAF]**		**2208**	**2373**	**2070**	**1397**	**856**	**326**	**56**	**19**	**15**	**24**	**168**	**987**	**10498**
	Delta Surplus Water Diverted [TAF]	160 TAF No Project / No Action Alternative	6	7	0	14	14	7	1	2	3	0	3	5	62
		Alt. 1B	18	22	21	11	13	11	3	3	3	1	5	13	124
Future, with Climate Change 2030	**Delta Surplus Water Available [TAF]**		**2591**	**2743**	**2176**	**1189**	**472**	**93**	**4**	**4**	**5**	**40**	**191**	**1238**	**10745**
	Delta Surplus Water Diverted [TAF]	160 TAF No Project / No Action Alternative	6	6	1	13	13	5	0	1	2	0	2	5	55
		Alt. 1B	18	21	22	10	12	8	1	2	3	1	5	15	117

NOTE: Delta Surplus Water Diverted under Alternative 1B is the same with and without third-party transfers, which do not count as Delta Surplus water.

REVISED TABLE 4.2-9
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/NO ACTION ALTERNATIVE
SUMMARY OF CHANGES USED TO EVALUATE WATER DELIVERY TO OTHER USERS (ALL YEARS)

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**100-TAF No Project/ No Action Alt**	**4610**	**2652**	**7469**	**15717**	**3085**	**15818**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.3%	0.0%	-0.1%	0.0%	0.0%	-0.5%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**4684**	**2645**	**7381**	**15250**	**3137**	**15741**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.3%	0.0%	0.0%	0.0%	0.0%	-0.4%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

REVISED TABLE 4.2-10
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/NO ACTION ALTERNATIVE
SUMMARY OF CHANGES USED TO EVALUATE WATER DELIVERY TO OTHER USERS (ALL YEARS)

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**160-TAF No Project/ No Action Alt**	**4610**	**2652**	**7464**	**15718**	**3085**	**15817**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.3%	0.0%	0.0%	-0.1%	0.0%	-0.5%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**4684**	**2645**	**7377**	**15250**	**3137**	**15739**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.3%	0.0%	0.0%	-0.1%	0.0%	-0.4%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**4561**	**2591**	**6715**	**15227**	**3353**	**16768**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.0%	-0.1%	-0.1%	0.0%	-0.4%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

REVISED TABLE 4.2-11
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/NO ACTION ALTERNATIVE
WET YEAR ANNUAL AVERAGES OF CHANGES USED TO EVALUATE WATER DELIVERY TO OTHER USERS

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**100-TAF No Project/ No Action Alt**	**5263**	**3466**	**9859**	**23207**	**5393**	**28916**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.4%	0.0%	-0.1%	0.0%	0.0%	-0.5%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**5378**	**3468**	**9835**	**22509**	**5460**	**28767**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.4%	-0.1%	-0.1%	0.0%	0.0%	-0.4%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

REVISED TABLE 4.2-12
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/NO ACTION ALTERNATIVE
WET YEAR ANNUAL AVERAGES OF CHANGES USED TO EVALUATE WATER DELIVERY TO OTHER USERS

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**160-TAF No Project/ No Action Alt**	**5263**	**3467**	**9857**	**23207**	**5393**	**28912**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.4%	0.0%	-0.1%	0.0%	0.0%	-0.4%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**5378**	**3467**	**9834**	**22508**	**5460**	**28762**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.4%	-0.1%	-0.1%	0.0%	0.0%	-0.4%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**5226**	**3440**	**8670**	**22345**	**6048**	**31333**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.3%	0.0%	-0.2%	0.0%	0.0%	-0.3%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

Revised Table 4.2-13
Total Project Compared to 100-TAF No Project/No Action Alternative
Above Normal Year Annual Averages of Changes Used to Evaluate Water Delivery to Other Users

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**100-TAF No Project/ No Action Alt**	**4902**	**3015**	**8499**	**18010**	**2969**	**17371**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.6%	0.1%	-0.1%	-0.1%	0.0%	-0.4%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**5012**	**3031**	**8414**	**17406**	**3047**	**17268**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.5%	0.1%	-0.1%	0.0%	0.0%	-0.3%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

[1] Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
[2] Total SWP deliveries include Table A, Article 56 and Article 21
[3] CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

Revised Table 4.2-14
Incremental Phase 2 Expansion Compared to 160-TAF No Project/No Action Alternative[1]
Above Normal Year Annual Averages of Changes Used to Evaluate Water Delivery to Other Users

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**160-TAF No Project/ No Action Alt**	**4902**	**3015**	**8496**	**18014**	**2969**	**17368**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.6%	0.1%	-0.1%	-0.1%	0.0%	-0.4%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**5011**	**3032**	**8411**	**17409**	**3047**	**17265**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.5%	0.1%	0.0%	0.0%	0.0%	-0.3%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**4970**	**3026**	**7632**	**17307**	**3384**	**18139**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.5%	-0.1%	-0.1%	0.0%	0.0%	-0.4%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

Revised Table 4.2-15
Total Project Compared to 100-TAF No Project/No Action Alternative
Below Normal Year Annual Averages of Changes Used to Evaluate Water Delivery to Other Users

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**100-TAF No Project/ No Action Alt**	**4537**	**2720**	**7277**	**13029**	**2401**	**10158**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.3%	-0.1%	-0.1%	0.0%	0.0%	-0.5%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**4606**	**2725**	**7180**	**12643**	**2456**	**10109**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.3%	-0.1%	0.0%	-0.1%	0.0%	-0.5%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

Alt. = alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand acre-feet

REVISED TABLE 4.2-16
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/NO ACTION ALTERNATIVE
BELOW NORMAL YEAR ANNUAL AVERAGES OF CHANGES USED TO EVALUATE WATER DELIVERY TO OTHER USERS

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**160-TAF No Project/ No Action Alt**	**4537**	**2718**	**7269**	**13031**	**2401**	**10156**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.3%	0.0%	0.0%	-0.1%	0.0%	-0.5%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**4606**	**2725**	**7171**	**12648**	**2456**	**10108**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.3%	-0.1%	0.2%	-0.2%	0.0%	-0.5%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**4406**	**2662**	**6490**	**12809**	**2446**	**10761**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.0%	-0.1%	-0.1%	0.0%	-0.5%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

REVISED TABLE 4.2-17
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/NO ACTION ALTERNATIVE
DRY YEAR ANNUAL AVERAGES OF CHANGES USED TO EVALUATE WATER DELIVERY TO OTHER USERS

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**100-TAF No Project/ No Action Alt**	**4285**	**2178**	**5893**	**10706**	**1625**	**7394**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.1%	-0.2%	-0.1%	0.0%	-0.6%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**4314**	**2130**	**5777**	**10405**	**1658**	**7379**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.0%	0.0%	0.0%	-0.5%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

REVISED TABLE 4.2-18
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/NO ACTION ALTERNATIVE
DRY YEAR ANNUAL AVERAGES OF CHANGES USED TO EVALUATE WATER DELIVERY TO OTHER USERS

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**160-TAF No Project/ No Action Alt**	**4285**	**2177**	**5885**	**10706**	**1625**	**7395**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.1%	-0.1%	-0.1%	0.0%	-0.6%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**4314**	**2131**	**5771**	**10405**	**1658**	**7380**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.1%	0.1%	0.0%	0.0%	-0.5%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**4126**	**1995**	**5434**	**10598**	**1681**	**7916**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.1%	0.0%	-0.1%	0.0%	-0.4%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

Revised Table 4.2-19
Total Project Compared to 100-TAF No Project/No Action Alternative
Critical Year Annual Averages of Changes Used to Evaluate Water Delivery to Other Users

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**100-TAF No Project/ No Action Alt**	**3478**	**1156**	**3849**	**7847**	**1186**	**5128**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.2%	0.3%	0.0%	0.0%	-0.5%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**3500**	**1156**	**3674**	**7673**	**1207**	**5104**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.3%	0.3%	-0.1%	0.0%	-0.5%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

1 Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
2 Total SWP deliveries include Table A, Article 56 and Article 21
3 CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

REVISED TABLE 4.2-20
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/NO ACTION ALTERNATIVE
CRITICAL YEAR ANNUAL AVERAGES OF CHANGES USED TO EVALUATE WATER DELIVERY TO OTHER USERS

		Annual CVP Deliveries[1] [TAF]	Annual SWP Deliveries[2] [TAF]	CVP and SWP Carry-over Storage[3] [TAF]	Sacramento River Inflow to the Delta [TAF]	San Joaquin River Flow at Vernalis [TAF]	Net Delta Outflow [TAF]
Existing Condition	**160-TAF No Project/ No Action Alt**	**3478**	**1156**	**3844**	**7847**	**1186**	**5128**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.2%	0.4%	0.0%	0.0%	-0.5%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**3500**	**1155**	**3668**	**7672**	**1207**	**5105**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.5%	0.4%	-0.1%	0.0%	-0.5%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**3564**	**1079**	**3756**	**7915**	**1219**	**5369**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.6%	-0.3%	0.0%	0.0%	-0.3%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not affected.

[1] Total CVP deliveries include total agricultural, refuge, municipal and industrial deliveries.
[2] Total SWP deliveries include Table A, Article 56 and Article 21
[3] CVP and SWP carry-over storage includes storage in Shasta, Trinity, Oroville, Folsom and San Luis reservoirs.

% = percent
Alt. = Alternative
CVP = Central Valley Project
SWP = State Water Project
TAF = thousand-acre foot (feet)

**TABLE 4.2-30
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE[1]
SUMMARY OF AVERAGE TRANSFER-BETHANY PIPELINE DELIVERIES [TAF/MONTH]**

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Existing Condition	**100-TAF No Project/ No Action Alt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Alt. 1B without Transfers	13	12	15	10	4	6	5	7	4	2	4	8	91
	Alt. 1B with Transfers	13	12	15	11	4	7	18	17	13	4	5	8	128
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Alt. 1B without Transfers	12	11	14	9	3	4	5	7	5	3	3	8	82
	Alt. 1B with Transfers	12	11	14	9	3	5	18	17	13	4	4	8	117

**REVISED TABLE 4.2-31
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
SUMMARY OF AVERAGE TRANSFER-BETHANY PIPELINE DELIVERIES [TAF/MONTH]**

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Existing Condition	**160-TAF No Project/ No Action Alt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Alt. 1B without Transfers	13	12	15	10	4	6	5	7	4	2	4	8	91
	Alt. 1B with Transfers	13	12	15	11	4	7	18	17	13	4	5	8	128
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Alt. 1B without Transfers	12	11	14	9	3	4	5	7	5	3	3	8	82
	Alt. 1B with Transfers	12	11	14	9	3	5	18	17	13	4	4	8	117
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Alt. 1B without Transfers	12	11	13	8	2	4	4	6	5	3	4	8	80
	Alt. 1B with Transfers	12	11	13	9	3	5	18	17	14	5	4	8	119

Impact 4.2.2: Neither the Phase 2 Expansion nor the Total Project would result in significant adverse changes in Delta water quality causing the exceedance of a water quality objective. (Less than Significant Impact)

As was the case for the operations modeling results for the Draft Supplement, the changes due to the refined Alternative 1B operations in the Delta hydrology and flow parameters described above are small and non-significant, and therefore the changes in Delta water quality causing exceedance of water quality objectives would also be small and the impacts determination of less than significant is unchanged.

Impact 4.2.3: Neither the Phase 2 Expansion nor the Total Project would result in changes to Delta water quality that would result in significant adverse effects on beneficial uses. (Less than Significant Impact)

As was the case for the operations modeling results for the Draft Supplement, the changes due to the refined Alternative 1B operations in the Delta hydrology and flow parameters described above are small and non-significant, and therefore the changes in Delta water quality causing adverse effects on beneficial uses would also be small and the impacts determination of less than significant is unchanged.

Impact 4.2.4: Diversions of Delta water under the Phase 2 Expansion or the Total Project would not result in a significant reduction of Delta water levels. (Less than Significant Impact)

As was the case in the Draft Supplement, the changes due to the refined Alternative 1B operations in the Delta hydrology and flow parameters described above are small and non-significant, and therefore the changes in Delta water levels would also be small and the impact determination of less than significant is unchanged.

Impact 4.2.5: Neither the Phase 2 Expansion nor the Total Project would result in a cumulatively considerable contribution to significant adverse cumulative effects on deliveries of water to other users, changes in Delta water quality, change in Delta water levels, changes in groundwater recharge due to changes in Mokelumne River flows, and changes in flooding potential due to changes in Mokelumne River flows. (Less than Significant Impact)

The analyses of potential cumulative effects on deliveries to other users, changes in Delta water quality, and changes in Delta water levels are unchanged from the Draft Supplement. The potential for cumulative changes in Mokelumne River flow to affect groundwater recharge or flooding is less than significant, as detailed in the discussion under "Impact WR-CUM-1" and "Impact WR-CUM-2" in Appendix B-2, Updated EBMUD Component of Los Vaqueros Reservoir Expansion Project. The impact determination of less than significant is unchanged.

B-1.2.2 Delta Fisheries and Aquatic Resources

This section updates the impacts analysis for the Alternative 1B on Delta Fisheries and Aquatic Resources presented in Section 4.3 of the Draft Supplement to reflect the refinements to Alternative 1B. Potential impacts on Delta fisheries and aquatic resources are unchanged from those presented in the Draft Supplement since there is no change in the significance of the potential impacts on Delta fisheries and aquatic resources due to the refined operations. Therefore, Tables 4.3-4 and 4.3-5 in the Draft Supplement remain unchanged. For the same reasons described in Draft Supplement Section 4.3, Impacts 4.3.1 through 4.3.5 and 4.3.8 are no longer applicable to the Project and so no impact would occur with respect to these topics. These impacts are not discussed further.

Revised analysis for Impacts 4.3.6, 4.3.7, 4.3.9, and 4.3.10s is provided below. Revised analysis for Impacts 4.3.11s through 4.3.22s is provided in this Final Supplement in Appendix B-2, Updated EBMUD Component of the Los Vaqueros Reservoir Expansion Project (see "Impact MOKFISH-1" through "Impact MOKFISH-13," respectively).[1]

Impact 4.3.6: Operation of the Phase 2 Expansion alternatives would not result in changes to Delta hydrologic or hydrodynamic conditions that affect Delta fish populations or quality and quantity of aquatic habitat within the Sacramento-San Joaquin River system, including the Delta (Less than Significant)

The revised Tables 4.3-6 through 4.3-15 show that, for the refined Alternative 1B, the changes to Delta inflow, Delta outflow, X2 position, Export/Inflow ratio, and OMR flow are very small and similar to the modeling results shown in the Draft Supplement. In response to comment S_CDFW_09, the parameter QWEST, the net flow in the lower San Joaquin River at Jersey Point, has been added to revised Tables 4.3-6 and 4.3-7 and new Tables 4.3-24A through 4.3-24F and 4.3-25A through 4.3-25F have been added. At the location where QWEST is calculated, tidal velocities range from approximately +200,000 cfs (westward towards the San Francisco Bay) to -200,000 cfs (eastward), and the changes to QWEST due to Phase 2 Expansion operations are small in the context of overall flow. In response to comments S_CDFW_09 and S_CDFW_11, Delta outflow, X2 position, QWEST, and OMR flow are summarized by water year type in new Tables 4.3-10B through 4.3-10F, 4.3-11B through 4.3-11F, 4.3-12B through 4.3-12F, 4.3-13B through 4.3-13F, 4.3-24A through 4.3-24F, 4.3-25A through 4.3-25F, 4.3-16B through 4.3-16F, and 4.3-17B through 4.3-17F. Because the changes to these flow parameters are substantially the same as those disclosed in the Draft Supplement, the impact conclusion of Less than Significant is unchanged.

[1] Note that Draft Supplement Section 4.3 incorporated EBMUD's "MOKFISH" impacts in Draft Supplement Appendix A by renumbering them, with Impact 4.3.11s corresponding to "Impact MOKFISH-1," 4.3.12s corresponding to "Impact MOKFISH-2," and so on. However, Draft Supplement Section 4.3 inadvertently omitted "Impact MOKFISH-5" and so no impact number in the Supplement's numbering scheme corresponds to that impact. Regardless, adequate information about this less-than-significant impact was provided in the draft, and modeling updates have resulted in no change to the "Impact MOKFISH-5" analysis (which is in regard to reduced mobilization of substrate for salmonid spawning habitat maintenance).

REVISED TABLE 4.3-6
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
SUMMARY OF CHANGES USED TO EVALUATE HYDRODYNAMIC CONDITIONS THAT AFFECT DELTA FISH POPULATIONS AND QUALITY OF AQUATIC HABITAT QUALITY OF AQUATIC HABITAT IN THE DELTA (ALL YEARS)

		Delta Inflow[1] [cfs]	Delta Outflow[2] [cfs]	X2 Position [km]	Export /Inflow Ratio	QWEST [cfs]	OMR[3] [cfs]
Existing Condition	**100-TAF No Project/ No Action Alt**	30419	22007	74	0.32	**2668**	**-2701**
Percent Change from 100-TAF No Project/No Action Alt	Alt. 1B	-0.1%	-0.5%	0.1%	0.8%	-3.4%	0.2%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	30318	21900	74	0.32	2571	-2665
Percent Change from 100-TAF No Project/No Action Alt	Alt. 1B	-0.1%	-0.4%	0.1%	0.7%	-3.1%	0.1%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

1 Includes flows from Sacramento River and San Joaquin River
2 Outflow decreases primarily during times of Delta surplus. See Chapter 2 for description of Delta surplus conditions.
3 Dec-Jun for all years. Positive percent increase indicates a potential environmental benefit as OMR is regulated as a negative number

REVISED TABLE 4.3-7
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE SUMMARY OF CHANGES USED TO EVALUATE HYDRODYNAMIC CONDITIONS THAT AFFECT DELTA FISH POPULATIONS AND QUALITY OF AQUATIC HABITAT QUALITY OF AQUATIC HABITAT IN THE DELTA (ALL YEARS)

		Delta Inflow[1] [cfs]	Delta Outflow[2] [cfs]	X2 Position [km]	Export/Inflow Ratio	QWEST [cfs]	OMR[3] [cfs]
Existing Condition	**160-TAF No Project/ No Action**	30419	22005	74	0.32	**2666**	**-2701**
Percent Change from 160-TAF No Project/No Action Alt	Alt. 1B	-0.1%	-0.5%	0.1%	0.8%	-3.3%	0.2%
Future, Without Climate Change	**160-TAF No Project/ No Action**	30318	21898	74	0.32	**2569**	**-2666**
Percent Change from 160-TAF No Project/No Action Alt	Alt. 1B	-0.1%	-0.4%	0.1%	0.7%	-3.0%	0.1%
Future, with Climate Change 2030	**160-TAF No Project/ No Action**	31540	23353	74	0.30	**3132**	**-2218**
Percent Change from 160-TAF No Project/No Action Alt	Alt. 1B	-0.1%	-0.4%	0.1%	0.7%	-2.4%	0.3%

NOTES:

The changes to these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

1 Includes flows from Sacramento River and San Joaquin River
2 Outflow decreases primarily during times of Delta surplus. See Chapter 2 for description of Delta surplus conditions.
3 Dec-Jun for all years. Positive percent increase indicates a potential environmental benefit as OMR is regulated as a negative number

REVISED TABLE 4.3-8
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGES TO DELTA INFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**47392**	**59215**	**50171**	**34685**	**26999**	**22091**	**22208**	**16805**	**21114**	**14486**	**19944**	**29915**
Percent Change from 100-TAF No Project/No Action Alt	Alt. 1B	-0.2%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.3%	0.5%	-0.1%	-0.5%	-0.1%	-0.3%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**47209**	**58868**	**49904**	**35340**	**26771**	**21998**	**22058**	**16715**	**21026**	**14374**	**19817**	**29740**
Percent Change from 100-TAF No Project/No Action Alt	Alt. 1B	-0.2%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.0%	-0.4%	-0.1%	-0.2%

NOTE: The changes to Delta Inflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Inflow is not adversely affected.

REVISED TABLE 4.3-9
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGES IN DELTA INFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**47387**	**59211**	**50159**	**34686**	**27001**	**22088**	**22214**	**16808**	**21120**	**14498**	**19949**	**29906**
Percent Change from 160-TAF No Project/No Action Alt	Alt. 1B	-0.2%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.5%	-0.2%	-0.6%	-0.2%	-0.3%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**47196**	**58865**	**49899**	**35334**	**26773**	**21999**	**22061**	**16719**	**21035**	**14380**	**19831**	**29728**
Percent Change from 160-TAF No Project/No Action Alt	Alt. 1B	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	0.0%	-0.5%	-0.2%	-0.2%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**54142**	**69290**	**56160**	**34480**	**21458**	**17021**	**21289**	**16256**	**20442**	**14512**	**19830**	**33603**
Percent Change from 160-TAF No Project/No Action Alt	Alt. 1B	-0.1%	-0.1%	0.0%	0.0%	-0.1%	-0.1%	0.0%	0.3%	0.1%	-0.2%	-0.4%	-0.2%

NOTE: The changes to Delta Inflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Inflow is not adversely affected.

REVISED TABLE 4.3-10
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGES IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**42021**	**52917**	**42824**	**30905**	**22357**	**12678**	**7936**	**4203**	**9749**	**6067**	**11517**	**20914**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.5%	-0.5%	-0.8%	0.2%	0.0%	-0.9%	-0.3%	-0.6%	0.1%	-0.4%	-0.6%	-0.9%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**41818**	**52562**	**42564**	**31300**	**22107**	**12528**	**7877**	**4173**	**9739**	**6035**	**11375**	**20728**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.5%	-0.5%	-0.8%	0.2%	0.0%	-0.6%	-0.3%	-0.6%	0.2%	-0.6%	-0.4%	-0.8%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-10B
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
WET YEAR MONTHLY AVERAGE CHANGES IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**84030**	**96415**	**79486**	**55467**	**40297**	**23197**	**11496**	**5068**	**19499**	**7766**	**17461**	**42742**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.4%	-0.5%	-0.5%	0.1%	-0.1%	-1.0%	-0.6%	-1.7%	0.2%	-0.8%	-0.8%	-1.0%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**83567**	**95871**	**79157**	**56223**	**39965**	**22845**	**11348**	**4989**	**19543**	**7736**	**17113**	**42111**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.4%	-0.5%	-0.5%	0.1%	-0.1%	-0.8%	-0.7%	-1.8%	0.3%	-0.7%	-0.4%	-0.8%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-10C
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGES IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**46550**	**61521**	**52193**	**33225**	**24318**	**11616**	**9564**	**4000**	**11797**	**5353**	**11792**	**17838**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.6%	-0.4%	-0.9%	0.2%	0.4%	-0.9%	0.0%	0.0%	0.0%	-0.3%	-0.8%	-0.6%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**46231**	**61097**	**51632**	**33688**	**23979**	**11479**	**9500**	**4000**	**11810**	**5324**	**11621**	**17707**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.2%	-0.5%	-0.8%	0.3%	0.3%	-0.7%	0.0%	0.0%	0.1%	-0.1%	-1.2%	-0.9%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-10D
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
BELOW NORMAL YEAR MONTHLY AVERAGE CHANGES IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**21999**	**36191**	**22861**	**22888**	**16579**	**8043**	**7074**	**4000**	**4064**	**5482**	**8677**	**11879**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.8%	-0.7%	-1.4%	0.4%	0.2%	-0.8%	0.0%	0.0%	-0.1%	-0.4%	-0.2%	-1.0%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**21915**	**35810**	**22791**	**23207**	**16244**	**7948**	**7050**	**4002**	**3984**	**5473**	**8681**	**11810**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.7%	-0.6%	-1.5%	0.4%	0.2%	-0.4%	0.0%	0.0%	-0.5%	-0.7%	-0.5%	-1.0%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-10E
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
DRY YEAR MONTHLY AVERAGE CHANGES IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**14333**	**22990**	**19802**	**14685**	**10517**	**6667**	**5000**	**3769**	**3210**	**5298**	**8522**	**8604**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-1.0%	-0.9%	-1.4%	0.3%	0.1%	-0.5%	0.0%	-0.2%	-0.1%	-0.3%	-0.1%	-1.0%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**14403**	**22738**	**19668**	**14798**	**10383**	**6677**	**5000**	**3728**	**3166**	**5248**	**8502**	**8824**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.9%	-0.9%	-1.4%	0.3%	0.2%	-0.1%	0.0%	-0.2%	0.6%	0.1%	-0.2%	-1.0%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-10F
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
CRITICALLY DRY YEAR MONTHLY AVERAGE CHANGES IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**11360**	**14472**	**11842**	**9053**	**6026**	**5369**	**4005**	**3421**	**3014**	**4936**	**6172**	**5699**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-0.8%	-1.1%	-1.5%	-0.4%	-0.3%	-0.2%	0.2%	0.6%	-0.5%	0.4%	-0.1%	0.5%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**11290**	**14467**	**11624**	**9107**	**5967**	**5342**	**4012**	**3445**	**3000**	**4895**	**6151**	**5681**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	-1.2%	-0.9%	-1.2%	-0.3%	-0.2%	0.0%	0.1%	0.7%	0.0%	-1.3%	0.1%	0.7%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

REVISED TABLE 4.3-11
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGE IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**42014**	**52914**	**42818**	**30907**	**22355**	**12675**	**7934**	**4202**	**9749**	**6069**	**11514**	**20907**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.5%	-0.5%	-0.8%	0.2%	0.0%	-0.8%	-0.2%	-0.6%	0.1%	-0.4%	-0.5%	-0.9%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**41801**	**52561**	**42566**	**31303**	**22104**	**12529**	**7872**	**4169**	**9744**	**6031**	**11376**	**20715**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.5%	-0.5%	-0.8%	0.2%	0.0%	-0.6%	-0.3%	-0.5%	0.1%	-0.5%	-0.4%	-0.7%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**48748**	**62948**	**48658**	**30257**	**16587**	**8133**	**8044**	**4016**	**9497**	**7183**	**11240**	**24929**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.4%	-0.4%	-0.7%	0.2%	0.0%	-0.5%	0.0%	-0.3%	0.3%	-0.4%	-0.6%	-0.7%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-11B
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
WET YEAR MONTHLY AVERAGE CHANGE IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**84021**	**96397**	**79483**	**55470**	**40292**	**23197**	**11490**	**5066**	**19505**	**7771**	**17445**	**42726**
Percent Change from 160-TAF No Project/No Action Alt	Alt. 1B	-0.4%	-0.4%	-0.5%	0.1%	-0.1%	-1.0%	-0.6%	-1.6%	0.1%	-0.8%	-0.7%	-1.0%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**83539**	**95850**	**79155**	**56226**	**39961**	**22845**	**11341**	**4978**	**19558**	**7740**	**17106**	**42079**
Percent Change from 160-TAF No Project/No Action Alt	Alt. 1B	-0.4%	-0.4%	-0.5%	0.1%	-0.1%	-0.8%	-0.6%	-1.6%	0.2%	-0.8%	-0.4%	-0.8%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**101326**	**119909**	**88591**	**56072**	**27330**	**11180**	**10751**	**4189**	**19919**	**9337**	**18778**	**56701**
Percent Change from 160-TAF No Project/No Action Alt	Alt. 1B	-0.4%	-0.3%	-0.5%	0.1%	-0.2%	-0.9%	0.0%	-1.4%	0.3%	-0.6%	-0.7%	-0.6%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-11C
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGE IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**46539**	**61520**	**52177**	**33223**	**24320**	**11598**	**9567**	**4000**	**11784**	**5351**	**11801**	**17838**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.6%	-0.4%	-0.9%	0.2%	0.4%	-0.8%	0.0%	0.0%	0.1%	-0.3%	-0.9%	-0.6%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**46217**	**61101**	**51623**	**33689**	**23972**	**11480**	**9482**	**4000**	**11810**	**5322**	**11628**	**17688**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.2%	-0.5%	-0.8%	0.3%	0.4%	-0.7%	0.1%	0.0%	0.1%	0.0%	-1.2%	-0.8%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**54631**	**69684**	**60558**	**29766**	**18133**	**7620**	**10507**	**4018**	**11211**	**6767**	**8657**	**21099**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.4%	-0.5%	-0.7%	0.4%	0.1%	-0.6%	-0.7%	-0.3%	0.2%	-0.1%	-0.4%	-0.9%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-11D
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
BELOW NORMAL YEAR MONTHLY AVERAGE CHANGE IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**22000**	**36187**	**22847**	**22895**	**16579**	**8043**	**7073**	**4000**	**4067**	**5483**	**8675**	**11870**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.8%	-0.7%	-1.4%	0.4%	0.2%	-0.8%	0.0%	0.0%	-0.1%	-0.4%	-0.2%	-0.9%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**21915**	**35814**	**22790**	**23214**	**16239**	**7948**	**7048**	**4000**	**3984**	**5462**	**8690**	**11798**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.7%	-0.6%	-1.5%	0.4%	0.2%	-0.4%	0.0%	0.0%	-0.5%	-0.5%	-0.6%	-0.9%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**24003**	**39487**	**30942**	**22917**	**13955**	**6445**	**8025**	**4066**	**3474**	**6880**	**9485**	**10052**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.6%	-0.8%	-1.0%	0.0%	0.1%	-0.3%	0.3%	-0.8%	0.3%	-0.2%	-0.8%	-1.3%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-11E
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
DRY YEAR MONTHLY AVERAGE CHANGE IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**14333**	**23002**	**19802**	**14684**	**10516**	**6667**	**5000**	**3768**	**3211**	**5299**	**8524**	**8601**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-1.0%	-0.9%	-1.4%	0.3%	0.1%	-0.5%	0.0%	-0.1%	-0.1%	-0.3%	-0.2%	-0.9%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**14401**	**22743**	**19670**	**14801**	**10384**	**6682**	**5000**	**3728**	**3167**	**5248**	**8502**	**8825**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.9%	-1.0%	-1.4%	0.3%	0.2%	-0.2%	0.0%	-0.2%	0.5%	0.1%	-0.2%	-1.0%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**15624**	**28962**	**22823**	**13859**	**9290**	**7091**	**5022**	**4145**	**3192**	**6264**	**7836**	**8229**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.5%	-0.7%	-1.3%	0.5%	0.4%	-0.1%	0.0%	0.6%	-0.2%	-0.6%	0.0%	-1.0%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

TABLE 4.3-11F
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
CRITICALLY DRY YEAR MONTHLY AVERAGE CHANGE IN DELTA OUTFLOW [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**11347**	**14474**	**11845**	**9053**	**6028**	**5369**	**4005**	**3417**	**3014**	**4934**	**6171**	**5705**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.6%	-1.1%	-1.6%	-0.4%	-0.4%	-0.2%	0.2%	0.7%	-0.5%	0.5%	-0.1%	0.4%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**11255**	**14493**	**11653**	**9104**	**5967**	**5342**	**4012**	**3441**	**3000**	**4874**	**6150**	**5695**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.9%	-1.1%	-1.4%	-0.3%	-0.2%	0.0%	0.1%	0.8%	0.0%	-0.9%	0.2%	0.4%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**12547**	**16099**	**13112**	**9225**	**6115**	**6079**	**4000**	**3413**	**3009**	**4763**	**5144**	**5911**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	-0.3%	-0.6%	-1.8%	0.5%	-0.1%	0.0%	0.0%	1.7%	0.0%	0.3%	-0.4%	0.1%

NOTE: The changes to Delta Outflow are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that Delta Outflow is not adversely affected.

Revised Table 4.3-12
Total Project Compared to 100-TAF No Project/ No Action Alternative
Monthly Average Change in X2 Position [km]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**76**	**67**	**60**	**61**	**63**	**67**	**75**	**80**	**86**	**84**	**84**	**82**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.2%	0.3%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**76**	**67**	**60**	**61**	**63**	**68**	**75**	**81**	**86**	**84**	**84**	**82**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

Table 4.3-12B
Total Project Compared to 100-TAF No Project/ No Action Alternative
Wet Year Monthly Average Change in X2 Position [km]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**63**	**54**	**50**	**52**	**54**	**58**	**65**	**74**	**83**	**81**	**81**	**77**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	0.2%	0.1%	0.1%	0.1%	0.0%	0.2%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**64**	**54**	**50**	**52**	**54**	**58**	**65**	**74**	**83**	**81**	**81**	**77**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

TABLE 4.3-12C
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGE IN X2 POSITION [KM]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**77**	**62**	**54**	**54**	**58**	**63**	**73**	**78**	**84**	**83**	**84**	**81**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.2%	0.2%	0.0%	-0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**77**	**62**	**54**	**54**	**58**	**63**	**73**	**78**	**84**	**83**	**84**	**81**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.3%	0.2%	0.2%	0.2%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

TABLE 4.3-12D
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
BELOW NORMAL YEAR MONTHLY AVERAGE CHANGE IN X2 POSITION [KM]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**82**	**72**	**61**	**63**	**64**	**68**	**76**	**82**	**86**	**84**	**85**	**85**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.3%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**82**	**72**	**61**	**63**	**64**	**68**	**77**	**82**	**86**	**84**	**85**	**85**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

Table 4.3-12E
Total Project Compared to 100-TAF No Project/ No Action Alternative
Dry Year Monthly Average Change in X2 Position [km]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**83**	**78**	**69**	**66**	**70**	**74**	**80**	**85**	**88**	**84**	**85**	**85**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**83**	**77**	**69**	**67**	**69**	**74**	**81**	**85**	**88**	**85**	**85**	**85**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

Table 4.3-12F
Total Project Compared to 100-TAF No Project/ No Action Alternative
Critically Dry Year Monthly Average Change in X2 Position [km]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**88**	**82**	**75**	**75**	**77**	**83**	**86**	**88**	**91**	**88**	**88**	**88**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.1%	0.3%	0.4%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**88**	**82**	**75**	**75**	**78**	**83**	**86**	**88**	**91**	**88**	**89**	**89**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.1%	0.3%	0.3%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

REVISED TABLE 4.3-13
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGE IN X2 LOCATION [KM]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**76**	**67**	**60**	**61**	**63**	**67**	**75**	**80**	**86**	**84**	**84**	**82**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.2%	0.3%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**76**	**67**	**60**	**61**	**63**	**68**	**75**	**81**	**86**	**84**	**84**	**82**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**76**	**66**	**59**	**60**	**64**	**70**	**78**	**81**	**86**	**84**	**83**	**81**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

TABLE 4.3-13B
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
WET YEAR MONTHLY AVERAGE CHANGE IN X2 LOCATION [KM]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**63**	**54**	**50**	**52**	**54**	**58**	**65**	**74**	**83**	**81**	**81**	**77**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.3%	0.2%	0.1%	0.1%	0.0%	0.0%	0.2%	0.1%	0.1%	0.1%	0.0%	0.2%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**64**	**54**	**50**	**52**	**54**	**58**	**65**	**74**	**83**	**81**	**81**	**77**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**62**	**52**	**50**	**52**	**55**	**62**	**72**	**77**	**83**	**83**	**81**	**76**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

TABLE 4.3-13C
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGE IN X2 LOCATION [KM]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**77**	**62**	**54**	**54**	**58**	**63**	**73**	**78**	**84**	**83**	**84**	**81**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.2%	0.2%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**77**	**62**	**54**	**54**	**58**	**63**	**73**	**78**	**84**	**83**	**84**	**81**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.2%	0.2%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**74**	**60**	**54**	**54**	**60**	**66**	**76**	**79**	**84**	**82**	**82**	**82**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.1%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

TABLE 4.3-13D
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
BELOW NORMAL YEAR MONTHLY AVERAGE CHANGE IN X2 LOCATION [KM]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**82**	**72**	**61**	**63**	**64**	**68**	**76**	**82**	**86**	**84**	**85**	**85**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.3%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**82**	**72**	**61**	**63**	**64**	**68**	**77**	**82**	**86**	**84**	**85**	**85**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**81**	**71**	**62**	**61**	**65**	**70**	**79**	**82**	**85**	**82**	**82**	**82**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.2%	0.2%	0.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

**TABLE 4.3-13E
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
DRY YEAR MONTHLY AVERAGE CHANGE IN X2 LOCATION [KM]**

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**83**	**78**	**69**	**66**	**70**	**74**	**80**	**85**	**88**	**84**	**85**	**85**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**83**	**77**	**69**	**67**	**69**	**74**	**81**	**85**	**88**	**85**	**85**	**85**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.2%	0.2%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**83**	**77**	**65**	**65**	**70**	**76**	**81**	**85**	**88**	**84**	**84**	**84**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.1%	0.1%	0.2%	0.3%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

TABLE 4.3-13F
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
CRITICALLY DRY YEAR MONTHLY AVERAGE CHANGE IN X2 LOCATION [KM]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**88**	**82**	**75**	**75**	**77**	**83**	**86**	**88**	**91**	**88**	**88**	**88**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.0%	0.2%	0.4%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**88**	**82**	**75**	**75**	**77**	**83**	**86**	**88**	**91**	**88**	**89**	**89**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.1%	0.3%	0.3%	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**88**	**81**	**74**	**73**	**77**	**83**	**85**	**88**	**90**	**89**	**89**	**89**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0%	0.0%	0.1%	0.3%	0.1%	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%

NOTE: The changes to X2 are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that X2 is not adversely affected.

TABLE 4.3-24A
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**5904**	**8134**	**7630**	**9489**	**7290**	**2924**	**-2060**	**-3593**	**-2521**	**-462**	**-641**	**-77**
	Alt. 1B	5753	7887	7283	9544	7281	2799	-2123	-3672	-2499	-430	-683	-194
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**5718**	**7754**	**7311**	**9783**	**7124**	**2767**	**-2053**	**-3593**	**-2555**	**-476**	**-760**	**-162**
	Alt. 1B	5575	7540	6979	9841	7114	2684	-2115	-3662	-2536	-470	-795	-270

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-24B
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
WET YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**14454**	**15853**	**15819**	**17110**	**14031**	**7057**	**685**	**-4022**	**-2684**	**-767**	**-104**	**4286**
	Alt. 1B	14232	15527	15384	17185	13978	6822	490	-4243	-2677	-748	-140	4035
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**14143**	**15308**	**15307**	**17600**	**13827**	**6822**	**536**	**-4126**	**-2800**	**-690**	**-356**	**3956**
	Alt. 1B	13938	15029	14887	17656	13770	6642	364	-4308	-2770	-713	-390	3708

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-24C
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**7077**	**10312**	**8560**	**10643**	**7764**	**1796**	**-2612**	**-5152**	**-1478**	**-443**	**-881**	**-753**
	Alt. 1B	6895	10022	8175	10701	7792	1662	-2669	-5243	-1407	-363	-994	-819
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**6752**	**9884**	**8024**	**10951**	**7639**	**1647**	**-2721**	**-5235**	**-1671**	**-548**	**-983**	**-878**
	Alt. 1B	6602	9620	7661	11053	7657	1561	-2797	-5323	-1600	-515	-1119	-948

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-24D
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
BELOW NORMAL YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**2120**	**6311**	**3540**	**8034**	**5702**	**871**	**-3889**	**-5235**	**-4253**	**-696**	**-1392**	**-1963**
	Alt. 1B	2005	6101	3214	8114	5733	768	-3922	-5270	-4258	-609	-1395	-2044
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**1916**	**5852**	**3309**	**8474**	**5451**	**705**	**-3866**	**-5270**	**-4349**	**-777**	**-1471**	**-1999**
	Alt. 1B	1811	5662	2994	8572	5478	652	-3895	-5306	-4333	-701	-1501	-2049

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-24E
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
DRY YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**-170**	**1911**	**2621**	**4107**	**2706**	**504**	**-4536**	**-2661**	**-2861**	**-43**	**-958**	**-3373**
	Alt. 1B	-269	1720	2344	4160	2724	463	-4537	-2652	-2834	-58	-979	-3433
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**-154**	**1684**	**2441**	**4219**	**2581**	**419**	**-4360**	**-2499**	**-2684**	**-91**	**-982**	**-3173**
	Alt. 1B	-246	1511	2163	4281	2597	396	-4364	-2505	-2715	-76	-987	-3235

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-24F
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
CRITICALLY DRY YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**-267**	**695**	**1244**	**1595**	**938**	**1124**	**-1605**	**-587**	**-681**	**-173**	**-211**	**-1711**
	Alt. 1B	-359	530	994	1573	903	1095	-1516	-532	-652	-157	-273	-1713
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**-328**	**581**	**1246**	**1554**	**853**	**1028**	**-1421**	**-484**	**-621**	**-169**	**-250**	**-1709**
	Alt. 1B	-448	470	1038	1517	836	1032	-1353	-417	-601	-222	-241	-1688

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-25A
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**5903**	**8135**	**7636**	**9491**	**7286**	**2924**	**-2065**	**-3596**	**-2525**	**-469**	**-649**	**-76**
	Alt. 1B	5753	7887	7283	9544	7281	2799	-2123	-3672	-2499	-430	-683	-194
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**5713**	**7757**	**7318**	**9790**	**7120**	**2767**	**-2061**	**-3600**	**-2556**	**-487**	**-776**	**-164**
	Alt. 1B	5575	7540	6979	9841	7114	2684	-2115	-3662	-2536	-470	-795	-270
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**7566**	**10058**	**8887**	**9679**	**6537**	**1701**	**-1971**	**-3591**	**-2636**	**573**	**-761**	**1541**
	Alt. 1B	7419	9858	8532	9727	6532	1652	-1979	-3641	-2632	561	-750	1416

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-25B
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
WET YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**14455**	**15854**	**15819**	**17114**	**14026**	**7057**	**674**	**-4027**	**-2682**	**-770**	**-107**	**4286**
	Alt. 1B	14232	15527	15384	17185	13978	6822	490	-4243	-2677	-748	-140	4035
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**14140**	**15308**	**15308**	**17603**	**13823**	**6822**	**525**	**-4139**	**-2801**	**-692**	**-363**	**3954**
	Alt. 1B	13938	15029	14887	17656	13770	6642	364	-4308	-2770	-713	-390	3708
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**18592**	**19526**	**18124**	**17907**	**12861**	**3949**	**-400**	**-4586**	**-3326**	**988**	**-29**	**9682**
	Alt. 1B	18332	19258	17677	17966	12813	3835	-464	-4719	-3296	957	38	9448

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-25C
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**7077**	**10311**	**8571**	**10641**	**7749**	**1791**	**-2607**	**-5162**	**-1508**	**-450**	**-888**	**-762**
	Alt. 1B	6895	10022	8175	10701	7792	1662	-2669	-5243	-1407	-363	-994	-819
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**6750**	**9886**	**8035**	**10951**	**7624**	**1647**	**-2736**	**-5250**	**-1684**	**-557**	**-992**	**-895**
	Alt. 1B	6602	9620	7661	11053	7657	1561	-2797	-5323	-1600	-515	-1119	-948
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**8168**	**11337**	**10680**	**10637**	**6951**	**1028**	**-1345**	**-4978**	**-1685**	**262**	**-1653**	**-914**
	Alt. 1B	7991	11083	10289	10734	6952	971	-1362	-5043	-1686	225	-1707	-1043

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-25D
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
BELOW NORMAL YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**2120**	**6311**	**3534**	**8037**	**5702**	**871**	**-3901**	**-5227**	**-4250**	**-724**	**-1406**	**-1964**
	Alt. 1B	2005	6101	3214	8114	5733	768	-3922	-5270	-4258	-609	-1395	-2044
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**1916**	**5855**	**3311**	**8480**	**5446**	**705**	**-3882**	**-5265**	**-4346**	**-802**	**-1515**	**-2007**
	Alt. 1B	1811	5662	2994	8572	5478	652	-3895	-5306	-4333	-701	-1501	-2049
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**2623**	**6934**	**5181**	**8034**	**5222**	**254**	**-3333**	**-4559**	**-3778**	**387**	**-1412**	**-2468**
	Alt. 1B	2515	6749	4824	8066	5238	232	-3325	-4565	-3790	398	-1461	-2563

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-25E
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
DRY YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**-170**	**1913**	**2628**	**4107**	**2706**	**504**	**-4542**	**-2660**	**-2862**	**-42**	**-958**	**-3365**
	Alt. 1B	-269	1720	2344	4160	2724	463	-4537	-2652	-2834	-58	-979	-3433
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**-155**	**1686**	**2448**	**4232**	**2583**	**421**	**-4364**	**-2508**	**-2679**	**-91**	**-995**	**-3168**
	Alt. 1B	-246	1511	2163	4281	2597	396	-4364	-2505	-2715	-76	-987	-3235
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**722**	**3970**	**2437**	**3946**	**1987**	**625**	**-3701**	**-2138**	**-2408**	**948**	**-772**	**-2627**
	Alt. 1B	647	3812	2141	3983	2021	614	-3647	-2151	-2390	928	-705	-2717

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

TABLE 4.3-25F
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
CRITICALLY DRY YEAR MONTHLY AVERAGE CHANGE IN QWEST [CFS]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**-276**	**695**	**1268**	**1597**	**940**	**1124**	**-1604**	**-597**	**-680**	**-180**	**-237**	**-1705**
	Alt. 1B	-359	530	994	1573	903	1095	-1516	-532	-652	-157	-273	-1713
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**-353**	**594**	**1269**	**1569**	**851**	**1028**	**-1407**	**-481**	**-623**	**-200**	**-262**	**-1698**
	Alt. 1B	-448	470	1038	1517	836	1032	-1353	-417	-601	-222	-241	-1688
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**119**	**1594**	**1702**	**1551**	**880**	**1178**	**-1635**	**-696**	**-837**	**-221**	**-458**	**-1732**
	Alt. 1B	91	1517	1495	1565	872	1185	-1623	-669	-875	-187	-485	-1706

NOTE: The changes to QWEST are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that QWEST is not adversely affected.

REVISED TABLE 4.3-14
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGE IN EXPORT/INFLOW RATIO

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**0.24**	**0.18**	**0.20**	**0.08**	**0.09**	**0.23**	**0.42**	**0.54**	**0.48**	**0.49**	**0.43**	**0.42**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	1.6%	2.6%	2.4%	0.4%	0.4%	1.8%	1.3%	0.8%	-0.2%	-0.3%	0.5%	0.7%
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**0.24**	**0.18**	**0.20**	**0.09**	**0.09**	**0.23**	**0.42**	**0.53**	**0.48**	**0.48**	**0.43**	**0.42**
Percent Change from 100-TAF No Project/ No Action Alt	Alt. 1B	1.7%	2.2%	1.9%	0.5%	0.4%	0.7%	1.2%	0.8%	-0.1%	-0.2%	0.5%	0.7%

NOTE: The changes to the E:I ratio are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that the E:I ratio is not adversely affected.

REVISED TABLE 4.3-15
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGE IN EXPORT/INFLOW RATIO

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**0.24**	**0.18**	**0.20**	**0.08**	**0.09**	**0.23**	**0.42**	**0.54**	**0.48**	**0.49**	**0.43**	**0.42**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	1.5%	2.6%	2.6%	0.4%	0.4%	1.7%	1.2%	0.9%	-0.2%	-0.3%	0.5%	0.7%
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**0.24**	**0.18**	**0.20**	**0.09**	**0.09**	**0.23**	**0.42**	**0.53**	**0.48**	**0.48**	**0.43**	**0.42**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	1.5%	2.2%	1.9%	0.4%	0.4%	0.7%	1.3%	0.9%	-0.1%	-0.1%	0.6%	0.8%
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**0.21**	**0.15**	**0.18**	**0.10**	**0.11**	**0.25**	**0.38**	**0.53**	**0.48**	**0.41**	**0.44**	**0.40**
Percent Change from 160-TAF No Project/ No Action Alt	Alt. 1B	1.3%	1.9%	2.1%	0.0%	0.5%	0.1%	0.8%	0.8%	0.2%	0.2%	0.3%	1.0%

NOTE: The changes to the E:I ratio are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that the E:I ratio is not adversely affected.

REVISED TABLE 4.3-16
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**100-TAF No Project/ No Action Alt**	**-6441**	**-3616**	**-3396**	**-3007**	**918**	**408**	**-3773**
	Alt. 1B	-6469	-3620	-3433	-3055	982	427	-3780
Future Condition	**100-TAF No Project/ No Action Alt**	**-6391**	**-3587**	**-3407**	**-3013**	**1105**	**408**	**-3773**
	Alt. 1B	-6423	-3597	-3436	-3054	1176	429	-3775

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-16B
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
WET YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**100-TAF No Project/ No Action Alt**	**-5735**	**-2204**	**-2713**	**-1966**	**2741**	**1913**	**-4435**
	Alt. 1B	-5779	-2192	-2803	-2101	2810	1902	-4477
Future Condition	**100-TAF No Project/ No Action Alt**	**-5719**	**-2146**	**-2779**	**-2075**	**3078**	**1919**	**-4445**
	Alt. 1B	-5786	-2134	-2859	-2191	3129	1911	-4488

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-16C
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**100-TAF No Project/ No Action Alt**	**-6897**	**-3657**	**-2948**	**-4180**	**1225**	**548**	**-4856**
	Alt. 1B	-6914	-3657	-3016	-4227	1293	588	-4848
Future Condition	**100-TAF No Project/ No Action Alt**	**-6901**	**-3654**	**-2926**	**-4177**	**1457**	**577**	**-4842**
	Alt. 1B	-6933	-3650	-2983	-4224	1541	612	-4837

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-16D
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
BELOW NORMAL YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**100-TAF No Project/ No Action Alt**	**-7128**	**-4240**	**-3805**	**-4109**	**731**	**179**	**-4250**
	Alt. 1B	-7158	-4240	-3803	-4132	816	222	-4234
Future Condition	**100-TAF No Project/ No Action Alt**	**-7144**	**-4240**	**-3767**	**-4078**	**940**	**144**	**-4243**
	Alt. 1B	-7154	-4240	-3767	-4099	1043	203	-4215

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-16E
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
DRY YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**100-TAF No Project/ No Action Alt**	**-7539**	**-4817**	**-4165**	**-3146**	**-466**	**-704**	**-3210**
	Alt. 1B	-7562	-4817	-4163	-3137	-402	-665	-3200
Future Condition	**100-TAF No Project/ No Action Alt**	**-7328**	**-4754**	**-4161**	**-3136**	**-408**	**-710**	**-3211**
	Alt. 1B	-7349	-4758	-4160	-3127	-322	-667	-3199

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-16F
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
CRITICALLY DRY YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**100-TAF No Project/ No Action Alt**	**-5070**	**-4106**	**-3696**	**-2593**	**-1047**	**-1060**	**-1542**
	Alt. 1B	-5074	-4161	-3687	-2570	-1016	-1050	-1542
Future Condition	**100-TAF No Project/ No Action Alt**	**-5056**	**-4131**	**-3701**	**-2452**	**-1059**	**-1053**	**-1542**
	Alt. 1B	-5053	-4219	-3668	-2427	-1015	-1056	-1520

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

REVISED TABLE 4.3-17
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**160-TAF No Project/ No Action Alt**	**-6440**	**-3618**	**-3396**	**-3005**	**919**	**404**	**-3773**
	Alt. 1B	-6469	-3620	-3433	-3055	982	427	-3780
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**-6392**	**-3590**	**-3406**	**-3017**	**1112**	**404**	**-3773**
	Alt. 1B	-6423	-3597	-3436	-3054	1176	429	-3775
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**-5452**	**-2926**	**-2587**	**-2503**	**1079**	**539**	**-3676**
	Alt. 1B	-5500	-2947	-2630	-2565	1147	568	-3652

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-17B
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE WET YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**160-TAF No Project/ No Action Alt**	**-5735**	**-2204**	**-2712**	**-1966**	**2744**	**1908**	**-4435**
	Alt. 1B	-5779	-2192	-2803	-2101	2810	1902	-4477
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**-5719**	**-2145**	**-2778**	**-2079**	**3081**	**1915**	**-4445**
	Alt. 1B	-5786	-2134	-2859	-2191	3129	1911	-4488
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**-3114**	**-800**	**-1724**	**-737**	**3264**	**2407**	**-4390**
	Alt. 1B	-3194	-865	-1833	-888	3318	2404	-4382

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-17C
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**160-TAF No Project/ No Action Alt**	**-6906**	**-3657**	**-2949**	**-4180**	**1223**	**532**	**-4856**
	Alt. 1B	-6914	-3657	-3016	-4227	1293	588	-4848
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**-6916**	**-3653**	**-2924**	**-4177**	**1458**	**562**	**-4842**
	Alt. 1B	-6933	-3650	-2983	-4224	1541	612	-4837
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**-6696**	**-3735**	**-3158**	**-3405**	**1558**	**751**	**-4520**
	Alt. 1B	-6745	-3734	-3197	-3490	1651	781	-4487

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-17D
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE BELOW NORMAL YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**160-TAF No Project/ No Action Alt**	**-7128**	**-4240**	**-3805**	**-4129**	**733**	**179**	**-4250**
	Alt. 1B	-7158	-4240	-3803	-4132	816	222	-4234
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**-7152**	**-4240**	**-3767**	**-4104**	**946**	**139**	**-4243**
	Alt. 1B	-7154	-4240	-3767	-4099	1043	203	-4215
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**-7184**	**-3637**	**-2837**	**-3624**	**541**	**161**	**-3940**
	Alt. 1B	-7227	-3637	-2849	-3659	612	222	-3900

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-17E
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
DRY YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**160-TAF No Project/ No Action Alt**	**-7531**	**-4817**	**-4165**	**-3139**	**-465**	**-704**	**-3210**
	Alt. 1B	-7562	-4817	-4163	-3137	-402	-665	-3200
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**-7321**	**-4755**	**-4161**	**-3131**	**-395**	**-707**	**-3211**
	Alt. 1B	-7349	-4758	-4160	-3127	-322	-667	-3199
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**-6546**	**-4207**	**-3020**	**-3613**	**-493**	**-902**	**-3099**
	Alt. 1B	-6601	-4212	-3020	-3606	-423	-848	-3074

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

TABLE 4.3-17F
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
CRITICALLY DRY YEAR MONTHLY AVERAGE CHANGE IN NET OLD AND MIDDLE RIVER FLOWS [CFS]

		Dec	Jan	Feb	Mar	Apr	May	Jun
Existing Condition	**160-TAF No Project/ No Action Alt**	**-5065**	**-4115**	**-3697**	**-2569**	**-1046**	**-1058**	**-1542**
	Alt. 1B	-5074	-4161	-3687	-2570	-1016	-1050	-1542
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**-5049**	**-4153**	**-3699**	**-2452**	**-1043**	**-1055**	**-1542**
	Alt. 1B	-5053	-4219	-3668	-2427	-1015	-1056	-1520
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**-5162**	**-3831**	**-2886**	**-2210**	**-1098**	**-1106**	**-1738**
	Alt. 1B	-5145	-3836	-2891	-2193	-1028	-1096	-1713

NOTE: The changes to net Old and Middle River flows are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that this parameter is not adversely affected.

Impact 4.3.7: Operation of the Total Project and the Phase 2 Expansion would not significantly affect direct entrainment or impingement of fish. (Less than Significant)

The revised Tables 4.3-18 and 4.3-19 show that changes to the direct entrainment losses at the CVP and SWP export facilities from the refined Alternative 1B operations are very small, the same as shown in the results for the Draft Supplement. The revised Tables 4.3-20 and 4.3-21 show that potential entrainment at CCWD intakes are very small for the refined Alternative 1B operations both with and without potential third-party water transfers, similar to the results shown in the Draft Supplement. Tables 4.3-22 and 4.3-23 have been updated to show the total diversions at CCWD intakes under the refined Alternative 1B operations both with and without the maximum possible use of Phase 2 Expansion facilities to move third-party transfer water. These diversions are slightly higher than those shown in the Draft Supplement because the analysis for the Final Supplement includes updated Local Agency Partner demands and potential diversions of transfer water acquired from willing third-party sellers. In response to comment S_CDFW_10, an analysis of the potential impacts on longfin smelt abundance related to X2 position following the method described in Kimmerer et al. (2009) was added. The longfin smelt abundance index is shown as monthly averages and by water year type in the new Tables 4.3-26A through 4.3-26F and 4.3-27A through 4.3-27F. The changes to the longfin smelt abundance index due to Alternative 1B operations are very small and would not result in significant impacts related to the direct entrainment or impingement of fish. Because the changes to the entrainment parameters are the same as were disclosed in the Draft Supplement, the impact conclusion of Less than Significant is unchanged.

REVISED TABLE 4.3-18
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
SUMMARY OF CHANGES USED TO EVALUATE DIRECT ENTRAINMENT
AT CVP AND SWP EXPORT FACILITIES (ALL YEARS)

		Larval & Early Juvenile % Entrainment Loss	Adult % Entrainment Loss
Existing Condition	**100-TAF No Project/ No Action Alt**	**6.0**	**7.5**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.0	0.0
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**6.0**	**7.5**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.0	0.0

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

REVISED TABLE 4.3-19
PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
SUMMARY OF CHANGES USED TO EVALUATE DIRECT ENTRAINMENT
AT CVP AND SWP EXPORT FACILITIES (ALL YEARS)

		Larval & Early Juvenile % Entrainment Loss	Adult % Entrainment Loss
Existing Condition	**160-TAF No Project/ No Action Alt**	**6.0**	**7.5**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0	0.0
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**6.0**	**7.5**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0	0.0
Future with Climate Change	**160-TAF No Project/ No Action Alt**	**6.1**	**7.0**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.0	0.0

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

REVISED TABLE 4.3-20
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
SUMMARY OF CHANGES USED TO EVALUATE DIRECT ENTRAINMENT AT CCWD'S INTAKES
(TOTAL AVERAGE ANNUAL FISH ENTRAINED JANUARY THROUGH JUNE)

		Delta Smelt	Longfin Smelt	Splittail
Existing Condition	**100-TAF No Project/ No Action Alt**	**0.021**	**0.023**	**0.226**
Change from 100-TAF No Project/No Action Alt	Alt 1B without Transfers	0.017	0.198	-0.029
	Alt 1B with Transfers	0.017	0.198	-0.022
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**0.025**	**0.033**	**0.276**
Change from 100-TAF No Project/No Action Alt	Alt 1B without Transfers	0.016	0.190	-0.034
	Alt 1B with Transfers	0.016	0.190	-0.029

REVISED TABLE 4.3-21
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
SUMMARY OF CHANGES USED TO EVALUATE DIRECT ENTRAINMENT AT CCWD'S INTAKES
(TOTAL AVERAGE ANNUAL FISH ENTRAINED JANUARY THROUGH JUNE)

		Delta Smelt	Longfin Smelt	Splittail
Existing Condition	**160-TAF No Project/ No Action Alt**	**0.021**	**0.021**	**0.226**
Change from 160-TAF No Project/No Action Alt	Alt 1B without Transfers	0.017	0.201	-0.029
	Alt 1B with Transfers	0.017	0.201	-0.023
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**0.026**	**0.027**	**0.273**
Change from 160-TAF No Project/No Action Alt	Alt 1B without Transfers	0.016	0.196	-0.030
	Alt 1B with Transfers	0.016	0.196	-0.025
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**0.026**	**0.028**	**0.282**
Change from 160-TAF No Project/No Action Alt	Alt 1B without Transfers	0.015	0.199	-0.028
	Alt 1B with Transfers	0.015	0.199	-0.020

REVISED TABLE 4.3-22
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE[1]
SUMMARY OF AVERAGE CHANGES TO CCWD TOTAL DIVERSIONS [TAF/MONTH]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Existing Condition	**100-TAF No Project/ No Action Alt**	**5**	**6**	**0**	**13**	**13**	**13**	**21**	**18**	**13**	**10**	**8**	**6**	**127**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B without Transfers	13	16	21	-3	0	7	6	7	5	5	4	10	91
	Alt. 1B with Transfers	13	16	21	-3	0	8	22	19	12	5	4	10	129
Future Without Climate Change	**100-TAF No Project/ No Action Alt**	**6**	**7**	**1**	**16**	**16**	**16**	**25**	**22**	**16**	**13**	**9**	**7**	**155**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B without Transfers	12	15	21	-3	0	5	5	6	6	5	3	9	83
	Alt. 1B with Transfers	12	15	21	-3	0	6	21	18	12	5	3	9	119

REVISED TABLE 4.3-23
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
SUMMARY OF AVERAGE CHANGES TO CCWD TOTAL DIVERSIONS [TAF/MONTH]

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Existing Condition	**160-TAF No Project/ No Action Alt**	**5**	**6**	**0**	**13**	**14**	**13**	**22**	**19**	**14**	**11**	**8**	**6**	**129**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B without Transfers	13	16	22	-3	-1	7	5	7	4	5	4	10	89
	Alt. 1B with Transfers	13	16	22	-3	0	8	22	18	12	5	4	10	127
Future Without Climate Change	**160-TAF No Project/ No Action Alt**	**6**	**7**	**0**	**16**	**16**	**16**	**26**	**23**	**17**	**13**	**10**	**7**	**157**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B without Transfers	12	15	22	-3	-1	5	4	5	5	4	3	8	81
	Alt. 1B with Transfers	12	15	22	-3	0	6	21	17	12	4	3	8	117
Future With Climate Change	**160-TAF No Project/ No Action Alt**	**7**	**7**	**1**	**16**	**17**	**16**	**25**	**23**	**17**	**12**	**9**	**7**	**157**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B without Transfers	12	14	22	-3	-1	5	2	4	4	5	4	9	79
	Alt. 1B with Transfers	12	14	22	-2	0	6	20	18	11	5	4	9	120

TABLE 4.3-26A
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**2.38**	**2.82**	**3.17**	**3.16**	**3.03**	**2.82**	**2.46**	**2.17**	**1.91**	**2.01**	**1.99**	**2.08**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**2.37**	**2.82**	**3.17**	**3.16**	**3.03**	**2.81**	**2.45**	**2.16**	**1.90**	**2.01**	**1.99**	**2.07**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-26B
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
WET YEAR MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**3.02**	**3.51**	**3.68**	**3.60**	**3.48**	**3.30**	**2.94**	**2.48**	**2.05**	**2.14**	**2.16**	**2.36**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**3.00**	**3.51**	**3.68**	**3.59**	**3.48**	**3.30**	**2.93**	**2.47**	**2.04**	**2.14**	**2.16**	**2.35**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-26C
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**2.36**	**3.10**	**3.48**	**3.50**	**3.27**	**3.06**	**2.55**	**2.27**	**2.00**	**2.04**	**2.01**	**2.14**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**2.35**	**3.10**	**3.48**	**3.50**	**3.28**	**3.06**	**2.54**	**2.27**	**2.00**	**2.04**	**2.01**	**2.13**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-26D
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
BELOW NORMAL YEAR MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**2.11**	**2.59**	**3.16**	**3.03**	**2.99**	**2.79**	**2.37**	**2.10**	**1.91**	**1.97**	**1.93**	**1.95**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**2.11**	**2.58**	**3.15**	**3.03**	**3.00**	**2.79**	**2.36**	**2.10**	**1.91**	**1.97**	**1.93**	**1.95**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-26E
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
DRY YEAR MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**2.05**	**2.30**	**2.75**	**2.87**	**2.71**	**2.48**	**2.17**	**1.95**	**1.80**	**1.97**	**1.93**	**1.94**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**2.06**	**2.32**	**2.75**	**2.86**	**2.72**	**2.47**	**2.16**	**1.95**	**1.79**	**1.96**	**1.93**	**1.93**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-26F
TOTAL PROJECT COMPARED TO 100-TAF NO PROJECT/ NO ACTION ALTERNATIVE
CRITICALLY DRY YEAR MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**100-TAF No Project/ No Action Alt**	**1.80**	**2.07**	**2.43**	**2.46**	**2.32**	**2.06**	**1.89**	**1.79**	**1.66**	**1.79**	**1.77**	**1.77**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**100-TAF No Project/ No Action Alt**	**1.80**	**2.07**	**2.42**	**2.46**	**2.32**	**2.06**	**1.89**	**1.79**	**1.66**	**1.79**	**1.76**	**1.76**
Change from 100-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-27A
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**2.38**	**2.82**	**3.17**	**3.16**	**3.03**	**2.82**	**2.46**	**2.17**	**1.91**	**2.01**	**1.99**	**2.08**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**2.37**	**2.82**	**3.17**	**3.16**	**3.03**	**2.81**	**2.45**	**2.16**	**1.90**	**2.01**	**1.99**	**2.07**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**2.41**	**2.87**	**3.22**	**3.19**	**2.99**	**2.68**	**2.29**	**2.12**	**1.91**	**2.00**	**2.04**	**2.12**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-27B
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
WET YEAR MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**3.02**	**3.51**	**3.68**	**3.60**	**3.48**	**3.30**	**2.94**	**2.48**	**2.05**	**2.14**	**2.16**	**2.36**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**3.00**	**3.51**	**3.68**	**3.59**	**3.48**	**3.30**	**2.93**	**2.47**	**2.04**	**2.14**	**2.16**	**2.35**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**3.11**	**3.58**	**3.70**	**3.57**	**3.43**	**3.10**	**2.57**	**2.33**	**2.02**	**2.05**	**2.15**	**2.41**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-27C
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
ABOVE NORMAL YEAR MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**2.36**	**3.10**	**3.48**	**3.50**	**3.27**	**3.06**	**2.55**	**2.27**	**2.00**	**2.04**	**2.01**	**2.14**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**2.35**	**3.10**	**3.48**	**3.50**	**3.28**	**3.06**	**2.54**	**2.27**	**2.00**	**2.04**	**2.01**	**2.13**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**2.47**	**3.19**	**3.51**	**3.48**	**3.20**	**2.88**	**2.37**	**2.24**	**2.00**	**2.09**	**2.09**	**2.10**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-27D
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
BELOW NORMAL YEAR MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**2.11**	**2.59**	**3.16**	**3.03**	**2.99**	**2.79**	**2.37**	**2.10**	**1.91**	**1.97**	**1.93**	**1.95**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**2.11**	**2.58**	**3.15**	**3.03**	**3.00**	**2.79**	**2.36**	**2.10**	**1.91**	**1.97**	**1.93**	**1.95**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**2.15**	**2.62**	**3.10**	**3.12**	**2.96**	**2.67**	**2.23**	**2.10**	**1.93**	**2.07**	**2.08**	**2.10**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-27E
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
DRY YEAR MONTHLY AVERAGE CHANGE IN LONGFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**2.05**	**2.30**	**2.75**	**2.87**	**2.71**	**2.48**	**2.17**	**1.95**	**1.79**	**1.97**	**1.93**	**1.94**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**2.06**	**2.32**	**2.75**	**2.86**	**2.72**	**2.47**	**2.16**	**1.95**	**1.79**	**1.96**	**1.93**	**1.93**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**2.04**	**2.36**	**2.92**	**2.95**	**2.69**	**2.37**	**2.13**	**1.96**	**1.81**	**1.97**	**1.98**	**1.98**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

TABLE 4.3-27F
INCREMENTAL PHASE 2 EXPANSION COMPARED TO 160-TAF NO PROJECT/ NO ACTION ALTERNATIVE
CRITICALLY DRY YEAR MONTHLY AVERAGE CHANGE IN LOGNFIN ABUNDANCE INDEX

		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Existing Condition	**160-TAF No Project/ No Action Alt**	**1.80**	**2.07**	**2.43**	**2.46**	**2.32**	**2.06**	**1.89**	**1.79**	**1.66**	**1.79**	**1.77**	**1.77**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, Without Climate Change	**160-TAF No Project/ No Action Alt**	**1.80**	**2.07**	**2.42**	**2.46**	**2.32**	**2.06**	**1.89**	**1.79**	**1.66**	**1.79**	**1.76**	**1.76**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future, with Climate Change 2030	**160-TAF No Project/ No Action Alt**	**1.79**	**2.12**	**2.48**	**2.53**	**2.33**	**2.04**	**1.93**	**1.81**	**1.67**	**1.74**	**1.75**	**1.75**
Change from 160-TAF No Project/ No Action Alt	Alt. 1B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

NOTE: The changes these parameters are the same under Alternative 1B both with and without third-party transfers; carriage water to meet Delta water quality objectives and other regulatory requirements associated with potential water transfers would ensure that these parameters are not adversely affected.

Impact 4.3.9: The Phase 2 Expansion alternatives, when combined with other planned projects or projects under construction in the area, could cumulatively contribute to substantial adverse impacts to Delta fisheries and aquatic resources (Less than Significant)

The analysis of potential cumulative effects Delta fisheries and aquatic resources is unchanged from the Draft Supplement. There is no cumulative impact on fisheries from the EBMUD Component of Los Vaqueros Reservoir Expansion Project, as described in the discussion in Appendix B-2, Updated EBMUD Component of Los Vaqueros Reservoir Expansion Project. The impact determination of Less than Significant is unchanged.

Impact 4.3.10s: Operation of the Phase 2 Expansion alternatives would not result in changes to Delta hydrologic or hydrodynamic conditions that affect the growth of algal blooms. (Less than Significant)

As described above for Impact 4.3.6, the changes to Delta inflow, Delta outflow, X2 position, Export/Inflow ratio, and OMR flow are very small and similar to the modeling results shown in the Draft Supplement. Because the modeling demonstrated that there would be no substantial change in the hydrodynamic conditions, there would be no substantial change in the likelihood or persistence of harmful algal blooms. Therefore, the impact conclusion of Less than Significant is unchanged.

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APPENDIX B-2
Updated EBMUD Component of Los Vaqueros Reservoir Expansion Project

The 2010 Final EIS/EIR did not include East Bay Municipal Utility District (EBMUD) as a potential partner in the Los Vaqueros Reservoir Expansion Project. This Supplement identifies EBMUD as a potential partner in the Phase 2 Expansion. The purpose of this Appendix is to provide an analysis of potential effects related to EBMUD's participation in the Phase 2 Expansion project. This analysis covers water resources and fisheries. The effects of the EBMUD component of the Phase 2 Expansion were evaluated quantitatively by comparing model simulations of the No Project/No Action Alternative to model simulations of the Phase 2 Expansion. The modeling assumptions, modeling output and figures from the model simulations for evaluating the Existing Condition are in Appendix B-3. The modeling assumptions, modeling output and figures from the model simulations for evaluating the Cumulative Future Condition are in Appendix B-4.

B-2.1 Background – Existing Conditions for EBMUD and the Mokelumne River

This section provides an overview of the existing conditions along the Mokelumne River, the EBMUD Mokelumne River facilities, the Freeport Regional Water Project (FRWP) facilities, and operational and regulatory requirements for the EBMUD component of the proposed Phase 2 Expansion project.

B-2.1.1 Mokelumne River Overview

The Mokelumne River watershed located upstream of Camanche Dam is relatively narrow and steep and is located north east of the Sacramento-San Joaquin River Delta on the western slope of the Sierra Nevada in Alpine, Amador, and Calaveras Counties. Above Camanche Dam, the Mokelumne River drains over 600 square miles with elevation in the watershed ranging from about 235 feet at the dam to 10,000 feet in the headwater region. The lower portion of the Mokelumne River is located in the Central Valley and the Delta in San Joaquin and Sacramento Counties. The lower Mokelumne River begins downstream of Camanche Dam and runs southwesterly through Lodi and then northwesterly until it is joined by the Cosumnes River. It then enters the Delta, splitting into the North and South Fork channels near the Delta Cross Channel (DCC). Mild summers and cold winters characterize the mountainous eastern region, while hot, dry summers and mild winters prevail in the Central Valley and western foothills portion of the region.

The lower Mokelumne River (i.e., the portion of the river downstream of Camanche Dam) is relatively narrow and fast-running immediately below Camanche Dam and becomes deeper and slower approximately 10 miles downstream of the dam. The lower portion of the river has a more gradual gradient, and travel times are longer than in the upper 10 miles. Travel times also are increased by the presence of the Woodbridge Irrigation District (WID) diversion dam (Woodbridge Dam), which backs up water to form Lodi Lake, and by tidal influence in the lowest 37.5 miles of the river.

Annual precipitation and stream flow in the Mokelumne River watershed upstream of Camanche Dam are extremely variable from month to month and from year to year. Most precipitation normally falls between November and May and very little falls between late spring and late fall. Peak flows in the Mokelumne River normally occur during winter storms or during the spring snow-melt season from March thru June. These flows decrease to a minimum in late summer or fall, and in some years, natural unimpaired flows into Pardee Reservoir in late summer or fall may be minimal to non-existent.

Variations in rainfall and runoff have a major effect on EBMUD's ability to manage Mokelumne River water supply during normal and drought year conditions. **Figure 1** demonstrates natural Mokelumne River runoff by water year, illustrating the wide variability in runoff. Long-term average unimpaired flow equaled 726 thousand-acre feet from water year (WY) 1929 through WY 2016. On average, the Mokelumne River contribution to total Delta inflow is around 1.4% (DWR DAYFLOW record WY 1970 through 2009).

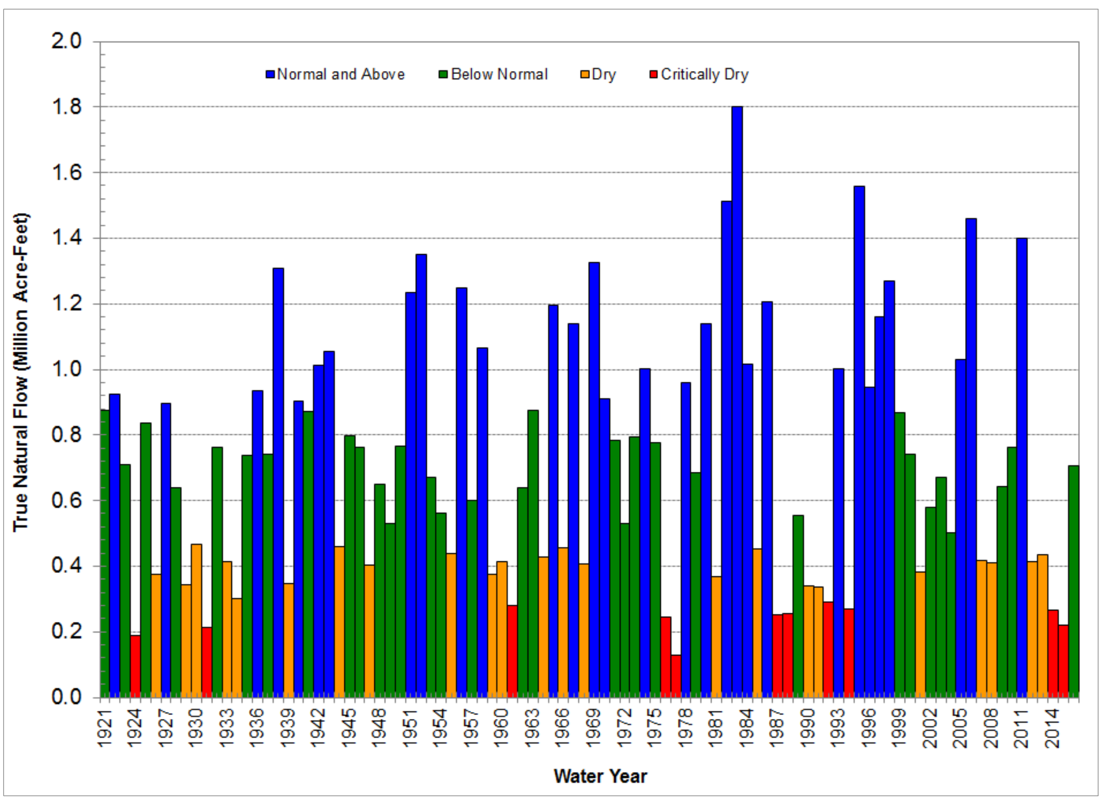


Figure 1
Historic Mokelumne True Natural Flow

B-2.1.2 East Bay Municipal Utility District Water Supply Structures

EBMUD water supply facilities for Mokelumne River water include Pardee and Camanche Dams, their associated reservoirs, the Mokelumne Aqueducts, and the East Bay terminal storage reservoirs. During dry years, EBMUD also draws on its CVP water supplies through the FRWP to meet a portion of its dry year water demands.

Pardee Dam and Reservoir

Pardee Reservoir is located on the main stem of the Mokelumne River about 38 miles northeast of Stockton, near the town of Jackson. Construction of Pardee Dam was completed in 1929. Pardee Reservoir has 37 miles of shoreline and a maximum surface area of 2,134 acres at a spillway crest elevation of 567.7 feet. The permitted capacity of Pardee Reservoir is 209,950 acre-feet. Pardee Dam has outlets at two elevations, 260 feet and 375 feet. In comparison, the aqueduct inlets are higher up in the reservoir at approximately 480 feet, 490 feet, 520 feet, and 550 feet. EBMUD uses Pardee Reservoir principally for municipal water supply, diverting its full Mokelumne River water right allocation out of the reservoir. The reservoir also is used as a source of water for the Jackson Valley Irrigation District (JVID).

Camanche Dam and Reservoir

Camanche Dam is located 10 miles downstream from Pardee Dam on the Mokelumne River, though, at times when Camanche Reservoir is full, waters from Camanche Reservoir touch the toe of Pardee Dam, creating in effect, a single reservoir. Construction of Camanche Dam was completed in 1964. Camanche Reservoir has 62 miles of shoreline and a surface area of 7,768 acres (approximately 12 square miles) at a spillway crest elevation of 235.5 feet. The permitted capacity of Camanche Reservoir is 431,500 acre-feet. Camanche Dam has a high-level outlet at 203 feet and low-level outlet at 102 feet.

Mokelumne Aqueducts

Untreated water from Pardee Reservoir is transported approximately 91 miles to EBMUD's water treatment plants and terminal reservoir through the Pardee Tunnel, the Mokelumne Aqueducts and the Lafayette Aqueducts. The Mokelumne Aqueducts are comprised of the three 82-mile long pipelines that transport water from Pardee Tunnel to Walnut Creek. Mokelumne Aqueducts No. 1 and 2 are interconnected near Walnut Creek. The Mokelumne Aqueducts have a total capacity of 200 million gallons per day (MGD) by gravity flow and up to 325 MGD with pumping at the Walnut Creek pumping plant.

EBMUD Water Supply Reservoirs

There are five local water supply reservoirs (referred to as the terminal reservoirs): Briones, Chabot, Lafayette, San Pablo, and Upper San Leandro reservoirs. The total capacity of these reservoirs is 151,066 AF. The terminal reservoirs serve multiple functions that include regulating EBMUD's Mokelumne River supply in winter and spring, augmenting EBMUD's Mokelumne

River water supply with local runoff, providing emergency supply during extended drought or other emergencies, providing local supply during high turbidity events upstream, providing environmental and recreational benefits to East Bay communities, and minimizing flooding.

Freeport Regional Water Project Facilities (FRWP)

The Freeport Regional Water Authority (FRWA) is a joint powers agency created by EBMUD and the Sacramento County Water Agency in 2002 to implement the development of the Freeport Regional Water Project. In 2011, EBMUD brought the FRWP online to allow delivery of water from the Sacramento River to customers during dry years. It also delivers surface water in all years to Sacramento County. The FRWP includes a 185-MGD water intake and pumping plant on the Sacramento River near Freeport; a 72” to 84” diameter pipeline from the intake to the Folsom South Canal; a water treatment plant for SCWA and approximately 20 miles of 72” diameter pipeline and two inline 100-MGD pumping plant to convey water from Folsom South Canal to EBMUD’s Mokelumne Aqueducts. Additionally, an 85-MGD EBMUD-CCWD raw water intertie is connected to Mokelumne Aqueduct No. 2 near Brentwood.

Freeport and CCWD

In 2006, EBMUD, FRWA, County of Sacramento and Sacramento County Water Agency entered into a long-term non-emergency agreement for water with CCWD as part of the negotiated settlement of the FRWP EIR/EIS. The agreement allows CCWD to request and receive from EBMUD 3,200 acre-feet per year at a maximum rate of 100 MGD of CCWD’s CVP contract water wheeled via EBMUD through the FRWP facilities to the EBMUD-CCWD Intertie in Brentwood.

EBMUD’s Mokelumne River Reservoir Operational Objectives

EBMUD operates Pardee and Camanche Reservoirs together as an integrated system to deliver municipal water supply of up to 325 MGD to its East Bay service area in the most energy-efficient manner using the Mokelumne Aqueducts, while meeting all other operating goals, objectives, and requirements. These other operating goals, objectives, and requirements include bypassing or releasing water from Pardee and/or Camanche Reservoirs for downstream senior water rights users, meeting downstream fishery flow requirements, regulating streamflow, using best efforts to manage water temperatures to protect fishery and public trust interests, and meeting U.S. Army Corps of Engineers (USACE or Corps) flood-control requirements. Consistent with all other operating objectives and obligations, releases from the two reservoirs also are planned to provide hydropower benefits.

B-2.1.3 East Bay Municipal Utility District Mokelumne River Water Rights

EBMUD receives its share of Mokelumne River water for municipal and industrial uses pursuant to License 11109 for Pardee Reservoir and Water Right Permit 10478 for Camanche and Pardee Reservoirs. Together, Permit 10478 and License 11109 allow delivery of a maximum of 325 MGD from the Mokelumne River (364,000 acre-feet per year).

B-2.1.4 Other Mokelumne River Entitlements and Other Supplies

The Mokelumne River serves a variety of uses, including agriculture, fisheries, hydropower, recreation, and municipal and industrial use. Before water can be put to use or diverted to storage under EBMUD's water rights, the needs of senior users (parties with older water rights priority) and fishery release requirements must be met. Riparian landowners, who have rights that are tied to the river's natural flow, and other individuals and agencies with appropriative water rights that predate EBMUD's rights, have claims on the river that are senior to EBMUD's rights.

Mokelumne River Flow and Diversions between Camanche Dam and the Delta

EBMUD's position in the hierarchy of Mokelumne River water right users is determined by a variety of agreements between Mokelumne River water right holders, the appropriative rights, permits, and licenses issued by the State, pre-1914 rights, and riparian rights. EBMUD operates Pardee and Camanche Reservoirs in a coordinated manner to meet its water supply needs while concurrently making releases from Camanche Reservoir to satisfy downstream senior rights and regulatory and environmental obligations.

Flow downstream of Camanche Dam is affected by:

- instream flow requirements under the JSA to protect and enhance conditions for the anadromous fish and ecosystem of the lower Mokelumne River;
- entitlements held by the North San Joaquin Water Conservation District (NSJWCD), and WID;
- diversions by other water right holders and riparian landowners; and
- carriage water releases for losses from evaporation, seepage from the river, and evapotranspiration by riparian vegetation.

Resulting minimum required releases from Camanche Reservoir range from about 135,000 acre-feet in critically dry years to about 315,000 acre-feet in normal and above-normal years.

Hydrologic Requirements for Fish Protection—Joint Settlement Agreement

Hydrologic requirements for fish protection are contained in the JSA, which is summarized below. Portions of the JSA pertaining directly to flows and reservoir storage, including water year type, Camanche release requirements, and hypolimnion goals, are described briefly below.

Water Year Type

The JSA specifies minimum flow releases from Camanche Dam and expected flow below the Woodbridge Dam based on time of year (for fish life stage) and water year types. For the October through March releases, water year types are determined based on the combined storage in Camanche and Pardee Reservoirs on November 5th. For the April through September releases, water year types are determined based on the unimpaired runoff into Pardee Reservoir as forecasted by the California Department of Water Resources (DWR) in the April 1 Bulletin 120 Report, unless the projected combined storage for November 5 is less than 200 thousand acre-feet (TAF), in which case the water year type would be critically dry.

Camanche Release Requirements

The JSA Camanche Dam release requirements vary throughout the year to meet the needs of the life stages of anadromous fish. Minimum release requirements range from 100 to 325 cubic feet per second (cfs) during normal and above normal water year types, 100 to 250 cfs during below-normal years, 100 to 220 cfs during dry years, and 100 to 130 cfs during critically dry years. Additional releases up to 200 cfs are required in April, May, and June in normal and above normal years, and below normal water year types depending on the combined storage in Camanche and Pardee Reservoirs relative to the maximum allowable storage for the end of the prior month.

As described above, EBMUD typically releases more than the JSA minimum flow requirements to also meet downstream senior obligations or when regulating flood-control releases. Since implementation of the JSA in 1998 (water years 1998 through 2012), annual releases from Camanche Dam have ranged from about 197 TAF in water year 2008, to about 1.2 million acre-feet in water year 2006.

The JSA stipulates that, except during emergencies or when flood-control releases are being made, decreases in flow should not be more than 50 cfs per day during October 16 through March 31 (the spawning and incubation period for anadromous fish) and not more than 100 cfs per day during the rest of the year. In addition, the JSA gainsharing provision provides that EBMUD contribute part of the actual yield from new water supplies to river flow.

Hypolimnion Goals

The hypolimnion is the cooler and denser bottom layer of water in a thermally stratified lake or reservoir. Like most deep California reservoirs, Pardee and Camanche Reservoirs become de-stratified and lose their hypolimnion during the colder part of the year. The JSA specifies that EBMUD will use its best efforts to maintain Pardee and Camanche Reservoir stratification with a minimum of 28 TAF of hypolimnetic volume in Camanche Reservoir through October whenever Pardee Reservoir volume exceeds 100 TAF. EBMUD’S Water Quality and Resource Management Program (WQRMP) specifies that the water of the hypolimnion should be less than 16.4 degrees Celsius (°C) (61.5 degrees Fahrenheit [°F]).

Other Diversions along the Lower Mokelumne River

North San Joaquin Water Conservation District

NSJWCD is an irrigation district with diversion facilities along the lower Mokelumne River, located between Camanche Dam and Woodbridge Dam. NSJWCD’s temporary water right allows NSJWCD to divert from December 1 to July 1 up to 20,000 AFY from the Mokelumne River, either directly or to storage in EBMUD’s Camanche Reservoir. NSJWCD historically has used as much as 9,488 AFY under Permit 10477, and in the last 10 years, diversions have declined to between 0 and 3,000 AFY. In dry and critically dry years, when there is no stored water surplus to meet EBMUD's municipal needs, NSJWCD typically receives no water under its entitlement.

Woodbridge Irrigation District

WID serves irrigation water to about 20,000 acres of agricultural land in San Joaquin County in the vicinity of Lodi and Woodbridge. The lower Mokelumne River flows through Lodi Lake, which is an impoundment created by Woodbridge Dam near Lodi. From this lake, WID diverts water into an extensive canal system. WID has pre-1914 water rights senior to EBMUD's Mokelumne River water rights, and also has two overlapping licensed water rights for direct diversions up to 414.4 cfs, the maximum capacity of WID Canal. These entitlements are conditioned by the water rights settlement agreements with EBMUD, which, depending on inflow to Pardee Reservoir, provide WID with firm annual diversions of 60 TAF in normal water years and 39 TAF in dry years.

Riparian and Individual Appropriators

Riparian landowners, who have rights that are tied to the river's natural flow, and other individuals and agencies with appropriative rights that predate EBMUD's rights have claims on Mokelumne River water that are senior to EBMUD's rights. These individuals and agencies include ranches, vineyards, and farms that pump water from the Mokelumne River. Downstream of Camanche Dam, pumped diversions by riparian and senior appropriative users (not including those described above) reached about 34,000 AFY in 1972 but since have declined to a range of 16 TAF to 21 TAF.

Carriage Water

EBMUD also releases carriage water from Camanche Reservoir to ensure that sufficient flow actually reaches downstream users. Flow in the Mokelumne River can be lost from evaporation, transpiration, and channel seepage into the groundwater basin. Estimates of loss rates have ranged from 57,000 to 130,000 AFY, with most of the loss occurring in the 21-mile reach between Camanche Dam and Lodi Lake near the town of Lodi (HCG 1998).

Flood-Control Requirements

The Corps' flood-control agreement with EBMUD requires that a combined storage reservation of up to 200 TAF be maintained in Pardee and Camanche Reservoirs between September 15 and July 31 of each year. A portion of the 200 TAF flood-control reservation may be transferable, up to a maximum of 70 TAF, to available space in PG&E's Salt Springs and Lower Bear Reservoirs. By November 5, between 130 TAF and 200 TAF of flood-control reservation must be created in Pardee and Camanche Reservoirs. The flood-control reservation must be maintained at least through mid-March and potentially into July in years of heavy snow accumulation.

EBMUD Water Demands

EBMUD's demand fluctuates seasonally and can also change from year to year. Factors that can affect demand include changes in population, changes in customer usage patterns or changes in customer class, droughts and customer rationing, temperature and climate, and the results of water recycling and conservation programs.

In 2015, EBMUD published the Urban Water Management Plan (UWMP 2015), which provided a broad overview of the EBMUD system, its supplemental supplies, and its demand management efforts. The UWMP 2015 also included an update on demand projections out to the year 2040, using a land-use based methodology informed by the general plans of service area Cities and Counties. As explained more thoroughly in the UWMP 2015, EBMUD found that the effects of drought and economic recession resulted in lower demand than would occur under normal circumstances, but that demands are still expected to increase back to 2040 projected demand levels as development and water use return to pre-drought and pre-recession conditions.

The UWMP 2015 included a planning level demand in 2015 of 190 MGD. For analytical purposes, the No Project/No Action Alternative assumes EBMUD’s demand is 190 MGD for the Existing Condition. This level of demand does not reflect short-term reductions in demand caused by rationing during the most recent drought. EBMUD considered customer demand over a range of time periods when determining what demand level would best characterize existing conditions. EBMUD ultimately chose to use the UWMP’s 2015 level of demand of 190 MGD to recognize its currently lower levels of customer demand while minimizing bias in the demand estimate introduced by the extraordinary weather conditions—and accompanying regulatory mandates—that occurred during the last drought.

For the Future Conditions, the UWMP 2015 projects a demand of 230 MGD in the year 2040. This increased demand reflects anticipated development in EBMUD’s service area based on City and County general plans. Planned increases in EBMUD’s water recycling and conservation programs are factored into this value as well.

B-2.2 Description of EBMUD Component of the Phase 2 Expansion Project

The EBMUD component of the Phase 2 Expansion project consists of using existing EBMUD and Freeport Regional Water Project (FRWP) facilities, along with several modified EBMUD facilities, to develop a mutually beneficial partnership with CCWD, the Local Agency Partners, and Refuges.

The EBMUD component of the Phase 2 Expansion includes two separate scenarios: Scenario One, *Storage, Transfer, and Exchange of Water Supplies*, consists of two parts and would: convey a portion of existing EBMUD Mokelumne River water supplies in certain wet years for storage in Los Vaqueros Reservoir and later use within EBMUD’s service area (Part A); and transfer a portion of EBMUD’s stored water in LVE to CCWD, the other Local Agency Partners, or Refuges, and in return, CCWD and Local Agency Partners would exchange (transfer) water back to EBMUD at Freeport during certain dry years (Part B).

Scenario Two, W*heeling by EBMUD,* would utilize existing EBMUD facilities to wheel non-EBMUD water for CCWD, the other Local Agency Partners, or Refuges. Both of these scenarios are included in all of the action alternatives of the Phase 2 Expansion project.

B-2.2.1 Scenario One: Storage, Transfer, and Exchange of Water Supplies

Under Scenario One, a portion of existing Mokelumne River water supplies would be conveyed into the Los Vaqueros Pipeline at a maximum rate of 85 MGD via Mokelumne Aqueduct No. 2, through the EBMUD-CCWD Intertie, and into storage in Los Vaqueros Reservoir. It is anticipated that EBMUD would most likely convey water to Los Vaqueros Reservoir in the months of May and June when water supplies are available in EBMUD's Mokelumne River facilities. However, depending on a myriad of factors including hydrology and EBMUD service area demands, it is possible that transfer window of opportunity could occur over a longer period of time from May through October.

The following criteria would be used to determine when water can be conveyed to LVE:

- Conveyance would only occur in years when EBMUD anticipates making flood control releases ("Wet Years").
- Conveyance would be limited to 15 TAF annually and would occur no more than two years in a row, such that in any two-year period, no more than 30 TAF of water would be diverted to Los Vaqueros Reservoir.
- Following any two consecutive years in which EBMUD diverts up to 30 TAF to Los Vaqueros, no conveyance would occur for at least three subsequent years.
- EBMUD would retain sole discretion to determine whether to implement transfers, subject to the limits set forth above.

Under Part A, during certain dry years, EBMUD would have the ability to divert up to 30 TAF of EBMUD's stored water from Los Vaqueros Reservoir to EBMUD's service area. Additional facilities may be required to enable delivery of water in this manner. In particular, EBMUD may need to make upgrades at the EBMUD-CCWD Intertie in order to move water into EBMUD's system at sufficient pressures and rates. EBMUD would also need to upgrade the pumps at its Walnut Creek Pumping Plant (WCPP) to include variable frequency drives (VFDs). Following is a brief discussion of those facilities; construction impacts associated with these facilities are analyzed in Chapter 4 of the Draft Supplement.

Under Part B, EBMUD could also transfer its portion of stored water in LVE to CCWD, the Local Agency Partners, and Refuges. In return, CCWD, the Local Agency Partners, and Refuges would transfer their water supplies at the Freeport Intake to EBMUD for conveyance to EBMUD's service area in some dry years when Freeport Facilities are in operation; no new facilities are needed to enable these exchanges.

EBMUD-CCWD Intertie Pump Station

A new pump station may be constructed at the EBMUD-CCWD Intertie and used to lift water from the Los Vaqueros Pipeline to Mokelumne Aqueduct No. 2. In order to be conservative for this analysis, it is assumed that a high-lift pump station would provide the 300 feet of head needed to lift water from the Transfer Facility to the EBMUD-CCWD Intertie at 85 mgd. However, further evaluation of system hydraulics may conclude that a pump station is not needed, or that a lower power pump station may be sufficient. The pump station would be approximately 9,675 square feet in size; note that this does not include any land that would be needed for an electrical substation or other similar facility, if needed. The pump station would consist of four 2,000-hp pumps (three running to provide 85 mgd plus one standby pump). This pumping plant could cause very high surge pressures on the Los Vaqueros Pipeline, so significant surge controls would be needed. EBMUD would need to purchase land for the pump station.

Variable Frequency Drives at Walnut Creek Pumping Plant

While making deliveries to Los Vaqueros Reservoir, EBMUD would need VFD capability at the WCPP in order to balance raw water flows coming in to meet demands in the EBMUD service area. Currently EBMUD meets customer demand by managing flow rates on the three separate aqueducts, using a combination of pumping and gravity flows. The ability to throttle pumping on these aqueducts is limited. If one or more aqueduct were dedicated to conveying flows to or from the Los Vaqueros Pipeline, it would be very challenging operationally to balance the flows coming into the WCPP with the EBMUD system demands on the other side. VFDs are therefore needed on all three lines to adjust supply to demand while managing deliveries from the Los Vaqueros Pipeline.

The installation of VFDs at the WCPP would require the construction of two new buildings to house the VFDs. A new structure approximately 200’ by 25’ and 20’ tall would be located adjacent to the building housing Walnut Creek Raw Water Pumping Plants 1 and 2. A second structure, 180’ by 25’ and 15’ tall, would be located next to Pumping Plant #3. Both of these structures would be located on existing EBMUD property.

B-2.2.2 Scenario Two: Wheeling by EBMUD

Under Scenario Two, EBMUD would use existing EBMUD facilities including the FRWP, the Folsom South Canal Connection (FSCC), Mokelumne Aqueducts No. 1 and 2, and the EBMUD-CCWD Intertie to divert up to 30 TAF per year of CCWD and other Local Agency Partners water supplies. These water supplies could include both CVP and non-CVP supplies. At its sole discretion, EBMUD would determine when sufficient unused capacity is available in its facilities to wheel water supplies to the Los Vaqueros Pipeline. Sufficient capacity in EBMUD facilities would most likely be available in Wet Years from October through February when EBMUD’s service area demands are lower and only Mokelumne Aqueduct No. 3 is needed to meet EBMUD demands. The maximum flow rate would be 85 MGD from October through February. Since both Mokelumne Aqueducts No. 1 and 2 are interconnected at Walnut Creek, both Aqueducts need to be dedicated to wheel water supplies from the Sacramento River to Los Vaqueros Reservoir.

EBMUD Existing Mokelumne River Water Rights for Municipal Use

The water to be used for Scenario One (transferring EBMUD's extra Mokelumne River water to CCWD, the other Local Agency Partners, or Refuges) would be water available under EBMUD's water right License 11109 (Application 4228) and Permit 10478 (Application 13156). Since the 1920's, EBMUD's primary source of water has been the Mokelumne River. EBMUD diverts Mokelumne River water for municipal and hydroelectric uses pursuant to a series of rights including License 11109 and Permit 10478 for municipal uses and License 1388, License 6062, Permit 10479, and Permit 17378 for hydroelectric uses.

EBMUD's facilities associated with the Mokelumne River include Pardee and Camanche Dams and Reservoirs, hydro-electric power generation facilities at the base of each dam, the Mokelumne Aqueducts which convey water from Pardee Reservoir to the East Bay, and the Camanche Reservoir Fish Hatchery. EBMUD operates Pardee and Camanche Reservoirs together as an integrated system to efficiently deliver municipal water supply to the EBMUD service area while meeting all regulatory requirements and contractual obligations.

EBMUD's water rights have the following existing key parameters and attributes:

L11109

- Priority Date: September 22, 1924
- Direct Diversion: 310 cfs (year-round)
- Point of Diversion: Pardee Dam
- Collection to Storage: 209,950 AF (Oct 1-Jul 15)
- Total Beneficial Use: 224,037 AF per year
- Total Taken from the source: 316,250 AF per year
- Purpose of Use: Municipal and Recreational
- Place of use: EBMUD's service area and Pardee Reservoir

P10478

- Priority Date: June 16,1949
- Direct Diversion: Dec 1through July 1, up to 194 cfs
- Diversion to Storage: Dec 1 through July 1, up to 353,000 AF
- Point of Diversion: Pardee and Camanche Reservoirs
- Total Beneficial Use: 140,000 AF per year
- Purpose of Use: Municipal and Industrial, Recreational, Fish and Wildlife Preservation and Enhancement
- Place of use: EBMUD's service area, Pardee and Camanche Reservoirs, and Mokelumne River Fish Hatchery

B-2.2.3 Petitions Necessary to Facilitate the EBMUD Component of the Phase 2 Expansion Project

Scenario One: Storage, Transfer, and Exchange of Water Supplies

Under Scenario One, Part A, EBMUD would file a change petition with the State Water Board under Water Code Section 1701 to add Los Vaqueros Reservoir as a Point of Rediversion, Place of Use and Distribution of Storage for EBMUD's Mokelumne River water right Permit 10478.

Under Scenario One, Part B, EBMUD would file a change petition with the State Water Board under Water Code Section 1735 to transfer EBMUD's stored water in Los Vaqueros Reservoir to CCWD or other Local Agency Partners or Refuges. In return, CCWD, the Local Agency Partners, or the Refuges could file a change petition with the State Water Board under Water Code Section 1735 to transfer a portion of their appropriated water rights to EBMUD and add Freeport Intake as the point of rediversion and add EBMUD service area to their place of use. Additionally, CCWD or other Local Agency Partners or Refuges could also transfer a portion of their CVP Contract water to EBMUD through the Freeport facilities; a forbearance agreement with Reclamation would be needed. EBMUD's service area is already a part of the USBR's place of use, and if these agencies are also CVP contractors, interagency agreements would be needed.

Scenario Two: Wheeling by EBMUD

No change petitions are required by EBMUD to wheel non-EBMUD waters to CCWD, Local Agency Partners, or Refuges.

B-2.3 Water Resources

This Section describes Pardee and Camanche Reservoir integrated operations and describes the water resources in the Lower Mokelumne River. The section also assesses the significance of impacts on water resources including fishery and other ecosystem impacts associated with the EBMUD component of the Phase 2 Expansion.

B-2.3.1 Upstream of Pardee Reservoir

Annual precipitation and streamflow in the Mokelumne River watershed are extremely variable from month to month and from year to year. Most precipitation normally falls between November and May, with very little falling between late spring and late fall. Runoff is generally dominated seasonally by snowmelt, with the highest flows in April through June of wet years. The average annual flow into Pardee Reservoir is about 723 TAF, with a range from less than 324 TAF (10th percentile) to about 1,211 TAF (90th percentile).

B-2.3.2 Pardee and Camanche Reservoirs

Pardee Reservoir typically is operated between 170,000 and 200,000 acre-feet and has ranged from 48,000 acre-feet (March 1977) to 212,000 acre-feet (May 1984). Camanche Reservoir typically is operated from 270,000 to 340,000 acre-feet and has ranged from approximately 9,200 acre-feet (February 1989) to 423,000 acre-feet (July 1967).

Operations of the two reservoirs are coordinated to achieve multiple objectives. These objectives are to provide municipal water supply benefits, streamflow regulation, fishery/public trust interests, flood control, obligations to downstream diverters, and water temperatures suitable for anadromous fish in the lower Mokelumne River.

B-2.3.3 Downstream of Camanche Reservoir

The amount of flow in the lower Mokelumne River is important to the anadromous fish that use the river downstream of Camanche Dam. Flow in the Mokelumne River is also important for

- maintaining riparian vegetation,
- providing water supply for downstream users,
- providing recreational opportunities, and
- improving water quality.

Historical flow patterns, including the occurrence of high-flow events, are described below.

Flow Patterns

Flow downstream is principally moderated by Camanche Dam. However, there is still variation in Mokelumne River flows as shown in **Figure 2**. Based on flow data from water years 1966 through 2012, in years with high flows (90th percentile), the Camanche release flows are highest during May. In contrast, during years with average flow, water is stored in the reservoirs and peak reservoir releases tend to occur in June.

During April, May, and June during normal and above and below-normal water year types, the JSA requires additional releases from Camanche Dam of up to 200 cfs based on Pardee and Camanche storage levels. These additional flows are reflective of the seasonal pattern of flows in the Mokelumne River basin (Figure 2).

High-Flow Events

High-flow events can have both negative and positive effects. For example, high flows may improve conditions for fish by removing fine sediment and aiding migration but could also damage agricultural lands, property and structure. In the lower Mokelumne, studies indicate floodplain inundation occurs at flows above 3000 cfs. Approximately 32% of water years 1966 through 2012 had 10 or more days with daily flows that exceeded 3000 cfs.

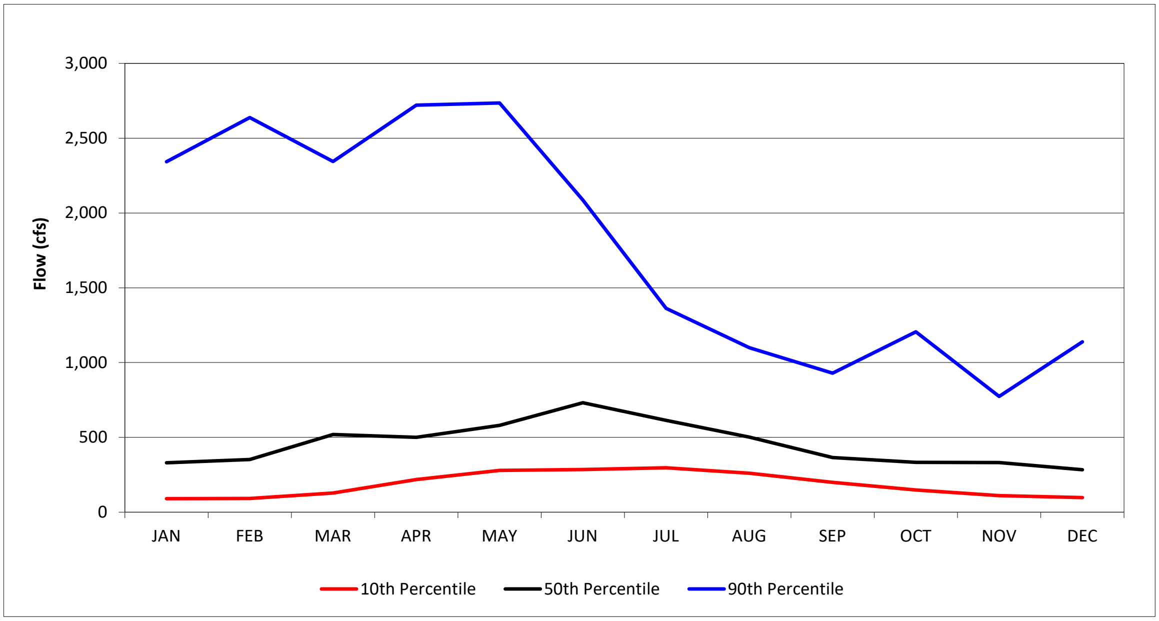


Figure 2
Average Monthly Flow Releases from Camanche Reservoir for Calendar Years 1966 through 2012

Water Quality

Source waters from the Sierra Nevada to the upper Mokelumne River basin provide excellent water quality. Minimal treatment is needed to meet drinking water health standards for Mokelumne River water. EBMUD further protects water quality at Pardee Reservoir through reservoir use limitations (i.e., prohibition of body contact recreation) and the purchase of conservation easements in areas with significant potential for residential development adjacent to Pardee Reservoir. As a result, the raw water is not exposed to common sources of contaminants such as pesticides, agricultural or urban runoff, municipal sewage discharges, or industrial toxics. There are, however, some water quality issues of concern. Pardee and Camanche Reservoirs are listed as impaired waters on the Central Valley Regional Water Quality Control Board's (CVRWQCB's) proposed changes to the 303(d) list (CVRWQCB 2012). Pardee Reservoir is listed as impaired based on the presence of elevated mercury levels, and Camanche Reservoir is listed as impaired based on the presence of elevated copper, mercury, and zinc levels. Toxic substances, as well as some other water quality constituents of concern for fish and drinking water quality are discussed below.

Water Temperature

Water temperature is the main water quality issue considered to be affected by the Phase 2 Expansion project. The following sections describe the use of critical threshold Camanche Reservoir water surface elevation of 190 feet above mean sea level to determine the potential for temperature impacts in the lower Mokelume River.

Coordinated Operation of Pardee and Camanche Reservoirs to Maintain Cold Water Releases

EBMUD operates Camanche Reservoir and Pardee Reservoir in an integrated manner to maintain low temperatures for fish migration, spawning, egg incubation, and juvenile rearing. This is done by preserving when feasible the coldwater pool (i.e., hypolimnion) in the lower depths of Pardee and Camanche Reservoirs over the summer so that cold water is available for release to the lower Mokelumne River during the fall when warm water temperatures might otherwise adversely affect spawning and incubation of Chinook salmon. However, release temperatures during the summer also are monitored to ensure adequate temperatures for juvenile steelhead rearing in the lower Mokelumne River. EBMUD has developed an operational approach to managing the two reservoirs so that, to the extent feasible, the coldwater hypolimnion in both Camanche and Pardee Reservoirs can be used to maintain stratification. The coldwater supply is used judiciously based on results of water quality monitoring, weekly review of conditions, modeling, and forecasting.

Water Temperature Monitoring and Critical Camanche Storage Threshold of 190 Feet Mean Sea Level (msl)

Water temperatures are monitored at four monitoring stations downstream of Camanche Reservoir: McIntire, Elliott, Golf, and Frandy. These sites are located approximately 1, 10, 24, and 33 miles downstream of Camanche Dam, respectively. Station McIntire temperatures serve as a measure of the temperatures from the Camanche Dam releases and supports salmon and steelhead spawning habitat. Station Elliott is at the downstream end of the primary Chinook salmon and steelhead spawning habitat, Station Golf is located immediately downstream of Woodbridge Dam and is the migration corridor for salmon and steelhead, and Station Frandy is located furthest downstream where the river is tidally influenced. Water temperatures measured at Station Frandy can be influenced by a number of factors, including tide, Delta water temperatures, and Delta diversions.

During periods of drought when Camanche Reservoir storage is drawn down, there is the potential for the coldwater supply at the bottom of Camanche to be depleted. Under these circumstances, release temperatures may increase. As reservoir elevation drops and the hypolimnion is depleted, the low-level outlet at Camanche Reservoir may begin to draw some water from the warmer metalimnion. Because the height of the different temperature layers in the reservoir (hypolimnion, metalimnion, and epilimnion) is variable, there is no consistent, precise reservoir elevation threshold for affecting release temperatures. EBMUD's most recent studies indicate that during March thru October, an elevation of 190 feet appears to be the highest elevation at which release temperatures might be affected by low storage levels.[1] Therefore, this threshold is used to determine potential temperature-based impacts to Lower Mokelumne River resources.

Toxic Substances

Penn Mine, a former copper and zinc mine located approximately 10 miles upstream of Camanche Dam, historically has been the source of high concentrations of the trace metals copper, zinc, and—to a lesser extent—cadmium in the river. In 2003, EBMUD and CVRWQCB

[1] Permit 10478 Time Extension Project, Draft EIR- September 2014

completed a cleanup of the Penn Mine site and were successful in returning the property to a natural pre-mining condition. Therefore, runoff from Penn Mine is no longer a source of concern.

Dissolved Oxygen

The dissolved oxygen objective presented in the water quality control plan (WQCP) for the Sacramento River and San Joaquin River basins is that dissolved oxygen concentrations should not fall below 7.0 milligrams per liter (mg/L) (CRWQCB 2016). In 1993, EBMUD installed, and since has successfully operated, a hypolimnetic oxygen-diffuser system (hypolimnetic oxygenation system [HOS]) in Camanche Reservoir that has eliminated hydrogen sulfide problems at the downstream Mokelumne River Fish Hatchery.

Turbidity

Turbidity is the condition of cloudiness or haziness caused by suspended solids in the water. On rare occasions, the water supply in Pardee Reservoir is affected by short-term events and/or episodic events that may stir up sediments. High turbidity caused by unusually heavy late winter storms and/or landslides into Pardee Reservoir has created periods of poor water quality that have limited the Mokelumne water supply available for domestic use. In such cases, the Mokelumne Aqueducts supplying water to the EBMUD service area were shut down, or their flows were reduced until turbidity levels returned to acceptable levels.

B-2.3.4 Regulatory Setting

This section describes the regulations and policies relevant to water resources on the Mokelumne River affected by the EBMUD component of the Phase 2 Expansion project. The potential physical changes to the environment from construction for the EBMUD component of the Phase 2 Expansion are analyzed in Chapter 4. The discussion below focuses only on those regulations that are potentially relevant to the Mokelumne River resources in relation to the EBMUD component of the Phase 2 Expansion.

Porter-Cologne Water Quality Control Act

In 1967, the Porter-Cologne Act established the State Water Board and nine regional water quality control boards (RWQCBs) as the primary state agencies with regulatory authority over California water quality and appropriative surface water rights allocations. Under this act (and the federal Clean Water Act), the state is required to adopt a water quality control policy and waste discharge requirements to be implemented by the State Water Board and the nine RWQCBs. The State Water Board also establishes WQCPs and statewide plans. The RWQCBs carry out State Water Board policies and procedures throughout the state.

WQCPs, also known as basin plans, designate beneficial uses for specific surface water and groundwater resources and establish water quality objectives to protect those uses. WQCPs define surface water quality objectives for multiple parameters, including suspended material, turbidity, pH, dissolved oxygen, bacteria, temperature, salinity, toxicity, ammonia, and sulfides.

2016 Water Quality Control Plan for the Central Valley

The Central Valley WQCP (CVRWQCB 2016) contains water quality objectives for the region that includes the Mokelumne River. The WQCP does not have specific temperature objectives for the Mokelumne River other than that temperature of receiving water should not be increased by more than 2.8°C (5°F). For this objective, the WQCP states "appropriate averaging periods may be applied provided that beneficial uses will be fully protected."

1995 and 2006 Water Quality Control Plans and Decision 1641 for the Delta

The 2006 WQCP is the most recent WQCP for the Delta; however, no changes in water quality objectives were made from the 1995 WQCP. The State Water Board's 1995 WQCP (adopted May 1995) and the Final EIR for implementation (November 1999) incorporated several elements of the U.S. Environmental Protection Agency (USEPA), National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (USFWS) regulatory objectives for salinity and endangered species protection. The changes from the previous regulatory limits for CVP and SWP Delta operations (Decision 1485) were substantial. The State Water Board fully implemented the 1995 WQCP with D-1641 in March 2000.

In D-1641, the State Water Board balanced the need for water for ecosystem benefits and consumptive needs and found that it would not be in the public interest to require more water from the Mokelumne River system than would be provided under the JSA. The State Water Board further concluded that Decision 1641 established EBMUD's responsibility to help meet Delta flow-dependent objectives.

State Water Board Resolution 68-16 (1968) states that water quality in the state will be regulated to achieve the "highest water quality consistent with maximum benefit to the people of the State." The principles of this resolution are upheld by the RWQCBs. The State Water Board is currently in the midst of considering updates to the Water Quality Control Plan. In September 2016, the State Water Board issued a Revised Draft Substitute Environmental Document for Flow Requirements on the Lower San Joaquin River and Salinity Standards for the Southern Delta. The Mokelumne River is an eastside tributary and will be addressed in the Phase 2 of the Bay-Delta Plan Update.

EBMUD has been working with other Mokelumne River stakeholders and the California Department of Fish & Wildlife (CDFW) on a proposed Voluntary Agreement (VA) for the Phase 2 Update of the Bay Delta WQCP. The Phase 2 update is a comprehensive review of the Bay-Delta Plan which addresses Delta Outflow, Sacramento River and Delta Tributary Inflow, Eastside streams including the Mokelumne River, Coldwater Habitat and Interior Delta Flows. It is unknown at this time what the final terms of a Mokelumne River VA would provide and whether the SWRCB or other regulatory state agencies would support and adopt a VA.

B-2.3.5 Assessment of Impacts

This section summarizes the No Project/No Action Alternative hydrologic conditions and changes in these conditions that are expected to occur under the EBMUD component of the Phase 2 Expansion. The modeling methods and results that are summarized in this water resources section also were used to evaluate EBMUD component of the Phase 2 Expansion effects for other resources, particularly fish. Results and figures from the modeling are shown in Appendix B-3.

As discussed earlier in this appendix, the EBMUD component includes a ‘Wheeling by EBMUD’ scenario (Scenario Two) under which EBMUD would wheel water for CCWD, other Local Agency Partners, and Refuges by utilizing EBMUD’s excess capacity at FRWP and Mokelumne Aqueducts No. 1 and 2. This proposed operation is similar to the current operations wherein EBMUD, as part of the Freeport Settlement, wheels a portion of CCWD’s CVP supplies through the FRWP facilities and Mokelumne Aqueducts No. 1 and 2. The dedication of both Mokelumne Aqueducts No. 1 and 2 for CCWD, other Local Agency Partners, and Refuges use would result in less water being diverted from the Mokelumne River to the East Bay. As a result, during this period, storage in Pardee and Camanche Reservoirs will likely be marginally higher than under the No Project/No Action Alternative. Higher storage levels in Pardee and Camanche Reservoir generally translated to higher water surface elevations in Camanche Reservoir. Therefore, it is more likely that Camanche Reservoir would be above the critical threshold of 190 ft mean sea level between March through October. Storage levels in Camanche Reservoir above 190 ft mean sea level could provide marginal benefits to the lower Mokelumne River resources by keeping water temperatures cooler and providing marginally higher flood flow releases in the following years.

During the time period when Mokelumne Aqueducts 1 and 2 are not available for EBMUD use, EBMUD must rely on Mokelumne Aqueduct No. 3 and terminal reservoir storage to meet water supply needs. This operation could result in changes to carryover storage; most of this change would be concentrated in EBMUD’s terminal reservoirs, as EBMUD would not be able to refill these reservoirs as quickly while the Aqueducts 1 and 2 are being used to convey water to Los Vaqueros. EBMUD would wheel water for other agencies only when EBMUD’s reservoirs are at or near full capacity (thereby minimizing impacts to EBMUD’s customers). EBMUD used its Riverware model to analyze the changes in terminal reservoir storage. Results indicate that the maximum reduction of 7659 AF (5% of terminal reservoir storage volume of 151 TAF) in terminal reservoir storage occurs in simulated January 1922. The terminal reservoirs continue to recover and become fully recovered within a few months. In January 1922, under baseline conditions, the terminal reservoir storage is 87% whereas under the Wheeling by EBMUD scenario, terminal reservoir storage is at 82%. The total available storage for EBMUD’s water supply needs remain within the standard operating criteria for the terminal reservoirs and within the 180-day storage that EBMUD strives to maintain for emergency planning purposes. Given that these changes are concentrated in the terminal reservoirs, and that the changes in storage are within standard operating ranges, this document does not further assess impacts to environmental resources associated with the Wheeling by EBMUD scenario.

Under the ‘Storage, Transfer, and Exchange’ scenario (Scenario One) when EBMUD would obtain exchanged water from CCWD or other Local Agency Partners, both Mokelumne Aqueducts No. 1 and 2 would need to be dedicated to move water from the Los Vaqueros Pipeline to EBMUD’s conventional treatment plants. As a result, EBMUD would only be able to use Mokelumne Aqueduct No. 3 to divert Mokelumne River supplies. Therefore, EBMUD would divert less water from the Mokelumne River, which would result in higher storage levels in Pardee and Camanche Reservoirs. The FRWP EIR (certified in 2004) analysis concluded that Pardee and Camanche

Reservoirs would be expected to have storage gains when supplemental supplies are used to meet EBMUD's service area demands. Similar to the discussion above, higher storage levels in Pardee and Camanche Reservoir generally result in a higher likelihood that water surface elevations in Camanche Reservoir would be above the critical threshold of 190 ft mean sea level. As a result, higher storage levels could provide marginal benefits to the lower Mokelumne River resources by keeping water temperatures cooler and providing marginally higher flood flow releases in the following years. Therefore, this section does not assess the potential environmental impacts to the lower Mokelumne River resources associated with this aspect (when EBMUD obtains exchanged water from Los Vaqueros Reservoir) of the EBMUD component of the Phase 2 Expansion.

This analysis evaluates the potential changes in hydrology associated with the EBMUD component of the Phase 2 Expansion project when EBMUD conveys water to Los Vaqueros Reservoir. Pardee and Camanche Reservoir storage along with lower Mokelumne River flows were simulated with EBMUD's reservoir operations planning model, Riverware. Potential changes in lower Mokelumne River water temperatures were assessed based on Camanche Reservoir water surface elevation of 190 feet.

RiverWare Modeling

RiverWare is a generalized river basin modeling software for simulating the operations of a water supply system. It was developed by USBR and USGS as a management tool. RiverWare is supported by a number of other agencies and research universities. The software facilitates data input and output efficiently enough for real time operations and provides a selection of water facilities and solution algorithms, all through a graphical user interface. RiverWare is EBMUD's reservoir operations planning model that simulates the operation of EBMUD's current Mokelumne River water supply system under the regulatory constraints that EBMUD must observe. The RiverWare model is used to analyze system performance given the effects of facility modifications, changes in operating rules and regulation, and supplemental water supply options.

RiverWare Model Assumptions

Four different cases were modeled: (1) No Project/No Action (baseline case); (2) EBMUD Component of Phase 2 Expansion; (3) Cumulative No Project/No Action; (4) Cumulative with Project. **Table 1** below summarizes the modeling assumptions used for these four cases.

Modeling for all four cases was based on an 82-year hydrologic record for the Mokelumne River, spanning from 1921-2012. EBMUD's Riverware modeling is designed to reflect EBMUD's operational constraints, permit conditions, agreements with other agencies, flood control releases, and EBMUD's obligations to release water for senior water rights holders and environmental obligations. The model includes the release requirements stipulated by the JSA as described above, including provisions for gainsharing.

The current version of the EBMUD Riverware model includes new terms that were incorporated into EBMUD's Permit 10478 in 2016. This includes a new term under which, subject to certain conditions, EBMUD is required to release up to 2 TAF of additional water during September through February of below normal and dry years to assist with fish migration.

TABLE 1
SUMMARY OF PRIMARY RIVERWARE ASSUMPTIONS FOR MODELING CASES

No Project/No Action	EBMUD Component of Phase	Cumulative with Project	Cumulative No Project/No Action
General Assumptions:			
190 MGD Demand, 2015 Level of Development	190 MGD Demand, 2015 Level of Development	230 MGD Demand, 2040 Level of Development	230 MGD Demand, 2040 LOD
Hydrologic Period: 1921-2012	Hydrologic Period: 1921-2012	Hydrologic Period: 1921-2012	Hydrologic Period: 1921-2012
Drought Planning Sequence Active	Drought Planning Sequence Active	Drought Planning Sequence Active	Drought Planning Sequence Active
Incorporates new permit terms	Incorporates new permit terms	Incorporates new permit terms	Incorporates new permit terms
Divert CVP water pursuant to EBMUD's contract, when end-of-season total system storage drops below 450 TAF; begin CVP diversions on July 1 of first year of drought. Subject to North of Delta M&I cutbacks.	Divert CVP water pursuant to EBMUD's contract, when end-of-season total system storage drops below 450 TAF; begin CVP diversions on July 1 of first year of drought. Subject to North of Delta M&I cutbacks.	Divert CVP water pursuant to EBMUD's contract, when end-of-season total system storage drops below 500 TAF; begin CVP diversions on May 1 of first year of drought. Subject to North of Delta M&I cutbacks.	Divert CVP water pursuant to EBMUD's contract, when end-of-season total system storage drops below 500 TAF; begin CVP diversions on May 1 of first year of drought. Subject to North of Delta M&I cutbacks.
Mokelumne River Priorities:			
1. JSA, senior water rights holders, riparians, etc.	1. JSA, senior water rights holders, riparians, etc.	1. JSA, senior water rights holders, riparians, etc.	1. JSA, senior water rights holders, riparians, etc.
2. EBMUD needs	2. EBMUD needs	2. EBMUD needs	2. EBMUD needs
3. NSJWCD 20 TAF	3. NSJWCD 20 TAF	3. NSJWCD 20 TAF	3. NSJ 20 TAF
	4. LVE	4. PDA NSJWCD Terms	4. PDA NSJWCD Terms
		5. LVE	

On top of these general assumptions, different modeling parameters can be layered to simulate baseline, project, and cumulative conditions. Different levels of demand can be programmed into the model. For the No Project/No Action and Project cases, a 190 MGD demand is assumed for EBMUD's service area and a 230 MGD demand is assumed for the 2040 cumulative conditions, as described above. The model also incorporates different "levels of development" to reflect demands on the Mokelumne River.

Model parameters are also adjusted based on EBMUD policy. As discussed in more detail below, EBMUD uses a three-year Drought Planning Sequence to assess water supply reliability. The model also incorporates elements of EBMUD's Drought Management Program to set rationing levels and trigger the use of CVP supply. These Drought Management Program guidelines are expected to shift over time with increasing demand.

The model sets priorities for how it treats water in the Lower Mokelumne River. In all four cases, the model prioritizes releases for the JSA, senior water rights holders and riparians above meeting EBMUD demand. The 20 TAF deliveries to NSJWCD are prioritized next. In the Project case, diverting water to Los Vaqueros is the lowest priority.

For the cumulative cases, the model incorporates terms from the Protest Dismissal Agreement; more detail is provided in the Cumulative section. The model also assumes that transfer water is available based on EBMUD's existing water transfers program, particularly its agreement with Placer County Water Agency.

For the EBMUD component of the Phase 2 expansion, the following assumptions were made; these assumptions were used to direct the modeling for the Project Case and the Cumulative with Project Case:

- EBMUD's share of storage in Los Vaqueros Reservoir is 30TAF.
- During wet years, EBMUD moves 15TAF per year, with two years required to deliver 30TAF.
- Water delivered to Los Vaqueros Reservoir is based on the availability of surplus water in the months of May and June.
- Delivery of water to Los Vaqueros is limited to 2 years over any 4-year period.
- Water is conveyed to Los Vaqueros at a rate of 85 MGD. EBMUD's supply from the LVE Project is diverted at FRWP under an exchange contract.

Drought Planning Sequence

EBMUD uses historical hydrologic data to inform its modeling and planning for future droughts. The worst hydrologic drought event in EBMUD's history was the 1976-77 drought, when runoff was only 25 percent of average and total reservoir storage decreased to 39 percent of normal. Fortunately, a very wet year in 1978 followed the critically dry year of 1977 and contributed to the water system's rapid recovery. Although the 1976-1977 drought only lasted for two years, to plan for the possibility of an extended drought lasting three years, EBMUD typically uses a three year "drought planning sequence" (DPS) to assess the adequacy of its water supply. The first and second years of this DPS are modeled using the actual runoff that occurred in 1976 and 1977, the driest recorded two-year period. The simulated runoff in the third year is 185 TAF, which is the average from 1976 and 1977.

RiverWare Results

Reservoir Storage

Increased aqueduct diversions to convey water to CCWD could result in slightly reduced storage in Pardee and Camanche Reservoirs in certain months when water is conveyed to CCWD. However, storage levels in Pardee and Camanche Reservoirs will be slightly higher than No Project/No Action Alternative when EBMUD is able to divert exchanged water from Freeport.

With the implementation of the EBMUD component of the Phase 2 Expansion, Pardee storage remained stable with little to no changes in storage as compared to No Project/No Action Alternative conditions. Under implementation of the EBMUD component of the Phase 2 Expansion, the maximum reduction in storage level at Pardee is 11 TAF (in simulated September 1979); which translates to 5.4% of Pardee Reservoir capacity of 204 TAF. Results indicate that this change is temporary and Pardee storage recovers to No Project/No Action Alternative levels by November 1979.

Figure WR-1 in Appendix B-3 plots the Pardee storage levels under No Project/No Action Alternative and with the EBMUD component of the Phase 2 Expansion. The figure illustrates that there is no appreciable difference in Pardee Reservoir storage levels between No Project/No Action Alternative and with the EBMUD component of the Phase 2 Expansion. As expected, under the EBMUD component of the Phase 2 Expansion Project, Pardee Reservoir levels are higher in drier years such as 1977, when transferred or exchanged water is available to EBMUD through Freeport.

As expected, Camanche Reservoir storage levels decline slightly in wetter years when water is delivered to Los Vaqueros and are generally higher in the exchange years when water is delivered to EBMUD. With the EBMUD component of the Phase 2 Expansion, the maximum decline in Camanche Reservoir storage is 14,911 AF in February 1993- which translates to 3.5% of Camanche Reservoir capacity of 417 TAF. Results indicate that this decline last just two months and Camanche storage recovers to No Project/No Action Alternative levels by April 1993.

Figure WR-2 in Appendix B-3 graphs the Camanche storage levels under No Project/No Action Alternative and with the EBMUD component of the Phase 2 Expansion. The Figure illustrates that there is no appreciable difference in Camanche Reservoir storage levels as a result of the EBMUD component of the Phase 2 Expansion.

Figure WR-9 in Appendix B-3 plots the Pardee plus Camanche Reservoir levels under both the No Project/No Action Alternative and the EBMUD Component of the Phase 2 Expansion Project. As expected, Pardee plus Camanche Reservoir levels are slightly lower in wetter years when water is delivered to CCWD. Pardee plus Camanche Reservoir levels are generally higher in drier years when transferred or exchanged water is available to EBMUD from Freeport. The maximum decline in Pardee plus Camanche Reservoir water storage is 14,543 AF in February 1993 –which translates to 2.4% of P+C Reservoirs storage capacity of 621TAF. This decline is temporary, lasting just two months to April 1993.

EBMUD considers end of September to be the end of the water year. **Figure WR-3** in Appendix B-3 graphs EBMUD's end-of-September total system storage to determine the impacts, if any, to carryover storage. The results indicate that the maximum reduction in carryover storage in EBMUD total system storage occurs in 1996, when storage decreases by about 7,751 AF (1.3% reduction from the No Project/No Action case). Most of the decrease in storage occurs in the terminal reservoirs while Pardee and Camanche reservoir storage remains stable. Total System Storage recovers to near baseline levels within six months (March 1997). Under the No Project/No Action Alternative, the average annual End of September Total System Storage is over 575 TAF. Under the EBMUD Component of the Phase 2 Expansion, the average annual End of September Total System Storage is reduced by approximately 500 AF (a minor reduction of 0.09%). This small reduction in average annual carryover storage does not translate to additional need for water for EBMUD, does not increase rationing for EBMUD customers, and does not reduce minimum required Lower Mokelumne River flows.

Figure WR-3 also shows that in dry years – when EBMUD is able to obtain exchanged water supplies under the Project – EBMUD's total system storage increases (Data results indicate that TSS increased by as much as 34,927 AF in simulated September 1978). In wet years, when EBMUD conveys water to Los Vaqueros, EBMUD relies upon water previously stored in its terminal reservoirs, and EBMUD's total system storage decreases slightly. EBMUD total system storage recovers during the years following deliveries to CCWD, the other Local Agency Partners, and/or Refuges.

Figure WR-10 in Appendix B-3 graphs EBMUD's Pardee plus Camanche (P+C) End of October (EOO) storage under the No Project/No Action Alternative and EBMUD component of the Phase 2 Expansion Project. P+C End of October storage is a critical criterion used by EBMUD to determine the JSA year-types for the October through March time frame, flood control operations, and availability of water supplies for North San Joaquin Water Conservation District. The results indicate that the largest decrease occurs in year 1961, when there is a decrease of 2,825 AF (0.45% of 621 TAF capacity). However, during the driest years, when transferred or exchanged water is available to EBMUD, Pardee plus Camanche EOO storage levels increase by as much as 37 TAF (5.9% of capacity) in 1978.

It is also worth noting that RiverWare incorporates operational guidelines for the reservoirs, including the terminal reservoirs; therefore, the model prioritizes maintaining reservoir storage levels within these operational guidelines. EBMUD has a policy of maintaining 180 days of emergency storage in its East Bay terminal reservoirs; changes in terminal storage levels generally occur within these guidelines. For the reasons noted above, the minor reduction in overall carryover storage is less than significant.

Changes in JSA Year Type during October through March time frame[2]

RiverWare modeling results indicate that with the EBMUD component of the Phase 2 Expansion Project, there would be 3 non-consecutive periods over the 92-year period of record when JSA year types change from drier to wetter conditions in the October through March time frame. The changes to wetter conditions occur in October 1962 to March 1963, October 1989 to March 1990, and October 1992 to March 1993. In October 1962 to March 1963, the JSA year type changes from *Below Normal* under No Project/No Action Alternative to *Normal and Above* under the EBMUD Component of the Phase 2 Expansion Project, reflecting an increase of 22 TAF in Pardee and Camanche storage volumes under Project conditions. Similarly, in October 1989 to March 1990, the JSA year type changes from *Dry* to *Below Normal* under Project conditions, reflecting an increase of 26 TAF in Pardee and Camanche storage. In October 1992 to March 1993, the JSA year type changes from *Critically Dry* to *Dry* under Project conditions, reflecting an increase of 7 TAF in Pardee and Camanche Reservoir storage.

In general, these changes are triggered by higher storage levels in Pardee and Camanche storage as a result of increased water deliveries (i.e. return of exchanged waters) through Freeport. The changes from drier to wetter JSA categories result in greater flows in the Lower Mokelumne River during the specific October through March time period.

Table 2 shows the changes in JSA year type for the October thru March time period

TABLE 2
JSA YEAR TYPES (OCT THRU MARCH)

JSA Year Type (October - March)		
Year type	**No Project/ No Action Alternative**	**Phase 2 Expansion Alternatives**
Normal and Above	46	47
Below Normal	25	24
Dry	14	15
Critically Dry	7	6
Total	92	92

Camanche Releases and Flow in the Lower Mokelumne River

Implementation of the EBMUD component of the Phase 2 Expansion results in negligible reductions in total Camanche releases. Figure WR-4 in Appendix B-3 provides a comparison of the Camanche releases under conditions with the EBMUD component implemented versus No Project/No Action Alternative conditions over the 92-year period of record. The figure shows how similar total Camanche releases are under these two conditions.

2 JSA year-types and the resultant minimum flows are determined by Pardee and Camanche (P+C) storage on November 5th. April through September JSA minimum flows are determined by the water year unimpaired runoff into Pardee Reservoir as forecasted by DWR in the April 1st Bulletin 120 Report with certain exceptions.

Under No Project/No Action Alternative conditions, the average annual total Camanche release over the 92-year period of record (CY 1921-2012) is 714 cfs; the average annual Total Camanche release with the EBMUD component of the Phase 2 Expansion is marginally lower at 709 cfs (a difference of 5 cfs or 0.7 % reduction in total Camanche releases over the 92-year period of record). **Table 3** and **Figure 3** below show the average monthly Total Camanche flows under both conditions. With the project, the maximum reduction in average monthly total flows below Camanche occurs in June when both baseline and project flows are generally high; the baseline average monthly flow of 1,138 cfs is reduced to 1,109 cfs under Project conditions, a reduction of 29 cfs.

TABLE 3
AVERAGE MONTHLY TOTAL FLOWS BELOW CAMANCHE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No Project/No Action Alternative (CY 1921-2012) in cfs												
Average Flow	642	801	804	842	1163	1138	748	451	395	579	514	503
Phase 2 Expansion Alternative (CY 1921-2012) in cfs												
Average Flow	640	799	800	840	1144	1109	745	450	393	579	516	502

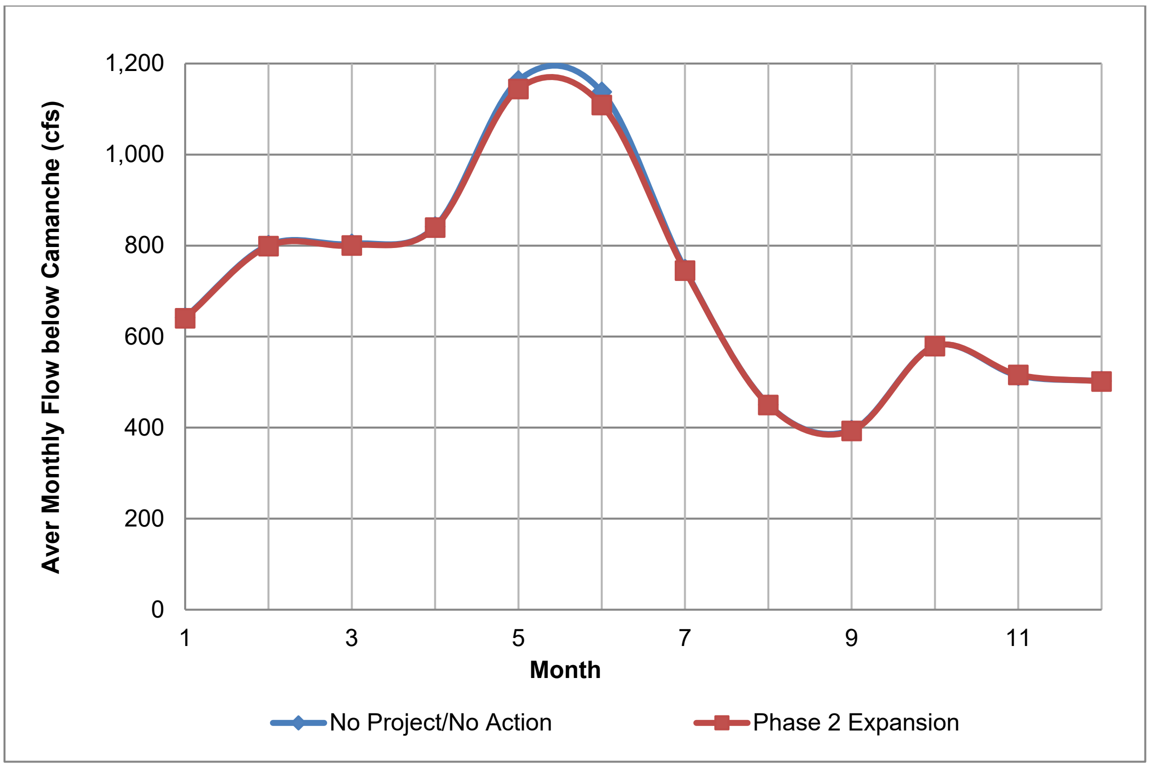


Figure 3
Average Monthly Flow Below Camanche

Table 4 below summarizes the average monthly Total Camanche Releases by JSA-year type for the No Project/No Action and the EBMUD Project:

TABLE 4
AVERAGE MONTHLY TOTAL FLOWS BELOW CAMANCHE BY JSA YEAR TYPE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No Project/No Action Alternative (CY 1921-2012) in cfs												
Normal & Above	840	944	899	1,724	2,263	2,169	1,343	629	569	782	644	730
Below Normal	681	1,036	946	571	1,009	1,072	661	473	421	456	475	349
Dry	239	360	588	288	366	310	338	297	238	338	359	220
Critical Dry	130	130	194	200	211	268	254	235	192	209	163	134
Phase 2 Expansion Alternative (CY 1921-2012) in cfs												
Normal & Above	823	954	886	1,719	2,220	2,107	1,335	627	567	783	641	718
Below Normal	699	1,002	966	571	993	1,042	660	472	424	443	485	350
Dry	239	355	576	288	366	310	338	297	230	324	338	220
Critical Dry	130	130	140	200	211	268	254	235	192	202	165	134

Table 4 indicates that the minimum flows below Camanche Reservoir required by the JSA are met in all year types. There are some changes under Project conditions. In *Normal and above* years and Below Normal years, the most significant reductions are seen in June; in *Normal and above* years, June average releases are reduced by 62 cfs (3% reduction), and in *Below Normal* years, the Total Camanche Releases are reduced by 30 cfs (3% reduction). In *Dry* years and *Critical Dry* Years, no changes in releases occur in April – August timeframe. The maximum reduction in *Dry* Years occurs in November with 21 cfs reduction (6%) and in Critically Dry years, the maximum reduction occurs in March with 55 cfs (28%).

An investigation into the 28% reduction in average Total Camanche Releases during March in *critically dry* years indicates that the reduction occurs as a result of a single JSA year type change during October 1992 to March 1993. Under the No Project/No Alternative, October 1992 to March 1993 is a *Critically Dry* year; whereas under the EBMUD component of the Phase 2 Expansion Project the same period changes to a Dry year resulting in one less critically dry year under the Project. The reduction of 55 cfs in total average flows (28% reduction from baseline) during March in Critical Dry years is simply an artifact of averaging. As a result of the project, one year, 1993, shifted from a Critically Dry to Dry year type. The high flows in March of 1993 were inflating the averages for the Critically Dry years; when that year shifted to become a Dry year, the average for the remaining Critically Dry years therefore dropped. However, this change in averages is not representative of the potential changes as a result of the project. **Table 5** below shows total flow below Camanche during March in critically dry years under both baseline and Project conditions.

TABLE 5
TOTAL FLOW BELOW CAMANCHE IN MARCH DURING CRITICAL DRY YEARS

Critical Dry Year	No Project/No Action Alternative in cfs	Phase 2 Expansion Alternative in cfs
1932	140	140
1962	140	140
1978	139	139
1979	140	140
1989	140	140
1992	139	139
1993	523	---
Average	194	140

NOTES:
1) Under No Project/No Action Alternative, March 1993 flows include flood control releases in addition to the minimum required JSA flows of 139 cfs.
2) Under Phase 2 Expansion Alternative, October 1992 to March 1993 is classified as dry, not critically dry. The total flow below Camanche in March 1993 is 397 cfs, which is greater than the minimum required JSA flow of 220 cfs due to flood control releases.

Minimum Required Releases

As described above, EBMUD typically releases more than the JSA minimum flow requirements to also meet downstream senior obligations or when regulating stream flow to meet flood-control requirements. Under No Project/No Action Alternative conditions, the average annual minimum required releases below Camanche are 347 cfs. With the EBMUD Project, the average annual minimum required releases are nominally higher by 1 cfs to 348 cfs. See **Figure 4** below and **Figure WR-5** in Appendix B-3.

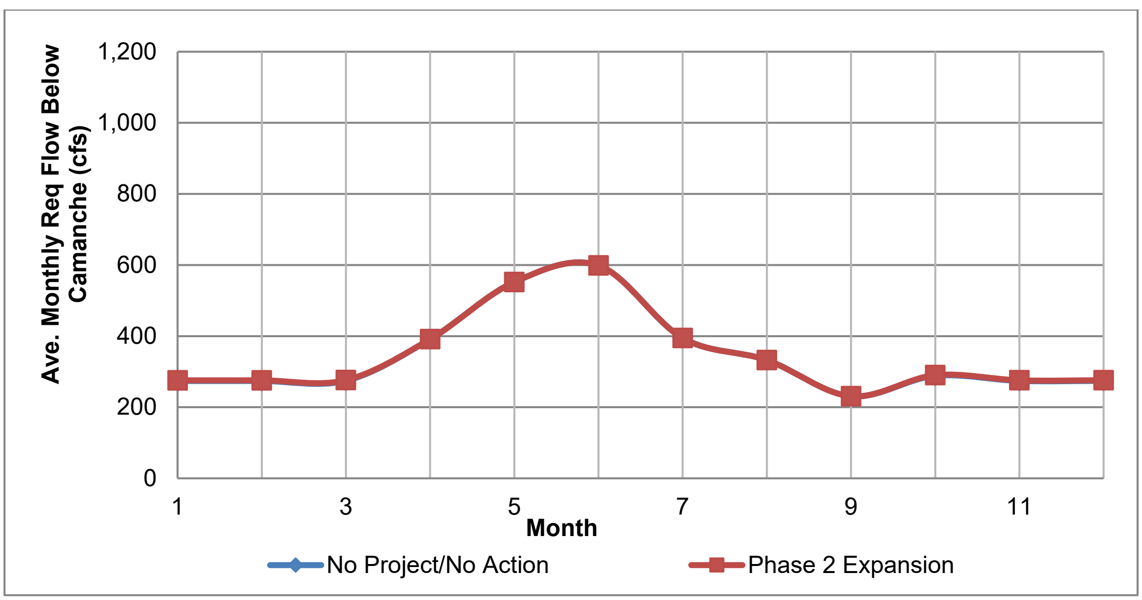


Figure 4
Average Monthly Req Flow Below Camanche

Table 6 summarizes the average monthly total Required Releases below Camanche in cfs by JSA year type.

TABLE 6
AVERAGE MONTHLY REQUIRED FLOWS BELOW CAMANCHE BY JSA YEAR TYPE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No Project/No Action Alternative (CY 1921-2012) in cfs												
Normal & Above	325	325	325	525	769	861	453	378	260	325	325	325
Below Normal	250	250	250	411	596	673	431	361	247	284	250	250
Dry	220	220	220	274	361	310	337	291	205	254	220	220
Crit Dry	130	130	140	200	211	268	254	216	161	132	132	134
Phase 2 Expansion Alternative (CY 1921-2012) in cfs												
Normal & Above	325	325	325	525	769	861	453	378	260	325	325	325
Below Normal	250	250	250	411	595	673	431	361	247	284	250	250
Dry	220	220	220	274	361	310	337	291	205	254	220	220
Crit Dry	130	130	140	200	211	268	254	216	161	132	132	134

As reflected in Table 6, the monthly average Required Releases below Camanche remain the same under both No Project/No Action Alternative and the EBMUD Component of the Phase 2 Expansion Project.

Flood Control Releases

A portion of the total Camanche release includes releases to meet the November 5th flood control requirement. Under No Project/No Action Alternative conditions, average annual Camanche flood control releases are 384 cfs over the 92-year period of record. With the EBMUD component of the Phase 2 Expansion, the average annual Camanche Flood Control releases are 2 cfs lower at 382 cfs, a nominal change. As illustrated in the Figure below, the majority of the changes occur in the months of May and June. See **Figure 5** and **Table 7** below.

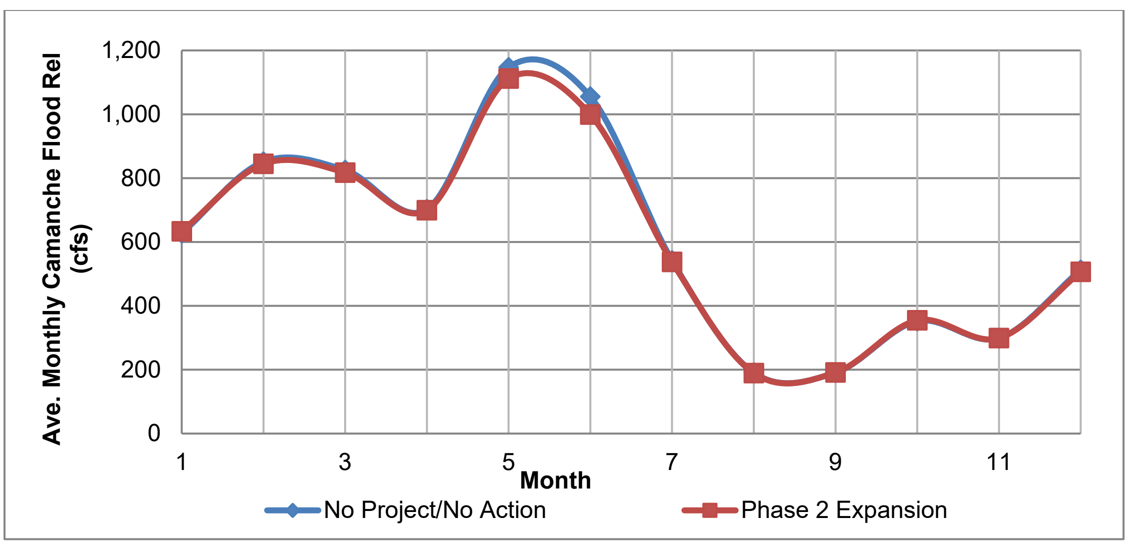


Figure 5
Average Monthly Camanche Flood Release

TABLE 7
AVERAGE MONTHLY CAMANCHE FLOOD RELEASE BY JSA YEAR TYPE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No Project/No Action Alternative (CY 1921-2012) in cfs												
Normal & Above	607	791	733	1,199	1,548	1,354	890	270	309	457	319	518
Below Normal	709	1,064	890	211	631	643	230	148	175	217	284	473
Dry	265	653	1,718	84	124	0	13	35	48	181	258	0
Crit Dry	0	0	382	1	0	0	0	42	56	108	110	0
Phase 2 Expansion Alternative (CY 1921-2012) in cfs												
Normal & Above	600	799	713	1,194	1,503	1,291	882	268	307	458	316	513
Below Normal	760	1,033	926	210	606	595	229	147	178	203	300	460
Dry	281	675	1,335	83	124	0	15	39	39	140	206	0
Crit Dry	0	0	0	1	0	0	0	42	56	141	199	0

Once again, the shifting of one year with a high March flow from "Critically Dry" to "Dry" affects the averages for March of Critically Dry years. However, this is an artifact of averaging, as explained above, and is not indicative of effects of the project.

Table 8 summarizes the frequency of flood control events by JSA year-type. Under both the No Project/No Action alternative and the Project conditions, the frequency of flood flow events remain generally the same with slight increases in the Feb, Mar, Oct and November months in Normal and above years. Under the Project Alternative, the annual average flood control releases are slightly reduced by 3-9 cfs (2.3% reduction) in Below Normal and Normal year types, whereas, the annual average flood control releases remain the same in drier year types. The results also indicate that when water is conveyed to Los Vaqueros, the flood control releases are marginally reduced in certain months of the wetter years and when EBMUD obtains exchanged water from CCWD, there is a small increase flood control releases in certain months of the drier year-types. These changes in monthly flood control releases are minor and do not result in significant impacts to environmental resources. **Figure WR-6** in Appendix B-3 illustrates the minor changes in flood control releases over the period of record.

TABLE 8
FREQUENCY OF FLOOD EVENTS BY JSA YEAR TYPE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No Project/No Action Alternative (CY 1921-2012) in cfs												
Normal & Above	39	36	36	29	28	28	29	27	29	46	46	36
Below Normal	14	17	18	22	19	18	29	22	29	19	19	5
Dry	1	3	3	4	1	0	1	4	16	6	7	0
Crit Dry	0	0	1	3	0	0	0	4	5	5	2	0
Phase 2 Expansion Alternative (CY 1921-2012) in cfs												
Normal & Above	39	37	37	29	28	28	29	27	29	47	47	36
Below Normal	13	16	17	22	19	18	29	22	29	18	18	5
Dry	1	3	4	4	1	0	1	4	15	7	8	0
Crit Dry	0	0	0	3	0	0	0	4	5	3	1	0

Flows Below WID

Figure WR-7 in Appendix B-3 graphs the average flows below WID under the No Project/No Action and the EBMUD component of the Phase 2 Expansion. The figure provides an overall context to view the flows below WID for the 92-year period of record. In the No Project/No Action Alternative, the average annual flow below WID is approximately 547 cfs. Average annual flow below WID is approximately 5 cfs (0.9% reduction) lower (542 cfs) under the EBMUD component of the Phase 2 Expansion. The 0.91% reduction in average annual flows below WID primarily occurs in the months of May and June. **Table 9** categorizes the average monthly flows below WID based on JSA year-types.

TABLE 9
AVERAGE MONTHLY FLOW BELOW WID (LAKE LODI) BY JSA YEAR TYPE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No Project/No Action Alternative (CY 1921-2012) in cfs												
Normal & Above	788	891	835	1,601	1,986	1,791	920	277	334	639	589	674
Below Normal	630	985	882	450	741	704	260	134	195	332	420	293
Dry	189	308	526	166	156	31	30	28	54	238	303	163
Crit Dry	80	82	133	77	24	31	22	36	46	124	108	79
Phase 2 Expansion Alternative (CY 1921-2012) in cfs												
Normal & Above	771	902	823	1,597	1,943	1,729	911	275	332	641	586	661
Below Normal	648	950	902	450	725	675	259	133	198	319	430	295
Dry	189	303	514	166	156	31	30	28	46	225	282	163
Crit Dry	79	81	78	77	24	31	22	36	46	117	111	78

In Normal and above years, the largest reduction in average monthly flows below WID occur in June, when flows decrease by 61 cfs (3%). In Below Normal years the largest reduction occurs in February, when flows decrease by 35 cfs. In Dry years, the largest reduction occurs in November, when flows decrease by 21cfs. In Critically Dry years, the largest reduction occurs in March with a reduction of 55 cfs; but as discussed above, further investigation into the critically dry year reduction in March indicates that the decrease in the average monthly flow is due to a single change in JSA category (October 1992 to March 1993 change from Critically Dry to Dry conditions).[3]

Figure WR-7 in Appendix B-3 provides an overall context to view the flood flow releases during the 92-year period of record. There is no appreciable change in flows below WID between the No Project/No Action Alternative and the EBMUD component of the Phase 2 Expansion.

[3] See October 1992 to March 1993 Camanche Reservoir Operations above for a discussion of changes resulting from change in JSA year types under the EBMUD Component of the Phase 2 Expansion Project and the No Project/No Action Alternative.

Woodbridge Irrigation District, North San Joaquin Water Conservation District and Jackson Valley Irrigation District

With the EBMUD component of the Phase 2 Expansion, EBMUD would continue to meet obligations to senior water rights holders before making EBMUD diversions. As noted earlier, senior water rights holders include WID. **Table 10** indicates that EBMUD's obligations to WID remain the same under both the No Project/No Action Alternative and with the EBMUD component of the Phase 2 Expansion.

NSJWCD's right to divert water is junior to EBMUD's water rights. **Table 11** shows NSJWCD diversions under the No Project/No Action and Phase 2 Expansion Alternatives. In the No Project/No Action Alternative, NSJWCD's water deliveries would be available from the Mokelumne River in 58 out of 92 years modeled, with an average annual delivery volume of 18,545 AF. By comparison, with the EBMUD component of the Phase 2 Expansion, there would be no change in the number of years of NSJWCD's deliveries and there would be a minor reduction of 3 AF in average annual delivery volume. The largest reduction in deliveries occurs in 1954, when there would be a slight reduction of 224 AF (2.3% reduction) as a result of the Project.

JVID water rights are senior to EBMUD's water rights under Permit 10478. JVID diverts water from Pardee Reservoir at the Jackson Creek Spillway Facility (elevation 550 ft) to supply water for domestic and irrigation uses to customers in portions of Amador County. With the EBMUD component of the Phase 2 Expansion, water surface elevations fall below 550 ft in an additional 3 months. The recently approved changes to EBMUD Permit 10478 include a new regulatory term which requires EBMUD to assist JVID in installing a submersible pump when Pardee elevation falls below 550 ft and water is available under JVID's water right priority. This permit condition will prevent the drop in surface elevation from impacting JVID's ability to access water.

Camanche Elevation Threshold

Under No Project/No Action Alternative conditions, RiverWare modeling results indicate that March through October Camanche Reservoir end-of-month storage is less than the 190 feet msl threshold in 48 months over the 92-year period of record. With the EBMUD component of the Phase 2 Expansion, March through October Camanche end-of-month storage is less than 190 feet msl in 49 months (1 additional month increase from the No Project/No Action condition). The end of October Camanche Reservoir storage is below 190 ft msl in 8 years under both the No Project/No Action and with the EBMUD component of the Phase 2 Expansion. Since there is minimal change in the number of months Camanche Reservoir is below the 190 ft msl threshold (during the March through October time frame) as compared to the No Project/No Action case, there will be no significant impact on water temperatures in the Lower Mokelumne River. See **Figure WR-8** in Appendix B-3.

TABLE 10
WID DIVERSIONS UNDER NO PROJECT/NO ACTION ALTERNATIVE AND PHASE 2 EXPANSION ALTERNATIVES (CY 1921-2012) IN TAF

WID Diversions Under No Project/No Action Alternative and Phase 2 Expansion Alternatives (CY 1921-2012) in AF

Year	No Project/ No Action Alternative	Phase 2 Expansion Alternatives	DIFF		Year	No Project/ No Action Alternative	Phase 2 Expansion Alternatives	DIFF
1921	60	60	0		1967	60	60	0
1922	60	60	0		1968	60	60	0
1923	60	60	0		1969	60	60	0
1924	39	39	0		1970	60	60	0
1925	60	60	0		1971	60	60	0
1926	60	60	0		1972	60	60	0
1927	60	60	0		1973	60	60	0
1928	60	60	0		1974	60	60	0
1929	39	39	0		1975	60	60	0
1930	60	60	0		1976	39	39	0
1931	39	39	0		1977	39	39	0
1932	60	60	0		1978	39	39	0
1933	60	60	0		1979	60	60	0
1934	39	39	0		1980	60	60	0
1935	60	60	0		1981	60	60	0
1936	60	60	0		1982	60	60	0
1937	60	60	0		1983	60	60	0
1938	60	60	0		1984	60	60	0
1939	39	39	0		1985	60	60	0
1940	60	60	0		1986	60	60	0
1941	60	60	0		1987	39	39	0
1942	60	60	0		1988	39	39	0
1943	60	60	0		1989	60	60	0
1944	60	60	0		1990	39	39	0
1945	60	60	0		1991	39	39	0
1946	60	60	0		1992	39	39	0
1947	39	39	0		1993	60	60	0
1948	60	60	0		1994	39	39	0
1949	60	60	0		1995	60	60	0
1950	60	60	0		1996	60	60	0
1951	60	60	0		1997	60	60	0
1952	60	60	0		1998	60	60	0
1953	60	60	0		1999	60	60	0
1954	60	60	0		2000	60	60	0
1955	60	60	0		2001	60	60	0
1956	60	60	0		2002	60	60	0
1957	60	60	0		2003	60	60	0
1958	60	60	0		2004	60	60	0
1959	60	60	0		2005	60	60	0
1960	60	60	0		2006	60	60	0
1961	39	39	0		2007	60	60	0
1962	60	60	0		2008	39	39	0
1963	60	60	0		2009	60	60	0
1964	60	60	0		2010	60	60	0
1965	60	60	0		2011	60	60	0
1966	60	60	0		2012	60	60	0

TABLE 11
NSJWCD DIVERSIONS UNDER NO PROJECT/NO ACTION ALTERNATIVE AND PHASE 2 EXPANSION ALTERNATIVES (CY 1921-2012) IN AF

NSJWCD Diversions Under No Project/No Action Alternative and Phase 2 Expansion Alternatives (CY 1921-2012) in AF

Year	No Project/ No Action Alternative	Phase 2 Expansion Alternatives	Diff		Year	No Project/ No Action Alternative	Phase 2 Expansion Alternatives	Diff
1921	8000	8000	0		1967	20000	20000	0
1922	20000	20000	0		1968	0	0	0
1923	19675	19700	25		1969	20000	20000	0
1924	0	0	0		1970	20000	20000	0
1925	8000	8000	0		1971	20000	20000	0
1926	0	0	0		1972	1272	1281	9
1927	20000	20000	0		1973	20000	20000	0
1928	8000	8000	0		1974	20000	20000	0
1929	0	0	0		1975	20000	20000	0
1930	0	0	0		1976	0	0	0
1931	0	0	0		1977	0	0	0
1932	20000	20000	0		1978	0	0	0
1933	0	0	0		1979	0	0	0
1934	0	0	0		1980	20000	20000	0
1935	20000	20000	0		1981	0	0	0
1936	20000	20000	0		1982	20000	20000	0
1937	20000	20000	0		1983	20000	20000	0
1938	20000	20000	0		1984	20000	20000	0
1939	0	0	0		1985	0	0	0
1940	20000	20000	0		1986	20000	20000	0
1941	20000	20000	0		1987	0	0	0
1942	20000	20000	0		1988	0	0	0
1943	20000	20000	0		1989	0	0	0
1944	17199	17223	24		1990	0	0	0
1945	20000	20000	0		1991	0	0	0
1946	20000	20000	0		1992	0	0	0
1947	0	0	0		1993	20000	20000	0
1948	20000	20000	0		1994	0	0	0
1949	20000	20000	0		1995	20000	20000	0
1950	20000	20000	0		1996	20000	20000	0
1951	20000	20000	0		1997	20000	20000	0
1952	20000	20000	0		1998	20000	20000	0
1953	20000	20000	0		1999	20000	20000	0
1954	9686	9462	-224		2000	20000	20000	0
1955	0	0	0		2001	0	0	0
1956	20000	20000	0		2002	3790	3776	14
1957	20000	20000	0		2003	20000	20000	0
1958	20000	20000	0		2004	0	0	0
1959	0	0	0		2005	20000	20000	0
1960	0	0	0		2006	20000	20000	0
1961	0	0	0		2007	0	0	0
1962	20000	20000	0		2008	0	0	0
1963	20000	20000	0		2009	20000	20000	0
1964	0	0	0		2010	20000	20000	0
1965	20000	20000	0		2011	20000	20000	0
1966	0	0	0		2012	0	0	0

B-2.3.6 Significance Criteria

The criteria used for determining the significance of an impact on hydrology and water quality are based on Section I of Appendix G (a model Environmental Checklist) of the State CEQA Guidelines and professional standards and practices. Because this Appendix analyzes only the potential modifications to Mokelumne River resources due to operations of the EBMUD component of the Phase 2 Expansion, with construction of new facilities and modification of existing facilities analyzed in Chapter 4, only those criteria that are relevant to this analysis are listed below. Impacts on hydrology may be considered significant if the operations of the EBMUD component of the Phase 2 Expansion would:

- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted);
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site; or
- otherwise substantially degrade water quality.

B-2.3.7 Impact Discussion

The primary impact mechanisms for water resources are changes in lower Mokelumne River flow, which could affect groundwater recharge or reduce flooding. Less-than-significant impacts on water resources associated with these changes are described in the following sections.

Significant Impacts

As explained below under Less-Than-Significant Impacts, changes in lower Mokelumne River flow associated with the EBMUD component of the Phase 2 Expansion would not result in significant impacts on water resources.

Less-than-Significant Impacts

Impact WR-1: Potential for changes in Mokelumne River flow to affect groundwater recharge (Less than Significant)

The California Department of Water Resources (DWR) categorized the Eastern San Joaquin Sub-basin to be in critical overdraft under SGMA (Bulletin 118 Interim Update 2016). The Eastern San Joaquin basin is experiencing an estimated long-term overdraft of 150,000 – 160,000 AFY (Eastern San Joaquin Basin Groundwater Management Plan (GWMP), 2004). According to Bulletin 118, Update 2003, published by DWR in 2003, U.S. Geological Survey Data Series 696 published in 2012, and the 2004 Eastern San Joaquin GWMP, the average annual recharge in the Eastern San Joaquin Sub-basin is estimated to be on the order of 750,000 to 900,000 AF, of which 198,000 AF is seepage from all surface water sources in the basin (2004 Eastern San Joaquin GWMP) including the Mokelumne River and all other rivers that serve as a source of recharge for the Eastern San Joaquin Sub-basin. The water budget for the Eastern San Joaquin Sub-basin is currently being updated with the development of a Groundwater Sustainability Plan as required by SGMA, but the 2004 Eastern San Joaquin GWMP estimated that approximately 867,000 AF of groundwater pumping occurs in the sub-basin annually.

EBMUD evaluated the Phase 2 Expansion effects on groundwater seepage by looking at stream channel losses. Stream channel losses are a function of various parameters such as river stage and groundwater depth, and can result from shallow to deep percolation to groundwater (recharge), evapotranspiration, and temporary bank storage. Groundwater recharge is only one of several components that comprise channel losses, and reductions in channel loss do not result in an acre-foot for acre-foot reduction in stream seepage to groundwater.

Channel losses can be estimated using a variety of approaches.[4] Channel losses estimated when evaluating the Phase 2 Expansion using EBMUD's RiverWare model ranged between approximately 44,500 – 47,000 AFY. Earlier estimated channel loss rates in the lower Mokelumne River have ranged from 47,000 to 130,000 AFY, with most of the loss occurring in the 21-mile reach between Camanche Dam and Lodi Lake near the town of Lodi (HCG 1998). Some of this loss is likely seepage to groundwater. There is some potential for a reduction in river flow to cause a reduction in groundwater recharge. A reduction in groundwater recharge could result from reduced river contact with the substrate caused by reduced channel width and depth. However, percolation to groundwater is controlled largely by the position of the groundwater table compared to river elevation. In addition, the EBMUD component of the Phase 2 Expansion is unlikely to have much effect on channel shape because reduction in flow would be small (overall reduction of 0.7% of flow below Camanche Dam as described above). The Draft Supplement concluded that since the average annual reduction in flow below Camanche Dam is small (5 cfs or 3620 AF per year), the EBMUD component of the Phase 2 Expansion would have less than significant impacts on groundwater recharge and that no mitigation is necessary. The analysis of channel losses from the RiverWare modeling completed subsequent to publication of the Draft Supplement are discussed below and confirm this conclusion. The small reduction in the average annual flow results in a minor reduction in annual channel losses of only about 2 AF under Phase 2 Expansion conditions.

EBMUD's model runs indicate that the average annual channel loss is expected to range between 44,540 – 47,230 AF under both the No Project/No Action Alternative and with the Phase 2 Expansion. Relative to the No Project/No Action Alternative, under Phase 2 Expansion conditions the model outputs for specific hydrologic years show increases in channel losses in some years and decreases in others, ranging from an increase in annual channel losses of approximately 30 AF, to a decrease in annual channel losses of approximately 20 AF. On average, under Phase 2 Expansion conditions, annual channel losses are only approximately 2 AF lower than under No Project/No Action Alternative, a de minimis reduction of less than 0.01%.

4 Channel losses estimated using varying approaches can result in different range of values because the loss components represented can differ depending on the method used; therefore, the magnitude of losses is not necessarily comparable. Channel losses in EBMUD's model were estimated using a proprietary physically based approach whereas the estimates in HCG (1998) were calculated using a mass balance approach based on measured streamflows and reported diversions. The channel loss components represented using these two approaches are not equivalent and therefore the loss estimates cannot be compared to one another.

These reductions in channel losses would result in minimal reductions in groundwater recharge, if at all, because groundwater recharge is only a fraction of total channel losses. Given that groundwater recharge is only one of several components contributing to channel losses, the annual average reduction in seepage to groundwater would be something less than 2 AF. Further, due to the effects of groundwater levels on the rate of stream seepage, these de minimis reductions in channel losses may not actually translate into a reduction in stream seepage to groundwater since changes in groundwater levels are not accounted for in the estimates of channel losses in EBMUD's model. Decreases in groundwater levels that would result in higher channel losses, and therefore more seepage, are not represented in the model. As a result, EBMUD's subsequent modeling confirmed the Draft Supplement's conclusion that impacts to groundwater, if any, would be less than significant.

Impact WR-2: Potential for changes in Mokelumne River flow to reduce flooding (Less than Significant)

As described above, a flow of 3,000 cfs could produce floodplain inundation (and potentially flood-related damage) downstream of Woodbridge Dam. The data show the same number (18) of months with flows above 3,000 cfs for both the No Project/No Action Alternative and with the EBMUD component of the Phase 2 Expansion. Therefore, this is considered a less than significant impact. No mitigation is necessary.

B-2.4 Fish Resources

This section describes fish resources in the Lower Mokelumne River (below Camanche Dam to Frandy gage – a distance of about 33 miles). Fish resources within the Delta are discussed in Section 4.3 of the Supplement.

This section assesses the significance of the impacts associated with implementing the EBMUD component of the Phase 2 Expansion project. This assessment focuses on fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*Oncorhynchus mykiss*) in the lower Mokelumne River, which are considered key evaluation species based on their regulatory status, commercial and recreational importance, and sensitivity to project effects. The welfare of these species is indicative of the general quality of the aquatic habitats below Camanche Dam, because of their broad overlap in seasonal habitat requirements with other native fish species.

This analysis concludes that the EBMUD component of the Phase 2 Expansion would not result in significant impacts on fish resources.

B-2.4.1 Environmental Setting

Sixteen native and 26 introduced fish species have been observed in the lower Mokelumne River downstream of Camanche Dam based on the results of fish monitoring conducted since 1990 (see **Table 12**). Special-status species observed in the lower Mokelumne River include steelhead (listed as threatened under the Federal Endangered Species Act [ESA]) and delta smelt (listed as threatened under the ESA and as endangered under the California Endangered Species Act

TABLE 12
FISH SPECIES OBSERVED IN THE LOWER MOKELUMNE RIVER

Family	Common Name	Scientific Name	Distribution
Petromyzontidae: Lamprey Family	Pacific lamprey	*Lampetra tridentata*	Native
Acipenseridae: Sturgeon Family	White sturgeon	*Acipenser transmontanus*	Native
	Green sturgeon	*Acipenser medirostris*	Native
Clupeidae: Herring Family	Threadfin shad	*Dorosoma pretenense*	Introduced
	American shad	*Alosa sapidissima*	Introduced
Cyprinidae: Minnow Family	Hitch	*Lavinia exilicaudia*	Native
	Sacramento splittail	*Pogonichthys macrolepidotus*	Native
	Sacramento blackfish	*Orthodon microlepidotus*	Native
	Sacramento pikeminnow	*Ptychocheilus grandis*	Native
	Hardhead	*Mylopharodon conocephalus*	Native
	Golden shiner	*Notemigonus crysoleucas*	Introduced
	Goldfish	*Carassius auratus*	Introduced
	Common carp	*Cyprinus carpio*	Introduced
Catostomidae: Sucker Family	Sacramento sucker	*Catostomus occidentalis*	Native
Ictaluridae: Catfish Family	Black bullhead	*Ameiurus melas*	Introduced
	Brown bullhead	*Ameiurus nebulosus*	Introduced
	White catfish	*Ameiurus catus*	Introduced
	Channel catfish	*Ictalurus punctatus*	Introduced
Osmeridae Smelt Family	Delta smelt	*Hypomesus transpacificus*	Native
	Wakasagi	*Hypomesus nipponensis*	Introduced
Salmonidae: Salmon and Trout Family	Chinook salmon	*Oncorhynchus tshawytscha*	Native
	Chum salmon	*Oncorhynchus keta*	Native
	Kokanee	*Oncorhynchus nerka*	Native
	Steelhead/rainbow trout	*Oncorhynchus mykiss*	Native
Atherinopsidae: Silversides Family	Inland silversides	*Menidia beryllina*	Introduced
Poeciliidae: Livebearers	Western mosquitofish	*Gambusia affinis*	Introduced
Cottidae: Sculpin Family	Prickly sculpin	*Cottus asper*	Native
Moronidae: Striped Bass Family	Striped bass	*Morone saxatilis*	Introduced
Centrarchidae: Sunfish Family	Bluegill	*Lepomis macrochirus*	Introduced
	Pumpkinseed	*Lepomis gibbosus*	Introduced
	Redear sunfish	*Lepomis microlophus*	Introduced
	Warmouth	*Lepomis gulosus*	Introduced
	Green sunfish	*Lepomis cyanellus*	Introduced
	White crappie	*Pomoxis annularis*	Introduced
	Black crappie	*Pomoxis nigromaculatus*	Introduced
	Largemouth bass	*Micropterus salmoides*	Introduced
	Smallmouth bass	*Micropterus dolomieu*	Introduced
	Redeye bass	*Micropterus coosae*	Introduced
	Spotted bass	*Micropterus punctulatus*	Introduced
Percidae: Perch Family	Bigscale logperch	*Percina macrolepida*	Introduced
Embiotocidae: Surfperch Family	Tule perch	*Hysterocarpus traski*	Native
Gobiidae: Goby Family	Yellowfin goby	*Acanthogobius flavimanus*	Introduced

SOURCE: EBMUD data

[CESA]), fall-run Chinook salmon (listed as a federal species of concern), Sacramento splittail (California species of special concern), and hardhead (California species of special concern). Other runs of Chinook salmon that inhabit the Central Valley include winter-run (listed as endangered under ESA and CESA) and spring-run (listed as threatened under ESA and CESA) that typically do not occur in the lower Mokelumne River and are not addressed in this analysis. Fall-run Chinook salmon and steelhead are the primary management species in the lower Mokelumne River because of their regulatory status and their recreational or commercial value.

B-2.4.2 Lower Mokelumne River

The lower Mokelumne River (**Figure 6**). The gradient ranges from 0.1% near Camanche Dam to 0.02% near the Cosumnes River confluence. Tidal influence from the Delta typically extends to the town of Thornton but can reach as far upstream as Woodbridge Dam. The reach below Woodbridge Dam is characterized primarily by flat water habitats (pools and runs); elevated spring, summer, and fall water temperatures; and mud and sand substrates. Lodi Lake, a seasonal impoundment formed by Woodbridge Dam during the irrigation season, is characterized by low water velocities and mud substrates. The river between Lodi Lake and Camanche Dam is characterized by alternating bars and flat water habitats. The uppermost 6 to 9 miles of this reach below Camanche Dam support most of the salmon and steelhead spawning and juvenile rearing habitat. This segment is characterized by higher-gradient runs and riffles; cooler spring, summer, and fall water temperatures; and gravel-cobble substrates.

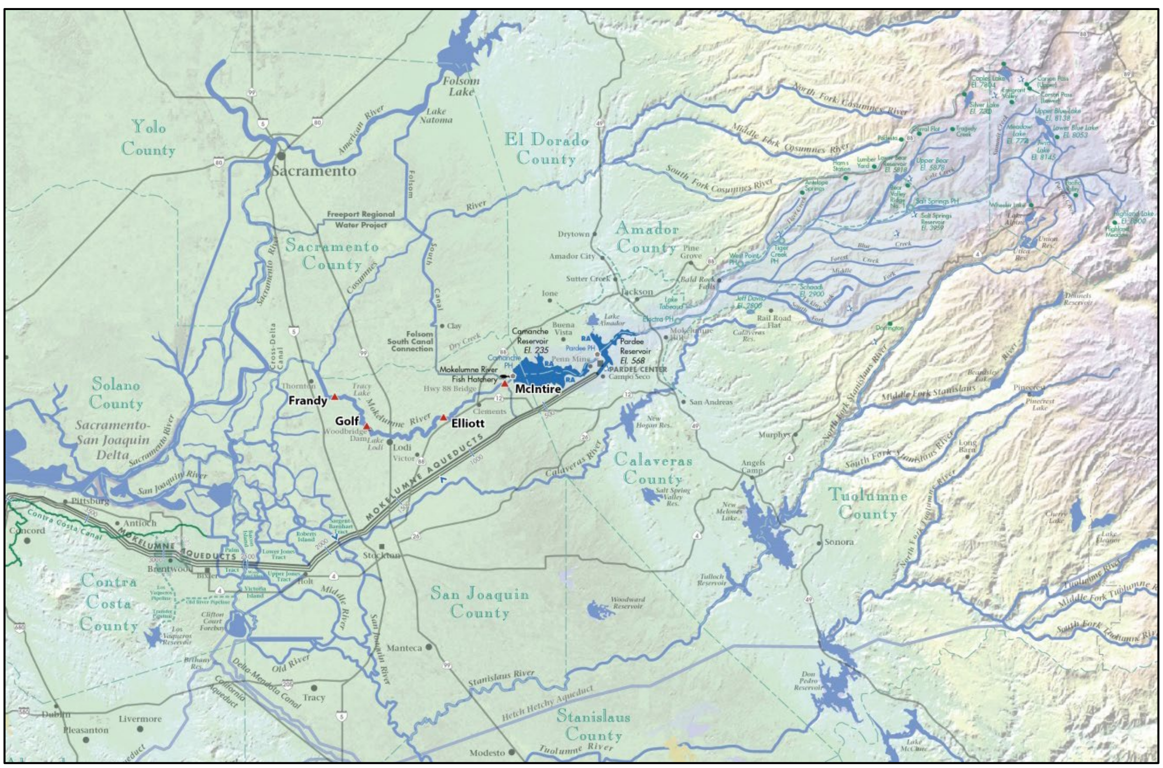


Figure 6
Lower Mokelumne River

Fall-Run Chinook Salmon

Fall-run Chinook salmon are the most abundant and widely distributed of the four Chinook salmon runs in the Central Valley (Williams 2006). They historically spawned in the Central Valley and lower foothill reaches of all major tributaries of the Sacramento and San Joaquin Rivers. Dams currently restrict their distribution to the lowermost reaches of their historical spawning habitat where populations are sustained by natural and hatchery production.

Status

NMFS conducted a status review of Central Valley fall-/late fall–run Chinook salmon Evolutionarily Significant Unit (ESU) in 1999 and concluded that this ESU did not warrant listing as threatened or endangered under the ESA (64 *Federal Register* [FR] 50394). This ESU is classified as a species of concern (69 FR19975).

Life History and Habitat Requirements

Central Valley fall-run Chinook salmon have an ocean-type life history in which adults enter fresh water at an advanced stage of maturity, move rapidly to spawning areas in lower mainstem and tributary reaches, and spawn within a few days or weeks of freshwater entry (Healey 1991). Central Valley fall-run Chinook salmon typically enter spawning streams from July through December and spawn from October through December. Most fry emerge from December through March and typically emigrate from their natal streams within 1 to 7 months of emergence, entering the estuary as fry or smolts primarily from January through June. This life-history pattern has allowed fall-run Chinook salmon to sustain relatively large populations in low-elevation reaches of the Central Valley floor below dams where unfavorable water temperature and low-flow conditions frequently occur in summer.

Most adult fall-run Chinook salmon in the lower Mokelumne River return in September (2%), October (32%), November (55%), and December (11%) (**Table 13**). During this period, adults actively migrate through the lower reaches of the lower Mokelumne River above the confluence with the San Joaquin River until they reach the primary spawning areas between the Elliott Road Bridge and Camanche Dam.

Chinook salmon spawn in the lower Mokelumne River typically from October through December (Table 13), primarily between the Elliott Road Bridge and Camanche Dam. Upon reaching spawning areas, female Chinook salmon dig depressions in the riverbed where they deposit their eggs. Females typically select sites with gravel-cobble substrates and sufficient subsurface flows to provide oxygen to the developing embryos. Following fertilization of the eggs by an attending male, the female buries the eggs with gravel and then spends up to 3 weeks defending the nest (redd) from other females. All Chinook salmon die after spawning.

The incubation period extends from the time of spawning to fry emergence, and is controlled largely by water temperature. Based on general relationships between water temperature and emergence times, the incubation period in the lower Mokelumne River extends primarily from the onset of spawning through March (Table 13).

TABLE 13
FALL-RUN CHINOOK SALMON AND STEELHEAD LIFE STAGE OCCURRENCE IN THE LOWER MOKELUMNE RIVER

	July	August	September	October	November	December	January	February	March	April	May	June
Fall-run Chinook Salmon												
Adult Migration			■	■	■	■						
Spawning and incubation				■	■	■	■	■	■			
Juvenile rearing							■	■	■	■	■	■
Smolting												
Emigration							■	■	■	■	■	■
Steelhead												
Adult migration			■	■	■	■	■	■				
Spawning and incubation						■	■	■	■	■	■	
Juvenile rearing	■	■	■	■	■	■	■	■	■	■	■	■
Smolting												
Emigration								■	■	■	■	■

SOURCE: EBMUD data.

After emergence, Chinook salmon fry disperse downstream or reside for several months in the lower Mokelumne River from Camanche Dam downstream to Woodbridge Dam before emigrating to the ocean. In the lower Mokelumne River, EBMUD monitoring since 1992 suggests a bimodal emigration pattern occurs with a distinct fry emigration period from January through March (about 66% of total juvenile outmigration on average) and a distinct smolt emigration period from April through June (about 33% of total juvenile outmigration on average). Small numbers (<1% of outmigrating Chinook) of yearling smolts also are observed between December and May. When hydrologic conditions allow (e.g., under higher flow conditions), fry typically disperse downstream from spawning areas soon after emergence. These movements, facilitated by peak winter flows, result in dispersal of fry throughout the lower reaches of the spawning streams and upper reaches of the Bay-Delta estuary, where they seek out shallow river margins, floodplains, and tidal wetlands. During dryer hydrologic conditions, more fry remain near the spawning areas, where they rear for several months before emigrating in the late spring.

The transition from fry to the juvenile life stage (parr) occurs at a length of approximately 1.8 to 2.4 inches and is generally associated with rapid growth and increased utilization of deeper, higher-velocity habitats. Newly emerged fry that remain in their natal stream move to shallow water along the margins of the river where they complete their transition from yolk-sac to external feeding. As they grow, juvenile salmon move into deeper areas of the channel near cover, faster currents, and higher concentrations of food.

During emigration, juvenile Chinook salmon undergo a series of behavioral, physiological, and morphological changes as they transition from parr to smolts and prepare to enter the marine environment.

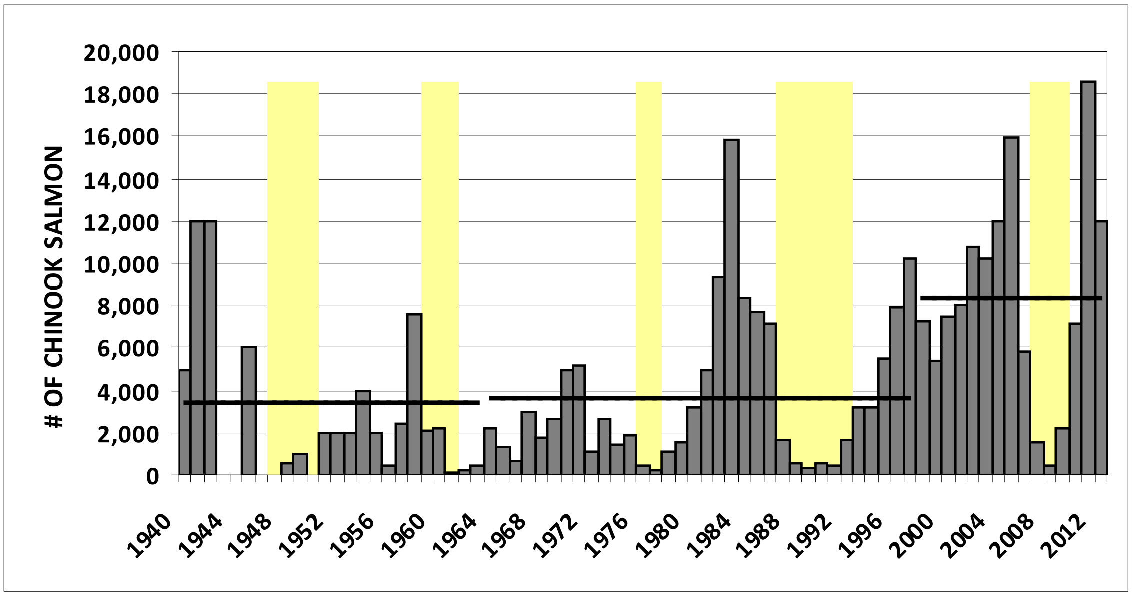
Optimal temperatures for Central Valley fall-run Chinook salmon fry growth and survival are 13 to 18 °C, although throughout their range, positive growth is experienced at temperatures of 5 to 19°C (Moyle 2002). Major mortality occurs at 22 to 23°C and maximum embryo survival temperatures are 5 to 13°C (Moyle 2002).

Population Status

Annual escapement (i.e., numbers of adults returning to spawn) of fall-run Chinook salmon in the Mokelumne River has varied considerably over the period of record (**Figure 7**). Coinciding with the 1987–1992 drought, adult salmon returns to the river declined markedly, averaging less than 840 adults annually. EBMUD implemented experimental management actions beginning in the mid-1990s that, in combination with favorable hydrologic conditions in the watershed, improved habitat conditions and resulted in an increasing trend in the abundance of juvenile salmon produced in the river and the numbers of adult fall-run Chinook salmon returning to the river to spawn. In addition, in 1998 EBMUD, together with the California Department of Fish and Wildlife (CDFW) and the U.S. Fish & Wildlife Service, approved the Joint Settlement Agreement (JSA), which contains a suite of comprehensive flow and non-flow measures to protect and enhance the Mokelumne fishery. Chinook salmon escapement from 1993 through 2006 averaged over 8,000 annually. The adult return to the river in 2007–2009 was, however, one of the lowest since implementing the JSA. These recent low escapements of adult fall-run Chinook salmon to the river reflect a regional decline of Central Valley fall-run Chinook salmon attributed primarily to poor marine survival that began in spring 2005, compounded by drought, past and present fish management, hatchery practices, and inland habitat conditions (Lindley et al. 2009). Following the return of better oceanic conditions and the end of the 2007–2009 drought, fishery returns on the Mokelumne rebounded. For example, the 2011 return was 18,589 fall-run Chinook salmon, a record for the Mokelumne River during the 1940–2011 period (Figure 7.).

Chinook salmon production in the lower Mokelumne River is supplemented by hatchery fish reared at the Mokelumne River Fish Hatchery. Since 1998, the CDFW annual fall-run Chinook salmon production at the Mokelumne River Fish Hatchery has averaged 5.5 million juvenile fish, with about 55% of these fish released in the lower Mokelumne River. Most of the remaining production has been released in San Pablo and San Francisco Bays, and the San Joaquin and Sacramento Rivers.

Because of the hydraulic conditions in the Delta, interactions of the Central Valley Project (CVP) and the State Water Project (SWP) with populations of salmonids in the San Joaquin River basin, as well as the Mokelumne River, are exceptionally adverse (National Marine Fisheries Service 2009). Under current CVP and SWP operating conditions, adverse effects on migrating juvenile and adult fall-run Chinook salmon and steelhead originating in the Mokelumne River basin are likely to continue (National Marine Fisheries Service 2009).



Horizontal lines indicate pre-Camanche, post-Camanche, and post-JSA periods, respectively.

1. Pre-Camanche" escapement (3,374) is the average estimate at Woodbridge Dam for the period from 1940 through 1963 (excluding years when no data were recorded: 1943, 1944, 1946, 1947, and 1950).
2. Post-Camanche" escapement (3,636) is the average estimate at Woodbridge Dam for the period 1964 through 1997.
3. "Post-JSA" escapement (8,318) is the average estimate at Woodbridge Dam since implementation of the JSA in 1998.
4. Yellow shaded areas are periods of drought in California (California Department of Water Resources 2009a).

Figure 7
Estimated Annual Spawning Escapement of Fall-Run Chinook Salmon in the Lower Mokelumne River since 1940

Steelhead

Steelhead and resident rainbow trout, collectively referred to as *Oncorhynchus mykiss*, were once widespread in the Central Valley before dams blocked access to most of their historical spawning and rearing habitat. All extant populations of Central Valley steelhead are recognized as winter-run based on their state of sexual maturity and time of river entry. Although these populations occur largely in the upper Sacramento River and its tributaries, steelhead adults and juveniles have been documented in other accessible rivers throughout the Central Valley (Good et al. 2005), including the lower Mokelumne River.

Status

Oncorhynchus mykiss may exhibit anadromy or freshwater residency. Resident forms are usually referred to as rainbow trout, while anadromous forms, which spend a portion of their life cycle in coastal marine waters, are termed steelhead. Resident rainbow trout can produce anadromous progeny, and anadromous steelhead can produce resident progeny in the Central Valley (Zimmerman et al. 2008).

There appear to be no steelhead-bearing rivers in the Sacramento River Basin that have not received releases of multiple hatchery stocks (California Department of Fish and Game 1995; Cramer et al. 1995). Prior to the establishment of the Mokelumne River Fish Hatchery, there were numerous releases of steelhead from the Mount Shasta, Mount Whitney, Basin Creek, Fern

Creek, Kaweah, and Mormon Creek hatcheries into the San Joaquin River Basin (West Coast Steelhead Biological Review Team 1998). There is no documentation of egg collections from San Joaquin River basin sources, so it is presumed that these hatchery releases came from sources in the Eel River and Scott Creek and San Lorenzo Basins (West Coast Steelhead Biological Review Team 1998). However, the exact origin of these steelhead releases is unknown.

CDFW determined that by 1952, steelhead were "virtually nonexistent" in the Mokelumne River below Pardee Dam (California Department of Fish and Game 1959), most likely the result of mining, cannery, and winery waste discharges. From 1953 to 1959, CDFW released more than 1,250,000 steelhead fingerlings between Pardee Dam and Thornton in an effort to revitalize the Mokelumne steelhead population.

NMFS listed the Central Valley steelhead Distinct Population Segment as a threatened species in 1998 (63 FR 13347). Critical habitat designated by NMFS for steelhead includes the Delta and Central Valley Rivers, including the tributaries and mainstem of the San Joaquin River and the Sacramento River. Natural-origin anadromous steelhead in the lower Mokelumne River and Feather River Hatchery steelhead, which served as a supplemental brood stock source at Mokelumne River Hatchery until 2008, are part of the Central Valley steelhead Distinct Population Segment. Following completion of Camanche Dam in 1964, Nimbus Hatchery stock, as well as fish from Coleman National Fish Hatchery and Feather River Hatchery, have been introduced to the Mokelumne River (California Department of Fish and Game 1995; Cramer et al. 1995; McEwan and Jackson 1996). Nimbus Hatchery, located on the American River (tributary to the Sacramento River), was founded with Eel River winter steelhead from the Van Arsdale Fisheries Station and returning American River steelhead; Mad River and Russian River stocks, as well as Sacramento River stocks, have been mixed into the Nimbus Hatchery population over time (California Department of Fish and Game 1995; Cramer et al. 1995). The Mokelumne River and Nimbus Hatchery stocks were excluded from the Distinct Population Segment because of their genetic affinities with mixed steelhead stocks (Good et al. 2005; National Marine Fisheries Service 1998).

Life History and Habitat Requirements

Based on EBMUD's monitoring since 1992, more than 90% of adult steelhead in the lower Mokelumne River migrate upstream from September through February (September 13%, October 31%, November 13%, December 14%, January 17%, February 6%). In the lower Mokelumne River, most steelhead spawn in the upper reaches of the lower Mokelumne River from December through March (Table 5).

Like Chinook salmon, steelhead deposit their eggs in excavated gravel nests or redds. Unlike salmon, some adults survive spawning (referred to as kelts), return to the ocean, and return to fresh water to spawn again. Based on general relationships between water temperature and emergence times, the incubation period extends primarily from December through May.

Central Valley steelhead typically rear in freshwater for 1 or 2 years before emigrating to the ocean. Juvenile steelhead have been reported to emigrate from natal streams during fall, winter, and spring, but the peak emigration period for naturally produced juveniles typically occurs in late winter and spring (Nobriga and Cadrett 2003). Juveniles typically are observed passing Woodbridge Dam from February through June, including young-of-year (fish born in the year of capture) that appear from March through June.

Zimmerman et al. (2008) revealed that the Central Valley *O. mykiss* population is skewed toward the non-anadromous resident form as 77% of the analyzed *O. mykiss* in that study were progeny of resident rainbow trout. Similarly, results from Del Real et al. (2012) suggest a large proportion (78%) of natural-origin *O. mykiss* in lower Mokelumne River demonstrate a resident life history.

O. mykiss are found where daytime water temperatures are 0 to 27°C, although extremely low (<4°C) or extremely high (>23°C) temperatures can be lethal if the fish have not previously been gradually acclimated (Moyle 2002). The optimal temperatures for *O. mykiss* growth are around 15 to 18°C (Moyle 2002).

Population Status

Steelhead runs on the lower Mokelumne River appear to be supported largely by hatchery production and, prior to 2008, imported eggs and fry from Nimbus (American River) and Feather River hatcheries. Natural production of steelhead in the lower Mokelumne River appears to be low, based on the dominance of hatchery adults in the run and small numbers of unmarked juveniles observed at Woodbridge Dam (all *O. mykiss* produced at the Mokelumne River Fish Hatchery have been marked with an adipose fin clip since 1998). In 2005 EBMUD developed a population estimate of natural-origin *O. mykiss* in the lower Mokelumne River from Camanche Dam downstream to the Woodbridge Dam using a mark-recapture study with passive integrated transponder (PIT) tags. That estimate was about 9,200 adult *O. mykiss*.

The existing population was supplemented by imported eggs (mostly from Feather River Hatchery) until 2008, and since then CDFW and EBMUD are supplementing the population with Mokelumne-origin steelhead. This objective is consistent with current policies and management direction to minimize adverse genetic and ecologic interactions between hatchery and natural populations of anadromous fish (California Department of Fish and Game and East Bay Municipal Utilities District 2012).

Since 1998, CDFW’s annual steelhead production at the Mokelumne River Fish Hatchery has averaged 189,000 yearlings that have been released each year into the lower Mokelumne River at various locations (e.g., New Hope Landing).

Other Fish Species

In addition to Chinook salmon and steelhead, other fish—including delta smelt, green and white sturgeon, hardhead, hitch, longfin smelt, Pacific lamprey, prickly sculpin, Sacramento blackfish, Sacramento pikeminnow, Sacramento splittail, Sacramento sucker, and tule perch have been observed or may occur in the lower Mokelumne River. Striped bass and American shad, which typically occur in the lower Mokelumne River below Woodbridge Dam, and kokanee, which occur in Pardee Reservoir, are of recreational importance.

B-2.4.3 Regulatory Setting

In addition to the State CEQA Guidelines, select local agreements and programs influence the protection of biological resources in the project area. Because this Appendix analyzes only the potential modifications to Mokelumne River resources due to operations of the EBMUD component of the Phase 2 Expansion, with construction of new facilities and modification of existing facilities analyzed in Chapter 4, the discussion below focuses only on those regulations that are *potentially* relevant to the operations of the EBMUD component of the Phase 2 Expansion.

This section describes those agreements and programs relevant to fish resources in the lower Mokelumne River. Specifically, this section describes the JSA that defines goals, measures, performance criteria and responsive actions associated with implementation of the JSA.

Lower Mokelumne River Project (FERC Project No. 2916-004), Joint Settlement Agreement

A condition in EBMUD's State Water Board Permit 10478 required EBMUD to reach an agreement with CDFW regarding flows to be released downstream for the protection of fish in the lower Mokelumne River. Accordingly, in 1961, EBMUD entered into an agreement with CDFW (1961 Agreement) that required EBMUD to release 13 TAF annually from Camanche Reservoir to the lower Mokelumne River to benefit aquatic habitat and fish production. These 13 TAF were in addition to releases for the WID, riparian and senior appropriators, and channel losses. The 1961 Agreement, at CDFW's request, also required EBMUD to construct a fish hatchery at Camanche Dam, with the hatchery to be operated by CDFW. Consistent with the 1961 Agreement, EBMUD built the fish hatchery, which is operated by CDFW.

EBMUD, CDFW, and USFWS approved a JSA in 1998. Its purpose is to protect and enhance conditions for the anadromous fish population and associated ecosystem of the lower Mokelumne River while simultaneously protecting EBMUD's Lower Mokelumne River Project as a reliable, high-quality water supply for EBMUD.

The provisions of the JSA build upon and expand some of the requirements of the 1961 Agreement. Principally, the JSA specifies a more complex schedule of release requirements from Camanche Dam. EBMUD also agreed to expand and upgrade the hatchery in accordance with the 1996 Hatchery Master Plan, in consultation with CDFW, USFWS, and NMFS. Reconstruction was completed in 2002 at a cost of about $12.5 million. The JSA also requires implementation of non-flow enhancement measures, such as gravel augmentation, and new monitoring and reporting objectives.

The JSA fish releases from Camanche Dam are significantly higher than the prior releases required under the 1961 Agreement. EBMUD voluntarily began releasing the JSA flows in 1996 when they were first negotiated, prior to formal conclusion and execution of the JSA in 1998. NMFS completed its conferencing opinion of the JSA effects on Central Valley steelhead and in April 1998 concluded the following:

> The conferencing previously done for Central Valley steelhead is adequate and serves as the section 7 consultation for this species, now that it has been listed as threatened. Given our original analysis of the proposed action, which concluded that the proposed action should improve conditions for fall-run Chinook salmon, I [William T. Hogarth, Regional Administrator] also conclude that this action is not likely to adversely affect the proposed-threatened Central Valley fall-run/late-fall-run Chinook salmon ESU. This concludes section 7 consultation for the threatened Central Valley steelhead, and conferencing for the proposed-threatened Central Valley fall-run/late-fall-run Chinook salmon. Although conferencing does not take the place of a section 7 consultation, no further consultation should be necessary in the event of a Central Valley fall-run/late-fall-run Chinook listing, provided that the project is implemented substantially as described in the November 1993 Final Environmental Impact Statement.

In addition, on March 23, 1998, the USFWS completed a Biological Opinion on the JSA, entitled *Formal Endangered Species Consultation on the Joint Settlement Agreement Alternative for the Operations of the Lower Mokelumne River Project (FERC Project No. 2916-004) Operated by East Bay Municipal Utility District in Calaveras, Amador, and San Joaquin Counties, California*, reaching a no jeopardy conclusion. The Federal Energy Regulatory Commission (FERC) subsequently issued its Order Approving Settlement Agreement and Amending License on November 27, 1998, amending EBMUD's FERC License for its Mokelumne Project by requiring the JSA.

The State Water Board incorporated the flow provisions of the JSA into EBMUD's Mokelumne River water rights in 2000 under Decision 1641. By that action, the State Water Board replaced the 1961 Agreement flows with the JSA flows in EBMUD's water rights. EBMUD continues making fish releases to the lower Mokelumne River consistent with the JSA.

Flow Measures

The JSA specifies minimum flow releases from Camanche Dam to attain expected flow below Woodbridge Dam based on time of year (corresponding to fish life stages) and water year types. For the October through March releases, water year types are determined based on combined storage in Camanche and Pardee Reservoirs on November 5. For the April through September releases, water year types are determined based on the unimpaired runoff into Pardee Reservoir unless the projected combined storage for November 5 is less than 200 TAF, in which case, the water year would be critically dry. Minimum JSA flow releases from Camanche Dam and the expected flows below Woodbridge Dam are designed to protect fish resources in the lower Mokelumne River. Actual flows from 1998 to date have met or exceeded the required JSA flows below Camanche and Woodbridge Dams.

The JSA Camanche Dam release requirements vary throughout the year to meet the needs of the life stages of anadromous fish. Minimum release requirements range from 100 to 325 cfs during normal and above-normal runoff water year types, 100 to 250 cfs during below-normal years, 100 to 220 cfs during dry years, and 100 to 130 cfs during critically dry years. Additional releases up to 200 cfs are required for juvenile salmonid migration in April, May, and June, depending on the combined storage in Camanche and Pardee Reservoirs.

For more than 100 years (water years 1901 through 2012), annual Mokelumne River flows just upstream of Pardee Reservoir (Mokelumne Hill Station) have ranged from 129 TAF to 1.8 million acre-feet. Since implementation of the JSA in 1998, flow releases below Camanche Dam have ranged from 198 TAF to 1.2 million acre-feet.

Ramping Rates

The JSA stipulates that except during emergencies or when flood-control releases are being made, decreases in flow should not be more than 50 cfs per day during October 16 through March 31 (the spawning and incubation period for fall-run Chinook salmon and steelhead) and not more than 100 cfs per day during the rest of the year.

Camanche Hypolimnion

The JSA specifies temperature management goals for the hypolimnion in Camanche Reservoir. EBMUD is committed to using its best efforts to maintain the volume of the hypolimnion in Camanche Reservoir above 28 TAF through October if Pardee Reservoir storage is more than 100 TAF. The JSA states that water quality in the hypolimnion should be preserved by maintaining adequate oxygenation and reducing the presence of hydrogen sulfide levels by use of the HOS. The WQRMP specifies that water of the hypolimnion should be less than 16.4°C.

Gainsharing

The JSA gainsharing provision requires EBMUD to augment instream flows by 20% from the yield of new water supplies developed by EBMUD up to 20 TAF per year. Examples of these new water supplies include development of additional storage capacity on the Mokelumne River and groundwater from a conjunctive use program. Water from conservation programs, recycled water projects, or the Amador Canal pipeline project, are not subject to gainsharing.

For example, in 2015, due to drought conditions and reduced Mokelumne River runoff, EBMUD obtained additional water through its Freeport facilities including 33,250 AF of water from its Central Valley Project contract and 24,680 AF of transfer water. Based on these deliveries, a total 11,586 AF of water was made available through the JSA gainsharing provision. An additional 2,891 AF of gainsharing water was carried over from 2014. In September 2015, a draft fall plan for the gainsharing was forwarded to the Partnership Coordinating Committee for review and approval. A total of 6,093 AF of the gainsharing supply was used from October 16, 2015 through December 31, 2015 to augment base flows and for additional pulse flows. The remaining 8,384 AF was carried over to 2016.

In 2016, the Partnership Coordinating Committee requested to use some of the gainsharing water to increase the minimum flow release from Camanche Reservoir for the months of January and February. The remaining water was used for pulse flow releases in April and in the fall.

Non-Flow Measures

The JSA includes the following non-flow measures:

- Capital investments, such as the expansion and upgrade of the Mokelumne River Fish Hatchery described previously.

- Sustaining the long-term viability of the salmon and steelhead fishery while protecting the genetic diversity of naturally producing populations in the lower Mokelumne River. This involves supporting the development and implementation of Mokelumne River steelhead and fall-run Chinook HGMP to minimize adverse effects on the wild stocks. CDFW operates the Mokelumne River Fish Hatchery. Section 7 of the ESA obligates consultation with NMFS on any activities that may affect a listed anadromous fish species, including hatchery programs. HGMPs are a mechanism for addressing the take of certain listed species that may occur as a result of artificial propagation activities. NMFS uses the information provided by HGMPs to evaluate impacts on anadromous salmon and steelhead listed under the ESA, and in certain situations, the HGMPs will apply to the evaluation and issuance of Section 10 take permits. Completed HGMPs also may be used for regional fish production and management planning by federal, state, and tribal resource managers. The primary goal of the HGMP is to devise biologically based artificial propagation management strategies that ensure the conservation and recovery of listed ESUs.

- Managing the coldwater pools in Camanche and Pardee Reservoirs to provide suitable water temperatures for all salmonid and native fish life stages. This involves operating both Camanche and Pardee Reservoirs in concert to allow storage of an adequate volume of cold water during the winter and spring to prevent early turnover (destratification) in Camanche Reservoir, and provide sufficient cold water for release in the lower Mokelumne River through early November. This action will provide long-term benefits to salmonids and other native fish species in the lower Mokelumne River.

- Use coded-wire tagging on a greater proportion or all of the juvenile Chinook salmon produced at the Mokelumne River Fish Hatchery, if it is part of a statewide program. Currently the proportional coded-wire tagging and marking program for Central Valley Chinook salmon is 25% of the salmon released, and all steelhead released are tagged with an adipose fin clip but no coded-wire tag. The tagging program is a cooperative effort between CDFW, California Department of Water Resources, USFWS, Pacific States Marine Fisheries Commission, U.S. Bureau of Reclamation, and EBMUD. Since 2007, over 6.8 million fall-run Chinook salmon produced at the Mokelumne River Fish Hatchery have been tagged and released.

- Activities that enhance habitat conditions:

  – Plant trees and shrubs along the river for shade and remove undesirable vegetation. EBMUD initiated efforts in the early 2000s to improve the river’s ecosystem, including riparian restoration and enhancement on private lands. Since 2004, over 11,500 native trees and shrubs have been planted in the lower Mokelumne River riparian zone downstream of Camanche Dam.

  – Improve spawning gravels through continued implementation of the spawning gravel augmentation plan for the lower Mokelumne River. This plan, developed in cooperation with the University of California, Davis, has resulted in the placement and configuration of more than45,000 cubic yards of suitable-sized salmonid spawning gravel. Additional gravel placement to replace gravel lost to historical mining, scouring and subsidence, and annual supplementation to compensate for the lack of gravel recruitment is needed for the long term. This action will provide long-term benefits to salmonid and other native fishes spawning and incubation habitat.

  - Create side channels adjacent to the main channel of the lower Mokelumne River to provide suitable and beneficial habitat to juvenile Chinook salmon and steelhead, as well as habitat for a community of other fish and aquatic invertebrates. Two channels were created in 2005 (Channel 1 has a length of approximately 300 feet and a mean width of 17 feet; Channel 2 has a length of 200 feet and a mean width of 27 feet).
  - Work cooperatively with local landowners along the lower Mokelumne River to implement the conservation practices and restoration and enhancement projects identified in the San Joaquin County Resource Conservation District's Lower Mokelumne River Conservation Handbook.
  - Identify, design, and install fish screens on diversion facilities in cooperation with diverters. CDFW is the lead for this activity subject to available funding.
- Procedural measures:
  - Perform monitoring to gage success.
  - Update and maintain a Mokelumne River science database.

Lower Mokelumne River Partnership

As part of the JSA, a Lower Mokelumne River Partnership has been established to support the protection of anadromous fish and the ecosystem of the lower Mokelumne River, encourage stakeholder participation, and integrate Mokelumne River strategies with other programs. The steering committee for the partnership is composed of one representative each from EBMUD, CDFW, and USFWS. The partnership program is funded by earnings from the $2 million Partnership Fund established by EBMUD in 1998 and any additional funding sources that can be secured. As of February 2017, the Fund had earned $837,448. In addition to the steering committee, the partnership includes a group of stakeholders with an interest in the lower Mokelumne River. The purpose of having a stakeholder group is to foster communication, make recommendations to the steering committee, and participate in enhancement work.

To facilitate operation of the JSA Partnership Steering Committee, a coordinating committee was formed. The JSA Coordinating Committee includes biologists and related staff of CDFW, EBMUD, USFWS, and NMFS. The Coordinating Committee meets in April and October of each year, and its work includes assessing the upcoming water year type and flow conditions; developing habitat projects and making recommendations to the JSA Partnership Steering Committee for expenditure of the Partnership Fund; and developing proposed adaptive management flow modifications to benefit the fishery.

Adaptive Management

To optimize habitat conditions, the JSA provides that river operations can be modified if warranted by river conditions and scientific information. With concurrence of CDFW, USFWS, and NMFS, and approval from the State Water Board, EBMUD may modify the JSA Camanche releases as long as the total volume released during the year would not be less than that specified in the JSA for the water year type.

Adaptive management flow modification occurred in March 2004, when WID requested EBMUD delay planned April flow increases required by the JSA and instead release the deferred water in May to allow completion of the fish bypass pipeline component of their dam construction. With concurrence of CDFW, USFWS, NMFS, and approval from the State Water Board, EBMUD maintained Camanche release at the lower rate of 330 cfs until mid-April, when WID completed the portion of the work that would have been affected by a higher release rate. The release then increased to 515 cfs by the end of April as WID initiated its seasonal diversions. The deferred volume of water originally scheduled to be released during April was released in addition to JSA requirements in May to coincide with outmigration of juvenile Chinook salmon and the volitional release of juvenile Chinook salmon from the Mokelumne River Fish Hatchery.

With prior concurrence of CDFW, USFWS, and NMFS, and approval from the State Water Board, EBMUD modified the below-normal JSA minimum flows in April and May 2009 to provide a fall pulse flow to attract adult fall-run Chinook salmon into the Mokelumne River. A total of 5,183 acre-feet of water was reallocated from the spring to provide flows in October that ranged from 308 cfs to 2,275 cfs.

In October, adult fall-run Chinook salmon move up through the Bay-Delta estuary toward their natal spawning grounds. Open DCC gates can result in straying of adult salmon as Sacramento River water is routed into the Mokelumne and San Joaquin Rivers. To maximize the effectiveness of fall pulse flows, the Lower Mokelumne River Partnership sent a letter to the U.S. Bureau of Reclamation (USBR or Reclamation) requesting the closure of the DCC for a 10-day period in October 2011. Similar requests were made in 2009 and 2010 resulting in a 48-hour closure in October 2010. Through efforts by the partnership, USBR, and DWR, a 10-day closure of the DCC was initiated from October 4 through October 14, 2011. The closure coincided with the first of four fall pulse flows with a peak magnitude of 1,800 cfs. Recent studies in the Mokelumne River have shown that a combination of pulse flows along with closure of the DCC gates in October can not only increase the number of Chinook salmon returns, it can also reduce straying of Mokelumne-origin salmon to the lower American River (California Department of Fish and Game 2012a).

Upon recommendation from the JSA Partnership and approval from the State Water Resources Control Board, minimum JSA flow releases from Camanche Dam were reduced in March 2012 to provide additional Chinook salmon attraction flows in October 2012. A series of pulse flows totaling 5,140 acre feet was released from October 8 through November 8, 2012 to facilitate passage of adult Chinook salmon in the lower Mokelumne River.

In 2015, critically dry conditions required adaptive management to maximize the use of limited water supplies. The Partnership Coordinating Committee decided at its October 8, 2015 meeting to eliminate the ramping rate criteria for October through December 2015 to prevent the waste of water during the ramp down steps that could otherwise be used for pulse flows. The Committee agreed that using the water for pulses rather than for maintaining ramping rates would benefit the fisheries to a much greater extent.

B-2.4.4 Assessment of Impacts

This section describes the approach, significance criteria, impact mechanisms, methods, and results of the assessment of potential effects on fisheries resources that could result from the Phase 2 Expansion.

Approach

Historical data on Chinook salmon and steelhead populations and habitat conditions in the project area, and general habitat relationships reported in literature, are used as the basis for this resource assessment. Modeling of reservoir operations and water temperatures was used to evaluate quantitatively the magnitude and frequency of changes in reservoir storage, flows, and water temperatures potentially affecting the quantity and quality of habitat of the key evaluation species (fall-run Chinook salmon, steelhead, selected resident reservoir fish). The assessment procedure included:

- summarizing existing knowledge of the life history, habitat requirements, ecology of the evaluation species, and historical relationships between habitat conditions and fish populations in the project area;
- describing potential impact mechanisms based on observed or predicted relationships between key environmental variables (reservoir storage, flows, and water temperatures) and species responses or habitat conditions in the project area;
- using monthly operations and water surface elevations modeling to quantitatively evaluate the magnitude and frequency of changes in reservoir storage, flows, and elevations due to Phase 2 Expansion operations compared to No Project/No Action Alternative conditions; and,
- assessing potential changes in habitat conditions from the Phase 2 Expansion compared to simulated No Project/No Action Alternative conditions.

Determination of significance was based on the sensitivity of the affected life stages of key evaluation species, the proportion of the population likely to be adversely affected by project conditions, and the frequency and/or duration of their exposure to these conditions.

Significance Criteria

Generally, the criteria used for determining the significance of an impact on fish resources are based on Appendix G (a model environmental checklist) of the State CEQA Guidelines. The CEQA Guidelines environmental checklist, however, is only a model and, because of its generic nature, its specific criteria are not necessarily suitable for every project. The following criteria reflect the potential impacts of the Phase 2 Expansion on Mokelumne River and Pardee and Camanche Reservoir fish resources.

Significant impacts on fish resources may occur if the Phase 2 Expansion would result in

- substantial interference with the movement of any resident or migratory species;
- substantial short- or long-term losses of habitat quantity or quality;

- substantial effects on rare or endangered species or their habitat; or
- substantial effects on fish communities or species protected by applicable federal, state, and local environmental regulations, policies, or programs.

Determining the significance of an impact requires that changes in environmental conditions associated with the Phase 2 Expansion are measurable, likely to adversely affect a substantial proportion of a species population or habitat, and potentially cause substantial short-term or long-term reductions in abundance.

EBMUD, USFWS, and CDFW have agreed that the flows, non-flow measures, and other elements of the JSA provide reasonable protection and enhancement of the anadromous fish and ecosystem of the lower Mokelumne River, compared to pre-1998 conditions. EBMUD's actions in compliance with the JSA constitute a reasonable contribution toward federal fishery restoration goals. In September 2008, the JSA Partnership Steering Committee (USFWS, CDFW, EBMUD) concluded that during the 10 years since JSA implementation, significant progress has been made toward partnership goals, and numerous successes and milestones have been achieved. Consequently, the assessment of impacts was based on the assumption that protection of fish resources in the lower Mokelumne River depends on EBMUD's ability to continue to meet the JSA flow requirements and successfully implement other elements of the agreement during the Phase 2 Expansion.

B-2.4.5 Impact Mechanisms

Changes in flows, reservoir storage, and water temperatures can influence the biological performance of individuals and populations (e.g., growth, survival, production) through their direct and indirect effects on habitat quantity and quality. These general mechanisms are described below for each of the key evaluation species. Key evaluation species in Pardee and Camanche Reservoirs include coldwater fish (rainbow trout, kokanee) and warmwater fish (black bass). Key species in the lower Mokelumne River include fall-run Chinook salmon and steelhead.

Flow

Alteration of natural flow patterns below major reservoirs has been identified as a contributing factor to historical declines of Chinook salmon and steelhead in the Central Valley (Yoshiyama et al. 1998). However, the relationship between flow and fish populations is poorly understood because of the complex linkages between flow and the physical and biological attributes of stream ecosystems. This assessment concerns fall-run Chinook salmon and steelhead, the key evaluation species discussed above. Abundance of these species is indicative of the general quality of the lower Mokelumne River aquatic habitat because of the broad overlap of flow and temperature requirements with other native species.

Adult Immigration

Low flows, typically in association with high water temperatures, along the migration routes of adult salmon and steelhead can impede or delay these species' migration to spawning areas (Bjornn and Reiser 1991). Fall-run Chinook salmon may delay their upstream migration to spawning areas until water temperatures begin to decline and flow increases to levels that permit passage over natural (e.g., shallow riffles) or artificial obstructions. Most adult fall-run Chinook salmon (99%) in the lower Mokelumne River return in September through December. More than 90% of adult steelhead in the lower Mokelumne River migrate upstream from September through February.

To successfully navigate to their natal streams, adult Chinook salmon and steelhead require sufficient flow to provide adequate water depth in stream channels and to overcome flow-related barriers. JSA flow releases from Camanche Dam exceed 100 cfs in all water year types during all months, and these flows provide adequate fish passage depths in the lower Mokelumne River from Camanche Dam downstream to Woodbridge Dam (California Department of Fish and Game 1991). Flows in the lower Mokelumne River below Woodbridge Dam are typically lower than the reach above Woodbridge Dam and are tidally influenced. Instream flows and tidal action influence water velocity, water depths, and consequently, upstream salmonid migration.

Spawning and Incubation

Flow affects the quantity of available spawning area for Chinook salmon and steelhead through its effect on water depths and velocities over suitable substrates, and the quality of the intergravel environment (temperature and dissolved oxygen) for embryos and alevins (fry with yolk sacs).

In addition to spawning habitat quantity, survival of salmonid embryos has been tied to dissolved oxygen (Coble 1961), percent fine sediment (Sear 1993), and permeability (Kondou et al. 2001) in spawning gravels. Merz and Setka (2004) showed that strategically placed gravel in the lower Mokelumne River significantly improved spawning habitat quality and availability, which supports salmonid spawning and egg incubation.

Flows of sufficient magnitude and duration are also needed periodically below dams to flush fine sediments from spawning gravels and promote the natural geomorphic processes that maintain salmon and steelhead spawning and rearing habitat (Kondolf et al. 1991). A study in the North Fork Feather River indicated a flushing flow of 2,000 cfs occurring as a planned release or natural flow for 1 to 3 days would be sufficient to transport sediment from salmonid spawning gravels (Reiser et al. 1989). Merz et al. (2008) estimated that flows of 2,000 cfs or greater are needed to mobilize sediments and dislodge aquatic plants from spawning areas. That study predicted that a flow of 2,000 cfs for 1 day in the lower Mokelumne River (ramped up 45% daily for 4 days and ramped down 15% for 8 days) would mobilize about 42% of the surface bed material and found that it reduced rooted aquatic vegetation about 12.5%. Fine-grained sediments that are not flushed through the system reduce the quality of salmonid spawning habitat and provide a substrate for vegetation establishment. The longer the duration of the flow, the more fine sediment and sand would be flushed from the substrate (Holmquist-Johnson and Milhous 2010). The duration of these flows should occur continuously over a few days and should be as frequent as hydrologic conditions provide sufficient runoff (i.e., in wetter years when floodflow releases from Camanche Dam are required).

Juvenile Rearing and Emigration

Flow affects juvenile salmon and steelhead rearing habitat through direct effects on water depths, velocities, and access to cover, and through indirect effects on prey abundance or availability.

Rapid fluctuations in flow below reservoirs also may cause stranding of juveniles along shorelines. With the exception of emergencies or flood-control releases, the JSA specifies that daily flow releases from Camanche Dam not decrease by more than 50 cfs per day during the period October 16 through March 31 and by more than 100 cfs per day at other times of the year.

Flow also may affect the quality of migration habitat for emigrating juveniles. Water travel time has been identified as a potential factor influencing the survival of juvenile salmon and steelhead during their downstream migration to the Delta, although evidence of a direct link between flow, travel time, and survival has not been demonstrated (Baker and Morhardt 2001). Flow also affects the distribution and extent of suitable water temperatures for rearing juveniles. Lower flows tend to result in higher water temperatures downstream of Camanche Dam from March through October and lower water temperatures from November through February. Higher flows tend to ameliorate temperature increases resulting from air temperature and solar radiation.

Floodplain Habitat

Winter and spring inundation of floodplain habitat provides important habitat and ecosystem functions in lowland rivers. In the Central Valley, remnant floodplains and side channels provide important refuges and food resources for juvenile salmon (Sommer et al. 2001a, 2001b, 2005; Jeffres et al. 2008). The seasonal timing, magnitude, and duration of overbank flows affect the availability of floodplain habitat for juvenile salmon, Sacramento splittail, and other native fishes that use floodplain habitat for spawning and rearing. In the lower Mokelumne River, relationships between modeled water surface elevations and top of bank elevations developed by the U.S. Geological Survey (USGS) in 1970 indicate that floodplain inundation occurs at flows greater than 3,000 cfs in the lowermost reaches of the lower Mokelumne River between the confluence of the Cosumnes River and Tracy Lake (Florsheim and Mount 2003). Based on extensive monitoring of native and nonnative fish species that spawn and/or rear on the Cosumnes floodplain, the characteristics of floodflows that maximize the benefits of the floodplain spawning and rearing habitat include multiple events or continuous flows between March and May, with one or more peaks in early May (Mount pers. comm.). These flows should be as frequent as hydrologic conditions provide sufficient runoff (i.e., in wetter years when floodflow releases from Camanche Dam are required).

Reservoir Storage

EBMUD's model prioritizes meeting operational guidelines for EBMUD's terminal reservoirs (Briones, Chabot, Lafayette, San Pablo, and Upper San Leandro), which includes maintaining certain minimum storage levels. Results show that changes in terminal reservoir storage are not significant; the greatest reduction in total terminal reservoir storage modeled occurs in June 1928, when the total storage drops by approximately 7,100 acre-feet, out of a total volume of 151,066 acre-feet. Therefore, the Phase 2 Expansion's minimal alterations on the terminal reservoir operations are not anticipated to have effects on fish populations in these reservoirs.

Water levels in Pardee and Camanche Reservoirs typically peak in May or June and then decline through the summer, potentially affecting the quantity and quality of spawning and rearing habitat for littoral fish species. Inundated shallow-water areas provide habitat for spawning and rearing black bass (largemouth, smallmouth, and spotted bass). Fluctuating water levels can significantly influence the spawning and rearing success of black bass in reservoirs. A likely mechanism for poor reproductive success of black bass under rapidly rising water level conditions is decreasing water temperature at the nest site, nest desertion by the male (male bass guard the nest from potential predators), and subsequent increased risk of predation (Kohler et al. 1993; Mitchell 1982). With decreasing water levels, these mechanisms may include loss of habitat, increased egg and larval mortality by stranding or suffocation by eroded sediments, nest desertion, poor egg survival, and disrupted spawning (Kohler et al. 1993; von Geldern 1971).

Pardee and Camanche Reservoirs thermally stratify from spring through early fall, providing habitat for both coldwater and warmwater fish species. The amount of coldwater habitat is determined by runoff water temperatures, reservoir storage, reservoir morphology, meteorological conditions, season, and extent of vertical mixing. Drawdown of reservoir storage from June through October can diminish the volume of cold water in the reservoir's hypolimnion, thereby reducing the amount of habitat for coldwater fish (trout and kokanee) during these months. Flood-control releases also can reduce the amount of cold water in Pardee and Camanche Reservoirs by reducing residence times and increasing the contribution of warm inflows from upstream storage reservoirs.

Reservoirs also serve as a source of cold water for maintaining habitat for anadromous salmonids (fall-run Chinook salmon and steelhead) in the reaches below Camanche Dam. During the summer and fall when air temperatures exert a strong influence on river temperatures, the water temperature requirements of these species can be met by withdrawing and releasing water from the hypolimnion of upstream reservoirs. The downstream extent of suitable water temperatures depends on release temperature (a function of reservoir temperature profile and outlet depth), discharge, and meteorological conditions.

Since implementation of the JSA, EBMUD has been adaptively managing coldwater storage in Pardee and Camanche Reservoirs to minimize exposure of Mokelumne River adult Chinook salmon and salmon eggs to elevated water temperatures throughout the spawning season. EBMUD uses its best efforts to maintain 28 TAF of water colder than 16.4°C through October whenever Pardee Reservoir's total volume is greater than 100 TAF to prevent early turnover of Camanche Reservoir.

Water Temperature

Changes in water temperature may directly or indirectly affect fish populations by influencing a number of physiological, behavioral, and ecological mechanisms that affect survival, growth, migration, and reproduction. Each species and life stage has a specific temperature tolerance range that is bracketed by upper and lower lethal thresholds, commonly defined as the temperatures at which 50% mortality occurs for a given acclimation temperature and exposure duration. Within this range, criteria for evaluating water temperature effects typically are based on the physiological performance of fish under controlled laboratory conditions as measured by growth, food conversion efficiencies, swimming ability, and other physiological functions.

Physiological performance is generally greatest over a relatively narrow range of temperatures and decreases as temperatures approach the lethal thresholds.

As described in Water Resources Section, Camanche Reservoir water surface elevation of 190 feet can be used a threshold for criteria for determining the potential for temperature related impacts. During periods when Camanche Reservoir storage is drawn down, there is the potential for the cold water supply at the bottom of the reservoir to be depleted, resulting in an increase in release temperatures. Because the height of the different temperature layers in the reservoir is variable, there is no consistent, precise reservoir elevation threshold for affecting release temperatures. EBMUD's most recent studies indicate that during the March through October timeframe, an elevation of 190 feet appears to be the highest elevation at which release temperatures may be affected by low storage levels. Therefore, this threshold criteria of 190 feet msl is used as a significance criteria to determine the potential for temperature related impacts in the Lower Mokelumne River. EBMUD attempts to maintain this level during operations to ensure a sufficient cold water pool.

Adult Immigration

Chinook salmon and steelhead undergo long and rigorous migrations en route to natal rivers and encounter many stressors along the way. The effects of stressors are magnified at higher water temperatures. Stress from high water temperatures can increase adult pre-spawn mortality, reduce embryo survival, and increase the incidence of disease (McCullough 1999). The effects from exposure to elevated water temperatures are positively correlated with exposure time (McCullough 1999), and the cumulative effects may be delayed until adults arrive on spawning grounds. Adult pre-spawn mortality is of particular concern. McCullough (1999) stated that adult salmon, which fast during a long upstream journey, exhaust virtually all energy reserves prior to spawning. High water temperatures during immigration and holding can magnify these demands and potentially reduce survival and reproductive success. Many freshwater diseases that afflict Chinook salmon and steelhead are most virulent within specific water temperature ranges.

Spawning and Incubation

The Chinook salmon and steelhead spawning and embryo incubation life stage is defined as the time period from redd construction and egg deposition through alevin emergence. The spawning component of this life stage extends from redd construction through egg deposition. The embryo (eggs and alevins) incubation component of this life stage extends from egg deposition until the alevins emerge from gravel substrates as free-swimming fry. The amount of time between fertilization and emergence from the gravel as fry varies temporally and spatially and is heavily dependent on water temperature (Moyle 2002). Under ideal water temperatures and dissolved oxygen levels, Chinook salmon embryos hatch in 40 to 60 days and remain in interstitial spaces of gravel substrates as alevins for another 4 to 6 weeks (Moyle 2002).

Juvenile Rearing and Emigration

The Chinook salmon juvenile rearing and smolt emigration life stage is defined as the time period from fry emergence through ocean entry. The juvenile component consists of three stages: fry, parr (fingerling), and smolt. Young Chinook salmon are called fry upon emergence from gravel beds. During the transition from fry to parr, juvenile salmonids grow in size and spend more time using deeper and higher-velocity habitats for feeding and rearing (Moyle 2002). The fry-to-parr transition occurs at approximately 1.8 to 2.4 inches (National Marine Fisheries Service 1997). Juvenile Chinook salmon spend several months to more than a year rearing in fresh water prior to emigrating to saltwater. During emigration, the parr-smolt transformation takes place and involves morphological, physiological, and behavioral changes that prepare juveniles for the ocean environment. In general, these changes occur while juvenile salmonids are en route from natal streams to the ocean.

The life-history patterns of *O. mykiss* are variable and flexible (Moyle 2002). Two basic patterns are migratory life history (steelhead) and resident life history (resident rainbow trout), and both types often exist in the same population. Migratory *O. mykiss* are either sea-run (anadromous) or within river (potadromous) migrants. Regardless of life-history strategy, for the first year or two, most *O. mykiss* typically remain in the lower Mokelumne River.

A decrease in the survivability of emigrating juvenile salmonids may occur when water temperatures are not optimal for growth (Folmar et al. 1982). Thermal stress loading occurs when water temperatures are outside suitable ranges, which, by itself, can cause immediate or delayed mortalities (Brett 1952). Also, adverse effects related to water temperature can be secondary in nature, such as reduced growth, salinity and disease resistance, and susceptibility to predation. For example, growth is a function of water temperature, and survival of smolts to adulthood has been reported to be positively correlated with body length (Ward et al. 1989).

B-2.4.6 Impact Assessment

Quantitative assessment of Phase 2 Expansion effects on fish resources was based on monthly hydrologic and water temperature modeling results presented in Section 3, Water Resources.

This analysis focuses on Pardee and Camanche Reservoir storage and surface water elevations, as well as flow. As discussed in the Water Resources Section, a Camanche Reservoir water surface elevation of 190 feet msl during March thru October appears to be the highest elevation at which release temperatures might be affected by low storage levels. The methods used to assess potential fish impacts related to each of the potential impact mechanisms are presented below. In general, impacts to fish resources were assessed using a combination of monthly reservoir operations modeling and selected biological criteria to quantitatively evaluate the magnitude and frequency of Phase 2 Expansion effects on key habitat variables in Camanche and Pardee Reservoirs and lower Mokelumne River fishery resources.

The protection of fish resources in the lower Mokelumne River depends on EBMUD's ability to continue to meet the JSA flow requirements and successfully implement other elements of the agreement. The following impact assessment focuses on fish impacts related to the following topics:

- flow
- reservoir storage

- water temperature (as related to Camanche reservoir water surface elevation)
- water quality

Each impact identified in the following discussion relates to one or more of the significance criteria listed above under Significance Criteria above.

Flow

Phase 2 Expansion effects on the magnitude and frequency of flows potentially affecting the quantity and quality of habitat of each species and life stage of concern were quantified by comparing average monthly flow releases from Camanche Dam and expected flows below Woodbridge Dam under the simulated No Project/No Action Alternative and Phase 2 Expansion conditions. On average, the No Project/No Action Alternative and Phase 2 Expansion monthly flows below Camanche are 714 cfs (43,105 AF/month) and 709 cfs (42,803 AF/month), respectively. The Phase 2 Expansion would result in a slight reduction in average monthly flow below Camanche Dam of 5 cfs or 302 AF (or 0.7%).

On average, the No Project/No Action Alternative and Phase 2 Expansion monthly flows below Woodbridge Dam are 547 cfs (33,023 AF/month) and 542 cfs (32,721 AF/month), respectively. The Phase 2 Expansion would result in a slight reduction in average monthly flow below WID of 5 cfs or 302 AF (or 0.9%).

Adult Salmonid Migration

Impact MOKFISH-1: Reduced migration habitat for adult fall-run Chinook salmon and steelhead (Less than Significant)

To successfully navigate to their natal streams, adult Chinook salmon and steelhead require sufficient flow to provide adequate water depth in stream channels and to overcome flow-related barriers. Flows that result in water depths of at least 0.8 foot typically provide adequate adult salmonid passage (Taylor and Love 2003). The State Water Resources Control Board recommendation for northern California coastal streams is at least 0.7 foot of water depth for steelhead and 0.9 foot of water depth for Chinook salmon (State Water Resources Control Board 2010). EBMUD measurement of flow below Woodbridge Dam and upstream salmonid passage at Woodbridge Dam indicate that 95% of adult salmonid passage occurs at flows exceeding 100 cfs.

Based on observations of fish passage at Woodbridge Dam at low flows, flows below Woodbridge Dam of at least 100 cfs from September through December and from September through February provide adequate passage for adult fall-run Chinook salmon and adult steelhead, respectively. As described above, EBMUD’s Permit 10478 includes a new regulatory terms which, subject to certain conditions, requires EBMUD to release up to 2 TAF of additional water during September through February during below normal and dry years to assist with migration; this permit term has been incorporated into the modeling for the Final Supplement.

Effects of Phase 2 Expansion flow conditions below Woodbridge Dam relative to the No Project/No Action Alternative condition are shown in **Table14**. Over the 92-year hydrologic period modeled, 551 months fell between September and February, when changes in flows below Woodbridge Dam could result in reduced migration habitat for fall-run Chinook salmon and steelhead. Comparison of the No Project/No Action Alternative and Phase 2 Expansion modeling results indicates that the Phase 2 Expansion would result in an improvement – whereby there are three fewer months out of the 551 months when average flows below Woodbridge Dam would drop below 100 cfs (see Table 6). Therefore, this impact is less than significant.

TABLE 14
NUMBER OF MODELED YEARS WHEN FLOWS BELOW WOODBRIDGE DAM MAY IMPEDE ADULT SALMONID MIGRATION BASED ON JSA YEAR TYPE (WHEN AVERAGE FLOW IS LESS THAN 100 CFS)

	Number of months Flows below WID are less than 100 cfs from Sept - Feb									
	Baseline					Project				
	Normal	BN	Dry	CD	Total	N	BN	D	CD	Total
Sept	3	9	19	8	39	3	9	20	8	40
Oct	0	0	0	3	3	0	0	0	3	3
Nov	0	0	0	6	6	0	0	0	5	5
Dec	0	0	0	7	7	0	0	0	6	6
Jan	0	0	0	7	7	0	0	0	6	6
Feb	0	0	0	7	7	0	0	0	6	6
					69					66

Salmonid Spawning and Rearing Habitat

Impact MOKFISH-2: Reduced spawning and rearing habitat for fall-run Chinook salmon and steelhead (No Impact)

Flow affects the quantity of available spawning, fry, and juvenile rearing habitat for fall-run Chinook salmon and steelhead through its effect on water depths and velocities over suitable substrates. To evaluate the potential impact of these flow reductions on salmonid spawning and rearing habitat, the changes in Chinook salmon and steelhead habitat Weighted Usable Area (WUA) were examined under the No Project/No Action Alternative conditions and Phase 2 Expansion flows using the flow and WUA curves developed by CDFW in 1991 (California Department of Fish and Game 1991). Estimates of suitable habitat area, such as WUA, are species and life-stage-specific measures of suitable depth, velocity, and substrate area commonly used to quantify flow effects on fish habitat availability. CDFW's 1991 approach set the following ranges of optimal flows for different life stages of fall-run Chinook salmon and steelhead. Fall-run Chinook WUA is maximized at flows (Camanche Dam releases) of 300 to 500 cfs (spawning), 100 to 200 cfs (fry rearing), and 100 to 200 cfs (juvenile rearing). Steelhead WUA is maximized at flows of 200 to 600 cfs (spawning), 100 cfs (fry rearing), and 100 to 600 cfs (juvenile rearing).

The flow duration curve for Camanche minimum required releases under No Project/No Action Alternative and Phase 2 Expansion indicates minimal changes in flows below 600 cfs during the 92-year period of record (Figure WR-5 in Appendix B-3). Over the course of the modeled period, the overall average reduction in monthly flows below Camanche is approximately 5 cfs. The

Phase 2 Expansion objective is to divert Mokelumne River water during wet years when water is available above EBMUD's needs and other obligations and reduce diversions from the Mokelumne River in drier years by obtaining exchanged water supplies to meet demands. Reducing diversions from the Mokelumne River in drier periods is expected to provide net benefits to lower Mokelumne River resources. As a result, this impact is considered less than significant.

Salmonid Juvenile Outmigration

Impact MOKFISH-3: Reduced outmigration for juvenile fall-run Chinook salmon and steelhead (No impact)

In the lower Mokelumne River, a bimodal emigration pattern occurs with a distinct fry emigration period from January through March and a distinct smolt emigration period from April through June. Under certain hydrologic conditions (e.g., higher flow conditions), more fry typically disperse downstream from spawning areas soon after emergence. These movements, facilitated by peak winter flows, result in dispersal of fry throughout the lower reaches of the spawning streams and upper reaches of the Bay-Delta estuary, where they seek out shallow river margins, floodplains, and tidal wetlands. These fry are dependent on the Delta and estuary for the majority of their rearing before emigrating as smolts in the late spring. During dryer hydrologic conditions, more fry remain near the spawning areas, where they rear for several months before emigrating in the late spring.

Based on data collected from rotary screw traps in the river just below Woodbridge Dam from 1993 through 2012, there is no significant relationship (R2=0.09) between average monthly flow release from Camanche Dam and the normalized number (juveniles per spawning adult) of juvenile fall-run Chinook salmon outmigrating during that month. However, there is a significant relationship (R2=0.49, P<0.001) between the average flow from January through March and the proportion of juvenile fall-run Chinook salmon that migrate downstream as fry. These data suggest that average flow releases from Camanche Dam of approximately 800 cfs and above during January through March may encourage early outmigration.

Outmigration timing and emigrant size and abundance are influenced by a variety of factors including the abundance of adult spawners and the timing of their return; temperatures during early development ultimately affecting the timing of fry emergence; and conditions during juvenile rearing including habitat quality and predation (Groot and Margolis 1991; Quinn 2005). Numerous studies indicate that transiting the Delta interior is a very risky undertaking for juvenile salmonids (National Marine Fisheries Service 2009) and may be more difficult as fry. However, management and recovery of salmon populations should focus on maintenance of life-history variation, including outmigration timing and emigrant size (Miller et al. 2010).

There are 38 years under both No Project/No Action Alternative and Phase 2 Expansion conditions when the average flows for the January through March period are greater than 800 cfs. That is, the frequency of flows greater than 800 cfs during January thru March does not change as a result of the Phase 2 Expansion. Therefore, the impacts are less than significant.

Floodplain Habitat

Impact MOKFISH-4: Reduced floodplain habitat for native fish species (No Impact)

As discussed in Impact Mechanisms above, inundation of floodplain habitat for native fishes is most important in March, April and May, and flows in excess of 3,000 cfs below Woodbridge Dam may support floodplain inundation (i.e., in wetter years when floodflow releases from Camanche Dam are required). According to Mount (pers. comm.), connectivity between the river channel and floodplain should occur in multiple events or continuously between March 1st and May 1st, and one or more flood peak flows should occur in early May to maximize benefits to native fish species. These flows should be as frequent as hydrologic conditions provide sufficient runoff (i.e., in wetter years when floodflow releases from Camanche Dam are required). Of the 92 simulated years, the frequency of flows exceeding 3,000 cfs in March, April, and/or May below Woodbridge Dam are infrequent (approximately 9 months out of a total of 276 months) but are the same with Phase 2 Expansion conditions and No Project/No Action Alternative conditions; therefore, impacts are less than significant.

Salmonid Spawning Habitat Maintenance

Impact MOKFISH-5: Reduced mobilization of substrate for salmonid spawning habitat maintenance (Less than Significant)

Merz et al. (2008) estimated that flows of 2,000 cfs or greater were needed to mobilize surface bed material and dislodge aquatic plants from salmonid spawning areas. The duration of these flows should occur continuously over a few days and should be as frequent as hydrologic conditions provide sufficient runoff (i.e., in wetter years when floodflow releases from Camanche Dam are required). Flows of this frequency, duration, and magnitude can serve as a general indicator of the flows needed for maintaining the quantity and quality of spawning gravel in the lower Mokelumne River. Under both the No Project/No Action Alternative and Phase 2 Expansion conditions, the flows exceeding 2,000 cfs below Camanche Dam occur approximately 7% of the time (80 months out of 1101 total months). In both cases, there are 33 years with average flows exceeding 2,000 cfs in at least one month. Therefore, impacts are less than significant.

Native Fishes Habitat

Impact MOKFISH-6: Reduced flows that support native fish species habitat (Less than Significant)

Native fishes that typically occur in the lower Mokelumne River upstream of the Delta include hardhead, hitch, Pacific lamprey, prickly sculpin, Sacramento pikeminnow, Sacramento blackfish, Sacramento sucker, and tule perch. Flows that provide adequate habitat for salmonids are expected to be sufficient to accommodate all life stages of the native fishes observed in the lower Mokelumne River; therefore, this impact is considered less than significant.

Reservoir Storage

Impact MOKFISH-7: Short term reduction in fish habitat in Pardee and Camanche Reservoirs (Less than Significant)

Phase 2 Expansion effects on fish habitat in Pardee and Camanche Reservoirs were evaluated by comparing the magnitude of reservoir surface elevation changes (i.e., monthly average of extrapolated daily rates) based on modeled end-of-month (EOM) reservoir water surface elevations under simulated No Project/No Action Alternative and Phase 2 Expansion conditions. The difference in EOM Pardee storage under Phase 2 Expansion conditions relative to the No Project/No Action Alternative is minimal, with a maximum storage level change of 11,017 AF in simulated September 1979. This change in level equates to 48 inches out of 172 ft (height of Pardee Reservoir). Similarly, the maximum difference in Camanche storage is 14,911 AF in simulated February 1993, which equates to 28 inches. Results indicate that this decline lasts just one month and Camanche storage recovers to No Project/No Action Alternative levels by April 1993. Because the storage change is relatively minimal in Pardee and Camanche Reservoirs, the impact to fish in these Reservoirs is considered less than significant.

Water Temperature

Reservoir Storage Effects and Downstream Temperature

As discussed in "Impact Mechanisms" above, there is a relationship between the storage level in Camanche Reservoir and temperatures in the Lower Mokelumne River. Based on available and reconstructed historical data (March 1974 through October 2008), there is a significant correlation between Camanche Reservoir water surface elevation below elevation 190 feet and Camanche Reservoir storage effects on release temperatures. This relationship was used to evaluate the effects of Phase 2 Expansion-related changes on temperature impacts in the Lower Mokelumne River.

Additionally, EBMUD's JSA requirements include maintaining minimum pool volume to ensure sufficient cold water pool for fishery needs, along with dissolved oxygen levels. For both the No Project/No Action Alternative and Phase 2 Expansion conditions, the modeling results show EBMUD meeting all JSA flow release requirements.

Impact MOKFISH-8: Substantial short or long-term change of water temperature for coldwater fish species (Less than Significant)

Coldwater species include kokanee and rainbow trout in Pardee Reservoir and rainbow trout in Camanche Reservoir. Kokanee salmon prefer well-oxygenated open water in reservoirs where temperatures are 10 to 15°C, and rainbow trout growth is optimal when temperatures are around 15 to 18°C (Moyle 2002). Potential impacts on these species were evaluated based on the 190 msl Camanche elevation threshold discussed above.

According to **Figure WR-8** in **Appendix B-3**, under No Project/No Action Alternative conditions, Camanche Reservoir is below 190 ft threshold 7.8% of the time (7.2 years). The Phase 2 Expansion would result in improvements – whereby Camanche Reservoir is below the

190 ft threshold 7.5% of the time (6.9 years). Using Camanche water surface elevation threshold of 190 msl as a criterion for cold water pool, there was is a slight improvement in the number of years when Camanche water surface elevation was below 190 ft msl under Phase 2 Expansion conditions relative to No Project/No Action Alternative. Therefore, the impacts are less than significant.

Fall-Run Chinook Salmon Adult Migration, Spawning, and Incubation

Impact MOKFISH-9: Reduction in suitable water temperatures for migration, spawning and incubation of fall-run Chinook salmon (Less than Significant)

Most adult fall-run Chinook salmon in the lower Mokelumne River return in September, October, November, and December. During this period, adults actively migrate through the lower reaches of the lower Mokelumne River until they reach the primary spawning areas. Fall-run Chinook salmon spawn in the lower Mokelumne River primarily from October through December, particularly from Camanche Dam downstream to the Elliott Road Bridge. The incubation period extends from the time of spawning to fry emergence, and is controlled largely by water temperature. Based on general relationships between water temperature and emergence times, the incubation period in the lower Mokelumne River extends primarily from the onset of spawning through March. As discussed above, the 190 msl criterion for Camanche Reservoir can be used to evaluate temperature effects.

According to **Figure WR-8** in **Appendix B-3**, under No Project/No Action Alternative conditions, Camanche Reservoir is below 190 ft threshold 7.8% of the time (7.2 years). The Phase 2 Expansion conditions result in improvements whereby Camanche Reservoir is below the 190 ft threshold 7.5% of the time (6.9 years). Using Camanche water surface elevation threshold of 190 msl as a criterion for cold water pool, there was is a slight improvement in the number of years when Camanche water surface elevation was below 190 ft msl under Phase 2 Expansion conditions relative to the No Project/No Action Alternative. Therefore, the impacts are less than significant.

Moreover, actual operations including JSA requirements related to maintaining a volume of coldwater (<16.4 degrees C) would be adhered to. Therefore, the impacts are less than significant.

Fall-run Chinook Salmon Juvenile Rearing, Smoltification, and Emigration

Impact MOKFISH-10: Reduction in suitable water temperatures for rearing, smoltification, and emigration of juvenile fall-run Chinook salmon (Less than Significant)

After emergence, Chinook salmon fry disperse downstream or reside for several months in their natal streams before emigrating to the ocean. In the lower Mokelumne River, a bimodal emigration pattern occurs with a distinct fry emigration period in late December through March and a distinct smolt emigration period in late April through June. Smaller numbers of yearling smolts also are observed between late December and May. Most of the juvenile salmon rearing and smolting in the lower Mokelumne River takes place from Camanche Dam downstream to Woodbridge Dam (location of Station Golf). The critical period for juvenile salmon rearing is

January through June, and from April through June for smolting. During the emigration period (primarily from January through June), juveniles actively migrate through the lower reaches of the lower Mokelumne River until they reach the Delta. As discussed above, the 190 msl criterion for Camanche Reservoir can be used to evaluate temperature effects.

According to **Figure WR-8** in **Appendix B-3**, under No Project/No Action Alternative conditions, Camanche Reservoir is below 190 ft threshold 7.8% of the time (7.2 years). The Phase 2 Expansion conditions result in improvements whereby Camanche Reservoir is below the 190 ft threshold 7.5% of the time (6.9 years). Using Camanche water surface elevation threshold of 190 msl as a criterion for cold water pool, there was is a slight improvement in the number of years when Camanche water surface elevation was below 190 ft msl under Phase 2 Expansion conditions relative to No Project/No Action Alternative. Therefore, the impacts are less than significant.

Steelhead Adult Migration, Spawning, and Incubation

Impact MOKFISH-11: Reduction in suitable water temperatures for migration, spawning and incubation of steelhead (Less than Significant)

In the lower Mokelumne River, most steelhead pass Woodbridge Dam from September through February and spawn in the upper reaches of the lower Mokelumne River from December through March. During this period, adults actively migrate through the lower reaches of the lower Mokelumne River until they reach the primary spawning areas.

The steelhead spawning and incubation period in the lower Mokelumne River occurs primarily from December through May, particularly from Camanche Dam downstream to the Elliott Road Bridge. Water temperatures from Camanche Dam downstream to Station Elliott (where most steelhead spawning occurs in the lower Mokelumne River) during December through May are considered in the analysis of Phase 2 Expansion temperature effects on adult steelhead spawning and incubation habitat. As discussed above, the 190 msl criterion for Camanche Reservoir can be used to evaluate temperature effects.

According to **Figure WR-8** in **Appendix B-3**, under No Project/No Action Alternative conditions, Camanche Reservoir is below 190 ft threshold 7.8% of the time (7.2 years). The Phase 2 Expansion conditions result in improvements whereby Camanche Reservoir is below the 190 ft threshold 7.5% of the time (6.9 years). Using Camanche water surface elevation threshold of 190 msl as a criterion for cold water pool, there was is a slight improvement in the number of years when Camanche water surface elevation was below 190 ft msl under Phase 2 Expansion conditions relative to No Project/No Action Alternative. Therefore, the impacts are less than significant.

Steelhead Juvenile Rearing, Smolting, and Emigration

Impact MOKFISH-12: Reduction in suitable water temperatures for rearing, smoltification, and emigration of juvenile steelhead (Less than Significant)

Central Valley steelhead typically rear in freshwater for 1 or 2 years before emigrating to the ocean. Juveniles typically are observed passing Woodbridge Dam from December through July, including young-of-year (fish born in the year of capture) that appear from March through July.

Juvenile steelhead rear in the lower Mokelumne River year-round, and smolting typically occurs from February through June. Most rearing and smolting take place from Camanche Dam downstream to Woodbridge Dam. Steelhead emigrate from the lower Mokelumne River primarily from February through June. During the emigration period, juveniles actively migrate through the lower reaches of the lower Mokelumne River until they reach the Delta. As discussed above, the 190 msl criterion for Camanche Reservoir can be used to evaluate temperature effects.

According to Figure WR-8 in Appendix B-3, under No Project/No Action Alternative conditions, Camanche Reservoir is below 190 ft threshold 7.8% of the time (7.2 years). The Phase 2 Expansion conditions result in improvements whereby Camanche Reservoir is below the 190 ft threshold 7.5% of the time (6.9 years). Using Camanche water surface elevation threshold of 190 msl as a criterion for cold water pool, there was is a slight improvement in the number of years when Camanche water surface elevation was below 190 ft msl under Phase 2 Expansion conditions relative to No Project/No Action Alternative. Therefore, the impacts are less than significant.

Water Quality

Impact MOKFISH-13: Reduction in water quality (dissolved oxygen, pH, and turbidity) for fall-run Chinook salmon and steelhead (Less than Significant)

In addition to flow, aquatic organisms can be affected by various water quality parameters. In addition to cold water, salmon and steelhead need high levels of dissolved oxygen, a pH close to neutral and limited turbidity. As explained below, prior studies have not found these water quality parameters to be problematic on the lower Mokelumne River.

Studies of the effects of pH on salmonids have that levels between 5.0 and 9.0 are generally acceptable (Deas and Orlob 1999), and long-term (2000 through 2012) monthly sampling on the lower Mokelumne River showed pH levels ranging from 6.37 to 8.03, with a mean of 7.07. The EBMUD component of the Phase 2 Expansion would not be expected to result in changes in pH, so significant impacts related to pH are not anticipated.

Similarly, studies of turbidity show that suspended solid concentrations below 20 to 25 mg/L would result in few, if any, measurable effects on fish populations (Robertson-Bryan Inc. 2006), with the possible exception of egg and larvae mortality and reduced growth rates in salmonids at lower levels (10 to 20 mg/L) (Newcombe and Jenson 1996). However, analysis of total suspended solids in the lower Mokelumne River of samples collected monthly by EBMUD at the Elliott Road Bridge from December 1999 through May 2005 (extent of EBMUD's existing data) resulted in measures ranging from 1.5 to 7.2 mg/L (mean 2.98 mg/L). The EBMUD component of the Phase 2 Expansion would not be expected to result in changes in total suspended solid concentrations, so significant impacts related to turbidity are not anticipated.

In terms of dissolved oxygen, the California Regional Water Quality Control Board's Basin Plan for the Sacramento River and San Joaquin River basins dissolved oxygen objective is a minimum of 7.0 mg/L (California Regional Water Quality Control Board 2011), and EBMUD targets maintaining a dissolved oxygen level of 7 mg/L downstream from Camanche at Station 11.

EBMUD manages dissolved oxygen levels by changing how water is released from Camanche, increasing sluicing to oxygenate water heading downstream. EBMUD also operates a Hypolimnetic Oxygenation System (HOS) that feeds pure oxygen into the Camanche Reservoir hypolimnion. This system is designed to prevent the bottom waters from going anoxic, thereby preventing the formation of hydrogen sulfide. EBMUD will continue to operate the Camanche hydropower facilities and HOS to meet JSA water quality requirements with implementation of the Phase 2 Project.

In addition, as part of EBMUD's Permit 10478 Time Extension Project EIR, EBMUD determined that downstream dissolved oxygen levels were related to flow, reservoir surface elevation, and temperature. Using modeling based on that relationship, the Permit 10478 Time Extension Project EIR determined that the Permit 10478 time extension would result in no impacts related to dissolved oxygen levels in the lower Mokelumne River. Given that the EBMUD component of the Phase 2 Expansion would result in overall minor changes in flow below Camanche Reservoir and is not expected to have significant impacts on reservoir surface elevations that could cause temperature impacts on the Lower Mokelumne River, significant impacts on the lower Mokelumne River related to dissolved oxygen levels are not expected to occur.

For these reasons, impacts to fishery resources related to water quality would be less than significant.

B-2.5 Cumulative Analysis

This chapter analyzes the cumulatively significant impacts associated with the EBMUD component of the Phase 2 Expansion. The State California Environmental Quality Act (CEQA) Guidelines Section 15355 defines a cumulative impact as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." Individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. An environmental impact report (EIR) must address the cumulative impacts of the project when the project's incremental effect is cumulatively considerable (State CEQA Guidelines Section 15130).

B-2.5.1 Approach to Cumulative Impact Analysis

Legal Requirements

A cumulative impact is one that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts (State CEQA Guidelines, Section 15130[a][1]). The State CEQA Guidelines require a discussion of cumulative impacts when the project's incremental effect is cumulatively considerable, as defined in Section 15065(a)(3).1. This analysis conforms to Section 15130 of the Guidelines, which also includes the following:

(a) …Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

(1) …An EIR should not discuss impacts which do not result in part from the project evaluated in the EIR.

(2) When the combined cumulative impact associated with the project's incremental effect and the effects of other projects is not significant, the EIR shall briefly indicate why the cumulative impact is not significant and is not discussed in further detail in the EIR. A lead agency shall identify facts and analysis supporting the lead agency's conclusion that the cumulative impact is less than significant.

(3) An EIR may determine that a project's contribution to a significant cumulative impact will be rendered less than cumulatively considerable and thus is not significant. A project's contribution is less than cumulatively considerable if the project is required to implement or fund its fair share of a mitigation measure or measures designed to alleviate the cumulative impact. The lead agency shall identify facts and analysis supporting its conclusion that the contribution will be rendered less than cumulatively considerable.

State CEQA Guidelines Section 15130[b][1] identifies two methods for establishing the cumulative environment in which a project may be considered:

- A list of past, present, and probable future projects that may cause related or cumulative impacts; or
- Adopted projections from a General Plan or other regional planning document.

The following sections describe the methods and assumptions used for the cumulative impact analysis in this Supplement for the EBMUD component of the Phase 2 Expansion.

B-2.5.2 Methods and Assumptions

Certain aspects of the EBMUD component of Phase 2 Expansion includes factors that cannot be meaningfully analyzed under the typical CEQA assessment of comparing No Project/No Action Alternative and the Phase 2 Expansion project conditions. The passage of time alone could result in changes to water demand (due to population growth or other factors) that may occur with or without a specific project in place, and some projects with the potential to contribute to cumulative impacts on the Mokelumne River are not readily subject to quantified analysis. In order to provide a more comprehensive analysis, EBMUD completed a qualitative analysis which provides a framework within which all cumulative impacts may be better understood, and then used that qualitative analysis to inform a comprehensive consideration of cumulative impacts readily susceptible to quantification.

The qualitative analysis, which forms the framework for cumulative impacts assessment is derived primarily from the modeling conducted in Permit 10478 Time Extension EIR (Permit 10478 EIR), certified by EBMUD's Board of Directors in September 2014. The Permit 10478 EIR analyzed the environmental impacts resulting from an increase in EBMUD's water demand

This section analyzes potential impacts associated with future cumulative conditions in the lower Mokelumne River, by considering the future impact of the EBMUD Component of the Phase 2 Expansion Project diversions in combination with other reasonably foreseeable diversions from the Mokelumne River. In compliance with the requirements of CEQA, the analysis considers whether cumulative impacts are significant, and the magnitude of the project's contribution to cumulative impacts.

For most of the analysis described below, results are represented as a comparison between the No Project/No Action Alternative and the Cumulative with Project Alternative. This enables the reader to see the full cumulative effect. In some cases, the incremental difference between the Cumulative with Project conditions and the Cumulative No Project/No Action condition is discussed to better understand how much of the cumulative effect is attributable specifically to the EBMUD Component of the Phase 2 Expansion Project.

As described in the earlier sections of the FEIR, RiverWare was used to model four studies, namely: (1) the No Project/No Action Alternative; (2) the EBMUD Component of the Phase 2 Expansion Project: (3) Cumulative with the EBMUD Component of the Phase 2 Expansion Project (Cumulative with Project); and (4) Cumulative No Project/No Action. The results from these model studies allow the reader to parse out how much of the cumulative effect is from other reasonably foreseeable actions and how much of the cumulative effect can be attributed to the Project.

The modeling studies conducted in Permit 10478 Time Extension EIR (Permit 10478 EIR), certified by EBMUD's Board of Directors in September 2014, provide additional information that is useful in understanding the potential for cumulative impacts. The Permit 10478 EIR analyzed the environmental impacts resulting from an increase in EBMUD's water demand from the year 2005 to the year 2040, and considered cumulative impacts on the Mokelumne River resulting from that increase in demand combined with anticipated 2040 level of demand for upstream senior water rights on the river. Consideration of the Phase 2 Expansion in the context of the Permit 10478 EIR's cumulative impact analysis provides an understanding of how the Phase 2 Expansion's contribution to cumulative impacts relate to those other stressors on the Mokelumne River.

B-2.5.3 Water Resources

Cumulative Impacts Framework

For Cumulative conditions, the model results are based upon the year 2040 Level of Demand for EBMUD (assumed to be 230 MGD average annual demand) and upstream senior water right users on the Mokelumne River (Amador and Calaveras Counties) using their full water right entitlement of 47 TAF. Additional details regarding the cumulative model scenarios are provided above.

Permit 10478 Time Extension

The Permit 10478 Time Extension Draft EIR (Permit 10478 EIR) provides a useful framework for beginning the analysis of cumulative conditions. The Permit 10478 EIR looked at changes resulting from an increase in EBMUD demand from 214 MGD in 2005 to 230 MGD in 2040. For the project level analysis, the Permit 10478 EIR considered a 2005 level of development on the

Mokelumne River. The cumulative analysis then considered a higher level of development (2040 levels) and added in EBMUD's anticipated increase in available supplemental supplies.

According to Permit 10478 EIR, average annual demand of 230 MGD in the year 2040 diverted from the Mokelumne River (along with other assumptions) resulted in no significant impacts to water resources, vegetation and wildlife resources, recreational or other visual resources.

The analysis of the 230-MGD demand included detailed modeling of lower Mokelumne River temperatures, flows and storage elevations. Population changes, general and local economic conditions and a myriad other factors that are not within EBMUD's control influence the average annual water demand. Nonetheless, the average annual demand is a key parameter in that it directly influences the amount of water diverted from the Mokelumne River as well as the reservoir levels and other river conditions.

Two potentially significant impacts were identified in fishery resources and agricultural resources. These impacts were mitigated to less than significant impacts after implementation of certain mitigation measures. These measures have now been incorporated into Permit 10478 as new permit terms and are described below.

First, the Permit 10478 EIR identified reduced migration habitat for adult fall-run Chinook salmon and steelhead as a potentially significant impact resulting from the proposed permit extension. To successfully navigate to their natal streams, adult Chinook salmon and steelhead require sufficient flow to provide adequate water depth in stream channel and to overcome flow related barriers. Based on EBMUD observation of fish passage below WID, flows in excess of 100 cfs from September through February were considered adequate for passage. The JSA flows below Camanche exceed 100 cfs in all water year types and these flows provide adequate flow depth. Flows below WID are typically lower than in the Camanche reach and are tidally influenced. The tidal influence may affect the flow depth and velocity.

As mitigation, the new regulatory term for Permit 10478 requires EBMUD to release up to 2,000 AF of additional water above required releases during September thru February in Below Normal and Dry years, when determined necessary by the JSA Partnership Steering Committee, to facilitate fish passage below WID. With this term in place, EBMUD does not anticipate significant impacts to fish passage as a result of the increase in average annual demand.

The second potentially significant impact noted in the Permit 10478 EIR included impacts to JVID's ability to divert water under its senior water right.[5] When Pardee storage levels fall below 550 ft (i.e., Pardee storage volume threshold of approximately 167 TAF), and water is available under JVID's water right, JVID would not be able to physically access their water supplies. As part of the new regulatory requirement, EBMUD will work with JVID to install a submersible pump during periods when Pardee water surface elevation is below 550 ft and water is available under JVID's priority. Therefore, EBMUD does not anticipate significant impacts to agricultural resources (i.e., this senior water right holder) as a result of the increase in average annual demand.

5 JVID holds a senior water right, for agricultural purposes.

The Permit 10478 EIR also considered cumulative impacts at a 2040 level of development on the Mokelumne River, which assumed that Amador and Calaveras Counties use their full water right entitlement of 47 TAF as compared to the 27 TAF assumed in the No Project/No Action Alternative assessment of this Supplement. For the cumulative analysis, the Permit 10478 EIR also took into consideration additional supplemental supplies that EBMUD planned to obtain to meet its dry year needs. The analysis drew on EBMUD's Water Supply Management Program (WSMP) 2040, assuming that by 2040 EBMUD would have secured or otherwise obtained some of the additional dry-year supplies identified in that document. EBMUD's ability to obtain dry year supplies was proven in 2014 and 2015, when EBMUD was able to obtain approximately 24,680 AF of transfer water and approximately 51,850 AF of CVP water through Freeport. The cumulative analysis in the Permit 10478 EIR concluded that with implementation of the two permit terms described above, cumulative impacts would be less than significant. As such, the Permit 10478 EIR's impact analysis provides a point of comparison for understanding the environmental significance of impacts identified in the quantitative assessment below.

Other Mokelumne River Projects and Programs

The Permit 10478 EIR was certified in September 2014, and the Permit extension was issued in 2016, including the new terms identified as mitigation measures. Since the Permit 10478 EIR analysis was completed, new projects and management programs have emerged that could contribute to cumulative effects on water quality and fish resources in the Mokelumne River in the future. Following is a description of those projects and programs.

Ecosystem Restoration Program

The Ecosystem Restoration Program (ERP) is administered by the CDFW. The ERP is a multi-agency effort aimed at improving and increasing aquatic and terrestrial habitats and ecological function in the Delta and its tributaries. The goals of the ERP are to contribute to the recovery of at-risk native species; rehabilitate natural ecosystem processes; maintain and enhance fish populations critical to commercial, sport, and recreational fisheries; protect and restore functional habitats; reduce negative impacts of invasive species; and improve and maintain water and sediment quality to better support ecosystem health. ERP actions contribute to cumulative benefits on fish and wildlife species, habitats, and ecological processes. As such, it is not considered in further detail in the cumulative impacts analysis. Additional information is available at <http://www.dfg.ca.gov/ERP>.

Bay-Delta Water Quality Control Plan

The State Water Board is in the process of reviewing and updating its Water Quality Control Plan for the San Francisco Bay / Sacramento-San Joaquin Delta Estuary (Bay-Delta WQCP). In considering potential changes to the Bay-Delta WQCP, the State Water Board is reviewing changes that should be made to water quality objectives and the program of implementation to protect beneficial uses in the Bay-Delta, both in the immediate future under existing conditions and in the longer term. In October 2016, the State Water Board issued a working draft Scientific Basis Report for Phase 2 of the Bay Delta Plan Update. The Mokelumne River is listed as one of three eastside tributaries that are assessed as part of Phase 2.

EBMUD has been working with other Mokelumne River stakeholders and the California Department of Fish & Wildlife (CDFW) on a proposed Voluntary Agreement (VA) for the Phase 2 Update of the Bay Delta WQCP. The Phase 2 update is a comprehensive review of the Bay-Delta Plan which addresses Delta Outflow, Sacramento River and Delta Tributary Inflow, Eastside streams including the Mokelumne River, Coldwater Habitat and Interior Delta Flows. It is unknown at this time what the final terms of a Mokelumne River VA will provide and whether the SWRCB or other regulatory state agencies would support and adopt a VA. Because of substantial uncertainty regarding the changes in water quality objectives that may be implemented as part of the plan update, it is not considered in any further detail in the cumulative impacts analysis.

California WaterFix

The California Department of Water Resources is proposing the construction of twin tunnels below ground to transport water from the Sacramento River underneath the Delta to the intakes for the Central Valley Project and State Water Project. It is estimated that the California WaterFix project would provide up to 4.9 million AF of water per year on average. California WaterFix may result in increased openings of the Delta Cross Channel gates, which EBMUD has determined would significantly increase the risk that Mokelumne salmonids will stray to the Sacramento and American Rivers, rather than returning to the Mokelumne River. EBMUD has determined that the project may also result in flow and water delivery changes that would impact juvenile salmon and steelhead migration in the spring. There is not currently sufficient information to evaluate these impacts.

San Joaquin County DREAM Project

The Demonstration Recharge Extraction and Aquifer Management (DREAM) Project is a collaboration of San Joaquin County, NSJWCD, and EBMUD. San Joaquin County has responsibility for planning and engineering of the DREAM Project. EBMUD will provide funding for the DREAM Project pursuant to the protest dismissal agreement with NSJWCD and San Joaquin County (and other parties) and a surface water supply of up to 1,000 AF, at a rate of 2 cfs, to be applied to approximately 350 acres of developed farmland in lieu of groundwater extraction. The NSJWCD Mokelumne River South System intake and delivery pipeline would be used to convey surface water to farmlands currently pumping groundwater. In exchange for providing 1,000 AF of surface water to the DREAM Project, EBMUD would receive up to 500 AF (half of the amount delivered for irrigation) of groundwater extracted from an existing well located near the proposed surface water irrigation site for export to EBMUD customers. San Joaquin County issued the export permit for the DREAM Project in April 2017, and design is underway for project facilities. Feasibility and environmental information developed as part of the DREAM Project would inform future efforts toward additional and potentially expanded projects such as those considered in the protest dismissal agreement with San Joaquin County noted below. Because the DREAM Project consists of a one-time conveyance of 1,000 AF of water for in-lieu groundwater recharge, and subsequent 500 AF extraction of groundwater for delivery to EBMUD, and is likely to be completed prior to any EBMUD participation in the Phase 2 Expansion project, it is not considered in further detail in the cumulative impact analysis.

Protest Dismissal Agreement (PDA)

In November 2014, EBMUD entered into a protest dismissal agreement (PDA) with San Joaquin County, NSJWCD, Stockton East Water District (SEWD), Central Delta Water Agency (CDWA) and South Delta Water Agency (SDWA). Under the PDA, the parties agreed to work jointly to improve the health and sustainability of the Eastern San Joaquin groundwater basin and to set aside the respective protests on pending water right applications and petitions.

Under the PDA, EBMUD agreed to provide additional water to NSJWCD subject to certain conditions, utilize unused capacity in the Mokelumne Aqueducts to convey NSJWCD's water to SEWD under certain conditions, and, solely at EBMUD's discretion and upon issuance of a water rights permit by the State Water Resources Control Board to San Joaquin County (under County Application 29835), EBMUD also agreed to temporarily store water for the County in Pardee and/or Camanche Reservoirs during each storage season (from about December 1st to the following June 30th). In return for releasing water to NSJWCD (the purpose of which is direct or in lieu recharge of the Eastern San Joaquin groundwater basin), EBMUD would receive groundwater banking extraction credits for 50% of the amount of released water actually applied through direct or in-lieu recharge in the NSJWCD service area.

Sections 1 and 2 of the PDA include releases of up to 8 TAF of EBMUD's Permit 10478 water for NSJWCD during normal and borderline below-normal water years, subject to certain conditions. Modeling assumptions for the Cumulative with Project and Cumulative No Project/No Action Alternative includes the assumptions for PDA sections 1 and 2.

Another PDA term, PDA Section 6, relates to the temporary storage of water that San Joaquin County seeks under its Application 29835. In 1990, the County applied to the State Water Board to appropriate water from the Mokelumne River pursuant to its Application 29835. The County amended that application in 2014 and anticipates that additional amendments are likely to be made in the future. The County does not have a timeline for moving forward with Application 29835 and has not yet completed permitting requirements including preparation of CEQA documentation for the application. The PDA acknowledges this water right application. In the PDA, the County recognizes that Mokelumne River flows are highly variable and likely to diminish as more water is diverted by EBMUD and other senior diverters. In light of these facts, PDA Term 6 states in part, that in the future based upon issuance of a water right permit under Application 29835 and subject to an operating agreement to be developed by EBMUD and the County, the County may request EBMUD to, and EBMUD shall, collect and temporarily store for County in Camanche Reservoir or Pardee Reservoir or in both reservoirs, Mokelumne River water not to exceed 48,000 AF annually which County would be entitled to divert and store under the County's permit. It is uncertain if or when the State Water Board will issue a permit to the County under Application 29835 or what type of terms and conditions will be placed on the permit to avoid impacting senior water rights holders and instream uses. Upon issuance of the permit to the County by the State Water Board, EBMUD and the County would then have to negotiate an operating agreement for the County's use of EBMUD facilities. Given the uncertainties regarding issuance of the permit and final terms and conditions on the permit and the operating agreement between the County and EBMUD necessary to effectuate Term 6, it is not possible to analyze PDA Term 6 quantitatively; therefore, this term is not included in the modeling assumptions.

EBMUD Component of the Phase 2 Expansion - Quantitative Cumulative Impact Analysis

The discussion above provides a context for evaluating the potential cumulative impacts of the proposed EBMUD component of the Phase 2 Expansion (Cumulative with Project). Of the two scenarios considered for EBMUD participation in the Phase 2 Expansion, in terms of Mokelumne River impacts, the most relevant is the scenario in which EBMUD stores Mokelumne River water to Los Vaqueros Reservoir during wetter years, and then takes water back during drier years, most likely in the form of an exchange at Freeport.

The quantitative analysis compares the No Project/No Action Alternative with Cumulative with Project. To discern the magnitude of the Project's contribution to cumulative impacts, a comparison between the Cumulative with Project Alternative and the Cumulative No Project/No Action Alternative was also conducted. The quantitative analysis provides more detailed information to evaluate the environmental resources in the lower Mokelumne River and the magnitude of the Phase 2 Expansion's potential contribution to cumulative impacts.

Both the Cumulative with Project and Cumulative No Project/No Action Alternative were modeled by considering 2040 conditions, including EBMUD's projected demand of 230 MGD and the 47 TAF level of demand from Amador and Calaveras Counties. Sections 1 and 2 of the PDA, which reflect future water use by NSJWCD, were also included in the Cumulative model runs. Lastly, supplemental dry year water in the form of CVP allocations and water transfers is included. Where the future projects discussed above are sufficiently developed and understood, they have been incorporated into the modeling for the Cumulative cases for quantitative analysis of potential cumulative impacts.

Cumulative Impact Analysis

Reservoir Storage

Pardee Reservoir Storage

Figure CWR-1 in Appendix B-4 plots the end of month storage levels for Pardee Reservoir under the No Project/No Action, Cumulative with Project and Cumulative No Project/No Action cases. The figure illustrates that Pardee Reservoir storage levels remain generally stable under all three cases over the 92- year period of record. In certain dry years, storage levels decrease under the Cumulative with Project and Cumulative No Project/No Action as compared to the No Project/No Action case. In other dry years, Pardee storage rises under the Cumulative with Project conditions as compared to the No Project/No Action case. For example, during the extended drought of 1987-1992, storage under the Cumulative with Project case rises by as much as 11,360 AF in June 1991 as compared to the No Project/No Action case. The benefits of the Project are realized in certain dry years when EBMUD obtains water from the Project.

Under Cumulative with Project conditions as compared to the No Project/No Action case, the average reduction in Pardee Storage is 2.6 TAF (1.3% of Pardee Reservoir capacity of 204 TAF). The maximum decline in storage level occurs in September 1978 and is 47 TAF (23% of Pardee Reservoir capacity). Pardee Reservoir recovers to the No Project/No Action levels by July 1979.

Changes in storage and water surface elevation at Pardee and Camanche Reservoirs under cumulative conditions could impact fish resources and special status wildlife species. Potential impacts to fish resources under the cumulative conditions are discussed under Fish Resources below.

In terms of special status wildlife species, the Permit 10478 EIR examined the potential for impacts to these species resulting from changing storage levels and water surface elevations. The Permit 10478 EIR found that most special status plats identified in the project area are found in chaparral, woodland, grassland, seasonal wetland, vernal pool, and slough habitats. These habitats are not located in areas that would experience changes in water-surface elevations at Pardee or Camanche Reservoirs or changes in the frequency of maintenance flows in the lower Mokelumne River and, therefore, would not be affected under the Project or cumulative conditions. No special-status plants or special natural communities were documented directly in or adjacent to Pardee and Camanche Reservoirs and none are known to occur along the lower Mokelumne River.

The Permit 10478 EIR also looked at how changes in storage and water surface elevations could affect local vegetation, and the findings of that analysis are also relevant here. The Permit 10478 EIR found that historically, fluctuations at these reservoirs, in response to day-to-day operations and changes in runoff patterns, affected vegetation that had established at or near the water surface and within the drawdown zone. Similarly, vegetation that periodically established in the drawdown zone or near the waters' edge was commonly inundated and lost during prolonged periods of high storage, while plants that established during periods of high storage could be lost during periods of reduced reservoir storage or drought. Compared to baseline conditions, cumulative conditions would result in minor changes in reservoir storage. Fluctuations in reservoir water-surface elevation would be similar to those experienced under baseline conditions and vegetation would experience a similar cycle of establishment, inundation, and loss, as water elevations rise and fall seasonally and in response to precipitation and flood-control requirements as compared to baseline conditions. Therefore, cumulative impacts on reservoir vegetation, as well as on special-status wildlife species that inhabit these areas, would be less than significant. Because there would be no cumulative impact on wildlife species that inhabit the area immediately surrounding the Pardee and Camanche Reservoirs, no mitigation is necessary.

Camanche Reservoir Storage

Figure CWR-2 in Appendix B-4 plots the end-of-month storage levels for Camanche Reservoir under the No Project/No Action, Cumulative with Project and Cumulative No Project/No Action conditions. In general, Camanche Reservoir levels show greater variability than Pardee Reservoir storage levels because Camanche Reservoir releases water to meet downstream obligations. As with Pardee, in certain dry conditions, the storage levels generally increase under both Cumulative with Project and Cumulative No Project/No Action Alternative as EBMUD obtains exchanged water supplies from CCWD or other Local Agency Partners or obtains other non-Mokelumne waters to meet demands.

Under Cumulative with Project conditions as compared to the No Project/No Action case, the average reduction in Camanche storage is 6.3 TAF (1.5% of Camanche Reservoir capacity of

417 TAF). Cumulative conditions unrelated to the Project result in an average decline of 7.9 TAF. In this case, the project results in a benefit (i.e. an average increase of 1.6 TAF in Camanche Reservoir) under cumulative conditions.

In all three cases, Camanche storage is reduced to 6 TAF in the 1977 -78 extended drought. The largest reduction in Camanche Reservoir storage occurs in December 1977 when Camanche storage is reduced from 70 TAF under the No Project/No Action case to 6.4 TAF under cumulative conditions. The nearly 64 TAF reduction under cumulative conditions (15% of the 417 TAF capacity) occurs as a result of increased diversions and extended drought conditions. Camanche Reservoir storage levels generally recover by October 1978. The project's contribution is minor in that 1.6 TAF of the 64 TAF reduction can be attributed to the implementation of the project. Additionally, under Cumulative with Project conditions, Camanche Reservoir recovers within 2 months to levels under Cumulative No Project/No Action conditions. As with Pardee Reservoir, storage in Camanche Reservoir is higher in certain dry years (such as portions of the 1987-1992 drought period) under the Cumulative with Project as compared to either the No Project/No Action Alternative or Cumulative No project/No Action alternative.

Future increases in upstream demand, increased aqueduct diversions, and the implementation of the Project are likely to reduce the amount of water stored in Pardee and Camanche Reservoirs. As discussed in the Water Resources section above, when the water storage elevation in Camanche falls below 190 ft msl between March through October, it is possible that the temperature of water released from the reservoir would rise.

Under the No Project/No Action, cumulative No Project/No Action Alternative and Cumulative with Project, model results indicate that Camanche Reservoir falls below the 190 ft threshold in 48 months, 53 months and 43 months respectively. That is, under Cumulative with Project conditions, Camanche Reservoir levels fall below the 190 ft msl threshold (from March thru October) in 5 less months than under the No Project/No Action condition. This improvement in key storage level is a result of transferred or exchanged waters available to EBMUD through the Freeport facilities. When comparing Cumulative with Project to the Cumulative No Project/No Action case, the project results in an improvement for 10 additional months further illustrating the benefits of the Project.

As discussed above, the Cumulative with Project case shows benefits compared to the Cumulative No Project/No Action case in terms of storage levels and temperature effects. Therefore, there is no cumulative impact from the Project.

End of September (EOS) Total System Storage (TSS)

End of September TSS is a parameter used to determine whether EBMUD can exercise its CVP contract and is also used as a criterion by EBMUD to determine whether the drought management programs should be commenced. **Figure CWR-3** in Appendix B-4 plots the end of September (EOS) EBMUD total system storage (TSS). The results indicate that under the Cumulative with Project Alternative, on average the carryover storage (i.e. End of September TSS) in decreases by about 31 TAF (5.4% of the average EOS TSS of 575 TAF under No Project/No Action Alternative). A review of results between the Cumulative with Project and Cumulative without

Project indicate that on average only 763 AF of the 31 TAF decline is a result of the Project; the remaining 30 TAF is a result of the cumulative conditions unrelated to the Project. The average carryover storage impact of 763 AF is minor; therefore, the project's incremental effect is not cumulatively considerable.

In addition, the majority of the average annual reduction (23.7 TAF, or nearly 76%) occurs in EBMUD's terminal reservoirs, whose storage levels fluctuate under current conditions. The remaining reduction is distributed between Pardee (1.6 TAF) and Camanche (6.1 TAF). The reduction in Pardee and Camanche does not result in environmental impacts in that storage levels do not fall below the 190 ft msl threshold in Camanche more frequently as compared to the No Project/No Action and the Cumulative No Project/No Action Alternative. As noted earlier, the 190 ft msl in Camanche is a threshold used to determine temperature impacts to lower Mokelumne resources).

Changes in JSA year type

Tables 15 and **16** show the comparison of JSA year types during the Oct-March time frame and during the April-September timeframe. The tables provide a summary of the JSA year types for the No Project/No Action Alternative, Cumulative No Project/No Action and Cumulative with Project cases.

TABLE 15
JSA YEAR TYPE: UNIMPAIRED INFLOW INTO PARDEE BASED (APRIL – SEPTEMBER)

Year Type	No Project/ No Action Alternative	Cumulative No Project/ No Action Alternative	Cumulative Phase 2 Expansion Project
Normal and Above	29	29	29
Below Normal	30	30	30
Dry	24	23	24
Critically Dry	9	10	9
Total	**92**	**92**	**92**

TABLE 16
JSA YEAR TYPE: PARDEE AND CAMANCHE STORAGE BASED (OCTOBER – MARCH)

Year Type	No Project/ No Action Alternative	Cumulative No Project/ No Action Alternative	Cumulative Phase 2 Expansion Project
Normal and Above	46	43	43
Below Normal	25	25	27
Dry	14	16	15
Critically Dry	7	8	7
Total	**92**	**92**	**92**

Modeling results indicate that there is no change in JSA year types for the April –September time frame (when JSA year types are determined by unimpaired inflow) between the No Project/No Action Alternative and the Cumulative with Project case. Under Cumulative with Project case (as compared to the Cumulative No Project/No Action case), there is a decrease in Critically Dry year and a subsequent increase in Dry years. A review of the results indicates that this change occurs in 1992 and is triggered by Footnote 4 of the JSA Attachment 1, Water Year Type Determination[6].

During the October through March timeframe (when JSA year type is determined based on Pardee and Camanche storage), modeling results indicate that under Cumulative with Project case as compared to the No Project/No Action Alternative, the number of critically dry years remain the same. Seven years would shift from wetter to drier year types and two years would shift from drier to wetter year types. However, looking at the Cumulative No Project/No Action case shows that all the same years that shift to drier year types would shift without implementation of the Project, plus two additional years would shift to a drier year type. Implementation of the Project therefore either does not contribute to drier JSA year types or improves conditions under the cumulative case. Therefore, there is no cumulative impact from the Project.

Total Camanche Releases and Flows in the Lower Mokelumne River

Table 17 below provides a summary of average monthly and average annual Total Camanche Releases (flows below Camanche) under the No Project/No Action Alternative, Cumulative with Project and Cumulative No Project/No Action conditions. Results indicate that on an annual basis the Total Camanche Releases under No Project/No Action, Cumulative with Project and Cumulative No Project/No Action are 714 cfs, 663 cfs, and 666 cfs respectively. Over the 92-year period of record, the average annual total Camanche releases under cumulative with Project are reduced by 51cfs (7% reduction) from No Project/No Action flows of 714 cfs. Approximately 0.4% (3 cfs) of this reduction would be attributed to the Project under cumulative conditions.

TABLE17
AVERAGE MONTHLY FLOWS BELOW CAMANCHE

Average Total Flows Below Cam. in cfs	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Annual
No Project/ No Action	642	801	804	842	1,163	1,138	748	451	395	579	514	503	714
Cumulative with Project	597	704	738	788	1,092	1,065	714	418	347	543	487	470	663
Cumulative No Project/ No Action	595	699	741	787	1,110	1,087	717	417	347	542	484	471	666

[6] Footnote 4, on page 5 of the JSA Attachment 1 states "April through September minimum flows shall be critically dry whenever Nov. 5 combined Pardee/Camanche storage is projected to be 200 TAF or less based on the runoff forecast in DWR bulletin 120, beginning April 1st".

Figure 8 below plots the average monthly total Camanche releases under No Project/No Action, Cumulative with Project, and Cumulative No Project/No Action. The graph reveals that in all months, the Total Camanche releases under the No Project/No Action are slightly higher than the Total Camanche Releases under cumulative conditions. Results also indicate that flows under cumulative conditions with and without the Project are generally the same with a maximum difference ranging from 5 cfs (0.7% increase) in February to 22 cfs (2% reduction) in June.

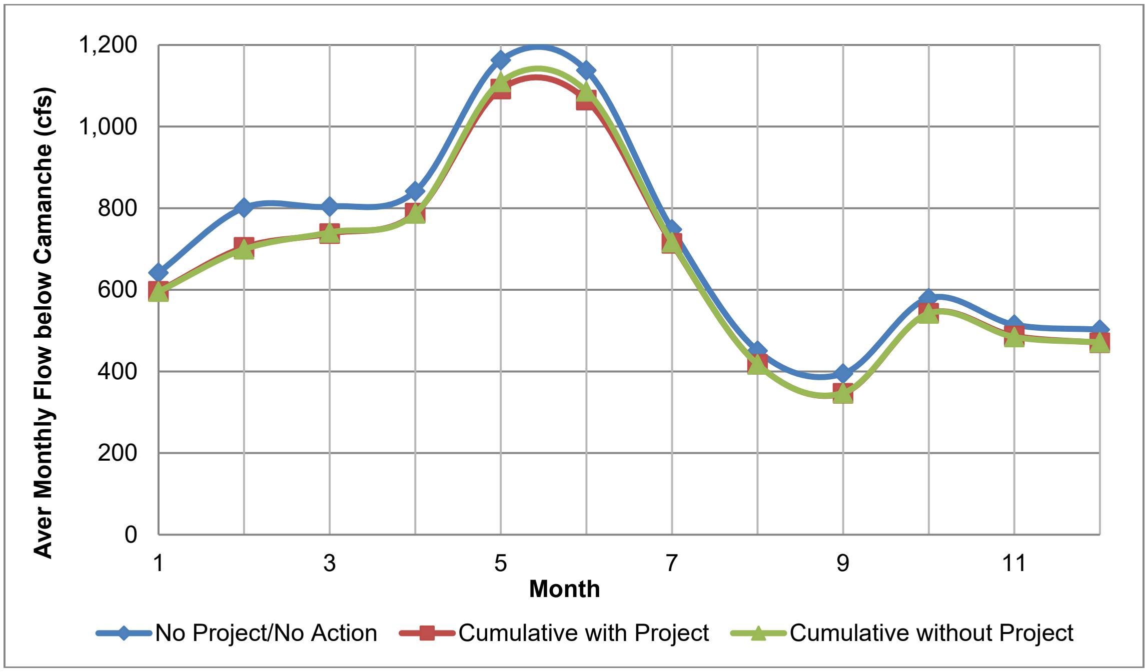


Figure 8
Average Monthly Flow Below Camanche

The maximum reduction in Total Camanche Releases between No Project/No Action and Cumulative with Project occurs in February. In February, flows under No Project/No Action are 801 cfs and these flows are reduced by 97 cfs (12% reduction) to 704 cfs under cumulative with Project case. Model results for February indicate that under cumulative with Project, Total Camanche flows are slightly higher (5 cfs or 0.7% increase) as compared to Cumulative No Project/No Action.

Table 18 provides a summary of the average monthly flows below Camanche Reservoir, by JSA year type, for the No Project/No Action, Cumulative with Project, and Cumulative No Project/No Action alternatives. The table shows that the minimum flows below Camanche Reservoir as required by the JSA are met in all year types.

Under Cumulative with Project, the average annual total flows below Camanche are reduced in Normal, Below Normal and Critically Dry year types. The largest reduction is in Below Normal years, where the average annual Total Flows below Camanche are reduced by 32 cfs (10% reduction) under the Cumulative with Project case as compared to the No Project/No Action Alternative. In Dry Years, there are no changes in average annual flows between the two cases. A

TABLE 18
AVERAGE MONTHLY AND AVERAGE ANNUAL TOTAL FLOWS BELOW CAMANCHE BY JSA YEAR TYPE (VALUES IN CFS)

Average Flows Below Camanche in cfs		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Annual
No Project/No Action	Normal & Above	840	944	899	1,724	2,263	2,169	1,343	629	569	782	644	730	581
	Below Normal	681	1,036	946	571	1,009	1,072	661	473	421	456	475	349	312
	Dry	239	360	588	288	366	310	338	297	238	338	359	220	151
	Crit Dry	130	130	194	200	211	268	254	235	192	209	163	134	99
Cumulative with Project	Normal & Above	816	897	874	1,635	2,158	2,047	1,291	575	493	730	609	704	569
	Below Normal	587	757	754	510	903	972	618	435	363	448	477	325	280
	Dry	225	368	631	280	355	299	321	280	214	346	338	220	152
	Crit Dry	130	130	146	200	211	268	254	236	195	202	132	134	96
Cumulative No Project/No Action	Normal & Above	820	904	881	1,627	2,197	2,101	1,297	577	495	735	609	707	574
	Below Normal	611	766	773	517	924	986	621	435	362	441	475	334	289
	Dry	223	370	646	280	355	300	322	279	214	369	357	220	154
	Crit Dry	130	130	140	200	211	268	256	233	200	200	132	134	101

closer examination indicates that in dry years, there is some variability, as monthly flows range from a 7% increase (43 cfs increase) in March to a decrease of 10% (24 cfs reduction) in September when compared to the No Project/No Action Alternative. In critically dry years, under the Cumulative with Project case, March average flows are 48 cfs lower than in the No Project/No Action case; a review of the Cumulative No Project/No Action case shows that March flows would have been reduced by 55 cfs compared to the No Project/No Action case. In this circumstance, the implementation of the Project appears to result in improved flows below Camanche.

The reductions in flows below Camanche under cumulative conditions could impact fish resources and special status wildlife species. Fish resources are discussed in the section below. Project conditions would not have significant direct or indirect cumulative impacts on annual grassland, chaparral, oak woodland, or savannah communities and associated habitat for special-status species because these communities are not affected by reductions in river flows (EBMUD 2013). In addition, most special-status plants in the project area are found in chaparral, woodland, grassland, seasonal wetland, vernal pool, and slough habitats that would not experience changes in the frequency of maintenance flows in the lower Mokelumne River and, therefore, would not be affected under cumulative conditions (EBMUD 2013). Therefore, the cumulative impacts would be *less than significant.*

Minimum Required Releases

Figure 9 below plots the average monthly required flows below Camanche under the No Project/No Action, Cumulative with Project, and Cumulative No Project/No Action Alternatives. JSA required minimum flows are met in all months and all cases.

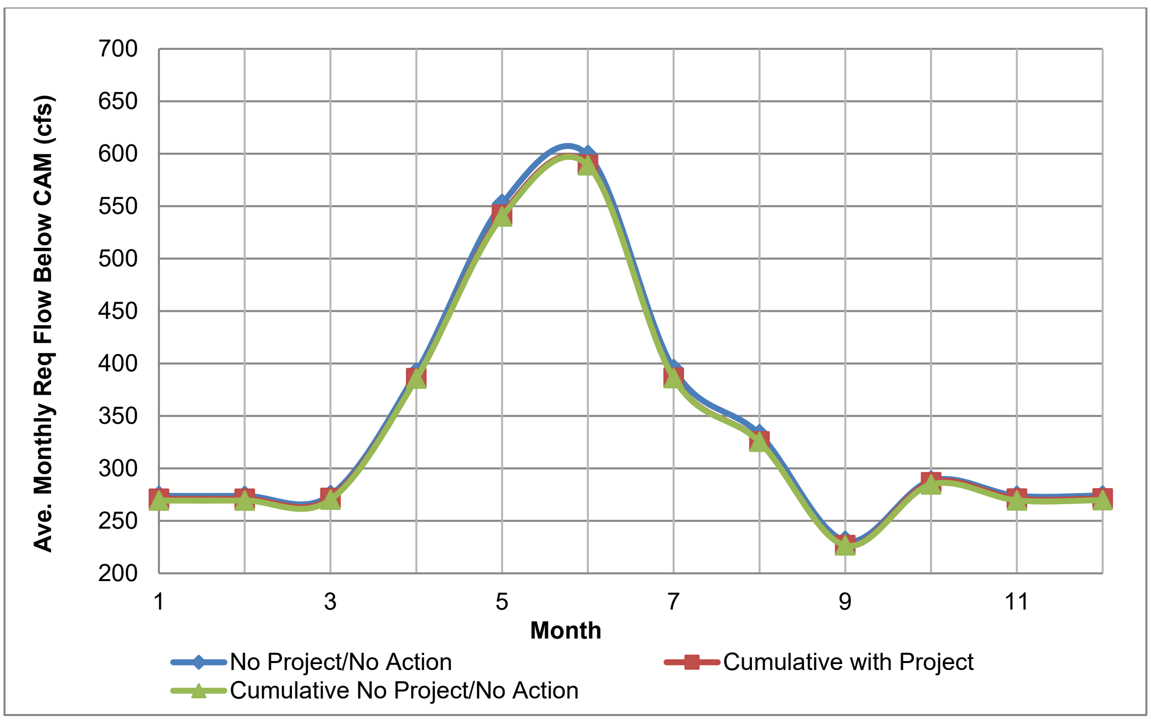


Figure 9
Average Monthly Req Flow Below Camanche

Table 19 provides a summary of the average required monthly flows below Camanche Reservoir for the No Project/No Action, Cumulative with Project and Cumulative No Project/No Action Alternatives. EBMUD typically releases more than the JSA minimum flow requirements in order to meet downstream senior obligations or when regulating flood-control releases. Under the No Project/No Action Alternative, the annual average required monthly releases are 347 cfs and under the Cumulative with Project, minimum required releases are slightly lower at 342 cfs - resulting in a decrease of about 5 cfs (1.4% reduction). However, the annual average monthly required release under the Cumulative No Project/No Action Alternative is even lower, at 341 cfs. The implementation of the Project results in improved flows below Camanche. Therefore, there is no cumulative impact from the Project.

Table 20 provides a monthly summary of average monthly required flows below Camanche based on JSA year type. Table 6 indicates that the minimum required flows below Camanche Reservoir as required by the JSA are met in all year types. There is little difference in the average monthly flows under the three scenarios. Under the Cumulative with Project case, the maximum reduction occurs in Dry years with reductions ranging from 0-6% as compared to the No Project/No Action Alternative. The reduction of 6% occurs in August when flows are 291 cfs under the No Project/No Action case, 273 cfs under the Cumulative with Project case and 274 cfs under Cumulative No Project/No Action case. In August, the JSA requirement for dry year flows below Camanche is 100 cfs. Flows below Camanche are well above these minimum requirements in all three scenarios. There is no cumulative impact from the Project.

Flood Control Releases

A portion of the total Camanche release includes releases to meet flood control requirements. The frequency of flood control events varies between the three scenarios. Under the No Project/No Action Alternative, flood flows occur in 712 months out of the 1104 months in the period of record. As expected, the number of months with flood control releases is reduced by 21 months under the Cumulative with Project conditions as compared to the No Project/No Action alternative (i.e. 691 months as compared to 712 months). A review of results for the Cumulative with Project and Cumulative No Project/No Action Alternatives indicates that the project increases the frequency of flood flow months (i.e. 691 months as compared to 688 months). This increase is a result of EBMUD obtaining supplemental waters through the Freeport facilities.

The average flood control releases vary with each scenario, as shown in **Table 21**. Under the No project/No Action Alternative, the average flood flow release is 384 cfs. The average release is reduced by 48 cfs to 336 cfs under Cumulative with Project Alternative, and it is reduced by 44 cfs to 340 cfs under the Cumulative No Project/No Action Alternative. Therefore, under cumulative conditions, the project decreases the flood flows by an average of 4 cfs. **Figure 10** plots the average monthly flood releases under the three scenarios. Under the No Project/No Action Alternative, the peak flood flows occur in the months of May and June. Under Cumulative with Project and Cumulative No Project/No Action, flood flows during the peak months of May and June decrease.

TABLE 19
AVERAGE MONTHLY AND AVERAGE ANNUAL REQUIRED FLOWS BELOW CAMANCHE RESERVOIR (1921-2012)

Average Req Flow Below Cam in cfs	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Annual
No Project/No Action	274	274	275	391	552	599	395	333	231	288	274	274	347
Cumulative with Project	271	271	272	386	542	590	386	326	227	287	271	271	342
Cumulative No Project/No Action	269	269	270	386	540	589	386	325	227	285	270	270	341

TABLE 20
AVERAGE MONTHLY AND AVERAGE ANNUAL REQUIRED FLOWS BELOW CAMANCHE BY JSA YEAR TYPE (VALUES IN CFS)

Average Required Flows Below Camanche in cfs		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Annual
No Project/No Action	Normal & Above	325	325	325	525	769	861	453	378	260	325	325	325	225
	Below Normal	250	250	250	411	596	673	431	361	247	284	250	250	168
	Dry	220	220	220	274	361	310	337	291	205	254	220	220	127
	Crit Dry	130	130	140	200	211	268	254	216	161	132	132	134	91
Cumulative with Project	Normal & Above	325	325	325	522	767	857	450	376	259	325	325	325	231
	Below Normal	250	250	250	398	570	657	421	355	243	284	250	250	166
	Dry	220	220	220	274	355	299	320	273	195	254	220	220	127
	Crit Dry	130	130	140	200	211	268	254	216	161	132	132	134	91
Cumulative No Project/No Action	Normal & Above	325	325	325	520	767	858	450	376	259	325	325	325	231
	Below Normal	250	250	250	401	569	655	421	354	242	284	250	250	170
	Dry	220	220	220	274	355	300	322	274	196	254	220	220	126
	Crit Dry	130	130	140	200	211	268	256	218	161	132	132	134	96

TABLE 21
AVERAGE MONTHLY AND AVERAGE ANNUAL FLOOD CONTROL RELEASES AT CAMANCHE

Average Cam. Flood Rel in cfs*	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Annual
No Project/ No Action	627	851	825	702	1,147	1,055	542	191	191	352	299	513	384
Cumulative with Project	768	848	875	638	937	810	503	146	141	291	265	482	336
Cumulative No Project/No Action	750	824	883	637	970	848	507	154	144	293	267	488	340

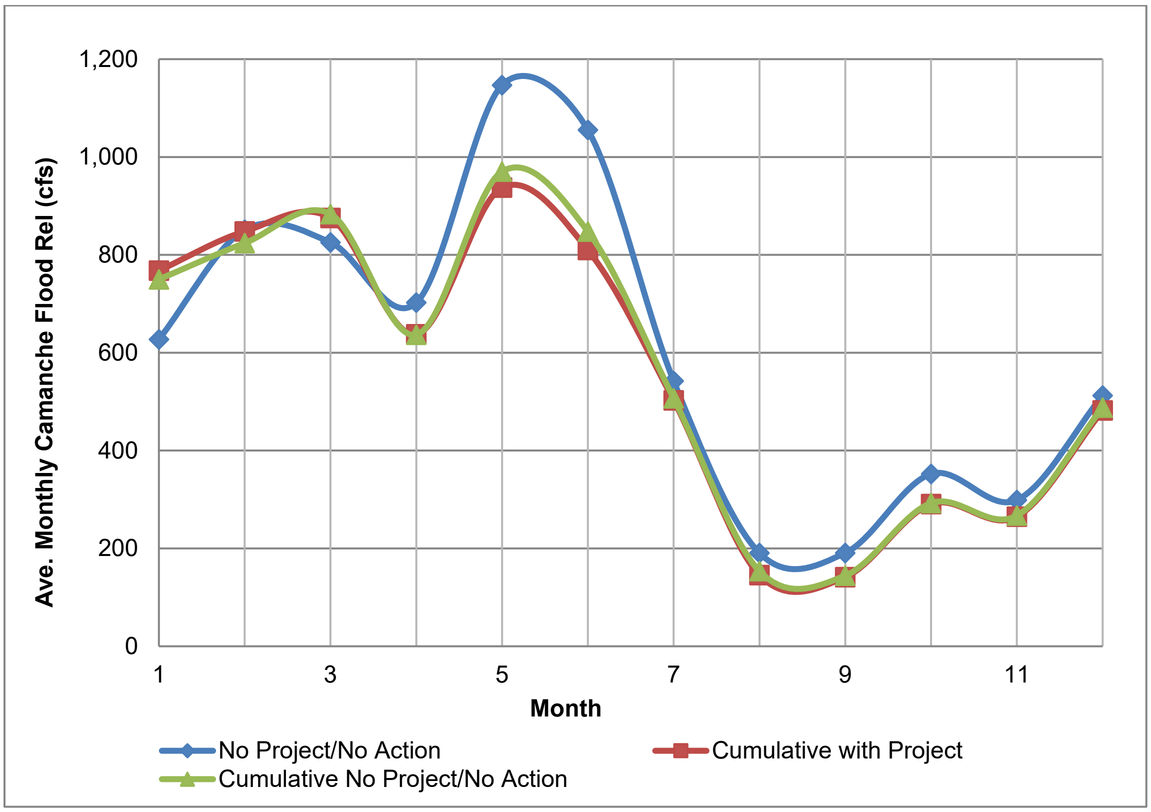


Figure 10
Average Monthly Camanche Flood Release

Under Cumulative with Project conditions, the maximum reduction occurs in June when waters are diverted to the Los Vaqueros Reservoir; June flows are reduced by 245 cfs from the No Project/No Action flows of 1,055 cfs. A review of results under Cumulative No Project/No Action Alternative for June indicates that flood flows are 848 cfs as compared to the Cumulative with Project flows of 810 cfs. Therefore, 38 cfs (15.5%) of the 245 cfs reduction in June can be attributed to the Project.

In summary, under cumulative conditions the Project increases the frequency of flood flow months compared to the Cumulative No Project/No Action Alternative. Average flood control releases are slightly lower under the Cumulative with Project Conditions compared to Cumulative No Project/No Action Alternative, but these decreases are primarily due to conveying water to Los Vaqueros during May and June periods when flood control releases are very high to begin with. Therefore, this impact to flood control releases is *less than significant.*

Flows Below WID

Figure 11 below shows the flows below WID for the three alternatives. As indicated in Figure 11 below, Flows below WID under cumulative condition with Project are reduced throughout the year and in all months when compared to the No Project/No Action Alternative. In the Cumulative with Project Alternative, on a monthly basis, the reductions range from 97 cfs (12.9%) in February to 27 cfs (5.9%) in November as compared to the No Project/No Action Alternative. Results from Cumulative No Project/No Action Alternative indicate that approximately 5 cfs of the 97 cfs reduction in February and 3 cfs of the 27 cfs reduction in November would be attributed to the Project under cumulative conditions. The remaining reductions in Flows below WID are a result of the cumulative conditions not related to the project.

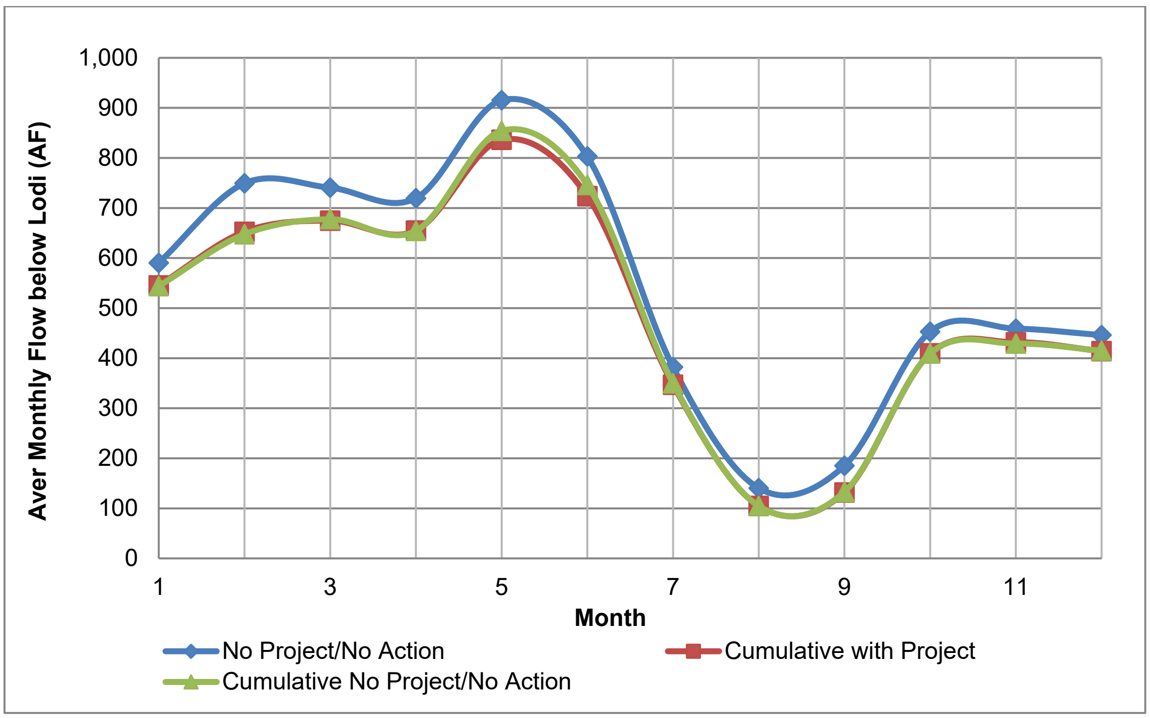


Figure 11
Average Monthly Flow Below WID

In several months (Jan, Feb, Apr, and Nov), the Cumulative with Project results in more flows below WID (ranging from 1 cfs to 22 cfs) than the Cumulative No Project/No Action Alternative. That is, the project slightly increases flows below WID in some months.

Table 22 below shows the average monthly and annual flows below WID. The average annual total flows below WID are 547 cfs, 493 cfs, 496 cfs under the No Project/No Action, Cumulative with Project and Cumulative No Project/No Action conditions respectively. In the Cumulative with Project Alternative, flows below WID are reduced by 54 cfs (9.8%) and approximately 3 cfs of the 54 cfs reduction can be attributed to the Project.

It can be useful to examine the flows below WID by JSA year type. **Table 23** below provides average monthly and annual flows below WID based on JSA year type. In all years and year types, flows below WID meet or exceed the JSA required minimum flows.

Under Cumulative with Project as compared to the No Project/No Action Alternative, reductions in flows below WID ranging from 3-34% occur in all months under Normal and Below Normal years. In Dry years, reductions occur periodically in certain months and increases in flows occur in other months. In Critically Dry years, there are increases in flows in later summer months but larger decreases in flows in March and November.

A comparison between the Cumulative with Project and Cumulative No Project/No Action provides a means to quantify the incremental effect of the Project under future conditions. Under Cumulative with Project Alternative, in critically dry years, the average monthly flow in March is 85 cfs whereas under Cumulative No Project/No Action Alternative, it is 79 cfs. That is, the implementation of the Project under future conditions improves the flows in March in critically dry years. The decrease in flows in November (as noted above) is all due to the future actions not related to the Project. Implementation of the Project under cumulative conditions does not result in changes to flows in November as compared to the Cumulative No Project/No Action alternative.

In summary, under cumulative conditions the Project improves flows below WID in some cases, or results in negligible reductions in flow. The reductions in flows below WID under cumulative conditions could impact fish resources and special status wildlife species. Fish resources are discussed in the section below. Project conditions would not have significant direct or indirect cumulative impacts on annual grassland, chaparral, oak woodland, or savannah communities and associated habitat for special-status species because these communities are not affected by reductions in river flows (EBMUD 2013). In addition, most special-status plants in the project area are found in chaparral, woodland, grassland, seasonal wetland, vernal pool, and slough habitats that would not experience changes in the frequency of maintenance flows in the lower Mokelumne River and, therefore, would not be affected under cumulative conditions (EBMUD 2013). Therefore, the cumulative impacts would be *less than significant.*

Woodbridge Irrigation District and North San Joaquin Water Conservation District Diversions

As described above, EBMUD's agreements with WID provide firm annual deliveries of 60 TAF in normal water years and 39 TAF in dry years, based on inflow into Pardee Reservoir. Under the No Project/No Action Alternative, diversions by WID would be 39 TAF in 18 years and 60 TAF in 74 years. In both the Cumulative with Project and the Cumulative No Project/No Action Alternatives, diversions by WID would be 39 TAF in 23 years and 60 TAF in 69 years; when compared to the No Project/No Action Alternative, WID would experience an increase in years

TABLE 22
AVERAGE MONTHLY AND AVERAGE ANNUAL FLOWS BELOW WID (1921-2012)

Average Flow below WID in cfs	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Annual
No Project/No Action	590	749	741	720	915	803	382	140	185	453	459	446	547
Cumulative with Project	545	653	675	655	836	724	347	105	132	409	432	414	493
Cumulative No Project/No Action	544	648	678	654	854	746	350	105	133	409	429	415	496

TABLE 23
AVERAGE MONTHLY AND AVERAGE ANNUAL FLOWS BELOW WID BY JSA YEAR TYPE (VALUES IN CFS)

Average Flows below WID in cfs		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average Annual
No Project/No Action	Normal & Above	788	891	835	1,601	1,986	1,791	920	277	334	639	589	674	494
	Below Normal	630	985	882	450	741	704	260	134	195	332	420	293	225
	Dry	189	308	526	166	156	31	30	28	54	238	303	163	73
	Crit Dry	80	82	133	77	24	31	22	36	46	124	108	79	33
Cumulative with Project	Normal & Above	764	845	810	1,493	1,863	1,650	853	206	241	569	553	647	472
	Below Normal	536	705	690	374	624	594	215	90	129	327	422	269	192
	Dry	174	317	569	158	151	31	30	29	40	252	282	163	74
	Crit Dry	80	81	85	77	24	31	22	37	50	117	77	79	30
Cumulative No Project/No Action	Normal & Above	768	852	817	1,485	1,902	1,705	859	208	244	573	554	651	477
	Below Normal	560	715	710	382	646	610	218	91	128	320	420	278	197
	Dry	174	319	584	158	151	31	30	27	38	270	302	163	79
	Crit Dry	80	81	79	77	24	31	23	33	54	115	77	79	32

when 39 TAF is available as opposed to 60 TAF. This increase is solely a result of the increase in upcountry water use and the subsequent decrease in inflows to Pardee Reservoir. Implementation of the Project does not change the frequency of years when WID could divert 39 TAF vs 60 TAF. Therefore, there is no cumulative impact from the Project.

The NSJWCD also has water rights on the Mokelumne River under its water right permit 10477, a junior water right. **Table 24** summarizes the diversions to WID and NSJWCD under the No Project/No Action Alternative and under cumulative conditions. Under the No Project/No Action Alternative, diversions by NSJWCD would occur in 58 years with an average delivery of 18,545 AF. In both the Cumulative with Project and the Cumulative No Project/No Action Alternatives, diversions by NSJWCD would occur in 53 years with an average delivery of 18,540 AF and 18,382 AF respectively. When compared to the No Project/No Action Alternative, under cumulative conditions NSJWCD would experience a reduction in years when water is available under its water right priority, but this reduction is not attributable to the Project. The Project increases the average deliveries available to NSJWCD under cumulative conditions. Therefore, there is no cumulative impact from the Project.

Permit 10478 Protest Dismissal Agreement Releases for NSJWCD

Under both cumulative conditions (i.e. Cumulative with Project and cumulative No Project/No Action Alternative), it is assumed that Sections 1 and 2 of the Protest Dismissal Agreement (PDA) are implemented. Under these terms, EBMUD would make releases of its Permit 10478 water for groundwater banking within NSJWCD's service area during normal years and some below normal years under certain conditions. In the Cumulative with Project and the Cumulative No Project/No Action Alternatives, releases of PDA water would occur in 67 years and 66 years respectively.

B-2.5.4 Significance Criteria

The criteria used for determining the significance of an impact on hydrology and water quality are based on Section I of Appendix G (a model Environmental Checklist) of the State CEQA Guidelines and professional standards and practices. Because this Appendix analyzes only the potential modifications to Mokelumne River resources due to operations of the EBMUD component of the Phase 2 Expansion, with construction of new facilities and modification of existing facilities analyzed in Chapter 4, only those criteria that are relevant to this analysis are listed below. Impacts on hydrology may be considered significant if the operations of the EBMUD component of the Phase 2 Expansion project would:

- substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted);
- substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site; or
- otherwise substantially degrade water quality.

TABLE 24
NSJWCD AND WID DIVERSIONS FOR CUMULATIVE WITH PHASE 2 EXPANSION ALTERNATIVES, CUMULATIVE NO PROJECT/NO ACTION ALTERNATIVE AND NO PROJECT/NO ACTION ALTERNATIVE CONDITIONS (ALL VALUES IN AC-FT)

	WID Diversions				NSJWCD Diversions		
Year	No Project/ No Action Alternative	Cumulative No Project/ No Action Alternative	Cumulative with Project Alternatives		No Project/ No Action Alternative	Cumulative No Project/ No Action Alternative	Cumulative With Project
1921	60001	60001	60001		8000	8000	8000
1922	60001	60001	60001		20000	20000	20000
1923	60001	60001	60001		19675	11386	11399
1924	39001	39001	39001		0	0	0
1925	60001	60001	60001		8000	8000	8000
1926	39001	39001	39001		0	0	0
1927	60001	60001	60001		20000	20000	20000
1928	60001	60001	60001		8000	8000	8000
1929	39001	39001	39001		0	0	0
1930	60001	60001	60001		0	0	0
1931	39001	39001	39001		0	0	0
1932	60001	60001	60001		20000	2834	11226
1933	60001	60001	60001		0	0	0
1934	39001	39001	39001		0	0	0
1935	60001	60001	60001		20000	20000	20000
1936	60001	60001	60001		20000	20000	20000
1937	60001	60001	60001		20000	20000	20000
1938	60001	60001	60001		20000	20000	20000
1939	39001	39001	39001		0	0	0
1940	60001	60001	60001		20000	20000	20000
1941	60001	60001	60001		20000	20000	20000
1942	60001	60001	60001		20000	20000	20000
1943	60001	60001	60001		20000	20000	20000
1944	60001	60001	60001		17199	0	0
1945	60001	60001	60001		20000	20000	20000
1946	60001	60001	60001		20000	20000	20000
1947	39001	39001	39001		0	0	0
1948	60001	60001	60001		20000	20000	20000
1949	60001	60001	60001		20000	0	0
1950	60001	60001	60001		20000	20000	20000
1951	60001	60001	60001		20000	8000	8000
1952	60001	60001	60001		20000	20000	20000
1953	60001	60001	60001		20000	20000	20000
1954	60001	60001	60001		9686	8000	8000
1955	60001	60001	60001		0	0	0
1956	60001	60001	60001		20000	20000	20000
1957	60001	60001	60001		20000	20000	20000
1958	60001	60001	60001		20000	20000	20000
1959	60001	39001	39001		0	0	0
1960	60001	39001	39001		0	0	0
1961	39001	39001	39001		0	0	0
1962	60001	60001	60001		20000	0	0
1963	60001	60001	60001		20000	20000	20000
1964	60001	60001	60001		0	0	0
1965	60001	60001	60001		20000	20000	20000
1966	60001	60001	60001		0	0	0

TABLE 24 (CONTINUED)
NSJWCD AND WID DIVERSIONS FOR CUMULATIVE WITH PHASE 2 EXPANSION ALTERNATIVES, CUMULATIVE NO PROJECT/NO ACTION ALTERNATIVE AND NO PROJECT/NO ACTION ALTERNATIVE CONDITIONS (ALL VALUES IN AC-FT)

	WID Diversions				NSJWCD Diversions		
Year	No Project/ No Action Alternative	Cumulative No Project/ No Action Alternative	Cumulative with Project Alternatives		No Project/ No Action Alternative	Cumulative No Project/ No Action Alternative	Cumulative With Project
1967	60001	60001	60001		20000	20000	20000
1968	60001	60001	60001		0	0	0
1969	60001	60001	60001		20000	20000	20000
1970	60001	60001	60001		20000	20000	20000
1971	60001	60001	60001		20000	20000	20000
1972	60001	60001	60001		1272	0	0
1973	60001	60001	60001		20000	20000	20000
1974	60001	60001	60001		20000	20000	20000
1975	60001	60001	60001		20000	20000	20000
1976	39001	39001	39001		0	0	0
1977	39001	39001	39001		0	0	0
1978	39001	39001	39001		0	0	0
1979	60001	60001	60001		0	0	0
1980	60001	60001	60001		20000	20000	20000
1981	60001	39001	39001		0	0	0
1982	60001	60001	60001		20000	20000	20000
1983	60001	60001	60001		20000	20000	20000
1984	60001	60001	60001		20000	20000	20000
1985	60001	60001	60001		0	0	0
1986	60001	60001	60001		20000	20000	20000
1987	39001	39001	39001		0	0	0
1988	39001	39001	39001		0	0	0
1989	60001	60001	60001		0	0	0
1990	39001	39001	39001		0	0	0
1991	39001	39001	39001		0	0	0
1992	39001	39001	39001		0	0	0
1993	60001	60001	60001		20000	20000	20000
1994	39001	39001	39001		0	0	0
1995	60001	60001	60001		20000	20000	20000
1996	60001	60001	60001		20000	20000	20000
1997	60001	60001	60001		20000	20000	20000
1998	60001	60001	60001		20000	20000	20000
1999	60001	60001	60001		20000	20000	20000
2000	60001	60001	60001		20000	20000	20000
2001	60001	39001	39001		0	0	0
2002	60001	60001	60001		3790	0	0
2003	60001	60001	60001		20000	20000	20000
2004	60001	60001	60001		0	0	0
2005	60001	60001	60001		20000	20000	20000
2006	60001	60001	60001		20000	20000	20000
2007	60001	39001	39001		0	0	0
2008	39001	39001	39001		0	0	0
2009	60001	60001	60001		20000	20000	20000
2010	60001	60001	60001		20000	20000	20000
2011	60001	60001	60001		20000	20000	20000
2012	60001	60001	60001		0	0	0

B-2.5.5 Impact Discussion

The primary impact mechanisms for water resources are changes in lower Mokelumne River flow, which could affect groundwater recharge or reduce flooding. Less-than-significant impacts on water resources associated with these changes are described in the following sections. As explained above, the quantitative cumulative impact analysis helps isolate the degree to which the Phase 2 Expansion project contributes to potential cumulative impacts. To put those contributions into perspective and help reach conclusions regarding impact significance, the analysis below discusses the cumulative impacts attributable to the Phase 2 Expansion project in relation to the Permit 10478 EIR's cumulative impact analysis, which considers the effects of EBMUD's increasing demands to 230 MGD and increased levels of demand on the Mokelumne River through the year 2040.

Significant Impacts

As explained below under Less-Than-Significant Impacts, changes in lower Mokelumne River flow associated with cumulative Phase 2 Expansion conditions would not result in significant impacts on water resources.

Less-than-Significant Impacts

Impact WR CUM-1: Potential for changes in Mokelumne River flow to affect groundwater recharge (Less than Significant)

The California Department of Water Resources (DWR) categorized the Eastern San Joaquin Sub-basin to be in critical overdraft under SGMA (Bulletin 118 Interim Update 2016). The Eastern San Joaquin basin is experiencing an estimated long-term overdraft of 150,000 – 160,000 AFY (Eastern San Joaquin Basin Groundwater Management Plan (GWMP), 2004). According to Bulletin 118, Update 2003, published by DWR in 2003, U.S. Geological Survey Data Series 696 published in 2012, and the 2004 Eastern San Joaquin GWMP, the average annual recharge in the Eastern San Joaquin Sub-basin is estimated to be on the order of 750,000 to 900,000 AF, of which 198,000 AF is seepage from all surface water sources in the basin (2004 Eastern San Joaquin GWMP) including the Mokelumne River and all other rivers that serve as a source of recharge for the Eastern San Joaquin Sub-basin. The water budget for the Eastern San Joaquin Sub-basin is currently being updated with the development of a Groundwater Sustainability Plan as required by SGMA, but the 2004 Eastern San Joaquin GWMP estimated that approximately 867,000 AF of groundwater pumping occurs in the sub-basin annually.

EBMUD evaluated the Phase 2 Expansion effects on groundwater seepage by looking at stream channel losses. Stream channel losses are a function of various parameters such as river stage and groundwater depth, and can result from shallow to deep percolation to groundwater (recharge), evapotranspiration, and temporary bank storage. Groundwater recharge is only one of several components that comprise channel losses, and reductions in channel loss do not result in an acre-foot for acre-foot reduction in stream seepage to groundwater.

Channel losses can be estimated using a variety of approaches.[7] Channel losses estimated when evaluating the Phase 2 Expansion using EBMUD's RiverWare model ranged between approximately 44,500 – 47,000 AFY. Earlier estimated channel loss rates in the lower Mokelumne River ranged from 47,000 to 130,000 AFY, with most of the loss occurring in the 21-mile reach between Camanche Dam and Lodi Lake near the town of Lodi (HCG 1998). Some of this loss is likely seepage to groundwater. There is some potential for a reduction in river flow to cause a reduction in groundwater recharge. A reduction in groundwater recharge could result from reduced river contact with the substrate caused by reduced channel width and depth. However, percolation to groundwater is controlled largely by the position of the groundwater table compared to river elevation. In addition, the cumulative Phase 2 Expansion condition is unlikely to have much effect on channel shape because reduction in flow would be small (overall reduction of 0.6% of flow below Camanche Dam as described above). The Draft Supplement concluded that since the average annual reduction in flow attributable to the Phase 2 Expansion project under cumulative conditions below Camanche Dam is small (3 cfs or 2173 AF per year), the cumulative groundwater impacts would be less than significant. The analysis of channel losses from the RiverWare modeling completed subsequent to publication of the Draft Supplement are discussed below and confirm this conclusion. The small reduction in the average annual flow results in a minor reduction in annual channel losses of only about 65 AF under Phase 2 Expansion conditions.

EBMUD's model runs indicate that the average annual channel loss is expected to range between 44,540 – 47,230 AF under No Project/No Action Alternative. Under cumulative conditions, annual channel loss is expected to range between 44,580 – 47,180 AF without the Project and 44,590 – 47,160 AF with the Phase 2 Expansion. Relative to the No Project/No Action Alternative, under cumulative conditions the model outputs for specific hydrologic years show increases in channel losses in some years and decreases in others, ranging from an increase in annual channel losses of approximately 140 AF, to a decrease in annual channel losses of approximately 260 AF. On average, under cumulative conditions with the Phase 2 Expansion, annual channel losses are approximately 65 AF lower than under baseline conditions (i.e. No Project/No Action Alternative), a de minimis reduction of approximately 0.1%.

These reductions in channel losses would result in minimal reductions in groundwater recharge, if at all, because groundwater recharge is only a fraction of total channel losses. Given that groundwater recharge is only one of several components contributing to channel losses, the annual average reduction in seepage to groundwater would be something less than 65 AF. Further, due to the effects of groundwater levels on the rate of stream seepage, these de minimis reductions in channel losses may not actually translate into a reduction in stream seepage to groundwater since changes in groundwater levels are not accounted for in the estimates of channel losses in EBMUD's model. Decreases in groundwater levels that would result in higher channel losses, and therefore more seepage, are not represented in the model. As a result,

[7] Channel losses estimated using varying approaches can result in different range of values because the loss components represented can differ depending on the method used; therefore, the magnitude of losses is not necessarily comparable. Channel losses in EBMUD's model were estimated using a proprietary physically based approach whereas the estimates in HCG (1998) were calculated using a mass balance approach based on measured streamflows and reported diversions. The channel loss components represented using these two approaches are not equivalent and therefore the loss estimates cannot be compared to one another.

EBMUD's subsequent modeling confirmed the Draft Supplement's conclusion that cumulative impacts to groundwater, if any, would be less than significant.

EBMUD's modeling also confirmed that, under cumulative conditions, the Phase 2 Expansion effects on channel losses would vary by year, but over the 92-year period of record, would actually result in a small net increase in channel losses. In terms of inter-annual variation, in 1991 and 1992, under cumulative conditions the channel losses with the Project are higher than without by 130 and 200 AF, respectively; otherwise, under cumulative conditions, changes in channel losses resulting from the Project range from a decrease of 30 AF to an increase of 60 AF. Over the 92-year period-of-record, however, total channel losses under cumulative conditions, but without the Project, were 4,188.4 TAF, while total channel losses with the Project were a bit higher, at 4,188.5 TAF. Thus, the modeling confirms that the Project does not result in a cumulatively considerable contribution to cumulative groundwater impacts.

Impact WR CUM-2: Potential for changes in Mokelumne River flow to reduce flooding (Less than Significant)

As described above, a flow of 3,000 cfs could produce floodplain inundation (and potentially flood-related damage) downstream of Woodbridge Dam. Modeling results show that the cumulative Phase 2 Expansion conditions result in one fewer month with flows above 3,000 cfs compared the No Project/No Action Alternative and the cumulative No Project/No Action Alternative conditions (17 vs. 18 months, out of 1,101 months modeled). The Permit 10478 EIR concluded that the cumulative impacts associated with EBMUD's projected 2040 demand of 230 MGD and the 2040 level of development on the river would be less than significant. Given that the changes are minimal, cumulative impacts on flooding would be less than significant.

B-2.5.6 Fish Resources

This section assesses the significance of the impacts associated with implementing the EBMUD component of the Phase 2 Expansion under cumulative conditions. It describes cumulative conditions for fish resources based on results from the cumulative RiverWare simulations and other considerations described above under water resources. This section discusses impacts to fish resources in the Lower Mokelumne River (below Camanche Dam to Frandy gage – a distance of about 33 miles) under the Cumulative Phase 2 Expansion (Cumulative with Project) and the Cumulative No Project/No Action Alternative conditions. Fish resources within the Delta are discussed in Section 4.3 of the Supplement.

This assessment focuses on fall-run Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*Oncorhynchus mykiss*) in the lower Mokelumne River, which are considered key evaluation species based on their regulatory status, commercial and recreational importance, and sensitivity to project effects. The welfare of these species is indicative of the general quality of the aquatic habitats below Camanche Dam, because of their broad overlap in seasonal habitat requirements with other native fish species.

This analysis concludes that the EBMUD component of the Phase 2 Expansion would not result in cumulatively considerable impacts on fish resources.

Lower Mokelumne River

Projected increases in water demands could affect fish resources in the Mokelumne River through changes in reservoir inflows, storage, and releases to the lower Mokelumne River. Potential changes in lower Mokelumne River water temperature could also affect fish resources. These effects are described in the following sections. As explained above, the quantitative cumulative impact analysis helps isolate the degree to which the Phase 2 Expansion project contributes to potential cumulative impacts. To put those contributions into perspective and help reach conclusions regarding impact significance, the analysis below discusses the cumulative impacts attributable to the Phase 2 Expansion project by comparing modeling results for cumulative conditions with and without the project. This analysis also refers to the Permit 10478 EIR's cumulative impact analysis, which considers the effects of EBMUD's increasing demands to 230 MGD and increased levels of demand on the Mokelumne River through the year 2040.

Flow

The magnitude and frequency of Mokelumne River flows which could potentially affect the quality and quantity of habitat for fall-run Chinook and steelhead were assessed under both the Cumulative No Project/No Action Alternative and the Cumulative with Project conditions. Cumulatively considerable effects were determined by comparing the average monthly flow releases below Camanche Dam and below WID. On average, modeled monthly flows below Camanche Dam under Cumulative No Project/No Action Alternative conditions and Cumulative with Project conditions are 667 cfs (40,267 AF/month) and 664 cfs (40,086 AF/month) respectively. Although the average flows under cumulative conditions are about 7% lower than the No Project/No Action Alternative average flow of 715 cfs (43,105 AF/month), the Cumulative Phase 2 Expansion conditions result in a nominal reduction of 3 cfs or 181 AF (0.45%) of average monthly flow below Camanche compared to the Cumulative No Project/No Action Alternative conditions. Looking at the comparison of the Cumulative cases more closely, most of the reduction in flows from the Project occur in May and June when the Project diverts flows to Los Vaqueros, during periods when flows are high enough that the reduction in flow would not cause an impact. Conversely, there are months when implementation of the Project under cumulative conditions results in an increase in flows below Camanche. Therefore, there is no cumulative impact from the Project.

A similar pattern emerges when looking at monthly flows below WID. On average, modeled monthly flows below WID under the Cumulative with Project conditions and the Cumulative No Project/No Action Alternative are 494 cfs (29,823 AF/month) and 497 cfs (30,004 AF/month) respectively. Although the average WID flows under cumulative conditions are nearly 10% lower than the No Project/No Action Alternative average flow of 547 cfs or 33,023 AF/month, the cumulative conditions Phase 2 Expansion result in a nominal reduction of about 3 cfs or 181 AF (0.6%) in average monthly flows below WID compared to the cumulative No Project/No Action Alternative conditions. most of the reduction in flows from the Project occur in May and June when the Project diverts flows to Los Vaqueros, during periods when flows are high enough that the reduction in flow would not cause an impact. Conversely, there are some months when the Project results in an increase in flows below WID under cumulative conditions. Therefore, there is no cumulative impact from the Project.

Adult Salmonid Migration

To successfully navigate to their natal stream, adult Chinook salmon and steelhead require sufficient flows to provide adequate water depth in stream channels and to overcome flow-related barriers. JSA flow releases from Camanche Dam exceed 100 cfs in all year-types and during all months and these flows provide adequate fish passage depths in lower Mokelumne River from Camanche Dam downstream to WID. Threshold flows that may impede upstream migration of adult salmon and steelhead in the lower Mokelumne River are discussed in greater detail in the Fish Resources Section.

Under No Project/No Action Alternative conditions, the flows below WID are less than 100 cfs from September – February for a total of 71 months (out of 552 total months). Under Cumulative No Project/No Action Alternative conditions and Cumulative with Project conditions, flows below WID are less than 100 cfs from September – February for a total of 88 months. Although the total number of months that flows below WID are less than 100 cfs increase under cumulative conditions, the analysis indicates that frequency of flows less than 100 cfs for fall-run Chinook salmon are the same under cumulative Phase 2 Expansion conditions as cumulative No Project/No Action Alternative conditions. Since the total number of months that flows below WID are less than 100 cfs is the same under cumulative conditions with or without the Project, there is no cumulative impact from the Project.

Salmonid Spawning and Rearing Habitat

As described under the Fish Resources Section, flow affects the quantity of available spawning, fry and juvenile rearing habitat for fall-run Chinook salmon and steelhead through its effect on water depths and velocities over suitable substrates. In 1991, CDFW developed optimal flows for different life stages for fall-run chinook and steelhead. Habitat for fall-run chinook is maximized at flow below Camanche Dam of 300-500 cfs (spawning), 100 to 200 cfs (fry-rearing), and 100 to 200 cfs (juvenile rearing). Steelhead WUA is maximized at flows of 200 to 600 cfs (spawning), 100 cfs (fry rearing), and 100 to 600 cfs (juvenile rearing).

As shown in Figure CWR-5 in Appendix B-4, the flow duration curve for Camanche minimum required releases indicates that 92% of the time flows are below 600 cfs under No Project/No Action Alternative conditions and under cumulative conditions with and without the Phase 2 Expansion. The Figure indicates that flows are below 200 cfs approximately 5.6% of the time under No Project/No Action Alternative conditions. Under cumulative conditions, flows are below 200 cfs approximately 7.3% of time under Cumulative No Project/No Action Alternative conditions and 6.0% of the time under the Cumulative with Project conditions. Thus flows below 200 cfs occur less under cumulative conditions with the Project than without, and there is no cumulative impact from the Project.

Salmonid Juvenile Outmigration

As described under in the Fish Resources Section, evaluation of impacts on outmigration of juvenile salmon was based on changes in the frequency of flows associated with increased fry outmigration (average flows exceeding 800 cfs below Camanche Dam during January through March). Under the Cumulative No Project/No Action Alternative, the modeling showed 34 years with January through

March average flows exceeding 800 cfs out of the 92-year record, and the cumulative conditions Phase 2 Expansion also showed 34 years. A decrease of 4 years was observed under cumulative conditions compared to the 38 years under No Project/No Action Alternative; however, there was no change in the number of years exceeding 800 cfs under cumulative conditions with and without the Phase 2 Expansion, indicating that the reduction seen under cumulative conditions is not a result of the Project. Therefore there is no cumulative impact of the Project on salmonid juvenile outmigration.

Floodplain Habitat

As discussed under Fish Resources Section (Section 4), native fish may benefit from flows that result in inundation of floodplain habitat in the lower Mokelumne River in March, April and May. This has been estimated to occur at flows greater than 3,000 cfs below Woodbridge Dam, which typically occur in wetter years when floodflow releases from Camanche Dam are required. The frequency of flows exceeding 3,000 cfs below WID in March, April and May is 9 months (out of total 276 months) under both Cumulative No Project/No Action Alternative and Cumulative with Project conditions, as well as under No Project/No Action Alternative. Therefore, the Phase 2 Expansion project would not contribute to any cumulative impacts associated with floodplain habitat inundation. (The Permit 10478 EIR also found no cumulative impacts resulting from meeting EBMUD's 2040 anticipated demand of 230 MGD and 2040 level of demand on the river.)

Salmonid Spawning Habitat Maintenance

As discussed under the Fish Resources Section, the occurrence of flows of 2,000 cfs or greater below Camanche Dam provides a general indicator of the magnitude of flows needed for maintaining the quantity and quality of spawning gravel in the lower Mokelumne River. As discussed previously, under No Project/No Action Alternative conditions, flows of 2000 cfs or greater occur in 80 months out of a total of 1101 months; there are 33 years wherein average monthly flows exceed 2,000 cfs. Under the Cumulative with Project case, there are 73 months with flows of 2,000 cfs or greater, occurring during 30 years. This represents a change of seven months (spread over three years) out of the 1,101 months of the hydrologic record. The impact is less than significant.

Further, under the Cumulative No Project/No Action case, there are also 30 years wherein there are months with average flows greater than 2,000 cfs, the same number of years as under the Cumulative with Project Case. This suggests that the Project does not make a considerable contribution to this less-than-significant impact.

Pardee and Camanche Reservoirs

Cumulative impacts of the Phase 2 Expansion project on fish habitat in Pardee and Camanche Reservoirs were evaluated by comparing the magnitude of reservoir surface elevation changes based on modeled end-of-month reservoir water surface elevations under No Project/No Action Alternative conditions and the cumulative conditions, and then comparing the Cumulative with Project and the Cumulative No Project/No Action Alternative conditions. When comparing

No Project/No Action Alternative conditions with the Cumulative with Project conditions, storage level fluctuations are observed in Pardee and Camanche Reservoirs that vary by up to 56 feet and 44 feet, respectively. These fluctuations are expected due to the overall increase in demands on the river from multiple sources under cumulative conditions.

However, when comparing the modeled cumulative conditions with and without the Phase 2 Expansion project, Pardee storage is generally stable (Figure CWR-1 in Appendix B-4). In certain dry years, storage levels decrease under the Cumulative with Project and Cumulative No Project/No Action as compared to the No Project/No Action case. In other dry years, Pardee storage rises under the Cumulative with Project conditions as compared to the No Project/No Action case. The most significant decline in Pardee storage levels occurs in August 1978, when Pardee storage declines by 56 feet in the Cumulative with Project case compared to the No Project/No Action case; however, the Pardee Reservoir level under the Cumulative with Project case recovers same level as under the No Project/ No Action case by June 1979. There are also cases where implementation of the Project appears to improve storage levels. For example, in July 1931, Pardee water surface elevation is 16 feet higher under the Cumulative with Project conditions as compared to the Cumulative No Project/No Action Alternative. Overall, the Phase 2 Expansion project does not negatively contribute to reservoir elevation impacts under cumulative conditions.

There is slightly more variability in Camanche Reservoir storage levels when comparing the two modeled cumulative conditions as compared to Pardee Reservoir (Figure CWR-2 in Appendix B-4). In general, the storage levels generally increase under Cumulative conditions compared to the No Project/No Action alternative, as EBMUD obtains exchanged water supplies from CCWD or Local Agency Partners, or obtains other non-Mokelumne River waters to meet demands. Under Cumulative with Project conditions as compared to the No Project/No Action case, the average reduction in Camanche storage is 6.3 TAF (1.5% of Camanche Reservoir capacity of 417 TAF). Comparing the Cumulative No Project/No Action case to the No Project/No Action case results in an average decline of 7.9 TAF. In this case, the project results in a benefit (i.e. an average increase of 1.6 TAF in Camanche Reservoir) under cumulative conditions. Also, as discussed in more detail under “Water Temperature” below, under Cumulative with Project conditions there are fewer months when Camanche Reservoir drops below the 190 msl threshold relative to the No Project/No Action case. Therefore, there is no cumulative impact from the Project.

Water Temperature

Based on available and reconstructed historical data (March 1974 through October 2008), there is a significant correlation between Camanche Reservoir water surface elevation below elevation 190 feet and Camanche Reservoir storage effects on release temperatures. This relationship was used to evaluate the effects of Phase 2 Expansion project-related changes in reservoir water surface elevation on Camanche release temperatures and the adequacy of the cold water pool volume. EBMUD must also meet additional JSA requirements include maintaining minimum pool volume along with dissolved oxygen levels.

Kokanee salmon prefer well-oxygenated open water in reservoirs where temperatures are 10 to 15°C, and rainbow trout growth is optimal when temperatures are around 15 to 18°C (Moyle 2002). The Permit 10478 EIR concluded that less-than-significant cumulative impacts on cold water fish species would result from meeting EBMUD's 2040 anticipated demand of 230 MGD and 2040 level of demand on the river.

According to Figure CWR-8 in Appendix B-4, under Cumulative No Project/No Action Alternative conditions, Camanche Reservoir is below the 190 ft threshold 8.2 % of time (7.54 years). The Cumulative with Project conditions decrease the number of years when Camanche drops below 190 msl; Camanche Reservoir is below the 190 ft threshold 7.1% of the time (6.53 years). This is also an improvement compared to under No Project/No Action Alternative conditions where the Camanche Reservoir is below 190 ft 7.8% of the time. This improvement under cumulative Phase 2 Expansion conditions is likely due to EBMUD obtaining exchanged water from CCWD or other Local Agency Partners to meet dry year demands and would result in improved conditions for cold water fish species. As a result, the Phase 2 Expansion project would not contribute to cumulative impacts to cold water fish species. There is no cumulative impact from the Project.

Water Quality

As discussed in the Water Resources section, dissolved oxygen, pH, and turbidity are water quality parameters that can affect aquatic organisms. Dissolved oxygen levels are of particular concern, and the California Regional Water Quality Control Board's Basin Plan for the Sacramento River and San Joaquin River basins set a dissolved oxygen objective of a minimum of 7.0 milligrams per liter mg/L (California Regional Water Quality Control Board 2011). To meet DO requirements, EBMUD often reduces or forgoes hydropower generation from Camanche in the summer. Instead of releasing water through the hydropower facilities, EBMUD releases water through the sluice gates, which have baffles to increase oxygenation. EBMUD also operates a Hypolimnetic Oxygenation System (HOS) that feeds pure oxygen into the Camanche Reservoir hypolimnion. This system is designed to prevent the bottom waters from going anoxic, thereby preventing the formation of hydrogen sulfide. EBMUD will continue to operate the Camanche hydropower facilities and HOS to meet JSA water quality requirements with implementation of the Phase 2 Project.

Dissolved oxygen levels are correlated to water temperature. Given that the cumulative Phase 2 Expansion conditions show an improvement in the number of years that meet the Camanche water surface elevation threshold of 190 feet, as a threshold criteria for cold water pool, it is not expected that dissolved oxygen levels would be less under the cumulative Phase 2 Expansion condition than under the cumulative No Project/No Action Alternative condition. As a result, the Phase 2 Expansion project would not contribute to cumulative water quality impacts affecting aquatic organisms. There are no cumulative impacts from the Project.

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APPENDIX B-3
Updated EBMUD Model Study Description and Assumptions; Model Results for Project at 190MGD versus Baseline at 190MGD

Contents

Model Study Description and Assumptions

Four different cases were modeled: (1) No Project/No Action (baseline case); (2) EBMUD Component of Phase 2 Expansion; (3) Cumulative No Project/No Action; (4) Cumulative with Project. **Table 1** below summarizes the modeling assumptions used for these four cases.

Modeling for all four cases was based on an 82-year hydrologic record for the Mokelumne River, spanning from 1921-2012. EBMUD's Riverware modeling is designed to reflect EBMUD's operational constraints, permit conditions, agreements with other agencies, flood control releases, and EBMUD's obligations to release water for senior water rights holders and environmental obligations. The model includes the release requirements stipulated by the JSA as described above, including provisions for gainsharing.

The current version of the EBMUD Riverware model includes new terms that were incorporated into EBMUD's Permit 10478 in 2016. This includes a new term under which, subject to certain conditions, EBMUD is required to release up to 2 TAF of additional water during September through February of below normal and dry years to assist with fish migration.

On top of these general assumptions, different modeling parameters can be layered to simulate baseline, project, and cumulative conditions. Different levels of demand can be programmed into the model. For the No Project/No Action and Project cases, a 190 MGD demand is assumed for EBMUD's service area and a 230 MGD demand is assumed for the 2040 cumulative conditions, as described above. The model also incorporates different "levels of development" to reflect demands on the Mokelumne River.

Model parameters are also adjusted based on EBMUD policy. As discussed in more detail below, EBMUD uses a three-year Drought Planning Sequence to assess water supply reliability. The model also incorporates elements of EBMUD's Drought Management Program to set rationing levels and trigger the use of CVP supply. These Drought Management Program guidelines are expected to shift over time with increasing demand.

The model sets priorities for how it treats water in the Lower Mokelumne River. In all four cases, the model prioritizes releases for the JSA, senior water rights holders and riparians above meeting EBMUD demand. The 20 TAF deliveries to NSJWCD are prioritized next. In the Project case, diverting water to Los Vaqueros is the lowest priority.

For the cumulative cases, the model incorporates terms from the Protest Dismissal Agreement; more detail is provided in the Cumulative section. The model also assumes that transfer water is available based on EBMUD's existing water transfers program, particularly its agreement with Placer County Water Agency.

TABLE 1
SUMMARY OF PRIMARY RIVERWARE ASSUMPTIONS FOR MODELING CASES

No Project/No Action	EBMUD Component of Phase	Cumulative with Project	Cumulative No Project/No Action
General Assumptions:			
190 MGD Demand, 2015 Level of Development	190 MGD Demand, 2015 Level of Development	230 MGD Demand, 2040 Level of Development	230 MGD Demand, 2040 LOD
Hydrologic Period: 1921-2012	Hydrologic Period: 1921-2012	Hydrologic Period: 1921-2012	Hydrologic Period: 1921-2012
Drought Planning Sequence Active	Drought Planning Sequence Active	Drought Planning Sequence Active	Drought Planning Sequence Active
Incorporates new permit terms	Incorporates new permit terms	Incorporates new permit terms	Incorporates new permit terms
Mokelumne River Priorities:			
JSA, senior water rights holders, riparians, etc.	JSA, senior water rights holders, riparians, etc.	JSA, senior water rights holders, riparians, etc.	JSA, senior water rights holders, riparians, etc.
EBMUD needs	EBMUD needs	EBMUD needs	EBMUD needs
NSJWCD 20 TAF	NSJWCD 20 TAF	NSJWCD 20 TAF	NSJ 20 TAF
	LVE	PDA NSJWCD Terms	PDA NSJWCD Terms
		LVE	

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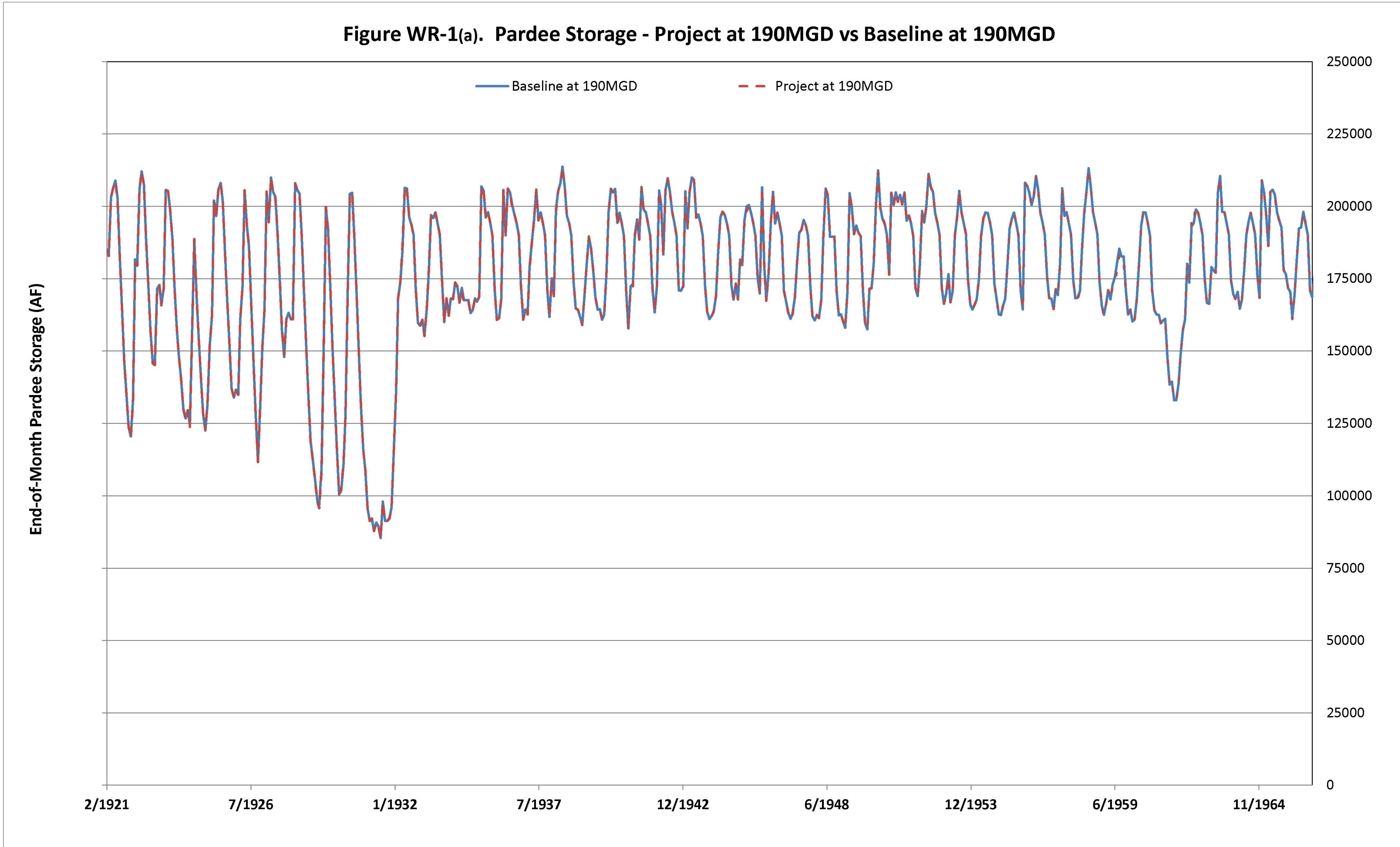


Figure WR-1(a). Pardee Storage - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
End-of-Month Pardee Storage (AF)
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

Figure WR-1(b). Pardee Storage - Project at 190MGD vs Baseline at 190MGD

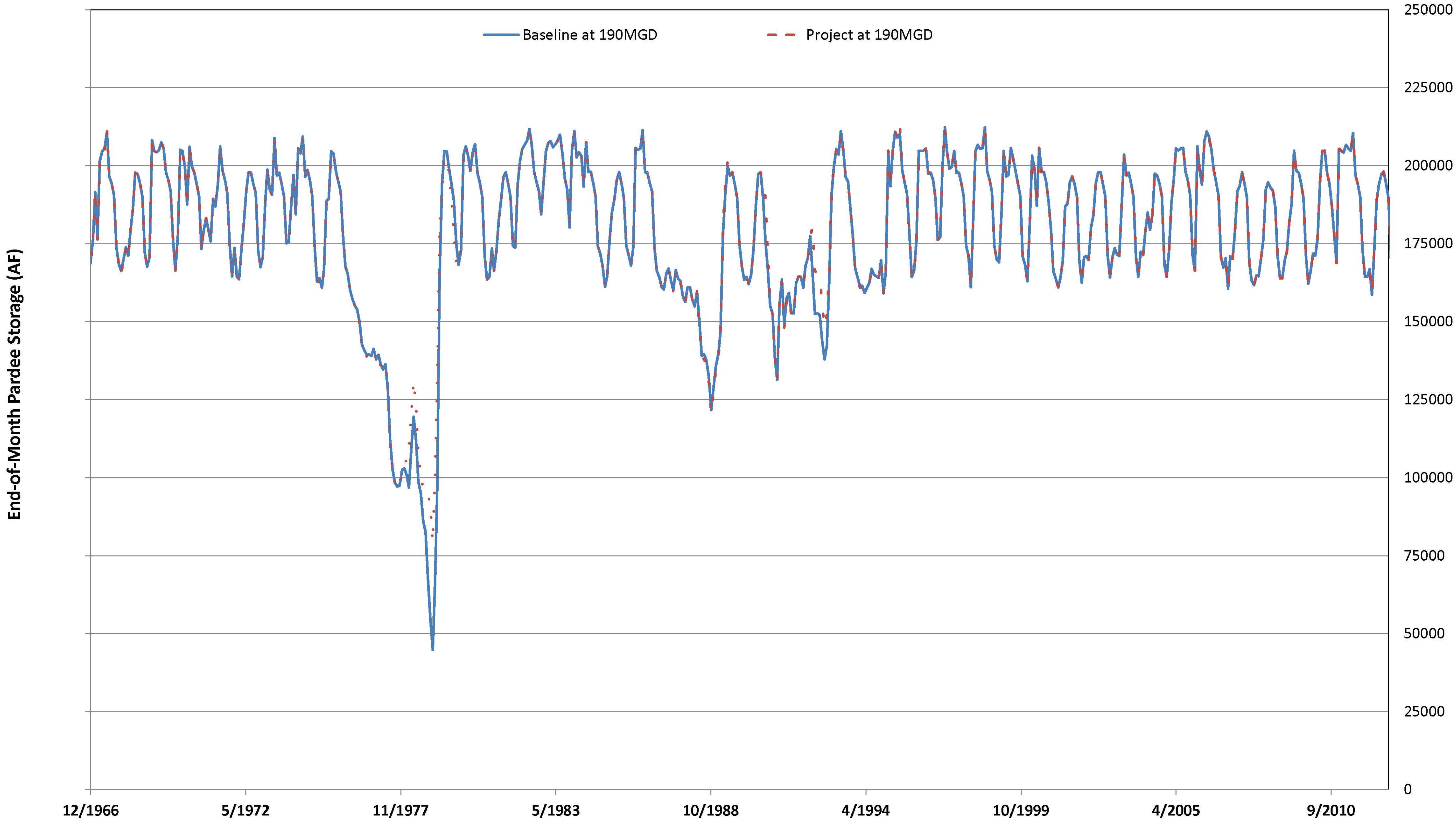
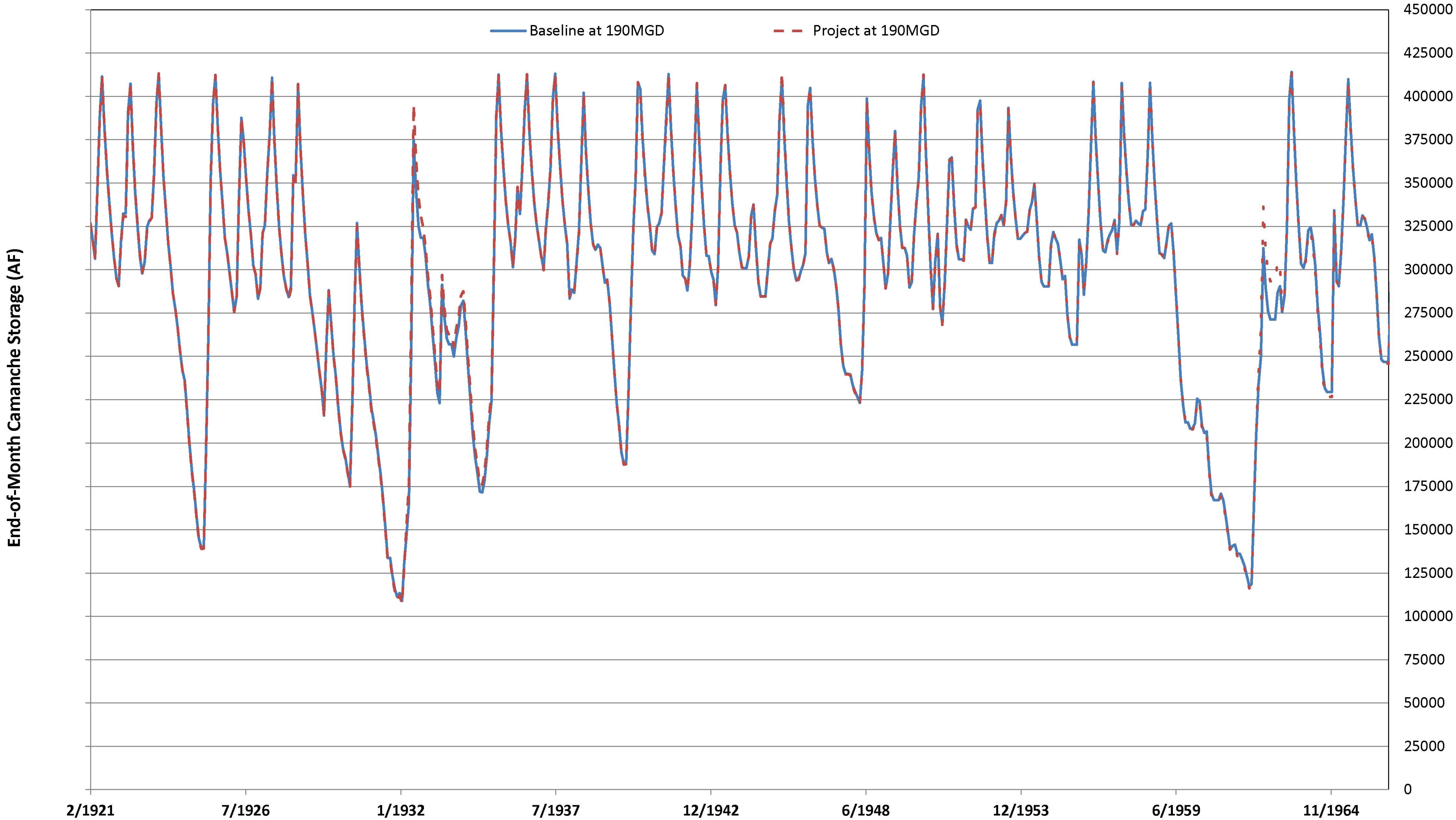


Figure WR-2(a). Camanche Storage - Project at 190MGD vs Baseline at 190MGD



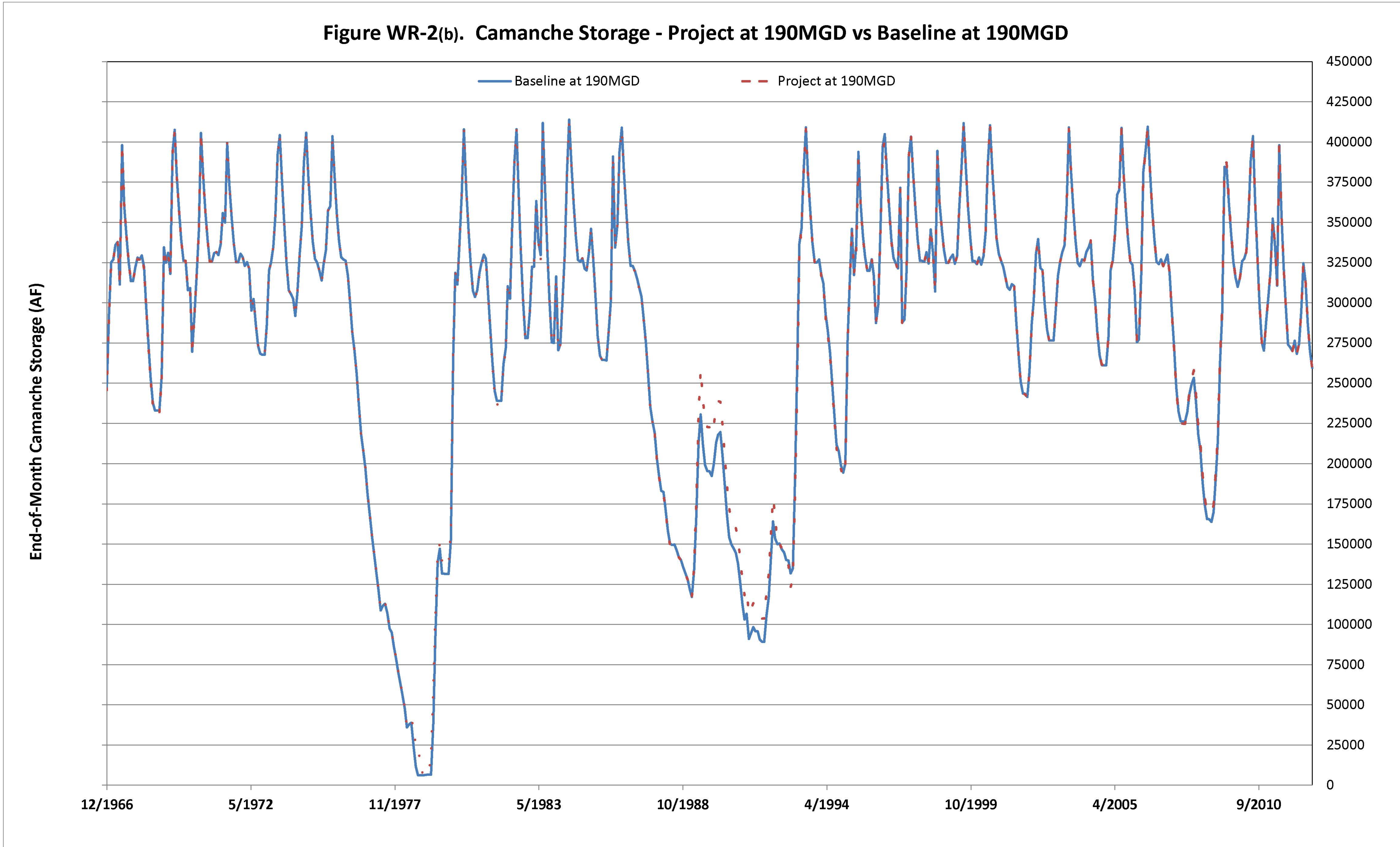


Figure WR-2(b). Camanche Storage - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
End-of-Month Camanche Storage (AF)
450000
425000
400000
375000
350000
325000
300000
275000
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
12/1966
5/1972
11/1977
5/1983
10/1988
4/1994
10/1999
4/2005
9/2010

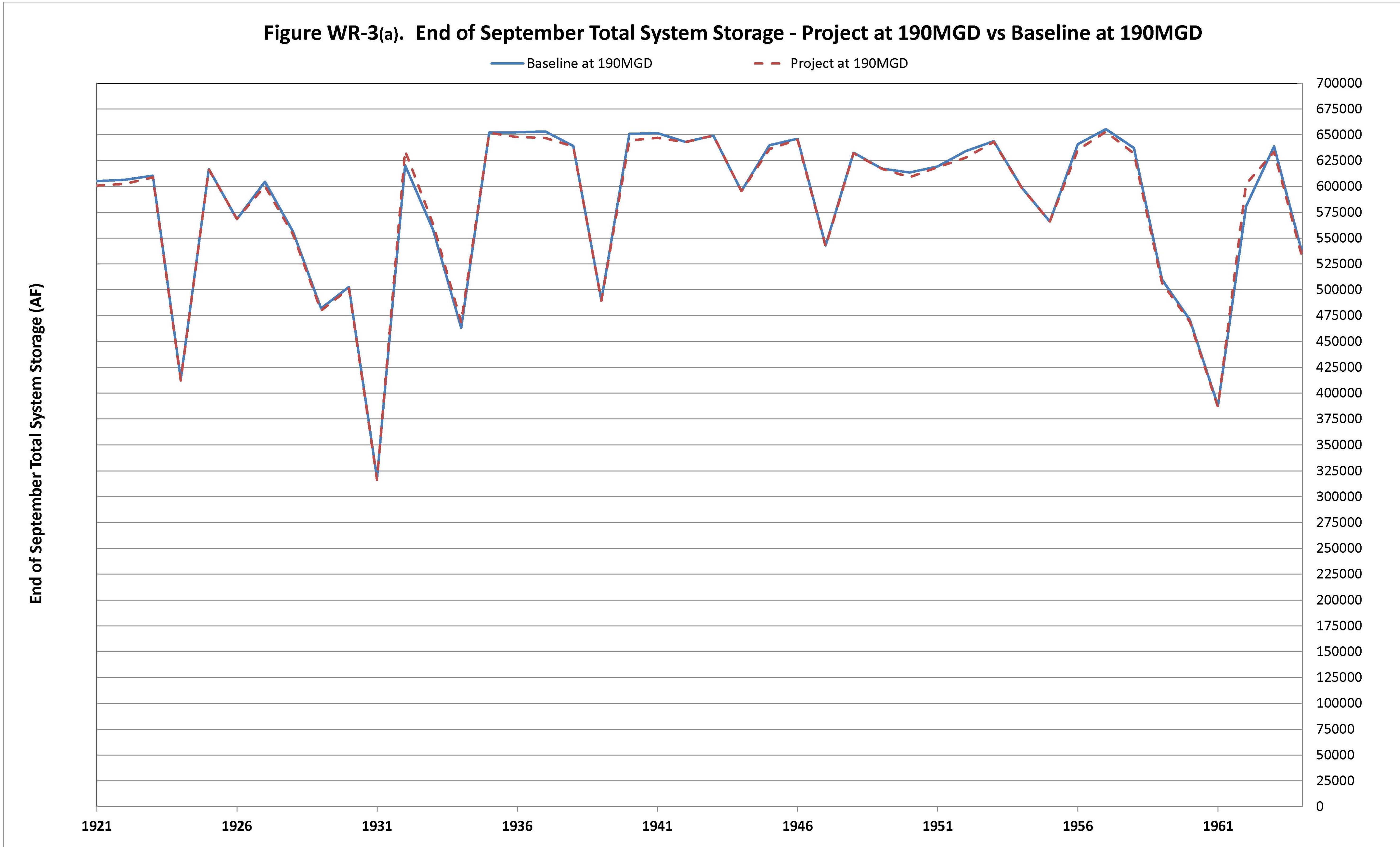


Figure WR-3(a). End of September Total System Storage - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
End of September Total System Storage (AF)
700000
675000
650000
625000
600000
575000
550000
525000
500000
475000
450000
425000
400000
375000
350000
325000
300000
275000
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
1921
1926
1931
1936
1941
1946
1951
1956
1961

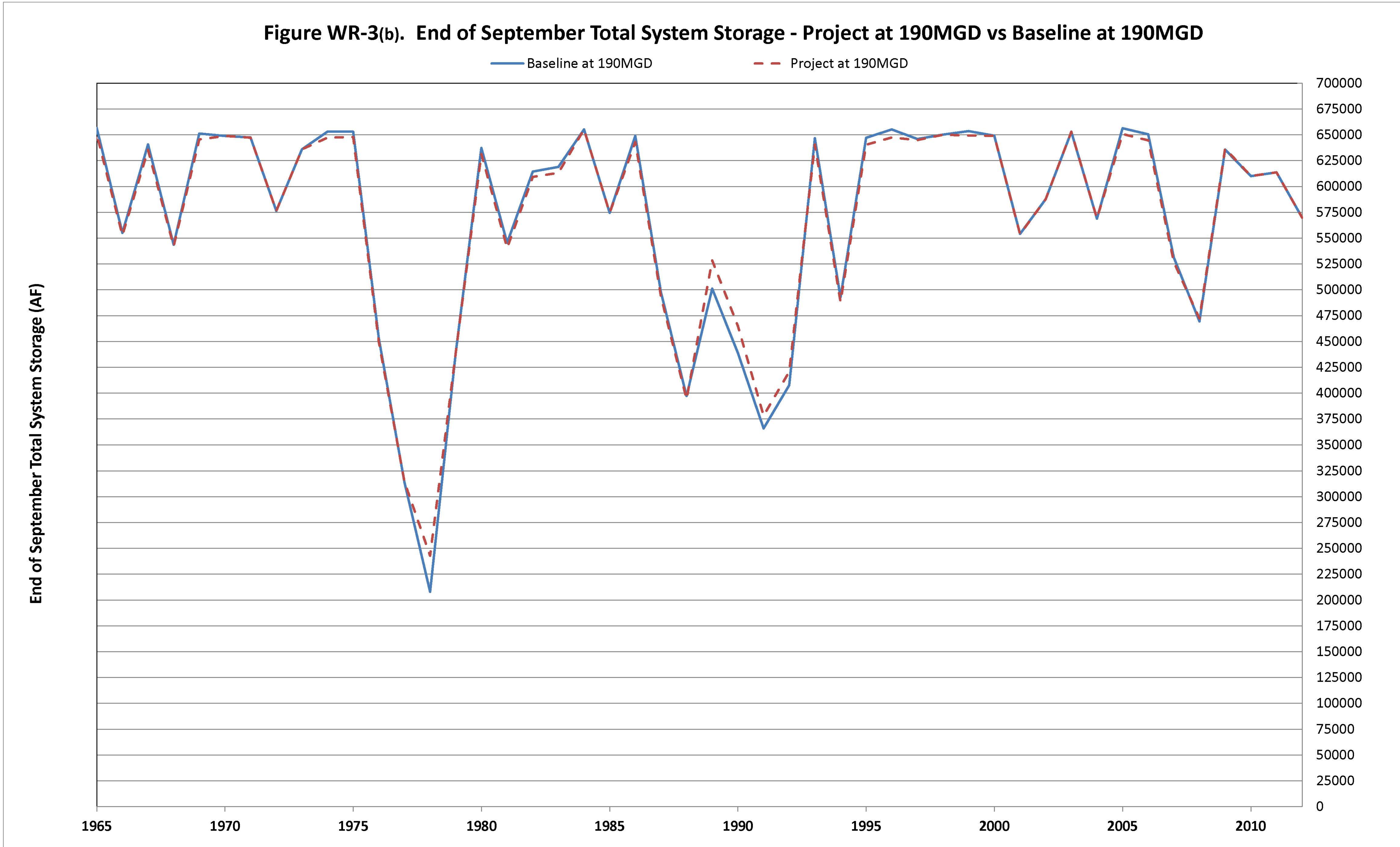
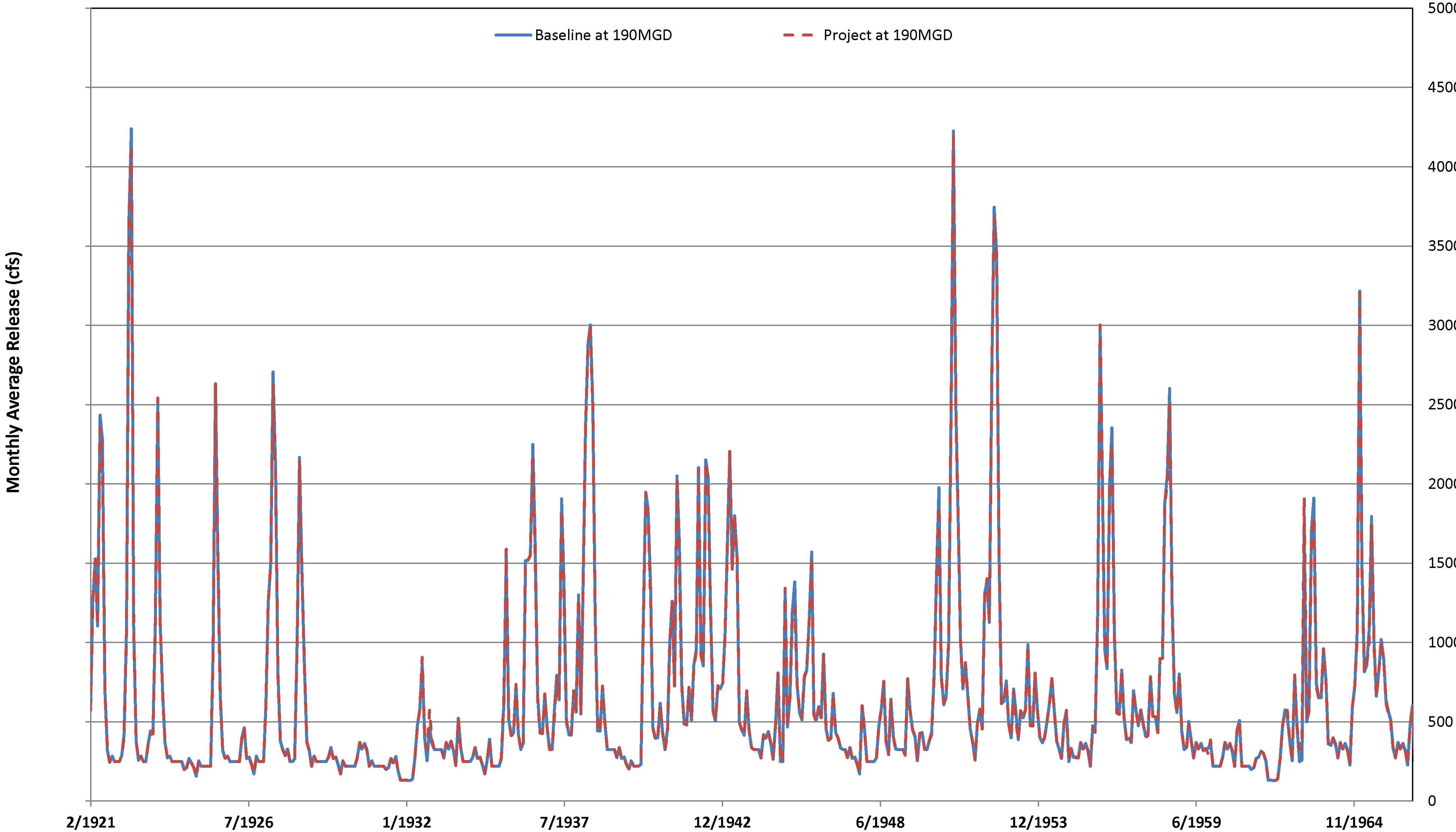


Figure WR-3(b). End of September Total System Storage - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
End of September Total System Storage (AF)
700000
675000
650000
625000
600000
575000
550000
525000
500000
475000
450000
425000
400000
375000
350000
325000
300000
275000
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010

Figure WR-4(a). Camanche Total Outflow - Project at 190MGD vs Baseline at 190MGD



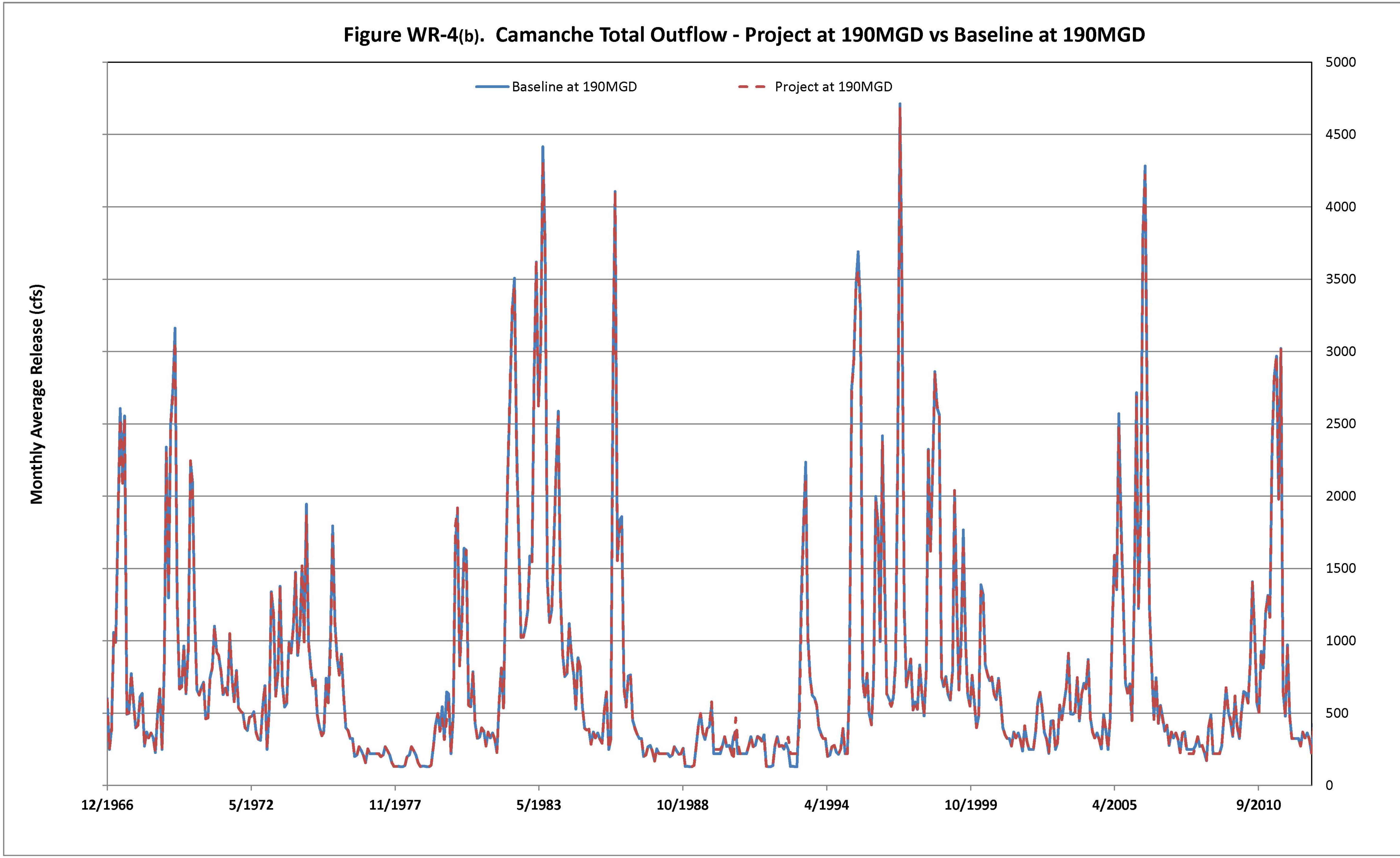


Figure WR-4(b). Camanche Total Outflow - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
Monthly Average Release (cfs)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
12/1966
5/1972
11/1977
5/1983
10/1988
4/1994
10/1999
4/2005
9/2010

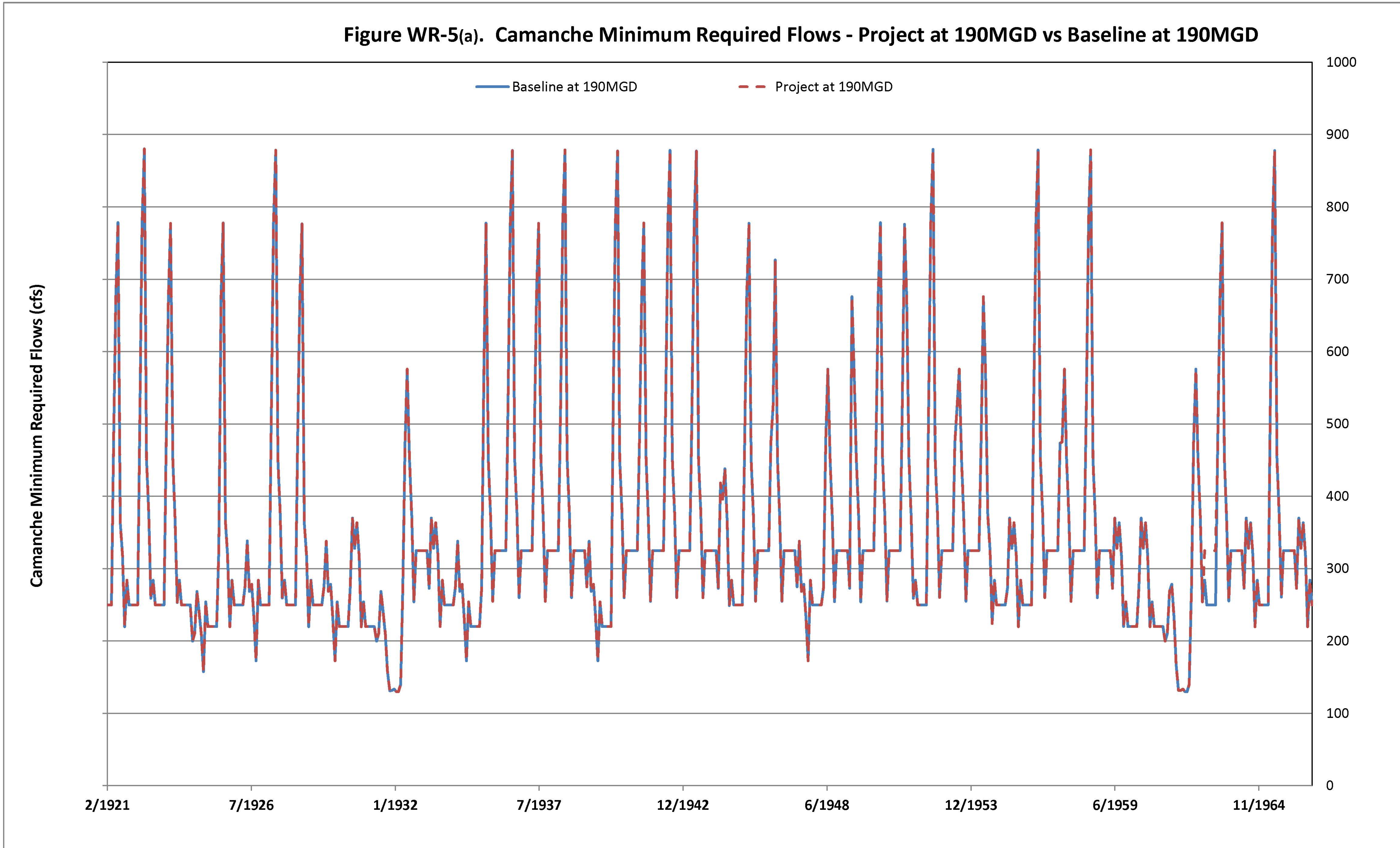
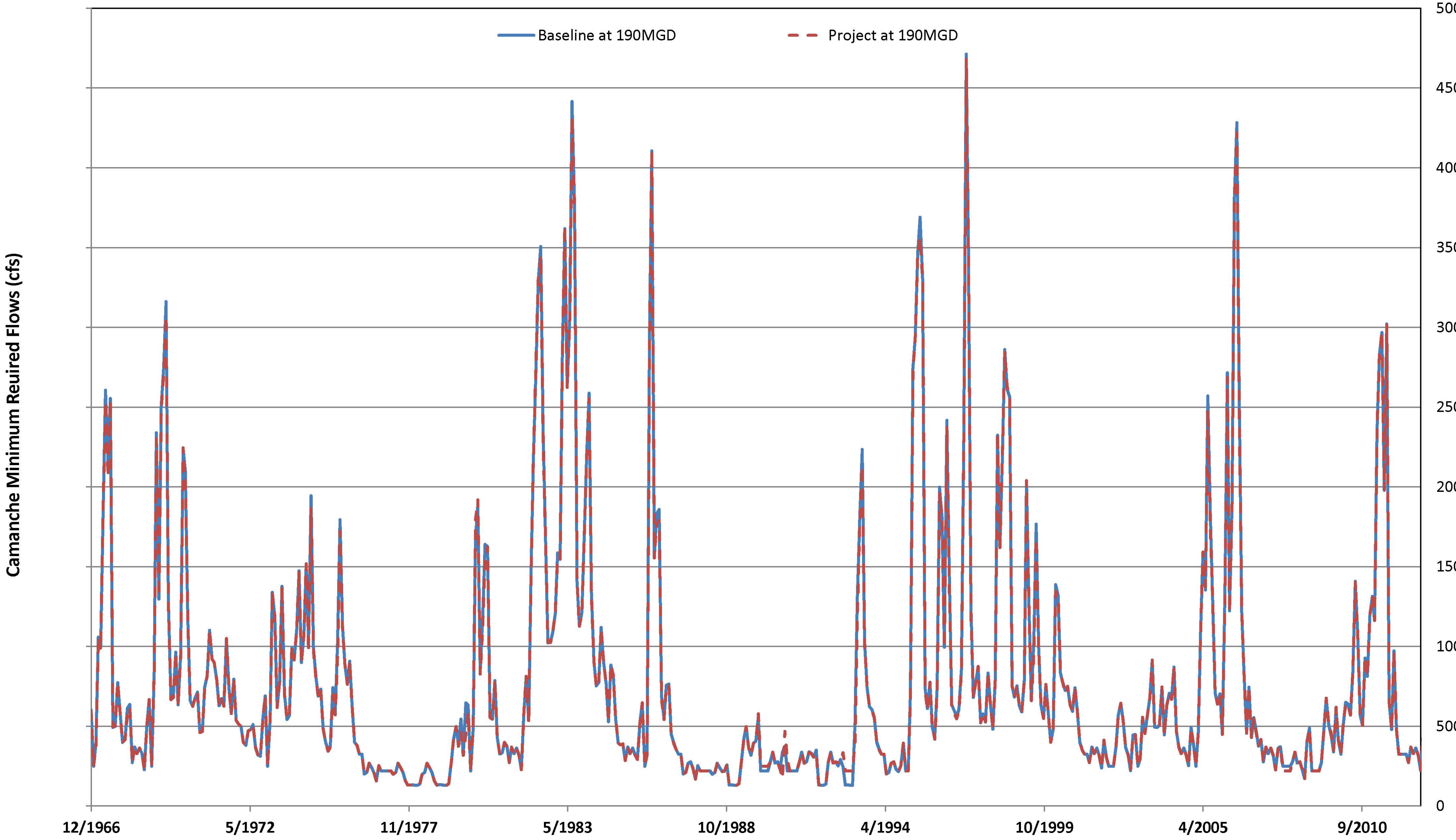


Figure WR-5(a). Camanche Minimum Required Flows - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
Camanche Minimum Required Flows (cfs)
0
100
200
300
400
500
600
700
800
900
1000
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

Figure WR-5(b). Camanche Minimum Required Flows - Project at 190MGD vs Baseline at 190MGD



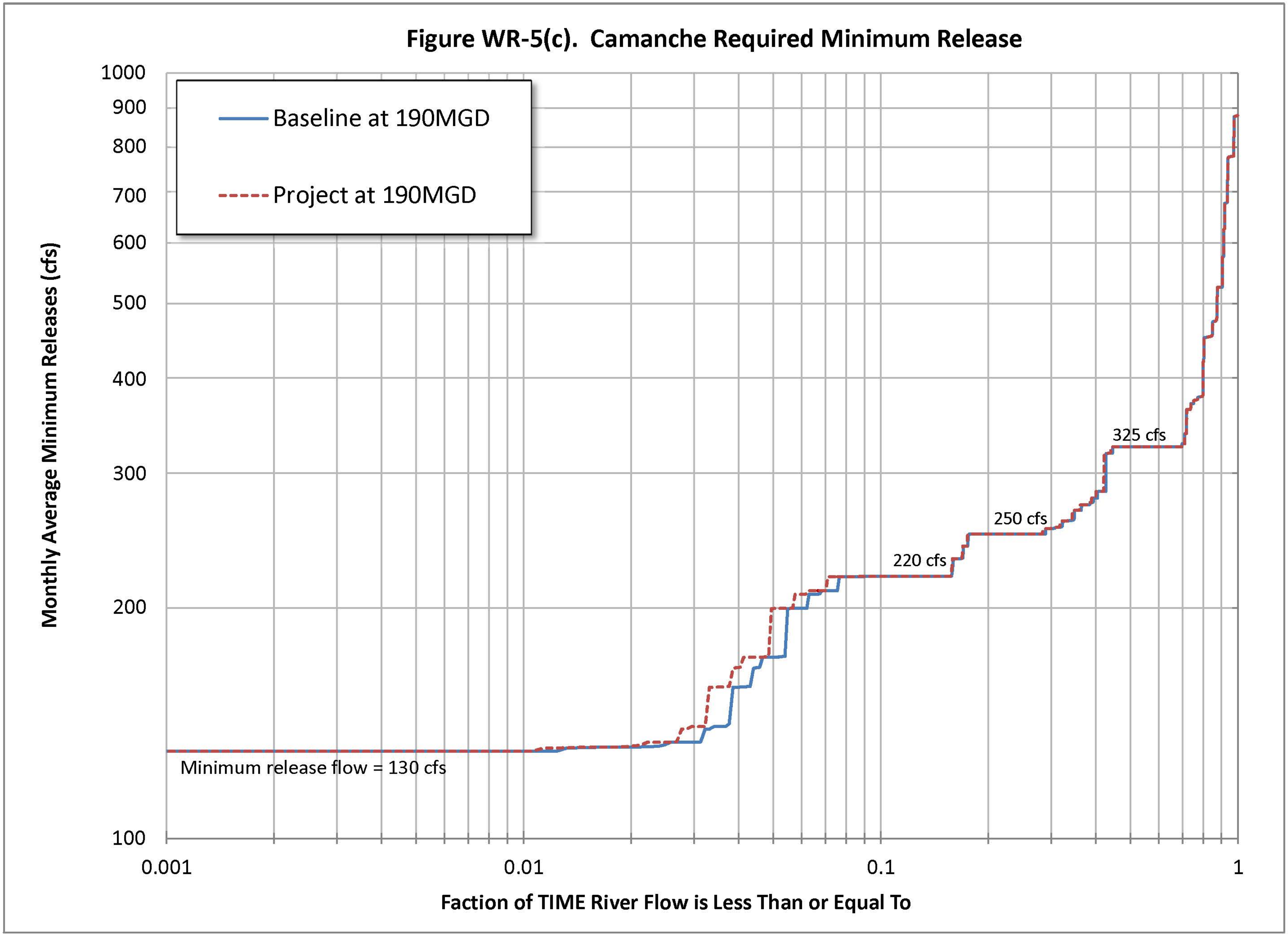


Figure WR-5(c). Camanche Required Minimum Release
Baseline at 190MGD
Project at 190MGD
Monthly Average Minimum Releases (cfs)
1000
900
800
700
600
500
400
300
200
100
0.001
0.01
0.1
1
Faction of TIME River Flow is Less Than or Equal To
Minimum release flow = 130 cfs
220 cfs
250 cfs
325 cfs

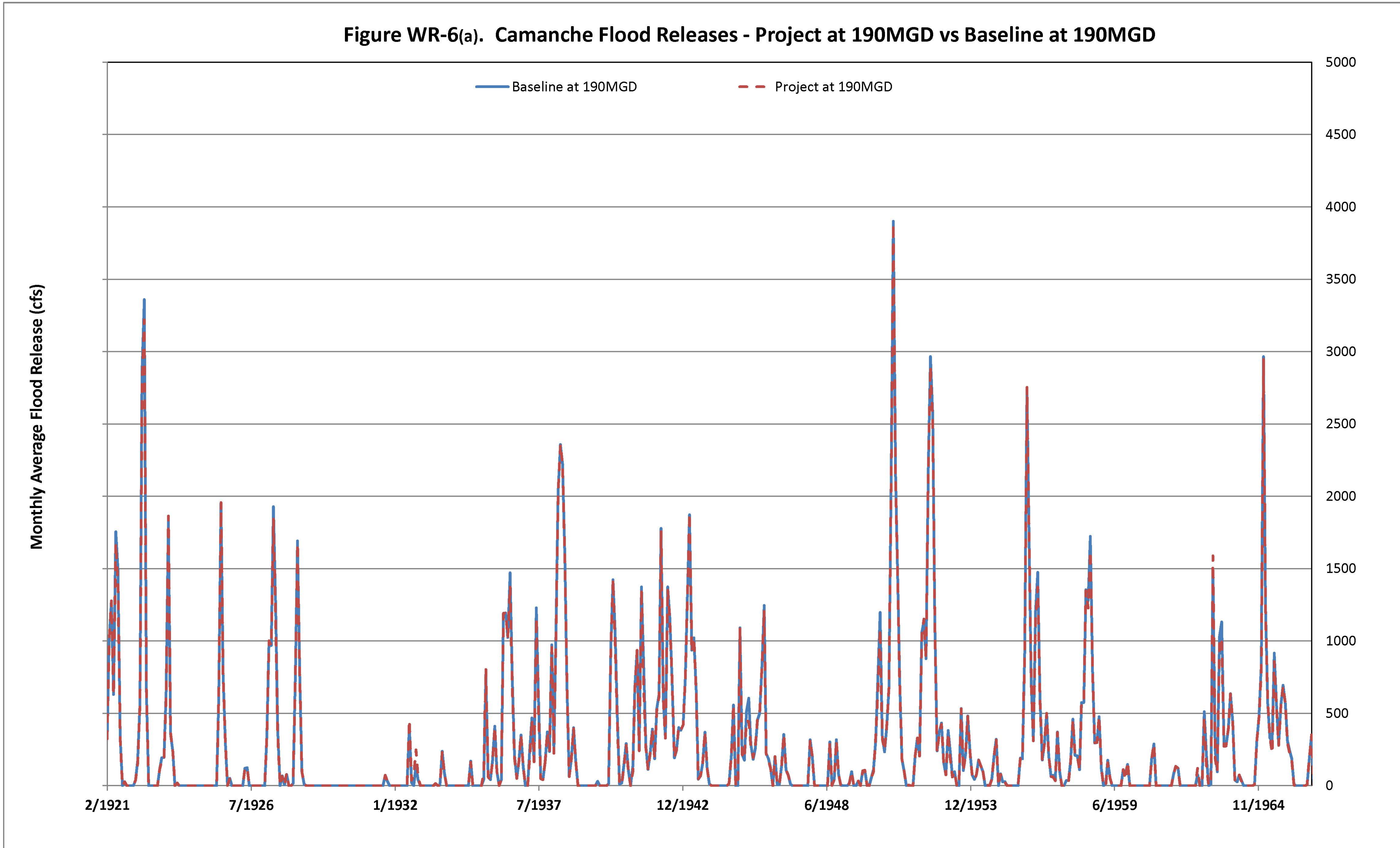


Figure WR-6(a). Camanche Flood Releases - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
Monthly Average Flood Release (cfs)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

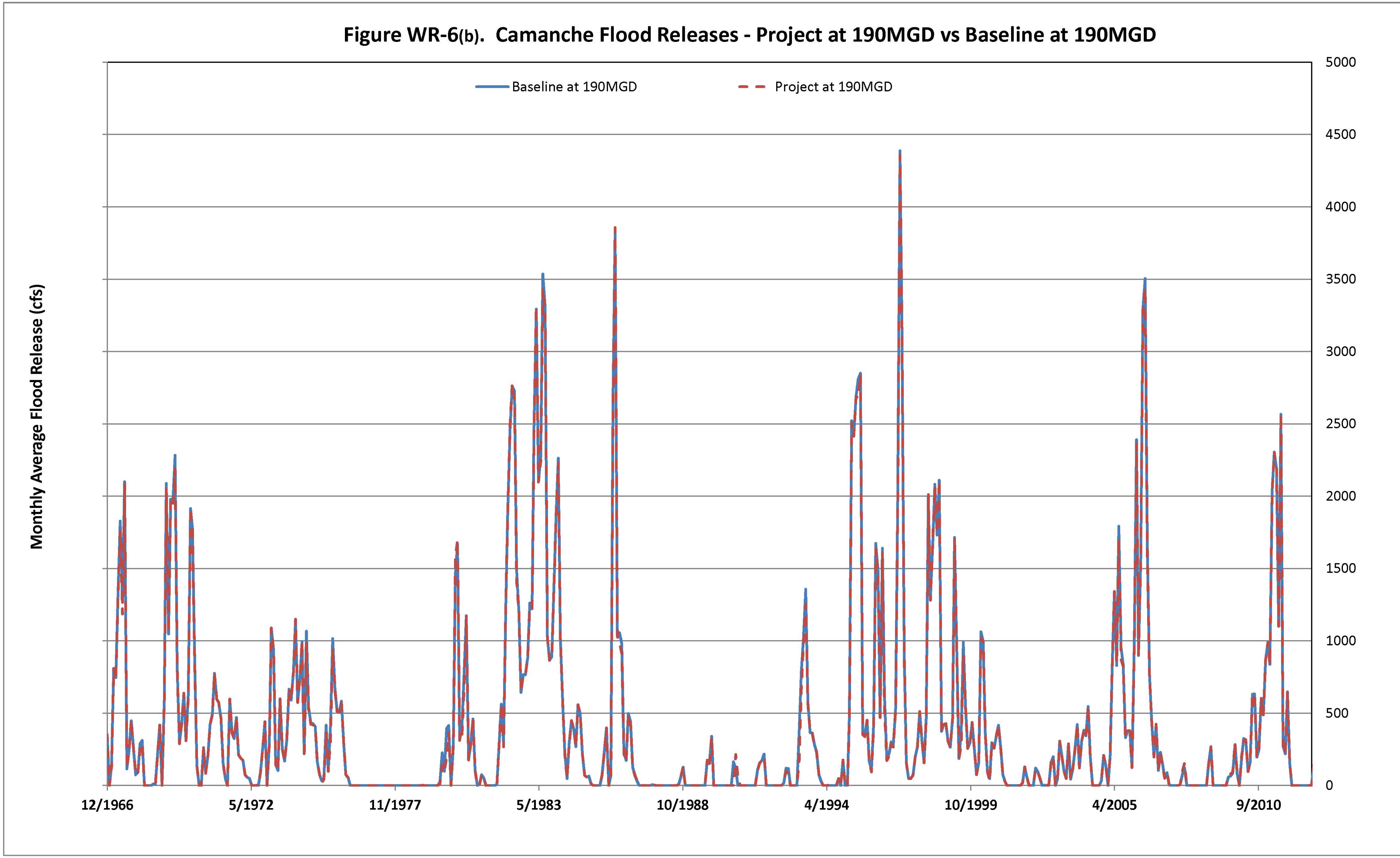


Figure WR-6(b). Camanche Flood Releases - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
Monthly Average Flood Release (cfs)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
12/1966
5/1972
11/1977
5/1983
10/1988
4/1994
10/1999
4/2005
9/2010

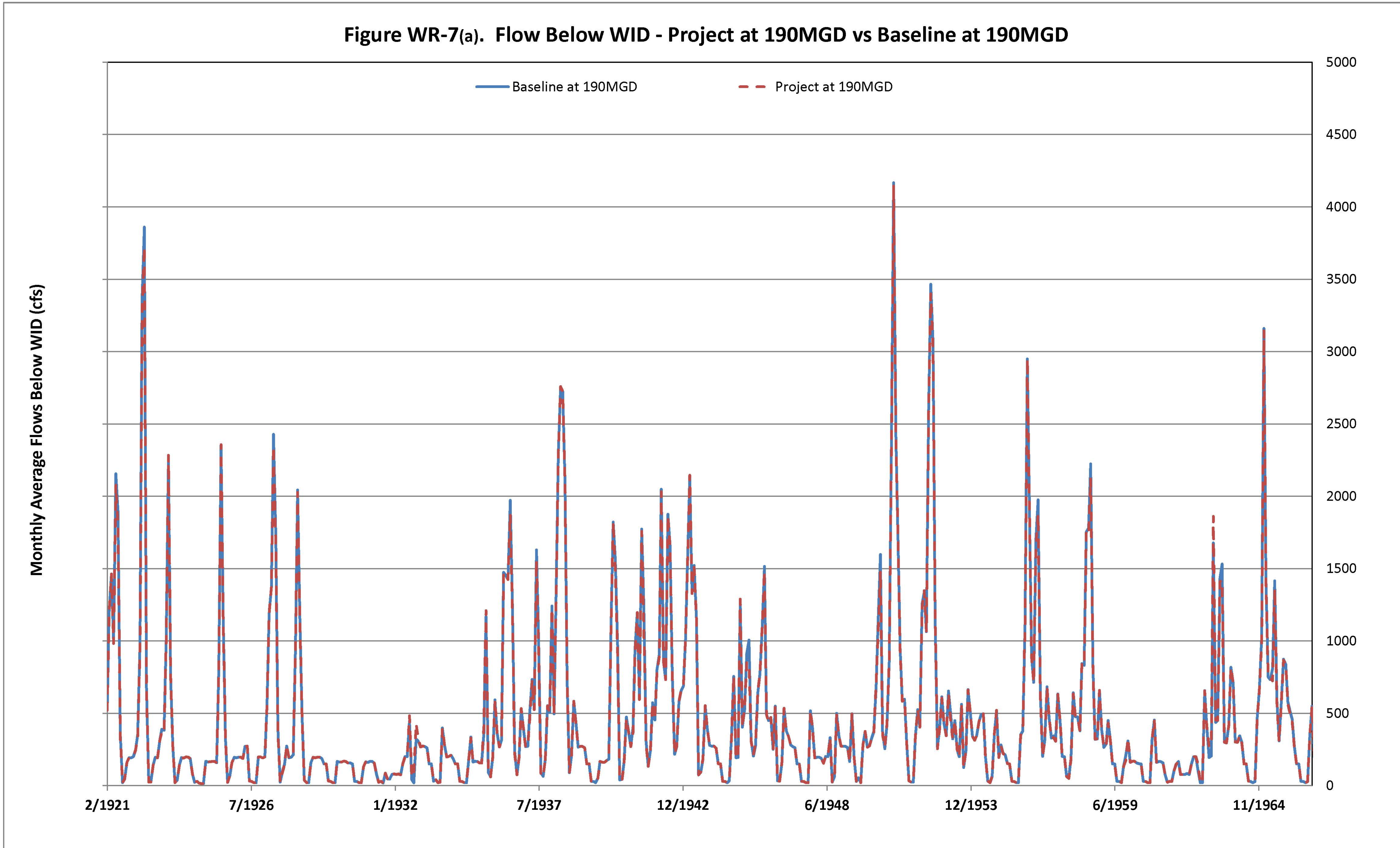
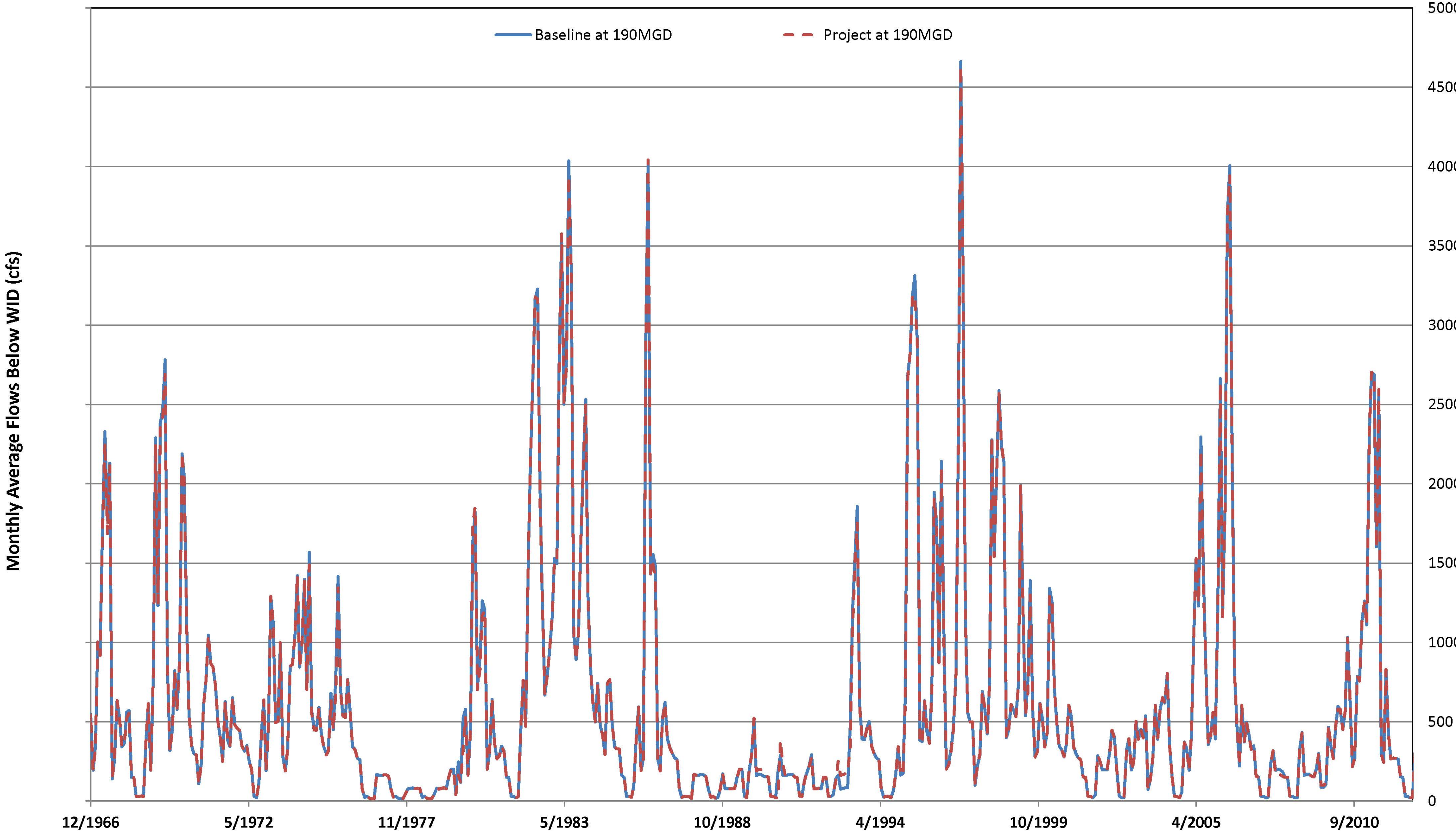


Figure WR-7(a). Flow Below WID - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
Monthly Average Flows Below WID (cfs)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

Figure WR-7(b). Flow Below WID - Project at 190MGD vs Baseline at 190MGD



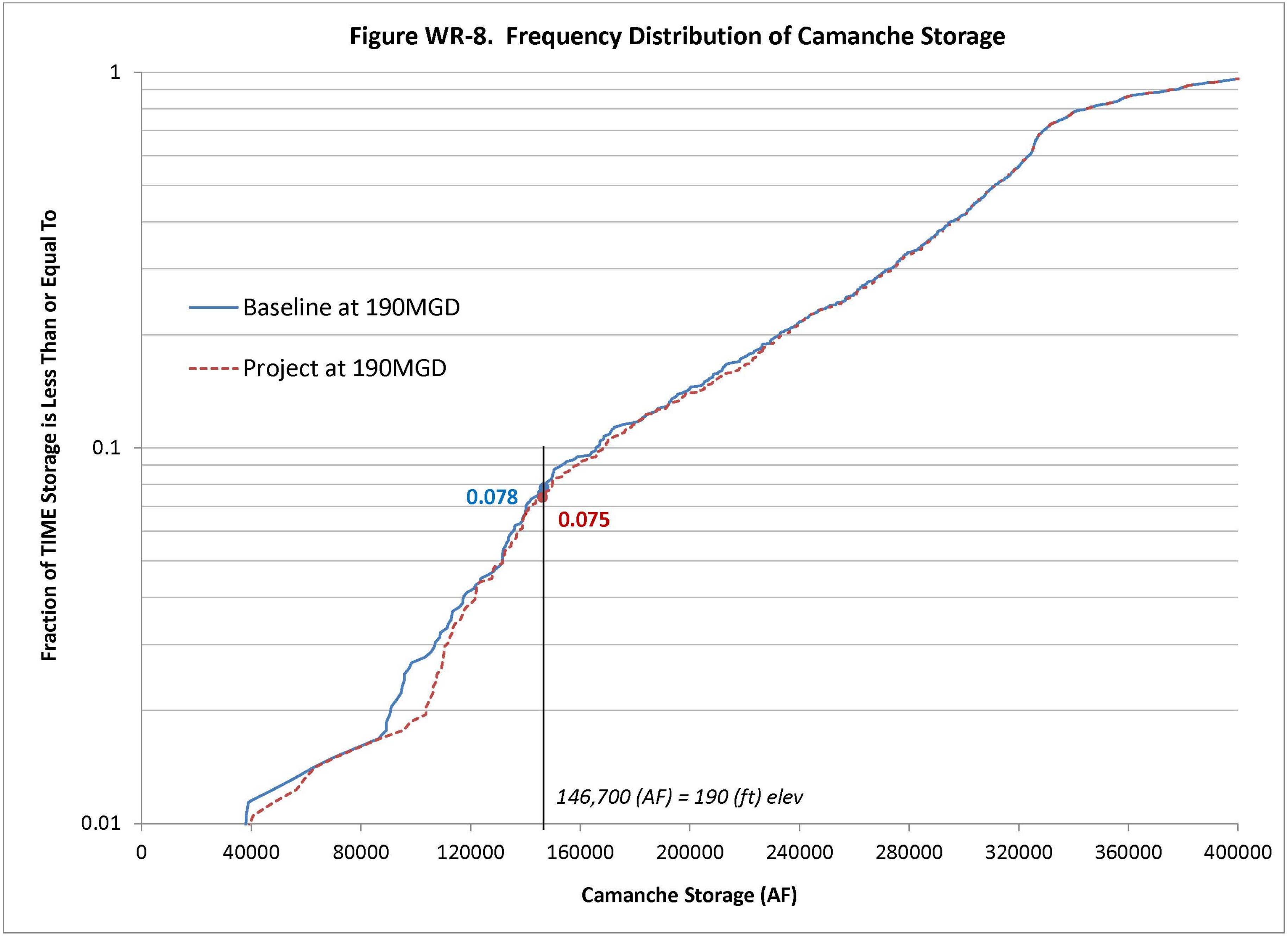


Figure WR-8. Frequency Distribution of Camanche Storage
Fraction of TIME Storage is Less Than or Equal To
1
0.1
0.01
Baseline at 190MGD
Project at 190MGD
0.078
0.075
146,700 (AF) = 190 (ft) elev
0
40000
80000
120000
160000
200000
240000
280000
320000
360000
400000
Camanche Storage (AF)

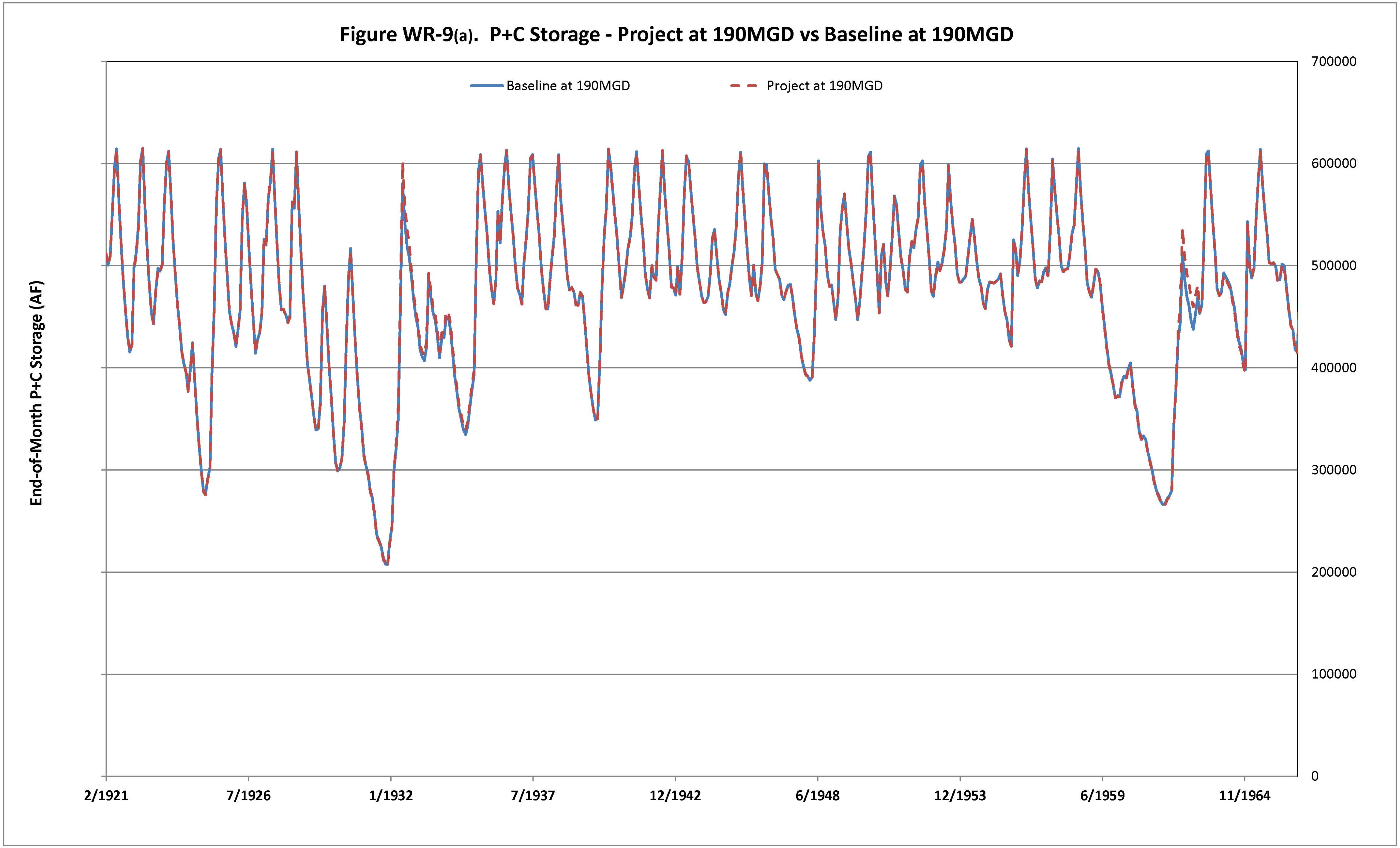


Figure WR-9(a). P+C Storage - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
End-of-Month P+C Storage (AF)
700000
600000
500000
400000
300000
200000
100000
0
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

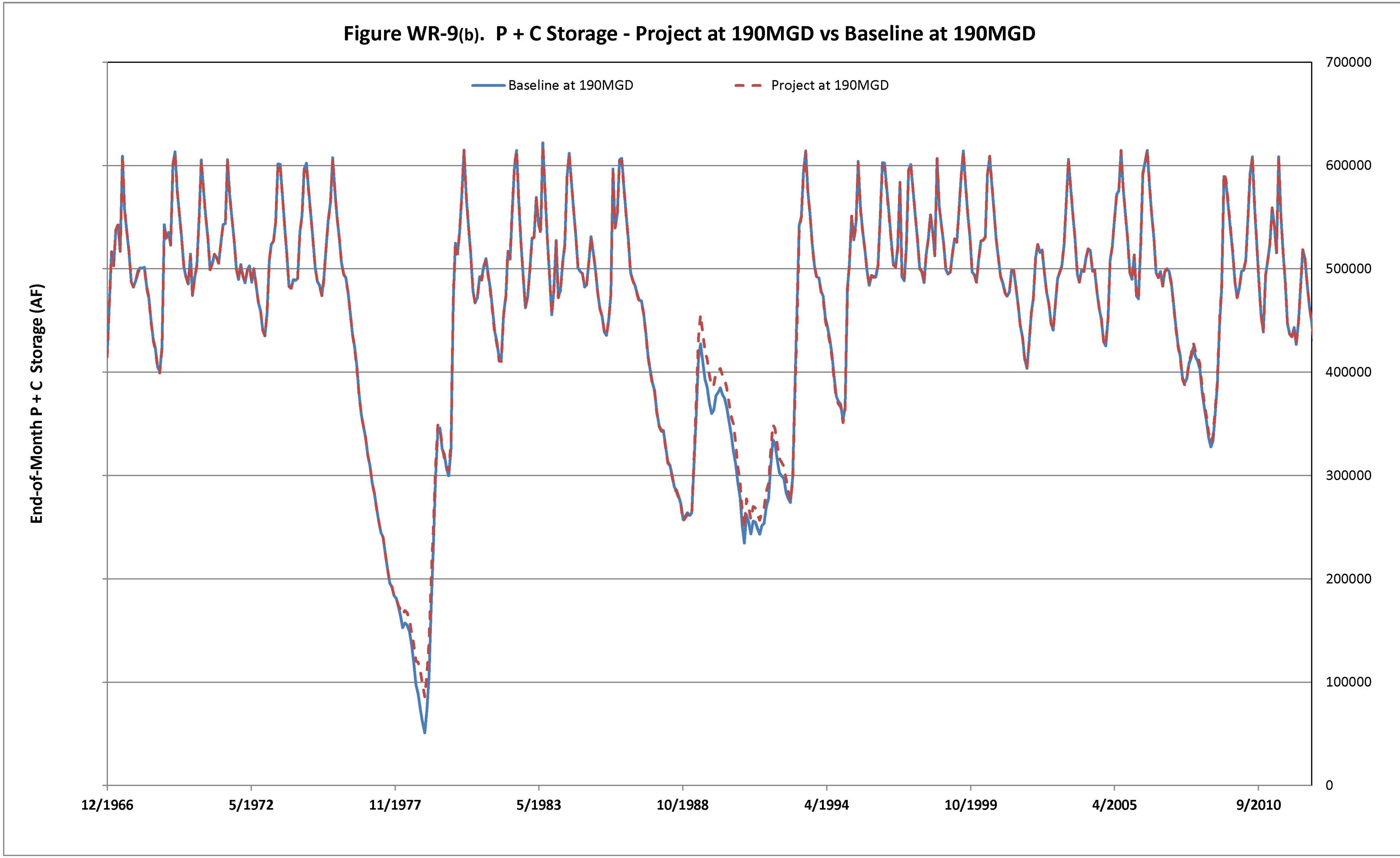


Figure WR-9(b). P + C Storage - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
End-of-Month P + C Storage (AF)
700000
600000
500000
400000
300000
200000
100000
0
12/1966
5/1972
11/1977
5/1983
10/1988
4/1994
10/1999
4/2005
9/2010

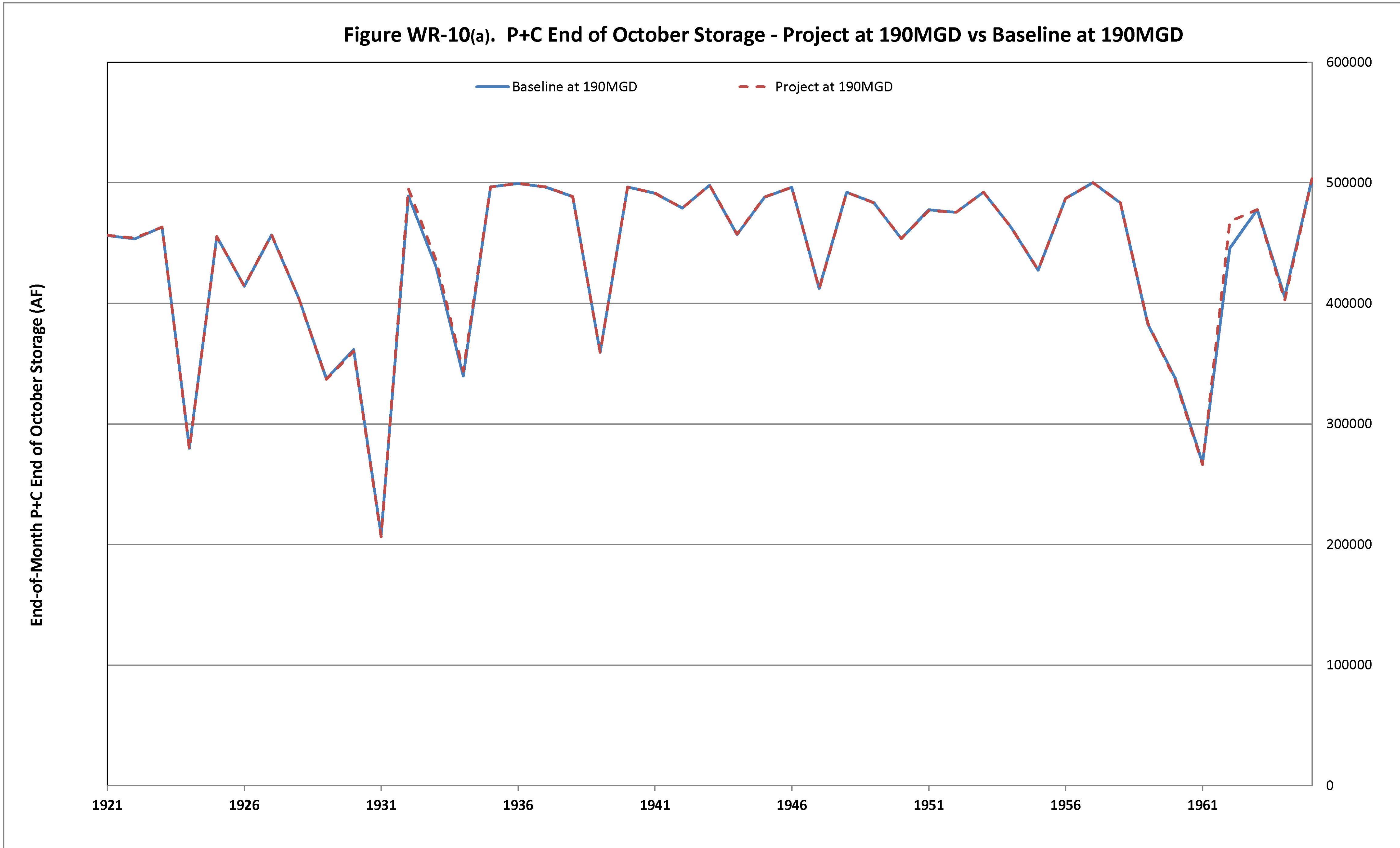


Figure WR-10(a). P+C End of October Storage - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
End-of-Month P+C End of October Storage (AF)
600000
500000
400000
300000
200000
100000
0
1921
1926
1931
1936
1941
1946
1951
1956
1961

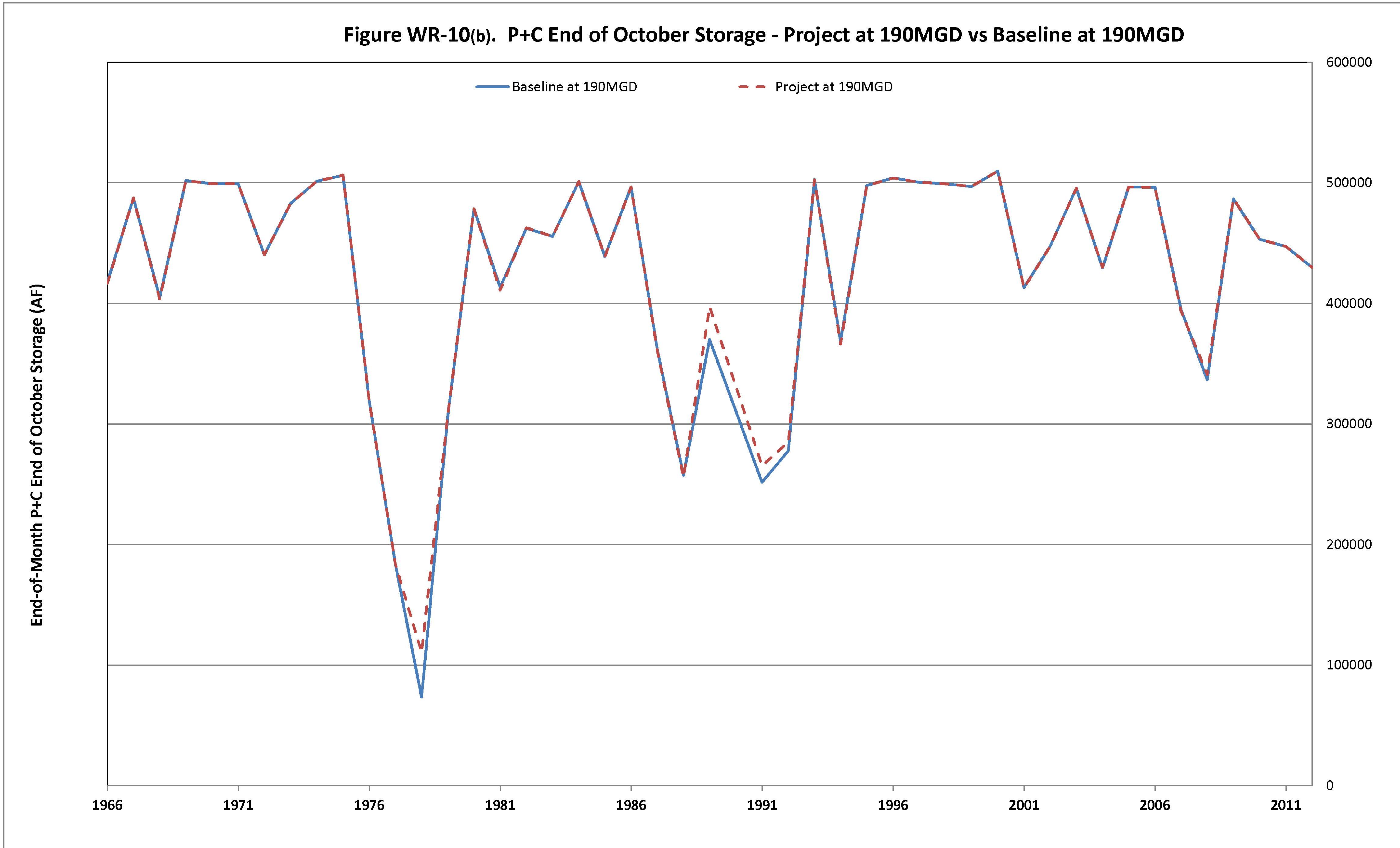


Figure WR-10(b). P+C End of October Storage - Project at 190MGD vs Baseline at 190MGD
Baseline at 190MGD
Project at 190MGD
End-of-Month P+C End of October Storage (AF)
600000
500000
400000
300000
200000
100000
0
1966
1971
1976
1981
1986
1991
1996
2001
2006
2011

Date	Baseline at 190 MGD Pardee Storage (acre-ft)	Project at 190 MGD Pardee Storage (acre-ft)	Baseline at 190 MGD Camanche Storage (acre-ft)	Project at 190 MGD Camanche Storage (acre-ft)	Baseline at 190 MGD TRA Storage (acre-ft)	Project at 190 MGD TRA Storage (acre-ft)	Baseline at 190 MGD JSA Year Type (NA)	Project at 190 MGD JSA Year Type (NA)	Baseline at 190 MGD Camanche Outflow (cfs)	Project at 190 MGD Camanche Outflow (cfs)	Baseline at 190 MGD Required Camanche Release (cfs)	Project at 190 MGD Required Camanche Release (cfs)	Baseline at 190 MGD Camanche Flood Release (AF)	Project at 190 MGD Camanche Flood Release (AF)	Baseline at 190 MGD Flow below Lodi Lake (AF)	Project at 190 MGD Flow below Lodi Lake (AF)
1/1921	185026.3	185026.3	326779.1	326779.1	134534.2	134534.2	1	1	574.2	574.2	250.00	250.00	19934.2	19934.2	32092	32092
2/1921	182830.6	182830.6	317706.4	317706.4	139031.5	139031.5	1	1	1257.9	1257.9	250.00	250.00	55974.4	55974.4	66889	66889
3/1921	203150.5	203150.5	306335.1	306335.1	144306.2	144306.2	1	1	1527.7	1527.7	250.00	250.00	78566.4	78566.4	89991	89991
4/1921	206443.0	206443.0	345113.4	345113.4	145520.5	145520.5	1	1	1104.5	1104.5	474.62	474.62	37479.4	37479.4	58536	58536
5/1921	208859.2	208466.0	388566.8	388134.1	141723.6	139359.0	1	1	2433.5	2354.2	677.83	677.75	107956.2	103082.0	132561	127687
6/1921	202967.4	202323.0	411533.7	411683.0	136231.9	131605.6	1	1	2278.9	2180.6	778.58	778.42	89276.9	83437.4	113081	107242
7/1921	182230.0	182336.3	381161.4	381489.2	130347.2	125776.4	1	1	698.1	682.9	364.14	364.14	20533.5	19601.7	22338	21406
8/1921	164072.9	164178.4	356950.5	357275.7	124606.6	120092.0	1	1	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1921	146553.2	146657.8	339108.9	339285.3	119484.9	115023.8	1	1	245.0	247.5	219.82	219.82	1497.4	1644.8	2692	2839
10/1921	134878.5	134982.4	321423.5	321599.3	116110.7	111700.4	1	1	284.0	284.0	284.00	284.00	0.0	0.0	9959	9959
11/1921	123644.7	123748.0	307288.0	307463.5	115646.2	111276.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11537	11537
12/1921	120613.8	120302.3	294972.5	295147.9	127178.3	123247.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11861	11861
1/1922	133133.3	132350.0	290407.4	290583.5	135861.0	132432.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12399	12399
2/1922	181660.2	180116.1	316500.1	315753.5	144341.2	142631.7	1	1	287.5	287.5	250.00	250.00	2082.7	2082.7	13712	13712
3/1922	180017.0	179517.8	332386.2	331115.0	148615.7	147593.0	1	1	419.4	400.0	250.00	250.00	10413.4	9223.3	21747	20558
4/1922	206056.2	206018.8	332460.4	330506.2	149001.0	148755.4	0	0	1084.7	1075.5	525.00	525.00	33303.0	32757.5	57280	56734
5/1922	212056.3	212056.2	390495.4	388001.9	145794.2	143153.0	0	0	3648.4	3564.5	778.92	778.88	176438.9	171284.8	207214	202061
6/1922	207554.7	207262.0	407394.6	408011.1	140651.6	135752.2	0	0	4240.0	4100.0	880.30	880.21	199918.7	191593.6	229759	221435
7/1922	188838.6	188756.7	371958.8	372755.3	134766.8	129928.8	0	0	1098.4	1091.9	452.51	452.46	39717.8	39320.7	41526	41127
8/1922	172881.1	172799.6	344255.0	345046.4	129004.0	124224.1	0	0	376.9	376.9	376.86	376.86	0.0	0.0	1540	1540
9/1922	157144.7	157064.0	325595.8	326382.8	123812.0	119088.2	0	0	259.7	259.7	259.12	259.12	32.8	32.8	1525	1525
10/1922	145874.8	145794.6	307631.9	308416.2	121528.7	116851.1	1	1	284.0	284.0	284.00	284.00	0.0	0.0	8747	8747
11/1922	145198.1	145118.2	297802.1	298586.4	122694.2	118050.5	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11687	11687
12/1922	171471.1	170924.8	304544.0	304782.5	134885.8	131278.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11886	11886
1/1923	172835.3	172571.4	324772.3	323354.6	135912.9	133730.2	1	1	366.1	366.1	250.00	250.00	7140.6	7140.6	19364	19364
2/1923	166307.1	165784.1	328297.1	327722.5	137579.3	136019.0	1	1	442.9	421.4	250.00	250.00	10710.9	9520.8	21683	20494
3/1923	171433.1	171437.5	329941.1	330059.8	140998.8	139522.8	1	1	445.2	424.2	250.00	250.00	12000.2	10710.9	23510	22223
4/1923	205709.7	205718.1	354352.7	355368.3	145097.7	143804.5	1	1	1122.6	1104.6	474.35	474.31	38576.2	37507.5	59761	58692
5/1923	205272.7	205272.7	396066.8	396641.0	140697.4	139114.3	1	1	2529.0	2541.3	678.07	678.15	113812.9	114561.8	139702	140450
6/1923	198825.6	198825.6	413235.3	413260.4	135461.7	133898.0	1	1	1138.0	1147.2	777.20	777.20	21469.7	22018.5	45272	45821
7/1923	188667.3	188650.3	381135.2	381151.7	129577.2	128053.5	1	1	687.4	687.5	449.59	449.77	14623.0	14620.4	16428	16425
8/1923	171840.3	171823.5	353655.0	353664.4	123819.7	122316.4	1	1	371.9	372.0	371.91	372.03	0.0	0.0	1327	1327
9/1923	157585.5	157570.5	334127.1	334132.2	118730.4	117244.5	1	1	272.5	272.6	253.19	253.26	1149.9	1150.0	2342	2342
10/1923	147827.2	147812.3	315477.6	315482.7	115311.2	113840.1	1	1	284.0	284.0	284.00	284.00	0.0	0.0	8757	8755
11/1923	140506.6	140491.7	302410.8	302415.9	114086.0	112626.9	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11574	11574
12/1923	130097.7	129853.3	286313.5	286318.6	117496.9	116276.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11727	11727
1/1924	126700.4	126465.8	277112.3	277117.4	123901.3	122677.5	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12237	12237
2/1924	129549.2	129214.0	266521.0	266526.1	129961.6	128844.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11368	11368
3/1924	124396.6	123793.5	253363.4	253368.4	133684.8	132845.0	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11493	11493
4/1924	157482.1	156602.1	241833.2	241838.3	134245.5	133695.1	3	3	199.8	199.8	199.79	199.79	0.0	0.0	4625	4625

Date	Baseline at 190 MGD Pardee Storage (acre-ft)	Project at 190 MGD Pardee Storage (acre-ft)	Baseline at 190 MGD Camanche Storage (acre-ft)	Project at 190 MGD Camanche Storage (acre-ft)	Baseline at 190 MGD TRA Storage (acre-ft)	Project at 190 MGD TRA Storage (acre-ft)	Baseline at 190 MGD JSA Year Type (NA)	Project at 190 MGD JSA Year Type (NA)	Baseline at 190 MGD Camanche Outflow (cfs)	Project at 190 MGD Camanche Outflow (cfs)	Baseline at 190 MGD Required Camanche Release (cfs)	Project at 190 MGD Required Camanche Release (cfs)	Baseline at 190 MGD Camanche Flood Release (AF)	Project at 190 MGD Camanche Flood Release (AF)	Baseline at 190 MGD Flow below Lodi Lake (AF)	Project at 190 MGD Flow below Lodi Lake (AF)
5/1924	188611.5	188693.7	236087.8	235125.3	131662.3	131131.8	3	3	210.8	210.8	210.75	210.75	0.0	0.0	1465	1465
6/1924	169313.1	169393.0	218200.4	217245.0	126656.0	126134.4	3	3	268.5	268.5	268.51	268.51	0.0	0.0	1845	1845
7/1924	154773.7	154851.9	200010.3	199065.1	121224.8	120711.8	3	3	241.1	241.1	241.05	241.05	0.0	0.0	1115	1115
8/1924	140612.7	140688.8	184094.5	183160.0	116220.3	115715.8	3	3	208.5	208.5	208.46	208.46	0.0	0.0	924	924
9/1924	128463.6	128537.6	172574.0	171648.0	112621.5	112124.3	3	3	157.6	157.6	157.59	157.59	0.0	0.0	897	897
10/1924	122513.5	122585.4	157337.8	156416.8	111003.1	110511.3	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10393	10393
11/1924	131560.6	131630.8	144815.0	143897.7	113206.8	112719.6	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9729	9729
12/1924	152039.5	152108.2	139838.8	138917.2	122104.3	121619.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10229	10229
1/1925	162277.4	162345.7	140122.2	139199.3	130016.6	129638.1	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10357	10357
2/1925	202029.1	202029.7	193186.8	192329.3	144516.3	144210.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9361	9361
3/1925	196699.7	196591.7	261802.8	260943.8	144279.8	144082.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9737	9737
4/1925	205854.0	205854.0	351883.1	352027.0	147552.4	147355.6	1	1	921.1	902.5	324.33	324.33	35512.2	34401.4	47635	46524
5/1925	208086.5	208086.5	396393.9	396339.4	148547.2	148351.7	1	1	2631.6	2634.8	678.16	678.19	120114.7	120311.3	144722	144919
6/1925	201549.1	201549.1	412374.0	412319.7	143383.3	143190.5	1	1	1544.0	1544.0	777.83	777.83	45591.2	45591.2	69396	69396
7/1925	183680.9	183681.0	381500.8	381454.9	137475.2	137284.3	1	1	659.9	659.7	364.06	364.06	18188.1	18180.1	19992	19984
8/1925	167719.2	167719.2	357222.0	357180.2	131702.9	131513.8	1	1	319.6	319.5	318.52	318.52	64.5	60.7	1392	1388
9/1925	152460.2	152460.2	337857.6	337834.9	126624.0	126437.0	1	1	270.6	270.3	219.82	219.82	3022.9	3003.9	4217	4198
10/1925	137079.3	137079.3	318324.7	318302.1	122967.2	122781.8	1	1	284.0	284.0	284.00	284.00	0.0	0.0	9894	9894
11/1925	133966.3	133966.3	309080.1	309057.5	122360.6	122176.0	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11707	11707
12/1925	136605.7	136605.7	297968.4	297945.8	124792.2	124699.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11903	11903
1/1926	134817.8	134815.9	286152.5	286129.9	132407.4	132733.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12144	12144
2/1926	160842.5	160853.3	275528.5	275505.9	140066.3	140376.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	10946	10946
3/1926	172150.0	172204.4	284509.0	284486.4	142777.7	143038.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11573	11573
4/1926	205571.4	205571.3	340134.3	340164.0	146793.8	147052.1	2	2	395.7	395.7	275.24	275.24	7170.2	7170.2	16191	16191
5/1926	193405.9	193405.9	387642.5	387672.0	142604.0	142856.0	2	2	462.0	462.0	338.38	338.38	7601.8	7601.8	16833	16833
6/1926	185997.3	185997.3	374636.9	374666.3	136969.3	137215.2	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1932	1932
7/1926	165564.7	165564.7	352806.4	352835.6	130945.0	131184.6	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1926	145768.9	145768.9	334082.0	334111.0	125157.9	125391.4	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1926	127857.4	127857.4	320595.2	320624.0	119963.6	120191.9	2	2	172.5	172.5	172.49	172.49	0.0	0.0	1192	1192
10/1926	111678.4	111678.3	302580.6	302609.4	117257.4	117481.6	1	1	284.0	284.0	284.00	284.00	0.0	0.0	12226	12226
11/1926	129966.9	129966.8	297452.1	297480.9	122318.4	122541.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11853	11853
12/1926	151316.6	151316.6	283261.6	283290.4	123954.8	123821.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11794	11794
1/1927	164470.2	164470.5	289358.1	289386.9	132986.7	133209.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12249	12249
2/1927	205093.2	205093.2	320945.5	320973.2	143964.7	144136.8	1	1	602.5	602.5	250.00	250.00	19577.1	19577.1	30711	30711
3/1927	194536.4	194542.2	325703.5	325724.9	147270.8	146937.5	1	1	1251.6	1251.6	250.00	250.00	61587.7	61587.7	72907	72907
4/1927	209964.0	209964.0	356370.3	356397.4	148699.0	148919.1	0	0	1494.7	1494.7	525.00	525.00	57700.0	57700.0	81616	81616
5/1927	204954.5	204848.7	377632.5	377649.6	144254.6	141806.2	0	0	2706.5	2622.6	778.33	778.22	118557.4	113406.9	149314	144164
6/1927	203252.1	202663.5	410839.7	410074.2	139310.4	134596.9	0	0	2112.7	2041.1	878.47	878.39	73440.7	69189.6	103215	98967
7/1927	190645.5	191240.4	375129.7	374551.5	133484.1	128829.6	0	0	818.4	796.0	452.03	451.98	22527.5	21153.2	24335	22958
8/1927	174191.4	174781.3	347355.2	346806.4	127752.6	123149.0	0	0	377.4	377.0	376.86	376.86	32.5	6.4	1572	1546

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
9/1927	157120.5	157703.6	324918.5	324620.7	122591.6	118037.8	0	0	327.8	323.6	259.30	259.28	4075.8	3828.4	5578	5330
10/1927	147947.4	148527.0	308711.9	308523.9	119427.5	114918.7	1	1	289.5	287.7	284.00	284.00	335.3	226.1	9156	9047
11/1927	161063.0	160890.9	296410.3	296565.2	120307.8	115835.3	1	1	328.0	334.9	250.00	250.00	4643.3	5050.5	16299	16704
12/1927	163207.0	162581.2	289000.1	288780.2	125068.9	121325.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11894	11894
1/1928	160983.7	161002.0	284200.3	283209.0	130184.1	126182.5	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12114	12114
2/1928	160977.8	161032.1	290165.7	288402.7	135451.8	132324.7	1	1	265.5	265.5	250.00	250.00	892.6	892.6	12252	12252
3/1928	208006.7	208007.3	354508.9	354286.4	142654.9	139052.4	1	1	1019.4	1003.2	250.00	250.00	47306.5	46314.7	58921	57931
4/1928	205745.3	205731.4	350480.5	350403.1	143808.3	141094.3	1	1	2167.3	2150.7	475.83	475.80	100652.9	99663.0	121599	120609
5/1928	204390.8	204390.8	407174.5	407083.7	139298.0	136612.5	1	1	1431.4	1431.4	676.92	676.92	46389.4	46389.4	70984	70984
6/1928	190463.2	190362.1	372340.1	372249.8	133639.9	131088.7	1	1	873.3	873.3	776.68	776.68	5752.2	5752.2	29557	29557
7/1928	171026.6	170925.0	344693.2	344603.5	127637.9	125127.1	1	1	373.7	373.7	363.59	363.59	619.4	619.4	2427	2427
8/1928	151776.0	151675.4	320731.7	320642.7	121864.2	119388.6	1	1	318.5	318.5	318.50	318.50	0.0	0.0	1328	1328
9/1928	135152.9	135053.2	304514.8	304426.3	116740.1	114294.8	1	1	219.8	219.8	219.79	219.79	0.0	0.0	1193	1193
10/1928	118875.1	118776.2	285122.4	285034.3	113165.9	110748.0	1	1	284.0	284.0	284.00	284.00	0.0	0.0	9896	9896
11/1928	112755.1	112656.6	275871.9	275783.7	112884.9	110481.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11709	11709
12/1928	105891.7	105563.9	264756.8	264668.7	118144.0	115980.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11903	11903
1/1929	98528.3	98216.9	252937.7	252849.6	122794.8	120631.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12144	12144
2/1929	96973.7	95750.7	241940.2	241852.0	127150.5	125913.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	10946	10946
3/1929	109335.0	108153.8	230949.1	230861.0	131126.5	129865.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11573	11573
4/1929	150814.9	149343.0	216039.5	215951.6	132823.8	131873.6	2	2	274.8	274.8	274.76	274.76	0.0	0.0	9023	9023
5/1929	199575.0	199803.5	257897.0	257045.7	130555.6	128702.6	2	2	337.9	337.9	337.94	337.94	0.0	0.0	9228	9228
6/1929	192132.2	192184.2	288174.7	287503.3	127082.0	125252.3	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1932	1932
7/1929	172160.1	172216.4	268954.1	268282.7	121418.3	119673.6	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1929	151739.7	151849.1	250892.0	250226.9	115806.3	114097.5	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1929	133333.0	133511.9	237943.9	237284.0	110783.7	109106.7	2	2	172.5	172.5	172.49	172.49	0.0	0.0	1192	1192
10/1929	116559.9	116814.2	220928.8	220272.4	107270.1	105617.8	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10338	10338
11/1929	100529.5	100855.3	206811.4	206157.8	105995.2	104359.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9677	9677
12/1929	101928.8	102318.2	197177.6	196524.0	110120.8	108490.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10045	10045
1/1930	110934.7	111215.2	191664.1	191008.3	117616.2	116156.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10467	10467
2/1930	127564.4	127629.8	183950.1	183293.4	124001.2	122820.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9342	9342
3/1930	171391.4	171295.6	175690.8	175034.3	130271.7	129335.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9635	9635
4/1930	204332.9	204329.4	221465.1	220259.0	133302.3	132834.9	2	2	272.8	272.8	272.80	272.80	0.0	0.0	9410	9410
5/1930	204677.5	204676.1	284235.7	282756.0	130882.3	130699.1	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9259	9259
6/1930	189988.8	189988.8	326898.2	325425.9	126309.5	126129.2	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1821	1821
7/1930	170234.7	170234.7	301155.8	299694.8	120422.1	120244.9	2	2	363.5	363.5	363.47	363.47	0.0	0.0	1801	1801
8/1930	149772.0	149772.0	277803.1	276353.7	114767.3	114593.1	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1337	1337
9/1930	130928.8	130928.8	262116.6	260676.9	109723.9	109552.3	2	2	219.8	219.8	219.82	219.82	0.0	0.0	1202	1202
10/1930	116176.6	116176.6	245606.3	244173.6	106202.0	106032.9	2	2	254.0	254.0	254.00	254.00	0.0	0.0	8080	8080
11/1930	108797.2	108797.2	234450.9	233021.1	105235.6	105068.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9789	9789
12/1930	95572.2	95572.2	220382.7	218957.2	108212.5	108047.3	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9883	9883

Date	*Baseline at 190 MGD* Pardee Storage *(acre-ft)*	*Project at 190 MGD* Pardee Storage *(acre-ft)*	*Baseline at 190 MGD* Camanche Storage *(acre-ft)*	*Project at 190 MGD* Camanche Storage *(acre-ft)*	*Baseline at 190 MGD* TRA Storage *(acre-ft)*	*Project at 190 MGD* TRA Storage *(acre-ft)*	*Baseline at 190 MGD* JSA Year Type *(NA)*	*Project at 190 MGD* JSA Year Type *(NA)*	*Baseline at 190 MGD* Camanche Outflow *(cfs)*	*Project at 190 MGD* Camanche Outflow *(cfs)*	*Baseline at 190 MGD* Required Camanche Release *(cfs)*	*Project at 190 MGD* Required Camanche Release *(cfs)*	*Baseline at 190 MGD* Camanche Flood Release (AF)	*Project at 190 MGD* Camanche Flood Release (AF)	*Baseline at 190 MGD* Flow below Lodi Lake (AF)	*Project at 190 MGD* Flow below Lodi Lake (AF)
1/1931	91357.4	91357.4	212911.0	211482.8	114023.6	113859.3	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10392	10392
2/1931	92247.8	92247.8	204439.6	203010.5	118801.9	118639.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9312	9312
3/1931	87949.3	87870.0	193197.8	191770.4	124106.7	124024.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9650	9650
4/1931	90812.1	90713.3	181884.1	180462.4	126187.4	126126.5	3	3	199.8	199.8	199.76	199.76	0.0	0.0	4625	4625
5/1931	89490.4	89392.6	168490.9	167079.4	123200.7	123140.4	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1465	1465
6/1931	85462.9	85366.2	151164.0	149765.4	116420.0	116360.4	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1845	1845
7/1931	98053.4	97962.1	133784.6	132405.0	111616.4	111553.5	3	3	241.0	241.0	241.03	241.03	0.0	0.0	1113	1113
8/1931	91421.3	91327.5	133784.6	132405.0	107571.4	107506.5	3	3	280.8	281.2	208.78	208.78	4427.8	4453.9	5349	5375
9/1931	91411.6	91317.9	123680.9	122321.8	102855.5	102787.7	3	3	190.5	190.5	157.97	157.97	1935.7	1935.8	2834	2834
10/1931	92300.5	92210.2	115645.4	114296.9	99947.1	99877.6	3	3	131.4	131.4	131.37	131.37	0.0	0.0	2868	2868
11/1931	96125.5	96038.1	111376.6	110030.4	101942.3	101871.1	3	3	131.6	131.6	131.60	131.60	0.0	0.0	4630	4630
12/1931	116125.4	116040.4	113478.1	112120.6	112151.0	112077.9	3	3	133.7	133.7	133.66	133.66	0.0	0.0	5040	5040
1/1932	136307.8	136224.9	108943.7	107585.7	121438.7	121364.5	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4807	4807
2/1932	168289.0	168207.5	130467.2	129101.0	131224.1	131149.3	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4664	4664
3/1932	173857.7	174002.8	147815.9	153733.6	137096.9	137497.4	3	3	140.0	140.0	140.00	140.00	0.0	0.0	4677	4677
4/1932	184804.6	186455.0	165697.6	177025.7	137720.1	138892.3	1	1	272.8	272.8	272.80	272.80	0.0	0.0	8995	8995
5/1932	206423.1	206788.6	260059.1	280204.2	133633.5	135154.2	1	1	475.3	475.3	475.33	475.33	0.0	0.0	12389	12389
6/1932	206132.9	206146.2	374655.7	395095.6	128409.6	129845.0	1	1	575.8	575.8	575.79	575.79	0.0	0.0	11899	11899
7/1932	196331.6	196391.9	345253.2	363243.7	122761.5	124092.8	1	1	868.3	906.5	452.13	452.17	25588.0	27937.0	27393	29742
8/1932	193580.1	193641.5	325046.0	341831.9	117151.5	118461.7	1	1	394.0	411.6	373.46	373.54	1263.3	2339.9	2591	3667
9/1932	190169.7	190092.1	318391.1	331089.1	112109.7	113400.8	1	1	254.7	324.4	254.08	254.24	37.8	4172.7	1231	5365
10/1932	170767.4	171037.0	318391.1	324066.7	108615.2	109888.9	0	0	464.1	572.1	325.00	325.00	8553.6	15194.6	19722	26359
11/1932	159671.5	159594.2	308050.0	312757.6	107553.5	108813.5	0	0	363.9	385.8	325.00	325.00	2313.3	3615.0	18242	19545
12/1932	158874.4	158797.5	291126.5	295831.5	111572.8	112822.4	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16436	16436
1/1933	160807.6	160749.3	279330.7	284046.9	122808.0	124035.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16870	16870
2/1933	155460.4	155181.6	262872.2	267584.7	128245.1	129684.2	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15032	15032
3/1933	164599.4	164556.8	246117.8	250828.2	134059.1	135253.4	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16039	16039
4/1933	178024.5	178669.3	228955.2	233645.4	134637.8	135127.7	2	2	272.8	272.8	272.83	272.83	0.0	0.0	8940	8940
5/1933	197008.7	196953.6	223029.9	228440.6	132196.4	132630.5	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9300	9300
6/1933	195957.4	195822.7	291253.2	296907.4	127355.0	127581.1	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1824	1824
7/1933	197888.7	197795.5	272481.3	277913.6	121651.0	121871.8	2	2	376.0	378.2	363.47	363.50	769.2	903.6	2570	2704
8/1933	193974.2	194284.4	260255.7	265236.6	116006.5	116223.7	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1933	190153.2	190066.4	256891.3	262231.2	110981.8	111195.7	2	2	224.3	224.3	219.85	219.85	262.1	262.5	1459	1459
10/1933	173960.9	174221.5	256823.9	262120.4	108434.1	108645.6	1	1	522.2	517.0	284.00	284.00	14648.9	14327.0	24598	24276
11/1933	160031.5	159916.6	249933.6	255636.4	107556.5	107765.3	1	1	340.8	339.9	250.00	250.00	5405.0	5352.5	16855	16803
12/1933	168212.6	168296.0	260608.1	266138.7	113380.4	113587.9	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12156	12156
1/1934	162367.4	162250.9	267436.7	273161.6	121911.1	122118.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12511	12511
2/1934	168005.4	168140.1	279221.5	284763.9	131405.8	131559.0	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11743	11743
3/1934	167912.8	168042.9	282077.6	287605.8	135304.9	135460.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11391	11391
4/1934	173515.7	173742.8	265018.1	270524.5	136047.6	136103.2	2	2	274.8	274.8	274.76	274.76	0.0	0.0	8925	8925

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
5/1934	172180.7	172357.4	243869.8	249347.0	132134.0	132237.4	2	2	338.0	338.0	337.96	337.96	0.0	0.0	9294	9294
6/1934	166721.3	166904.0	225707.8	231144.0	127615.3	127698.0	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1837	1837
7/1934	171835.5	170507.2	205151.8	210530.7	122012.5	123555.5	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1934	167594.2	166837.5	192388.0	197287.8	116880.6	118211.6	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1934	167520.9	166801.2	182493.0	187378.5	113248.5	114348.8	2	2	172.5	172.5	172.49	172.49	0.0	0.0	1219	1219
10/1934	167621.6	167313.5	172151.7	176614.5	111300.4	112165.2	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10384	10384
11/1934	163162.3	163055.3	171569.7	176263.3	114846.5	115507.8	2	2	390.2	383.0	220.00	220.00	10128.2	9699.9	20010	19583
12/1934	164193.2	164086.6	178424.5	183117.8	124339.1	124748.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10042	10042
1/1935	168213.4	168108.7	193561.0	198266.7	137075.9	136989.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10408	10408
2/1935	167077.6	166974.3	210920.6	215624.8	139779.1	139540.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9342	9342
3/1935	168744.8	168787.1	224528.9	228891.0	142246.4	142147.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9703	9703
4/1935	206872.6	206874.8	298965.7	303416.5	147297.0	147276.6	1	1	272.8	272.8	272.80	272.80	0.0	0.0	9289	9289
5/1935	205352.9	205352.9	387740.3	389386.1	144123.8	144108.5	1	1	617.2	662.5	575.36	575.43	2571.6	5353.6	22309	25088
6/1935	196186.9	196186.9	412646.4	411919.9	138732.4	138716.9	1	1	1547.8	1587.7	777.64	777.75	45827.0	48194.5	69627	71997
7/1935	197976.1	197982.6	380998.4	380322.1	133030.8	133008.4	1	1	514.4	513.7	451.46	451.46	3871.2	3825.9	5676	5631
8/1935	194226.6	194233.0	358479.0	358000.3	127404.3	127381.6	1	1	416.6	413.4	373.90	373.88	2623.4	2431.2	3950	3758
9/1935	189854.8	189861.2	340074.2	339814.5	122305.0	122282.4	1	1	429.5	425.9	255.00	255.00	10386.3	10169.3	11577	11360
10/1935	171026.7	171033.1	325594.2	325558.2	119173.5	119150.8	0	0	736.0	732.4	325.00	325.00	25273.6	25050.2	36478	36255
11/1935	160773.7	160780.0	316507.3	316507.3	118517.5	118494.4	0	0	423.2	422.6	325.00	325.00	5844.4	5808.5	21804	21768
12/1935	161393.4	161399.7	301448.9	301448.9	122289.0	122265.6	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16436	16436
1/1936	167902.8	167958.9	318137.8	318137.8	134793.5	134756.8	0	0	363.7	363.7	325.00	325.00	2380.2	2380.2	19354	19354
2/1936	205684.4	205687.6	347763.5	347830.2	146441.4	146558.6	0	0	1516.6	1516.6	325.00	325.00	68539.8	68539.8	84823	84823
3/1936	189965.1	189976.3	332191.3	332259.1	146083.7	146023.3	0	0	1518.7	1518.7	325.00	325.00	73399.4	73399.4	89327	89327
4/1936	206164.4	206163.9	357969.7	358029.7	147569.7	147518.6	0	0	1549.3	1549.3	525.00	525.00	60953.0	60953.0	84821	84821
5/1936	204800.0	204736.1	391914.7	392265.6	144929.0	142413.6	0	0	2249.7	2154.8	777.83	777.83	90501.7	84670.2	121279	115450
6/1936	200555.5	199721.3	412679.5	412773.7	140120.0	135346.0	0	0	1634.7	1559.1	877.98	877.78	45025.7	40542.5	74865	70379
7/1936	197178.7	197444.9	379210.6	379366.5	134275.5	129561.8	0	0	661.3	642.3	451.78	451.78	12882.2	11714.8	14691	13524
8/1936	194077.6	194010.4	356542.6	357004.8	128526.8	123870.1	0	0	427.9	428.3	377.26	377.30	3111.5	3132.7	4651	4672
9/1936	190082.2	190014.9	338984.9	339181.4	123351.7	118749.9	0	0	426.0	430.5	259.98	259.98	9880.4	10144.6	11373	11637
10/1936	172740.4	172673.2	326709.8	326853.2	119851.9	115302.8	0	0	675.3	676.2	325.00	325.00	21540.9	21593.6	32756	32809
11/1936	160889.2	160822.4	317005.1	317005.1	118594.3	114093.3	0	0	451.6	454.0	325.00	325.00	7534.5	7677.8	23419	23563
12/1936	164328.7	164130.6	308035.6	307660.0	122928.4	118971.6	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16581	16581
1/1937	162875.6	162613.3	300456.9	299683.9	135222.2	131658.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16843	16843
2/1937	179061.3	178549.2	322644.9	323207.0	143170.4	142161.7	0	0	563.4	514.3	325.00	325.00	13239.9	10512.6	28630	25906
3/1937	187607.4	187460.6	338290.7	338754.7	152958.1	152272.7	0	0	793.5	780.6	325.00	325.00	28810.3	28016.9	45169	44377
4/1937	195055.0	195092.9	358926.8	359192.0	148037.3	147421.4	1	1	638.9	638.9	473.63	473.63	9832.2	9832.2	31246	31246
5/1937	205810.1	205689.1	399675.9	399775.2	144228.7	140170.5	1	1	1907.1	1834.2	677.37	677.28	75614.2	71136.9	100212	95734
6/1937	195747.9	195154.2	413192.1	412651.7	139770.6	133471.3	1	1	1392.1	1318.0	777.48	777.34	36573.9	32172.2	60404	56002
7/1937	197922.3	197882.4	381846.6	381507.7	134018.4	127802.2	1	1	512.7	500.4	451.46	451.42	3766.8	3010.2	5571	4815
8/1937	194225.2	194057.6	359062.3	359009.0	128299.9	122157.7	1	1	418.0	415.4	373.84	373.86	2713.5	2556.1	4040	3882

Date	*Baseline at 190 MGD* Pardee Storage *(acre-ft)*	*Project at 190 MGD* Pardee Storage *(acre-ft)*	*Baseline at 190 MGD* Camanche Storage *(acre-ft)*	*Project at 190 MGD* Camanche Storage *(acre-ft)*	*Baseline at 190 MGD* TRA Storage *(acre-ft)*	*Project at 190 MGD* TRA Storage *(acre-ft)*	*Baseline at 190 MGD* JSA Year Type *(NA)*	*Project at 190 MGD* JSA Year Type *(NA)*	*Baseline at 190 MGD* Camanche Outflow *(cfs)*	*Project at 190 MGD* Camanche Outflow *(cfs)*	*Baseline at 190 MGD* Required Camanche Release *(cfs)*	*Project at 190 MGD* Required Camanche Release *(cfs)*	*Baseline at 190 MGD* Camanche Flood Release (AF)	*Project at 190 MGD* Camanche Flood Release (AF)	*Baseline at 190 MGD* Flow below Lodi Lake (AF)	*Project at 190 MGD* Flow below Lodi Lake (AF)
9/1937	189889.7	189722.2	340225.8	340281.7	123157.7	117084.7	1	1	417.9	416.0	255.00	255.02	9691.2	9581.7	10882	10774
10/1937	170948.7	170979.6	325650.4	325633.8	119936.6	113928.5	0	0	697.2	695.2	325.00	325.00	22887.3	22761.7	34066	33941
11/1937	161777.0	161807.8	314832.0	314832.0	121274.4	115313.8	0	0	561.3	561.0	325.00	325.00	14062.2	14045.5	30116	30099
12/1937	175102.2	174520.9	283345.1	283436.2	129079.3	124863.0	0	0	1299.4	1280.6	325.00	325.00	59911.6	58761.2	76361	75214
1/1938	168967.3	168806.4	288563.9	286957.8	134686.8	131922.1	0	0	548.4	548.4	325.00	325.00	13735.7	13735.7	30528	30528
2/1938	199013.7	197941.0	286631.8	286854.8	146573.5	145247.2	0	0	1412.9	1372.9	325.00	325.00	60417.4	58195.9	75813	73593
3/1938	205218.2	205211.8	303410.4	302187.9	149297.1	148155.0	0	0	2359.4	2359.4	325.00	325.00	125089.4	125089.4	141241	141241
4/1938	208067.1	208071.6	321988.2	320668.0	146582.9	146003.0	0	0	2883.3	2883.3	525.00	525.00	140332.6	140332.6	164161	164161
5/1938	213727.8	213727.8	360836.0	359526.6	143686.7	143342.4	0	0	3003.2	3003.2	778.36	778.36	136803.8	136803.8	167564	167564
6/1938	206654.3	206663.3	402153.6	401964.8	138722.1	138243.7	0	0	2479.8	2463.1	878.79	878.76	95265.8	94275.8	125021	124031
7/1938	196697.7	196695.4	368046.1	367881.8	133102.6	132626.8	0	0	1152.2	1152.0	452.61	452.57	43015.7	43006.0	44820	44810
8/1938	194232.0	194229.8	345544.2	345425.9	127439.9	126968.1	0	0	441.3	440.6	377.39	377.39	3928.9	3883.9	5467	5422
9/1938	189906.2	189904.0	327029.3	326965.0	122351.3	121882.2	0	0	442.9	442.0	260.02	260.02	10882.5	10828.8	12380	12327
10/1938	174035.5	174033.3	314575.5	314564.8	119293.3	118826.6	0	0	725.6	724.8	325.00	325.00	24634.9	24581.5	35882	35830
11/1938	164781.8	164779.6	311471.7	311474.4	118832.4	118367.6	0	0	496.4	496.2	325.00	325.00	10200.1	10186.8	26127	26113
12/1938	164237.1	164295.2	314485.9	314290.3	122410.4	122084.3	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16394	16394
1/1939	161683.0	161739.2	312516.0	312320.4	130549.8	130225.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16741	16741
2/1939	158954.8	159037.8	302800.3	302604.6	136148.8	135798.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15112	15112
3/1939	169208.4	169266.8	292485.3	292112.9	141795.6	141647.4	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16149	16149
4/1939	179627.5	179761.4	294344.7	293973.3	141443.6	141220.6	2	2	274.8	274.8	274.78	274.78	0.0	0.0	8954	8954
5/1939	189440.4	189573.4	281036.2	280666.2	137284.9	137063.3	2	2	338.0	338.0	338.03	338.03	0.0	0.0	9334	9334
6/1939	185605.1	185687.4	262135.7	261768.3	131884.0	131714.2	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1820	1820
7/1939	177574.5	177656.8	241207.0	240843.3	125938.5	125779.7	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1939	168541.3	168633.9	223416.4	223056.3	120202.0	120046.5	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1939	164304.0	164408.7	210282.3	209925.0	115234.7	115082.4	2	2	203.0	203.0	172.59	172.59	1811.5	1811.3	3056	3056
10/1939	164509.6	164627.6	194934.7	194579.1	111906.4	111756.3	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10380	10380
11/1939	160844.2	160975.3	187997.8	187643.4	110803.5	110654.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9703	9703
12/1939	162592.8	162559.4	188066.2	187888.9	113953.4	113805.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9947	9947
1/1940	177151.2	177091.5	230396.6	230218.0	133677.0	133564.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10687	10687
2/1940	198163.3	198270.6	278166.0	277708.2	149935.0	149945.5	2	2	232.4	232.4	220.00	220.00	714.1	714.1	10582	10582
3/1940	206101.1	206100.7	323619.4	323561.0	154427.8	154407.8	2	2	1183.9	1179.4	220.00	220.00	59267.0	58989.3	68933	68658
4/1940	204813.7	204813.7	351713.6	351654.4	147914.5	147893.4	0	0	1948.0	1948.0	525.00	525.00	84675.6	84675.6	108489	108489
5/1940	206062.1	205927.5	408243.7	408250.9	144504.3	141048.7	0	0	1844.5	1770.3	777.45	777.35	65612.1	61056.5	96366	91810
6/1940	194290.7	193344.6	404122.0	402797.4	139662.8	133928.8	0	0	1349.8	1293.6	877.42	877.33	28110.5	24770.6	57864	54524
7/1940	197802.1	197852.1	375725.8	373456.9	133995.7	128325.3	0	0	462.4	461.9	451.41	451.41	673.5	643.5	2481	2451
8/1940	194029.6	194047.4	354698.6	353031.1	128313.6	122709.3	0	0	396.2	387.2	377.19	376.99	1168.4	625.0	2709	2166
9/1940	189786.1	189803.8	337959.0	337054.4	123252.3	117709.4	0	0	402.2	389.5	259.83	259.83	8471.5	7715.5	9961	9205
10/1940	170668.7	170686.4	325843.0	325718.1	120003.7	114519.8	0	0	617.1	604.4	325.00	325.00	17959.3	17181.4	29180	28405
11/1940	157793.6	157811.2	311143.7	311168.6	119940.3	114505.2	0	0	435.9	433.4	325.00	325.00	6598.3	6448.3	22534	22385
12/1940	172374.1	171930.0	308974.3	307987.2	129198.4	125271.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16648	16648

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
1/1941	173135.5	172108.8	324695.3	325065.3	140348.4	138054.7	0	0	458.1	421.0	325.00	325.00	8181.9	5900.9	24954	22675
2/1941	190156.7	189886.5	326690.1	326622.4	143361.4	142249.4	0	0	1001.4	982.1	325.00	325.00	37567.5	36496.4	52677	51607
3/1941	195473.2	194938.7	332749.3	332463.3	150053.2	149340.0	0	0	1260.6	1260.6	325.00	325.00	57531.4	57531.4	73603	73603
4/1941	188617.1	188383.6	360066.1	360060.2	151135.8	151101.8	1	1	725.9	715.0	473.84	473.82	15000.1	14353.9	36055	35409
5/1941	206694.0	206470.2	388284.7	384282.1	148453.5	145919.1	1	1	2051.1	2035.0	677.22	677.22	84478.4	83486.7	109082	108090
6/1941	198864.2	198128.5	412903.0	413133.4	143021.9	138234.6	1	1	1631.4	1476.1	777.89	777.72	50790.9	41557.7	74595	65362
7/1941	197945.7	197928.8	380661.6	381144.4	137169.3	132412.3	1	1	727.6	712.3	451.93	451.91	16950.2	16008.2	18755	17813
8/1941	193958.5	194089.4	356447.8	356765.4	131396.9	126698.4	1	1	486.3	486.5	374.04	374.04	6902.9	6917.4	8228	8243
9/1941	189641.3	189596.2	335853.8	336024.3	126197.5	121553.4	1	1	480.8	486.2	255.02	255.02	13433.9	13756.2	14628	14951
10/1941	171761.8	171914.3	319560.1	319592.7	122794.2	118241.2	0	0	716.6	715.6	325.00	325.00	24080.5	24019.7	35246	35186
11/1941	163380.2	163531.8	313589.9	313385.1	122809.0	118354.1	0	0	510.5	514.5	325.00	325.00	11038.2	11275.7	27015	27252
12/1941	172033.2	171814.5	296674.5	296419.3	133181.2	130624.8	0	0	858.1	841.9	325.00	325.00	32777.3	31785.6	49401	48410
1/1942	205469.7	205336.7	294760.7	294641.9	139076.9	138259.9	0	0	956.1	940.0	325.00	325.00	38807.2	37815.4	55766	54775
2/1942	200813.3	200593.2	287950.0	288071.2	142150.3	140953.7	0	0	2103.6	2085.7	325.00	325.00	98778.3	97786.6	113791	112801
3/1942	183341.9	183105.8	303065.9	302731.0	146908.1	146339.9	0	0	921.9	921.9	325.00	325.00	36704.7	36704.7	52674	52674
4/1942	205583.0	205582.3	331115.6	330530.9	150950.8	150381.7	0	0	853.5	853.5	525.00	525.00	19547.4	19547.4	43627	43627
5/1942	209736.5	209736.5	367143.8	367551.5	150183.1	149620.3	0	0	2152.3	2136.1	777.63	777.61	84523.5	83533.6	115388	114398
6/1942	205187.6	205187.6	406902.6	407705.6	144669.2	144114.9	0	0	2041.3	2034.7	878.35	878.29	69202.2	68809.4	98957	98564
7/1942	198193.5	198194.3	373279.7	373927.5	138713.8	138167.2	0	0	1182.1	1184.5	452.60	452.60	44854.3	45004.4	46659	46809
8/1942	194254.3	194254.3	347252.4	347696.7	132915.6	132377.0	0	0	569.3	572.6	377.59	377.61	11788.9	11988.3	13329	13528
9/1942	189748.2	189748.2	325673.5	325914.5	127754.2	127222.4	0	0	505.0	508.4	260.00	260.00	14577.1	14778.5	16067	16269
10/1942	170920.8	170920.8	308101.1	308134.4	124447.5	123998.7	0	0	726.4	729.8	325.00	325.00	24681.5	24888.6	35822	36028
11/1942	170857.2	170857.2	307787.4	307774.0	126326.0	125852.8	0	0	708.5	709.3	325.00	325.00	22821.2	22867.9	39006	39053
12/1942	172399.8	172246.4	298768.6	298755.2	130119.6	129756.1	0	0	745.2	745.2	325.00	325.00	25835.1	25835.1	42276	42276
1/1943	205193.6	205191.9	294318.8	294038.7	139024.9	138904.9	0	0	1058.7	1058.7	325.00	325.00	45114.7	45114.7	62022	62022
2/1943	192430.2	192366.4	279595.6	280018.2	141056.2	140947.4	0	0	1625.7	1611.4	325.00	325.00	72239.1	71445.7	87296	86503
3/1943	205013.7	205024.9	301282.4	301035.6	146302.8	146195.7	0	0	2198.1	2207.7	325.00	325.00	115171.9	115767.0	131352	131948
4/1943	209983.0	209980.2	359430.4	359842.0	147864.8	147790.5	0	0	1462.0	1450.7	525.00	525.00	55756.2	55081.8	79697	79023
5/1943	209118.6	209118.6	398098.0	398469.9	143539.2	143502.0	0	0	1799.6	1799.6	777.14	777.14	62870.8	62870.8	93616	93616
6/1943	196031.8	196031.8	406164.2	406534.4	137948.5	137913.2	0	0	1538.6	1538.6	877.52	877.52	39338.4	39338.4	69104	69104
7/1943	197148.9	197149.3	378520.9	378844.4	132044.3	132010.6	0	0	496.8	497.5	451.42	451.42	2789.5	2833.7	4594	4638
8/1943	193946.1	193946.5	355824.7	356081.0	126220.9	126189.1	0	0	445.7	446.7	377.24	377.26	4208.2	4272.1	5748	5812
9/1943	189676.7	189677.1	338567.4	338706.5	120997.2	120966.9	0	0	416.7	418.7	259.95	259.95	9330.1	9446.3	10818	10935
10/1943	172421.9	172422.3	325574.6	325597.7	117495.9	117466.9	0	0	694.7	696.6	325.00	325.00	22735.0	22850.7	33926	34042
11/1943	163575.4	163575.8	321368.5	321368.5	116437.9	116409.9	0	0	450.0	450.4	325.00	325.00	7440.8	7463.9	23371	23394
12/1943	161039.0	161039.4	309689.1	309689.1	120059.2	120032.1	0	0	337.1	337.1	325.00	325.00	743.8	743.8	17164	17164
1/1944	162214.8	162215.2	301246.7	301246.7	129367.3	129341.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16762	16762
2/1944	163678.3	163681.0	300861.4	300861.4	139731.6	139703.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15816	15816
3/1944	168905.3	168939.2	301084.3	301084.3	144277.8	144219.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15989	15989
4/1944	183667.0	183850.2	307536.5	307387.6	146833.4	146776.6	2	2	272.9	272.9	272.86	272.86	0.0	0.0	9078	9078

Date	Baseline at 190 MGD Pardee Storage (acre-ft)	Project at 190 MGD Pardee Storage (acre-ft)	Baseline at 190 MGD Camanche Storage (acre-ft)	Project at 190 MGD Camanche Storage (acre-ft)	Baseline at 190 MGD TRA Storage (acre-ft)	Project at 190 MGD TRA Storage (acre-ft)	Baseline at 190 MGD JSA Year Type (NA)	Project at 190 MGD JSA Year Type (NA)	Baseline at 190 MGD Camanche Outflow (cfs)	Project at 190 MGD Camanche Outflow (cfs)	Baseline at 190 MGD Required Camanche Release (cfs)	Project at 190 MGD Required Camanche Release (cfs)	Baseline at 190 MGD Camanche Flood Release (AF)	Project at 190 MGD Camanche Flood Release (AF)	Baseline at 190 MGD Flow below Lodi Lake (AF)	Project at 190 MGD Flow below Lodi Lake (AF)
5/1944	196176.0	196120.9	331247.5	331332.4	143051.8	142996.7	2	2	418.5	418.5	418.45	418.52	0.0	0.0	9271	9271
6/1944	198070.7	198166.0	337573.4	337501.8	138090.7	138037.4	2	2	396.0	396.1	396.04	396.14	0.0	0.0	1825	1825
7/1944	196983.1	197099.9	312624.6	312524.8	132143.0	132091.8	2	2	438.1	438.2	438.11	438.21	0.0	0.0	1804	1804
8/1944	193964.8	194071.5	292809.9	292716.2	126343.8	126294.3	2	2	365.1	365.2	365.14	365.21	0.0	0.0	1328	1328
9/1944	189930.9	189839.5	284533.8	284635.8	121139.2	121091.2	2	2	264.7	264.8	248.97	249.01	936.6	936.5	2148	2148
10/1944	172610.5	172866.3	284466.3	284568.4	117989.7	117942.9	1	1	491.3	485.7	284.00	284.00	12747.0	12399.7	21669	21321
11/1944	167821.9	168077.3	284466.3	284568.4	121680.1	121633.9	1	1	808.0	808.0	250.00	250.00	33201.5	33201.7	44958	44960
12/1944	173329.1	173078.3	299997.9	300605.8	127385.3	127339.9	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11881	11881
1/1945	167809.6	167866.6	314773.0	315073.0	133125.7	133080.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12028	12028
2/1945	181644.7	181646.6	318029.6	318385.4	140970.7	141004.7	1	1	1341.4	1341.4	250.00	250.00	60615.8	60615.8	71633	71633
3/1945	179671.9	179673.8	333539.4	333895.5	148698.1	148715.7	1	1	467.7	467.7	250.00	250.00	13388.6	13388.6	24921	24921
4/1945	195250.2	195252.1	343118.3	342827.3	147956.0	147973.3	1	1	649.8	660.7	473.68	473.70	10480.7	11126.8	31359	32005
5/1945	199960.8	198532.3	386440.1	385790.1	144793.7	142418.4	1	1	1190.5	1126.8	676.53	676.44	31600.4	27694.6	56225	52319
6/1945	200443.3	199583.9	410809.8	413705.7	139224.6	134588.7	1	1	1382.8	1220.8	777.53	777.34	36017.7	26390.0	59906	50279
7/1945	197828.7	197791.9	377900.0	380282.7	133331.0	128749.9	1	1	734.9	729.5	451.83	451.82	17404.7	17076.1	19211	18883
8/1945	194202.8	194135.8	350545.7	352234.3	127534.9	123008.6	1	1	556.9	568.5	374.06	374.06	11245.4	11956.2	12571	13282
9/1945	189875.3	189808.7	327844.8	328707.1	122334.6	117861.3	1	1	512.3	526.1	255.02	255.02	15308.9	16128.5	16501	17321
10/1945	175148.3	175279.8	312830.9	312909.8	119301.4	114888.3	0	0	781.6	791.1	325.00	325.00	28076.6	28660.0	39369	39953
11/1945	169872.5	170003.8	300785.7	300754.1	120352.0	115975.3	0	0	825.5	827.4	325.00	325.00	29783.4	29893.8	45900	46011
12/1945	206585.8	206513.0	294250.8	293595.1	131288.3	127734.0	0	0	1147.7	1147.7	325.00	325.00	50589.2	50589.2	67149	67149
1/1946	178613.8	177961.9	294115.6	294825.5	133597.2	131223.7	0	0	1571.0	1537.4	325.00	325.00	76612.7	74549.8	93172	91113
2/1946	167770.1	167174.9	298825.8	298604.1	137931.6	136632.1	0	0	546.4	546.4	325.00	325.00	12297.7	12297.7	27374	27374
3/1946	176960.3	176864.0	302833.4	302869.4	143963.2	142909.8	0	0	512.9	496.8	325.00	325.00	11553.9	10562.1	27637	26647
4/1946	193903.3	194122.6	309505.1	309263.6	144965.2	143884.0	1	1	595.3	595.3	473.56	473.56	7246.2	7246.2	28087	28087
5/1946	204999.1	204999.1	394840.3	394818.1	141476.2	140405.3	1	1	525.3	525.3	525.32	525.32	0.0	0.0	15476	15476
6/1946	194037.9	194037.9	404947.7	404925.7	136044.4	134984.7	1	1	927.9	927.9	726.78	726.78	11964.9	11964.9	32788	32788
7/1946	197878.7	197875.3	374252.9	374231.0	130321.7	129279.0	1	1	457.0	457.0	451.36	451.36	347.6	347.6	2152	2152
8/1946	194237.1	194233.6	352996.7	352978.0	124632.6	123602.3	1	1	382.5	382.4	373.53	373.53	549.5	546.6	1876	1873
9/1946	189884.7	189881.2	336968.1	336905.0	119514.5	118495.6	1	1	395.7	396.4	254.90	254.93	8376.8	8420.2	9581	9624
10/1946	170844.7	170841.2	325427.4	325418.7	115948.9	114940.1	0	0	679.1	678.2	325.00	325.00	21772.9	21718.7	32977	32923
11/1946	166967.7	166964.2	324340.6	324340.6	116831.1	115827.4	0	0	433.6	433.5	325.00	325.00	6463.0	6454.3	22572	22564
12/1946	163183.7	162950.4	323684.5	323684.5	122237.3	121468.2	0	0	400.0	400.0	325.00	325.00	4611.6	4611.6	21018	21018
1/1947	161133.1	160901.9	310061.3	310061.5	128533.5	127767.4	0	0	337.1	337.1	325.00	325.00	743.8	743.8	17383	17383
2/1947	162913.6	162663.2	303787.9	303788.3	134296.7	133553.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15042	15042
3/1947	168451.2	168448.9	306215.1	306017.2	139347.6	138559.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16144	16144
4/1947	180006.2	180065.6	300886.2	300490.6	138865.1	138220.1	2	2	274.8	274.8	274.78	274.78	0.0	0.0	8960	8960
5/1947	190932.4	190792.6	290956.0	290759.9	134345.1	133707.6	2	2	337.9	337.9	337.94	337.94	0.0	0.0	9232	9232
6/1947	191857.7	191853.6	277748.3	277355.9	130049.0	129482.9	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1843	1843
7/1947	195332.8	195328.7	256673.8	256285.1	124126.7	123568.7	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1947	193329.4	193325.3	244291.5	243906.6	118342.6	117792.5	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
9/1947	189820.8	189816.7	239913.2	239531.4	113173.0	112629.3	2	2	172.5	172.5	172.49	172.49	0.0	0.0	1192	1192
10/1947	172509.0	172504.9	239845.8	239464.0	111363.8	110822.7	1	1	602.1	602.1	284.00	284.00	19559.6	19560.4	31866	31868
11/1947	162105.6	162101.6	239549.4	239167.8	110757.2	110219.3	1	1	456.1	456.1	250.00	250.00	12262.4	12263.1	23795	23796
12/1947	160622.2	160572.2	233180.9	232799.9	114106.7	113617.9	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11803	11803
1/1948	162217.8	162533.4	229598.0	228843.1	121777.2	121298.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12062	12062
2/1948	161420.3	161357.1	226573.3	226192.6	128040.0	127566.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11369	11369
3/1948	167468.1	167540.8	223209.5	222650.4	135960.3	135529.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11620	11620
4/1948	189440.7	189442.0	241560.6	241001.0	138662.4	138304.9	1	1	272.8	272.8	272.83	272.83	0.0	0.0	9218	9218
5/1948	206172.6	206168.2	292944.5	292344.0	134564.5	134259.3	1	1	475.3	475.3	475.33	475.33	0.0	0.0	12463	12463
6/1948	203989.0	203989.4	398851.1	398214.8	129699.5	129433.3	1	1	575.8	575.8	575.79	575.79	0.0	0.0	11902	11902
7/1948	189519.5	189520.9	366912.8	366345.8	123893.4	123631.1	1	1	755.5	754.5	451.94	451.94	18667.4	18601.3	20473	20407
8/1948	189519.5	189520.9	344546.4	344025.7	118190.5	117932.0	1	1	376.4	375.7	373.42	373.42	184.1	141.7	1512	1469
9/1948	189519.5	189520.9	330141.6	329809.9	113077.9	112822.4	1	1	296.8	293.6	254.21	254.17	2533.5	2349.2	3727	3542
10/1948	170976.6	170978.0	321196.8	321150.9	109635.5	109382.2	0	0	642.8	638.2	325.00	325.00	19540.6	19255.5	30729	30444
11/1948	162353.5	162354.9	317170.4	317170.4	108685.3	108433.4	0	0	402.3	401.5	325.00	325.00	4600.1	4554.2	20520	20474
12/1948	162716.3	162717.7	318373.8	318373.8	114390.7	114138.6	0	0	329.8	329.8	325.00	325.00	297.5	297.5	16811	16811
1/1949	160113.2	160114.5	302758.4	302758.4	122529.0	122277.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16688	16688
2/1949	157987.7	157974.7	289240.8	289240.8	131054.4	130817.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15123	15123
3/1949	170614.9	170710.0	297825.6	297627.3	140682.0	140535.4	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16214	16214
4/1949	204595.9	204601.9	328597.8	328404.4	140994.2	140933.2	1	1	289.8	289.8	272.92	272.92	1004.8	1004.8	9930	9930
5/1949	199481.0	199388.5	357640.0	357576.3	137069.3	136978.4	1	1	772.6	772.6	675.94	675.94	5945.1	5945.1	30601	30601
6/1949	190414.5	190408.5	380007.9	379852.6	131625.4	131541.6	1	1	575.8	575.8	575.78	575.78	1.0	1.0	11902	11902
7/1949	193386.6	193380.7	348096.9	347942.7	125848.2	125765.2	1	1	452.1	452.1	451.33	451.33	50.0	50.0	1853	1853
8/1949	190861.4	190855.4	325179.2	325033.5	120181.0	120099.0	1	1	406.5	406.3	373.49	373.49	2027.4	2020.1	3360	3353
9/1949	189696.8	189690.9	312645.8	312500.9	115077.5	114996.3	1	1	254.7	254.7	254.12	254.12	35.8	35.8	1228	1228
10/1949	170835.4	170829.5	312645.8	312500.9	111584.6	111504.1	0	0	428.0	428.0	325.00	325.00	6331.5	6332.1	17512	17513
11/1949	159630.8	159624.9	308184.7	308040.0	111213.6	111133.7	0	0	432.2	432.2	325.00	325.00	6377.7	6377.8	22361	22361
12/1949	157551.9	157546.0	289700.5	289556.0	115843.3	115763.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16381	16381
1/1950	171501.2	171482.4	292895.1	292750.2	132567.7	132501.2	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16938	16938
2/1950	171831.9	171745.6	320077.1	319932.0	138540.4	138541.5	0	0	381.3	381.3	325.00	325.00	3124.0	3124.0	18260	18260
3/1950	180249.9	180191.6	337673.9	338490.3	145226.8	145229.3	0	0	435.5	419.4	325.00	325.00	6793.5	5801.7	22869	21879
4/1950	200812.3	200753.5	353695.5	352793.3	146206.0	146209.0	1	1	788.3	817.2	473.98	474.04	18702.1	20416.9	39611	41326
5/1950	212427.6	211997.6	394279.0	393469.0	142996.0	140162.8	1	1	1419.1	1338.7	676.68	676.51	45650.8	40718.4	70268	65336
6/1950	199499.9	198711.2	411714.6	412674.8	137555.1	132466.2	1	1	1976.6	1860.1	778.21	778.04	71308.0	64389.1	95116	88197
7/1950	195634.8	196131.5	369291.9	370180.4	131719.6	126694.2	1	1	794.8	774.9	451.90	451.87	21086.5	19860.7	22891	21665
8/1950	193967.6	193965.6	333509.3	334102.7	125999.1	121032.5	1	1	608.5	621.3	374.28	374.31	14403.4	15188.3	15729	16514
9/1950	190169.8	190167.8	302554.6	302876.5	120860.8	115951.2	1	1	654.8	659.4	255.41	255.41	23768.1	24037.1	24988	25257
10/1950	176322.8	176320.8	277366.5	277411.2	118604.4	113740.6	0	0	994.5	999.0	325.00	325.00	41164.4	41441.2	52481	52758
11/1950	204676.9	204676.9	304992.9	304973.0	125145.6	120307.6	0	0	2374.9	2376.0	325.00	325.00	121980.2	122042.7	138173	138235
12/1950	200558.0	200153.1	320690.9	320349.3	133170.5	130075.8	0	0	4225.8	4209.7	325.00	325.00	239854.7	238863.0	256322	255330

Date	*Baseline at 190 MGD* Pardee Storage *(acre-ft)*	*Project at 190 MGD* Pardee Storage *(acre-ft)*	*Baseline at 190 MGD* Camanche Storage *(acre-ft)*	*Project at 190 MGD* Camanche Storage *(acre-ft)*	*Baseline at 190 MGD* TRA Storage *(acre-ft)*	*Project at 190 MGD* TRA Storage *(acre-ft)*	*Baseline at 190 MGD* JSA Year Type *(NA)*	*Project at 190 MGD* JSA Year Type *(NA)*	*Baseline at 190 MGD* Camanche Outflow *(cfs)*	*Project at 190 MGD* Camanche Outflow *(cfs)*	*Baseline at 190 MGD* Required Camanche Release *(cfs)*	*Project at 190 MGD* Required Camanche Release *(cfs)*	*Baseline at 190 MGD* Camanche Flood Release (AF)	*Project at 190 MGD* Camanche Flood Release (AF)	*Baseline at 190 MGD* Flow below Lodi Lake (AF)	*Project at 190 MGD* Flow below Lodi Lake (AF)
1/1951	204785.3	204775.0	278312.7	278292.7	136133.5	134324.3	0	0	2461.3	2429.0	325.00	325.00	131357.3	129373.8	148141	146159
2/1951	201842.4	201618.4	268857.1	268190.3	140880.5	139941.3	0	0	1805.7	1805.7	325.00	325.00	82235.9	82235.9	97279	97279
3/1951	203981.1	203989.2	292573.1	292132.1	145588.4	145267.7	0	0	1013.5	996.1	325.00	325.00	42337.8	41266.7	58281	57213
4/1951	200954.4	200705.1	326550.9	326111.2	147311.6	147250.4	0	0	707.5	707.5	525.00	525.00	10859.7	10859.7	34770	34770
5/1951	204806.0	204806.0	363670.3	362985.2	145645.4	145584.1	0	0	872.7	872.7	776.01	776.01	5947.9	5947.9	36751	36751
6/1951	195027.0	195027.0	364745.3	364064.1	140327.0	140266.2	0	0	676.0	676.0	675.99	675.99	1.0	1.0	17852	17852
7/1951	196884.5	196884.4	336225.3	335548.9	134549.7	134489.5	0	0	455.4	455.4	451.34	451.34	248.4	248.4	2051	2051
8/1951	194230.5	194230.5	314821.7	314150.2	128949.0	128889.4	0	0	376.9	376.9	376.86	376.86	0.0	0.0	1540	1540
9/1951	189676.6	189676.5	305990.1	305322.6	123837.9	123778.8	0	0	259.7	259.7	259.12	259.12	32.8	32.8	1523	1523
10/1951	171747.5	171747.4	305922.7	305255.1	120871.4	120812.8	1	1	488.5	488.5	284.00	284.00	12574.7	12576.7	21324	21326
11/1951	169023.5	169023.5	305922.7	305255.1	123970.0	123911.4	1	1	580.3	580.3	250.00	250.00	19653.1	19652.9	31319	31319
12/1951	179421.3	179421.3	328842.3	328471.2	139488.3	139429.2	1	1	459.7	454.8	250.00	250.00	12892.8	12595.2	24921	24624
1/1952	198415.5	198415.4	324900.1	325638.8	146107.7	146043.4	1	1	1307.7	1289.7	250.00	250.00	65039.0	63928.2	77277	76166
2/1952	194425.7	194376.3	323042.5	322987.9	139962.5	139947.7	1	1	1388.3	1402.1	250.00	250.00	65475.3	66268.7	76755	77548
3/1952	199967.4	200046.6	335228.6	335044.9	147093.2	147078.8	1	1	1127.1	1127.1	250.00	250.00	53931.4	53931.4	65429	65429
4/1952	211210.6	211210.6	336181.8	336028.3	148217.3	148251.8	0	0	2722.7	2722.7	525.00	525.00	130772.2	130772.2	154614	154614
5/1952	206756.4	206901.9	392538.3	391869.6	145458.1	141971.2	0	0	3745.2	3677.4	779.20	779.16	182372.4	178209.7	213132	208970
6/1952	205030.8	204595.8	397584.1	395154.3	140740.7	135005.3	0	0	3449.5	3396.2	879.61	879.57	152920.7	149749.8	182688	179518
7/1952	197716.6	197701.7	365333.1	363635.1	135216.2	129568.6	0	0	1570.7	1551.9	453.32	453.31	68706.8	67551.3	70515	69360
8/1952	194267.9	194253.2	341227.8	340080.4	129516.4	123934.8	0	0	617.6	608.8	377.60	377.56	14759.5	14220.6	16299	15760
9/1952	190105.4	190090.6	319745.3	319076.8	124382.2	118862.9	0	0	629.1	621.1	260.18	260.18	21951.5	21476.9	23506	23031
10/1952	171795.8	171781.0	303794.1	303701.5	120806.5	115349.5	0	0	757.9	748.6	325.00	325.00	26619.9	26045.7	37758	37184
11/1952	166344.0	166329.2	303794.1	303701.5	120515.2	115105.4	0	0	489.3	489.3	325.00	325.00	9775.5	9775.6	25756	25758
12/1952	169888.3	169351.1	320979.7	319845.0	132405.4	128582.7	0	0	400.0	400.0	325.00	325.00	4611.6	4611.6	21237	21237
1/1953	176536.7	175520.0	327068.7	325715.0	135573.0	133684.7	0	0	706.5	690.3	325.00	325.00	23454.9	22463.1	40219	39229
2/1953	166805.5	166828.4	328375.8	328252.1	137786.5	136420.8	0	0	567.9	517.9	325.00	325.00	13487.8	10710.9	28440	25667
3/1953	170829.9	170682.8	331545.9	331372.6	144556.6	143570.2	0	0	387.9	385.5	325.00	325.00	3867.8	3719.1	19910	19761
4/1953	189867.9	189933.8	325605.1	324876.9	148455.5	147817.9	1	1	570.1	570.1	473.49	473.49	5750.4	5750.4	26745	26745
5/1953	196369.6	196435.2	339947.3	339222.4	145326.2	144696.1	1	1	525.3	525.3	525.32	525.32	0.0	0.0	15399	15399
6/1953	205311.1	205311.2	393449.9	392793.5	140627.3	140004.1	1	1	575.8	575.8	575.76	575.76	0.0	0.0	11953	11953
7/1953	197852.7	197852.1	365428.5	364895.4	134746.9	134131.1	1	1	986.4	984.5	452.32	452.32	32838.8	32720.0	34641	34523
8/1953	194302.5	194301.9	344931.9	344570.6	129001.7	128392.1	1	1	478.7	476.0	374.06	374.06	6435.4	6266.6	7762	7594
9/1953	190597.3	190596.8	329575.7	329379.7	123810.7	123208.2	1	1	475.3	472.6	255.00	255.00	13111.3	12947.5	14302	14138
10/1953	174444.3	174443.7	317863.7	317836.6	120258.1	119661.3	0	0	807.5	804.7	325.00	325.00	29666.5	29498.0	40874	40706
11/1953	166097.2	166096.6	317863.7	317836.6	120096.0	119502.9	0	0	560.5	560.5	325.00	325.00	14015.1	14015.2	29996	29998
12/1953	164358.9	164418.9	319661.4	319436.0	122858.7	122407.4	0	0	400.0	400.0	325.00	325.00	4611.6	4611.6	21017	21017
1/1954	166046.0	166103.8	321320.7	321244.1	131839.0	131391.2	0	0	368.5	366.1	325.00	325.00	2677.7	2529.0	19418	19269
2/1954	167796.7	167704.6	322001.6	321925.0	138212.8	137915.8	0	0	400.0	400.0	325.00	325.00	4165.4	4165.4	19232	19232
3/1954	174983.6	175196.1	334471.7	334087.5	144403.8	144110.8	0	0	503.2	503.2	325.00	325.00	10958.8	10958.8	27117	27117
4/1954	189740.8	189794.1	338910.9	338636.0	145902.1	145661.2	1	1	613.7	613.7	473.59	473.59	8339.3	8339.3	29277	29277

Date	*Baseline at 190 MGD* Pardee Storage *(acre-ft)*	*Project at 190 MGD* Pardee Storage *(acre-ft)*	*Baseline at 190 MGD* Camanche Storage *(acre-ft)*	*Project at 190 MGD* Camanche Storage *(acre-ft)*	*Baseline at 190 MGD* TRA Storage *(acre-ft)*	*Project at 190 MGD* TRA Storage *(acre-ft)*	*Baseline at 190 MGD* JSA Year Type *(NA)*	*Project at 190 MGD* JSA Year Type *(NA)*	*Baseline at 190 MGD* Camanche Outflow *(cfs)*	*Project at 190 MGD* Camanche Outflow *(cfs)*	*Baseline at 190 MGD* Required Camanche Release *(cfs)*	*Project at 190 MGD* Required Camanche Release *(cfs)*	*Baseline at 190 MGD* Camanche Flood Release (AF)	*Project at 190 MGD* Camanche Flood Release (AF)	*Baseline at 190 MGD* Flow below Lodi Lake (AF)	*Project at 190 MGD* Flow below Lodi Lake (AF)
5/1954	195851.7	195904.7	349672.7	349399.0	141142.9	140904.1	1	1	772.7	772.7	675.97	675.97	5946.5	5946.5	30568	30568
6/1954	197895.3	197974.4	329490.2	329191.3	135651.8	135415.2	1	1	575.8	575.8	575.78	575.78	1.0	1.0	11929	11929
7/1954	197673.4	197583.3	307029.3	306998.7	129750.8	129517.4	1	1	379.1	377.5	375.84	374.20	199.8	203.0	2002	2006
8/1954	194349.9	194401.5	292970.9	292862.1	123977.9	123747.6	1	1	326.2	325.2	326.20	325.18	0.0	0.0	1327	1327
9/1954	190015.9	190067.3	290305.7	290215.0	118767.8	118540.3	1	1	269.8	269.5	224.69	224.05	2685.1	2705.4	3877	3898
10/1954	173221.2	173272.4	290238.2	290147.6	115168.2	114943.0	1	1	490.7	490.7	284.00	284.00	12707.8	12708.1	22393	22416
11/1954	168108.3	167812.7	290238.2	290147.6	114932.8	114708.4	1	1	570.5	576.4	250.00	250.00	19073.6	19420.9	30636	30983
12/1954	162663.3	162628.9	314696.6	314298.2	121270.9	121091.9	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12030	12030
1/1955	162439.4	162601.6	321784.6	321484.6	133375.4	133197.3	1	1	332.3	327.4	250.00	250.00	5057.9	4760.4	17356	17059
2/1955	165690.6	165578.8	317960.6	317837.1	138694.3	138614.6	1	1	276.8	276.8	250.00	250.00	1487.6	1487.6	12432	12432
3/1955	167936.3	167824.7	314943.9	315118.0	142718.7	142639.2	1	1	279.0	274.2	250.00	250.00	1785.2	1487.6	13122	12826
4/1955	179906.5	179759.5	305031.9	305205.8	145559.1	145515.9	2	2	272.8	272.8	272.80	272.80	0.0	0.0	9123	9123
5/1955	192271.0	192300.6	294509.5	294506.7	141415.7	141372.9	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9256	9256
6/1955	195759.9	195789.2	296400.3	296397.5	135902.0	135859.7	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1821	1821
7/1955	197881.6	197886.1	273975.7	273997.4	130114.6	130072.8	2	2	363.5	363.5	363.47	363.47	0.0	0.0	1801	1801
8/1955	194062.5	194278.0	261071.6	260882.1	124384.5	124343.3	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1955	190163.0	189981.9	256730.0	256936.9	119238.1	119197.4	2	2	219.8	219.8	219.82	219.82	0.0	0.0	1195	1195
10/1955	170806.9	170973.5	256662.6	256869.5	115663.4	115623.1	1	1	475.5	469.8	284.00	284.00	11772.3	11424.6	21639	21288
11/1955	164375.6	164343.0	256662.6	256869.5	115443.0	115402.9	1	1	434.3	437.7	250.00	250.00	10968.7	11166.6	22497	22694
12/1955	208156.5	208156.5	317326.9	317501.4	134898.9	134858.8	1	1	1164.5	1164.5	250.00	250.00	56232.2	56232.2	68503	68503
1/1956	207070.3	207070.3	308010.9	308184.8	144013.1	143973.8	1	1	3003.2	3003.2	250.00	250.00	169291.7	169291.7	181332	181332
2/1956	204667.5	204667.5	285587.7	285761.6	141644.9	141605.8	1	1	2035.2	2035.2	250.00	250.00	102685.8	102685.8	113881	113881
3/1956	200493.7	200493.8	304971.2	305144.7	144163.2	144124.4	1	1	956.8	956.8	250.00	250.00	43458.5	43458.5	54703	54703
4/1956	203379.8	203338.8	332460.3	332633.4	147525.6	147528.2	0	0	835.8	835.8	525.00	525.00	18496.1	18496.1	42455	42455
5/1956	210516.5	210147.4	373088.5	372265.0	145521.3	142116.7	0	0	1987.1	1932.9	777.50	777.47	74376.2	71045.7	105276	101945
6/1956	205882.5	205665.6	408505.0	408091.7	140071.2	134418.3	0	0	2353.9	2251.8	878.66	878.49	87786.4	81716.4	117539	111467
7/1956	197788.6	197837.3	374694.4	374503.1	134205.3	128627.7	0	0	1050.8	1042.8	452.50	452.50	36790.1	36295.7	38600	38108
8/1956	194239.0	194238.9	349016.2	348898.1	128469.5	122957.0	0	0	554.7	554.3	377.50	377.50	10896.2	10872.7	12435	12412
9/1956	190241.6	190241.5	327322.8	327258.8	123380.4	117929.3	0	0	548.3	547.4	259.98	259.98	17154.1	17100.6	18658	18604
10/1956	175916.2	175916.1	311186.3	311177.4	120487.0	115089.5	0	0	825.7	824.8	325.00	325.00	30784.5	30729.4	42007	41952
11/1956	168254.2	168254.0	310072.9	310074.7	119498.1	114155.5	0	0	526.3	526.1	325.00	325.00	11976.2	11965.5	27850	27839
12/1956	168062.6	167999.3	317224.4	316185.8	121703.6	117513.7	0	0	387.9	387.9	325.00	325.00	3867.8	3867.8	20250	20250
1/1957	164504.7	164356.6	320483.1	319990.2	130645.6	126773.4	0	0	397.6	385.5	325.00	325.00	4462.9	3719.1	21189	20446
2/1957	171428.3	170868.9	323054.5	323156.9	139161.0	135721.4	0	0	370.5	359.8	325.00	325.00	2529.0	1933.9	17657	17062
3/1957	169309.0	168901.4	328678.9	328306.0	145950.7	143056.2	0	0	696.8	693.5	325.00	325.00	22859.8	22661.5	39015	38816
4/1957	180442.2	180105.1	310396.2	309231.4	147285.0	145137.7	1	1	570.1	570.1	473.49	473.49	5750.4	5750.4	26696	26696
5/1957	206259.1	206260.9	327728.5	326229.1	147932.1	145804.4	1	1	475.3	475.3	475.32	475.32	0.0	0.0	12466	12466
6/1957	196711.5	196711.5	407809.5	406319.9	142391.1	140289.0	1	1	575.8	575.8	575.76	575.76	0.0	0.0	11903	11903
7/1957	197969.6	197953.1	378628.3	377257.5	136357.3	134295.6	1	1	487.4	485.6	451.36	451.36	2216.6	2107.9	4019	3911
8/1957	194021.8	194005.3	356834.1	355830.9	130524.8	128486.0	1	1	408.8	402.9	373.93	373.90	2143.7	1785.8	3471	3113

Date	Baseline at 190 MGD Pardee Storage (acre-ft)	Project at 190 MGD Pardee Storage (acre-ft)	Baseline at 190 MGD Camanche Storage (acre-ft)	Project at 190 MGD Camanche Storage (acre-ft)	Baseline at 190 MGD TRA Storage (acre-ft)	Project at 190 MGD TRA Storage (acre-ft)	Baseline at 190 MGD JSA Year Type (NA)	Project at 190 MGD JSA Year Type (NA)	Baseline at 190 MGD Camanche Outflow (cfs)	Project at 190 MGD Camanche Outflow (cfs)	Baseline at 190 MGD Required Camanche Release (cfs)	Project at 190 MGD Required Camanche Release (cfs)	Baseline at 190 MGD Camanche Flood Release (AF)	Project at 190 MGD Camanche Flood Release (AF)	Baseline at 190 MGD Flow below Lodi Lake (AF)	Project at 190 MGD Flow below Lodi Lake (AF)
9/1957	190234.7	190218.1	339598.3	339053.1	125780.3	123763.4	1	1	422.4	414.8	254.76	254.74	9976.2	9523.5	11176	10723
10/1957	174320.5	174303.9	325900.6	325850.1	124173.2	122169.0	0	0	785.3	777.3	325.00	325.00	28301.9	27808.2	39505	39012
11/1957	168227.7	168211.1	325900.6	325850.1	123390.8	121404.3	0	0	534.6	534.6	325.00	325.00	12471.3	12471.4	28405	28404
12/1957	168441.5	168241.0	328302.3	328251.8	128011.0	127890.4	0	0	532.3	532.3	325.00	325.00	12744.0	12744.0	29226	29226
1/1958	170774.6	170311.0	326553.5	326701.3	135310.7	137160.9	0	0	435.5	432.3	325.00	325.00	6793.5	6595.1	23365	23167
2/1958	184787.9	184717.4	325691.9	325324.4	149216.3	148857.2	0	0	900.0	900.0	325.00	325.00	31934.4	31934.4	46862	46862
3/1958	197633.2	197687.1	333760.2	333245.0	152589.2	151462.5	0	0	900.0	900.0	325.00	325.00	35355.9	35355.9	51214	51214
4/1958	204623.4	204623.3	334897.1	334830.1	147457.1	147446.6	0	0	1879.3	1872.7	525.00	525.00	80589.6	80192.9	104355	103960
5/1958	213199.0	212946.1	366287.9	365050.1	140509.7	137573.2	0	0	2057.4	2005.2	777.66	777.63	78690.3	75478.8	109432	106220
6/1958	206933.8	206706.8	407887.0	407961.6	135986.6	130258.1	0	0	2602.7	2499.3	878.93	878.82	102571.0	96428.8	132323	126181
7/1958	198100.2	198074.9	373747.9	374054.5	130400.1	124739.6	0	0	1238.3	1231.2	452.76	452.73	48303.6	47869.0	50111	49676
8/1958	194481.2	194538.2	348693.8	348821.3	124773.5	119179.5	0	0	672.9	674.4	377.82	377.81	18140.8	18237.3	19679	19775
9/1958	190267.4	190324.4	327341.0	327439.3	119710.3	114179.5	0	0	559.4	559.9	260.04	260.07	17813.4	17840.2	19303	19330
10/1958	173810.8	173867.4	309526.6	309545.7	116201.7	110734.3	0	0	802.3	803.6	325.00	325.00	29346.7	29425.8	40480	40560
11/1958	165729.2	165785.4	308918.5	308769.8	115004.9	109594.4	0	0	440.1	443.0	325.00	325.00	6850.9	7018.7	22736	22904
12/1958	162515.7	162154.6	306633.2	305890.4	117944.2	113595.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16299	16299
1/1959	166417.2	166388.3	316261.4	316062.4	127681.6	123382.5	0	0	339.5	325.0	325.00	325.00	892.6	0.0	17746	16854
2/1959	171061.0	171363.7	325182.8	325428.6	136502.6	132440.7	0	0	501.8	483.9	325.00	325.00	9818.3	8826.6	25046	24055
3/1959	167871.3	167837.8	326616.6	327208.8	140230.8	136197.2	0	0	378.2	378.2	325.00	325.00	3272.8	3272.8	19227	19227
4/1959	172946.4	172191.9	310410.9	311001.5	140070.2	136797.8	2	2	272.8	272.8	272.83	272.83	0.0	0.0	8984	8984
5/1959	175487.5	173321.0	285147.7	285735.2	135353.9	133537.0	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9224	9224
6/1959	180225.3	178002.5	262651.9	263235.4	130283.8	128565.3	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1821	1821
7/1959	185341.8	183141.2	236515.5	237093.1	124306.5	122610.2	2	2	363.5	363.5	363.47	363.47	0.0	0.0	1801	1801
8/1959	182691.2	180478.7	221544.9	222148.8	118575.8	116902.2	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1959	182691.2	180478.7	212102.1	212718.6	115266.3	113610.3	2	2	331.9	331.9	220.04	220.04	6655.7	6654.3	7970	7968
10/1959	170868.3	170898.2	212034.7	212651.2	111649.2	110013.7	2	2	333.9	297.6	254.00	254.00	4914.6	2679.5	12945	10718
11/1959	162602.7	162632.4	208389.5	207897.3	110332.9	108714.7	2	2	366.7	385.3	220.00	220.00	8727.3	9837.2	18386	19493
12/1959	164326.7	164034.2	208497.2	208006.0	114159.4	112877.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9930	9930
1/1960	160279.2	160384.7	211618.7	210729.6	123697.0	122422.1	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10376	10376
2/1960	160840.6	160587.1	225571.2	224680.3	131484.9	130575.1	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9715	9715
3/1960	168117.4	167913.9	223966.1	222897.9	136416.1	135639.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9670	9670
4/1960	179843.5	179902.6	210223.7	208784.5	137843.7	137186.3	2	2	272.8	272.8	272.83	272.83	0.0	0.0	9034	9034
5/1960	193448.4	193589.0	205972.4	204411.8	134623.7	134022.8	2	2	370.0	370.0	370.03	370.03	0.0	0.0	9227	9227
6/1960	197996.3	197983.9	206779.2	205260.4	129667.8	129196.3	2	2	328.1	328.1	328.11	328.11	0.0	0.0	1821	1821
7/1960	197837.8	197825.7	185306.2	183804.3	124453.9	124032.0	2	2	363.5	363.5	363.50	363.50	0.0	0.0	1803	1803
8/1960	194266.6	194303.9	170989.7	169505.8	118806.4	118396.8	2	2	318.5	318.5	318.50	318.50	0.0	0.0	1328	1328
9/1960	189743.9	189639.5	167276.7	166004.3	113774.6	113378.0	2	2	219.8	219.8	219.79	219.79	0.0	0.0	1199	1199
10/1960	171033.8	170842.4	167209.3	165936.8	111270.5	110883.8	2	2	441.8	444.4	254.00	254.00	11549.7	11707.5	19580	19739
11/1960	164007.9	164074.5	167209.3	165833.7	112328.5	111947.4	2	2	508.7	507.1	220.00	220.00	17179.6	17084.6	27029	26936
12/1960	162676.9	162704.1	170872.6	169500.5	115382.4	115095.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9927	9927

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
1/1961	162444.0	162432.5	167087.7	165715.7	124554.3	124355.6	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10286	10286
2/1961	159572.4	159549.1	158922.8	157551.6	131158.2	131019.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9253	9253
3/1961	160561.7	160547.9	148781.0	147410.6	137865.9	137778.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9691	9691
4/1961	161097.0	161083.6	138817.9	137452.1	140867.4	140780.1	3	3	199.8	199.8	199.76	199.76	0.0	0.0	4570	4570
5/1961	147758.4	147859.5	140735.2	139379.9	139633.2	139431.6	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1467	1467
6/1961	138408.8	138508.9	141539.3	140197.7	134599.9	134399.7	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1822	1822
7/1961	139471.7	139490.9	136134.9	134811.2	130362.4	130244.2	3	3	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1961	133024.9	133044.4	136134.9	134811.2	125569.9	125452.5	3	3	314.6	314.9	232.38	232.38	5055.2	5072.3	6383	6400
9/1961	133024.9	133044.4	133033.0	131718.4	121944.0	121827.4	3	3	301.6	301.7	167.42	167.42	7985.7	7990.3	8891	8896
10/1961	138608.4	138627.5	129090.0	127775.2	120232.8	120116.9	3	3	253.1	253.2	131.91	131.91	7449.6	7460.2	10288	10299
11/1961	148982.6	149001.3	123397.1	122086.4	124079.4	123962.9	3	3	131.6	131.6	131.60	131.60	0.0	0.0	4574	4574
12/1961	157414.6	157432.8	117523.6	116215.3	131399.7	131283.0	3	3	133.6	133.6	133.64	133.64	0.0	0.0	4716	4716
1/1962	160948.6	160966.4	118732.1	117424.9	135581.6	135464.8	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4764	4764
2/1962	180168.4	180186.0	163413.8	162091.9	146938.4	146875.3	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4725	4725
3/1962	173643.4	174662.0	204805.0	205543.6	145365.2	148660.5	3	3	140.0	140.0	140.01	140.01	0.0	0.0	4794	4794
4/1962	193067.6	196046.1	234403.5	241258.5	145055.2	145599.2	1	1	272.8	272.8	272.78	272.78	0.0	0.0	8983	8983
5/1962	194219.5	195138.1	249674.8	266281.7	140569.0	140388.8	1	1	475.3	475.3	475.29	475.29	0.0	0.0	12302	12302
6/1962	198920.6	200322.8	312427.1	336328.3	135720.6	135361.7	1	1	575.8	575.8	575.76	575.76	0.0	0.0	11900	11900
7/1962	197815.4	197778.4	289687.4	312162.7	130034.3	129680.6	1	1	528.0	571.8	451.50	451.61	4704.8	7389.4	6513	9198
8/1962	194210.1	194376.6	275876.5	297969.7	124371.2	124022.3	1	1	373.4	373.4	373.39	373.39	0.0	0.0	1327	1327
9/1962	190084.4	190052.7	271252.9	293402.2	119339.5	118994.6	1	1	254.7	254.7	254.12	254.12	35.8	35.8	1228	1228
10/1962	174607.0	174575.4	271185.5	293402.2	122597.1	122149.0	1	0	796.1	794.9	284.00	325.00	31488.5	28893.7	40398	40322
11/1962	166625.9	166594.5	271185.5	293265.8	121082.4	120477.1	1	0	468.6	470.0	250.00	325.00	13009.3	8625.3	24486	24565
12/1962	166312.6	166281.3	286687.8	304165.2	126595.9	126049.2	1	0	250.0	325.0	250.00	325.00	0.0	0.0	11925	16499
1/1963	179003.4	178828.6	290413.2	302270.6	131827.2	130618.1	1	0	259.7	350.8	250.00	325.00	595.1	1586.8	12669	18237
2/1963	177903.5	177958.1	275524.0	276853.0	140703.8	139888.1	1	0	1730.0	1914.3	250.00	325.00	82196.2	88265.8	93179	103407
3/1963	177080.9	177063.6	285309.0	285686.5	148261.9	147515.0	1	0	500.0	516.1	250.00	325.00	15372.1	11752.2	26910	27900
4/1963	204656.4	204656.1	323204.1	323575.1	152312.0	152253.4	1	1	570.1	570.1	473.49	473.49	5750.4	5750.4	26882	26882
5/1963	210451.0	210014.8	398879.7	396418.6	146254.5	143189.0	1	1	1710.1	1688.0	676.91	676.91	63527.5	62170.9	88173	86817
6/1963	198097.6	197374.3	414158.4	413341.7	140910.1	135590.5	1	1	1910.3	1794.8	778.14	778.06	67371.0	60500.1	91179	84308
7/1963	197956.8	197897.4	379075.5	378760.3	135135.8	129887.2	1	1	742.9	723.8	451.76	451.73	17900.0	16729.1	19704	18533
8/1963	194283.8	194293.0	349486.1	349268.8	129413.5	124223.6	1	1	651.4	648.8	374.22	374.21	17045.8	16881.8	18371	18207
9/1963	190190.3	190199.5	324284.8	324165.1	124299.8	119164.0	1	1	651.0	649.4	255.37	255.37	23543.0	23446.8	24749	24653
10/1963	174377.6	174386.8	303419.6	303403.2	121389.8	116305.8	0	0	961.1	959.5	325.00	325.00	39115.5	39012.2	50372	50269
11/1963	169675.5	169684.8	301044.7	301051.2	123501.0	118457.5	0	0	764.0	763.6	325.00	325.00	26123.9	26101.0	42281	42258
12/1963	168044.6	168017.8	306240.2	305007.5	125044.2	121091.3	0	0	363.7	361.3	325.00	325.00	2380.2	2231.4	18702	18554
1/1964	170492.6	169941.2	322505.7	320964.0	134326.8	131682.2	0	0	351.6	351.6	325.00	325.00	1636.4	1636.4	18454	18454
2/1964	164603.2	164712.4	324541.7	321962.0	138126.0	135876.6	0	0	400.0	400.0	325.00	325.00	4314.1	4314.1	19825	19825
3/1964	167725.4	167936.7	317365.9	314315.1	142489.7	140918.9	0	0	363.7	358.9	325.00	325.00	2380.2	2082.7	18371	18073
4/1964	178083.2	178361.9	302101.0	299058.7	142584.2	140955.8	2	2	272.9	272.9	272.86	272.86	0.0	0.0	8963	8963

Date	Baseline at 190 MGD Pardee Storage (acre-ft)	Project at 190 MGD Pardee Storage (acre-ft)	Baseline at 190 MGD Camanche Storage (acre-ft)	Project at 190 MGD Camanche Storage (acre-ft)	Baseline at 190 MGD TRA Storage (acre-ft)	Project at 190 MGD TRA Storage (acre-ft)	Baseline at 190 MGD JSA Year Type (NA)	Project at 190 MGD JSA Year Type (NA)	Baseline at 190 MGD Camanche Outflow (cfs)	Project at 190 MGD Camanche Outflow (cfs)	Baseline at 190 MGD Required Camanche Release (cfs)	Project at 190 MGD Required Camanche Release (cfs)	Baseline at 190 MGD Camanche Flood Release (AF)	Project at 190 MGD Camanche Flood Release (AF)	Baseline at 190 MGD Flow below Lodi Lake (AF)	Project at 190 MGD Flow below Lodi Lake (AF)
5/1964	190030.3	190307.2	279357.6	276328.4	138050.6	136434.4	2	2	370.0	370.0	370.03	370.03	0.0	0.0	9312	9312
6/1964	194788.1	194710.8	263632.6	260819.4	133070.6	131623.6	2	2	328.1	328.1	328.11	328.11	0.0	0.0	1875	1875
7/1964	197767.2	197782.9	242966.7	240089.7	127236.4	125803.4	2	2	363.5	363.5	363.50	363.50	0.0	0.0	1803	1803
8/1964	194116.0	194225.6	231668.9	228726.4	121468.4	120049.1	2	2	318.5	318.5	318.50	318.50	0.0	0.0	1329	1329
9/1964	190229.0	190140.2	229399.2	226676.5	116299.7	114893.3	2	2	228.1	228.1	219.82	219.82	490.9	490.4	1693	1692
10/1964	176134.6	176084.5	229331.8	226556.8	113174.3	111778.4	1	1	595.7	596.0	284.00	284.00	19165.0	19184.3	29185	29202
11/1964	168423.3	168373.4	229331.7	226556.7	114278.6	112888.0	1	1	722.2	722.2	250.00	250.00	28100.3	28100.2	39730	39730
12/1964	208980.2	208980.2	334181.1	333485.9	123169.2	121916.7	1	1	1075.8	1038.7	250.00	250.00	50777.6	48496.6	63021	60742
1/1965	204803.4	204800.0	293562.5	293109.1	134601.9	133973.0	1	1	3216.1	3200.0	250.00	250.00	182382.8	181391.1	194346	193354
2/1965	197702.6	197600.4	290402.4	290811.3	139110.3	138780.0	1	1	1497.1	1477.9	250.00	250.00	69263.8	68192.7	80033	78963
3/1965	186310.8	186130.4	311333.7	311742.6	145561.6	145311.9	1	1	816.1	816.1	250.00	250.00	34810.4	34810.4	46188	46188
4/1965	205052.4	205052.1	340760.8	340339.8	149847.2	149624.5	0	0	854.2	863.3	525.00	525.00	19587.1	20132.5	43636	44181
5/1965	205716.0	205578.8	379403.0	379487.6	145875.6	142471.8	0	0	1085.7	1001.0	776.42	776.25	19019.3	13817.2	49759	44557
6/1965	203987.3	203450.3	409969.1	408348.1	140386.1	134733.4	0	0	1794.1	1736.7	877.94	877.89	54515.9	51104.2	84269	80857
7/1965	197817.1	197807.8	381035.5	379975.8	134554.8	128974.4	0	0	1003.8	986.2	452.41	452.38	33906.8	32825.5	35711	34630
8/1965	195171.1	195116.3	358759.5	358002.6	128832.0	123316.9	0	0	661.2	657.1	377.78	377.78	17427.9	17176.9	19017	18766
9/1965	192616.7	192562.3	340250.8	339840.1	123652.4	118200.5	0	0	820.4	814.6	260.71	260.71	33305.2	32962.0	34798	34455
10/1965	178002.9	177948.7	325373.8	325399.6	120043.9	114654.4	0	0	1018.7	1011.6	325.00	325.00	42652.0	42216.3	53769	53336
11/1965	176523.4	176469.4	325373.8	325399.6	123075.3	117719.9	0	0	893.9	893.9	325.00	325.00	33852.4	33852.7	49965	49964
12/1965	171807.0	171912.0	331315.4	330825.0	128171.6	124008.0	0	0	635.5	622.6	325.00	325.00	19091.2	18297.8	35596	34804
1/1966	170428.2	169223.9	329012.9	329514.4	133080.8	130254.0	0	0	564.5	548.4	325.00	325.00	14727.5	13735.7	31451	30460
2/1966	161659.7	161027.6	324421.2	323853.1	139453.8	137935.1	0	0	514.3	500.0	325.00	325.00	10512.6	9719.1	25602	24810
3/1966	169368.9	169399.5	317075.2	316056.8	143325.4	141908.0	0	0	334.7	329.8	325.00	325.00	595.1	297.5	16520	16223
4/1966	181185.0	181213.0	320445.3	319429.9	144367.6	142966.1	2	2	272.8	272.8	272.83	272.83	0.0	0.0	8970	8970
5/1966	192367.1	192395.0	307541.8	306531.5	140074.9	138687.4	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9240	9240
6/1966	192698.0	192725.7	287334.4	286330.3	134705.0	133332.3	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1821	1821
7/1966	198064.0	198090.2	261197.2	260201.9	128957.2	127605.3	2	2	363.5	363.5	363.47	363.47	0.0	0.0	1804	1804
8/1966	193952.9	194159.5	248173.2	247006.9	123276.1	121940.8	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1966	190194.2	190224.4	246765.4	245782.9	118177.2	116857.0	2	2	227.9	227.9	219.82	219.82	480.2	480.2	1673	1673
10/1966	170890.5	170920.6	246698.0	245715.4	114629.2	113323.0	1	1	479.7	479.8	284.00	284.00	12031.6	12036.9	21884	21890
11/1966	168650.3	168680.4	246698.0	245715.4	116652.6	115350.9	1	1	601.9	601.9	250.00	250.00	20939.8	20939.0	32613	32612
12/1966	176134.5	175889.2	293112.5	292127.6	124158.5	123135.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12015	12015
1/1967	191521.9	191479.7	325117.3	324813.1	145389.7	144515.1	1	1	396.5	380.3	250.00	250.00	9005.1	8013.3	21464	20474
2/1967	176730.0	176396.2	326903.3	326599.5	142900.2	142411.8	1	1	1059.3	1059.3	250.00	250.00	44946.1	44946.1	55723	55723
3/1967	201538.7	201228.9	335902.9	336503.5	148679.1	148906.3	1	1	996.1	980.0	250.00	250.00	45878.4	44886.6	57439	56449
4/1967	204647.8	204647.8	337866.3	338397.6	152868.1	152857.4	0	0	1864.0	1860.0	525.00	525.00	79677.2	79439.2	103909	103676
5/1967	205457.7	205332.5	311422.7	311759.5	144031.1	140515.4	0	0	2606.5	2535.5	778.31	778.31	112409.7	108046.0	143177	138814
6/1967	210890.8	211010.7	398169.3	397938.2	140820.5	135056.0	0	0	2151.3	2064.0	878.51	878.49	75739.1	70544.1	105553	100360
7/1967	196618.4	196603.8	360556.7	361332.0	135162.7	129489.5	0	0	2555.4	2540.8	454.52	454.49	129179.9	128281.2	130991	130091
8/1967	194313.7	194303.8	341242.7	341769.0	129469.5	123861.7	0	0	492.9	496.8	377.46	377.48	7097.3	7335.7	8636	8874

Date	*Baseline at 190 MGD* Pardee Storage *(acre-ft)*	*Project at 190 MGD* Pardee Storage *(acre-ft)*	*Baseline at 190 MGD* Camanche Storage *(acre-ft)*	*Project at 190 MGD* Camanche Storage *(acre-ft)*	*Baseline at 190 MGD* TRA Storage *(acre-ft)*	*Project at 190 MGD* TRA Storage *(acre-ft)*	*Baseline at 190 MGD* JSA Year Type *(NA)*	*Project at 190 MGD* JSA Year Type *(NA)*	*Baseline at 190 MGD* Camanche Outflow *(cfs)*	*Project at 190 MGD* Camanche Outflow *(cfs)*	*Baseline at 190 MGD* Required Camanche Release *(cfs)*	*Project at 190 MGD* Required Camanche Release *(cfs)*	*Baseline at 190 MGD* Camanche Flood Release (AF)	*Project at 190 MGD* Camanche Flood Release (AF)	*Baseline at 190 MGD* Flow below Lodi Lake (AF)	*Project at 190 MGD* Flow below Lodi Lake (AF)
9/1967	190610.0	190600.2	325775.4	326060.8	124340.4	118794.0	0	0	499.1	503.1	260.02	260.02	14226.3	14465.1	15719	15958
10/1967	173823.1	173813.4	313566.1	313621.4	120908.1	115421.5	0	0	773.3	777.0	325.00	325.00	27564.6	27794.1	38756	38985
11/1967	168729.9	168720.1	313566.1	313621.4	120232.5	114795.2	0	0	589.9	589.9	325.00	325.00	15763.2	15763.0	31825	31825
12/1967	166234.9	165539.9	321902.7	321264.3	124600.9	120584.0	0	0	400.0	400.0	325.00	325.00	4611.6	4611.6	21062	21062
1/1968	170035.1	169395.8	328154.2	327116.9	134125.1	130869.1	0	0	416.1	416.1	325.00	325.00	5603.4	5603.4	22481	22481
2/1968	173938.3	172990.9	326967.2	326803.0	140973.4	139353.6	0	0	613.8	575.9	325.00	325.00	16611.8	14430.0	32254	30074
3/1968	171171.4	170610.8	329457.3	329164.5	146773.7	146146.5	0	0	636.3	617.7	325.00	325.00	19140.8	18000.3	35214	34074
4/1968	179568.7	179177.6	322178.9	321096.0	146919.3	146919.7	2	2	272.9	272.9	272.86	272.86	0.0	0.0	8951	8951
5/1968	186252.5	185864.3	297420.9	296343.2	142808.8	142808.9	2	2	370.0	370.0	370.03	370.03	0.0	0.0	9244	9244
6/1968	197845.7	197936.7	275609.6	274062.5	137268.4	137268.3	2	2	328.1	328.1	328.11	328.11	0.0	0.0	1821	1821
7/1968	197311.4	197482.2	253478.5	251862.1	131450.8	131453.7	2	2	363.5	363.5	363.50	363.50	0.0	0.0	1803	1803
8/1968	194231.7	194217.4	237680.3	236263.3	125779.7	125782.2	2	2	329.4	329.4	318.56	318.56	665.0	664.5	2011	2011
9/1968	190109.3	190095.1	233013.6	231607.4	120606.6	120608.8	2	2	228.0	228.0	219.79	219.79	486.9	486.9	1679	1679
10/1968	171944.5	171930.3	232946.1	231540.0	117212.3	117214.3	1	1	504.8	504.9	284.00	284.00	13578.5	13584.4	23506	23512
11/1968	167676.3	167662.2	232946.1	231540.0	117680.1	117682.1	1	1	668.1	668.0	250.00	250.00	24876.3	24875.1	36559	36558
12/1968	170716.0	170701.9	253845.9	252437.7	125288.6	125290.5	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11970	11970
1/1969	208300.6	208297.2	334447.3	332958.1	143308.9	143313.4	1	1	840.0	840.0	250.00	250.00	36278.2	36278.2	48754	48754
2/1969	204815.0	204814.9	324955.6	325591.8	152180.4	151944.1	1	1	2339.3	2300.0	250.00	250.00	116034.8	113852.9	127169	124989
3/1969	204343.9	204310.7	331093.0	330539.6	144246.3	144165.0	1	1	1296.8	1316.1	250.00	250.00	64364.6	65554.7	75712	76901
4/1969	205010.7	205010.8	318004.4	318539.9	145657.4	145554.3	0	0	2504.7	2486.0	525.00	525.00	117800.1	116689.3	141727	140615
5/1969	207522.5	207668.1	393961.8	392719.9	141920.0	138399.6	0	0	2751.6	2703.2	778.14	778.11	121345.8	118372.4	152084	149112
6/1969	205664.7	205377.8	407601.6	406788.6	136742.0	130931.9	0	0	3161.7	3069.7	879.36	879.27	135811.2	130342.6	165571	160101
7/1969	197944.6	197840.9	378390.9	377926.3	131156.1	125415.4	0	0	1270.0	1261.4	452.88	452.86	50240.3	49715.1	52045	51519
8/1969	195398.5	195398.2	356983.2	356691.0	125519.8	119846.7	0	0	671.6	667.2	377.82	377.82	18064.8	17791.5	19602	19329
9/1969	191788.1	191787.8	339056.3	338897.8	120435.4	114826.5	0	0	682.1	679.8	260.48	260.48	25087.1	24954.6	26581	26448
10/1969	175863.2	175863.0	326091.7	326069.8	118253.6	112700.9	0	0	964.0	961.8	325.00	325.00	39292.4	39156.0	50516	50379
11/1969	166337.7	166337.5	326091.7	326069.8	118001.8	112500.1	0	0	634.4	634.4	325.00	325.00	18411.8	18411.8	34439	34439
12/1969	177607.7	176472.9	307794.1	308575.0	129671.4	125641.0	0	0	945.8	927.7	325.00	325.00	38172.5	37061.7	54702	53591
1/1970	205155.2	205131.3	309079.4	307236.5	145928.5	143225.1	0	0	2240.0	2245.2	325.00	325.00	117750.5	118067.8	134625	134943
2/1970	204672.0	204653.8	269584.1	268725.9	141891.0	140477.1	0	0	2100.7	2068.6	325.00	325.00	98619.6	96834.5	113574	111788
3/1970	199838.4	199455.0	292208.1	292294.4	144738.9	144889.1	0	0	1172.9	1155.5	325.00	325.00	52136.3	51065.2	68158	67089
4/1970	187625.9	187715.7	315907.2	315517.7	144981.1	145173.5	0	0	661.7	661.7	525.00	525.00	8132.3	8132.3	32077	32077
5/1970	206110.1	206110.1	344338.4	344040.1	140503.5	140694.8	0	0	625.3	625.3	625.34	625.34	0.0	0.0	21520	21520
6/1970	199734.5	199738.5	405707.3	405410.6	136161.5	136347.4	0	0	676.0	676.0	675.97	675.97	0.0	0.0	17869	17869
7/1970	197783.4	197799.5	378550.9	378285.0	130464.4	130633.3	0	0	714.5	714.0	451.88	451.88	16145.7	16120.2	17949	17923
8/1970	194205.7	194383.9	356970.4	356695.1	124769.7	124937.0	0	0	462.9	460.5	377.52	377.52	5250.7	5100.0	6789	6638
9/1970	190180.5	190160.5	339128.1	339031.2	119641.9	119807.7	0	0	467.7	468.0	260.02	260.02	12357.3	12378.0	13850	13871
10/1970	173346.0	173326.1	325832.2	325816.1	116322.9	116487.5	0	0	746.2	744.9	325.00	325.00	25902.0	25821.3	37102	37022
11/1970	179511.5	179491.7	325832.2	325816.1	122386.1	122551.2	0	0	815.5	815.5	325.00	325.00	29187.9	29187.9	45445	45445
12/1970	183271.0	183251.2	330879.6	330863.9	135375.6	135597.2	0	0	1101.3	1101.3	325.00	325.00	47732.9	47732.9	64329	64329

Date	Baseline at 190 MGD Pardee Storage	Project at 190 MGD Pardee Storage	Baseline at 190 MGD Camanche Storage	Project at 190 MGD Camanche Storage	Baseline at 190 MGD TRA Storage	Project at 190 MGD TRA Storage	Baseline at 190 MGD JSA Year Type	Project at 190 MGD JSA Year Type	Baseline at 190 MGD Camanche Outflow	Project at 190 MGD Camanche Outflow	Baseline at 190 MGD Required Camanche Release	Project at 190 MGD Required Camanche Release	Baseline at 190 MGD Camanche Flood Release	Project at 190 MGD Camanche Flood Release	Baseline at 190 MGD Flow below Lodi Lake	Project at 190 MGD Flow below Lodi Lake
	(acre-ft)	*(acre-ft)*	*(acre-ft)*	*(acre-ft)*	*(acre-ft)*	*(acre-ft)*	*(NA)*	*(NA)*	*(cfs)*	*(cfs)*	*(cfs)*	*(cfs)*	(AF)	(AF)	(AF)	(AF)
1/1971	179245.4	179251.0	331594.4	331578.7	133711.0	133795.3	0	0	921.9	921.9	325.00	325.00	36704.7	36704.7	53334	53334
2/1971	175764.4	175767.5	329672.8	329657.1	136927.4	136863.8	0	0	900.0	900.0	325.00	325.00	31934.4	31934.4	46902	46902
3/1971	189380.4	189382.9	336404.6	336388.9	144749.4	144688.2	0	0	790.3	790.3	325.00	325.00	28612.0	28612.0	44738	44738
4/1971	187002.6	187004.8	355796.1	355780.5	146188.8	146129.9	1	1	628.0	628.0	473.63	473.63	9184.7	9184.7	30058	30058
5/1971	193966.0	193968.2	349966.0	349950.4	141847.2	141790.7	1	1	673.8	673.8	625.47	625.47	2972.3	2972.3	24536	24536
6/1971	206153.0	206153.1	399546.2	399533.0	136374.9	136320.7	1	1	625.8	625.8	625.76	625.76	0.0	0.0	14893	14893
7/1971	198330.1	198330.1	372535.5	372525.3	130568.9	130516.9	1	1	1050.4	1050.4	452.41	452.41	36770.0	36767.0	38572	38569
8/1971	195392.6	195392.5	352548.5	352541.6	124850.5	124800.5	1	1	739.1	739.0	374.70	374.70	22403.4	22400.1	23729	23726
9/1971	191056.1	191056.0	336629.3	336625.5	119752.4	119704.2	1	1	579.9	579.9	255.12	255.12	19328.3	19325.3	20533	20530
10/1971	174236.6	174236.6	325253.0	325252.4	116201.4	116154.8	0	0	795.8	795.7	325.00	325.00	28948.6	28945.3	40099	40096
11/1971	164501.3	164501.3	325253.0	325252.4	115755.5	115710.2	0	0	536.8	536.8	325.00	325.00	12600.6	12600.6	28640	28640
12/1971	173626.3	173626.2	330508.2	330507.7	122657.4	122613.2	0	0	512.9	512.9	325.00	325.00	11553.9	11553.9	28260	28260
1/1972	164452.0	164451.9	328440.3	328439.8	130369.2	130326.3	0	0	500.0	500.0	325.00	325.00	10760.5	10760.5	27399	27399
2/1972	163590.4	163620.8	322962.6	322962.0	137193.1	137121.0	0	0	400.0	400.0	325.00	325.00	4314.1	4314.1	19929	19929
3/1972	173461.6	173491.7	325372.4	325371.8	141064.1	140993.9	0	0	380.6	380.6	325.00	325.00	3421.5	3421.5	19331	19331
4/1972	181523.1	181553.1	321288.5	321288.0	142723.3	142654.7	1	1	471.9	471.9	423.52	423.52	2876.1	2876.1	20826	20826
5/1972	191925.3	191955.1	295168.2	295163.8	138114.2	138047.5	1	1	478.9	478.9	478.86	478.92	0.0	0.0	15376	15376
6/1972	197865.2	197894.8	302346.5	302336.9	133018.8	132954.1	1	1	510.8	510.9	510.78	510.86	0.0	0.0	11907	11907
7/1972	197801.2	197750.9	286313.2	286382.7	127275.7	127213.4	1	1	365.1	365.1	363.53	363.53	93.7	93.9	1899	1899
8/1972	194022.0	194067.9	273120.8	273093.9	121567.2	121506.9	1	1	318.5	318.5	318.50	318.50	0.0	0.0	1328	1328
9/1972	191349.2	191196.9	268358.2	268529.5	116777.2	116718.7	1	1	312.8	312.8	220.00	220.00	5524.3	5524.4	6802	6802
10/1972	172734.4	172583.1	267641.8	267813.3	116456.3	116399.1	1	1	548.9	548.9	284.00	284.00	16288.3	16287.7	26152	26152
11/1972	167484.3	167293.2	267641.8	267813.3	123256.7	123200.3	1	1	691.3	692.0	250.00	250.00	26258.7	26298.5	37950	37992
12/1972	170739.6	170856.3	286021.0	285885.1	129188.1	129156.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11894	11894
1/1973	188112.1	188061.9	320119.1	320151.3	144407.0	144421.1	1	1	537.1	537.1	250.00	250.00	17653.2	17653.2	30076	30076
2/1973	198743.1	198693.7	325004.6	325036.8	145537.1	145565.2	1	1	1339.3	1339.3	250.00	250.00	60496.8	60496.8	71662	71662
3/1973	192302.1	192252.5	334702.2	334734.5	146461.8	146477.8	1	1	1188.4	1188.4	250.00	250.00	57700.0	57700.0	69164	69164
4/1973	190654.5	190565.0	354568.2	354640.2	146056.8	146072.6	1	1	617.1	617.1	473.58	473.58	8539.9	8539.9	29397	29397
5/1973	208905.2	208909.1	392704.9	392683.5	141817.2	141832.7	1	1	780.0	780.0	676.01	676.01	6394.7	6394.7	30990	30990
6/1973	196929.9	196929.9	404394.5	404377.0	136839.7	136854.8	1	1	1377.0	1377.0	777.39	777.39	35678.7	35678.7	59478	59478
7/1973	197769.8	197769.7	374807.6	374794.4	131226.2	131240.8	1	1	702.1	702.1	451.77	451.77	15394.2	15390.1	17199	17194
8/1973	194067.3	194067.3	347838.3	347829.4	125578.9	125593.1	1	1	542.7	542.7	374.06	374.06	10372.2	10368.0	11698	11693
9/1973	190240.9	190240.9	325158.9	325154.1	120687.4	120701.2	1	1	567.2	567.2	255.02	255.02	18579.2	18575.1	19782	19778
10/1973	175124.8	175124.7	307798.1	307797.4	118040.5	118054.1	0	0	990.9	990.8	325.00	325.00	40944.8	40940.6	52279	52275
11/1973	175598.2	175598.2	305535.2	305535.4	128420.9	128421.7	0	0	915.8	915.7	325.00	325.00	35153.2	35152.4	51314	51313
12/1973	187182.7	187182.6	302515.5	302515.7	134015.0	134015.6	0	0	1106.5	1106.5	325.00	325.00	48050.3	48050.3	64684	64684
1/1974	197053.6	197053.5	291825.7	291825.8	133724.6	133725.4	0	0	1474.8	1474.8	325.00	325.00	70701.9	70701.9	87404	87404
2/1974	184464.7	184464.5	306416.9	306417.0	139802.8	139803.5	0	0	900.0	900.0	325.00	325.00	31934.4	31934.4	46949	46949
3/1974	205618.3	205618.2	330273.7	330273.7	149824.4	149825.1	0	0	1070.3	1070.3	325.00	325.00	45828.8	45828.8	61942	61942
4/1974	203934.2	203934.2	347932.4	347932.4	151665.7	151666.5	0	0	1519.3	1519.3	525.00	525.00	59167.8	59167.8	83155	83155

Date	*Baseline at 190 MGD* Pardee Storage *(acre-ft)*	*Project at 190 MGD* Pardee Storage *(acre-ft)*	*Baseline at 190 MGD* Camanche Storage *(acre-ft)*	*Project at 190 MGD* Camanche Storage *(acre-ft)*	*Baseline at 190 MGD* TRA Storage *(acre-ft)*	*Project at 190 MGD* TRA Storage *(acre-ft)*	*Baseline at 190 MGD* JSA Year Type *(NA)*	*Project at 190 MGD* JSA Year Type *(NA)*	*Baseline at 190 MGD* Camanche Outflow *(cfs)*	*Project at 190 MGD* Camanche Outflow *(cfs)*	*Baseline at 190 MGD* Required Camanche Release *(cfs)*	*Project at 190 MGD* Required Camanche Release *(cfs)*	*Baseline at 190 MGD* Camanche Flood Release (AF)	*Project at 190 MGD* Camanche Flood Release (AF)	*Baseline at 190 MGD* Flow below Lodi Lake (AF)	*Project at 190 MGD* Flow below Lodi Lake (AF)
5/1974	209395.0	209114.7	387498.5	386201.8	146316.6	142946.4	0	0	1019.0	968.6	776.13	776.05	14934.2	11836.7	45671	42574
6/1974	196521.6	196103.9	405765.9	403847.7	140965.9	135347.5	0	0	1945.8	1865.8	878.15	878.10	63528.4	58770.8	93333	88576
7/1974	198665.4	198571.1	378517.0	377309.8	135626.4	130076.1	0	0	994.2	977.4	452.43	452.39	33312.9	32284.2	35216	34187
8/1974	195321.6	195380.0	356695.6	355790.0	129856.3	124370.1	0	0	809.3	802.0	378.24	378.24	26505.6	26058.8	28044	27598
9/1974	190237.7	190097.6	338259.6	337966.9	124665.8	119239.1	0	0	688.7	681.7	260.48	260.44	25478.7	25069.5	26970	26561
10/1974	173985.6	174043.5	327294.4	327233.3	121517.5	116147.0	0	0	732.5	725.5	325.00	325.00	25055.8	24626.7	36295	35866
11/1974	162872.8	162930.4	325032.3	325044.5	120913.4	115593.3	0	0	487.0	485.7	325.00	325.00	9637.7	9564.4	25609	25536
12/1974	163994.0	162825.8	320071.4	320034.1	125147.1	121292.9	0	0	400.0	397.6	325.00	325.00	4611.6	4462.9	21020	20871
1/1975	160827.7	160910.7	313833.7	313173.9	133113.6	129407.9	0	0	356.5	344.4	325.00	325.00	1933.9	1190.1	18590	17846
2/1975	166736.7	166356.0	324171.3	322568.5	140791.1	138951.5	0	0	375.9	367.9	325.00	325.00	2826.5	2380.2	18070	17624
3/1975	188488.2	187623.7	332667.2	333332.5	149427.0	148585.6	0	0	741.9	696.8	325.00	325.00	25636.7	22859.8	41871	39097
4/1975	189534.1	189335.9	357448.2	357280.6	150582.9	150014.6	1	1	571.1	571.1	473.51	473.51	5804.7	5804.7	26761	26761
5/1975	204701.8	203217.0	360157.5	361898.3	145794.2	142868.3	1	1	1049.6	946.9	626.35	626.13	26025.3	19722.5	47545	41245
6/1975	203904.5	203233.8	403639.8	403290.8	140246.3	135065.9	1	1	1794.0	1722.7	777.98	777.82	60458.5	56223.2	84263	80025
7/1975	198235.9	198317.7	377299.0	377110.2	134374.3	129258.8	1	1	1127.6	1112.8	452.82	452.77	41492.6	40581.1	43301	42389
8/1975	195088.0	195264.5	355015.3	354713.4	128551.3	123496.5	1	1	888.6	888.9	374.88	374.89	31586.0	31604.6	32993	33011
9/1975	191655.8	191832.3	338073.1	337830.3	123306.9	118310.9	1	1	764.0	763.0	255.71	255.71	30246.7	30188.1	31440	31381
10/1975	177973.8	178150.0	328308.9	328310.5	122508.7	117556.3	0	0	908.1	904.1	325.00	325.00	35852.7	35608.5	47155	46911
11/1975	167687.4	167515.8	326978.8	327325.7	121525.1	116696.6	0	0	615.2	615.2	325.00	325.00	17265.6	17267.1	33198	33199
12/1975	165323.1	164325.3	326160.6	326506.9	123373.0	119222.1	0	0	400.0	400.0	325.00	325.00	4611.6	4611.6	20937	20937
1/1976	160030.1	160028.6	316830.8	316334.9	128878.6	125211.6	0	0	380.6	378.2	325.00	325.00	3421.5	3272.8	20015	19866
2/1976	157339.1	157399.0	300543.1	300047.4	134577.1	130875.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15598	15598
3/1976	155143.3	155093.4	281581.7	281086.8	138723.6	135161.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16021	16021
4/1976	153913.7	153447.4	270597.3	270103.7	139207.9	136092.1	3	3	200.6	200.6	199.81	199.81	48.6	48.6	4598	4598
5/1976	149809.8	148648.1	255517.1	255026.7	134331.1	131949.5	3	3	210.8	210.8	210.75	210.75	0.0	0.0	1424	1424
6/1976	142728.5	141577.0	236791.1	236304.4	128686.5	126337.2	3	3	268.5	268.5	268.51	268.51	0.0	0.0	1820	1820
7/1976	140745.8	141164.7	218405.7	217924.0	124344.9	120572.0	3	3	241.1	241.1	241.05	241.05	0.0	0.0	1115	1115
8/1976	139511.1	138896.6	208328.9	208883.6	119319.4	115721.2	3	3	208.5	208.5	208.46	208.46	0.0	0.0	989	989
9/1976	139511.1	138896.6	197659.1	198225.9	115764.7	112343.3	3	3	157.6	157.6	157.60	157.60	0.0	0.0	902	902
10/1976	138994.1	138395.3	180628.0	181191.2	113607.9	110362.3	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10330	10330
11/1976	141240.0	140655.2	168583.6	169144.9	115501.4	112407.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9751	9751
12/1976	137932.0	137361.3	154914.9	155474.2	122241.9	119271.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9890	9890
1/1977	139365.0	138728.2	143078.2	143636.8	128403.7	127049.1	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10228	10228
2/1977	136308.9	135685.5	132757.8	133315.9	131386.7	131728.6	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9242	9242
3/1977	134677.5	134069.0	121198.5	121755.3	136676.1	137491.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9634	9634
4/1977	136311.0	135717.7	108810.5	109363.3	138002.3	138794.6	3	3	199.8	199.8	199.76	199.76	0.0	0.0	4467	4467
5/1977	128335.0	127757.7	111831.5	112379.4	137104.5	137869.9	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1502	1502
6/1977	112123.0	111563.0	112900.7	113441.4	132618.9	133359.6	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1819	1819
7/1977	102740.7	102206.3	107168.8	107700.3	129134.1	129841.2	3	3	241.0	241.0	241.03	241.03	0.0	0.0	1113	1113
8/1977	98294.8	97787.3	97482.2	98004.4	125698.0	126371.8	3	3	208.5	208.5	208.48	208.48	0.0	0.0	923	923

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
9/1977	97282.7	96760.5	95062.5	95610.9	121574.2	122225.2	3	3	157.7	157.7	157.67	157.67	0.0	0.0	924	924
10/1977	97602.7	97099.0	86332.3	86874.7	119117.3	119743.9	3	3	131.3	131.3	131.33	131.33	0.0	0.0	2829	2829
11/1977	102536.5	102048.6	78499.3	79038.5	120027.3	119317.1	3	3	131.6	131.6	131.60	131.60	0.0	0.0	4570	4570
12/1977	103042.0	103133.9	70328.9	70864.8	121985.8	120885.5	3	3	133.6	133.6	133.64	133.64	0.0	0.0	4922	4922
1/1978	100749.9	106601.7	62735.2	63269.8	125899.8	127067.5	3	3	130.0	130.0	130.00	130.00	0.0	0.0	5091	5091
2/1978	96906.3	108804.9	55936.7	56470.0	130897.5	131429.8	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4402	4402
3/1978	109586.7	121143.2	47777.2	48308.5	136370.8	137152.3	3	3	139.0	139.0	139.02	139.02	0.0	0.0	4953	4953
4/1978	119600.5	130838.0	35927.9	36454.1	138189.7	139192.5	3	3	199.7	199.7	199.73	199.73	0.0	0.0	4782	4782
5/1978	111771.1	122686.1	37955.6	38475.7	137294.4	138513.4	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1418	1418
6/1978	98679.3	108052.3	38900.9	40687.3	132962.4	134317.1	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1820	1820
7/1978	95002.3	100371.6	24299.1	36390.0	128349.8	131086.6	3	3	241.0	241.0	241.03	241.03	0.0	0.0	1113	1113
8/1978	85887.5	96354.6	11403.5	24209.9	123405.8	127857.0	3	3	208.5	208.5	208.48	208.48	0.0	0.0	923	923
9/1978	82712.0	96354.6	6272.1	22969.1	119033.7	123621.0	3	3	157.7	157.7	157.72	157.72	0.0	0.0	996	996
10/1978	67119.9	95281.3	6251.5	15117.3	115743.1	121119.6	3	3	131.7	131.3	131.35	131.33	23.8	0.0	2852	2828
11/1978	55060.1	90319.1	6251.5	7918.5	115035.1	120356.0	3	3	134.3	131.6	131.63	131.60	156.9	0.0	4827	4671
12/1978	44829.7	79522.2	6309.5	6496.5	115855.4	122831.7	3	3	133.7	133.6	133.67	133.64	0.0	0.0	4689	4688
1/1979	66537.8	101073.8	6509.3	6458.1	122954.7	129730.1	3	3	130.0	130.0	130.00	130.00	0.0	0.0	5006	5006
2/1979	98154.0	132342.4	6676.3	6625.1	130615.2	137640.1	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4644	4644
3/1979	165111.3	179131.1	6494.9	19776.3	137116.0	142783.2	3	3	140.0	140.0	139.99	139.99	0.0	0.0	4767	4767
4/1979	194378.6	192121.5	38081.3	59643.9	138466.3	144857.0	1	1	272.8	272.8	272.78	272.78	0.0	0.0	8962	8962
5/1979	204675.3	202388.8	93001.1	106364.4	135040.4	142879.0	1	1	420.0	420.0	420.00	420.00	0.0	0.0	12311	12311
6/1979	204599.7	201904.0	138898.6	146872.3	130270.1	137621.9	1	1	498.4	498.4	498.45	498.45	0.0	0.0	11899	11899
7/1979	198911.6	197495.0	147047.6	149887.0	126476.1	132129.5	1	1	388.0	374.9	363.51	363.51	1504.5	701.6	3314	2511
8/1979	194044.8	188667.0	131580.7	139035.7	122846.7	126663.4	1	1	545.4	461.4	319.27	319.19	13906.0	8743.0	15236	10073
9/1979	189001.5	177984.7	131580.7	139035.7	118356.8	121759.3	1	1	319.2	317.8	220.31	220.28	5881.9	5804.8	7075	6997
10/1979	175037.2	168979.1	131513.3	138968.3	116452.8	120479.9	2	2	647.0	450.5	254.00	254.00	24165.6	12081.6	32266	20212
11/1979	168208.5	168237.6	131513.2	136648.2	117868.9	121918.8	2	2	633.8	582.8	220.00	220.00	24624.2	21588.6	34462	31425
12/1979	172828.5	173278.2	152466.9	158951.2	126959.6	129896.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10049	10049
1/1980	203353.3	203524.2	265184.6	271068.3	134453.2	137149.3	2	2	484.5	500.6	220.00	220.00	16264.7	17256.5	26789	27780
2/1980	206216.3	206226.8	318595.6	319219.5	145855.1	145297.9	2	2	1682.1	1791.7	220.00	220.00	84100.4	90407.9	93796	100096
3/1980	203314.3	203473.4	311374.3	310876.7	146178.7	145734.8	2	2	1889.0	1919.4	220.00	220.00	102626.3	104490.8	112078	113941
4/1980	198348.5	198263.9	337425.6	337789.0	147546.1	146793.4	0	0	840.2	826.7	525.00	525.00	18754.0	17950.7	42691	41892
5/1980	204442.4	204015.2	368645.7	368995.2	144271.1	140400.8	0	0	1177.8	1103.4	776.51	776.41	24676.5	20105.2	55456	50885
6/1980	206872.2	206597.9	408002.7	408083.9	138918.0	132803.2	0	0	1640.5	1549.6	877.78	877.61	45383.3	39987.7	75135	69739
7/1980	197619.1	197664.5	371595.0	371513.3	133198.2	127182.6	0	0	1626.9	1623.9	453.27	453.27	72164.3	71979.1	74039	73854
8/1980	194345.2	194308.2	346125.1	346137.1	127492.5	121547.9	0	0	554.6	554.4	377.50	377.50	10886.7	10875.9	12426	12415
9/1980	190076.9	190238.1	324917.3	324798.4	122354.0	116476.1	0	0	543.8	542.7	259.98	259.98	16890.7	16823.5	18381	18314
10/1980	171057.0	171020.0	307545.6	307542.2	118788.9	112976.4	0	0	785.8	787.2	325.00	325.00	28335.2	28418.1	39483	39566
11/1980	163522.1	163485.3	303663.3	303663.3	117566.5	111811.2	0	0	431.3	431.3	325.00	325.00	6327.6	6324.2	22235	22232
12/1980	164396.9	164293.6	307863.2	306872.1	121028.1	116372.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16400	16400

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
1/1981	173465.7	173122.5	318985.1	317991.3	131851.9	127459.5	0	0	334.7	334.7	325.00	325.00	595.0	595.0	17520	17520
2/1981	166373.2	165965.3	324765.0	323117.6	136981.6	133338.4	0	0	400.0	400.0	325.00	325.00	4165.4	4165.4	19201	19201
3/1981	172855.3	172411.0	329956.7	328404.6	143672.6	140285.9	0	0	375.8	371.0	325.00	325.00	3124.0	2826.5	19376	19078
4/1981	182394.6	182305.8	327429.2	325661.0	143320.2	139833.1	2	2	272.8	272.8	272.83	272.83	0.0	0.0	9002	9002
5/1981	188932.5	189041.4	306306.0	304349.0	138685.8	135237.6	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9238	9238
6/1981	196527.1	196200.7	283672.0	281727.3	133034.5	130066.8	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1821	1821
7/1981	197867.5	197918.8	262869.9	260567.2	127205.2	124282.1	2	2	363.5	363.5	363.47	363.47	0.0	0.0	1801	1801
8/1981	194207.7	194137.7	245143.1	242983.5	121431.4	118549.9	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1981	190071.5	190200.0	239135.7	236794.8	116301.2	113455.9	2	2	227.8	227.8	219.85	219.85	470.4	470.1	1671	1671
10/1981	174229.9	174160.4	239019.1	236727.4	114121.1	111298.6	1	1	579.8	582.3	284.00	284.00	18188.1	18343.9	28169	28326
11/1981	173697.2	173627.7	239019.1	236727.4	119507.5	116686.3	1	1	813.1	813.0	250.00	250.00	33508.3	33500.8	45300	45292
12/1981	194182.1	193883.0	261998.0	260994.0	127562.0	124974.0	1	1	538.7	517.7	250.00	250.00	17752.3	16463.1	29682	28395
1/1982	201688.9	203298.6	271804.6	269949.8	143549.2	140782.5	1	1	1512.3	1530.3	250.00	250.00	77614.4	78725.1	89818	90927
2/1982	205307.1	205339.4	310313.6	312410.0	142870.4	142917.5	1	1	2168.6	2168.6	250.00	250.00	106553.6	106553.6	117493	117493
3/1982	206793.6	206841.0	302495.6	304577.4	148810.5	151337.8	1	1	2716.1	2748.4	250.00	250.00	151638.6	153622.1	163217	165199
4/1982	207990.2	208007.2	346904.5	348370.1	149713.2	150258.3	0	0	3286.7	3300.0	525.00	525.00	164333.0	165126.4	188331	189124
5/1982	211746.9	212444.1	387917.5	387932.6	143432.2	140109.0	0	0	3506.5	3445.2	779.03	778.98	167705.1	163939.7	198473	194707
6/1982	206713.0	206463.6	407966.8	407906.4	138513.5	132927.8	0	0	2367.3	2291.9	878.80	878.67	88575.5	84096.7	118337	113859
7/1982	198037.9	198140.8	365417.4	365665.5	133188.3	127664.2	0	0	1655.8	1645.2	453.53	453.49	73927.2	73273.7	75737	75083
8/1982	194809.9	194773.4	330207.3	330327.4	127670.9	122212.8	0	0	1022.5	1026.8	378.60	378.68	39591.7	39853.2	41131	41393
9/1982	191958.3	192229.1	299560.3	299564.9	122896.7	117499.0	0	0	1028.3	1025.0	261.02	261.02	45654.8	45462.6	47345	47155
10/1982	184405.3	184675.2	277965.5	277977.1	121271.4	115926.2	0	0	1090.1	1090.0	325.00	325.00	47047.0	47039.9	58421	58415
11/1982	195052.6	194984.5	277965.5	277977.1	129805.8	124572.3	0	0	1208.1	1213.8	325.00	325.00	52550.3	52887.8	68746	69082
12/1982	204701.6	204688.9	293529.4	293553.4	134610.4	131174.3	0	0	1587.1	1558.1	325.00	325.00	77604.4	75819.3	94103	92320
1/1983	207382.1	207311.4	322515.6	321455.4	140027.0	137796.3	0	0	1547.1	1547.1	325.00	325.00	75144.9	75144.9	92094	92094
2/1983	207916.9	207911.4	322418.7	322935.3	149778.5	147629.4	0	0	2810.7	2775.0	325.00	325.00	138051.6	136068.1	153168	151185
3/1983	205952.5	205952.5	363237.6	362744.7	154673.5	154574.8	0	0	3619.4	3635.5	325.00	325.00	202564.9	203556.7	218899	219890
4/1983	206851.0	206849.9	338006.8	337485.2	148890.1	148779.7	0	0	2623.3	2623.3	525.00	525.00	124861.3	124861.3	148847	148847
5/1983	207997.3	208142.6	329642.4	326332.7	145684.7	142144.0	0	0	3048.4	3016.1	778.36	778.31	139580.5	137600.2	170382	168401
6/1983	210008.5	210147.4	411955.5	409124.9	140599.1	134780.3	0	0	4416.7	4316.7	880.38	880.34	210426.5	204478.8	240184	234236
7/1983	203830.5	203830.5	370791.9	370508.9	135245.9	129497.9	0	0	3770.8	3731.7	455.62	455.59	203844.0	201445.6	205652	203254
8/1983	195888.5	195888.6	332616.8	332425.6	129749.7	124068.4	0	0	1406.8	1405.3	379.67	379.67	63154.9	63064.8	64698	64608
9/1983	192454.8	192454.9	301686.8	301580.2	124840.8	119220.8	0	0	1128.7	1127.3	261.70	261.70	51593.3	51509.5	53128	53044
10/1983	180195.0	180195.1	275346.0	275331.2	121225.0	115707.9	0	0	1214.2	1212.7	325.00	325.00	54676.7	54585.1	65804	65713
11/1983	204899.8	204899.8	274985.6	274964.9	127417.9	121895.6	0	0	1687.6	1687.7	325.00	325.00	81083.3	81089.2	97408	97414
12/1983	211160.3	211115.6	316338.0	315250.2	133261.5	129676.3	0	0	2209.7	2196.8	325.00	325.00	115886.0	115092.6	132534	131740
1/1984	202656.0	202173.5	270440.0	270076.3	133033.6	131451.8	0	0	2587.7	2553.5	325.00	325.00	139132.6	137030.1	155609	153508
2/1984	204334.5	204234.1	274340.6	274021.6	140529.1	139878.7	0	0	1337.9	1314.5	325.00	325.00	58265.3	56916.5	73880	72536
3/1984	203178.5	203146.1	303035.8	302219.2	146767.5	146550.3	0	0	904.5	904.5	325.00	325.00	35633.6	35633.6	51609	51609
4/1984	193286.5	193305.5	330612.6	330015.9	148178.7	148236.7	0	0	753.3	744.2	525.00	525.00	13587.0	13041.5	37491	36945

Date	*Baseline at 190 MGD* Pardee Storage *(acre-ft)*	*Project at 190 MGD* Pardee Storage *(acre-ft)*	*Baseline at 190 MGD* Camanche Storage *(acre-ft)*	*Project at 190 MGD* Camanche Storage *(acre-ft)*	*Baseline at 190 MGD* TRA Storage *(acre-ft)*	*Project at 190 MGD* TRA Storage *(acre-ft)*	*Baseline at 190 MGD* JSA Year Type *(NA)*	*Project at 190 MGD* JSA Year Type *(NA)*	*Baseline at 190 MGD* Camanche Outflow *(cfs)*	*Project at 190 MGD* Camanche Outflow *(cfs)*	*Baseline at 190 MGD* Required Camanche Release *(cfs)*	*Project at 190 MGD* Required Camanche Release *(cfs)*	*Baseline at 190 MGD* Camanche Flood Release (AF)	*Project at 190 MGD* Camanche Flood Release (AF)	*Baseline at 190 MGD* Flow below Lodi Lake (AF)	*Project at 190 MGD* Flow below Lodi Lake (AF)
5/1984	207647.6	207647.6	381938.8	381363.8	144227.1	144282.9	0	0	774.4	774.4	726.05	726.05	2975.2	2975.2	30655	30655
6/1984	197951.8	197951.8	413983.3	413971.1	139735.9	139789.5	0	0	1119.3	1109.9	827.10	827.10	17389.7	16827.8	44179	43617
7/1984	198106.4	198106.4	385756.0	385746.9	134171.0	134222.3	0	0	901.4	901.3	452.39	452.39	27608.1	27605.2	29415	29412
8/1984	194317.5	194317.5	361153.7	361147.6	128657.5	128706.5	0	0	767.2	767.1	378.14	378.14	23920.2	23917.3	25463	25460
9/1984	190196.7	190196.7	341384.5	341381.1	123652.1	123699.3	0	0	528.2	528.2	259.98	259.98	15962.2	15959.4	17453	17450
10/1984	174250.8	174250.8	326798.0	326797.5	121988.1	121955.6	0	0	883.8	883.7	325.00	325.00	34358.0	34355.1	45631	45628
11/1984	171727.5	171727.4	325511.4	325511.6	128623.0	128587.1	0	0	818.6	818.6	325.00	325.00	29370.0	29369.4	45558	45557
12/1984	167870.4	167870.4	327722.0	327722.1	128487.0	128451.4	0	0	545.2	545.2	325.00	325.00	13537.4	13537.4	29945	29945
1/1985	161250.2	161219.3	321237.7	321237.9	131799.9	131795.4	0	0	395.2	395.2	325.00	325.00	4314.1	4314.1	20959	20959
2/1985	164499.5	164666.8	320169.1	319971.0	138181.7	138177.3	0	0	383.9	383.9	325.00	325.00	3272.8	3272.8	18342	18342
3/1985	176223.6	176043.8	331090.1	331239.1	147272.0	147267.5	0	0	390.3	390.3	325.00	325.00	4016.6	4016.6	20193	20193
4/1985	185047.6	184868.9	346091.9	346240.4	146652.3	146648.0	2	2	285.6	285.6	272.90	272.90	754.0	754.0	9685	9685
5/1985	189164.9	189135.1	326898.3	326898.0	142083.6	142079.3	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9219	9219
6/1985	195221.5	195191.9	304641.7	304641.5	136818.6	136814.3	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1838	1838
7/1985	198013.1	198149.9	279328.9	279162.5	131029.4	131025.2	2	2	363.5	363.5	363.47	363.47	0.0	0.0	1801	1801
8/1985	194297.3	194296.9	267097.8	267069.0	125289.6	125285.4	2	2	320.3	320.3	318.55	318.55	110.4	110.4	1443	1443
9/1985	189796.9	189796.4	264540.5	264511.8	120261.3	120257.2	2	2	292.2	292.2	219.93	219.93	4302.8	4302.8	5539	5539
10/1985	174411.4	174410.9	264473.0	264444.4	117207.4	117203.3	1	1	521.8	521.8	284.00	284.00	14618.9	14619.0	24544	24544
11/1985	171447.3	171446.8	264140.0	264111.4	119087.1	119083.0	1	1	648.2	648.2	250.00	250.00	23694.5	23694.5	35379	35379
12/1985	168023.6	168023.1	282817.6	282789.0	123419.3	123415.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11880	11880
1/1986	173993.4	173992.9	301260.0	301231.4	132506.3	132502.3	1	1	321.0	321.0	250.00	250.00	4363.7	4363.7	16544	16544
2/1986	205696.9	205696.9	391021.2	390991.9	143938.3	143946.4	1	1	2913.6	2913.6	250.00	250.00	147929.4	147929.4	159217	159217
3/1986	205123.1	205123.1	334426.1	334396.7	144884.9	144907.2	1	1	4106.5	4106.5	250.00	250.00	237127.4	237127.4	248596	248596
4/1986	205472.7	205472.7	348337.4	348307.8	144079.6	144101.9	0	0	1554.0	1554.0	525.00	525.00	61230.6	61230.6	85124	85124
5/1986	211399.8	210983.7	394204.6	393553.5	140799.4	137722.4	0	0	1833.5	1769.7	777.38	777.26	64942.3	61022.3	95710	91790
6/1986	197956.7	197504.3	409016.5	407007.6	135577.8	130158.3	0	0	1858.5	1790.7	877.99	877.94	58347.7	54314.8	88103	84070
7/1986	197891.4	197829.7	381405.6	379973.5	129964.5	124610.2	0	0	688.7	673.1	451.83	451.77	14565.5	13610.9	16370	15415
8/1986	194319.6	194339.8	358181.4	357179.0	124325.2	119034.2	0	0	550.3	542.1	377.52	377.52	10625.3	10121.9	12164	11660
9/1986	191809.2	191829.2	337241.0	336688.7	119842.7	114607.7	0	0	758.1	750.6	260.29	260.29	29622.2	29174.4	31316	30869
10/1986	173632.6	173652.5	322988.9	322882.0	116316.9	111141.8	0	0	765.4	758.2	325.00	325.00	27079.5	26635.5	38222	37778
11/1986	166193.0	166212.8	322988.9	322882.0	115246.7	110124.0	0	0	450.5	450.5	325.00	325.00	7468.8	7468.9	23388	23388
12/1986	164348.8	164333.5	319658.5	319056.0	118669.4	114419.3	0	0	397.6	392.7	325.00	325.00	4462.9	4165.3	20847	20549
1/1987	161028.1	161013.2	314724.7	314122.2	127460.5	123243.0	0	0	354.0	354.0	325.00	325.00	1785.2	1785.2	18509	18509
2/1987	160294.6	159860.8	309366.2	308564.7	137322.1	133739.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15169	15169
3/1987	165426.3	165542.6	303660.8	302660.1	143238.2	139332.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16230	16230
4/1987	167041.4	167227.5	290312.4	289315.3	143070.5	139133.8	3	3	200.6	200.6	199.78	199.78	50.4	50.4	4519	4519
5/1987	163112.3	162647.0	274961.3	273969.9	138364.2	135114.0	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1418	1418
6/1987	160151.3	159528.6	256070.3	255086.0	132786.4	129743.5	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1819	1819
7/1987	166513.6	165987.3	235202.5	234228.1	126759.1	123775.9	3	3	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1987	163822.7	163246.8	226254.7	225410.4	120979.6	118058.0	3	3	238.0	239.2	232.09	232.09	366.2	434.0	1692	1759

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
9/1987	163032.6	162479.9	218996.0	218274.0	115798.2	112935.6	3	3	169.2	169.2	166.76	166.76	147.5	147.5	1044	1044
10/1987	158287.1	157884.4	203710.1	202991.3	112517.0	109699.7	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10398	10398
11/1987	156326.6	156065.8	192272.2	191555.2	112287.6	109497.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9775	9775
12/1987	160989.7	160907.4	183225.2	182133.2	119155.0	116696.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10053	10053
1/1988	160983.4	160820.3	182465.7	181371.9	129641.5	127389.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10357	10357
2/1988	157199.4	157202.1	171314.3	170222.5	135037.8	132754.1	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9529	9529
3/1988	154920.5	155080.2	158319.0	157230.4	138518.8	136245.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9579	9579
4/1988	159633.5	159747.5	150310.9	149223.9	143298.4	141090.8	3	3	199.8	199.8	199.79	199.79	0.0	0.0	4647	4647
5/1988	150006.1	148612.4	149568.6	149908.0	142469.4	140374.9	3	3	210.8	210.8	210.75	210.75	0.0	0.0	1460	1460
6/1988	138991.2	138087.0	149815.7	149674.6	138096.8	136029.1	3	3	268.5	268.5	268.51	268.51	0.0	0.0	1828	1828
7/1988	139580.7	138108.2	146458.1	146206.7	133099.2	131753.1	3	3	241.1	241.1	241.05	241.05	0.0	0.0	1115	1115
8/1988	137528.6	136209.8	142005.5	141804.2	128267.9	126914.6	3	3	217.2	214.6	208.49	208.46	537.5	379.4	1462	1304
9/1988	132415.6	130994.8	140218.9	140094.5	124538.6	123178.2	3	3	218.3	219.3	157.97	158.00	3587.9	3650.2	4485	4547
10/1988	121746.9	120366.4	135640.5	135440.1	122658.4	121284.4	3	3	258.5	259.7	131.79	131.79	7790.7	7868.1	10618	10696
11/1988	128741.6	127395.2	132011.2	131811.0	125777.9	124540.2	3	3	131.6	131.6	131.58	131.58	0.0	0.0	4656	4656
12/1988	135870.9	134556.5	128071.6	127871.3	133310.4	132652.8	3	3	133.6	133.6	133.62	133.62	0.0	0.0	4793	4793
1/1989	139643.5	138359.9	121740.2	121540.2	136786.4	136488.3	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4735	4735
2/1989	146841.5	145583.8	117155.9	116956.0	138964.5	138647.1	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4316	4316
3/1989	177975.0	180225.2	134059.4	136922.8	143802.7	144867.0	3	3	140.0	140.0	139.99	139.99	0.0	0.0	4919	4919
4/1989	190778.4	193786.7	166457.0	176233.9	142061.9	142305.3	1	1	272.8	272.8	272.78	272.78	0.0	0.0	8964	8964
5/1989	199874.5	202123.3	212839.7	230937.6	137329.0	137535.1	1	1	420.0	420.0	420.00	420.00	0.0	0.0	12296	12296
6/1989	196832.1	197081.5	230566.1	258341.7	132341.3	132411.7	1	1	498.4	498.4	498.45	498.45	0.0	0.0	11900	11900
7/1989	197808.7	197906.3	211889.8	239531.5	126560.7	126629.8	1	1	364.7	364.7	363.51	363.51	70.9	70.9	1873	1873
8/1989	194178.7	194145.8	199249.0	226741.1	120823.9	120891.9	1	1	318.5	318.5	318.52	318.52	0.0	0.0	1335	1335
9/1989	189671.5	189660.2	195482.3	222732.2	115999.9	116067.0	1	1	394.6	395.9	220.12	220.12	10380.9	10460.8	11727	11807
10/1989	174812.5	174801.2	195337.0	222491.1	113808.1	113874.6	2	1	406.6	407.0	254.00	284.00	9383.0	7563.4	17573	17601
11/1989	167685.4	167674.2	192480.4	218505.5	113988.7	114054.5	2	1	560.4	578.4	220.00	250.00	20257.1	19540.7	29988	31057
12/1989	163355.0	163389.8	199947.6	224048.0	116423.2	116442.5	2	1	220.0	250.0	220.00	250.00	0.0	0.0	9879	11724
1/1990	164320.3	164354.2	213252.4	235570.5	127280.1	127300.3	2	1	220.0	250.0	220.00	250.00	0.0	0.0	10431	12276
2/1990	161976.6	162017.0	218124.6	238802.6	134619.2	134632.9	2	1	220.0	250.0	220.00	250.00	0.0	0.0	9342	11009
3/1990	165244.4	165283.4	219581.1	238394.5	139224.6	139239.4	2	1	220.0	250.0	220.00	250.00	0.0	0.0	9655	11499
4/1990	173198.7	173240.1	205329.5	224098.0	138928.5	138940.4	2	2	274.8	274.8	274.76	274.76	0.0	0.0	9047	9047
5/1990	187640.8	187682.1	186763.3	205452.7	136130.6	136142.4	2	2	338.0	338.0	338.00	338.00	0.0	0.0	9378	9378
6/1990	197318.2	197361.8	168610.0	187130.7	130885.9	130894.9	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1820	1820
7/1990	197875.0	197863.6	154327.2	172619.7	126183.2	125839.2	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1805	1805
8/1990	189406.4	194220.1	149784.5	162571.4	120623.5	120212.7	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1990	175853.9	189930.7	147480.2	160130.6	115724.4	115235.6	2	2	337.9	172.5	172.95	172.49	9815.0	0.0	11007	1192
10/1990	166502.0	171279.0	144520.0	160063.2	113318.9	112777.6	2	2	376.3	468.1	254.00	254.00	7518.6	13165.7	17839	23472
11/1990	155102.8	155422.2	138132.7	153244.7	112293.7	111725.9	2	2	220.0	291.9	220.00	220.00	0.0	4275.9	9735	14000
12/1990	152500.4	152331.2	125957.1	141031.3	115265.7	114702.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9944	9944

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
1/1991	138252.8	138090.0	113115.5	128147.1	122281.7	121269.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10186	10186
2/1991	131401.3	131319.8	103250.5	118274.3	129489.6	127961.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9259	9259
3/1991	155504.0	155305.4	106731.3	122006.6	141005.2	139029.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10247	10247
4/1991	163503.3	162652.0	91055.2	106234.1	142281.9	140976.9	2	2	274.8	274.8	274.76	274.76	0.0	0.0	8974	8974
5/1991	148877.0	148018.3	94640.7	109652.4	140389.5	139112.7	2	2	337.9	337.9	337.94	337.94	0.0	0.0	9263	9263
6/1991	157542.2	156690.0	98427.0	113273.9	135334.4	134073.7	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1909	1909
7/1991	159224.0	158394.4	95755.1	110341.7	130587.9	129333.9	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1991	152657.2	151816.7	95755.1	110341.7	126096.6	124846.8	2	2	340.1	336.6	232.42	232.42	6622.0	6404.8	7963	7746
9/1991	152657.2	151816.7	90558.6	105040.7	122653.7	121406.4	2	2	329.6	328.4	172.95	172.95	9323.9	9247.6	10518	10442
10/1991	162429.2	161607.8	89265.8	103729.1	122404.7	121153.1	3	3	306.1	305.2	132.14	132.14	10694.6	10643.9	13680	13629
11/1991	164296.4	164471.9	89265.8	103729.1	123647.6	123185.7	3	3	350.1	331.9	132.62	132.56	12943.9	11862.7	17437	16357
12/1991	164415.8	164393.3	105464.4	120100.9	128335.7	128610.6	3	3	133.7	133.7	133.71	133.69	0.0	0.0	4725	4724
1/1992	160901.2	160879.1	117105.4	131731.2	131352.5	131902.5	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4767	4767
2/1992	167817.9	168167.7	139168.6	153510.1	139053.0	139600.5	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4708	4708
3/1992	170494.2	170496.7	164130.4	178818.6	141635.5	142015.8	3	3	139.0	139.0	139.01	139.01	0.0	0.0	4778	4778
4/1992	177502.2	177504.7	153449.3	168067.5	140866.1	140650.6	2	2	274.8	274.8	274.75	274.75	0.0	0.0	8958	8958
5/1992	165347.4	180165.1	150013.5	149572.4	139601.9	139252.0	2	2	338.0	338.0	337.97	337.97	0.0	0.0	9221	9221
6/1992	152426.9	166207.5	150383.3	150413.6	136203.9	136070.9	2	2	268.5	268.5	268.52	268.52	0.0	0.0	1850	1850
7/1992	152723.4	165476.4	146775.2	147439.1	131622.4	131710.5	2	2	278.5	278.5	278.46	278.46	0.0	0.0	1809	1809
8/1992	152072.6	164995.3	144866.1	143773.5	127043.4	127335.3	2	2	251.5	271.9	232.14	232.22	1188.1	2438.2	2514	3764
9/1992	143997.9	155575.5	140160.3	141260.6	123514.6	124005.8	2	2	292.0	272.5	172.79	172.73	7096.0	5935.5	8289	7128
10/1992	137872.0	148140.1	139834.6	136692.2	122640.8	123324.8	3	2	249.0	335.0	131.80	254.00	7208.9	4980.0	10101	15359
11/1992	142265.3	152295.1	131756.9	123385.6	123904.7	123920.3	3	2	131.6	220.0	131.60	220.00	0.0	0.0	4481	9694
12/1992	163657.1	166578.2	134876.3	128106.4	135292.5	134699.3	3	2	133.6	220.0	133.64	220.00	0.0	0.0	5004	10272
1/1993	190897.1	191359.9	189591.5	179661.6	147980.7	147995.1	3	2	130.0	220.0	130.00	220.00	0.0	0.0	5160	10650
2/1993	199534.4	199902.5	258827.9	243916.5	147668.9	147685.4	3	2	130.0	220.0	130.00	220.00	0.0	0.0	4625	9579
3/1993	205401.7	205401.7	336984.6	330205.9	145888.5	145904.6	3	2	523.2	396.8	141.11	220.00	23494.6	10869.6	28355	20584
4/1993	203653.9	203653.9	346229.6	346750.2	146728.5	146744.3	0	0	1316.0	1193.3	525.00	525.00	47068.5	39769.2	70923	63634
5/1993	211126.8	210750.2	382244.0	380402.8	144257.2	140852.0	0	0	1793.5	1762.6	777.34	777.31	62485.1	60583.0	93330	91428
6/1993	204987.2	204530.7	409199.4	408198.7	139505.9	133840.5	0	0	2235.5	2130.2	878.49	878.33	80748.3	74490.4	110566	104308
7/1993	196445.0	196385.1	378767.9	378110.3	133711.9	128114.2	0	0	1033.2	1021.2	452.49	452.45	35704.1	34974.0	37508	36778
8/1993	194908.0	194853.8	356957.4	356416.4	127907.5	122375.3	0	0	743.9	742.0	378.04	378.04	22496.7	22379.2	24034	23916
9/1993	186568.1	186344.7	337428.0	337088.9	122689.0	117219.3	0	0	623.8	623.3	260.33	260.33	21627.3	21597.5	23120	23090
10/1993	177671.9	177449.9	325024.3	324956.7	119206.1	113797.2	0	0	604.6	600.2	325.00	325.00	17193.1	16922.5	28367	28097
11/1993	167204.2	167181.5	325024.3	324956.7	119185.7	113824.4	0	0	556.6	553.3	325.00	325.00	13781.7	13583.8	29838	29641
12/1993	164286.5	163557.7	326955.9	326491.7	124999.4	120781.5	0	0	400.0	400.0	325.00	325.00	4611.6	4611.6	21073	21073
1/1994	161280.3	160952.4	317089.1	316150.7	131452.2	127638.8	0	0	354.0	349.2	325.00	325.00	1785.2	1487.6	18511	18214
2/1994	161551.6	160907.8	312137.7	310248.6	140963.6	138430.1	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15205	15205
3/1994	159237.0	159359.7	292750.9	290118.2	144291.8	141763.4	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15970	15970
4/1994	160739.6	160379.0	282909.5	280281.8	146295.9	144269.7	3	3	200.6	200.6	199.78	199.78	50.4	50.4	4642	4642

Date	*Baseline at 190 MGD* Pardee Storage *(acre-ft)*	*Project at 190 MGD* Pardee Storage *(acre-ft)*	*Baseline at 190 MGD* Camanche Storage *(acre-ft)*	*Project at 190 MGD* Camanche Storage *(acre-ft)*	*Baseline at 190 MGD* TRA Storage *(acre-ft)*	*Project at 190 MGD* TRA Storage *(acre-ft)*	*Baseline at 190 MGD* JSA Year Type *(NA)*	*Project at 190 MGD* JSA Year Type *(NA)*	*Baseline at 190 MGD* Camanche Outflow *(cfs)*	*Project at 190 MGD* Camanche Outflow *(cfs)*	*Baseline at 190 MGD* Required Camanche Release *(cfs)*	*Project at 190 MGD* Required Camanche Release *(cfs)*	*Baseline at 190 MGD* Camanche Flood Release (AF)	*Project at 190 MGD* Camanche Flood Release (AF)	*Baseline at 190 MGD* Flow below Lodi Lake (AF)	*Project at 190 MGD* Flow below Lodi Lake (AF)
5/1994	162523.8	162165.8	269244.6	266629.9	143814.8	141807.2	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1477	1477
6/1994	166902.9	166548.0	250395.6	247800.4	138253.6	136267.3	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1819	1819
7/1994	165047.3	164814.7	229585.2	227016.3	132191.2	130242.3	3	3	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1994	164622.8	164515.3	211911.5	209369.0	126343.0	124439.9	3	3	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1994	163973.6	163854.1	207628.3	205259.8	121105.7	119246.2	3	3	216.1	216.0	167.30	167.30	2901.3	2900.4	3817	3816
10/1994	169590.9	169625.8	198995.9	196639.4	117561.1	115735.9	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10372	10372
11/1994	159108.8	159466.8	194545.2	191894.4	124414.0	122618.2	2	2	394.8	396.8	220.00	220.00	10400.4	10518.5	20279	20397
12/1994	165937.6	166195.9	200373.2	197719.6	128489.1	128732.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10102	10102
1/1995	204843.2	204844.1	276804.4	274157.6	144301.5	144780.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10805	10805
2/1995	193456.1	193110.1	310517.2	310089.6	139022.1	137947.2	2	2	703.6	661.4	220.00	220.00	26856.6	24516.1	36006	33669
3/1995	205028.6	205032.0	346040.6	346413.5	147890.4	147950.0	2	2	2741.9	2724.5	220.00	220.00	155070.0	153998.9	164911	163842
4/1995	210928.7	210929.1	317201.3	317587.7	150353.3	151071.7	0	0	2940.0	2940.0	525.00	525.00	143704.6	143704.6	167652	167652
5/1995	209000.1	209144.4	336447.1	332101.2	148037.5	143791.2	0	0	3467.7	3467.7	779.03	779.03	165324.8	165324.8	196224	196224
6/1995	210206.9	213263.7	393889.9	388856.1	144688.9	138015.4	0	0	3690.0	3560.0	880.03	879.98	167207.3	159474.8	197051	189318
7/1995	198532.6	198550.8	361264.1	359734.3	138678.7	132094.1	0	0	3304.7	3297.3	455.25	455.25	175210.6	174755.6	177017	176562
8/1995	194464.3	194487.2	341638.3	340557.1	132840.1	126335.9	0	0	737.7	730.5	378.09	378.07	22113.4	21670.4	23656	23213
9/1995	191006.2	191177.9	328596.6	328051.3	127586.1	121157.0	0	0	610.8	599.3	260.29	260.26	20856.0	20177.4	22346	21667
10/1995	177923.8	177817.0	319825.7	319807.2	123920.0	117566.4	0	0	777.2	773.2	325.00	325.00	27807.2	27559.3	38946	38698
11/1995	164295.8	164189.6	319825.7	319807.2	122634.6	116345.9	0	0	492.3	492.3	325.00	325.00	9956.2	9956.3	25855	25856
12/1995	166673.5	165916.6	327011.4	327637.1	132550.0	127901.7	0	0	438.7	419.4	325.00	325.00	6991.8	5801.7	23605	22415
1/1996	176256.5	175786.4	316567.4	315944.1	141989.4	140351.1	0	0	745.2	729.0	325.00	325.00	25835.1	24843.3	42701	41711
2/1996	204733.1	204733.7	287457.8	287501.1	146017.2	146212.0	0	0	1998.6	1960.0	325.00	325.00	96269.2	94047.7	111938	109717
3/1996	204776.1	204764.5	298606.2	298345.0	146050.0	144774.4	0	0	1811.6	1811.6	325.00	325.00	91409.6	91409.6	107390	107390
4/1996	204836.7	204832.5	343728.7	343115.5	148623.4	147168.9	0	0	994.7	994.7	525.00	525.00	27947.5	27947.5	51919	51919
5/1996	205511.5	205391.3	397222.3	394296.5	149605.2	144807.0	0	0	2418.5	2382.6	777.70	777.65	100888.3	98685.7	131683	129481
6/1996	197461.6	197731.3	404984.8	401109.0	144118.5	137088.7	0	0	1491.6	1408.3	877.60	877.49	36536.6	31587.3	66292	61343
7/1996	197812.8	197780.5	379705.8	376793.6	138193.8	131312.7	0	0	636.6	625.2	451.66	451.65	11373.0	10673.3	13180	12480
8/1996	195390.7	195097.5	357782.7	356121.5	132369.3	125572.8	0	0	597.2	581.4	377.54	377.53	13508.2	12535.2	15047	14074
9/1996	189675.4	189729.0	338452.5	337366.4	127132.8	120414.4	0	0	562.3	547.0	260.07	260.02	17986.2	17075.1	19480	18569
10/1996	176252.5	176305.8	327794.3	327606.0	123787.3	117142.5	0	0	606.5	591.9	325.00	325.00	17307.2	16411.7	28545	27651
11/1996	177070.5	177123.7	324450.2	324668.1	126458.6	119890.4	0	0	853.2	846.4	325.00	325.00	31432.0	31025.9	47542	47137
12/1996	199703.2	199779.9	321507.8	320133.3	141818.2	136906.4	0	0	2289.7	2286.5	325.00	325.00	120805.1	120606.7	137514	137317
1/1997	212332.1	212248.6	371565.1	370643.5	144278.0	141140.6	0	0	4712.9	4680.6	325.00	325.00	269805.6	267822.1	286703	284720
2/1997	204522.3	204441.4	287917.2	286251.1	138276.0	136621.2	0	0	3492.9	3485.7	325.00	325.00	175936.5	175539.8	190787	190389
3/1997	199070.2	198937.3	289533.8	290019.8	139698.1	138670.8	0	0	1245.2	1209.7	325.00	325.00	56579.3	54397.5	72417	70238
4/1997	199657.3	200032.2	320720.6	321205.2	142010.2	140487.5	0	0	680.0	680.0	525.00	525.00	9223.3	9223.3	33109	33109
5/1997	204735.2	204735.2	391458.4	392313.6	137896.6	136389.4	0	0	774.4	774.4	726.01	726.01	2972.7	2972.7	30652	30652
6/1997	197644.8	197551.4	403420.0	404241.0	132937.5	131575.2	0	0	874.9	874.9	826.64	826.64	2873.8	2873.8	29671	29671
7/1997	197769.1	197822.5	379047.4	379619.2	127183.7	125840.8	0	0	522.0	523.6	451.36	451.36	4340.5	4438.6	6145	6243
8/1997	194289.7	194244.9	357219.9	357742.6	121767.2	120441.7	0	0	578.3	580.6	377.65	377.66	12335.8	12479.1	13880	14024

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
9/1997	190187.6	190143.0	339184.2	339465.6	116605.2	115295.8	0	0	526.0	530.1	260.02	260.02	15829.1	16068.6	17319	17558
10/1997	174320.9	174315.9	326102.2	326132.7	113811.2	112513.8	0	0	833.1	836.6	325.00	325.00	31245.0	31456.1	42494	42705
11/1997	171333.3	171328.2	326102.2	326132.7	119599.0	118300.4	0	0	645.6	645.6	325.00	325.00	19074.7	19074.7	35189	35189
12/1997	161053.5	160956.7	325638.3	325650.4	126326.7	125123.1	0	0	481.3	481.6	325.00	325.00	9610.1	9628.4	26035	26053
1/1998	182529.8	182783.7	331423.2	331435.4	145343.1	144526.2	0	0	787.7	787.7	325.00	325.00	28453.3	28453.3	45535	45535
2/1998	204661.1	204661.1	324365.3	324170.9	154290.9	154144.1	0	0	2324.3	2338.6	325.00	325.00	111036.3	111829.7	126484	127277
3/1998	206691.5	206684.5	345623.2	346418.8	146952.3	146607.7	0	0	1623.2	1605.8	325.00	325.00	79826.0	78754.9	95887	94818
4/1998	205354.3	205354.3	330867.5	330618.9	146946.5	147002.9	0	0	2186.7	2203.3	525.00	525.00	98877.5	99869.2	122841	123831
5/1998	205700.7	205700.7	307006.0	307750.1	147951.7	147851.3	0	0	2861.3	2845.2	778.31	778.31	128079.4	127087.6	159112	158120
6/1998	212344.4	212344.4	394539.1	394290.0	142571.4	142473.4	0	0	2610.0	2626.7	878.86	878.86	103011.8	104003.5	132773	133765
7/1998	198234.6	198234.2	362415.1	362227.7	136701.5	136604.2	0	0	2565.1	2564.2	454.45	454.45	129782.4	129724.3	131592	131534
8/1998	195487.1	195486.6	346205.4	346078.7	130864.7	130769.5	0	0	752.4	751.5	378.15	378.15	23014.1	22954.4	24551	24492
9/1998	191580.7	191580.3	333071.5	332999.7	125652.9	125559.7	0	0	683.1	682.2	260.53	260.53	25147.4	25093.1	26653	26598
10/1998	174255.1	174254.6	324907.4	324893.4	122235.4	122143.8	0	0	753.7	752.7	325.00	325.00	26358.4	26300.7	37529	37471
11/1998	170020.2	170019.8	324907.4	324893.4	124818.3	124731.1	0	0	632.6	632.6	325.00	325.00	18302.2	18302.2	34366	34366
12/1998	169026.3	169025.8	328006.2	327992.3	127476.4	127976.1	0	0	590.3	590.3	325.00	325.00	16314.3	16314.3	32733	32733
1/1999	185546.3	185574.4	330002.7	329988.8	135937.8	135595.2	0	0	786.5	786.5	325.00	325.00	28374.0	28374.0	45224	45224
2/1999	204741.4	204741.4	324285.2	324311.1	147026.2	147141.5	0	0	2040.0	2040.0	325.00	325.00	95247.7	95247.7	110483	110483
3/1999	196602.9	196603.4	329075.9	329102.1	148979.0	148967.9	0	0	1242.6	1242.6	325.00	325.00	56420.7	56420.7	72239	72239
4/1999	197054.3	197055.0	358737.6	358763.7	150488.6	150470.9	1	1	660.6	660.6	473.68	473.68	11124.5	11124.5	32016	32016
5/1999	205702.4	205549.6	384234.2	384136.6	145278.3	142889.3	1	1	1043.9	955.8	676.23	676.14	22606.0	17193.0	47229	41816
6/1999	202351.8	201802.0	411706.8	411924.6	139820.0	135170.3	1	1	1767.3	1675.9	778.00	777.89	58870.3	53435.6	82690	77255
7/1999	198250.0	198287.7	383254.4	383460.2	133924.2	129328.7	1	1	989.3	980.0	452.52	452.55	33008.0	32429.7	34811	34232
8/1999	194299.8	194217.2	359339.9	359621.0	128120.2	123578.3	1	1	630.3	631.1	374.42	374.42	15736.9	15780.4	17066	17110
9/1999	190177.7	190293.1	340503.7	340605.5	122911.4	118421.7	1	1	549.3	549.0	255.02	255.02	17513.1	17493.3	18705	18685
10/1999	170940.4	171055.1	325998.5	326012.6	119485.6	115048.0	0	0	760.3	761.7	325.00	325.00	26763.9	26851.4	37926	38014
11/1999	168177.8	168292.5	325998.5	326012.6	120254.5	115850.4	0	0	573.6	573.6	325.00	325.00	14792.2	14792.1	30870	30870
12/1999	162960.7	162537.5	324035.1	323851.0	123408.4	119781.7	0	0	400.0	400.0	325.00	325.00	4611.6	4611.6	20933	20933
1/2000	182082.9	181522.9	328274.0	327691.6	139811.1	136889.8	0	0	483.9	481.5	325.00	325.00	9768.7	9620.0	26723	26574
2/2000	203244.5	202335.6	323758.9	324732.5	153313.3	151910.0	0	0	1388.3	1344.1	325.00	325.00	61161.2	58622.3	77115	74578
3/2000	198928.0	198527.3	329019.1	329083.9	145951.9	145363.0	0	0	1320.0	1320.0	325.00	325.00	61181.1	61181.1	77079	77079
4/2000	187168.0	187331.5	343888.7	343348.6	144971.3	144765.0	1	1	834.8	834.8	474.11	474.11	21459.8	21459.8	42393	42393
5/2000	205789.3	205789.2	385579.1	385203.7	142619.8	142415.3	1	1	772.8	772.8	676.01	676.01	5949.1	5949.1	30695	30695
6/2000	197964.5	197964.5	410404.5	411106.9	137472.4	137269.6	1	1	724.1	706.0	676.17	676.12	2852.4	1777.2	20728	19653
7/2000	198039.3	198057.6	384354.6	384864.5	131629.8	131412.6	1	1	747.6	750.6	451.83	451.83	18184.0	18370.5	19990	20176
8/2000	194533.8	194501.2	360716.7	361073.0	125853.6	125638.1	1	1	630.8	634.0	374.21	374.21	15775.0	15976.4	17101	17303
9/2000	188424.2	188391.6	340015.1	340221.3	120743.1	120529.1	1	1	593.5	596.0	255.21	255.21	20128.4	20277.4	21354	21503
10/2000	179265.0	179232.6	330458.6	330493.0	119169.6	118957.1	0	0	741.7	744.5	325.00	325.00	25622.2	25793.9	37055	37227
11/2000	166281.6	166249.3	326353.3	326353.3	119014.8	118803.9	0	0	594.3	594.8	325.00	325.00	16023.0	16057.4	31935	31969
12/2000	163722.7	163598.8	322381.6	322381.6	123206.1	123088.2	0	0	400.0	400.0	325.00	325.00	4611.6	4611.6	20951	20951

Date	*Baseline at 190 MGD* Pardee Storage *(acre-ft)*	*Project at 190 MGD* Pardee Storage *(acre-ft)*	*Baseline at 190 MGD* Camanche Storage *(acre-ft)*	*Project at 190 MGD* Camanche Storage *(acre-ft)*	*Baseline at 190 MGD* TRA Storage *(acre-ft)*	*Project at 190 MGD* TRA Storage *(acre-ft)*	*Baseline at 190 MGD* JSA Year Type *(NA)*	*Project at 190 MGD* JSA Year Type *(NA)*	*Baseline at 190 MGD* Camanche Outflow *(cfs)*	*Project at 190 MGD* Camanche Outflow *(cfs)*	*Baseline at 190 MGD* Required Camanche Release *(cfs)*	*Project at 190 MGD* Required Camanche Release *(cfs)*	*Baseline at 190 MGD* Camanche Flood Release (AF)	*Project at 190 MGD* Camanche Flood Release (AF)	*Baseline at 190 MGD* Flow below Lodi Lake (AF)	*Project at 190 MGD* Flow below Lodi Lake (AF)
1/2001	160963.9	160851.8	315599.3	315599.1	132773.1	132644.6	0	0	349.2	349.2	325.00	325.00	1487.6	1487.6	18266	18266
2/2001	163936.1	163857.5	309785.9	309785.5	144323.4	144141.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15193	15193
3/2001	169529.4	169701.3	308081.3	307706.2	145830.3	145774.1	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15993	15993
4/2001	186860.2	187003.0	311551.7	311177.2	147139.2	147112.1	2	2	272.8	272.8	272.83	272.83	0.0	0.0	9044	9044
5/2001	187882.6	187827.2	310474.8	310299.9	142676.4	142649.7	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9219	9219
6/2001	194616.9	194561.9	288076.8	287902.8	137405.3	137378.8	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1830	1830
7/2001	196585.3	196560.7	268274.4	268072.0	131600.2	131574.1	2	2	363.5	363.5	363.47	363.47	0.0	0.0	1801	1801
8/2001	194143.7	194086.2	251029.3	250861.9	125844.1	125818.3	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/2001	189897.0	190037.8	243535.1	243171.1	120717.6	120692.1	2	2	238.2	238.2	219.88	219.88	1091.3	1091.2	2304	2304
10/2001	169716.8	169659.3	243467.6	243103.7	117221.3	117196.1	1	1	409.5	412.7	284.00	284.00	7715.0	7914.3	17626	17825
11/2001	162453.0	162395.8	241389.8	241073.1	119413.8	119388.4	1	1	305.4	304.6	250.00	250.00	3297.5	3250.7	14906	14860
12/2001	170685.6	170826.6	257190.0	256673.2	132953.4	132927.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12095	12095
1/2002	171025.6	170890.6	286866.8	286627.4	135023.2	134996.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12125	12125
2/2002	169795.6	169859.4	301342.8	300904.9	139605.5	139578.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	10980	10980
3/2002	180334.7	180120.8	330468.7	330605.8	146806.3	146779.0	1	1	371.0	366.1	250.00	250.00	7438.1	7140.6	18950	18654
4/2002	183976.5	184040.2	339666.4	339526.1	146759.9	146732.8	1	1	570.1	570.1	473.49	473.49	5750.4	5750.4	26614	26614
5/2002	194267.8	194331.1	321696.8	321562.7	143651.9	143625.0	1	1	644.7	644.6	596.37	596.28	2972.3	2972.3	24574	24574
6/2002	197843.4	197819.8	320385.7	320346.7	138068.6	138042.0	1	1	535.1	534.9	535.08	534.95	0.0	0.0	11899	11899
7/2002	198061.0	197955.1	298431.0	298473.8	132118.0	132092.7	1	1	365.8	365.8	363.51	363.51	143.5	143.3	1946	1946
8/2002	194038.7	194007.4	283329.7	283298.4	126273.8	126249.0	1	1	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/2002	190169.1	190115.9	276578.6	276569.6	121028.5	121003.9	1	1	222.8	222.8	219.82	219.82	177.1	177.1	1369	1369
10/2002	170930.1	170877.3	276511.1	276502.1	117389.4	117365.1	1	1	445.6	445.7	284.00	284.00	9939.6	9939.9	19793	19795
11/2002	164212.3	164159.6	276511.1	276502.1	117432.6	117408.3	1	1	449.2	449.2	250.00	250.00	11850.7	11850.7	23382	23382
12/2002	170675.3	170622.7	296130.6	296121.6	134188.0	134163.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12060	12060
1/2003	173534.5	173483.2	316837.3	316828.3	136406.4	136417.1	1	1	298.4	298.4	250.00	250.00	2975.2	2975.2	15007	15007
2/2003	171552.9	171550.7	325347.4	325338.4	139224.2	139248.8	1	1	557.1	557.1	250.00	250.00	17058.1	17058.1	27930	27930
3/2003	171074.1	171071.9	331416.6	331407.6	145557.4	145585.3	1	1	454.8	454.8	250.00	250.00	12595.2	12595.2	23974	23974
4/2003	187887.8	188032.8	335710.1	335701.1	151484.0	151368.3	1	1	570.1	570.1	473.47	473.47	5749.1	5749.1	26881	26881
5/2003	203535.1	203511.2	360184.2	360343.4	145735.5	145791.7	1	1	673.8	673.8	625.47	625.47	2972.3	2972.3	24527	24527
6/2003	196887.0	196887.0	409076.9	409217.7	140181.1	140235.7	1	1	914.8	914.6	626.35	626.43	17161.0	17148.7	32036	32023
7/2003	197793.9	197793.9	381818.0	381938.3	134320.3	134373.2	1	1	495.2	495.5	451.33	451.33	2698.6	2718.1	4501	4521
8/2003	194043.4	194043.4	358587.6	358676.2	128493.4	128544.8	1	1	492.4	492.9	373.91	373.91	7286.9	7317.9	8637	8668
9/2003	189933.7	189933.7	339711.7	339759.8	123257.5	123307.6	1	1	507.3	508.0	255.02	255.02	15013.5	15053.6	16207	16247
10/2003	170791.7	170791.7	324748.8	324756.7	119617.4	119666.3	0	0	746.1	746.7	325.00	325.00	25892.7	25932.7	37029	37069
11/2003	164407.1	164407.1	322773.1	322773.1	119378.3	119426.4	0	0	446.6	446.7	325.00	325.00	7234.6	7242.6	23232	23240
12/2003	172424.6	172424.6	326918.2	326918.2	133061.2	133069.3	0	0	632.3	632.3	325.00	325.00	18892.8	18892.8	35565	35565
1/2004	171318.7	171318.7	326144.0	326144.0	135617.3	135597.3	0	0	706.5	706.5	325.00	325.00	23454.9	23454.9	40139	40139
2/2004	178827.8	178827.8	331543.3	331543.3	141914.8	141881.5	0	0	669.0	669.0	325.00	325.00	19785.4	19785.4	35612	35612
3/2004	184989.5	185020.2	334371.4	334371.4	144525.5	144462.3	0	0	871.0	871.0	325.00	325.00	33570.7	33570.7	49487	49487
4/2004	179356.5	179257.1	338450.8	338797.6	145070.2	144989.8	2	2	472.2	468.8	273.55	273.55	11818.5	11620.1	20755	20556

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
5/2004	184465.1	184366.5	313291.6	313636.7	140289.2	140210.0	2	2	370.0	370.0	370.03	370.03	0.0	0.0	9233	9233
6/2004	197475.2	197377.3	301117.9	301460.9	134533.9	134456.2	2	2	328.1	328.1	328.11	328.11	0.0	0.0	1821	1821
7/2004	196842.9	196584.0	280841.1	281343.2	128583.6	128507.4	2	2	363.5	363.5	363.50	363.50	0.0	0.0	1803	1803
8/2004	194151.4	194203.2	267190.4	267379.7	122703.9	122629.3	2	2	318.5	318.5	318.50	318.50	0.0	0.0	1328	1328
9/2004	190136.2	190011.6	261184.8	261548.8	117584.2	117510.8	2	2	252.9	252.9	219.88	219.88	1965.5	1965.6	3190	3190
10/2004	168314.5	168388.1	261117.4	261481.4	115612.9	115540.3	1	1	492.3	489.1	284.00	284.00	12810.0	12611.1	22895	22697
11/2004	164383.7	164457.0	261117.4	261481.4	115988.2	115916.5	1	1	390.9	390.9	250.00	250.00	8382.4	8381.9	19944	19943
12/2004	173034.0	173107.6	278713.8	279078.1	124974.4	124902.7	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11993	11993
1/2005	187957.0	188030.3	320352.3	320717.7	136902.3	136878.5	1	1	459.7	459.7	250.00	250.00	12892.8	12892.8	25207	25207
2/2005	195309.9	195383.0	326133.7	326499.4	144041.4	144127.8	1	1	1092.9	1092.9	250.00	250.00	46810.6	46810.6	57748	57748
3/2005	205550.1	205550.1	341311.4	341750.8	153185.7	153217.5	1	1	1592.3	1592.3	250.00	250.00	82533.4	82533.4	94046	94046
4/2005	204901.9	204901.9	367224.1	366553.2	149675.2	149673.6	0	0	1354.0	1372.7	525.00	525.00	49329.6	50440.4	73192	74303
5/2005	205589.3	205468.2	370109.6	370264.6	147310.7	143894.5	0	0	2571.0	2483.9	778.16	778.07	110236.9	104886.8	141114	135764
6/2005	205784.2	205582.6	408830.9	408552.4	143719.5	138053.8	0	0	1832.0	1747.8	878.17	878.05	56757.8	51756.2	86599	81597
7/2005	198188.8	198202.8	380114.5	380217.9	137727.1	132137.1	0	0	1290.1	1280.2	453.00	452.96	51471.8	50867.5	53277	52673
8/2005	195133.5	195125.1	357499.1	357516.2	131874.2	126348.9	0	0	709.5	711.3	377.98	377.98	20384.8	20493.6	21925	22034
9/2005	190475.4	190466.9	339275.1	339285.5	126615.9	121150.5	0	0	638.8	638.9	260.35	260.36	22519.6	22526.0	24034	24040
10/2005	171063.3	171054.4	325492.4	325487.9	123054.6	117648.2	0	0	703.0	703.3	325.00	325.00	23243.5	23258.3	34396	34411
11/2005	166306.0	166297.2	323620.7	323620.7	123199.4	117839.5	0	0	449.0	448.9	325.00	325.00	7379.7	7375.2	23312	23307
12/2005	206232.2	205831.6	307357.7	307148.8	137849.4	134182.8	0	0	1300.0	1282.6	325.00	325.00	59951.3	58880.2	76738	75669
1/2006	198265.8	197797.1	275423.8	275512.5	140339.2	138333.6	0	0	2716.1	2687.1	325.00	325.00	147026.9	145241.8	163780	161995
2/2006	194004.0	193340.9	277192.3	276993.0	140878.1	139768.3	0	0	1224.3	1218.6	325.00	325.00	49944.5	49627.2	64938	64620
3/2006	207949.4	207949.4	317204.6	316316.3	153533.0	153139.8	0	0	1892.9	1892.9	325.00	325.00	96408.0	96408.0	112681	112681
4/2006	210980.2	210979.3	381815.4	380919.2	149826.0	150170.6	0	0	3816.7	3816.7	525.00	525.00	195870.6	195870.6	220014	220014
5/2006	209129.1	208498.1	394805.3	394008.7	142466.5	139249.3	0	0	4283.9	4219.4	779.33	779.28	215489.0	211524.8	246312	242348
6/2006	205093.1	204902.1	409554.4	410373.0	137597.4	131323.1	0	0	2567.7	2454.1	878.95	878.85	100489.9	93735.2	130243	123492
7/2006	198392.4	198395.1	381560.1	382099.9	131898.5	125702.5	0	0	1211.7	1213.0	452.82	452.77	46661.3	46744.7	48467	48547
8/2006	194663.5	194666.1	358127.0	358491.7	126160.0	120039.6	0	0	821.5	824.3	378.22	378.22	27255.5	27427.6	28795	28968
9/2006	190246.4	190249.0	339246.8	339494.1	120990.8	114941.8	0	0	456.7	458.6	259.80	259.80	11713.7	11829.4	13204	13319
10/2006	170844.4	170847.0	325455.4	325489.6	117516.8	111536.4	0	0	745.3	748.8	325.00	325.00	25843.9	26056.5	36999	37212
11/2006	167400.9	167403.5	324046.5	324046.5	117877.1	111949.2	0	0	429.4	429.9	325.00	325.00	6209.7	6243.9	22182	22216
12/2006	170362.8	169955.2	326990.0	326692.7	125849.2	121065.0	0	0	554.8	548.4	325.00	325.00	14132.4	13735.7	30644	30248
1/2007	160532.5	160636.9	322809.1	322759.8	130009.9	125305.0	0	0	467.7	454.8	325.00	325.00	8777.0	7983.6	25391	24598
2/2007	170982.7	170826.9	326071.6	326369.6	136683.7	131924.5	0	0	375.9	375.9	325.00	325.00	2826.5	2826.5	18132	18132
3/2007	170271.1	170118.2	329993.6	330142.4	140679.9	135964.9	0	0	414.5	416.9	325.00	325.00	5504.2	5653.0	21443	21591
4/2007	179017.2	178900.8	318595.6	318171.8	141898.6	137761.1	2	2	277.1	277.1	272.85	272.85	252.6	252.6	9295	9295
5/2007	191870.1	191509.2	294213.3	293416.7	137563.7	134092.0	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9243	9243
6/2007	193566.9	192988.8	273521.0	272357.5	132118.7	129286.2	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1821	1821
7/2007	197930.7	197364.3	247298.0	246145.8	126199.7	123403.1	2	2	363.5	363.5	363.47	363.47	0.0	0.0	1801	1801
8/2007	194135.6	194060.7	232331.1	230704.0	120360.5	117604.7	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327

Date	*Baseline at 190 MGD* **Pardee Storage** *(acre-ft)*	*Project at 190 MGD* **Pardee Storage** *(acre-ft)*	*Baseline at 190 MGD* **Camanche Storage** *(acre-ft)*	*Project at 190 MGD* **Camanche Storage** *(acre-ft)*	*Baseline at 190 MGD* **TRA Storage** *(acre-ft)*	*Project at 190 MGD* **TRA Storage** *(acre-ft)*	*Baseline at 190 MGD* **JSA Year Type** *(NA)*	*Project at 190 MGD* **JSA Year Type** *(NA)*	*Baseline at 190 MGD* **Camanche Outflow** *(cfs)*	*Project at 190 MGD* **Camanche Outflow** *(cfs)*	*Baseline at 190 MGD* **Required Camanche Release** *(cfs)*	*Project at 190 MGD* **Required Camanche Release** *(cfs)*	*Baseline at 190 MGD* **Camanche Flood Release** (AF)	*Project at 190 MGD* **Camanche Flood Release** (AF)	*Baseline at 190 MGD* **Flow below Lodi Lake** (AF)	*Project at 190 MGD* **Flow below Lodi Lake** (AF)
9/2007	189907.1	189633.7	226258.1	224842.5	115152.3	112431.6	2	2	226.7	226.7	219.85	219.85	405.2	405.0	1606	1606
10/2007	168878.3	169000.9	226190.6	224775.1	112339.9	109643.4	1	2	361.4	355.0	284.00	254.00	4756.7	6211.0	14685	14294
11/2007	163254.6	163376.5	226170.4	224660.1	111378.0	108705.1	1	2	372.3	373.9	250.00	220.00	7276.1	9160.5	18771	18870
12/2007	161708.8	161494.6	232152.5	232684.3	116569.2	114045.8	1	2	250.0	220.0	250.00	220.00	0.0	0.0	11951	10107
1/2008	164808.3	164744.8	243242.7	245226.7	132140.6	129852.4	1	2	250.0	220.0	250.00	220.00	0.0	0.0	12361	10516
2/2008	164571.3	164450.7	249307.7	252225.0	139840.3	138410.6	1	2	250.0	220.0	250.00	220.00	0.0	0.0	11355	9629
3/2008	170416.0	170350.5	253300.7	258051.6	142836.2	141362.6	1	2	250.0	220.0	250.00	220.00	0.0	0.0	11392	9547
4/2008	176438.1	176748.5	238352.0	243082.0	143464.5	141629.6	2	2	274.8	274.8	274.79	274.79	0.0	0.0	8928	8928
5/2008	192372.1	192482.0	218153.2	223051.5	138709.9	136894.6	2	2	338.0	338.0	338.00	338.00	0.0	0.0	9254	9254
6/2008	194642.1	194727.7	208531.7	213220.0	133163.0	131563.0	2	2	268.5	268.5	268.52	268.52	0.0	0.0	1819	1819
7/2008	192945.6	193018.4	188186.4	192817.1	127896.5	126273.5	2	2	278.5	278.5	278.46	278.46	0.0	0.0	1805	1805
8/2008	192040.0	192113.5	174387.5	178886.8	122203.4	120592.1	2	2	232.1	232.1	232.08	232.08	0.0	0.0	1326	1326
9/2008	186758.2	186782.2	165631.9	170051.8	117128.2	115523.7	2	2	172.5	172.5	172.46	172.46	0.0	0.0	1193	1193
10/2008	171196.3	171124.4	165564.5	169984.4	114660.0	113062.4	2	2	405.3	404.8	254.00	254.00	9300.7	9274.6	19641	19615
11/2008	163865.4	163901.6	163856.1	168273.4	115237.0	113639.9	2	2	488.5	485.1	220.00	220.00	15979.0	15772.2	25729	25524
12/2008	163980.0	163889.3	169891.2	174306.6	120134.9	118588.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10025	10025
1/2009	169655.1	169866.5	192037.9	196127.5	128468.5	126901.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10516	10516
2/2009	172581.7	172285.5	214161.0	217955.1	141667.2	140836.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9431	9431
3/2009	182006.8	181935.0	263807.7	267166.4	144905.0	144691.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9656	9656
4/2009	187786.7	187941.9	293784.7	296855.7	145110.1	144948.7	1	1	272.8	272.8	272.80	272.80	0.0	0.0	8981	8981
5/2009	204844.0	204844.0	384596.7	387743.9	142689.9	142596.5	1	1	475.3	475.3	475.29	475.29	0.0	0.0	12388	12388
6/2009	198432.2	198432.2	384123.3	387253.4	137099.1	137006.1	1	1	676.0	676.0	675.97	675.97	0.0	0.0	17860	17860
7/2009	197718.5	197836.7	362161.0	364421.2	131180.3	131081.4	1	1	509.6	521.6	451.34	451.35	3580.5	4318.0	5383	6121
8/2009	194085.8	194073.4	342515.6	344120.6	125342.5	125245.0	1	1	440.0	452.6	373.97	374.02	4060.9	4830.7	5386	6156
9/2009	189558.0	189545.5	326023.2	327035.6	120203.3	120106.5	1	1	339.7	349.5	254.62	254.75	5060.2	5637.9	6262	6840
10/2009	170977.9	170965.3	315589.2	315833.2	119976.1	119878.6	0	0	607.5	620.0	325.00	325.00	17372.9	18139.7	28619	29385
11/2009	162200.6	162188.1	309990.9	309990.9	119595.8	119497.9	0	0	408.3	412.4	325.00	325.00	4954.6	5198.6	20876	21119
12/2009	166350.4	166185.9	315501.4	315699.9	125826.8	125681.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16529	16529
1/2010	171846.2	171762.5	325863.6	325071.0	139021.6	139106.0	0	0	508.9	525.0	325.00	325.00	11306.0	12297.7	28223	29213
2/2010	171229.5	171491.3	327414.5	327306.2	141920.8	141800.9	0	0	650.0	632.1	325.00	325.00	18049.9	17058.1	33179	32188
3/2010	176503.8	176719.3	331804.4	331547.4	147690.6	147636.7	0	0	640.3	642.7	325.00	325.00	19388.7	19537.5	35422	35570
4/2010	194844.9	195058.5	356005.4	355748.2	151232.7	151316.1	1	1	570.1	570.1	473.49	473.49	5750.4	5750.4	26872	26872
5/2010	204775.1	204775.1	388503.3	388459.6	146142.0	146223.9	1	1	837.6	837.6	676.01	676.01	9934.3	9934.3	34617	34617
6/2010	204859.6	204859.6	403671.8	403943.9	140584.8	140663.8	1	1	1408.6	1403.2	777.43	777.43	37555.2	37237.8	61360	61042
7/2010	197779.1	197779.0	362897.7	363102.5	134644.0	134720.1	1	1	1086.1	1087.2	452.42	452.42	38964.1	39029.8	40768	40834
8/2010	194213.4	194213.4	329095.1	329233.5	128813.5	128886.7	1	1	570.0	571.1	374.06	374.06	12048.1	12113.2	13374	13439
9/2010	187378.5	187378.5	299161.4	299236.5	123573.7	123644.6	1	1	506.9	507.9	255.02	255.02	14987.6	15050.3	16180	16242
10/2010	177863.2	177863.2	275329.0	275339.4	120579.1	120647.9	0	0	928.3	929.3	325.00	325.00	37094.6	37159.1	48365	48430
11/2010	168787.5	168787.5	270223.8	270221.8	122129.6	122197.1	0	0	812.7	812.9	325.00	325.00	29018.3	29030.8	45121	45133
12/2010	205497.4	205497.4	288770.6	288768.5	134199.8	134083.8	0	0	1195.5	1195.5	325.00	325.00	53524.7	53524.7	70176	70176

Date	Baseline at 190 MGD Pardee Storage (acre-ft)	Project at 190 MGD Pardee Storage (acre-ft)	Baseline at 190 MGD Camanche Storage (acre-ft)	Project at 190 MGD Camanche Storage (acre-ft)	Baseline at 190 MGD TRA Storage (acre-ft)	Project at 190 MGD TRA Storage (acre-ft)	Baseline at 190 MGD JSA Year Type (NA)	Project at 190 MGD JSA Year Type (NA)	Baseline at 190 MGD Camanche Outflow (cfs)	Project at 190 MGD Camanche Outflow (cfs)	Baseline at 190 MGD Required Camanche Release (cfs)	Project at 190 MGD Required Camanche Release (cfs)	Baseline at 190 MGD Camanche Flood Release (AF)	Project at 190 MGD Camanche Flood Release (AF)	Baseline at 190 MGD Flow below Lodi Lake (AF)	Project at 190 MGD Flow below Lodi Lake (AF)
1/2011	204765.9	204765.9	304395.2	304391.9	132905.3	132772.0	0	0	1314.8	1314.8	325.00	325.00	60863.7	60863.7	77524	77524
2/2011	204221.5	204221.4	319461.2	319457.8	141602.4	141679.9	0	0	1162.1	1162.1	325.00	325.00	46493.2	46493.2	61684	61684
3/2011	206662.6	206662.6	352448.9	352445.5	151230.6	151218.0	0	0	2359.4	2359.4	325.00	325.00	125089.4	125089.4	141226	141226
4/2011	205506.8	205506.8	337340.1	337336.7	148865.6	148853.4	0	0	2830.0	2830.0	525.00	525.00	137159.0	137159.0	160914	160914
5/2011	204809.9	204809.9	310613.3	310610.0	147073.9	147062.0	0	0	2967.7	2967.7	778.31	778.31	134624.9	134624.9	165478	165478
6/2011	210440.4	210440.4	398034.7	398031.4	144197.3	144185.8	0	0	1979.3	1979.3	878.14	878.14	65522.7	65522.7	95372	95372
7/2011	196936.4	196936.4	354399.8	354397.1	138398.3	138387.2	0	0	3022.0	3022.0	454.97	454.97	157844.6	157843.9	159652	159651
8/2011	194131.8	194131.8	322328.0	322326.2	132487.7	132477.0	0	0	652.8	652.8	377.83	377.83	16908.7	16907.9	18452	18451
9/2011	190050.2	190050.2	296559.5	296558.5	127184.3	127173.9	0	0	479.3	479.3	260.04	260.04	13048.0	13047.2	14558	14558
10/2011	173231.8	173231.8	274015.2	274015.0	124096.7	124086.6	0	0	972.6	972.5	325.00	325.00	39816.9	39816.1	51055	51054
11/2011	164392.3	164392.3	272260.0	272260.0	123832.6	123822.6	0	0	480.3	480.3	325.00	325.00	9238.5	9238.4	25176	25176
12/2011	164415.0	164415.0	269975.2	269975.2	124840.9	124806.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16302	16302
1/2012	166847.5	166847.5	276400.2	276400.3	134407.8	134350.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16739	16739
2/2012	158625.6	158625.6	268171.1	268171.1	139260.0	139204.2	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15580	15580
3/2012	174064.5	174064.5	274562.6	274562.6	151239.4	151184.4	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16270	16270
4/2012	189025.4	189025.4	294504.2	294504.2	150845.1	150863.0	2	2	272.9	272.9	272.86	272.86	0.0	0.0	9194	9194
5/2012	194039.0	194039.0	324566.5	324566.5	142619.0	142723.5	2	2	370.0	370.0	370.03	370.03	0.0	0.0	9224	9224
6/2012	197190.1	197190.1	312522.4	312522.4	137351.3	137414.3	2	2	328.1	328.1	328.11	328.11	0.0	0.0	1840	1840
7/2012	198161.6	198161.6	287255.7	287255.8	131522.6	131583.8	2	2	363.5	363.5	363.50	363.50	0.0	0.0	1805	1805
8/2012	194125.3	194125.3	269555.1	269555.1	125691.4	125750.8	2	2	318.5	318.5	318.50	318.50	0.0	0.0	1328	1328
9/2012	189727.9	189727.9	259663.1	259663.1	120456.4	120514.3	2	2	223.3	223.3	219.82	219.82	205.3	205.3	1406	1406
10/2012	170267.5	170267.5	259595.7	259595.7	117714.0	117770.6	1	1	430.5	430.5	284.00	284.00	9007.7	9007.7	18908	18908
11/2012	169430.9	169430.9	259595.7	259595.7	118204.7	118260.3	1	1	503.7	503.7	250.00	250.00	15096.1	15096.1	26762	26762
12/2012	175892.9	175892.9	298240.9	298240.9	125390.1	125445.5	1	1	375.8	375.8	250.00	250.00	7735.6	7735.6	19788	19788

APPENDIX B-4
Updated EBMUD Model Results for Cumulative with Project versus Cumulative without Project

Contents

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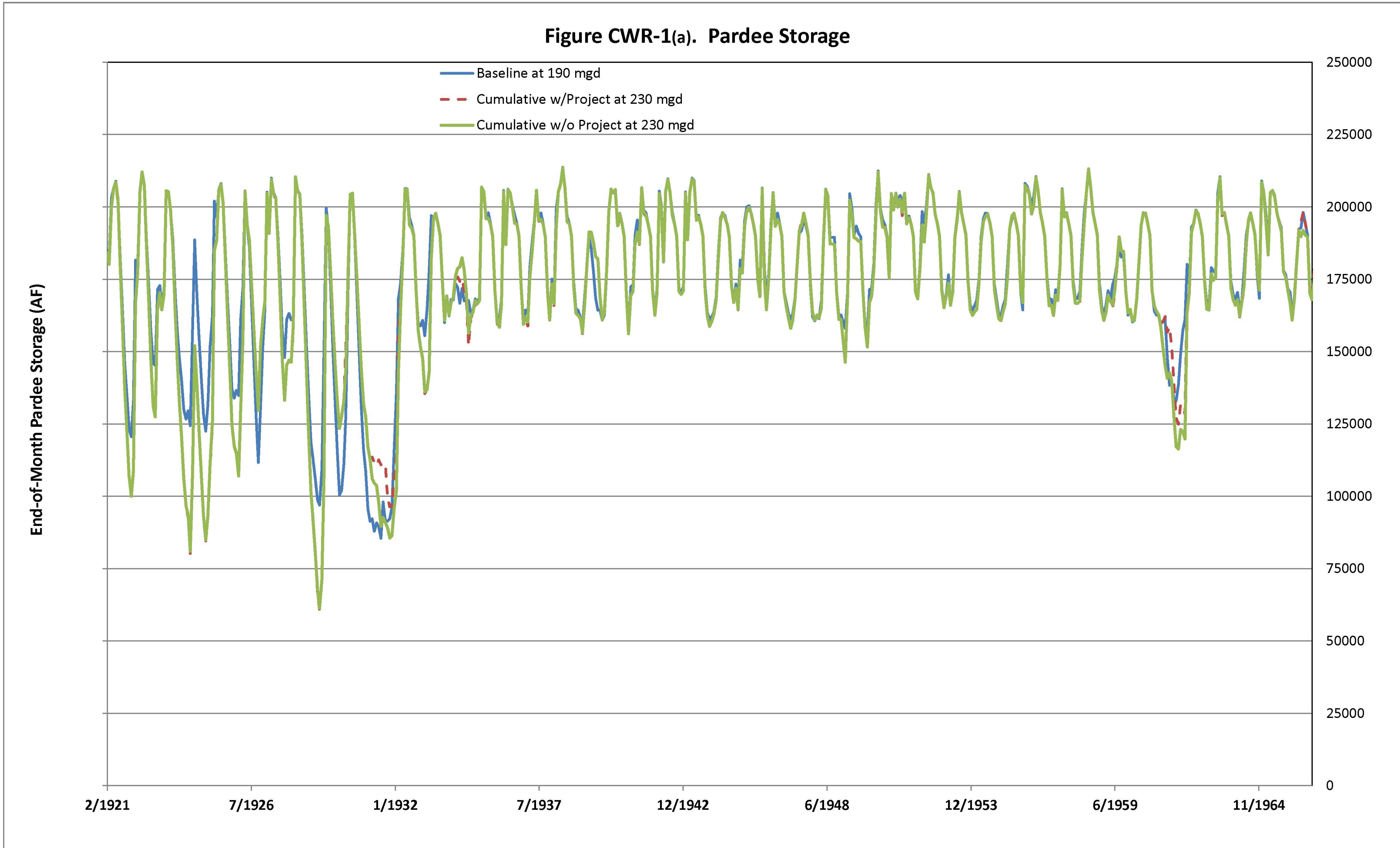


Figure CWR-1(a). Pardee Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End-of-Month Pardee Storage (AF)
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

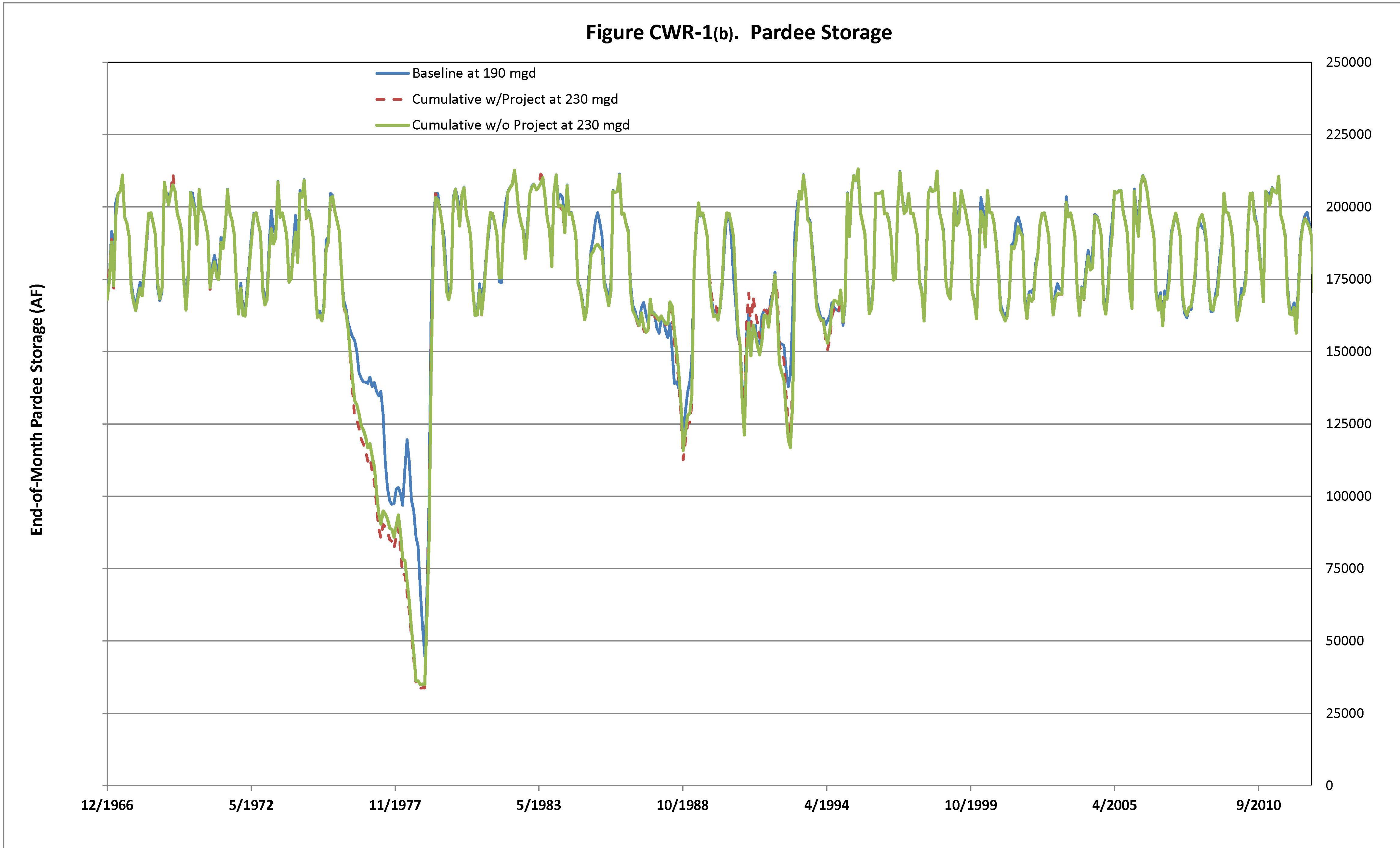


Figure CWR-1(b). Pardee Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End-of-Month Pardee Storage (AF)
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
12/1966
5/1972
11/1977
5/1983
10/1988
4/1994
10/1999
4/2005
9/2010

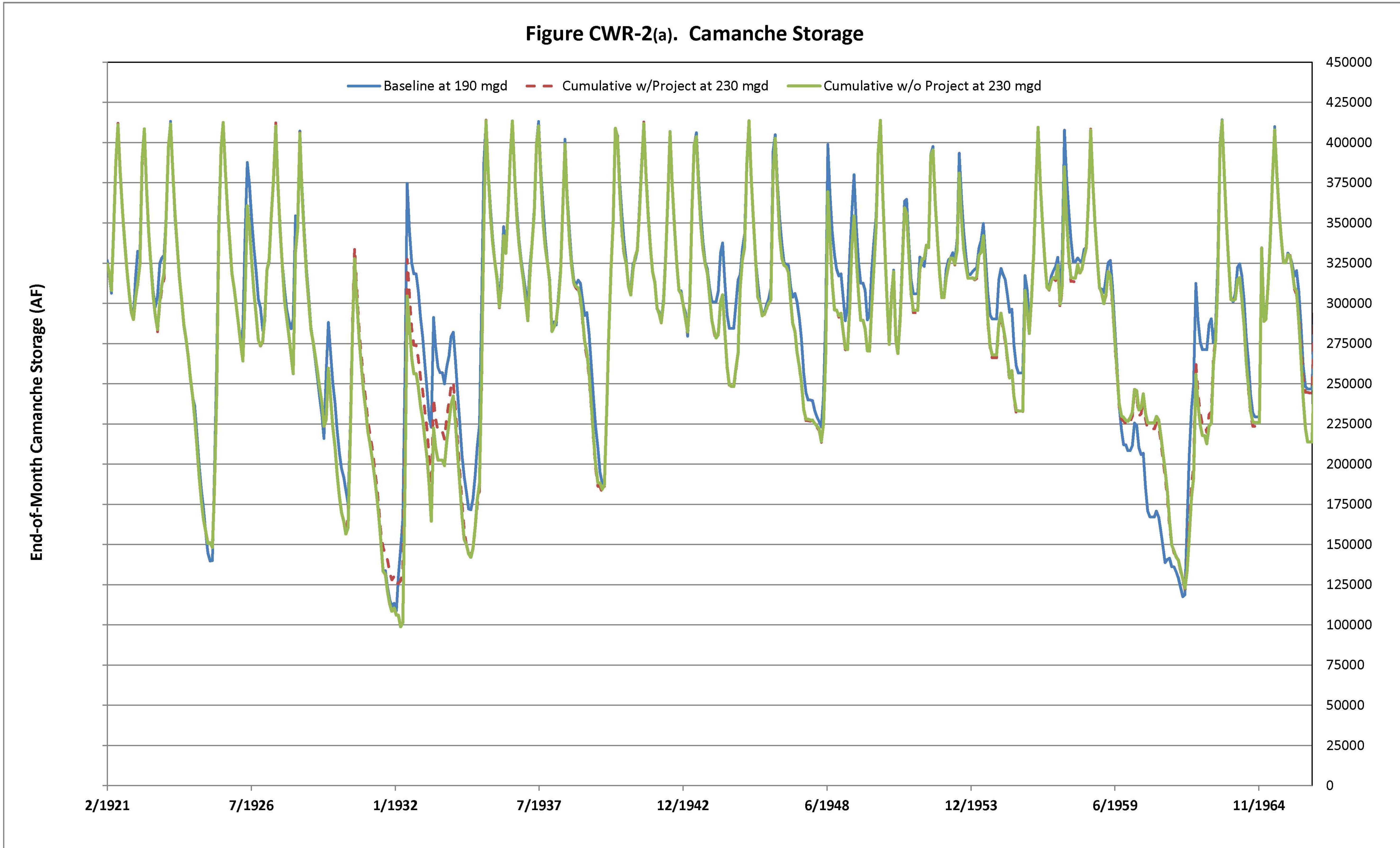
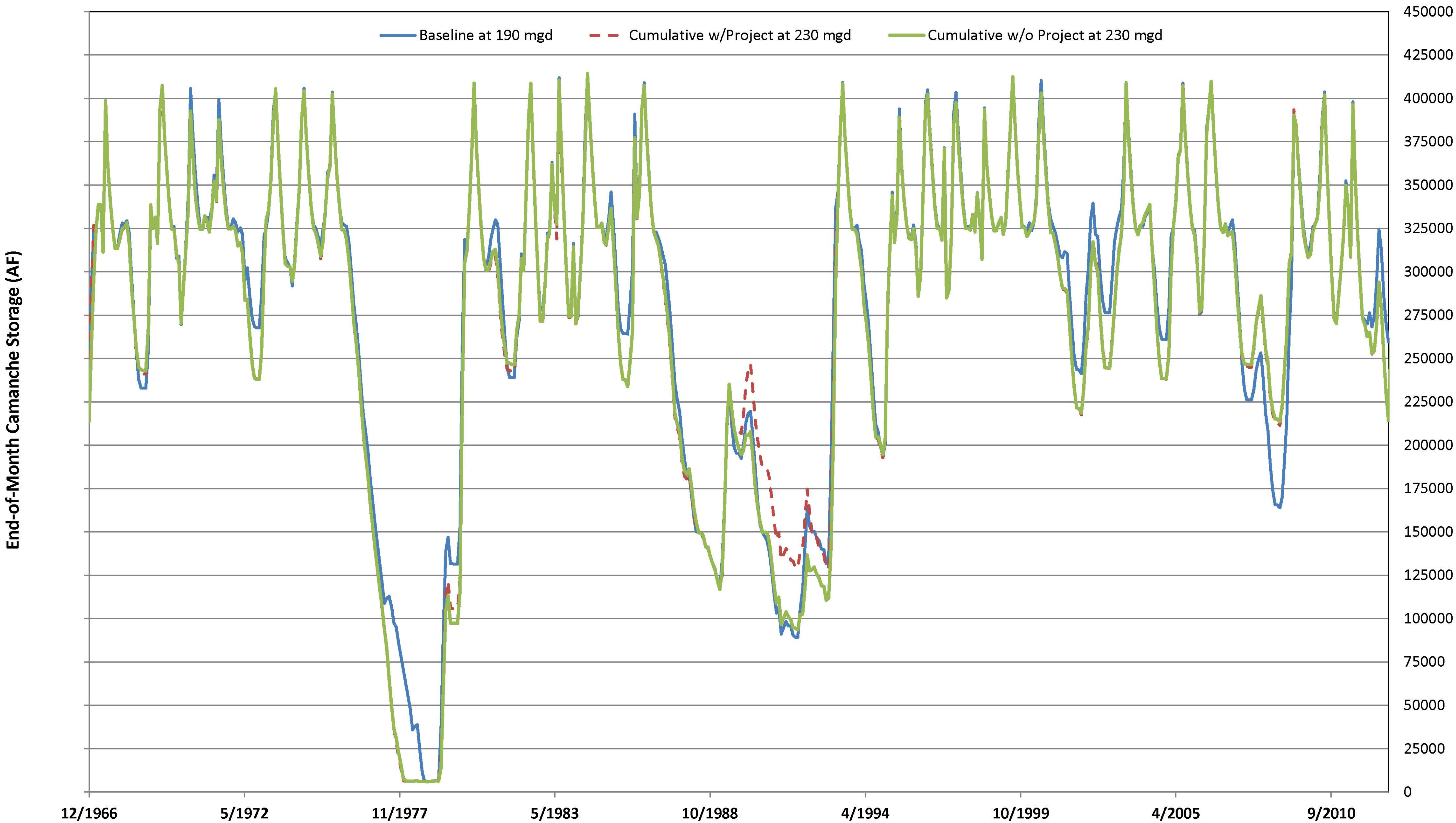


Figure CWR-2(a). Camanche Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End-of-Month Camanche Storage (AF)
450000
425000
400000
375000
350000
325000
300000
275000
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

Figure CWR-2(b). Camanche Storage



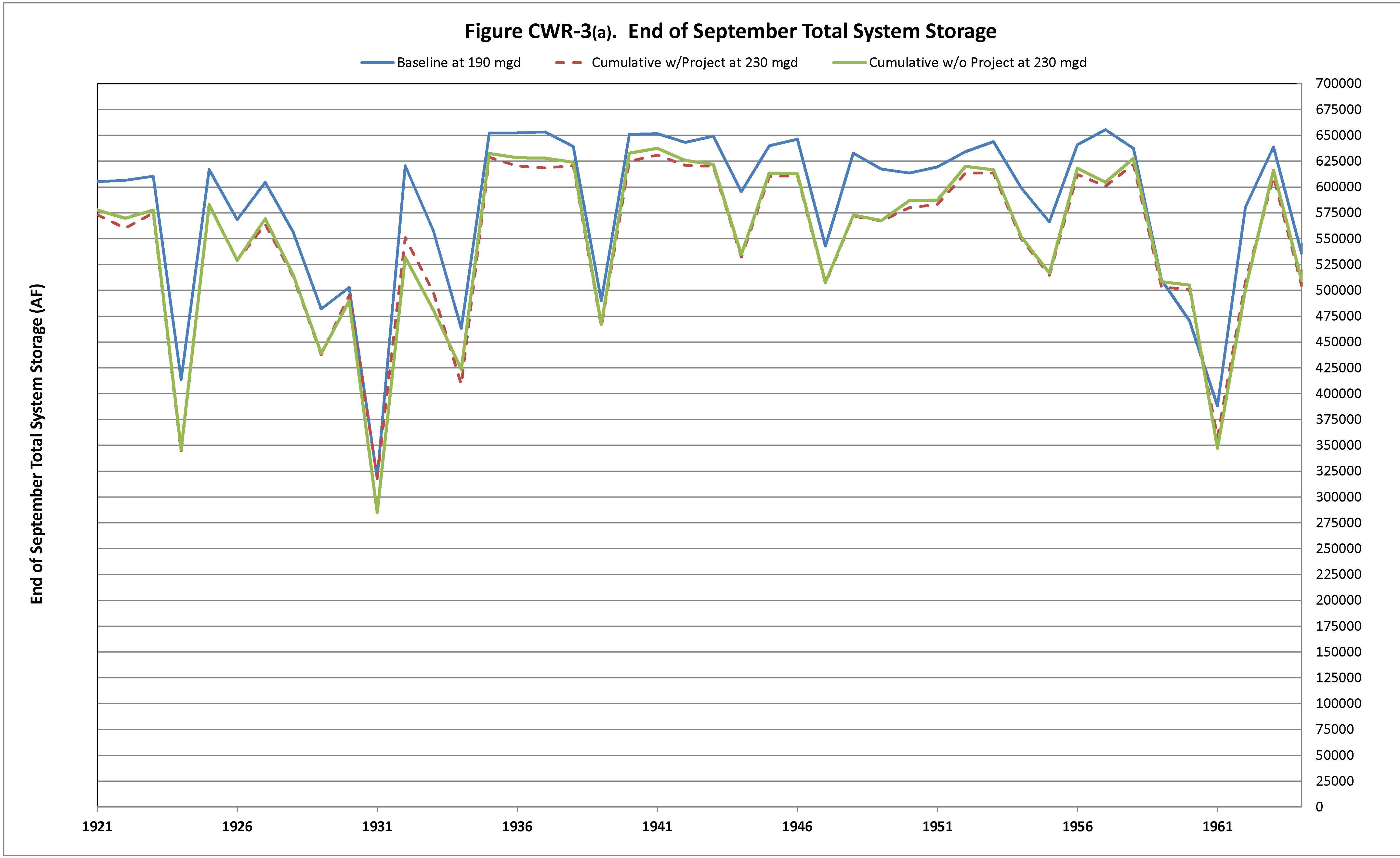


Figure CWR-3(a). End of September Total System Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End of September Total System Storage (AF)
700000
675000
650000
625000
600000
575000
550000
525000
500000
475000
450000
425000
400000
375000
350000
325000
300000
275000
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
1921
1926
1931
1936
1941
1946
1951
1956
1961

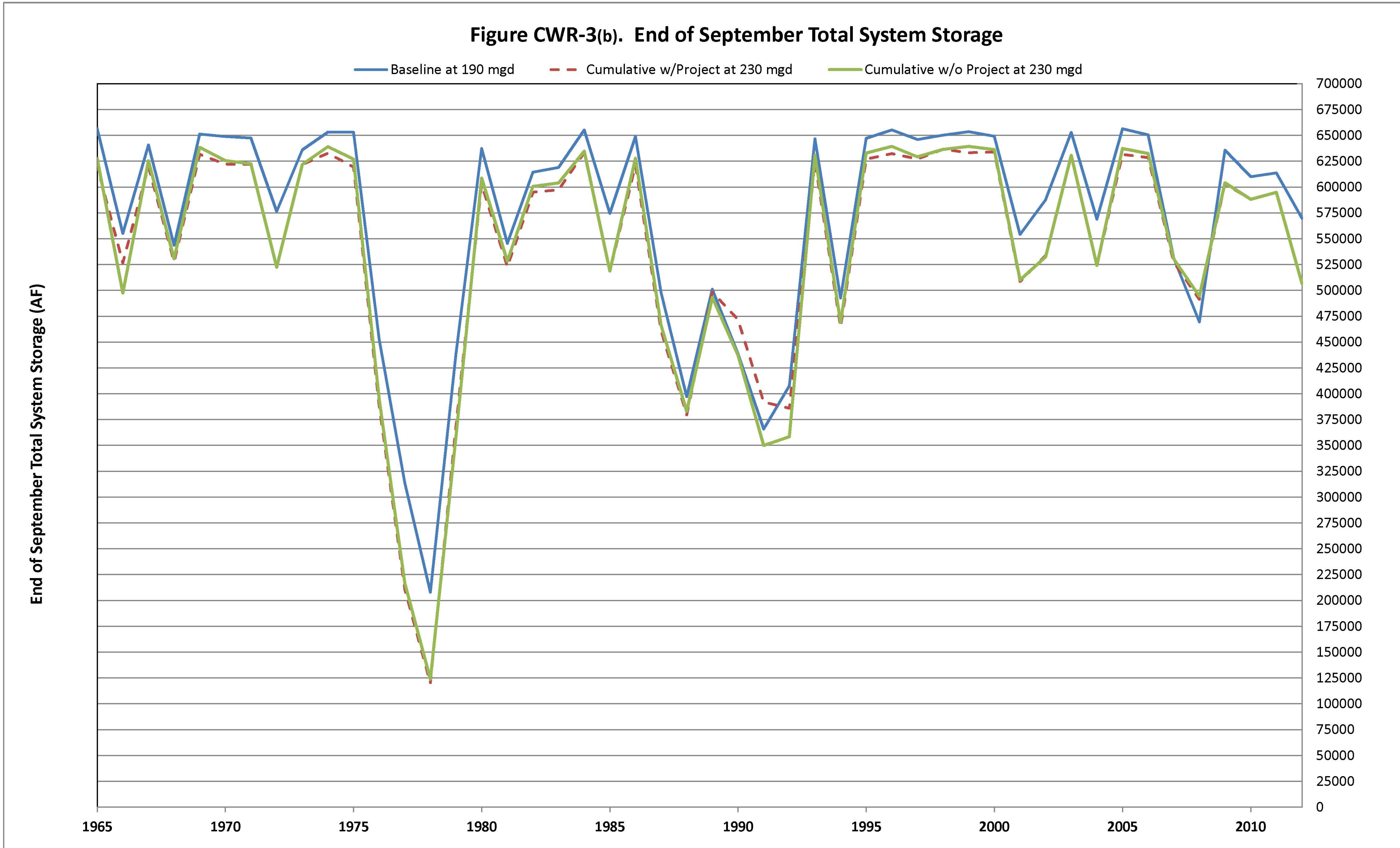


Figure CWR-3(b). End of September Total System Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End of September Total System Storage (AF)
700000
675000
650000
625000
600000
575000
550000
525000
500000
475000
450000
425000
400000
375000
350000
325000
300000
275000
250000
225000
200000
175000
150000
125000
100000
75000
50000
25000
0
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010

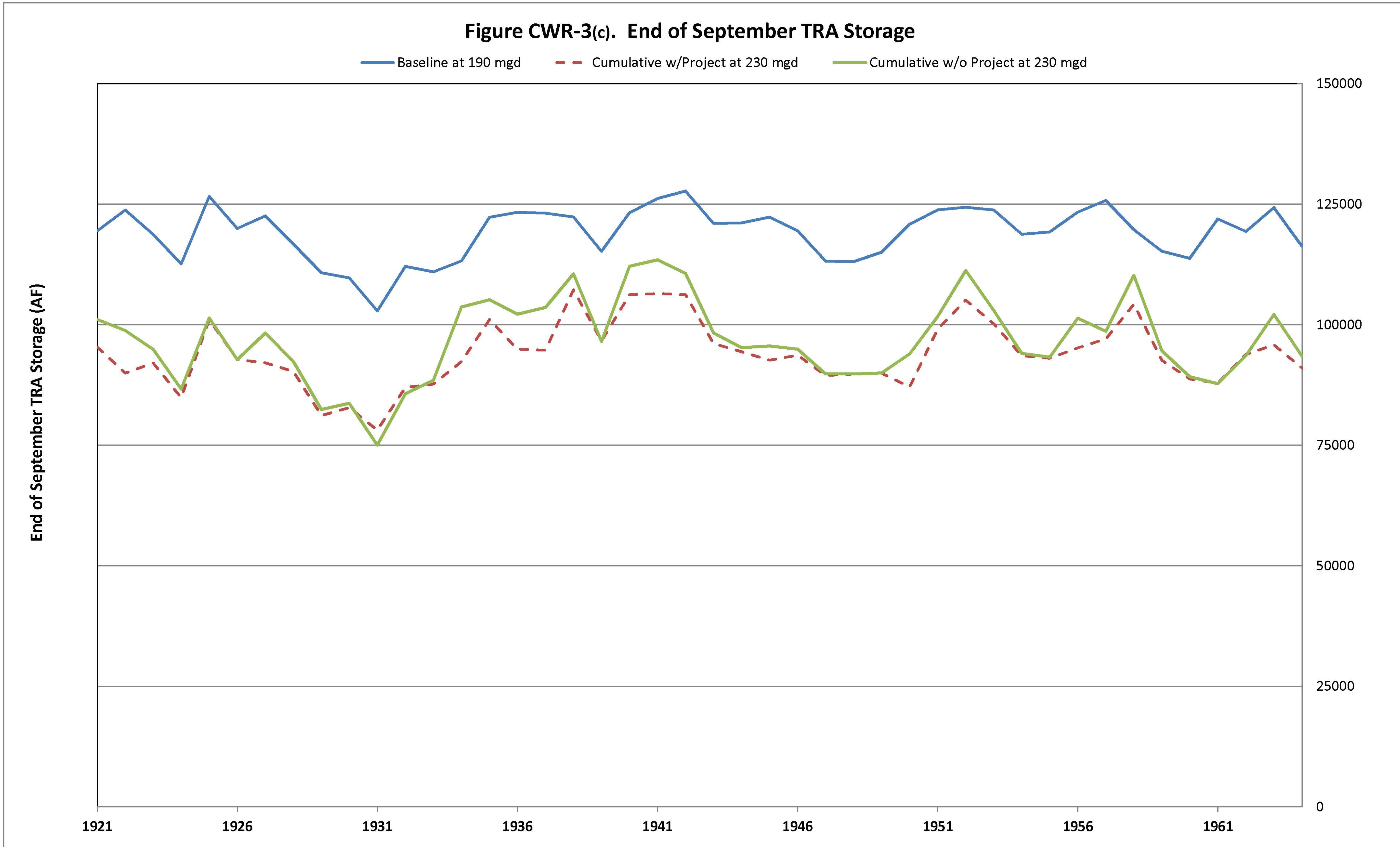


Figure CWR-3(c). End of September TRA Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End of September TRA Storage (AF)
150000
125000
100000
75000
50000
25000
0
1921
1926
1931
1936
1941
1946
1951
1956
1961

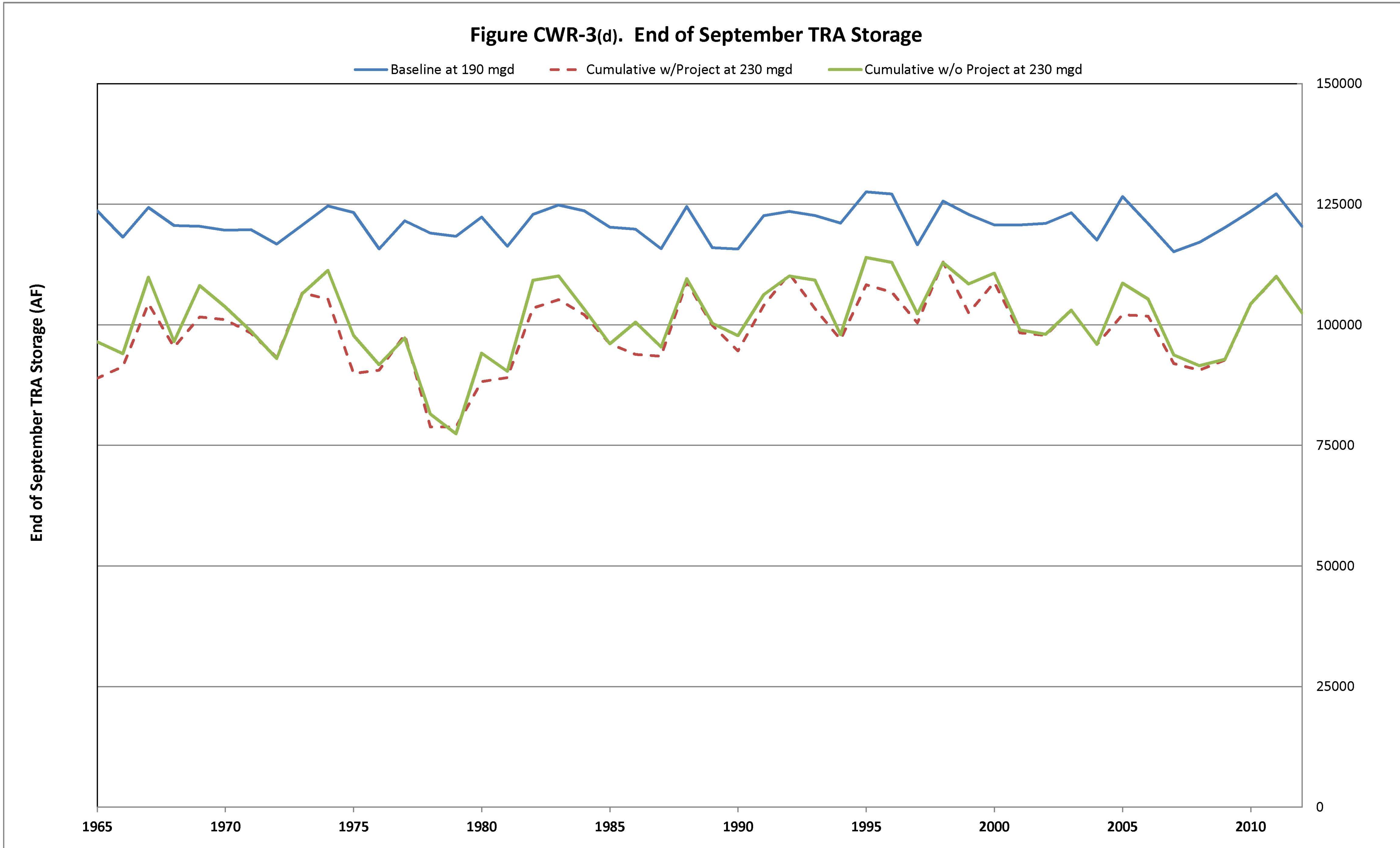


Figure CWR-3(d). End of September TRA Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End of September TRA Storage (AF)
150000
125000
100000
75000
50000
25000
0
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010

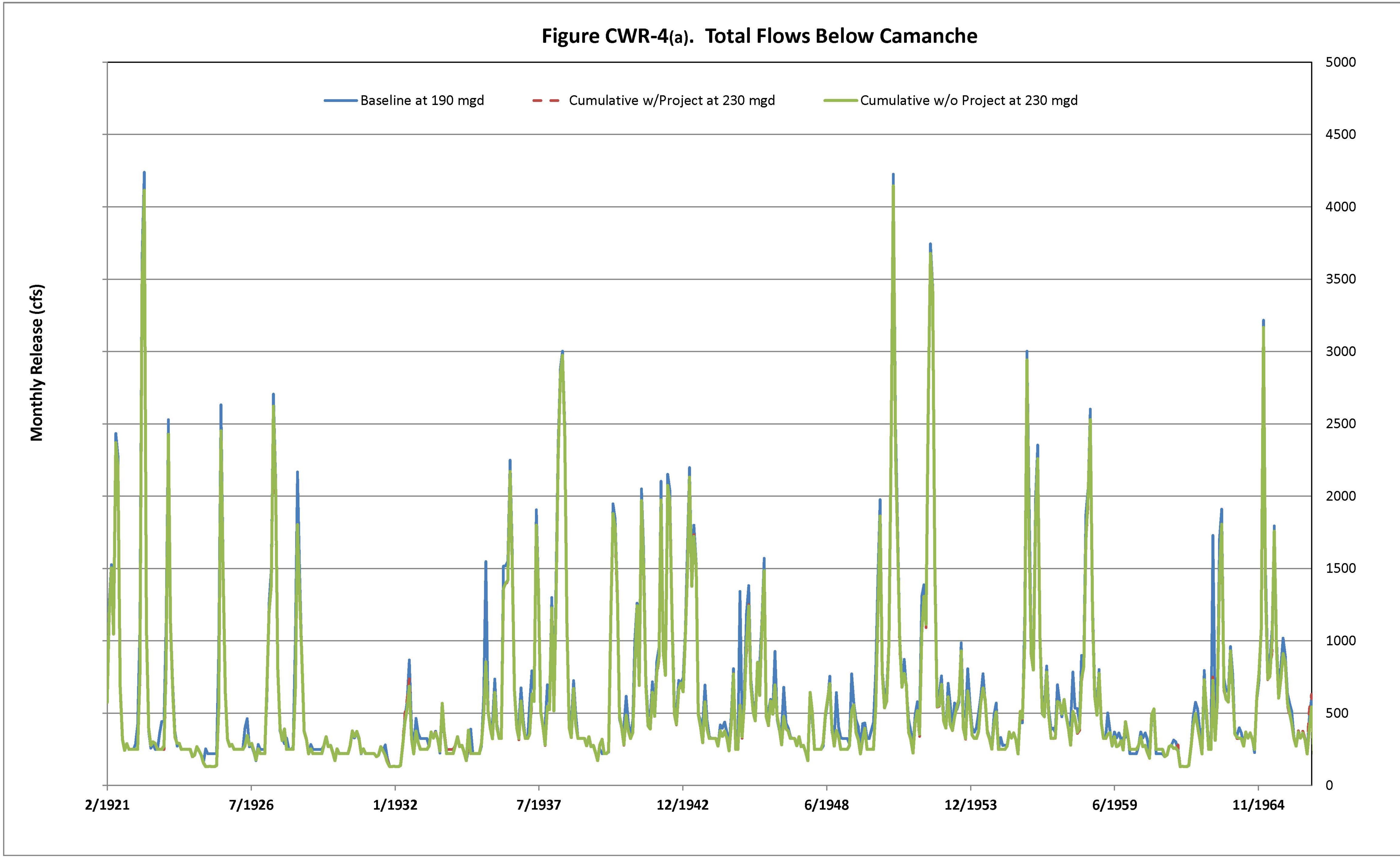
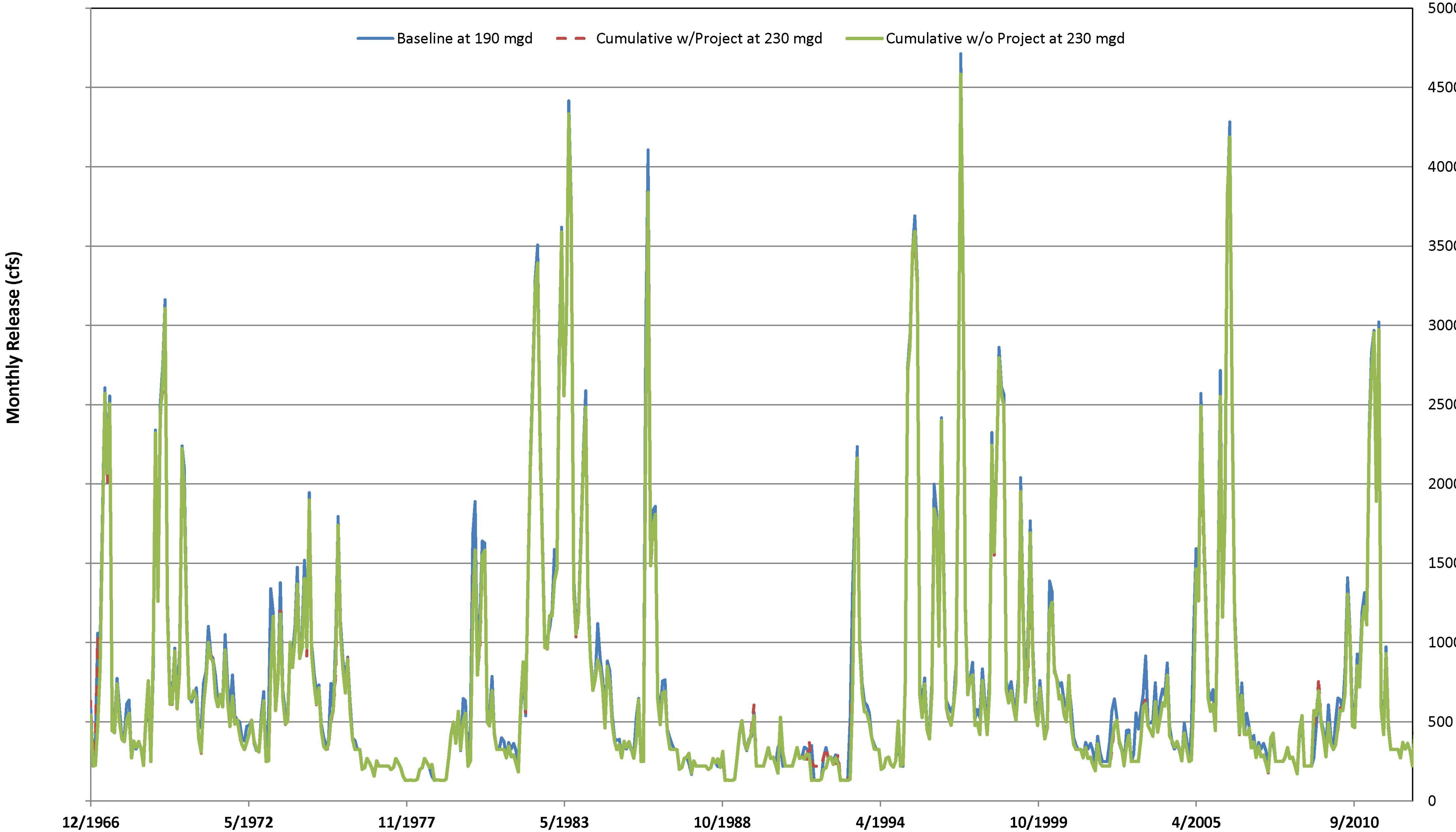


Figure CWR-4(a). Total Flows Below Camanche
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
Monthly Release (cfs)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

Figure CWR-4(b). Total Flows Below Camanche



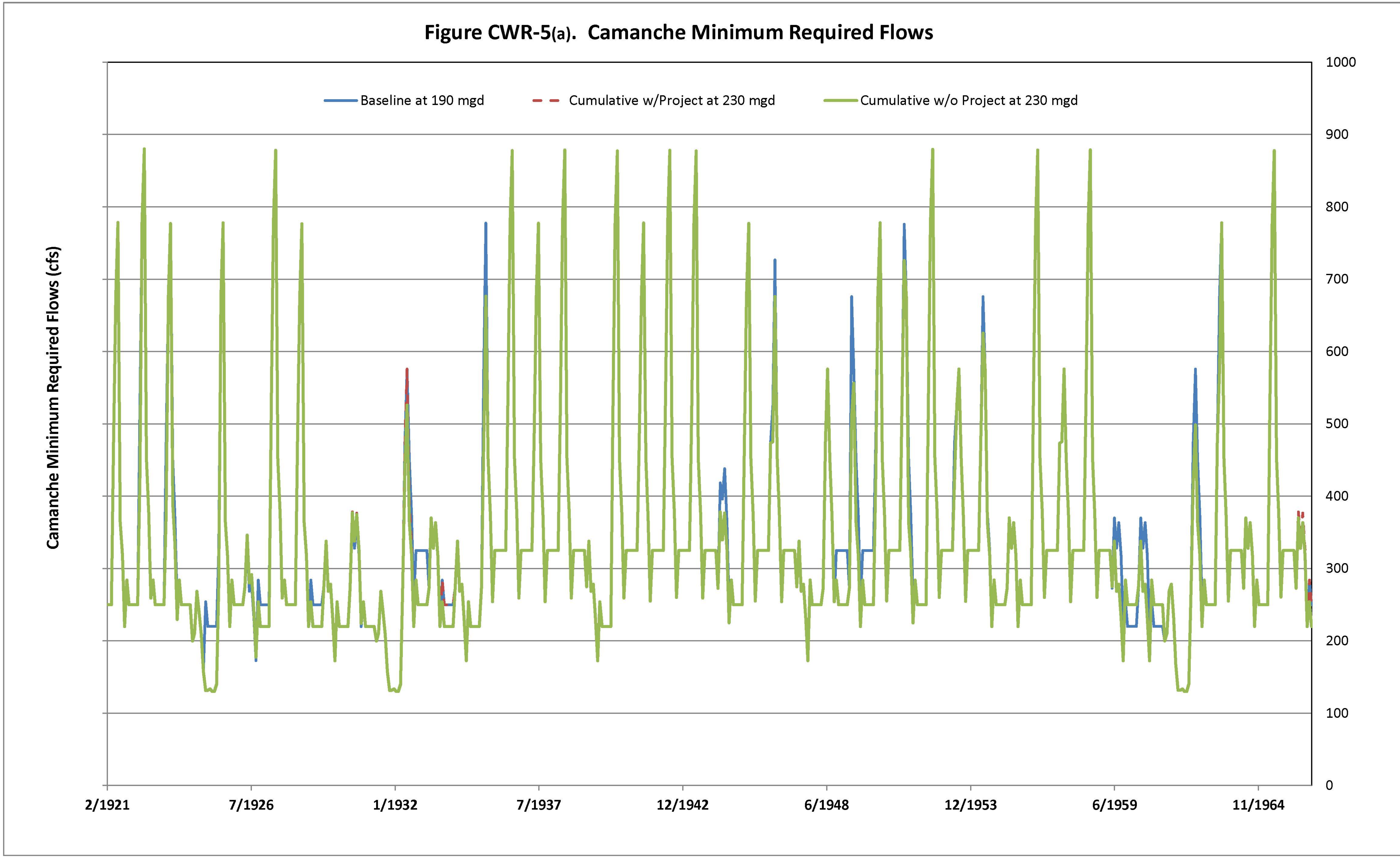
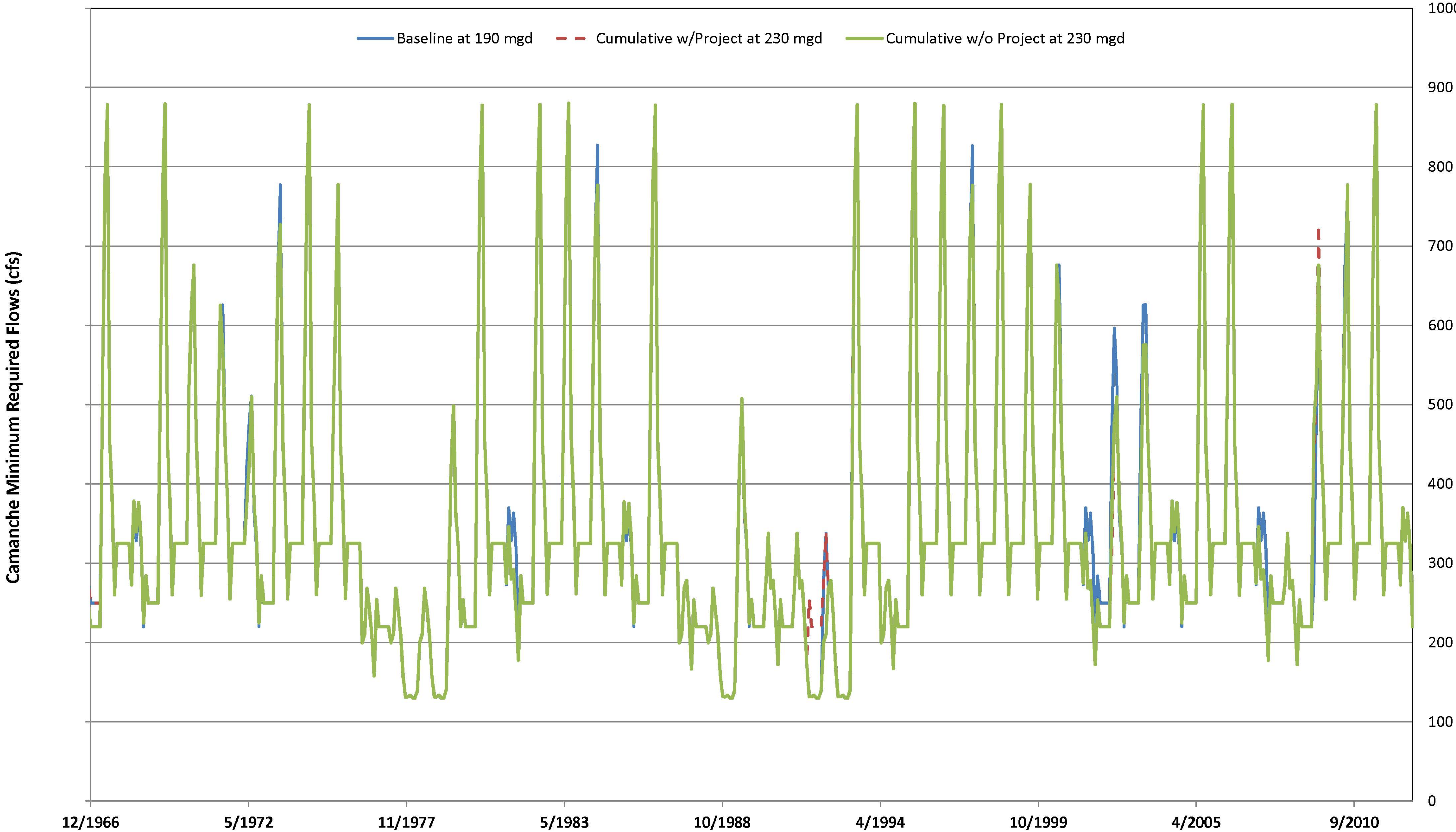


Figure CWR-5(a). Camanche Minimum Required Flows
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
Camanche Minimum Required Flows (cfs)
1000
900
800
700
600
500
400
300
200
100
0
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

Figure CWR-5(b). Camanche Minimum Required Flows



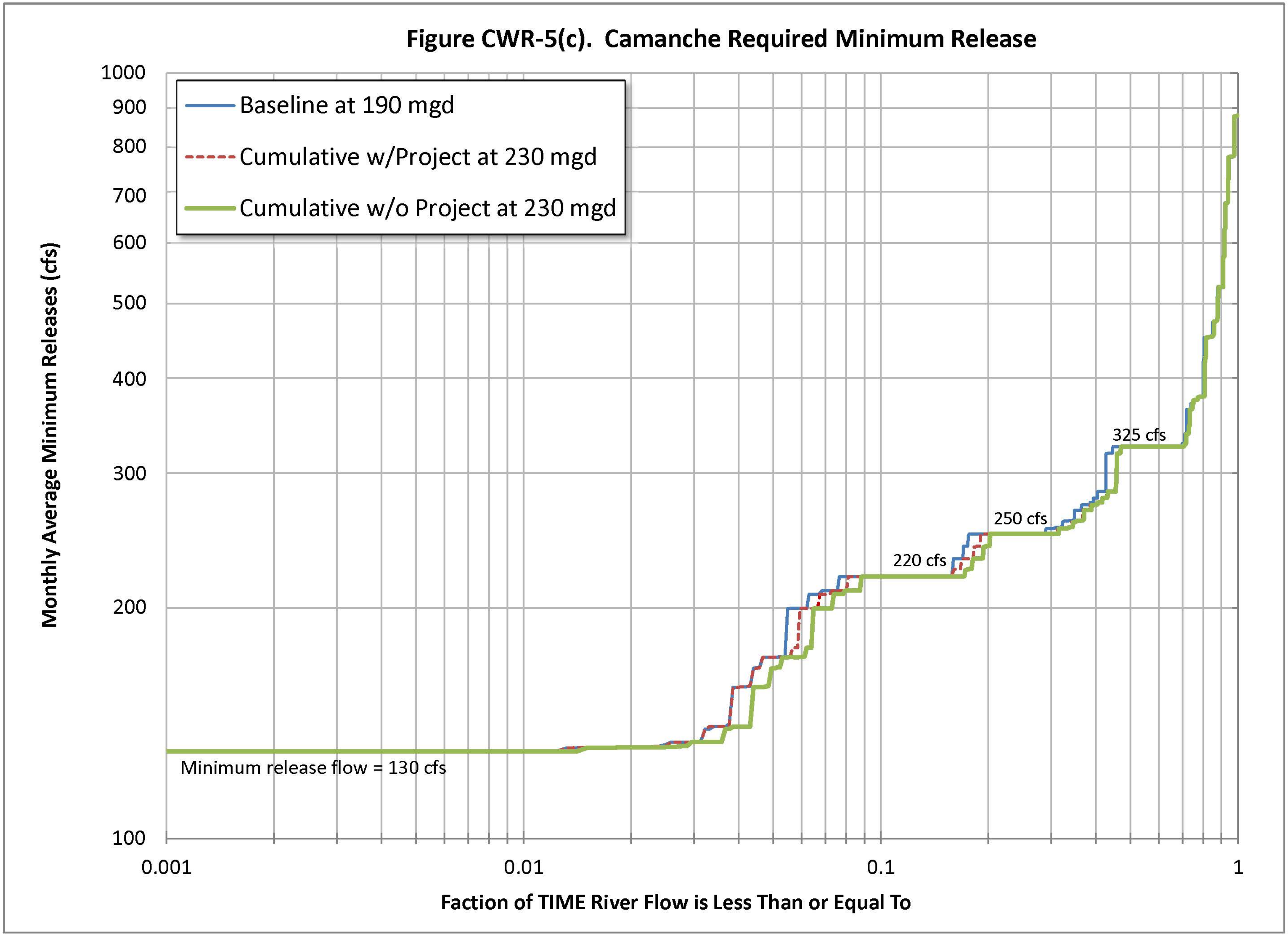


Figure CWR-5(c). Camanche Required Minimum Release
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
Monthly Average Minimum Releases (cfs)
1000
900
800
700
600
500
400
300
200
100
325 cfs
250 cfs
220 cfs
Minimum release flow = 130 cfs
0.001
0.01
0.1
1
Faction of TIME River Flow is Less Than or Equal To

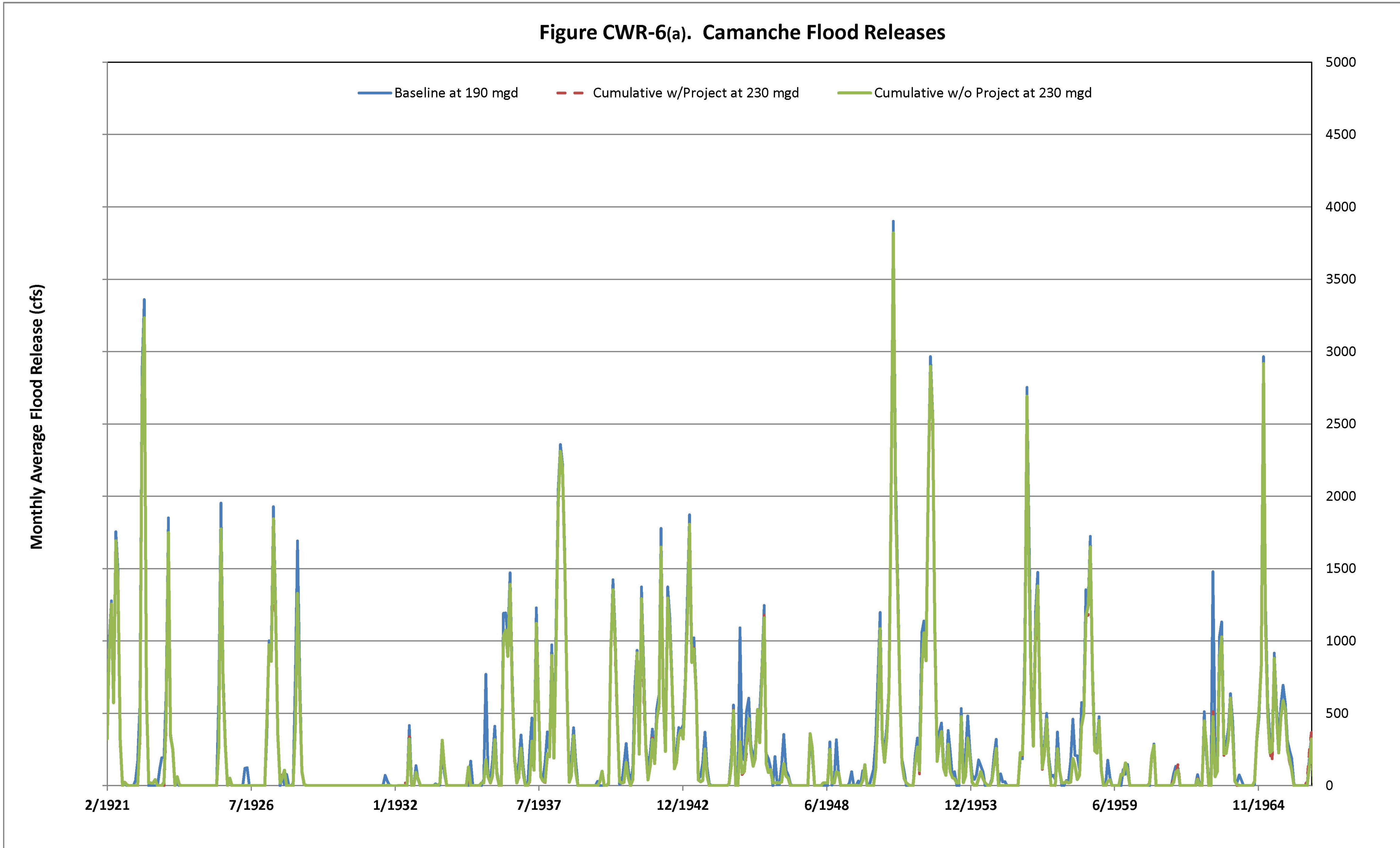


Figure CWR-6(a). Camanche Flood Releases
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
Monthly Average Flood Release (cfs)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

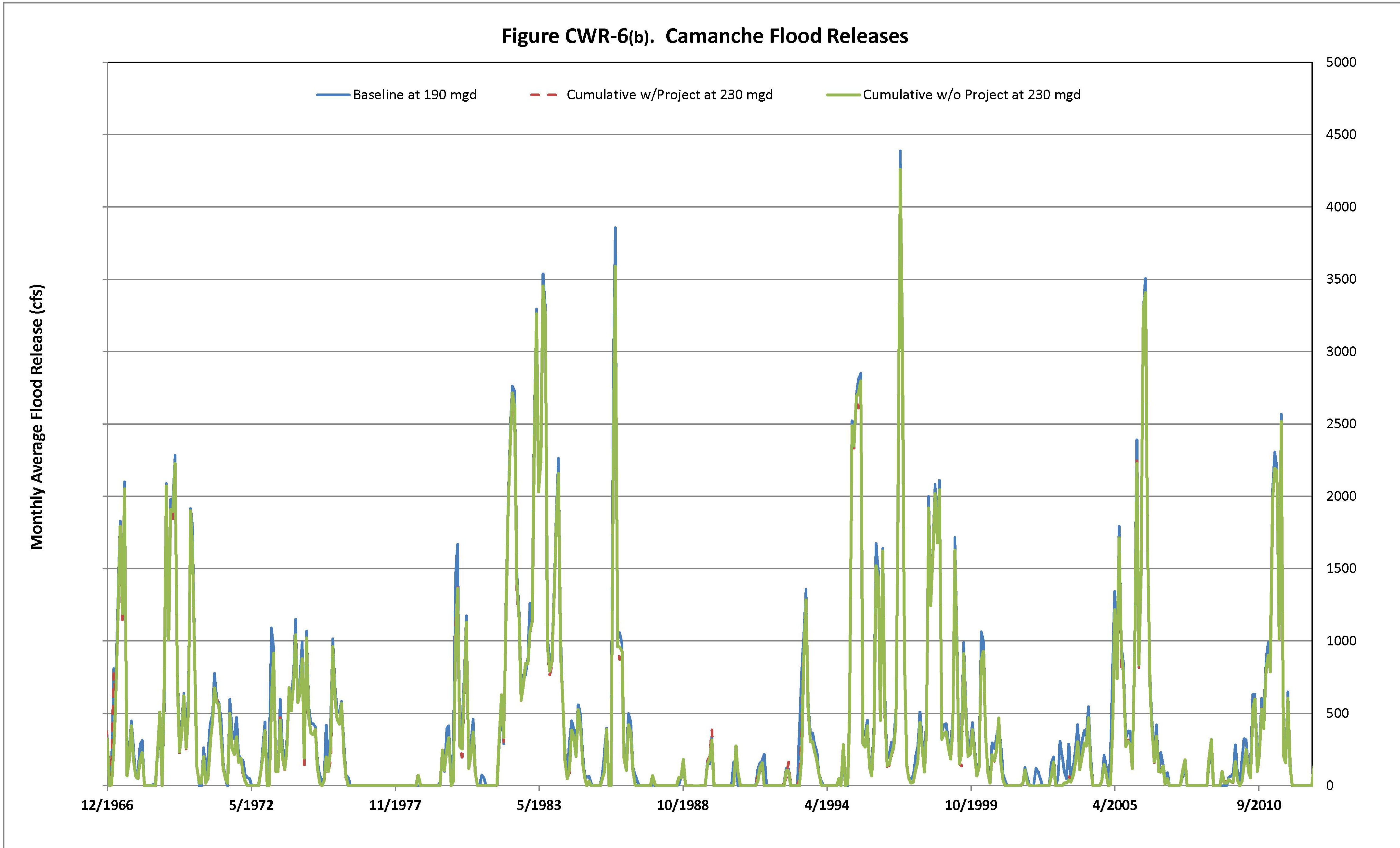
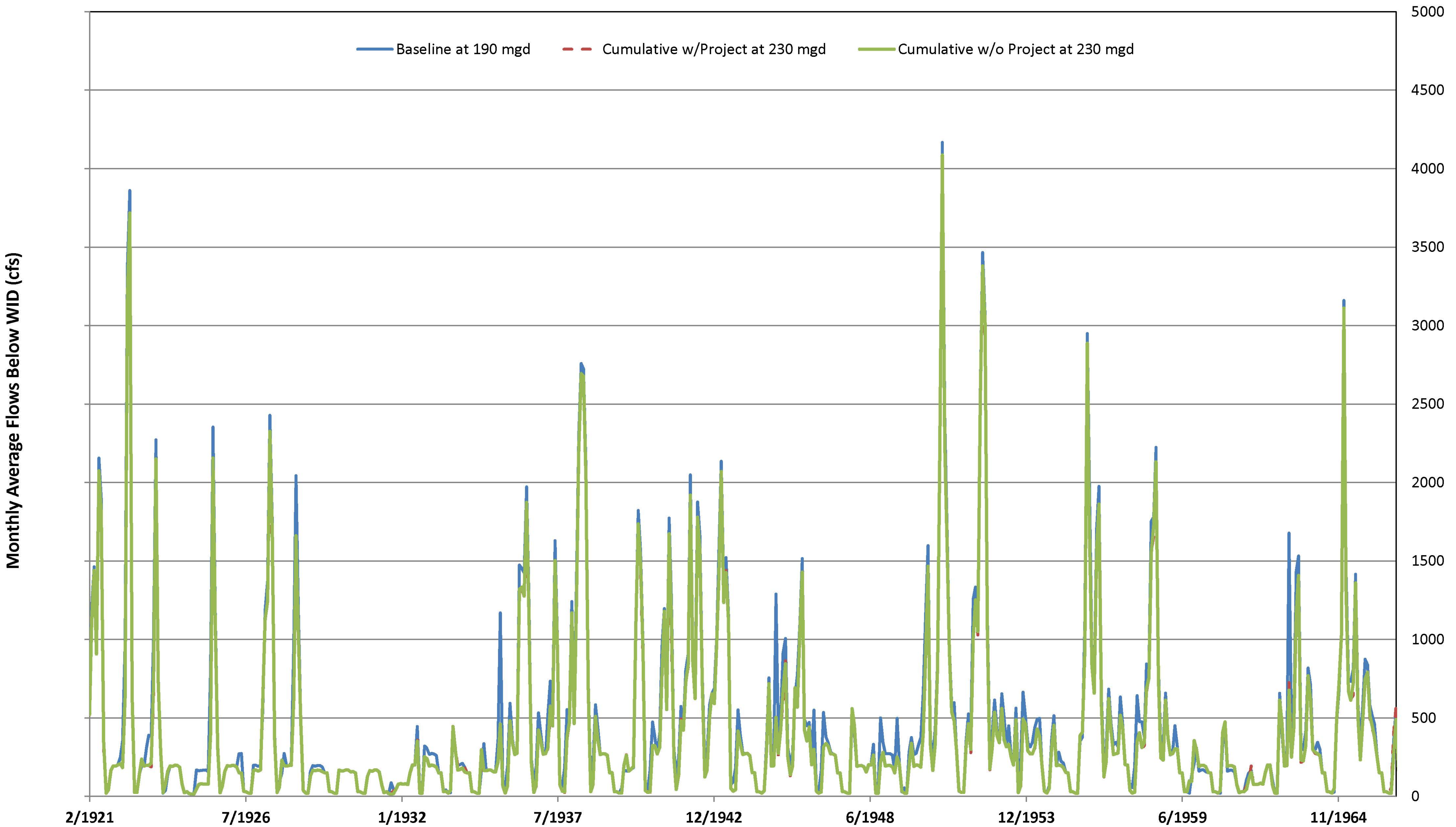


Figure CWR-6(b). Camanche Flood Releases
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
Monthly Average Flood Release (cfs)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
12/1966
5/1972
11/1977
5/1983
10/1988
4/1994
10/1999
4/2005
9/2010

Figure CWR-7(a). Flow Below WID



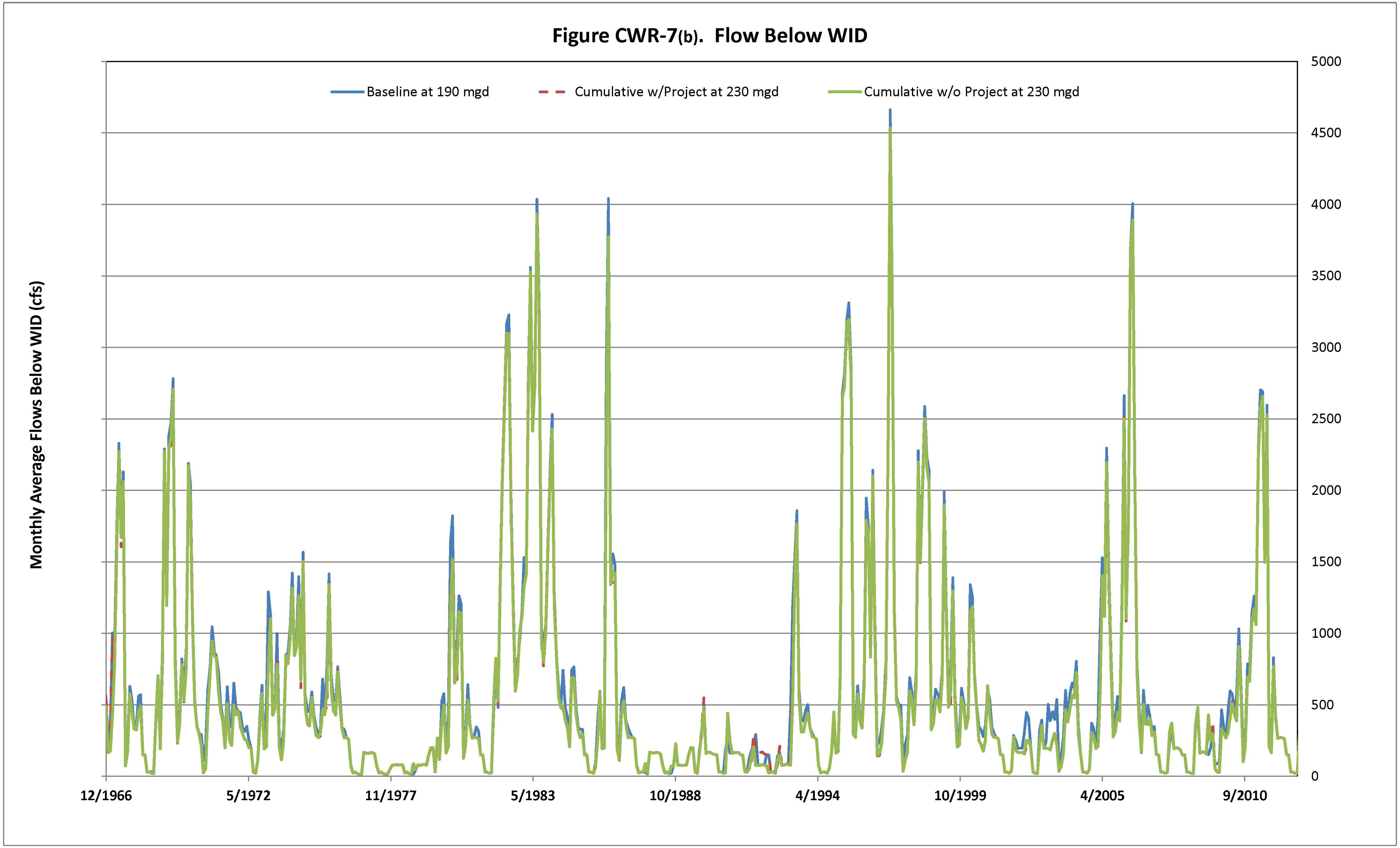


Figure CWR-7(b). Flow Below WID
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
Monthly Average Flows Below WID (cfs)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
12/1966
5/1972
11/1977
5/1983
10/1988
4/1994
10/1999
4/2005
9/2010

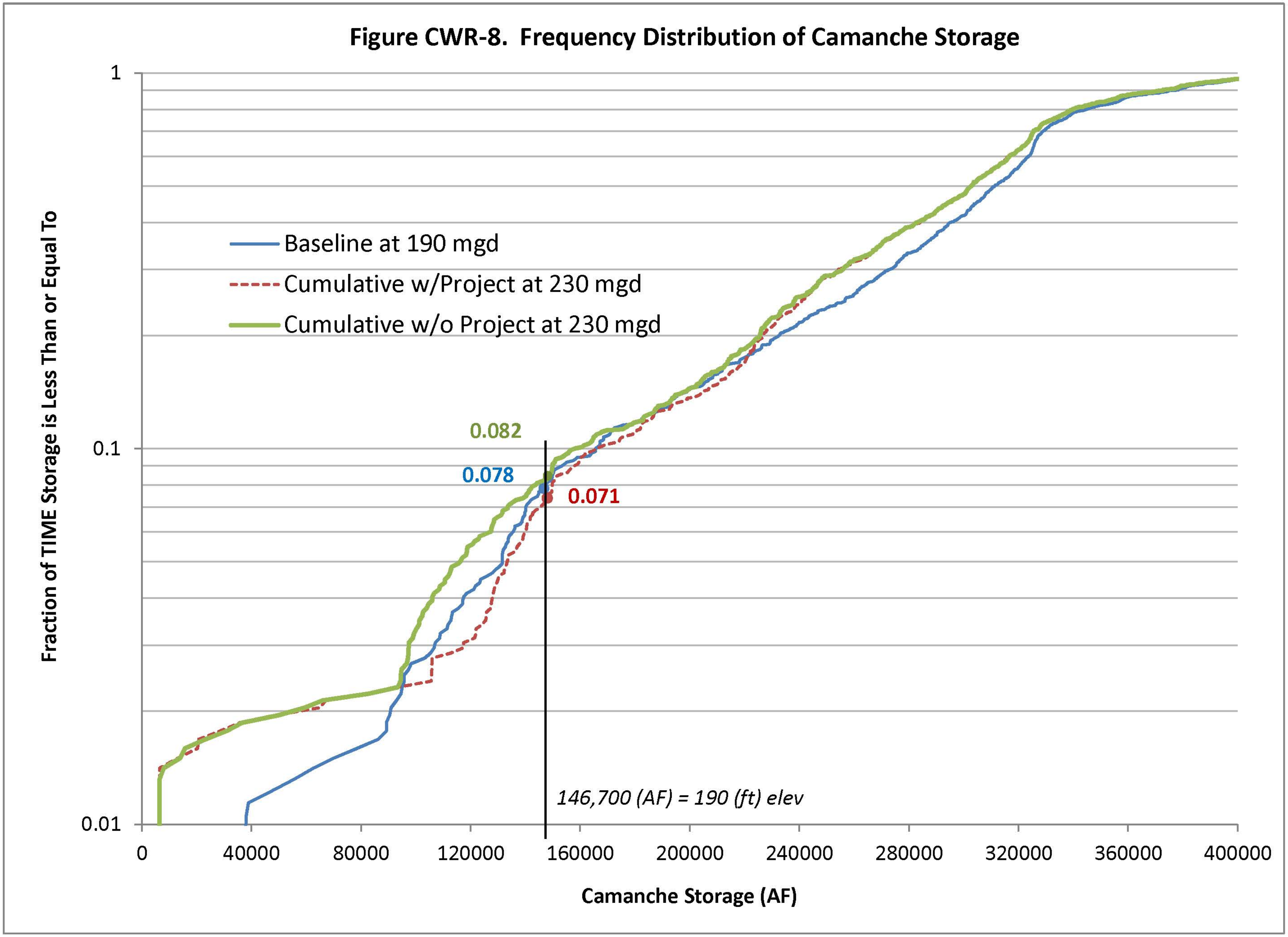


Figure CWR-8. Frequency Distribution of Camanche Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
0.082
0.078
0.071
146,700 (AF) = 190 (ft) elev
Fraction of TIME Storage is Less Than or Equal To
Camanche Storage (AF)
1
0.1
0.01
0
40000
80000
120000
160000
200000
240000
280000
320000
360000
400000

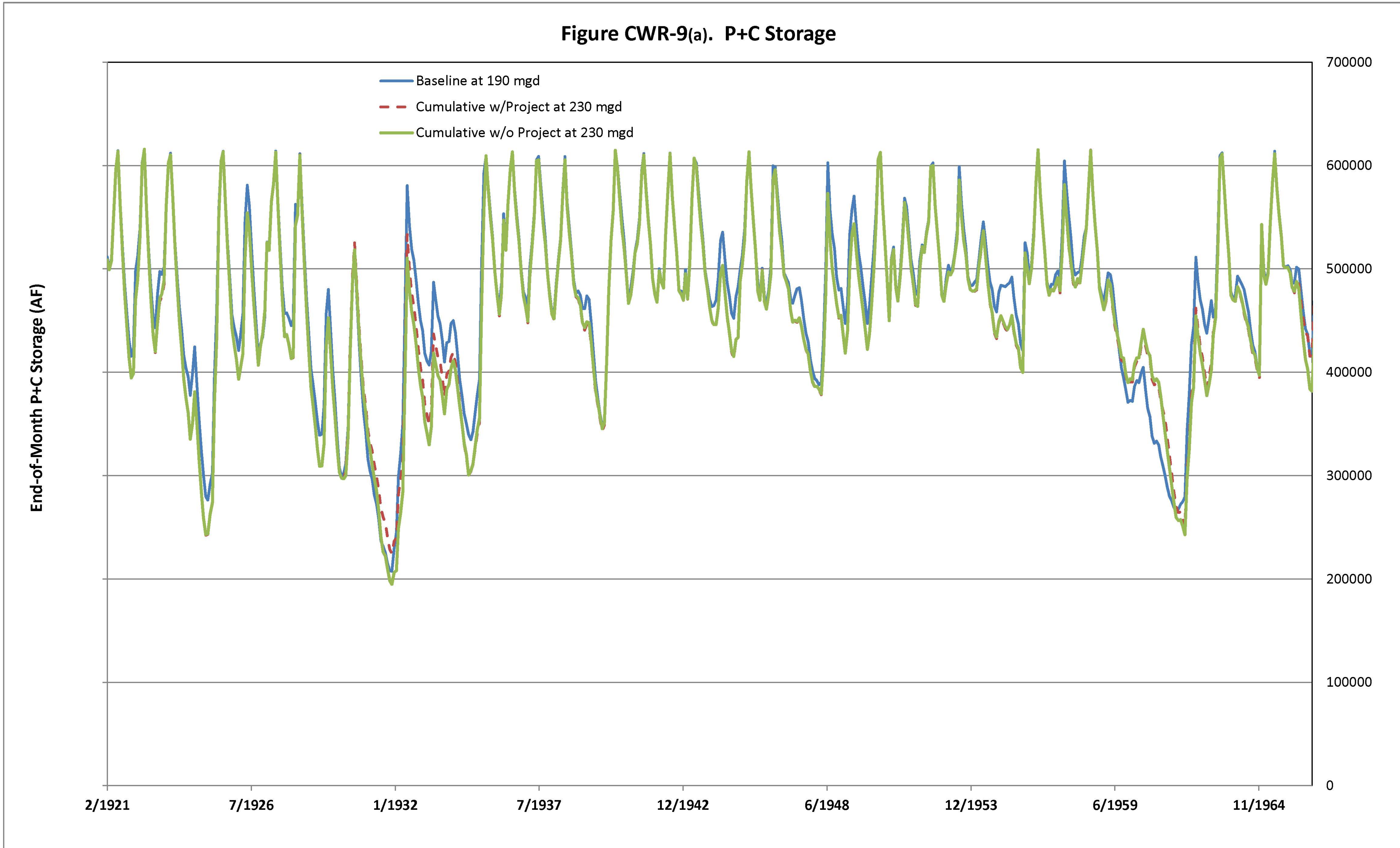


Figure CWR-9(a). P+C Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End-of-Month P+C Storage (AF)
700000
600000
500000
400000
300000
200000
100000
0
2/1921
7/1926
1/1932
7/1937
12/1942
6/1948
12/1953
6/1959
11/1964

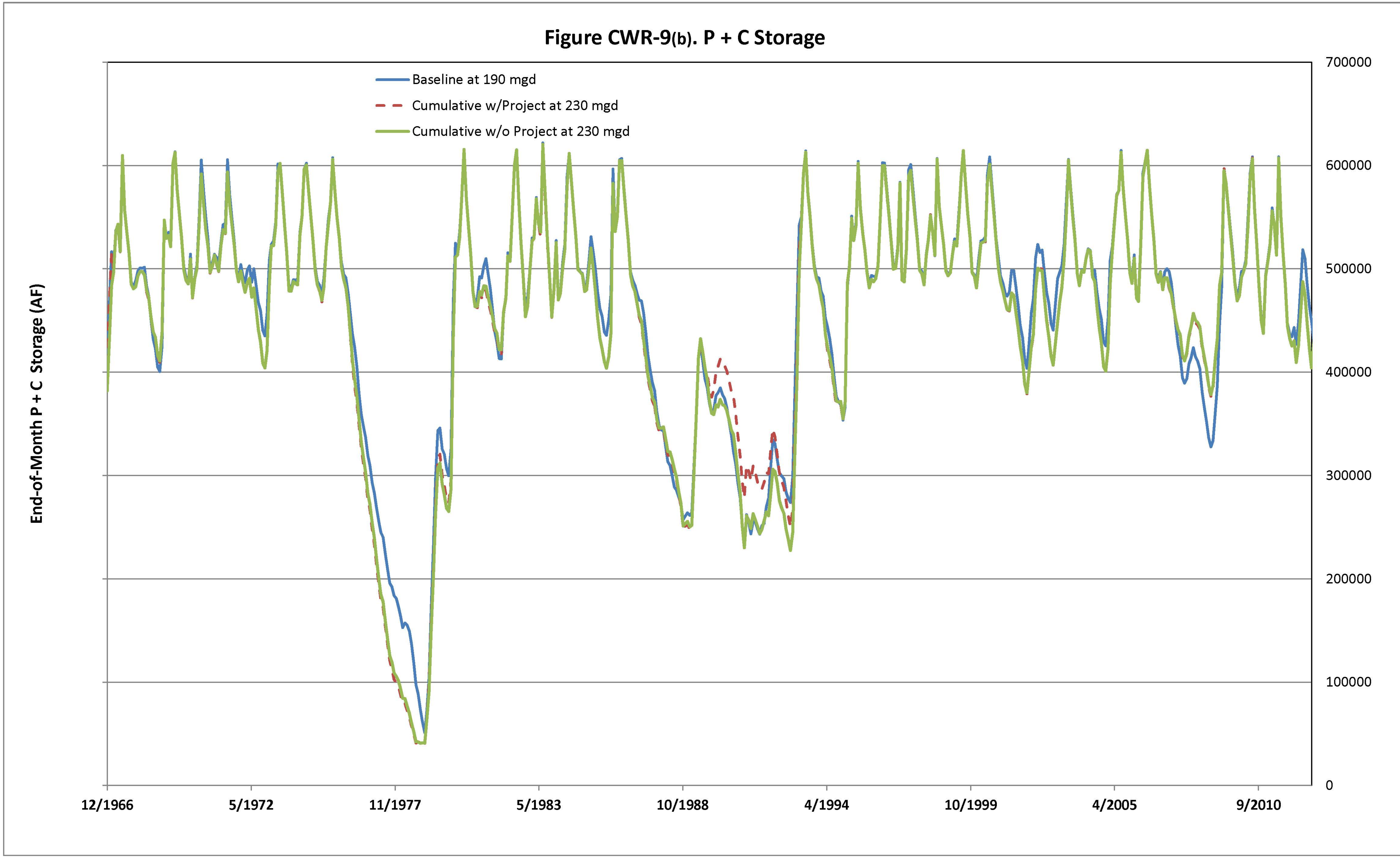


Figure CWR-9(b). P + C Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End-of-Month P + C Storage (AF)
700000
600000
500000
400000
300000
200000
100000
0
12/1966
5/1972
11/1977
5/1983
10/1988
4/1994
10/1999
4/2005
9/2010

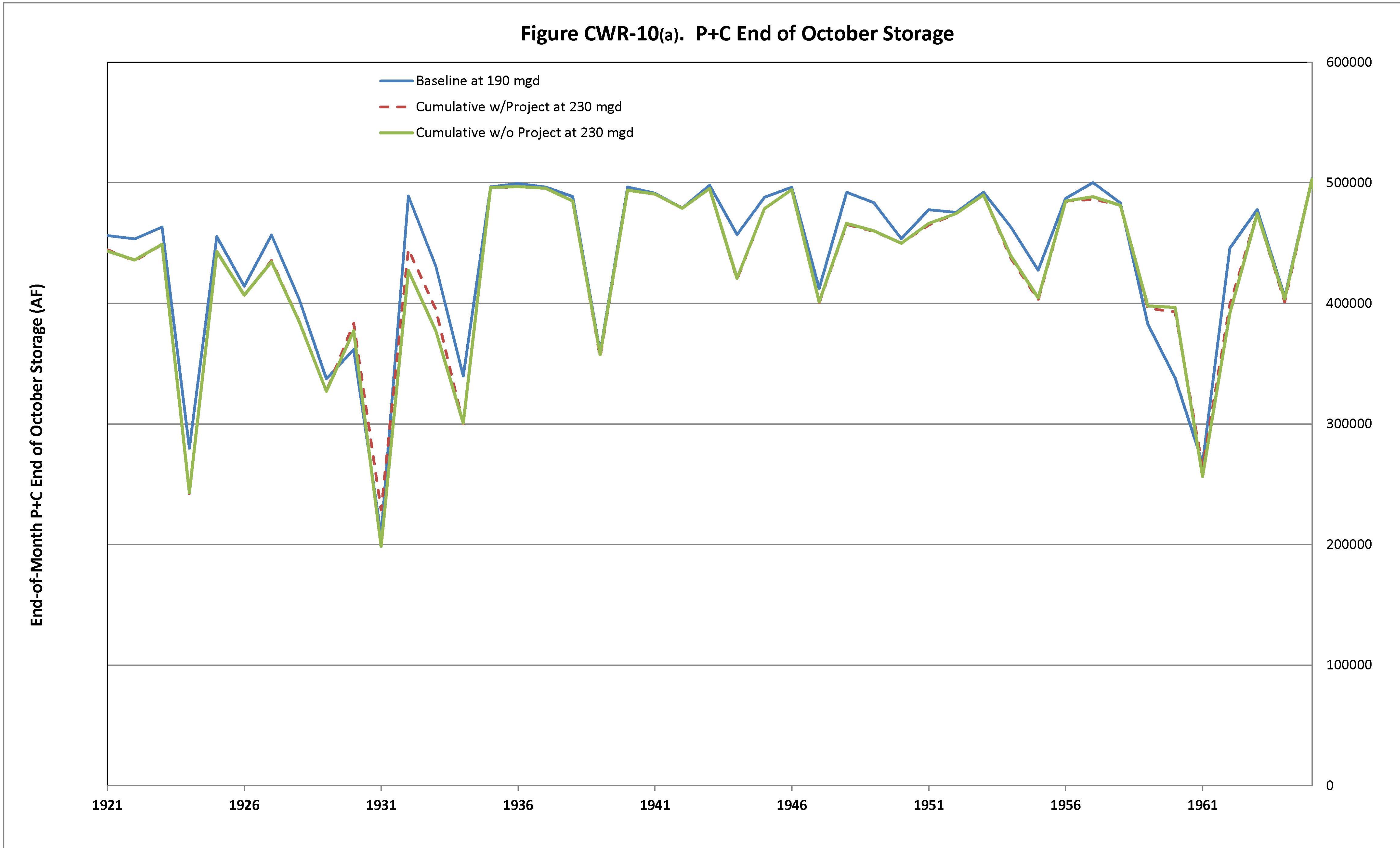


Figure CWR-10(a). P+C End of October Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End-of-Month P+C End of October Storage (AF)
600000
500000
400000
300000
200000
100000
0
1921
1926
1931
1936
1941
1946
1951
1956
1961

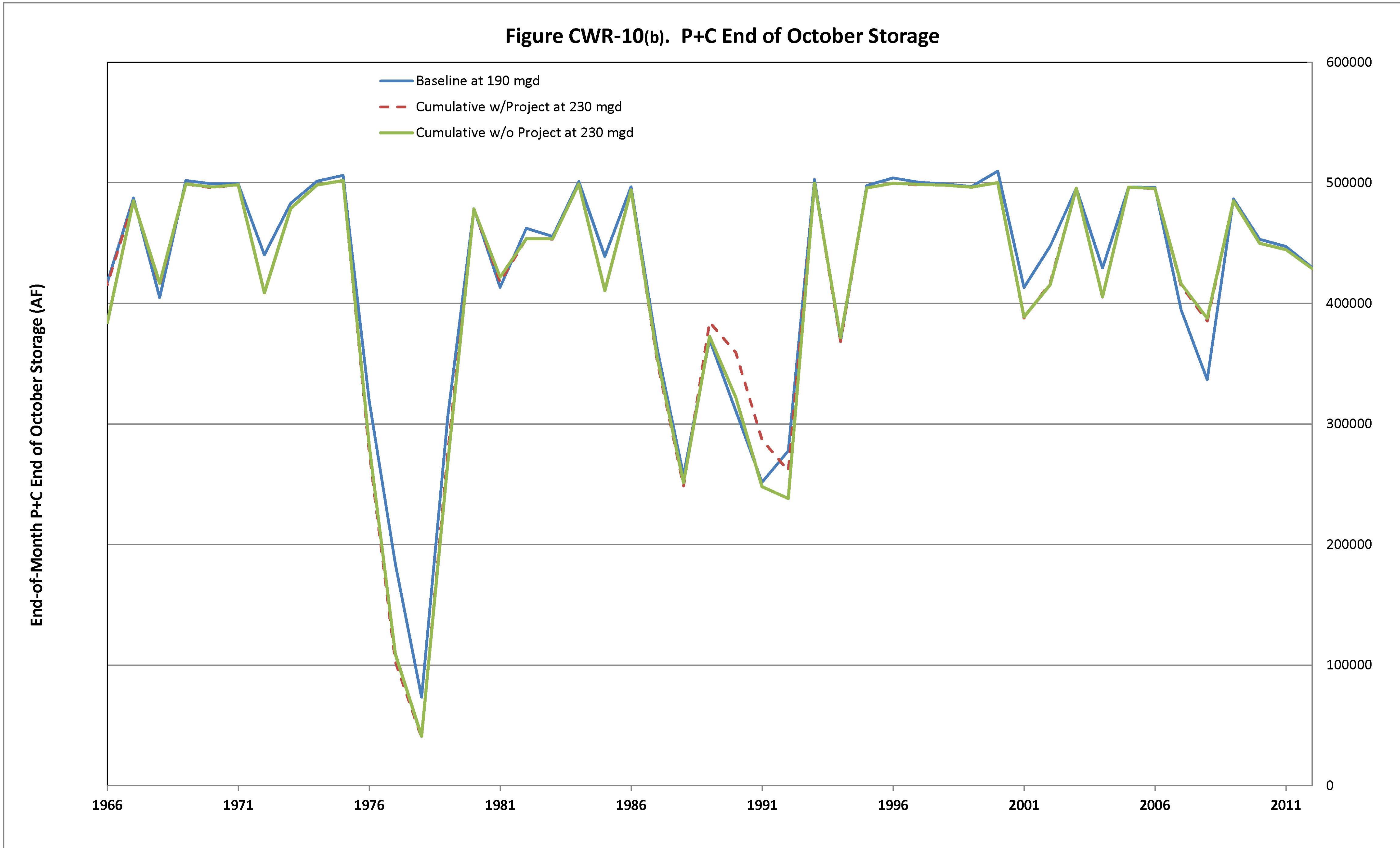


Figure CWR-10(b). P+C End of October Storage
Baseline at 190 mgd
Cumulative w/Project at 230 mgd
Cumulative w/o Project at 230 mgd
End-of-Month P+C End of October Storage (AF)
600000
500000
400000
300000
200000
100000
0
1966
1971
1976
1981
1986
1991
1996
2001
2006
2011

Date	Cumulative without Project Pardee Storage (acre-ft)	Cumulative with Project Pardee Storage (acre-ft)	Cumulative without Project Camanche Storage (acre-ft)	Cumulative with Project Camanche Storage (acre-ft)	Cumulative without Project TRA Storage (acre-ft)	Cumulative with Project TRA Storage (acre-ft)	Cumulative without Project JSA Year Type (NA)	Cumulative with Project JSA Year Type (NA)	Cumulative without Project Camanche Outflow (cfs)	Cumulative with Project Camanche Outflow (cfs)	Cumulative without Project Required Camanche Release (cfs)	Cumulative with Project Required Camanche Release (cfs)	Cumulative without Project Camanche Flood Release (AF)	Cumulative with Project Camanche Flood Release (AF)	Cumulative without Project Flow below Lodi Lake (AF)	Cumulative with Project Flow below Lodi Lake (AF)
1/1921	184162.6	184162.6	324567.1	324567.1	134323.8	134323.8	1	1	574.2	574.2	250.00	250.00	19934.2	19934.2	32092	32092
2/1921	180147.7	180147.7	319184.9	319184.9	139007.6	139007.6	1	1	1175.7	1175.7	250.00	250.00	51412.3	51412.3	62337	62337
3/1921	199862.7	199862.7	308033.2	308033.2	142077.7	142077.7	1	1	1504.5	1504.5	250.00	250.00	77138.3	77138.3	88562	88562
4/1921	206359.7	206359.7	344453.0	344453.0	141174.7	141174.7	1	1	1047.6	1047.6	474.53	474.53	34102.7	34102.7	54038	54038
5/1921	208581.5	208218.0	388059.5	386902.8	135323.8	132940.0	1	1	2371.0	2303.2	677.70	677.66	104116.2	99953.7	127562	123400
6/1921	202758.6	201317.4	411133.5	412176.6	127730.2	121712.3	1	1	2204.1	2115.7	778.47	778.35	84829.6	79578.4	107512	102261
7/1921	179458.3	180183.8	381012.9	381890.6	118701.5	112759.7	1	1	678.7	646.0	364.14	364.06	19340.0	17334.3	21144	19139
8/1921	158460.7	159133.8	356802.5	357673.2	109136.6	103321.0	1	1	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1921	137623.7	138291.0	339028.6	339500.9	101116.5	95374.8	1	1	243.9	250.5	219.82	219.82	1430.3	1825.0	2625	3020
10/1921	122453.6	123098.5	321023.3	321493.8	95995.8	90339.7	1	1	289.2	289.2	284.00	284.00	321.0	321.3	10277	10277
11/1921	107129.0	107769.6	306888.7	307358.2	95318.1	89717.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11537	11537
12/1921	99994.6	99989.9	294573.4	295042.7	107253.9	102321.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11861	11861
1/1922	108770.3	108542.9	290006.8	290477.9	117015.1	112344.0	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12399	12399
2/1922	167033.3	166340.1	303074.7	303153.7	129090.6	125306.0	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11638	11638
3/1922	177262.4	176960.2	312654.2	311394.8	133997.4	131194.5	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11377	11377
4/1922	205345.0	205204.8	324505.6	324846.7	134943.2	132473.5	0	0	767.2	732.5	425.00	425.00	20360.6	18297.8	37305	35246
5/1922	212057.5	212059.6	388205.2	384565.0	130663.7	124996.6	0	0	3467.7	3451.6	778.72	778.70	165343.8	164353.6	194961	193971
6/1922	207325.8	207181.6	408519.0	407517.7	123543.8	114288.3	0	0	4114.7	4003.3	880.21	880.16	192466.3	185844.3	221184	214564
7/1922	186567.4	186370.4	372589.5	371888.8	114647.3	105521.4	0	0	1082.6	1078.6	452.47	452.46	38743.7	38503.1	39393	39150
8/1922	167244.3	167132.1	343683.8	342988.5	105747.0	96667.1	0	0	396.4	396.4	377.52	377.52	1158.9	1158.9	1539	1539
9/1922	147175.8	146920.7	323940.5	323249.0	98806.3	89986.3	0	0	278.0	278.0	259.14	259.14	1121.5	1121.5	1493	1493
10/1922	131172.1	130949.5	304897.1	304208.3	96025.3	87268.0	1	1	301.7	301.7	284.00	284.00	1087.1	1086.9	8674	8674
11/1922	127461.0	127239.4	292561.7	291873.6	98004.6	89318.5	1	1	292.1	292.1	250.00	250.00	2507.3	2506.6	14190	14189
12/1922	164883.3	164239.8	283844.8	282385.1	111565.2	104114.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11886	11886
1/1923	170430.4	169897.8	301429.0	299223.1	119111.3	112352.9	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12252	12252
2/1923	164425.0	164126.7	311394.2	308395.9	124436.2	118294.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11008	11008
3/1923	169790.9	169585.9	318927.4	315452.8	128346.2	124129.4	1	1	274.2	250.0	250.00	250.00	1487.6	0.0	13028	11547
4/1923	205600.7	205563.6	354618.7	353744.8	131995.9	128564.4	1	1	837.8	778.6	374.16	374.10	27589.8	24072.4	41702	38185
5/1923	205135.9	205135.9	397627.7	397363.2	126778.6	123809.6	1	1	2427.1	2409.7	677.99	677.94	107550.0	106481.7	132280	131212
6/1923	198715.0	198715.0	411681.6	411694.6	119562.8	116627.4	1	1	1118.0	1113.3	777.15	777.15	20282.4	20004.7	42963	42686
7/1923	186036.7	186036.7	381583.2	381591.9	110625.7	107724.3	1	1	639.6	639.6	388.92	389.01	15411.3	15409.7	17130	17128
8/1923	165919.7	165919.7	356190.9	356196.1	101644.7	98781.0	1	1	337.8	337.8	334.17	334.23	222.4	222.2	1463	1463
9/1923	147211.4	147211.4	335506.9	335509.7	94896.1	92068.2	1	1	291.8	291.8	229.51	229.54	3704.6	3704.8	4814	4814
10/1923	132550.7	132550.7	316405.5	316408.3	91205.8	88411.2	1	1	291.3	291.3	284.00	284.00	447.9	447.9	9946	9945
11/1923	120949.5	120949.5	303337.2	303340.0	90031.4	87266.7	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11574	11574
12/1923	106282.1	105961.9	287237.6	287240.5	94224.2	91804.7	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11727	11727
1/1924	96730.6	96412.4	278037.7	278040.5	103401.2	101001.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12237	12237
2/1924	93509.4	92741.1	267446.8	267449.6	112409.5	110477.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11368	11368
3/1924	81025.5	80262.5	254288.1	254291.0	119821.0	117906.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11493	11493
4/1924	107828.4	107016.8	242754.9	242757.7	122348.4	120513.7	3	3	199.8	199.8	199.79	199.79	0.0	0.0	4625	4625

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5/1924	152095.5	151306.7	228971.3	228974.1	117263.4	115438.5	3	3	210.8	210.8	210.75	210.75	0.0	0.0	1465	1465
6/1924	138444.5	137675.3	211137.4	211140.2	109161.6	107349.9	3	3	268.5	268.5	268.51	268.51	0.0	0.0	1845	1845
7/1924	122575.4	121831.2	193023.0	193025.8	100932.9	99132.3	3	3	241.1	241.1	241.05	241.05	0.0	0.0	1115	1115
8/1924	107298.9	106584.2	177187.4	177190.1	93049.4	91251.1	3	3	208.5	208.5	208.46	208.46	0.0	0.0	924	924
9/1924	93411.8	92729.7	165730.3	165733.0	86691.6	84889.9	3	3	157.6	157.6	157.59	157.59	0.0	0.0	897	897
10/1924	84981.7	84266.6	158051.6	158054.2	83918.4	82173.1	3	3	131.4	131.4	131.36	131.36	0.0	0.0	2892	2892
11/1924	93163.6	92541.7	150774.2	150776.9	83437.6	81620.0	3	3	131.6	131.6	131.58	131.58	0.0	0.0	4515	4515
12/1924	111631.0	110524.6	151156.2	151158.9	91252.1	89930.8	3	3	133.6	133.6	133.62	133.62	0.0	0.0	4961	4961
1/1925	125607.8	124533.9	148170.9	148173.6	102796.2	101455.9	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4867	4867
2/1925	184987.5	184602.9	183095.9	182207.5	125243.8	124102.1	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4407	4407
3/1925	188487.8	188295.9	242470.3	240905.7	132177.0	131524.3	3	3	140.0	140.0	139.99	139.99	0.0	0.0	4866	4866
4/1925	205774.9	205765.4	344046.4	342052.6	136192.9	135791.5	1	1	529.1	529.1	273.34	273.34	15220.3	15220.3	23247	23247
5/1925	207849.5	207848.9	396273.0	396242.3	134734.3	134349.4	1	1	2452.9	2420.6	677.92	677.90	109141.3	107158.7	132587	130605
6/1925	200953.6	200953.6	412503.2	412472.1	127560.8	127181.2	1	1	1473.9	1473.9	777.79	777.79	41421.5	41421.5	64104	64104
7/1925	181148.0	181148.0	381667.8	381641.2	118642.4	118268.6	1	1	633.0	632.9	364.02	364.02	16539.3	16534.9	18344	18339
8/1925	162192.2	162192.2	357373.4	357349.4	109320.6	108951.9	1	1	319.8	319.8	318.52	318.52	78.4	75.9	1406	1403
9/1925	143617.9	143617.9	337939.7	337926.7	101414.5	101049.8	1	1	271.8	271.6	219.82	219.82	3091.5	3080.6	4286	4275
10/1925	124557.6	124547.0	318406.5	318393.5	96231.1	95880.6	1	1	284.0	284.0	284.00	284.00	0.0	0.0	9894	9894
11/1925	117328.6	117318.1	309161.9	309148.9	95425.7	95077.5	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11707	11707
12/1925	114905.9	114895.3	298050.2	298037.2	99723.1	99377.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11903	11903
1/1926	107070.2	107059.8	286234.3	286221.3	110926.3	110580.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12144	12144
2/1926	129410.6	129210.4	275235.5	275222.5	119549.1	119395.0	1	1	250.0	250.0	250.00	250.00	0.0	0.0	10946	10946
3/1926	153902.2	153513.6	264252.9	264240.0	125310.1	125346.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11573	11573
4/1926	205377.8	205366.0	303668.5	303316.0	130226.8	130227.5	2	2	274.8	274.8	274.76	274.76	0.0	0.0	9023	9023
5/1926	193554.7	193554.7	360815.2	360452.7	125633.7	125634.3	2	2	346.2	346.2	346.23	346.23	0.0	0.0	9228	9228
6/1926	188537.4	188537.4	348373.6	348012.6	118078.6	118079.1	2	2	280.1	280.1	280.09	280.09	0.0	0.0	1932	1932
7/1926	172627.5	172627.5	325922.3	325563.9	109072.2	109072.6	2	2	291.6	291.6	291.60	291.60	0.0	0.0	1803	1803
8/1926	157175.1	157175.1	306882.8	306527.0	100187.8	100188.3	2	2	240.4	240.4	240.39	240.39	0.0	0.0	1325	1325
9/1926	143089.8	143089.8	293254.1	292900.5	92783.9	92784.5	2	2	177.5	177.5	177.54	177.54	0.0	0.0	1192	1192
10/1926	129671.4	129671.4	277180.9	276828.6	90360.9	90361.5	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10201	10201
11/1926	151457.5	151457.5	273780.4	273427.3	95670.1	95670.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10067	10067
12/1926	161015.4	161015.4	276513.1	276160.5	99768.7	99769.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9950	9950
1/1927	167390.4	167390.4	292804.8	292451.6	112653.4	112654.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10404	10404
2/1927	204686.1	204686.1	320883.7	320846.6	126230.7	126231.7	2	2	674.3	668.6	220.00	220.00	25230.1	24912.8	34691	34373
3/1927	190860.6	190860.6	327129.1	327845.9	131387.3	131388.3	2	2	1193.5	1181.3	220.00	220.00	59862.0	59108.3	69341	68590
4/1927	209576.1	209576.1	355342.0	354948.9	135472.6	135473.7	0	0	1384.7	1403.3	525.00	525.00	51154.5	52265.2	73956	75066
5/1927	204865.0	204807.4	377143.5	377461.0	130053.8	126814.6	0	0	2622.6	2533.5	778.22	778.16	113406.9	107936.0	143005	137534
6/1927	202796.3	202336.6	410295.0	412308.9	123100.5	116240.7	0	0	2047.9	1956.5	878.39	878.26	69590.1	64160.3	98246	92816
7/1927	188232.2	188725.6	374154.3	375957.5	114206.2	107440.7	0	0	800.7	788.4	451.98	451.97	21444.3	20686.7	22090	21332
8/1927	168320.3	168718.1	345222.2	347012.5	105400.7	98823.8	0	0	396.4	396.4	377.52	377.52	1158.9	1158.9	1539	1539

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9/1927	147148.4	147223.7	323761.3	324732.6	98293.1	92118.8	0	0	311.5	325.2	259.23	259.31	3112.8	3920.0	3494	4302
10/1927	133211.4	133286.2	301327.3	302247.5	94668.7	88564.2	1	1	390.7	391.5	284.00	284.00	6562.0	6610.7	14212	14261
11/1927	145301.4	145375.9	291047.1	291967.0	94855.0	88807.0	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11671	11671
12/1927	147069.5	145995.4	279667.2	280587.1	100468.0	95619.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11894	11894
1/1928	146361.2	145291.9	266976.3	267896.0	111217.8	106413.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12114	12114
2/1928	158646.1	157043.8	256274.2	257194.2	118863.6	114636.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11363	11363
3/1928	210428.0	210430.2	331919.9	331201.2	127406.8	124352.9	1	1	671.0	652.9	250.00	250.00	25884.7	24773.9	37546	36436
4/1928	205590.6	205568.7	346555.5	346238.2	129559.5	127345.1	1	1	1804.0	1784.0	475.35	475.35	79061.4	77871.3	98884	97694
5/1928	204143.9	204143.9	405787.2	406271.9	124927.9	122738.3	1	1	1298.8	1285.4	676.78	676.74	38249.7	37427.3	61686	60863
6/1928	187865.6	187865.6	369008.6	369490.7	117287.6	115121.5	1	1	874.0	874.0	776.68	776.68	5789.5	5789.5	28473	28473
7/1928	165074.3	165074.3	341385.2	341863.9	108151.1	106011.1	1	1	373.7	373.7	363.59	363.59	619.4	619.4	2427	2427
8/1928	142367.0	142367.0	317447.4	317922.6	99162.4	97052.2	1	1	318.5	318.5	318.50	318.50	0.0	0.0	1328	1328
9/1928	121271.3	121271.3	301249.6	301722.1	92415.0	90331.6	1	1	219.8	219.8	219.79	219.79	0.0	0.0	1193	1193
10/1928	101695.5	101695.5	283712.2	284182.6	87034.1	84976.8	2	2	254.0	254.0	254.00	254.00	0.0	0.0	8051	8051
11/1928	91565.1	91565.1	276245.9	276716.4	86506.3	84468.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9924	9924
12/1928	80350.6	79615.9	266975.8	267446.4	92590.2	91303.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10058	10058
1/1929	67280.0	65982.2	257001.6	257472.2	99678.1	98971.3	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10300	10300
2/1929	61354.3	60555.0	247669.1	248139.7	105459.8	104268.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9280	9280
3/1929	70997.0	70456.5	238523.7	238994.5	108556.4	107126.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9728	9728
4/1929	106288.0	105658.2	223592.8	224062.3	112167.4	110848.9	2	2	274.8	274.8	274.76	274.76	0.0	0.0	9023	9023
5/1929	197088.6	197123.7	228213.4	228026.8	107728.5	106423.8	2	2	337.9	337.9	337.94	337.94	0.0	0.0	9228	9228
6/1929	193079.2	193100.5	259725.0	259553.0	101437.4	100149.6	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1932	1932
7/1929	177435.5	177456.8	240955.1	240784.6	94157.5	92888.9	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1929	161090.8	161111.6	223167.5	222998.8	87431.3	86180.4	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1929	146125.7	146146.0	210433.8	210266.4	82422.4	81187.8	2	2	172.5	172.5	172.49	172.49	0.0	0.0	1192	1192
10/1929	133607.4	133696.0	193572.0	193405.5	79533.2	78245.9	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10338	10338
11/1929	123490.3	123576.6	179575.4	179409.7	78443.9	77172.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9677	9677
12/1929	127626.5	127710.3	169941.9	169776.2	85916.9	84656.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10045	10045
1/1930	132770.0	132753.2	164324.4	164158.0	97099.3	95946.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10467	10467
2/1930	143724.0	151024.6	156571.2	156404.6	107202.2	106061.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9342	9342
3/1930	177132.6	177637.6	160808.4	167286.0	117200.1	116197.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9635	9635
4/1930	204388.9	204389.4	215177.0	222132.2	120648.3	119656.7	2	2	272.8	272.8	272.80	272.80	0.0	0.0	9410	9410
5/1930	204718.5	204718.9	281910.2	288749.0	116156.9	115178.3	2	2	377.1	378.3	377.06	378.29	0.0	0.0	9259	9259
6/1930	190725.6	190725.6	327828.8	334525.3	108645.0	107681.4	2	2	338.0	339.7	337.95	339.67	0.0	0.0	1821	1821
7/1930	175379.6	175379.6	301550.8	308077.0	99750.9	98799.5	2	2	374.7	376.6	374.69	376.65	0.0	0.0	1801	1801
8/1930	159292.0	159292.0	277762.4	284162.1	90993.3	90054.1	2	2	325.6	326.8	325.59	326.82	0.0	0.0	1337	1337
9/1930	144358.6	144358.6	261820.6	268132.8	83732.1	82803.9	2	2	224.1	224.9	224.12	224.87	0.9	1.9	1202	1203
10/1930	132017.3	132017.3	245311.7	251593.9	80571.9	79653.8	2	2	254.0	254.0	254.00	254.00	0.0	0.0	7927	7900
11/1930	127601.8	127601.7	234156.9	240426.4	80057.8	79146.6	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9789	9789
12/1930	117021.5	117021.5	220089.6	226340.6	84782.3	83878.1	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9883	9883

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1/1931	112768.7	112768.6	212617.3	218880.2	94603.9	93703.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10392	10392
2/1931	106134.4	113565.4	204145.7	210412.5	103646.0	102634.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9312	9312
3/1931	104526.9	111723.5	192904.3	199163.2	110367.2	109551.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9650	9650
4/1931	103703.3	110738.3	181591.7	187826.3	113958.6	113258.2	3	3	199.8	199.8	199.76	199.76	0.0	0.0	4625	4625
5/1931	97954.3	112607.6	168200.7	174391.3	109175.5	108878.5	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1465	1465
6/1931	89635.3	110897.5	150876.4	157010.5	99973.7	100724.9	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1845	1845
7/1931	92695.0	111519.6	133500.9	148399.1	90070.3	92189.8	3	3	241.0	241.0	241.03	241.03	0.0	0.0	1113	1113
8/1931	90898.4	110848.1	131287.8	143530.9	81610.7	84298.6	3	3	208.5	216.4	208.48	208.54	0.0	485.3	923	1409
9/1931	89266.5	100007.9	120812.8	140507.4	75043.2	78162.2	3	3	160.9	176.7	157.71	157.77	187.9	1128.9	1085	2026
10/1931	85629.1	96318.1	112799.8	132350.0	71996.0	75037.5	3	3	131.4	131.4	131.37	131.37	0.0	0.0	2868	2868
11/1931	86386.7	96637.1	108535.8	128054.8	72057.3	75451.3	3	3	131.6	131.6	131.60	131.60	0.0	0.0	4630	4630
12/1931	95914.5	106467.2	110613.6	130288.9	81350.3	84394.7	3	3	133.7	133.7	133.66	133.66	0.0	0.0	5040	5040
1/1932	102013.1	113926.0	106078.0	125761.2	93726.0	95326.2	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4807	4807
2/1932	142703.7	155338.1	106052.2	125847.5	106001.5	106846.2	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4664	4664
3/1932	165404.7	169299.2	98892.8	127505.1	115985.5	116626.7	3	3	140.0	140.0	140.00	140.00	0.0	0.0	4677	4677
4/1932	182692.5	182623.0	101401.4	132807.1	121412.8	121978.2	1	1	273.8	291.6	272.80	272.80	59.9	1121.5	8995	8995
5/1932	206232.0	206231.8	190820.7	217846.6	117154.7	118495.7	1	1	440.6	494.2	439.62	475.33	61.9	1158.9	12389	12389
6/1932	205959.9	205959.9	304562.4	327376.1	109914.8	111232.3	1	1	526.9	594.6	525.86	575.79	59.9	1121.5	11899	11899
7/1932	193771.0	193771.0	285768.7	305345.1	101168.8	102463.0	1	1	687.0	737.0	364.18	387.79	19849.9	21474.2	21655	23198
8/1932	192572.8	192572.8	265799.5	284219.8	92354.1	93634.8	1	1	318.5	334.7	318.50	333.42	0.0	82.0	1328	1328
9/1932	189926.0	189926.0	256328.9	273991.2	85715.6	86984.8	1	1	219.8	230.4	219.79	229.01	0.0	84.9	1193	1199
10/1932	170939.6	170939.6	256261.5	273923.7	82340.2	83599.2	1	1	376.3	374.9	284.00	284.00	5676.7	5586.5	15548	15052
11/1932	157165.8	157165.8	248259.8	265885.2	81343.8	82596.4	1	1	299.1	298.8	250.00	250.00	2921.2	2902.7	14413	14395
12/1932	151446.1	151124.3	235977.2	253594.0	86696.5	88267.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11861	11861
1/1933	147640.9	147319.9	228275.6	245944.3	100500.6	102072.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12296	12296
2/1933	136111.2	135500.1	216020.8	233674.9	109052.5	110909.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	10900	10900
3/1933	136918.0	136966.7	203900.4	221545.7	119410.5	120600.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11469	11469
4/1933	143015.0	144034.8	186927.6	204491.9	122959.7	123167.3	2	2	272.8	272.8	272.80	272.80	0.0	0.0	8939	8939
5/1933	182375.9	183444.5	164486.8	181940.1	119399.0	119548.2	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9300	9300
6/1933	196325.1	196322.3	222505.0	240868.5	111908.5	112056.3	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1824	1824
7/1933	197842.3	197839.0	210020.9	228053.2	103298.1	103201.3	2	2	367.6	369.9	363.47	363.47	252.5	396.2	2053	2197
8/1933	194235.9	194232.7	202565.5	220410.8	95034.2	94623.3	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1933	190219.4	190216.1	202565.5	220410.8	88493.4	87726.0	2	2	238.2	235.9	219.89	219.85	1091.6	952.0	2287	2147
10/1933	174673.8	174663.9	202474.0	220304.9	85877.7	85094.4	2	1	568.1	561.6	254.00	284.00	19314.1	17067.7	27413	27011
11/1933	160784.9	160840.0	199004.4	215654.9	84826.1	84016.3	2	1	354.3	366.6	220.00	250.00	7993.2	6939.2	17653	18385
12/1933	169251.1	168919.0	214293.8	229178.8	92078.8	91370.3	2	1	220.0	250.0	220.00	250.00	0.0	0.0	10311	12156
1/1934	162556.6	162624.7	226072.3	238706.2	103285.0	102313.1	2	1	220.0	250.0	220.00	250.00	0.0	0.0	10666	12511
2/1934	166815.5	166564.2	236857.0	247863.8	114520.2	113610.7	2	1	220.0	250.0	220.00	250.00	0.0	0.0	10077	11743
3/1934	168738.5	168287.8	242446.6	251182.3	120230.2	119591.6	2	1	220.0	250.0	220.00	250.00	0.0	0.0	9546	11391
4/1934	176042.2	174663.3	226306.5	234629.2	124213.4	122525.1	2	2	274.8	274.8	274.76	274.76	0.0	0.0	8925	8925

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5/1934	178766.7	175799.2	205373.2	213648.4	123138.9	118412.5	2	2	338.0	338.0	337.96	337.96	0.0	0.0	9294	9294
6/1934	179330.0	174311.8	187511.3	195719.7	119111.4	111438.4	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1837	1837
7/1934	182438.1	175345.4	167385.5	175495.2	113400.2	104001.4	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1934	178173.7	171081.4	153150.4	159115.7	107908.9	97243.1	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1934	169905.8	166995.3	149983.1	149707.8	103695.5	92356.4	2	2	172.5	172.5	172.49	172.49	0.0	0.0	1219	1219
10/1934	156399.1	152133.1	144307.0	147967.8	99409.0	89894.7	2	2	382.9	302.0	254.00	254.00	7928.3	2950.9	18290	13326
11/1934	162521.6	161538.7	142102.2	142546.8	100999.7	91230.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9902	9902
12/1934	163638.6	163607.7	147571.3	147067.4	109066.6	99353.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10042	10042
1/1935	167653.7	166211.4	161285.4	159787.9	123566.6	116286.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10408	10408
2/1935	166496.8	166411.9	177613.1	174381.2	130477.1	123627.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9342	9342
3/1935	167770.8	167817.2	187788.8	183583.4	139327.0	133370.6	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9703	9703
4/1935	206790.7	206756.4	257788.6	252808.1	143734.3	138976.1	1	1	291.7	291.7	272.80	272.80	1121.5	1121.5	9289	9289
5/1935	205285.3	205267.1	351485.9	346221.2	137449.2	133048.9	1	1	494.1	494.1	475.29	475.29	1158.9	1158.9	13590	13590
6/1935	195943.2	195943.2	413533.5	414339.2	129947.4	125611.9	1	1	855.5	753.4	676.38	626.09	10661.1	7575.6	27389	21328
7/1935	196142.9	196142.9	380290.1	381050.1	120994.8	116731.5	1	1	510.6	511.3	451.40	451.39	3642.3	3683.1	4287	4328
8/1935	193955.5	193955.5	354050.1	354804.7	112311.3	108116.7	1	1	392.9	392.9	374.06	374.06	1158.9	1158.9	1325	1325
9/1935	189831.0	189831.0	337480.4	337889.8	105208.6	101077.6	1	1	323.4	329.2	254.40	254.42	4107.0	4448.2	4179	4521
10/1935	170918.1	170619.1	325223.9	325309.2	100276.1	96845.1	0	0	643.5	643.1	325.00	325.00	19584.6	19560.8	29644	29621
11/1935	160474.5	159935.2	314662.3	314126.7	98053.1	96011.7	0	0	403.7	395.3	325.00	325.00	4680.7	4183.5	20643	20146
12/1935	158419.3	157357.6	297730.3	297195.1	102708.3	101207.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16436	16436
1/1936	166267.9	165891.8	310831.5	309333.0	116282.9	115063.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16973	16973
2/1936	205246.8	205248.2	342113.7	341011.8	132999.6	132132.2	0	0	1361.6	1341.7	325.00	325.00	59624.0	58483.5	75915	74776
3/1936	186994.6	186995.0	331139.4	331030.7	136072.5	135212.0	0	0	1399.4	1383.2	325.00	325.00	66060.5	65068.7	81994	81004
4/1936	205989.8	205990.4	357227.0	357118.2	137609.9	136757.5	0	0	1419.3	1419.3	525.00	525.00	53217.3	53217.3	75975	75975
5/1936	204747.1	204692.8	391292.4	391162.2	133724.7	129653.5	0	0	2170.3	2092.9	777.83	777.83	85622.3	80861.9	115241	110480
6/1936	199891.4	199298.4	413401.0	411732.7	126867.5	119188.5	0	0	1550.4	1515.7	877.76	877.68	40027.3	37967.9	68745	66685
7/1936	194425.9	194714.5	379117.9	377624.3	117933.2	110358.3	0	0	651.6	634.6	451.77	451.74	12287.5	11242.1	12937	11892
8/1936	194048.4	194153.0	352055.3	350753.9	109213.4	101746.3	0	0	396.4	396.4	377.50	377.50	1158.9	1158.9	1539	1539
9/1936	189661.6	189647.4	336494.1	335784.3	102203.8	94950.9	0	0	326.5	316.6	259.28	259.22	3997.6	3414.8	4370	3787
10/1936	172269.0	172602.1	324599.1	324218.1	98612.5	91444.0	0	0	583.7	572.8	325.00	325.00	15909.3	15234.7	25993	25319
11/1936	159469.8	159603.2	314121.2	313942.9	97369.1	90276.8	0	0	407.0	406.9	325.00	325.00	4879.2	4875.7	20767	20763
12/1936	161859.0	161348.5	301725.8	301547.1	102494.8	96099.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16581	16581
1/1937	160235.3	158865.4	289211.6	289032.6	116555.7	111061.2	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16843	16843
2/1937	175613.3	175347.0	317637.9	315523.5	128739.2	124395.1	0	0	357.1	351.8	325.00	325.00	1785.2	1487.6	17187	16890
3/1937	184392.4	184334.2	337602.2	337938.0	142138.1	138526.5	0	0	632.3	577.4	325.00	325.00	18892.8	15520.9	35264	31895
4/1937	194136.4	193537.3	355965.3	355229.6	140551.5	137793.5	1	1	581.9	595.3	473.51	473.54	6452.2	7245.6	26744	27538
5/1937	205714.5	205588.5	398932.4	399938.9	134877.0	129175.0	1	1	1799.4	1680.6	677.19	677.14	69000.3	61703.8	92439	85142
6/1937	195248.3	194766.8	410376.8	409548.1	128345.3	119053.6	1	1	1361.9	1329.1	777.38	777.34	34780.0	32832.4	57489	55541
7/1937	195721.2	195599.2	377206.7	376508.3	119406.6	110241.9	1	1	514.7	506.9	451.42	451.42	3893.3	3409.8	4539	4055
8/1937	194107.9	193979.1	349530.7	348870.3	110685.0	101648.8	1	1	405.4	405.0	374.06	374.06	1926.6	1901.0	2093	2068

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9/1937	189644.7	189826.7	334727.3	333969.6	103586.9	94733.4	1	1	281.5	276.9	254.15	254.14	1625.9	1352.1	1698	1424
10/1937	170727.1	170729.2	324860.6	324774.4	99582.7	91498.5	0	0	546.7	527.7	325.00	325.00	13629.3	12463.3	23680	22514
11/1937	160919.9	160922.0	313245.6	313244.9	100041.1	92021.7	0	0	525.5	524.1	325.00	325.00	11933.6	11848.2	27991	27906
12/1937	173423.5	172598.2	282656.8	283726.7	108664.1	101523.8	0	0	1227.1	1209.7	325.00	325.00	55468.6	54397.5	71924	70855
1/1938	166517.3	165990.5	285414.0	284976.0	119020.0	113141.3	0	0	516.1	516.1	325.00	325.00	11752.2	11752.2	28546	28546
2/1938	192666.2	192275.1	289215.4	289348.7	136562.7	131102.2	0	0	1257.9	1237.9	325.00	325.00	51809.0	50698.3	67211	66100
3/1938	205154.0	205110.6	300784.0	300883.9	147818.5	143657.9	0	0	2260.6	2234.8	325.00	325.00	119019.9	117433.1	135175	133588
4/1938	207931.5	207904.0	319877.3	319842.8	148779.3	145093.6	0	0	2836.7	2831.3	525.00	525.00	137555.7	137238.4	160264	159947
5/1938	213498.6	213397.9	357889.9	357811.5	143041.9	139522.0	0	0	2974.2	2974.2	778.36	778.36	135018.6	135018.6	164620	164620
6/1938	206479.4	206479.4	399058.3	398880.1	135525.2	132054.7	0	0	2415.7	2415.7	878.66	878.66	91461.2	91461.2	120094	120094
7/1938	194909.3	194909.3	365140.0	364989.4	126521.4	123105.6	0	0	1120.8	1120.3	452.57	452.57	41086.5	41060.1	41732	41706
8/1938	194191.9	194191.9	339701.0	339556.9	117721.6	114358.7	0	0	402.1	402.0	377.52	377.52	1509.3	1503.9	1889	1883
9/1938	189783.3	189783.3	323692.8	323605.3	110558.2	107244.5	0	0	331.2	330.2	259.43	259.43	4268.2	4212.4	4645	4589
10/1938	172292.6	172393.9	312645.4	312492.4	105540.5	102514.2	0	0	671.4	666.9	325.00	325.00	21302.5	21020.9	31398	31117
11/1938	163367.8	163332.9	310734.6	309693.6	103423.7	101750.5	0	0	423.4	418.3	325.00	325.00	5854.2	5552.5	21787	21488
12/1938	162529.7	162516.3	309587.5	308151.0	107777.8	106495.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16394	16394
1/1939	161398.0	161269.3	303404.4	301592.6	115156.2	114372.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16741	16741
2/1939	156511.9	156202.8	291811.9	289999.5	121593.3	120996.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15112	15112
3/1939	166674.3	166072.0	276402.3	274589.5	128500.6	128203.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16149	16149
4/1939	179268.5	179517.6	269582.8	266830.1	130189.8	129992.5	2	2	274.8	274.8	274.78	274.78	0.0	0.0	8954	8954
5/1939	191374.4	191227.2	256575.3	254230.5	125794.8	125599.5	2	2	338.0	338.0	338.03	338.03	0.0	0.0	9334	9334
6/1939	191284.1	191138.1	237855.7	235529.1	118186.2	117993.3	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1820	1820
7/1939	187672.5	187527.8	217173.0	214870.3	110003.5	109890.5	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1939	182900.6	182758.3	199628.0	197349.4	102309.8	102297.5	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1939	181980.2	181840.0	188478.7	186217.3	96553.2	96655.7	2	2	172.5	172.5	172.49	172.49	0.0	0.0	1245	1245
10/1939	169033.2	169161.7	188411.3	186149.9	93224.9	93376.4	2	2	282.4	279.4	254.00	254.00	1749.0	1563.3	12124	11940
11/1939	160953.2	161036.9	184405.6	182151.4	92186.4	92293.8	2	2	319.4	322.8	220.00	220.00	5915.9	6116.4	15604	15804
12/1939	164142.7	163856.4	187211.0	185335.9	96477.4	96673.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9947	9947
1/1940	178083.2	178094.3	232776.1	230655.3	118803.1	119015.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10687	10687
2/1940	198323.0	198595.7	281471.7	279699.2	138824.1	139124.8	2	2	238.6	232.4	220.00	220.00	1071.1	714.1	10938	10582
3/1940	206177.6	206172.0	322047.8	321652.9	149692.8	149992.1	2	2	1178.1	1161.9	220.00	220.00	58910.0	57918.2	68580	67589
4/1940	204784.8	204785.0	351330.3	352129.6	149698.7	149542.2	0	0	1880.0	1860.0	525.00	525.00	80629.3	79439.2	103328	102138
5/1940	205980.7	205821.1	408886.8	408621.6	144206.2	141689.8	0	0	1783.2	1710.3	777.27	777.22	61854.5	57375.4	91447	86968
6/1940	193479.1	192756.0	402980.9	401954.6	137144.4	130999.6	0	0	1320.8	1273.4	877.39	877.28	26382.8	23572.9	55015	52205
7/1940	197659.3	197110.6	369451.6	368264.2	128113.4	122045.6	0	0	480.1	480.1	451.41	451.41	1765.0	1765.0	2413	2413
8/1940	194278.9	194224.7	344428.4	342421.6	119290.1	113301.5	0	0	396.6	402.1	377.50	377.50	1171.1	1509.6	1551	1890
9/1940	189930.6	189876.1	330684.4	328906.8	112149.9	106235.6	0	0	283.0	279.3	259.11	259.11	1420.2	1201.8	1791	1572
10/1940	169690.6	169833.5	324190.8	323898.8	107048.1	101202.7	0	0	486.4	459.0	325.00	325.00	9921.8	8241.7	19996	18317
11/1940	156175.1	155972.1	310622.6	310684.5	105339.1	99573.2	0	0	380.1	380.0	325.00	325.00	3279.5	3272.7	19220	19212
12/1940	169567.5	169297.5	305221.7	304936.7	115160.4	109978.2	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16648	16648

Date	*Cumulative without Project* Pardee Storage *(acre-ft)*	*Cumulative with Project* Pardee Storage *(acre-ft)*	*Cumulative without Project* Camanche Storage *(acre-ft)*	*Cumulative with Project* Camanche Storage *(acre-ft)*	*Cumulative without Project* TRA Storage *(acre-ft)*	*Cumulative with Project* TRA Storage *(acre-ft)*	*Cumulative without Project* JSA Year Type *(NA)*	*Cumulative with Project* JSA Year Type *(NA)*	*Cumulative without Project* Camanche Outflow *(cfs)*	*Cumulative with Project* Camanche Outflow *(cfs)*	*Cumulative without Project* Required Camanche Release *(cfs)*	*Cumulative with Project* Required Camanche Release *(cfs)*	*Cumulative without Project* Camanche Flood Release (AF)	*Cumulative with Project* Camanche Flood Release (AF)	*Cumulative without Project* Flow below Lodi Lake (AF)	*Cumulative with Project* Flow below Lodi Lake (AF)
1/1941	170979.8	170839.8	321206.6	320375.5	129443.9	124867.8	0	0	366.1	363.7	325.00	325.00	2529.0	2380.2	19305	19156
2/1941	187266.7	186791.0	328486.1	328646.4	140691.4	136470.3	0	0	820.0	802.1	325.00	325.00	27491.3	26499.6	42619	41629
3/1941	191370.8	191008.3	333038.8	333575.4	148202.8	144628.9	0	0	1243.2	1225.2	325.00	325.00	56460.3	55349.6	72535	71424
4/1941	187304.5	187037.2	356409.9	356510.4	150006.5	148565.5	1	1	693.3	693.3	473.77	473.77	13061.6	13061.6	32995	32995
5/1941	206555.5	206305.6	385310.8	383545.7	146287.6	142638.0	1	1	1969.9	1907.3	677.17	677.13	79487.7	75642.5	102932	99087
6/1941	198269.0	197726.4	411785.8	412633.6	138695.4	131425.1	1	1	1536.0	1427.4	777.83	777.65	45118.1	38666.2	67801	61349
7/1941	197018.2	196666.3	378302.3	379360.4	129593.5	122413.1	1	1	696.6	689.9	451.87	451.86	15046.1	14639.5	15692	15285
8/1941	193938.8	193953.9	353911.7	354646.3	120704.1	113615.4	1	1	415.6	414.8	374.06	374.06	2552.3	2503.2	2719	2670
9/1941	189892.3	189907.4	334117.3	334516.0	113452.3	106449.5	1	1	391.6	397.1	254.94	254.97	8129.0	8460.5	8204	8535
10/1941	171086.2	170754.6	319631.4	319697.2	108252.5	101327.0	0	0	644.5	655.6	325.00	325.00	19647.5	20326.6	29665	30341
11/1941	162555.9	162622.2	312883.9	312474.3	106700.2	99830.9	0	0	478.6	479.9	325.00	325.00	9140.3	9219.2	25119	25198
12/1941	170310.3	170033.0	297458.2	297495.3	118028.0	111877.8	0	0	780.6	767.7	325.00	325.00	28016.9	27223.5	44645	43853
1/1942	204646.0	204608.3	293493.6	293686.8	129517.2	123997.5	0	0	891.6	875.5	325.00	325.00	34840.2	33848.4	51803	50812
2/1942	199414.7	199376.6	288100.7	287883.8	138082.4	132997.3	0	0	1974.3	1974.3	325.00	325.00	91598.0	91598.0	106617	106619
3/1942	181130.7	180973.5	300491.0	301344.5	143131.6	138201.5	0	0	921.9	904.5	325.00	325.00	36704.7	35633.6	52674	51605
4/1942	205348.9	205356.1	328491.4	327974.0	146833.5	142070.0	0	0	762.5	780.5	525.00	525.00	14132.4	15203.5	37095	38164
5/1942	209514.0	209514.0	366451.5	366932.3	143402.3	138685.4	0	0	2074.8	2058.7	777.60	777.61	79765.5	78773.2	109469	108479
6/1942	205025.9	205025.9	406675.5	405923.1	135779.1	131129.8	0	0	1960.6	1981.3	878.20	878.25	64408.2	65638.0	93042	94271
7/1942	197072.8	197072.8	372610.6	371997.8	126702.5	122128.5	0	0	1147.1	1144.9	452.57	452.57	42705.4	42570.5	43351	43216
8/1942	194034.9	194034.9	346542.5	346081.5	117848.1	113344.4	0	0	496.2	493.8	377.52	377.52	7299.7	7151.6	7679	7531
9/1942	189842.8	189842.8	325261.9	325001.7	110680.9	106238.4	0	0	423.3	420.0	259.92	259.91	9722.8	9524.4	10095	9896
10/1942	170781.2	170781.2	308134.2	308098.2	105526.3	101131.2	0	0	665.1	661.5	325.00	325.00	20915.3	20691.7	30902	30678
11/1942	169790.2	169790.2	305984.8	305999.2	106067.2	101697.1	0	0	707.4	706.5	325.00	325.00	22752.0	22701.6	38939	38889
12/1942	171109.1	171324.3	298604.2	298311.1	111812.7	107565.2	0	0	648.4	648.4	325.00	325.00	19884.6	19884.6	36331	36331
1/1943	204850.2	204669.3	290323.1	290133.8	124701.0	121748.6	0	0	1013.5	997.4	325.00	325.00	42337.8	41346.1	59248	58258
2/1943	188695.7	188696.1	282338.8	282009.3	129646.9	126717.8	0	0	1463.6	1462.9	325.00	325.00	63234.0	63194.3	78294	78253
3/1943	204941.8	204941.8	300181.1	300842.4	135206.2	132303.3	0	0	2131.6	2115.5	325.00	325.00	111085.9	110094.2	127267	126277
4/1943	209670.7	209663.9	359297.9	359966.9	136493.1	133937.9	0	0	1377.3	1372.0	525.00	525.00	50718.1	50400.7	73543	73225
5/1943	208869.9	208819.1	398281.0	397616.2	130675.1	128545.4	0	0	1722.6	1738.7	777.10	777.10	58136.9	59128.7	87723	88715
6/1943	195399.9	195399.9	403691.1	403813.8	123077.3	120983.7	0	0	1517.9	1503.8	877.48	877.43	38107.0	37272.3	66751	65916
7/1943	196576.5	196621.1	372854.5	372971.5	114044.9	111947.6	0	0	492.5	492.6	451.39	451.39	2529.6	2534.4	3175	3180
8/1943	194056.0	194125.5	348353.3	348548.5	105282.6	102929.9	0	0	405.5	408.6	377.52	377.52	1722.6	1910.9	2102	2291
9/1943	189862.9	189816.2	333788.4	334061.1	98323.7	96115.8	0	0	296.4	295.1	259.21	259.20	2215.8	2137.7	2586	2508
10/1943	170770.6	170921.9	324497.5	324432.7	94851.2	92669.2	0	0	578.3	580.5	325.00	325.00	15572.3	15710.9	25619	25758
11/1943	162290.3	162293.3	319003.0	318804.9	93782.1	91622.1	0	0	392.6	397.3	325.00	325.00	4020.9	4303.2	19957	20240
12/1943	158727.9	158730.9	304630.1	304432.2	98224.4	96083.2	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16420	16420
1/1944	160570.8	160543.1	289436.2	289238.1	110086.3	107992.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16762	16762
2/1944	162914.4	162777.3	283325.7	282376.1	121911.9	120688.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15816	15816
3/1944	167648.4	167904.9	278569.1	277246.0	128094.2	126863.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15989	15989
4/1944	181700.5	181650.0	280590.1	279445.1	131295.8	130208.7	2	2	272.9	272.9	272.86	272.86	0.0	0.0	9078	9078

Date	Cumulative without Project **Pardee Storage** (acre-ft)	Cumulative with Project **Pardee Storage** (acre-ft)	Cumulative without Project **Camanche Storage** (acre-ft)	Cumulative with Project **Camanche Storage** (acre-ft)	Cumulative without Project **TRA Storage** (acre-ft)	Cumulative with Project **TRA Storage** (acre-ft)	Cumulative without Project **JSA Year Type** (NA)	Cumulative with Project **JSA Year Type** (NA)	Cumulative without Project **Camanche Outflow** (cfs)	Cumulative with Project **Camanche Outflow** (cfs)	Cumulative without Project **Required Camanche Release** (cfs)	Cumulative with Project **Required Camanche Release** (cfs)	Cumulative without Project **Camanche Flood Release** (AF)	Cumulative with Project **Camanche Flood Release** (AF)	Cumulative without Project **Flow below Lodi Lake** (AF)	Cumulative with Project **Flow below Lodi Lake** (AF)
5/1944	195231.7	195285.1	300734.5	299318.0	126852.5	125950.4	2	2	378.3	378.3	378.33	378.33	0.0	0.0	9271	9271
6/1944	198059.6	198290.5	305382.0	303796.0	119933.9	119042.6	2	2	339.7	339.7	339.70	339.70	0.0	0.0	1825	1825
7/1944	196348.0	196311.5	281581.2	280273.6	110990.8	110109.8	2	2	376.7	376.7	376.67	376.67	0.0	0.0	1803	1803
8/1944	194074.6	194037.1	260243.8	258949.1	102067.0	101196.8	2	2	326.8	326.8	326.80	326.80	0.0	0.0	1328	1328
9/1944	189647.3	189610.0	249544.5	248259.6	95264.5	94405.3	2	2	239.9	239.8	224.89	224.89	890.6	890.2	2102	2101
10/1944	172487.0	172797.1	248283.5	246998.7	92079.7	91229.7	1	1	424.9	419.3	284.00	284.00	8663.6	8321.4	18438	18097
11/1944	166958.9	166991.6	248283.5	246998.7	94175.4	93330.7	1	1	770.6	775.2	250.00	250.00	30978.0	31252.5	42739	43013
12/1944	171953.2	171985.7	259874.9	258590.3	100698.4	99860.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11881	11881
1/1945	164597.0	164453.0	269198.2	268092.4	110372.2	109541.9	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12028	12028
2/1945	178609.1	178480.5	309675.6	309558.0	121512.2	120671.6	1	1	555.4	537.5	250.00	250.00	16958.9	15967.2	28038	27048
3/1945	177170.4	176932.3	327171.6	327649.4	130885.1	130160.0	1	1	337.1	327.4	250.00	250.00	5355.5	4760.4	16910	16318
4/1945	193338.3	193243.5	334987.3	334919.3	131560.5	131244.5	1	1	570.8	570.8	473.49	473.49	5787.8	5787.8	25543	25543
5/1945	198693.1	198197.1	385687.7	385922.8	127842.8	124725.6	1	1	975.6	912.9	676.25	676.20	18405.8	14552.8	41871	38018
6/1945	199817.3	199817.3	413580.3	412285.1	120330.3	117247.9	1	1	1240.9	1258.3	777.34	777.39	27583.4	28617.7	50351	51385
7/1945	197820.0	197820.0	379245.3	378165.8	111395.1	108348.8	1	1	691.8	688.4	451.79	451.76	14756.6	14550.4	15405	15198
8/1945	194050.3	194050.3	351620.1	350890.8	102403.8	99398.3	1	1	509.6	504.1	374.06	374.06	8336.8	7993.0	8503	8160
9/1945	189904.3	189904.3	328055.6	327660.0	95616.0	92649.1	1	1	447.8	442.3	255.02	255.02	11472.0	11141.3	11543	11212
10/1945	174871.7	174871.7	303761.8	303685.3	92528.0	89593.9	0	0	852.6	847.4	325.00	325.00	32441.7	32123.3	42568	42250
11/1945	169009.6	169009.6	300728.0	300692.9	92825.1	89917.6	0	0	622.9	622.3	325.00	325.00	17729.4	17687.9	33866	33824
12/1945	206371.3	206347.4	292291.9	292846.0	104481.1	101817.5	0	0	1099.4	1086.5	325.00	325.00	47613.9	46820.5	64177	63384
1/1946	174643.5	174643.5	293593.4	293053.1	114175.1	111535.0	0	0	1485.8	1503.2	325.00	325.00	71376.2	72447.3	87942	89011
2/1946	164438.6	164301.5	296816.3	296474.3	121788.6	119107.1	0	0	478.6	478.6	325.00	325.00	8529.1	8529.1	23610	23610
3/1946	175631.1	175220.1	300020.5	299083.0	128632.9	126988.6	0	0	416.9	414.5	325.00	325.00	5653.0	5504.2	21741	21592
4/1946	192118.1	192017.2	302181.1	301454.7	130757.8	129406.7	1	1	584.4	571.1	473.54	473.51	6598.1	5804.7	26318	25524
5/1946	204903.2	204903.2	382341.9	381517.7	126877.2	125541.5	1	1	494.2	494.2	475.32	475.32	1158.9	1158.9	12402	12402
6/1946	193338.5	193338.5	402670.9	401851.0	119466.4	118145.8	1	1	694.8	694.8	675.97	675.97	1121.5	1121.5	17849	17849
7/1946	195686.4	195686.4	369091.1	368277.1	110614.4	109308.9	1	1	473.6	473.6	451.34	451.34	1369.9	1369.9	2014	2014
8/1946	194175.1	194175.1	341811.1	341002.7	101688.0	100399.7	1	1	392.9	392.9	374.06	374.06	1158.9	1158.9	1325	1325
9/1946	189806.7	189806.7	328150.1	327376.2	94946.7	93674.9	1	1	281.2	280.7	254.17	254.17	1606.3	1576.0	1690	1660
10/1946	170706.5	170706.5	323725.1	323553.4	91448.3	90192.0	0	0	478.2	468.4	325.00	325.00	9420.4	8819.8	19489	18889
11/1946	165487.6	165487.6	322724.2	322686.6	91676.9	90431.6	0	0	391.6	389.3	325.00	325.00	3962.3	3828.3	20078	19944
12/1946	161723.4	161723.4	319243.9	319355.0	97593.0	96358.6	0	0	378.2	375.8	325.00	325.00	3272.8	3124.0	19679	19530
1/1947	158037.7	158037.7	301298.7	301409.7	107158.0	105935.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16640	16640
2/1947	160835.4	160835.3	287737.6	287848.5	116039.8	114827.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15042	15042
3/1947	167731.4	167636.2	282602.5	281963.7	123402.2	123044.4	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16144	16144
4/1947	179623.6	179493.1	269469.2	268832.7	125960.2	125641.6	2	2	274.8	274.8	274.78	274.78	0.0	0.0	8960	8960
5/1947	191776.5	191845.0	260830.4	260000.0	121367.4	121051.7	2	2	337.9	337.9	337.94	337.94	0.0	0.0	9232	9232
6/1947	193531.5	194533.7	251034.7	249276.0	114572.3	114259.9	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1843	1843
7/1947	197834.9	197849.9	234032.4	233269.4	105543.2	105235.1	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1947	194280.0	194339.8	227860.0	227059.5	96826.7	96523.0	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325

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9/1947	190059.4	190119.6	227860.0	227059.5	89786.2	89486.7	2	2	172.7	172.8	172.49	172.49	11.9	17.2	1204	1209
10/1947	173738.0	173797.5	227476.2	226770.7	87511.0	87215.1	1	1	644.0	642.5	284.00	284.00	22135.7	22042.3	34430	34336
11/1947	163493.9	163552.4	227476.2	226770.7	86785.4	86493.7	1	1	509.7	509.7	250.00	250.00	15454.4	15455.9	26979	26980
12/1947	160858.3	160840.5	225312.9	224608.6	91613.4	91400.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11803	11803
1/1948	162665.4	162647.7	223700.4	222997.1	101746.7	101536.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12062	12062
2/1948	161653.9	161755.0	222016.4	221114.1	111232.2	111102.5	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11369	11369
3/1948	164960.5	165019.6	214140.1	213235.8	122462.0	122374.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11620	11620
4/1948	187782.5	187925.3	224901.8	223798.7	126218.1	126244.3	1	1	291.7	291.7	272.83	272.83	1121.5	1121.5	9218	9218
5/1948	206018.8	206023.2	268120.1	267193.7	121877.7	121869.5	1	1	494.2	494.2	475.33	475.33	1158.9	1158.9	12463	12463
6/1948	203731.9	203731.9	369461.0	368544.4	114434.3	114426.0	1	1	594.6	594.6	575.79	575.79	1121.5	1121.5	11902	11902
7/1948	187167.3	187167.3	339596.7	338764.8	105455.8	105447.4	1	1	704.2	702.9	451.86	451.86	15514.8	15436.2	16161	16083
8/1948	187167.3	187167.3	313101.2	312275.3	96522.8	96514.6	1	1	392.9	392.9	374.04	374.04	1158.9	1158.9	1326	1326
9/1948	187052.8	187052.8	295897.8	295076.8	89793.5	89785.6	1	1	273.0	273.0	254.11	254.11	1121.9	1121.9	1195	1195
10/1948	170527.0	170527.0	295830.3	295009.3	86416.6	86408.8	1	1	380.8	380.8	284.00	284.00	5950.3	5953.5	13513	13517
11/1948	161067.4	161067.4	292189.6	291370.4	85430.0	85422.5	1	1	338.7	338.7	250.00	250.00	5276.4	5277.0	16755	16756
12/1948	161265.9	161265.9	293835.1	293015.4	92066.3	92059.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11939	11939
1/1949	153386.2	153386.2	281892.9	281073.5	102968.0	102961.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12114	12114
2/1949	146363.1	146363.1	272154.2	271334.3	113599.0	113592.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	10991	10991
3/1949	168663.5	168663.4	271316.1	270494.3	123630.6	123624.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11644	11644
4/1949	202364.7	202444.2	296522.7	295710.9	126300.9	126215.1	1	1	274.9	274.8	272.80	272.80	126.2	119.5	8924	8924
5/1949	197289.3	197239.9	336167.7	335628.9	121987.6	121902.9	1	1	513.4	511.1	511.28	509.10	130.4	123.5	15434	15434
6/1949	189363.3	189401.4	354367.0	353932.0	114507.0	114423.6	1	1	558.3	555.1	556.17	553.12	126.2	119.5	11899	11899
7/1949	189013.9	189053.6	327791.7	327363.8	105642.5	105560.4	1	1	366.5	366.4	363.51	363.51	185.4	179.3	1988	1982
8/1949	188182.8	188222.7	305448.4	305023.2	96741.3	96660.2	1	1	318.5	318.5	318.52	318.52	0.0	0.0	1333	1333
9/1949	188093.9	188133.6	289541.4	289118.6	90024.8	89944.5	1	1	219.8	219.8	219.82	219.82	0.0	0.0	1192	1192
10/1949	170712.4	170751.8	289474.0	289051.2	86615.1	86535.6	1	1	320.2	320.2	284.00	284.00	2226.0	2227.9	12109	12111
11/1949	158270.9	158310.1	284337.9	283915.9	86060.2	85981.1	1	1	395.0	395.0	250.00	250.00	8629.0	8629.0	20165	20165
12/1949	151600.0	151639.0	270493.8	270072.4	91668.0	91589.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11806	11806
1/1950	166944.8	166983.8	270384.2	269961.1	111212.4	111133.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12364	12364
2/1950	169109.0	169095.9	296961.0	296537.6	120104.6	120077.7	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11004	11004
3/1950	177846.6	177833.4	320637.3	320213.9	127929.0	127902.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11509	11509
4/1950	197553.1	197460.6	346620.3	346198.8	129989.7	130042.9	1	1	544.4	544.3	423.59	423.59	7186.8	7185.4	24000	23998
5/1950	212000.5	211685.0	393697.1	392665.3	125861.3	122358.5	1	1	1188.8	1129.1	676.35	676.28	31506.5	27845.8	54964	51303
6/1950	198870.1	198313.6	413807.3	413921.8	118479.9	111356.4	1	1	1863.1	1778.4	778.04	777.91	64568.6	59531.3	87255	82218
7/1950	193004.6	193309.5	370980.9	371199.1	109658.2	102629.7	1	1	777.0	761.2	451.86	451.82	19990.5	19024.7	20636	19670
8/1950	193004.6	193309.5	334617.7	334765.1	100727.8	93797.1	1	1	537.3	538.4	374.07	374.07	10035.0	10102.0	10202	10269
9/1950	189595.8	189818.1	303259.2	303049.7	93974.1	87133.5	1	1	579.6	587.0	255.07	255.10	19312.3	19749.1	19411	19849
10/1950	175405.3	175429.2	274524.3	274542.9	91326.3	84557.9	0	0	977.9	977.4	325.00	325.00	40145.7	40115.7	50307	50277
11/1950	204649.7	204649.7	302829.4	302349.3	96768.4	90041.7	0	0	2291.5	2300.2	325.00	325.00	117014.9	117536.8	133211	133733
12/1950	198995.6	198995.3	319707.7	319482.0	108069.3	102116.1	0	0	4145.2	4129.0	325.00	325.00	234896.0	233904.2	251365	250374

Date	*Cumulative without Project* **Pardee Storage** *(acre-ft)*	*Cumulative with Project* **Pardee Storage** *(acre-ft)*	*Cumulative without Project* **Camanche Storage** *(acre-ft)*	*Cumulative with Project* **Camanche Storage** *(acre-ft)*	*Cumulative without Project* **TRA Storage** *(acre-ft)*	*Cumulative with Project* **TRA Storage** *(acre-ft)*	*Cumulative without Project* **JSA Year Type** *(NA)*	*Cumulative with Project* **JSA Year Type** *(NA)*	*Cumulative without Project* **Camanche Outflow** *(cfs)*	*Cumulative with Project* **Camanche Outflow** *(cfs)*	*Cumulative without Project* **Required Camanche Release** *(cfs)*	*Cumulative with Project* **Required Camanche Release** *(cfs)*	*Cumulative without Project* **Camanche Flood Release** (AF)	*Cumulative with Project* **Camanche Flood Release** (AF)	*Cumulative without Project* **Flow below Lodi Lake** (AF)	*Cumulative with Project* **Flow below Lodi Lake** (AF)
1/1951	204695.5	204691.4	276786.3	276483.8	123231.2	117599.0	0	0	2283.9	2280.6	325.00	325.00	120448.0	120249.7	137243	137045
2/1951	200138.0	199944.7	268867.3	267924.3	131114.3	126036.2	0	0	1705.7	1711.4	325.00	325.00	76682.1	76999.5	91726	92043
3/1951	202685.7	202010.5	289478.9	290626.2	136429.8	132207.8	0	0	983.2	943.9	325.00	325.00	40473.3	38053.4	56419	54007
4/1951	198126.0	196993.1	322868.8	322734.8	137332.0	134347.4	0	0	680.0	689.2	525.00	525.00	9223.3	9768.7	32012	32557
5/1951	204755.8	204755.7	359511.3	358062.8	133527.4	130766.5	0	0	775.0	775.0	726.01	726.01	3010.1	3010.1	29580	29580
6/1951	194135.9	194135.9	356066.0	354625.4	126183.5	123460.4	0	0	694.8	694.8	675.99	675.99	1121.5	1121.5	17851	17851
7/1951	196303.4	196303.4	329018.7	327588.4	117335.3	114651.6	0	0	370.4	370.4	363.51	363.51	422.6	422.6	2226	2226
8/1951	194196.2	194196.2	306862.3	305442.6	108764.3	106118.6	0	0	322.0	322.0	321.99	321.99	0.0	0.0	1540	1540
9/1951	189889.3	189879.2	295658.7	294247.4	101732.7	99132.1	0	0	224.8	224.8	224.82	224.82	0.0	0.0	1490	1490
10/1951	170765.9	170737.5	295591.2	294180.0	98134.9	95924.8	1	1	432.6	427.0	284.00	284.00	9138.2	8795.3	19099	18760
11/1951	168268.4	168239.3	295591.2	294180.0	100268.1	98071.5	1	1	517.7	517.7	250.00	250.00	15931.3	15930.8	27602	27601
12/1951	178117.4	177581.6	321207.8	321581.0	117584.4	115900.4	1	1	354.8	325.8	250.00	250.00	6446.4	4661.2	18494	16716
1/1952	193826.5	193310.9	327764.6	327900.2	135310.3	133846.9	1	1	1061.3	1061.3	250.00	250.00	49885.0	49885.0	62142	62142
2/1952	188082.1	187483.6	327785.6	327188.2	140928.9	140290.0	1	1	1306.9	1306.9	250.00	250.00	60794.3	60794.3	72078	72079
3/1952	197094.5	196648.0	336168.4	336583.8	149273.3	148823.2	1	1	1114.2	1092.3	250.00	250.00	53138.0	51789.2	64636	63292
4/1952	210952.7	210950.8	334721.5	334661.0	148970.9	148556.2	0	0	2671.3	2671.3	525.00	525.00	127717.6	127717.6	150441	150441
5/1952	206842.7	207026.8	392202.5	388242.9	142920.4	140146.4	0	0	3677.4	3645.2	779.16	779.16	178209.7	176226.2	207811	205827
6/1952	204702.1	204347.3	395373.3	393771.1	136034.9	129629.4	0	0	3416.2	3316.2	879.59	879.52	150938.6	144992.2	179585	173639
7/1952	197436.5	197441.3	363675.7	362535.3	127260.0	120933.3	0	0	1504.4	1491.2	453.14	453.14	64640.6	63829.1	65290	64479
8/1952	194229.9	194234.8	340058.5	339236.2	118443.5	112199.2	0	0	546.8	541.7	377.53	377.52	10406.7	10095.8	10787	10476
9/1952	189762.4	189767.2	319007.9	318582.5	111255.8	105089.1	0	0	555.6	549.0	260.12	260.12	17582.4	17188.3	18015	17621
10/1952	171022.2	171027.0	303522.4	303463.5	105861.3	99768.8	0	0	699.6	693.6	325.00	325.00	23032.0	22666.4	33011	32648
11/1952	165171.1	165175.9	303522.4	303463.5	103956.6	97918.2	0	0	448.5	448.5	325.00	325.00	7348.2	7348.2	23332	23332
12/1952	169204.8	169004.5	315993.8	315587.6	116527.4	111063.7	0	0	397.6	397.6	325.00	325.00	4462.9	4462.9	21088	21088
1/1953	173797.8	173530.9	323368.4	324360.0	126468.3	121694.7	0	0	612.9	580.6	325.00	325.00	17702.7	15719.2	34473	32492
2/1953	166029.0	165874.9	328294.4	328631.0	129926.5	125737.1	0	0	421.4	421.4	325.00	325.00	5355.5	5355.5	20318	20318
3/1953	170602.9	170489.2	328143.1	328281.2	135940.9	131946.4	0	0	380.6	380.6	325.00	325.00	3421.5	3421.5	19464	19464
4/1953	189319.4	189052.8	324499.6	323962.9	139064.0	135933.9	1	1	472.4	472.4	423.49	423.49	2911.7	2911.7	19810	19810
5/1953	195530.5	195501.6	333435.0	332663.9	134594.7	131506.0	1	1	544.2	544.2	525.32	525.32	1158.9	1158.9	15399	15399
6/1953	205082.9	205082.9	380978.0	380181.9	127762.4	124717.5	1	1	594.6	594.6	575.76	575.76	1121.5	1121.5	11953	11953
7/1953	198037.9	198038.4	352556.6	351871.3	118784.8	115789.5	1	1	930.5	928.8	452.25	452.25	29409.7	29303.6	30053	29947
8/1953	194289.5	194289.9	333813.5	333175.5	110054.9	107106.8	1	1	395.6	394.9	374.06	374.06	1321.4	1278.6	1488	1445
9/1953	190400.9	190258.4	323347.7	322966.9	102963.9	100198.2	1	1	325.1	320.8	254.42	254.40	4203.0	3949.6	4274	4020
10/1953	174369.7	174227.6	315656.8	315774.3	99338.6	96603.7	0	0	654.1	646.0	325.00	325.00	20234.0	19736.5	30297	29804
11/1953	164329.6	164336.0	315656.8	315774.3	98847.1	96134.5	0	0	520.3	517.8	325.00	325.00	11619.6	11470.9	27607	27461
12/1953	162576.6	162583.0	315920.9	316038.3	102670.6	99982.6	0	0	349.2	349.2	325.00	325.00	1487.6	1487.6	17893	17893
1/1954	163865.2	163796.0	315098.1	314620.5	113655.8	111656.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16740	16740
2/1954	164476.5	164281.0	316622.9	315550.5	121289.7	120022.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15066	15066
3/1954	173555.4	173614.8	329961.4	328639.4	128624.5	127657.6	0	0	375.8	371.0	325.00	325.00	3124.0	2826.5	19290	18992
4/1954	187884.0	187844.7	331750.4	330084.0	131245.1	130731.2	1	1	570.8	570.8	473.49	473.49	5787.8	5787.8	25604	25604

Date	*Cumulative without Project* **Pardee Storage** *(acre-ft)*	*Cumulative with Project* **Pardee Storage** *(acre-ft)*	*Cumulative without Project* **Camanche Storage** *(acre-ft)*	*Cumulative with Project* **Camanche Storage** *(acre-ft)*	*Cumulative without Project* **TRA Storage** *(acre-ft)*	*Cumulative with Project* **TRA Storage** *(acre-ft)*	*Cumulative without Project* **JSA Year Type** *(NA)*	*Cumulative with Project* **JSA Year Type** *(NA)*	*Cumulative without Project* **Camanche Outflow** *(cfs)*	*Cumulative with Project* **Camanche Outflow** *(cfs)*	*Cumulative without Project* **Required Camanche Release** *(cfs)*	*Cumulative with Project* **Required Camanche Release** *(cfs)*	*Cumulative without Project* **Camanche Flood Release** (AF)	*Cumulative with Project* **Camanche Flood Release** (AF)	*Cumulative without Project* **Flow below Lodi Lake** (AF)	*Cumulative with Project* **Flow below Lodi Lake** (AF)
5/1954	194837.1	194972.6	342081.5	340224.6	126341.3	125856.7	1	1	674.4	674.4	625.48	625.48	3009.7	3009.7	23399	23399
6/1954	196664.8	196799.4	316775.7	314928.7	118873.8	118395.2	1	1	594.6	594.6	575.76	575.76	1121.5	1121.5	11927	11927
7/1954	197491.7	197624.9	290715.9	288883.8	109856.9	109384.1	1	1	367.2	367.2	363.51	363.51	224.2	224.2	2027	2027
8/1954	194291.7	194249.1	273819.6	272177.4	100862.9	100396.2	1	1	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1954	189719.0	189874.6	268063.2	266234.4	94058.6	93597.6	1	1	251.7	251.7	219.82	219.82	1899.0	1899.0	3091	3091
10/1954	171444.9	171402.1	267995.8	266167.0	90564.1	90108.5	1	1	429.4	432.8	284.00	284.00	8943.4	9150.4	18806	19012
11/1954	166120.6	166424.2	267909.7	266132.7	89977.1	89525.4	1	1	508.3	501.6	250.00	250.00	15369.6	14973.1	26932	26535
12/1954	161340.2	161268.6	287518.6	286112.6	96730.3	96280.9	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12030	12030
1/1955	160749.6	160876.3	293930.2	292321.8	111300.5	110853.7	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12318	12318
2/1955	163849.7	163768.7	285684.2	284075.8	119531.6	119295.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	10950	10950
3/1955	166412.1	166506.7	277959.6	276157.0	125966.7	125755.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11345	11345
4/1955	175514.3	175608.5	265829.8	264028.6	129411.3	129201.9	2	2	272.8	272.8	272.80	272.80	0.0	0.0	9123	9123
5/1955	192165.9	192281.4	253677.0	251864.2	125157.0	124950.4	2	2	370.0	370.0	370.00	370.00	0.0	0.0	9256	9256
6/1955	196887.6	196737.0	258142.3	256608.2	117722.0	117517.6	2	2	328.1	328.1	328.08	328.08	0.0	0.0	1821	1821
7/1955	197765.7	197751.6	241970.1	240316.4	108865.7	108663.7	2	2	363.5	363.5	363.47	363.47	0.0	0.0	1801	1801
8/1955	194225.5	194221.2	233554.8	231908.0	100245.8	100046.4	2	2	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1955	190130.8	190126.5	233174.2	231539.8	93265.9	93069.1	2	2	219.8	219.8	219.82	219.82	0.0	0.0	1195	1195
10/1955	171503.2	171498.9	233056.1	231421.3	89770.2	89575.8	1	1	512.3	512.4	284.00	284.00	14035.5	14044.7	23897	23905
11/1955	166987.0	167328.5	233056.1	231421.3	89324.5	89132.8	1	1	465.2	459.4	250.00	250.00	12804.2	12460.6	24329	23986
12/1955	207505.1	207505.1	308104.7	307362.7	109225.2	109034.7	1	1	977.4	972.6	250.00	250.00	44727.9	44430.4	57016	56719
1/1956	206366.5	206364.8	293979.1	294164.5	125847.7	125724.4	1	1	2941.9	2925.8	250.00	250.00	165523.1	164531.3	177565	176573
2/1956	204338.8	204338.8	281319.7	281583.8	134093.6	133971.2	1	1	1753.1	1751.7	250.00	250.00	86460.8	86381.4	97664	97586
3/1956	197555.1	197524.9	303651.9	303885.7	136274.0	136212.6	1	1	904.5	904.5	250.00	250.00	40245.2	40245.2	51497	51497
4/1956	200277.8	200296.7	330648.6	330881.7	137915.3	137805.5	0	0	799.2	799.2	525.00	525.00	16314.3	16314.3	39152	39152
5/1956	210226.8	209832.9	372835.6	372365.2	133425.3	130647.8	0	0	1865.2	1795.5	777.36	777.29	66887.0	62607.2	96628	92348
6/1956	205707.6	205568.3	409465.6	410108.1	125963.1	119557.9	0	0	2259.8	2167.2	878.58	878.58	82187.5	76679.9	110819	105314
7/1956	198007.6	197769.4	373972.2	373879.7	117057.3	110734.0	0	0	1014.4	1028.0	452.39	452.41	34558.7	35392.1	35210	36040
8/1956	194273.5	194170.1	348299.1	348534.0	108364.8	102127.4	0	0	498.5	491.0	377.50	377.50	7441.5	6979.0	7822	7359
9/1956	189729.8	189626.7	327214.0	327234.0	101351.8	95193.2	0	0	475.8	479.5	259.98	259.98	12844.7	13059.4	13227	13442
10/1956	174946.8	174845.4	309888.6	309905.2	97354.2	91604.6	0	0	784.7	779.1	325.00	325.00	28264.7	27920.9	38330	37986
11/1956	165874.3	166119.2	308620.6	308270.8	96161.2	90472.8	0	0	483.6	483.9	325.00	325.00	9437.0	9457.0	25320	25340
12/1956	166095.0	165993.4	314091.2	314088.4	99927.8	94297.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16383	16383
1/1957	162520.2	162144.3	316059.9	315660.3	111134.6	106221.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16727	16727
2/1957	169509.0	169167.2	315402.4	314202.5	121827.5	117860.4	0	0	330.4	327.7	325.00	325.00	297.5	148.8	15426	15277
3/1957	167674.7	167764.0	323812.8	322652.5	128777.9	125807.1	0	0	580.6	557.3	325.00	325.00	15719.2	14281.2	31882	30445
4/1957	179670.9	179725.2	299400.7	297118.8	130854.1	129067.2	1	1	570.8	570.8	473.49	473.49	5787.8	5787.8	25612	25612
5/1957	205967.1	205970.2	310431.0	308082.9	130370.7	128724.9	1	1	494.2	494.2	475.32	475.32	1158.9	1158.9	12466	12466
6/1957	196562.2	196562.2	385079.6	382747.5	122894.6	121268.3	1	1	594.6	594.6	575.76	575.76	1121.5	1121.5	11903	11903
7/1957	197728.0	197728.0	353065.0	350803.7	113952.7	112344.6	1	1	479.7	478.8	451.34	451.33	1741.1	1686.9	2385	2331
8/1957	194070.1	194070.0	328616.3	326370.9	105143.3	103554.4	1	1	392.9	392.9	374.06	374.06	1158.9	1158.9	1325	1325

Date	Cumulative without Project Pardee Storage (acre-ft)	Cumulative with Project Pardee Storage (acre-ft)	Cumulative without Project Camanche Storage (acre-ft)	Cumulative with Project Camanche Storage (acre-ft)	Cumulative without Project TRA Storage (acre-ft)	Cumulative with Project TRA Storage (acre-ft)	Cumulative without Project JSA Year Type (NA)	Cumulative with Project JSA Year Type (NA)	Cumulative without Project Camanche Outflow (cfs)	Cumulative with Project Camanche Outflow (cfs)	Cumulative without Project Required Camanche Release (cfs)	Cumulative with Project Required Camanche Release (cfs)	Cumulative without Project Camanche Flood Release (AF)	Cumulative with Project Camanche Flood Release (AF)	Cumulative without Project Flow below Lodi Lake (AF)	Cumulative with Project Flow below Lodi Lake (AF)
9/1957	190116.2	190116.0	315828.9	313596.4	98667.8	97097.2	1	1	278.9	278.9	254.14	254.14	1476.0	1475.7	1555	1555
10/1957	172708.5	172708.3	315828.9	313596.4	96477.6	94923.1	0	0	512.5	512.7	325.00	325.00	11532.1	11539.1	21604	21610
11/1957	166770.8	166770.6	315689.4	313457.2	95661.3	94123.1	0	0	463.5	463.6	325.00	325.00	8243.6	8248.4	24182	24187
12/1957	166623.4	166623.3	323987.5	322201.3	103238.3	101712.1	0	0	368.5	361.3	325.00	325.00	2677.7	2231.4	19167	18721
1/1958	167698.2	167447.4	318928.1	318334.7	119091.5	117826.6	0	0	400.0	380.6	325.00	325.00	4611.6	3421.5	21185	19995
2/1958	181456.3	181550.2	321195.3	321247.0	137222.3	135963.8	0	0	739.3	721.4	325.00	325.00	23008.6	22016.9	37947	36956
3/1958	194019.0	194040.8	329176.0	329227.6	149426.6	148248.5	0	0	822.6	822.6	325.00	325.00	30595.5	30595.5	46460	46460
4/1958	204603.8	204602.0	334674.0	334440.3	150326.5	150097.0	0	0	1695.3	1696.0	525.00	525.00	69640.7	69680.4	92294	92336
5/1958	213048.5	212730.0	365496.0	363961.8	142300.9	139706.4	0	0	2023.2	1956.8	777.63	777.60	76589.6	72505.7	106172	102088
6/1958	206768.6	206561.5	407908.8	408473.1	135205.2	128980.3	0	0	2529.3	2422.6	878.85	878.79	98207.9	91864.5	126838	120498
7/1958	198098.4	198001.1	373818.3	374450.0	126203.2	120055.1	0	0	1180.1	1177.1	452.66	452.61	44728.8	44549.1	45377	45195
8/1958	194368.5	194224.5	348586.8	349101.6	117411.1	111342.9	0	0	618.4	621.0	377.57	377.57	14808.1	14968.4	15188	15348
9/1958	190202.7	190059.2	327295.9	327623.3	110250.2	104257.7	0	0	486.1	489.2	260.02	260.02	13454.7	13640.4	13823	14008
10/1958	171237.4	171292.1	310060.9	310093.7	104879.7	98959.4	0	0	775.9	777.5	325.00	325.00	27725.6	27821.3	37702	37797
11/1958	164205.3	164259.6	306245.6	306097.0	102073.7	96216.7	0	0	429.1	432.2	325.00	325.00	6194.8	6376.4	22079	22260
12/1958	160769.1	160823.2	299829.3	299681.1	105687.1	99886.2	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16299	16299
1/1959	163931.2	163570.5	306609.0	305518.3	116298.2	111890.3	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16854	16854
2/1959	169514.7	169209.2	319888.4	318546.7	124724.5	120685.8	0	0	354.5	351.8	325.00	325.00	1636.4	1487.6	16872	16723
3/1959	167516.8	166923.6	317077.8	314768.9	128364.7	125768.3	0	0	366.1	363.7	325.00	325.00	2529.0	2380.2	18546	18397
4/1959	166067.5	165031.9	300781.7	298479.1	130200.1	128076.3	2	2	274.8	274.8	274.78	274.78	0.0	0.0	8984	8984
5/1959	171047.9	169962.1	277536.9	275247.1	125351.8	123312.3	2	2	337.9	337.9	337.94	337.94	0.0	0.0	9225	9225
6/1959	179991.1	178923.6	258627.0	256353.5	117644.1	115618.1	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1819	1819
7/1959	189656.9	188606.5	237733.4	235482.9	108623.2	106616.0	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1959	184671.5	183613.0	229980.4	227867.7	99897.1	97912.9	2	2	310.9	309.4	232.30	232.30	4835.2	4740.9	6161	6066
9/1959	184671.5	183613.0	229167.9	226938.6	94592.7	92621.2	2	2	245.9	248.3	172.61	172.61	4363.0	4506.5	5677	5820
10/1959	170752.9	170789.8	227225.3	225131.1	91061.7	89111.9	1	1	441.6	421.9	284.00	284.00	9690.0	8476.5	21833	20623
11/1959	163334.6	163370.7	226654.6	224185.5	89818.9	87890.7	1	1	357.1	363.6	250.00	250.00	6372.5	6757.2	17815	18199
12/1959	164620.5	164699.8	229020.0	226357.9	94417.4	92661.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11775	11775
1/1960	160643.4	160721.5	232446.1	229780.0	106344.7	104602.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12221	12221
2/1960	161071.9	161148.9	246514.6	243843.4	116767.3	115037.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11441	11441
3/1960	168307.6	168297.1	245563.7	242516.6	123460.7	122208.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11577	11577
4/1960	180370.4	180252.9	233720.6	230108.4	125792.8	125231.3	2	2	274.8	274.8	274.79	274.79	0.0	0.0	9034	9034
5/1960	193622.2	193462.0	234985.9	231371.3	121470.2	120984.5	2	2	338.0	338.0	337.97	337.97	0.0	0.0	9228	9228
6/1960	197738.3	197768.0	243753.2	239978.2	113852.9	113372.9	2	2	268.5	268.5	268.52	268.52	0.0	0.0	1819	1819
7/1960	197866.6	197865.1	231510.0	227804.2	104893.0	104419.7	2	2	278.5	278.5	278.46	278.46	0.0	0.0	1805	1805
8/1960	194289.6	194288.2	225770.8	222101.8	96225.3	95758.7	2	2	232.1	232.1	232.08	232.08	0.0	0.0	1326	1326
9/1960	190189.4	190187.8	225770.8	222101.8	89219.5	88758.9	2	2	189.3	189.8	172.46	172.46	1004.1	1032.4	2202	2230
10/1960	171007.9	171006.2	225651.5	221983.5	85817.9	85363.5	1	1	491.2	491.5	284.00	284.00	12741.7	12760.8	24886	24905
11/1960	165804.3	165802.0	225651.5	221983.5	86409.7	85960.0	1	1	529.4	529.5	250.00	250.00	16628.5	16628.8	28263	28263
12/1960	163972.7	163858.7	229710.1	225851.7	91399.9	91263.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11772	11772

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1/1961	162634.3	162520.0	227319.7	223461.4	102414.5	102279.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12131	12131
2/1961	158736.2	158544.0	218581.3	214724.9	111425.0	111369.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	10919	10919
3/1961	151423.1	160322.0	206566.9	202712.2	121746.1	120699.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11535	11535
4/1961	145200.1	162115.3	196424.2	192580.3	124979.6	123715.5	3	3	199.8	199.8	199.76	199.76	0.0	0.0	4570	4570
5/1961	140748.9	156696.8	183009.7	179191.9	120011.9	119599.1	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1467	1467
6/1961	142631.0	158441.1	164955.5	161173.6	111534.7	111127.7	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1822	1822
7/1961	139769.8	151558.6	149739.0	149862.6	102944.1	102543.2	3	3	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1961	127096.0	138219.7	146099.6	144892.8	94222.0	94372.7	3	3	256.1	277.8	232.15	232.24	1475.3	2803.1	2804	4132
9/1961	117127.4	127117.1	142349.8	142817.7	87769.7	87918.0	3	3	261.4	250.6	167.22	167.16	5602.4	4966.0	6506	5869
10/1961	116327.8	124951.1	140202.6	139235.3	83038.5	83435.2	3	3	239.4	279.7	131.79	131.94	6618.9	9086.6	9457	11925
11/1961	123080.4	131590.2	134476.5	133512.0	83452.8	83907.7	3	3	131.6	131.6	131.60	131.60	0.0	0.0	4574	4574
12/1961	122430.8	130895.0	128584.1	127621.2	90798.4	91247.9	3	3	133.6	133.6	133.64	133.64	0.0	0.0	4716	4716
1/1962	119851.6	128495.0	122972.7	122010.7	102512.9	102736.4	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4764	4764
2/1962	163540.8	166928.0	133583.1	137781.0	121509.8	121830.7	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4725	4725
3/1962	170103.6	170588.7	154749.5	161872.5	129992.3	130282.8	3	3	140.0	140.0	140.01	140.01	0.0	0.0	4794	4794
4/1962	191249.7	191253.3	179262.6	186829.9	130750.0	131042.0	1	1	272.8	272.8	272.78	272.78	0.0	0.0	8983	8983
5/1962	194213.4	194253.5	191625.8	199135.9	125355.2	125606.9	1	1	420.0	420.0	420.00	420.00	0.0	0.0	12302	12302
6/1962	198742.1	198742.0	255858.3	263348.8	117972.8	118221.2	1	1	498.4	498.4	498.45	498.45	0.0	0.0	11900	11900
7/1962	197779.7	197779.6	237400.6	244584.7	109145.7	109390.4	1	1	409.0	412.8	363.56	363.59	2791.9	3024.9	4601	4834
8/1962	194214.8	194214.7	224103.1	231216.1	100259.7	100500.7	1	1	318.5	318.5	318.52	318.52	0.0	0.0	1327	1327
9/1962	189652.1	189652.0	217893.8	224951.1	93596.1	93834.8	1	1	219.8	219.8	219.82	219.82	0.0	0.0	1192	1192
10/1962	173983.5	173983.4	217826.3	224883.7	98422.6	98660.6	1	1	732.2	732.2	284.00	284.00	27561.7	27559.8	37690	37688
11/1962	164653.8	164653.8	212737.3	219776.5	97085.5	97321.7	1	1	527.5	527.4	250.00	250.00	16510.3	16506.0	27989	27984
12/1962	164356.6	164356.5	223837.5	230881.6	104284.2	104519.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11925	11925
1/1963	176940.4	176940.3	225445.9	232482.5	112845.9	113080.3	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12077	12077
2/1963	174612.0	174691.2	261438.2	265717.3	124466.2	124620.5	1	1	726.8	776.8	250.00	250.00	26479.7	29256.6	37534	40308
3/1963	175686.3	175418.6	276735.7	278388.1	132230.5	132383.5	1	1	312.9	361.3	250.00	250.00	3867.8	6843.1	15437	18403
4/1963	201630.6	201638.3	311253.1	312649.0	139496.3	139631.1	1	1	570.7	570.7	473.47	473.47	5786.4	5786.4	25796	25796
5/1963	210077.3	210311.6	396399.0	395675.8	134178.0	131192.8	1	1	1455.8	1406.1	576.35	576.28	54073.6	51023.4	71412	68362
6/1963	197583.7	197025.3	413744.2	413400.3	126800.2	120191.0	1	1	1806.1	1743.4	778.08	777.97	61172.8	57450.6	83860	80137
7/1963	198073.0	198041.1	378893.2	378897.9	117884.3	111359.9	1	1	672.9	658.6	451.69	451.64	13598.9	12726.5	14244	13372
8/1963	193940.5	193976.4	349424.6	349398.0	109192.6	102756.8	1	1	597.8	597.2	374.08	374.08	13756.5	13720.3	13923	13887
9/1963	189960.4	189976.0	324191.0	324176.3	102149.5	95816.8	1	1	578.2	578.1	255.06	255.06	19231.4	19219.6	19316	19304
10/1963	172084.3	172175.6	302450.0	302433.2	98769.5	92775.1	0	0	930.3	924.7	325.00	325.00	37218.0	36873.0	47336	46991
11/1963	167894.2	167638.5	301953.2	302304.0	99781.6	93836.4	0	0	667.8	667.5	325.00	325.00	20397.8	20377.7	36564	36544
12/1963	166015.2	165714.9	302589.1	302939.2	103740.9	97900.9	0	0	356.5	356.5	325.00	325.00	1933.9	1933.9	18256	18256
1/1964	168011.1	167457.1	314908.0	314811.6	115570.0	110916.3	0	0	332.3	325.0	325.00	325.00	446.3	0.0	17264	16818
2/1964	162260.3	161996.5	315964.8	315025.7	121169.0	117259.0	0	0	327.6	325.0	325.00	325.00	148.8	0.0	15660	15511
3/1964	167111.7	166774.4	303112.3	301799.7	127975.0	124548.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15991	15991
4/1964	172763.5	171633.9	286395.9	285087.4	129767.9	127171.5	2	2	272.9	272.9	272.86	272.86	0.0	0.0	8963	8963

Date	*Cumulative without Project* **Pardee Storage**	*Cumulative with Project* **Pardee Storage**	*Cumulative without Project* **Camanche Storage**	*Cumulative with Project* **Camanche Storage**	*Cumulative without Project* **TRA Storage**	*Cumulative with Project* **TRA Storage**	*Cumulative without Project* **JSA Year Type**	*Cumulative with Project* **JSA Year Type**	*Cumulative without Project* **Camanche Outflow**	*Cumulative with Project* **Camanche Outflow**	*Cumulative without Project* **Required Camanche Release**	*Cumulative with Project* **Required Camanche Release**	*Cumulative without Project* **Camanche Flood Release**	*Cumulative with Project* **Camanche Flood Release**	*Cumulative without Project* **Flow below Lodi Lake**	*Cumulative with Project* **Flow below Lodi Lake**
	(acre-ft)	*(acre-ft)*	*(acre-ft)*	*(acre-ft)*	*(acre-ft)*	*(acre-ft)*	*(NA)*	*(NA)*	*(cfs)*	*(cfs)*	*(cfs)*	*(cfs)*	(AF)	(AF)	(AF)	(AF)
5/1964	187071.3	185958.9	263721.5	262419.0	125183.6	122607.1	2	2	370.0	370.0	370.03	370.03	0.0	0.0	9312	9312
6/1964	195409.6	195226.1	248072.3	245858.0	118227.9	115678.1	2	2	328.1	328.1	328.11	328.11	0.0	0.0	1875	1875
7/1964	197915.4	197940.2	232725.0	230326.6	109244.3	106724.5	2	2	363.5	363.5	363.50	363.50	0.0	0.0	1803	1803
8/1964	194227.6	194377.3	226020.5	223520.5	100539.7	98053.5	2	2	318.5	318.5	318.50	318.50	0.0	0.0	1329	1329
9/1964	190342.1	190293.3	226020.5	223520.5	93495.9	91041.8	2	2	250.4	254.0	219.91	219.91	1812.8	2029.0	3013	3229
10/1964	177907.9	177789.2	225953.0	223453.1	90315.5	87960.0	1	1	615.6	615.7	284.00	284.00	20387.3	20393.5	30398	30405
11/1964	171227.1	171185.0	225953.0	223453.0	90827.7	88416.9	1	1	772.4	772.4	250.00	250.00	31085.3	31085.2	42703	42703
12/1964	208451.9	208451.9	334571.9	332708.9	100490.8	98387.6	1	1	1075.8	1059.7	250.00	250.00	50777.6	49785.9	63021	62030
1/1965	204450.7	204450.7	288937.7	288859.7	116189.4	114100.7	1	1	3167.7	3138.7	250.00	250.00	179407.6	177622.4	191372	189587
2/1965	195062.2	195062.2	290220.8	290340.9	122831.5	120758.4	1	1	1362.9	1359.3	250.00	250.00	61805.9	61607.5	72581	72384
3/1965	183415.3	183344.8	312857.4	313255.2	128902.9	127629.9	1	1	735.5	719.4	250.00	250.00	29851.7	28859.9	41236	40245
4/1965	204926.6	204926.1	340228.1	339925.6	134016.2	132839.8	0	0	753.3	762.5	525.00	525.00	13587.0	14132.4	36514	37060
5/1965	205601.4	205483.7	379109.0	378755.7	128334.9	124219.1	0	0	1019.0	938.7	776.30	776.10	14922.9	10000.7	44504	39582
6/1965	203556.4	203020.6	407898.7	407237.5	120909.4	113182.0	0	0	1757.4	1700.1	877.94	877.86	52334.0	48924.6	80966	77556
7/1965	197873.9	197845.6	378963.3	378564.1	112069.2	104416.8	0	0	939.7	927.8	452.34	452.30	29969.1	29235.4	30615	29881
8/1965	194843.1	194847.1	357140.8	356879.7	103250.8	95596.9	0	0	604.8	603.8	377.68	377.64	13965.0	13906.0	14396	14337
9/1965	191590.8	191594.8	339597.0	339455.3	96494.4	88939.5	0	0	740.1	738.1	260.66	260.66	28531.5	28413.1	28902	28783
10/1965	177633.9	177637.9	325310.4	325292.9	93000.3	85540.7	0	0	911.8	909.8	325.00	325.00	36084.1	35960.3	46080	45956
11/1965	175578.8	175582.8	325310.4	325292.9	95037.8	87632.6	0	0	846.3	846.3	325.00	325.00	31018.2	31018.3	47132	47134
12/1965	171254.0	170833.2	330318.1	330290.1	102706.8	96785.9	0	0	571.0	554.8	325.00	325.00	15124.2	14132.4	31633	30642
1/1966	166735.0	166458.2	329204.4	329821.0	114193.2	108517.5	0	0	500.0	483.9	325.00	325.00	10760.5	9768.7	27488	26497
2/1966	160886.1	160894.0	321315.9	321436.7	123370.6	117648.7	0	0	431.3	436.6	325.00	325.00	5900.9	6198.4	20995	21293
3/1966	168372.3	167946.3	309923.9	308898.8	128241.9	124150.3	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15925	15925
4/1966	180149.0	179863.9	307769.3	305559.4	130355.1	127350.8	2	2	272.8	272.8	272.83	272.83	0.0	0.0	8970	8970
5/1966	191991.0	192523.8	288619.4	293170.3	125906.6	122958.0	2	2	370.0	378.3	370.00	378.29	0.0	0.0	9240	9240
6/1966	189747.5	194696.2	266845.0	274055.6	118552.7	115668.9	2	2	328.1	339.7	328.08	339.67	0.0	0.0	1821	1821
7/1966	191834.8	198244.6	240774.3	253693.3	109713.1	106857.7	2	2	363.5	376.6	363.47	376.65	0.0	0.0	1804	1804
8/1966	190155.8	194098.8	222282.8	244724.8	100777.0	98289.8	2	2	318.5	326.8	318.52	326.82	0.0	0.0	1327	1327
9/1966	189655.0	190561.2	213833.7	244724.8	94038.9	91361.5	2	2	219.8	260.8	219.82	224.93	0.0	2133.6	1193	3323
10/1966	170271.3	171211.6	213766.3	244332.3	90577.7	87978.1	2	1	397.1	530.4	254.00	284.00	8798.9	15148.3	16816	24816
11/1966	168033.8	171579.0	213766.3	244332.3	91616.6	89119.2	2	1	543.2	630.4	220.00	250.00	19230.6	22633.9	29121	34307
12/1966	174947.9	178665.1	258149.2	294250.9	99797.9	97946.6	2	1	220.0	250.0	220.00	250.00	0.0	0.0	10170	12015
1/1967	187871.6	188793.2	296074.5	326864.5	124388.8	123291.4	2	1	225.8	433.5	220.00	250.00	357.0	11286.1	10989	23742
2/1967	172704.7	171942.0	324473.8	325039.6	127903.8	128512.1	2	1	482.1	1025.7	220.00	250.00	14558.9	43081.6	23717	53862
3/1967	196989.0	196831.3	338901.4	339050.9	139005.6	139622.8	2	1	834.2	831.0	220.00	250.00	37765.8	35722.8	47497	47299
4/1967	204610.3	204610.3	338593.7	338727.8	146703.4	147176.4	0	0	1752.7	1752.7	525.00	525.00	73052.3	73052.3	96170	96170
5/1967	205364.1	205244.3	311391.5	311247.5	140135.8	138091.5	0	0	2571.0	2487.1	778.31	778.31	110227.9	105070.8	139837	134680
6/1967	210983.7	211074.2	398673.0	398067.2	134799.8	129114.5	0	0	2067.3	2002.0	878.49	878.40	70742.4	66859.7	99437	95554
7/1967	196421.9	196423.7	360933.7	360562.0	125817.4	120197.6	0	0	2507.1	2504.8	454.41	454.41	126217.0	126074.6	126867	126725
8/1967	194344.4	194346.4	340715.8	340387.4	117040.2	111489.0	0	0	444.8	444.1	377.52	377.52	4135.1	4094.0	4515	4474

Date	*Cumulative without Project* Pardee Storage *(acre-ft)*	*Cumulative with Project* Pardee Storage *(acre-ft)*	*Cumulative without Project* Camanche Storage *(acre-ft)*	*Cumulative with Project* Camanche Storage *(acre-ft)*	*Cumulative without Project* TRA Storage *(acre-ft)*	*Cumulative with Project* TRA Storage *(acre-ft)*	*Cumulative without Project* JSA Year Type *(NA)*	*Cumulative with Project* JSA Year Type *(NA)*	*Cumulative without Project* Camanche Outflow *(cfs)*	*Cumulative with Project* Camanche Outflow *(cfs)*	*Cumulative without Project* Required Camanche Release *(cfs)*	*Cumulative with Project* Required Camanche Release *(cfs)*	*Cumulative without Project* Camanche Flood Release (AF)	*Cumulative with Project* Camanche Flood Release (AF)	*Cumulative without Project* Flow below Lodi Lake (AF)	*Cumulative with Project* Flow below Lodi Lake (AF)
9/1967	190159.9	190161.8	325486.5	325336.1	109888.8	104402.9	0	0	431.8	428.8	260.02	260.02	10221.8	10045.0	10593	10416
10/1967	171665.8	171667.7	313475.8	313450.1	104658.3	99234.0	0	0	740.1	738.1	325.00	325.00	25526.4	25402.0	35556	35432
11/1967	167387.1	167687.6	313475.8	313450.1	103614.8	97599.2	0	0	508.2	514.0	325.00	325.00	10902.0	11249.1	26973	27319
12/1967	164214.0	164135.8	318542.4	318665.1	109321.4	103588.9	0	0	390.3	390.3	325.00	325.00	4016.6	4016.6	20466	20466
1/1968	168494.7	168331.5	324885.3	324362.3	119799.5	114983.5	0	0	375.8	373.4	325.00	325.00	3124.0	2975.2	20002	19854
2/1968	171938.3	171766.1	325670.7	325285.8	127774.4	123853.6	0	0	510.3	493.1	325.00	325.00	10661.3	9669.6	26310	25320
3/1968	169260.7	168852.8	328271.9	328619.7	134325.9	131177.0	0	0	554.0	533.9	325.00	325.00	14082.9	12843.2	30162	28923
4/1968	178183.2	178013.2	316004.0	315581.1	134397.4	131816.8	2	2	272.9	272.9	272.86	272.86	0.0	0.0	8951	8951
5/1968	188848.0	187348.5	290767.7	290347.0	128579.3	127359.2	2	2	378.3	378.3	378.33	378.33	0.0	0.0	9244	9244
6/1968	197777.1	197877.5	274490.1	272482.8	121088.1	119883.4	2	2	339.7	339.7	339.70	339.70	0.0	0.0	1821	1821
7/1968	197952.9	197933.0	255516.1	253647.0	112176.4	110987.1	2	2	376.7	376.7	376.67	376.67	0.0	0.0	1803	1803
8/1968	194277.0	194260.1	244904.2	243050.2	103582.0	102407.1	2	2	326.8	326.8	326.80	326.80	0.0	0.0	1346	1346
9/1968	190420.1	190403.2	243659.2	241819.4	96549.9	95389.5	2	2	224.9	224.9	224.83	224.83	3.8	3.8	1196	1196
10/1968	173815.3	173798.6	242860.2	241013.8	93202.2	92054.9	1	1	536.2	536.5	284.00	284.00	15508.5	15522.9	25248	25262
11/1968	168212.7	168469.8	242860.2	241013.8	93074.9	91939.5	1	1	758.5	753.9	250.00	250.00	30261.2	29981.7	41935	41655
12/1968	171995.6	171906.0	266742.6	265241.2	101389.4	100260.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11970	11970
1/1969	208525.2	208543.2	338640.9	337853.9	123243.1	122400.9	1	1	962.9	944.8	250.00	250.00	43835.4	42724.6	56304	55194
2/1969	204489.6	204489.6	325115.0	325534.5	139498.3	138658.2	1	1	2321.4	2300.0	250.00	250.00	115043.0	113852.9	126179	124989
3/1969	200745.1	200745.1	331588.6	330898.0	144343.1	143577.6	1	1	1261.3	1279.4	250.00	250.00	62182.7	63293.5	73532	74643
4/1969	204956.3	204956.3	316505.8	316806.8	146810.7	146051.8	0	0	2434.7	2418.0	525.00	525.00	113634.7	112643.0	136444	135453
5/1969	207612.3	211234.0	394301.7	388693.3	140388.8	137270.8	0	0	2674.2	2618.7	778.11	778.11	116587.2	113175.6	146168	142756
6/1969	205450.6	205148.3	407306.8	405923.1	133000.7	126258.6	0	0	3106.3	3031.7	879.24	879.24	132519.2	128079.0	161157	156716
7/1969	197859.1	197770.0	378221.5	377260.9	124036.5	117380.7	0	0	1211.2	1201.0	452.79	452.78	46632.6	46005.6	47278	46651
8/1969	195226.0	195242.2	357001.6	356353.1	115277.5	108711.9	0	0	610.8	604.1	377.77	377.77	14330.2	13918.6	14709	14298
9/1969	191185.1	191201.2	339155.8	338804.0	108139.3	101658.0	0	0	616.6	611.6	260.20	260.17	21204.9	20912.6	21576	21283
10/1969	174425.8	174441.8	324602.7	324548.9	104107.3	97695.8	0	0	945.7	940.9	325.00	325.00	38166.2	37868.7	48241	47946
11/1969	164409.8	164452.2	324602.7	324548.9	102822.4	96989.1	0	0	585.7	576.6	325.00	325.00	15515.6	14970.5	31545	31000
12/1969	175241.9	175147.7	310319.5	309988.0	115310.0	109916.8	0	0	812.9	812.9	325.00	325.00	30000.4	30000.4	46536	46536
1/1970	204910.7	204894.9	304705.0	303919.2	134893.5	129894.8	0	0	2223.9	2223.9	325.00	325.00	116758.7	116758.7	133634	133634
2/1970	202053.5	201413.1	270310.9	270385.1	139431.3	135196.0	0	0	1952.9	1935.0	325.00	325.00	90407.9	89416.2	105365	104375
3/1970	198687.1	198248.2	291897.9	291084.8	143538.0	140061.2	0	0	1120.0	1119.4	325.00	325.00	48883.4	48843.7	64910	64869
4/1970	187143.2	186939.8	313139.9	312457.2	141501.7	138243.5	0	0	652.5	643.3	525.00	525.00	7586.9	7041.4	30410	29865
5/1970	205991.3	205981.3	336121.8	334827.2	135022.4	132227.9	0	0	644.3	644.3	625.50	625.50	1158.9	1158.9	21519	21519
6/1970	199203.9	199203.9	392563.8	391265.9	128561.7	125805.0	0	0	694.8	694.8	675.97	675.97	1121.5	1121.5	17869	17869
7/1970	197800.8	197800.8	365324.7	364156.9	119587.0	116874.0	0	0	653.2	651.2	451.76	451.76	12383.7	12262.2	13028	12906
8/1970	194288.8	194288.8	344222.7	343063.0	110837.6	108165.7	0	0	396.4	396.4	377.52	377.52	1158.9	1158.9	1539	1539
9/1970	189872.1	189872.1	332012.0	331288.4	103711.1	101075.6	0	0	309.1	301.8	259.24	259.21	2966.7	2537.4	3340	2910
10/1970	172110.2	171507.7	324465.5	324354.4	98598.9	96940.9	0	0	610.2	594.7	325.00	325.00	17539.1	16581.1	27594	26643
11/1970	177860.8	177441.6	324465.5	324354.4	103583.2	102052.2	0	0	763.7	758.5	325.00	325.00	26106.5	25798.0	42369	42058
12/1970	180999.3	180442.8	332288.8	333248.6	117611.6	116220.3	0	0	1000.6	983.2	325.00	325.00	41544.4	40473.3	58155	57086

Date	Cumulative without Project Pardee Storage (acre-ft)	Cumulative with Project Pardee Storage (acre-ft)	Cumulative without Project Camanche Storage (acre-ft)	Cumulative with Project Camanche Storage (acre-ft)	Cumulative without Project TRA Storage (acre-ft)	Cumulative with Project TRA Storage (acre-ft)	Cumulative without Project JSA Year Type (NA)	Cumulative with Project JSA Year Type (NA)	Cumulative without Project Camanche Outflow (cfs)	Cumulative with Project Camanche Outflow (cfs)	Cumulative without Project Required Camanche Release (cfs)	Cumulative with Project Required Camanche Release (cfs)	Cumulative without Project Camanche Flood Release (AF)	Cumulative with Project Camanche Flood Release (AF)	Cumulative without Project Flow below Lodi Lake (AF)	Cumulative with Project Flow below Lodi Lake (AF)
1/1971	175908.9	175873.1	328799.7	327895.8	124055.2	122667.6	0	0	900.0	921.9	325.00	325.00	35355.9	36704.7	51989	53334
2/1971	174863.9	174856.9	322956.2	322568.9	128407.5	127278.0	0	0	885.7	871.4	325.00	325.00	31141.0	30347.6	46110	45317
3/1971	187730.2	187693.0	335044.2	334349.6	135783.8	135000.4	0	0	658.1	658.1	325.00	325.00	20479.6	20479.6	36617	36617
4/1971	185624.9	185605.6	352266.7	351914.5	136484.5	135999.1	1	1	595.3	584.4	473.56	473.54	7246.2	6598.1	26998	26350
5/1971	193477.4	193458.5	341003.5	340652.8	130804.7	130325.9	1	1	674.4	674.4	625.48	625.48	3009.7	3009.7	23415	23415
6/1971	205968.0	205968.0	387910.2	387542.5	123304.7	122833.7	1	1	594.6	594.6	575.76	575.76	1121.5	1121.5	11918	11918
7/1971	198035.6	198035.6	363606.3	363317.2	114385.2	113922.7	1	1	953.0	951.7	452.11	452.11	30796.0	30719.8	31440	31364
8/1971	195222.5	195222.5	346602.5	346407.1	105695.1	105240.7	1	1	630.2	628.7	374.12	374.12	15745.4	15653.3	15912	15820
9/1971	190693.1	190663.2	333061.1	332951.6	98719.4	98301.2	1	1	471.2	469.8	255.02	255.02	12865.6	12780.4	12948	12863
10/1971	173836.1	173806.4	324640.2	324625.1	95189.5	94776.2	0	0	662.2	660.7	325.00	325.00	20734.7	20640.6	30728	30634
11/1971	162961.3	162931.7	324640.2	324625.1	94478.5	94068.7	0	0	486.4	486.4	325.00	325.00	9605.9	9605.9	25651	25651
12/1971	171874.7	171845.1	326185.2	326170.1	101579.9	101172.6	0	0	512.9	512.9	325.00	325.00	11553.9	11553.9	28260	28260
1/1972	162603.7	162572.2	323900.6	324677.9	111082.1	110877.5	0	0	419.4	403.2	325.00	325.00	5801.7	4810.0	22445	21454
2/1972	162295.2	162277.5	314957.4	315359.9	120094.3	120251.0	0	0	356.0	356.0	325.00	325.00	1785.2	1785.2	17400	17400
3/1972	170140.8	170261.0	316641.0	316844.6	126304.6	126519.1	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15909	15909
4/1972	180424.3	180491.2	310495.9	310699.0	129149.4	129414.3	1	1	373.5	373.5	373.52	373.52	0.0	0.0	14975	14975
5/1972	189094.3	188787.9	283553.3	284128.7	124448.8	124710.7	1	1	428.4	428.4	428.36	428.36	0.0	0.0	12302	12302
6/1972	197368.7	197252.5	284260.4	284644.0	117365.2	117624.2	1	1	510.1	510.1	510.08	510.08	0.0	0.0	11907	11907
7/1972	197978.5	197881.2	263546.8	263909.0	108481.5	108737.6	1	1	377.8	377.8	376.71	376.71	66.2	66.2	1872	1872
8/1972	194124.5	194094.0	246781.8	247074.6	99568.9	99821.6	1	1	326.8	326.8	326.80	326.80	0.0	0.0	1328	1328
9/1972	190821.5	190790.9	238550.1	238840.9	93022.3	93272.0	1	1	310.3	310.3	225.02	225.02	5072.4	5072.8	6350	6351
10/1972	170847.2	170816.1	237907.4	238198.5	91836.8	92084.1	1	1	499.3	499.3	284.00	284.00	13239.6	13238.0	22932	22931
11/1972	166145.7	166114.6	237907.4	238198.5	97087.2	97333.1	1	1	631.9	631.9	250.00	250.00	22722.9	22723.2	34423	34423
12/1972	167898.2	167867.3	253240.2	253531.3	104012.3	104256.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11894	11894
1/1973	184559.7	184541.3	299663.5	299658.5	126097.7	126328.1	1	1	254.8	259.7	250.00	250.00	297.5	595.1	12751	13048
2/1973	192414.4	192597.3	329956.3	329782.1	138718.3	138915.0	1	1	820.0	820.0	250.00	250.00	31656.7	31656.7	42862	42862
3/1973	187164.6	187227.5	335313.8	335268.5	146240.9	146427.1	1	1	1165.8	1165.8	250.00	250.00	56311.6	56311.6	67778	67778
4/1973	189305.6	189367.2	352268.3	352223.1	144906.9	145092.6	1	1	571.1	571.1	473.51	473.51	5804.7	5804.7	25541	25541
5/1973	208676.0	208676.9	385853.3	385868.6	138555.3	138739.2	1	1	773.3	773.3	675.97	675.97	5983.9	5983.9	29419	29419
6/1973	196408.7	196408.7	405621.4	404541.3	131094.6	131276.0	1	1	1179.8	1198.3	727.15	727.20	26933.6	28031.2	46637	47734
7/1973	197921.6	197921.6	375368.9	374490.8	122154.5	122333.1	1	1	646.8	643.6	451.69	451.69	11997.0	11801.9	12642	12447
8/1973	194119.5	194119.5	348239.6	347646.3	113417.0	113593.0	1	1	487.7	483.2	374.06	374.06	6989.5	6709.8	7156	6876
9/1973	189944.7	189944.7	325474.4	325152.5	106483.0	106656.9	1	1	503.1	498.6	255.02	255.02	14761.8	14492.8	14844	14575
10/1973	174012.6	174012.6	304701.2	304649.8	101917.0	102090.5	0	0	1001.9	997.5	325.00	325.00	41623.0	41352.5	51820	51551
11/1973	175165.4	175165.4	303272.6	303272.6	111810.3	111984.3	0	0	842.8	841.9	325.00	325.00	30809.6	30758.2	46978	46927
12/1973	184941.5	184941.5	302866.4	302866.4	122022.9	122196.8	0	0	1026.5	1026.5	325.00	325.00	43131.2	43131.2	59772	59772
1/1974	191297.9	191297.9	294567.2	294567.2	130882.4	131056.1	0	0	1369.0	1369.0	325.00	325.00	64196.0	64196.0	80906	80906
2/1974	180823.3	180824.1	303654.1	303654.1	137847.4	138019.8	0	0	900.0	900.0	325.00	325.00	31934.4	31934.4	46949	46949
3/1974	204724.3	204727.1	327728.2	327738.9	147521.5	147680.6	0	0	969.7	969.7	325.00	325.00	39640.2	39640.2	55773	55773
4/1974	203375.1	203376.0	347989.5	348008.0	150252.6	150201.2	0	0	1403.3	1403.3	525.00	525.00	52265.2	52265.2	75136	75136

Date	*Cumulative without Project* **Pardee Storage** *(acre-ft)*	*Cumulative with Project* **Pardee Storage** *(acre-ft)*	*Cumulative without Project* **Camanche Storage** *(acre-ft)*	*Cumulative with Project* **Camanche Storage** *(acre-ft)*	*Cumulative without Project* **TRA Storage** *(acre-ft)*	*Cumulative with Project* **TRA Storage** *(acre-ft)*	*Cumulative without Project* **JSA Year Type** *(NA)*	*Cumulative with Project* **JSA Year Type** *(NA)*	*Cumulative without Project* **Camanche Outflow** *(cfs)*	*Cumulative with Project* **Camanche Outflow** *(cfs)*	*Cumulative without Project* **Required Camanche Release** *(cfs)*	*Cumulative with Project* **Required Camanche Release** *(cfs)*	*Cumulative without Project* **Camanche Flood Release** (AF)	*Cumulative with Project* **Camanche Flood Release** (AF)	*Cumulative without Project* **Flow below Lodi Lake** (AF)	*Cumulative with Project* **Flow below Lodi Lake** (AF)
5/1974	209221.8	208848.2	387425.7	385400.0	143491.0	140929.5	0	0	968.6	915.4	776.05	776.01	11836.7	8570.8	41415	38151
6/1974	196169.6	195993.9	404372.3	402772.8	135987.0	129797.0	0	0	1899.1	1819.0	878.10	878.07	60754.3	55991.9	89438	84673
7/1974	198305.3	198396.6	377459.4	376372.5	127389.5	121272.8	0	0	932.4	919.9	452.23	452.24	29525.7	28752.7	30270	29497
8/1974	195234.4	195278.1	355883.9	355169.7	118515.6	112477.8	0	0	741.8	736.6	378.17	378.12	22360.5	22044.6	22742	22426
9/1974	189966.8	190010.2	337863.9	337476.7	111282.7	105320.3	0	0	613.4	607.9	260.44	260.44	21002.0	20678.3	21370	21047
10/1974	173134.5	173177.8	325029.3	324958.3	106307.0	100412.1	0	0	714.5	709.4	325.00	325.00	23949.9	23634.4	34029	33714
11/1974	161895.8	161786.3	322299.0	322497.3	104295.9	98414.4	0	0	446.5	445.3	325.00	325.00	7231.9	7160.9	23203	23132
12/1974	162566.3	162637.2	316400.4	315855.3	109655.8	104239.0	0	0	344.4	346.8	325.00	325.00	1190.1	1338.9	17598	17747
1/1975	160613.2	160524.6	308992.0	307499.7	115984.6	111720.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16656	16656
2/1975	165255.0	164917.1	316790.2	316087.8	125242.1	121796.6	0	0	357.1	333.0	325.00	325.00	1785.2	446.3	17029	15690
3/1975	185799.2	185462.8	334956.8	334887.9	134825.5	131936.7	0	0	523.4	504.8	325.00	325.00	12198.5	11058.0	28448	27309
4/1975	187908.6	187724.8	354006.7	352867.6	135970.0	134273.6	1	1	570.8	570.8	473.49	473.49	5787.8	5787.8	25621	25621
5/1975	203179.6	200958.6	361182.2	362646.9	130142.8	125575.1	1	1	898.2	805.0	625.96	625.76	16737.6	11019.8	37099	31383
6/1975	203578.2	202391.3	402445.7	402864.1	122631.2	114454.8	1	1	1739.3	1670.0	777.89	777.74	57211.1	53094.1	79895	75775
7/1975	198333.3	198287.8	376408.3	376749.7	113637.4	105570.7	1	1	1060.8	1043.4	452.58	452.58	37399.8	36329.3	38050	36980
8/1975	195138.3	195149.0	354282.8	354517.4	104626.4	96668.8	1	1	832.4	833.2	374.81	374.81	28139.3	28188.2	28386	28435
9/1975	191679.2	191690.1	337661.6	337789.2	97804.9	89945.1	1	1	682.8	684.6	255.60	255.62	25422.3	25527.2	25494	25599
10/1975	177773.9	177784.9	324160.9	323870.1	96442.4	88636.8	0	0	894.3	901.1	325.00	325.00	35006.4	35424.5	45142	45560
11/1975	165572.0	165582.8	324160.9	323870.1	95793.9	88067.3	0	0	554.6	554.6	325.00	325.00	13664.2	13664.5	29604	29604
12/1975	163688.6	162672.0	318592.5	318649.3	99647.1	93416.9	0	0	390.3	378.2	325.00	325.00	4016.6	3272.8	20342	19598
1/1976	158111.4	157956.3	306130.1	304998.5	109194.2	103349.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16593	16593
2/1976	149337.0	147324.4	289846.3	288715.1	117739.1	113791.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15598	15598
3/1976	140528.9	136415.3	270902.7	269773.5	124675.4	122870.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16021	16021
4/1976	133093.3	127792.9	259947.2	258821.1	126804.9	126224.5	3	3	200.6	200.6	199.81	199.81	48.6	48.6	4598	4598
5/1976	131494.1	126364.0	244934.9	243816.1	121610.2	120910.2	3	3	210.8	210.8	210.75	210.75	0.0	0.0	1424	1424
6/1976	128498.4	123533.3	226291.2	225181.2	113249.6	112439.6	3	3	268.5	268.5	268.51	268.51	0.0	0.0	1820	1820
7/1976	124318.9	119530.1	208015.1	206916.8	104834.1	103915.2	3	3	241.1	241.1	241.05	241.05	0.0	0.0	1115	1115
8/1976	122989.9	118178.5	194484.5	193588.3	97387.6	96361.7	3	3	208.5	208.5	208.46	208.46	0.0	0.0	989	989
9/1976	120614.0	115964.3	183017.2	182129.0	91734.0	90604.3	3	3	157.6	157.6	157.60	157.60	0.0	0.0	902	902
10/1976	116768.9	112143.3	166081.6	165199.3	88499.2	87397.8	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10330	10330
11/1976	118191.5	113544.1	154086.2	153206.9	87667.5	86629.1	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9751	9751
12/1976	113730.3	108479.3	140469.6	139593.5	92680.0	92285.3	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9890	9890
1/1977	109932.1	104871.7	128655.6	127781.0	103173.9	102622.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10228	10228
2/1977	101956.7	96680.0	118348.2	117474.4	111570.5	111265.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9242	9242
3/1977	94104.8	89041.9	106821.0	105949.2	120404.6	119922.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9634	9634
4/1977	90426.4	85598.8	94542.8	93678.1	123289.1	122623.8	3	3	199.8	199.8	199.76	199.76	0.0	0.0	4467	4467
5/1977	94937.3	90231.1	82812.8	81957.1	120432.0	119699.8	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1502	1502
6/1977	93992.1	89523.9	65922.6	65081.7	113912.9	113007.4	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1819	1819
7/1977	92119.8	87895.7	50144.8	49321.1	108427.5	107353.8	3	3	241.0	241.0	241.03	241.03	0.0	0.0	1113	1113
8/1977	88960.7	84978.9	36665.3	35857.3	103107.4	101866.1	3	3	208.5	208.5	208.48	208.48	0.0	0.0	923	923

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9/1977	88618.0	84416.4	31140.6	28713.1	97284.3	97956.7	3	3	157.7	157.7	157.67	157.67	0.0	0.0	924	924
10/1977	85902.0	81947.4	23174.3	20780.9	93375.5	93830.8	3	3	131.3	131.3	131.33	131.33	0.0	0.0	2829	2829
11/1977	90002.7	86192.1	15766.6	13396.1	91770.5	92104.5	3	3	131.6	131.6	131.60	131.60	0.0	0.0	4570	4570
12/1977	93555.2	89145.1	8067.9	6466.8	95640.5	95858.8	3	3	133.6	133.6	133.64	133.64	0.0	0.0	4922	4922
1/1978	86626.8	81067.9	6458.0	6285.1	105088.0	105061.3	3	3	130.0	130.0	130.00	130.00	0.0	0.0	5091	5091
2/1978	78303.3	72870.0	6280.4	6344.9	112717.1	112362.5	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4402	4402
3/1978	77752.4	73082.4	6347.5	6412.3	120271.4	119198.2	3	3	139.0	139.0	139.02	139.02	0.0	0.0	4953	4953
4/1978	70730.2	66488.3	6349.9	6414.7	124012.8	122571.4	3	3	199.7	199.7	199.73	199.73	0.0	0.0	4782	4782
5/1978	63464.6	60231.4	6415.0	6480.2	120368.3	117985.4	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1418	1418
6/1978	54256.3	51436.5	6413.3	6478.5	111421.5	108708.1	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1820	1820
7/1978	46209.0	43758.8	6098.7	6163.6	101089.1	98365.8	3	3	241.0	241.0	241.03	241.03	0.0	0.0	1113	1113
8/1978	36237.2	34992.7	6098.7	6163.6	90919.0	88236.4	3	3	211.6	211.6	208.48	208.48	190.8	191.2	1114	1115
9/1978	36237.2	34992.7	6098.7	6163.6	81527.5	78861.7	3	3	230.5	248.4	158.30	158.46	4294.6	5353.4	5286	6345
10/1978	34921.9	33681.2	6098.7	6163.6	73144.0	70493.5	3	3	131.4	131.4	131.39	131.39	3.1	3.1	2835	2835
11/1978	35108.8	33866.2	6098.7	6163.6	66702.8	64062.8	3	3	134.2	134.2	131.63	131.63	155.1	155.9	4825	4825
12/1978	34980.6	33737.7	6155.9	6221.2	62040.1	59971.7	3	3	133.7	133.7	133.67	133.67	0.0	0.0	4689	4689
1/1979	58395.5	60635.8	6355.1	6420.7	65763.3	67041.7	3	3	130.0	130.0	130.00	130.00	0.0	0.0	5006	5006
2/1979	84330.2	92255.4	6521.8	6587.8	76471.6	79377.1	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4644	4644
3/1979	143134.7	150864.0	6340.6	6406.5	88156.9	91183.5	3	3	140.0	140.0	139.99	139.99	0.0	0.0	4767	4767
4/1979	188560.3	190021.3	14080.1	20336.9	95616.9	98625.9	1	1	272.8	272.8	272.78	272.78	0.0	0.0	8962	8962
5/1979	203216.8	204593.4	59566.3	67108.2	96768.1	98431.7	1	1	420.0	420.0	420.00	420.00	0.0	0.0	12311	12311
6/1979	202539.8	203222.9	104673.1	112982.0	92867.7	94310.2	1	1	498.4	498.4	498.45	498.45	0.0	0.0	11899	11899
7/1979	198915.4	199121.8	113169.0	121521.1	87584.8	89017.8	1	1	365.4	370.1	363.51	363.51	113.4	402.8	1923	2212
8/1979	194073.6	194252.2	97446.7	105885.0	82456.3	83877.2	1	1	565.2	561.9	319.27	319.27	15122.8	14918.5	16453	16249
9/1979	184074.5	184251.8	97446.7	105885.0	77432.3	78843.9	1	1	326.2	324.3	220.31	220.31	6301.9	6190.9	7495	7384
10/1979	170741.1	170886.7	97379.3	105817.6	74075.1	75513.0	2	2	503.6	502.7	254.00	254.00	15345.3	15294.4	23465	23414
11/1979	168025.1	168170.9	97226.9	105662.5	74297.7	75735.4	2	2	552.4	552.4	220.00	220.00	19777.2	19777.5	29618	29619
12/1979	171804.8	171602.9	115439.4	124223.9	85063.4	86503.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10049	10049
1/1980	202109.7	202109.7	232691.1	240263.9	101729.0	103165.4	2	2	254.8	272.3	220.00	220.00	2142.2	3213.3	12688	13756
2/1980	206089.0	206090.6	305336.9	305882.6	119484.4	121004.1	2	2	1215.2	1335.9	220.00	220.00	57243.8	64186.1	66968	73902
3/1980	201289.3	201385.5	312199.1	312663.6	126763.7	127864.8	2	2	1582.6	1587.7	220.00	220.00	83783.0	84100.4	93252	93569
4/1980	193433.7	193866.7	336701.0	337065.2	130824.0	131408.4	0	0	794.7	799.2	525.00	525.00	16046.5	16314.3	38864	39134
5/1980	204122.8	203591.3	368440.1	368487.9	125663.2	123081.1	0	0	1031.6	972.8	776.36	776.29	15694.5	12081.5	45315	41703
6/1980	206659.4	206459.4	408855.0	408961.6	118365.8	112162.8	0	0	1549.0	1472.9	877.66	877.55	39949.1	35425.6	68579	64055
7/1980	197604.0	197643.5	371544.4	371553.8	109617.1	103508.1	0	0	1582.0	1579.7	453.19	453.20	69410.7	69267.7	70127	69984
8/1980	193948.9	193940.7	346275.3	346272.5	101040.3	95021.5	0	0	498.3	499.3	377.50	377.50	7429.6	7489.8	7810	7870
9/1980	189649.9	189595.5	324892.0	324890.5	94142.9	88248.4	0	0	474.6	474.5	259.98	259.98	12768.3	12767.0	13137	13136
10/1980	170735.7	170879.5	307592.5	307494.0	90677.4	84856.3	0	0	696.7	695.1	325.00	325.00	22858.2	22756.9	32848	32748
11/1980	162506.1	162502.0	300876.2	300826.6	89540.0	83783.3	0	0	417.3	419.0	325.00	325.00	5494.3	5594.1	21402	21502
12/1980	162739.6	162698.7	301115.5	299678.2	94009.4	89723.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16400	16400

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1/1981	171300.5	171172.6	306965.7	305126.4	107610.8	103828.6	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16925	16925
2/1981	162816.7	162572.9	311881.1	309497.8	116048.9	112956.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15036	15036
3/1981	170605.6	170574.4	313015.9	309060.1	124678.1	122955.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16314	16314
4/1981	180887.2	180930.7	302355.2	298034.6	127178.8	125773.3	2	2	274.8	274.8	274.78	274.78	0.0	0.0	9002	9002
5/1981	190944.7	190616.5	281651.8	277727.3	122514.2	121122.8	2	2	346.3	346.3	346.25	346.25	0.0	0.0	9240	9240
6/1981	198037.1	197983.6	266047.5	261877.6	114944.1	113568.9	2	2	280.1	280.1	280.09	280.09	0.0	0.0	1819	1819
7/1981	197708.8	197792.4	256163.2	251897.1	106007.2	104650.5	2	2	291.6	291.6	291.60	291.60	0.0	0.0	1803	1803
8/1981	194376.7	194268.7	247413.2	243379.7	97344.9	96007.9	2	2	240.4	240.4	240.39	240.39	0.0	0.0	1325	1325
9/1981	190329.8	190398.2	247413.2	243379.7	90380.2	89060.6	2	2	184.7	182.2	177.54	177.54	423.9	278.7	1623	1479
10/1981	175442.8	175510.4	246359.3	242096.0	87932.0	86626.8	1	1	629.3	633.2	284.00	284.00	21230.9	21473.4	33303	33547
11/1981	175498.0	175564.6	246359.3	242095.9	92263.8	90967.7	1	1	877.7	877.4	250.00	250.00	37350.4	37336.4	49131	49117
12/1981	192029.5	192023.7	266448.2	264235.2	101183.4	100581.9	1	1	583.9	553.2	250.00	250.00	20529.2	18644.9	32451	30571
1/1982	195984.4	195984.4	275238.1	275197.0	124601.8	124003.2	1	1	1447.1	1411.6	250.00	250.00	73607.7	71425.8	85810	83630
2/1982	204927.5	204927.5	307589.3	307051.5	134297.2	134340.6	1	1	2112.1	2110.7	250.00	250.00	103419.7	103340.4	114363	114285
3/1982	206618.6	206618.6	300765.2	301038.3	146308.2	146268.2	1	1	2638.7	2625.8	250.00	250.00	146878.2	146084.8	158458	157665
4/1982	207794.8	207794.8	343885.1	344171.1	149249.0	149205.6	0	0	3240.0	3240.0	525.00	525.00	161556.1	161556.1	184434	184434
5/1982	212667.9	212079.7	388023.6	388153.8	140458.0	138143.1	0	0	3393.5	3312.9	778.90	778.80	160770.8	155818.4	190380	185427
6/1982	206519.5	206333.7	408689.3	408803.3	133371.0	127419.5	0	0	2304.0	2227.9	878.67	878.63	84814.6	80290.6	113457	108933
7/1982	198052.3	197936.8	365956.1	366299.2	124686.2	118807.2	0	0	1600.7	1595.8	453.40	453.40	70546.0	70244.0	71194	70892
8/1982	194630.1	194536.7	330625.1	330696.1	116068.6	110266.3	0	0	968.4	972.5	378.34	378.33	36282.4	36532.4	36662	36912
9/1982	191792.6	191897.1	299606.0	299711.5	109243.5	103509.6	0	0	962.8	958.9	261.02	261.02	41761.7	41528.4	42333	42100
10/1982	182194.0	182298.1	271507.1	271531.5	105760.1	100083.2	0	0	1171.2	1172.6	325.00	325.00	52033.7	52114.7	62255	62336
11/1982	192443.2	192418.1	271507.1	271531.5	113048.6	107383.6	0	0	1167.2	1169.4	325.00	325.00	50117.0	50245.9	66315	66444
12/1982	204660.9	204647.8	292272.6	292456.5	122333.5	117367.5	0	0	1388.7	1374.7	325.00	325.00	65406.4	64543.7	81930	81069
1/1983	206877.2	206853.1	319988.3	319050.7	138002.0	133181.9	0	0	1462.6	1480.0	325.00	325.00	69948.1	71019.2	86904	87974
2/1983	207771.1	207705.4	322053.9	321692.5	149540.0	146737.7	0	0	2689.3	2642.9	325.00	325.00	131307.7	128729.2	146426	143848
3/1983	205874.4	205874.4	361930.8	361387.1	153470.6	153058.9	0	0	3587.1	3587.1	325.00	325.00	200581.4	200581.4	216917	216917
4/1983	206731.8	206736.2	337842.1	337213.3	149078.8	149671.5	0	0	2556.7	2556.7	525.00	525.00	120894.3	120894.3	143762	143763
5/1983	208083.4	211333.2	327469.1	318895.8	141684.1	140266.3	0	0	3032.3	3016.1	778.33	778.31	138590.4	137600.2	168233	167242
6/1983	210115.6	210221.5	410480.6	401936.0	134430.6	129365.8	0	0	4333.3	4316.7	880.34	880.34	205470.6	204478.8	234107	233115
7/1983	203208.0	203208.0	370616.8	365558.6	125645.1	120636.8	0	0	3708.5	3654.3	455.56	455.53	200018.9	196686.8	200668	197336
8/1983	195616.2	195616.3	332424.8	329007.1	117071.6	112121.4	0	0	1342.3	1316.1	379.60	379.47	59193.6	57590.2	59580	57977
9/1983	192088.9	192088.9	301833.2	299927.7	110131.6	105237.2	0	0	1053.2	1028.1	261.34	261.18	47121.8	45633.0	47532	46043
10/1983	179358.8	179358.8	274156.8	273787.9	104971.6	100132.3	0	0	1185.8	1160.9	325.00	325.00	52927.9	51395.6	62897	61365
11/1983	204842.6	204842.6	274156.8	273787.9	109666.9	104853.2	0	0	1620.9	1620.9	325.00	325.00	77114.9	77115.0	93440	93439
12/1983	211036.5	211002.9	314538.1	314573.4	118887.2	115162.5	0	0	2152.9	2129.7	325.00	325.00	112395.0	110966.9	129043	127615
1/1984	200035.2	200035.2	269983.5	269985.3	125277.5	121587.8	0	0	2483.9	2483.9	325.00	325.00	132745.7	132745.7	149227	149227
2/1984	200601.4	199898.8	276055.1	277127.9	133726.0	130764.6	0	0	1244.8	1226.2	325.00	325.00	52909.9	51838.8	68535	67466
3/1984	200108.3	198819.3	301193.5	301908.5	139160.8	137169.1	0	0	900.0	900.0	325.00	325.00	35355.9	35355.9	51334	51334
4/1984	191065.5	190453.1	327564.4	327148.5	139461.2	137947.9	0	0	698.3	698.3	525.00	525.00	10314.2	10314.2	33097	33097

Date	Cumulative without Project Pardee Storage (acre-ft)	Cumulative with Project Pardee Storage (acre-ft)	Cumulative without Project Camanche Storage (acre-ft)	Cumulative with Project Camanche Storage (acre-ft)	Cumulative without Project TRA Storage (acre-ft)	Cumulative with Project TRA Storage (acre-ft)	Cumulative without Project JSA Year Type (NA)	Cumulative with Project JSA Year Type (NA)	Cumulative without Project Camanche Outflow (cfs)	Cumulative with Project Camanche Outflow (cfs)	Cumulative without Project Required Camanche Release (cfs)	Cumulative with Project Required Camanche Release (cfs)	Cumulative without Project Camanche Flood Release (AF)	Cumulative with Project Camanche Flood Release (AF)	Cumulative without Project Flow below Lodi Lake (AF)	Cumulative with Project Flow below Lodi Lake (AF)
5/1984	207365.0	207364.4	372631.3	371313.5	133935.6	132736.5	0	0	775.0	775.0	726.05	726.05	3012.6	3012.6	29534	29534
6/1984	197396.5	197396.5	414352.8	414386.0	127385.7	126204.6	0	0	889.6	866.9	776.77	776.72	6714.7	5368.7	29407	28061
7/1984	197904.2	197904.2	386295.8	386320.8	118706.3	117545.1	0	0	836.0	836.1	452.23	452.23	23595.6	23603.7	24244	24252
8/1984	194172.7	194172.7	361462.8	361479.7	110198.8	109057.4	0	0	710.8	710.9	378.09	378.09	20456.3	20464.3	20839	20847
9/1984	189945.7	189945.7	341529.9	341539.1	103242.7	102119.6	0	0	461.3	461.5	259.98	259.98	11981.2	11988.8	12350	12358
10/1984	173583.9	173338.7	325531.8	325547.3	99739.9	99524.3	0	0	849.8	839.1	325.00	325.00	32271.9	31611.1	42393	41732
11/1984	171395.1	171150.4	325531.8	325547.3	107017.2	106802.7	0	0	740.1	740.1	325.00	325.00	24701.4	24701.3	40892	40891
12/1984	166624.1	166680.7	328029.2	327697.8	111943.8	111777.0	0	0	490.3	490.3	325.00	325.00	10165.4	10165.4	26576	26576
1/1985	160980.2	161035.4	317203.3	316872.2	117259.1	117095.1	0	0	375.8	375.8	325.00	325.00	3124.0	3124.0	19769	19769
2/1985	164130.5	164154.9	315683.1	315352.0	124229.0	124096.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15069	15069
3/1985	173902.4	173834.7	326400.3	326068.8	133634.5	133595.3	0	0	356.5	356.5	325.00	325.00	1933.9	1933.9	18111	18111
4/1985	183510.2	183758.6	336630.6	335953.5	133282.5	133274.1	2	2	272.8	272.8	272.83	272.83	0.0	0.0	8931	8931
5/1985	184616.1	184666.7	315019.6	314615.9	127923.2	127913.7	2	2	377.5	376.3	377.52	376.34	0.0	0.0	9219	9219
6/1985	186441.1	186491.4	292206.9	291903.5	120671.8	120662.4	2	2	338.6	336.9	338.60	336.95	0.0	0.0	1838	1838
7/1985	187084.4	187134.2	265061.4	264875.4	111796.1	111786.8	2	2	375.4	373.6	375.43	373.55	0.0	0.0	1801	1801
8/1985	185909.4	185959.2	246884.6	246772.2	102793.4	102784.1	2	2	326.1	324.9	326.05	324.87	0.0	0.0	1332	1332
9/1985	184862.0	184911.8	237862.6	237788.4	96087.5	96078.4	2	2	271.0	270.4	224.51	223.79	2766.3	2771.0	4002	4007
10/1985	172842.6	172892.1	237795.1	237721.0	92872.5	92863.5	1	1	385.9	385.9	284.00	284.00	6262.6	6262.9	16051	16077
11/1985	170084.9	169787.0	233815.9	233741.9	94257.5	94248.5	1	1	639.6	645.5	250.00	250.00	23185.1	23532.0	34864	35211
12/1985	165934.1	165983.4	248859.4	248438.5	99353.8	99345.0	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11880	11880
1/1986	170840.9	170692.5	266042.2	265819.5	111080.4	111071.0	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12192	12192
2/1986	205433.0	205433.0	377349.2	376974.7	127006.6	126997.3	1	1	2360.4	2360.4	250.00	250.00	117205.0	117205.0	128531	128531
3/1986	205010.3	205010.3	331131.2	330755.8	136271.6	136262.4	1	1	3838.7	3838.7	250.00	250.00	220664.4	220664.4	232142	232142
4/1986	205366.4	205378.4	345376.6	344989.9	137048.0	137039.1	0	0	1485.3	1485.3	525.00	525.00	57144.6	57144.6	79920	79918
5/1986	211050.7	210711.0	393606.4	393883.0	131875.6	128687.1	0	0	1734.8	1650.3	777.17	777.00	58885.7	53699.0	88495	83308
6/1986	197491.8	197245.5	407380.4	406387.4	124505.2	117695.9	0	0	1807.6	1757.8	877.88	877.85	55323.2	52359.5	83956	80993
7/1986	197837.2	197809.9	379026.0	378418.8	115664.4	108944.4	0	0	639.2	629.4	451.66	451.63	11530.4	10931.2	12176	11577
8/1986	194017.3	193985.2	356535.6	356042.4	107019.6	100393.3	0	0	483.5	481.8	377.52	377.52	6515.5	6410.6	6895	6790
9/1986	191282.6	191354.1	336114.9	335867.6	100542.5	93891.1	0	0	681.8	677.7	260.26	260.26	25082.2	24837.5	25655	25410
10/1986	170962.0	171011.2	323243.2	323203.2	96979.7	90430.7	0	0	692.2	688.8	325.00	325.00	22577.5	22370.8	32564	32359
11/1986	164230.8	164279.6	319207.8	319059.1	95845.6	89365.6	0	0	434.3	436.1	325.00	325.00	6501.0	6609.8	22418	22528
12/1986	162587.2	162628.6	315287.6	314962.5	100181.8	93945.2	0	0	329.8	329.8	325.00	325.00	297.5	297.5	16681	16681
1/1987	160462.4	160094.1	305458.7	304758.6	110909.8	105505.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16723	16723
2/1987	158978.0	158386.6	296275.0	294803.0	121925.5	117547.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15169	15169
3/1987	163417.7	163121.3	286187.7	283589.1	128989.0	125476.2	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16230	16230
4/1987	158557.0	157570.2	272904.0	270315.3	130680.4	127895.5	3	3	200.6	200.6	199.78	199.78	50.4	50.4	4519	4519
5/1987	156693.6	155658.6	257655.8	255083.4	126044.1	123346.8	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1418	1418
6/1987	157357.1	156344.3	238894.8	236342.3	118109.2	115428.4	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1819	1819
7/1987	168121.0	167131.3	218201.4	215675.2	109599.4	107125.5	3	3	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1987	163183.2	162181.7	212265.7	209896.6	101623.6	99413.0	3	3	301.3	299.7	232.30	232.30	4243.6	4145.5	5569	5471

Date	*Cumulative without Project* Pardee Storage *(acre-ft)*	*Cumulative with Project* Pardee Storage *(acre-ft)*	*Cumulative without Project* Camanche Storage *(acre-ft)*	*Cumulative with Project* Camanche Storage *(acre-ft)*	*Cumulative without Project* TRA Storage *(acre-ft)*	*Cumulative with Project* TRA Storage *(acre-ft)*	*Cumulative without Project* JSA Year Type *(NA)*	*Cumulative with Project* JSA Year Type *(NA)*	*Cumulative without Project* Camanche Outflow *(cfs)*	*Cumulative with Project* Camanche Outflow *(cfs)*	*Cumulative without Project* Required Camanche Release *(cfs)*	*Cumulative with Project* Required Camanche Release *(cfs)*	*Cumulative without Project* Camanche Flood Release (AF)	*Cumulative with Project* Camanche Flood Release (AF)	*Cumulative without Project* Flow below Lodi Lake (AF)	*Cumulative with Project* Flow below Lodi Lake (AF)
9/1987	162958.3	161959.0	207847.3	205352.9	95412.0	93492.3	3	3	176.6	179.3	166.79	166.79	582.1	746.1	1478	1642
10/1987	162088.7	161388.2	192611.7	190128.7	92225.9	90323.5	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10398	10398
11/1987	160727.0	160856.4	185320.5	182095.5	91726.5	90025.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9775	9775
12/1987	162344.2	162098.7	183398.4	180547.9	99767.9	98300.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10053	10053
1/1988	160821.8	160987.6	186391.3	182984.6	113383.8	112273.2	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10357	10357
2/1988	159664.1	159151.7	176356.0	172580.9	120185.3	120337.3	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9529	9529
3/1988	159568.8	159924.2	163719.5	159581.9	126328.5	126242.5	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9579	9579
4/1988	167197.0	167894.4	155703.2	151571.8	131739.5	131312.2	3	3	199.8	199.8	199.79	199.79	0.0	0.0	4647	4647
5/1988	165616.4	162002.4	149627.8	149860.6	130900.4	130451.3	3	3	210.8	210.8	210.75	210.75	0.0	0.0	1460	1460
6/1988	156980.9	153200.5	149255.3	149729.9	126695.1	126204.4	3	3	268.5	268.5	268.51	268.51	0.0	0.0	1828	1828
7/1988	150722.8	147330.6	147821.9	147987.8	120540.8	120011.2	3	3	241.1	241.1	241.05	241.05	0.0	0.0	1115	1115
8/1988	142997.6	139640.5	141334.9	141806.4	114457.8	113873.4	3	3	266.4	262.3	208.67	208.64	3549.0	3302.1	4473	4226
9/1988	132250.5	128993.2	141334.9	141806.4	109557.2	108910.6	3	3	212.9	212.9	157.90	157.93	3273.1	3268.6	4167	4164
10/1988	115836.6	112690.2	135440.7	135910.2	106660.7	105937.9	3	3	313.6	313.6	132.03	132.01	11164.8	11164.6	13995	13994
11/1988	121752.4	118688.1	131811.6	132280.7	107120.6	106336.6	3	3	131.6	131.6	131.58	131.58	0.0	0.0	4656	4656
12/1988	127748.8	124761.4	127871.9	128341.3	114751.0	113908.6	3	3	133.6	133.6	133.62	133.62	0.0	0.0	4793	4793
1/1989	128736.9	125602.3	121540.7	122009.3	123555.7	122883.1	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4735	4735
2/1989	134870.3	131573.1	116956.6	117425.1	129583.8	129092.1	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4316	4316
3/1989	177838.0	177114.1	127549.5	125496.1	139281.0	138747.4	3	3	140.0	140.0	139.99	139.99	0.0	0.0	4919	4919
4/1989	192486.0	192348.5	162712.0	160017.3	138984.5	138526.6	1	1	272.8	272.8	272.78	272.78	0.0	0.0	8964	8964
5/1989	201391.6	201391.6	212838.7	210261.5	132610.0	132158.4	1	1	426.5	422.8	426.55	422.75	0.0	0.0	12296	12296
6/1989	197147.6	197147.6	235252.3	233010.3	125028.2	124583.6	1	1	507.6	502.3	507.61	502.30	0.0	0.0	11900	11900
7/1989	197860.3	197860.3	220852.0	219000.6	115967.6	115530.9	1	1	375.0	369.0	373.91	367.88	68.4	69.9	1871	1872
8/1989	194149.8	194149.8	210161.7	208561.7	107170.8	106741.9	1	1	325.1	321.3	325.08	321.28	0.0	0.0	1335	1335
9/1989	189749.2	189937.8	203202.4	208561.7	100314.9	99922.1	1	1	374.2	385.3	224.08	221.94	8929.9	9722.7	10276	11065
10/1989	174460.3	176435.2	198203.6	208058.9	96291.3	96372.7	2	2	434.3	456.2	254.00	254.00	11085.6	12431.5	19139	20555
11/1989	165735.3	169163.1	194691.0	206804.8	95706.2	95769.6	2	2	536.7	606.1	220.00	220.00	18842.3	22977.8	28583	32708
12/1989	162043.0	165391.5	197001.7	217296.6	99040.1	99043.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9879	9879
1/1990	162592.6	165616.9	205929.5	234867.1	111081.8	110941.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10431	10431
2/1990	160945.7	162530.1	205412.4	242697.3	119891.4	120204.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9342	9342
3/1990	165875.2	165897.5	207830.3	246835.8	126105.3	126213.6	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9655	9655
4/1990	175102.8	175195.1	193607.8	232519.6	127774.3	127811.1	2	2	274.8	274.8	274.76	274.76	0.0	0.0	9047	9047
5/1990	191984.2	192145.0	175468.9	214214.4	124393.9	124361.5	2	2	338.0	338.0	338.00	338.00	0.0	0.0	9378	9378
6/1990	197955.4	197771.2	164877.6	203624.1	116914.2	116882.5	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1820	1820
7/1990	197752.3	197719.6	156034.5	194167.3	109417.6	108550.1	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1805	1805
8/1990	194035.0	194194.6	149876.3	187356.9	102621.4	100679.7	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1990	189777.0	190193.8	149876.3	186991.8	97772.8	94612.7	2	2	176.6	172.5	172.49	172.49	243.3	0.0	1435	1192
10/1990	172304.8	172532.0	149671.1	186734.0	94580.7	91191.8	2	2	528.1	511.2	254.00	254.00	16854.4	15817.4	27151	26114
11/1990	158402.9	158163.5	143796.4	180787.4	94171.7	90099.8	2	2	308.4	307.3	220.00	220.00	5260.8	5195.2	14982	14917
12/1990	152185.6	150486.4	131606.3	168510.9	97735.6	94163.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9944	9944

Date	Cumulative without Project Pardee Storage (acre-ft)	Cumulative with Project Pardee Storage (acre-ft)	Cumulative without Project Camanche Storage (acre-ft)	Cumulative with Project Camanche Storage (acre-ft)	Cumulative without Project TRA Storage (acre-ft)	Cumulative with Project TRA Storage (acre-ft)	Cumulative without Project JSA Year Type (NA)	Cumulative with Project JSA Year Type (NA)	Cumulative without Project Camanche Outflow (cfs)	Cumulative with Project Camanche Outflow (cfs)	Cumulative without Project Required Camanche Release (cfs)	Cumulative with Project Required Camanche Release (cfs)	Cumulative without Project Camanche Flood Release (AF)	Cumulative with Project Camanche Flood Release (AF)	Cumulative without Project Flow below Lodi Lake (AF)	Cumulative with Project Flow below Lodi Lake (AF)
1/1991	132543.1	138185.0	118748.2	155558.6	107031.5	103332.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10186	10186
2/1991	121176.5	133012.3	108880.2	145671.3	115908.5	112428.3	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9259	9259
3/1991	148732.7	159739.1	112457.3	149787.8	128507.8	124741.3	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10247	10247
4/1991	159990.8	170165.9	96744.0	133863.8	130160.0	127199.7	2	2	274.8	274.8	274.76	274.76	0.0	0.0	8974	8974
5/1991	148492.5	158457.4	100264.2	137016.6	127985.9	125193.3	2	2	337.9	337.9	337.94	337.94	0.0	0.0	9263	9263
6/1991	159136.3	168901.8	103986.6	140373.6	123036.7	120401.5	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1909	1909
7/1991	156332.7	163845.9	101214.7	139062.2	116874.6	114388.3	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1991	151766.3	159874.6	99367.2	133826.3	110949.9	108592.6	2	2	265.1	298.6	232.21	232.35	2024.5	4074.7	3368	5418
9/1991	148861.4	154732.6	94850.1	133212.8	106269.8	104039.9	2	2	298.1	259.4	172.86	172.74	7453.3	5158.9	8645	6351
10/1991	153539.2	157258.6	94508.1	129607.2	102471.6	100308.6	3	2	290.3	374.5	131.98	254.00	9735.8	7412.0	12721	17873
11/1991	162534.3	164381.4	93520.9	128922.7	100162.6	100195.1	3	2	131.6	249.3	131.60	220.00	0.0	1744.2	4497	11449
12/1991	162408.4	164177.3	102381.6	138761.5	104318.0	106178.3	3	2	133.6	220.0	133.64	220.00	0.0	0.0	4721	9987
1/1992	158486.7	161120.2	102731.0	140643.5	113876.8	115862.1	3	2	130.0	220.0	130.00	220.00	0.0	0.0	4767	10257
2/1992	164668.4	167616.8	116456.3	155834.2	125728.8	128601.8	3	2	130.0	220.0	130.00	220.00	0.0	0.0	4708	9840
3/1992	169490.1	170211.5	136659.5	174728.5	133406.7	134818.6	3	2	139.0	220.0	139.01	220.00	0.0	0.0	4778	9709
4/1992	176496.8	175840.5	127539.0	161730.8	134524.5	136523.3	3	2	199.8	274.8	199.75	274.79	0.0	0.0	4495	8960
5/1992	164344.4	170277.4	128168.1	149587.4	132407.4	132472.6	3	2	210.8	338.0	210.75	337.97	0.0	0.0	1413	9221
6/1992	146135.0	152531.9	129814.7	150428.6	127612.7	127754.3	3	2	268.5	268.5	268.51	268.52	0.0	0.0	1850	1850
7/1992	142966.9	148655.4	125693.6	146535.1	121370.8	121649.3	3	2	278.5	278.5	278.46	278.46	0.0	0.0	1809	1809
8/1992	140161.2	147444.1	123284.1	141015.9	115159.6	115533.3	3	2	232.1	249.5	232.08	232.14	0.0	1069.8	1326	2396
9/1992	129395.2	135449.9	118930.5	139913.8	110144.9	110643.8	3	2	272.7	231.6	167.24	172.64	6273.2	3510.4	7169	4703
10/1992	119588.3	124462.1	118611.2	136734.3	107469.9	108066.0	3	3	234.3	295.8	131.75	132.02	6306.9	10068.2	9198	12960
11/1992	116874.8	121714.1	110656.4	128673.3	105024.4	105611.7	3	3	131.6	131.6	131.60	131.60	0.0	0.0	4481	4481
12/1992	132924.5	137661.5	111912.2	130053.0	114801.5	115482.0	3	3	133.6	133.6	133.64	133.64	0.0	0.0	5004	5004
1/1993	181073.5	182944.8	139269.1	160388.5	134394.1	134822.8	3	3	130.0	130.0	130.00	130.00	0.0	0.0	5160	5160
2/1993	193418.7	193911.2	199417.4	221846.7	143319.7	142678.1	3	3	130.0	130.0	130.00	130.00	0.0	0.0	4625	4625
3/1993	205373.4	205379.8	293129.1	313083.0	147354.5	147127.9	3	3	140.0	181.9	140.01	140.21	0.0	2566.7	4867	7431
4/1993	202741.6	202722.2	340202.6	345794.8	147195.2	147041.3	0	0	660.8	901.0	475.00	525.00	11058.0	22373.9	30900	45161
5/1993	210902.6	210429.0	381340.5	379296.1	141533.4	139016.2	0	0	1653.5	1692.3	777.02	777.17	53896.1	56267.3	83582	85953
6/1993	204664.1	204197.9	408413.0	408255.6	134613.0	128463.2	0	0	2163.5	2062.1	878.38	878.21	76470.6	70446.8	105167	99143
7/1993	195490.7	195459.1	377831.7	377797.5	125472.4	119399.0	0	0	990.9	981.9	452.40	452.37	33114.6	32560.0	33760	33205
8/1993	194311.4	194282.2	355841.4	355798.8	116561.5	110568.6	0	0	682.0	682.1	377.90	377.90	18701.4	18707.7	19081	19087
9/1993	184866.6	184837.4	336687.5	336660.2	109299.7	103382.1	0	0	564.7	564.5	260.20	260.20	18121.4	18106.4	18492	18477
10/1993	175238.3	175209.4	324471.2	324464.4	103996.0	98148.1	0	0	555.9	555.6	325.00	325.00	14198.4	14177.9	24215	24195
11/1993	165497.2	165616.5	324471.2	324464.4	102348.0	96553.7	0	0	496.9	494.4	325.00	325.00	10230.9	10082.3	26291	26143
12/1993	162486.5	162407.6	322040.2	322231.5	109169.4	103420.6	0	0	400.0	400.0	325.00	325.00	4611.6	4611.6	21073	21073
1/1994	160974.8	160743.6	310397.4	309839.1	116090.6	111290.8	0	0	329.8	329.8	325.00	325.00	297.5	297.5	17024	17024
2/1994	160850.4	160671.0	301463.8	300529.7	126686.4	122236.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15205	15205
3/1994	155740.9	154793.7	280979.9	280048.1	130046.3	126409.8	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15970	15970
4/1994	152892.8	150662.4	271161.1	270231.1	131748.4	129433.7	3	3	200.6	200.6	199.78	199.78	50.4	50.4	4642	4642

Date	*Cumulative without Project* **Pardee Storage** *(acre-ft)*	*Cumulative with Project* **Pardee Storage** *(acre-ft)*	*Cumulative without Project* **Camanche Storage** *(acre-ft)*	*Cumulative with Project* **Camanche Storage** *(acre-ft)*	*Cumulative without Project* **TRA Storage** *(acre-ft)*	*Cumulative with Project* **TRA Storage** *(acre-ft)*	*Cumulative without Project* **JSA Year Type** *(NA)*	*Cumulative with Project* **JSA Year Type** *(NA)*	*Cumulative without Project* **Camanche Outflow** *(cfs)*	*Cumulative with Project* **Camanche Outflow** *(cfs)*	*Cumulative without Project* **Required Camanche Release** *(cfs)*	*Cumulative with Project* **Required Camanche Release** *(cfs)*	*Cumulative without Project* **Camanche Flood Release** (AF)	*Cumulative with Project* **Camanche Flood Release** (AF)	*Cumulative without Project* **Flow below Lodi Lake** (AF)	*Cumulative with Project* **Flow below Lodi Lake** (AF)
5/1994	157317.3	154365.3	257556.2	256631.1	128688.6	127135.3	3	3	210.7	210.7	210.72	210.72	0.0	0.0	1477	1477
6/1994	165167.7	162278.2	238796.0	237878.1	120930.7	119356.9	3	3	268.5	268.5	268.48	268.48	0.0	0.0	1819	1819
7/1994	167757.7	164933.3	218103.6	217195.1	112382.8	110952.4	3	3	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/1994	167418.9	164561.7	204776.6	203973.5	104281.8	103044.0	3	3	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/1994	166267.4	163424.9	204776.6	203973.5	97967.3	96947.6	3	3	214.1	214.9	166.81	166.81	2812.3	2862.2	3723	3773
10/1994	171258.5	171164.9	200450.1	197219.7	94531.5	93473.1	2	2	254.0	254.0	254.00	254.00	0.0	0.0	10372	10372
11/1994	160343.7	160251.7	194653.3	192750.0	100812.2	99984.9	2	2	503.9	481.6	220.00	220.00	16892.9	15567.5	26753	25431
12/1994	167197.1	167303.5	203963.6	201860.0	108875.4	108246.8	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10102	10102
1/1995	204522.8	204522.8	282076.7	280526.0	134069.4	133160.7	2	2	231.6	231.6	220.00	220.00	714.1	714.1	11516	11516
2/1995	189774.5	189774.5	311841.7	311283.9	136353.2	136112.0	2	2	739.3	721.4	220.00	220.00	28840.1	27848.3	37987	36996
3/1995	205006.7	205011.1	344032.2	343702.8	149094.2	149007.3	2	2	2708.4	2707.1	220.00	220.00	153007.2	152927.9	162852	162773
4/1995	210763.3	210763.0	316751.6	317410.2	150148.3	150076.3	0	0	2873.3	2856.7	525.00	525.00	139737.6	138745.8	162563	161572
5/1995	209085.2	209269.2	332993.0	330542.0	144904.8	142666.8	0	0	3467.7	3422.6	779.03	778.98	165324.8	162551.0	195065	192291
6/1995	213143.1	213111.9	389064.1	388840.7	139404.1	133526.6	0	0	3593.3	3490.0	880.03	879.95	161455.2	155311.2	190177	184033
7/1995	198126.7	198126.8	359404.5	359223.0	130237.6	124429.7	0	0	3253.0	3251.8	455.22	455.22	172028.6	171957.0	172676	172605
8/1995	194318.2	194318.2	340350.6	340226.5	121283.6	115549.3	0	0	665.2	664.3	377.96	377.96	17662.8	17606.5	18047	17991
9/1995	190775.1	190775.1	328116.2	328046.3	113982.7	108318.3	0	0	527.3	526.4	260.03	260.03	15904.1	15850.4	16272	16219
10/1995	176561.3	176561.3	319272.9	319259.4	108503.9	102906.7	0	0	739.1	738.2	325.00	325.00	25461.1	25404.9	35443	35387
11/1995	163154.6	163154.6	318550.3	318536.8	105648.5	100110.2	0	0	453.3	453.3	325.00	325.00	7636.5	7636.5	23538	23538
12/1995	164878.1	164648.0	324888.6	324875.1	116551.5	111270.9	0	0	392.7	392.7	325.00	325.00	4165.4	4165.4	20780	20780
1/1996	174246.3	173947.1	313378.4	313584.9	132538.2	127833.1	0	0	678.1	661.9	325.00	325.00	21709.4	20717.7	38581	37590
2/1996	204698.7	204675.2	285930.9	285489.8	147535.4	144421.0	0	0	1844.1	1826.9	325.00	325.00	87383.1	86391.3	103056	102065
3/1996	204763.5	204753.2	298243.3	298185.5	148223.5	146406.1	0	0	1762.6	1731.6	325.00	325.00	88394.7	86490.5	104375	102471
4/1996	204817.0	204811.2	342594.8	341729.4	147561.1	147192.6	0	0	976.7	976.7	525.00	525.00	26876.4	26876.4	49729	49729
5/1996	205437.7	205303.2	394558.2	392390.4	145902.2	143162.4	0	0	2398.7	2329.3	777.65	777.60	99677.4	95410.1	129314	125046
6/1996	197573.5	197783.7	402425.2	399781.8	138278.3	131904.0	0	0	1414.9	1347.5	877.48	877.39	31977.9	27976.2	60612	56610
7/1996	197863.3	197798.2	376662.7	374624.0	129143.8	122842.1	0	0	588.7	583.6	451.51	451.48	8433.8	8121.9	9082	8770
8/1996	194816.4	194809.2	355890.7	354518.9	120221.6	113996.5	0	0	529.8	518.2	377.50	377.50	9364.5	8651.7	9744	9032
9/1996	189321.2	189313.9	337137.8	336310.4	112950.1	106798.3	0	0	477.7	468.6	259.89	259.87	12959.8	12422.4	13332	12794
10/1996	174735.3	174728.1	324943.0	324797.3	107779.5	101694.9	0	0	592.6	581.6	325.00	325.00	16456.1	15776.2	26535	25857
11/1996	175632.2	175625.0	324943.0	324797.3	109113.3	103078.4	0	0	748.1	748.1	325.00	325.00	25179.1	25179.1	41301	41301
12/1996	199842.3	199888.3	318279.8	317435.0	129146.4	123686.1	0	0	2251.6	2251.6	325.00	325.00	118464.5	118464.5	135178	135178
1/1997	212007.8	211783.6	371007.8	371676.6	141500.5	138182.7	0	0	4583.9	4525.8	325.00	325.00	261871.6	258301.3	278772	275204
2/1997	204337.0	204308.9	284956.3	285863.3	138600.1	136034.7	0	0	3475.0	3457.1	325.00	325.00	174944.7	173953.0	189795	188805
3/1997	197717.7	198188.3	289688.0	289553.1	141168.4	138100.1	0	0	1193.5	1211.0	325.00	325.00	53405.7	54476.8	69247	70316
4/1997	198718.3	198494.0	319269.3	319095.0	140537.3	138227.9	0	0	670.8	670.8	525.00	525.00	8677.8	8677.8	31442	31442
5/1997	204633.5	204625.9	384995.0	384327.0	134604.6	132601.2	0	0	775.0	775.0	726.01	726.01	3010.1	3010.1	29531	29531
6/1997	197703.0	197703.0	397705.7	397033.6	127077.4	125100.9	0	0	795.5	795.5	776.64	776.64	1121.5	1121.5	23822	23822
7/1997	197830.1	197830.1	372708.9	372059.2	118010.8	116063.0	0	0	477.6	477.3	451.36	451.36	1613.0	1595.4	2258	2241
8/1997	194095.6	194095.6	353037.4	352573.7	109496.2	107574.2	0	0	488.8	485.8	377.55	377.55	6838.8	6657.1	7224	7043

Date	*Cumulative without Project* **Pardee Storage** *(acre-ft)*	*Cumulative with Project* **Pardee Storage** *(acre-ft)*	*Cumulative without Project* **Camanche Storage** *(acre-ft)*	*Cumulative with Project* **Camanche Storage** *(acre-ft)*	*Cumulative without Project* **TRA Storage** *(acre-ft)*	*Cumulative with Project* **TRA Storage** *(acre-ft)*	*Cumulative without Project* **JSA Year Type** *(NA)*	*Cumulative with Project* **JSA Year Type** *(NA)*	*Cumulative without Project* **Camanche Outflow** *(cfs)*	*Cumulative with Project* **Camanche Outflow** *(cfs)*	*Cumulative without Project* **Required Camanche Release** *(cfs)*	*Cumulative with Project* **Required Camanche Release** *(cfs)*	*Cumulative without Project* **Camanche Flood Release** (AF)	*Cumulative with Project* **Camanche Flood Release** (AF)	*Cumulative without Project* **Flow below Lodi Lake** (AF)	*Cumulative with Project* **Flow below Lodi Lake** (AF)
9/1997	190106.2	190106.2	336920.6	336669.1	102307.9	100408.3	0	0	420.7	417.2	260.02	260.02	9564.2	9354.0	9932	9722
10/1997	173738.1	173253.5	324932.7	324894.1	97986.1	96588.7	0	0	760.9	757.5	325.00	325.00	26805.6	26593.0	36893	36681
11/1997	170530.9	170393.9	324932.7	324894.1	102486.5	101091.4	0	0	594.3	588.5	325.00	325.00	16027.4	15680.4	32145	31796
12/1997	160594.6	160351.7	323978.7	323769.7	109451.8	108338.0	0	0	419.4	419.4	325.00	325.00	5801.7	5801.7	22231	22231
1/1998	179367.6	179366.4	333070.0	332920.6	131424.7	130267.3	0	0	691.3	686.5	325.00	325.00	22522.6	22225.1	39615	39317
2/1998	204632.0	204631.0	323235.3	322985.5	150579.0	149508.0	0	0	2244.3	2244.3	325.00	325.00	106593.3	106593.3	122043	122044
3/1998	206500.7	206500.1	345220.6	346110.5	149081.4	148575.4	0	0	1570.3	1551.0	325.00	325.00	76573.0	75382.9	92639	91449
4/1998	205302.9	205303.3	330119.4	330048.6	147264.4	147405.8	0	0	2153.3	2170.0	525.00	525.00	96894.0	97885.7	119740	120730
5/1998	205623.0	205623.0	307428.6	307358.4	145856.6	145996.2	0	0	2796.8	2796.8	778.31	778.31	124112.4	124112.4	153986	153986
6/1998	212398.7	212398.7	393726.8	393656.9	138310.1	138447.0	0	0	2556.7	2556.7	878.78	878.78	99842.6	99842.6	128483	128483
7/1998	198455.6	198455.6	361959.5	361906.9	129124.7	129258.3	0	0	2500.9	2500.6	454.34	454.34	125837.6	125820.7	126489	126472
8/1998	195255.9	195255.9	345856.8	345820.9	120165.7	120295.9	0	0	698.9	698.7	378.01	378.01	19734.0	19717.6	20113	20097
9/1998	190583.0	190583.0	332989.4	332969.1	112895.1	113022.6	0	0	620.2	619.9	260.35	260.35	21412.0	21396.6	21795	21779
10/1998	174393.1	174393.1	323670.2	323666.5	107639.7	107765.3	0	0	696.2	695.9	325.00	325.00	22823.8	22807.2	32835	32819
11/1998	169717.1	169717.1	323670.2	323666.5	108531.0	108656.4	0	0	592.4	592.4	325.00	325.00	15911.3	15911.3	31982	31982
12/1998	168241.3	168195.3	328026.3	328022.6	113782.5	113952.7	0	0	509.7	509.7	325.00	325.00	11355.5	11355.5	27779	27779
1/1999	183121.0	183076.0	331481.8	331478.1	125623.8	125793.3	0	0	732.3	732.3	325.00	325.00	25041.7	25041.7	41896	41896
2/1999	204685.1	204685.1	321654.4	321605.7	140614.7	140390.4	0	0	1951.4	1951.4	325.00	325.00	90328.6	90328.6	105569	105569
3/1999	193656.2	193630.1	328600.5	328551.6	147064.5	147177.3	0	0	1171.0	1171.0	325.00	325.00	52017.3	52017.3	67838	67838
4/1999	194810.9	194785.6	355855.8	355807.0	148347.8	148355.6	1	1	625.5	625.5	473.61	473.61	9036.9	9036.9	28807	28807
5/1999	205598.3	205445.0	384558.9	384006.7	141360.9	138773.3	1	1	894.4	812.0	676.10	676.01	13420.2	8364.2	36885	31831
6/1999	201967.5	201263.9	412514.6	412007.7	133765.9	127547.9	1	1	1692.0	1630.9	777.88	777.83	54394.8	50761.2	77093	73457
7/1999	198386.9	198353.6	383735.7	383426.8	124608.7	118469.5	1	1	930.0	916.0	452.17	452.13	29382.1	28519.5	30027	29165
8/1999	194249.0	193977.9	359532.3	359580.2	115718.9	109661.9	1	1	578.9	577.0	374.35	374.35	12576.4	12459.1	12745	12628
9/1999	190239.9	190167.5	340642.7	340565.1	108486.1	102505.7	1	1	476.9	475.7	255.02	255.02	13201.6	13129.7	13272	13200
10/1999	170921.1	170848.8	325551.2	325525.3	103253.5	97346.6	0	0	713.3	712.5	325.00	325.00	23878.6	23827.1	33886	33835
11/1999	167365.1	167287.2	325551.2	325525.3	102433.9	96579.5	0	0	538.6	538.6	325.00	325.00	12709.3	12709.3	28789	28789
12/1999	161320.4	161242.6	320318.8	320293.0	106505.8	100710.8	0	0	392.7	392.7	325.00	325.00	4165.4	4165.4	20487	20487
1/2000	180413.8	180193.0	322857.3	322394.6	122690.2	117506.5	0	0	459.7	459.7	325.00	325.00	8281.1	8281.1	25235	25235
2/2000	198524.2	198106.1	326378.6	326322.3	143149.4	138756.9	0	0	1195.2	1177.9	325.00	325.00	50053.6	49061.9	66018	65027
3/2000	196658.0	194918.2	329302.6	329153.0	147065.2	144798.3	0	0	1253.5	1247.7	325.00	325.00	57095.0	56738.0	72996	72636
4/2000	186162.4	185922.4	341191.9	339945.9	147077.8	145082.0	1	1	823.9	813.0	474.09	474.07	20813.6	20167.4	40626	39979
5/2000	205673.1	205672.8	378103.1	376620.6	143414.3	141371.3	1	1	773.4	773.4	676.01	676.01	5986.5	5986.5	29574	29574
6/2000	198072.9	198072.9	403190.6	401715.4	136066.8	134052.4	1	1	644.7	644.7	625.82	625.82	1121.5	1121.5	14901	14901
7/2000	198004.6	198004.6	378976.4	377866.6	126871.4	124888.8	1	1	665.0	659.2	451.73	451.73	13114.2	12758.2	13761	13405
8/2000	194233.0	194233.0	357118.4	356368.5	117933.8	115981.7	1	1	547.5	541.7	374.07	374.06	10664.0	10311.2	10831	10478
9/2000	187769.7	187769.7	337819.2	337360.1	110734.0	108811.1	1	1	504.7	499.8	254.94	254.94	14861.2	14573.3	14965	14677
10/2000	177482.3	177482.3	322707.6	322584.4	107260.5	105357.4	0	0	792.5	787.1	325.00	325.00	28747.5	28412.0	39019	38685
11/2000	164412.3	164458.6	322376.2	322203.7	105487.8	103758.4	0	0	484.9	482.4	325.00	325.00	9513.2	9364.2	25436	25287
12/2000	162585.1	162435.9	316133.5	316109.9	110220.7	108704.4	0	0	356.5	354.0	325.00	325.00	1933.9	1785.2	18273	18124

Date	*Cumulative without Project* **Pardee Storage** *(acre-ft)*	*Cumulative with Project* **Pardee Storage** *(acre-ft)*	*Cumulative without Project* **Camanche Storage** *(acre-ft)*	*Cumulative with Project* **Camanche Storage** *(acre-ft)*	*Cumulative without Project* **TRA Storage** *(acre-ft)*	*Cumulative with Project* **TRA Storage** *(acre-ft)*	*Cumulative without Project* **JSA Year Type** *(NA)*	*Cumulative with Project* **JSA Year Type** *(NA)*	*Cumulative without Project* **Camanche Outflow** *(cfs)*	*Cumulative with Project* **Camanche Outflow** *(cfs)*	*Cumulative without Project* **Required Camanche Release** *(cfs)*	*Cumulative with Project* **Required Camanche Release** *(cfs)*	*Cumulative without Project* **Camanche Flood Release** (AF)	*Cumulative with Project* **Camanche Flood Release** (AF)	*Cumulative without Project* **Flow below Lodi Lake** (AF)	*Cumulative with Project* **Flow below Lodi Lake** (AF)
1/2001	160550.5	160626.9	308165.1	307766.4	118157.5	116801.1	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16778	16778
2/2001	162269.5	162343.8	298524.9	298125.6	131667.3	130311.4	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15193	15193
3/2001	169269.5	169264.5	290665.9	290068.7	135975.3	134909.7	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16055	16055
4/2001	186326.4	186155.9	290426.4	289632.5	136674.3	135983.1	2	2	274.8	274.8	274.78	274.78	0.0	0.0	9044	9044
5/2001	185507.2	185535.0	288762.6	287775.6	130862.3	130181.2	2	2	337.9	337.9	337.94	337.94	0.0	0.0	9221	9221
6/2001	187994.4	188022.0	270034.9	269054.3	123562.1	122892.0	2	2	268.5	268.5	268.49	268.49	0.0	0.0	1828	1828
7/2001	193157.8	193185.2	249028.7	248057.6	114632.2	113974.4	2	2	278.4	278.4	278.43	278.43	0.0	0.0	1803	1803
8/2001	191271.8	191299.2	233112.0	232150.3	105915.9	105270.4	2	2	232.1	232.1	232.09	232.09	0.0	0.0	1325	1325
9/2001	189660.1	189645.8	221604.1	220649.9	98931.3	98336.2	2	2	191.4	191.4	172.55	172.55	1121.5	1121.1	2334	2334
10/2001	167674.4	167660.2	221086.7	220132.7	95424.6	94836.2	2	2	362.0	362.1	254.00	254.00	6641.4	6645.9	16999	17004
11/2001	161419.2	161405.0	218589.0	217636.0	96503.5	95918.7	2	2	238.8	238.8	220.00	220.00	1120.2	1120.3	10952	10952
12/2001	169483.9	169377.7	232076.9	231120.3	110383.8	109892.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10251	10251
1/2002	167448.7	167346.1	257602.0	256338.3	119994.7	119811.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10280	10280
2/2002	168198.2	167987.6	268174.2	266711.2	126902.0	127028.9	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9314	9314
3/2002	178560.9	178889.7	302049.2	300585.2	134824.5	134414.3	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9702	9702
4/2002	183304.7	183162.3	317280.1	319138.2	134861.5	134578.6	1	1	373.5	323.5	373.47	323.47	0.0	0.0	14912	11937
5/2002	194006.5	194062.5	304717.1	306369.8	130384.8	130105.5	1	1	478.3	478.3	478.31	478.31	0.0	0.0	15453	15453
6/2002	197837.4	197892.6	300469.9	302113.1	122797.3	122522.6	1	1	510.0	510.0	510.05	510.05	0.0	0.0	11899	11899
7/2002	197951.8	198007.1	274590.6	276219.6	113765.4	113495.8	1	1	377.8	377.8	376.68	376.68	67.8	67.8	1870	1870
8/2002	193973.4	194028.3	255519.3	257133.5	104985.3	104720.7	1	1	326.8	326.8	326.82	326.82	0.0	0.0	1327	1327
9/2002	189818.3	189839.4	244665.3	246267.2	98060.1	97832.0	1	1	224.9	224.9	224.87	224.87	1.9	1.9	1194	1194
10/2002	170997.1	171018.1	244597.9	246199.8	94492.3	94266.9	1	1	354.8	354.6	284.00	284.00	4352.0	4343.1	14045	14035
11/2002	162670.7	162691.5	244252.3	245853.1	94159.9	93936.3	1	1	415.2	415.2	250.00	250.00	9832.2	9829.7	21370	21367
12/2002	168619.4	168640.2	259856.2	261462.0	111362.1	111138.5	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12060	12060
1/2003	170098.6	169994.6	278167.4	279770.7	119536.6	119439.4	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12044	12044
2/2003	169827.7	169632.1	297913.1	299515.7	127012.8	127008.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	10915	10915
3/2003	169868.5	169673.6	311694.8	313295.4	133800.1	133796.2	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11421	11421
4/2003	187447.9	187416.8	321409.1	322812.3	140424.9	140455.9	1	1	392.3	392.3	373.47	373.47	1121.5	1121.5	15182	15182
5/2003	201586.6	201536.0	347884.6	349281.5	135715.7	135760.4	1	1	594.2	594.2	575.32	575.32	1158.9	1158.9	18480	18480
6/2003	196523.0	196523.1	408779.8	408306.2	128106.3	128150.3	1	1	615.0	645.6	575.81	575.90	2332.9	4144.7	13111	14922
7/2003	197936.9	197936.9	378751.9	378302.0	119049.6	119093.0	1	1	476.7	476.3	451.33	451.33	1557.5	1537.1	2201	2181
8/2003	194008.5	194008.5	355050.6	354674.3	110230.6	110273.6	1	1	444.2	443.0	374.07	374.07	4309.8	4238.9	4501	4430
9/2003	189726.1	189734.3	337974.8	337765.5	103053.3	103087.9	1	1	408.8	406.0	254.85	254.85	9159.9	8994.6	9233	9068
10/2003	170703.8	171035.1	324873.9	324584.6	99401.3	99459.5	0	0	628.0	623.6	325.00	325.00	18630.2	18363.5	28621	28354
11/2003	162576.7	162561.0	321274.7	321274.7	98759.7	98817.8	0	0	435.6	436.5	325.00	325.00	6578.7	6636.6	22578	22636
12/2003	171998.6	171834.1	326456.9	326605.3	112776.2	112835.2	0	0	526.6	526.6	325.00	325.00	12396.9	12396.9	29074	29074
1/2004	168198.1	167990.8	328497.9	328685.9	121031.7	121093.3	0	0	619.4	619.4	325.00	325.00	18099.4	18099.4	34788	34788
2/2004	176624.8	176764.1	332809.7	332650.4	131942.0	132005.0	0	0	600.0	600.0	325.00	325.00	15818.4	15818.4	31650	31650
3/2004	182990.6	182822.6	335718.3	335836.4	135092.5	135185.2	0	0	793.5	793.5	325.00	325.00	28810.3	28810.3	44733	44733
4/2004	178217.4	178344.6	338800.9	338468.5	134824.2	134819.8	2	2	411.3	415.5	273.45	273.48	8199.9	8450.8	17136	17387

Date	Cumulative without Project Pardee Storage (acre-ft)	Cumulative with Project Pardee Storage (acre-ft)	Cumulative without Project Camanche Storage (acre-ft)	Cumulative with Project Camanche Storage (acre-ft)	Cumulative without Project TRA Storage (acre-ft)	Cumulative with Project TRA Storage (acre-ft)	Cumulative without Project JSA Year Type (NA)	Cumulative with Project JSA Year Type (NA)	Cumulative without Project Camanche Outflow (cfs)	Cumulative with Project Camanche Outflow (cfs)	Cumulative without Project Required Camanche Release (cfs)	Cumulative with Project Required Camanche Release (cfs)	Cumulative without Project Camanche Flood Release (AF)	Cumulative with Project Camanche Flood Release (AF)	Cumulative without Project Flow below Lodi Lake (AF)	Cumulative with Project Flow below Lodi Lake (AF)
5/2004	179061.1	179184.6	313131.3	312800.4	128468.4	128466.5	2	2	378.3	378.3	378.33	378.33	0.0	0.0	9233	9233
6/2004	196938.4	197061.0	291173.4	290844.5	120700.1	120698.2	2	2	339.7	339.7	339.70	339.70	0.0	0.0	1821	1821
7/2004	196477.7	196247.8	266625.7	266651.1	111581.4	111579.3	2	2	376.7	376.7	376.67	376.67	0.0	0.0	1803	1803
8/2004	194179.0	194140.9	248598.5	248421.6	102737.7	102747.7	2	2	326.8	326.8	326.80	326.80	0.0	0.0	1328	1328
9/2004	189679.4	189654.4	238629.2	238453.8	95951.4	95948.3	2	2	254.1	254.1	224.93	224.93	1736.5	1736.4	2961	2961
10/2004	166925.2	166900.3	238515.8	238340.4	93458.0	93454.7	1	1	429.8	429.8	284.00	284.00	8966.5	8966.7	18887	18887
11/2004	162970.8	162946.1	238253.6	238078.9	93225.0	93221.6	1	1	332.6	332.6	250.00	250.00	4915.6	4915.3	16494	16493
12/2004	170317.3	170292.5	252660.6	252485.5	102846.5	102842.8	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11993	11993
1/2005	183648.1	183623.8	301259.7	301084.0	118349.9	118345.6	1	1	259.7	259.7	250.00	250.00	595.1	595.1	12938	12938
2/2005	190631.7	190567.2	326148.7	325972.9	129626.3	129662.1	1	1	650.0	650.0	250.00	250.00	22215.2	22215.2	33189	33189
3/2005	205385.8	205385.8	338872.1	339744.7	140739.7	140774.0	1	1	1464.5	1446.5	250.00	250.00	74678.8	73568.0	86204	85095
4/2005	204843.8	204843.8	366060.3	365859.3	142032.0	142068.0	0	0	1262.7	1280.7	525.00	525.00	43894.9	44965.9	66643	67711
5/2005	205493.6	205367.6	370266.1	369908.4	139544.2	136360.8	0	0	2490.3	2416.1	778.07	777.99	105283.5	100726.9	135002	130445
6/2005	205624.6	205485.1	407209.7	409744.9	133867.2	127060.4	0	0	1791.0	1673.0	878.06	877.96	54327.1	47311.5	83046	76031
7/2005	198195.7	198149.0	378903.4	380987.7	124763.5	118043.8	0	0	1223.4	1228.9	452.93	452.92	47374.1	47714.7	48021	48361
8/2005	194724.9	194736.7	356829.1	358239.0	115885.0	109255.3	0	0	648.4	658.2	377.84	377.85	16637.5	17240.5	17019	17622
9/2005	190087.6	190093.6	338621.4	339422.7	108658.7	102120.7	0	0	566.8	577.0	260.21	260.23	18244.9	18846.6	18638	19239
10/2005	171002.3	170789.9	325360.4	325685.0	104515.2	98615.5	0	0	612.3	614.4	325.00	325.00	17665.4	17793.2	27675	27804
11/2005	164996.1	164785.0	320981.4	320981.4	104194.7	98347.6	0	0	445.3	450.8	325.00	325.00	7160.9	7485.4	23093	23418
12/2005	205480.2	205169.9	304807.4	305466.4	120027.3	114750.8	0	0	1214.8	1196.8	325.00	325.00	54714.8	53604.1	71509	70399
1/2006	195015.6	195015.6	276892.9	276132.3	133275.5	128038.2	0	0	2552.3	2570.3	325.00	325.00	136950.8	138061.5	153710	154820
2/2006	189859.7	189899.4	278600.8	278743.1	140915.3	135839.8	0	0	1160.7	1141.4	325.00	325.00	46413.9	45342.8	61413	60344
3/2006	207797.9	207793.6	316314.5	316610.4	155253.4	153323.3	0	0	1822.6	1791.6	325.00	325.00	92084.0	90179.8	108358	106454
4/2006	210718.1	210730.9	378013.6	378322.6	149173.9	149749.3	0	0	3816.7	3816.7	525.00	525.00	195870.6	195870.6	218893	218893
5/2006	208886.0	208256.9	394263.0	392306.3	138202.5	138126.1	0	0	4187.1	4141.9	779.26	779.24	209542.7	206767.1	239207	236431
6/2006	204954.2	204746.0	409780.2	408543.3	130357.4	126672.7	0	0	2494.8	2406.2	878.87	878.73	96157.2	90889.6	124789	119522
7/2006	198176.2	198051.4	381743.6	380939.6	121346.4	117695.9	0	0	1158.8	1150.5	452.77	452.77	43412.4	42903.3	44059	43550
8/2006	194575.6	194405.8	358301.5	357753.7	112543.0	108930.5	0	0	760.4	757.0	378.17	378.17	23501.8	23295.9	23883	23677
9/2006	189275.6	189304.0	337912.7	337495.5	105364.1	101788.8	0	0	425.5	420.0	259.65	259.57	9869.5	9547.4	10239	9917
10/2006	170193.7	169875.3	325065.3	324967.7	100095.0	96555.2	0	0	667.1	667.6	325.00	325.00	21034.6	21063.0	31037	31064
11/2006	164350.1	164995.5	322659.7	322660.0	99799.8	95330.6	0	0	422.8	421.2	325.00	325.00	5819.5	5722.0	21793	21696
12/2006	169121.8	168705.1	327733.4	327734.7	108637.0	104272.0	0	0	419.4	435.5	325.00	325.00	5801.7	6793.5	22321	23312
1/2007	158970.7	158772.0	320820.9	320694.7	114952.1	111524.7	0	0	460.5	444.4	325.00	325.00	8330.7	7339.0	24944	23954
2/2007	168960.9	168575.3	322587.5	321886.5	122618.8	119972.0	0	0	335.7	335.7	325.00	325.00	595.1	595.1	15901	15901
3/2007	168165.3	167968.3	323196.8	322249.1	128660.3	126249.9	0	0	373.4	371.0	325.00	325.00	2975.3	2826.5	18977	18828
4/2007	174247.1	173953.9	308932.0	307612.0	131011.6	129094.6	2	2	274.8	274.8	274.78	274.78	0.0	0.0	9043	9043
5/2007	189963.1	189674.4	285680.9	284367.6	126467.4	124570.0	2	2	346.2	346.2	346.23	346.23	0.0	0.0	9245	9245
6/2007	194734.7	195188.3	268629.1	266584.2	118767.0	116891.5	2	2	280.1	280.1	280.09	280.09	0.0	0.0	1819	1819
7/2007	197854.2	198054.7	252758.0	250981.8	109695.2	107841.4	2	2	291.6	291.6	291.60	291.60	0.0	0.0	1803	1803
8/2007	194245.9	193929.5	246788.2	245544.2	100893.7	99064.4	2	2	240.4	240.4	240.39	240.39	0.0	0.0	1325	1325

Date	Cumulative without Project **Pardee Storage** *(acre-ft)*	Cumulative with Project **Pardee Storage** *(acre-ft)*	Cumulative without Project **Camanche Storage** *(acre-ft)*	Cumulative with Project **Camanche Storage** *(acre-ft)*	Cumulative without Project **TRA Storage** *(acre-ft)*	Cumulative with Project **TRA Storage** *(acre-ft)*	Cumulative without Project **JSA Year Type** *(NA)*	Cumulative with Project **JSA Year Type** *(NA)*	Cumulative without Project **Camanche Outflow** *(cfs)*	Cumulative with Project **Camanche Outflow** *(cfs)*	Cumulative without Project **Required Camanche Release** *(cfs)*	Cumulative with Project **Required Camanche Release** *(cfs)*	Cumulative without Project **Camanche Flood Release** (AF)	Cumulative with Project **Camanche Flood Release** (AF)	Cumulative without Project **Flow below Lodi Lake** (AF)	Cumulative with Project **Flow below Lodi Lake** (AF)
9/2007	189907.8	189966.3	246788.2	245544.2	93785.6	91979.4	2	2	184.3	178.2	177.54	177.54	400.9	37.7	1600	1238
10/2007	169877.0	169935.0	246584.2	244966.2	90717.0	88930.1	1	1	395.3	401.5	284.00	284.00	6842.0	7223.2	18857	19238
11/2007	164564.9	164621.9	246489.3	244871.8	89609.6	87841.7	1	1	428.4	428.4	250.00	250.00	10612.8	10617.0	22096	22100
12/2007	162548.5	162612.4	256858.9	255239.6	95333.8	93572.1	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11951	11951
1/2008	165153.3	165216.3	270432.7	268807.1	113450.1	111695.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	12361	12361
2/2008	165694.3	165756.3	278490.6	276864.6	122694.5	120950.9	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11355	11355
3/2008	170771.1	170598.6	286167.2	284148.8	126939.1	125842.6	1	1	250.0	250.0	250.00	250.00	0.0	0.0	11392	11392
4/2008	178593.0	178352.0	271653.2	269642.5	128532.1	127517.5	2	2	274.8	274.8	274.79	274.79	0.0	0.0	8928	8928
5/2008	192700.3	192638.4	255278.4	253103.6	123858.2	122853.5	2	2	338.0	338.0	338.00	338.00	0.0	0.0	9254	9254
6/2008	196014.2	195952.7	247920.8	245762.8	116299.0	115304.7	2	2	268.5	268.5	268.52	268.52	0.0	0.0	1819	1819
7/2008	197356.3	197465.0	228741.7	226436.0	107329.7	106347.4	2	2	278.5	278.5	278.46	278.46	0.0	0.0	1805	1805
8/2008	194273.7	194212.3	220370.0	218256.9	98618.8	97650.3	2	2	232.1	232.1	232.08	232.08	0.0	0.0	1326	1326
9/2008	187753.3	187692.1	215167.0	213071.0	91566.2	90610.2	2	2	172.5	172.5	172.46	172.46	0.0	0.0	1193	1193
10/2008	172480.6	172349.7	215099.6	213003.6	88115.2	87240.9	2	2	442.3	442.5	254.00	254.00	11577.3	11588.3	21912	21923
11/2008	164868.7	165159.9	213566.7	211471.8	88244.5	87303.0	2	2	538.5	532.7	220.00	220.00	18949.5	18605.9	28690	28346
12/2008	164297.7	164400.0	222953.4	220660.8	94153.5	93605.7	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10025	10025
1/2009	168509.4	168611.2	245337.0	243034.8	104502.8	103961.4	2	2	220.0	220.0	220.00	220.00	0.0	0.0	10516	10516
2/2009	169518.6	169273.4	262725.8	260764.4	120460.0	119921.0	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9431	9431
3/2009	178993.5	178940.2	304859.8	302382.5	127259.9	127048.3	2	2	220.0	220.0	220.00	220.00	0.0	0.0	9656	9656
4/2009	185872.6	185775.9	310624.6	313996.4	128278.7	128113.3	1	1	570.7	472.4	473.47	423.47	5786.4	2910.4	25546	19695
5/2009	204786.4	204786.4	390185.3	393448.3	125170.5	125006.9	1	1	544.2	544.2	525.32	525.32	1158.9	1158.9	15463	15463
6/2009	198276.3	198276.3	384394.3	382850.8	117634.8	117472.8	1	1	694.8	775.5	675.97	726.62	1121.5	2909.8	17860	22622
7/2009	197848.7	197848.7	359665.5	358136.0	108594.0	108433.6	1	1	495.2	495.2	451.34	451.36	2697.7	2693.4	3342	3339
8/2009	194301.4	194301.4	338952.0	337620.6	99589.8	99431.5	1	1	401.9	398.8	374.06	374.06	1711.6	1523.3	1878	1690
9/2009	188623.8	188623.8	322650.4	321508.5	92862.4	92706.3	1	1	280.0	277.0	254.15	254.15	1539.8	1357.1	1620	1438
10/2009	170939.5	170939.5	314032.2	313694.2	91641.0	91486.6	0	0	492.6	479.6	325.00	325.00	10306.1	9504.3	20412	19610
11/2009	160841.0	160841.0	308283.7	307946.6	91138.0	90985.4	0	0	362.5	362.5	325.00	325.00	2231.4	2231.4	18156	18156
12/2009	164347.3	164347.3	309955.2	309617.8	98183.9	98033.0	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16529	16529
1/2010	169204.9	169204.9	322964.3	322626.0	117515.8	117366.2	0	0	354.0	354.0	325.00	325.00	1785.1	1785.1	18710	18710
2/2010	169935.9	169844.0	327688.4	328342.1	126173.7	126117.2	0	0	471.4	453.6	325.00	325.00	8132.4	7140.6	23272	22282
3/2010	174553.2	174461.6	330669.7	330530.4	134132.5	134076.8	0	0	575.0	587.9	325.00	325.00	15372.1	16165.5	31410	32202
4/2010	193055.2	192964.0	349009.8	348870.5	140621.1	140566.1	1	1	570.8	570.8	473.49	473.49	5787.8	5787.8	25788	25788
5/2010	204734.4	204734.4	384734.4	384505.8	137032.3	136977.3	1	1	681.7	681.7	625.48	625.48	3454.9	3454.9	23907	23907
6/2010	204709.6	204709.6	401892.0	402686.7	129429.6	129375.3	1	1	1305.1	1287.9	777.29	777.25	31408.0	30386.0	54088	53066
7/2010	195738.0	195738.0	361727.8	362325.7	120350.5	120296.7	1	1	1050.4	1053.5	452.38	452.38	36768.1	36959.9	37414	37605
8/2010	194242.7	194242.7	328118.7	328522.6	111510.0	111456.6	1	1	474.4	477.5	374.06	374.06	6167.1	6357.5	6334	6524
9/2010	184984.3	184983.4	298818.6	299037.7	104369.6	104317.7	1	1	464.8	467.9	255.02	255.02	12483.0	12666.1	12554	12737
10/2010	177217.6	177216.6	272683.7	272719.0	101178.5	101127.3	0	0	853.6	856.6	325.00	325.00	32503.0	32686.4	42619	42803
11/2010	167281.7	167280.8	270248.3	270241.2	101982.0	101931.8	0	0	720.0	720.7	325.00	325.00	23505.0	23547.4	39619	39661
12/2010	205403.5	205403.5	287185.0	287176.9	116367.9	116318.7	0	0	1127.7	1127.7	325.00	325.00	49359.4	49359.4	66015	66015

Date	*Cumulative without Project* **Pardee Storage** *(acre-ft)*	*Cumulative with Project* **Pardee Storage** *(acre-ft)*	*Cumulative without Project* **Camanche Storage** *(acre-ft)*	*Cumulative with Project* **Camanche Storage** *(acre-ft)*	*Cumulative without Project* **TRA Storage** *(acre-ft)*	*Cumulative with Project* **TRA Storage** *(acre-ft)*	*Cumulative without Project* **JSA Year Type** *(NA)*	*Cumulative with Project* **JSA Year Type** *(NA)*	*Cumulative without Project* **Camanche Outflow** *(cfs)*	*Cumulative with Project* **Camanche Outflow** *(cfs)*	*Cumulative without Project* **Required Camanche Release** *(cfs)*	*Cumulative with Project* **Required Camanche Release** *(cfs)*	*Cumulative without Project* **Camanche Flood Release** (AF)	*Cumulative with Project* **Camanche Flood Release** (AF)	*Cumulative without Project* **Flow below Lodi Lake** (AF)	*Cumulative with Project* **Flow below Lodi Lake** (AF)
1/2011	203858.4	203858.4	303727.4	303719.4	122491.7	122443.1	0	0	1227.1	1227.1	325.00	325.00	55468.6	55468.6	72136	72136
2/2011	200664.6	200664.6	320522.4	320514.4	133844.2	133796.2	0	0	1112.1	1112.1	325.00	325.00	43716.3	43716.3	58912	58912
3/2011	206378.1	206387.0	349761.8	349793.9	146664.6	146568.2	0	0	2289.0	2289.0	325.00	325.00	120765.4	120765.4	136903	136903
4/2011	205411.5	205411.5	337341.3	337382.3	145182.2	145086.8	0	0	2716.7	2716.7	525.00	525.00	130415.1	130415.1	153048	153048
5/2011	204784.4	204784.4	308527.2	308568.0	140259.3	140165.1	0	0	2954.8	2954.8	778.31	778.31	133831.5	133831.5	163526	163526
6/2011	210562.9	210562.9	396727.7	396768.4	135263.4	135170.2	0	0	1891.8	1891.8	878.02	878.02	60326.5	60326.5	89055	89055
7/2011	196954.2	196954.2	352712.8	352745.2	126335.5	126243.4	0	0	2972.5	2972.6	454.93	454.93	154799.5	154807.6	155450	155458
8/2011	194168.2	194168.2	321188.0	321209.9	117370.8	117279.7	0	0	584.6	584.8	377.66	377.66	12725.2	12735.6	13107	13118
9/2011	189412.6	189412.6	295425.6	295437.7	110072.6	109982.5	0	0	419.3	419.4	260.04	260.04	9474.2	9484.0	9863	9873
10/2011	171015.9	171015.9	273523.4	273525.2	105180.0	105090.9	0	0	930.1	930.2	325.00	325.00	37204.9	37215.2	47298	47308
11/2011	163023.1	163023.1	269586.4	269586.1	103338.4	103250.0	0	0	455.3	455.4	325.00	325.00	7756.0	7758.1	23694	23696
12/2011	162701.4	162655.3	262753.9	262753.6	106310.0	106268.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16302	16302
1/2012	165262.8	165217.7	265057.0	265056.7	116935.6	116893.6	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16739	16739
2/2012	156383.7	156681.1	253021.3	252646.1	123003.8	122993.5	0	0	325.0	325.0	325.00	325.00	0.0	0.0	15580	15580
3/2012	171601.9	171697.1	254486.6	254308.5	137467.6	137460.9	0	0	325.0	325.0	325.00	325.00	0.0	0.0	16270	16270
4/2012	187636.5	187683.2	269315.4	269187.5	141062.1	141053.7	2	2	272.9	272.9	272.86	272.86	0.0	0.0	9194	9194
5/2012	193498.0	193543.9	294114.0	293986.7	135083.7	135076.0	2	2	370.0	370.0	370.03	370.03	0.0	0.0	9224	9224
6/2012	195870.9	196086.5	278908.4	278611.9	127582.4	127574.7	2	2	328.1	328.1	328.11	328.11	0.0	0.0	1840	1840
7/2012	194724.0	194944.2	252678.0	252377.9	118509.4	118501.7	2	2	363.5	363.5	363.50	363.50	0.0	0.0	1805	1805
8/2012	192909.9	193128.3	229487.0	229189.8	109660.0	109652.5	2	2	318.5	318.5	318.50	318.50	0.0	0.0	1328	1328
9/2012	189816.3	189660.4	214349.2	214429.1	102534.5	102525.0	2	2	222.2	222.2	219.79	219.79	143.8	143.8	1344	1344
10/2012	170389.9	170389.9	258635.5	258635.5	117186.6	117186.6	1	1	430.6	430.6	284.00	284.00	9012.0	9012.0	18911	18911
11/2012	169354.5	169354.5	258635.5	258635.5	117681.8	117681.8	1	1	507.0	507.0	250.00	250.00	15294.1	15294.1	26960	26960
12/2012	175824.3	175824.3	298229.2	298229.2	125101.0	125101.0	1	1	356.5	356.5	250.00	250.00	6545.5	6545.5	18599	18599