Appendix 1A Introduction to Appendices and Models

The remainder of the appendices contained in this document provide environmental setting information, regulatory requirements, supporting technical information for the impact analyses and effects analyses, or California Environmental Quality Act process information for the Sites Reservoir Project (Project). Table 1A-1 lists the appendices, which are numbered to correspond with the associated chapter, and provides summaries of their contents.

Table 1A-1. List of Appendices

Appendices	Contents
Appendix 2A, Alternatives Screening and Evaluation	Screening process and evaluation of alternatives considered in the 2017 Draft EIR/EIS.
Appendix 2B, Additional Alternatives Screening and Evaluation	Screening process and evaluations of alternatives considered in the Final EIR/EIS.
Appendix 2C, Construction Means, Methods, and Assumptions	Methods, means, and assumptions for constructing facilities for each alternative.
Appendix 2D, Best Management Practices, Management Plans, and Technical Studies	Descriptions of best management practices, management plans, and technical studies that would be part of the Project.
Appendix 4A, Regulatory Requirements	Regulatory requirements for all resources.
Appendix 5A, Surface Water Resources Modeling of Alternatives	Introduction to surface model methods and assumptions for each alternative.
Appendix 5A1, Model Assumptions	Descriptions of the assumptions used for all model simulations.
Appendix 5A2, CALSIM II Model Assumptions Callouts	Matrix summarizing the assumptions used for the CALSIM II modeling of alternatives.
Appendix 5A3, DSM2 Model Assumptions Callouts	Matrix summarizing the assumptions used for the DSM2 modeling of alternatives.
Appendix 5A4, HEC5Q and Reclamation Temperature Model Assumptions Callouts	Matrix summarizing the assumptions used for the HEC5Q and Reclamation Temperature modeling of alternatives.
Appendix 5A5, CALSIM II Model Delivery Specifications	Delivery specifications for the CALSIM II model.
Appendix 5A6, Model Limitations and Improvements	Information on model limitations and improvements.
Appendix 5A7, Daily Pattern Development for the Estimation of Daily Flows and Weir Spills in CALSIM II	Description of the methods, model code update, results, and limitations associated with developing estimates for daily flow patterns and weir spills in CALSIM II.

Appendices	Contents
Appendix 5B, Water Resources Modeling System	Description of the CALSIM II model used to evaluate each alternative.
Appendix 5B1, Project Operations	CALSIM II model results of Project operations.
Appendix 5B2, River Operations	CALSIM II model results of river operations at key project locations.
Appendix 5B3, Delta Operations	CALSIM II model results of Delta flows.
Appendix 5B4, Regional Deliveries	CALSIM II model results of regional water supply deliveries.
Appendix 5B5, Water Supply	CALSIM II model results of water supply.
Appendix 5C, Upper Sacramento River Daily River Flow and Operations Model	Description of the Upper Sacramento River Daily Operations Model (USRDOM) and summary of model results.
Appendix 6A, Water Quality Constituents and Beneficial Uses	Description of beneficial uses for surface waters in the study area and description of surface water quality constituents.
Appendix 6B1, Sacramento–San Joaquin Delta Modeling, Salinity Results (DSM2-QUAL)	DSM2-QUAL model methodology and salinity results for each alternative.
Appendix 6B2, Sacramento–San Joaquin Delta Modeling, Chloride Results (DSM2-QUAL)	DSM2-QUAL model methodology and chloride results for each alternative.
Appendix 6B3, Sacramento–San Joaquin Delta Modeling, X2 Results (DSM2-QUAL)	DSM2-QUAL model methodology and X2 results for each alternative.
Appendix 6B4, Sacramento–San Joaquin Delta Modeling, Export Loading	DSM2/CALSIM II export loading reporting metrics.
Appendix 6B5, Water Quality Compliance	Plots demonstrating Delta water quality compliance.
Appendix 6C, River Temperature Modeling (HEC5Q and Reclamation Temperature Model)	HEC5Q and Reclamation Temperature model methodology and results related to the Trinity, Sacramento, Feather, and American Rivers.
Appendix 6D, Sites Reservoir Discharge Temperature Modeling	Methodology and results for CE-QUAL-W2 model of water temperature in Sites Reservoir, and temperature blending of Sites Reservoir releases with the TC Canal and GCID Main Canal.
Appendix 6E, Water Quality Data	Surface and groundwater quality data in the study area.
Appendix 6F, Mercury and Methylmercury	Summary of methods, data, and assumptions of analysis for mercury and methylmercury.
Appendix 7A, Fluvial Geomorphic Setting Information	Detailed discussion of fluvial geomorphic setting information for the watercourses and other waterbodies in the study area.
Appendix 7B, Hydrodynamic Geomorphic Modeling Results	Sediment transport, bedload, and river meandering modeling results from 2017 Draft EIR/EIS.
Appendix 8A, Groundwater Resources Basin Setting	Detailed description of groundwater basins and subbasins and existing sustainable groundwater management efforts in the study area.

Appendices	Contents
Appendix 8B, Groundwater Modeling	Groundwater modeling results from 2017 Draft EIR/EIS.
Appendix 9A, Special-Status Plant Species	Special-status plant table, special-status plant species accounts, and species lists from California Natural Diversity Database, U.S. Fish and Wildlife Service, and California Native Plant Society used to determine the special-status species with the potential to occur in the study area.
Appendix 9B, Vegetation and Wetland Methods and Information	Discussion of the land cover types, wetlands and other waters, and invasive plant species in the study area.
Appendix 10A, Wildlife Species Lists, Special-Status Wildlife Table, and Non-Listed Wildlife Species Accounts	Special-status wildlife species lists, special-status wildlife table, and the species accounts for non-listed wildlife species.
Appendix 10B, Wildlife Habitat Models and Methods	Land cover type associations, model assumptions, and rationales used for the special-status wildlife species habitat models.
Appendix 10C, Special-Status Wildlife Impacts Tables	Special-status wildlife impacts tables listing the permanent and temporary Project impact acreages using modeled species habitat. Indirect effect acreages are included for vernal pool branchiopods.
Appendix 11A, Aquatic Species Life Histories	Information, including life histories, of those aquatic species identified as having the potential to occur in the study area.
Appendix 11A1, Juvenile Salmonid Monitoring, Sampling, and Salvage Timing Summary from SacPAS	Graphical summaries of juvenile salmonid monitoring, sampling, and salvage timing in the Central Valley, as produced by the Central Valley Prediction and Assessment of Salmon database (SacPAS).
Appendix 11B, Upstream Fisheries Impact Assessment Quantitative Methods	Impact assessment quantitative methods for upstream temperature impacts on fisheries, including river and Delta habitat, and fish life cycle modeling.
Appendix 11D, Fisheries Water Temperature Assessment	Results for specific analysis of potential water temperature effects on fish in waterways upstream of the Delta.
Appendix 11E, Reservoir Fish Species Analysis	Description of analysis used to evaluate potential impacts on aquatic species occupying reservoirs possibly affected by operation changes due to the Project.
Appendix 11F, Smelt Analysis	Quantitative methods and supplementary results used in the impact analyses of delta smelt and longfin smelt.
Appendix 11H, Salmonid Population Modeling (SALMOD)	SALMOD model outputs, which simulates Sacramento River populations of winter-run, spring-run, fall-run, and late fall–run salmon, for the Project.
Appendix 11I, Winter-Run Chinook Salmon Life Cycle Modeling	Two memoranda describing the results of the IOS (Interactive Object-Oriented Simulation) and OBAN (Oncorhynchus Bayesian Analysis) winter-run Chinook salmon life cycle models.
Appendix 11J, Through-Delta Survival and Delta Rearing Habitat of Juvenile Chinook Salmon	Methods and modeling results for the through-Sacramento–San Joaquin Delta survival analysis and rearing habitat of juvenile Chinook salmon.

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Appendix 11K, Weighted Usable Area Analysis	Methods and results for the weighted usable area analysis, which estimates the amount of suitable spawning and rearing habitat of fishes available in rivers and streams at various levels of flow.
Appendix 11L, Sturgeon Analyses	Results of sturgeon analyses, including salvage-density analysis for south Sacramento–San Joaquin Delta entrainment risk and the Delta outflow year-class strength regression analysis.
Appendix 11M, Yolo and Sutter Bypass Flow and Weir Spill Analysis	Methods and results for quantifying inundated floodplain habitat in the Yolo and Sutter Bypasses and inundated side-channel habitat in the Sacramento River.
Appendix 11M1, Acres of Yolo Bypass with Limiting Habitat Suitability Criteria (Depth <1 meter deep and/or Flow Velocity <1.5 feet per second) for Rearing Salmonids under Three Different Fremont Weir Spills Levels)	Summary of the limiting habitat under three Fremont weir spill levels.
Appendix 11M2, Yolo Bypass Weir Spill Frequencies	Summary of the number of years that exceed Fremont weir flow magnitude thresholds between 1922 and 2003 for each Project alternative.
Appendix 11M3, Yolo Bypass Inundation Frequencies	Results for different inundation frequencies, including average monthly and annual number of inundation events.
Appendix 11M4, Sutter Bypass Weir Spill Frequencies	Data summary of the number of years that exceed flow magnitude and duration between 1922 and 2003.
Appendix 11M5, Sutter Bypass Inundation Frequencies	Graphic of average monthly and average annual number of Sutter Bypass inundation events with different ranges of duration and suitable habitat acreages and data summary of Sutter Bypass habitat area inundation events,
Appendix 11M6, Side-Channel Habitat Inundation Frequencies	Graphic of average monthly and average annual Sacramento River side-channel inundation events with different ranges of duration and suitable habitat acreage and data summary of habitat area inundation events for all Sacramento River side-channel reaches.
Appendix 11M7, Side-Channel Habitat Inundation Frequencies for Reach 1	Data summary of the frequency of Sacramento River side-channel inundation events for reach 1.
Appendix 11M8, Side-Channel Habitat Inundation Frequencies for Reach 2	Data summary of the frequency of Sacramento River side-channel inundation events for reach 2.
Appendix 11M9, Side-Channel Habitat Inundation Frequencies for Reach 3	Data summary of the frequency of Sacramento River side-channel inundation events for reach 3.

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Appendix 11N, Other Flow-Related Upstream Analyses	Methods and results for analyses related to potential direct effects of flows on anadromous salmonids and green sturgeon in the Sacramento, Feather, and American Rivers.
Appendix 11O, Anderson-Martin Models	Descriptions of the Martin et al. (2016) and Anderson (2018) egg mortality models that were used to assess water temperature–related effect on winter-run Chinook salmon egg mortality.
Appendix 11P, Riverine Flow-Survival	Discussion of methods applied to assess potential effects of Red Bluff and Hamilton City diversions on juvenile Chinook salmon riverine survival in the Sacramento River as a function of flow.
Appendix 11P1, Sites Reservoir Daily Divertible and Storable Flow Tool	Assumptions and results of the daily divertible and storable flow tool evaluation used to test diversion criteria in a real-time operations context.
Appendix 11Q, Other Delta Species Analyses	Descriptions of the salvage-density method, X2-abundance index regressions, and the threadfin shad south Delta entrainment risk analysis used for analysis of potential effects of the Project in the Delta.
Appendix 12A, Soil Survey Map	Figure of Natural Resources Conservation Service–mapped soil units in the study area.
Appendix 12B, Soil Map Units	Description of soil map units found in the study area.
Appendix 15A, Natural Resources Conservation Service Land Evaluation and Site Assessment Explanations and Calculations for the Sites Reservoir Project	Methods of analysis and results of a land evaluation and site assessment for the Project.
Appendix 15A1, Farmland Conversion Impact Ratings	Farmland conversion impact rating form for the Project.
Appendix 15A2, Site Assessment Calculations	Details of the point calculations used to complete the farmland conversion impact rating forms.
Appendix 17A, CVP/SWP Power Modeling	Power modeling methods, assumptions, and results used to examine the range of potential effects of Project operations on the electric power system in the western U.S.
Appendix 19A, Noise Definitions and Noise Calculations	Definitions related to noise and vibration, and detailed calculations of heavy equipment noise by distance and construction activity/component.
Appendix 20A, Methodology for Air Quality and GHG Emissions Calculations	Methods used to estimate criteria pollutant and GHG emissions; to model the pollutant concentrations; and to model the health effects associated with the pollutant concentrations.
Appendix 20C, Ambient Air Quality and Health Risk Analysis Technical Report	Methods used and results of the ambient air quality analysis and the health risk assessment.
Appendix 20C1, AERMOD Equivalency Model Demonstration	Demonstration of both AERMOD version 19191 and 21112 to show equivalency between versions. A new version of AERMOD

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	(version 21112) was released while most of the modeling was conducted for the Project.
Appendix 20C2, Model Construction Figures	Graphics of model construction details related to ambient air boundaries and construction traffic routes.
Appendix 20C3, Modeled Emissions	Modeled emissions information, including maximum daily, annual, and toxic air contaminant emission rates.
Appendix 20D, Photochemical Modeling Study to Support a Health Impact Analysis	Methods used and results for the photochemical grid modeling Health Impact Analysis from construction activities for particulate matter with a diameter less than or equal to 2.5 micrometers (PM2.5) and ozone precursors.
Appendix 21A, Greenhouse Gas Support Appendix	The net change in greenhouse gas emissions from land conversion from open fields to Sites Reservoir.
Appendix 22A, Cultural Resources	Detailed cultural setting, including the study area's flora, fauna, and geology relevant to cultural studies; the ethnographic context that describes the historical record pertaining to Native American ethnography in the study area, such as records of villages, homes, and ceremonies; the archaeological context that identifies and describes the archaeological models that characterize the study area's early Native American history, including chronology from the terminal Pleistocene era to the entry of Europeans into the Project region, and regional cultures that are expressed through archaeological data; and the historical record that describes the post-1800 era and includes nineteenth- and twentieth-century historical themes that characterize the study area's post-1800 history, including colonial settlement, ranching and agriculture, county and city histories including the town of Sites, and regional transportation development.
Appendix 24A, Landscape Character Photos and Associated Maps	Photographs and associated maps from the 2017 Draft EIR/EIS, as well as photographs from 2021 and associated maps for the Dunnigan Pipeline.
Appendix 24B, Regional and Project Landscape Description	Detailed discussion on the regional and Project landscapes.
Appendix 27A, Environmental Records Search	Updated environmental record information used for the impact analysis in this document and summary of results of the previous environmental records review for the 2017 Draft EIR/EIS.
Appendix 28A, Climate Change	Summary of the development of the 2035 Central Tendency and Water Storage Investment Program 2070 boundary conditions for the CALSIM II model.
Appendix 30A, Regional Economics Modeling	Description of the methods used to assess Project effects on regional economics and summary of the regional economic modeling results. Includes methodology used in the economic

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	modeling conducted for the 2017 Draft EIR/EIS to evaluate impacts on regional economics.
Appendix 30B, Comparison of Regional Hydrologic Model Results to Inform Economic Analyses	Comparison of regional hydrologic modeling results between the 2017 hydrologic model output and the current hydrologic output. This comparison is applied to the analysis of economic effects of the Project.
Appendix 33A, 2017 Draft EIR/EIS Chapter 36, Consultation and Coordination	Consultation and coordination that occurred for the Project prior to the publication of the 2017 Draft EIR/EIS.
Appendix 33B, Previous Scoping Processes	Overview of the scoping process and comments received on the 2017 Draft EIR/EIS.
Appendix 33C, Planning Aid Memorandum	Planning Aid Memorandum for the North-of-Delta Offstream Storage/Sites Reservoir Project between Bureau of Reclamation and U.S. Fish and Wildlife Service.

CVP = Central Valley Project; EIR = environmental impact report; EIS = environmental impact statement; GCID = Glenn-Colusa Irrigation District; GHG = greenhouse gas; SWP = State Water Project; TC = Tehama-Colusa.

Models were used to generate results that inform various impact analyses in this document. The models and how they relate to various impact analyses are summarized below in Table 1A-2 along with relevant resources. Several impact analyses in this document refer to results from previous modeling, these models are summarized in Table 1A-3.

Table 1A-2. List of Models

Model	Model Output	Model(s) that Provide Input	Appendix or Chapter	Relevant Resource(s)
CALSIM II: SWP and CVP Hydrology and System Operations Model	Flow, storage, and diversions	None.	Appendix 5B	Surface Water, Surface Water Quality
USRDOM: Upper Sacramento River Daily Operations Model	Flow, storage, and diversions	CALSIM II	Appendix 5C	Surface Water, Fluvial Geomorphology, Aquatic Biological Resources
DSM2: Delta Simulation Model II (hydrodynamic modeling)	Flow	CALSIM II	Appendix 6B	Surface Water Quality, Aquatic Biological Resources
DSM2-QUAL: Delta Simulation Model II (electrical conductivity modeling)	Salinity	CALSIM II	Appendix 6B, Chapter 6, Chapter 11	Surface Water Quality, Aquatic Biological Resources
HEC5Q Model: Trinity, Sacramento, and American Rivers	Water temperature	CALSIM II	Appendix 6C	Surface Water Quality, Aquatic Biological Resources
Reclamation Temperature Model: Feather River	Water temperature	CALSIM II	Appendix 6C	Surface Water Quality, Aquatic Biological Resources
CE-QUAL-W2: Sites Reservoir Temperature Model	Water temperature	CALSIM II, USRDOM and HEC5Q	Appendix 6D	Surface Water Quality, Aquatic Biological Resources
Sites Release Temperature Blending Tool	Water temperature in conveyance facilities downstream of Sites Reservoir and in the Sacramento River downstream of the Sites discharge	CALSIM II, HEC5Q, CE-QUAL-W2	Appendix 6D	Surface Water Quality, Aquatic Biological Resources
Metals Analysis	Aluminum, copper, iron, and lead concentrations	CALSIM II	Appendix 6E	Surface Water Quality

Model	Model Output	Model(s) that Provide Input	Appendix or Chapter	Relevant Resource(s)
The Central Valley Regional Water Quality Control Board mercury model	Concentration of methylmercury in fish tissue in the Delta	None	Appendix 6F	Surface Water Quality, Public Health, and Aquatic Biological Resources
Bedload Transport	Transport capacity, sediment budgets	Flow calculations from USRDOM HEC-RAS reach-averaged hydraulic properties	Appendix 7B	Fluvial Geomorphology, Aquatic Biological Resources, Vegetation and Wetland Resources
SRH-Meander Model: Sedimentation and River Hydraulics-Meander	Channel alignment, channel migration distance (Intermediate outputs include flow field, channel bank erosion rate, channel envelope)	Flow calculations from USRDOM HEC-RAS cross-sectional and profile geometry parameters	Appendix 7B	Fluvial Geomorphology, Aquatic Biological Resources, Vegetation and Wetland Resources
Suspended Sediment Load	Average annual sediment load	Flow calculations from USRDOM	Appendix 7B	Fluvial Geomorphology, Aquatic Biological Resources
Special-Status Species Habitat Models	Species abundance and distribution	Various	Chapter 9	Vegetation and Wetland Resources
Floodplain inundation and access	Yolo Bypass and Sutter Bypass weir spill flow and duration of floodplain inundation	CALSIM, Daily Divertible & Storable Flow Tool	Chapter 11	Fluvial Geomorphology, Aquatic Biological Resources
Lamprey ammocoete stranding	Percent of Pacific and river lamprey cohorts exposed to range of stranding risks	CALSIM II	Chapter 11	Aquatic Biological Resources
Lamprey redd dewatering	Frequency of exposure of Pacific and river lamprey redds to dewatering risk	CALSIM II	Chapter 11	Aquatic Biological Resources

Model	Model Output	Model(s) that Provide Input	Appendix or Chapter	Relevant Resource(s)
National Marine Fisheries Service Pile Driving Noise Calculator Spreadsheet Tool	Distance away from pile driving at which behavioral or injury acoustic effects to fish would occur	Pile driving assumptions	Chapter 11	Aquatic Biological Resources
Neomysis mercedis-outflow regression	*N. mercedis* (longfin smelt prey) density	CALSIM II	Chapter 11	Aquatic Biological Resources
Pseudodiaptomus forbesi–Delta outflow regression	*P. forbesi* (delta smelt prey) density	CALSIM II	Chapter 11	Aquatic Biological Resources
Redd scour	Frequency of flows high enough to scour or entomb salmonid redds	USRDOM	Chapter 11	Aquatic Biological Resources
Screen passage time	Duration of juvenile Chinook salmon to pass the Red Bluff and Hamilton City intakes	Results from literature and operational criteria	Chapter 11	Aquatic Biological Resources
Tidal habitat restoration mitigation calculations for longfin smelt	Inflow and particles entrained	CALSIM II	Chapter 11	Aquatic Biological Resources
Upstream temperature mean value and exceedance plot analysis	Water temperatures	HEC5Q, Reclamation Temperature Model	Chapter 11	Aquatic Biological Resources
WUA/PHABSIM	Availability of suitable habitat in a river reach	CALSIM II, HEC5Q	Chapter 11	Aquatic Biological Resources
WUA Model for Green Sturgeon Spawning in the Sacramento River	Frequency of flows maximizing spawning WUA	CALSIM II	Chapter 11	Aquatic Biological Resources
Water Temperature Index Value/Range Analysis	Frequency and magnitude of exceedance above a biologically based index value or occurrence outside an index range	HEC5Q, Reclamation Temperature Model	Appendix 11D	Aquatic Biological Resources
Eurytemora affinis-X2 and outflow analysis (Generalized Linear Model [GLM])	*Eurytemora affinis* density	CALSIM II	Appendix 11F	Aquatic Biological Resources
Delta Outflow-Longfin Smelt Abundance Index Analysis	Longfin smelt abundance index	CALSIM II	Appendix 11F	Aquatic Biological Resources

Model	Model Output	Model(s) that Provide Input	Appendix or Chapter	Relevant Resource(s)
Delta Outflow–Longfin Smelt Abundance Analysis (Based on Nobriga and Rosenfield 2016) ("2abc model")	Longfin smelt abundance index	CALSIM II	Appendix 11F	Aquatic Biological Resources
Upstream sediment entrainment	Percentage of suspended sediment entrained by Red Bluff and Hamilton City intakes	USRDOM	Appendix 11F	Aquatic Biological Resources
X2-Longfin Smelt Abundance Index Analysis	Longfin smelt abundance index	CALSIM II	Appendix 11F	Aquatic Biological Resources
SALMOD: Salmon Population Model	Juvenile Chinook salmon production, flow- and temperature-related mortality of early life stages	CALSIM II, HEC5Q	Appendix 11H	Aquatic Biological Resources
IOS: Interactive Object-Oriented Simulation	Winter-run Chinook salmon spawner abundance	CALSIM II, DSM2, HEC5Q	Appendix 11I	Aquatic Biological Resources
OBAN: *Oncorhynchus Bayesian* Analysis	Winter-run Chinook salmon spawner abundance	CALSIM II, HEC5Q	Appendix 11I	Aquatic Biological Resources
Delta Rearing Habitat of Juvenile Chinook Salmon	Riparian and wetland bench inundation indices	DSM2	Appendix 11J	Aquatic Biological Resources
STARS: Survival, Travel time, And Routing Simulation model, adapted by Perry	Through-Delta survival of juvenile Chinook salmon	DSM2	Appendix 11J	Aquatic Biological Resources
WUA: Weighted Usable Area	Spawning and rearing habitat availability of Chinook salmon and steelhead	CALSIM II	Appendix 11K	Aquatic Biological Resources
Delta Outflow Year-Class Strength Regression Analysis	White sturgeon year-class strength	CALSIM II	Appendix 11L	Aquatic Biological Resources
Bypass and Side-Channel Inundated Habitat Area	Inundated area less than 1 meter deep	USRDOM, HEC-RAS	Appendix 11M	Aquatic Biological Resources
Bypass Flow and Weir Spill	Flow into Yolo Bypass and Sutter Bypass	CALSIM II	Appendix 11M	Aquatic Biological Resources

Model	Model Output	Model(s) that Provide Input	Appendix or Chapter	Relevant Resource(s)
HEC-RAS	Water flow, sediment transport, water temperature, water quality	None	Appendix 11M	Aquatic Biological Resources
Juvenile Chinook Salmon Rearing Habitat Carrying Capacity of Inundated Habitat Areas	Rearing Chinook salmon carrying capacity (number of fish)	USRDOM, HEC-RAS, juvenile salmon territory size function, inundated habitat area methods	Appendix 11M	Aquatic Biological Resources
Lower Sutter Bypass Inundated Habitat from Sacramento River Backflow	Inundated area less than 1 meter deep	Daily-patterned CALSIM II, GIS,	Appendix 11M	Aquatic Biological Resources
Juvenile Stranding Analysis	Percent of Chinook salmon and steelhead juveniles stranded	CALSIM II, USRDOM	Appendix 11N	Aquatic Biological Resources
Redd Dewatering Analysis	Percent of Chinook salmon and steelhead redds dewatered	CALSIM II, USRDOM	Appendix 11N	Aquatic Biological Resources
Anderson-Martin Egg Mortality Models	Temperature-based early life stage mortality of winter-run Chinook salmon	HEC5Q	Appendix 11O	Aquatic Biological Resources
Daily Divertible & Storable Flow Tool (v. 2022 0602)	Daily divertible and storable flow for Sites Reservoir	Historical data	Appendix 11P	Aquatic Biological Resources
Flow Threshold Survival Analysis	Juvenile Chinook salmon migration survival	Daily Divertible & Storable Flow Tool	Appendix 11P	Aquatic Biological Resources
Salvage-Density Analysis	South Delta exports weighted by historical fish salvage density	CALSIM II	Appendix 11Q	Aquatic Biological Resources
Threadfin shad south Delta entrainment risk analysis	Percentage of particles entrained	CALSIM II	Appendix 11Q	Aquatic Biological Resources
X2-abundance index regressions	Abundance indices of striped bass, American shad, starry flounder, and California bay shrimp	CALSIM II	Appendix 11Q	Aquatic Biological Resources

Model	Model Output	Model(s) that Provide Input	Appendix or Chapter	Relevant Resource(s)
LESA analysis	Measures of soil, resource quality, project size, water resource availability, surrounding agricultural lands, and protected resource lands data for Glenn, Colusa, and Yolo Counties	Scoring criteria from *Part 523 of the Farmland Protection Policy Act Manual*	Appendix 15A	Agriculture and Forestry Resources
LT-GEN: Reclamation Long Term Generation	CVP hydropower generation and capacity, pumping plant energy requirements, and net revenue	CALSIM II	Appendix 17A	Energy
Sites [NODOS] Power tool	Energy generation and use at Project generation and pumping facilities	CALSIM II	Appendix 17A	Energy
SWP_Power: Reclamation Long Term Generation	SWP hydropower generation and capacity, pumping plant energy requirements, and net revenue	CALSIM II	Appendix 17A	Energy
Gravity model	Regional shifts in travel patterns exclusive to the recreational demand of Sites Reservoir in the form of a trip matrix that distributes the daily one-way trips from each of the population centers	A defined set of gravity factors that accounts for different regional and local factors combined to generate an attraction of trips compared to other surrounding traffic analysis zone	Chapter 18	Navigation, Transportation, and Traffic
Equations from Federal Transit Administration (2018)	Construction vibration levels	None	Chapter 19	Noise

Model	Model Output	Model(s) that Provide Input	Appendix or Chapter	Relevant Resource(s)
CalEEMod 2016.3.2.	Emission factors for criteria air pollutants and greenhouse gases; • Off-road equipment exhaust • Grading dust • Bulldozing dust • Truck loading dust • Demolition dust • Striping of parking lots (off-gassing) • Asphalt paving (off-gassing) Water- and wastewater-related greenhouse gas emissions	None.	Appendix 20A	Air Quality; Greenhouse Gas Emissions
eGRID: Emissions and Generation Resource Integrated Database	Greenhouse Gas Emission Factors	None	Appendix 20A	Greenhouse Gas Emissions
EMFAC 2017: EMission FACtors	On-road vehicle emission factors (criteria pollutants and greenhouse gases) for construction, operations and maintenance, and recreational vehicle trips.	None.	Appendix 20A	Air Quality; Greenhouse Gas Emissions
PC2014	Criteria pollutant and greenhouse gas emissions from personal watercraft; activity hours from personal watercraft.	None.	Appendix 20A	Air Quality; Greenhouse Gas Emissions
AERMOD dispersion model (v. 19191)	Pollutant concentrations	CalEEMod; EMFAC 2017	Appendix 20C	Air Quality
HARP2	Health effects from local pollutant concentrations	AERMOD	Appendix 20C	Air Quality
CAMx	Pollutant concentrations	WRF; SMOKE	Appendix 20D	Air Quality

Model	Model Output	Model(s) that Provide Input	Appendix or Chapter	Relevant Resource(s)
BenMAP: Environmental Benefits Mapping and Analysis Program, Community Edition (v. 1.5.8.5)	Health effects from regional pollutant concentrations	CAMx	Appendix 20D	Air Quality
CEPAM: California Emissions Projections Analysis Model	Annual pollutant emissions for 2016 and future years for California counties	None	Appendix 20D	Air Quality
SMOKE: Sparse Matrix Operator Kernel Emissions Modeling System	Hourly gridded emissions files	None	Appendix 20D	Air Quality
CALSIM II	Climate and sea-level change	2035 CT WSIP 2070	Appendix 28A	Climate Change
CMiP5: Coupled Model Intercomparison Project 5	None	Ensemble of 20 global climate model projections under various Representative Concentration Pathway (RCP) scenarios	Appendix 28A	Climate Change
Sites Historical Water Availability Analysis Tool	Potential water available for appropriation by the Project during the diversion season for the purpose of the water right application	None	Volume 3, Chapter 3, Master Response 1	Surface Water

CT = central tendency; CVP = Central Valley Project; GIS = geographic information system; GLM = generalized linear model; LESA = land evaluation and site assessment; NODOS = North-of-Delta Offstream Storage; RCP = representative concentration pathway; SWP = State Water Project; WSIP = water storage investment program; WUA = weighted usable area.

Table 1A-3. List of Previous Models

Model	Model Output	Model(s) that Provide Input	Appendix	Relevant Resource(s)
SRH: Sedimentation and River Hydraulics - capacity, meander, and vegetation modeling	Sediment balance, erosion, deposition, channel migration, cottonwood growth and survival	USRDOM	Appendix 7B	Fluvial Geomorphology
Sites Reservoir seepage evaluation	Reservoir seepage	None	Appendix 8B	Groundwater Resources
SACFEM2013: Groundwater model of the Sacramento Valley Groundwater Basin	Groundwater levels in the Colusa Subbasin	Sites Reservoir seepage evaluation	Appendix 8B	Groundwater Resources
CVHM: U.S. Geological Survey Central Valley Hydrologic Model	Central Valley groundwater levels and groundwater-surface water interaction	CALSIM II	Appendix 8B	Groundwater Resources
IMpact Analysis for PLANning (IMPLAN) model	Estimate changes in regional output, labor income, value added, employment, and tax base.	SWAP	Appendix 30A	Environmental Justice and Socioeconomics
Statewide Agricultural Production (SWAP) model	Simulates decisions of agricultural producers to estimate changes to agricultural production, assuming that farmers maximize profit subject to available resources (including water) and economic conditions.	CALSIM II	Appendix 30A	Environmental Justice and Socioeconomics
Least Cost Planning Simulation (LCPSIM) model	Estimates economic benefits and other impacts of changes in urban water supply in the South Coast and South San Francisco Bay regions using a simulation/optimization framework.	CALSIM II	Appendix 30A	Environmental Justice and Socioeconomics

Model	Model Output	Model(s) that Provide Input	Appendix	Relevant Resource(s)
Other Municipal Water Economics Model (OMWEM)	Estimates economic benefits of changes in SWP and CVP water supplies in areas outside of the regions modeled in LCPSIM.	CALSIM II	Appendix 30A	Environmental Justice and Socioeconomics

CVP = Central Valley Project; SWP = State Water Project.

Model output from currently run and previously run models is used as input to other models. Figures 1A-1 and 1A-2 identify the analytical framework at the system-wide and local levels.

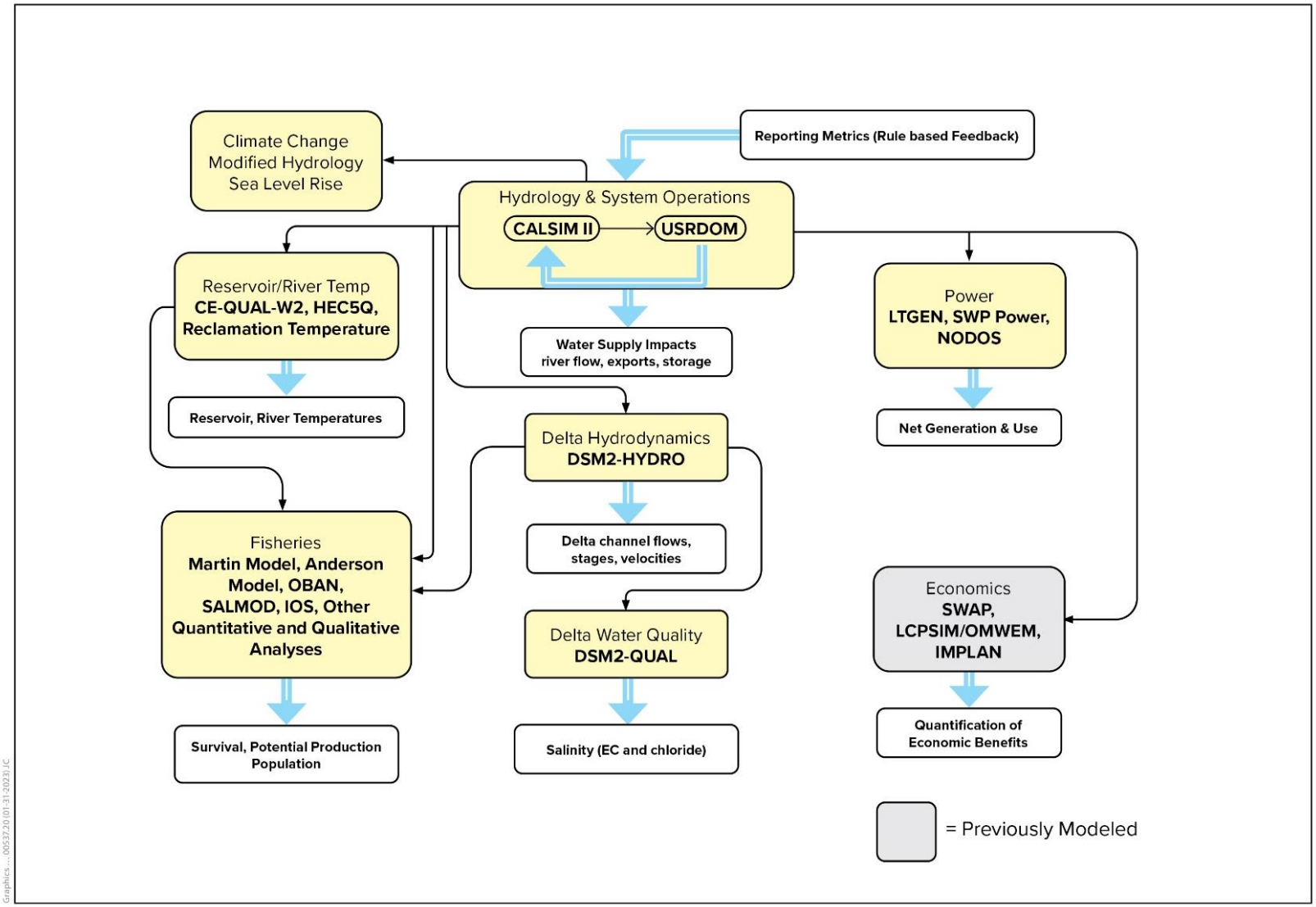

Figure 1A-1
Analytical Framework - System

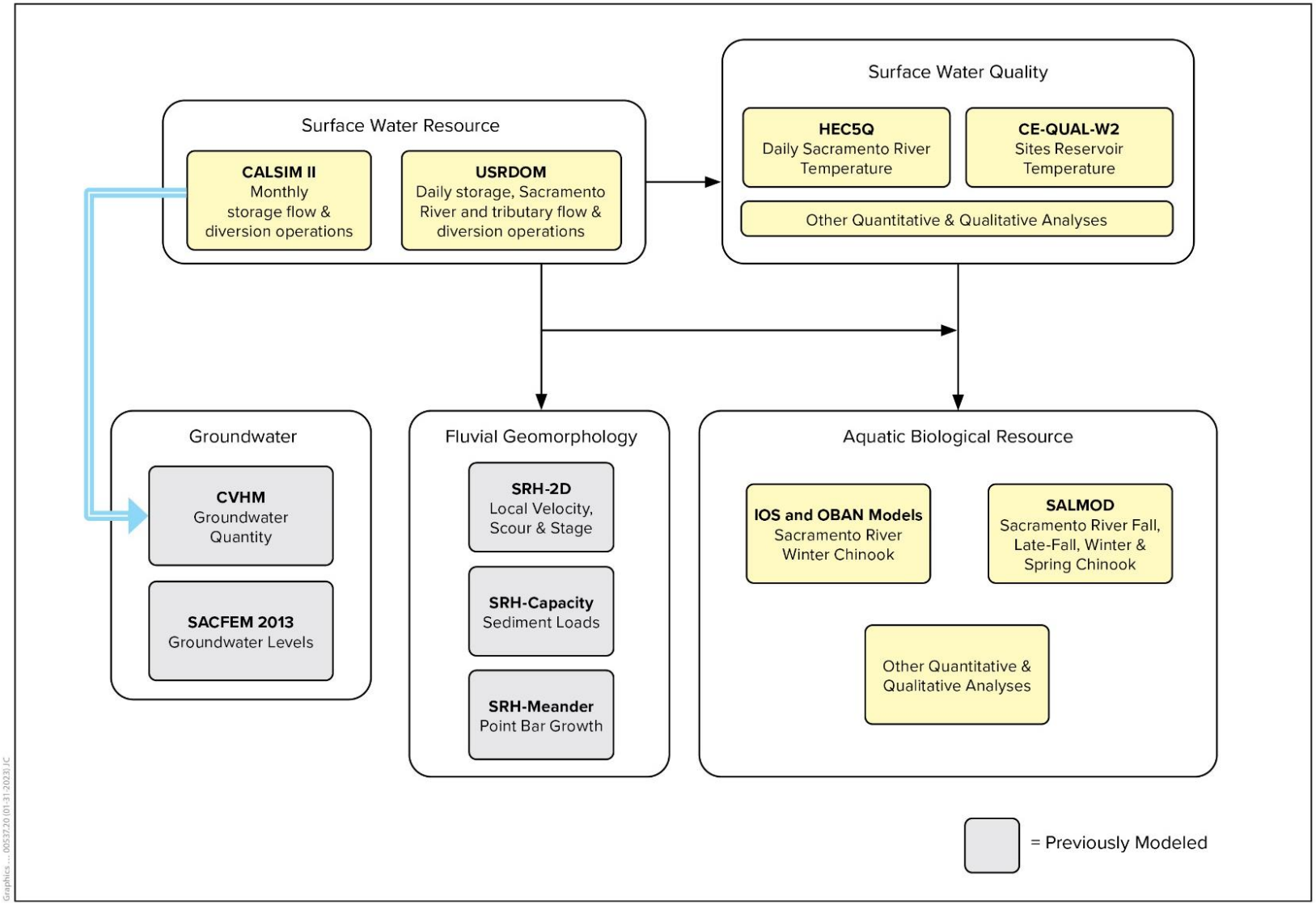

Figure 1A-2
Analytical Framework - Local

1A.1 References

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