Model/Analysis	Location	Type/ Criteria	Life-stage	Species	Description
CalSim-II	CVP/SWP-wide	Hydrologic	NA	NA	A hydrological planning scenario tool that provides monthly average flows for the entire SWP and CVP system based on an 82-year record.
DSM2-HYDRO	Delta and Suisun Marsh	Hydrologic	NA	NA	One-dimensional hydraulic model used to predict flow rate, stage, and water velocity.
DSM2-PTM	Delta and Suisun Marsh	Hydrologic (Particle tracking)	NA	NA	Simulates fate and transport of neutrally buoyant particles through space and time.
DSM2-ePTM (DWR)	Delta and Suisun Marsh	Hydrologic (Particle tracking)	model calibration based on smolt data; uncertain how applicable to rearing fry	model calibration based on Chinook smolt data; uncertain how applicable to steelhead.	Simulates fate and transport of "behaving" particles through space and time. Seven behavioral parameters; calibration method is based on particle swarm optimization
ePTM (SWFSC)	Delta	Hydrologic (Particle tracking)	model calibration based on smolt data; uncertain how applicable to rearing fry	model calibration based on Chinook smolt data; uncertain how applicable to steelhead.	Simulates fate and transport of "behaving" particles through space and time. Seven behavioral parameters (same seven as in DWR model, though exact interpretation a bit different because of different model structures); calibration method is based on <Barb will track down calibration method>
HEC-5Q	Sacramento and American Rivers	Water Quality	NA	NA	Water quality simulation tool used to provide water temperatures.
DSM2-QUAL	Delta and Suisun Marsh	Water Quality	NA	NA	Used to predict water temperature, dissolved oxygen, and salinity.
DSM2-QUAL Fingerprinting	Delta and Suisun Marsh	Water Quality (Olfactory Cues)	Adults	Chinook, steelhead	Models "source" of water at any location to indicate proportion coming from different upstream locations, and therefore incidates how homing capabilities of fish can be affected by changes in operations.
Reclamation Egg Mort. Model	Trinity, Feather, American, and Stanislaus Rivers	Biological	Egg	?	Uses CalSimII flow and climatic model output to predict monthly water temperature in River basins and upstream reservoirs.
SALMOD	Sacramento River	Biological	Returning Adult, Egg, Alevin	All Chinook	Predicts effects of flows on habitat suitability and quantity for all races of Chinook salmon.
SALSIM	San Joaquin River	Biological	All	Fall-run Chinook	Total life history population simulation model for fall-run Chinook salmon.
OBAN	Sacramento River	Biological	?	All Chinook	Statistical modeling approach to evaluating scenarios effects.
DPM	Delta to Chipps Island	Biological	Juvenile (migration)	All Chinook	Simulates migration and mortality of Chinook salmon smolts entering the Delta from the Sacramento, Mokelumne, and San Joaquin rivers through a simplified Delta channel network, and provides quantitative estimates of relative Chinook salmon smolt survival.

Model/Analysis	Location	Type/ Criteria	Life-stage	Species	Description
IOS	Sacramento River	Biological	All	Winter-run Chinook	A stochastic life cycle model for winter-run Chinook salmon.
Salvage-density Analysis	South Delta facilities	Biological (Flow relation)	Juvenile	All Chinook	A model of entrainment into the south Delta facilities as a function of flow based on historical salvage data.
USGS Flow-survival Model	North Delta (Sacramento R.)	Biological (Flow relation)	Juvenile (migration)	Fall-run Chinook (?)	A model that combines equations from statistical models estimating the relationship of Sacramento River inflows on reach-specific travel time, survival, and routing of salmonids to allow assessment of travel time and survival for different operational scenarios.
USGS Entrainment Model	North Delta (Sacramento R.)	Hydrologic (?)	Juvenile (migration)	Fall-run Chinook (?)	A statistical model of probability of entrainment into the central Delta as a function of hydrodynamic variables in the Sacramento River.
SWFSC Temp. Dependent Egg Mort Model	Sacramento River	Biological	Egg	All Chinook	A temperature-dependent mortality model for Chinook salmon embryos that accounts for the effect of flow and dissolved oxygen on the thermal tolerance of developing eggs.
SWFSC WRLCM	Sacramento River	Biological	All	Winter-run Chinook	A state-space and spatially explicit life cycle model of eggs, fry, smolts, juveniles in the ocean, and mature adults that includes density-dependent movement among
ICF loss analysis	South Delta facilities	Salvage and loss	Juvenile	Chinook, steelhead (mostly certain),sturgeon (?)	
SWFSC RAFT/CVTemp	Sacramento River		Juvenile	Chinook	Models water temperatures at various locations and estimates egg survival based on Reclamation's operations
Habitat Suitability Index (HSI) Modeling	NA	Habitat	All	Chinook	This would likely only be needed if some type of habitat restoration were included in the PA. And would need to be specific. HSI components are worked into other methods, like SALMOD.
Yolo Bypass Fry Rearing Model	Delta	Biological	Juvenile	Chinook	The Yolo Bypass Fry Rearing Model links growth to survival at ocean entry using the few existing relevant studies. May want to look into how updated this model is (don't recall it being used for CWF so may be due for refresh or replaced by something else).
Newman 2008	Delta	Biological	Juvenile	Chinook	Through-Delta survival method. Used in CWF but not relied upon extensively.
DSM2	Delta	Physical	Juvenile	Chinook, steelhead	Daily flow metrics, 15-minute velocity frequency: percentage positive flow, frequency of velocities above sustained swimming speeds; used in CWF but very data
6-year study work	Delta	Biological	Juvenile	Chinook, steelhead	Perry under contract with NMFS to begin some work on results from this data, but likley won't meet provided timeline. Rec has contract to complete reports for completed years.
SRKW Analysis	Ocean	Biological	All	SRKW	See CWF. Is largely based on effects to non-listed salmonids, in addition to those on listed salmonids (which are not as large a part of the diet).
CCC Steelhead Analysis		Biological	All	CCC Steelhead	
Eulachon Analysis		Biological	All	Eulachon	

Model/Analysis	Location	Type/ Criteria	Life-stage	Species	Description
Mean end-of-May and end-of-Sep reservoir storage changes from baseline	Sacramento, Feather, American, Stanislaus, San Joaquin Rivers	Physical	Spawner, Egg, Juv	(River dpendant) WR, SR, and FR/LFR Chinook, CV steelhead and GS	
Mean flow changes from baseline (daily data)	Sacramento, Feather, American, Stanislaus, San Joaquin and Trinity Rivers, and Clear Creek	Physical	Spawner, Egg, Juv	(River dpendant) SONCC, WR, SR, and FR/LFR Chinook, CV steelhead and GS	
Flow threshold exceedance (daily data)	Sacramento, Feather, American, Stanislaus, San Joaquin and Trinity Rivers, and Clear creek	Physical	Spawner, Egg, Juv	(River dpendant) SONCC, WR, SR, and FR/LFR Chinook, CV steelhead and GS	
Water temperature changes from baseline (daily data)	Sacramento, Feather, American, Stanislaus, San Joaquin and Trinity Rivers, and Clear creek	Water Quality	Spawner, Egg, Juv	(River dpendant) SONCC, WR, SR, and FR/LFR Chinook, CV steelhead and GS	
Water temperature threshold exceedance (daily data)	Sacramento, Feather, American, Stanislaus, San Joaquin and Trinity Rivers, and Clear creek	Water Quality	Spawner, Egg, Juv	(River dpendant) SONCC, WR, SR, and FR/LFR Chinook, CV steelhead and GS	
Spawning WUA	Sacramento, Feather, American, Stanislaus, San Joaquin and Trinity Rivers, and Clear creek	Habitat	Spawner,	(River dpendant) SONCC, WR, SR, and FR/LFR Chinook, CV steelhead and GS	

Model/Analysis	Location	Type/ Criteria	Life-stage	Species	Description
Rearing WUA	Sacramento, Feather, American, Stanislaus, San Joaquin and Trinity Rivers, and Clear creek	Habitat	Juvenile	(River dpendant) SONCC, WR, SR, and FR/LFR Chinook, CV steelhead and GS	
Redd dewatering (qualitative or greatest monthly flow reduction)	Sacramento, Feather, American, Stanislaus, San Joaquin and Trinity Rivers, and Clear creek	Habitat	Egg	(River dpendant) SONCC, WR, SR, and FR/LFR Chinook, CV steelhead and GS	
Hatchery assessment (lit review and CFM analysis)	Sacramento, Feather, American, Stanislaus, San Joaquin and Trinity Rivers, and Clear creek	Hatchery	Spawner, Juvenile	SR, FR Chinook and CV Steelhead	