

Temperature Dependent Mortality Model Inputs and Assumptions in Water Year 2021

Table 1. Winter-run Chinook temperature-dependent mortality assumptions for hindcast

Parameter	Run Date 11/16/21	Run Date 11/16/21
Meteorology source	Not Applicable	Not Applicable
Operations Forecast	Not Applicable	Not Applicable
Time period	1/1/2021-11/02/2021	1/1/2021-11/02/2021
Reservoir Model used	Not Applicable	Not Applicable
River Model used	Not Applicable	Not Applicable
Shasta Profile date	Not Applicable	Not Applicable
TCD Gate operations	Not Applicable	Not Applicable
Sacramento water temperatures used for TDM	Actual temperatures at KWK and CCR sourced from CDEC	Actual temperatures at KWK and CCR sourced from CDEC
Biological Model used	SacPAS Fish model	SacPAS Fish model
Temperature Mortality Model	Stage-independent mortality (Martin)	Stage-dependent mortality (Anderson)
Egg emergence timing model	Linear. 958 ATUs (degrees C), as indicated for Zeug et al. on SacPAS under Egg to emergence timing model.	487 (degree C days)
TDM redd time distribution	Actual 2021 redd data as integrated in SacPAS Fish Model	Actual 2021 redd data as integrated in SacPAS Fish Model
TDM redd space distribution	Actual 2021 redd data as integrated in SacPAS Fish Model	Actual 2021 redd data as integrated in SacPAS Fish Model
TDM Tcrit (50th percentile)	53.7°F (12.056°C)	53.7°F (12.056°C)
TDM bT (50th percentile)	0.026°C ⁻¹ d ⁻¹ (0.0144°F ⁻¹ d ⁻¹)	1.17°C ⁻¹ d ⁻¹ (0.65°F ⁻¹ d ⁻¹)
Critical Days	All	3
TDM Output (%)	76%	87%

Table 2. Winter-run Chinook temperature-dependent mortality assumptions for hindcast using 2012-2020 redd data.

Parameter	Run Date 11/16/21	Run Date 11/16/21
Meteorology source	Not Applicable	Not Applicable
Operations Forecast	Not Applicable	Not Applicable
Time period	1/1/2021-11/02/2021	1/1/2021-11/02/2021
Reservoir Model used	Not Applicable	Not Applicable
River Model used	Not Applicable	Not Applicable
Shasta Profile date	Not Applicable	Not Applicable
TCD Gate operations	Not Applicable	Not Applicable
Sacramento water temperatures used for TDM	Actual temperatures at KWK and CCR sourced from CDEC	Actual temperatures at KWK and CCR sourced from CDEC
Biological Model used	SacPAS Fish model	SacPAS Fish model
Temperature Mortality Model	Stage-independent mortality (Martin)	Stage-dependent mortality (Anderson)
Egg emergence timing model	Linear. 958 ATUs (degrees C), as indicated for Zeug et al. on SacPAS under Egg to emergence timing model.	487 (degree C days)
TDM redd time distribution	2012-2020	2012-2020
TDM redd space distribution	2012-2020	2012-2020
TDM Tcrit (50th percentile)	53.7°F (12.056°C)	53.7°F (12.056°C)
TDM bT (50th percentile)	0.026°C ⁻¹ d ⁻¹ (0.0144°F ⁻¹ d ⁻¹)	1.17°C ⁻¹ d ⁻¹ (0.65°F ⁻¹ d ⁻¹)
Critical Days	All	3
TDM Output (%)	82%	86%

Table 3. Preliminary Brood Year 2021 Egg-to-Fry Survival Estimate Modeling Methods and Assumptions

Parameter	Egg-to-Fry Hindcast Run Date 11-16-21	Egg-to-Fry Hindcast Run Date 11-16-21
Meteorology source	N/A	N/A
Operations Forecast	N/A	N/A
Time period	1/1/2021-11/2/2021	1/1/2021-11/2/2021
Reservoir Model used	N/A	N/A
River Model used	N/A	N/A
Shasta Profile date	N/A	N/A
TCD Gate operations	N/A	N/A
Sacramento water temperatures used for TDM	1/1/2021-11/2/21: Actual KWK and CCR water temperatures from CDEC	1/1/2021-11/2/21: Actual KWK and CCR water temperatures from CDEC
Biological Model used	SacPAS Fish model	SacPAS Fish model
Temperature Mortality Model	Stage-independent mortality (Martin)	Stage-dependent mortality (Anderson)
Egg emergence timing model	Linear. 958 ATUs (degrees C), as indicated for Zeug et al. on SacPAS under Egg to emergence timing model.	487 (degree C days)
TDM redd time distribution	Observed 2021	Observed 2021
TDM redd space distribution	Observed 2021	Observed 2021
TDM Tcrit (50th percentile)	53.7°F (12.056°C)	53.7°F (12.056°C)
TDM bT (50th percentile)	0.026°C ⁻¹ d ⁻¹ (0.0144°F ⁻¹ d ⁻¹)	1.17°C ⁻¹ d ⁻¹ (0.65°F ⁻¹ d ⁻¹)
Critical Days	All	3
Density Effects: Base rate	0.399	0.480
Carrying Capacity:	1028 redds total	41.8 per KM averaged by reach
Eggs per redd	4925	4925
Egg-to-fry Survival	6%	3%