Table S1. All files and model output are available for upload from the

github.com/bchasco/sar_paper.

File	Description	Output
create_DataAndPars.r	Creates a list of data and parameter objects that are used by the TMB obj	data (list) parameters (list)
create_MapAndObj.r	Creates a map list of parameters and random effects that are not to be estimated by the TMB object, Obj.	myMap (list) Obj (TMB)
wrapper_modelRuns.r	A wrapper that takes user defined inputs and then run the optimization for the TMB object.	rep (list) – TMB output SD (list) – TMB output
wrapper_simRuns.r	A wrapper to do the simulation testing for the parameters of the best fit model to the wild spring/summer Chinook salmon	simMelt (data.frame) – estimated parameters for the simulated data sets
wrapper_simQuadratic.r	A wrapper to compare the parameters estimates for the simulated data based on our AR1 model for day and day/year interaction model with a mixed-effect model where day effect is a fixed effect described linear combination of day and day^2	simMelt (data.frame) – estimated parameters for the simulated data sets
fig_AnnualSurv_ggplot.r	Plot of annual survival	fig_AnnualSurv_ggplot.tiff
fig_DailySurv_ggplot.r	Plot of daily survival, aggregated across years	fig_DailySurv_ggplot.tiff
fig_DayXYearSurvival_ggplot.r	Plot of daily survival by year	fig_DayXYearSurvival_ggplot.tiff
fig_envEffect_ggplot.r	Plot of the environmental effects	fig_envEffect_ggplot.tiff
fig_EnvironmentalVariableWt_ggplot.r	Plot of the predictive ability of the different environmental covariates	fig_EnvironmentalVariableWt_ggplot.tiff
table_AIC.r	Table of the AIC values for the top models	table_AICOutput.csv

table_bestFitMods.r	Table of best-fit models for hatchery and wild fish	table_bestFitMods.csv
table_resDeviance.r	Table of residual deviances for different fixed and mixed-effect models	table_resDeviance.csv

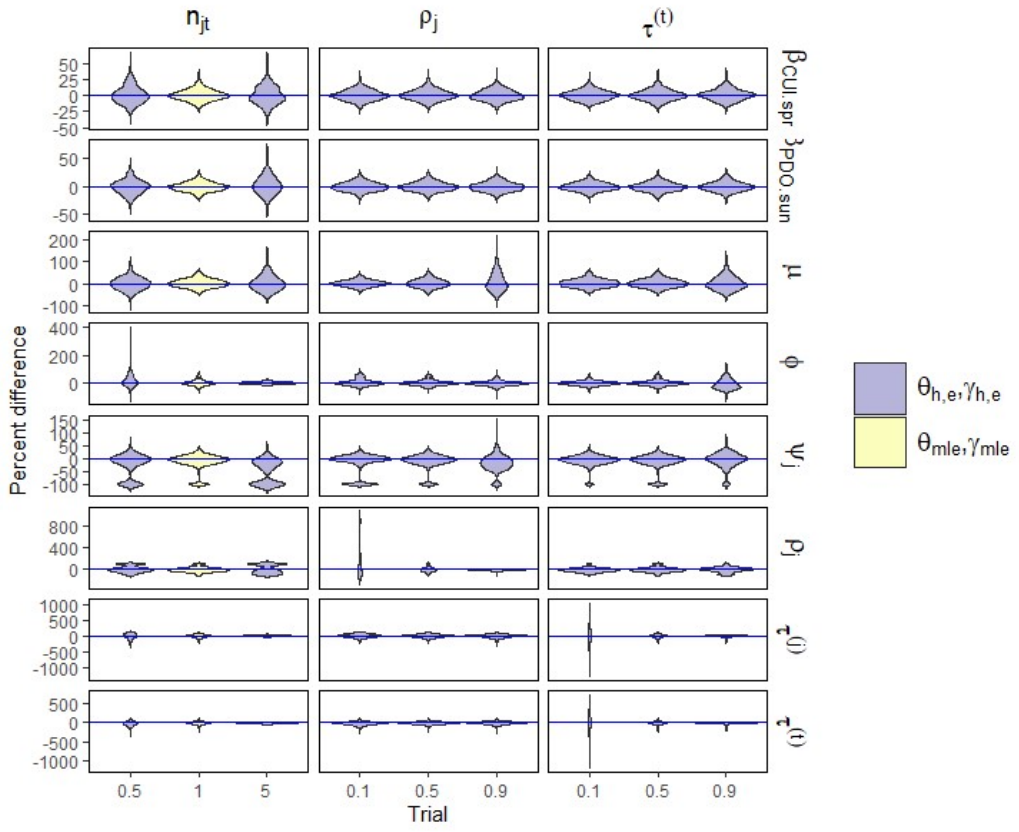

Figure S1. Violin plot of the percent difference between the estimated and "true" parameter values (rows) for three experiments (columns) related to sample size (n_{jt}), correlation of the daily random effects (ρ_j), and correlation of the day/year random effects $(\tau^{(j)}$ and $\tau^{(t)})$. The simulated data for the wild spring/summer Chinook salmon is based on the vectors of maximum likelihood parameters estimates ($\boldsymbol{\theta}_{mle}$ and $\boldsymbol{\gamma}_{mle}$, yellow violins), or the manipulation the sample size or some element of those vectors based on different trials (h; x-axis) and experiment (e; columns). For compactness, we removed the r subscript and superscript for the parameters since all simulations are for wild fish. To recreate the results of these simulation experiments refer to the Appendix Table.A2.

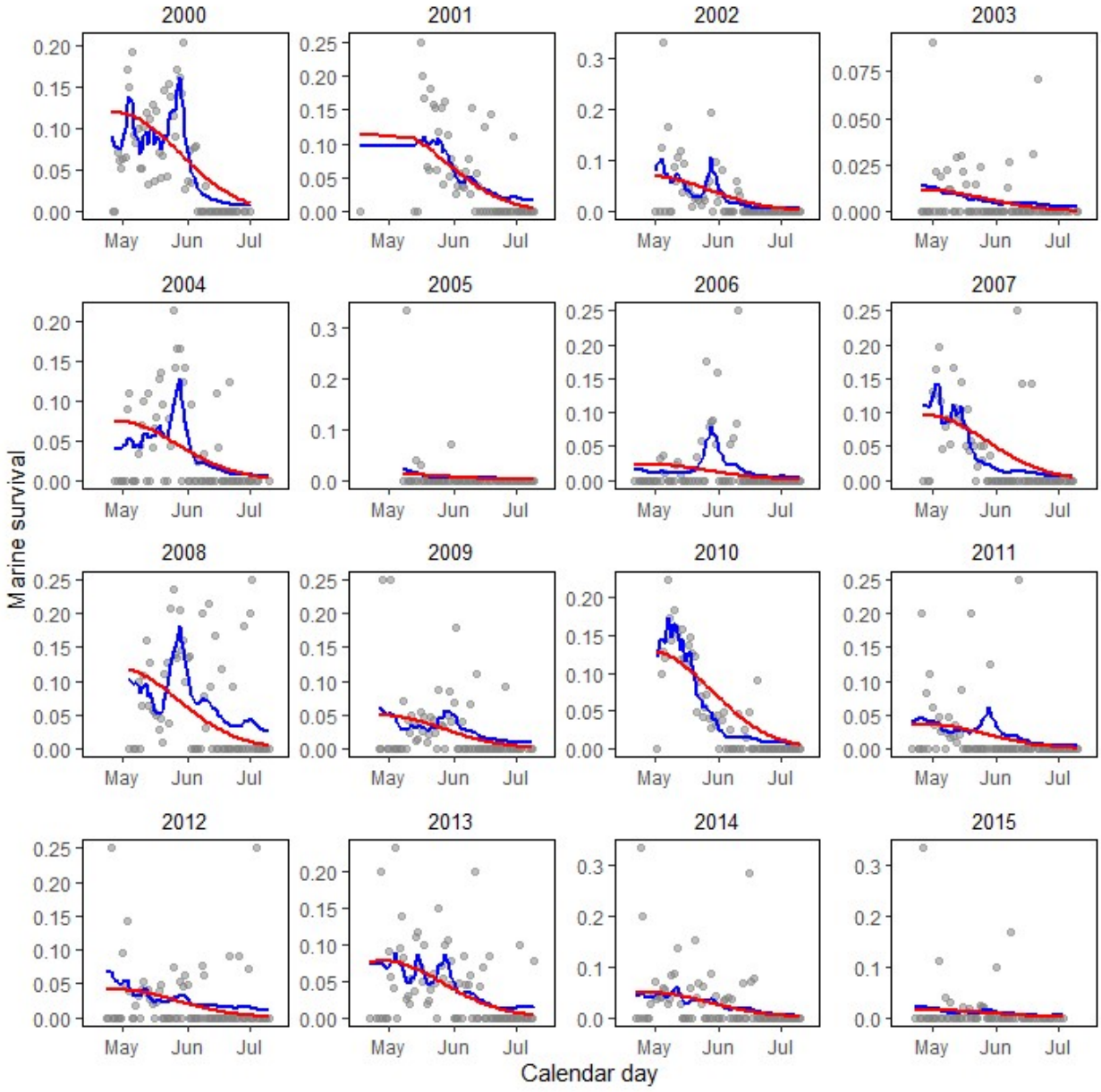

Figure S2. A single realization of the simulated smolt-to-adult (SAR; grey points) for wild spring/summr Chinook salmon based on the mle estimates for the simulation model with AR1 processes for the day and day/year interactions. The blue lines represent the SAR estimates for TMB estimation model with AR1 process for day and day/year, and the red lines represent the glm model implemented in R with fixed-effects for day, day^2, and the day/year interaction.