SAN FRANCISCO ESTUARY & WATERSHED SCIENCE
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RESEARCH

Appendix A: Supplemental Material for the Natal Assignment Model and Raw Increment Data

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Figure A1 Potential salmon sources included in the model used to assign the origin of juvenile Chinook Salmon collected in the legal Delta (*Gray*), in order to identify individuals born in the American River (*Orange*) and whether they reared there or in the freshwater Delta. Potential sources included the following: American River (AME), Nimbus Hatchery (NIH), Lassen tributaries (LAS, combining Mill, Deer, and Battle creeks due to isotopic overlap), Coleman National Fish Hatchery (CNH), upper Sacramento River (SAC_B, combining the upper Sacramento River mainstem and Butte Creek due to isotopic overlap), Yuba River (YUB), Feather River (FEA), Feather River Hatchery (FEH), Mokelumne River (MOK), Mokelumne River Hatchery (MOH), Stanislaus River (STA), Tuolumne River (TUO), Merced River (MER) and Merced River Hatchery (MEH).

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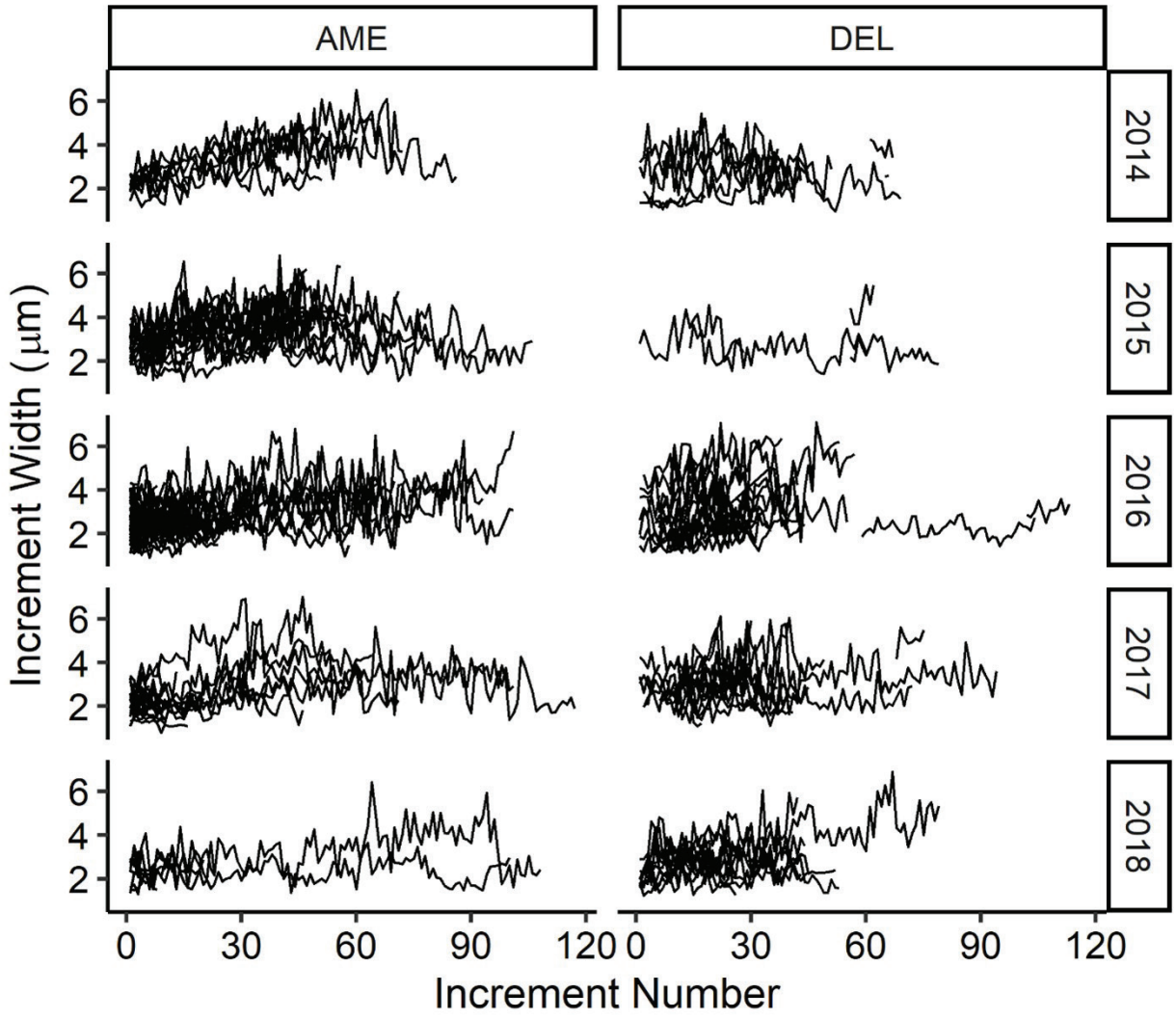

Figure A2 Growth rates of 130 American River origin juvenile Chinook Salmon inferred by otolith daily increment widths. *Black lines* show raw increment widths per year (2014–2018) and their assigned rearing habitat (AME = American River, DEL = Delta) before the 60-day window (i.e., 60th increment) was applied and erroneous data was excluded. The growth rates of Delta rearers are represented in both rearing habitats as they deposit increments in each during their downstream emigration from the American River to the Delta.

Table A1 Isoscape reference samples used to train and test the random forest classification model used to assign natal provenance to juvenile salmon sampled in the Delta in 2014–2018. (Provided as a downloadable .csv file separate from this appendix.)

Table A2 Numbers of salmon in the test dataset assigned to each of the 14 sources using out-of-sample predictions using a natal classification model optimized for the correct identification of natural origin juveniles born in the American River. As highlighted in *bold*, all American River origin juveniles were correctly classified, but 20% of Nimbus Hatchery juveniles were incorrectly classified as natural American River origin fish.

		actual	actual	actual	actual	actual	actual	actual	actual	actual	actual	actual	actual	actual	actual	
	Site codes[a]	AME	CNH	FEA	FEH	LAS	MEH	MER	MOH	MOK	NIH	SAC_B	STA	TUO	YUB	Prediction accuracy (%)
predicted	AME	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**83%**
predicted	CNH	**0**	3	1	0	0	0	0	0	0	0	0	0	0	0	75%
predicted	FEA	**0**	0	5	1	0	0	0	0	1	0	1	3	0	0	45%
predicted	FEH	**0**	0	1	5	0	0	0	1	0	0	0	0	0	0	71%
predicted	LAS	**0**	1	0	0	2	0	0	0	0	0	6	0	0	0	22%
predicted	MEH	**0**	0	0	0	0	3	1	0	0	0	0	0	0	2	50%
predicted	MER	**0**	0	0	0	0	2	2	0	0	0	0	0	0	0	50%
predicted	MOH	**0**	0	0	6	0	0	0	3	1	0	0	2	0	0	25%
predicted	MOK	**0**	0	1	1	0	0	0	0	2	0	3	3	0	0	20%
predicted	NIH	**0**	0	0	0	0	0	0	0	0	4	0	0	0	0	100%
predicted	SAC_B	**0**	2	0	0	0	0	0	0	0	0	8	0	0	0	80%
predicted	STA	**0**	0	0	0	0	0	0	1	0	0	0	1	0	0	50%
predicted	TUO	**0**	0	2	0	0	0	0	0	0	0	0	1	4	0	57%
predicted	YUB	**0**	0	0	0	0	1	0	0	0	0	0	0	0	3	75%
	Percent correct	**100%**	50%	50%	38%	100%	50%	67%	60%	50%	80%	44%	10%	100%	60%	

a. Site codes: AME = American River; CNHColeman National Fish Hatchery; FEA = Feather River; FEH = Feather River Hatchery; LAS = Lassen tributaries (including Mill, Deer and Battle creeks); NIH = Nimbus Hatchery; SAC_B = Sacramento River mainstem and Butte Creek, combined; YUB = Yuba River; MOK = Mokelumne River; MOH = Mokelumne Hatchery; STA = Stanislaus River; TUO = Tuolumne River; MER = Merced River; MEH = Merced Hatchery.

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