

Quantifying Floodplain Rearing Habitat for Juvenile Salmon in a Population Model

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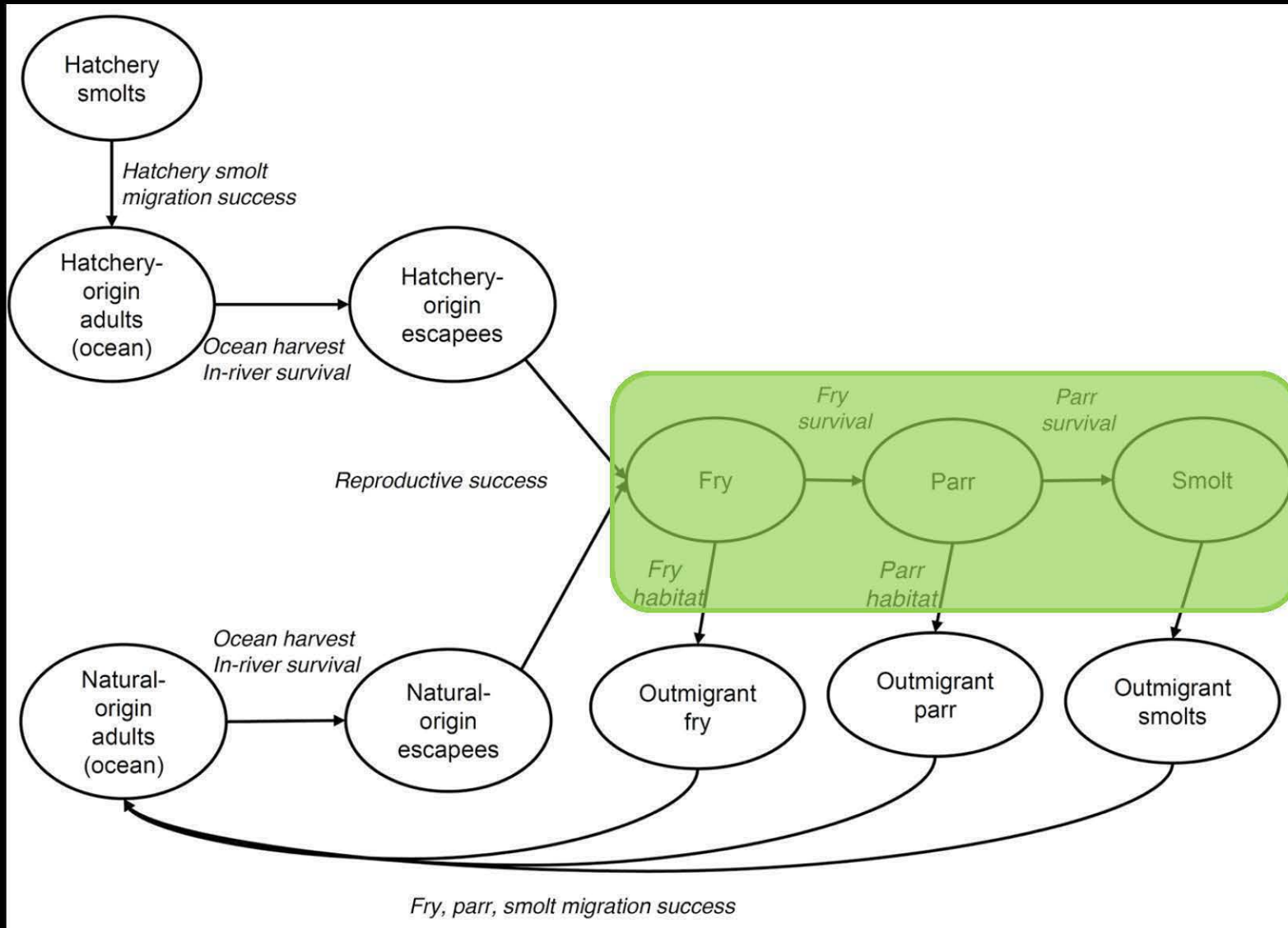






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Floodplains in the 2014 CVPIA model



Limitations associated with parameterization of floodplain habitat in 2014 CVPIA model

- Floodplain habitat quantified using expert elicitation
- Floodplain habitat decoupled from hydrology
- Floodplain habitat not used to modify growth rates

Floodplain habitat quantified using expert elicitation (not data)

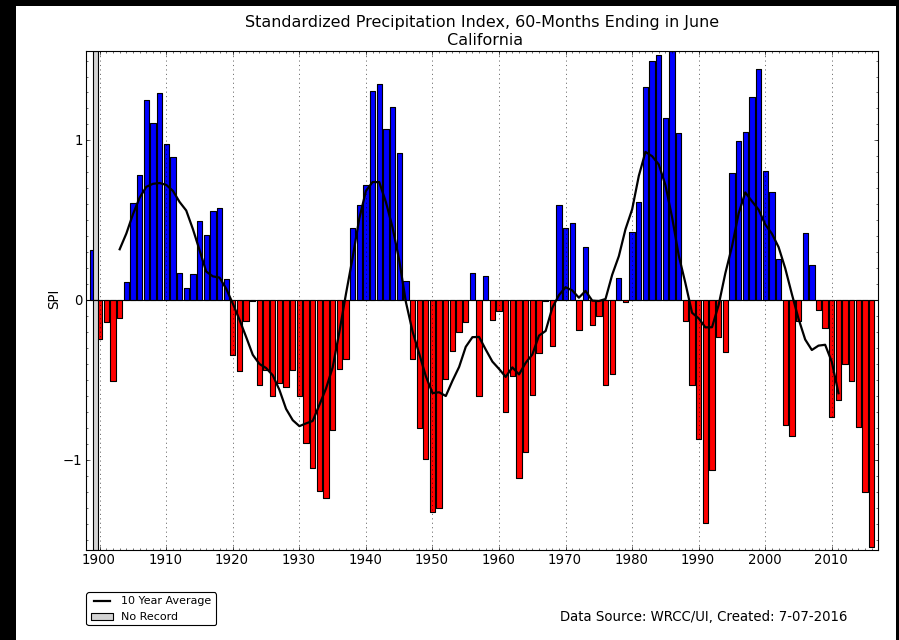
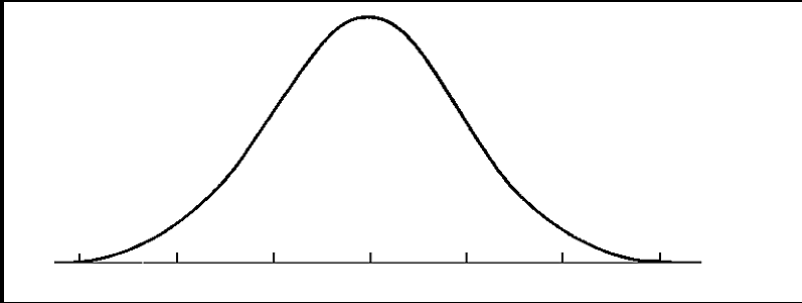
Table 2.4. Mean and standard deviation (in parenthesis) of Chinook Salmon adult holding habitat (pools/km) and spawning, fry and parr in-channel rearing, and juvenile floodplain habitat availability (100m²/km) by watershed. Values in bold and underlined were based on empirical data and all others were based on expert opinion. See text for a description of each habitat type and source of data.

Watershed	Holding	Spawning	Fry	Parr	Floodplain
American River	1.3 (0.16)	<u>2156 (1078.0)</u>	2289 (1064.5)	3092 (1332.8)	14944 (6442.6)
Antelope Creek	11.3 (1.67)	460 (120.2)	1008 (304.5)	829 (262)	404 (149)
Battle Creek	6.2 (2.79)	776 (178.6)	3081 (736.5)	5657 (1137.1)	20 (40)
Bear Creek	4.6 (1.10)	152 (37.5)	764 (216.1)	671 (194.8)	437 (207.8)
Bear River	1.3 (1.96)	395 (149.1)	239 (90.8)	351 (131.9)	323 (124.5)
Big Chico Creek	2.3 (0.56)	101 (26.4)	15 (3.8)	246 (61.5)	20 (40)
Butte Creek	7.1 (4.94)	<u>265 (132.4)</u>	1488 (744)	1211 (726.4)	1768 (3536.3)
Calaveras River	0.5 (0.07)	11 (6.6)	1885 (461.1)	2085 (525.1)	2274 (968.6)
Clear Creek	20.6 (4.39)	<u>1303 (651.6)</u>	<u>2928 (585.5)</u>	<u>2055 (821.9)</u>	1768 (3536.3)
Cosumnes River	0.5 (0.10)	161 (62.5)	1591 (542.9)	2430 (651.2)	91763 (7021.2)
Cottonwood Creek	9.9 (3.91)	278 (129.9)	1338 (563.5)	1362 (460.9)	367 (80.2)
Cow Creek	4.6 (1.01)	182 (79.6)	<u>1838 (344.9)</u>	<u>1047 (421.5)</u>	650 (318.8)
Deer Creek	4.1 (1.23)	402 (73.7)	268 (50.6)	479 (156.5)	380 (94.2)
Elder Creek	4.3 (2.55)	116 (51.3)	270 (53.2)	473 (148.3)	391 (165.5)
Feather River	1.1 (0.13)	1543 (188)	1726 (615.3)	1593 (517.6)	671 (840.4)
Merced River	7.1 (4.94)	92 (69.3)	628 (464.8)	658 (488.3)	705 (535.5)
Mill Creek	14 (4.02)	624 (265.6)	1549 (301.9)	1384 (274)	399 (144.9)
Mokelumne River	0.2 (0.03)	2786 (809)	3039 (464)	4658 (628.3)	4758 (687)
Paynes Creek	9.7 (4.48)	152 (37.5)	848 (285.8)	715 (250.4)	384 (126.6)
San Joaquin River	0.1 (0.08)	5 (5)	1896 (732.5)	2217 (424.8)	1667 (1347.3)
Stanislaus River	4.6 (0.69)	6156 (2062.6)	<u>835 (286.2)</u>	<u>709 (242.3)</u>	2815 (1366)
Stony Creek	1.5 (1.47)	24 (25.5)	150 (300.0)	10 (10)	10 (10)
Thomes Creek	4.2 (1.20)	122 (46.6)	263 (48.5)	470 (143.6)	381 (151)
Tuolumne River	0.8 (0.35)	<u>335 (124)</u>	<u>532 (200.0)</u>	<u>1141 (575.3)</u>	836 (623.3)
Upper-mid Sacramento River	0.8 (0.53)	<u>3272 (1091.6)</u>	<u>2492 (747.7)</u>	<u>953 (6803.2)</u>	1660 (2068.7)
Lower-mid Sacramento River	2.9 (0.61)	<u>3316 (574.1)</u>	<u>2062 (839.4)</u>	<u>2161 (866.4)</u>	3593 (2157.1)
Yuba River	3.6 (2.48)	<u>3396 (1697.9)</u>	<u>1211 (363.2)</u>	<u>433 (343)</u>	755 (248.7)

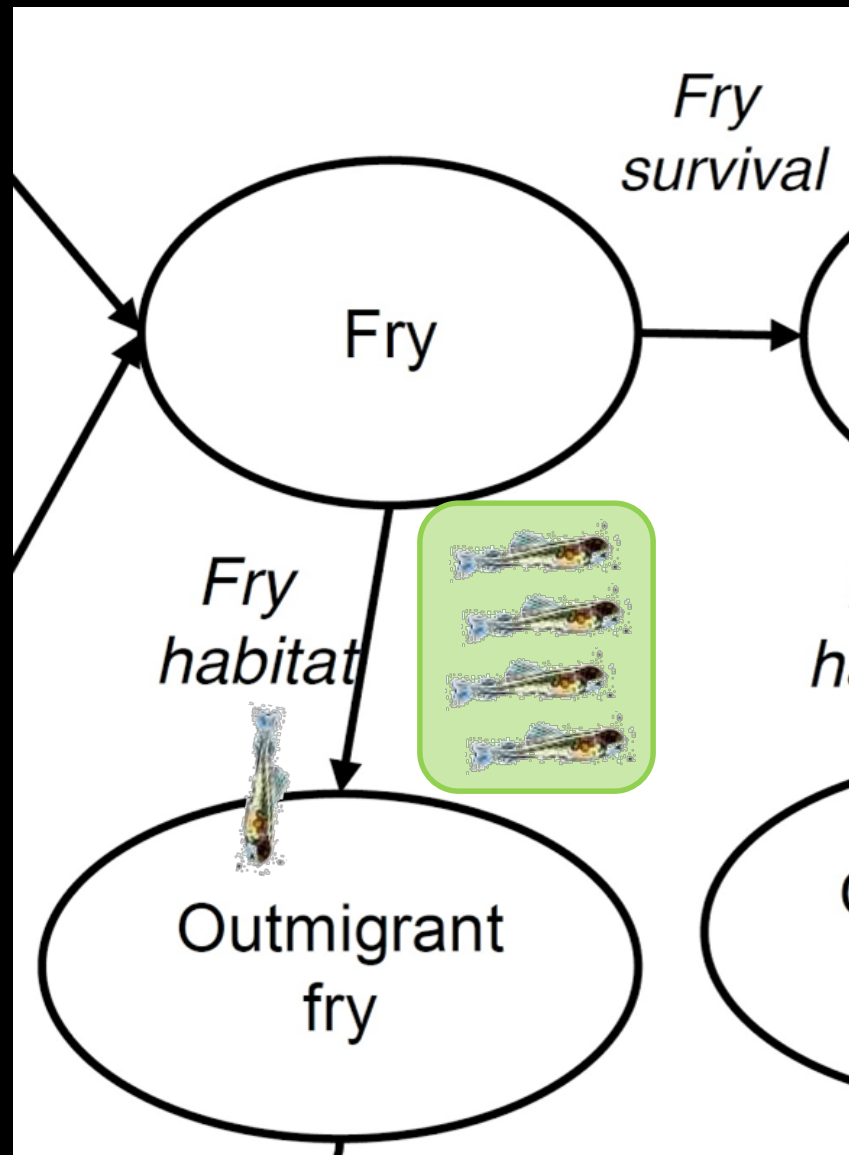
Floodplain habitat decoupled from hydrology

“ Terrestrial or semi-aquatic areas that are outside of and adjacent to the active stream channel; were connected to the main channel during high flows and allow ingress and egress of juvenile salmon; and were seasonally inundated for a period of at least 10 consecutive days with a frequency of occurrence of at least 6 out of 10 years.”

Floodplain habitat decoupled from hydrology



Floodplain habitat not used to modify growth rates

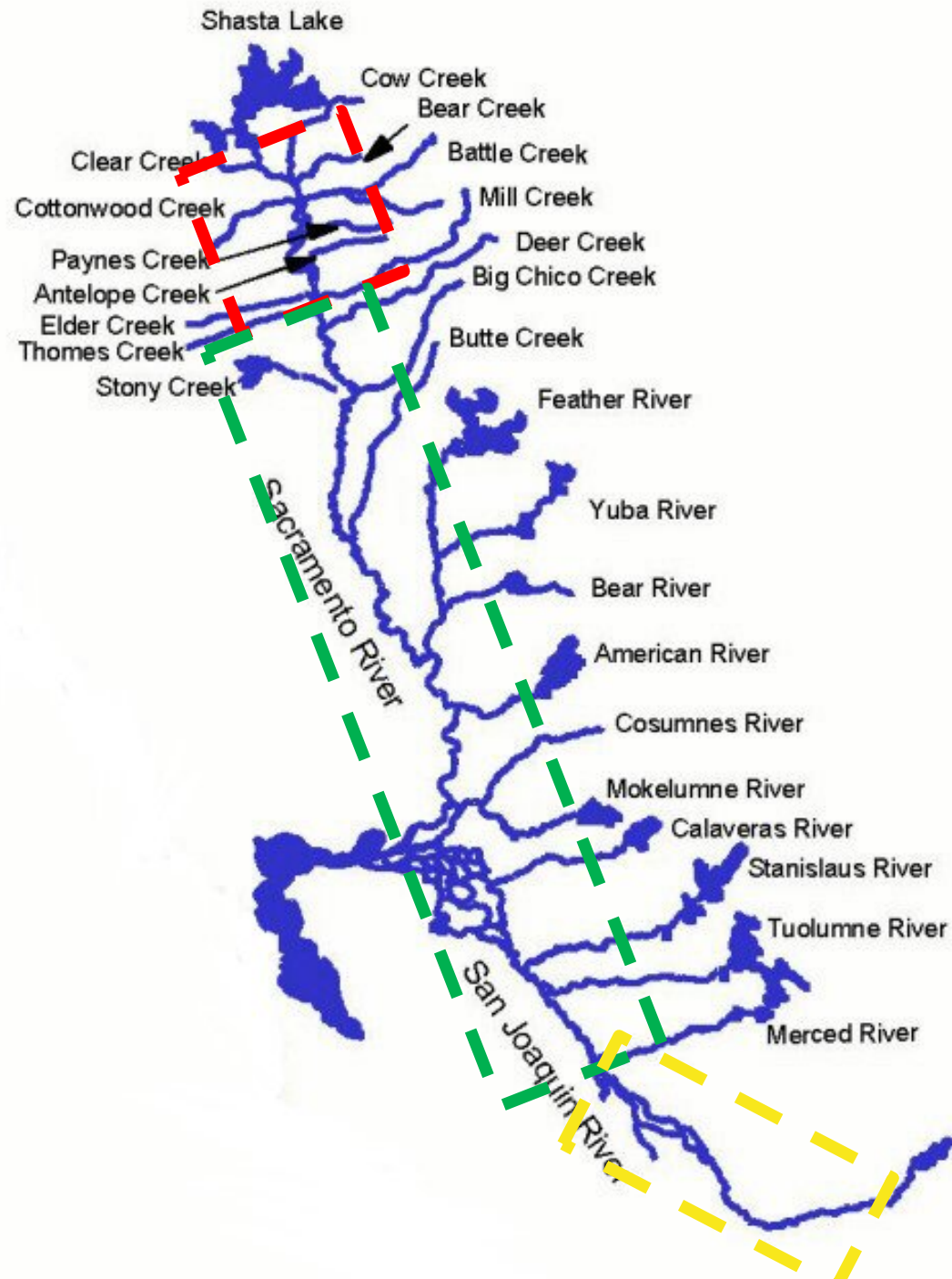


Improvements in parameterization of floodplain habitat in 2016 CVPIA model

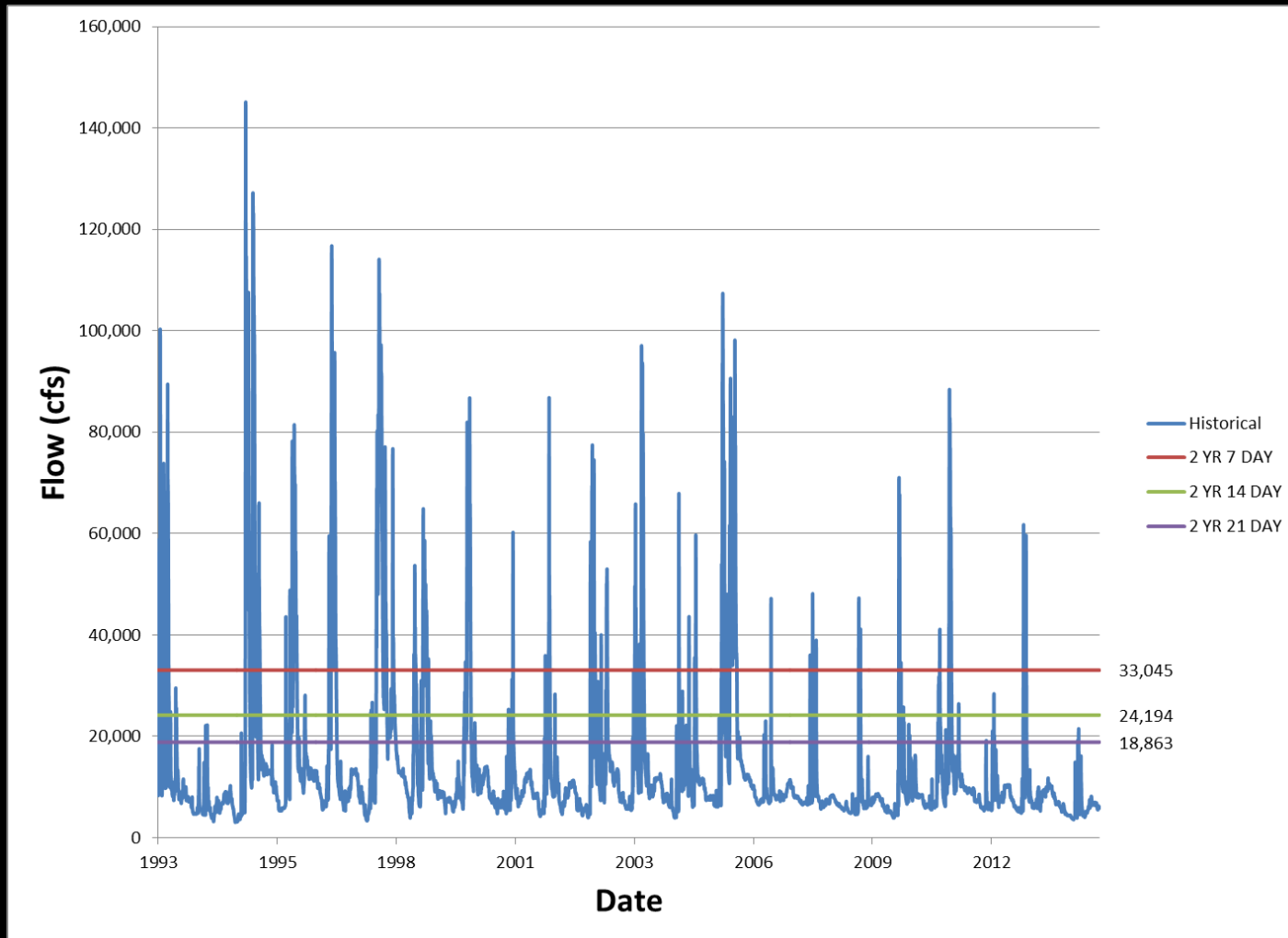
- Floodplain habitat quantified using data
- Floodplain habitat correlated with hydrology
- Floodplain habitat used to modify survival and growth rates

Floodplain habitat quantified using data (CVFPP Conservation Strategy)

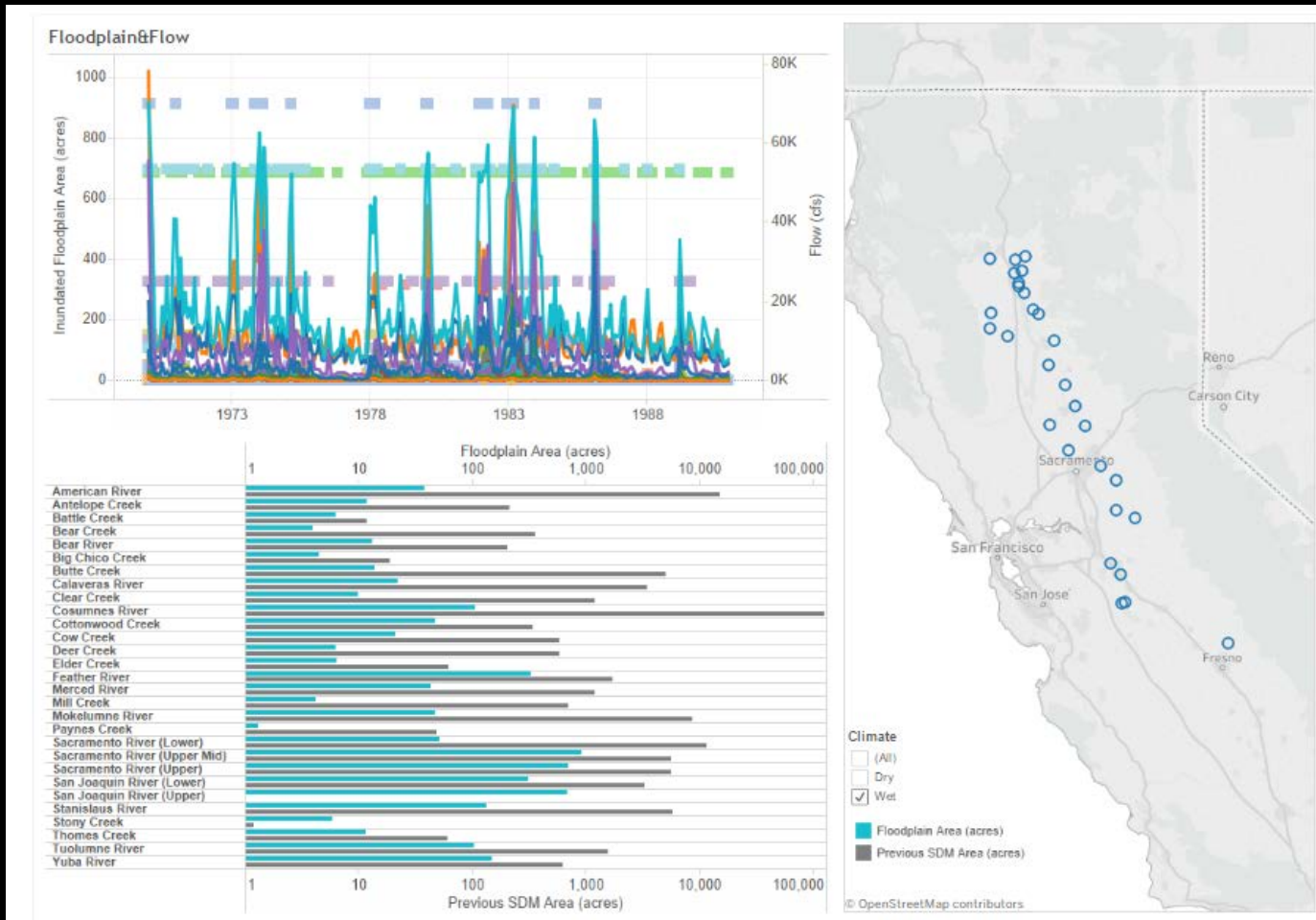
1. Not modeled; scaled projected water surface elevations
2. Modeled; limited extents on tributaries; scaled
3. Modeled, available from San Joaquin River Restoration Program



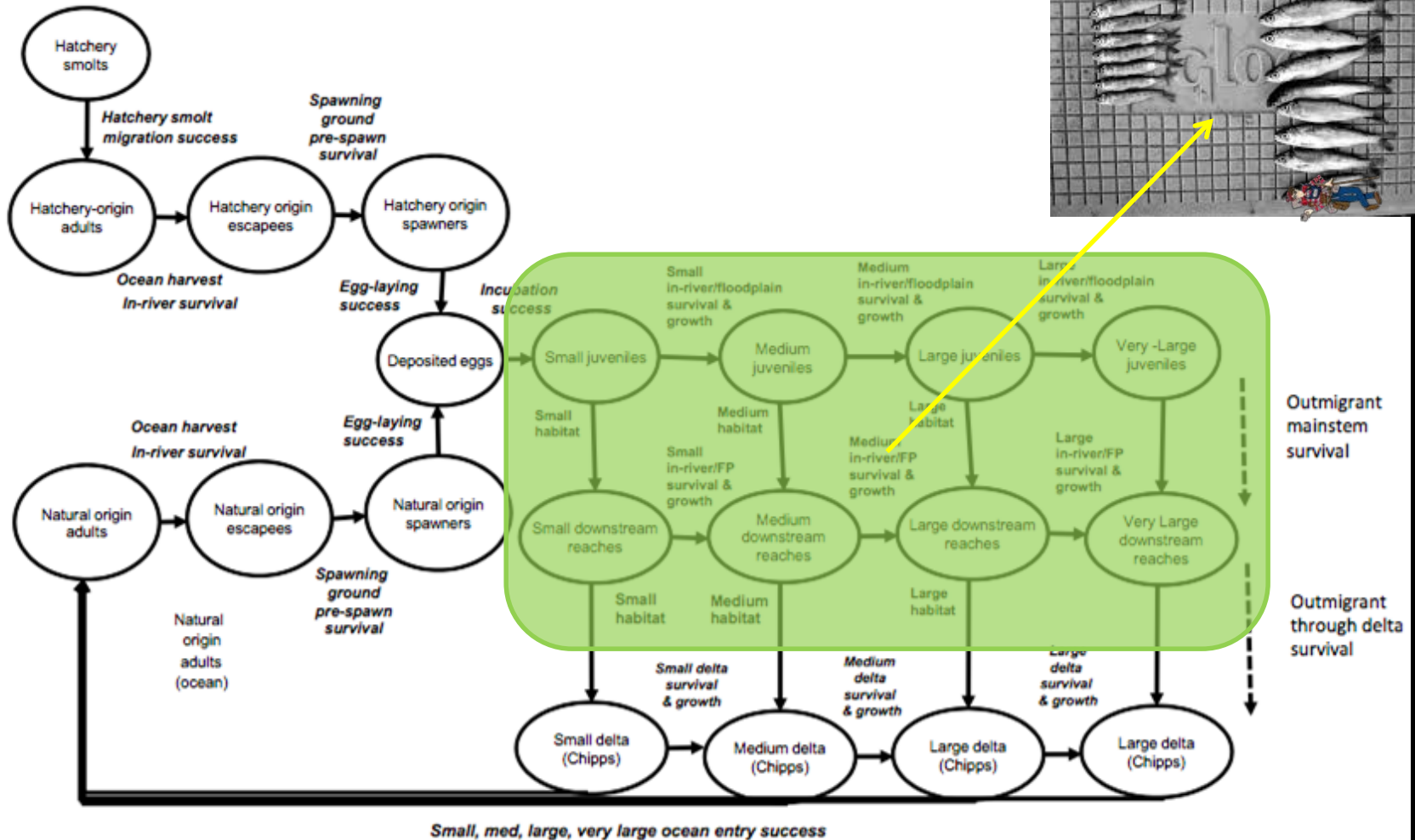
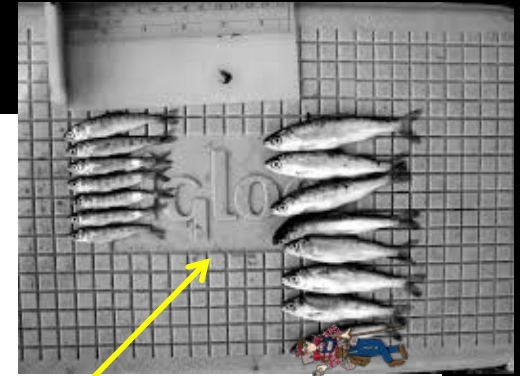
Floodplain habitat correlated with hydrology



Floodplain habitat correlated with hydrology

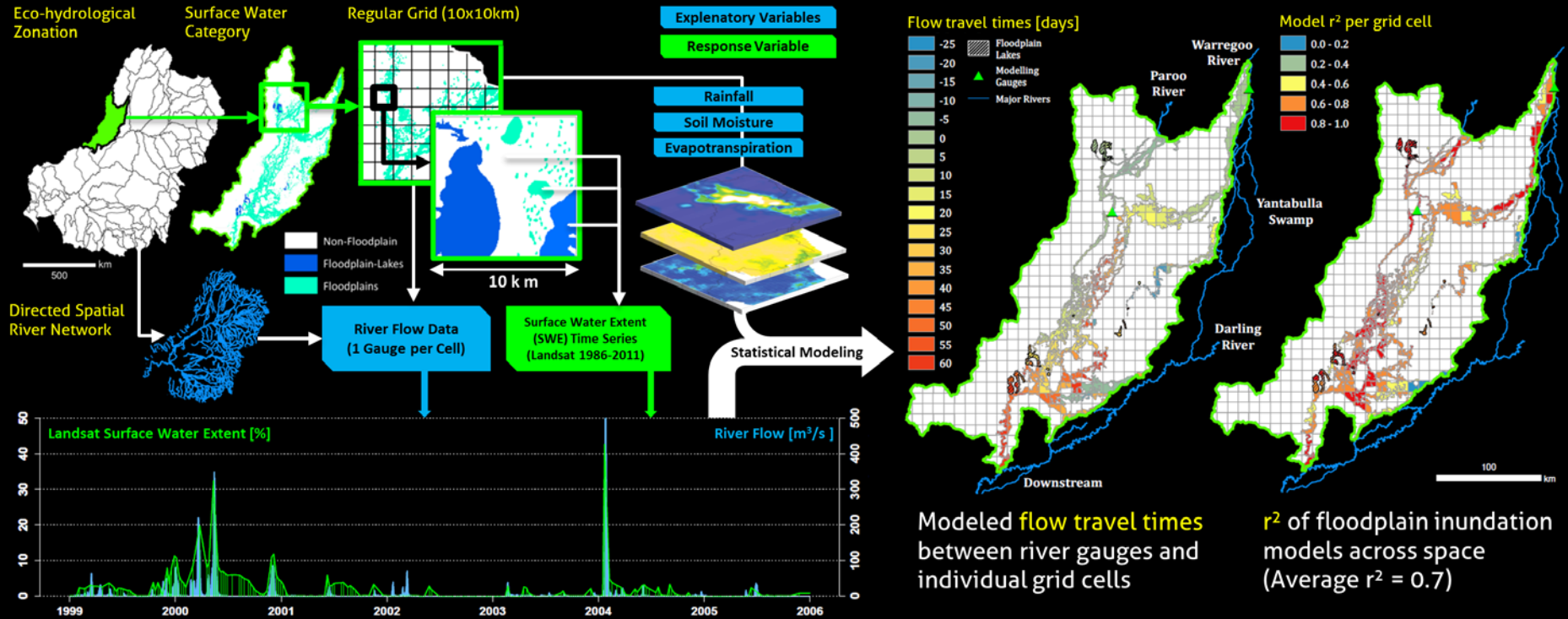


Floodplain habitat used to modify survival and growth rates

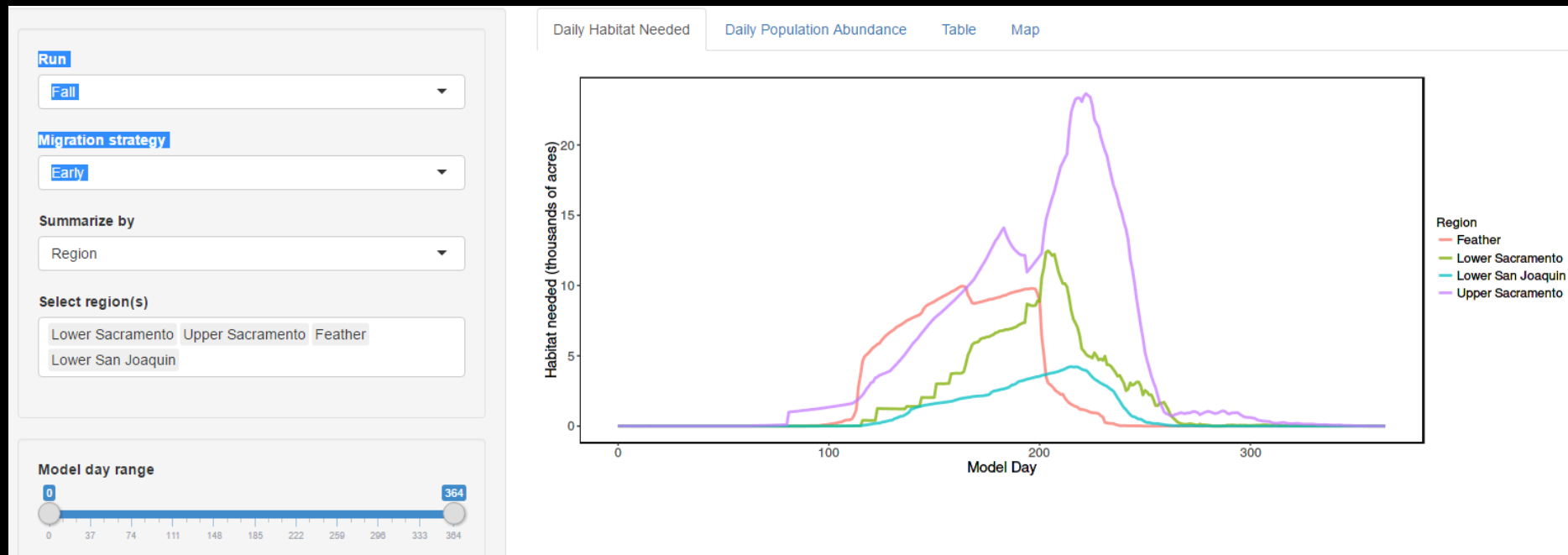


Next steps: further refining parameterization of floodplain habitat

A new Framework for Modeling **Surface Water Dynamics** from Space



Next steps: evaluating floodplain habitat creation actions



Questions?

