**Supporting Information.** Mahardja, B.*, V. Tobias, S. Khanna, L. Mitchell, P. Lehman, T. Sommer, L. Brown, S. Culberson, and J.L. Conrad. 2020. Resistance and Resilience of Pelagic and Littoral Fishes to Drought in the San Francisco Estuary. *Ecological Applications*.

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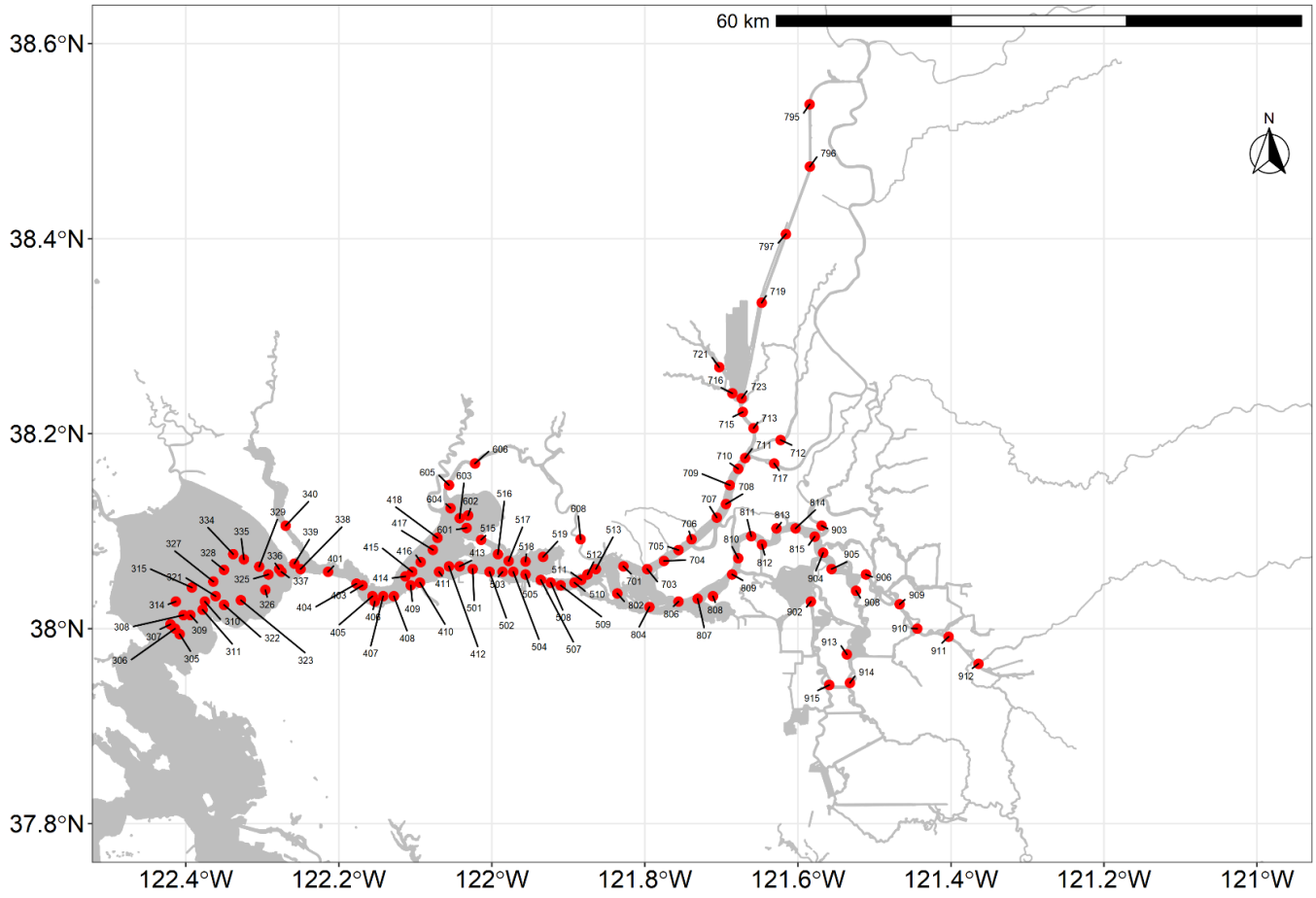
**Appendix S1.**

Additional information on datasets used for each drought cycle model and model results.

Fig. S1: Map of the San Francisco Estuary, indicating sampling locations for the FMWT survey used in this study and associated station numbers.



Drought Resiliency of Estuarine Fishes

Figure S2: Map of the upper San Francisco Estuary and its watershed, indicating sampling locations for the DJFMP beach seine survey used in this study and associated station codes.

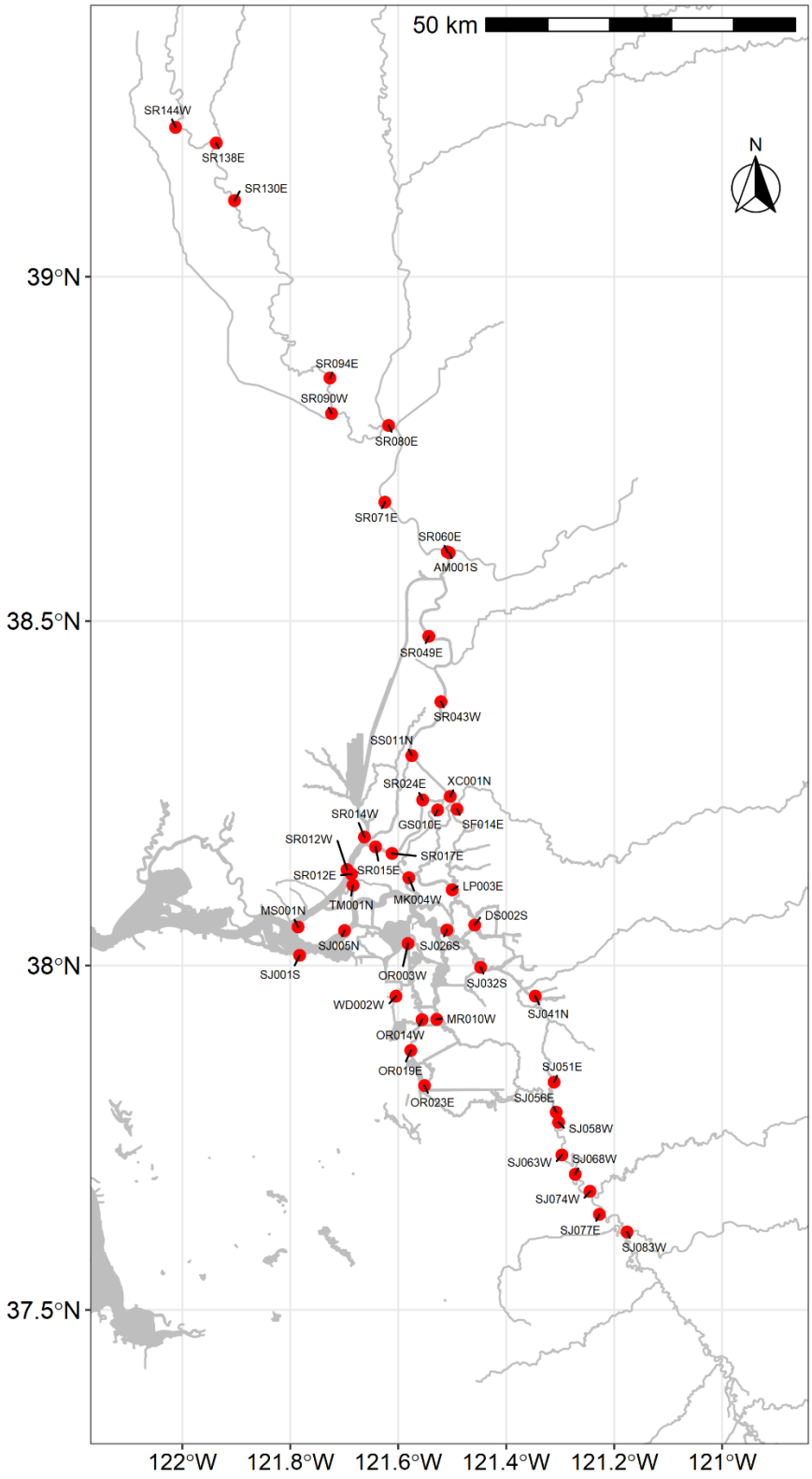


Figure S3. Annual summary of centroid day of outflow as described in Table 1 for our study period (1967-2017). Unit for y-axis is the number of days since October 1st. Water year classification was based on California Department of Water Resources index as seen in Figure 2.

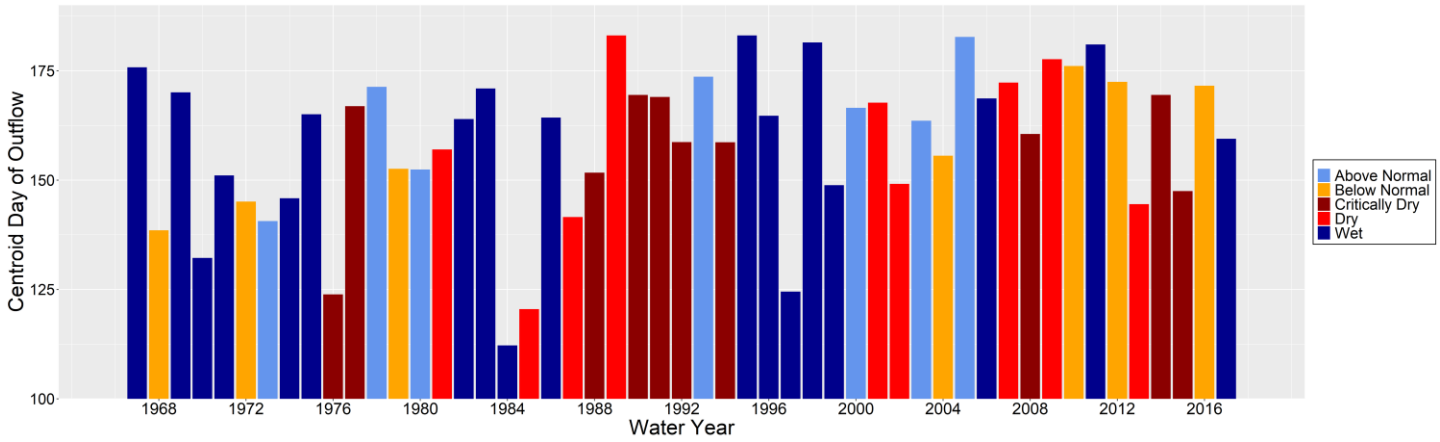



Figure S4. Annual summary of centroid day of Delta precipitation as described in Table 1 for our study period (1967-2017). Unit for y-axis is the number of days since October 1st. Water year classification was based on California Department of Water Resources index as seen in Figure 2.

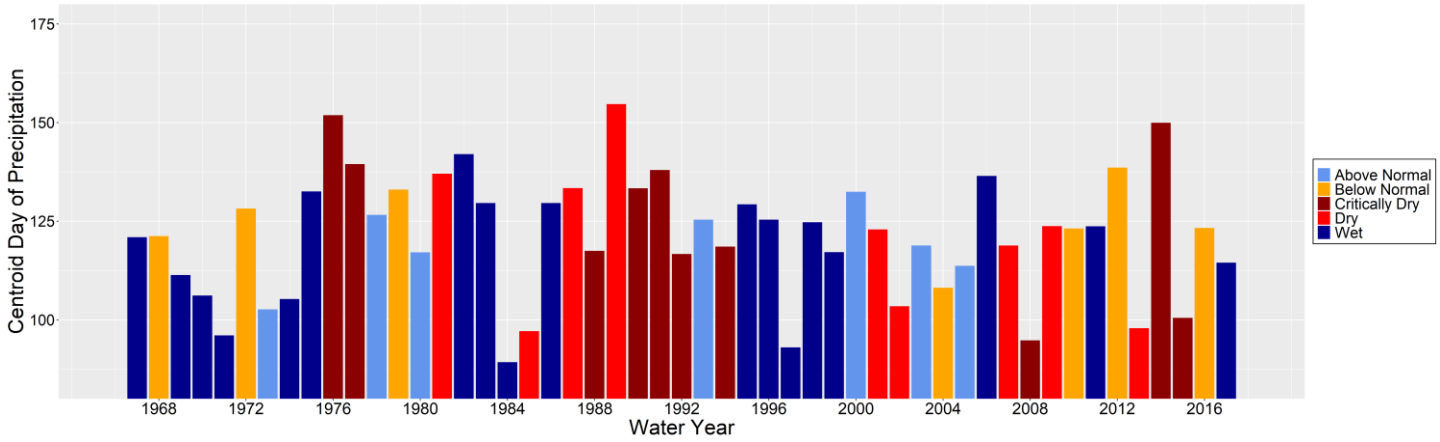


Figure S5. Annual summary of mean daily water export from the Sacramento-San Joaquin Delta as described in Table 1 for our study period (1967-2017). Unit for y-axis is in cubic feet per second. Water year classification was based on California Department of Water Resources index as seen in Figure 2.

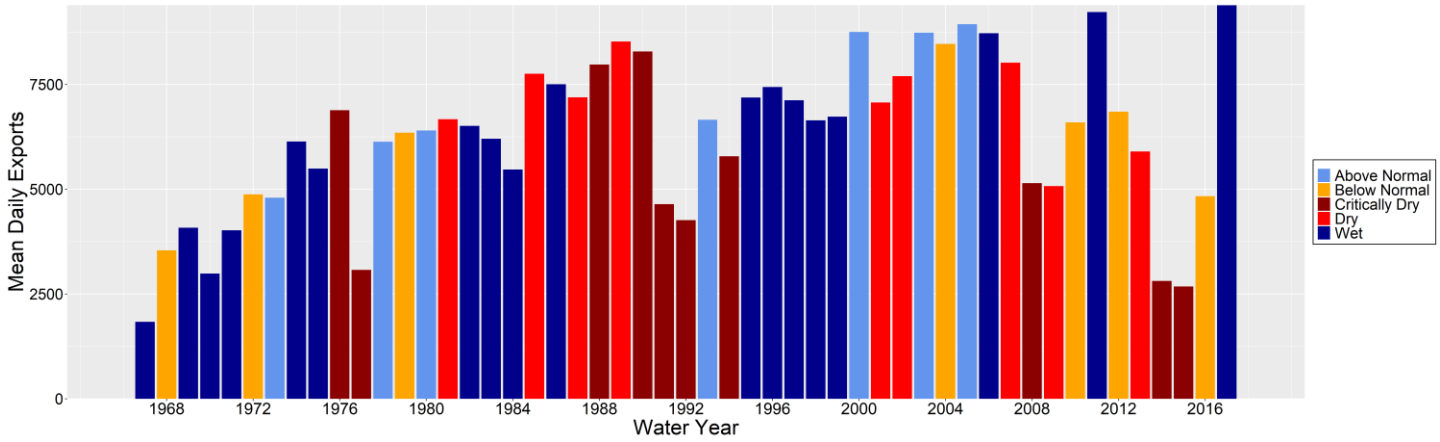



Figure S6: Resistance and resilience coefficients from Bayesian logistic regression models, sorted by species and drought cycle number. Lines extending from each point indicate the 95% credible intervals for each term. Black dots indicate 95% credible intervals that did not include 0.

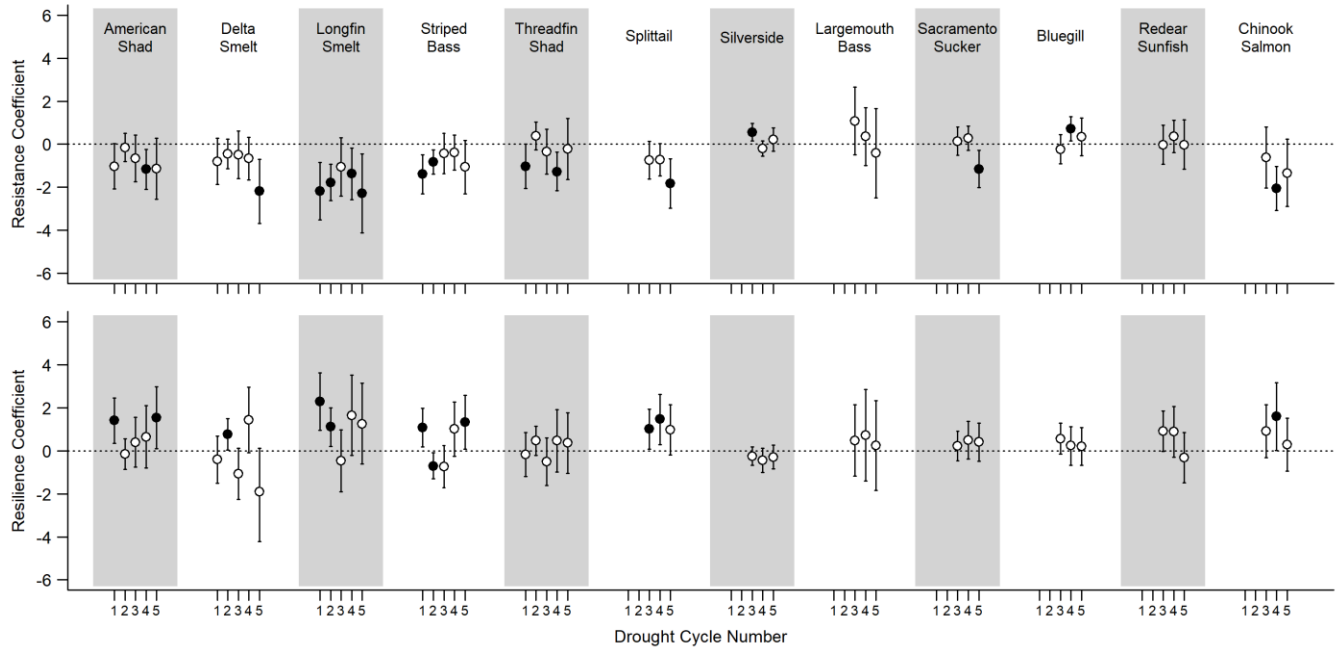


Table S1. List of FMWT stations, with + symbol indicating which stations have data in all three phases (pre-drought, drought, post-drought) of a drought cycle.

| Station | Drought Cycle 1: 1967-1986 | Drought Cycle 2: 1978-2000 | Drought Cycle 3: 1995-2006 | Drought Cycle 4: 2006-2011 | Drought Cycle 5: 2011-2017 |
|---|---|---|---|---|---|
| 305 | + | + | + | + | + |
| 306 | + | + | + | + | + |
| 307 | + | + | + | + | + |
| 308 | + | + | + | + | + |
| 309 | + | + | + | + | + |
| 310 | + | + | + | + | + |
| 311 | + | + | + | + | + |
| 314 | + | + | + | + | + |
| 315 | + | + | + | + | + |
| 321 | + | + | + | + | + |
| 322 | + | + | + | + | + |
| 323 | + | + | + | + | + |
| 325 | + | + | + | + | + |
| 326 | + | + | + | + | + |
| 327 | + | + | + | + | + |
| 328 | + | + | + | + | + |
| 329 | + | + | + | + | + |
| 334 | + | + | + | + | + |
| 335 | + | + | + | + | + |
| 336 | + | + | + | + | + |
| 337 | + | + | + | + | + |
| 338 | + | + | + | + | + |
| 339 | + | + | + | + | + |
| 340 | + | + | + | + | + |
| 401 | + | + | + | + | + |
| 403 | + | + | + | + | + |
| 404 | + | + | + | + | + |
| 405 | + | + | + | + | + |
| 406 | + | + | + | + | + |
| 407 | + | + | + | + | + |
| 408 | + | + | + | + | + |
| 409 | + | + | + | + | + |
| 410 | + | + | + | + | + |
| 411 | + | + | + | + | + |
| 412 | + | + | + | + | + |
| 413 | + | + | + | + | + |

| | | | | | |
|---|---|---|---|---|---|
| 414 | + | + | + | + | + |
| 415 | + | + | + | + | + |
| 416 | + | + | + | + | + |
| 417 | + | + | + | + | + |
| 418 | + | + | + | + | + |
| 501 | + | + | + | + | + |
| 502 | + | + | + | + | + |
| 503 | + | + | + | + | + |
| 504 | + | + | + | + | + |
| 505 | + | + | + | + | + |
| 507 | + | + | + | + | + |
| 508 | + | + | + | + | + |
| 509 | + | + | + | + | + |
| 510 | + | + | + | + | + |
| 511 | + | + | + | + | + |
| 512 | + | + | + | + | + |
| 513 | + | + | + | + | + |
| 515 | + | + | + | + | + |
| 516 | + | + | + | + | + |
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| 518 | + | + | + | + | + |
| 519 | + | + | + | + | + |
| 601 | + | + | + | + | + |
| 602 | + | + | + | + | + |
| 603 | + | + | + | + | + |
| 604 | + | + | + | + | + |
| 605 | + | + | + | + | + |
| 606 | + | + | + | + | + |
| 608 | + | + | + | + | + |
| 701 | + | + | + | + | + |
| 703 | + | + | + | + | + |
| 704 | + | + | + | + | + |
| 705 | + | + | + | + | + |
| 706 | + | + | + | + | + |
| 707 | + | + | + | + | + |
| 708 | + | + | + | + | + |
| 709 | + | + | + | + | + |
| 710 | + | + | + | + | + |
| 711 | + | + | + | + | + |
| 802 | + | + | + | + | + |
| 804 | + | + | + | + | + |
| 806 | + | + | + | + | + |
| 807 | + | + | + | + | + |

| | | | | | |
|---|---|---|---|---|---|
| 808 | + | + | + | + | + |
| 809 | + | + | + | + | + |
| 810 | + | + | + | + | + |
| 811 | + | + | + | + | + |
| 812 | + | + | + | + | + |
| 813 | + | + | + | + | + |
| 814 | + | + | + | + | + |
| 815 | + | + | + | + | + |
| 902 | + | + | + | + | + |
| 903 | + | + | + | + | + |
| 904 | + | + | + | + | + |
| 905 | + | + | + | + | + |
| 906 | + | + | + | + | + |
| 908 | + | + | + | + | + |
| 909 | + | + | + | + | + |
| 910 | + | + | + | + | + |
| 911 | + | + | + | + | + |
| 912 | + | + | + | + | + |
| 913 | + | + | + | + | + |
| 914 | + | + | + | + | + |
| 915 | + | + | + | + | + |
| 712 | - | - | + | + | + |
| 713 | - | - | + | + | + |
| 715 | - | - | + | + | + |
| 716 | - | - | + | + | + |
| 717 | - | - | + | + | + |
| 719 | - | - | - | + | + |
| 721 | - | - | - | + | + |
| 723 | - | - | - | + | + |
| 795 | - | - | - | + | + |
| 796 | - | - | - | + | + |
| 797 | - | - | - | + | + |

Table S2. List of DJFMP stations, with + symbol indicating which stations have data in all three phases (pre-drought, drought, post-drought) of a drought cycle. *Note that for Chinook Salmon, data for drought cycle 3 only consists of years from 1999 to 2006.

| Station | Region | Drought Cycle 3: 1995-2006* | Drought Cycle 4: 2006-2011 | Drought Cycle 5: 2011-2017 | Notes |
|---|---|---|---|---|---|
| SR071E | 1 | + | + | + | |
| SR080E | 1 | + | + | + | |
| SR090W | 1 | + | + | + | |
| SR094E | 1 | + | + | + | |
| SR130E | 1 | + | + | + | |
| SR138E | 1 | + | + | + | |
| SR144W | 1 | + | + | + | |
| MS001N | 2 | + | + | + | |
| AM001S | 2 | + | + | + | |
| SR049E | 2 | + | + | + | |
| SR060E | 2 | + | + | + | |
| SR012E/SR012W | 2 | + | + | + | Station SR012E was replaced by SR012W, treated as replicates of one another. |
| SR014W | 2 | + | + | + | |
| SR017E | 2 | + | + | + | |
| SR024E | 2 | + | + | + | |
| SR043W | 2 | + | + | + | |
| SS011N | 2 | + | + | + | |
| LP003E | 3 | + | + | + | |
| MK004W | 3 | + | + | + | |
| SJ001S | 3 | + | + | + | |
| SJ005N | 3 | + | + | + | |
| TM001N | 3 | + | + | + | |
| DS002S | 3 | + | + | + | |
| SF014E | 3 | + | + | + | |
| GS010E | 3 | + | + | + | |
| XC001N | 3 | + | + | + | |
| SJ051E | 4 | + | + | + | |
| MR010W | 4 | + | + | + | |
| SJ026S | 4 | - | + | + | |
| SJ032S | 4 | + | + | + | |
| SJ041N | 4 | + | + | + | |
| OR003W | 4 | + | + | + | |
| OR014W | 4 | + | + | + | |
| OR019E | 4 | + | + | + | |
| WD002W | 4 | + | + | + | |

| | | | | | |
|---|---|---|---|---|---|
| OR023E | 4 | + | + | + | |
| SJ068W | 5 | + | + | - | |
| SJ056E | 5 | + | + | + | |
| SJ058W | 5 | + | + | + | |
| SJ063W | 5 | + | + | + | |
| SJ074W | 5 | + | + | + | |
| SJ077E | 5 | + | + | + | |
| SJ083W | 5 | + | + | + | |

Table S3: Summary of Bayesian logistic regression model parameters and simulation accuracy rates for (a) American Shad, (b) Delta Smelt, (c) Longfin Smelt, (d) Striped Bass, (e) Threadfin Shad, (f) Sacramento Splittail, (g) Mississippi Silverside, (h) Largemouth Bass, (i) Sacramento Sucker, (j) Bluegill, (k) Redear Sunfish, and (l) Chinook Salmon. Columns in parameter summaries represent the marginal posterior mean (Mean), standard deviation (SD), and 95% credible interval lower (Lower CI) and upper (Upper CI) bounds. Simulated observation accuracy rates are summarized below parameter summaries. Columns in accuracy rate summaries represent the minimum (Min), first quartile (Q1), median (Median), mean (Mean), third quartile (Q3), and maximum (Max) accuracy rates. Potential scale reduction factors across all parameters and random effects, across all models, range from 0.999 to 1.003.

(a) American Shad

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | 0.325017 | 0.325537 | -0.31731 | 0.958914 |
| $\Delta_{1,c=1}$ | -1.03025 | 0.536392 | -2.07922 | 0.032679 |
| $\Delta_{2,c=1}$ | 1.409269 | 0.53778 | 0.355369 | 2.461786 |
| $\Delta_{1,c=2}$ | -0.15456 | 0.335083 | -0.81298 | 0.49977 |
| $\Delta_{2,c=2}$ | -0.14272 | 0.359575 | -0.84967 | 0.563881 |
| $\Delta_{1,c=3}$ | -0.65233 | 0.551611 | -1.75215 | 0.433164 |
| $\Delta_{2,c=3}$ | 0.391413 | 0.586456 | -0.76534 | 1.556605 |
| $\Delta_{1,c=4}$ | -1.16907 | 0.471626 | -2.1012 | -0.24481 |
| $\Delta_{2,c=4}$ | 0.648017 | 0.734574 | -0.79451 | 2.093257 |
| $\Delta_{1,c=5}$ | -1.14281 | 0.721002 | -2.56705 | 0.285985 |
| $\Delta_{2,c=5}$ | 1.535939 | 0.731451 | 0.106451 | 2.986957 |
| $\sigma_m$ | 0.347845 | 0.238769 | 0.125966 | 0.976459 |
| $\sigma_r$ | 0.659873 | 0.080799 | 0.52261 | 0.840296 |
| $\sigma_s$ | 0.761755 | 0.056718 | 0.659184 | 0.881065 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.028 | 0.459 | 0.638 | 0.610 | 0.775 | 0.989 |

(b) Delta Smelt

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -1.41887 | 0.350193 | -2.11046 | -0.72774 |
| $\Delta_{1,c=1}$ | -0.80099 | 0.548643 | -1.8773 | 0.287588 |
| $\Delta_{2,c=1}$ | -0.3932 | 0.553576 | -1.50772 | 0.694446 |
| $\Delta_{1,c=2}$ | -0.45096 | 0.349645 | -1.14309 | 0.243778 |
| $\Delta_{2,c=2}$ | 0.763025 | 0.372485 | 0.029708 | 1.496553 |
| $\Delta_{1,c=3}$ | -0.48727 | 0.560279 | -1.60563 | 0.614925 |
| $\Delta_{2,c=3}$ | -1.07632 | 0.602088 | -2.26097 | 0.114563 |
| $\Delta_{1,c=4}$ | -0.66729 | 0.502768 | -1.65835 | 0.320025 |
| $\Delta_{2,c=4}$ | 1.444691 | 0.772586 | -0.08502 | 2.964449 |
| $\Delta_{1,c=5}$ | -2.18566 | 0.764279 | -3.68731 | -0.69057 |

| | | | | |
|---|---|---|---|---|
| $\Delta_{2,c=5}$ | -1.89614 | 1.09477 | -4.21 | 0.123807 |
| $\sigma_m$ | 0.239646 | 0.180187 | 0.070539 | 0.711816 |
| $\sigma_r$ | 0.666319 | 0.085238 | 0.5211 | 0.853763 |
| $\sigma_s$ | 2.170588 | 0.181523 | 1.845605 | 2.552485 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.003 | 0.766 | 0.953 | 0.833 | 0.992 | 1.000 |

(c) Longfin Smelt

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -0.49989 | 0.712441 | -1.95344 | 0.871917 |
| $\Delta_{1,c=1}$ | -2.18621 | 0.677994 | -3.51985 | -0.85051 |
| $\Delta_{2,c=1}$ | 2.292388 | 0.678046 | 0.959668 | 3.62474 |
| $\Delta_{1,c=2}$ | -1.79319 | 0.428233 | -2.62774 | -0.93439 |
| $\Delta_{2,c=2}$ | 1.11643 | 0.456152 | 0.20895 | 2.004925 |
| $\Delta_{1,c=3}$ | -1.05572 | 0.691438 | -2.42144 | 0.301382 |
| $\Delta_{2,c=3}$ | -0.46866 | 0.727923 | -1.8926 | 0.97061 |
| $\Delta_{1,c=4}$ | -1.37775 | 0.605789 | -2.58467 | -0.18701 |
| $\Delta_{2,c=4}$ | 1.633978 | 0.953206 | -0.21522 | 3.520598 |
| $\Delta_{1,c=5}$ | -2.28713 | 0.935881 | -4.12501 | -0.44696 |
| $\Delta_{2,c=5}$ | 1.250737 | 0.951335 | -0.61257 | 3.150086 |
| $\sigma_m$ | 1.092857 | 0.592423 | 0.489391 | 2.579697 |
| $\sigma_r$ | 0.833356 | 0.104518 | 0.656928 | 1.06439 |
| $\sigma_s$ | 1.827413 | 0.143559 | 1.572844 | 2.136054 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.002 | 0.641 | 0.864 | 0.770 | 0.972 | 1.000 |

(d) Striped Bass

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | 0.596779 | 0.266005 | 0.081007 | 1.125655 |
| $\Delta_{1,c=1}$ | -1.39652 | 0.45853 | -2.30336 | -0.49643 |
| $\Delta_{2,c=1}$ | 1.083626 | 0.457162 | 0.184152 | 1.974991 |
| $\Delta_{1,c=2}$ | -0.83017 | 0.285779 | -1.39345 | -0.26607 |
| $\Delta_{2,c=2}$ | -0.7035 | 0.308402 | -1.30416 | -0.09292 |
| $\Delta_{1,c=3}$ | -0.43638 | 0.470188 | -1.36456 | 0.500125 |
| $\Delta_{2,c=3}$ | -0.74411 | 0.496092 | -1.71928 | 0.244879 |
| $\Delta_{1,c=4}$ | -0.39312 | 0.412038 | -1.20643 | 0.420893 |
| $\Delta_{2,c=4}$ | 1.015868 | 0.64128 | -0.25636 | 2.277012 |
| $\Delta_{1,c=5}$ | -1.06502 | 0.628059 | -2.29876 | 0.165852 |
| $\Delta_{2,c=5}$ | 1.335681 | 0.631964 | 0.088366 | 2.578507 |
| $\sigma_m$ | 0.205225 | 0.160282 | 0.061053 | 0.630479 |
| $\sigma_r$ | 0.554743 | 0.069635 | 0.436559 | 0.710169 |

| | | | | |
|---|---|---|---|---|
| $\sigma_s$ | 1.220561 | 0.089129 | 1.058664 | 1.410115 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.011 | 0.556 | 0.787 | 0.712 | 0.913 | 1.000 |

(e) Threadfin Shad

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -0.14986 | 0.536359 | -1.19244 | 0.878876 |
| $\Delta_{1,c=1}$ | -1.03228 | 0.518964 | -2.04805 | -0.00152 |
| $\Delta_{2,c=1}$ | -0.16288 | 0.521132 | -1.18618 | 0.853645 |
| $\Delta_{1,c=2}$ | 0.376541 | 0.327032 | -0.26725 | 1.026107 |
| $\Delta_{2,c=2}$ | 0.466713 | 0.346766 | -0.21344 | 1.151065 |
| $\Delta_{1,c=3}$ | -0.34405 | 0.528768 | -1.38965 | 0.691533 |
| $\Delta_{2,c=3}$ | -0.49969 | 0.559089 | -1.60282 | 0.598116 |
| $\Delta_{1,c=4}$ | -1.27807 | 0.457077 | -2.17153 | -0.37303 |
| $\Delta_{2,c=4}$ | 0.485377 | 0.734264 | -0.97475 | 1.924319 |
| $\Delta_{1,c=5}$ | -0.22832 | 0.716357 | -1.64288 | 1.194749 |
| $\Delta_{2,c=5}$ | 0.369029 | 0.713905 | -1.05404 | 1.771046 |
| $\sigma_m$ | 0.795161 | 0.461148 | 0.33793 | 1.942431 |
| $\sigma_r$ | 0.62894 | 0.078425 | 0.496746 | 0.802046 |
| $\sigma_s$ | 1.521028 | 0.111642 | 1.320218 | 1.755508 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.013 | 0.578 | 0.812 | 0.726 | 0.930 | 1.000 |

(f) Sacramento Splittail

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -2.29816 | 0.941304 | -4.18754 | -0.39098 |
| $\Delta_{1,c=3}$ | -0.74964 | 0.437952 | -1.61865 | 0.132387 |
| $\Delta_{2,c=3}$ | 1.017388 | 0.464874 | 0.086346 | 1.939517 |
| $\Delta_{1,c=4}$ | -0.72018 | 0.377046 | -1.4669 | 0.030199 |
| $\Delta_{2,c=4}$ | 1.469639 | 0.589328 | 0.289579 | 2.622284 |
| $\Delta_{1,c=5}$ | -1.82758 | 0.578041 | -2.96642 | -0.67265 |
| $\Delta_{2,c=5}$ | 0.973678 | 0.585645 | -0.18455 | 2.134355 |
| $\sigma_m$ | 2.099887 | 0.766865 | 1.168846 | 4.0517 |
| $\sigma_r$ | 0.511953 | 0.103219 | 0.351701 | 0.752326 |
| $\sigma_s$ | 0.849389 | 0.100449 | 0.678323 | 1.071716 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.003 | 0.662 | 0.904 | 0.790 | 0.982 | 1.000 |

(g) Mississippi Silverside

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -0.30091 | 0.48973 | -1.24428 | 0.68406 |
| $\Delta_{1,c=3}$ | 0.558685 | 0.202943 | 0.15838 | 0.966614 |
| $\Delta_{2,c=3}$ | -0.25078 | 0.215936 | -0.68018 | 0.177816 |
| $\Delta_{1,c=4}$ | -0.19713 | 0.177515 | -0.5477 | 0.154213 |
| $\Delta_{2,c=4}$ | -0.44223 | 0.279621 | -1.00296 | 0.119259 |
| $\Delta_{1,c=5}$ | 0.216108 | 0.27368 | -0.32579 | 0.755824 |
| $\Delta_{2,c=5}$ | -0.28702 | 0.278798 | -0.83694 | 0.267844 |
| $\sigma_m$ | 0.995405 | 0.385186 | 0.539746 | 1.933433 |
| $\sigma_r$ | 0.23022 | 0.050356 | 0.151009 | 0.345729 |
| $\sigma_s$ | 1.300186 | 0.145548 | 1.050652 | 1.619404 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.010 | 0.496 | 0.699 | 0.656 | 0.852 | 0.992 |

(h) Largemouth Bass

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -3.45139 | 0.610931 | -4.68455 | -2.24716 |
| $\Delta_{1,c=3}$ | 1.073656 | 0.792971 | -0.49961 | 2.658267 |
| $\Delta_{2,c=3}$ | 0.474855 | 0.841549 | -1.18199 | 2.153687 |
| $\Delta_{1,c=4}$ | 0.357826 | 0.678304 | -0.99291 | 1.690563 |
| $\Delta_{2,c=4}$ | 0.724206 | 1.073636 | -1.40315 | 2.860892 |
| $\Delta_{1,c=5}$ | -0.41142 | 1.048883 | -2.49447 | 1.664063 |
| $\Delta_{2,c=5}$ | 0.250561 | 1.054283 | -1.84138 | 2.334447 |
| $\sigma_m$ | 0.940282 | 0.35937 | 0.505983 | 1.859247 |
| $\sigma_r$ | 0.94336 | 0.194673 | 0.640181 | 1.400696 |
| $\sigma_s$ | 1.270491 | 0.149554 | 1.014578 | 1.599744 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.002 | 0.621 | 0.858 | 0.760 | 0.959 | 1.000 |

(i) Sacramento Sucker

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -2.47319 | 0.641526 | -3.74442 | -1.19832 |
| $\Delta_{1,c=3}$ | 0.135526 | 0.330017 | -0.52096 | 0.798621 |
| $\Delta_{2,c=3}$ | 0.224993 | 0.346002 | -0.45723 | 0.906164 |
| $\Delta_{1,c=4}$ | 0.27278 | 0.284493 | -0.28526 | 0.83278 |
| $\Delta_{2,c=4}$ | 0.500238 | 0.443757 | -0.3826 | 1.379198 |
| $\Delta_{1,c=5}$ | -1.15176 | 0.437598 | -2.01538 | -0.27756 |
| $\Delta_{2,c=5}$ | 0.412424 | 0.446874 | -0.47825 | 1.292816 |
| $\sigma_m$ | 1.118729 | 0.423386 | 0.609799 | 2.191103 |
| $\sigma_r$ | 0.380917 | 0.079026 | 0.258854 | 0.564739 |
| $\sigma_s$ | 2.441103 | 0.308086 | 1.91458 | 3.128333 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.005 | 0.582 | 0.828 | 0.749 | 0.971 | 1.000 |

(j) Bluegill

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -3.48222 | 0.304925 | -4.09595 | -2.88367 |
| $\Delta_{1,c=3}$ | -0.24073 | 0.346368 | -0.91764 | 0.447445 |
| $\Delta_{2,c=3}$ | 0.560391 | 0.365155 | -0.15878 | 1.295499 |
| $\Delta_{1,c=4}$ | 0.715977 | 0.286302 | 0.144434 | 1.284408 |
| $\Delta_{2,c=4}$ | 0.23673 | 0.450311 | -0.6716 | 1.124549 |
| $\Delta_{1,c=5}$ | 0.334311 | 0.438723 | -0.52502 | 1.210717 |
| $\Delta_{2,c=5}$ | 0.204433 | 0.437193 | -0.67315 | 1.078909 |
| $\sigma_m$ | 0.17584 | 0.094596 | 0.065805 | 0.416541 |
| $\sigma_r$ | 0.37719 | 0.087827 | 0.237454 | 0.57927 |
| $\sigma_s$ | 1.519669 | 0.193453 | 1.193541 | 1.951425 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.003 | 0.838 | 0.938 | 0.844 | 0.980 | 1.000 |

(k) Redear Sunfish

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -4.24516 | 0.415116 | -5.06468 | -3.44194 |
| $\Delta_{1,c=3}$ | -0.02302 | 0.451675 | -0.9245 | 0.875869 |
| $\Delta_{2,c=3}$ | 0.921322 | 0.472009 | -0.01686 | 1.854386 |
| $\Delta_{1,c=4}$ | 0.364545 | 0.379224 | -0.39502 | 1.121381 |
| $\Delta_{2,c=4}$ | 0.883665 | 0.596385 | -0.30217 | 2.064014 |
| $\Delta_{1,c=5}$ | -0.02615 | 0.581384 | -1.17015 | 1.129934 |
| $\Delta_{2,c=5}$ | -0.31878 | 0.585642 | -1.48568 | 0.846257 |
| $\sigma_m$ | 0.446131 | 0.193557 | 0.218583 | 0.929301 |
| $\sigma_r$ | 0.509242 | 0.107776 | 0.340305 | 0.761519 |
| $\sigma_s$ | 1.821438 | 0.229317 | 1.432721 | 2.327386 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.001 | 0.860 | 0.963 | 0.866 | 0.991 | 1.000 |

(l) Chinook Salmon

| Parameter | Mean | SD | Lower CI | Upper CI |
|---|---|---|---|---|
| $\alpha$ | -1.07827 | 1.000967 | -3.04301 | 0.877381 |
| $\Delta_{1,c=3}$ | -0.6247 | 0.719438 | -2.0434 | 0.809405 |
| $\Delta_{2,c=3}$ | 0.916806 | 0.619422 | -0.31497 | 2.145336 |
| $\Delta_{1,c=4}$ | -2.05282 | 0.512618 | -3.07346 | -1.03507 |

| | | | | |
|---|---|---|---|---|
| $\Delta_{2,c=4}$ | 1.603255 | 0.794203 | 0.023621 | 3.170159 |
| $\Delta_{1,c=5}$ | -1.34532 | 0.779127 | -2.89213 | 0.231711 |
| $\Delta_{2,c=5}$ | 0.290139 | 0.619123 | -0.95287 | 1.508615 |
| $\sigma_m$ | 1.885809 | 0.682384 | 1.050548 | 3.623147 |
| $\sigma_r$ | 0.699313 | 0.155273 | 0.465339 | 1.070536 |
| $\sigma_s$ | 1.894344 | 0.224001 | 1.511985 | 2.390495 |

Accuracy rate summary:

| Min | Q1 | Median | Mean | Q3 | Max |
|---|---|---|---|---|---|
| 0.004 | 0.614 | 0.853 | 0.758 | 0.961 | 1.000 |