# Tables

Table 1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Nominal value |  |  |
| Fecundity |  | 100000 |  |  |
| Sex ratio |  | 0.33 |  |  |
| S0 |  | 0.051 |  |  |
| S1 |  | 0.8603533 |  |  |
| S2 |  | 0.9 |  |  |
| Mj |  | 0.01180291 |  |  |
| mr |  | 0.1160029 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Table 1. Demographic values, symbols, descriptions, and sources used in modeling population dynamics for upper and lower Missouri River Basin pallid sturgeon populations. Demographic values. Values

|  |  |  |  |
| --- | --- | --- | --- |
| Symbol | Description | Value | Source |
| *Indices* | | | |
|  | Time | Varies | None |
|  | Age | Varies | None |
|  | Hatchery or natural origin | Varies | None |
|  | Time since spawning | Varies |  |
| *State variables* | | | |
|  | number of fish in embryo stage | Varies | Calculated at initialization |
|  | number of fish in free embryo stage | Varies | Calculated at initialization |
|  | number of fish in exogenously feeding larvae and age-0 stage | Varies | Calculated at initialization |
|  | Number of fish in juvenile stage | Varies | Calculated at initialization |
|  | Number of hatchery origin fingerling fish stocked | Varies | Calculated at initialization |
|  | Number of hatchery origin yearling fish stocked | Varies | Calculated at initialization |
|  | number of fish in spawning stage | Varies | Calculated at initialization |
|  | number of fish in a recrudescent adult fish | Varies | Calculated at initialization |
|  | Number of fish taken to hatchery for broodstock | Varies | Model input |
|  | Number of fish in the post-spawn stage | Varies | Calculated at initialization |
| *Demographic rates* | | | |
|  | Probability an oocyte is fertilized and gamete produced | Varies | Calibrated to each basin such that population is in equilibrium |
|  | probability that an embryo survives and transitions to a free embryo | Varies | Calculated at initialization |
|  | probability that an free embryo survives and transitions to an exogenously feeding larvae | Varies | Calculated at initialization |
|  | probability that an exogenously feeding larvae survives and transitions to the juvenile stage | Varies | See Table 3.3 |
|  | probability that fish in the juvenile state survival and transition to adult stage | Varies | See Table 3.3 |
| *Demographic values* | | | |
|  | Female fecundity | Varies | See equation xxx and Figure 3.1 |
|  | Age-specific probability that a juvenile fish becomes sexually mature and transitions to the spawning stage | Varies | See Figure 3.4 |
|  | probability of a recrudescent adult returning to spawning stage given the years since last spawn | Varies | See Figure 3.5 |
|  | Maximum age | 41 | (K. D. Keenlyne, Grossman, & Jenkins, 1992) |
|  | Sex ratio of adult pallid sturgeon | 0.33 | (K. D. Steffensen, M. A. Pegg, & G. E. Mestl, 2013b) |
|  | Intercept for linear relationship of fecundity and fork length | -43678 | (K. D. Steffensen et al., 2013b) |
|  | slope term for relationship of fecundity and fork length | 72.70 | (K. D. Steffensen et al., 2013b) |
|  | Average maximum fork length | 1683 | (Reynolds & Tyre, 2011) a |
|  | Growth coefficient | 0.036 | (Reynolds & Tyre, 2011) a |
|  | theoretical size at age-0 | -5.9 | (Reynolds & Tyre, 2011)a |

a used data from K.D. Keenlyne and Jenkins (1993) to estimate parameters

Table 2. Stage- and origin-specific initial abundance used in modeling population dynamics for upper and lower Missouri River Basin pallid sturgeon populations. Values reported as minimum, expected, and maximum values with corresponding sources.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Value | | |  |
| Stage | Basin | Origin | Minimum | Expected | Maximum | Source |
| Juvenile | Lower | Hatchery | 3750 | 4000 | 4250 | 1 |
|  |  | Natural | 0 | 500 | 1000 | 1 |
|  | Upper | Hatchery | 73439 | 97220 | 121025 | 2 |
|  |  | Natural | 0 | 500 | 1000 | 3 |
| Adult | Lower | Hatchery | 18000 | 21500 | 25000 | 1 |
|  |  | Natural | 0 | 500 | 1000 | 1 |
|  | Upper | Hatchery | 275 | 480 | 687 | 2 |
|  |  | Natural | 129 | 158 | 193 | 4 |

1 K. Steffensen personal communication

2 Rotella (2013)

3 Unknown; assumed to be similar abundances to lower basin

4 P. J. Braaten, D. B. Fuller, R. D. Lott, and G. R. Jordan (2009)

Table 3. Stage- and origin-specific survival rates used in modeling population dynamics for upper and lower Missouri River Basin pallid sturgeon populations. Values reported as minimum, expected, and maximum values with corresponding sources.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | Value | | |  |
| Basin | Survival | Minimum | Expected | Maximum | Source |
| Lower | S0 | 0.02 | 0.051 | 0.1 | 1 |
|  | S\_a = 1 | 0.60 | 0.686 | 0.75 | 1 |
|  | S\_a>=2 | 0.9 | 0.922 | 0.95 | 1 |
| Upper | Age-0 | 0.02 | 0.051 | 0.1 | 1a |
|  | Age-1 | 0.423 | 0.633 | 0.83 | 2b |
|  | Age-2 | 0.64 | 0.81 | 0.97 | 2b |
|  | Age-3 | 0.82 | 0.92 | 1 | 2b |
|  | Age-4+ | 0.71 | 0.82 | 0.94 | 2b |

1 K. D. Steffensen et al. (2013a)

2 Hadley and Rotella (2009)

a Age-0 survival estimates were unavailable, therefore lower basin estimates used.

b Survival values are average of values reported for RPMA1, RPMA2, and RPMA3.