APPENDIX D: HERITAGE CONSERVATION STATUS FOR SPECIES: A POSSIBLE RULE– AND POINT–BASED PROCESS FOR STATUS ASSIGNMENT (BASED ON THE 17 NOVEMBER 2001 DRAFT BY L. MASTER AND T. REGAN, NATURESERVE).

The method for determining an SRank is a hybrid of rule–based approaches and point–scoring techniques. The method incorporates unknown data. To determine an SRank, first determine what information is available for the species. Use the following rationale along with the Conservation Status Assessment Factors presented in this document and the method for point allocation for each of the factors presented below to determine the classification. We used an automated process with built–in algorithms (developed by the National Center for Ecological Analysis and Synthesis [NCEAS]), for applying this process.

- *Number of occurrences.* An <u>occurrence</u> is a unit of land and/or water with practical conservation value for the species, on which the species is, or was, present. For species, the occurrence often corresponds with the local population, but when appropriate may be a portion of a local population (e.g., long–distance dispersers) or a metapopulation. An initial rank may be assigned on the basis of the number of occurrences believed to be extant (i.e., 1 to 5 occurrences equals a rank of 1; 6 to 20 = 2; 21 to 80 = 3; 81 to 300 = 4; and 301+ = 5. Only extant occurrences are considered; data on historical occurrences are useful to evaluate trends (below). [A=1, B=2, C=3, D=4, E=5, U=3.5]. For a range rank, use the mean value as a "best estimate" (e.g., AC = 2, BC = 2.5) of the initial rank.

- *Viability of occurrences.* Occurrences are individually given a letter rank (A–D) to indicate relative viability or likelihood of persistence, based on their size, condition, and landscape context. If there are relatively few occurrences with excellent or good viability (A– or B–ranked, where there is 95+% probability of persistence for 20 yr [or 5 times the age of reproductive maturity]), the rank may be increased in priority by one–quarter to one–half. Conversely, the rank may be lowered in priority if there are many high–quality occurrences. [A=–0.5, B=–0.25, C=0, D=0, E=0, F=+0.25, U=0] (Note: only use B if No. of EOs ≠ 1)

- *Population size.* If the number of mature individuals is small, it may be appropriate to raise the priority by one–half rank or more. If there are many mature individuals, the priority may be lowered. [A=–1, B=–0.75, C=–0.5, D–E=–0.25, F=0, G=+0.25, H=+0.5, U=0]

- *Geographic distribution.* If a species' area of occupancy or extent of occurrence (= range extent) is relatively small, it is more vulnerable to negative effects from localized events. It may be appropriate to raise priority by one–quarter rank or more for a species with a narrow distribution and lower it by one–quarter to one–half rank for a widespread species. [Area of occupancy: A=–1, B=–0.75, C=–0.5,

D=–.25, E=0, F=0, G=0, H=+0.25, U=0; or (whichever is greatest) Extent of occurrence: A–B=–0.5, C–D=–0.25; E–F–G–H=0, U=0]

- *Environmental specificity.* If a species requires highly specific habitat(s) or other abiotic or biotic factor(s), <u>and</u> if the number of populations and distribution is unknown, the rank may be raised or lowered. [A=–0.5, B & C=0, D=+0.5, U=0] [In NatureServe & NCEAS spreadsheet: H=A, M=B&C, L=D]

- *Short–term trends in population size, area of occupancy, extent of occurrence, or number or condition of occurrences.* A significant short–term and non–cyclic negative trend may be reason to raise priority by one–quarter rank or more, or a significant positive trend may indicate that priority should be lowered by one–quarter rank. [A=–1, B=–0.75, C=–0.5, D=–0.25, E=0, F=+0.25, U=0] In the absence of short–term trend data, the rank may be raised or lowered for *long–term trends.* [A=–0.5, B=–0.25, C & D & E=0, F=+0.25, U=0]

- *Threats.* Threats include habitat destruction or degradation, introduction of exotic species, overexploitation and direct human–caused mortality, and elimination of natural disturbance regimes, such as fire or flooding. Depending on the severity, scope, and immediacy of threats, the priority may be raised or lowered by one–half to one rank. [A=–1, B=–0.75, C=–0.5, D=–0.25, E=0, F=+0.50, G=+0.75, H=+1.0, U=0] [In NCEAS spreadsheet, H value (HDMS value, not High) cannot be coded, as "insignificant" was not a choice in datasheet. In NCEAS spreadsheet, old H & M for Immediacy from datasheet = new M]

- *Protection and Management.* Depending on whether there are few or many occurrences that are adequately protected <u>and</u> managed, the rank may be raised or lowered. [A=–0.75, B=–0.5, C=–0.25, D=0, E=+0.5, U=0]

- *Intrinsic vulnerability.* If a species is intrinsically vulnerable because it is slow to mature, reproduces infrequently, and/or has low fecundity such that populations are very slow to recover from decreases in abundance, or is a species that has low dispersal capability such that extirpated populations are unlikely to become reestablished through natural colonization, it may be appropriate to raise its priority. [A=–0.25, B & C & U=0] [In NCEAS spreadsheet, old B&C from data sheet = new B, and old D from datasheet = new C]

Step 1: Determine the available data for the species. The following subheadings are indicative of the types of data useful for classification (refer to Conservation Status Assessment Factors for definitions of the following factors as noted in this document).

Number of occurrences (EOs)
Viability of occurrences (EOs)
Population size
Geographic Distribution (Extent of Occurrence [EOO] or Area of Occupancy [AOO])
Environmental Specificity

Trends (short–term and long–term trends)
Threats (scope, severity, immediacy)
Management / Protection
Intrinsic Vulnerability

Step2: Determine which of the following combinations of the first five data requirements suits the available data (only choose one combination and the first to apply).

EOs + viability of EOs + Population size
EOs + population size
EOs + viability of EOs + Geographic Distribution (greatest value from EOO or AOO)
EOs + Geographic Distribution (greatest value from EOO or AOO)
Pop size + Geographic Distribution (greatest value from EOO or AOO)
EOs + viability
EOs
Pop size + Environmental Specificity
Population size
Geographic Distribution (EOO only; AOO unknown) and Environmental Specificity
Geographic Distribution (greatest value from EOO or AOO)
Environmental Specificity

Explanation: only use Geographic Distribution if either Number of EOs **OR** Population size is unknown. Only use Environmental Specificity if EOs **AND** Distribution (AOO) are unknown or, and either or both Population Size or Geographic Distribution (EOO) are unknown.

Step 3: Using the point allocation document above, determine a value for the combination you choose. If EOs are unknown, then start point allocation at 3.5. If all five factors are unknown: points = 3.5

Step 4: Once a value has been determined for the first five data requirements, incorporate remaining data.

P = points (total from step 3) + trends (short–term trend otherwise use long–term trend) + threats

OR

P = points (total from step 3) + trends (short–term trend if known, otherwise use long–term trend) + management protection + intrinsic vulnerability

Explanation: only include management protection **and/or** intrinsic vulnerability if you have no information on threats.

The following Heritage Ranks correspond to the final point total.

Points (P)	SRANK
P ≤1.5	S1
1.5< P ≤2.5	S2
2.5< P ≤ 3.5	S3
3.5 < P ≤ 4.5	S4
P > 4.5	S5