ESA Recovery Criteria

Recovery Goals

Current Practice: Goal = Rulemaking thresholds

Delist

- "…measures provided pursuant to this Act are no longer necessary…" (definition of "conserve" in §3(3))
- no longer threatened or endangered

Downlist

- no longer "…in danger of extinction throughout all or a significant portion of its range…" (§3(6)), but not necessarily ready for delisting (still needs the protections of the Act)

How will we know when we've met our goals?

- Identify clearly articulated criteria in the recovery plan.
- These mark changes in the species' demographic status and threats.

Recovery Criteria

Standards for measurement of the parameters needed to determine that a species has achieved its recovery objectives and may be reclassified or delisted. May include:

- Demographic measures
- Threat reduction or elimination measures
- Other biological measures

Recovery Criteria

Criteria are developed for each reclassification and delisting objective.

§4(f)(1)(B) - The Secretary shall… to the maximum extent practicable ...

(B) incorporate in each plan ...

(ii) objective, measurable criteria which, when met, would result in a determination ... that the species be removed from the list ...”

Objective Criteria

Objectivity means ensuring that information is unbiased. It involves two elements: presentation and substance.

- Present criteria accurately, clearly, and completely. Explicitly state assumptions and uncertainties.
- Ensure that criteria are developed in an unbiased fashion, based on sound analysis of the species' biological and threats status.

Measurable Criteria

- Capable of being measured
- The extent, dimensions, quantity, etc., of something, ascertained esp. by comparison with a standard
- Provides a standard whereby “two biologists will have an identical recognition of when a criterion has been met”

Demography

Consider under what conditions you would confidently argue the species is recovered.

- Status
- Trends
- Distribution
- Population structure and processes

Demographic Criteria

What do the endpoints for demographic or other biological objectives (e.g., genetic) look like?

Examples:

- abundance level or population size
- survival and reproductive/recruitment rates
- stable or increasing trends (terms defined) for x amount of time
- defined distribution pattern

Demographic Criteria

Why are they useful?

- A check to ensure you've controlled threats
- Ensure small population size and limited distribution don't, themselves, remain a threat
- Can guide section 7 consultations and section 10 Habitat Conservation Plans (and other sections of the Act) to ensure they're assisting in recovery

Demographic Criteria Example

Criteria for Hawaiian monk seal:

- aggregate numbers exceed 2,900 total individuals in the Northwest Hawaiian Islands
- at least 5 of the 6 main sub-population in the Northwest Hawaiian Islands are above 100 individuals and the Main Hawaiian Islands population is above 500
- survivorship of females in each subpopulation in the Northwest Hawaiian Islands and in the Main Hawaiian Islands is high enough that, in conjunction with the birth rates in each subpopulation, the calculated population growth rate for each subpopulation is not negative.

Demographic Criteria Example

Criterion 1: Density and Abundance

- Density of emergent white abalone (short term) must be greater than 3,000 per hectare for 75% of the geographic localities.
- Maintain a total of 500,000 animals in the wild, distributed among all geographic localities in the USA and Mexico. Maintenance of 500,000 animals is based on crude estimates of abundance necessary to sustain a 90% probability of persistence in 100 years, per IUCN guidelines. The model assumes a conservative estimate of $\lambda = 0.90$ (i.e., 10% decline per year). The threshold value of 500,000 animals should be updated when empirical estimates of λ become available.

Criterion 2: Size Frequency

- Proportion of size of emergent animals in each geographic locality includes at least 85% intermediate-size animals (90 to 130 mm)
- Proportion of size of emergent animals in each geographic locality includes no more than 15% large animals (>130 mm)

Criterion 3: Trend

- Achieve a stable or increasing estimate of geometric population growth ($\lambda \geq 1$) for>75% of the geographic localities over a ten year period.

Criterion 4: Changes in distribution/reoccupation of historical range

- Reoccupation of white abalone over a spatial scale that encompasses their historic range such that 75% of the geographic localities in the USA and Mexico are reoccupied and meet the aforementioned recovery criteria.

Five Factors

ESA Sec 4(a)(1)

A. The present or threatened destruction, modification, or curtailment of its habitat or range

B. Overutilization for commercial, recreational, scientific, or educational purposes

C. Disease or predation

D. The inadequacy of existing regulatory mechanisms

E. Other natural or manmade factors affecting its continued existence

Threats-Based Criteria

What are the endpoints of the processes used to control the significant threats to the species?

For instance…

- Habitat fragmentation: How large and connected do patches need to be?
- Regulatory mechanisms: Management plan or regulation? What period of time? What level of jurisdiction and authority? Who decides it's adequate?
- Invasive species: Elimination? Containment? What period of time would indicated it's addressed?

Threats-Based Criteria

- These can be difficult to develop
- Be as explicit as possible.
- Remember: All threats are not equal.
  - It may be possible to make trade-offs among threats. This in turn makes recovery possible in multiple states. For instance, a species may tolerate a continuing level of one threat if another has been eliminated.
  - If trade-offs can be foreseen, explicitly describe how this would work

Threats-Based Criteria Example

Factor A:

- Beach armoring, shoreline stabilization structures, and all other barriers to nesting are categorized and inventoried for areas under U.S. jurisdiction. A peer-reviewed strategy is developed and implemented to ensure that the percentage of nesting beach free of barriers to nesting is stable or increasing relative to baseline,

Factor B:

- A scientifically based nest management plan outlining strategies for protecting nests (under U.S. jurisdiction) from natural and manmade impacts is developed and implemented.

Factor D:

- Specific and comprehensive Federal legislation is developed, promulgated, implemented, and enforced to ensure long-term (including post-delisting) protection of loggerheads and their terrestrial and marine habitats, including protection from fishery interactions.

Uncertainty

What if there's a high degree of uncertainty?

- Some sources of uncertainty, like stochastic uncertainty, are best dealt with by providing measures of population resilience or redundancy.
- If the state of knowledge is at issue, build uncertainty directly into the criteria by identifying confidence limits and indicating a need for future refinement.

Questions?