

Interim Viability Criteria Overview of Threatened Willamette/Lower Columbia Pacific Salmonids

The information in this appendix comes from *Interim Report on Viability Criteria for Willamette and Lower Columbia Basin Pacific Salmonids*, which was prepared by the Willamette/Lower Columbia Technical Recovery Team in March 2003.

Adult Population Productivity and Abundance Criteria Guidelines

1. In general, viable populations should demonstrate a combination of population growth rate, productivity, and abundance that produces an acceptable probability of population persistence. Various approaches for evaluating population productivity and abundance combinations may be acceptable, but must meet reasonable standards of statistical rigor.
2. A population with a non-negative growth rate and an average abundance approximately equivalent to estimated historical average abundance should be considered to be in the highest persistence category. The estimate of historical abundance should be credible, the estimate of current abundance should be averaged over several generations, and the growth rate should be estimated with an adequate level of statistical confidence. This criterion takes precedence over criterion 1.

Juvenile Outmigrant Production Criteria Guidelines

1. The abundance of naturally produced juvenile outmigrants should be stable or increasing as measured by observing a median annual growth rate or trend with an acceptable level of confidence.

Within-Population Diversity Criteria Guidelines

1. Sufficient life-history diversity must exist to sustain a population through short-term environmental perturbations and to provide for long-term evolutionary processes. The metrics and benchmarks for evaluating the diversity of a population should be evaluated over multiple generations and should include:
 - a. A substantial proportion of the diversity of a life-history trait(s) that existed historically
 - b. Gene flow and genetic diversity should be similar to historical (natural) levels and origins
 - c. Successful utilization of habitats throughout the range
 - d. Resilience and adaptation to environmental fluctuations

Habitat Criteria Guidelines

1. **The spatial distribution and productive capacity** of freshwater, estuarine, and marine habitats should be sufficient to maintain viable populations identified for recovery.

-
2. **The diversity of habitats** for recovered populations should resemble historical conditions given expected natural disturbance regimes (e.g., wildfire, flood, volcanic eruptions, etc.). Historical conditions represent a reasonable template for a viable population; the closer the habitat resembles the historical diversity, the greater the confidence in its ability to support viable populations.
 3. **At a large scale, habitats should be protected and restored, with a trend toward an appropriate range of attributes for salmonid viability.** Freshwater, estuarine, and marine habitat attributes should be maintained in a non deteriorating state.

Within-Population Spatial Structure Criteria Guidelines

1. The spatial structure of a population must support the population at the desired productivity, abundance, and diversity levels through short-term environmental perturbations, longer-term environmental oscillations, and natural patterns of disturbance regimes. The metrics and benchmarks for evaluating the adequacy of a population's spatial structure should specifically address:
 - a. **Quantity:** Spatial structure should be large enough to support growth and abundance, and diversity criteria.
 - b. **Quality:** Habitat underlying spatial structure should be within specified habitat quality limits for life-history activities (spawning, rearing, migration, or a combination) taking place within the patches.
 - c. **Connectivity:** Spatial structure should have permanent or appropriate seasonal connectivity to allow adequate migration between spawning, rearing, and migration patches.
 - d. **Dynamics:** The spatial structure should not deteriorate in its ability to support the population. The processes creating spatial structure are dynamic, so structure will be created and destroyed, but the rate of loss should not exceed the rate of creation over time.
 - e. **Catastrophic Risk:** The spatial structure should be geographically distributed in such a way as to minimize the probability of a significant portion of the structure being lost due to a single fish catastrophic event, either anthropogenic or natural.