Range Map and Species Habitat Model Use Case Guidance

Range and Distribution Mapping and Analysis Project (RADMAP)
California Department of Fish and Wildlife

This document provides guidance on how best to interpret RADMAP outputs, including range maps, continuous species habitat models, and categorical species habitat models. Users should follow these guidelines to determine which products to utilize for particular conservation and management decision making use cases.

Range Map: A species range is the generalized geographic area within which a species occurs without consideration of specific habitat that the species uses. Range maps will include the polygon(s) bounding the geographic extent over which the focal species is known to occur in California.

- Range maps do not provide information about habitat use or probability of occurrence within the range.
- Range maps are likely to include areas where the focal species does not regularly occur but may move through. Moreover, the focal species may be (infrequently) found outside the range, for example during a long-distance migration or dispersal event.
- Range maps are likely to include unsuitable habitat as well as occupied and unoccupied suitable habitat.
- Commission error (mapping areas not occupied by a species) is prioritized in range maps over omission error (missing part of a species' range).
- Range maps indicate the area where a species may occur in the landscape and can therefore be used to determine where a species may need to be considered for conservation, or to guide where surveys for a species should be conducted.

Species Habitat Model: Species habitat models (SHMs) are statistical models that indicate a focal species' likely distribution by identifying habitat associations, generally including vegetation type and structure as well as abiotic factors such as slope, elevation, and climate, and extrapolating these onto a map. SHMs predict the relative probability of habitat use across the landscape and may be represented by a continuous surface (values between 0 and 1) or as a categorical map (e.g., low, medium, high).

- The associated species' range map defines the extent of the SHM to avoid extrapolating beyond the species' known range.
- Relative probability of habitat use is not equivalent to the absolute probability of a species' occurrence on the landscape.
- The focal taxon may or may not actually occur in areas predicted with a high relative probability of habitat use; habitat may be suitable but unoccupied, particularly for taxa with small and/or declining populations or limited mobility.
- An expert-vetted statistical threshold may be applied to a continuous or categorical SHM to classify low or zero predicted habitat use values as non-habitat (i.e., set all values below the threshold to zero). Under certain circumstances, (e.g. when moving between high use areas) a species may occasionally use areas with low or zero predicted habitat use values.
- Models may not accurately reflect all habitats used per taxon due to a dearth of presence data, thereby limiting the scope of environmental space represented by the SHM. Users should refer to the validation metrics and consider the level of uncertainty associated with the model when interpreting model outputs.
- Areas with high relative predicted use values may be prioritized for locating survey or monitoring sites for scientific studies aiming to conserve and protect focal taxa.

Species Habitat Model (Continuous):

- SHMs are a continuous layer depicting a species' predicted habitat associations within each cell, represented as a value between 0 and 1. Values closer to 1 depict a higher relative probability of habitat use within that cell.

Species Habitat Model (Categorical):

- Derived from a continuous SHM, this product simplifies the continuous SHM output to depict a species' predicted habitat use as low, medium, and high.