Northwest Gap Analysis Project: Innovative Approaches to Species Distribution Modeling for Local and Regional Species Conservation

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Accurately representing species occurrences across large landscapes is vital for species conservation at local and regional scales. Previously, spatial and thematic resolutions at which Gap species modeling was conducted have been too coarse to optimally inform local conservation. Primarily this is because species modeling needs to be consistent across large regions, which require coarser, region-wide environmental data. We attempt to address this mismatch of resolutions by modeling species' range, distribution, and habitat quality as distinct products. Range models express species' spatial arrangement at coarse resolutions using 10-digit hydrological units as map units. Species' distributions were modeled as functions of regionally-mappable environmental variables but also of select fine-resolution variables not available as region-wide layers. Habitat quality models highlighted portions of region-wide distributions determined, via expert input, to support high or low rates of reproduction and survival, and thus present more detailed thematic information. Our approach is being applied to ~ 650 Northwestern terrestrial vertebrates and relies on both deductive and inductive modeling approaches. A web-based expert review system has been developed to obtain invaluable knowledge about species habitat preferences, historical and current range expansion or contraction, and important environmental variables. We believe our approach will make Gap species distribution modeling in the Northwest more applicable to local and regional conservation goals.