## **CLIMATE CHANGE VULNERABILITY ASSESSMENT FOR SIERRA NEVADA BIRDS Dr. Rodney Siegel, The Institute for Bird Populations**

Abstract: In a rapidly changing climate, effective bird conservation requires not only reliable data about the current status and vulnerability of species of conservation concern, but also credible projections of future status and vulnerability. Such projections can enable managers to address proactively emerging threats and, where possible, preempt or reduce the severity of climate-related problems through appropriate habitat management. We used the Climate Change Vulnerability Index (CCVI), a risk assessment tool developed by NatureServe, to predict vulnerability to climate change of 168 bird species that breed regularly in the Sierra Nevada. The CCVI assesses species-specific exposure and sensitivity to climate change within a defined geographic area, through the integration of a) species' range maps, b) information about species' natural history traits and ecological relationships, c) historic and current climate data, and d) spatially explicit climate change projections for the area of interest. We conducted the assessment under two different downscaled climate models with divergent projections about future precipitation in the Sierra Nevada through the middle of the 21<sup>st</sup> century. Of the five vulnerability rankings the CCVI assigns, only one species, White-tailed Ptarmigan, received the most vulnerable rank, Extremely Vulnerable. No species received the second-highest vulnerability ranking, Highly Vulnerable. Sixteen species scored as Moderately Vulnerable using one or both climate models: Common Merganser, Osprey, Bald Eagle, Northern Goshawk, Peregrine Falcon, Prairie Falcon, Spotted Sandpiper, Great Gray Owl, Black Swift, Clark's Nutcracker, American Dipper, Swainson's Thrush, American Pipit, Graycrowned Rosy-Finch, Pine Grosbeak, and Evening Grosbeak. In general, species with more northerly breeding ranges received significantly more vulnerable rankings than species with more southerly breeding ranges. Species associated with alpine/subalpine habitats and aquatic habitats received significantly more vulnerable rankings than birds associated with other habitats. In contrast, species of foothill, sagebrush, and chaparral habitats ranked as less vulnerable to climate change than other birds species, and our results suggest that many such species may even respond to climate change with population increases in the Sierra Nevada.