

Pacific Southwest Research Station

Sierra Nevada Research Center

Role of Urban Forests in Conserving and Restoring Biological Diversity in the Lake Tahoe Basin

The Research:

The conversion of wildlands to buildings, roads, and other developments results in habitat loss and the fragmentation of associated landscapes. Landscape fragmentation has three primary components: loss of original habitat, reduction in habitat patch sizes, and increasing isolation of habitat patches -- all of which contribute to a decline in biological diversity within the original habitat. Landscape fragmentation has a progressive and erosive effect on biological diversity and integrity, however our understanding of how disturbance and fragmentation influence the distribution and abundance of organisms is inadequate to effectively manage to sustain populations in the face of fragmentation.

Objectives:

- To determine the effects of fragmentation and disturbance on the occurrence, abundance, composition, and productivity of vertebrates, vascular plants and select invertebrate species in an urbanizing landscape.
- To evaluate the potential for landscape-level thresholds of species persistence for select focal species based on the amount, distribution and quality of habitat.
- To investigate the validity of species expected to be strong indicators based on intrinsic characteristics based on empirical data.
- To develop a predictive model that evaluates the relative effects of various acquisition, restoration, and development scenarios on individual species, species groups, and biological diversity.



Photo: Lori Campbell



Our Mission:

Sierra Nevada Ecosystems are complex and our knowledge of them is incomplete. As a result, the long term outcome of any given land and resource management strategy is uncertain. We will provide assistance to land managers and policy makers by addressing this management dilemma through targeted research, emphasizing an integrated, ecoregional approach to examine particular physical, ecological, and socio-economic issues, across a range of appropriate spatial and temporal scales specific to each issue.

This unit will represent the collective research expertise and interests of scientists located in Fresno, Davis and Albany as well as other scientists within the Pacific Southwest Research Station. With a full spectrum of research, from long-term, fundamental research to short-term, tactical applications, this Center is intended to support conservation, restoration, and sustainable utilization of the lands within the Sierra Nevada ecoregion.



USDA Forest Service
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Application of Research Results:

The following management objectives will be addressed:

1. What are reliable criteria for identifying potential indicator species?
2. Do particular species, species groups, or environmental parameters emerge as strong indicators of biological integrity at the stand or landscape scales?
3. How does anthropogenic disturbance within and around urban lots affect the ability of urban lots to support their native diversity of species? What management options exist for reducing the negative effects of disturbance?
4. What role do urban lots play in supporting biological integrity at the landscape scale? How might that role shift in light of various development (i.e., build-out) scenarios within the basin?
5. What management options exist for improving the biological integrity of existing urban lots?
6. What are the predicted effects of various stand and landscape-scale management scenarios regarding urban lot management (i.e., development, acquisition, restoration)?

Location:

The study area is the Lake Tahoe basin, located on the California-Nevada border in the central Sierra Nevada. The Lake Tahoe basin is an ideal setting to study of the contribution of forested parcels to maintaining biological diversity and integrity of a larger urbanizing landscape. The majority of development is restricted to the lower elevation areas around Lake Tahoe, and many species of vertebrates and vascular plants are most closely associated with these habitats. For these low elevation associates, the high elevation crests surrounding the basin are likely be an impediment to their dispersal, creating closed populations that are particularly vulnerable to fragmentation and disturbance.



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