

System Indicators

Land Conservation and Wildlife Habitat



Wildlife Habitat (2010)

November 2011

Wildlife Habitat

This system indicator addresses the distribution and abundance of natural areas important to fish and wildlife species in the Sierra. The results of the California Essential Habitat Connectivity Project (Connectivity Project) conducted by CalTrans and the California Department of Fish and Game¹⁰ were used to understand the location of small and large natural areas that provide plant communities and wildlife species populations with suitable habitat in the Sierra. The Connectivity Project analysis produced the most up-to-date statewide distribution and location of natural areas in California through a multi-agency, cooperative effort. The Connectivity Project used a GIS analysis to select large, intact natural areas greater than 2,000 acres and smaller natural areas less than 2,000 throughout California. The degree of land conversion, residential housing impacts, road impacts and status of forest structure (the level of canopy closure related to forests being departed from their normal fire return interval) were used to identify the large and small natural areas.

Large, intact natural areas were identified by the Connectivity Project as being the least developed and provide habitat for a variety of wildlife species including large predators such as mountain lions. Small natural areas are particularly important habitat for many smaller mammal species, birds, reptiles and amphibians. Large and small natural areas are surrounded by a matrix of land uses that can vary in the amount of wildlife habitat available and how permeable they are for wildlife to live in or move through. Areas not identified as large or small natural areas in the analysis include areas that are important to many wildlife species that are typically generalist species more adapted to the presence of humans such as the raccoon, coyote, wild turkey, mule deer, common raven and brown headed cowbirds.

The map of natural areas within the SNC boundary shows the distribution of large and small natural areas (Figure 2). In the entire 25 million acres within the Sierra Nevada, there are 11.6 million acres (49%) of large, intact natural areas. Not surprisingly based on the prior discussion of acres of land conserved, the distribution of these large natural areas significantly increases with elevation within the Region. In the elevation band below 3,000 feet, approximately 1.4 million out of a total of 5.3 million (26%) acres are identified as large natural areas (see Chart 2). Between 3,000 and 6,000 feet, there are about 4.3 million acres of large natural areas out of 11.7 million acres (37%). Above 6,000 feet, over 5.9 million of the 8.6 million total acres are large natural areas (69%). From Alpine County south to Kern County, the land above 6,000 feet is virtually a continuous, large natural area according to the Connectivity Project. This large natural area persists because 97% of the land above 6,000 feet is in public lands management, with a large majority in wilderness designation. The highest elevation areas of the Sierra are steep, rugged areas that are significantly less impacted by roads and development than lower elevation areas in the Region. Although high elevation areas represent the largest, most intact natural areas, the higher elevations typically provide habitat for fewer wildlife species and have less plant diversity and overall productivity.

A key factor in whether large intact natural areas exist is road density. Examining road density data for the Region provides insight to understand some of the results of the Connectivity

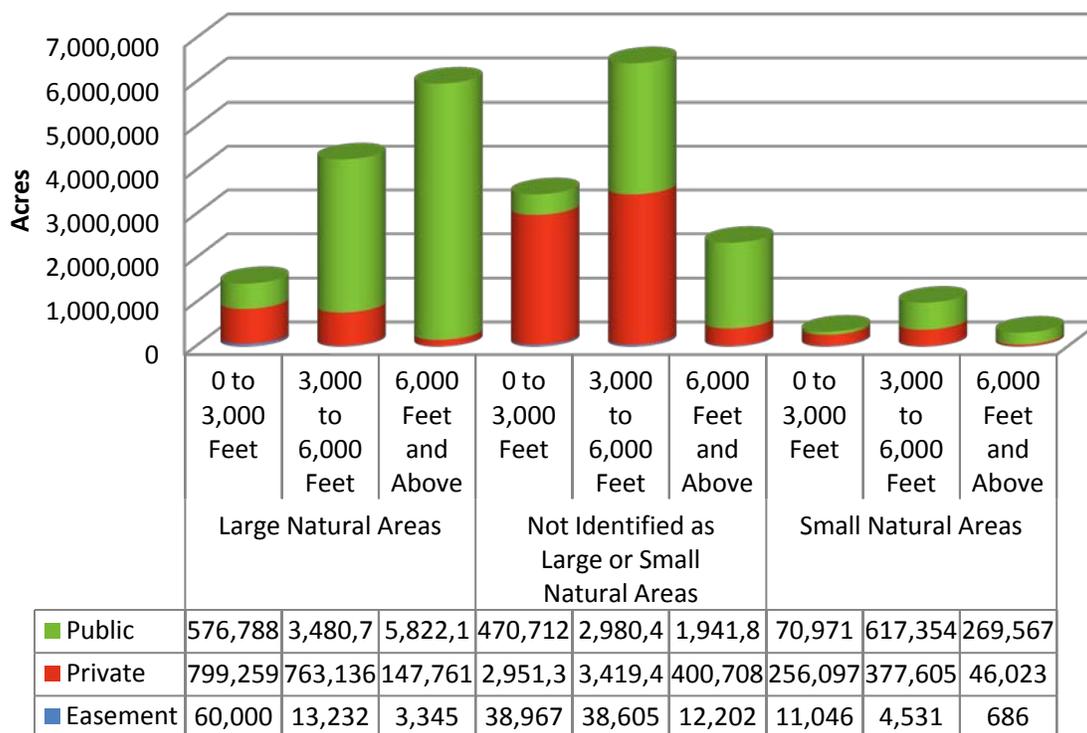
¹⁰ Spencer et al. 2010

Figure 2: Map of large and small natural areas within the SNC



Project as it relates to large, intact natural areas. For example, although 74% of the land between 3,000 and 6,000 is in public lands management, only 37% is identified as large, intact natural areas as the majority of the region is traversed by roads. Although less than 200,000 people inhabit this part of the Sierra, this area has a higher average road density than higher elevations: 2.3 miles/square mile compared to 1.47 miles/square mile above 6,000 feet. The greater road density at this elevation band leads to increased habitat fragmentation, which is significant as the majority of the Sierra’s mixed conifer forest occurs within the 3,000 to 6,000 foot elevation band.¹¹ In the Sierra, forest fragmentation is exacerbated by the condition of the majority of mixed conifer forests, which are significantly departed from their normal fire return interval and impacted by forests pests and climate change.¹² Because of the higher road density, fragmentation, and departure from the normal fire return interval, the majority of lands at this elevation band are not identified as large, intact natural areas by the Connectivity Project analysis. This is particularly evident when viewing Figure 1 on the west side of the Sierra in the central and southern Sierra. Despite the low population figures overall, the mid-elevations of the Sierra have a growing rural development pattern, which reduces overall available habitat and fragments habitat for many wildlife species.¹³ In addition, new development in the wildland-urban interface introduces a number of threats to wildlife persistence such as vehicular collisions, domesticated animals, disease transmission, and non-native species invasions that reduce available forage.

Chart 2 Natural Areas by Ownership and Elevation



¹¹ Barbour et al. 1991, Barbour and Minnich 2000

¹² North et al. 2009, Guarin and Taylor 2005, Beaty and Taylor 2007

¹³ Shilling and Givertz 2007, Laurance 2009, Terborgh 1974

As shown in Chart 2 the 3,000 to 6,000 foot elevation band has the majority of small natural areas in the Sierra; small natural areas make up over 8% of the total land area or under 1 million acres. As discussed in the previous paragraph, this percentage of small natural areas is likely associated with greater fragmentation and departure from the normal fire return interval than compared with lands above 6,000 feet. Above 6,000 feet, small natural areas make up just over 3% of the total area or 316,000 acres. Below 3,000 feet, the areas not identified as small or large natural areas make up the majority of the area at 66% or over 3.4 million acres out of a total of over 5.2 million acres, as the land below 3,000 feet on the west side of the Sierra has experienced the greatest degree of development, habitat conversion and fragmentation¹⁴.

Overall, the grasslands, oak woodland, and wetland ecosystems have experienced reductions in size and degradation of habitat quality, and are at risk of continued ecosystem health declines due to temperature and precipitation fluctuations associated with climatic change. This elevation band will also be disproportionately affected by the loss of subvention payments for Williamson Act contracts to preserve agricultural and grazing lands, which support many wildlife species, as the majority of these contracts are located below 3,000 feet.

Appendix C summarizes research related to changes in distribution and abundance of fish and wildlife species that occurred in the Sierra over the last hundred years.

¹⁴ Sierra Nevada Ecosystem Project 1996