

8.0 MODOC PLATEAU & CASCADES ECOREGION

The Modoc ecoregion is roughly bounded by the Oregon border to the north, the Nevada border to the east, the Feather River and Honey Lake Valley to the south, with the Sacramento Valley forming the western boundary (Figure 1-1, *California Regions and Topography*). The primary vegetation types of the region are coniferous forest including mixed coniferous forest, true fir, and eastside pine, juniper woodland, Great Basin Shrub/Steppe, California annual grasslands, oak woodland, and various aquatic habitats.

Coniferous forests comprise a large portion of the region. Forests dominated by yellow pine (*Pinus ponderosa*) occur on the east side of the Cascades and on the plateaus, which lie to the east in Siskiyou and Modoc counties. The understory is often sagebrush scrub but may also be comprised of species belonging to the chaparral community such as manzanita (*Arctostaphylos* spp.) and ceanothus (*Ceanothus* spp.). Other characteristic species of the coniferous forests of the region include Jeffrey pine (*Pinus jeffreyi*), lodgepole pine (*P. contorta*), Douglas fir (*Pseudotsuga macrocarpa*), white fir (*Abies concolor*), and red fir (*A. magnifica*). Lodgepole pine dominates the forests east of Mt. Shasta on the Modoc Plateau; it usually occurs in dense stands but in drier conditions it has a more scattered distribution. On the slopes of eastern Lassen County, forests dominated by Jeffrey pine merge with sagebrush habitat.

Oak woodlands in the region may be dominated by species such as interior live oak (*Quercus wislizenii*) or Canyon live oak (*Q. chrysolepis*). These species may contribute to mixed coniferous forest, scrubland, savanna, and riparian woodland communities.

Juniper woodland and scrub habitats occur from the Modoc Plateau and Cascade Ranges north to southern Washington and southwestern Idaho. This is an open woodland dominated by juniper (*Juniperus occidentalis*), with a sagebrush scrub understory where the dominant plant is sagebrush (*Artemisia tridentata*). This community may intergrade with coniferous forests at higher elevations.

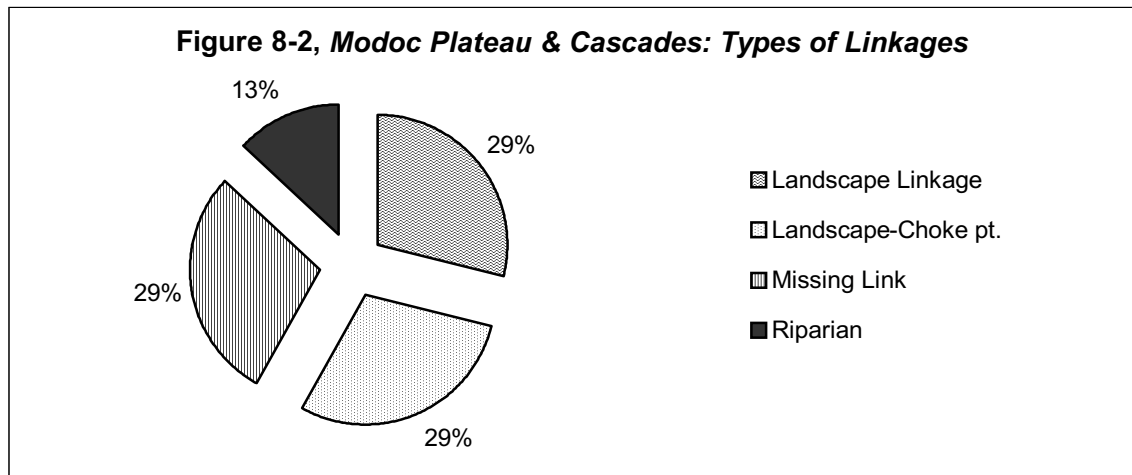
The Modoc ecoregion has high desert riparian habitats, marshes, vernal pools, and foothill riparian woodlands. The riparian scrub community occurs along streams and creeks on the Modoc Plateau and in the Great Basin deserts. A number of willow (*Salix* spp.) species are characteristic of this community; common species of the understory are sagebrush (*Artemisia tridentata*), sedges (*Carex* spp.), and rushes (*Juncus* spp.).

The freshwater marsh community occurs in lakebeds, at the margins of springs and along rivers. Typical species in this habitat include cattail (*Typha latifolia*) and tule (*Scirpus* spp.). The freshwater marsh habitat intergrades with Alkali marsh where temperatures are lower and the conditions more alkaline. Characteristic species in this community are saltgrass (*Distichlis spicata*), sedges (*Carex* spp.), rushes (*Juncus* spp.), and tules (*Scirpus* spp.).

Vernal pools occur in small depressions on lava flows of the plateau where the pools may fill and empty several times over the year. Annual herbs and grasses adapted to the fluctuating

water levels characteristic of this community are common blennosperma (*Blennosperma nanum*), western marsh cudweed (*Gnaphalium palustre*), coyote thistle (*Eryngium vaseyi*), and vernal pool goldfields (*Lasthenia fremontii*).

Cottonwood willow riparian forests occur in lower elevation, montane streams along the eastern Sierras north to the Modoc Plateau. The dominant species are cottonwood (*Populus fremontii*) and black willow (*Salix laevigata*); the understory is not well developed in this community.



The United States National Forest Service and the Bureau of Land Management manage the majority of the land, with checkerboard ownership throughout the central portion of the ecoregion. Publicly owned lands in the ecoregion include Modoc National Forest, Lassen National Forest, Shasta National Forest, Lava Beds National Monument, Lassen-Volcanic National Park, Tule Lake National Wildlife Refuge, Clear Lake National Wildlife Refuge, Modoc National Wildlife Refuge, Warner Mountains State Game Refuge, and Whiskeytown-Shasta-Trinity National Recreation Area. In addition, a significant block of land is managed by the military, the Sierra Army Depot.

A total of seven habitat linkages were identified for the region (Figure 8-1, *Modoc Plateau & Cascades: Missing Linkages*). Of the linkages identified, 29% (2/7) were considered Landscape Linkages¹, 29% (2/7) were determined to be Missing Links², and 13% (1/7) were identified as riparian linkages. Participants identified 29% (2/7) of the linkages as being both Choke-Points³ and Landscape Linkages¹ (Figure 8-2, *Modoc Plateau & Cascades: Types of Linkages*).

The key species used to identify the linkages in the region were either, those dependent on closed canopy forest conditions or those associated with riparian communities. Mammalian

¹ Landscape Linkage = Large, regional connections between habitat blocks (“core areas”) meant to facilitate animal movements and other essential flows between different sections of the landscape.

² Missing Link = A highly impacted area currently providing limited to no connectivity function (due to intervening development, roadways, etc.), but based on location one that is critical to restore connectivity function.

³ Choke-Point = A narrow, impacted, or otherwise tenuous habitat linkage connecting two or more habitat blocks (“core areas”).

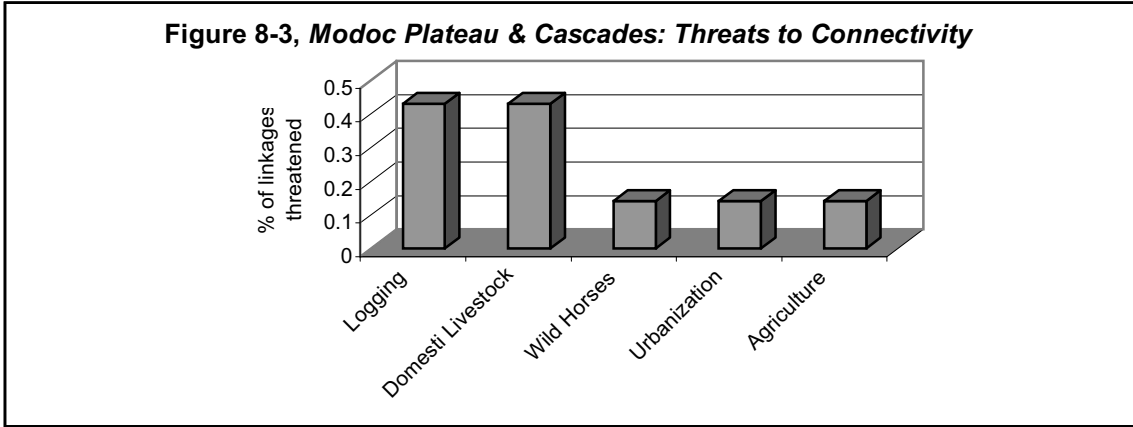
carnivores listed as key species included pine marten (*Martes americana*), Pacific fisher (*M. pennanti*), wolverine (*Gulo gulo*), gray wolf (*Canis lupus*), and mountain lion (*Felis concolor*). Ungulates recognized as key species included pronghorn antelope (*Antilocapra americana*), bighorn sheep (*Ovis canadensis*), and mule deer (*Odocoileus hemionus*). Birds identified as key species included northern spotted owl (*Strix occidentalis*), willow flycatcher (*Empidonax traillii*), sage grouse (*Centrocercus urophasianus*), and neotropical migratory birds. Both single and multiple key species were used in identifying the linkages; 86% (6/7) of the linkages recognized mammals as key species and 57% (4/7) used birds. Mammalian carnivores were recognized as key species in 71% (5/7) of the linkages.

Features listed as facilitating animal movement in the region varied. Some were listed as large semi-contiguous parcels of mixed coniferous forest where bridge underpasses provide passage between blocks of habitat, while others were identified as patches of industrial timberland that may provide movement cover between protected areas, but not adequate reproductive habitat. Riparian corridors were also recognized as providing connectivity function in the region.

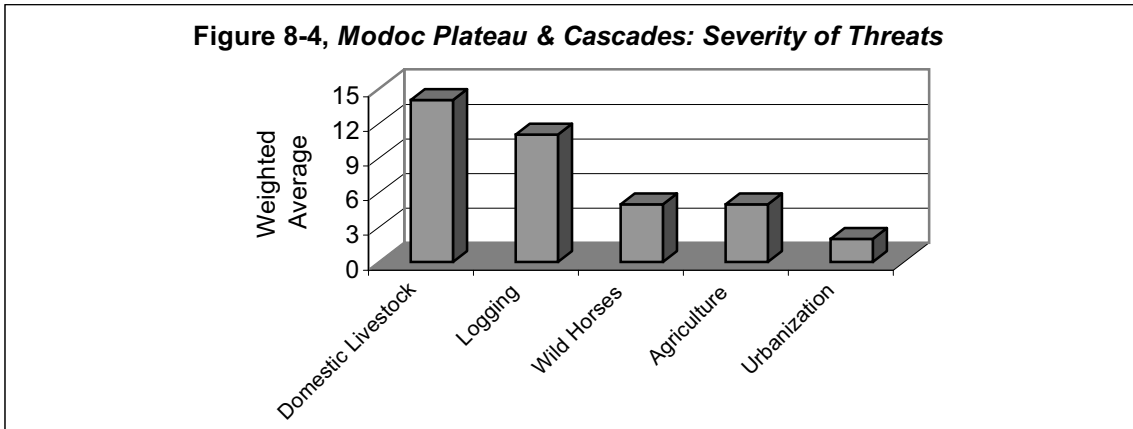
The primary barriers to animal movement in the region also varied. Habitat gaps due to intense logging were identified as barriers in 43% (3/7) of the linkages. Roads specifically mentioned as major impediments included Highways 70 and 36. Rural residential areas, ranching operations and the associated roads, fences and development were also identified as barriers to passage. In addition, riparian linkages degraded by domestic livestock were recognized as limiting “Stepping-Stone” habitat.

A number of specific recommendations were provided to restore connectivity in the region. Habitat types in need of restoration included mixed coniferous forest and riparian. In the mixed coniferous forest managing for old growth characteristics and restoring the natural fire regime were mentioned as vital restoration needs. The elimination of domestic sheep from portions of Surprise Valley was cited as a need to restore connectivity for Bighorn sheep. Excluding domestic animals from riparian habitats was also identified as a component of restoring connectivity. Participants felt that plans for restoring habitat linkages need to be developed, implemented, and monitored for use by target species.

The primary threats identified in the ecoregion were logging and domestic livestock; other acknowledged threats to connectivity included wild horses, urbanization, and agriculture (Figure 8-3, *Modoc Plateau & Cascades: Threats to Connectivity*). Of the linkages, 29% (2/7) identified are owned, all or in part, by industrial timber companies.

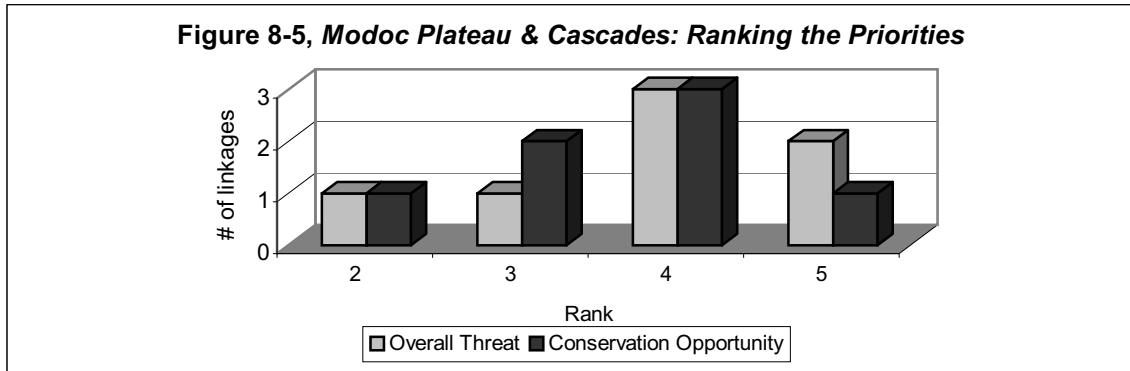


In addition, 43% (3/7) of the linkages are threatened by logging, all of which were ranked as severely threatened (rank = four or five). Domestic livestock threatened connectivity in 43% (3/7) of the linkages, all of which were ranked as severely threatened. Wild horses, urbanization, and agriculture each jeopardized 14% (1/7) of the linkages identified. A number of threats to habitat connectivity were identified for the region, though the average severity of the threat and the number of linkages affected varied. The weighted average (average rank \times number of linkages affected) was calculated for each threat identified to determine the severity of each threat in the region (Figure 8-4, *Modoc Plateau & Cascades: Severity of Threats*). Figure 8-4, average severity of each threat among linkages, reveals slightly different trends than Figure 8-3, the number of linkages impacted by each threat.



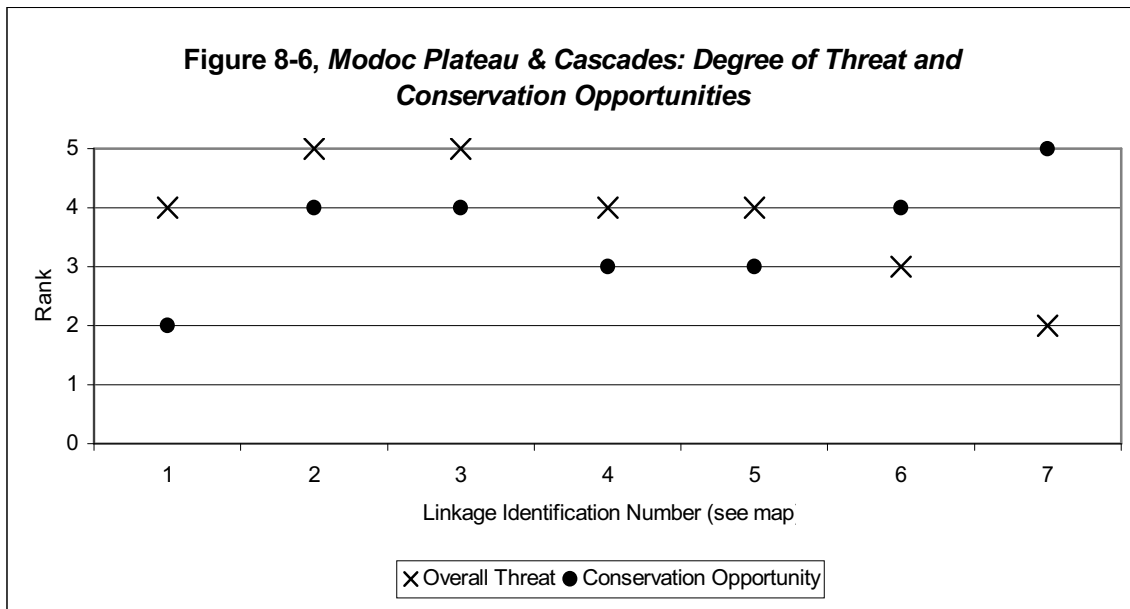
Note: The above graph depicts the weighted average of each threat identified. Weighted average = average rank \times number of linkages affected. The severity of each threat was ranked from one to five (one = not severe, five = extremely severe).

Conference participants also scored the feasibility of conserving the linkage and ranked the overall threat to connectivity (Figure 8-5, *Modoc Plateau & Cascades: Ranking the Priorities*). Participants ranked 57% (4/7) of the linkages as high priorities (rank = four or five) with good opportunities for conservation (Figure 8-1, *Modoc Plateau &*



Note: Graph compares the number of linkages ranked for overall threat and conservation opportunities. No linkages were ranked one for either category.

Cascades: Missing Linkages, Map ID#s 2, 3, 6, & 7). Overall, 71% (5/7) of the linkages identified were ranked as severely threatened (rank = four or five). The West Lassen-Fisher linkage (Map ID# 2) and the Great Basin Riparian linkage (Map ID# 3) were both ranked high (rank = four) as conservation opportunities; both were listed as severely threatened (rank = five). The Last Chance linkage (Map ID# 7) was ranked as the highest priority (rank = five) but it is not severely threatened (rank = two). The California-Oregon Cascades linkage (Map ID# 6) was also ranked as a high conservation priority (rank = four), it was ranked as moderately threatened (rank = three). A brief description is provided below of the top-ranked linkages (threat & opportunity = four or five). A comparison of how individual linkages were ranked is depicted in Figure 8-6, *Modoc Plateau & Cascades: Degree of Threat and Conservation Opportunities*.



Note: The above graph compares how each linkage was ranked for overall threat (one = no threat/secure, five = severe threat/ loss imminent) and the feasibility of conserving the linkage (one = not feasible, five = good opportunity).

The West Lassen-Fisher linkage (Figure 8-1, *Modoc: Missing Linkages*, Map ID# 2), on the west side of the Sierra Nevada, was identified as a Landscape Linkage¹ and a connectivity Choke-Point³. Forest carnivores, including the Pacific fisher, were the key species used to

identify this linkage, though this species has not been documented in the area for decades (per Bill Zielinski). The major landowners in the area were identified as the National Forest Service and industrial timber companies. Participants mentioned that the area has been subject to timber harvest and that commercial logging companies are aggressively liquidating old growth forests. Other barriers to connectivity included Highways 70 and 36. Please refer to the corresponding the Linkage Description Log sheet for more specific information.

The Great Basin Riparian linkage (Figure 8-1, *Modoc: Missing Linkages*, Map ID# 3) was identified as a Missing Link², limiting connectivity for mountain lion, pronghorn antelope, deer, sage grouse, and neotropical migratory birds. This linkage consists of riparian habitat in a high desert ecosystem. Wild horses and domestic livestock were cited as the primary threats to connectivity. Land in this linkage is administered by the Bureau of Land Management. Revising the Bureau of Land Management's grazing management program to exclude domestic livestock from riparian areas was identified as a restoration priority. Please refer to the corresponding Linkage Description Log sheet for more specific information.

Participants indicated that two linkages have willing sellers in all or a portion of the designated area (Figure 8-1, *Modoc: Missing Linkages*, Map ID#s 6 & 7), both of which were identified as conservation priorities (rank = four or five). There is potential for agency acquisition in one of the linkages (Map ID# 6). Other specific opportunities identified to secure or restore connectivity function included reforming forest protection laws on commercial timberland and modifying the California Forest Practices Act to recognize the importance of habitat attributes. In addition, working with federal and state agencies on management directives was identified as an opportunity to restore connectivity.