

Executive Summary: A Network of Wildlands

Only a century ago, southern California was one vast wildland supporting a dazzling array of habitats and a veritable treasure trove of life. Creatures great and small, mobile and stationary – many found no where else on earth - thrived in these habitats. Grizzly bears dominated the landscape and mountain lions roamed from the mountains to the sea.

Much of this vast wildland has been lost to housing developments, freeways, and strip malls, with drastic impacts on the abundant plant and animal communities that flourished here. Yet, much of the unique vegetation and wildlife that dominated this pre-development landscape can still be found, and what remains can be maintained, despite the changes we've made and continue making to the landscape.

Habitat loss and fragmentation are the leading threats to biodiversity worldwide, and nowhere is the risk more severe than in southern California. Countering these threats requires protecting connections between our existing open space areas to form a regional wildland network. Such an interconnected set of reserves would allow natural ecological processes—such as migration and range shifts with climate change—to continue operating as they have for millennia.

The South Coast Missing Linkages project has developed a comprehensive plan for such a regional network that would maintain and restore critical habitat linkages between existing reserves. These linkages form the backbone of a conservation strategy for southern California where the whole would be greater than the sum of the parts. This strategy represents the best hope for maintaining what remains of southern California's wildlife legacy, while ensuring quality of life for our citizens via clean air, clean water, and recreational opportunities.

South Coast Missing Linkages is a highly collaborative inter-agency effort to identify and conserve the highest-priority linkages in the South Coast Ecoregion. Partners include South Coast Wildlands, National Park Service, U.S. Forest Service, California State Parks, The Wildlands Conservancy, The Resources Agency, California State Parks Foundation, The Nature Conservancy, Santa Monica Mountains Conservancy, Resources Legacy Foundation, Conservation Biology Institute, San Diego State University Field Stations Program, Environment Now, Mountain Lion Foundation, and the Zoological Society of San Diego's Conservation and Research for Endangered Species, among others. Cross-border alliances have also been formed with Pronatura, Universidad Autonoma de Baja California, Terra Peninsular, and Conabio, in recognition of our shared vision for ecological connectivity across the border into Baja.



The South Coast Ecoregion encompasses roughly 8% of California and extends 190 miles into Baja.

Nature Needs Room to Roam

Movement is essential to wildlife survival, whether it be the day-to-day movements of individuals seeking food, shelter, or mates, dispersal of offspring to find new homes, or seasonal migration to find favorable conditions. Movement is essential for gene flow, for recolonizing unoccupied habitat after a local population goes extinct, and for species to shift their geographic range in response to global climate change. Disruption of these natural movement patterns by roads, development, or other impediments can alter these essential ecosystem functions and lead to losses of species and critical environmental services.

The tension between habitat fragmentation and conservation is particularly acute in southern California, one of 25 hotspots of biological diversity on Earth, and one of our nation's largest urban areas. It is also one of the most threatened areas, with over 400 species of plants and animals considered endangered, threatened or sensitive by government agencies and conservation groups. Existing reserves conserve many of these species, but wide-ranging species like mountain lions, badgers, and bighorn sheep may be lost from even the largest areas if highways and urbanization isolate each major wildland.

Despite a half-century of rapid habitat conversion, the South Coast Ecoregion retains valuable wildlands, and opportunities remain to conserve and restore a functional wildland network. The region's archipelago of conserved wildlands is fundamentally one interconnected system, and the goal of South Coast Missing Linkages is to keep it so. It is our hope that the South Coast Missing Linkages plan will serve as a catalyst for directing funds and attention toward the protection of ecological connectivity for the South Coast Ecoregion and beyond.



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"Without connectivity, landscapes may be reduced to pathetic remnants that sustain few species and provide little ecological value."

E.O. Wilson

Impediments to Wildlife Movement

Impediments to wildlife movement include roads, railroads, dams, canals, urban development, and agriculture. Loss of connectivity is by no means inevitable, and development does not have to result in a proliferation of barriers to wildlife movement.

In our Ecoregion, roads and urbanization are the major obstacles to wildlife movement. Road effects extend far beyond the road itself and include road kill, disruption of animal movements, spread of exotic species, and increases in pollution, noise, light and fire in wildlife habitats. Roads can fragment large habitat areas into smaller patches that support smaller populations, which are consequently more prone to local extinction. Many of these effects can be mitigated and recommendations to do just that are an important component of our plan for restoring ecological connectivity to the ecoregion.



Urban developments, unlike roads, create movement barriers that cannot be readily removed, restored, or mitigated. The impacts of urbanization include removal of native vegetation, spread of non-native vegetation, dogs and cats killing and harassing wildlife, artificial night lighting impeding night-time movement, pesticides, rodenticides, noise, disruption of fire regimes, pollution, conflicts with wild animals that eat domestic plants and animals, and altered patterns of water in streams and ponds.

Conservation Planning Approach

South Coast Missing Linkages incorporates advanced conservation planning techniques and the expertise of preeminent scientists. Our approach has been highly collaborative and interdisciplinary with participation by experts in biology, conservation design, and implementation in a reiterative process. This approach has yielded a strong biological foundation and a quantifiable, repeatable conservation design methodology (Appendix A, Conservation Planning Approach) that can be used as the basis for conservation action.

South Coast Missing Linkages developed the linkage designs based on inputs from a series of workshops at which 270 participants from 126 agencies, academic institutions, land managers, planners, conservation organizations, and community groups identified 109 focal species, including 26 plants, 25 insects, 4 fish, 5 amphibians, 12 reptiles, 20 birds and 17 mammals. These focal species cover a broad range of habitat and movement requirements such that planning adequate linkages for their needs is expected to cover connectivity needs for the ecosystems they represent. The linkage designs are based on state-of-the-art GIS analyses informed by experts on each focal species, and contain multiple strands to serve the needs of various species.

To identify potential routes between existing protected areas we conducted landscape permeability analyses for selected focal species for which appropriate data were available. Permeability analyses model the relative cost for a species to move between protected core habitat or population areas. We defined a least-cost corridor—or best potential route—for each species, and then combined these into a Least Cost Union. We then analyzed the size and configuration of suitable habitat patches within this Least Cost Union for all focal species to verify

that the final Linkage Design would suit the live-in or move-through habitat needs of all. Where the Least Cost Union omitted areas essential to the needs of a particular species, we expanded the Linkage Design to accommodate that species' particular requirements, and ensure that no species was left behind. We also visited priority areas in the field to identify and evaluate barriers to wildlife movement. We also suggest restoration strategies to mitigate those barriers, with special emphasis on opportunities to reduce the adverse effects of transportation barriers.

The resultant linkage designs are broad to 1) buffer against edge effects; 2) provide live-in habitat for species needing multiple generations to achieve gene flow through the linkage; 3) ensure availability of key resources; 4) allow natural processes to operate, and 5) allow species and natural communities to respond to climatic changes. A crucial element of each linkage design is a set of recommendations to mitigate barriers, restore habitats, and manage the linkage.

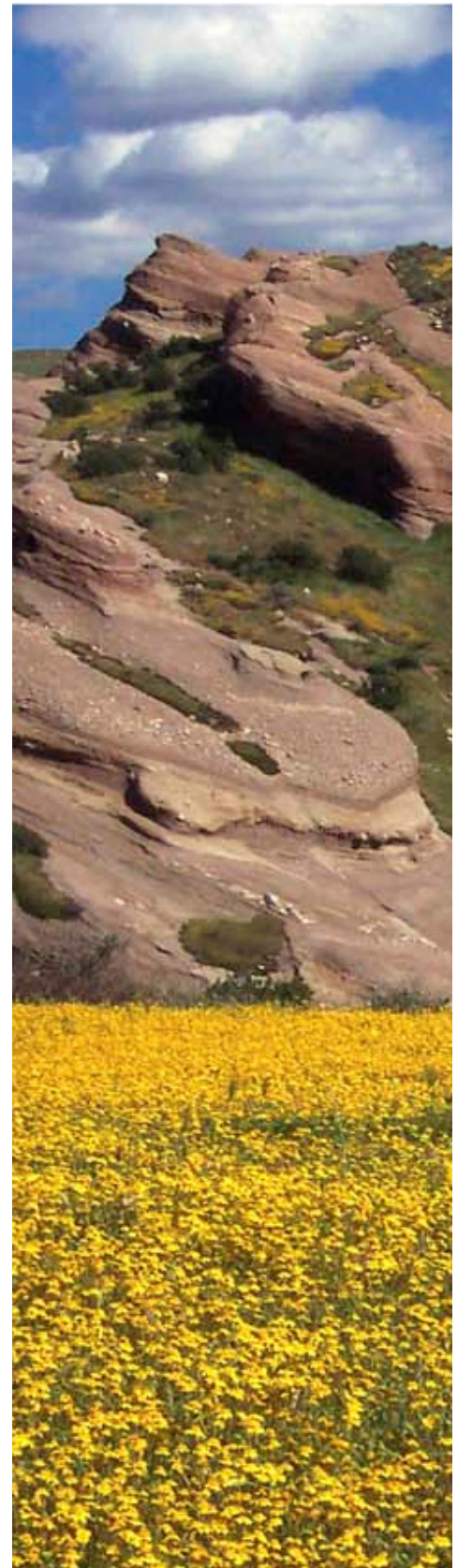
A Scientifically Sound Plan for Conservation Action

The South Coast Missing Linkages conservation plan addresses the challenges posed to our natural environment by the ever-increasing human footprint by seeking to influence regional development and land-management patterns in a manner that best preserves landscape level processes while accommodating economic development needs. We hope this linkage conservation plan will be used to protect an interconnected system of natural space where our native biodiversity can thrive at minimal cost to other human endeavors. For example, the plan can be used as a resource for regional land managers to guide how they can best help sustain biodiversity and ecosystem processes by implementing the linkage designs. Relevant aspects of the plan can be folded into management plans of agencies and organizations administering conservation lands in the region.

Transportation agencies can use the plan to design new projects and find opportunities to upgrade existing structures. Regulatory agencies can use this information to help inform decisions regarding impacts on streams and other habitats.

This report can also help motivate and inform construction of wildlife crossings, watershed planning, habitat restoration, conservation easements, zoning, and land acquisition. Implementing this plan will likely take decades, and will require collaboration among county planners, land and resource management agencies, transportation agencies, conservancies, and private landowners.

Public education and outreach are vital to the success of this effort – both to change land use activities that threaten wildlife



movement and to generate appreciation for the importance of the linkages and the wildland network they will sustain. The biological information, maps, figures, tables, and photographs in this plan are ready materials for interpretive programs. Public education can encourage residents at the urban-wildland interface to become active stewards of the land and generate a sense of place and ownership for local habitats and processes. Such voluntary cooperation is essential to preserving linkage function.

South Coast Wildland Network

South Coast Missing Linkages has prioritized and designed landscape linkages that are widely considered the backbone of a conservation strategy for southern California. The linkages designed by South Coast Missing Linkages stitch together over 18 million acres of our existing conservation investments (national forests, state and national parks, etc.) to form the South Coast Wildland Network (Appendix B, Existing Conservation Investments). The network encompasses 19,435,105 acres (94% is already protected), maintaining connected wildlife populations from the southern Sierra Nevada to Baja California, and from the beaches of Camp Pendleton eastward to the deserts of Anza-Borrego Desert State Park. These critically important linkages must be secured if we are to maintain the region's tremendous biodiversity.

The ecological, educational, recreational, and spiritual values of protected wildlands in the South Coast Ecoregion are immense. These conserved lands also represent an investment of tens of billions of dollars. We need to ensure the ecological health of this investment by securing these linkages.

The linkages identified by South Coast Missing Linkages are key to the ultimate protection and restoration of a wildlands network where our native biodiversity can thrive. The unbroken chain of mountains and foothills created by the South Coast Wildland Network will allow wide-ranging species like the mountain lion to roam from the Sierra Nevada to the Sierra Juarez in Baja California Norte. The South Coast Wildland Network will also provide unparalleled recreational, educational, and spiritual opportunities for more than 17 million people who make southern California their home, while promoting the long-term health of the state's land, water and air.

This report provides an overview of the critical linkages: where they lie on the landscape, what they connect and the species that use them. The full linkage reports are available at www.scwildlands.org.

