# Chuckwalla National Monument Ecological Values Survey

## Chuckwalla Bench

The Chuckwalla Bench is located near the center of the proposed Chuckwalla National Monument within the Bureau of Land Management's Chuckwalla Area of Critical Environmental Concern (ACEC). It is an elevated area of coalescing alluvial fans (fan shaped deposits of sediment) between the Chuckwalla and Chocolate mountains (U.S. Bureau of Land Management [BLM] 2015). Elevations range from approximately 500 feet at both ends of the "Bench" to more than 2500 feet in the highest portion of the central plateau, which contains approximately 80,000 acres at over 2000 feet (Clark et al. 2012). The Chuckwalla Bench has the best habitat in California for the federally endangered Sonoran pronghorn (*Antilocapra americana sonoriensis*). It was extirpated from California in the mid-20th century but plans are underway by the wildlife agencies to reintroduce it. The Chuckwalla Bench is considered the most suitable place for its reintroduction, which is considered crucial for the recovery of the species (BLM 2015, USFWS 2016). The Chuckwalla Bench contains the highest densities of desert tortoise (*Gopherus agassizii*) in the entire Colorado Desert (BLM 2015), and it is designated critical habitat for the species (BLM 2015, USFWS 2016). The Chuckwalla Bench provides excellent habitat for burro deer (*Odocoileus hemionus eremicus*), a subspecies of deer only found in the Sonoran Desert. It is considered the most important habitat for the subspecies in California (BLM 2015).

The Chuckwalla Bench and the rest of the ACEC are one of the most botanically diverse places in the California Desert, with 158 plant species (BLM 2015). Several are found nowhere else including the Mecca aster (*Xylorhiza cognata*) , Orocopia sage (*Salvia greatae)*, and the tree-like Munz's cholla (*Cylindropuntia munzii*), which grows 6–13 feet tall. All three are BLM sensitive species (BLM 2015). The vegetation on the Chuckwalla Bench is highly variable. Washes are dominated by palo verde (*Cercidium floridum*), ironwood (*Olneya tesota*) and catclaw acacia (*Acacia greggii*). Open areas between the washes contain shrubs, including creosote bush (*Larrea tridentata*), burrobush (*Ambrosia dumosa*), desert holly (*Atriplex hymenelytra*), brittlebush (*Encelia farinosa*), desert lavender (*Hyptis emoryi*), and cacti and succulents, including pencil cholla (*Cylindropuntia ramosissima*), teddy bear cholla (*C. bigelovii*), golden cholla (*C. echinocarpa*), Munz's cholla, and Mojave yucca (*Yucca shidigera*) (Clark et al. 2012). As the bench increases in elevation toward the central plateau, jojoba (*Simmondsia chinensis*), becomes increasingly common, and the proportion of Mojave yucca and chollas increases. Munz's cholla grows on the central plateau. It is an ecological analog to the chain-fruit cholla (*Cylindropuntia fulgida*) of southern Arizona, an important browse plant during drought for some pronghorn populations (Brown and Ockenfels 2008, as cited in Clark et al. 2012).

Munz's cholla from the Bradshaw Trail. Photo by Bob Wick.

Because the Chuckwalla Bench is higher than surrounding areas, including approximately 80,000 acres above 2000 feet, it has the potential to provide climate refugia for both plants and animals as lower elevation areas become inhospitable to them. Its calculated mean precipitation is between 8 and 12.8 inches annually (Lowe 1964, as cited in Clark et al. 2012), which is higher than surrounding areas. This is important for pronghorn because the most significant impact to them from climate change is its potential to increase the frequency and severity of drought (Clark et al. 2012). Higher elevation areas are potentially important climate refugia for plant species too. Kelly and Goulden (2008) found rapid upslope changes in plant distribution with recent climate change in Southern California's Santa Rosa Mountains. Guida (2011) concluded that the species in the Newberry Mountains on the southeastern boundary of the Mojave Desert that are most reliant on higher precipitation levels are migrating to higher elevations in order to adapt to current climate change.

With its high levels of plant and animal diversity, rare and unique plants and animals, potential for re-introduction of Sonoran pronghorn, and potential climate refugia, the Chuckwalla Bench is recognized by researchers, the wildlife agencies, and the Bureau of Land Management as a unique and important habitat within the proposed Chuckwalla National Monument.

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## Microphyll Woodland

Microphyll woodlands, also referred to as desert dry wash woodlands, provide essential ecosystem services in the arid Colorado Desert of California. The State of California identifies microphyll woodlands as a Sensitive Natural Habitat (California Department of Fish and Wildlife 2023). The Audubon Society identifies Colorado Desert Microphyll Woodlands as Important Bird Areas (Audubon Society 2019). Embedded in a matrix of arid uplands, these woodlands are estimated to comprise only five percent of land cover in California's Colorado Desert, yet they account for 95 percent of Sonoran Desert stopover habitat for migrating birds (Audubon Society 2019). The proposed monument, if designated, would protect over 30 percent of the microphyll woodland in the 22.5 million acres of California desert included in the Desert Renewable Energy Conservation Plan (Conservation Biology Institute 2014, Bureau of Land Management 2016). The proposed monument would provide protection to far more microphyll woodland than any existing national park, national monument, or wilderness in California.

The woodlands, which consist of small-leafed trees such as blue palo verde, mesquite, and ironwood, occur across most of the proposal area in seasonally dry stream courses (Thorne 1982; Laudenslayer, n.d.). Microphyll woodlands transport water, seeds, and nutrients to nearby desert ecosystems (O'Keeffe 2018). They are often referred to as "the veins of the desert" supporting plant and animal life (O'Keeffe 2018).

They are the most productive desert ecosystems , providing important foraging, nesting, sheltering and movement habitat for migratory, wintering, and resident birds and a variety of reptiles, mammals (Sharifi et al. 1982). These rare desert woodlands also provide critical habitat for rare and threatened species including the state and federally threatened desert tortoise and its federally designated critical habitat, the rare LeConte's thrasher, and many rare bats.

Microphyll woodlands, Milpitas Wash. Photo by Bob Wick.

The greatest concentration of microphyll woodlands in California is in the Colorado desert, and the nearly 690,000 acres of the proposal area protect approximately  162,000 acres of these woodlands (Conservation Biology Institute 2014). The protection of California's Colorado desert wildlife is synonymous with the protection of microphyll woodland. The proposed monument would protect a majority of one of the largest microphyll woodlands in the Colorado Desert: Milpitas Wash, which eventually flows to the Colorado River. Microphyll woodlands are also areas of significant carbon sequestration and storage, more so than any other desert habitat type (Allen & McHughen 2011; Yap et al. 2023).

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## Desert Sand Dunes

Desert sand dunes are an uncommon desert landscape that provides habitat for a suite of rare species that are evolutionarily adapted to exploiting the constantly shifting sands (Fernandes et al. 2010), including the most southern population of the Mojave fringed-toed lizard (Gottscho et al. 2014) and endemic insects and plants (Fernandes et al. 2010; Thorne 1982). They also provide a beautiful and unique visual landscape. Dunes in deserts typically form as a result of eolian (wind-blown) processes, where sand particles are moved with the prevailing winds. These eolian processes form sand transport corridors that include dunes and partially stabilized dunes and sand sheets (Collison 2010). Muhs et al. (2003) document some of the sand transport corridors that actively move substrates across the landscape in the western deserts, including the large sand transport corridor and associated dunes within the proposed Chuckwalla National Monument (Figure 1). Maintaining the supporting sand transport corridors is key to maintaining dune systems (Collison 2010). The proposed monument will protect not only the existing dunes within the boundaries of the monument, but will also protect much of the sand transport corridor and the downwind dunes and habitat.

The large sand transport corridor and dunes, part of which is within the Chuckwalla National Monument boundary, originates in the Pinto Basin in Joshua Tree National Park (see Pathway 3 in Figure 1) and moves to the southeast through the Palen Valley. Historically it terminated at the Colorado River, but currently ends at agricultural fields in the Palo Verde Valley.

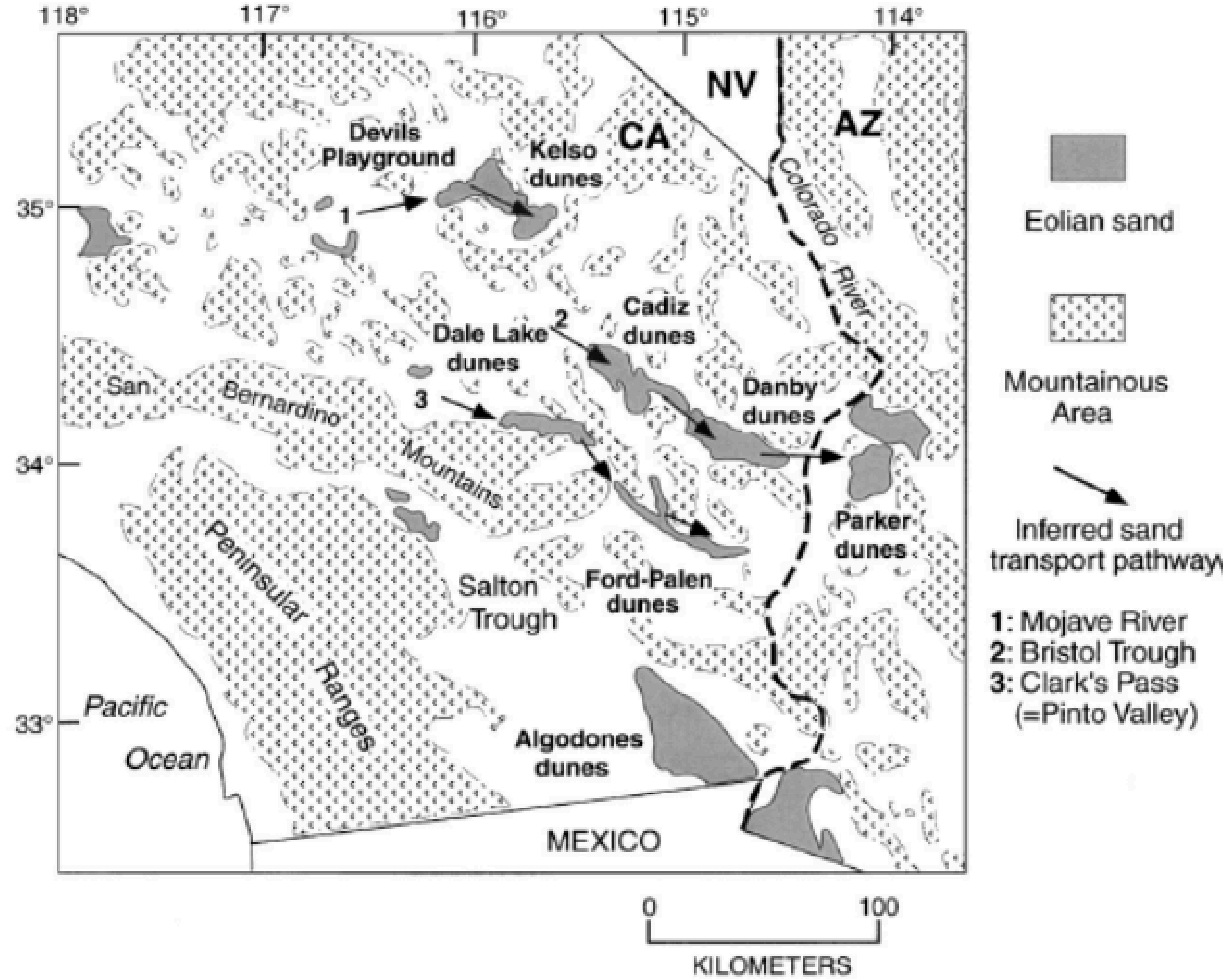

Figure 1. Pathway 3 above shows the sand transport corridor that originates in the Pinto Valley in Joshua Tree National Park and sweep southeastward to the agricultural areas that border the Colorado River (Muhs et al. 2003).

Zones within this sand transport corridor are characterized by the amount of sand movement (Collison 2010). The area in the proposed Chuckwalla National Monument includes active windblown sand migration, stabilized dunes with areas of sand migration, and relict windblown sand sheets with little to no sand migration (Collison 2010). The Desert Renewable Energy Conservation Plan (DRECP) recognizes the importance of the sand transport corridor, dunes and sand sheets in maintaining habitat for the unique species and designated the remaining sand transport corridor, dunes and sand sheets as the Palen-Ford Playa Dunes Area of Critical Environmental Concern, stating:

> **Ecological Values**: The unit would protect one of the major playa/dune systems of the California Desert. The area contains extensive and pristine habitat for the Mojave fringe-toed lizard, a BLM Sensitive Species and a California State Species of Special

> Concern. Because the Chuckwalla Valley population occurs at the southern distributional limit for the species, protection of this population is important for the conservation of the species. The unit would protect an entire dune ecosystem for this and other dune-dwelling species, including essential habitat and ecological processes (i.e., sand source and sand transport systems)...
>
> **Scientific Values**: This unit contains exemplary representation of pristine sand flow ecosystems and associated assemblages of sand flow ecosystem obligate species. The area represents outstanding opportunities for scientific research in ecosystem functionality, dispersion capacity as well as study of unique species only inhabiting these ecosystems. Significant opportunity also exists to study this system's response to disturbance and investigate resiliency to impact from large scale development as well as develop appropriate mitigation to maintain these ecosystems. Archaeological sensitivity is extremely high near the dry lakes, benches, and washes. Preservation is exemplary in buried contexts, and on undisturbed desert pavements.

(BLM 2016).

Including this area in the Chuckwalla National Monument would assure permanent protection for this rare ecosystem while not impeding solar development in the nearby Development Focus Area designated in the DRECP.

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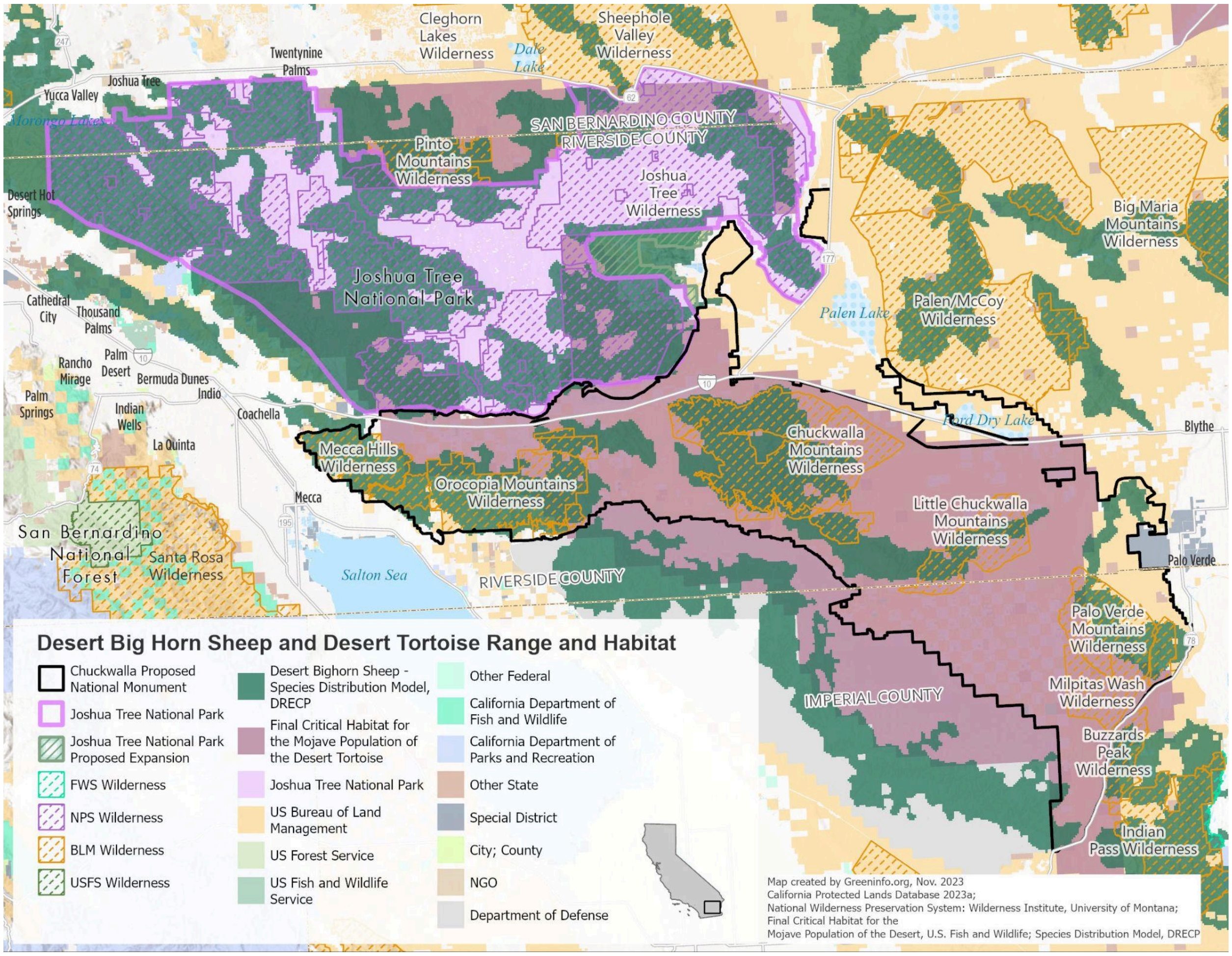


Desert Big Horn Sheep and Desert Tortoise Range and Habitat

Map created by Greeninfo.org, Nov. 2023
California Protected Lands Database 2023a;
National Wilderness Preservation System: Wilderness Institute, University of Montana;
Final Critical Habitat for the
Mojave Population of the Desert, U.S. Fish and Wildlife; Species Distribution Model, DRECP

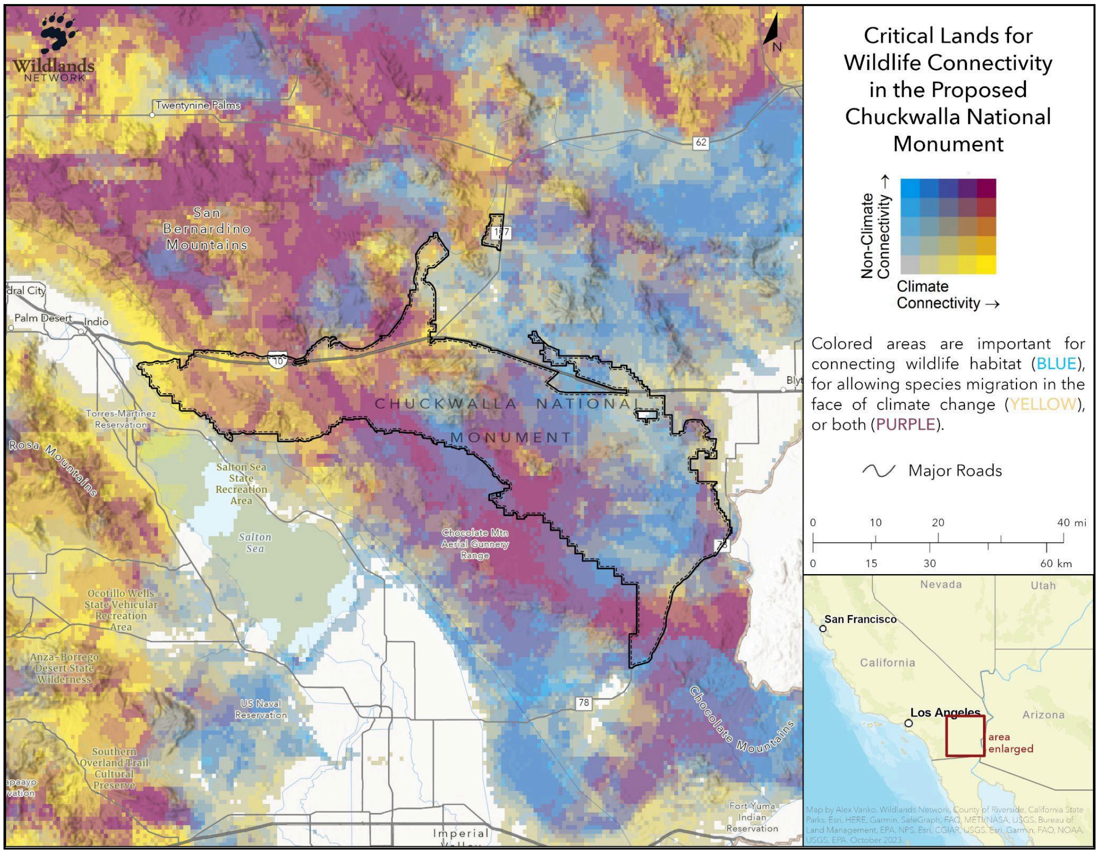
## Habitat Connectivity Value

The proposed Chuckwalla National Monument encompasses a critically important transition zone between the Colorado/Sonoran Desert and the Mojave Desert. This confluence of ecosystems and its wide array of topographies with their associated microclimates has resulted in a high level of biodiversity in this desert region (Bureau of Land Management [BLM] 2016). Currently, the proposed monument area is managed by a variety of management schemes and lacks an overarching, permanent management plan that will ensure the long-term viability of this landscape for wildlife. There are several protected areas within this region that act as “core reserves,” land protected in perpetuity for the purpose of nature conservation (e.g. wilderness areas, Joshua Tree National Park, etc). Alone, these core reserves are not sufficient to sustain highly mobile species like bighorn sheep, nor do they represent the diversity of habitats found within this landscape, such as the microphyll woodlands and alluvial fans which occupy the low-lying regions between mountain ranges (see above). Establishing this national monument is necessary to create a holistic management plan that can protect these habitats and address the landscape-level connectivity needs of the wildlife—not only to allow for daily movement and seasonal migrations but also to increase resiliency to the future uncertainties of climate change and development.

Image: Landscape of the Chuckwalla National Monument. The diverse topography of the landscape provides a wide array of habitats for wildlife and potential for climate refugia as the climate warms. Photo by Bob Wick.

Globally, habitat loss and fragmentation are two of the leading causes of declining wildlife populations (Lindenmeyer & Fisher 2013). As habitat diminishes, species lose access to resources such as food, water, space to establish new territories or migrate seasonally, and the ability to find genetically diverse mates. If a population becomes isolated, then they are at risk of unsustainable population numbers, genetic drift, or an inbreeding depression (Soule & Terborgh 1999). Coupled with the existential threat of climate change, which is resulting in shifting home ranges and altering habitat compositions, populations can become extirpated if we do not intervene with landscape or regional-level conservation strategies (Hilty et al. 2019). The proposed monument is centrally located where it serves as a critical linkage for wildlife throughout the greater desert region and will play a vital role in curbing the pressures of climate change and fragmentation.

The impending warming climate threatens to alter habitat ranges for many important desert species (see Climatology section). Large connected landscapes with complex topography allow for more opportunities for adaptation by native flora and fauna. Nunez et al. (2022) conducted a geospatial analysis compiling 75 different connectivity maps of western North America to identify areas of climate and non-climate connectivity (Figure 1). Within the monument boundaries, the Chuckwalla Bench and the Orocopia Mountains are identified as high overall connectivity value areas and the I-10 corridor is identified as having high climate connectivity value. This is a result of the monument’s varied topography and diverse habitats that provide opportunities for movement and adaptation, and its role in connecting linkages between Joshua Tree National Park and the Chocolate Mountains. The establishment of the Chuckwalla National Monument will allow for the development of a management plan that can respond to the uncertainty associated with climate change.



Map by Alex Vanko, Wildlands Network, County of Riverside, California State Parks, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, Esri, CGIAR, USGS, Esri, Garmin, FAO, NOAA, USGS, EPA. October 2023.

Figure 1: This map was created from 75 different connectivity maps across far western North America that represent a diversity of conservation targets, methodological approaches, and climate-driven movements. The ensemble connectivity value map identifies substantial regions of agreement and suggests places for no-regrets conservation investments that support connectivity in the present and into a dynamic future (Nuñez 2022).

In addition to the pressures of climate change, current encroachment pressures exist on all sides of the proposed monument and are already beginning to limit the available space and resources wildlife need to thrive. Critical wildlife linkages connect core habitat areas both within the proposed Monument area and beyond into the surrounding areas. The major linkage networks for wildlife exist between Joshua Tree National Park and the Chocolate Mountains via the Mecca Hills and Orocopia mountains, between the Palen andMcCoy Mountains and the Chocolate Mountains via the Chuckwalla Bench, and extend south adjacent to the Colorado River through the Palo Verde Mountains all the way to the Little Picacho Wilderness (Penrod et al., 2012).

Image: Desert landscape bisected by the I-10 highway. Photo by Bob Wick.

One of the major barriers to wildlife movement in this region is Interstate 10,which bisects several of these vital linkages and severely hinders the north-south movement of wildlife (Penrod et al., 2021; BLM, 2016). Highways not only serve as barriers to movement but also are a cause of direct mortality in wildlife-vehicle collisions and can have significant economic and public safety implications. Protected habitat adjacent to both sides of the highway facilitates effective wildlife connectivity infrastructure such as crossings and directional fencing (Spencer et al., 2010). One of the major species represented in this linkage is the desert tortoise, whose core habitat area has been bisected by this highway and fragmented by development (Penrod et al., 2012). On the west side of this linkage network, a least cost corridor for bighorn between Joshua Tree National Park and the Chocolate Mountains runs from the base of the Little San Bernardino Mountains through the Mecca Hills and Orocopia Mountains (Penrod et al., 2012). This critical linkage runs along the western edge of the proposed monument boundary and is only 0.5 miles wide at its narrowest point, which is where it crosses I-10. The establishment of a national monument would not only protect critical core habitat zones for wildlife, but also maintain these vital linkages to the adjacent protected areas.

Image: Desert tortoise crossing a roadway (Credit: Brad Sutton, NPS). Roads and highways not only fragment habitat for wildlife, but are also a major cause of mortality due to vehicle collisions.

The threats of fragmentation and isolation are looming over this unique and vibrant desert ecosystem. With surrounding development pressures, existing barriers, and a warming climate, the wildlife of this region require opportunities for movement and space to roam. The establishment of the Chuckwalla National Monument will enhance the connectivity value of this landscape and allow the biodiversity of this region a chance to thrive. Furthermore, a well connected landscape will be a prime opportunity to reestablish a Sonoran pronghorn population and restore this iconic species back to its historic range (U.S. Fish and Wildlife Service, 2016). Ultimately, this monument will serve as the cornerstone for desert wildlife throughout this region.

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