Greater I-10 Linkage Implementation Workshop

Held Virtually April 19, 20, 27, 28, 2021

Greater I-10 Linkage Implementation Workshop Planning Team ("Planning Team") Many thanks to the Planning Team, which engaged in all aspects of planning and design of the workshop. The Planning Team includes:
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1. Background

This workshop series focused on implementation of linkages in the Greater Interstate 10 (I-10) area of Riverside County, including the San Bernardino - San Jacinto Mountains Linkage, the San Bernardino - Little San Bernardino Mountains Linkage, and the Joshua Tree - Chocolate Mountains Linkage (Figure 1). The San Bernardino-San Jacinto and San Bernardino-Little San Bernardino linkage designs were both completed in 2005 as part of the South Coast Missing Linkages effort (Penrod et al. 2005a,b, Beier et al. 2006), while the Joshua Tree-Chocolate Mountains connection was completed in 2012 as part of A Linkage Network for the California Deserts (Penrod et al. 2012). While several years have passed since these linkage designs were developed, other more recent connectivity and climate assessments have reinforced the landscape level importance and continued permeability of these linkages. These critical linkages are important to maintain and restore habitat connectivity between existing reserves and allow natural ecological processes—such as migration and range shifts with climate change--to continue operating as they have for millennia.

South Coast Missing Linkages was a highly collaborative inter-agency effort to identify and conserve the highest priority linkages associated with the South Coast Ecoregion, including connections to adjacent ecoregions. The effort engaged diverse stakeholders (270 participants from 126 agencies and organizations) from the inception through a series of habitat connectivity workshops to lay the biological foundation for designing the linkages. The primary purpose of those workshops was to select focal species that are sensitive to habitat loss and fragmentation, but another essential goal of the workshops was to generate momentum and enthusiasm among participants for implementing the resulting linkage designs. The linkages were designed based on the habitat and movement needs of 109 focal species across the 15 priority linkages, 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 South Coast Missing Linkages are widely considered the backbone of a regional conservation strategy for southern California (Figure 2), stitching together over 18 million acres of existing conservation lands, and maintaining connected wildlife populations from Baja California Norte to the southern Sierra Nevada, and from the beaches of Camp Pendleton eastward to the deserts of Anza-Borrego Desert State Park.

The primary goal of A Linkage Network for the California Deserts (Penrod et al. 2012) was to identify areas where maintenance or restoration of ecological connectivity is essential for conserving the unique biological diversity of California's deserts. The effort engaged 60 participants from over 30 agencies and organizations. The Desert Linkage Network (Penrod et al. 2012) was developed, in part, based on the habitat and movement requirements of 44 different focal species that are sensitive to habitat loss and fragmentation across the 22 priority linkages, including 12 mammals, 8 birds, 10 herpetofauna, 9 plants, and 5 invertebrates. These 44 focal species capture a diversity of movement needs and ecological requirements and include area-sensitive species, barrier-sensitive species, less mobile species or corridor-dwellers, habitat specialists, and ecological indicator species. These focal species were selected to represent a diversity of interactions and are intended to serve as an umbrella for all native species and ecological processes of interest in the region. In addition to linkages designed for focal species, the Desert Linkage Network also used the land facet approach (Brost and Beier 2010) to design climate-robust linkages. The focal species linkages and land facet linkages were combined and then refined (e.g., adding riparian connections, removing redundant strands) to delineate the final Desert Linkage Network (Figure 3) that was intended to provide information concerning where and how to maintain connectivity and sustain ecological functions in a changing climate.

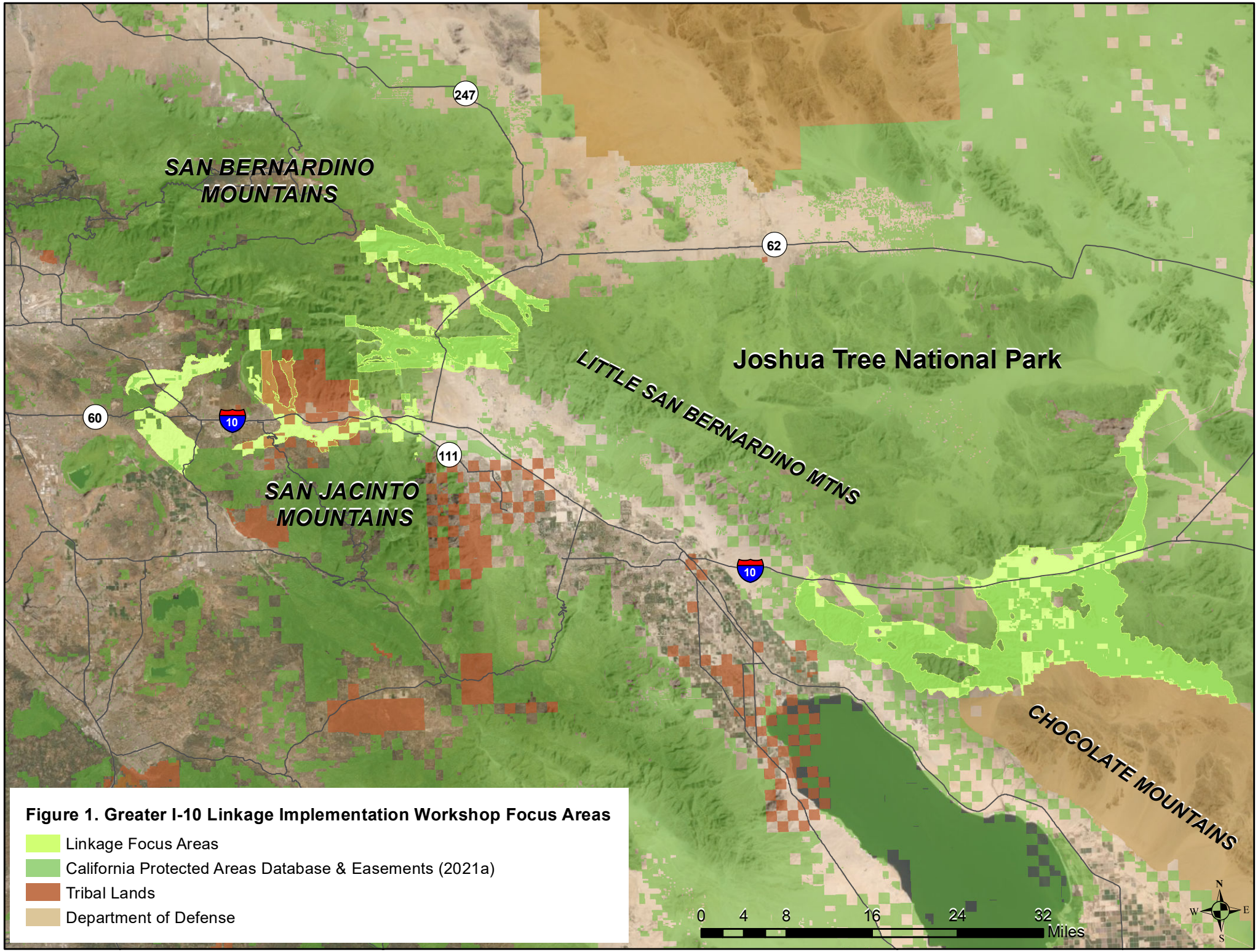


Figure 1. Greater I-10 Linkage Implementation Workshop Focus Areas

- Linkage Focus Areas
- California Protected Areas Database & Easements (2021a)
- Tribal Lands
- Department of Defense

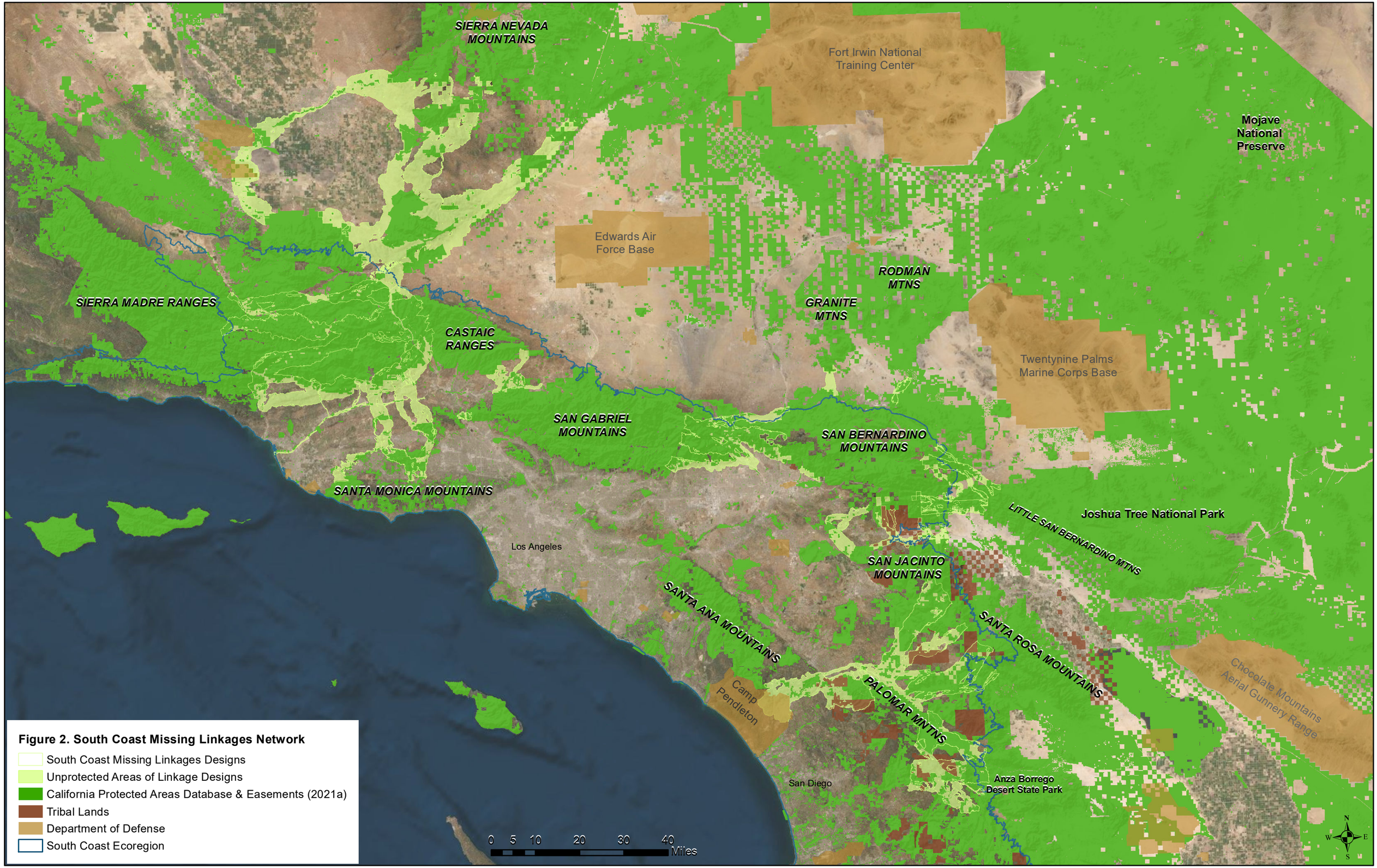


Figure 2. South Coast Missing Linkages Network

- South Coast Missing Linkages Designs
- Unprotected Areas of Linkage Designs
- California Protected Areas Database & Easements (2021a)
- Tribal Lands
- Department of Defense
- South Coast Ecoregion

CALIFORNIA DESERT CONNECTIVITY PROJECT

Figure 3. A Linkage Network for the California Deserts

N

1:2,350,000

0 30 60 90 Kilometers

0 30 60 Miles

SC Wildlands

The Nature Conservancy's Connectivity and Climate Flow (2020) captured all three of the linkages the workshop focused on and underscores the critical importance of these linkages both today and for climate adaptation (Figure 4). The Resilient and Connected Network analysis (The Nature Conservancy 2020) quantifies the importance of an area by measuring how much flow passes through it and how concentrated that flow is. The four prevalent flow types identified each suggest a different conservation strategy:

Diffuse flow: areas that are extremely intact and consequently facilitate high levels of dispersed flow that spreads out to follow many different and alternative pathways. A conservation aim might be to keep these areas intact and prevent the flow from becoming concentrated. This might be achievable through land management or broad-scale conservation easements.

Concentrated flow: areas where large quantities of flow are concentrated through a narrow area. Because of their importance in maintaining flow across a larger network, these pinch points are good candidates for land conservation.

The three linkage designs are identified as having either Concentrated flow or Diffuse flow (Figure 4). The Joshua Tree-Chocolate Mountains linkage and the targeted landscape blocks it connects have almost continuous climate-informed diffuse flow, indicating the area is *extremely intact and consequently facilitates high levels of dispersed flow*. The other two linkages have both concentrated flow and diffuse flow, with the San Gorgonio River strand of the San Bernardino-San Jacinto linkage also having continuous diffuse flow. It is essential to conserve these critical linkages to allow species and full communities to shift their ranges in response to climate change.

California Department of Fish and Wildlife (CDFW) recently compiled and synthesized the best-available spatial information in California on connectivity and wildlife movement into the Terrestrial Connectivity Dataset (Figure 5) to better integrate biodiversity conservation with transportation and infrastructure planning. The Terrestrial Connectivity dataset is one of the four key components of CDFW's Areas of Conservation Emphasis (ACE) data visualization platform, along with Terrestrial Biodiversity, Significant Habitats, and Climate Resilience (CDFW 2019). The Terrestrial Connectivity dataset summarizes information by ACE hexagons (2.5 square miles each) including the presence of mapped corridors or linkages and the juxtaposition with large, contiguous, natural areas. This map builds on the California Essential Habitat Connectivity Project (Spencer et al. 2010), based on guidance given in that report, and incorporates species-specific, fine-scale linkage information, including the San Bernardino-San Jacinto and San Bernardino-Little San Bernardino linkages (Penrod et al. 2005a,b) and the Joshua Tree-Chocolate Mountains Connection (Penrod et al. 2012). CDFW's (2019) Terrestrial Connectivity further justifies the importance of these critical linkages to California's conservation network.

The three linkages that the workshop focused on are critical ecoregional connections (Figure 6) and their importance to the state's conservation network cannot be overstated. The linkage designs have been used by federal, state, regional, and local agencies to guide conservation of critical linkages to sustain wildlife populations and to allow species to shift their ranges in response to climate change. As climate conditions such as temperature and precipitation patterns change, the distribution of plant communities will change, and wildlife will need to move to new areas to find suitable habitat. The linkages are identified as priorities in the California Wildlife Conservation Board's Strategic Plan (2014) and overlap two Natural Community Conservation Plans (NCCP), the Western Riverside County Multiple Species Habitat Conservation Plan (WRCMSHCP wrc-rca.org) and the Coachella Valley MSHCP (CVMSHCP cvmshcp.org). While the

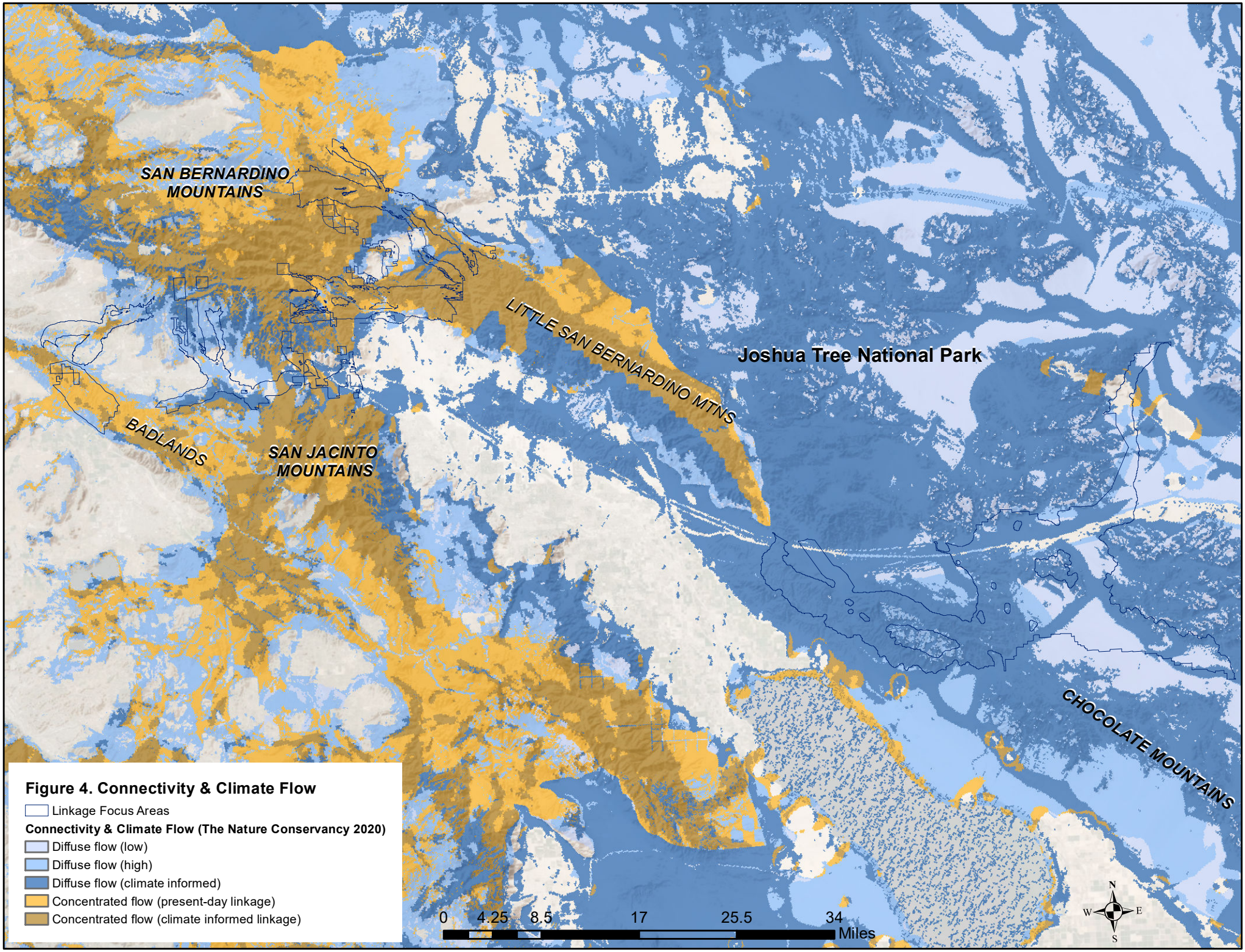
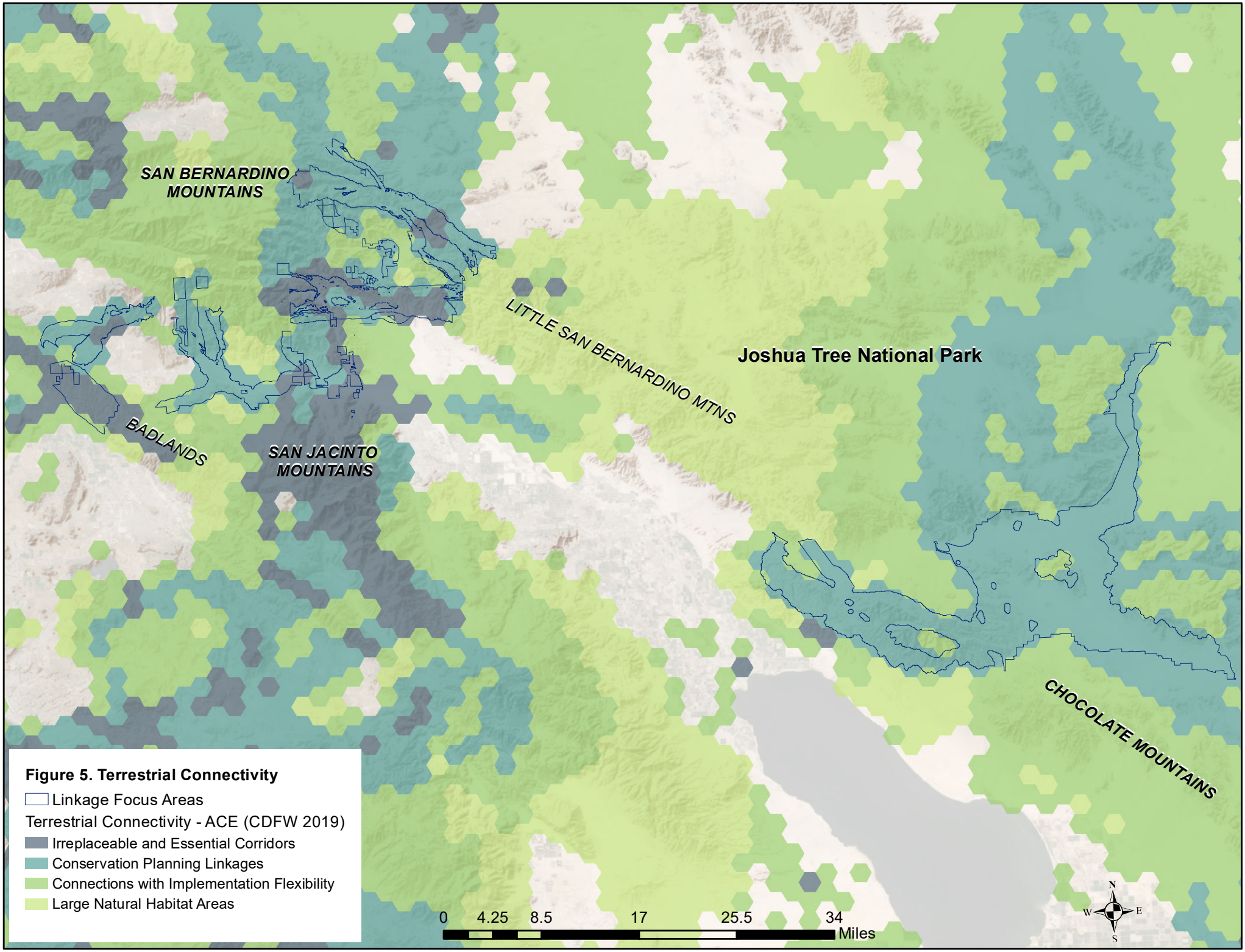


Figure 4. Connectivity & Climate Flow


SAN BERNARDINO MOUNTAINS
LITTLE SAN BERNARDINO MTNS
Joshua Tree National Park
BADLANDS
SAN JACINTO MOUNTAINS
CHOCOLATE MOUNTAINS
Figure 5. Terrestrial Connectivity
Linkage Focus Areas
Terrestrial Connectivity - ACE (CDFW 2019)
Irreplaceable and Essential Corridors
Conservation Planning Linkages
Connections with Implementation Flexibility
Large Natural Habitat Areas
0 4.25 8.5 17 25.5 34
Miles
N
W
E
S

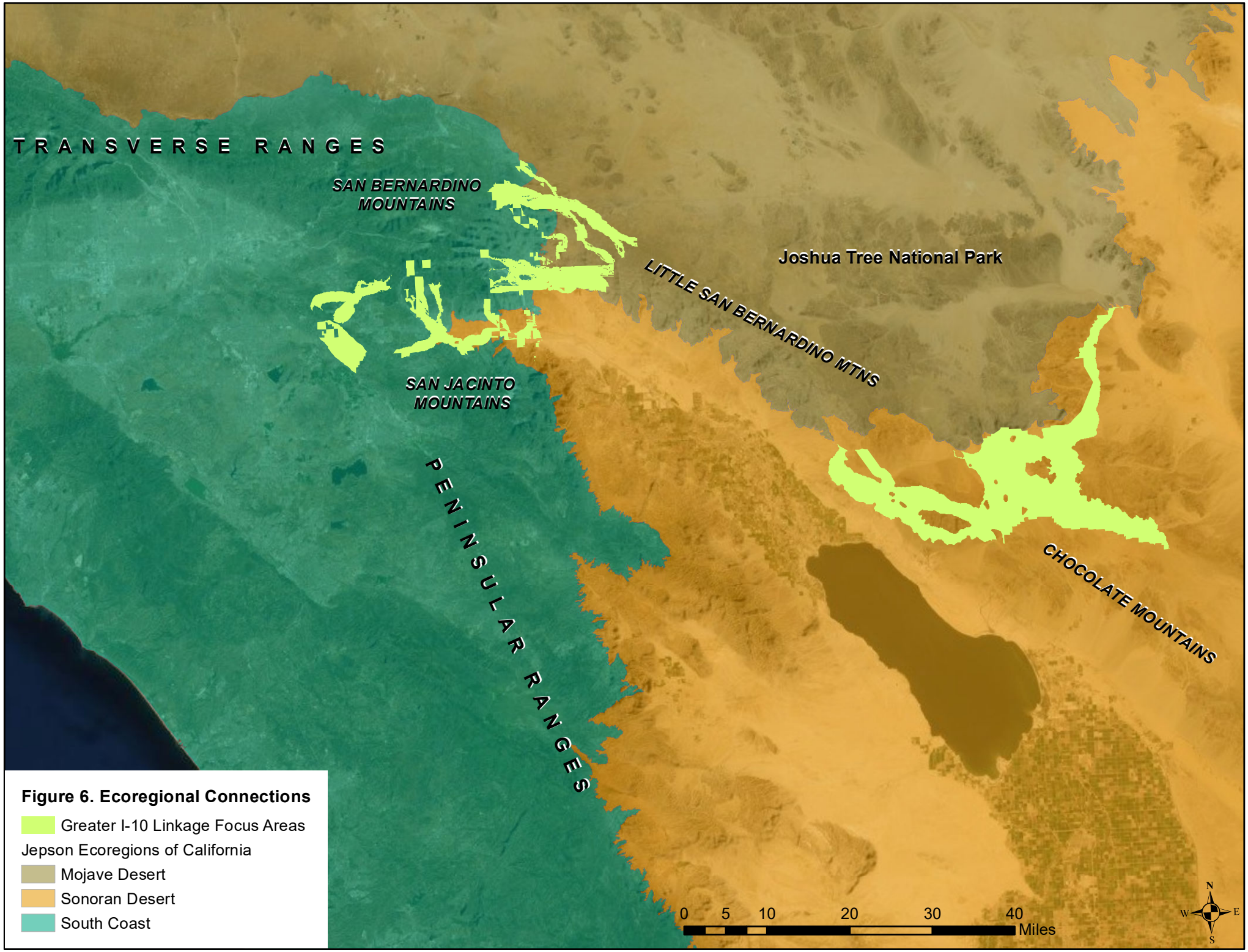


Figure 6. Ecoregional Connections

Greater I-10 Linkage Focus Areas

Jepson Ecoregions of California

Mojave Desert

Sonoran Desert

South Coast

CVMSHCP has adopted the San Bernardino to San Jacinto and San Bernardino to Little San Bernardino SCML design into their reserve design, the WRMSCP did not specifically adopt the SCML designs. They are irreplaceable connections between essential core habitats that are vital to maintaining California's biodiversity.

California has recognized the importance of identifying, maintaining, and restoring wildlife movement corridors, habitat linkages and landscape connectivity with statutory authority and legislative intent found in California Fish and Game Code Sections 1345, 1346, 1347, 1850, 1851, 1930, 1930.5, 1932, 1932.5, 2053, 2055, 2787; Public Resources Code Sections 37015, 71154, 80076, 80130, 80132; and Street and Highways Code Sections 90-92, 156.1, 2704.09. California's State Wildlife Action Plans (California Department of Fish and Game [CDFG] 2005, CDFW 2015) highlight the importance of connectivity to maintain biodiversity and restore populations of imperiled species. The California Biodiversity Initiative: A Roadmap for Protecting the State's Natural Heritage (2018) directs state agencies to integrate biodiversity conservation with transportation and infrastructure planning, and focus investments on projects that maintain and restore habitat connectivity and support landscape resiliency. Furthermore, all of California's climate adaptation strategies (California Resources Agency 2009, 2014, 2018, *in prep* 2021) identify maintaining habitat connectivity as one of the most important adaptation strategies to conserve biodiversity and support ecological functions as the climate changes.

2. Purpose and Need

While there have been significant conservation investments in these linkages, much more remains to be done in order to secure and protect suitable habitat and linkage opportunities into the future. Residential, commercial, and industrial development, energy and resource extraction, and transportation infrastructure threaten to sever these linkages and genetic connectivity, as well as natural processes for large and small species. Land protection, wildlife crossings and directional fencing, are needed to maintain and restore connectivity in all three linkages. The next decade is critical to ensuring connectivity in Southern California.

Linkage implementation can't be accomplished by any one agency or organization. It takes wildlife, land management, planning, transportation, and infrastructure agencies, academic and research institutions, land trusts and conservation organizations, environmental consulting firms, and others. Various skill sets are needed for linkage conservation (e.g., land use, land acquisition, habitat restoration, transportation, rangeland science). Most importantly, an ongoing forum and communication network to promote coordination across diverse disciplines and jurisdictional boundaries is needed to conserve connectivity at this scale.

There is tremendous capacity for linkage implementation in the region with numerous agencies, conservation organizations, and research institutions working on various aspects of linkage implementation. However, regular coordination amongst all of the players is currently lacking, and opportunities are being missed for proactive linkage protection. Science and stewardship capacity is strong, with the added benefit of having the NCCPs in place. Regular coordination between the two MSHCPs is essential, not just at the shared boundary in the San Gorgonio River where the two MSHCPs meet, but across linkages to share science, tools, and best management practices. Wildlife crossing infrastructure and land protection needs are largely known. Thus, the capacity and knowledge shared among workshop participants forms a strong foundation, which can influence critical planning efforts so that connectivity can be maintained, restored, and conserved.

3. Workshop Objectives and Approach

The primary goal of the Greater I-10 Linkage Implementation Workshop series was to establish a dialogue among participants and begin to develop communication and information sharing strategies to ensure that each partner's efforts are coordinated with the actions of others through a mutually beneficial plan of action that leverages resources for linkage conservation. The primary objectives of the workshop were to: (1) engage diverse stakeholders involved in various aspects of linkage implementation, such as wildlife and transportation agencies, land manager and planners, academic and professional scientists, land trusts and conservancies, and conservation organizations; (2) identify specific actions to further connectivity conservation; and (3) begin to develop coordinated strategies to maximize our collective impact for linkage implementation. The Greater I-10 Linkage Implementation Alliance (LIA) is envisioned as an ongoing forum and communication network that would meet regularly to promote coordination across jurisdictional boundaries and diverse disciplines with the primary goal of implementing these three linkages.

This workshop series was based on the work of an existing Linkage Implementation Alliance that has galvanized agencies and organizations from across diverse sectors to coordinate on various activities to promote and maintain connectivity between the Santa Monica Mountains National Recreation Area and Los Padres and Angeles National Forests. That Alliance was initiated in 2011 through a partnership with National Park Service, California Department of Fish and Wildlife, Caltrans, Santa Monica Mountains Conservancy, The Nature Conservancy, SCV Green, and SC Wildlands. The Alliance has met quarterly since its inception, and has been highly successful working to improve connectivity through research and monitoring, acquisition and conservation easements, and working with city and county planning departments on land use and policy, transportation departments on infrastructure improvements, and partner agencies on restoration, stewardship and outreach. This workshop series was organized around these same key issues.

The virtual workshop series was held over a four-day period to minimize online meeting fatigue. Each meeting was highly interactive and focused on key issues related to implementation, as indicated below.

April 19, 2021 10 am to 12:30 pm: Land Use, Policy, and Protection
April 20, 2021 10 am to 12:30 pm: Transportation & Infrastructure
April 27, 2021 10 am to 12:30 pm: Research & Monitoring
April 28, 2021 10 am to 12:30pm: Restoration, Stewardship & Outreach

Participants were asked to complete a few tasks in advance of the workshop to enrich the conversation and to help capture the data and information needed to help implement the Greater I-10 Linkages. Specifically, participants were asked to:

1. Fill out online datasheets to identify existing or past efforts, needs or opportunities for each focus area (e.g., land use, transportation, research) for which they have information.

2. Visit and explore the Greater I-10 Linkage Workshop Web Tool. If the effort, need, or opportunity identified in #1 above had a spatial location or study area, participants were asked to draw the location on the map, and give it a unique ID that was linked to the corresponding datasheet.

3. Upload any relevant documents, journal articles, GIS data, etc. to share with the project to the Greater I-10 Linkage Workshop TNC Box.

Each of the four sessions began with a series of presentations related to the focus issue to set the stage for the following discussions. Speakers for each session included:

Land Use, Policy, and Protection

- Keynote Speaker Dr. Paul Beier: Factors Influencing Successful Connectivity Conservation
- Katie Barrows/Coachella Valley Association of Governments (CVAG): Coachella Valley Multiple Species Habitat Conservation Plan Overview
- Tricia Campbell /Regional Conservation Authority (RCA): Western Riverside County Multiple Species Habitat Conservation Plan Overview

Transportation & Infrastructure

- Reyna Baeza/Caltrans: Caltrans Corridor Planning
- Jen Hoffman/RCA: Camera trap and Wildlife studies for the WRCMSHCP
- Michelle Mariscal/Puente-Chino Hills Habitat Authority: Camera trapping monitoring results for the Greater I-10 Linkage Area
- Brock Ortega/Dudek: SR 62/Morongo Basin Wildlife Linkage Plan Interim Results

Research & Monitoring

- Cam Barrows/University of California (UC) Riverside: Conservation and Linkages for the Coachella Valley MSHCP
- Jeff Lovich/U.S. Geological Survey (USGS): Are tortoise populations linked around the Coachella Valley?
- Robert Fisher/USGS: Golden Eagle Movement patterns, urbanization related responses and nest site occupancy analysis
- Winston Vickers/UC Davis and Justin Dellinger/CDFW: Mountain Lions and I-10: A Critical Corridor

Restoration, Stewardship & Outreach

- Frazier Haney, The Wildlands Conservancy: Sand to Snow Interface Project
- Geary Hund, Mojave Desert Land Trust: Outreach & Coordination in Protection of Habitat Linkage

Following the presentations and a short Q&A period, the next part of each session focused on identifying and discussing needs, opportunities and threats in each linkage related to the topic covered that day. First, input provided prior to the workshop via the web map and datasheets were discussed, and then participants were encouraged to identify other needs, opportunities, or threats and, if applicable, add any spatially related information to the map. For example, in the Land Use, Policy and Protection session, participants were asked to identify needs, opportunities, or threats related to land use or policy that may support or hinder wildlife movement (e.g., proposed specific plan), or opportunities or needs to protect land in the linkages, such as a key parcel in a chokepoint or a willing seller. Participants were also asked to share what they are currently working on or know about that may be relevant to linkage implementation. For example, is there a proposed development that threatens connectivity? A planning effort that provides opportunities for conserving or restoring connectivity, like a watershed plan? Each workshop session was wrapped up with a group discussion to identify specific actions to further connectivity conservation related to each key issue. Links to recordings of each session are provided in Appendix A.

4. Summary of Presentations

4.1 Land Use, Policy, and Protection Session

Paul Beier, Factors Influencing Successful Connectivity Conservation

Paul is a world-renowned conservation biologist focused on science-based design of wildlife corridors and working to conserve them on the ground. He was a Regents' Professor of Conservation Biology at Northern Arizona University. He recently retired and is now a Conservation Research Fellow at the Center for Large Landscape Conservation. Paul was a founding board member of SC Wildlands serving for over 15 years, the lead scientist for both South Coast Missing Linkages and the Desert Linkage Network, coauthored all of the reports, and conducted much of the field work.

Keeley and Beier et al. (2019) reviewed 263 connectivity plans from around the globe, 109 authors completed surveys, 77 authors interviewed, to identify factors influencing implementation of connectivity conservation plans developed over the last 30 years. Two types of connectivity conservation plans: shovel ready (specific recommendations acquisition, crossings, focal species) and vision plans (get it on the radar of key decision makers, inspire future actions, like California Essential Habitat Connectivity Project).

There were multiple key findings from the study. Crossing structures were 2.4 times more likely to be built if a plan called for it and 3 times more likely if there was a connectivity law. Land protection was 5.1 times more likely if called for in plan, and more likely when recommendations were from shovel ready plans. Restoration was 4 times more likely if a plan called for it. Time was also found to be important. Linkage implementation can take a long time ~20 years. The key is to ask for what is needed by including detailed recommendations in the plans. Laws help too.

Other key factors were identified as influencing successful connectivity conservation. Stakeholder involvement was identified as vital. NGOs can compensate for turnover in government staff. Evidently, implementation was not influenced by the type of connectivity model. However, the science should be transparent and repeatable. The study also concluded that when transportation, land use or regulatory agencies were asked to develop Connectivity Conservation Plans, it influenced implementation.

The three linkages focused on in this workshop have all the factors influencing linkage implementation:

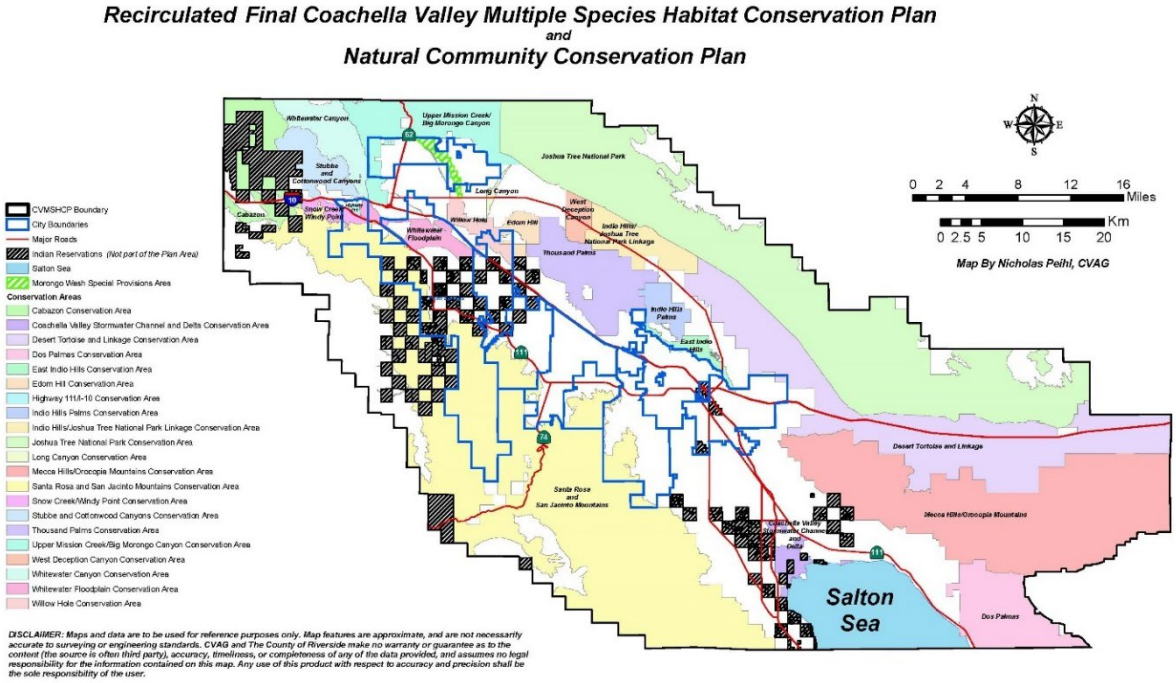
- Shovel Ready plans call for crossing structures, land protection, and restoration
- Mandates or enabling law (e.g., MSCP)
- Initial buy-in from government agencies
- Stakeholder involvement after initial buy-in
- NGOs that help government agencies stay on task
- Transparent and repeatable science

Katie Barrows – Coachella Valley Multiple Species Habitat Conservation Plan Overview

Katie Barrows is the Director of Environmental Resources for the Coachella Valley Association of Governments (CVAG) (since retired). CVAG provides staff to the Coachella Valley Conservation Commission, the regional agency that coordinates the land acquisition, monitoring and management

programs for the Coachella Valley Multiple Species Habitat Conservation Plan. Katie has been involved in development and implementation of the Plan since its inception.

Coachella Valley MSHCP (CVMSHCP) is a visionary plan at the landscape scale that includes 21 conservation areas with hardline boundaries in Riverside County. Within each of the 21 conservation areas depicted in the image below, 90% of the land is slated to be conserved, less than 10% can be developed. The total plan area covers 1.1 million acres and the reserve system will eventually be 724,780 acres, including land already conserved at the plan's inception, as well as, approximately 240,000 acres in conservation areas targeted by the plan. The CVMSHCP aims to conserve over 240,000 acres of open space and protect 27 plant and animal species. In addition to the 27 covered species, the CVMSHCP intends to conserve 27 different natural communities, ecosystem processes such as sand transport, and linkages.



The CVMSHCP has acquired about 98,000 acres towards goal to date. The CVMSHCP website has a video of land acquisitions in the plan area over the years from 1996 through 2020, which is available at https://www.cvmshcp.org/videos/AcqOverYears-2020.mp4. Tribal lands are not a part of the plan but the Coachella Valley Conservation Commission that works to implement the plan coordinated with multiple tribes within the plan area. Overall management of the Plan is provided by the Coachella Valley Conservation Commission (CVCC), a joint powers authority of elected representatives.

Six of the CVMSHCP Conservation Areas overlap the San Bernardino-San Jacinto Linkage, which from west to east include: Cabazon, Stubbe and Cottonwood Canyons, Snow Creek Windy Point, Whitewater Canyon, Highway 111, and Whitewater Floodplain. The Science Advisors for the CVMSHCP said the eastern branch of the San Bernardino-San Jacinto Linkage is the most important connection in the plan area. This is a connection between Whitewater River that originates in the San Bernardino Mountains and Snow Creek in the San Jacinto Mountains. The CVMSHCP has protected most of this part of the linkage, providing a vitally

important desert connection between the Peninsular and Transverse Ranges. Good wildlife crossings exist, with bridges over the Whitewater River on I-10 and the service road north of the freeway, and another bridged crossing for Snow Creek on SR-111. The structures are good and while wildlife use them, there are issues with human use of the structures too that likely deters use of the crossing structures by some species.

The southern portion of the San Bernardino-Little San Bernardino Linkage in Riverside County falls within the CVMSHCP and is included in the Upper Mission Creek/Big Morongo Canyon Conservation Area. There are a few nice bridges over Mission creek on SR-62 that help connect SB-LSB. East of SR-62, Mission Creek is included in the Morongo Wash Special Provision Area for flood control, which also provides a connection south to the Willow Hole Conservation Area. The CVMSHCP includes other corridors in between the San Bernardino-Little San Bernardino and the Joshua Tree-Chocolate Mountains, such as the Indio Hills/Joshua Tree National Park Linkage and West Deception Canyon, linking Joshua Tree National Park and the Thousand Palms/Coachella Valley Preserves.

Many of the connections for wildlife are along washes and drainages, which are also important connections for sand transport and flow from sand sources in the surrounding mountains. A speaker for the Research and Monitoring session will focus on the importance of sand flow along alluvial systems for sustaining habitat for many listed and endemic species, such as the fringe-toed lizard (*Uma inornata*) that relies on sand dunes.

The Joshua Tree-Chocolate Mountains Linkage overlaps three of the CVMSHCP Conservation Areas. Most of the linkage to the north and south of I-10 is included in the Desert Tortoise and Linkage Conservation Area that connects two other Plan Conservation Areas, Joshua Tree National Park and Orocopia and Mecca Hills Conservation Area. A field assessment of existing crossings structures was used to map corridors in that area. Another of the speakers for the Research & Monitoring session will focus on the Desert Tortoise Conservation Area along I-10.

How does the plan work with proposed developments? Proposed developments within the 21 Conservation Areas go through a Joint Project Review (JPR) to make sure any development is consistent with the MSHCP. They try to work with the developers to minimize impacts to species and communities. The proposed Paradise Valley Project included 1800 acres development, 10 miles east of Coachella within the Desert Tortoise Conservation Area. The Paradise Valley Project went through several JPR's to try to find consistency but ended up getting denied because it was right smack in the middle of critical corridors along alluvial fan dry washes that support multiple species covered by the plan. The plan provides ability to work with developers to minimize impacts but in case of Paradise Valley, a consistency determination was not possible and it was officially denied in November 2019.

Several species use the existing bridges and culverts in the Conservation Areas. Photos of numerous species were shown using the crossing structures in the San Bernardino-San Jacinto and San Bernardino-Little San Bernardino Linkages.

Q&A related to Katie Barrow's presentation on the CVMSHCP

Fraser Shilling from UC Davis explained that they have used wildlife occurrence data to test various hypothetical linkage models for the DRECP area and for the state. They have found no ability of the hypothetical linkages to statistically explain wildlife occurrence. Katie Barrows was asked how might this

affect MSHCP and MCP planning? In other words, since linkages don't explain where wildlife are, how should we and can we change the planning process?

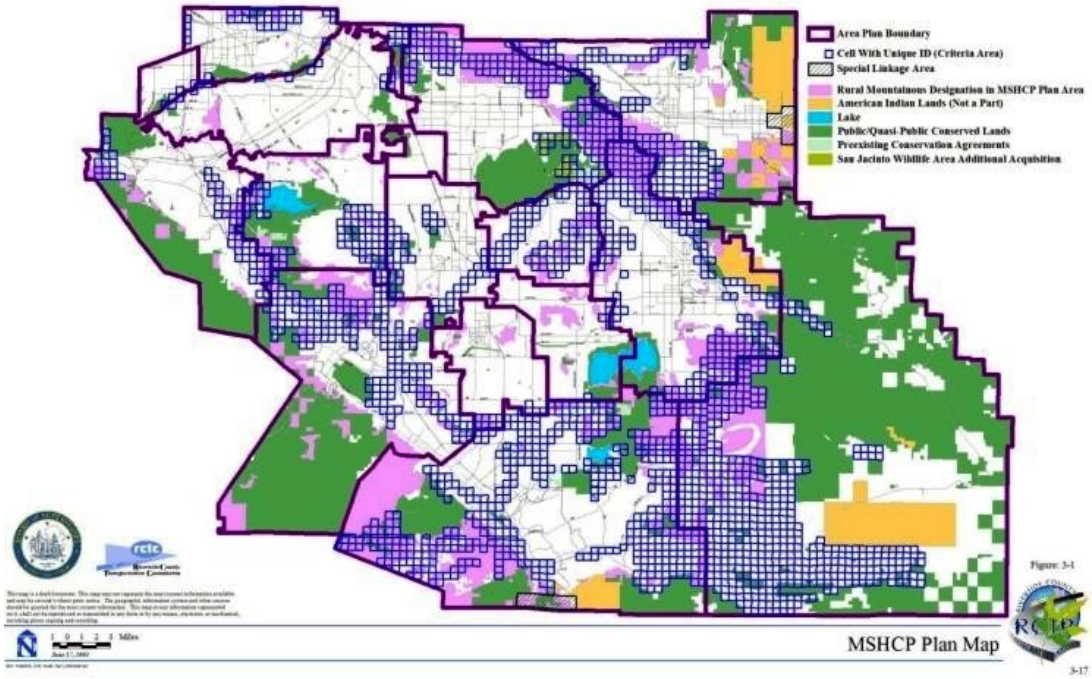
Katie Barrows responded that, in terms of boundaries, major changes are a huge process. She suggested coordinating with Fraser on the data he referred to and will follow up.

Kerry Holcomb from USFWS, commented that they used occurrence data to calculate the priority ranking index for protective fence installation (described above) and habitat suitability models. He said there is concern about genetic inferences because Interstate 10 has been there for so many decades, and before the freeway there was another road, so genetic imprints may be misleading if we don't look at land use.

Tricia Campbell – Western Riverside County Multiple Species Habitat Conservation Plan Overview

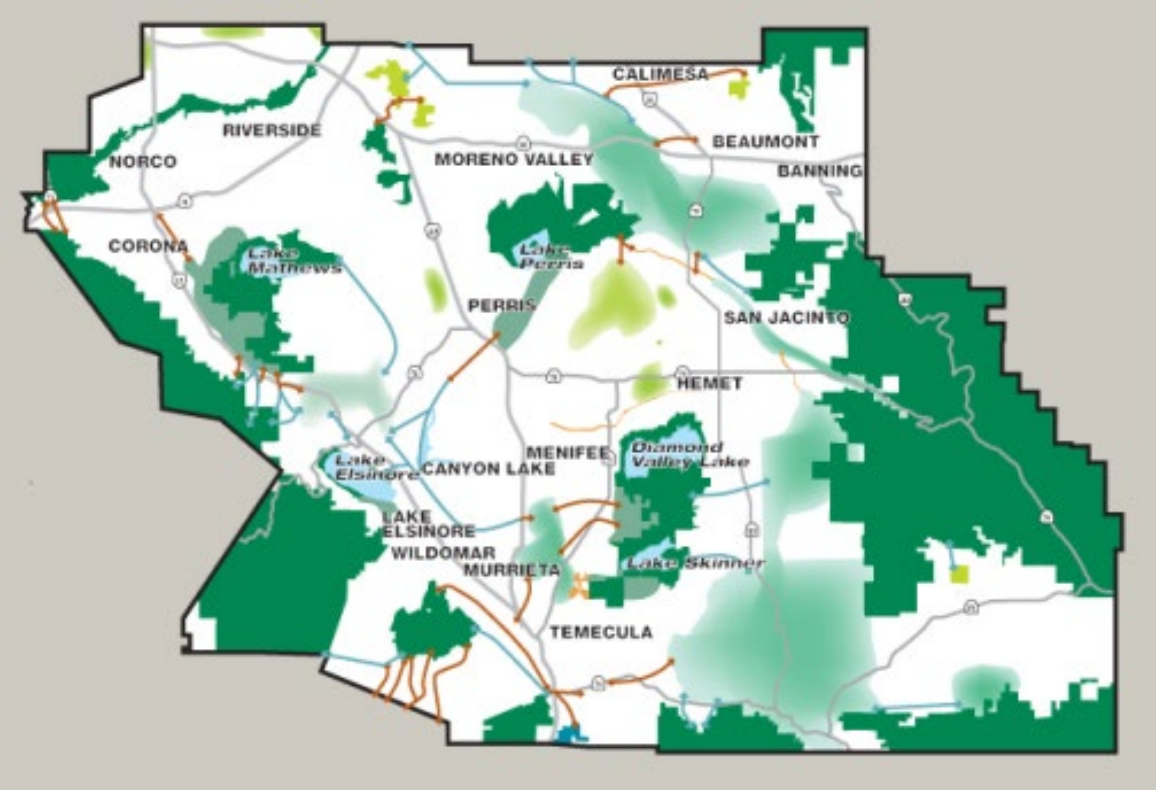
Tricia Campbell is the Manager of Reserve Management and Monitoring at the Regional Conservation Authority, Riverside, California. She oversees the monitoring and management programs for the Western Riverside County Multiple Species Habitat Conservation Plan as well as provides implementation oversight to the member agencies of the Plan and guidance for reserve acquisitions.

The Western Riverside County MSHCP, approved in 2004, covers 1.2 million acres and has a goal to set aside 500,000 acres in a reserve system. The vision is for a 500,000-acre reserve system, 347,000 acres are already conserved, and roughly 153,000 acres are to be preserved through plan implementation. The Western Riverside County MSHCP doesn't have hardline conservation areas like the CVMSHCP. The plan aims to conserve 146 covered plant and animal species, including 33 species listed as threatened or endangered. A Western Riverside County MSHCP reserve assembly summary map is online at https://wrcrca.maps.arcgis.com/apps/opsdashboard/index.html#/60fb5a8df60c49628b9cc779333824b4.



Within the plan area, 18 cities and the county of Riverside work with the Regional Conservation Authority (RCA) to ensure plan compliance. Entities that are not permittees of the Plan such as water agencies and school districts don't have to comply with the plan but need to comply with the California Environmental Quality Act (CEQA) which includes on the CEQA checklist a section on potential impacts to regional or local HCP/NCCPs. Areas identified as important for plan implementation are designated by "Criteria Cells" (image from presentation above), each cell is roughly 160 acres. Within these cells, the RCA reviews proposed projects. No consistency reviews by the RCA are required for proposed development projects outside of Criteria Cells, but does occur by the MSHCP permittee (e.g., city, county) processing the proposed project. The remaining lands to be conserved are to occur within the Criteria Cells. It is important to understand that development is the reason HCPs are created. The MSHCP provides a streamlined approach for development, including infrastructure while ensuring a regional approach to species conservation.

The Western Riverside County MSHCP doesn't capture all key movement areas. There is a Schematic of Cores and Linkages (image from presentation below) that includes a number of Constrained Linkages known at the time the plan was developed. The plan evaluated the length to width ratio of each of the Constrained Linkages. While the plan addresses 146 covered species, not all are listed species, such as bobcat (*Lynx rufus*) and long-tailed weasel (*Mustela frenata*), but are important for linkage functionality.



Constrained Linkage #23 overlaps the westernmost branch of the San Bernardino-San Jacinto Linkage. This linkage was envisioned as connecting San Timeteo Creek and the Badlands west of I-10 with Bogart Park in the foothills of the San Bernardino Mountains east of I-10, for species such as Least Bell's vireo (*Vireo bellii pusillus*), Los Angeles pocket mouse (*Perognathus longimembris brevinasus*), and bobcat. A few developments in two Criteria Cells east of I-10 and the Calimesa Country Club Golf Course already had

approval by the time the MSHCP was adopted, thus a functional corridor has somewhat been precluded there for all but possibly birds and more generalist species.

Constrained Linkage #22 is outside of the western branch of the San Bernardino-San Jacinto Linkage, to the southeast. It links the Norton Younglove Reserve to the Badlands via Noble Creek. Criteria Cells for this linkage are only on the west side of I-10, no cells occur east of I-10 up to Bogart Park.

The San Gorgonio River section of the San Bernardino-San Jacinto Linkage is identified as a Special Linkage in the Western Riverside County MSHCP where it connects to the Coachella Valley MSHCP plan but no Criteria Cells targeting conservation occur in this area. Tribal coordination is essential here too.

How does the Western Riverside County MSHCP compare with the South Coast Missing Linkages? The South Coast Missing Linkages regional report was completed in 2008, the San Bernardino-San Jacinto Linkage report was completed in 2005, while the Western Riverside County MSHCP was approved in 2004. The linkages were not yet mapped when the MSCP was approved. The Plan does have some overlap and specifically requires proposed projects go through CEQA and MSCP for Special Linkages, such as those that are bisected by two MSHCPs, as in the San Bernardino-San Jacinto at the San Gorgonio River, and the Santa Ana-Palomar Linkage, which is also included in the Northern San Diego County MSHCP. The Western Riverside County MSHCP doesn't capture the fine scale data and information as what was provided in the South Coast Missing Linkages.

The plan does include special regulations to reduce edge effects within Criteria Cells. For example, only certain roads in Criteria Cells are able to be upgraded. Developments at the urban wildland interface near existing or future conservation areas have special regulations to mitigate impacts and reduce edge effects that address drainage, toxics, lighting, noise, invasive species, fencing, grading, etc.

Q&A related to Tricia Campbell's presentation on the WRMSHCP

Regarding the San Gorgonio River, which is not an identified linkage with criteria cells in the WRCMSHCP but is identified as a Special Linkage. How does that work when a development proposal comes through in the Special Linkage? Does it require a Joint Project Review?

Tricia Campbell responded that it's a bit different. The RCA is included in the process but it's primarily between USFWS, CDFW, and the developers. For example, the proposed I-10 Bypass team is working with the agencies, the RCA is included in the conversation but does not play a formal consistency review role.

Dr. Paul Beier commented how unfortunate it is that Constrained Linkage #23 is considered a lower-level linkage in the WRCMSHCP, because of its significance. There is still an opportunity there and it's critical!

Cara Lacey - Overview of Connectivity Related National and State Legislation

Cara Lacey, the Director of the Connected Lands Cities Program of The Nature Conservancy of California, provided a brief summary of national and state level legislation related to connectivity.

Cara explained that there is bipartisan support at the federal and state level for wildlife movement corridors and crossings.

Federal Level Legislation Related to Habitat Connectivity and Wildlife Movement

S.1499 - Wildlife Corridors Conservation Act of 2019-2020 (Wildlife Corridors Conservation Act of 2019 (2019; 116th Congress S. 1499) - GovTrack.us) was introduced by Senator Tom Udall in 2019. The Act would authorize funding for wildlife corridors and crossings. It would require annual appropriations, and also includes $50 million in annual allocations for private lands. It passed the House, and still has bipartisan support. It is possible that the new Congress will take it back up.

S.2302 - America's Transportation Infrastructure Act of 2019 was introduced by Senator Barasso in the last congress in 2019. It includes real money and mandatory spending that doesn't require appropriations. Wildlife corridors are explicit in this bill, which includes several key provisions to improve safety, resiliency to disasters and reduce emissions. This bill would also reauthorize FY2021-FY2025 federal-aid highway program and the transportation infrastructure finance and innovation program; increases funding for tribal and federal lands transportation programs; bridge investment program and animal detection systems to reduce wildlife-vehicle collisions, among other things. S.2302 - 116th Congress (2019-2020): America's Transportation Infrastructure Act of 2019 | Congress.gov | Library of Congress.

H.R.3684 - INVEST (Investing in a New Vision for the Environment and Surface Transportation) in America Act was introduced by Representative Peter DeFazio in June 2021, passed with bipartisan support, and signed by President Biden November 15, 2021. This huge infrastructure package specifically calls out wildlife crossings and habitat connectivity, and allocates funding for improving infrastructure to support wildlife movement. The budgetalso addresses surface transportation, programmatic infrastructure investments, project level investments, planning and asset management, federal and tribal lands, and several other provisions. Text - H.R.3684 - 117th Congress (2021-2022): INVEST in America Act | Congress.gov | Library of Congress.

Section 1310, Wildlife Crossings Program under project level investments would provide a competitive wildlife crossing grant program specifically to reduce wildlife-vehicle collisions and improve habitat connectivity for terrestrial and aquatic species. Planning, engineering and design, construction, acquisition, research on wildlife-vehicle collisions, integration of wildlife conservation and transportation plans, and education and outreach.

Section 1641 Establishment of Western Riverside County National Wildlife Refuge under other provisions would establish a National Wildlife Refuge within the Western Riverside County MSHCP to conserve, manage, and restore habitat for listed species and "to provide for wildlife habitat connectivity and migratory corridors within the Western Riverside County Multiple Species Habitat Conservation Plan Area." The acquisition boundaries of the Refuge would be the same as Final Western Riverside County MSHCP (2003), and a cooperative agreement would be put in place between the Department of Interior and State of California. The Western Riverside County MSHCP is the only such conservation plan specifically called out in the bill.

H.R.2773 Recovering America's Wildlife Act of 2021 was introduced in April of 2021 by Representative Dingell. The Act would provide 1.3 billion annually from the general fund of the treasury each fiscal year to a competitive grant program administered by State fish and wildlife departments to fund "techniques, tools, strategies, or collaborative partnerships that accelerate, expand, or replicate effective and measurable recovery efforts for species of greatest conservation need and species listed under the Endangered Species

Act of 1973 (15 U.S.C. 1531 et seq.) and the habitats of such species." The Act would also provide $97.5 million annually to Indian Tribes for proactive conservation actions to restore Tribal species of greatest conservation need and to secure those species before listing is warranted under the Endangered Species Act. The fund would support Wildlife Conservation Strategies, habitat conservation, restoration, conservation education, wildlife associated recreation, invasive species control, and law enforcement related to protecting listed and candidate species and their habitats. This proposed legislation has been referred to the House Committee on Natural Resources. H.R.2773 - 117th Congress (2021-2022): Recovering America's Wildlife Act of 2021 | Congress.gov | Library of Congress.

State Level Legislation Related to Habitat Connectivity and Wildlife Movement

Senate Bill (SB) 790 – Wildlife Connectivity Mitigation Credits was introduced in February 2021 by Senators Stern and Cortese, has made its way through various committees at the time of the workshop, and was recently signed by Governor Newsom September 28, 2021. This bill requires California Department of Fish and Wildlife to work with Caltrans to provide compensatory mitigation credits to transportation improvement projects on the state highway system that integrate improvements for fish and terrestrial wildlife passage to improve local and regional habitat connectivity, and other environmental improvements. Bill Text - SB-790 Wildlife connectivity actions: compensatory mitigation credits. (ca.gov).

SB-45 Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection Bond Act of 2020 would authorize the issuance of bonds in the amount of nearly 5.6 billion to reduce vulnerability to fire, flood, drought, and other climate change-related events and increase climate resilience that enhance and protect natural, rural, and urban environments. The bill includes specific allocations to the State's Wildlife Conservation Board for fish and wildlife protection and climate adaptation. It is expected to go before voters in the November 2022 statewide election. Bill Text - SB-45 Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection Bond Act of 2022. (ca.gov).

Assembly Bill (AB) 1500 Safe Drinking Water, Wildfire Prevention, Drought Preparation, Flood Protection, Extreme Heat Mitigation, and Workforce Development Bond Act of 2022 was introduced by Eduardo Garcia and Kevin Mullin, and many other coauthors in February 2021. This bill is similar to Proposition 68 approved by voters in 2018. AB1500 is expected to go before voters in the June 2022 statewide election. If approved by the voters, it would authorize the issuance of bonds in the amount of 7.8 billion to the State General Obligation Bond Law to support climate adaptation projects related to safe drinking water, wildfire prevention, drought preparation, flood protection, extreme heat mitigation, and workforce development programs. The bill seeks to improve climate resilience through strategic restoration and stewardship based on the best available science, including local and traditional ecological knowledge. Bill Text - AB-1500 Safe Drinking Water, Wildfire Prevention, Drought Preparation, Flood Protection, Extreme Heat Mitigation, and Workforce Development Bond Act of 2022. (ca.gov).

AB-1183 California Desert Conservation Program was introduced by Assemblyman Ramos in early 2021, approved by the Governor September 2021, and became law November 2021. The California Desert Conservation Program will be folded into the state's Wildlife Conservation Board and provide funding to acquire, preserve, restore and enhance desert habitat within the California deserts region, including land in critical linkages. The Wildlands Conservancy, Mojave Desert Land Trust, and California Wilderness Coalition who participated in the linkage implementation workshop worked closely with Assemblyman Ramos, as sponsors of this bill. Bill Text - AB-1183 California Desert Conservation Program.

4.2 Transportation and Infrastructure Session

Reyna Baeza, Caltrans: Caltrans Corridor Planning and Transportation Improvement Plans

Reyna is a landscape architect that works in Caltrans District 8. She began her career at Caltrans nearly 14 years ago and has worked in various divisions, including Design and Maintenance Engineering. She's spent the last three years in the Division of Transportation Planning, working on Complete Streets, Wildlife Connectivity, and Corridor Planning.

Background: Reyna has worked on many Caltrans Transportation Enhancement (TE) proposals, a few seeking federal funding under the eligible category of Environmental Mitigation, specifically to reduce vehicle-caused wildlife mortality while maintaining habitat connectivity. One proposal developed was for SR-62 in Yucca Valley from Yucca Park Road to Shaftner Avenue. The funding was requested to study various options for improving crossing opportunities along a recently installed median barrier, new under crossings and over crossings, as well as culvert improvements for mule deer (*Odocoileus hemionus*), bobcat, and small mammals to cross safely. Unfortunately, due to the very competitive process, the project was not selected to move forward. Luckily, in 2019, the Divisions of Environmental and Transportation Planning partnered on a proposal for a Special Study, and together we were able to secure funding for the SR 62 Morongo Basin Wildlife Linkage Study, for which Reyna is currently the Contract Manager for and is planned for completion in June of this year. This project will be covered during Brock Ortega's presentation.

Background info on SR 62 Project:

This project placed a concrete barrier on State Route (SR)-62 in the Town of Yucca Valley from Yucca Park Road to Shaftner Avenue (Post Mile 7.64-8.54). The purpose of the project was to reduce the number of cross-median collisions which are occurring on the four-lane road (two lanes in each direction) with variable 8ft to 12ft median width. This location was included in the 2005 median barrier monitoring report and met the crash criteria (cross-median collisions).

Some history on previous plans which include Transportation Concept Reports (TCR). TCR's include a very brief section for Environmental Considerations. Usually, TCRs consist of 2 pages including an environmental scan of resources to be considered within the corridor. This Environmental Scan is provided in the form of a table and identified the probability of environmental resource issues arising along the corridor and includes a ranking of high, medium, or low.

The assessment however did not consider any planned or programmed projects and only accounted for the existing environmental setting. The scan assessed a few of the Environmental Resources listed on this slide in addition to the following which could be included:

- Visual Aesthetics and Scenic Resources
- Floodplains
- Climate Change and Sea Level Rise
- Waters and Wetlands
- Wild and Scenic Rivers
- Special Status Species

TCR's for I-10 and SR-62 were completed in 2017.

I-10 TCR Environmental Considerations:

- **Section 4(f) Lands**: Publicly owned parks, recreation areas, or wildlife and waterfowl refuges, and any land from a historic site of national, state, or local significance. Segments 12-14 run through federally protected land in central and eastern Riverside County. Segment 10 runs through adjacent ecological reserves and Segment 14 traverses conservation easements over public and private property.
- **Habitat Connectivity**: Includes wildlife crossings and Essential connectivity Areas. Segments 9, 10, and 14 traverse Essential Connectivity Areas according to the California Department of Fish and Wildlife.

SR-62 TCR Environmental Considerations:

- **Section 4(f) Land:** Section 4(f) Lands include publicly owned parks, recreation areas, or wildlife and waterfowl refuges, and any land from a historic site of national, state, or local significance. Along segments 1 and 2, the newly designated Sand to Snow National Monument is located on both sides of SR-62 and Big Morongo Canyon Preserve is located on the route's eastern edge. Along segments 3-11, Joshua Tree National Park runs along in close proximity to the route's southern edge, with BLM-owned territory located on the opposite side of the highway and the Mojave National Preserve beyond.
- **Habitat Connectivity:** Habitat connectivity identifies wildlife crossings and if the segment runs through an essential connectivity area. SR-62 in both Riverside and San Bernardino counties traverse migratory bird passages.

Corridor System Management Plans (CSMP) which are another document produced by Transportation Planning. Existing CSMP's include the:

- Interstate 15
- Interstate 215
- State Route 91 and
- Interstate 10 – Was completed in June of 2011. Shown here are the study limits of I-10 CSMP. As seen, this study covered a 36-mile section of I-10 in San Bernardino and Riverside County from I-15 in Ontario to SR 60 in Riverside County. As you can see the limits of this plan do not include the I-10 Greater Linkage study area.

The CSMP focused on increasing transportation options, decreasing congestion and improvement of travel times along the corridor. Thus, CSMP's do not include wildlife and habitat connectivity assessments.

- The California Transportation Commission (CTC) required that CSMPs be developed for corridors with projects funded by the Corridor Mobility Improvement Account (CMIA), which was created by the passage of Proposition 1B in November 2006.

Caltrans has a new Corridor Planning Process, finalized in 2020 and developed in collaboration with the CTC Comprehensive Multimodal Corridor Plan Guidelines approved in December of 2018.

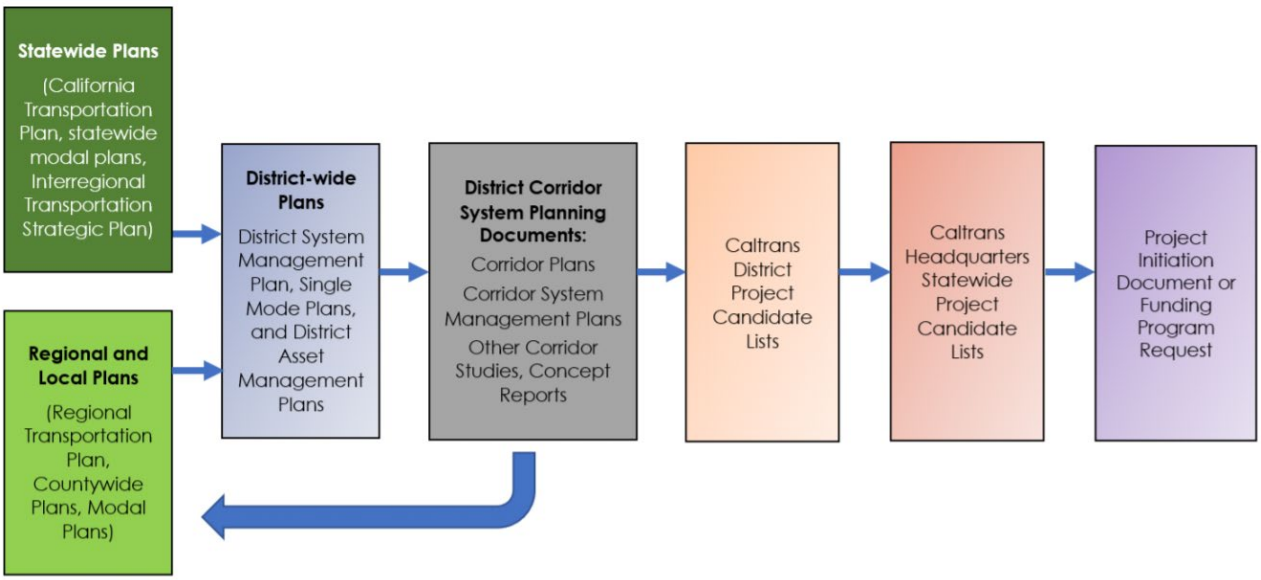
Caltrans is committed to developing corridor plans that identify and recommend strategies and improvements in coordination with our planning partners, resulting in a range of pre-Project Initiation Document project candidates and non-project strategies that achieve Caltrans goals and objectives. These project candidates and strategies are advanced to implementation through regional planning, system planning and programming processes.

The corridor plans and recommended projects should strive to meet local, regional, statewide goals for a safe, sustainable, integrated, and effective transportation system that positively impacts all Californians. They should also outline a corridor vision for improving and operating the system in a manner that achieves these goals. Link below:

https://dot.ca.gov/programs/transportation-planning/multi-modal-system-planning/system-planning/corridor-planning-process-guide

The Eight-Step Corridor Planning Process.

This process should include:
• Internal and External Partners
• Stakeholders
• Tribal Governments and
• Advocacy Groups
The image on the bottom corner illustrates the District System Planning process within Caltrans and its key products, note TCRs, CSMPs and Corridor Plans can be found in the gray colored box.



The Corridor Planning Process lists Environmental Considerations as an Emphasis Area and requires an in-depth narrative of the following key topics:

- Advance Mitigation
- Fish Passage Barrier Remediation
- Wildlife and Habitat Connectivity
- And Other landscape-scale considerations like GHG emissions

Key differences between the TCR/CSMPs and the new process:

- All corridor planning teams should include at least one Environmental Planner (Generalist) and specialists to develop the Environmental Considerations Section
- Identification of transportation strategies that accommodate environmentally sensitive areas and habitats.
- Include an assessment of wildlife connectivity; and provide a map of potentially important linkage areas along a corridor
- Must reference potentially important habitat linkages
- Include recommendations to improve connectivity through identifying ranges of alternatives that provide solutions for remediating barriers to wildlife movement
- And, lastly, project should include an identification of mitigation strategies tied to planned transportation investments.

Integrating environmental considerations into Caltrans' transportation planning efforts supports Caltrans' Strategic Plan. Considering environmental issues and needs during the corridor planning process best aligns with the Goal to "Strengthen Stewardship and Drive Efficiency" while also comprehensively integrating sustainability principles across all goals, addressing people, planet, and prosperity.

Additionally, the recent Corridor Planning Guidebook aligns with **California Transportation Plan (CTP) 2050 Goal #6 to "**Practice Environmental Stewardship" and lists two policies to strengthen stewardship and addressing people, planet and prosperity:

Policy 1 (to)- *Integrate Environmental Considerations in All Stages of Planning and Implementation*

(and) Policy 2 – *Conserve and Enhance Natural, Agricultural, and Cultural Resources*

Policy 1 - *Integrate Environmental Considerations in All Stages of Planning and Implementation* – This policy within the CTP recommends that Caltrans develop robust State and regional advance-mitigation plans that consider the environmental effects of several planned infrastructure projects to streamline project delivery while maximizing biological benefits.

Policy 2 – *Conserve and Enhance Natural, Agricultural, and Cultural Resources* – The recommendations on how to implement this policy include suggestions such as convening stakeholders to provide guidance on how to enhance environmental stewardship at the regional and local levels and supporting

District 8 has a 5-year workplan for completing Corridor Plans. The Transportation Planning team is currently working on the I-15 Multimodal Corridor Plan. The I-10 and SR-62 Corridor Plans will not kick-off until year 4. District 8's team will leverage past and current studies. For example, the SR-62 Morongo Basin Wildlife Linkage Study, I-10 Greater Linkage effort and multiple previous studies will feed into wildlife and habitat connectivity recommendations for these corridor plans

The study area for the I-15 Multimodal Corridor Plan is divided into 3 segments, Southern, Middle and Northern. The Northern segment is from north of 395/15 JCT to Nevada State Line. The Middle segment is from South of 395/15 to 91/15 Junction. The Southern Segment is from South of 91/15 Junction to SD County Line. The study area includes a 3-mile radius, similar to other corridor plans like the Highway 101 Corridor Plan in District 7 and Inland Empire Comprehensive Multimodal Corridor Plan also known as IECMCP.

Corridor Plan Goals

- The Plans will be holistic and multimodal
- Clearly define corridor goals, objectives, and performance measures to be used
- Conduct a performance assessment to identify and quantify performance issues
- Develop and analyze improvement strategies
- Select and prioritize projects and strategies into recommendations to be implemented in the short, medium, or long term, and
- Provide a list of programs for eligible funding from various State, Federal, and local programs

Stakeholder Outreach

- Only through robust stakeholder outreach will District 8 Corridor Plans be a comprehensive, multimodal, performance-based plan aimed at safely and effectively managing and operating an efficient and integrated transportation system.
- Cross-divisional input will be solicited at key milestones.
- Transportation stakeholders and regional partners including MPOs, resource agencies, NGO's and NPO's within the corridor will also be engaged throughout plan development. The resulting recommendations will achieve corridor goals and objectives and help optimize the corridor to meet future needs.

Jen Hoffman/WRCMSHCP and SAWA: Camera Trap and Wildlife Monitoring for the Western Riverside County MSHCP

Jennifer Hoffman has worked with the Western Riverside County MSHCP Biological Monitoring Program as the Mammal Taxa Lead for 11 years. Her Favorite mammalian Covered Species by the plan is the San Diego Black-tailed jackrabbit.

The Western Riverside County Multiple Species Habitat Conservation Plan area extends eastward to San Gorgonio wash where we have attempted to monitor wildlife use with cameras. This presentation focused on mammals documented during MSHCP monitoring efforts. Starting in the eastern plan area with San Gorgonio Wash monitoring, cameras often are stolen or vandalized at this location. For the limited monitoring that was done at the San Gorgonio Wash location, some MSHCP covered species have been documented, including bobcat and coyote (*Canis latrans*). This site was monitored in 2007, 2009, 2010 and 2013.

Banning Bench: small mammal trapping was performed at this Core Area composed of river habitat. Species documented include Bryant's woodrat (*Neotoma bryanti*), Dulzura kangaroo rat (*Dipodomys simulans*), and Los Angeles pocket mouse; bear (*Ursus americanus*) and mountain lion (*Puma concolor*) tracks were also documented at this location.

Bogart Park: (Western SB-SJ Linkage, Linkage 23) Cameras operated in 2008 and 2014 documented puma, bobcat, coyote, gray fox (*Urocyon cinereoargenteus*), mule deer, and several meso carnivores.

Singleton Property, part of MSHCP Constrained Linkage 23: Cameras operated 2008-2010, 2014-2016. Documented puma, deer, bobcat, coyotes, gray fox. Beautiful, diverse oak woodland and chaparral habitat.

Badlands/San Timeteo: LA pocket mouse trapping was performed at this location in 2010. Documented Dulzura kangaroo rat, LA pocket mouse, and Stephens' kangaroo rat (*Dipodomys stephensi*).

Badlands: Camera traps were operated at this location in 2010 and 2011 at existing culverts before SR-60 construction began, which is going on now. These culverts have a natural bottom, with both animals and humans using them. Documented long-tailed weasel, bobcat, badger (*Taxidea taxus*) and mule deer on these camera traps.

Jackrabbit Trail: Operated Camera Traps in 2015 and 2016. This location, owned by the RCA, is off Gilman Springs Road and the target species for this location was badger. Documented bobcat, badger, coyote and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*). Quite a few badger roadkills have been documented on Gilman Springs Road that appear to be moving between San Jacinto Wildlife Area and the Badlands.

Lamb Canyon: Camera traps were operated at this location in 2008 and 2009. Three cameras placed in Lamb Canyon culverts under SR-79. There is not a lot of data from these cameras, and it is likely that cameras were stolen. Documented use by bobcat, coyote and gray fox, as well as lots of humans. Lots of debris in culverts at the time, could be a good culvert for wildlife if it were maintained.

The WRCMSHCP has 146 covered species, including 14 covered mammals

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Michelle Marsical, Camera Trapping Monitoring Results for the Greater Interstate 10 Linkage Area

Michelle Mariscal conducted biological monitoring for the Multiple Species Habitat Conservation Plans in the Coachella Valley and Western Riverside County for ten years before taking her current position with the Puente Hills Habitat Preservation Authority, which manages the Puente Hills Preserve in Los Angeles County. A camera trap study conducted in the Coachella Valley was part of her Master thesis while at the University of California Riverside.

Michelle conducted a camera study of underpasses along I-10 and SR 62 as part of her Masters' thesis at UCR. Results of this study have been published in Southwestern Naturalist.

Michelle monitored 7 underpass sites for 29 months between 2010 – 2012 in the San Gorgonio Pass area. The study focused on understanding wildlife use patterns and wildlife use constraints.

<u>Wildlife Use of Underpasses</u>

Wildlife species aren't shy about using underpasses, however, neither are humans as human occurrences outnumbered animal passages.

The Stubbe Canyon underpass also supports the Pacific Coast Trail, so humans are present night and day several months out of the year. She also documented a lot of vehicle traffic by utility companies at this underpass.

315 domestic animals were documented on underpass cameras over the course of the study.

Many wildlife species were documented at underpasses: small rodents, birds, jackrabbits, brush rabbits (*Sylvilagus bachmani*), squirrels, crows, reptiles, desert cottontails (*S. audobonii*), coyote and mountain lion.

Michelle reviewed the structural attributes and wildlife use of each underpass. Bobcat use of underpasses is positively correlated with width. Bobcat use is also statistically negatively associated with off road vehicles and other vehicle use. Lagomorphs use of underpasses is negatively associated with openness.

She also placed cameras further away from highways, in more natural canyon environment to compare use, and found that wildlife occurs more frequently on cameras than humans or domestic animals in the more natural environment. Documented one burrowing owl (*Athene cunicularia*) at one more natural site. Cattle were also recorded in the more natural environment but were not documented at underpasses.

Michelle also compared human spatial patterns, and identified that more hikers are found at canyon sites but fewer vehicles.

Rodents are 9 times more frequent at underpasses than lagomorphs. At canyon sites, birds were more common than lagomorphs.

<u>Evaluated the 24-hour cycle of use by humans and wildlife species</u>

Total human activity occurs at all hours at underpass sites, but human use ramped up near dawn and during all daylight hours.

Canyon sites: Human use peaked at 10 am and waned at 4pm.

Coyotes: Activity at underpasses peaked at 2 am; activity of coyotes at canyon site peaked at dawn. As human activity increased at dawn at underpasses, coyote use declined.

Bobcat activity at underpasses is more nocturnal. At canyon sites, bobcat use peaks at dusk and near dawn. As human activity ramped up near dawn at underpasses, bobcat use declined.

Results indicate that coyotes and bobcats modify their habitat use in response to human presence.

<u>Threats and Opportunities</u>

Dry Morongo Wash Underpass/SR 62: lots of human presence at this location, including fire pits and debris. Dogs frequently documented off leash from neighboring parcels. This is the only crossing in the study area used by deer and mountain lion. The size of underpass is great for wildlife use and close to where mountain ranges come together. Documented bighorn sheep near this underpass but did not document them using it.

Brock Ortega: Sr Wildlife Biologist, Dudek: SR 62/Morongo Basin Wildlife Linkage Plan Interim Results

Brock is a Senior Wildlife Biologist and principal at Dudek, where he has worked for 26 years. He holds federal permits for several listed species, and particularly enjoys working on wildlife movement and renewable energy projects. Brock's Co-Presenters include Fraser Shilling, Norris Dodd/Aztec Engineering, and Travis Longcore. Funding for this project came from Caltrans District 8.

Methods:

The project team performed literature review, track, camera and road mortality studies, highway noise and light studies, as well as a drone study of the entire highway.

Land ownership is critically important when siting crossing structures and requires protected lands on either side of highway.

Yucca Grade Segment: wildlife cameras set up on protected lands owned by the Mohave Desert Land Trust and BLM.

Track stations were set up along dirt roads that paralleled the highway, with cameras set up at crossing structures.

Morongo Valley Segment: only a few crossing structures are located along this segment, including Little Morongo Creek, a San Bernardino County Flood facility and one other crossing.

Morongo Grade Segment: this included the bridge location at Dry Morongo Wash that Michelle spoke of plus a few other crossing structures.

Results

The project team examined available connectivity modelling as part of this study, however, models don't indicate what's happening on the ground, so the team examined site conditions in more detail.

Roadkill and wildlife sightings data were obtained from California Highway Patrol, California Roadkill Observation System (Home | CROS (wildlifecrossing.net)), U.S. Geological Study, California Natural Diversity Database, and through track stations. Concrete barriers along roads can be an impediment to successful wildlife crossings. Some significant roadkill was documented along Morongo Grade.

In addition to focused surveys, the team completed track and sign surveys, hiking surveys to document track and scat, which was especially important in areas like Mission Creek and Morongo Wash Bridge where cameras were stolen.

Documented bighorn sheep (*Ovis canadensis*), mule deer and mountain lion. Wildlife camera results documented >1000 human influence photos. Cameras documented lots of jackrabbits.

Green highlights in table below indicate crossing structures. One desert tortoise (*Gopherus agassizii*) showed up at a camera trap station on Yucca Grade. High concentration areas for bighorn sheep and people circled.

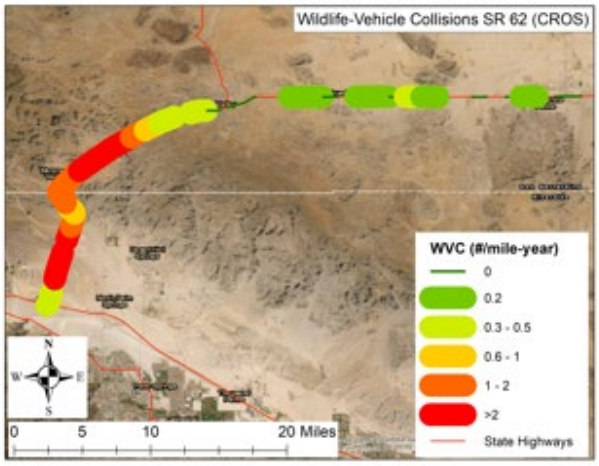
Wildlife Camera Results

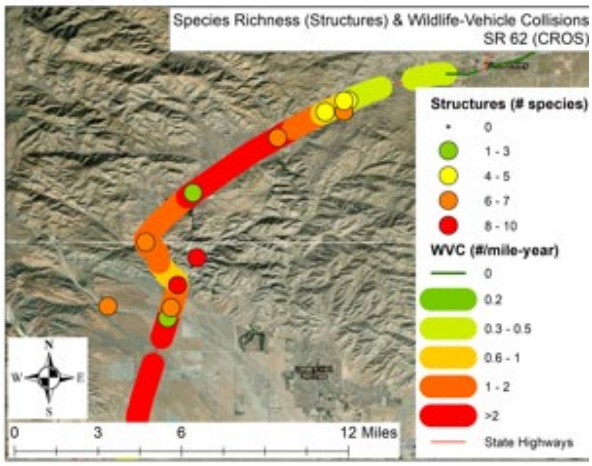
- Over 13,000 wildlife photos
- Over 1,000 human influence photos
- Over 5,900 focal species (2,100 hares)

Row Labels	Domestic Dog	Human	Grand Total
Big Morongo Cyn Preserve_1	38	77	115
Lower Morongo Wash Culvert		132	132
Mission Creek Bridge (North)		171	171
Mission Creek Bridge (South)		13	13
Mission Creek Preserve	40	97	137
Morongo Grade Roadside Cameras (MGRCA)		250	250
Morongo Valley Box Culvert		16	16
Morongo Valley Storm Channel	6	38	44
Morongo Wash Bridge		87	87
RYG – Remote YuccaGrade		1	1
YuccaGrade Land Trust East	3	4	7
YuccaGrade Owl Culvert	29	23	52
YuccaGrade Twin Pipe Culvert		49	49
YuccaGrade West (YGW)	5	66	71
Grand Total	121	1024	1145

Count of Species	Column Label											
Row Labels	American Badger	Bighorn Sheep	Black Bear	Black-Tailed Jackrabbit	Bobcat	Coyote	Desert Tortoise	Gray Fox	Greater Roadrunner	Mountain Lion	Mule (or Black-tailed) Deer	Grand Total
Big Morongo Cyn Preserve_1		10		254	2	59		210	2	2	2	541
Lower Morongo Wash Culvert	1			32	19	28		564				644
Mission Creek Bridge (North)	12			2 289	90	597			135			3123
Mission Creek Bridge (South)					1	3			1			5
Mission Creek Preserve	1		1	36	1	141			34			214
Morongo Grade Roadside Cameras (MGRCA)		10		55	1	71		21	9	1		168
Morongo Valley Box Culvert				100	92	8			10			210
Morongo Valley Storm Channel				46		6		9	16			77
Morongo Wash Bridge		16			28	128			11		51	234
RYG – Remote YuccaGrade				95	24	59			3			233
YuccaGrade Land Trust East				102	10	106		4	3		35	260
YuccaGrade Owl Culvert				19		6			26			51
YuccaGrade Twin Pipe Culvert	3					3			4			10
YuccaGrade West (YGW)				92		53	3		25			173
Grand Total	17	36	1	3 120	268	1300	3	808	279	3	88	5923

The study also examined wildlife collisions along Mission Creek floodplain and Morongo Valley area, with slightly less collisions noted on Morongo Grade.

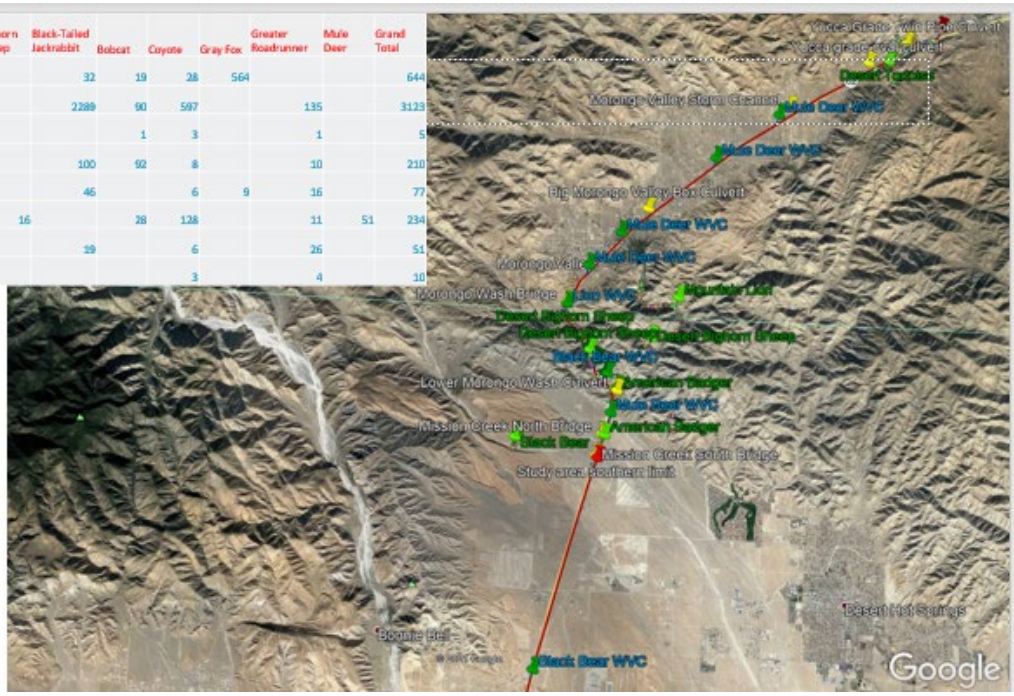




1) wildlife vehicle collision (final dataset, n=258, 2015-2020), 2) camera data (species richness for whole study, draft data).

The study examined areas with high mortality and high utilization of crossings. Blue dots indicate wildlife collisions, green dots indicate successful crossings on the map below. Three mountain lions were killed at at-grade crossings, and one mule deer mortality was documented, plus two black bear mortalities.

Structure Name	American Badger	Bighorn Sheep	Black-Tailed Jackrabbit	Bobcat	Coyote	Gray Fox	Greater Roadrunner	Mule Deer	Grand Total
Lower Morongo Wash Culvert	1		32	19	28	564			644
Mission Creek Bridge (North)	12		2289	90	597		135		3123
Mission Creek Bridge (South)				1	3		1		5
Morongo Valley Box Culvert			100	92	8		10		210
Morongo Valley Storm Channel			46		6	9	16		77
Morongo Wash Bridge		16		28	128		11	51	234
Yucca Grade Oval Culvert			19		6		26		51
Yucca Grade Twin Pipe Culvert	3				3		4		10



Results indicated that bridges are conveying more wildlife species than other structures.

Recommendations

Mission Creek Bridges: major drawback with this structure is that there is a lot of human use, but there are also a high number of wildlife detections. Structures are good and represent good candidates for noise and light mitigation. It is recommended that the bench at the undercrossing be removed to create more height/passage for wildlife; may require periodic maintenance to clear sediment.

Lower Morongo Wash Concrete Box: the study only documented one gray fox using this structure; it possibly needs light and sound screening, as well as directional fencing. It may be a good idea to install sound protected light wells in the median, but this is not recommended if it is only used by night-time animals. This structure should be enlarged to allow more use by coyotes and mountain lions. This crossing would need to be an overcrossing to make it usable by deer.

Dry Morongo wash: mountain lion, mule deer and many other species use this structure currently. A fair number of bighorn sheep at this location. The optimal spacing of bighorn sheep crossings is 2 miles; currently there is 3 miles between existing crossings. One possibility is to shave down the fill under the crossing in this location to provide more clearance for bighorn sheep; this crossing also needs light and sound mitigation. It

is also recommended that gates be established at the Southern California Edison Access Road to limit vehicle use of structure.

Little Morongo Wash bridges: lots of deer collisions were documented in Morongo Valley and this is the only crossing. This crossing is silted-in and used by only a few species (only 1 foot clearance). This is a SBCFD facility that needs maintenance so that mule deer could use it. Light and sound mitigation is also needed for this location, as well.

Big Morongo Wash Culvert: The only possible fixes for this existing crossing, short of replacement with a larger structure, would be light and sound mitigations. Not much wildlife use documented at this location. To enhance its function, this crossing needs to be replaced with a larger structure.

Proposed New Crossings:

The study recommends the installation of 2 new overpass structures where there are conserved lands on both sides of highway to connect Yucca Grade at the north end and Morongo Grade at the south end on the San Bernardino-Little San Bernardino Linkage. These 2 locations reflect areas with high wildlife use and represent areas where such structures are feasible to construct.

Yucca Grade and Morongo Grade site inspections were conducted for overcrossings with Contech Engineering. Establishment of a pre-cast modular crossing would require setting up frames on either side of highway and then dropping in pre-cast segments in the middle. Minimum 24'10" clearance is required for this structure, and the structure would be 80 feet wide. Would also require establishing directional fencing to lead wildlife to structures. Modular crossing structures can be installed without affecting the existing SCE powerline. Some potential wetland and Joshua Tree impacts associated with installation of this structure.

Morongo Grade Overpass: Existing topography works well for the placement of a modular overcrossing in this location but would need to incorporate another crossing to accommodate SCE utility road in addition to SR- 62.

The cost of a modular structure would be approximately $1-2 million on its own. It is estimated that 2 modular crossing structures could be permitted and installed for less than $10 million.

Q&A Related to Brock Ortega's Presentation on the Morongo Basin Wildlife Linkage Study

How was wildlife collision data collected for SR-62 Study?
Brock Ortega responded that data were collected from UC Davis Road Ecology Center, Caltrans Maintenance crews, and California Highway Patrol. A technician intern from UC Riverside also collected roadkill data while driving to and from the site.

What time of day were bighorn sheep crossing at Dry Morongo Bridge, and how did you determine where overpass should go?
Brock Ortega responded that Bighorn sheep were detected mostly in the morning. The location of the overpass was determined by: topography, constructability, evidence of bighorn sheep use and establishing 2-mile distance between crossings. Powerlines are also a constraint. Generally, the narrower the distance between edges of the road, the better. Directional fencing will help guide animals to structures as well.

What is the estimated Cost for an overpass?

Brock Ortega responded that structures are estimated to cost $1-2million each; this cost estimate doesn't include pouring footing, earthwork, placing soil or fencing, planning, engineering design, or permitting. Need to understand if this structure type meets Caltrans standards.

Do you see bighorn sheep crossing at one time of year and is it multi-directional?
Brock Ortega responded that yes, they do cross both directions, not sure able to address seasonal use. Seemed like consistent use during the time of the study.

What is the cost for wildlife fencing?
Norris Dodd responded that they estimate wildlife fencing to cost $130k per mile depending on rock substrate. Scott Quinnell reported that for the recent I-15 wildlife fencing (2020), it's costing $500k/mile, while SR-241 was $1 million per mile. Cost highly dependent on substrate – rock increases price. Really need to focus on final installation to make sure there are no gaps in fencing. Amount of rock substrate can really drive up the cost of fence construction, and you won't know that until you start building it.

Fraser Shilling commented that for the Hwy 89 fencing in the Sierra Nevada, long sections of fence are currently down, but it cost roughly $100k /mile. Fencing is only effective if there is maintenance and if, like the SR-241 fencing, is robust and sturdy.

4.3 Research and Monitoring Session

Cameron Barrows, UC Riverside: Conservation and Linkages for the Coachella Valley: Ecosystem Processes: Sand Transport

Dr. Cameron Barrows – spent the first 27 years of his career working for conservation NGOs, focused on establishing networks of protected natural landscapes throughout southern California. For the past 16 years, he's been at UC Riverside's Center for Conservation Biology, focused on developing metrics for evaluating how well protected land networks meet their objectives under a barrage of stressors, like habitat fragmentation, invasive species, and climate change.
Talk will focus on how severing linkages impacts ecosystem processes.

1985: First HCP in Coachella Valley led to expanded MSHCP in 2008

<u>Coachella Valley History</u>

If we go back in history, 150-200 years ago, there was a massive 100 square mile sand dune system in the Coachella Valley that supports species found nowhere else in the world. During droughts, species might have shifted to cooler wetter portions of the dunes in the north/west end of the valley, vs wetter periods, when species shifted to hotter drier areas to the south end of the valley.

Historically, fluvial processes carried sand from the San Gorgonio River, Mission Creek, Little Morongo Wash, plus a few washes that flow south from Joshua Tree and Whitewater River. Whitewater River was the primary source of sand, as was San Gorgonio River but sand flows have decreased due to I-10 and other constrictions upstream.

Sand moves through the system via water and then is carried by wind; first west to east through the San Gorgonio Pass. East of the Pass, sand is transported by winds to the south-east.

Sand dune system supports two endangered species: Coachella Valley Fringed toad lizard and Coachella Valley milk vetch (*Astragalus lentiginosus* var. *coachellae*). Also supports many arthropods found nowhere else in world.

Today, very little, maybe 5 percent, of the sand dunes remain today.

After the serious drought of 2000 to 2004, there became a genetic partitioning of fringed toad lizards across the valley, and no connectivity is occurring anymore. This is a particular concern from a genetic, as well as, climate change standpoint, as is sand transport, for their long-term survival.

Freeway construction began in 1925 with Hwy 99, which turned into I-10 in the 1960s. But even the railroad, which was built in the 1860-1880s (which should have been built at the base on the mountains to the south instead of right thru the middle of the sand dunes), limited southern sand transport and began the sand starvation of dune systems south of what is now I-10.

Sand sources have pretty much now been limited to Whitewater River, but it becomes channelized south of the I-10 to create percolation ponds to support the regions 30 golf courses. Colorado River water is sent down the Whitewater River to replenish groundwater used by golf courses. So instead of water and sand coming down the Whitewater River, very little does. Sand flows pretty much stop at percolation beds on Whitewater River.

Genetic separation has caused an interesting dialog, as USGS has determined that the Flat-tailed horned lizards in the San Gorgonio River are different from the other populations. USGS suggests that we consider mixing the populations; however, it is possible the separate subpopulations have become more adapted in their locations and maybe we would be detracting from their adaptations to their local environments if we mixed them. This needs further study.

Indian Avenue, near the percolation areas, gets closed down multiple times a year due to flooding or sand flows and engineers want to block sand/water flows west of Indian Ave. Scientists have told the engineers that this would be devastating to the species that rely on the sand habitat. We instead have suggested they create modular vehicle overpasses to accommodate flows underneath to sustain connectivity between the two fringed toad lizard populations and sand flows

Largest dune left is 1000-2000 acres in the southeastern portion of the valley, north of I-10. This dune system still receives some sand flows from Indian Hills and Joshua Tree. The Joshua Tree corridor is the only protected sand corridor that allows species and sand to travel from 5000 feet at Keys View in Joshua Tree to just above sea level. County has allowed a lot of development to occur in this area and Army Corps of Engineers and the County are creating a flood dike that will protect houses from sand and flood flows while also maintaining the dune habitat and wildlife populations.

In this location, the County and USFWS regularly collect sand on 38th Avenue and transport it upwind from the dunes – unfortunately a necessary action to sustain NW to SE sand flows to the dunes. The sand trucking effort is helping, but the County needs to make sure they don't stabilize the sand when they drop it upwind.

Flat tailed horned lizard (*Phrynosoma mcallii*) – most northern population is found in Coachella Valley, in only one location, but hasn't made threatened or endangered list. This is the densest population recorded, much denser than populations to the south of the Salton Sea. This remains a healthy population.

Fringe toad lizards seem to be doing well, despite drought and not having the option of moving up mountain sides in response to drought and climate change like other lizards.

Jeff Lovich, USGS: Are tortoise populations linked around the Coachella Valley?

Dr. Jeff Lovich is a Research Ecologist with the U.S. Geological Survey. He has been researching the ecology and systematics of turtles and other wildlife for 40 years. His research has taken him throughout the United States, as well as to Morocco, Japan, and the Galápagos, but he keeps coming back to the Coachella Valley where he started working in 1992. His current research focuses on all aspects of turtle ecology, and the impacts of utility-scale wind and solar energy development on wildlife, especially desert tortoises.

Tortoises are confined to the upland areas around the valley, as the sandy valleys aren't good tortoise habitat. First study population was in the Mesa wind farms of Whitewater River.

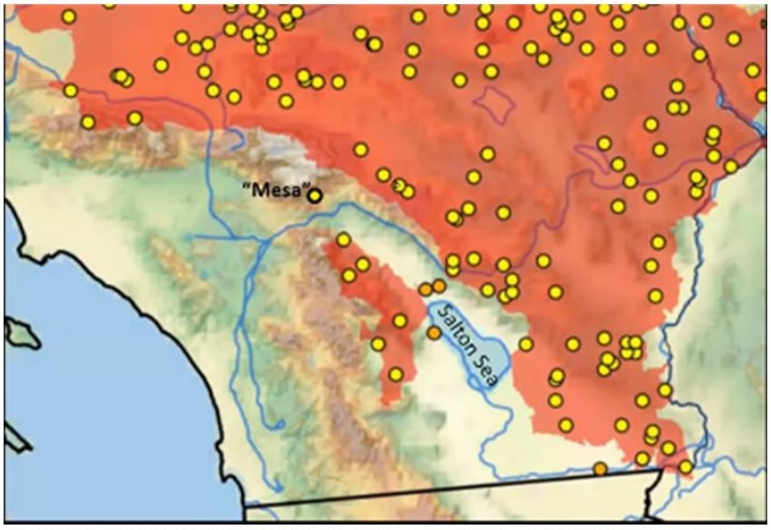
Funders of Jeff's tortoise research: CA Energy Commission, Coachella Valley Conservation Commission, and Bureau of Land Management.

Desert tortoise reaches the southern limit of their range in the Coachella Valley. There are a few records from the Peninsular Range, but the valley floor is devoid of tortoise due to sandy habitat which they don't like, short flowering season, and extreme heat. Coachella Valley is a lowland depression known as lowland trough that is considered a barrier to tortoise movement.

Kristie Cummings and Sharon Pluffer: two techs that have supported Jeff's research.

Working with CVCC to answer basic questions:

What constitutes a population? Many records exist, a population must have multiple individuals, successful reproduction, and subadults present. Tortoise can live 50 years, but if there's no recruitment, populations become decadent and will disappear, yet it takes a long time.



Modified from Berry, K.C. and R. W. Murphy. 2019. Gopherus agassizii (Cooper 1861) Mojave Desert Tortoise, Agassiz's Desert Tortoise. In: Rhasin, A.G.I. et al. (Eds) Chelonian Research Monographs. Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group: 109.101-109.145.

Cottonwood Canyon in Joshua Tree is a special place for tortoise: good wildflowers, gets more rain and thus is good habitat. Composed of tilting bajadas and rocky hills – classic Sonoran vegetation. Great habitat. Worked there from 2015-16. Alice Carl did surveys in 1980s. In 2016 documented 18 tortoises, including one Jeff marked in 1990s and 18 carcasses, one of which was killed by badger. Put radios on live tortoises. Found 3 juveniles and one subadult at this site so there is breeding.

Right across the I-10 is the Orocopia site, which is very different as it is composed of a creosote flat with scattered trees. 2017 experienced good plant production, whereas 2018 was terrible. Found 22 live tortoises but it took a lot of walking. USFWS has done line transects for tortoises and results were very similar - only found one juvenile and one subadult. Found 57 carcasses, biased toward females, likely from drought that took place between 2012 and 2016. The number of living tortoises were mostly male, with most of the dead biased toward females. Likely females bet-hedge their egg production, sometimes with two egg clutches in good years, but they lose a lot of body mass, which doesn't do them well when we have long droughts after a productive year.

No surveys have been completed in Paradise Valley to the east. In 2003, a 100 percent survey coverage was completed for the Orocopia population, where they found 10 live tortoises (including 1 sub-adult and 1 juvenile) and 123 dead ones. Something is going on with tortoise south of I-10, likely due to drought. This is consistent with results from USFWS/Utah Game and Fish surveys in the Colorado Desert Unit, where they had a 36% decline in tortoises between 2004 and 2014. What we are seeing with declines is a sub sample of the larger area.

Moving to the west is Deep Canyon, a remote site managed by UC Riverside. This site has had a historical breeding population and is the only natural population in the Peninsular Ranges. There are some tortoises in Anza Borrego but they were likely released. Deep Canyon is a harsh place for tortoises, very dry with lots of cactus. Over the past few years, we have found 8 live, 6 dead tortoises (including 3 hatchlings killed on the road), and 1 gravid female, so there has been breeding. Hatchlings are usually found every year. No tortoises found in 2021 despite intensive searches of burrows that have been occupied for many years.

Mission Creek Population: 3 live tortoises found in 2021, including one hatchling. No dead tortoises found. A very small population but it does appear that there is reproduction happening.

Jeff's long term study site is located in Mesa/Upper Whitewater Canyon, where he has been studying tortoises since a wind farm was installed there in the early 1980s. Between 1997 and 2013, he marked 70 non-hatchling tortoises. This site has consistently supported a population of around 100 tortoises, one of the largest populations with high reproductive output. However, despite high reproduction, there is little evidence of recruitment, with a very aged population that may soon be dying off.

Major threats to the Mesa/Upper Whitewater Canyon population of tortoises include fires started by wind turbines, causing invasion of red brome and mustard. Site operations may also be an issue, as the site is currently being repowered, and the increased human activity could have significant impacts. Jeff has published a number of research papers on this population, and even has camera traps set up where burrows are visited by bobcats and even bighorn sheep, who may be seeking minerals from excavated burrows.

Jeff published a paper last year about gene flow from the Mesa/Whitewater population in the western Coachella Valley to the populations at the Orocopia and Cottonwood sites in the east and thought that gene flow

would be interrupted by the Salton Trough (6 million years ago Gulf of CA was a major barrier, and it wasn't until 3 million years ago that the Colorado river was a barrier too). Despite these long term barrier effects, all tortoises in the Coachella Valley show some genetic connectivity to the Colorado desert population. Deep Canyon might be a bellweather of climate change impacts of the past.

Conclusions:

- Tortoise populations in the Coachella Valley are widely separated and may be relicts of a past wider distribution.
- Despite scattered nature of populations, gene flow has occurred.
- Major barriers existed in the region for over 6 million years.
- Tortoise population declines in low elevation areas may be a sign of the effects of climate change.

Winston Vickers, UC Davis Wildlife Health Center: Mountain Lions and I-10: A Critical Corridor

Dr. Winston Vickers is an associate veterinarian for UC Davis Karen C. Drayer Wildlife Health Center and the lead investigator for the California Mountain Lion Project. He has been studying mountain lions for 19 years, and his research with UC Davis, and that of others, has been critical to the recognition of the major threats to mountain lion populations and possible mitigation measures that can reduce those threats. He has also devoted extensive time to education about mountain lions, including directing both short and full-length documentaries about mountain lions that have been viewed over one million times.

The UC Davis Southern California Mountain lion study was started by Dr. Walter Boyce in Anza-Borrego Desert State Park, and while originally focused on bighorn sheep, the study team soon realized mountain lions were facing big issues as well.

Recent genetics work by Guftasen, Ernst and Delle identified there are 10 distinct mountain lion populations in California, with southern California having especially small geographic subpopulations.

Santa Cruz and the 5 Southern California subpopulations have been petitioned for listing under the California Endangered Species Act. Researchers are finding inbreeding going on in these populations with significant barriers to connectivity, especially highways.

There is a great deal of mountain lion research collaboration throughout the state, with Justin Dellinger/CDFW bringing state-wide data and habitat suitability mapping to bear on mountain lion research.

Mountain lion habitat is mainly restricted to major mountain ranges. Desert habitat is too open and not really very good for lions.

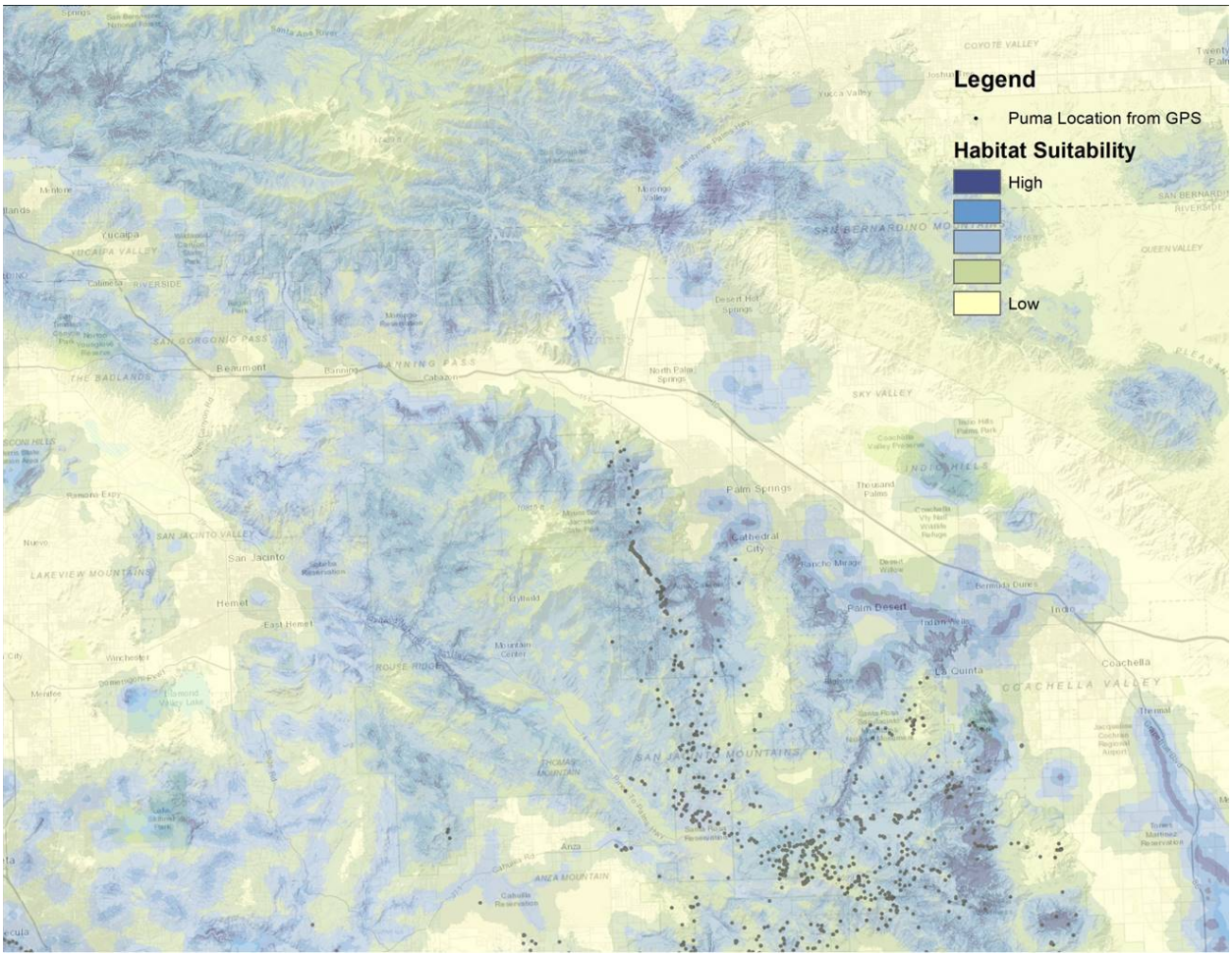
At least 10,000 square kilometers of suitable habitat is needed to sustain a viable population. Connecting these 3 populations (Santa Anas, Eastern Peninsular and Transverse) to the north to the Tehachapi Mountains, securing crossings across major highways, and protecting habitat are all critically important to creating a sustainable population.

Data indicate that five of the 10 populations in the state do not have that level of habitat protection, including the Santa Monica Mountains, Santa Ana Mountains, and the Eastern Peninsular Range. Even when you

combine the Transverse, Eastern Peninsular and Santa Ana populations, you still don't have the 10,000 square kilometers of protected habitat needed to sustain a population.

The good news is that the San Gabriel and San Bernardino Mountains are still connected and represent one subpopulation. The population is in the mid-range regarding genetic diversity. It is a key population hub to connect the 5 separate southern California sub populations. There have been a couple of collared lions in the Transverse Range – one's natal home range is in the San Gabriel Mountains but has gone east of I-15 into the San Bernardino Mountains, and has crossed I-15 several times. We don't know exactly where she crossed I-15, but it looks like she possibly crossed I-15 near Devore, also south of Cajon Junction. Probably used an existing undercrossing. She even wandered into Palmdale!

Winston then showed a map of the Greater I-10 Area and the Mountain Lion Habitat suitability mapping from CDFW. One collared lion came from the San Bernardino Mountains southward, came close to I-10 at Whitewater, but didn't cross the highway. Riparian habitat is likely the most suitable mountain lion habitat for gene flow in this location, but Whitewater's riparian habitat is very sparse (map below).



Winston explained that in the Calimesa area, a male disperser came down from Big Bear and, if we look closely where he came down and with Dudek's, RCA's, and M. Mariscal's data, you can see he came where

other evidence has pointed to mountain lion activity, but he didn't cross I-10. His data points right behind houses but there is only a narrow pathway to get to I-10 and across just west of the 60/I-10 merge.

Lions are sensitive to people and transportation infrastructure; their work at Temecula Creek and I-15 shows that, if there is a lot of human presence, lions are not willing to cross even when there are suitable crossings. Dispersing juveniles are more willing.

Both the Calimesa and desert linkages have very little vegetation cover, which would need to be improved to support lion movement. All the human activity with the Pacific Coast Trail crossing on I-10 could also deter lion use.

One collared lion headed from the west to Morongo Valley at Hwy 62 region, where he approached the highway but went back, but then got struck and killed on Hwy 62 between Yucca and Morongo Valley.

From a habitat perspective there was good lion habitat between Beaumont and Banning but that is no longer the case.

San Gorgonio River provides a possible linkage and there is evidence of lions on both sides of I-10, but there isn't much cover on the desert floor, even along the river, which is probably too daunting for a lion. We know from genetic info that lions aren't crossing now so the habitat should or must be improved for them to use this area. Lion Canyon and Whitewater Canyon to the east of San Gorgonio River are also very open. If we could increase plant cover along the rivers and washes, it might be suitable, otherwise a lion would have to cross 2.3 km of open habitat in San Gorgonio Pass area, and 3 km of open habitat along Whitewater River.

The example of Temecula Creek looks great but heavily impacted by people and noise and light. Lions are approaching I-15 from both sides but only documented one successful crossing of a lion from the Palomar Mountains east of the freeway to the Santa Ana Mountains. We are now facing extirpation of lions from inbreeding in the Santa Ana Mountains. Ongoing and planned wildlife crossing improvements could improve this outlook.

Winston explained that Justin Dellinger at CDFW will be doing a scat dog survey in the Transverse Ranges to find out how large the population is. Now we are using mark-recapture using hair snare set-ups with attractants with hair snare in front. Looking at different ways of estimating population size of the populations because we want to sequence the genome, especially from small populations, and to quickly quantify genetic health to identify critical levels when management interventions, e.g., genetic rescue, are warranted. Also looking at reducing major causes of mortality caused by depredation and roadkill.

Robert Fisher, USGS: Habitat Connectivity for Golden Eagles

Dr. Robert Fisher has been a research scientist at the USGS for the past 23 years. Over the years Robert has worked on various species and topics with his research team to understand the biotic responses (and potential mitigative measures) to urbanization in the southern California landscape, working on a diversity of species, from parasites to mountain lions. Much of his work looks at fragmentation effects, connectivity, genetics, and developing monitoring programs for cryptic and rare species. He has been leading a program on the Golden Eagle addressing these questions since 2014.

Although not a bird biologist, Robert was tasked for tagging golden eagles (*Aquila chrysaetos*) to understand habitat use, occupancy, estimate number of eagle pairs, collect genetic samples for statewide genetics, and examine any issues with toxicants.

Seminal 1937 paper on golden eagles comes from San Diego, which estimated an eagle territory at 36 square miles. The paper also told us that they avoid each other and their territories don't overlap. The 1937 paper states: Eagles are better able to survive in Southern California if we don't develop their habitat, so USGS has focused on direct and indirect effects of humans on eagle dynamics (e.g., recreation).

Renewable energy coming online in San Diego and research being used in developing considerations for such projects in the county.

Study Methods: Bait eagles with calves from milk industry, process the eagles and fit with GPS backpacks. Pete Bloom is the eagle trapper. We've captured 50 eagles, 49 fitted with CTT or backpacks. USGS targeted birds previously banded by others so could examine natal use. USGS worked to identify where each eagle came from and where it's nesting now to get a sense of how the current landscape is functioning for eagles.

High resolution data: for example, one bird lives in the Carrizo Gorge and goes to Mexico every day for foraging.

USGS reduced the point data and modelled areas important for eagles. Bigger the dots, the more important it is to avoid land uses that will impair eagles. This data has provided a useful management tool.

2020 report: 27 eagles have travelled to the Rocky Mountains in Canada and down into Baja, California, but most stay in Southern California.

None of the monitored eagles have crossed Coachella Valley or gone into Arizona or Mainland Mexico.

2 eagles sending data since 2014. One appears unable to breed due to Department of Homeland Security activities at the border.

USGS developing an "Urban avoidance threshold" to use as a planning tool to show the probably eagles will use an area. Eagles typically avoid areas 1300-2000 meters from the Wildland-Urban Interface.

USGS performed a site occupancy study based on Altamont Pass study in Northern California's East Bay. USGS placed a mapping grid across Southern California, and completed 175 breeding surveys in prioritized grids over 2 years to come up with a density and occupancy probability. Only surveyed cells with less than 50 percent urban and more than 50 percent open. Eagles are less detectable in forests and we think they avoid it. Also, eagles seem to like terrain roughness and avoid flat areas. 53 pairs of eagles identified across the sampling frame. Reports are available on the USGS Website, plus two publications are in press.

Data from I-10 Corridor Eagles:

Golden eagle "F-11" from San Diego was captured in Proctor Valley and flew up to the I-10 San Gorgonio pass area. Also crosses the Pechanga/ I-15 corridor, so this bird uses the same crossings that are important for lions.

Another eagle crossed I-15 at the Steele Peak area, also crossed I-10, visited San Gabriel Mountains, and then came back to Orange County.

Another San Diego eagle went to San Gorgonio River, came back, then returned to the San Gorgonio River and then back to San Diego. She is really focused on crossing back and forth in San Gorgonio pass area (really important to keep open) between the San Bernardino and San Jacinto Mountains. This eagle avoids Cabazon, Banning and the PCT where it goes through Whitewater River area.

Another eagle is using Calimesa area to cross from Badlands to San Bernardino Mountains, avoiding Whitewater, using San Gorgonio River. If it gets more developed may not want to cross there.

There is also concerned about a rabbit virus (Hemorrhagic fever), as jackrabbits are the main food source for golden eagles.

Eagles avoid urbanization and wind development, and we are on the verge of squeezing them out.

Q&A for Session

A participant asked if anyone is working on conservation near Hemet?

Robert Fisher answered that some of the degraded ex-farmlands and grasslands in French Valley have a lot of rabbits and may be important for eagles.

Is the Morongo Tribe engaged in connectivity? Cameron Barrows offered that the Agua Caliente Tribe had started their own NCCP. He also mentioned that the Tribe is suing the water district due to over-use of water and could have an outcome of managing the Whitewater River better for people and wildlife

Is anyone studying Coachella Valley round-tailed ground squirrels (*Spermophilus tereticaudus chlorus*)?

Cameron Barrows answered that the round-tailed ground squirrel is a covered species in the CVMSHCP, they do monitor them, associated with blow sand habitat, occur throughout the valley floor at low densities but are in high densities at mesquite dunes, but most of them are drying up and not doing very well. Replaced by antelope ground squirrels in rocky areas. Need blow sand/aeolian sand. Seem to be doing ok, population ebbs and flows. A couple of years ago almost gone but coming back in last few years. Seem to do ok in irrigated areas next to dunes, like golf courses.

Would vegetated overcrossings be beneficial for eagles?

Robert Fisher answered that, yes, golden eagles would use a vegetated overcrossing, as long overcrossings do not serve as recreational bridges for people. Golden eagles don't mind cars, but they do mind people. Pechanga Crossing would be good. Birds likely foraging in San Gorgonio pass for rabbits so that's why they travel through the pass area.

Are nonnative fire ants on golf courses in Coachella?

Cam Barrows responded that, yes there are fire ants present in golf courses in Coachella Valley.

What can be done about vibration in large freight transportation corridors? Is it just about distance above grade of the crossing?

Fraser Shilling commented that for I-90, some of their mitigations for herps and underground mammals were due to ground vibrations from heavy vehicles.

Jeff Lovich responded that USGS did transects for tortoise in this area and found very little evidence of tortoise in this area but was a drought year. Thermal Canyon is a very dry, hot portion of Coachella Valley, so not sure of its utility to wildlife.

Robert Fisher commented that the greater linkage area, particularly the San Gorgonio Pass, is important for genetic connectivity for Sonoran and Mojave. USGS prepared a paper on this and can share the data.

Fraser Shilling also suggested that the literature that relates to wildlife-vehicle conflict poses the question supported by meta-analysis, that for ground dwelling animals, connectivity may be less important than mortality from roads. Roadway mortality needs more focus. Also need to deal with rate of population loss.

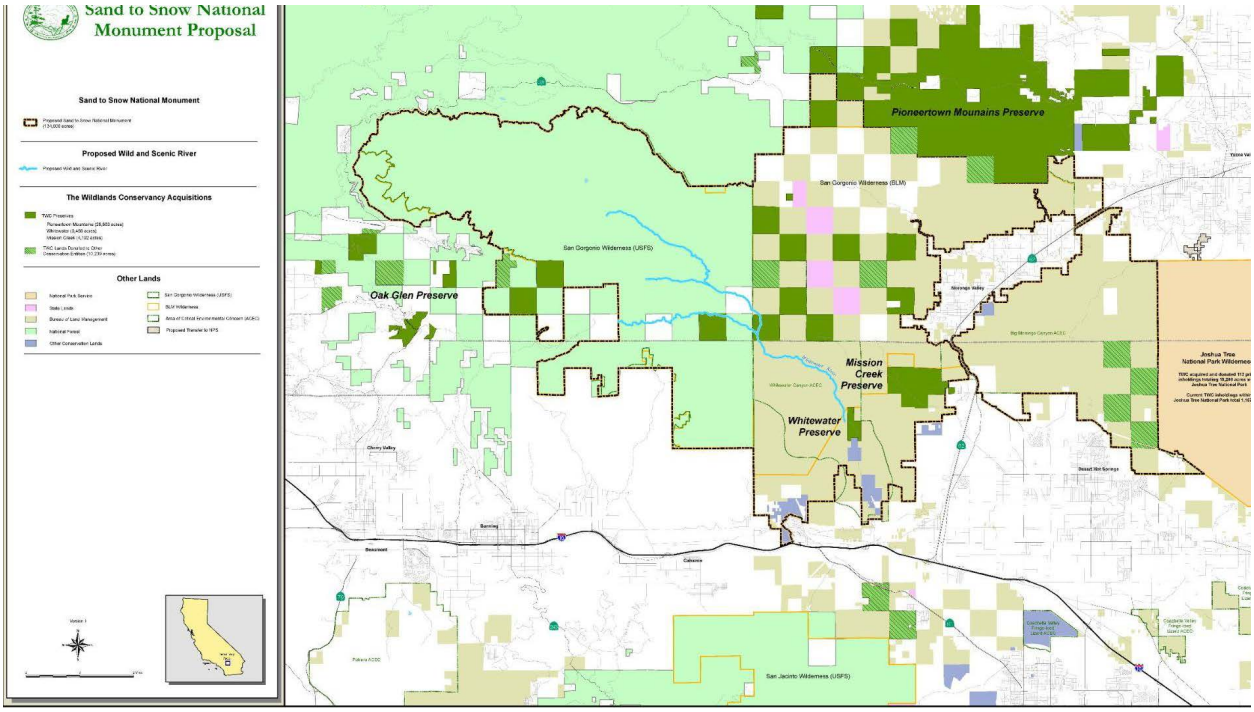
4.4 Restoration, Stewardship, and Outreach Session

Frazier Haney, The Wildlands Conservancy: Sand to Snow Interface Project

Frazier Haney has been working to protect natural landscapes and people's access to the outdoors for over fifteen years in various professional positions. He grew up hiking, climbing, and camping in the Midwest and the California Desert, a privilege which left him with a deep love of the outdoors. He attended UC Santa Cruz and received a Bachelor of Science degree in Ecology and Evolution, and later University of Redlands to complete an MBA. Frazier currently volunteers as a Board Member of the California Desert Coalition and works as the Executive Director for The Wildlands Conservancy based in Oak Glen, California. He lives in the town of Beaumont, CA with his wife Jamie and kids Lily and Owen.

The Wildlands Conservancy's (TWC) mission is to preserve the beauty and biodiversity of the earth and to provide programs so that children may know the wonder and joy of nature. One of TWC's first major projects as an organization was the Sand to Snow Wilderness Interface Project, which aimed to acquire critical lands to connect the San Gorgonio Wilderness with the Bighorn Mountain Wilderness to the north, with Joshua Tree to the east (San Bernardino-Little San Bernardino Linkage), and with the San Jacinto Wilderness to the south (San Bernardino-San Jacinto Linkage). That effort became the foundation for the Sand to Snow National Monument, which was designated in 2016 by President Obama. The Whitewater River that cuts through the Monument was designated as a Wild and Scenic River. Much of the land acquired in Sand to Snow (image from presentation below) became TWC Preserves including Whitewater, Mission Creek, Pioneertown, Bear Paw, Bluff Lake, and Oak Glen Preserve, while other lands where appropriate were donated or transferred to public agencies.

TWC is still acquiring key lands for conservation but also focuses on children's outdoor education, connecting visitors with nature, recreation, stewardship, and restoration. All of TWC's Preserves are free to the public, and there are many repeat and regular visitors who also volunteer. TWC provides more outdoor education programs for youth in underserved communities than any NGO in California. Many times, it's the first-time kids have been exposed to natural areas, and TWC seeks to engage them in a safe, friendly, and fun way to get to know wildlands. At Oak Glen, there are kid quizzes throughout the preserve to pique their interest. Visitors form the basis for preserve management, often returning as volunteers to help with restoration. For



example, at Wind Wolves Preserve volunteers help plant the endangered Bakersfield cactus, which TWC has a permit to propagate, and now Wind Wolves is one of the strongholds for this species. Almost every cactus planted with volunteer help. Nettle plants grown in the Mojave Desert Land Trust's native plant nursery were sent to Wind Wolves to restore tricolored blackbird habitat, all with volunteer help. After the Water Fire last summery, volunteers helped reline burned out trails, manage invasives, and plant willow shoots and other natives to help with recovery. All volunteers coming out to help were first visitors to the preserves.

In the last decade, the number of visitors to the preserves has grown significantly. Over the past year, TWC launched the Behold the Beauty Association to engage visitors and the general public in a more formal way. TWC welcomes over a million and half visitors per year across their preserve system, which is a great opportunity to tell people about connectivity, wilderness, monuments, and various campaigns, as well as, to get to know TWC's philosophy. One of TWC's key tenets is "*Since this wonderous Earth is our home, all of our preserves are open to the public for free because having to pay to visit Nature is to be dispossessed of a birthright. Free access to our preserves removes the socio-economic barriers that tend to promote a disconnect with nature".* Once visitors have joined the Behold the Beauty Association, they are encouraged to participate in campaigns, volunteer for plantings, and other preserve needs. It's all part of a bigger idea of connecting people with nature.

Q&A related to Frazier Haney' presentation on the Sand to Snow Interface Project

Joan Taylor from the Sierra Club asked if Frazier could talk about the large desert land acquisition of the Catellus lands that The Wildlands Conservancy did years ago and then how they had to defend those lands.

Frazier provided the following background on that effort. In late 90s, The Wildlands Conservancy found out about former railroad lands owned by Catellus Lands all across the California desert, from San Gorgonio Wilderness, Joshua Tree National Park, Mojave Preserve, all the way out to the Colorado River. The

Wildlands Conservancy Board, David Myers, and others raised 63 million dollars, including 18 million in public funds (e.g., Land and Water Conservation Funds), and 45 million in private funds, to purchase over 530,000 acres, which was then donated to the Department of Interior as conservation gift to the American people. It included 21,000 acres in Joshua Tree, 87,000 acres in the Mojave Preserve, 200,000 acres in various desert Wilderness Areas, and over 200,000 acres to BLM in limited use areas, like Ord Rodman Desert Wildlife Management Area. Elden Hughes, dreamed of a Mother Road National Monument, which would connect 17 Wilderness Areas, Joshua Tree, Mojave Preserve, and incorporate many of the acquired Catellus lands. After the lands were donated, solar and wind development was proposed on thousands of acres. The Wildlands Conservancy led the charge to protect Mother Road National Monument and Sand to Snow NM and fought for years to keep solar out. In 2008, Senator Feinstein introduced Mojave Trails National Monument that included Sand to Snow, and the Soda and Avawatz Mountains. In 2016, Obama designated Mojave Trails and Sand to Snow National Monuments under the Antiquities Act. The Wildlands Conservancy played a central role because of their acquisition of the Catellus lands.

Paul Beier commented, "I have visited all of the TWC Preserves. Seeing the slides and seeing the commitment to free access with a focus on underserved groups has brought tears to my eyes."

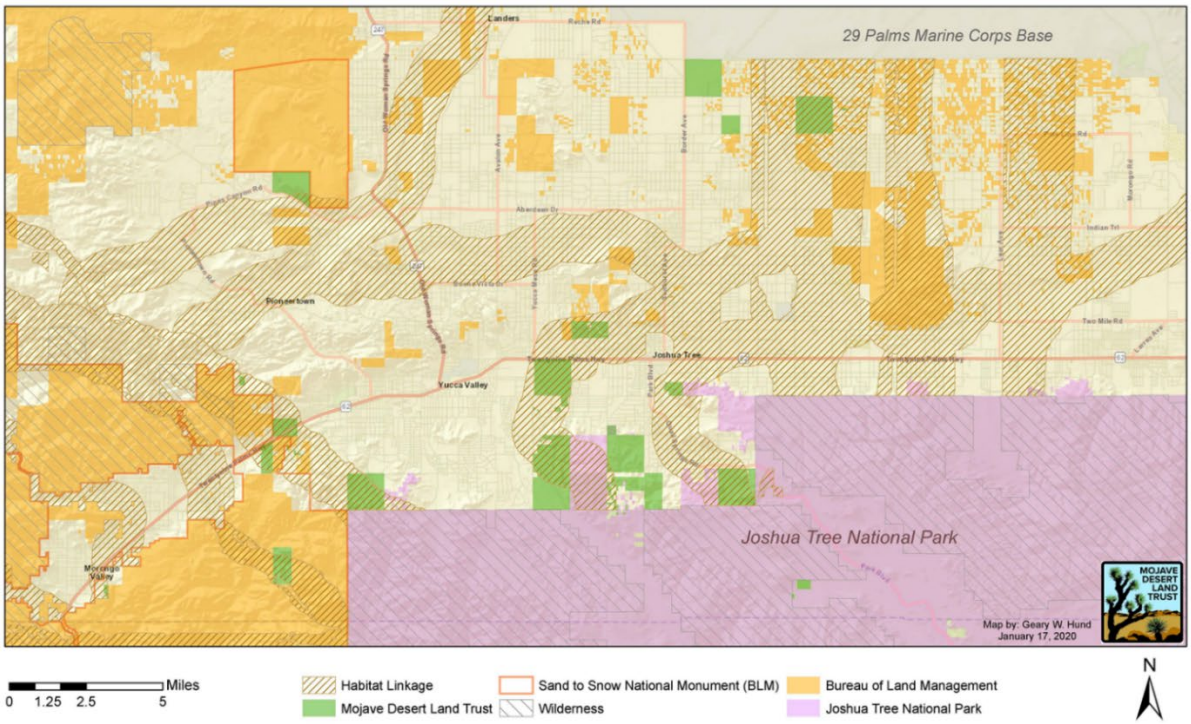
Geary Hund, Mojave Desert Land Trust: Outreach & Coordination in Protection of Habitat Linkages

Geary has worked in conservation for more than 40 years. He began his career with California State Parks, first as a ranger and then as an ecologist. He was recognized by the Director of State Parks for his role on a team that secured permanent resource management funding for State Parks, and by the Lieutenant Governor for his work on wildlife corridors. After retiring from State Parks, Geary worked as a refuge and then endangered species biologist for the United States Fish and Wildlife Service. Geary also served as Associate Director of the Coachella Valley Mountains Conservancy, and he worked for The Wilderness Society on National Conservation Land issues. He received a Wilderness Hero's award in 2011 from The Wilderness Society in recognition of his role in the passage of wilderness and wild and scenic river legislation in Riverside County. Geary joined the Mojave Desert Land Trust board in early 2017, and he became the Executive Director in February of 2019.

The Mojave Desert Land Trust's (MDLT) mission is to protect the Mojave and Colorado Desert ecosystems and their natural, cultural, and scenic resource values. MDLT has a vast service area covering 26 million acres across these desert ecosystems. MDLT has a number of programs in addition to land acquisition, such as habitat restoration, public engagement and outreach, conservation education, and public policy work. MDLT's plant conservation program and native plant nursery provides plants to numerous agencies and organizations for habitat restoration. An active public engagement and outreach program complements their classroom work, serving underserved and disadvantaged communities, to introduce and include them in the outdoor experience. MDT also have a very robust volunteer program and engages in public policy work on multiple levels.

After just 15 years since the inception of the organization, MDLT has reached a major milestone. Over 100,000 acres have been conserved. MDLT has acquired land in National Parks, Wilderness Areas, and National Monuments, conserved designated critical habitat for federally listed species, and secured critical wildlife movement corridors. In the Morongo Basin, MDLFT has protected over 7,300 acres in critical wildlife movement linkages (image from presentation below). This includes land on both sides of State Route 62 on the Yucca Grade where Caltrans has proposed a vegetated wildlife overpass. Long ago MDLT made a decision to not just buy and transfer land but also to keep some in permanent ownership. MDLT has four permanent preserves. One, the Palisades Ranch along the Mojave River provides outstanding desert riparian habitat along this key wildlife movement corridor, while also providing nesting habitat for listed species, such as Least Bell's vireo and yellow-billed cuckoo (*Coccyzus americanus*).

Habitat Linkages in the Morongo Basin



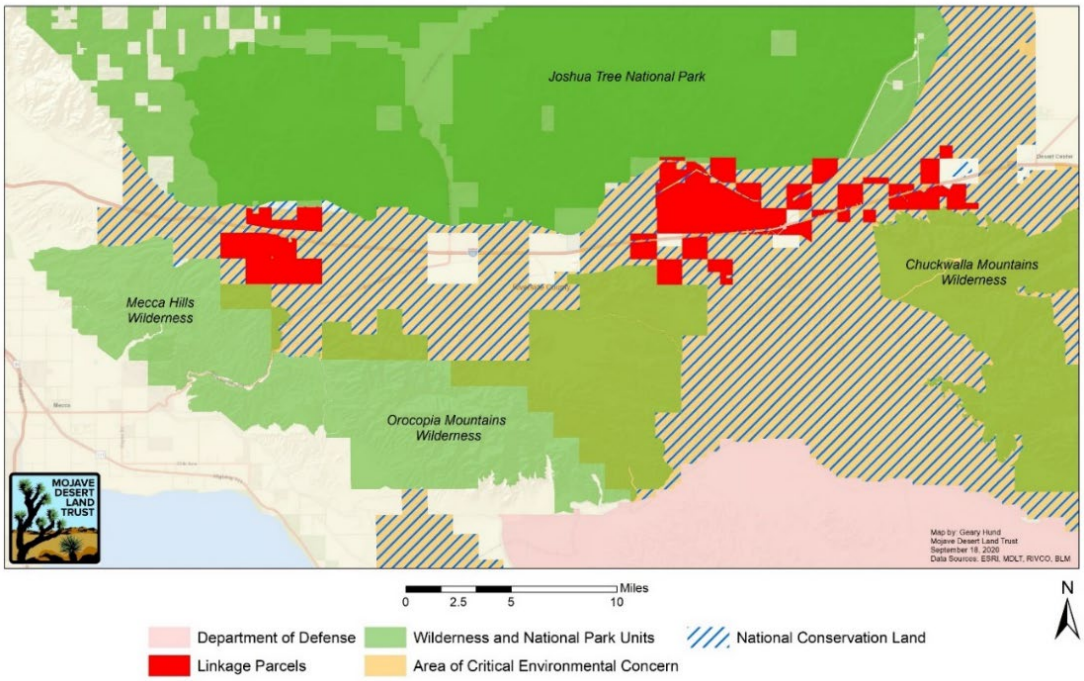
MDLT does outreach and coordination at multiple levels. At the federal level, they work with National Park Service and Bureau of Land Management to set priorities for acquisitions based on Conservation Plans, such as the DRECP, MSHCP, linkage studies like South Coast Missing Linkages, and other internal analyses. They also share information on MDLT's priority acquisitions with the agencies. MDLT also does outreach to gain support for LWCF funding requests to acquire land in linkages. MDLT provides technical assistance to agencies, writing LWCF funding request for agencies that have limited staff. BLM received 1.5 million for acquisitions in Mojave as a result of MDLT support.

At the state level, MDLT works with the California Department of Fish and Wildlife's (CDFW) Wildlife Conservation Board to implement a Conceptual Area Protection Plan for the Morongo Basin, which includes over 20,000 acres in the linkages that are preapproved for acquisition or easements if there are willing sellers. MDLT is also coordinating with the San Bernardino Regional Conservation Investment Strategy, which is a voluntary, non-regulatory, and non-binding conservation assessment that includes information and analyses focused on conserving target species, their habitats, and the conservation status of the land within the RCIS focus area. Caltrans SR-62 study also drives MDLT work. MDLT acquired land on both sides of highway, where there is now a recommendation to integrate a wildlife overpass on MDLT acquired land.

At the local level, MDLT works with local governments, communities, and congressional representatives. They work with local governments on conservation endeavors, such as the City of Apple Valley's Multiple Species Conservation Plan, and the Coachella Valley Conservation Commission to implement the Coachella Valley MSHCP. MDLT also works with local communities, who value open space as part of their identity and quality of life, and as a gateway to the National Parks. MDLT and TWC work with congressional representatives for funding acquisitions and other conservation endeavors.

Geary shared a map of MDLT's Mojave Desert Linkage Acquisitions Program, which looks at modeled linkages and private property within linkages to target acquisitions. Two areas rose to the top, the San Bernardino – Granite Mountains Linkage identified as part of SCML in the Lucerne and Apple Valley area, which was designated as an Area of Critical Environmental Concern (ACEC) during DRECP, the Granite Mountains Linkage ACEC, the majority of which is private land. MDLT just closed on the first parcel in this linkage, can't wait on RCIS or Apple Valley MSHCP. The other area that rose to the top was between Mecca Hills Wilderness, Orocopia Mountains Wilderness, Chuckwalla Mountains Wilderness, and Joshua Tree National Park, in the Joshua Tree-Chocolate Mountains Linkage (image from presentation below).

Chuckwalla Area of Critical Environmental Concern Linkages



Here, there is potential for residential and renewable energy development because of the Development Focus Area (DFA) identified in the DRECP and existing solar facilities further east of this area. Most of this area is already ACEC, Wilderness, and National Conservation Land, so it's really essential. We found out how quickly things can change during the Trump Administration, so we need to acquire private land and gain permanent protection for these linkage areas. TWC, MDLT, California Wilderness Coalition, and many others are working with Congressman Ruiz on a potential monument, suggested name Chuckwalla Mountains National Monument, which was identified at the Land Use, Policy and Protection session. The Monument proposal includes the ACEC, Wilderness additions, and other important cultural areas. If you like to support this proposal or would like more information, please reach out to Geary at MDLT.

Another policy initiative MDLT is involved in with TWC and many other sponsors, is State Assembly Bill 1183, California Desert Conservation Program, which was introduced by Assemblyman Ramos. This program would be folded into the state's Wildlife Conservation Board and would provide funding for acquisitions. Geary testified on Monday April 26, 2021, and it passed out of first committee. Next stop appropriations. This could be a great funding opportunity to help acquire land in critical linkages.

Q&A for Geary Hund's presentation on Outreach & Coordination in Protection of Habitat Linkages

Gordon Pratt asked if invertebrate surveys have been conducted in the Chocolate Mountains Gunnery Range and if there is a partnership with the Gunnery Range.

Geary responded that the Mojave Desert Land Trust works with the Gunnery Range in the Chuckwalla Bench area to connect to the Chocolate Mountains but is not sure to what extent the area has been surveyed.

Gordon Pratt asked if the Cadiz Dunes have been surveyed, as there are many insects found only in dune systems.

Geary answered that he suspects comprehensive surveys have not been completed. He made a note to ask BLM, and mentioned it would be a great thing to fund invertebrate surveys.

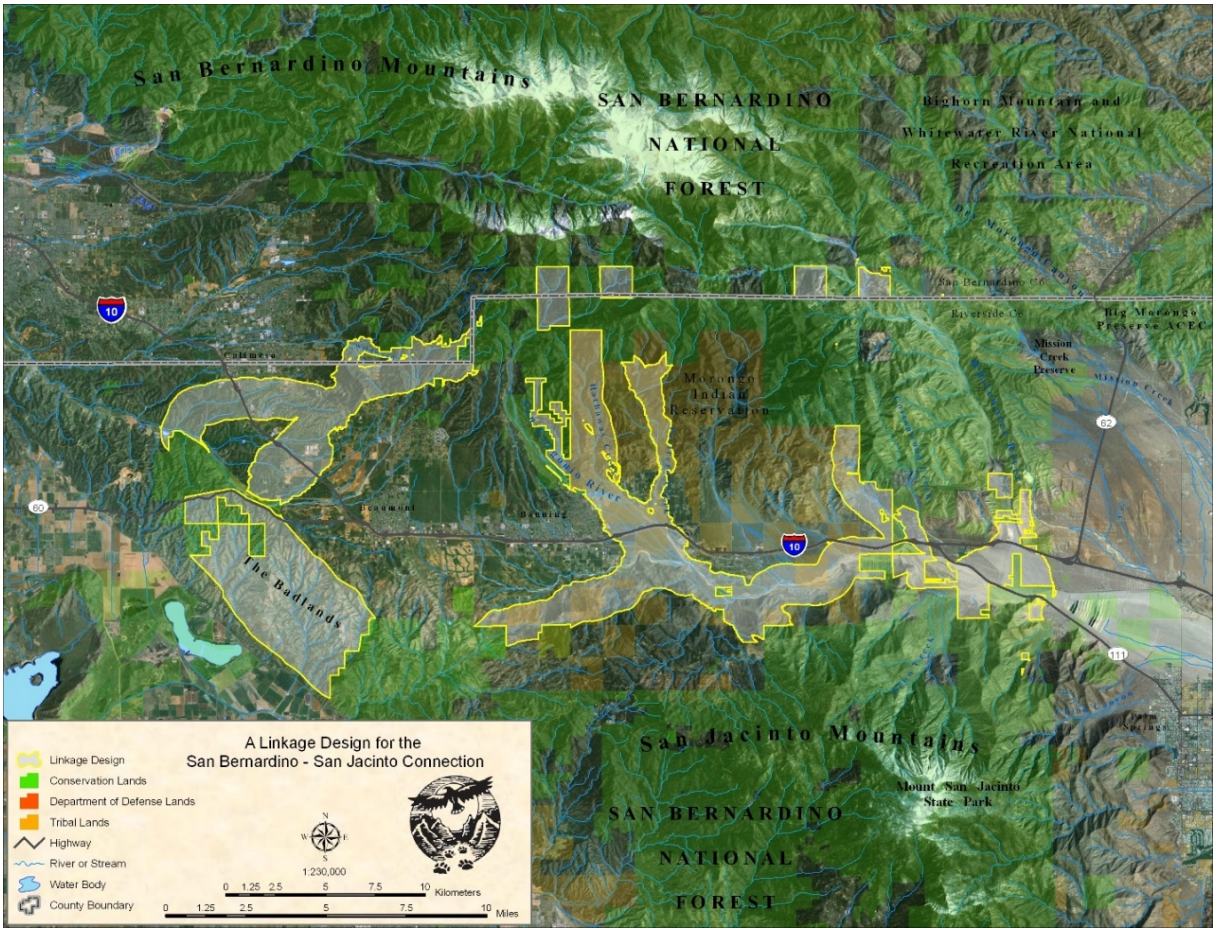
Lynn Sweet commented that there is currently a vegetation map being developed for the Chocolate Mountains that should be coming out soon. They have mapped stands of some rare plants including Orocopia sage (*Salvia greatae*).

5. San Bernardino-San Jacinto Linkage Needs, Opportunities, and Threats

5.1 Ecological Significance of the Linkage

The San Bernardino-San Jacinto Connection links the Transverse and Peninsular Mountain Ranges of the South Coast Ecoregion. The San Bernardino Mountains are part of the east-west trending Transverse Ranges and feature the highest peak in southern California, Mount San Gorgonio, while the San Jacinto Mountains are the highest and northernmost of the Peninsular Ranges. The Badlands are contiguous with the San Jacinto Mountains, forming a peninsula of coastal foothill habitats extending roughly 30 km (19 mi) toward the northwest.

These mountain ranges provide a rich assemblage of vegetative communities and a classic display of elevational life zones. The lower elevation coastal foothills are a mosaic of grassland, coastal sage, chaparral, oak savannas and woodlands, and riparian forests. At mid elevations there is a shift to montane chaparral interspersed with conifer hardwood forests dominated by Jeffrey pine (*Pinus jeffreyi*), ponderosa pine (*P. ponderosa*) and sugar pine (*P. lambertiana*) and mixed with patches of canyon live oak (*Quercus chrysolepis*) or black oak (*Q. kelloggii*). Montane riparian forests are tucked into deep canyons and montane meadows occur where the terrain is gentle and the substrate fairly impervious. At the highest elevations there is a transition to subalpine habitats, with white fir (*Abies concolor*), lodgepole pine (*P. contorta*), and limber pine (*P. flexilis*) being the most prominent species. Descending down the desert side of the mountains, one passes through pinyon-juniper woodland, redshank chaparral, and desert scrub.



Both coastal and desert habitats occur in the lowlands between these mountain masses, with the San Gorgonio River marking the transition between these major vegetative zones. Coastal habitats dominate the pass to the west of the San Gorgonio River, where Noble, Little San Gorgonio, El Casco, and Wildwood creeks flow westward into San Timoteo Canyon. Desert habitats dominate to the east, with numerous alluvial plains fanning out from the canyons on the floor of the San Gorgonio Pass. The San Gorgonio and Whitewater rivers emanate from the San Bernardino Mountains to form extensive alluvial fans in concert with tributaries from the north and east sides of the San Jacinto Mountains. These rivers and streams transport and deposit sands eroded from the mountains to the desert lowlands. These sands are essential to sustaining rare dune

ecosystems in the Coachella Valley. A number of sensitive natural communities occur in the planning area, including desert fan palm oasis, cottonwood willow riparian forest, and southern coast live oak riparian forest.

This variety of habitats support a diversity of organisms, including many species listed as endangered, threatened, or sensitive by government agencies (USFWS 1980, 1987, 1998, CVAG 2004, CNDDB 2021ab). These include riparian songbirds, such as yellow warbler (*Setophaga petechia*), yellow-breasted chat (*Icteria virens*), and the endangered least Bell's vireo, and southwestern willow flycatcher (*Empidonax traillii extimus*). Sensitive reptiles that prefer drier habitats and sparser vegetative cover, such as the coast horned lizard (*Phrynosoma blainvillei*), and the endangered Coachella Valley fringe-toed lizard, also have the potential to occur in the linkage planning area. The threatened arroyo toad (*Anaxyrus californicus*) occurs in the lower reaches of the Whitewater River. A number of sensitive birds of prey have been recorded in the linkage, including Cooper's hawk (*Accipiter cooperii*), golden eagle, long-eared owl (*Asio otus*), and burrowing owl. The planning area also provides habitat for imperiled plant species, such as slender-horned spineflower (*Dodecahema leptoceras*) and Coachella Valley milk-vetch.

In addition, because this regionally important linkage is situated where the Transverse and Peninsular Ranges converge, and in an ecological transition zone between the South Coast and Sonoran ecoregions, it is considered a contact zone for many subspecies. This interchange of genetic material is most prevalent among mammals and reptiles, such as the little pocket mouse (*Perognathus longimembris brevinasus and P.l. bangsi*) (Williams 1986), and western patch-nosed snake (*Salvadora hexalepis hexalepis and S.h. virgultea*) (Stewart and Hogan 1980). The San Gorgonio Pass is situated at a unique evolutionary crossroads where genetic interactions occur at multiple temporal and spatial scales.

Finally, in addition to providing habitat for rare and endangered species and a contact zone where species intergrade along a genetic continuum, the linkage provides live-in and move-through habitat for numerous other native species that require extensive wildlands to thrive, such as American badger, mule deer, and mountain lion.

5.2 Land Use, Policy, and Protection Needs, Opportunities, and Threats

The San Bernardino-San Jacinto Linkage is complicated jurisdictionally, with two counties, five cities, and one sovereign nation. Morongo Tribal lands cover 10,986 acres of the linkage, mostly along the San Gorgonio River and Upper Stubbe Canyon, which are delineated as stewardship zones in the linkage. The linkage also includes significant unincorporated lands, primarily in Riverside County, with a small section of the western branch in San Bernardino County. Five cities overlap portions of this linkage. Three in the western branch, including the cities of Redlands, Calimesa, and Beaumont. The City of Banning overlaps portions of the San Gorgonio River branch, and the City of Palm Springs overlaps the easternmost branch of the linkage south of Interstate 10 at Whitewater River.

There are also several conservation planning efforts and designations in the linkage (Figure 7). The Coachella Valley Multiple Species Conservation Plan covers roughly 7,053 acres of the linkage, capturing the San Gorgonio River, Stubbe Canyon and Whitewater River strands of the linkage. Stubbe Canyon and Whitewater River are also included in the Sand to Snow National Monument. Whitewater River is also designated as an Area of Critical Environmental Concern, and the Pacific Crest Trail Special Resource Management Area follows Stubbe Canyon. The Western Riverside County MSHCP covers about 16,638 acres in the linkage, most of which is identified as core habitat in the Badlands, with Constrained Linkage

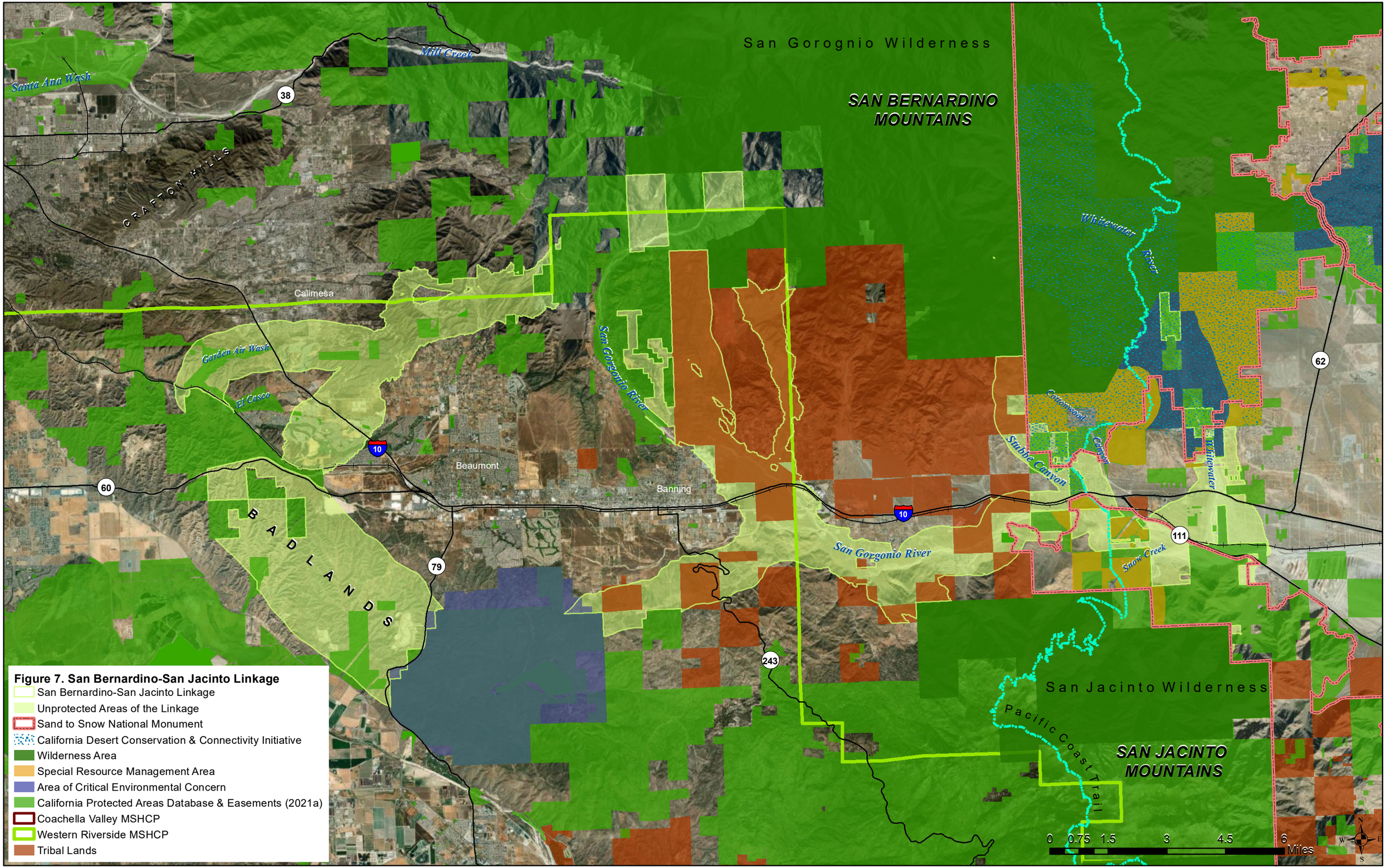


Figure 7. San Bernardino-San Jacinto Linkage

- San Bernardino-San Jacinto Linkage
- Unprotected Areas of the Linkage
- Sand to Snow National Monument
- California Desert Conservation & Connectivity Initiative
- Wilderness Area
- Special Resource Management Area
- Area of Critical Environmental Concern
- California Protected Areas Database & Easements (2021a)
- Coachella Valley MSHCP
- Western Riverside MSHCP
- Tribal Lands

#23 covering part of the western branch of the linkage, and a Special Linkage along a section of the San Gorgonio River. Most branches of the Linkage Design include some ownerships that protect natural habitats from conversion to urban uses, including lands administered by BLM, California State Parks, Coachella Valley Mountains Conservancy, Western Riverside County Regional Conservation Authority, The Wildlands Conservancy, Friends of the Desert Mountains, Rivers and Lands Conservancy, and State Lands Commission. At the time the SCML report for the San Bernardino-San Jacinto was released in 2005 (Penrod et al.), roughly 29% of the linkage (21,223/74,414 acres) was conserved. Since that time, roughly 5,200 acres have been conserved in the linkage. Workshop participants identified several land use, policy, and protection needs, opportunities and threats in the San Bernardino-San Jacinto Linkage.

By far, the most threatened part of the linkage is the westernmost branch that links the San Bernardino Mountains to the Badlands and San Jacinto Mountains. Most of the land in this branch of the linkage falls within the jurisdictions of either the City of Calimesa or unincorporated Riverside County, though small sections in the north are in San Bernardino County and the City of Redlands, and a section in the southeast fork is in Beaumont, which has been severed by development. Immediately following the Linkage Implementation Workshop series, TNC and SC Wildlands reached out to the City of Calimesa to schedule a Zoom meeting with the Planning Manager to alert them to the critical importance of the westernmost branch of the San Bernardino-San Jacinto Linkage, and the last opportunity to conserve a coastal sage connection between the Transverse and Peninsular Ranges, which is vital to countless species, including mountain lion, which is a candidate for listing under the California Endangered Species Act (CESA). The Planning Manager alerted the various developers of the importance of this wildlife linkage and called a meeting between the developers and TNC, SC Wildlands, and Two Canyons Conservancy, which was held at the City of Calimesa on July 6, 2021. Although this branch of the linkage will be restricted to mere choke-points in some areas, maintaining connectivity here will benefit multiple species. Discussions with the city and developers are ongoing at the time of this report.

THREAT: San Bernardino-San Jacinto Linkage Not Adopted by Western Riverside County MSHCP The western branch of the linkage dominated by coast sage scrub and middle San Gorgonio Wash branches of the San Bernardino to San Jacinto Mountains Linkage, except for Constrained Linkage #23, were not adopted by this MSHCP which presents a major challenge for achieving significant conservation outcomes at these locations. Because these locations were not specifically described for conservation through the "Criteria Cell" process, opportunities to extract land protection, restoration or other conservation measures from proposed land uses are minimal. Any conservation outcomes will require the work of local jurisdictions and environmental groups to be proactive in identifying threats and opportunities for securing connectivity. ***Recommended Actions:*** Prepare a Conceptual Area Protection Plan (CAPP) to address conservation needs for the San Bernardino-San Jacinto Linkage, 2) create a listserv that alerts local stakeholders to proposed threats to connectivity in the linkage and opportunities to engage in the environmental review process for identified projects and 3) engage with local jurisdictions (cities, county) and wildlife agencies to elevate understanding of the importance of the linkage.

THREAT/OPPORTUNITY: Constrained Linkage #23 from the MSHCP (AE-1 on Figure 8, where AE stands for Acquisition/Easement) is conserved from the Badlands all the way to the west side of Interstate 10 along Garden Air Wash. The City of Calimesa says that the criteria cells in Constrained Linkage #23 were planned for development back in the late 1990s, so it's unclear why the MSHCP identified those for conservation. The Garden Air Country Club golf course, which the current owner closed with no plans to

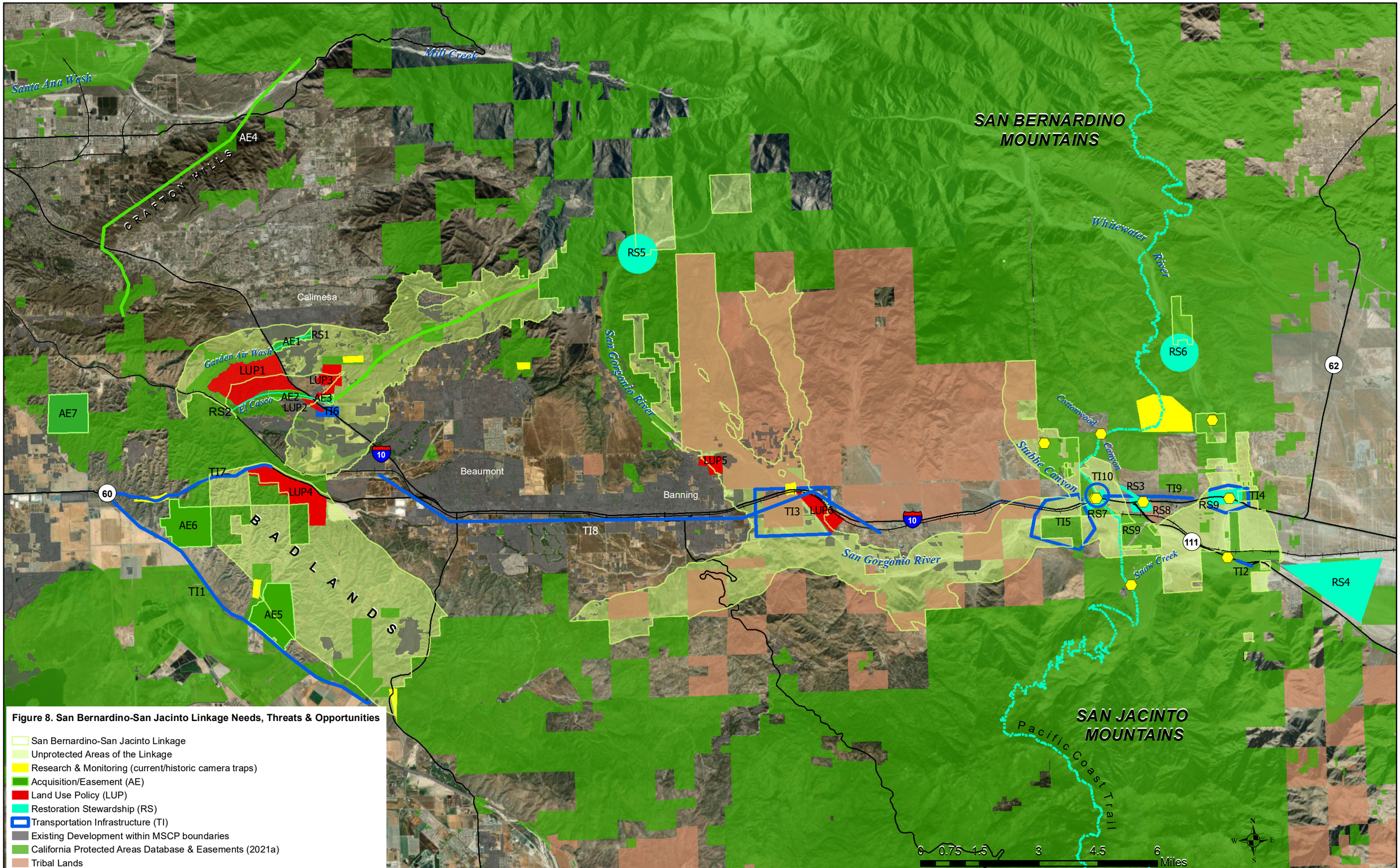


Figure 8. San Bernardino-San Jacinto Linkage Needs, Threats & Opportunities

- San Bernardino-San Jacinto Linkage
- Unprotected Areas of the Linkage
- Research & Monitoring (current/historic camera traps)
- Acquisition/Easement (AE)
- Land Use Policy (LUP)
- Restoration Stewardship (RS)
- Transportation Infrastructure (TI)
- Existing Development within MSCP boundaries
- California Protected Areas Database & Easements (2021a)
- Tribal Lands

San Bernardino to San Jacinto Mountains Linkage
Summary of Needs, Threats, and Opportunities

KEY	Type	Description/Summary	Recommended Action
AE1, RS-1	OPP	Constrained Linkage 23: Land protection/restoration of Garden Air Golf Course, and creation of I-10 Crossing Structure required to secure connectivity east of I-10 to the SB Mtns	1.Acquire GC and frontage property and restore habitat, 2. Once GC acquired, restore connectivity across I-10 with new crossing.
LUP-1 LUP-2 AE-2 RS-2	THREAT/OPP	El Casco Creek west of I-10 threatened by proposed Summerwind/Oak Valley developments, which will be made non-functional if development moves ahead as proposed.	Work with City of Calimesa and developers to increase or acquire additional set-backs for El Casco Creek; monitor proposed developments to ensure minimum viable linkage; restore El Casco Creek Riparian habitat
AE-3 LUP-3	OPP	El Casco Creek east of I-10 needs restoration of concrete ditch and land protection eastward to SB Mtns to secure a coastal sage scrub connection in the western branch of the linkage. Secure connectivity as part of land use planning.	Track proposed "Heights" development projects and work to secure 500-foot+ wide linkage from I-10 to SB Mtns thru development agreements and acquisition of other key properties
TI-6	OPP	City/Caltrans Cherry Valley Interchange Project provides potential opportunity to restore El Casco Creek and upgrade I-10 Crossing	Engage in environmental review process (Dec '21) to call for upgrades to El Casco Creek/I-10 culvert
TI-7 LUP-4	THREAT	Restored wildlife crossings for SR 60 threatened by development. Beaumont Point SP (BPSP) threatens 20x20 Wildlife Crossing and connectivity. Land protection needs to be secured on either side of new crossing structures	Engage in environmental review process for BPSP, urge agencies to require/seek protection of habitat lands on both sides of crossings
LUP-5 LUP-6	THREAT/ OPP	2 Robertsons Ready Mix (RRM) mine operations degrade habitat and wildlife connectivity in a key ecotonal area and need restoration. Timing and nature of future reclamation plans unknown.	Reach out to RRM to explore restoration and management opportunities; track mine expansion projects and provide public comments.
LUP-7	THREAT	Portion of western branch (CSS Linkage) lost since 2005 due to development	
TI-3	THREAT	Proposed I-10 ByPass Project threatens connectivity and sand flows in the San Gorgonio Pass area.	Convene a subcommittee to review the project and advise on appropriate connectivity designs/ mitigations
TI-8	THREAT	Railway Expansion Project proposes new commuter stations between Banning and Cabazon	Contact RCTC to get on distribution list for environmental documents and provide comments during review process.
TI-1	NEED	Gilman Springs road is a source of roadkill for wildlife, especially badgers, moving between the Badlands and SJWA	Design and implement Wildlife Crossing Infrastructure Plan for Gilman Springs Road
AE-4	NEED	Optional (constrained) linkage between Badlands and San Bernardino Mountains	Conduct field investigations and parcel analysis to assess opportunities for securing this linkage.
AE-5 AE-6	OPP	Two proposed acquisitions in the Badlands by RCA totaling 1600 acres	Rally public support for acquisition of these key core properties in the Badlands.
AE-7	OPP	Proposed acquisition of 560 acres by Two Canyons Conservancy in Reche Canyon	Rally public support for acquisition of this property
TI-2	OPP	Hwy 111 blocks sand transport processes along Whitewater River that feed dune system habitat	Work with CVAG/Caltrans to plan/implement bridge for Hwy 111 at Whitewater River to allow sand transport to move interrupted
TI-3	THREAT	Proposed I-10 ByPass Project could impact connectivity and sand transport	Form subcommittee to advise on JPR and wildlife connectivity mitigations
TI-4 TI-5	THREAT/ OPP	Wind farm infrastructure limits connectivity	Any proposed "RePowers" should require removal of fencing and conversion of lattice turbines to solid turbines.
TI-9	THREAT	Proposed Detention Facility and Widening of Tamarack Road could interrupt connectivity	Project has been withdrawn, but continue to monitor status in case it is proposed once again. Signage and reduced speed limit needed to reduce roadkill on Tamarack Road.
TI-10	THREAT/OPP	Stubbe Wash barricades to limit ORV trespass have been vandalized	Install chain and lock to replace bollards that were removed

RS-3	NEED	Cottonwood Creek has been channelized at I-10, limiting its connectivity value	Work with CVCC, Morongo Tribe, water agencies and RCFCWCD to restore Cottonwood Creek.
RS-4	NEED/ THREAT	Whitewater Percolation Basins interrupt sand transport processes.	Meet with water agencies to discuss options to relocate percolation ponds to a location that will not interrupt natural processes
RS-5 RS-6	THREAT	Dewatering of drainages in SB Mountains degrades downstream riparian habitat and connectivity	Submit project nomination for to SGIRWMG to work with multiple agencies to develop groundwater management plan to recover riparian habitat
RS-7 RS-8 RS-9	THREAT	Wildlife undercrossings for Stubbe, Cottonwood, and Whitewater Rivers require actions to deter illegal trespass and human activity	Install educational signage and chains/locks to deter trespass. Work with jurisdictions and law enforcement to fund and implement regular patrols to deter illegal human activity.
RS-10	THREAT	Pacific Coast Trail recreational activity at Stubbe Canyon U/C may be deterring wildlife use.	Assess potential realignment of PCT to reduce impacts on connectivity.

AE = Acquisition Conservation Easement
LUP = Land Use Policy
RS = Restoration Stewardship
TI = Transportation Infrastructure

reopen, lies east of the highway and the Inland Riverside County Resource Conservation District is working with the golf course owner on some improvement plans that may restore some portions of the site. In addition, the lands between the Garden Air Golf Course and Calimesa Road are zoned as Commercial, and there is currently no wildlife crossing structure for where Garden Air Wash intersects I-10. Moreover, planned and approved development in the City of Calimesa has blocked portions of this linkage east of the golf course. There are two potential chokepoints from the golf course through this planned development to open space to the east (image below), which lead to conserved open space to the east. The first is where there appears to be a culvert from the golf course to the canyon set aside that is about 180 feet wide between existing homes and roughly 300 feet between the canyon and the golf course. The second is south of the development, along a canyon, which ranges in width form 150-350 feet for roughly half a mile. All open space lands within the development are currently owned by the City of Calimesa. Lawsuits brought against the developer by the Center for Biological Diversity resulted in the current open space configuration and incorporation of wildlife crossing structures that link these lands to protected lands east of Singleton Road.

Garden Air Corridor along golf course showing two potential pathways through existing development.

THREAT/OPPORTUNITY: El Casco Creek (aka Cherry Valley Wildlife Corridor; AE-2 on Figure 8) is the stream to the south of Garden Air Wash, where there are still opportunities but there are entitled developments, and proposed developments are making their way through the environmental review process. Currently, there is a narrow band of planned conservation along El Casco Creek to the west side of Interstate 10 just north of the Cherry Valley Interchange, where several developments are either built or entitled. This wildlife corridor was identified and pushed by a city councilmember in the early 2000s. There is an existing structure for El Casco Creek on I-10, a double box culvert but far from ideal due to low visibility to the other side, concrete flooring and creek is channelized east of freeway, and there are plans for the Cherry Valley Interchange (see section 5.3). An onsite biologist with Helix Environmental indicated that they had recently recorded a mountain lion at the El Casco Creek undercrossing. East of the freeway is currently undeveloped but is zoned low density residential in the Calimesa General Plan and there are preliminary plans for some

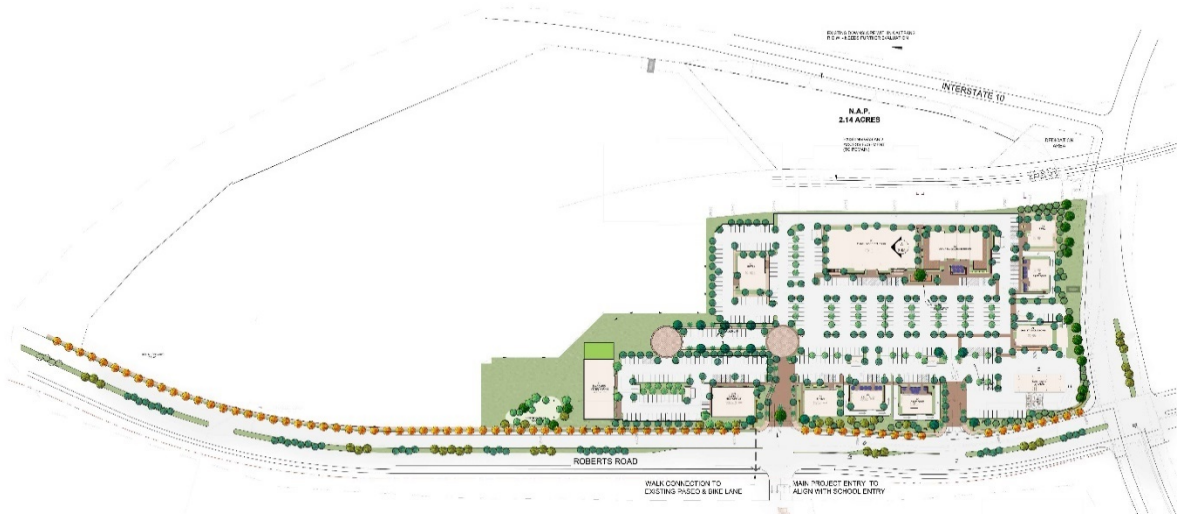
development, one called the Heights at Calimesa Specific Plan, which is described below. All of these potential projects are in the initial stages and have not yet gone through any formal planning processes or environmental review, so opportunities remain to conserve a wider more functional connection east of the freeway. ***Recommended Action:*** Monitor proposed developments within the City of Calimesa and engage in environmental review processes to ensure minimum viable corridor conserved.

THREAT/OPPORTUNITY: Oak Valley Town Center (LUP-1 on Figure 8, where LUP stands for Land Use/Policy) is an entitled commercial development with site plans (image below) for business parks and retail development along the north side of El Casco Creek. Grading has begun for four warehouses identified as business parks on the site plan. The rest of the development plans are not solidified at this time, except for a planned stormwater detention basin. It is currently planned for commercial development. There might be an opportunity to work with the developer to widen the setback next to the El Casco Creek, which is partially within the 100-year flood plain. There are plans to incorporate a box culvert for where El Casco Creek crosses Roberts Road but how large the culvert will be is unknown at this time. There is a small triangular area that has been identified to be set aside as open space, adding 2 acres next to the creek. ***Recommended Actions:*** Continue to work with developer to evaluate opportunities to increase setbacks along El Casco Creek, incorporate a wildlife crossing for I-10, and find out the dimensions for the Roberts Road box culvert planned for El Casco Creek.

THREAT/OPPORTUNITY: Summerwind Commons (LUP-2 on Figure 8) is a 39-acre development, 11 acres are entitled with site plans (image below) for business uses off of Cherry Valley Boulevard and Roberts Road. Other site plans for Summerwind Commons are for small lot/small home development south of El Casco Creek, just east of the new alignment of Roberts Road. Currently, the plan includes a “2 acre” creek setback that is roughly 16 feet wide and would be composed of a 2:1 slope with armoring just outside the creek to keep all grading outside of ACOE jurisdiction. The development planned at the top of slope would

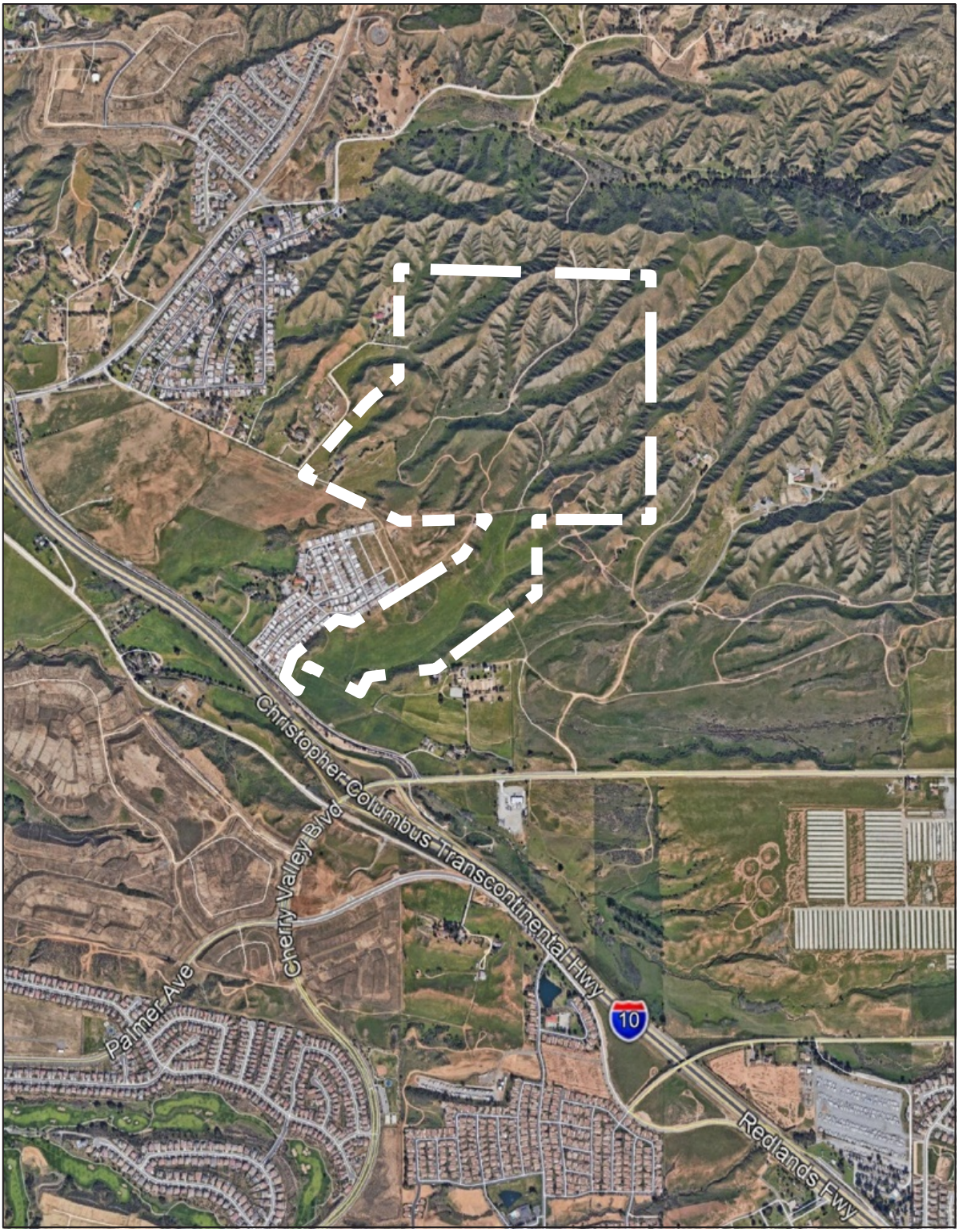
likely have a sound wall for much of its length along the creek. A settling/detention basin where the creek intersects the new alignment of Roberts Road is also planned. ***Recommended Actions:*** This 39-acre property has recently been put up for sale, providing an opportunity to get more of a setback along El Casco Creek by working with the new owner and the city of Calimesa.

Possible opportunities to install a wildlife overcrossing from Summerwind Commons site to the other side of I-10 were discussed, but there does not appear to be adequate space to create such a crossing, unless it was installed at an angle. Fixing the existing undercrossing at El Casco Creek, or creating a new dedicated wildlife underpass for the creek, may be a better option than an overcrossing at this location and could be used as mitigation for the proposed Cherry Valley Interchange project discussed below in section 5.3.



Summerwind Commons Site Plan for entitled area

THREAT/OPPORTUNITY: The Heights at Calimesa Specific Plan (LUP-3 on Figure 8) is in the very early stages of planning for residential development and have submitted the first draft of the site plan to the City of Calimesa but has not yet begun the environmental review process. The site is 244 acres, with plans for 2,248 multi-family units, 21 acres of mixed-use development, 21 acres of parkland, 20 acres of open space, 124 acres of natural open space (image below). This property is contiguous with and would provide a direct connection to Bogart Park open space which was conserved under the Western Riverside County MSHCP, making it a critical piece of the puzzle for the El Casco Creek connection. Potential to discuss project design with applicant to help conserve wildlife movement on the south side of the project area, that also includes a portion of the Price Ranch discussed below. ***Recommended Actions:*** Work with the project applicant to incorporate wildlife movement corridor into project design, ideally before the project goes through permitting process. Engage in the environmental review process to advocate for set asides to ensure functional wildlife movement corridor through the property to conserved open space.



The Heights at Calimesa Specific Plan boundary

OPPORTUNITY: Price Ranch (AE-3 on Figure 8) This 27.6-acre property is currently being pitched as a Prime Commercial Development Site and on the market for $7 million but the owner is open to acquisition

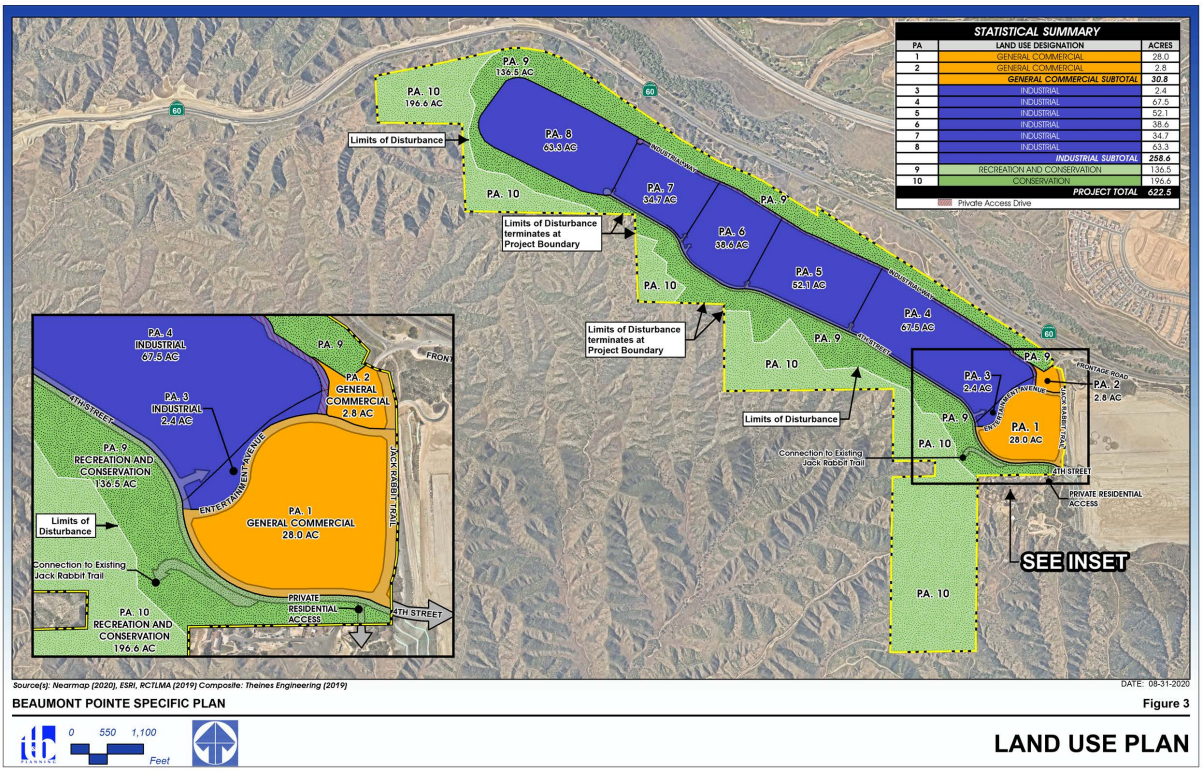
for conservation purposes. This site is immediately south and contiguous with The Heights at Calimesa Specific Plan discussed above. It is also continuous with the frontage property along Calimesa Road that is adjacent to the culverts under Interstate 10 for El Casco Creek. **Recommended Action:** Work with the owner and any potential buyers to set aside portions of the property that are key to maintaining and restoring habitat connectivity and wildlife movement.

Price Ranch property boundary

OPPORUNITY: Potential addition to western branch of San Bernardino-San Jacinto Linkage (AE-4 on Figure 8) that would link San Timoteo and other conserved Western Riverside County MSHCP lands northward from Live Oak Canyon Open Space following habitat along the Oakmont Trail, which leads to the Hilltop Estates Bridal Trail, and the Gold Hill Grade all the way to the southside of I-10. For roughly a half mile, the pathway narrows to a choke-point along Hilltop Estates Bridal Trail and Gold Hill Grade, varying in width from approximately 350-500 feet. North of the freeway, this potential linkage through the Crafton Hills is fairly wide open and expands to widths between about half mile to nearly a mile across, all the way to Mill Creek which flows out of San Bernardino National Forest. Much of the land in the Crafton Hills area is owned by one major landowner, who purchased it to keep it as open space. The Redlands Land Use Plan currently does not support conservation. A crossing structure would need to be added to allow safe passage for wildlife under/over I-10. ***Recommended Actions:*** Investigate this potential route further in the field, evaluate parcel data and ownership, and determine long term status of Hilltop Estates Bridal Trail and Gold Hill Grade.

THREAT: Proposed Beaumont Point Specific Plan (LUP-4 on Figure 8) includes 622.5 acres within Western Riverside County MSHCP core habitat criteria cells in the Badlands that abuts State Route 60 (SR-60) to the north, Jack Rabbit Trail and the Hidden Canyon Industrial Park to the east, and undeveloped land to the south and west. Caltrans and the Riverside County Transportation Commission are in the process of widening SR-60, and have installed several wildlife crossings and directional fencing to support species

conservation under this MSHCP at great cost, including two 20x20 wildlife crossings, as well as, a number of medium and small sized crossings. A few of the crossings, including one of the large 20x20 wildlife crossings, are directly adjacent to this proposed development. The project is in unincorporated Riverside County and includes commercial and industrial development, including a 125-room hotel, and four main roadways for onsite circulation, as shown in the image below, and would require a General Plan Amendment, Pre-zoning, and annexation into the City of Beaumont. As part of the proposed Project, 196.6 acres are identified for conservation, as required by the MSHCP. The proposed development is currently going through the MSHCP process and a Joint Project Review by the agencies. CDFW representative said that the wildlife crossing improvements currently being implemented by Caltrans/RCTC were not described in the Western Riverside County MSHCP, and that CDFW are suggesting redesigns to maintain wildlife movement and protection of the wildlife crossing.



Recommended Actions: The Notice of Preparation (NOP) for the Beaumont Point Specific Plan Draft Environmental Impact Report (DEIR) comment period was from September 7 to October 6, 2020. At this time, there is no anticipated release date for the DEIR. The CEQA Lead for the proposed project is Christina Taylor, Community Development Director, City of Beaumont and she has provided the applicants with contact information for SC Wildlands and TNC. The State of California has made significant capital outlay expenditures on SR60 improvements, including wildlife crossings and directional fencing to support species conservation under the WRMSHCP, where considerable conservation investments have also been made by the state. This proposed project is right by large wildlife crossings and would interfere with wildlife movement. More information at https://www.beaumontca.gov/DocumentCenter/View/36613/Beaumont-Pointe-NOP_Final. Contact Ms. Taylor at (951) 572-3212 or via email at ctaylor@beaumontca.gov to get on the distribution list for the DEIR and submit your comments into the record.

THREATS: Mining Operations in San Gorgonio River north and south of Interstate 10 (LUP-5 and LUP-6 on Figure 8) Both gravel mines are owned by Robertson's Ready Mix (rrmca.com) and were in operation at the time field work was conducted for the linkage back in 2004. Robertson's has facilities throughout southern California. The operation north of I-10 is Banning Rock Plant #66, while the operations south of I-10 include Cabazon Rock Plants #11 and #77. Neither totally preclude wildlife passage in their existing footprints but restoring them would improve the San Gorgonio River corridor for wildlife movement and sand transport. Several questions were raised at the workshop, including 1) What is the lifespan of these mining operations? 2) Can these mines expand or are they constrained in some way? 3) Are monitoring plans in place for noise, lighting, water quality, etc.? 4) Are reclamation plans in place?

Robertson's Ready Mix Banning Rock Plant #66 (LUP-5 on Figure 8), has been in continuous operation since the early 1900's, and the Banning City Council just approved an entitlement package in October 2020 that includes a general plan amendment, zone change, conditional use permit, reclamation plan amendment, street vacations, and a development agreement governing the expansion and rezoning of 208 acres. The agreement includes the construction and 24-hour operation of an onsite ready mix concrete batch plant and associated maintenance facility. Excavation and crushing are to be conducted primarily Monday through Friday, 5:00 AM to 10:00 PM and from 6:00 AM to 5:00 PM on Saturdays. The anticipated timeframe for final reclamation to be completed for the quarry isn't until 2040. After reclamation, Robertson's will dedicate about 17-20 acres to the city for public use. All that was required under CEQA was a Mitigated Negative Declaration. The project was also determined to be consistent with the MSHCP because it's located outside of criteria cells and mitigation was provided through payment of a fee to the Western Riverside County MSHCP. ***Recommended Action:*** Reach out to Robertson's Ready Mix to see if they're willing to work with the conservation community to install sound walls or berms between their operations and the river to reduce sound from excavation and crushing and reduce the penetration of nighttime lighting into the river to encourage wildlife movement. Proposition 68 funding may be a source for implementing this recommendation

Robertson's Ready Mix Cabazon Rock Plants #11 and/or #77 (LUP-6 on Figure 8), is the mining operation along the San Gorgonio River south of I-10, which falls within the Coachella Valley Multiple Species Habitat Conservation Plan. At the workshop, participants from CDFW mentioned that the operation south of I-10 was planning on expanding to the west and potentially south of the river and weren't sure if any public review process was required. There was a Joint Project Review for the Coachella Valley MSHCP going on at the time of the workshop and it was mentioned that modeling of impacts to sand transport was being conducted as part of the project and that information on wildlife movement would be helpful. ***Recommended Action:*** If this proposed project expansion goes out for public review, comment on mitigation for wildlife movement and sand transport. ***Other Recommendations Related to Mining:*** Investigate the potential for installation of sound walls or berms between existing mining operations and the San Gorgonio River to reduce the impacts to wildlife movement from noise generated from excavation and crushing and reduce or eliminate illumination of night time lighting in the river due to near round the clock mining operations. There are also several other mining claims in the San Gorgonio River further east and along Whitewater River. The claims that fall within the CVMSHCP should be investigated for administrative withdrawals due to the importance of these areas as habitat for species and sand transport.

OPPORTUNITIES: Land Acquisitions in the Badlands: The Western Riverside County Regional Conservation Authority (RCA) is seeking federal funding to preserve land in two key areas in the San Bernardino-San Jacinto Linkage within the Badlands that would contribute assembling the interconnected system called for in the Western Riverside County MSHCP. As Tricia Campbell explained in her presentation, the plan requires that local, state, and federal governments all contribute to land acquisition. At this time, key parcels have been identified for acquisition using a combination of federal funds and local mitigation fees. These two targeted acquisitions, together encompass about 1600 acres, and both support a wealth of endangered species and would provide key wildlife movement corridors between other preserved lands. These acquisitions are described below.

Eden Hot Springs Property, Badlands (AE-5 on Figure 8): The Eden Hot Springs properties include 821 acres on Mount Eden in the Badlands area of unincorporated Riverside County, east of Mystic Lake and north of Gilman Springs Road, and are continuous with the San Jacinto Wildlife Area, which connects to the Wolfskill-Driscoll Reserve and BLM land in the Badlands, promoting connectivity between the Badlands and the San Jacinto Mountains in the San Bernardino National Forest. This linkage would provide habitat protection and movement for species covered by the Western Riverside County MSHCP including Bell's sage sparrow (*Amphispiza belli* ssp. *belli*), loggerhead shrike (*Lanius ludovicianus*), cactus wren (*Campylorhynchus brunneicapillus*), Stephens' kangaroo rat, Los Angeles Pocket Mouse, southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), and mountain lion, as well as, countless other native species associated with coastal sage scrub.

Kelvar and Wolfskill Properties, Badlands (AE-6 on Figure 8): The Kelvar and Wolfskill properties include 745 acres between Route 60 and the intersection of Gilman Springs Road and Alessandro Boulevard in the Badlands of unincorporated Riverside County. These lands are continuous with large BLM parcels to the north and east and connect to the Norton Younglove Reserve north of SR-60, making use of one of Caltrans' new large 20x20 wildlife crossings, promoting connectivity from conserved land in the Badlands to the San Jacinto Mountains in San Bernardino National Forest. This acquisition would also provide habitat protection and movement for the same target species identified for the Eden Hot Springs property above, which have key populations in the Badlands.

Recommended Action: Congress must first appropriate the funds for these MSHCP acquisitions. Please use the form on this page to go on record in support of the RCA's funding request to Congress.

Reche Canyon Property, Badlands (AE-7 on Figure 8): This potential acquisition in the Badlands is located east of Redlands Boulevard and would link extensive already conserved conservation lands in the Western Riverside County MSHCP. The property is in the Reche Canyon area and encompasses the entirety of the following MSHCP criteria cells: #563, 564, 653, 654, which provide habitat protection and movement for several species covered by the plan. Two Canyons Conservancy has an option to purchase these 560 acres from a willing seller, which will expire in 2022.

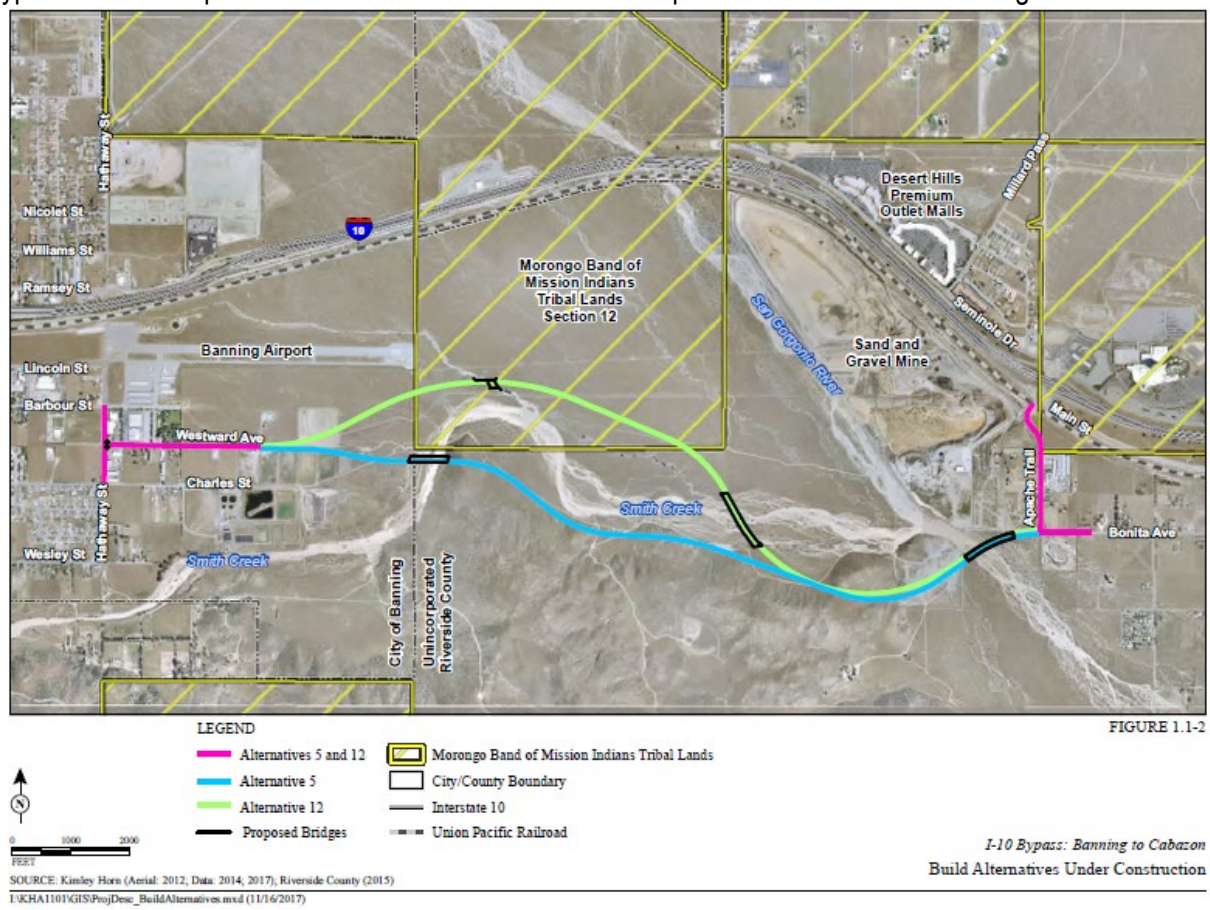
5.3 Transportation and Infrastructure Needs, Opportunities, and Threats

THREAT: Gilman Springs Road Impacts Connectivity between Badlands and San Jacinto WA (TI-1 on Figure 8, where TI stands for Transportation/Infrastructure): Jackrabbit Trail camera data from the WRCMSHCP raises issues with connectivity across Gilman Springs Road, especially for badgers moving

between the Badlands and the San Jacinto Wildlife Area. Road-killed badgers are frequently documented on Gilman Springs Road, necessitating construction of wildlife fencing and crossing structures to facilitate wildlife movement. ***Recommended Action*:** Develop wildlife crossing infrastructure improvement plan for Gilman Springs Road, including baseline wildlife movement monitoring. Seek funding for fencing and upgrades to crossing structures. Additionally, a second wildlife crossing for SR-60 currently only has conserved lands on one side/north of the highway, making that culvert also vulnerable.

OPPORTUNITY: Sand Transport Corridor (TI-2 on Figure 8) SR-111 blocks an important sand transport corridor that feeds dune system habitats crucial to the persistence of imperiled species. Sand often accumulates on the roadway, posing a potential vehicle hazard. Transportation agencies often are required to remove sand from the roadway, creating a long-term maintenance requirement. ***Recommended Action:*** Work with Riverside County Transportation Department (TCTD)/CVAG/Caltrans and local jurisdictions to push for the installation of a bridge where Hwy 111 intersects the Whitewater River to allow sand transport under the bridge and reduce long-term maintenance.

THREAT: Proposed I-10 Bypass Project between Banning and Cabazon (TI-3 on Figure 8) The Riverside County Transportation Department (County) proposes to construct a new road between the City of Banning and the unincorporated community of Cabazon which would serve to connect the two communities should there be a closure of the I-10. The project is located in close proximity to Morongo Indian Tribal Land, and would cross both Smith Creek and the San Gorgonio River (image below). The proposed Bypass would be up to four lanes constructed south of and parallel to I-10 in the San Gorgonio River area.



The project would be funded with federal, state and local funds and therefore will require both CEQA and NEPA. Under NEPA, Caltrans is the lead agency for compliance, whereas the County will be the lead agency for CEQA. A Draft Environmental Impact Report/Environmental Assessment EIR/EIS was released in 2017, and a recirculated EIR/EIS was released in August 2019, which is available at I-10 Bypass — Riverside County Projects (rcprojects.org).

In 2013, Riverside County released an NOP for I-10 Bypass Project to connect Banning to Cabazon along south side of I-10. Comments provided by Sierra Club related to impacts to connectivity and fluvial sand transport between the San Gorgonio River and CVMSHCP. San Gorgonio wash provides significant sand source for Snow Creek area and for Whitewater River floodplain reserve area.

2019 DEIR comments on the bypass project came from Center for Biological Diversity and Sierra Club, with comments centered around cumulative impacts from the bigger project that looks at transportation connectivity between Banning to Cabazon and Cabazon to Palm Springs.

Because the project straddles both the WRCMSHCP and CVMSHCP it will require a Joint Project Review by both plans. Participants asked a procedural question regarding the timing of the Joint Project Review by both NCCPs, and whether it would occur prior to CEQA. JPRs should take place, optimally, prior to CEQA so that it informs CEQA but currently it is proposed to occur after public comment period but before final EIR. The 2019 Recirculated EIR went into more detail on connectivity and sand transport, but the Center for Biological Diversity had an issue that standards for heights of crossings were not adequate.

Participants asked whether CVCC received a request for a JPR from the RCTD for this project. Katie Barrows/CVCC stated she worked on this project with the county, but not sure if for entire or part of project.

Tricia Campbell/RCA stated that this is one of the projects for which the RCA does not have a formal role; it is not required that a JPR occur before CEQA document, although it is always recommended. For portions of the project within western Riverside County, there will still be coordination going on between the RCTD and wildlife agencies, with a lot of discussion around sizing, fencing, lighting. In terms of piecemeal-ing of two separate projects, Tricia was not sure.

The CEQA document may be coming out soon, but the RCTD doesn't have construction funding for the project but is proceeding with environmental review. This is a Caltrans local assistance project but Caltrans staff are not directly involved, as the RCTD is the lead.

Recommended Action: A subcommittee should be formed to focus on the JPR update, appropriate design criteria for crossings, as well as lighting and fencing, and whether this project is part of larger bypass project. Determine what opportunity exists, if any, to engage connectivity experts in the design of the project.

THREAT/OPPORTUNITY: Wind Farm Infrastructure limits connectivity (TI-4 and TI-5 on Figure 8) There are several wind farms in the Whitewater River area under conservation status, and participants asked if it is possible to require them to remove any fencing that precludes wildlife movement?

CDFW representatives indicated that collared bighorn sheep regularly use wind farms near Whitewater River north of I-10, and there is no fencing at that facility. There are also collared deer south of the highway using wind farms so, likely those wind farms may not be fenced.

Additionally, SCML Report recommended that existing lattice turbines be converted to solid turbines to reduce wildlife movement conflict.

Several participants, including Katie Barrows, indicated that many wind farms are undergoing a retrofit (aka "re-powers") and are removing lattice type turbines and reducing the of turbines but increasing size of individual turbines. Retrofits in the CVMSHCP go through a Joint Project Review which usually recommends that fencing be removed. Lattice turbines are going out of fashion and are now being replaced with solid turbines. CVMSHCP permits only apply to ground disturbance and not non-ground disturbing activities. Issue area circled on map (TI5) is going through a retrofit to reduce number of turbines and get rid of lattice turbines. There are a couple of retrofits going on in the area. USFWS has developed wildlife friendly wind farm design guidelines WEG_final.pdf (fws.gov).

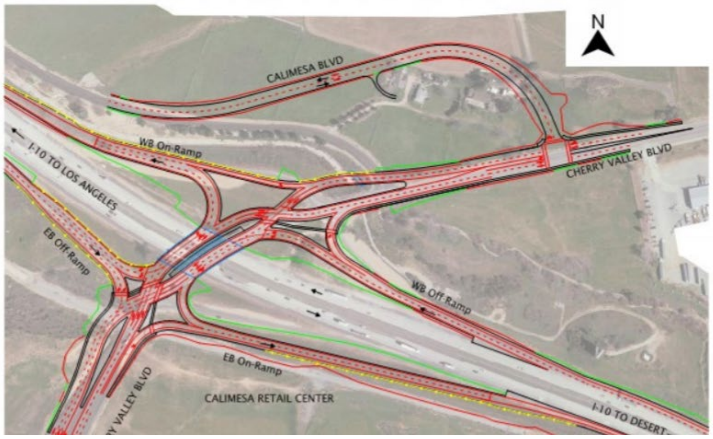
While CVMSHCP permits only for ground disturbance, studies are ongoing to assess impacts to birds and bats and to alter designs in response. The turbines to the west of Whitewater at the Mesa Wind Facility are not fenced and used by desert tortoise.

OPPORTUNITY: Cherry Valley Interchange Project in Western CSS Linkage (TI-6 on Figure 8) Caltrans and Riverside County Transportation Department, in conjunction with the city of Calimesa, are processing environmental documents to improve the Cherry Valley Interchange on Interstate 10. The planned Cherry Valley Interchange Project would result in a realignment of on and off-ramps as well as partial realignment of Calimesa Boulevard. Two alternatives are being considered, a "Diverging Diamond" or "Partial Cloverleaf," as depicted below. The project is currently processing an Environmental Assessment (EA), which should be completed by November 2022.

This project is in close vicinity to El Casco Creek, which is discussed above, under the land use and planning session, as a potential linkage in the western arm of the San Bernardino to San Jacinto Linkage. El Casco Creek has a history of flooding, most notably in 2010, when flooding in the vicinity of the I-10 culvert resulted in the shutting down of Interstate 10 at this location. The culvert was built in 1938 and is currently undersized for wildlife use (and flood flows, evidently). In order for El Casco Creek to function as a wildlife corridor in the linkage, many improvements to existing entitled or planned developments west and east of I-10 need to occur; mainly, existing planned setbacks from El Casco Creek need to be widened to accommodate wildlife use. In addition, the El Casco Creek undercrossing for both I-10 and Calimesa Boulevard needs to be both enlarged and straightened.

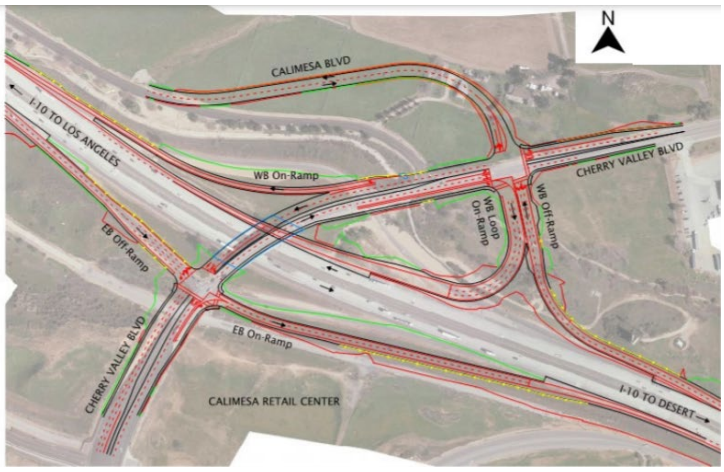
Alt. 3 – Diverging Diamond Interchange (DDI)

- Newer interchange type, works very well
- Accommodates pedestrians and bicycles
- Realigns Calimesa Blvd for required operational needs
- Limits driveway access along Cherry Valley



Alt. 4 – Partial Cloverleaf (Parclo)

- Traditional interchange type
- Accommodates pedestrians and bicycles
- Realigns Calimesa Blvd for required operational needs
- Limits driveway access along Cherry Valley
- Two WB On-Ramps



It is estimated that the EA will be out for public review in December 2021 which might provide some opportunity to comment on the need for incorporating enhancements for El Casco Creek undercrossing for Calimesa Boulevard and I-10 to both prevent flooding and enhance its function for wildlife connectivity. The target date for the completion of the EA is June 2022, with final design commencing soon after; however, the project appears to be ahead of schedule. Project will require waters permitting, including ACOE 404 and LSA 1603 permitting. The project lead at Caltrans is Shawn Oriaz (shawn.oriaz@dot.ca.gov). ***Recommended Actions:*** Contact Caltrans to get on distribution list for EA distribution. Review and comment on public documents to advocate for larger or new crossing structure for I-10 and Calimesa Blvd to facilitate wildlife movement.

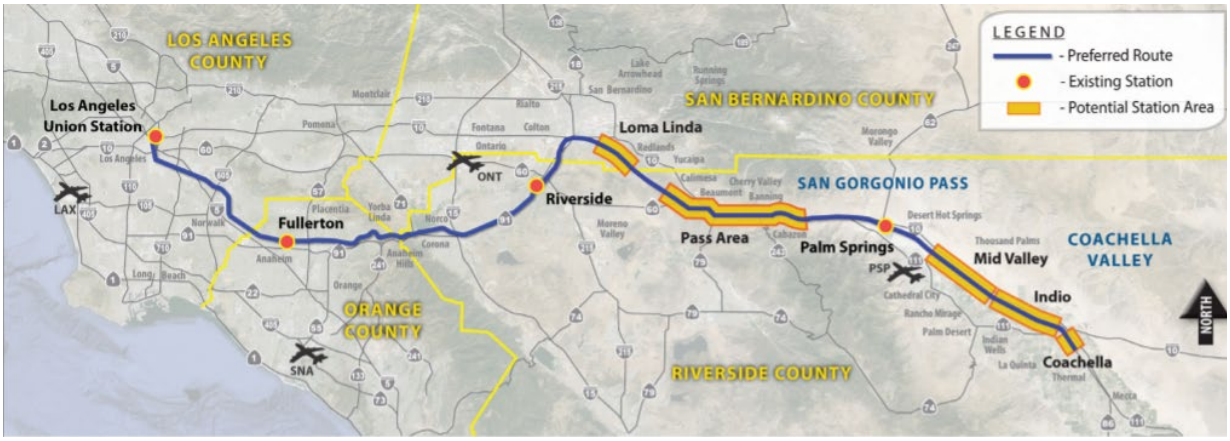
THREAT/OPPORTUNITY: Upgrade of I-60 Culverts and Proximity to Planned Development (TI-7 on Figure 8) The Riverside County Transportation Commission, in partnership with Caltrans, is widening a 4.5-mile section of Route 60 from Gilman Springs Road to 1.4 miles west of Jack Rabbit Trail in the Badlands area between Moreno Valley and Beaumont. The project lies within mountainous terrain with a curving alignment. Connectivity improvements are being implemented as part of this project including installation of wildlife fencing, 7 culvert upgrades, and installation of 2 20x20 foot concrete box wildlife crossing structures. These two large crossing structures replace 2 previous concrete box structures that were previously monitored by the Western Riverside County MSHCP. Those crossings were not determined to be optimally sized for wildlife, so have been enlarged to 20x20 and lengthened to 200 feet. Construction will be complete in 2022.

A concern was raised by workshop participants that conserved lands are not present on either side of these crossings, and that future development could impede their use by wildlife. The proposed Beaumont Point Specific Plan Warehouse Project (LUP4 on Figure 8), described above in the land use section, was identified as a specific project that would interfere with at least one of the wildlife crossings.

The fact that Caltrans prioritized these locations for crossing structure improvement/creation through their CEQA process may provide a de-facto prioritization of this location as a linkage. The Beaumont Point Specific Plan applicant was made aware of the SR-60 culvert that has been upgraded to facilitate wildlife movement and the applicant has modified the project to ensure lands they own do not cut off the culvert. Additionally, a second wildlife crossing for SR 60 currently only has conserved lands on one side/north of the highway,

making that culvert also vulnerable. ***Recommended Action:*** Need to prioritize land protection in vicinity of crossing structures.

THREAT: Coachella Valley-San Gorgonio Pass Rail Corridor Service Program (TI-8 on Figure 8) The proposed Coachella Valley-San Gorgonio Pass Rail Corridor (Coachella Valley Rail) extends approximately 144 miles between downtown Los Angeles and the Coachella Valley. The RCTC, in coordination with Caltrans and the Federal Railroad Administration (FRA), is working to bring passenger rail service as an alternate mode of travel across Southern California, connecting desert communities and attractions with Los Angeles, Orange County, and the Inland Empire, as depicted below.



Proposed Coachella Valley-San Gorgonio Pass Rail Corridor route

The project will evaluate the addition of up to 5 passenger rail stations between Loma Linda and Coachella. Additional tracks may be proposed at selected locations to enhance train travel speeds, minimize delays, and maintain safety. Locations for the addition of a passenger rail station include much of the linkage area in the San Gorgonio Pass area and could impact connectivity.

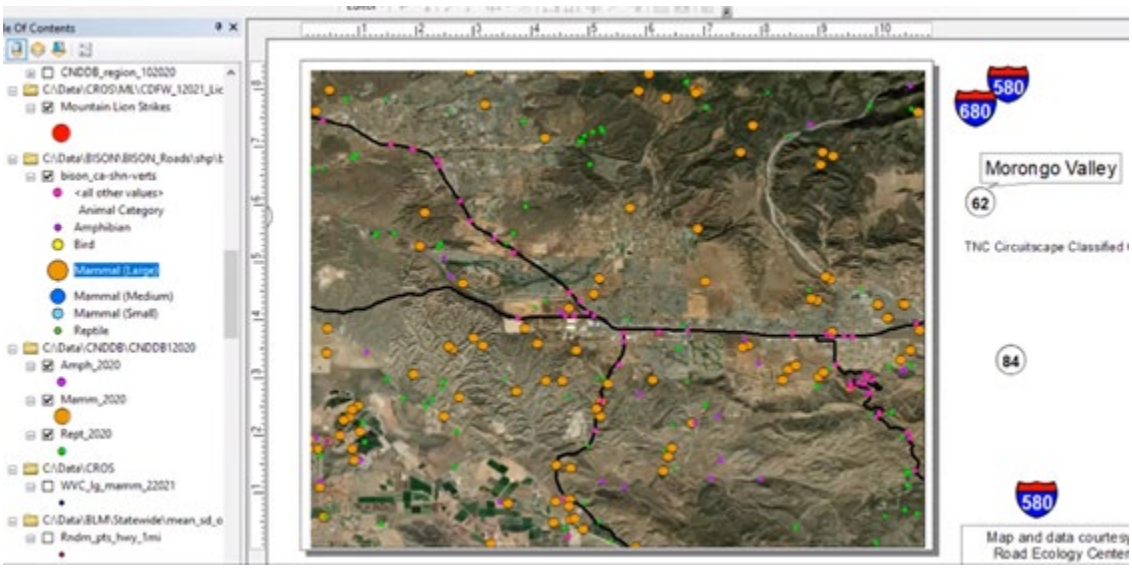
The project proposes operating two daily round-trips between Los Angeles Union Station and Indio or Coachella, with morning and evening departures from each end. Passenger service is expected to take about 3 hours and 15 minutes, which is comparable to trips made by cars on congested highways connecting these communities, such as I-5, Route 91, and I-10. The environmental analysis currently being conducted is a Tier 1/Program Environmental Impact Statement/Environmental Impact Report (EIS/EIR), in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The Tier 1/Program Draft EIS/EIR was released for public review in May 2021 for 45 days. Future Tier 2/Project NEPA/CEQA documents will be prepared when funding is identified. RCTC is actively seeking funding opportunities to advance the program. ***Recommended Action:*** Contact RCTC to get on the distribution list for the Tier 2/Project NEPA/CEQA documents and comment during the environmental review process (e.g., NOP, DEIS/EIR).

THREAT: San Gorgonio River connectivity: Proposed Detention Facility & Tamarack Rd widening (TI-9 on Figure 8) In 2010, the County of Riverside released an EIR for a proposed new detention facility on the north side of I-10 and also proposed the widening of Tamarack Road north of freeway where it crosses Stubbe Canyon Wash. At that time, Sierra Club provided comments on how the widening of Tamarack would

impact wildlife movement and questioned whether it was tied to the proposed larger I-10 bypass project. One of the major concerns for this project is, that if a major incident closes the freeway, the bypass and widened Tamarack Road would be an alternative route. According to participants, the Detention facility proposal was withdrawn by the applicant. Tamarack Road is an alternative connection between Banning and Palm Springs that is already used when traffic gets heavy. ***Recommended Action:*** Be on the lookout in case this proposal resurfaces. Because wildlife must cross Tamarack Road to get to the Stubbe Canyon bridges at I-10, signage to alert drivers to watch out for wildlife and reducing speed limits near crossings could be beneficial for wildlife.

THREAT/OPPORTUNITY: Stubbe Wash Barricades to Limit Unauthorized ORV trespass (TI-10 on Figure 8) Stubbe Wash has had a history of unauthorized vehicle use, which could impair their use for wildlife. To address this issue, Caltrans installed bollards in both east and west Stubbe Wash to limit vehicle use of underpasses. A few of the bollards were removed in East Stubbe Wash, likely by utility companies making road accessible again. ***Recommended Action:*** It may be necessary to install a chain and lock across the entry in West Stubbe to limit vehicle access.

OPPORTUNITY: Wildlife Data Collection to Inform Connectivity Needs for Multiple Species Fraser Shilling of UC Davis Road Ecology Center shared a view of his desktop GIS application with several wildlife data layers he has compiled from various sources for the state. He showed a screenshot of data points from the Calimesa area, as depicted below. The data were compiled from scientists, CNDDB, CDFW, iNaturalist, etc. Pink dots on the map indicate unclassified species occurrences. These data do not include camera trap data but do include some track/sign data.



Fraser Shillings desktop GIS showing several wildlife layers

Fraser stressed that these data show much more than just roadkill and provide an indication of what species may need connectivity planning for a given area. He suggested that, for near term studies, to only use recent data, i.e., from 2010. This is the same repository of data that was used for SR 62 connectivity study presented at this workshop.

5.4 Research and Monitoring Needs and Opportunities

NEED/THREAT Science/Research and Land Protection in San Gorgonio Pass: There has been very little sand movement down San Gorgonio wash, and attendees wondered if it is because of gravel mines. Group agreed that we need to understand if some desert species will need to track cooler wetter conditions to the west, and what are the limitations from restoring dune habitat to the west? Research and modelling are needed to look at this potential issue. The I-10 Bypass project could add to the problem of interrupted sand transport, but if the bypass were elevated, it could allow those processes to take place. Robert Fisher with USGS identified that, for golden eagles, we should focus more on San Gorgonio to Whitewater portion of the San Bernardino to San Jacinto linkage. Also, based on Cam Barrow's work, there might be a westward expansion of Coachella Valley species into the pass area, so we need to focus research and land protection in that area. ***Recommended Action**:* Convene experts meeting with transportation and land use agencies working in the San Gorgonio Pass area to discuss and resolve threats to species and natural processes in this location.

NEED Science/Research Santa Ana River Watershed HCP: Robert Fisher identified that the Santa Ana River Wash HCP links with San Timoteo Wash. Heather Dyer is currently the head of the HCP. This HCP could be an important tool to use, i.e., whether they might be able to apply conservation in the Banning to Badlands area, which is part of the Santa Ana River Watershed. Lytle and Cajon Washes are also critical, and still connected to Santa Ana wash, and might provide an alternate route between San Gabriel and San Bernardino Mountains for some smaller wildlife. Some BLM lands in that area are transitioning to being part of the HCP rather than to mining uses. ***Recommended Action:*** Follow up to see if there are conservation opportunities to use the HCP in areas of the linkage within the Santa Ana Watershed.

Figure 8 depicts several research and monitoring efforts described in workshop presentations that presenters added to the map. These include Jennifer Hoffman's camera traps in San Gorgonio Wash, Bogart Park, Singleton Road, Badlands, and Lamb Canyon described on page 20-21; Michelle Mariscal's camera traps in upper Stubbe Canyon, Stubbe Canyon Underpass East and West, upper Cottonwood Canyon, Cottonwood Underpass, Upper Whitewater River, Whitewater River Underpass, Highway 111 Underpass at juncture for San Gorgonio/Whitewater, and upper Snow Creek Canyon described on page 21-22; and the long-term monitoring site of Jeff Lovich's Mesa Wind Farm Desert tortoise population described on page 30.

5.5 Restoration and Stewardship Needs, Opportunities, and Threats

Virtually all of the identified restoration and stewardship needs in the San Bernardino-San Jacinto Linkage are associated with rivers and streams, including Garden Air Wash and El Casco Creek in the western branch of the linkage, and San Gorgonio River, Cottonwood Creek, Stubbe Canyon, and Whitewater River in the San Gorgonio Pass.

Garden Air Wash (RS-1 on Figure 8, where RS stands for Restoration/Stewardship) is conserved to the west of Interstate 10 as part of the Western Riverside County MSHCP), where it is dominated by willows with some cottonwoods. Garden Air Wash is heavily incised to the west of the freeway due to past land uses. Other than two MSHCP Criteria Cells (#326 and #411) that span the freeway, the rest of the Garden Air Wash

to the east of the freeway is not included in the MSHCP. East of the freeway, the Garden Air Wash was long ago converted to the Garden Air Country Club golf course, which is largely dominated by ornamental grass with scattered native and non-native trees and small pockets of native coast sage scrub. As described above, the golf course is currently closed and is on the market, providing an opportunity for both acquisition and restoration.

Flood Risk Maps for California developed by FEMA show both 100-year and 500-year floodplains all along Garden Air Wash from just west of the Interstate, including the WRMSCP Criteria Cells, through the entire golf course to Freemont Street in the east, depicted in the image below. Generally, FEMA flood risk data is only generated for developed or developing areas. Thus, FEMA flood risk data is not yet depicted for open space areas to the west of the freeway. As described in the City of Calimesa's Local Hazard Mitigation Plan (Bennett 2012), the December 2010/January 2011 winter storm events caused major damage to the City's infrastructure, including roads.

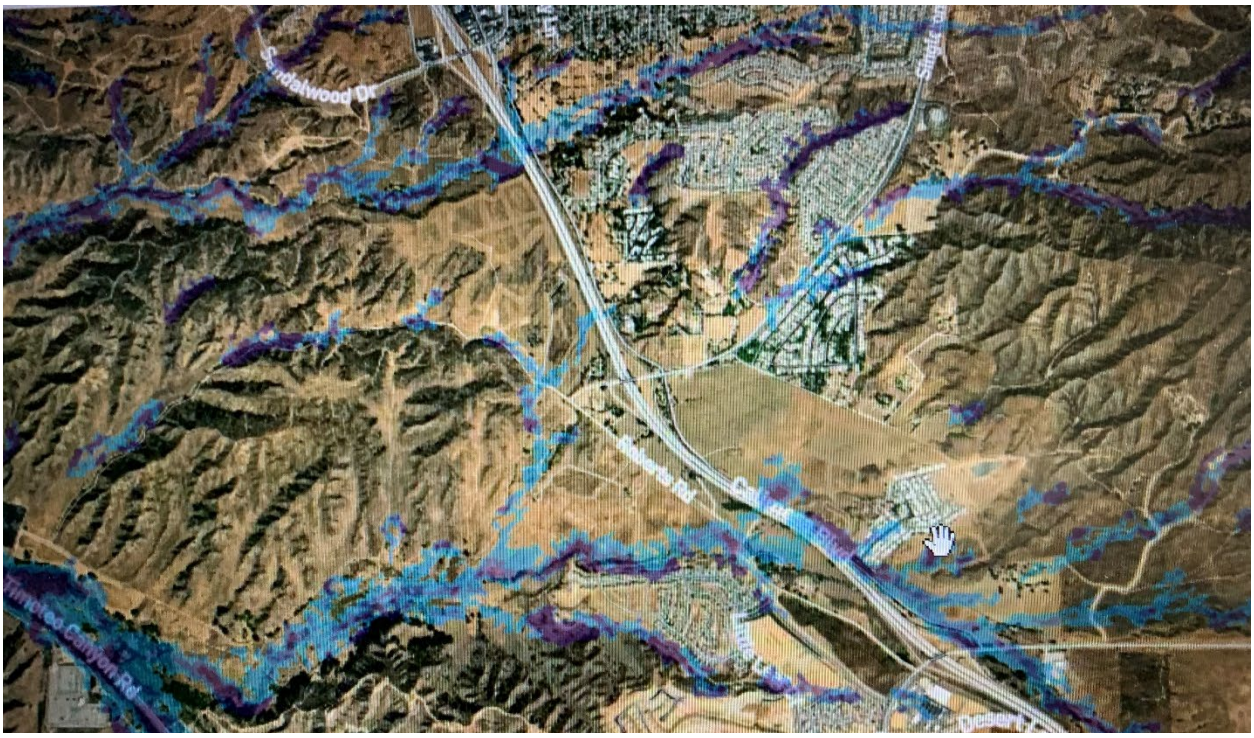
California Flood Risk from FEMA for Garden Air Wash with bright blue showing 100-year flood plain and light blue showing 500-year floodplain in relation to protected areas in green and Western Riverside Multiple Species Habitat Conservation Plan Criteria Cells and the linkage design.

Recommended Actions: Habitat restoration can help reduce flood risks and improve habitat connectivity and wildlife movement. The Inland Empire Resource Conservation District has worked with the current golf course owner on some improvement plans to restore some portions of the site. If the golf course was purchased for conservation purposes, habitat restoration plans could be expanded to be much more thorough, and incorporate habitat elements for a diversity of target species (e.g., nesting habitat, nectar sources for butterflies). The culvert on the east side of the golf course that leads to a canyon that would facilitate movement to existing protected open space to the southeast, also needs habitat restoration to provide cover and funnel wildlife through this choke-point. The lack of a culvert system for Garden Air Wash at Interstate-10 limits opportunities for wildlife movement across I-10 at this location. Installing a large culvert or bridge at I-10 at this location, as discussed above in section 5.3, is a critical part of the solution for reducing

flood risk, restoring riparian function, supporting climate adaptation, and improving habitat connectivity and wildlife movement.

THREAT El Casco Creek (RS-2 on Figure 8) is also severely incised west of the freeway due to the 2009 wildfire debris flows, a 100-year flood event, an undersized culvert, and habitat conversion in the uplands. In addition to the severe erosion and invasion by non-native plants and trees (e.g., Tree of Heaven, tree tobacco), it has also been degraded with large amounts of large boulders, concrete, and other debris dumped directly in the creek just south of Roberts Road. As described above in section 5.2, there are entitled developments to the north (Oak Valley) and south (Summerwind Commons) of El Casco Creek, and a housing development has already been built along the creek to the west of Roberts Road. Habitat in the creek is also severely degraded east of Roberts Road all the way to the freeway, with haphazard fencing along both sides of the creek and vegetation cut and left in the creek bed. The terms of the settlement between the Oak Valley developer and the Center for Biological Diversity and San Bernardino Valley Audubon Society in 2002, included the protection of all high-quality wetlands on-site and an additional 30 acres of wetlands off-site (M. Bond, pers. comm. in Penrod et al. 2005a). Not all permits have yet been issued, such as the 1600 permit for Oak Valley that may provide an opportunity to discuss riparian improvements and restrictive covenants. The Oak Valley developer has also hired a geomorphologist and a riparian restoration specialist to work with Riverside Lands Conservancy to restore the creek from the freeway to the Western Riverside County MSHCP preserve area to the west, along roughly a 1-mile distance of El Casco Creek, as mitigation. Providing more of a setback along the creek can provide open space to reduce the flood risk to surrounding homes and development and it can provide a buffer to minimize edge effects from development on wildlife utilizing the creek for live-in or move-through habitat.

The culvert for El Casco Creek on Interstate-10 needs to be upgraded and upsized to improve wildlife movement, reduce risk of flood and debris flows, support climate adaptation, and increase safety as described above and in Penrod et al. (2005a). El Casco Creek also experienced extensive flooding in the 2010 winter storm events that flooded the freeway, which is reflected in the Flood Factor model developed in 2020 by First Street Foundation, depicted in image below. East of the freeway, El Casco Creek is currently channelized and requires restoration to function for wildlife. The Flood Factor model also clearly shows that the Price and The Heights properties described above in section 5.2 provide feasible opportunities to restore flows once the existing freeway culvert is upgraded. The Cherry Valley Interchange project described in section 5.3 provides a potential opportunity to upgrade this culvert to a bridge, and Proposition 1 funds could be used to restore the riparian corridor east of the freeway.



Flood Factor model developed in 2020 by First Street Foundation

Recommended Actions:
Work with the City of Calimesa and Oak Valley and Summerwind Commons Developers to increase setbacks along El Casco Creek to maintain wildlife movement, reduce flood risk to transportation infrastructure and surrounding development, and support climate adaptation.

Work with the City of Calimesa to develop funding/permitting opportunities associated with the protection of El Casco Creek, such as a Mitigation Credit System.

Review and comment on Cherry Valley Interchange project during public review process for DEIR (expected late Fall 2021) to promote an upgrade for the I-10 culvert, restore the channelized portion of El Casco Creek east of the freeway to support wildlife movement, increase groundwater recharge, and reduce flood risk to transportation infrastructure and surrounding development.

At the policy level, work with the State Water Board, in coordination with the wildlife agencies and Caltrans, to promote the benefits of upsizing culverts as means to reduce flood risk, enhance climate adaptation, and improve wildlife movement. Work to ensure that Caltrans or local transportation agencies are not be penalized with additional impacts and mitigations for upsizing culverts and bridges when such projects incorporate considerations for wildlife movement and climate adaptation.

OPPORTUNITY: Engage Morongo Band of Mission Indians in Linkage Implementation Alliance: The San Bernardino-San Jacinto Linkage overlaps the Morongo Tribe's ancestral lands, including nearly 11,000 acres of the reservation. Staff with the Morongo Tribe were invited to this linkage implementation workshop. Kathleen Brundige from the Coachella Valley Conservation Commission shared that they work with the Morongo Tribe on wildlife surveys (e.g., burrowing owl, riparian birds) and restoration efforts, and coordinate

on various monitoring activities but haven't really coordinated with them on land acquisitions. ***Recommended Actions:*** Create a relationship with the Tribe to listen and learn about their experiences in the area. Where and when they feel it is possible, explain the goals of the Linkage Implementation Alliance, and work together to identify shared goals and collaborative actions to meet those goals. Invite them to engage in the Linkage Alliance in whatever role they deem appropriate – leadership, partner, participant or other role.

THREAT San Gorgonio River has two gravel mines that encroach into the floodplain that will eventually be restored as part of required reclamation plans (LUP-4 and LUP-5). The operation north of the freeway is Robertson's Ready Mix Banning Rock Plant #66, where reclamation isn't scheduled until 2040, while the operation south of I-10 include Robertson's Ready Mix Cabazon Rock Plants #11 and #77, which are in the midst of a Joint Project Review by the Agencies. Just downstream of the I-10 bridges for the San Gorgonio River, a low concrete dike runs almost the full width of the river, deflecting flow to the south bank to protect a mining operation that occupies almost the whole river bottom. Mining operations in the river decrease its value as a travel corridor for wildlife. ***Recommended Action:*** Future expansions should be prohibited and restoration planned to benefit wildlife movement when these mines cease operations.

THREAT Cottonwood Creek (RS-3 on Figure 8) becomes channelized as it approaches Interstate 10 and it's the only crossing structure without natural substrate in the linkage from the San Gorgonio River to the Whitewater River. Great numbers of wildlife have been recorded in upper Cottonwood Canyon but not in the area where it's channelized (M. Mariscal, pers. Comm.). Restoring Cottonwood Creek would enhance wildlife movement and sand transport, reduce flood risk, and facilitate groundwater recharge. Workshop participants weren't sure which water agency has jurisdiction in Cottonwood Creek; could be Coachella Valley Water District. It was also noted that the structure at Cottonwood may be within the Morongo Tribe's jurisdiction and that County Flood Control should also be brought into conversation because of the undercrossings. ***Recommended Action:*** Create a relationship with the Morongo Band of Mission Indians to determine how they would like to be involved and work with them in that capacity. Work with CVMSHCP, Riverside County Flood Control, Water District, and others. Together, with these partners co-create, develop, fund, and implement a restoration plan for Cottonwood Creek.

NEED/THREAT Whitewater Basins (RS-4 on Figure 8): The Whitewater Percolation Basins are not ideally situated to support essential ecosystem flows, such as sand transport. A question was raised regarding the possibility of relocating the Whitewater River percolation ponds to allow sand transport to flow uninterrupted. It was stated that golf courses in the area use so much water that they are depleting the aquifer, so percolation ponds are intended to keep the aquifer full. It has been proposed to move the percolation ponds to the south, as it would greatly benefit sand flows and habitat, but the Coachella Valley Water District has said it doesn't make economic sense. ***Recommended Actions:*** Meet with CVWD to discuss options to relocate the percolation ponds. Work with CVMSHCP, experts at University of California Riverside, and Coachella Valley Water District staff to develop and implement a plan to reorient the Whitewater basins at some time in the future to increase the rate of aeolian sand transport.

THREAT Dewatering of drainages in the San Bernardino Mountains, particularly San Gorgonio River (RS-5 on Figure 8) and Whitewater River (RS-6 on Figure 8): Dewatering has reduced vegetative cover and sand transport along rivers, streams, and washes in the linkage throughout the San Gorgonio Pass, making these drainages less able to support wildlife movement. There are an extraordinary number of water agencies with jurisdiction in the San Gorgonio Pass. The San Gorgonio Integrated Regional Water

Management Group (SGIRWMG) includes the City of Banning, Banning Heights Mutual Water Company, Cabazon Water District, High Valleys Water District, Riverside County Flood Control and Water Conservation District, and the San Gorgonio Pass Water Agency.

The San Gorgonio Integrated Regional Water Management Plan released in 2018 highlights the importance of biological corridors between the San Bernardino and San Jacinto Mountains and aeolian sand transport, and includes goals to conserve these ecosystem functions consistent with the Western Riverside Multiple Species Habitat Conservation Plan and the Coachella Valley Multiples Species Habitat Conservation Plan. It also describes in detail many water diversions. For example, the San Gorgonio River is diverted to the Banning Canyon Storage Unit, "When surface water flow is present in Banning Canyon, flows are diverted by Banning into off-stream recharge basins to facilitate groundwater recharge". Together the "Safe Yield" for these two storage units is 6,030 Acre-feet per year. In addition, "Banning recharges the Banning Canyon Storage Unit with water delivered from the Whitewater River via a flume system". As part of SG IRWM's Proposition 1 Planning Grant, the SGIRWMG accepts nominations for beneficial projects to be integrated into the IRWM Plan on an ongoing basis, providing an opportunity to restore vegetative cover and other ecosystem processes consistent with the IRWMP's goals to protect aquatic and riparian habitat and adaptation to climate change.

Recommended Actions: Submit Project Nomination Form to SGIRWMG (available at www.sgirwm.org) to work with the USFS, WRCMSHCP, CVMSHCP, and others to investigate the historic flow regime of the San Gorgonio and Whitewater Rivers and develop a surface and groundwater management program to restore vegetative cover and recover properly functioning aquatic/riparian conditions (e.g., sand transport).

THREAT Stewardship of Bridges (RS-7, 8, & 9 on Figure 8) Several of the bridges (Stubbe, Cottonwood, Whitewater) have off-road vehicle (ORV) issues and are also used as party places, causing wildlife to avoid using the structures and habitat degradation. Wildlife monitoring of the bridges on I-10 found wildlife use happens at different times of day, but use of the structures by ORV and partygoers is also deterring wildlife use and disturbing habitat (M. Mariscal, pers. comm.). Caltrans installed bollards in Stubbe Canyon Bridge to try to deter ORV and party use but it's been somewhat unsuccessful. ***Recommended Actions:*** Install educational signage under each bridge in the linkage to explain its use by wildlife, the importance of maintaining connectivity for healthy wildlife populations, and the impacts ORV use and human presence has on linkage function. Work with Caltrans to evaluate installing bollards or chain and lock systems under each bridge to reduce unauthorized ORV access and ensure other jurisdictional agencies that need access have keys and are apprised of the structure's importance to wildlife movement. Work with CVMSHCP, Caltrans, and local law enforcement agencies to monitor undercrossings to discourage OVR and party use of structures.

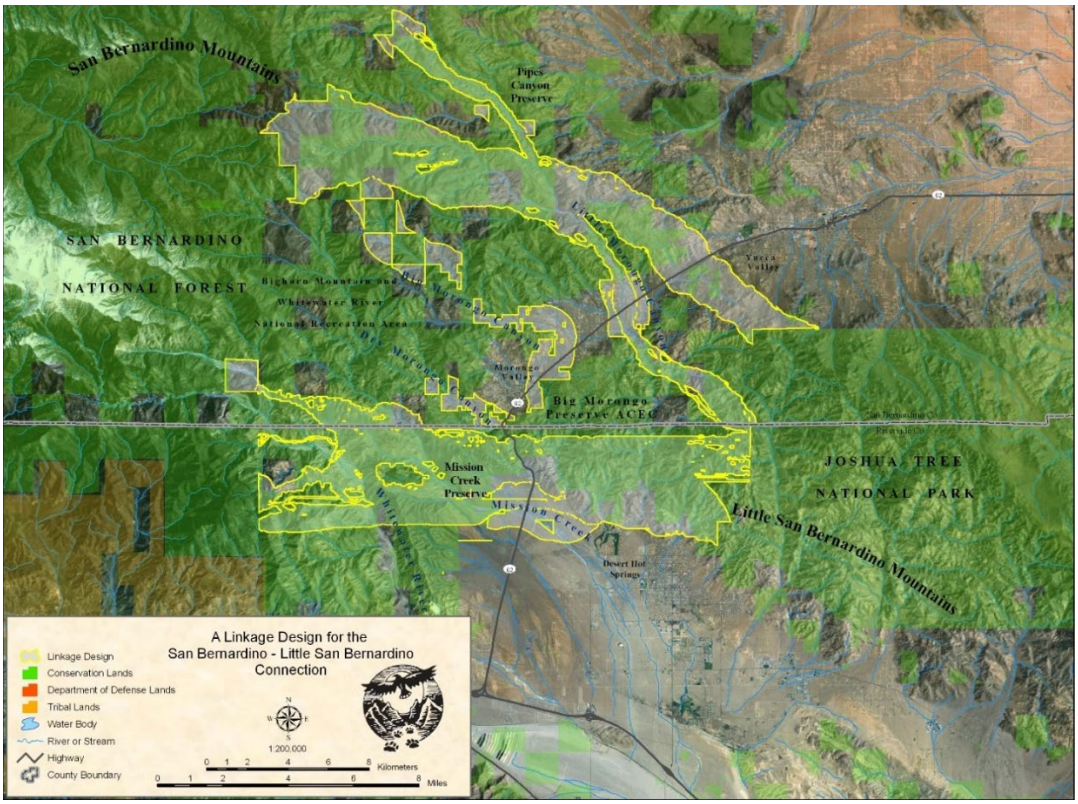
THREAT Pacific Coast Trail (RS-10 on Figure 8) In addition to facilitating wildlife movement across Interstate-10, the bridges for Stubbe Canyon also provide passage for hikers on the Pacific Crest Trail. Wildlife monitoring of these structures found it is readily used by wildlife and people (M. Mariscal, pers. Comm.). There was some discussion at the workshop, as to whether there is a more suitable route for the PCT that would have less impact on wildlife movement and habitat connectivity. The Sierra Club and MDLT walked a potential realignment from Stubbe to Whitewater about 7 years ago with PCT Association. It was noted that there are many sensitive species in the area of that potential realignment in the sand dune area, and the crossing structure beneath Highway 111 had fairly high bobcat use, so there would be a good number of potential negative impacts if that area experiences increased recreational use. ***Recommended***

Actions: Explore other potential realignments of PCT to reduce impacts to wildlife movement. Install signage to inform hikers on PCT how to reduce impacts to habitat and wildlife.

6. San Bernardino-Little San Bernardino Linkage Needs, Opportunities, and Threats

6.1 Ecological Significance of the Linkage

The San Bernardino-Little San Bernardino Connection occurs in a rare ecological transition zone linking the South Coast to the Mojave Desert ecoregion. As such, the planning area encompasses a unique variety of both coastal and desert habitats, from mixed coniferous forest and montane chaparral at higher elevations in the San Bernardino Mountains, to pinyon-juniper woodland, Joshua tree woodlands, and mixed chaparral at mid elevations, and desert scrub, creosote bush scrub, and riparian oases at lower elevations that transition back into pinyon-juniper and Joshua tree woodland in the Little San Bernardino Mountains. Little, Big, and Dry Morongo canyons are distinct geological features of the linkage, cutting through the Little San Bernardino Mountains, with Little and Big Morongo canyons forming substantial wetlands where the creeks meet bedrock. In this land of predominantly dry vegetation, the desert oases provide essential resources that attract a diversity of terrestrial and aquatic species. The Big Morongo Canyon Preserve's desert oasis is known internationally for its bird diversity. A number of sensitive natural communities occur in the planning area, including desert fan palm oasis woodland, cottonwood willow riparian forest, and mesquite bosque (CNDDB 2021). These include some of the rarest vegetation communities in the United States.



This variety of habitats support a diversity of organisms, including many species listed as endangered, threatened, or sensitive by government agencies (USFWS 1980, 1998, CDFW 2021ab). A number of rare species depend on the area's riparian oases, which provide breeding locations for many riparian birds and critical watering areas for desert bighorn sheep. Several riparian songbirds, such as summer tanager (*Piranga rubra*), yellow warbler, and the endangered least Bell's vireo, and yellow-billed cuckoo have the potential to occur in the linkage. Sensitive reptiles that prefer drier habitats and sparser vegetative cover, such as the threatened desert tortoise, red diamond rattlesnake (*Crotalus ruber*), coast horned lizard, and the endangered Coachella Valley fringe-toad lizard also have the potential to occur, as do a number of sensitive birds of prey, such as Cooper's hawk, golden eagle, and burrowing owl. The planning area also provides habitat for imperiled plant species, like the triple-ribbed milk-vetch (*Astragalus tricarinatus*) and Little San Bernardino Mountains linanthus (*Linanthus maculatus*). In addition to providing habitat for rare and endangered species, the linkage provides live-in and move-through habitat for countless other native species.

6.2 Land Use, Policy, and Protection Needs, Opportunities, and Threats

The San Bernardino-Little San Bernardino Linkage straddles both Riverside and San Bernardino Counties. While much of the linkage falls in unincorporated county lands, a portion of the northernmost branch of the linkage is within the City of Yucca Valley and a portion of the southernmost branch is within the City of Desert Hot Springs. The linkage overlaps several federal land conservation designations (Figure 9), including the Sand to Snow National Monument, California Desert National Conservation Lands, Big Morongo Canyon Preserve Area of Critical Environmental Concern (ACEC), and Pipes Canyon ACEC. In addition, virtually all of the linkage design within Riverside County is included in the Coachella Valley Multiple Species Habitat Conservation Plan (21,109 acres).

Most branches of the Linkage Design include land designations that protect natural habitats from conversion to urban uses, including lands administered by BLM (e.g., Big Morongo Canyon ACEC), The Wildlands Conservancy (Mission Creek Preserve, Pipes Canyon Preserve), Coachella Valley Mountains Conservancy, Mojave Desert Land Trust, Friends of the Desert Mountains, Riverside County Regional Park and Open Space District, San Bernardino County, and State Lands Commission. At the time the SCML report for the San Bernardino-Little San Bernardino Linkage was released in 2005 (Penrod et al.), roughly 62% of the linkage (37,650 of 60,805 acres) was conserved. Since that time, an additional 7,800 acres have been acquired, such that 75% of the linkage is now conserved! There is a Conceptual Area Protection Plan for the Morongo Basin focused on connectivity that is basically preapproved for acquisitions or easements if there are willing sellers. Workshop participants identified a few potential land use, policy, and protection needs, and opportunities in the linkage; no development threats were identified in this linkage at the workshop.

OPPORTUNITY BLM California Desert Conservation and Connectivity Initiative (AE1 on Figure 10) is envisioned as an on-going, multi-phased, multiple year proposal to improve desert tortoise conservation lands and conserve wildlife connectivity within the California Desert Conservation Area depicted below, as identified in the Desert Renewable Energy Conservation Plan (DRECP). This program will focus on BLM acquisitions for maintaining connectivity and TES habitat on lands designated as California Desert National Conservation Lands or Areas of Critical Environmental Concern. Lands in the northern branch of the San Bernardino-Little San Bernardino, which is a high desert connection that takes in the ecotone between the

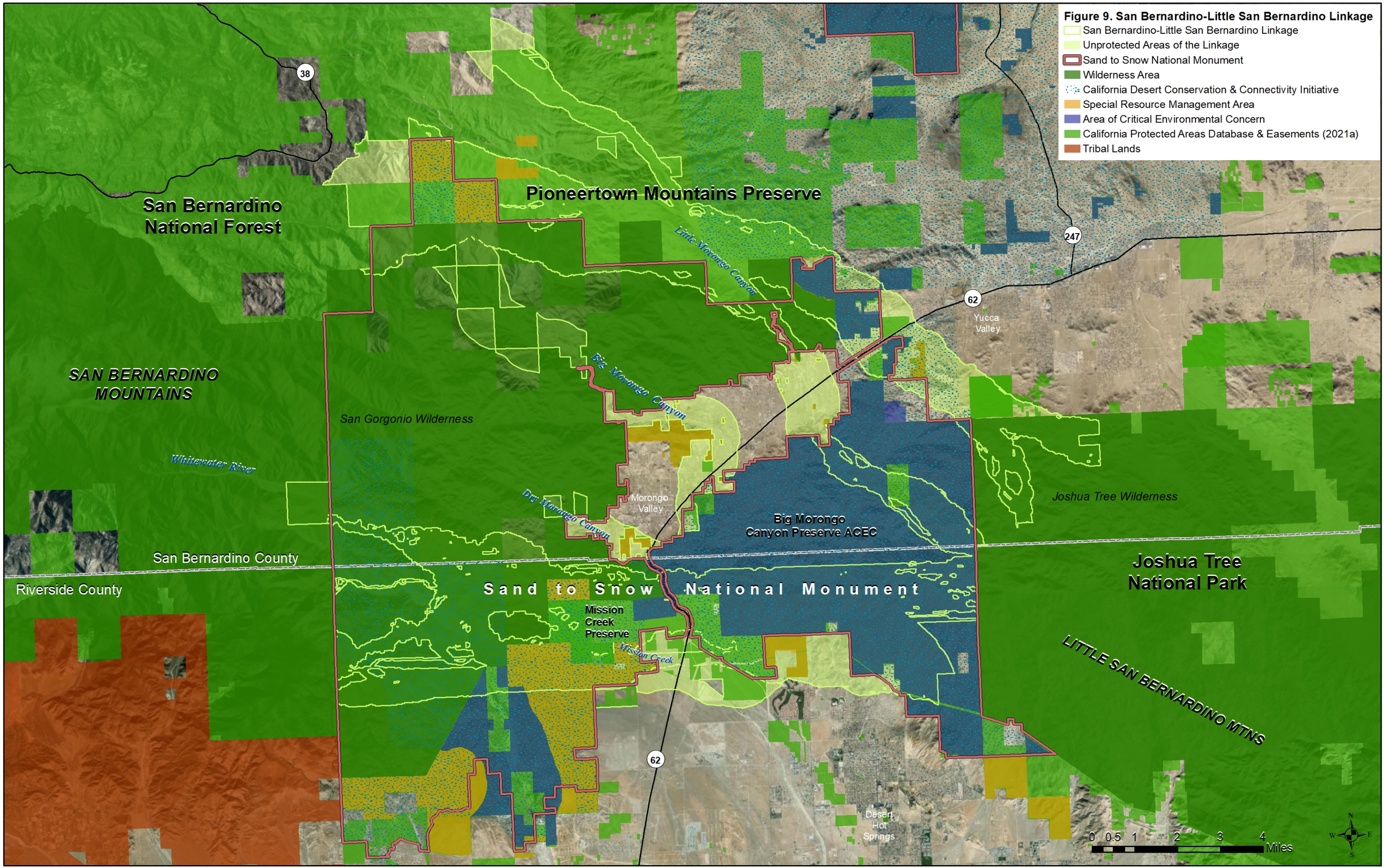


Figure 9. San Bernardino-Little San Bernardino Linkage
San Bernardino-Little San Bernardino Linkage
Unprotected Areas of the Linkage
Sand to Snow National Monument
Wilderness Area
California Desert Conservation & Connectivity Initiative
Special Resource Management Area
Area of Critical Environmental Concern
California Protected Areas Database & Easements (2021a)
Tribal Lands
San Bernardino National Forest
Pioneertown Mountains Preserve
Little Morongo Canyon
Big Morongo Canyon
Dry Morongo Canyon
SAN BERNARDINO MOUNTAINS
San Gorgonio Wilderness
Whitewater River
Morongo Valley
Yucca Valley
Big Morongo Canyon Preserve ACEC
Joshua Tree Wilderness
San Bernardino County
Riverside County
Sand to Snow National Monument
Mission Creek Preserve
Mission Creek
Joshua Tree National Park
LITTLE SAN BERNARDINO MTNS
Desert Hot Springs
38
247
62
0 0.5 1 2 3 4 Miles

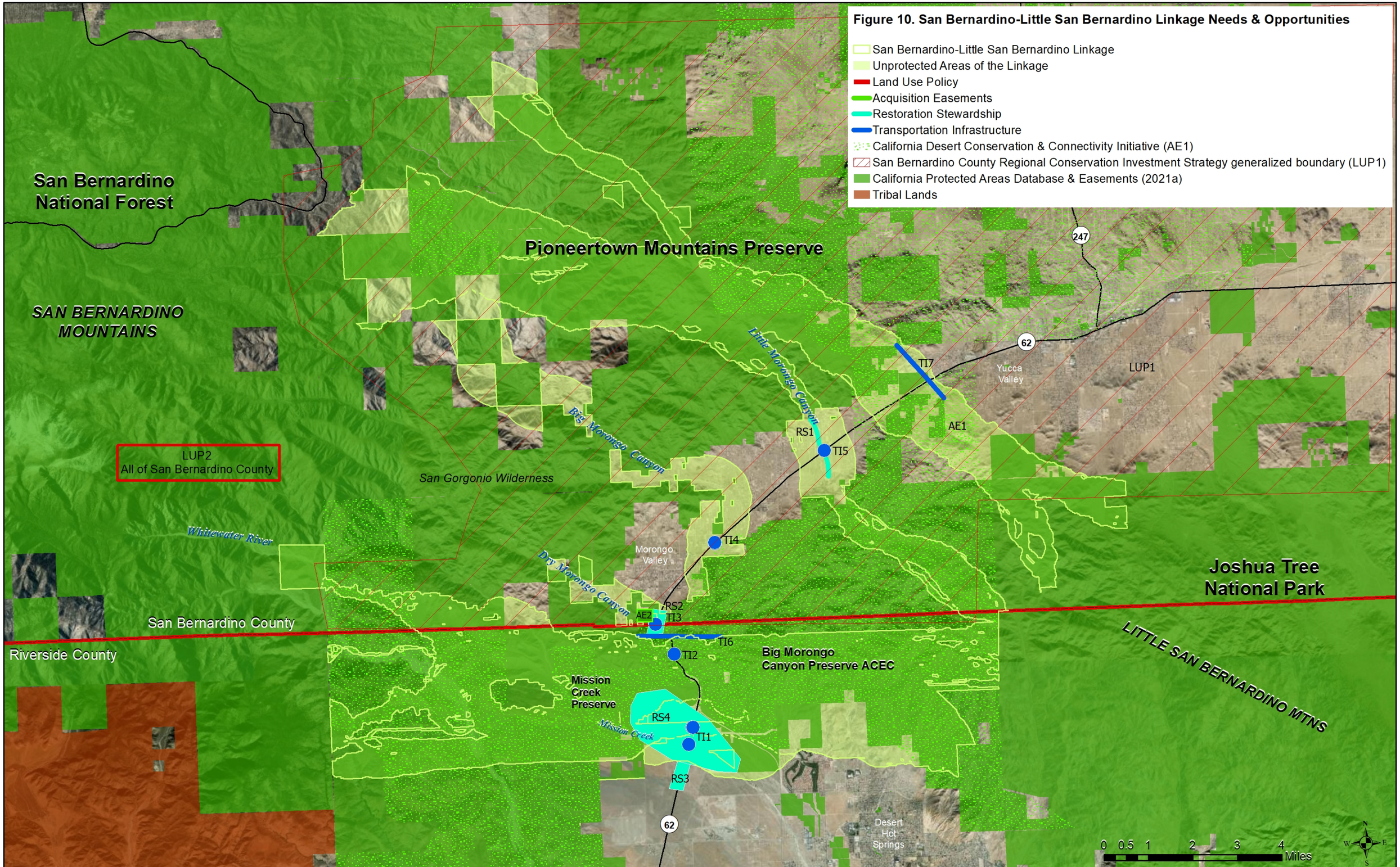


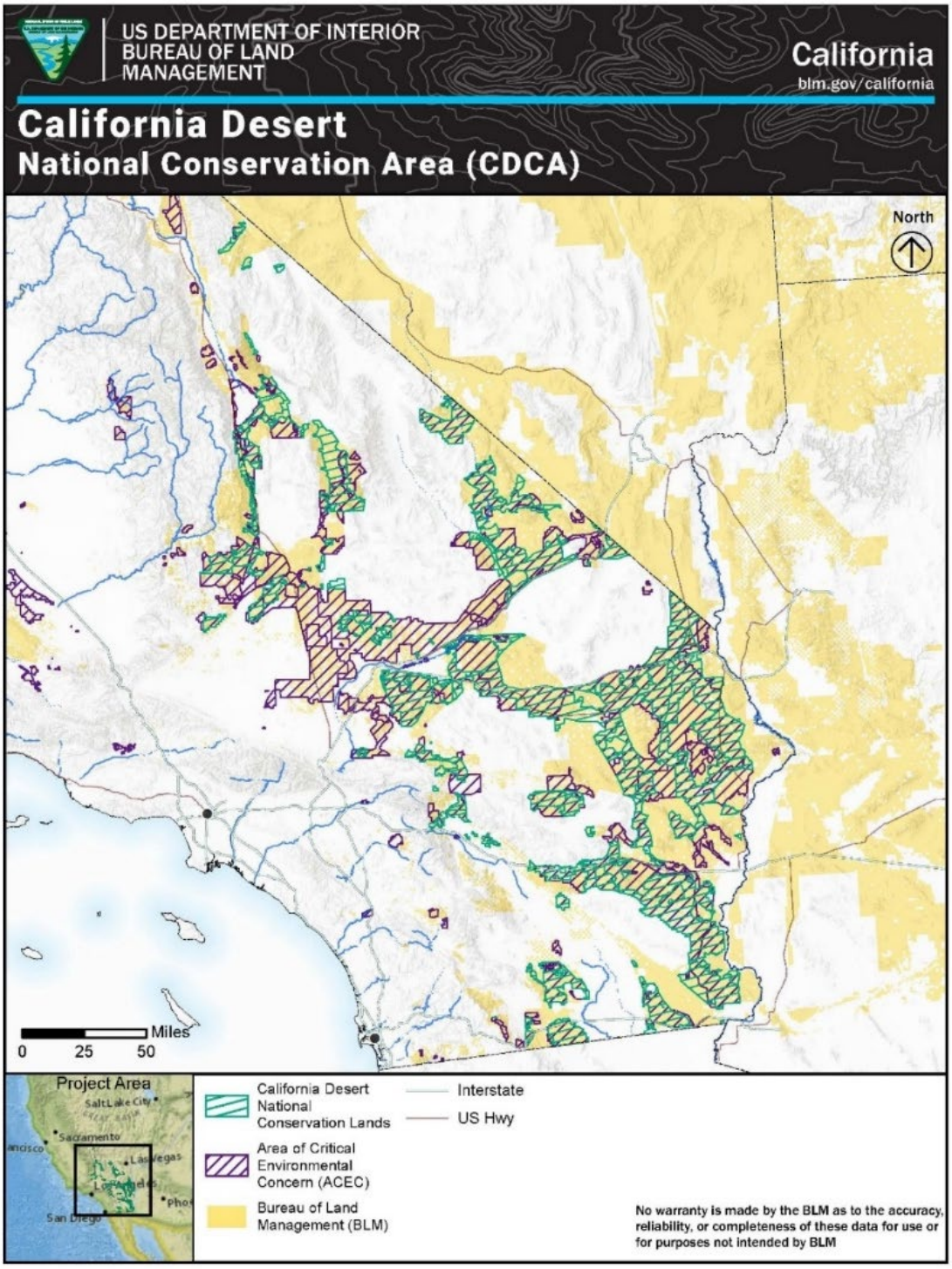
Figure 10. San Bernardino-Little San Bernardino Linkage Needs & Opportunities
San Bernardino-Little San Bernardino Linkage
Unprotected Areas of the Linkage
Land Use Policy
Acquisition Easements
Restoration Stewardship
Transportation Infrastructure
California Desert Conservation & Connectivity Initiative (AE1)
San Bernardino County Regional Conservation Investment Strategy generalized boundary (LUP1)
California Protected Areas Database & Easements (2021a)
Tribal Lands
San Bernardino National Forest
SAN BERNARDINO MOUNTAINS
Pioneertown Mountains Preserve
LUP2
All of San Bernardino County
San Gorgonio Wilderness
Whitewater River
Little Morongo Canyon
Big Morongo Canyon
Dry Morongo Canyon
Mission Creek
Morongo Valley
Yucca Valley
Desert Hot Springs
Joshua Tree National Park
LITTLE SAN BERNARDINO MTNS
San Bernardino County
Riverside County
Big Morongo Canyon Preserve ACEC
Mission Creek Preserve
LUP1
AE1
AE2
TI7
TI5
TI4
TI3
TI6
TI2
TI1
RS1
RS2
RS3
RS4
247
62
0 0.5 1 2 3 4 Miles
N
S
E
W

San Bernardino to Little San Bernardino Mountains Linkage
Summary of Needs, Threats, and Opportunities

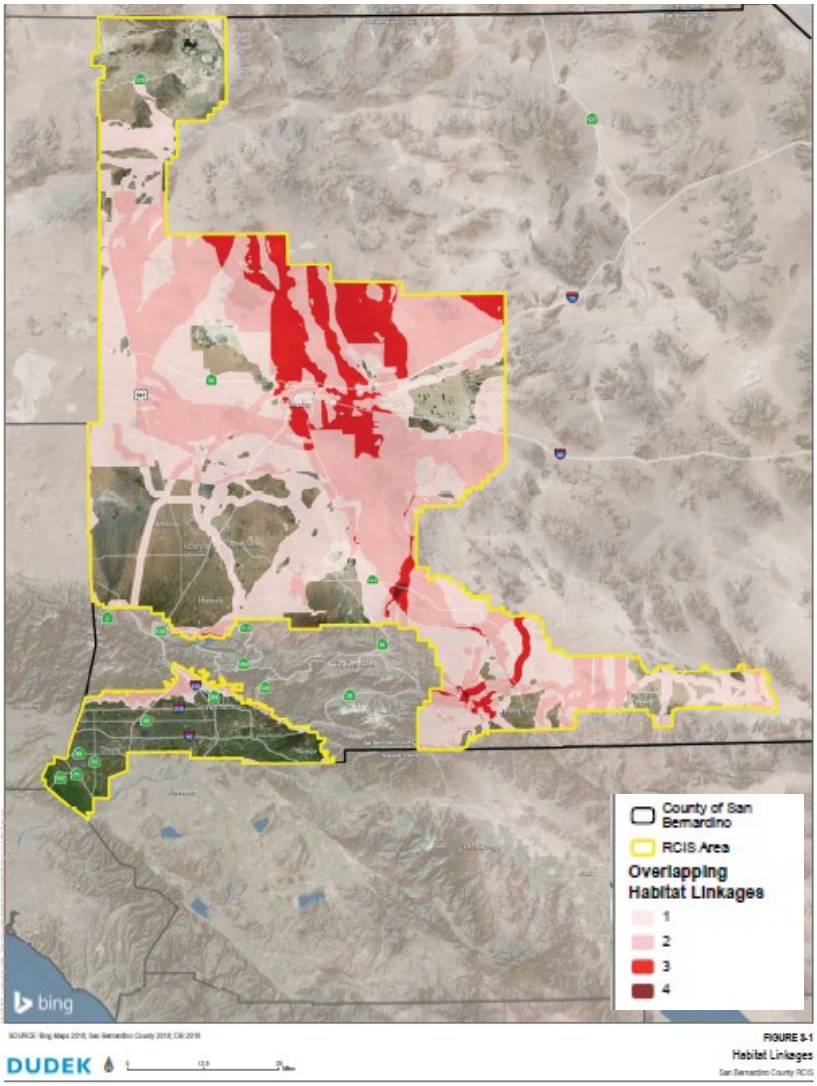
Key	Type	Description/Summary	Recommended Action
AE1	OPP	BLM Desert Connectivity Initiative provides opportunities for land acquisition	Write letters requesting DOI to provide LWCF to support acquisitions associated with the Initiative
LUP1	OPP	San Bernadino County Regional Conservation Investment Strategy incorporates San Bernardino to Little San Bernardino Linkage and other desert linkages	Participate in public review process and advocate for connectivity conservation and long-term monitoring
LUP2	OPP	Updates to San Bernardino County Planning Documents	????
AE-2	OPP	Land protection and trespass management needed for 4 private property inholdings east of SR 62 at Dry Morongo Canyon.	Work with TWC, MDLT, and others
RS1	NEED	Little Morongo Wash has been degraded by past flood control activities	Work with RCFC, MDLT to conduct a restoration feasibility study for Little Morongo Creek
RS 2 RS 3 RS 4	THREAT	SR 62 Bridges for Dry Morongo and Mission Creek subject to chronic disturbance from human activities and sedimentation.	Install educational signage and chains/locks to deter trespass. Coordinate meeting with jurisdictions, CVCC, NGOs and law enforcement to fund and implement regular patrols, signage and other actions to deter illegal human activity.
RS 4	THREAT	Area south of Indian Canyon Road, on both sides of SR 62, subject to human disturbance caused by ORV use and other illegal activities.	Install educational signage and chains/locks to deter trespass. Work with jurisdictions, CVCC, NGOs and law enforcement to fund and implement regular patrols to deter illegal human activity.
TI-1 TI-2 TI-3 TI-4 TI-5	OPP	Existing SR 62 crossing structures identified for upgrades (noise/light mitigation, wildlife fencing): Mission Creek Bridges (T-1), Lower Morongo Bridge (TI-2), Dry Morongo Wash (TI-3), Big Morongo Wash Culvert (TI-4), and Little Morong Wash bridge (TI-5).	Support Caltrans by forming an Interagency Group to support planning, design, grants, funding, and implementation of crossing enhancements. Seek legislative support
T-6 T-7	OPP	Caltrans is in the early planning stages for two modular vegetated wildlife overcrossings for SR62 in locations previously identified by SCML (Morongo Grade (TI-6) and Yucca Grade (TI-7)	Support Caltrans by forming an Interagency Group to support planning, design, grants, funding and implementation of crossing enhancements. Seek legislative support

AE = Acquisition Conservation Easement
LUP = Land Use Policy
RS = Restoration Stewardship
TI = Transportation Infrastructure

Sonoran and Mojave deserts, would be targeted by this initiative. Following the workshop, several participants met with BLM staff to discuss this initiative. ***Recommended Action:*** Send a letter of support to Secretary Deb Haaland for BLM's funding request through the Land and Water Conservation Fund for the California Desert Conservation and Connectivity Initiative that will help to conserve essential linkages and conservation areas in the Mojave and Sonoran deserts.



OPPORTUNITY San Bernardino County Regional Conservation Investment Strategy (LUP-1 on Figure 10) was initiated several years ago and a draft Regional Conservation Investment Strategy (RCIS) plan was completed and distributed in 2018 (Dudek). The San Bernardino County Transportation Authority (SBCTA) received a grant for a cooperative project with the San Bernardino Council of Governments to develop and complete a final draft of the San Bernardino County Regional Conservation Investment Strategy, covering two subareas, the Valley subarea and West Desert subarea and the Mountain region located in San Bernardino County. The Valley subarea is in the inland coastal plain south of the San Bernardino and San Gabriel Mountains. The West Desert subarea covers the western portion of the Mojave Desert ecoregion in the county and includes most of the San Bernardino-Little San Bernardino Linkage. Several connectivity studies are being integrated into the RCIS strategy, including California Essential Habitat Connectivity Project (Spencer et al. 2010), California Desert Linkage Network (Penrod et al. 2012), Joshua Tree Twenty-Nine Palms Linkage (Penrod et al. 2008), South Coast Missing Linkages (Beier et al. 2006, SC Wildlands 2008), Desert Tortoise Conservation Areas and Linkages (Averill-Murray et al. 2013), and Conservation Biology Institute's West Mojave connectivity modeling for Large and Small species (CBI 2017). The most recent funding for the project was initiated in 2019 and is estimated to be completed by March 2022. The image to the left depicts the overlapping habitat linkages being considered in the San Bernardino Resource Conservation Investment Strategy.



Once this Resource Conservation Investment Strategy is completed, it should provide additional justification for land conservation and habitat restoration in the San Bernardino-Little San Bernardino Linkage, and other critical linkages in the Mojave Ecoregion. ***Recommended Action:*** Participate in stakeholder engagement opportunities in this public planning process.

OPPORTUNITY Updates to the San Bernardino County Code, Title 8 Development Code (Code), including zoning maps (San Bernardino County 2021), in order to comply and be consistent with the recently adopted 2020 Countywide Plan, Policy Plan (LUP-2 on Figure 10) Although the majority of the Code standards and provisions will remain intact and carry over from the current code, the project proposes an ordinance that will repeal Title 8 in its entirety and adopt a new Title 8 as a replacement. The new Code will be reorganized, include a new zoning classification system, zone map, and include provisions to bring the code into compliance with new state laws and Policy Plan goals and policies (i.e., environmental justice, land use compatibility, hazards avoidance, environmental protection, etc.). This Countywide Hearing took place July 22, 2021 County of San Bernardino Land Use Services Department.

OPPORTUNITY Dry Morongo Canyon (AE-2 on Figure 10) The land in Dry Morongo Canyon immediately west of State Route 62 and the bridged undercrossing should be targeted for conservation easement, purchase, or other action to maintain its wild character. There appears to be four different properties off of Canyon House Road. This road also provides access to an unnamed dirt road that leads directly to the bridge on SR62, as shown in the image below, which is used for illegal off road vehicle use (see section 6.5 below). It is critical that this structure be maintained and that the lands near it are protected from habitat degradation, trespass, and further development.

6.3 Transportation and Infrastructure Needs, Opportunities, and Threats

Figure 10 depicts the locations of several recommendations to improve wildlife passage across SR-62 based on research and monitoring efforts from a recent Caltrans study focused on wildlife movement across this route that was described in Brock Ortega's presentation, which is summarized on pages 22-25. Caltrans commissioned this study as SR-62 is expected to be widened in the near future. These same locations were identified for wildlife crossing improvements in the San Bernardino-Little San Bernardino Linkage report (Penrod et al. 2005b). It's very exciting and gratifying to see recommendations to improve wildlife movement

across SR-62 in the recent Caltrans study, which include opportunities for improvements to existing structures (e.g., noise and light mitigation, directional fencing), as well as, installation of two wildlife overpasses. Existing structures identified for improvements include: Mission Creek Bridges (TI-1 on Figure 10), Lower Morongo Wash Concrete Box (TI-2), Dry Morongo Wash (TI3), Big Morongo Wash Culvert (TI4), and Little Morongo Wash bridge (TI-5). Vegetated modular wildlife overcrossings were recommended at the Morongo Grade (TI-6) and at Yucca Grade (TI-7). Please see page 25 for a summary of these recommendations. ***Recommended Actions:*** Work with Caltrans District 8 to develop an SR-62 inter-agency working group to support funding, planning, design and implementation of the wildlife crossing improvements identified in the recent study.

6.4 Research and Monitoring Needs and Opportunities

Participants didn't identify any specific needs or opportunities for this linkage during the Research and Monitoring session.

The primary research and monitoring discussed at the workshop for the San Bernardino-Little San Bernardino Linkage was the Caltrans study for SR-62, which was presented by Brock Ortega at the Transportation and Infrastructure session. The presentation on this study is summarized on pages 22-25 and the recommendations are highlighted in the previous section.

CVMSHCP research and monitoring in the Mission Creek area was also mentioned, including surveys for two covered plant species, Little San Bernardino linanthus and Triple-ribbed milkvetch, and trapping for Palms springs pocket mouse.

6.5 Restoration and Stewardship Needs, Opportunities, and Threats

NEED Little Morongo Wash (RS-1 on Figure 10) was the only habitat restoration need specifically identified in this linkage at the workshop. Little Morongo Wash provides the most direct desert wash connection between the San Bernardino and Little San Bernardino Mountains. The lower part of Little Morongo Wash from just above SR-62 to the oasis at the base of the Little San Bernardino Mountains is within the 100-year floodplain. Little Morongo Wash has been channelized on the Morongo Valley floor for flood control but upper Little Morongo is dominated by white alder, cottonwoods, and

sycamores and water still flows in the channel into summer in some years. Little Morongo Wash flows form a substantial oasis where the creek encounters bedrock at the base of the Little San Bernardino Mountains, which is definitely a draw to wildlife. Flood control activities have severely reduced abundance and species diversity of riparian vegetation along Little Morongo Wash where it's channelized but since the sides and bottom of the channel are natural substrate (i.e., no concrete) some level of habitat restoration is feasible. ***Recommended Action:*** Work with Riverside County Flood Control District, wildlife and land management agencies, and nonprofits such as Mojave Desert Land Trust to conduct a Cottonwood Creek Restoration (de-channelization) feasibility study to increase vegetative cover and plant diversity to support movements of a greater array of species, and to slow flows, reduce flood risk, and increase groundwater recharge.

Stewardship of Bridges (RS-2 & 3 on Figure 10) Bridges for Dry Morongo and Mission Creek have illegal ORV issues and are also used as party places, which impact soils and vegetation and inhibit species from using this crossing route, particularly at night. **Dry Morongo Wash** is especially important for seasonal movements of bighorn sheep, as there are springs in the upper canyon that draw animals into the drainage. However, the area is also popular with off-road vehicle enthusiasts, with heavy signs of use in Dry Morongo Wash where it runs under State Route 62 and for some distance above and below the bridge, and the area under the bridge is a party place. Access to the bridge appears to be from an unnamed dirt road off of Canyon House Road. BLM is working with law enforcement officials on encroachment into Joshua Tree National Park, especially in wilderness. **Mission Creek** crosses SR62 in two places and each area has two bridge structures for the north and south bound lanes. ORV use and human disturbance are evident under each bridge. Sedimentation of one of the bridges limits wildlife use of the structure. ***Recommended Actions:*** Coordinated outreach, protection, and monitoring is needed to prevent both ORV and human disturbance at undercrossings. Install educational signage under each bridge in the linkage to explain its use by wildlife, the importance of maintaining connectivity for healthy wildlife populations, and the impacts ORV use and partygoers have on linkage function. Illegal vehicle access to Dry Morongo Canyon may be prevented by installing fencing and signage at Canyon House Road. Evaluate the potential to install bollards under each of the four Mission Creek bridges to deter ORV use. Work with CVMSHCP, BLM, Caltrans, Water Districts, and local law enforcement agencies to monitor undercrossings to discourage OVR and party use of structures and to evaluate impacts of these activities on wildlife.

THREAT Chronic Human Trespass (RS-4 on Figure 10) The area to the south of Indian Canyon Road both to the east and west of SR-62, is subject to unauthorized and illegal human activities. Cars stolen in Yucca Valley and the Morongo Basin have ended up in the Mission Creek area. One workshop participant's car was stolen and then recovered in Mission Wash. Other unauthorized activities are also known to occur near Worsely Road. These activities are also happening within the Sand to Snow National Monument to the west of SR62 around Mission Creek. A Resource Management Plan is currently being developed for this area that may address some of these issues. BLM is working with law enforcement officials in this area to deter illegal ORV use. Coachella Valley Conservation Commission (CVCC) is also trying to set up a contract with the Desert Hot Springs Police Department to monitor MSCP lands in this area to the west of SR-62. ***Recommended Actions:*** A participant from CVCC suggested a meeting among CVCC, BLM, Caltrans, and others to develop coordinated strategies to deal with these issues. Install signage visible from public roadways for all washes that both inform people about the importance of the desert washes to wildlife movement and spells out the applicable laws for deterring trespass, illegal ORV, and other unauthorized activities. San Diego County passed bond measures to help fund management and monitoring of MSCP

lands, and included funding for local law enforcement agencies to monitor and issue citations for illegal use. Perhaps, a similar bond measure could be passed here to support implementation of the CVMSHCP.

7. Joshua Tree-Chocolate Mountains Linkage Needs, Opportunities, and Threats

7.1 Ecological Significance of the Linkage

The Joshua Tree-Chocolate Mountains Linkage occurs in a transition zone between the Mojave and Sonoran Desert Ecoregions, supporting a high diversity of plant communities and species. The Mojave and Sonoran Deserts differ primarily in elevation. The Mojave Desert is higher in elevation, and is therefore cooler, receiving more precipitation. This accounts for the differences in vegetation types; evergreen trees such as the Joshua tree (*Yucca brevifolia*) flourish in the Mojave but cannot persist in the Sonoran. At higher elevations in the Mojave Desert, juniper (*Juniperus spp*.) and pinyon pine (*Pinus quadrifolia*) are present with an understory of creosote bush (*Larrea tridentate*) and other shrubs and herbs. Characteristic habitats in the Sonoran Desert include creosote bush scrub, saltbush scrub, desert riparian, bajadas or desert washes, and sand dunes. The Coachella Valley Dunes support a diversity of endemic species, which require maintaining the sand sources that replenish these systems.

This variety of habitats supports a diversity of organisms, including many species listed as endangered, threatened, or sensitive by government agencies. The threatened desert tortoise is perhaps the best-known species of desert scrub communities, as bighorn sheep are of the rugged terrain. A number of rare species depend on desert riparian communities, which provide breeding habitat for species such as least Bell's vireo, southwestern willow flycatcher, and yellow-billed cuckoo. Sensitive reptiles that prefer drier habitats and sparser vegetative cover, such as the Mojave fringe-toed lizard (*U.* scoparia) also depend on habitats here. A statewide analysis of landscape integrity conducted for the California Essential Habitat Connectivity Project (Spencer et al. 2010) identified the Mojave and Sonoran Ecoregions along with the southern Sierra Nevada as the most ecologically intact areas in the state. There are multiple areas of ecological significance within the California deserts.

7.2 Land Use, Policy, and Protection Needs, Opportunities, and Threats

The Joshua Tree-Chocolate Mountains Linkage (171,716 acres) lies entirely within Riverside County and much of the linkage is conserved and administered by the Bureau of Land Management. The linkage overlaps several federal land conservation designations (Figure 11), including California Desert National Conservation Lands; portions of the Chuckwalla, Orocopia Mountains, and Mecca Hills Wilderness Areas; and Chuckwalla Area of Critical Environmental Concern. In addition, about 57% of the linkage design is included in the Coachella Valley Multiple Species Habitat Conservation Plan (97,750 acres), as part of the Desert Tortoise and Linkage Conservation Area and Mecca Hills/Orocopia Mountains Conservation Area.

In addition to land conservation designations described above, the DRECP (2016) also identified Development Focus Areas for Renewable Energy throughout the California Deserts, including directly east of the Joshua Tree-Chocolate Mountains Linkage, in the Chocolate Mountains-Palen McCoy Mountains Linkage. Meeting renewable energy production goals is essential to help combat climate change but it is

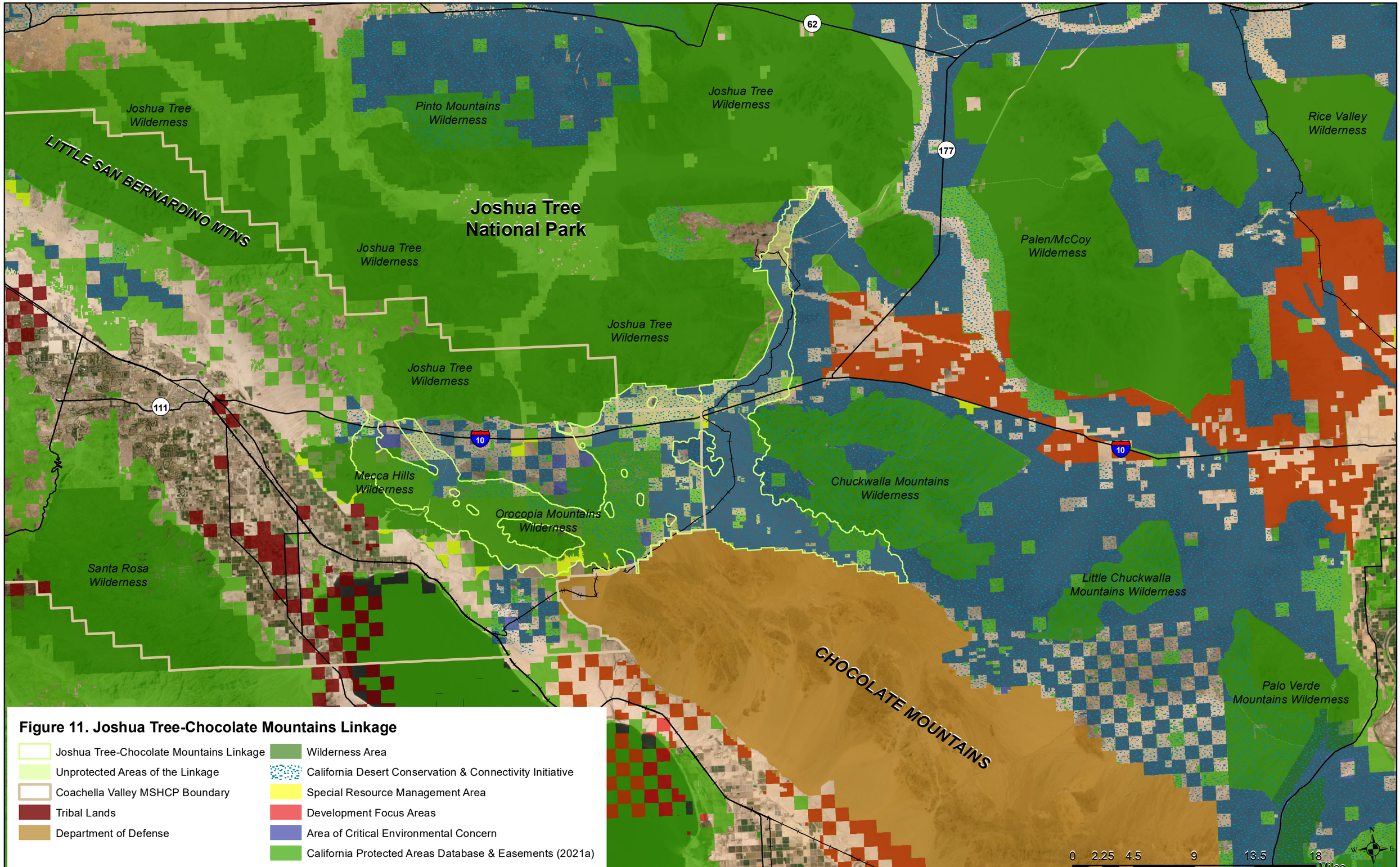


Figure 11. Joshua Tree-Chocolate Mountains Linkage

- Joshua Tree-Chocolate Mountains Linkage
- Unprotected Areas of the Linkage
- Coachella Valley MSHCP Boundary
- Tribal Lands
- Department of Defense
- Wilderness Area
- California Desert Conservation & Connectivity Initiative
- Special Resource Management Area
- Development Focus Areas
- Area of Critical Environmental Concern
- California Protected Areas Database & Easements (2021a)

equally important to maintain habitat connectivity, sustain essential ecosystem functions, and provide opportunities for species to shift their ranges in response to climate change.

Workshop participants identified a few potential land use, policy, and protection needs, and opportunities in in this linkage at the workshop.

THREAT/OPPORTUNITY Paradise Valley Specific Plan - Eastern Coachella Valley Area Plan Area Policy 2.3 (LUP-1 on Figure 12) Paradise Valley Specific Plan is a major proposed development in the Coachella Valley Multiple Species Habitat Conservation Plan Area that has been floating around for many years. Geographically, the project site is in Shavers Valley with Pinkam Wash flowing out of Joshua Tree National Park, down through this microphyll wash that flows under Interstate 10 to the Orocopia Hills area. The proposed Paradise Valley development includes 5,400 acres that spans both sides of Interstate 10. There was a significant opposition effort that included environmental and social justice groups opposed to the project. This area is already identified as a corridor in the Multiples Species Habitat Conservation Plan. A focused Connectivity Conservation Plan, as Dr. Paul Beier spoke about earlier, could elevate the importance of the conservation opportunity. There is funding available for this acquisition but the owner of the property site is currently not a willing seller. From a Land Use Policy perspective, the only reason that the Paradise Valley Project was considered is because of the Eastern Coachella Valley Area Plan within the General Plan that describes the potential for a new town to be located in this area. ***Recommended Action:*** Initiate a focused group discussion on deleting this particular policy from the County's GP, which would eliminate any new town in this area from further consideration. The County can amend the General Plan four times a year. The next General Plan update is expected in 2022.

THREAT Connectivity across I-10 threatened by Multiple Solar Projects on BLM Land (LUP-2 on Figure 12): The DRECP Development Focus Area east of Desert Center covers 158,000 acres, where Athos Solar has been approved (3,440 acres), and three other projects are proposed on BLM land including Oberon Solar (4,700 acres), Arica Solar (2,000 acres), and Victory Pass (2,000 acres); another solar project is proposed on private land in Chuckwalla Valley.

Athos Solar Project Athos I & II is one of the largest renewable energy projects in California (image below), incorporating 1.48 million First Solar Series 6™ photovoltaic (PV) modules on a 3,440-acre* land parcel, located approximately 75 miles east of Palm Desert in a small town called Desert Center. It is currently in the construction phase within the DFA described above. When complete, it will cover nearly 5-square miles and will have the capacity to generate over 2,200 GWh per year of renewable energy, enough to power 179,000 homes and offset 1.7 million tons of carbon dioxide emissions annually.

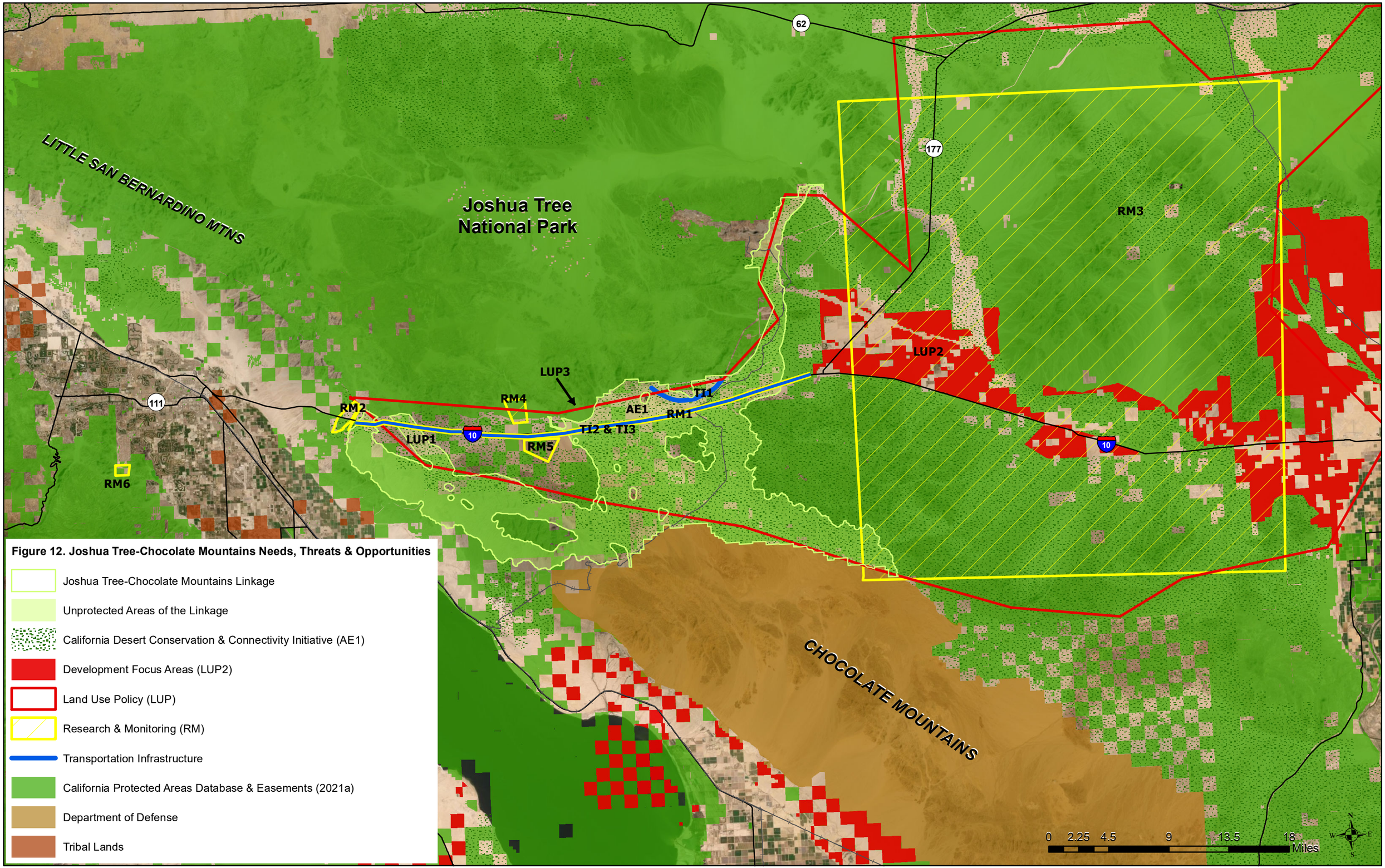


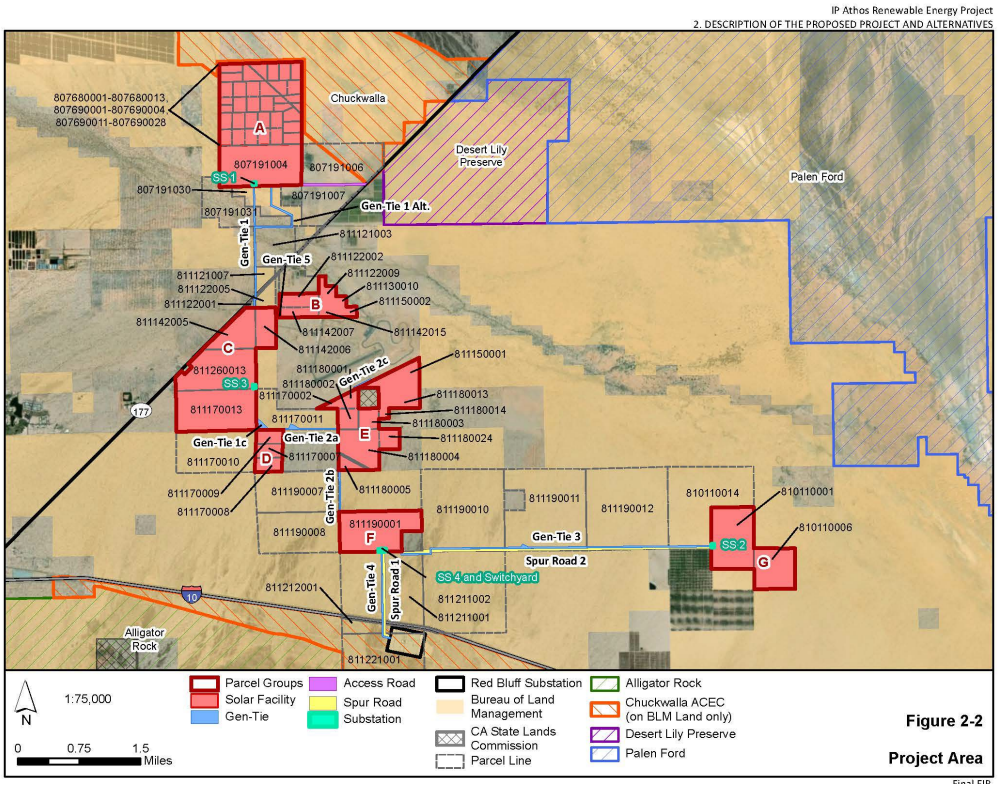
Figure 12. Joshua Tree-Chocolate Mountains Needs, Threats & Opportunities

- Joshua Tree-Chocolate Mountains Linkage
- Unprotected Areas of the Linkage
- California Desert Conservation & Connectivity Initiative (AE1)
- Development Focus Areas (LUP2)
- Land Use Policy (LUP)
- Research & Monitoring (RM)
- Transportation Infrastructure
- California Protected Areas Database & Easements (2021a)
- Department of Defense
- Tribal Lands

Joshua Tree to Chocolate Mountains Linkage
Summary of Needs, Threats, and Opportunities

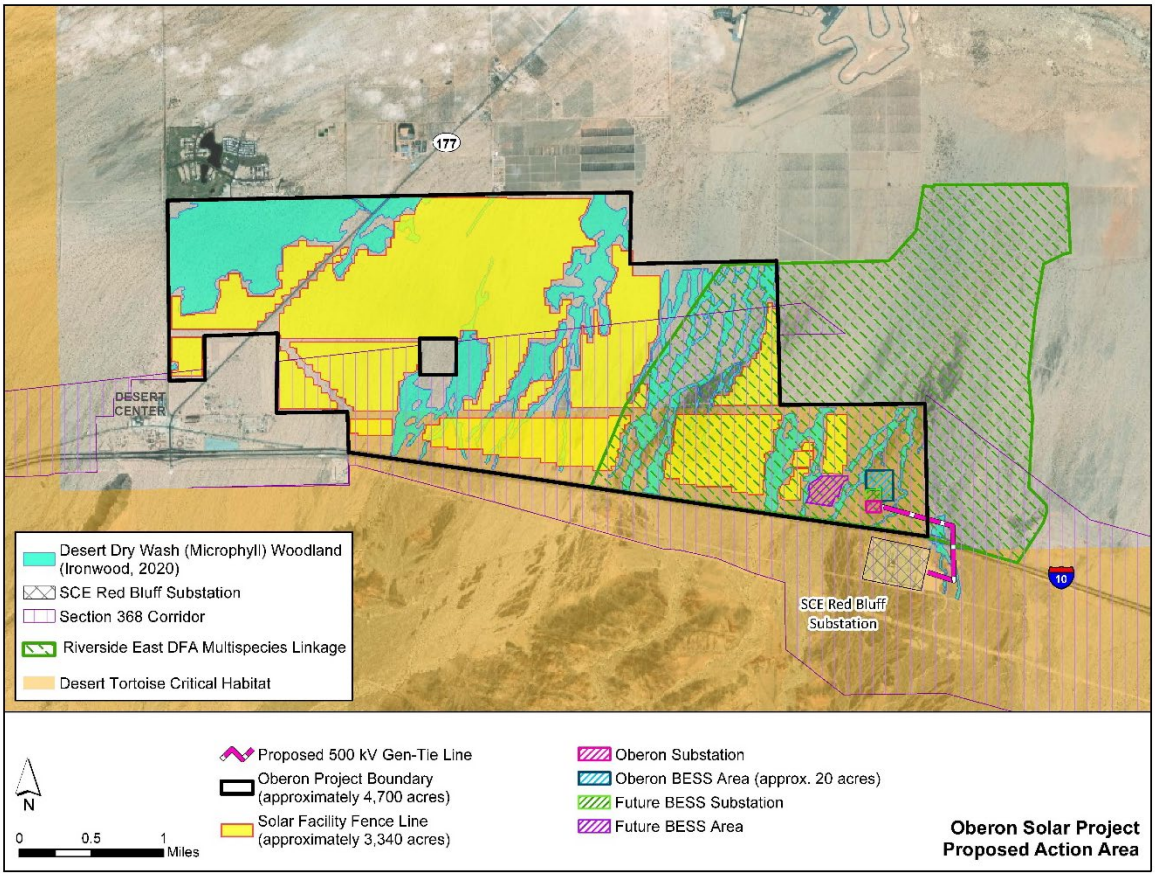
Key	Type	Description/Summary	Recommended Action
LUP-1	THREAT/ OPP	Proposed Paradise Valley Specific Plan threatens connectivity and habitat	Propose removal of proposed residential land use designation in the upcoming 2022 CVGP update. Acquire lands for conservation.
LUP-2	THREAT	Proposed Athos, Oberon and , Arica and Victory Pass Solar Developments will impact north south connectivity in the linkage	Create listserv to rally and organize community response to proposed projects during ER process for each project.
LUP-3	OPP	Chuckwalla Mountains National Monument Proposal	Write letters of support to Representatives when the bill is introduced to Congress.
AE-1	OPP	DRECP Connectivity Initiative; opportunities for BLM acquisitions to support connectivity	Write letters of support to DOI in support of the Initiative and specific acquisitions
TI-1	NEED	CA Aqueduct is a barrier to wildlife movement	Work with MWD to identify future opportunities for incorporating connectivity enhancements into the aqueduct infrastructure
TI-2	NEED/ OPP	Wildlife/directional fencing needed for I-10 to protect tortoises and other wildlife from vehicle mortalities. Ensure that fencing also installed in median openings at bridges	Urge Caltrans to incorporate fencing into planned projects for I-10, such as the proposed median project. Convince CDFW that new fence is appropriate mitigation for 2081/CESA.
TI-3	NEED	Rip rap at existing I-10 undercrossings impedes tortoise and other wildlife movement	Urge Caltrans to remove rip rap as part of future planned projects for I-10. Review alternatives in AZ & NV that will serve similar hydraulic function in CA.
RM-1 RM-2	NEED	Camera trap and tracking studies needed for existing I-10 undercrossings in the linkage is to understand issues, importance of selected crossings (ie, Thermal Canyon) and opportunities for enhancement	Urge Caltrans, USGS, or other entity to complete camera trap monitoring as part of future planned projects for I-10.
RM3	OPP	UNR Genetic Study for Desert Tortoise	
RM-4 RM-5 RM-6		USGS Desert Tortoise population monitoring locations: Cottonwood (RM-4), Orocopia (RM-5) and Deep Canyon (RM-6)	

AE = Acquisition Conservation Easement
LUP = Land Use Policy
RS = Restoration Stewardship
TI = Transportation Infrastructure



Athos Renewable Energy Project shown in red

THREAT Proposed Oberon Solar Development Project (image below) is the first solar project to be processed under the DRECP Conservation Management Actions. IP Land Holdings, LLC, proposes to construct solar arrays, substation, battery storage and interconnecting power lines on 4,700-acres of BLM-managed public lands. Scoping comments on the Notice of Preparation of a Draft Environmental Impact Report were due April 19, 2021. Rather than be consistent with DRECP (2016), the project applicant is proposing to amend the California Desert Conservation Area Plan, which would set a very bad precedent. The project is evaluating potential impacts of occluding designated wildlife corridors in the DRECP where there are good culverts and bridges across I-10, and siting over microphyll woodlands. The Colorado River Basin Regional Water Quality Control Board is the CEQA lead for the EIR. Additional information about the proposed Oberon Solar project is available online at https://go.usa.gov/xfdH5. ***Recommended Action:*** Contact BLM at BLM_CA_PS_OberonSolar@blm.gov to get on the distribution list for the DEIR. USFWS working with BLM to ensure consistency with DRECP and maintain habitat linkages. For comments, questions, or to contribute biological information for consideration, please contact Vincent_james@fws.gov and Magdalena.Rodriguez@wildlife.ca.gov



THREAT Arica Solar and Victory Pass Solar Projects

The BLM is the lead federal agency for the National Environmental Policy Act (NEPA) review and is responsible for deciding whether to grant, grant with modifications or deny the right-of-way applications for Arica and Victory Pass Solar Projects. California Department of Fish and Wildlife separately intends to produce an Environmental Impact Report for the projects as the lead agency for the California Environmental Quality Act (CEQA) review. The BLM expects the environmental documents to be available for public review later this year. ***Recommended Action:*** Contact BLM at mliberat@blm.gov to get on the distribution list for the DEIR. USFWS working with BLM to ensure consistency with DRECP. For comments, questions, or to contribute biological information for consideration, please contact Vincent_james@fws.gov and Magdalena.Rodriguez@wildlife.ca.gov.

General Recommendations Solar Projects: Develop listserv to alert conservation community of proposed solar developments. Submit comments in force during scoping periods and when DEIR/EISs are released. Call out threats to habitat loss and fragmentation but also provide suggestions for actionable alternatives (e.g., rooftop solar, grey space solar within city matrix) to shift industrial solar away from converting natural habitats.

OPPORTUNITY Chuckwalla Mountains National Monument Proposal (LUP-3 on Figure 12) Several organizations that participated in the workshop (TWC, MDLT, California Wilderness Coalition), and several others groups are working to submit a National Monument Proposal for the greater Chuckwalla Mountains area to Representative Ruiz. Proponents are currently in the process of field checking the proposal and hope to get to Representative Ruiz, who is largely supportive, by late summer or early fall of 2021. The proposed monument boundaries were primarily drawn based on protecting habitat connectivity and critical wildlife movement corridors and would provide a higher level of protection for this big swath of land, that already includes National Conservation Lands, Wilderness Areas, and Areas of Critical Environmental Concern. ***Recommended Action:*** When this bill is introduced into Congress send a letter of support or call your Representative to inform them of the importance of this area to maintaining landscape connectivity, critical wildlife movement corridors, and the California desert's rich biodiversity, and urge them to support designation of the Chuckwalla Mountains National Monument.

Speaker Geary Hund from Mojave Desert Land Trust had this to say of the area proposed for a National Monument, "we keep learning how special it is. It has more species than any other part of the Colorado Desert -- 156 species. It also has the highest desert tortoise densities, a mule deer subspecies called the burro deer, and a key area for reintroduction of pronghorn. It also has incredible cultural sites, a very special area". Kerry Holcomb from US Fish and Wildlife Service commented "it's one of the best opportunities for a Yellowstone type ecosystem in southern California. May be dreaming big but if we can get constituent ungulates back, get ORV under control, full protection of areas, that area could be a crown jewel for southern California".

OPPORTUNITY BLM California Desert Conservation and Connectivity Initiative (AE-1 on Figure 12) has been put forward by the California Desert District of the BLM. This initiative is envisioned as an on-going, multi-phased, multiple year proposal to improve desert tortoise conservation lands and conserve wildlife connectivity within the California Desert Conservation Area as identified in the Desert Renewable Energy Conservation Plan (DRECP). This program will focus on BLM acquisitions for maintaining connectivity and TES habitat on lands designated as California Desert National Conservation Lands or Areas of Critical Environmental Concern. Virtually all of the unprotected land in the linkage lies within these designations, providing conservation opportunities. See map of California Desert Conservation and Connectivity Initiative focus areas in section 6.2 on page 67. Following workshop, several participants met with BLM staff to discuss this initiative. ***Recommended Action:*** Send a letter of support to Secretary Deb Haaland for BLM's funding request through the Land and Water Conservation Fund for the California Desert Conservation and Connectivity Initiative that will help to conserve essential linkages and conservation areas in the Mojave and Sonoran deserts.

7.3 Transportation and Infrastructure Needs, Opportunities, and Threats

NEED California Aqueduct Barrier to Movement (TI-1 on Figure 12): There are excellent bridges along I-10 but a half mile north is the CA aqueduct, and it is a significant barrier except for where there are siphons that go underground, usually in locations where there are washes that it crosses. In addition, it is important to make sure that siphons are designed to prevent wildlife from getting stuck inside. ***Recommended Actions:*** Reach out to MWD to see if there might be future opportunities for incorporating connectivity enhancements as part of any planned future maintenance or upgrades.

NEED/OPPORTUNITY Wildlife Exclusion and Directional Fencing (TI-2 on Figure 12): Fencing for tortoises and other wildlife is needed for the I-10 in the Joshua Tree to Chocolate Mountains linkage. Kerry Holcomb at USFWS commented that this area is a priority for desert tortoise connectivity and the second highest ranked priority for the installation of protective highway fence that guides tortoises and other critters toward existing and improved underpasses. It is the only way to connect tortoise populations in the lower Colorado Desert with those in the Mojave. Jeff Lovich indicated that he has seen a dead mule deer on I-10 and wondered, in addition to fencing, if the existing undercrossings are tall enough for mule deer. Kristeen Penrod noted that they documented several large bridges and culverts likely large enough for mule deer along this section of I-10; just need fencing to funnel mule deer to these crossings. In addition, median openings at existing crossings need to be fenced as well. ***Recommended Action**:* Caltrans has a series of projects coming up on I-10 to flatten median to stop rollover accidents, so there may be an opportunity to integrate wildlife exclusion fencing into a future planned project. Could potentially also include vehicle barriers to prevent unauthorized ORV use. Caltrans, in coordination with CDFW, is evaluating installation of tortoise fencing in lieu of mitigation between Indio and the State line.

NEED Rip rap removal (TI-3 on Figure 12): Rip rap at existing under-crossings along I-10 in the Joshua Tree to Chocolate Mountains Linkage make it difficult for tortoise to use the crossings. ***Recommended Action**:* Caltrans could evaluate addressing this problem as part of a future I-10 SHOPP project to upgrade median, culverts, and bridges for I-10.

7.4 Research and Monitoring Needs and Opportunities

NEED Camera Trap Monitoring of I-10 Crossings (RM-1 on Figure 12): Camera trap monitoring needs to be completed for the I-10 crossings in the Joshua Tree-Chocolate Mountains linkage. Some monitoring of tortoise use is being conducted, but a comprehensive camera trap study is needed to document wildlife use of crossings. ***Recommend Action:*** Suggest camera trap monitoring be conducted as part of planning for I-10 median improvements.

NEED Monitor Thermal Canyon for Wildlife Movement (RM-2 on Figure 12): Bill Havert asked if anyone with science background ever looked at Thermal Canyon where it crosses I-10 and its utility for wildlife. Because Thermal Canyon is huge and has large open bridge structures, Bill was wondering if it could be a good corridor between Joshua Tree and Mecca Hills. Coachella Valley Conservancy did look at acquisitions in Thermal Canyon and opportunities to acquire lands but need data on wildlife use.

OPPORTUNITY Desert Tortoise Genetic Connectivity Study (RM-3 on Figure 12): Kirsten Ducher/Post Doc at UNR offered that she is conducting research/collection of tortoise genetic data in Desert Center area and just finished this year. Genetic material was collected from Joshua Tree, Desert Sunlight, Chocolate Mountains and Chuckwalla Bench. Looking at population genetic structure differentiation and diversity as a result of natural and anthropogenic features on the landscape.

Figure 12 also depicts a few research and monitoring locations described in Rob Lovich's presentation summarized on pages 28-30 that were added to the map, which include the Cottonwood tortoise population (RM-4), Orocopia tortoise population (RM-5), and Deep Canyon tortoise population (RM-6).

7.5 Restoration and Stewardship Needs and Opportunities

The restoration and stewardship discussion for the Joshua Tree-Chocolate Mountains Linkage mainly focused on implementation of the Desert Renewable Energy Conservation Program (DRECP) and engagement with Tribal Nations.

The vast scale of renewable energy developments proposed in the California deserts are likely to impact habitat connectivity, alter essential ecosystem functions, and eliminate opportunities for species to shift their ranges in response to climate change. The potential impacts of energy development on our existing public lands, specifically to wildlife and their ability to move across the landscape, are enormous.

NEED Conservation Summit for DRECP One of the key needs identified was to organize a presentation summit with BLM, conservation organizations, and wildlife, land management, and transportation agencies to discuss DRECP implementation and priorities for connectivity conservation. The BLM Desert District Manager is aware of the Monument proposal and its importance to connectivity. The new implementation lead for the DRECP is also putting a Land and Water Conservation Fund proposal together specifically for acquisitions in wildlife movement corridors (See BLM California Desert Conservation and Connectivity Initiative in section 6.2 above). The new Implementation Lead for DRECP also served on the Multidisciplinary Team as the BLM representative for the California Essential Habitat Connectivity Project, so she has a deep understanding of connectivity needs in the region. In addition, with the passage of the Great American Outdoors Act, it will be important to coordinate with BLM Desert District on funding opportunities that will be coming in for acquisitions. ***Recommended Actions:*** Organize an inter-agency DRECP Implementation Summit to identify critical connections threatened by Development Focus Areas and shared priorities for linkage conservation. Contact your Representatives and Senators in Congress to urge them to pass legislation that focuses renewable energy projects in already disturbed areas near population centers.

OPPORTUNITY Engage Agua Caliente Tribe in Linkage Implementation Alliance. The Agua Caliente Tribe has their own MSCP. The Coachella Valley Conservation Commission works closely with the Tribe on some different monitoring efforts, such as Peninsular bighorn surveys and trail monitoring. The Tribe has a sophisticated GIS staff, and is super helpful when applying for grants. The Tribe is also very interested in land management issues. Culturally significant areas are included in the MSHCP areas too. CVCC has been discussing how they can better assist the Tribe with access to their ancestral lands, which may include areas of the Joshua Tree-Chocolate Mountains Linkage. ***Recommended Actions:*** Create a relationship with the Tribe to listen and learn about their experiences in the area. Where and when they feel it is possible, explain the goals of the Linkage Implementation Alliance, hear about their conservation priorities and related projects, identify shared goals and collaborative actions to meet those goals, and invite them to engage in the in the Alliance in whatever role they deem appropriate (e.g., leadership, partnership, participant)

A participant asked if the organizations working on the proposed National Monument had reached out to tribes. Geary Hund at MDLT said that the Native American Land Conservancy was working with them on the proposal.

8. Outreach & Education for All Linkages

Outreach and education are vital to success linkage conservation – 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. Educating communities around each linkage will raise awareness, build support for linkage conservation, provide a base of volunteers who can work to implement specific projects in the linkages (e.g., erosion control or riparian planting), and develop the next generation of linkage stewards. We need to effectively engage the community to develop a public expectation of linkage protection. We need to organize new constituencies and empower old partners and utilize the unique abilities of each constituency to institutionalize support for these linkages. Participants shared several ideas focused on community engagement in conservation issues, which have been summarized here:

NEED Hold a meeting to begin connectivity outreach in this region and where: Include representatives from JTNP, USFS, BLM, RCA, CVCC, MDLT, TWC. Learn from JTNP on their media outreach and adapt/expand it to messaging on the need for connectivity. For example, JTNP has started a scientific journal for the park, and we could do a whole issue on connectivity between Joshua Tree and other protected lands (highlight studies for different species, Caltrans work on SR 62, etc.).

NEED Long term outreach: human interest stories regarding children engaged in learning and explaining connectivity. For example:

- Getting kids at local schools involved in the design of crossing structures for SR 62
- Desert Environmental Youth Experience (CVCC): student led projects
    - UCR/CCB, TWC, CREEK (Jen F), mission springs water district
    - SoCal Gas: Teaching the Teachers grant
    - Other funders: Wells Fargo, local businesses

OPPORTUNITY Caltrans District 8 has been very proactive with their connectivity efforts, and has several projects planned or underway that could be highlighted in the press to educate the public on the need for connectivity and the actions that are being taken on the ground, and the wildlife that these projects will benefit. For example, the Press Enterprise published a 3-page feature on the Liberty Canyon 101 wildlife crossing, and a similar feature could highlight efforts in this region. One such article was recently published in the Desert Sun, Mojave Desert Land Trust wants wildlife overpass on Highway 62 (desertsun.com).

NEED A big picture media focus on connectivity in southern California from the border to Death Valley to the southern Sierra Nevada is needed.

NEED Develop public outreach materials centered on habitat connectivity. SC Wildlands' traveling exhibit, Wildlands of the Santa Clara River Watershed, included a series of landscape photographs, species photos and maps to help tell the story. On opening night at each venue, a Living on the Edge program was held on how to be good land stewards at the urban wildlife interface. Wildlife ambassadors (e.g., bobcat, kingsnake, red-tailed hawk) were part of the program to get the community and especially kids excited. Companion stewardship brochures were also distributed on opening night, and then plenty were left for take away for the life of the exhibit at each location.

NEED Develop some kind of story map or online game of how wildlife interact with all of these barriers, e.g., how does a road look to a desert tortoise? Create materials that explain how connectivity is important to find mates, food, shelter to make the experience real for them. Could be a great tool for teachers too.

9. Funding for Conserving Connectivity & Wildlife Passage Improvements

The following funding programs and opportunities address various aspects of conserving habitat connectivity and improving fish and wildlife passage. This list is not exhaustive.

There are funding streams that come from federal gas tax dollars for wildlife crossing improvements and improvements to habitat connectivity, which are eligible under parts of the federal transportation bill (https://www.fhwa.dot.gov/fastact/factsheets/). Whereas, Caltrans has a lot more difficulty programming stand-alone terrestrial wildlife crossing projects because it's not currently an eligible project type under one of their asset classes.

Bureau of Land Management issues financial assistance through grants and cooperative agreement awards to institutions of higher education, non-profit organizations, state and local governments, foreign entities and Indian tribal governments for projects that meet the BLM mission and falls in line with the DOI's top priorities. Several programs are available https://www.blm.gov/services/financial-assistance-and-grants.

CDFW Big Game Grant Program funds are generated through the purchase of game tags that are used in programs and projects that benefit big game species (bighorn sheep, bear, deer, elk, pronghorn antelope, and wild pig). "Projects" refers to research and habitat restoration or enhancement activities that benefit big-game species. These projects may be conducted solely by CDFW staff or in partnership with outside entities (https://wildlife.ca.gov/Grants/Big-Game).

California Forest Improvement Program encourages private and public investment in, and improved management of, California forest lands and resources. Cost-share assistance is provided to private and public ownerships containing 20 to 5,000 acres of forest land. Cost-shared activities include management planning, site preparation, tree purchase and planting, timber stand improvement, fish and wildlife habitat improvement, and land conservation practices (https://www.fire.ca.gov/grants/).

Caltrans Advance Mitigation Program authorizes Caltrans to plan and implement advance mitigation solutions for its future transportation projects to reduce delays by proactively obtaining environmental mitigation in advance of – rather than during – transportation projects. The primary goal of the Program is to address longer-term future environmental mitigation needs resulting in improved environmental, economic, and project delivery outcomes. By consolidating the forecasted mitigation needs of multiple future transportation projects, Caltrans can potentially provide strategically placed and environmentally sound replacement habitat and shorten project delivery timelines, resulting in both time and cost savings. Ultimately, the Program aims to help Caltrans meet conservation goals in addition to regulatory requirements (https://dot.ca.gov/programs/environmental-analysis/caltrans-biology/strategic-biological-planning-advance-mitigation-innovation/advancemitigation).

DOI S.O. 3362, Improving Habitat Quality in Western Big-Game Winter Range and Migration Corridors announced $3.2 million in grant funding on February 14, 2020, for 11 western states, bringing the DOI and other stakeholders' support of big game species habitat conservation and scientific research for migration corridors and winter ranges to more than $22 million since S.O. 3362 was issued. These grants are a part of DOI's ongoing efforts to implement S.O. 3362; $6.4 million has supported 36 research projects vital to scientifically identifying migration corridors and seasonal use areas (e.g., winter range). In addition to funding state-defined priority research projects, DOI has made available another $1.4 million over two years to assist state wildlife agencies with big game movement data analysis and corridor mapping, and almost $14.4 million has been matched in partnership-assisted grant funding for direct habitat conservation in support of the order.

Environmental Enhancement and Mitigation Program (EEMP) administered by the California Transportation Commission funds environmental enhancement and mitigation projects directly or indirectly related to transportation projects. EEMP projects must fall within one of three categories: highway landscape and urban forestry; resource lands; or roadside recreation. Projects funded under this program must provide environmental enhancement and mitigation over and above that otherwise called for under the California Environmental Quality Act (https://catc.ca.gov/programs/environmental-enhancement-mitigation).

Federal Lands Access Program (FLAP) was established in 23 U.S. Code 204 to improve transportation facilities that provide access to, are adjacent to, or are located within federal lands. FLAP supplements state and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators. The program is designed to provide flexibility for a wide range of transportation projects (https://flh.fhwa.dot.gov/programs/flap/).

Federal Lands Transportation Program was established in 23 US Code 203 to improve the transportation infrastructure owned and maintained by the following Federal Lands Management Agencies: National Park Service, Bureau of Land Management, U.S. Forest Service, USFWS, U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, and independent federal agencies with land and natural resource management responsibilities (https://flh.fhwa.dot.gov/programs/fltp/).

National Fish and Wildlife Foundation awards competitive grants through their programs to protect and conserve fish, wildlife, plants, and habitats. They have several relevant grant programs, such as Conservation Partners Program, Bring Back the Natives, and Acres for America (https://www.nfwf.org/programs).

Regional Conservation Partnership Program is a Natural Resources Conservation Service program that seeks to co-invest with partners to implement projects that address regional natural resource concerns. Partners must apply to either the Critical Conservation Area (CCA) or state/multi-state funding pool. Most of Caltrans District 2 is identified as a CCA. This program awards $300 million annually. It requires a 50% match, which can be in any combination of cash and in-kind (https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/rcpp//).

Resource Conservation Districts (RCD) work with state, federal, and local partners to create publications that help local residents make smart conservation and land management choices. These resources can benefit anyone from students to farmers to land managers, and are developed with the public interest in mind. RCD Regions that overlap the three focal linkages include Inland Empire RCD, San Jacinto Basin RCD, Mojave Desert RCD, and Coachella Valley RCD (https://carcd.org/rcds/find/).

Tribal Transportation Program is authorized under the Federal Lands Highway Program, and is jointly administered by the Bureau of Indian Affairs and Federal Highway Administration. Symposium participants said that Tribes can use this to do transportation improvements and projects of their own on the State Highway System or county roads. Relationships and future partnerships with tribes are important so that together we can co-create or support them in their project efforts as they lead. It is possible that tribes may not have the capacity to perform or implement project work so creating relationships and having more partners improves an entity's chances of obtaining grant funding and could help in building capacity where the tribes deem it is needed. A total of $505 million has been authorized for the program in fiscal year 2020 (https://www.fhwa.dot.gov/fastact/factsheets/tribaltransportationfs.cfm).

Wildlife Conservation Board's Wildlife Corridor and Fish Passage Program was allocated $30 million by Proposition 68 to fund planning and implementation projects that improve passage for fish and wildlife. Example projects for this program include the construction of wildlife crossings, restoration of habitat in wildlife corridors, removal of instream impediments to fish passage, etc., and planning projects that provide design and environmental review for wildlife corridor or fish passage restoration projects. Other programs that may contribute to conserving connectivity include Acquisitions and Conservation Easements, Forest Conservation, and Climate Adaptation. For more information, visit https://wcb.ca.gov/Grants.

U.S. Fish and Wildlife Service's Tribal Wildlife Grants Program provides technical and financial assistance to Tribes for the development and implementation of programs that benefit fish and wildlife resources and their habitat. Activities may include, but are not limited to: planning for wildlife and habitat conservation, fish and wildlife conservation and management actions, fish and wildlife related laboratory and field research, natural history studies, habitat mapping, field surveys and population monitoring, habitat preservation, and public education that is relevant to the project (Fish and Wildlife Service - Native American Liaison fws.gov).

10. Summary of Recommendations, Next Steps, and Action Items

Land use and policies are important tools for maintaining and restoring connectivity and numerous supportive policies are already in place. As part of ongoing planning processes (e.g., general plan updates, transportation plans, Habitat Conservation Plans, watershed management plans), opportunities exist to insert and formalize strategies for conserving connectivity. Similarly, ongoing revisions to existing plans and policies present opportunities to revise language that is not consistent with linkage conservation (e.g., a choke point in a linkage that is zoned for high-density residential). Participation in public planning processes is key to enacting policies that can maintain, restore and enhance habitat connectivity.

Implementation should also include a system of monitors for tracking planning processes and local land use actions that may impact or even sever a linkage. If potentially disruptive actions are identified early enough in the planning process wildlife movement issues can be addressed. Each Linkage should have at least one monitor (e.g., organization, individual) who can rally the troops as necessary. Monitors should focus on specific jurisdictions and at-risk areas, be on information distribution lists for general plan amendments and, for specific areas of concern, proposals for zoning and other land use regulatory changes as well as specific development proposals.

The term stewardship speaks to the importance of long-term conservation, monitoring and adaptive management, which are essential to maintain and restore connectivity and the ecological processes on which biodiversity depends. Stewardship of public and private lands is essential for maintaining biological diversity and productivity over time. Consistent sources of funding are needed to implement long-term adaptive management plans to assess and improve management effectiveness. Ongoing monitoring is the only way to fully comprehend species and ecosystem responses to management actions and it is critical to ensuring that these linkages are used by the flora and fauna for which they were intended.

We must also convey the vision of a connected landscape to a much broader audience if it is to gain the social and political support necessary to make it a reality. We need to develop and implement communication strategies to inform the general public and decision makers as to the importance of protecting these linkages. We also need to establish processes to ensure that all entities that acquire, regulate or influence wildlife habitat protection in the region incorporate the linkages into their conservation planning efforts.

General overarching recommended actions include:

Land Use, Planning and Protection Identified Actions:

1. Support Acquisitions in the Badlands by Signing on to Support Letter https://www.surveymonkey.com/r/L53RM5V
2. Develop Conceptual Area Protection Plan (CAPP) or other protection plan for linkages not covered by NCCPs (San Bernardino to San Jacinto Mtns Linkage, Joshua Tree to Chocolate Mtns Linkage)
3. Investigate life span of surface mines and the possibility of administrative withdrawals for the other mining claims in the linkages. Monitor possible NOP for proposed gravel mine expansion in San Gorgonio River
4. Stay informed about/support California Wilderness Coalition's Future Wilderness Area designation proposal
5. Assemble a group of planners, govt agencies, wildlife biologists to assess connectivity opportunities in the western/CSS linkage in the Calimesa area of the San Bernardino to San Jacinto Linkage
6. Monitor status/comment on proposed development Beaumont Point south of I-60 adjacent to newly constructed I-60 wildlife crossings
7. Cherry Valley Interchange Project – potential to incorporate wildlife crossing enhancements for El Casco Creek

Transportation and Infrastructure Workshop Identified Actions:

8. Convene a subcommittee/group for I-10 Bypass Project composed of agencies, scientists, NGOs
9. Convene group of scientists, agencies, NGOs, for western CSS Link in Calimesa area
10. Get meetings with rail, water and power companies to discuss connectivity remediation actions
11. Thermal Canyon – collect data on wildlife use?
12. Get follow-up/input on how recommendations for connectivity structures are considered? Funding sources to draw on for the structures themselves

13. Send out updates on existing /proposed transportation bills
14. Compile data for wildlife for linkage areas. Most NGOs comment on projects during EIR process, but if we could get the data to the jurisdictions/decision makers so they can be informed prior to initiating a project/NOP.

Research and Monitoring Workshop Identified Actions:

15. Joshua Tree-Chocolate Mtns: monitoring of I-10 under-crossings needed
16. Effects of ground vibration at under-crossings use by small wildlife, and what can be done about it (I-90 Study)? Is there habitat type that vibrates less? Is it related to height of road?
17. Focus on SB-SJ connectivity needs between Cabazon and Whitewater – important transition zone. Possible that species might start moving west in response to climate change
18. If I-10 Bypass project moves forward, consider land acquisition in that area as part of mitigation
19. Consider elevated (modular construction) roadways in active wash areas to facilitate sand and water movement. Wind transport requires wide openings in the crossing structures/elevated roadways.
20. Focus on Opportunities to preserve open wash habitat where it still exists. Examine why sand transport is not happening in San Gorgonio wash – is it the gravel mine in San Gorgonio River?
21. Roadway edge hardening (ie, removal of vegetation) as a deterrent for wildlife to cross the road
22. Relocate percolation ponds south of I-10 to allow restoration and sand transport
23. Establish relationship with Morongo Band of Mission Indians, hear about their conservation priorities and related projects, identify shared goals and collaborative actions to meet those goals, and invite them to engage in the in the Linkage Implementation Alliance in whatever role they deem appropriate (e.g., leadership, partnership, participant).

Stewardship, Restoration and Outreach Workshop Identified Actions:

24. Meeting of agencies and NGOs regarding connectivity needs and DRECP.
25. Hold a meeting to begin connectivity outreach in this region and where: Include representatives from JTNP, USFS, BLM, RCA, CVCC, MDLT, TWC. Learn from JTNP on their media outreach and adapt/expand it to messaging on the need for connectivity. For example, JTNP has started a scientific journal for the park, and we could do a whole issue on connectivity between Joshua Tree and other protected lands (highlight studies for different species, Caltrans work on SR 62, etc.).
26. Cottonwood Creek Restoration (de-channelization) feasibility study
27. Meeting to create a relationship with the Tribes: Morongo Band of Mission Indians
28. Long term outreach: human interest stories regarding children engaged in learning and explaining connectivity: examples
    a. Getting kids involved in the design of crossing structures for SR 62
    b. Desert Environmental Youth Experience (CVCC): student led projects
    a. UCR/CCB, TWC, CREEK (Jen F), mission springs water district
    b. SoCal Gas: Teaching the Teachers grant
    c. Other funders: Wells Fargo, local businesses
29. Highlight Caltrans D8 efforts to protect connectivity in the news
30. Press Enterprise: whole 3 pages “crossing for cougar town” (Liberty Canyon)- do the same but HERE!

31. SoCal perspective: need a big picture media focus on connectivity – from the border to Death Valley to southern Sierra Nevada

The Linkage Implementation Alliance (LIA) is envisioned as an ongoing forum and communication network that would meet regularly to promote coordination across jurisdictional boundaries and diverse disciplines with the primary goal of implementing these three linkages, which will also support implementation of the WRCMSHCP and the CVMSHCP. It is our hope that the LIA will focus disparate conservation efforts on coordinated regional actions and create and sustain the partnerships needed to conserve connectivity.

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Appendix A
Workshop Recordings

The workshop recordings will be available online until June 2022.

Topic: Greater I-10 Linkage Land Use, Planning and Protection Workshop, April 19, 2021

Meeting Recording:

https://tnc.zoom.us/rec/share/EdWfNnprs775LSdVSzUrN6JTazTlkdjT1PuHAWUD0U5xc_Y9sz8bXaoZa0ozXxK8.k_J9yyTE2tYcbv7P

Topic: Greater I-10 Linkage Transportation and Infrastructure Workshop, April 20, 2021

Meeting Recording:

https://tnc.zoom.us/rec/share/UAfC3MSC_MMnax0ptV2C4MvCS6QIA5ovPoxcqb8B2awc4IQbv2-QS7Lt6l7pyPNm.rZYE6st_U0HSY11I

Topic: Greater I-10 Linkage Research and Monitoring Workshop, April 27, 2021

Meeting Recording:

https://tnc.zoom.us/rec/share/eo-VSnem_ECJUx6RdCWqk7UYk2ddOFNAyYvnIqZeuoSKWSv8Iupj-g70PEaeUIvr.-lOkK_qEho9arSMe

Topic: Greater I-10 Linkage Stewardship and Outreach Workshop, April 28, 2021

Meeting Recording:

https://tnc.zoom.us/rec/share/KYvxKJVXzirM4EoA_xOqsEZlbzgoRzZB0ZEep6t9dp8UVExD8mPEw6uMha9LT10.svYvWuYo7ETX1KC5