AN ANALYSIS OF WEST-WIDE ENERGY CORRIDOR 30-52

Additional transmission capacity is needed to bring renewable energy to communities in the West. This report looks at the potential for West-Wide Energy Corridor 30-52 to deliver power to markets in Arizona and California, and the possible environmental impacts if transmission lines are built in the corridor.

The Brenda Solar Energy Zone, an example of renewable energy lands near to Corridor 30-52, a West-Wide Energy Corridor in Arizona.
About Sonoran Institute

Mission
The Sonoran Institute inspires and enables community decisions and public policies that respect the land and people of western North America.

Vision
The Sonoran Institute contributes to a vision of a West with:

- Healthy landscapes—including native plants and wildlife, diverse habitats, open spaces, clean air and water—from northern Mexico to western Canada.
- Vibrant communities where people embrace conservation to protect quality of life today and in the future.
- Resilient economies that support prosperous communities, diverse opportunities for residents, productive working landscapes, and stewardship of the natural world.

A Collaborative, Community-Based Approach
The nonprofit Sonoran Institute, founded in 1990, works across the rapidly changing West to conserve and restore natural and cultural assets and to promote better management of growth and change. The Institute's community-based approach emphasizes collaboration, civil dialogue, sound information, local knowledge, practical solutions, and big-picture thinking.

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About the Sun Corridor

The Sun Corridor Legacy Program is one of the four keystone initiatives of the Sonoran Institute. The “Sun Corridor” refers to Arizona’s megapolitan area stretching from Nogales in the south to Prescott in the north, with Phoenix and Tucson at its core. The megapolitan is growing at a tremendous rate, and that rapid growth comes with the challenge of conserving natural desert and open space while improving urban quality of life. The Sun Corridor Legacy Program’s three focus areas are:

- **Envisioning** a healthy and prosperous Sun Corridor region,
- **Engaging** diversity in environmental issues and decision-making,
- and **Enhancing** the community by promoting strategic conservation initiatives.

The Sun Corridor’s desirable climate, housing options, and relatively low cost of living are reasons why this region continues to attract new residents. Future quality of life, environmental quality, and economic prosperity will largely be determined by how well growth is managed. Going forward, regional solutions that comprehensively address conservation, development, transportation, water, and energy issues will be critical to a more sustainable future.

Arizonans must consider these regional issues when making decisions about how to develop communities, preserve cherished open spaces, ensure an adequate high-quality water supply, protect our quality of life, and enhance economic prosperity. New approaches to problem solving are needed to make this happen, and the Sonoran Institute finds them through work with federal, state, and local governments, and stakeholder groups to determine the best mix of land use and conservation for lands in the region. To find out more about the program’s initiatives, visit [www.sonoraninstitute.org](http://www.sonoraninstitute.org).

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**John Shepard** is a Senior Adviser at the Sonoran Institute, responsible for ensuring that the mission and vision of the organization are realized through long-range strategic planning and effective program development, implementation, and evaluation. John is currently leading the Institute’s efforts to appropriately site utility-scale solar projects in Arizona and more effectively integrate local land-use policies and water management in the Colorado River basin.

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## Contents

About Sonoran Institute .................................................................................................................. 2
About the Sun Corridor .................................................................................................................... 3
   About the Authors ....................................................................................................................... 3
Introduction .................................................................................................................................... 7
   Section 368 and the West-Wide Energy Corridors ..................................................................... 9
   The Sonoran Institute and Renewable Energy .......................................................................... 9
   Arizona Solar Working Group .................................................................................................... 11

1. Energy ....................................................................................................................................... 13
   1.1. Palo Verde Hub ..................................................................................................................... 13
   1.2. Bureau of Land Management ............................................................................................... 13
   1.3. State Trust Lands and Renewable Energy ......................................................................... 15
   1.4. County Renewable Energy Incentive Districts .................................................................. 16
   1.5. Gila Bend/Transmission Study ............................................................................................. 16

2. Transportation ............................................................................................................................. 16
   2.1. I-10 ...................................................................................................................................... 16
   2.2. Interstate 11 ......................................................................................................................... 17
   2.3. Highway-oriented Development ......................................................................................... 18

3. Water ......................................................................................................................................... 18
   3.1. CAP ..................................................................................................................................... 18
   3.2. Colorado River ..................................................................................................................... 20

4. Land Development ....................................................................................................................... 20
   4.1. County Plans ....................................................................................................................... 21
      Maricopa County ..................................................................................................................... 21
      La Paz County ......................................................................................................................... 22
   4.2. City/Town plans ................................................................................................................... 23
      Quartzite ................................................................................................................................. 23
   4.3. Other Planning Considerations ........................................................................................... 24
      Planned developments ............................................................................................................. 24
      US Bureau of Land Management Lands .............................................................................. 25
      Sonoran Desert Heritage Conservation Plan ........................................................................ 26

5. Military Facilities & Operations .................................................................................................. 26
6. Native American Concerns
7. Environmental Concerns
   7.1. Wildlife
      ESA protected species
      Sonoran desert tortoise
      Desert bighorn sheep
      Other ground-dwelling animal impacts:
   7.2. Species of economic and recreational importance (SERI)
   7.3. Birds
   7.4. Plants
   7.5. Riparian areas
8. Lands with wilderness character
9. Threats to cultural resources
10. Recreation Activities
11. Conclusion
Appendix II: Wildlife Impacts
    Mapping Discussion and Results
Corridor 30-52 is aligned with Interstate 10 and could provide the opportunity for lower impact infrastructure by co-locating energy transmission with a highway. This photo shows an existing corridor in Buckeye, AZ that brings together electrical transmission, a flood control structure, and an interstate highway.
An Analysis of West-Wide Corridor 30-52

Introduction

Over the past decade in the West, substantial planning efforts have been undertaken to assess environmental risks from infrastructure development and to identify the highest quality, lowest impact, and easiest to access development areas for renewable energy and/or transmission. This work stems from the recognition that renewable sources of power will increasingly be developed and that there are more and less suitable sites for large-scale generation projects and associated transmission. By identifying these locations in advance, projects can be guided to lower-conflict sites on the landscape, increasing the predictability for development and conservation activities alike.

Arizona has been a state leader in this regard. As of 2012, the state has been generating 4% of its electricity from renewable sources other than hydroelectric plants (Figure 1). The Arizona BLM office undertook a statewide assessment, the Restoration Design Energy Project (RDEP), which ultimately identified 196,000 acres of low-conflict BLM lands suitable for solar and wind development. Figure 2 identifies the Renewable Energy Development Areas (REDAs) and Solar Energy Zones (SEZs) that were identified through the RDEP and the Western Solar Plan (WSP). This assessment also identified U.S. Forest Service (FS), state trust, and private lands that met similar criteria. The Arizona State Land Department undertook a similar assessment of state trust lands that identified lands suitable for renewable energy development. Finally, Arizona counties and other local jurisdictions are identifying Renewable Energy Incentive Districts where they would like to establish future solar and wind development. Many of the lands identified as suitable for solar and wind development through these various processes are located in areas west of the Phoenix metropolitan area.

In addition to these efforts, Arizona’s political and economic development leadership is building the state’s economic future, in part, on solar energy development. The state’s abundant solar resources, considered among the best in world, and its vast land base are the assets that could generate economic activity in job creation, tax revenues, and capital investment. Arizona is expected to consume an increasing amount of solar in-state, but recognizes that export is necessary and desirable to increase the state’s economic prosperity. As transmission lines are the highways of electricity, the state must be able to build future transmission infrastructure to deliver its primary energy product—solar electricity—to markets throughout the Western United States.

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1 These consist of the Western Governors’ Association’s Western Renewable Energy Zone identification process, BLM’s Solar Programmatic Environmental Impact Statement, the Western Electricity Coordinating Council’s Environmental Data Task Force, and California’s Desert Renewable Energy Conservation Plan.

2 Arizona’s historic load growth is 4% per year, much faster than the national average of 1.5%.
Several factors contribute to the need for additional electrical transmission capacity and associated energy corridors such as 30-52 across Arizona:

- While the pace and magnitude of development is uncertain, market fundamentals dictate that additional transmission and transfer capability likely will be needed between Arizona and other states.
- Arizona’s growth rate—historically one of the nation’s highest—requires continual investment in electrical transmission infrastructure to reach newly developed areas and to ensure reliability of the existing system as it expands.
- California, Arizona’s western neighbor, is considered the world’s eighth largest economy, the nation’s largest state energy consumer, and the state with the most aggressive clean energy goals.
- Arizona’s eastern neighbor, New Mexico, has high-quality wind resources that far exceed projected in-state demand and will seek to export these.
- Arizona is home to two of the largest electric hubs in the West (Palo Verde Hub and Four Corners) demonstrating the significant past investment in major transmission infrastructure. These areas will continue to be important centers for transmission that will need to be expanded and modernized.

As the region undergoes change in its traditional energy mix and increases reliance on wind and photovoltaic solar generation, it becomes more important to access diverse resources from around the west to ensure reliability and to lower the cost for integrating variable resources.

Figure 2: The BLM has screened and identified renewable energy lands across Arizona, many of which are found west of the Phoenix metropolitan area.
Section 368 and the West-Wide Energy Corridors

Section 368 of the National Energy Policy Act of 2005 mandated the designation of new corridors for pipelines and power lines across the West (West-Wide Energy Corridors, WWEC). Among them, several new WWECs were identified in Arizona. Following the designation of these corridors, many conservation organizations raised concerns that they failed to facilitate renewable energy development, served primarily fossil-fuel generation, and failed to address known environmental and cultural values. Litigation followed, in 2012, The Wilderness Society and a number of other organizations reached a settlement with the federal government to respond to these concerns.

Under the settlement the following four requirements will now be applied to the WWEC process:

1. The Bureau of Land Management (BLM), US Forest Service (FS), and the Department of Energy (DOE) will enter into a Memorandum of Understanding (MOU) that will guide the review of corridors and mitigation measures.
2. Agencies will follow specified principles while reviewing corridors that consider access for renewable energy, avoidance and mitigation for environmental impacts and increasing stakeholder input.
3. BLM and FS will issue guidance for use and development of corridors and emphasize need for environmental analysis of any proposed project in the corridors. BLM will correct existing guidance in Instruction Memorandum 2010-169 to match the settlement agreement.
4. BLM and FS will incorporate and increase emphasis of environmental considerations into agency training on processing applications.

Plaintiffs in the litigation identified a number of WWECs that were particularly problematic for a variety of reasons. These “Corridors of Concern” (COC) were identified as having little-to-no access to renewable energy sources and impacts on important natural areas including National Parks and habitat for endangered and threatened species. These COCs were identified by the plaintiffs who requested additional scrutiny and evaluation of them and other corridors to limit impacts and promote renewable energy development (Figure 3).

In the summer of 2014, BLM announced that the review of corridors will be focused in areas of priority, allowing limited resources to focus on areas with higher potential and need for transmission capacity. The purpose of this review will be to consider the merits of the WWECs in the region and identify new alignments that could be designated under Section 368. The inclusion of western Arizona as a first priority has been well received by advocates of renewable energy throughout the region. The first priority for evaluation will be lands in western Arizona, southern Nevada and the California Desert.

The Sonoran Institute and Renewable Energy

The Sonoran Institute is committed to helping communities in the West move to a clean, safe, and reliable energy future in a manner that supports local prosperity and quality of life. We work on many fronts to make these goals a reality: from identification of appropriate sites for renewable energy generation and transmission to ensuring that the public is meaningfully engaged in the planning processes. Throughout our work, we strive to provide all stakeholders with the information and resources needed to advance a sustainable energy future for the West.

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3 WWEC plaintiffs included: The Wilderness Society, BARK, Center for Biological Diversity, Defenders of Wildlife, Great Old Broads for Wilderness, Klamath-Siskiyou Wildlands Center, National Parks Conservation Association, National Trust for Historic Preservation, Natural Resources Defense Council, Oregon Natural Desert Association, Sierra Club, Southern Utah Wilderness Alliance, Western Resource Advocates, Western Watersheds Project, and County of San Miguel, Colorado.
368 Corridors and AZ Land Management

Figure 3: Corridors of Concern in Arizona
Arizona Solar Working Group
In September 2010, the Sonoran Institute convened a diverse group of stakeholders as the Arizona Solar Working Group (ASWG). The group was assembled to promote dialogue and collaboration between conservation and wildlife organizations, renewable energy advocates, utilities, and solar developers working toward a sustainable energy future. The ASWG believes it is important to have a holistic vision when developing generation and transmission projects to ensure that they are planned and built to avoid and minimize impacts on the state’s magnificent lands and wildlife.

Initially, the group focused on providing comments on the environmental impact assessment for the Restoration Design Energy Project. During the development of these comments, the ASWG agreed that there might be similar potential benefits to a guided development approach to transmission siting. The group identified the legal settlement and re-evaluation of the WWECs as an important opportunity to capitalize on the true potential of energy corridors designation – providing access to renewable energy while avoiding and minimizing impacts to sensitive wild lands and wildlife habitat.

The ASWG has provided comments to the BLM on their proposed corridor review process. The group also hosted a meeting to allow a broad range of stakeholders to share their insights and concerns about WWECs with BLM, FS, and DOE staff in Arizona and Washington, DC. With this report, the ASWG looks at one of the more promising WWECs (30-52) in Arizona to assist in the delivery of renewable power to markets with minimal environmental impacts. This report is designed to assist the BLM in its re-evaluation of this particular corridor and serve as a model in its assessment of other corridors.

Assessment of Corridor 30-52 in Arizona
In Arizona, WWEC 30-52 extends from the Palo Verde Hub west of Phoenix to the Colorado River and beyond into California. Our analysis will only include lands in Arizona due to the availability of consistent and reliable data that was used in the RDEP process. We recommend a similar analysis be performed on the corridor in California. This general corridor has been highlighted numerous times as a candidate for additional transmission capacity and was the subject of a highly contentious transmission line proposal in the recent past.

In 2006, Southern California Edison proposed a 97-mile 500KV line from the Palo Verde Hub to the Devers substation in Riverside County, California. Known as Palo Verde Devers 2, this proposed line would have allowed the California utility to tap into the excess gas-fired generation at the Palo Verde Hub. (At the time, there was very little discussion about the project’s ability to convey solar power to California.) As proposed, the project would have provided fewer benefits to Arizonan ratepayers than California ratepayers. Moreover, the line was proposed to go through Kofa National Wildlife Refuge, resulting in significant environmental impacts. Consequently, the Arizona Corporation Commission did not approve the line.

However, the corridor continues to maintain a high profile, though it is now considered in the context of renewable energy development. As part of Arizona’s fifth biennial transmission assessment competed in 2008, the Arizona

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Corporation Commission ordered Arizona utilities to provide their top three transmission projects designed to facilitate the integration of renewable energy into the grid. Among those projects were two proposed transmission lines located within this general corridor: the 500 kV Delaney-Palo Verde and Delaney-Colorado River lines.

The Delaney-Palo Verde line is under construction and is expected to be in service in 2016. The Delaney-Colorado River line was recently studied by California Independent System Operator as part of their 2013-14 transmission plan. It was subsequently approved by their board of directors. Applications to finance and build the line were solicited with a November 2014 deadline. Pinnacle West, the parent company for Arizona Public Service, which owns the Delaney-Palo Verde line, has developed a partnership with Mid-American Transmission—Bright Canyon Energy—which was one of six entities deemed to be qualified for consideration to develop the Delaney-Colorado River line.

As noted above, the settlement reached regarding Section 368 corridors identified a number of “corridors of concern.” Corridor 30-52 was not identified as such, but this does not imply that no issues associated with locating a transmission line within the corridor. As part of its priority regional assessment, the BLM will revisit all corridors to consider new information and to conduct a more complete assessment that extends to the non-BLM portions of these corridors. The subsequent sections of this report take a broad look at the array of land-use and environmental issues on lands within the corridor that may inform the BLM’s section 368 corridor re-evaluation process.

Figure 4: Corridor 30-52 will connect the Palo Verde energy hub to markets in California.
Evaluation

1. Energy

1.1. Palo Verde Hub

The Palo Verde Hub typically refers to a wholesale energy trading market built around the massive generating capacity (approximately 10,000 MW) provided by the nuclear power and gas plants west of Phoenix. In the context of this report, the hub also refers to the extensive generation and transmission infrastructure that supports wholesale energy trading. The ability to access that infrastructure continues to draw new generation and transmission capacity, including utility-scale solar and other renewable energy-related projects.

Over the past six years, approximately 620MW of generating capacity has been brought on line around the Palo Verde Hub. Additionally, seven of the top renewal transmission lines identified by utilities as part of Arizona’s biennial transmission planning process are designed to enhance transmission capacity going in and out of the Palo Verde hub. Lastly, two proposed merchant (privately developed) transmission lines—SunZia and Southline—are designed to bring wind and solar power from New Mexico and southern Arizona so that it accessible to the Palo Verde Hub and, from there, to California markets.

Because of its location and extent, Corridor 30-52 may be well positioned to take advantage of its access to the Palo Verde Hub and offer an important conduit for renewable energy transmission across multiple states. However, its ultimate value must be considered in the context of both regional, state, and utility-specific transmission planning.

Recommendation: The BLM and DOE should coordinate with regional transmission planning efforts to determine the likely need and scope of energy corridors. Ongoing efforts that connect resources to the Palo Verde hub could accelerate or justify the need for corridor 30-52.

1.2. Bureau of Land Management

Federal lands managed by the Bureau of Land Management (BLM) are located along the 30-52 corridor. Generally, these lands allow for multiple uses, including recreation, natural resource conservation, grazing, energy development, and mining. Over the past six years, new pressures for renewable energy generation have been placed on the BLM, and the agency has responded through various planning efforts to identify and incentivize solar and wind development in areas with minimal environmental conflicts, close to existing and planned transmission lines.

In 2012, the BLM finalized a multi-year, six-state effort to identify BLM lands suitable for utility-scale solar development. Known as the Western Solar Plan, this effort resulted in the designation of 19 Solar Energy Zones (SEZs) that it deemed were well-suited for utility-scale solar. Two of these SEZs were located in Arizona. In 2013, the Arizona BLM Office concluded a complementary state-wide planning effort, the Restoration Design Energy Project (RDEP), which identified another SEZ called Agua Caliente in addition to 192,000 acres of BLM land outside of SEZs that

Figure 5: Significant amounts of land with renewable energy potential are located near to 30-52.
would be prioritized for both solar and wind development. These additional lands are designated Renewable Energy Development Areas (REDAs). Figure 5 depicts Corridor 30-52 and the SEZs and REDAs that are near the corridor.

While planning for siting of renewable energy generation and transmission are complimentary efforts, it should be noted that the original designation of West-Wide Energy Corridors predates the designation of SEZs and REDAs. While the identification of the latter considered proximity to existing and planned corridors, the presence of WWECs was not a key factor in their location. Going forward, as the BLM conducts its priority regional reviews of WWECs, there will be opportunities to consider how these corridors align with BLM lands prioritized for renewable energy development.

**Recommendation:** The BLM should develop specific criteria for the designation and modification of future WWECs, and that one of those criteria address the WWEC’s role in facilitating development within REDAs.

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<td>LANE COWGER</td>
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1.3. **State Trust Lands and Renewable Energy**

A good portion of the land through which Corridor 30-52 traverses is owned by the Arizona State Land Department (ASLD). These lands are held in trust for beneficiaries, which receive the monetary returns from the sale or lease of the property or the resources extracted from them.

In the past several years, both utility-scale solar and wind projects have been sited on state trust lands. In response to these projects, ASLD has assessed the suitability of its lands across the state for renewable energy. Under this new program, ASLD has identified parcels of land suitable for renewable energy leasing and has included solar leasing as an additional aspect of revenue generation. Through the ASLD website, parcels available for solar lease are publicly advertised. To date, two projects have been constructed, one in western Maricopa County near the Palo Verde hub and one in Yuma. The Arlington Valley Solar project and the Capitol Power project are two examples of projects that are at least somewhat through the permitting process. There are a number of additional projects within 20 miles of the corridor that are within the approval process and could possibly benefit from new transmission infrastructure in 30-52.

ASLD’s primary objective is to gain the highest possible value from state trust lands and is generally concerned about the placement of transmission infrastructure in places that could degrade the desirability of their parcels. The Sonoran Institute, in 2011, prepared a report titled, *Wires, Roads, and Water: Developing Sustainable Infrastructure on State Trust Land*, which provides insights on how to alleviate these concerns and bring value to trust beneficiaries. In discussions with ASLD, they are generally concerned about energy infrastructure and its negative impact to property values. They would prefer the alignment of this type of infrastructure with existing corridors, with appropriate precautions that values be protected.

**Recommendation:** As a key aspect of transmission planning, further evaluation of WWEC’s should include demand consideration of lands that are already identified as suitable for renewable energy by the Arizona State Land Department, prioritizing corridors that have permitted projects nearby.

**Recommendation:** Engage in early discussions with the Arizona State Land Department to ensure that planned infrastructure is located to reduce the impact on values to the Trust. Seek opportunities for the
**Trust to gain value from the corridor by accommodating interconnection with energy generation on State Lands.**

**Point of Communication**

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1.4. **County Renewable Energy Incentive Districts**  
Arizona allows counties, cities, and towns to designate vacant or underused land as Renewable Energy Incentive Districts in their jurisdictions and adopt suite of policies or incentives that encourage construction and operation of renewable energy generation facilities. Yuma County considered adopting such districts as a component of the 2010 Comprehensive Plan though the County Commission rejected the idea in 2013, in part due to challenges in getting the energy to market.

1.5. **Gila Bend/Transmission Study**  
Located approximately 30 miles south of Corridor 30-52, the Town of Gila Bend has aggressively and successfully marketed itself to solar developers. After the housing bust in 2008, it established a Solar Field Overlay Zone, a designation somewhat similar to an incentive district in that it streamlines the approval of solar projects located within the zone. More than a dozen utility-scale solar projects are in the planning process or under construction in Gila Bend, with 339MW of capacity built to date. The town is now moving to establish itself as a solar energy hub, with an eye to delivering power to inside Arizona and to California. It has commissioned a study of new transmission line alternatives that would provide additional capacity to bring that solar power to markets. Some of these alternatives include lines proximate to Corridor 30-52.

**Recommendation:** BLM consult with local jurisdictions, counties especially but not limited to them (given Gila Bend’s leadership) regarding any zoning and planning they are doing to incentivize RE generation and transmission.

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2. **Transportation**

2.1. **I-10**  
Interstate 10 is a major east-west corridor connecting California with Phoenix and Tucson as well as states in the southeastern United States. The Arizona Department of Transportation (ADOT) has prioritized certain highway corridors throughout the state for additional funding that would be applied toward expansion and maintenance. I-10 is one of these designated routes as it serves to connect goods and services in Arizona to markets in other states. Historically, highways have been avoided as locations for adjacent electrical transmission lines in-part, to protect the scenic views of drivers. This practice, however has raised concerns from conservationists over the impacts of additional parallel infrastructure in corridors separate from highways like Interstate 10. Corridor 30-52 provides an opportunity to rethink this practice and model a new approach that carefully and aesthetically integrates energy infrastructure with an interstate highway.
On February 9, 2015, Arizona Department of Transportation Director John Halikowski signed a letter to Ray Suazo, the Arizona State Director of the BLM, asking for additional coordination with respect to interstate transmission projects that could be located along existing and planned highways.

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**Recommendation:** Work closely with the Arizona Department of Transportation to integrate energy infrastructure along the existing interstate highway. This approach will provide opportunity to minimize the environmental impacts of transmission infrastructure and allow for greater compatibility with existing land.

### 2.2. Interstate 11

The proposed Interstate 11 that is planned to connect the Phoenix region to Las Vegas in its initial phases with further expansion to Tucson and Nogales, is envisioned as a multi-modal “smart corridor.” Among its many components this transportation corridor may include elements such as an interstate highway, passenger and/or freight rail, electrical and other energy transmission facilities, and state-of-the-art data infrastructure such as fiber-optic cable. These features make the proposed corridor appealing to conservation interests as it provides the opportunity to embark upon a more integrated and sustainable approach to corridor planning and development. The current model of infrastructure typically mandates parallel yet distant infrastructure elements that compound the impacts on environmental resources. By placing transmission lines, rail corridors, and highways parallel, yet separate from each other, there are significant increases in harm to natural landscapes and wildlife. The Interstate 11, as proposed, further distinguishes itself by providing a significant opportunity for local communities to benefit from trade stimulated by the CANAMEX corridor and renewable energy development that would be served by integrated electrical transmission infrastructure.

The I-11 “smart corridor” concept is attractive to renewable energy advocates due to the large amount of lands suitable for solar and wind development with few environmentally sensitive resources located near the proposed highway. These lands were screened through the Bureau of Land Management’s (BLM) Restoration Design Energy Project (RDEP), a statewide assessment that was supported by environmental and wildlife groups, renewable energy developers, and utilities in Arizona. A March, 2014 report authored by the Sonoran Institute, lauded the possible benefits to renewable energy development brought by the successful integration of electrical transmission infrastructure into the I-11 corridor. In the evaluation, the Sonoran Institute determined that over 700,000 acres of REDA-quality lands are located within 20 miles of the highway. Significant renewable energy development of these lands will require additional electrical transmission lines to get power to markets. With the proximity of 30-52 to various proposed routes for the Interstate 11 corridor, particularly between Casa Grande and Buckeye, there are opportunities to coordinate planning efforts to enhance transmission access to and from the Palo Verde hub.

**Recommendation:** Considerations should be made for how development within 30-52 can enhance the reliability of the broader energy transmission system in light of future renewable energy expansion and development in Arizona.
2.3. Highway-oriented Development

As with any highway, Interstate 10 has occasional business development at exits along its length. Corridor 30-52 will need to navigate around these operations in a way that remains proximate to the highway alignment and with appropriate engagement of the landowners and businesses that might be affected. Exit 45, as shown in Figure 6 above, is a good example of an area that will require careful planning and coordination to avoid conflicts with existing land owners and business operations.

Recommendation: Engage landowners and businesses along the corridor as early as possible in the process to ensure their participation and to resolve their concerns.

3. Water

3.1. CAP
One linear feature that runs parallel with the 30-52 corridor is the Central Arizona Project canal which brings Colorado River water from the general area of Lake Havasu, Arizona, through the municipal areas of Phoenix, Pinal County, and Tucson. A new transmission line would have to carefully navigate the canal in four locations (Figure 7) and will require careful siting and the avoidance of mitigation lands that are managed by the Bureau of Reclamation. According to sources at the CAP, rights of way can be permitted for energy corridors that cross the facility, even in cases where mitigation lands are impacted (Figure 8).
Figure 7: Mitigation lands around the Central Arizona Project are managed by the Bureau of Reclamation.

Figure 8: The Central Arizona Project canal runs parallel, and crosses the proposed corridor.
Recommendation: Work closely with Arizona Department of Transportation, Central Arizona Project, and other infrastructure managers to ensure minimal impact on their operations while promoting the best possible integration of energy infrastructure into existing facilities.

Recommendation: Wherever possible, avoid impacts to mitigation lands adjacent to the CAP canal.

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3.2. Colorado River

The crossing of significant waterways can be impactful to wildlife, recreation interests, and a variety of stakeholders who rely on the water. The Colorado River is crossed by the Palo Verde-Devers transmission line south of Blythe where the river is very narrow and channelized, which limits harm to floodplains, riparian vegetation, and other resources. Corridor 30-52 should be carefully sited to limit additional impacts. Additionally, the river is home to the Razorback sucker and critical habitat is located in some places near this crossing area (Figure 17).

Recommendation: The crossing of the Colorado River should be accomplished with minimal impact to riparian resources including wildlife. Crossing near the existing Palo Verde-Devers line should be considered.

4. Land Development

Figure 9: Character of the landscape around Corridor 30-52. It is possible to see an existing power line corridor: Palo Verde-Devers in the distance.

The land around Corridor 30-52 remains fairly remote, even in a future of significant growth in the West Valley of Phoenix. Development is planned in the rural unincorporated area of Tonopah including the large community of Belmont which is just west of the Hassayampa River. Based upon conversations with Maricopa County and La Paz County, there does not appear to be any development of significance to this corridor planned for the foreseeable future. The proposed corridor begins far west of known development projects in Maricopa County though it will need to navigate around the community of Quartzite and Ehrenberg on route to California.

Local jurisdictions, including counties and incorporated cities and towns, are required to develop long-term plans to accommodate future growth and development these plans are known as Comprehensive Plans for counties, and
General Plans for cities and towns. They are updated every 10 years or so and allow for each community to anticipate, among other things, growth and future infrastructure needs. The Comprehensive plans for Maricopa County and La Paz County and the General Plan for the Town of Quartzite were consulted to determine what, if any, future development was anticipated for the region around Corridor 30-52.

4.1. County Plans

Maricopa County

County Comprehensive Plans are prepared to anticipate for future growth and development. In Maricopa County, the Tonopah/Arlington Area Plan was completed in 2000 to provide direction for the southwestern portion of the county. Though there are planned developments in the region including the large Belmont community west of Buckeye, Corridor 30-52 is generally located west of this activity as is shown in Figure 10. Based upon discussions with Darren Gerard of the Maricopa County Planning Department, there are no known conflicts with the planned corridor and development plans of master-planned communities or residential projects. It is worth considering that Maricopa County has permitted a number of large solar generation facilities near the Palo Verde Hub that may benefit from additional transmission capacity serving the area.

Recommendation: Engage Maricopa County officials in early discussions about where the corridor can be situated to reduce impact on planned development areas.
**Recommendation:** Consider the large volume of energy projects planned and approved in western Maricopa County as potential demand for energy transmission in Corridor 30-52.

**Point of Communication**

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<th>NAME OF SOURCE</th>
<th>ORGANIZATION</th>
<th>TITLE</th>
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<tbody>
<tr>
<td>DARREN GERARD</td>
<td>Maricopa County Planning</td>
<td>Deputy Director</td>
</tr>
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</table>

**La Paz County**

This county of approximately 20,000 residents on the western edge of Arizona is very rural and remote from urban areas. Of the total amount of land La Paz County, only 5.3% is privately owned, limiting the amount of development and industry that can occur. The largest community is Quartzite with a population of just over 3,600 residents. During the winter months the area explodes with tourists who come to recreate in the deserts around the county. The region is popular for its opportunity for off-highway vehicle recreation but is not likely to see population growth in any significant way. Along Vicksburg Road there is some highway-oriented development as discussed earlier in the report, which are designated for future development under the Employment Center designation (Figure 11). There are also areas of Rural Residential (one home or less per acre) planned around the route. According to discussions with La Paz County Supervisor DL Wilson, there are no known growth or development plans in the unincorporated areas of the county.

**Recommendation:** There should be careful consideration of impacts to private land in La Paz County as there is a limited amount available for development and industry. The community is especially sensitive to private lands and property rights.

**Point of Communication**

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<tr>
<td>DL WILSON</td>
<td>La Paz County</td>
<td>Supervisor</td>
</tr>
</tbody>
</table>
4.2. City/Town plans

**Quartzite**

This small community of 3,600 residents straddles Interstate 10 and State Route 95 in La Paz County (Figure 12). The community is very rural and relies on winter tourism as its main economic engine. The Quartzite land use plan (Figure 13) identifies a range of intense land uses near 30-52 and Interstate 10. The proposed corridor will have to traverse this community, passing either to the north or south in order to prevent significant disruption and reduce land acquisition costs. Based upon an interview with Town Manager Skylor Miller, a corridor generally located south of the Town may have the least impact on the community, thought that may place it near other existing energy infrastructure like Palo-Verde Devers and an interstate natural gas line.

**Recommendation:** Engage the Town of Quartzite and La Paz County in discussions that will provide insight into the best location for the energy corridor.

**Recommendation:** Consider locating the corridor near or adjacent to other linear corridors which may include the interstate pipeline or the Palo Verde-Devers transmission line.

**Point of Communication:**

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<th>NAME OF SOURCE</th>
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<tbody>
<tr>
<td>SKYLOR MILLER</td>
<td>Town of Quartzite</td>
<td>Town Manager</td>
</tr>
<tr>
<td>DL WILSON</td>
<td>La Paz County</td>
<td>County Supervisor</td>
</tr>
</tbody>
</table>
4.3. Other Planning Considerations

Planned developments
The land around Corridor 30-52 remains fairly remote, even in a future of significant projected growth in the West Valley of Phoenix. The proposed corridor begins far west of known development projects in Maricopa County, though it will need to navigate around the communities of Quartzite and unincorporated Ehrenberg on route to California.

Development is planned in the rural unincorporated area of Tonopah including the large planned community of Belmont, which is just west of the Hassayampa River. Based upon conversations with Maricopa County and La Paz County, there does not appear to be any planned development projects of significance in this corridor planned in the foreseeable future.

Recommendation: Coordinate closely with jurisdictions responsible for processing development approvals to reduce impact on future development.

Point of Communication

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<td>Deputy Director</td>
</tr>
<tr>
<td>DL WILSON</td>
<td>La Paz County</td>
<td>County Supervisor</td>
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US Bureau of Land Management Lands

Bureau of Management Lands are administered under Resource Management Plans (RMPs) that are generally updated every 10 years. In these documents, the BLM has evaluated many issues relevant to ecology, land use, recreation, and a number of other topics to make decisions about how to manage these lands. RMPs should be consulted to ensure that proposed land uses are planned to avoid areas of high ecological value including Areas of Critical Environmental Concern (ACEC), development avoidance areas, desert tortoise habitat of high quality, and recreation areas that are incompatible with infrastructure development. Corridor 30-52 passes through portions of the Lake Havasu, Lower Sonoran, Yuma, and Hassayampa districts which are governed by individual RMPs.

Figure 14: Corridor 30-52 passes near to lands within the Sonoran Desert Heritage conservation plan.
Sonoran Desert Heritage Conservation Plan
For almost a decade, a group of diverse stakeholders has collaborated to develop the Sonoran Desert Heritage (SDH) proposal (Figure 14), a community-inclusive vision for western Maricopa County. The proposal is focused on the conservation of existing Bureau of Land Management (BLM) land at the urban-rural interface. Congressional protection of these lands through a variety of designations will sustain future environmental services, recreational opportunities, and natural amenities contributing to the quality of life of the region’s residents. Legislation was introduced in 2013 to create two National Conservation Areas that will include lands in the Gila Bend, Harquahala, and Belmont Mountains along with new wilderness areas. Two Special Management Areas are also proposed which would seek to preserve wildlife corridors connecting the Barry Goldwater Range to other natural landscapes. Corridor 30-52 passes near the SDH proposed conservation lands but does not appear to pose any conflict.

Recommendation: Consider the conservation value of lands near Corridor 30-52 to avoid conflict with conservation actions.

5. Military Facilities & Operations
Western Arizona is an activity center for military operations due to the proximity of major military facilities and the Barry M. Goldwater bombing range which is among the most active in the nation. Infrastructure development has occasionally found opposition from the military community, most notably the recent SunZia transmission line which was opposed by the White Sands Missile Range after a Massachusetts Institute of Technology report found that electromagnetic interference would likely occur as a result of the line. The Sonoran Institute contacted Kevin O’Berry of the Barry Goldwater Range Management Office for initial input on the proposed energy corridor. Preliminarily, no concerns have been voiced.

Recommendation: Connect with the military community in Arizona to ensure that Corridor 30-52 and other energy infrastructure poses no conflict to ongoing or planned military operations.

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<th>NAME OF SOURCE</th>
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<tbody>
<tr>
<td>KEVIN O’BERRY</td>
<td>56 FW Range Management Office</td>
<td>Intergovernmental Liaison</td>
</tr>
</tbody>
</table>

6. Native American Concerns
Corridor 30-52 passes near to the Colorado River Indian Tribe (CRIT) Reservation and through lands that are significant to Native American cultures. Outreach efforts were initiated with the CRIT to gain input on the proposed infrastructure however no responses were received at the time of this report.

Recommendation: Consultation should occur with Native American tribes including representatives of the CRIT to hear and resolve any concerns with energy infrastructure.

7. Environmental Concerns
Environmental issues are generally complex and require significant and time-consuming evaluation by experts of ecology and habitat. This section will take a brief look at a number of environmental concerns and their relationship with the proposed infrastructure in Corridor 30-52 including: wildlife issues, like impacts to species of economic and recreational importance, threatened and endangered species, and birds; plant communities; and riparian areas. Impacts may include habitat loss and modification, edge effects on core areas, population subdivision/isolation, disturbance, direct mortality, and increased human access.
The preliminary environmental assessment described in section 7.1 was conducted by the Sonoran Institute, Defenders of Wildlife, and The Wilderness Society, on behalf of the Arizona Solar Working Group. Potential impacts were assessed by overlaying species ranges, critical habitat, and migration corridors over Corridor 30-52. We chose to buffer Corridor 3-52 (a mile on each side) in order to account for the fact that transmission corridors can have a variety of impacts upon species, depending on the species and mode or vector of impact, that extend beyond the transmission line itself. Ultimately, impacts cannot be adequately assessed without specific routes being considered within the corridor and across all landownerships.

Overall we recommend the BLM consult with the US Fish and Wildlife Service and Arizona Game and Fish Department to interpret the best available information which should inform the alternative configuration and route selection, such that all important low density, habitat connectivity and dispersal habitats for special status species are identified and screened out of the final preferred alternative.

7.1. Wildlife
The Sonoran Desert is the most diverse and complex desert ecosystem in the world and has a fair number of iconic species like Sonoran desert bighorn sheep, the Gila monster, and a wide variety of reptiles, birds, and rodents. Over the past several decades, linear infrastructure has been built across the desert including Interstate 10, Interstate 8, the Central Arizona Project canal, Palo Verde Devers transmission line and several natural gas pipelines. This infrastructure has impacted the quality of habitat that many species rely upon for their survival, sometimes contributing directly to their mortality or fragmenting habitat that threatens the continued viability of certain species populations.

Impacts vary greatly between species. Several potentially impacted species are listed in Exhibit 17. The fringe-toed lizards have clearly defined, essential habitats (dune habitats, vernal pools) that are typically avoided during siting; direct impacts to these species are unlikely, but the integrity of their fragile habitats must be maintained during and after development. Other species, like the desert tortoise and the spade-foot toad, are poor dispersers that hibernate for much of the year and rely on access to seasonal resources such as annual plant blooms and vernal pools; their seasonal use areas and access to resources must be maintained, even though their activities are invisible to us for most of the year. A third group of species, represented by golden eagle, great egret, and Sonoran pronghorn, range widely to access needed resources but have inherent conflicts with development that must be reconciled. Golden eagles are perching hunters, but the perches provided by some transmission structures cause direct eagle mortality while putting vulnerable prey species like desert tortoise at risk. Great egrets are vulnerable to fatal collisions with poorly-sited power lines that intersect flyways between breeding and foraging areas. Pronghorn are not directly threatened by power lines, but their predator avoidance behavior makes disturbance and fragmentation impacts from transmission development potentially problematic.

Given the significant environmental impacts transmission development can cause, careful application of the mitigation hierarchy is the best strategy to limit impacts; first prioritize avoiding impacts through siting and design, then

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This assessment looked a three West-Wide Energy Corridors. The findings were submitted by the ASWG as comments to the BLM in response to their Request for Information regarding implementation of the WWEC settlement. See Appendix II for more detail on the wildlife impact modeling process and results.
minimize impacts on-site with best management practices, and finally effectively mitigate or off-set unavoidable impacts by protecting or improving habitat off-site.

**ESA protected species**

Our preliminary assessment did not identify any instances of significant overlaps with designated critical habitat for threatened or endangered (T&E) species located in the vicinity of the proposed 30-52 corridor. It is important to note that the majority of this project is in parallel and proximate to I-10 and will contribute little direct additional impact to wildlife as long as the corridor is adjacent to the existing infrastructure. Care should be taken, however, around riparian areas that result from the flood pooling near the highway and to impacts that all transmission lines have on birds.

Though the realized infrastructure development in 30-52 is likely to be less than a tenth of the width of the study corridor, impacts are possible due to the nature of the desert ecosystem and the long length of time necessary to recover from disturbance. Known impacts to wildlife resulting from transmission lines are discussed in Figure 17. Modeled conflicts with wildlife habitat in the 30-52 corridor are documented in Figure 16. The only critical habitat area for T&E species along the corridor is with the Razorback sucker which relies on the waters of the Colorado River (Figure 15).

<table>
<thead>
<tr>
<th>Overlaps of Modeled Species Range with Route Segments (acres)</th>
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<tbody>
<tr>
<td>Western burrowing owl</td>
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<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>10,487</td>
</tr>
<tr>
<td>Southwestern willow flycatcher</td>
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Figure 15: Known critical habitat areas for T&E species in the vicinity of the 30-52 corridor in Arizona. There appears to be some overlap with critical habitat for the Razorback sucker.

Figure 16: Possible Impacts to wildlife by Corridor 30-52 with a 2 mile total width.
<table>
<thead>
<tr>
<th>Species Group</th>
<th>Construction-Related Habitat Disturbance</th>
<th>Surface Occupancy/Operations and Maintenance</th>
<th>Linear Habitat Loss or Modification Within ROW</th>
<th>Road Effects</th>
<th>Visual Disturbance</th>
<th>Fencing/Barriers</th>
<th>Transmission Structures and Conductors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fringe-Toed Lizards (Mojave, Yuman)</td>
<td>Dune obligate species; avoid dunes and preserve sand transport.</td>
<td>Vehicle use damages dune habitat, OHV hearing damage potential.</td>
<td>Avoid dune habitats, avoid disrupting sand transport.</td>
<td>Site roads to avoid dunes and preserve sand transport.</td>
<td>None noted.</td>
<td>No issues with typical fencing.</td>
<td>None noted.</td>
</tr>
<tr>
<td>Plains Spade-foot Toad</td>
<td>Avoid disturbance of burrows and disruption of vernal pool habitats.</td>
<td>OHV noise can cause early emergence (mistaken for rainfall), OHV mortality potential.</td>
<td>Sensitivity to herbicides and pesticides—avoid application in habitat.</td>
<td>Unable to cross major roads, vehicle mortality possible on minor roads at night.</td>
<td>None noted.</td>
<td>No issues with typical fencing.</td>
<td>None noted.</td>
</tr>
<tr>
<td>Mojave &amp; Sonoran Desert Tortoise</td>
<td>Both subspecies are vulnerable to fragmentation effects from roads, ROWs, and associated transmission development; define important habitat and avoid.</td>
<td>OHVs decreases density of herbecous forage by a factor of three, spread invasive weeds, increase fire frequency, compact soil, and limit habitat use. Limit use.</td>
<td>Sonoran prefers rocky uplands, ridgeline transmission potentially high impact; Mojave more affected by lowland development.</td>
<td>Avoid road exclusion fencing that prevents needed movement as well as vehicle mortality; use strict speed limits to prevent collisions</td>
<td>None noted.</td>
<td>Stranded livestock fencing typically used for livestock does not block movement, but other fence types can.</td>
<td>Predation risk increases near structures due to raptor and corvid perchng and ROW use.</td>
</tr>
<tr>
<td>Golden Eagle</td>
<td>Avoid disturbance of important nest, roosting, and foraging areas.</td>
<td>Avoid disturbance of important nest, roosting, and foraging areas</td>
<td>Habitat modification with ROWs and perch availability attract eagles for hunting and nesting. Limit activity through perch management.</td>
<td>Use of roadside areas for hunting and scavenging frequently results in vehicle mortality.</td>
<td>Avoid visual disturbance near nesting areas.</td>
<td>Fatal eagle collisions with fences are not a major source of documented mortality.</td>
<td>Eagle attraction to structures is a high electrocution risk and increases predation pressure on tortoise and other species—prevent perching.</td>
</tr>
<tr>
<td>Great Egret</td>
<td>Avoid siting near permanent and seasonal water features heavily used by waterbirds, avoid breeding season disturbance of these areas.</td>
<td>Ongoing O&amp;M typically avoids overlap with waterbird foraging and nesting habitat; few conflicts.</td>
<td>ROW placement should avoid overlap with waterbird foraging and nesting habitat to minimize conflicts.</td>
<td>Road mortality possible, particularly when roads are sited near or between foraging and nesting habitats. Avoid these configurations.</td>
<td>None noted.</td>
<td>Fatal waterbird collisions with fences do occur, but are not a major contributor to documented mortality.</td>
<td>Avoid siting between use areas to prevent transmission line collisions mortality.</td>
</tr>
<tr>
<td>Sonoran Pronghorn Antelope</td>
<td>This extremely visual, mobile, and skittish grazer depends on awareness and speed for survival, strongly avoiding areas with heavy development. No development in areas important for water and forage availability, avoid blocking migration corridors.</td>
<td>Sensitive to noise and visual disturbance, small disturbances can result in large-scale movements; avoid key areas during fall breeding and spring fawning.</td>
<td>Pronghorn exhibit some degree of habituation to transmission structures if there is little or no associated human disturbance.</td>
<td>Pronghorn avoid heavily used roads. Avoid road construction in areas pronghorn need to move to access forage, water, and migration routes</td>
<td>Sensitive to visual disturbance from tall structures.</td>
<td>Improperly designed livestock fencing (mesh fencing or stranded fencing with low wires) can ensnare pronghorn or block movement.</td>
<td>Predation risk for fawns increases near structures due to raptor and corvid perching and ROW use.</td>
</tr>
</tbody>
</table>
Sonoran desert tortoise

The Sonoran desert tortoise is a candidate species for listing for protection under the Endangered Species Act (ESA) and has habitat within and around the proposed energy corridor. It is uncertain when the official listing process will proceed for this species but the Bureau of Land Management (BLM) has identified habitat that is suitable for the tortoise by category: Category 1 is most suitable for tortoise and may have the highest representation of the animal present on the ground while Category 3 is good quality habitat and may be inhabited by tortoise. Figure 18 identifies the tortoise habitat that is proximate and overlapping Corridor 30-52. Figure 16 demonstrates that over 66,000 acres of desert tortoise habitat could be impacted by a two-mile wide corridor along this route.

Figure 18: Desert tortoise habitat is prevalent along the proposed 30-52 corridor. There appears to be no conflict, however with Category 1, the highest valued habitat under the BLM ranking system.
Desert bighorn sheep

The Sonoran Desert’s iconic mammal is the bighorn sheep. This species has been carefully managed by the Arizona Game and Fish Department (AGFD) over the past few decades due to declines in the distribution and population of the animal. Today, populations are carefully watched and cultivated to prevent further declines and loss of inhabited areas. Generally, human impacts, drought, increases in predation by mountain lions, and fragmentation of habitat are most often cited as causes of the challenges that have faced the species. According to Figure 1, a two-mile wide corridor would impact about 15,000 acres of desert bighorn sheep habitat (Figure 19).

Other terrestrial mammal and reptile impacts:

The impact study on wildlife demonstrated conflicts with two other species that are important to the ecology of the Sonoran Desert. These animals are kit fox and Gila monster which can both be broadly distributed across the landscape. According to the GIS model, the corridor of a 2 mile study width could impact over 75,000 acres of habitat for each species.

Recommendation: Carefully examine the impacts of Corridor 30-52 with respect to Endangered, Threatened, or Candidate species and their habitats.

Recommendation: In areas of impact to Sonoran desert tortoise habitat, appropriately avoid impacts where possible by closely integrating development activities with existing disturbance. In the event of additional degradation of habitat, appropriately mitigation actions should occur.

Recommendation: Permit rights-of-way that are proximate and integrated with existing infrastructure where possible. This effort will reduce impacts on all natural resources.

Recommendation: Care should be taken to maintain terrestrial habitat connectivity by preserving and/or restoring missing linkages.
7.2. Species of economic and recreational importance (SERI)

The Arizona Game and Fish Department has a special category for thirteen of Arizona’s huntable wildlife. This category is known as Species of Economic and Recreational Importance (SERI) which includes big game and small game species like deer, pronghorn antelope, javelina, squirrel, and quail, among others. Generally, arid portions of the state do not have high representation on the scale as the quantity and distribution of SERI species tends to be lower in the desert. Their modeled habitat blocks and wildlife corridors are shown in Figure 20. It is apparent that Corridor 30-52 will bisect habitat and may present additional fragmentation challenges for terrestrial animals. These impacts, however will be lessened if the infrastructure is carefully integrated with current disturbed lands. See Appendix I for detailed maps on a variety of species impacts. Refer to the Arizona Missing Linkages work at http://corridordesign.org/linkages/arizona.

Figure 20: There are a variety of wildlife movement areas in proximity to Corridor 30-52.

Figure 21: Data from Arizona Game and Fish’s Habimap program identifies habitat blocks (green) and linkages (blue and yellow).
**Recommendation:** Permit rights-of-way that are proximate and integrated with existing infrastructure where possible. This effort will reduce impacts on all natural resources.

**Recommendation:** Engage in early and meaningful discussions with the Arizona Game and Fish Department and wildlife conservation groups like the Arizona Wildlife Federation in order to identify avoidance areas and impacts to SERI interests.

### 7.3. Birds

Electrical transmission lines have been historically known to threaten the mortality of some avian species, especially large raptors and eagles who can be electrocuted due to their large wing spans. Over the years, this risk has been reduced through new design approaches. Often, predator birds can benefit from electrical transmission lines as they can use them as predation view-points to watch for prey in the landscape below. There are other risks to the mortality of birds that are posed by energy infrastructure including the possibility of collisions with the wires and the increase in public access that is provided by roads created during the installation process. In the case of Corridor 30-52, there are few known impacts to avian species or their habitat. Of special interest are three species of importance; the Western burrowing owl, Golden eagle, and Sprague’s pipit which are known to occur around the proposed corridor. The impacts analysis performed by Defender’s of Wildlife et.al (Figure 16) demonstrates an impact with a 2 mile-wide corridor of over 10,000 acres to Western burrowing owl habitat, 12,000 acres to Golden eagle habitat, and approximately 200 acres of impact to Sprague’s pipit habitat. These impacts are generally considered to be insignificant with respect to the reality of a narrower corridor and the close proximity to the infrastructure to existing development.

**Recommendation:** Carefully evaluate the possible impacts of the 30-52 corridor to avian species like the Golden eagle and Sprague’s pipit. Integrate modern development methods into the infrastructure to limit the risk of avian mortality.

### 7.4. Plants

The most noticeable impact of transmission development on wildlife is direct habitat loss and modification to build roads, staging areas, structure pads, substations, etc. Each mile of transmission line that is built in the desert southwest compacts an estimated 99-159 acres of soil. In many cases, Right of Way (ROW) vegetation is maintained at an earlier successional state by cutting, mowing, or spraying and never allowed to return to pre-development conditions. When recovery is allowed, time required to attain previous conditions is dependent on the type and severity of disturbance; areas where fires or vegetation removal have occurred with no soil removal and little compaction typically recover most quickly, followed by transmission ROWs, roads, then pipelines, which can take one to several centuries due to the degree of soil disturbance involved. An analysis of 47 studies estimated time to reestablish native plant communities after disturbance in the Sonoran and Mojave deserts. Based on this analysis, the average time estimated to recover perennial plant cover was 76 years, but recovering pre-disturbance species composition was estimated to take 215 years on average. Other studies have directly tied regeneration time to degree of soil compaction, which inhibits seedling emergence, root growth, and nutrient uptake. Fundamentally,

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restoration of impacted sites through active intervention is impractical at this time: standard project-level Sonoran desert restoration methods based on re-seeding have only a 10% success rate, whereas effective restoration methods using container plants would cost $177,210 to $284,610 per mile of line. Given this, avoidance and minimization of key habitats is the best strategy.

Plants protected by the Endangered Species Act are not known to occur in the vicinity of Corridor 30-52. There are concerns, however, that additional infrastructure and human impact may facilitate the spread of invasive plant species which can replace native plants and change the fire regime of the ecosystem. The propagation of invasive and non-native plants has been a significant concern of conservationists with respect to additional infrastructure corridors across natural landscapes. These impacts can be reduced by ensuring the close integration of infrastructure components in order to use less land and reduce human accessibility where it did not previously exist.

**Recommendation:** Permit rights-of-way that are proximate and integrated with existing infrastructure where possible. This effort will reduce impacts on all natural resources.

**Recommendation:** Regularly monitor the areas around infrastructure impacts to identify the presence of invasive and non-native plant species. Early eradication activities will reduce the long-term propagation of unwanted plants.

### 7.5. Riparian areas

As an arid place, the Sonoran Desert has few true riparian areas with flowing water and wetland character. One exception is the Colorado River which is in the direct path of the proposed Corridor 30-52. Other xeroriparian areas like desert washes and flood pools around infrastructure can be excellent places for plant and wildlife habitat and sources for water and food for desert animals. Impacts to these important ecological zones can have broad implications to plant and animal communities that are otherwise desperate for resources in the meager landscape.

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The corridor should be integrated closely with existing infrastructure while remaining respectful to high value xeroriparian areas proximate to Interstate 10 and the Central Arizona Project Canal (CAP) (Figure 22). These areas can have high value for wildlife and plants and should be subjected to few if any impacts.

*Recommendation:* Avoid impacts to xeroriparian areas like desert washes and flood-pooling lands along the CAP and Interstate 10. Where possible, disturb lands on the down-stream side of existing infrastructure projects.

8. Lands with wilderness character

There are no known lands with wilderness character near the proposed Corridor 30-52. Areas to the south and north of the corridor have been evaluated by the Arizona Wilderness Coalition and are known to be of wilderness quality and may be candidates for protection under the Wilderness Act of 1964. Figure 23 shows these lands and their proximity to the corridor. There is no expected impact to these lands caused by the development of an energy corridor along Interstate 10.

![Figure 23: Lands with wilderness character (light green) can be found north and south of Corridor 30-52. The energy corridor will not cause impacts to these areas.](image)

9. Threats to cultural resources

Impacts to cultural resources are very difficult to avoid without appropriately surveying and researching the cultural sites prior to ground-disturbing activities. In the case of Corridor 30-52, impacts can be avoided since the corridor is close to Interstate 10 which was completed in the 1980’s, which should have resulted in archival records of impact and cultural resources disturbed during the development activity. Close consultation with Native American tribal governments including the Tohono O’odham and the Colorado River Indian Tribe should occur as the corridor is evaluated.

*Recommendation:* A careful examination of cultural resource disturbance records created during the development of the Interstate 10 and CAP canal should occur as the corridor is evaluated.

*Recommendation:* Early consultation should occur with the Colorado River Indian Tribe and the Tohono O’odham nation as the corridor is evaluated.

10. Recreation Activities

Public lands are generally appreciated for the opportunity they provide for boundless outdoor recreation. BLM lands in the Sonoran Desert are no exception as they are enjoyed by hundreds of thousands of OHV users, hikers, hunters,
and other recreationists every year. Lands around Quartzite become crowded every winter as thousands of visitors descend with their RVs and outdoor equipment. The addition of an energy corridor should be accomplished while limiting impacts to recreationists in the area that drive the economy of surrounding rural communities. Generally, additional infrastructure corridors have limited impact on other activities, but they could harm the character of the area and infringe on scenic views.

**Recommendation: Locate Corridor 30-52 in close proximity to other existing infrastructure to limit impacts on recreation activities and the natural character of the area.**

11. Conclusion

Corridor 30-52 can bring tremendous service to the broad goals of improving congestion of energy transmission between Arizona and markets in California while facilitating the increase in renewable energy generation and portfolio diversification. Additionally, by being located adjacent to Interstate 10, it can be implemented without significant additional environmental impacts. It is recommended, however, that the segments in California be evaluated to ensure that the corridor can achieve its full planned extent. The corridor has significant upside, as discussed in this report and seems to have limited negative impacts as outlined below:

In general, Corridor 30-52 appears to be a great opportunity to model the integration of energy infrastructure with existing transportation corridors that will bring broad benefit to the community while limiting negative impacts. The co-location of this infrastructure, if successfully accomplished, can be an alternative to other more impactful corridors would otherwise be considered for development. The Corridor has outstanding challenges including how to navigate developed areas like Quartzite and how to locate the infrastructure in close proximity to the highway. The advantages of the corridor, however, seem to outweigh the drawbacks including: the opportunity that is presented to facilitate additional renewable energy development in the Brenda SEZ, the REDA lands all around the area, and within communities like Western Maricopa County.

There is no slam dunk in energy infrastructure planning and more research and analysis needs to be done on Corridor 30-52, but this evaluation has uncovered a lot of information that presents no significant drawbacks to the implementation of this corridor. In further evaluation of this and other West-Wide Energy Corridors, we suggest that the BLM take a close look at the recommendations in this report to guide the process toward enabling the best of the corridors to their fullest potential while rejecting projects where the drawbacks outweigh the benefits.
Appendix I: Wildlife Impacts

Mapping Discussion and Results

A preliminary GIS overlay analysis was conducted by the ASWG to determine risk of potential wildlife impacts from transmission lines in three corridors in southwestern Arizona. Potential wildlife impacts were assessed by overlaying species ranges, critical habitat and migration corridors with the possible transmission routes.

Species were selected by members of the Arizona Solar Working Group and Arizona Game and Fish Department to reflect conservation priorities in the region. Some species, such as Sonoran Desert Tortoise, were chosen for their regional importance as a key species and an indicator of high-quality, connected Sonoran Desert habitat. Others, such as the Mojave Fringe-Toed lizard, were chosen because of their reliance on specific, limited types of habitat where disturbance could be very damaging for species viability. We chose several big game species important to the state that are vulnerable to the effects of habitat fragmentation, such as Desert bighorn sheep, American pronghorn, and mule deer. We also examined two bat species, California leaf-nosed bat and Lesser long-nosed bat, as the impacts of transmission lines on bat species are relatively unknown and these species of conservation need may be vulnerable to direct or indirect impacts. Finally, we examined both the designated critical habitat and modeled suitability range for a suite of Arizona’s threatened and endangered species, from Sprague’s pipit to a number of fish species.

Maps of a few representative species distributions are shown below, and this section concludes with a table showing the overlap, by acres, of each of the modeled suitability habitats with the various corridor alternatives studied.

Wildlife and migration/connectivity GIS data was provided by Arizona Game and Fish Department. Critical habitat data was provided the US Fish and Wildlife Service. Each of these datasets provides a different lens on potential wildlife impacts and comes with its own benefits and drawbacks.

- Critical habitat is legally designated and “contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.” While critical habitat may include recovery or experimental areas, it is not generally intended to encompass the full range of the habitat for that species, and therefore there may be other places on the landscape where those species are at substantial risk, in addition to within their critical habitats.
- AZGFD’s species distribution models, on the other hand, likely overpredict occupied and at-risk habitat and are therefore more conservative tools to estimate wildlife impact risk. These models were built for all Species of Greatest Conservation Need in fulfillment of Element 1 of the State’s Wildlife Action Plan, and were built using SWReGAP Land Cover as a base layer. The layers represent predicted range for the species, based on factors such as landcover, elevation, soil type, etc. A species may or may not be present at any given point within its predicted distribution, but it is more likely to be found within the distribution than outside of it.
- AZGFD has also worked closely with other agencies, stakeholders, counties, and scientists at Northern Arizona University and elsewhere to develop an ongoing modeling process for important wildlife linkages throughout the state. These linkages are designed to connect large intact (unfragmented) blocks of movement habitat important for multiple wildlife species of state concern, and represent the best routes through appropriate habitat for a wide variety of species. Maintaining the integrity of the wildlife movement areas and intact habitat blocks, as well as the linkages that connect them, is essential to maintaining the viability of Arizona’s unique wildlife populations in the face of pressures from development, fragmentation, climate change, drought, and other concerns. AZGFD and its partners initially developed preliminary models of potential habitat blocks and linkages throughout the state in 2006-2007, and then over time have

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prioritized the development of detailed models in various places. All the models are shown in Figure 3 below, and all linkages and large intact blocks should be protected from fragmentation through the use of the mitigation hierarchy and in consultation with the Department.

Where additional management tools and species-specific information, such as AZ BLM’s habitat management units for Sonoran Desert Tortoise or AZGFD’s Heritage Data Management System exist, BLM should incorporate those datasets into its analysis of species impacts and use them to inform its use of the mitigation hierarchy in avoiding, minimizing, and where appropriate offsetting wildlife impacts.

**Overall we recommend the BLM consult with the USFWS and AZGFD to interpret the best available information from BLM, AZFGD, and USGS models, which should inform the alternative configuration and route selection, such that all important low density, habitat connectivity and dispersal habitats for special status species are identified and screened out of the final preferred alternative.**

Transmission corridor centerline information for the I-10 and I-8 routes was provided by the BLM via the WWEC PEIS website and subsequently processed by buffering the transmission centerlines by one mile on either side, creating a two-mile wide corridor—substantially wider than the 3,500-ft default width of the majority of the WWECs. We chose to buffer the corridors in order to account for the fact that transmission corridors can have a variety of impacts upon species, depending on the species and mode or vector of impact. Many species of concern are impacted most heavily by direct disturbance and fragmentation resulting from the construction and presence of the line and its associated infrastructure, and we would need only a narrow buffer radius to identify these species. Other species experience transmission lines as movement barriers at the landscape scale, and it would be appropriate to look several miles out to identify any populations of these species and their potential migratory corridors. On the far end, some species are impacted by increased predation from raptors and corvids taking advantage of perching and nesting opportunities provided by the wires and towers. Several studies have identified predation impacts by ravens extending as far as 4.3 miles in either direction from a transmission line in some landscapes. 11

In choosing a 1 mile buffer, ASWG is seeking to strike a middle ground accounting for these types of impacts and past precedent in corridor planning and analysis. Using a 4+ mile buffer could result in overprediction of impacted species and lead to an artificially long list of species to review for further study, given that only some species are at risk from raptor or corvid predation (in the case of those species, such as sage grouse and desert tortoise, however, it would be appropriate to consider potential siting impacts as far as 4 miles from the corridor). We also base this recommendation on choices made in a number of recent studies and models:

- The Eastern Interconnection States’ Planning Council (EISPC) Energy Zones (EZ) Map viewer allows for a choice of a 1- or 2-mile buffer (for a corridor diameter of 2 or 4 miles) when running “imperiled species” and “habitat” analysis tools.
- The California Energy Commission utilized a 0.5-mile buffer to measure critical habitat near proposed line corridors in its model supporting recommendations for the report Planning Alternative Corridors for

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Transmission. We feel this buffer width is too small to capture the full range of species potentially impacted by a line, but may be useful for analyzing impacts to species affected most directly by construction and habitat fragmentation from the line itself.

- The Electric Power Research Institute developed a model for creating and screening “macro-corridors” which may “have a width of as much as a mile or greater for segments that have substantial length through areas of high suitability, while still allowing enough width in the low suitability areas for the right-of-way requirements of the project.”

By contrast, the Bureau of Land Management used a 4-mile buffer on either side of proposed subroutes for the SunZia project to define a study corridor for the identification of potentially occurring species (SunZia DEIS 3.6.12). We feel that this broad corridor, while useful for conservatively capturing the full range of possible species affected, is wider than necessary for the task of identifying species at potential risk from corridor placement and informing further, more detailed studies. In order to test whether a broader buffer would be useful, ASWG buffered the federal WWEC corridors to 1- and 2-mile radius and examined overlap with AZGFD predicted habitats for 13 initial species. No species had overlap with the 2-mile buffer that did not also have overlap with the 1-mile buffer, indicating that a 1-mile buffer should be sufficient to capture an appropriate representation of potentially impacted species.

Due to the origin of the centerline data for these routes, which did not contain alignment information on private land, our analysis was also only conducted on public land.

Transmission corridor information for the I-11 route was produced by tracing the maps provided by the Arizona Department of Transportation; as such, it does include information about route alignment on private land. However, it also includes numerous alignment options - which are displayed and discussed below as numbered segments.

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An Analysis of West-Wide Energy Corridor 30-52

Legend
- Corridor Buffers 1 Mile
- Golden eagle

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