

August 20, 2012

Bureau of Land Management
Adrian Garcia, Project Manager
SunZia Transmission Line Project
P.O Box 27115
Santa Fe, NM 87502-0115

Re: Comments on SunZia Transmission Line Project Draft EIS/RMPA

Dear Mr. Garcia:

We appreciate the opportunity to provide comments on the SunZia Transmission Line Project Draft Environmental Impact Statement. We recognize that new transmission lines are an integral part of the shift to renewable energy supplies in the Southwest, and welcome the chance to participate in their siting.

The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends. The Nature Conservancy has invested significant time and resources in developing and applying science to our mission. A recent focus has been on the placement of energy infrastructure, with the goal to help find siting solutions that work for project proponents and yet minimize impacts to the natural environment.

Overall, we commend the BLM for your work with this project to co-locate routes with existing right-of-way alignments, which minimizes new environmental impacts while reducing costs associated with both construction and maintenance. We appreciate that most of the alignments avoid perennial streams and broadleaf riparian vegetation communities. We also appreciate the detailed Best Management Practices provided in Tables 2-10 and 2-11 of the DEIS.

Below, we provide general comments on expected direct, indirect, and cumulative impacts from this project, followed by route-specific comments. We have serious concerns about the potential impacts of siting this project in some areas, including the San Pedro River Valley, the Galiuro Mountains, both Rio Grande crossings, the Nutt Grasslands, and the Lordsburg Playas. We recommend avoiding several of those areas, and suggest mitigation measures if they cannot be avoided.

Potential for Mitigation

The Nature Conservancy supports a systematic approach to use mitigation for maintaining or enhancing environmental values in situations where development is being planned, despite detrimental environmental impacts (Kiesecker et al. 2009). In many ways, this is just an evolution of the mitigation hierarchy first established for U.S. wetlands mitigation by the Environmental Protection Agency and Department of the Army in 1990. As currently described in statute (40 CFR § 1508.20) mitigation includes:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action;*
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation;*
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;*
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and*
- (e) Compensating for the impact by replacing or providing substitute resources or environments.*

This approach has gained wide application, and was recently clarified in a memo from the Council on Environmental Quality (2011). BLM did a good job of incorporating these elements into the recent Final Programmatic EIS for Solar Energy Development in Six Southwestern States.

Given the size and nature of the SunZia project, there will inevitably be significant environmental impacts if it is built. Some of these will affect high-quality, intact habitat that is currently helping keep additional species off the endangered species list. There are also real opportunities to avoid some of the most sensitive areas, and we appreciate that several potential routes were dropped during early phases of this process for just that reason. Below we suggest additional areas that should be avoided. We also suggest ways to minimize impacts for those areas which cannot be avoided. We do not have specific recommendations for compensation, but provide several analyses that should inform such measures.

In reviewing the DEIS, we appreciate the descriptions of standard and selective mitigation measures (Tables 2-10, 2-11), but see those as largely consisting of Best Management Practices. Most notably, they do not include any description of compensation to offset unavoidable impacts. We were unable to find descriptions of specific mitigation measures that would be required for each of the project alternatives. As this is a requirement of the EIS process (40 CFR § 1502.14), we request that such details be issued prior to issuance of the Final EIS so that the public can properly assess the tradeoffs involved with the various routes. These should also be part of the Construction Operations and Maintenance Plan, and should be included in the various lease agreements with land owners. We also request the Final EIS include a monitoring and enforcement program to assess the actual impacts of the project and the effectiveness of mitigation efforts, as described in BLM's guidance on preparing NEPA analyses.

The BLM has demonstrated authority to negotiate for substantive mitigation measures, even beyond the mandates of laws such as the Endangered Species Act. In 2010, BLM entered a cooperative conservation agreement with agencies from three states and proponents for the Ruby Pipeline, a 675-mile natural gas line. In addition to avoidance, minimization, and restoration measures, it provides \$11.6 million in funding to offset the impacts that still remain. Those funds went to the state wildlife agencies of Nevada, Utah, and Wyoming for additional conservation measures to benefit two unlisted species. We suggest that unavoidable impacts of the 500-mile SunZia project merit a similar effort.

General Concerns

Habitat loss and fragmentation

We are very concerned about the direct and indirect effects of new access roads for construction and maintenance of transmission lines. There is direct habitat loss from the footprint of the roads, which should be estimated for each of the potential routes. Where routes cross steep, rocky terrain, road length will be significantly more than the length of the line because construction will require bulldozing circuitous access routes to individual tower sites. We expect these access roads will become permanent features of the landscape to simplify line maintenance, unless their closure and restoration is an explicit mitigation requirement.

Indirect effects of access roads are harder to measure, but no less significant. Roads become vectors for invasive species and sources of soil erosion, especially with frequent use. We anticipate that these access roads will be frequently used by the general public, regardless of structures built to control use. Our experience with managing utility corridors in large landscapes has been that fences and locks are cut, and gates are knocked down or removed on a regular basis. Anything that resembles a road becomes an attractive nuisance and an ongoing management headache. Those roads then become entry points for further incursions into undeveloped landscapes. The resulting use creates ground disturbance, soil erosion, and noise, among other impacts, fragmenting lands that were formerly continuous habitat for wildlife.

There is a large and growing body of scientific literature on the negative effects of landscape fragmentation. As described in the recent Arizona State Wildlife Action Plan (AGFD 2011), the Arizona Game and Fish Department “has identified the importance of maintaining unfragmented habitats as a critical component in the conservation of wildlife and wildlife habitat as well as addressing existing and predicted global climate change (i.e., protecting blocks of habitat across an elevational and vegetation gradient).” Depending on which route is chosen, the SunZia transmission lines and associated access roads will likely fragment several large, intact areas.

The ADOT/AGFD Wildlife Linkages Assessment identifies the portion of the San Pedro River Valley between the Catalina/Rincon Mountains and the Galiuro Mountains as a potential linkage zone and the river corridor as a riparian habitat/linkage zone (Arizona Wildlife Linkage Workgroup 2006). It also identified areas south of the Galiuro Mountains, and south of the Pinaleno Mountains. A more detailed analysis modeled wildlife movement corridors between the Galiuro and Pinaleno Mountains (Beier et al. 2008). All of these are crossed by one or more of the routes under consideration. These are areas where protecting the ability of wildlife to move should be considered in the design of fencing and other infrastructure.

Vegetation management under transmission lines has become a major impact due to recent regulatory changes, and contributes to both habitat loss and fragmentation. With the SunZia project, we are particularly concerned about areas where the routes cross riparian areas. Recent construction of other transmission lines in this region has created large openings in previously-continuous riparian forests, which will likely be maintained for the life of those lines. We applaud BLM and the project proponents for designing alternatives that generally avoid perennial stream reaches, but note that several riparian crossings are still under consideration. There is no mention in the DEIS of mitigation measures to offset vegetation clearing and maintenance associated with the crossing of riparian habitat. The limited distribution and high biological value of these habitats in the Southwest warrant compensation in cases where sensitive, high value habitat cannot be avoided.

The standard practice for vegetation management in this region differs from that described in the DEIS (p. 4-65): “Nearly all vegetation communities affected by the Project are dominated by plants of relatively low stature, and a cleared or brushed right-of-way for conductor clearance and fire safety would not be required.” Figure 1 shows a typical portion of the Arizona Public Service right-of-way from Moenkopi to Yavapai substations, with two 500-kV lines crossing the Prescott National Forest. Vegetation maintenance in that pinyon/juniper woodland with intermixed chaparral has produced a linear clearing 100 meters wide (2010 image, National Agriculture Imagery Program). This is similar to the vegetation in the Galiuro Mountains, where we would expect similar maintenance.

Figure 1. Vegetation maintenance under dual 500-kV transmission line, Prescott National Forest.



For portions of several routes, the presence of the SunZia transmission lines would likely impair a different sort of vegetation management: the use of fire to restore or maintain healthy conditions in upland vegetation communities. Fire is a natural ecological process, and its absence can cause significant negative changes in community composition and function. Recent gains in our understanding of this have led the BLM, U.S. Forest Service, and other land managers to develop extensive fire plans that include the use of both natural and prescribed ignitions. However, wildland fires are generally not compatible with transmission line structures and operations, due to concerns for arcing and carbon deposition. The SunZia lines will likely become a reason to suppress fires in their vicinity and preclude planned fires that might affect the lines.

Cumulative Effects

The cumulative effects analysis in the DEIS is insufficient, in that it includes just the SunZia project study area. As a regional project, the analyses should include at least the whole area of Arizona and New Mexico.

To evaluate cumulative effects associated with the proposed SunZia transmission lines at an appropriate

scale, we looked at existing habitat loss and fragmentation from roads and transmission lines in Arizona and New Mexico. We then compared the present baseline condition to a future scenario that included 20 transmission line proposals across Arizona and New Mexico currently in some phase of planning. We did not consider pipelines in this analysis but note that pipelines similarly fragment habitat and would further amplify this type of analysis.

Using a conservative estimate of 100-meter-wide corridors for all existing transmission lines, we estimate 723,000 acres has been disturbed by existing lines. The additional 20 lines would add another 158,000 acres of disturbance. If each of the proposed lines is implemented with the same mitigation standards as proposed for SunZia in the DEIS, i.e. without offsets for habitat loss, fragmentation, and other direct and indirect impacts, baseline environmental conditions across the region will decline and the need for new species listings under the Endangered Species Act will likely increase.

The remaining habitat blocks would also be compromised to the point where species and habitat recovery options would be limited. Figure 2 compares the current baseline condition to the future scenario. The largest remaining habitat blocks are indicated by progressively darker shades of green. The red polygon depicts the area encompassed by the Galiuro Mountains, Aravaipa Canyon, and Santa Teresa Mountains. The graphic to the right illustrates the change in size of this habitat block due to the proposed Aravaipa route of SunZia.

Figure 2. Habitat fragmentation in Arizona and New Mexico due to roads and transmission lines.

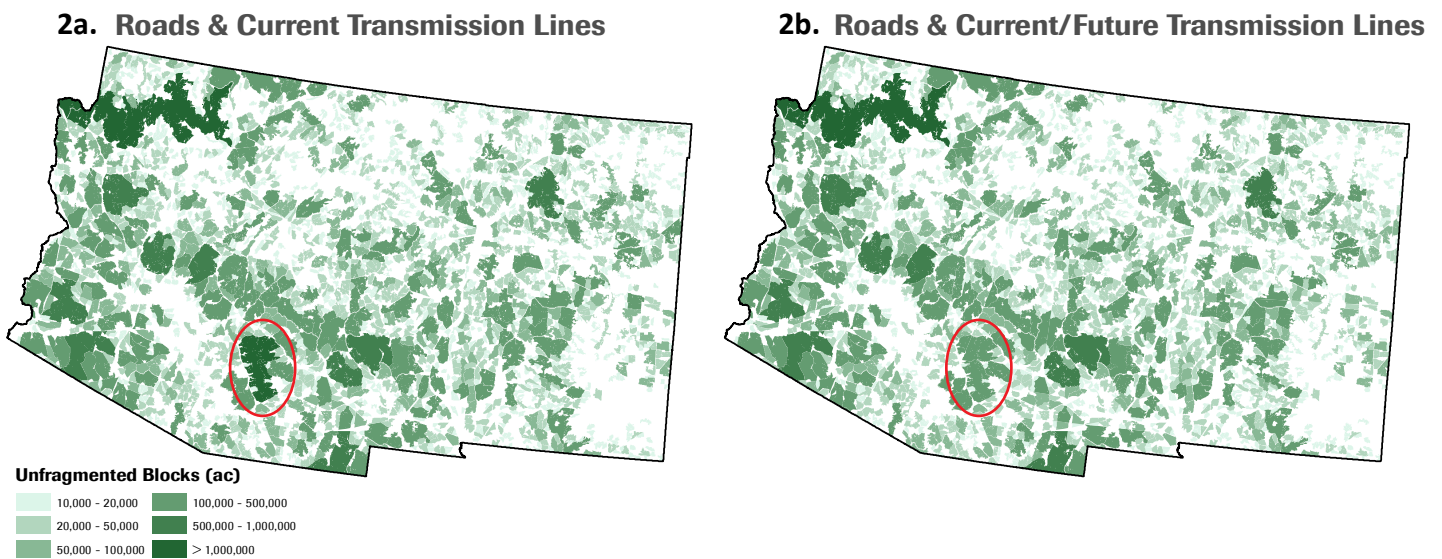
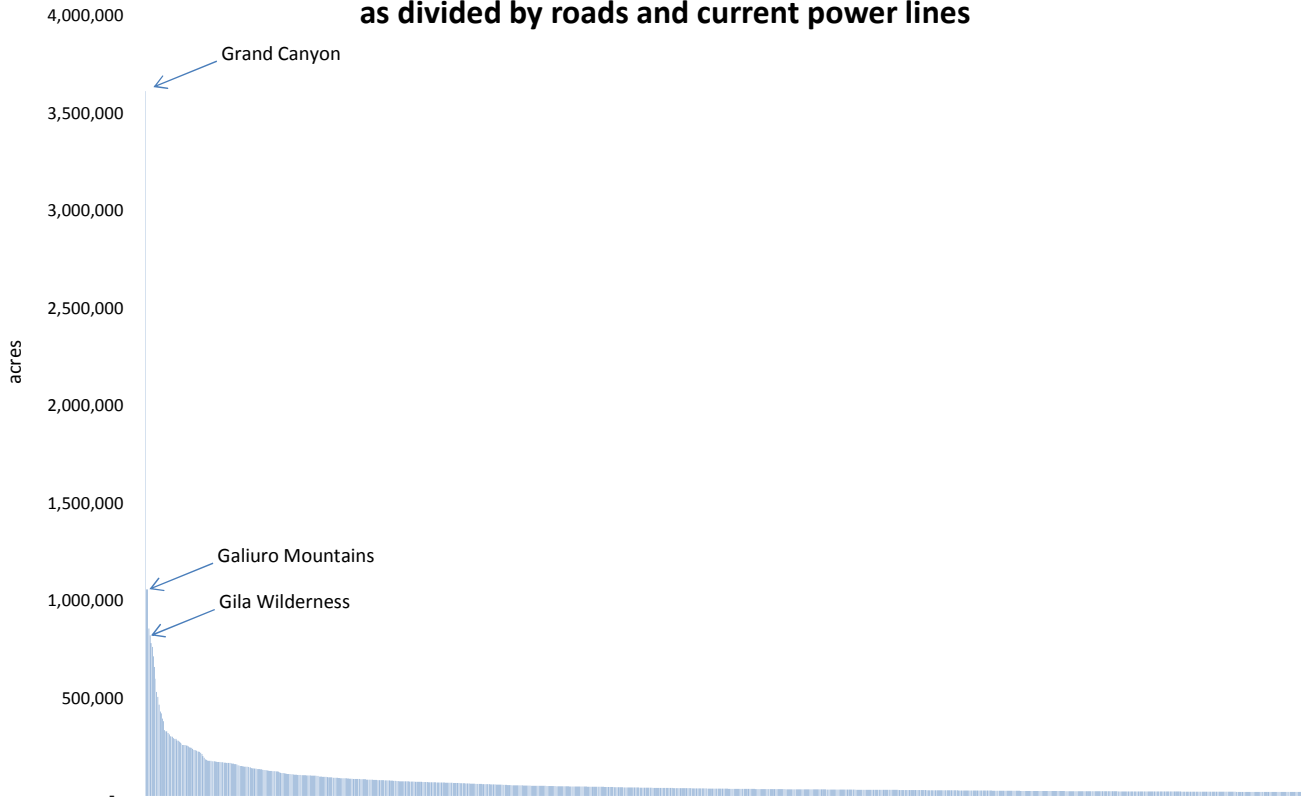


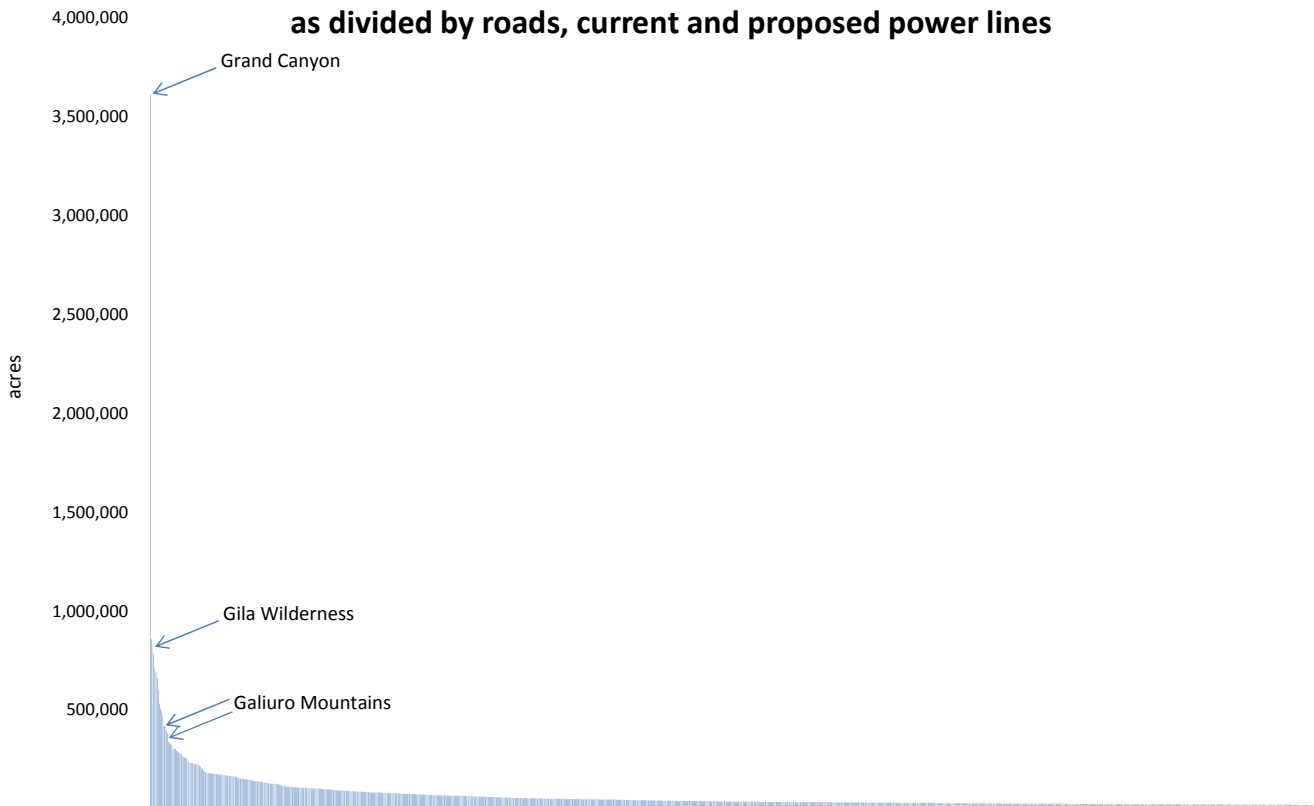
Figure 3 plots the distribution of habitat patch sizes in acres across Arizona and New Mexico. All patches smaller than 20,000 acres were excluded from the analysis to make the size of the graphic more manageable. Figure 3a illustrates how the current baseline condition is skewed considerably to the right, meaning the landscape of Arizona and New Mexico is comprised predominantly of small habitat fragments. This graphic also illustrates that outside of the Grand Canyon, there is no habitat block larger than the Galiuro-Aravaipa-Santa Teresa area. Figure 3b illustrates the change in ordinal position and size of the Galiuro-Aravaipa-Santa Teresa area from siting SunZia across the axis of this area.

While the impacts are less dramatic, other alternative routes for SunZia would also affect large blocks of currently unfragmented habitat. And as part of the cumulative effects, the other proposed lines would significantly shrink at least 25 additional habitat blocks that are currently larger than 20,000 acres.

**Figure 3a. Existing infrastructure:
Unfragmented landscapes >20,000 acres in Arizona & New Mexico,
as divided by roads and current power lines**



**Figure 3b. Cumulative effects of new infrastructure:
Unfragmented landscapes >20,000 acres in Arizona & New Mexico,
as divided by roads, current and proposed power lines**



The conclusion from these analyses is that the Sunzia transmission route proposed to cross the Galiuro-Aravaipa-Santa Teresa area would split in half the second largest unfragmented landscape remaining in the southwestern U.S. It would introduce habitat disturbance into an area where there are no paved roads, no dirt roads over the Santa Teresas into the Gila River Valley, and only one nearly-impassable jeep trail that crosses over the axis of the Galiuros from Aravaipa Valley to the San Pedro River Valley. With the Southwest's largest remaining intact area, the Grand Canyon, already in protected status, it raises the question of whether mitigation measures are even possible for disturbances to the region's second largest intact landscape.

A different analysis, conducted independently by the Arizona Game and Fish Department, showed most of the lower San Pedro River Valley as part of a single unfragmented block of land that included the Rincon, Galiuro, and Santa Teresa Mountains (habimap.org, accessed 1 August 2012).

Arizona Route-specific Comments

Preferred alternative, west of San Pedro (4C2c and related routes 4C2, 4C2a, 4C2b)

We recommend avoiding this route.

The Nature Conservancy and many others have long identified the Lower San Pedro River Valley as a top priority for biological conservation in the Southwest. It supports more than 300 bird species and provides important habitat for millions of migratory birds. The San Pedro River Valley has higher recorded bird species richness (number of species) and density (number of birds per hectare) than the Rio Grande Valley (Brand et al. 2009). It has been identified by the National Audubon Society as a Globally Important Bird Area. It includes designated Critical Habitat for Southwestern Willow Flycatcher and Gila Chub, and proposed Critical Habitat for Spikedace and Loach Minnow. More than 750 plant species have been identified in the riparian corridor and adjacent uplands. The watershed supports more than 80 mammal species, 12 amphibians, 55 reptiles, about 100 butterfly species, and 250 bee species. Historically it supported 13 native fish species, though several have been lost (Stromberg and Tellman 2009).

Tributary streams with perennial or intermittent flow have similar values to the mainstem San Pedro River. One study found that more species of migrating birds along the San Pedro Valley use isolated wetlands than sites along a continuous riparian corridor, and the relative abundances of most migrating birds were similar (Skagen et al. 1998). Link C441 would cross an intermittent reach of Buehman Canyon, which supports a significant riparian community.

Over the last three decades The Nature Conservancy and many other agencies and organizations have been working steadily to protect the Lower San Pedro Basin. Partners in this effort include the Arizona Game & Fish Department, Arizona State Parks Department, Bureau of Land Management, Bureau of Reclamation, Pima County, Saguaro Juniper Corporation, Salt River Project, and U.S. Fish & Wildlife Service. The Resolution Copper Company has offered to protect additional lands in the valley through a proposed land exchange. Together, these partners and other private landowners have protected approximately 192,000 acres and invested over \$42.5 million in acquisition of conservation lands and appurtenant water rights. That investment required 68 separate land transactions, beginning in 1970 and continuing through 2012, and does not include adjustments for inflation.

The majority of those investments – about 144,000 acres – were made to satisfy mitigation requirements for habitat losses elsewhere in Arizona that were the unavoidable by-product of projects important to economic development. Jeopardizing the integrity of these conservation projects by construction of the SunZia transmission lines could trigger the need for additional and possibly less-successful mitigation. In particular, link C441 would cross through state trust lands managed by Pima County to provide a mitigation bank as part of their Habitat Conservation Plan; construction of the lines would reduce the conservation credit they receive for those leases.

The construction and maintenance of the SunZia lines would fragment portions of several large intact landscape blocks. The western side of the Lower San Pedro River Valley includes arms of two large blocks: Rincon Mountains (approximately 235,000 acres) and Santa Catalina Mountains (116,600 acres). The fragmentation analysis described above showed that this route would sever about 31,000 acres off the Rincon block and 17,000 acres off the Santa Catalina block, while reducing the elevation gradient of both.

If avoidance is not possible, we recommend at least the following mitigation measures.

If there is a decision to site the SunZia lines along this route, the following is a minimum set of mitigation measures that should be required.

- Minimize bird mortality through use of the best available technology to prevent bird collisions with the transmission lines, overhead ground wires, and guy wires. Use tower designs that minimize the need for guy wires.
- Minimize damage to riparian forests along the San Pedro River by shifting the alignment to an ephemeral reach or using sufficiently tall towers to span them without vegetation clearing and maintenance.
- Minimize damage to riparian forests in Buehman Canyon by using hilltop placement of towers or sufficiently tall towers to span them without vegetation clearing and maintenance. Avoid construction of roads that would create new access into the canyon.
- Minimize impacts to Paige Canyon by not running parallel down the canyon. This would avoid opening the length of the canyon to recreational off-road driving impacts.
- Minimize impacts to Allen Flat grasslands by siting lines adjacent to the existing roads, thus avoiding the need for new access roads and vegetation clearing in the habitat patch interior.
- Minimize the effects of fragmentation by not creating a continuous maintenance road along the route. Use landscape features such as cliffs to maintain permanent barriers to continuous travel.
- Compensation should be provided for the loss of mitigation and conservation lands, and for direct and indirect impacts to wildlife habitat.

East of San Pedro (4C1)

We recommend avoiding this route.

The rationale for avoiding this route is almost entirely the same as given for the Preferred Alternative.

The construction and maintenance of this alternative would fragment portions of the largest intact landscape block in the region. The eastern side of the Lower San Pedro River Valley includes arms of the Galiuro/Aravaipa/Santa Teresa habitat block (approximately 1,058,000 acres). The fragmentation

analysis described above showed that this route would sever about 71,000 acres off this block.

If avoidance is not possible, we recommend at least the following mitigation measures.

If there is a decision to site the SunZia lines along this route, the following is a minimum set of mitigation measures that should be required.

- Minimize bird mortality through use of the best available technology to prevent bird collisions with the transmission lines, overhead ground wires, and guy wires. Use tower designs that minimize the need for guy wires.
- Minimize damage to riparian forests along the San Pedro River by crossing at an ephemeral reach (as shown in the DEIS) or using sufficiently tall towers to span them without vegetation clearing and maintenance.
- Minimize damage to riparian forests in Hot Springs Canyon by using hilltop placement of towers or sufficiently tall towers to span them without vegetation clearing and maintenance.
- Minimize impacts to Allen Flat grasslands by siting lines adjacent to the existing roads.
- Minimize the effects of fragmentation by not creating a continuous maintenance road along the route.
- Compensation should be provided for the loss of mitigation and conservation lands, and for direct and indirect impacts to wildlife habitat.

Sulphur Springs Valley (4B)

We recommend avoiding this route.

The link C170 would cross the Galiuro Mountains between the Aravaipa Canyon Wilderness and the Galiuro Wilderness. While the vicinity of that link appears on some maps as a corridor of state and private lands between the federal blocks to the north and south, on the ground it is part of an unbroken landscape of extremely rugged hills and canyons. A majority of that link is within the Aravaipa Canyon watershed. Arizona state trust lands in the northern Galiuros have ecological conditions and management needs that are identical to those of the BLM lands to the north and the Forest Service lands to the south. Most (51,000 acres) of the BLM lands around Aravaipa Canyon were state trust lands until an exchange in 1986. The narrow strip of state lands remaining in that gap was identified for BLM acquisition in the Safford District Resource Management Plan (BLM 1991).

The Aravaipa ecosystem supports at least 529 plant and 353 vertebrate animal species, including 233 birds, 50 reptiles, 48 mammals, 12 fish, and 10 amphibians (BLM 2010). The area includes five species currently listed under the Endangered Species Act, 13 BLM sensitive species, and 14 species on AGFD's list of Wildlife of Special Concern in Arizona. The Arizona Heritage Data Management System identified 35 species of interest as occurring within the Aravaipa Creek watershed.

As noted above, the Galiuro/Aravaipa region is currently the second-largest unfragmented block in Arizona and New Mexico, comprising approximately 1,058,000 acres. This is a large area of lands with wilderness characteristics. The creation of access routes for transmission line construction and maintenance would create a continuous swath of disturbance through the middle of that block, leaving remnants of 486,000 acres, 563,000 acres, and smaller fragments. There is no way to replace or mitigate for the reduction of that habitat block.

Constructed access routes for transmission lines, even if not built to a high standard, would subsequently provide access routes for recreational off-road drivers, who would then have easy access to canyons and mesas that are currently accessible only by foot or horseback. This would create a permanent set of new management problems for BLM staff trying to maintain the Aravaipa Canyon Wilderness and for The Nature Conservancy staff trying to maintain our Aravaipa Canyon Preserve.

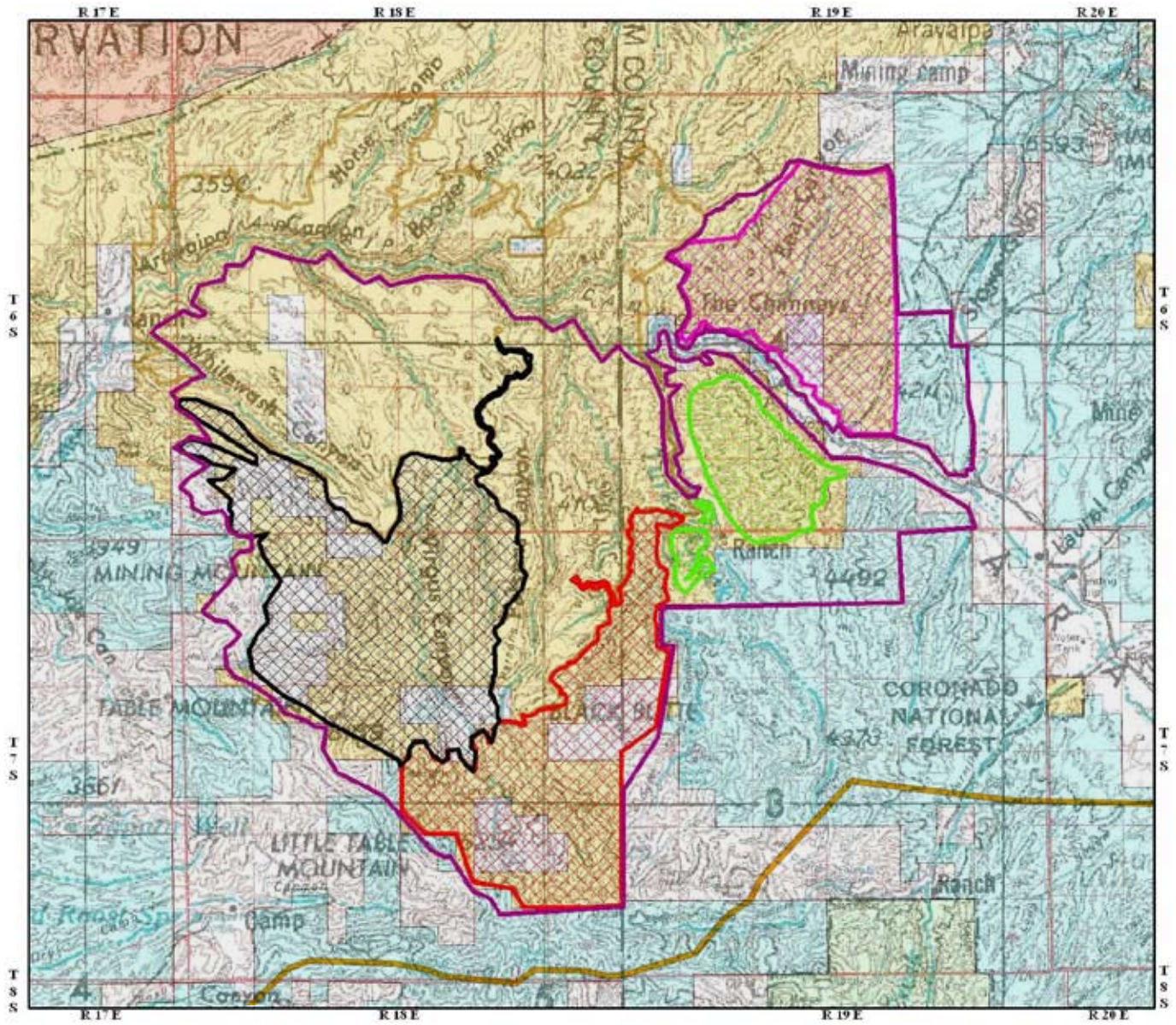
The Galiuro Mountains and upland areas south of Aravaipa Canyon were recommended as one of three priority areas for fire restoration management by the Safford District BLM in an assessment of BLM fire management plans in Arizona (Schussman and Gori 2004). Ecological models presented there suggest the area historically burned every 7-10 years.

As acknowledged in the DEIS (Section 4.17.4.7), placement of transmission lines across the Galiuros would severely limit, if not entirely preclude, the use of fire as a management tool to maintain and enhance habitat for wildlife. This is due to the significant liabilities transmission providers face if they incur outages through lack of vegetation management and the hazards a transmission line creates for fire crews. Along with fragmentation effects of transmission lines, the exclusion of fire from habitats historically maintained by fire will result in habitat loss for species dependent upon grassland and forested habitats. Moreover, limiting the use of fire as a management tool increases the chance of catastrophic wildfire in an area with few roads and limited access for fire suppression activities, which would introduce a constant threat for any new infrastructure. Use of fire is the only practical tool to manage habitat for an area of this size. The lack of extensive infrastructure in this area has made habitat management using fire practical, something that has become increasingly difficult to accomplish elsewhere as urban, suburban, and exurban development encroach into prime wildlife habitat throughout the state's forests and grasslands.

While the Galiuro route would cross only state and private lands, its close proximity to federal lands would affect fire management across much larger areas where fire planning already exists. The Galiuro Mountains and upland areas south of Aravaipa Canyon were identified as areas suitable for wildland fire use for resource management benefit in the BLM (2004a) Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management, and in the BLM (2004b) Safford-Tucson Fire Management Plan. There is a similar policy in the Coronado National Forest (2010) Fire Use Management Plan. Similar policies were stated in the Muleshoe Ecosystem Management Plan (BLM 1998), which sets out a prescribed fire program using both natural and deliberate ignitions to restore and maintain upland vegetation throughout most of the Galiuro Mountains. Similar guidance was presented in the draft Aravaipa Ecosystem Management Plan (BLM 2010). An existing BLM prescribed fire burn unit is within one mile of link C170 (Figure 4; SunZia route added).

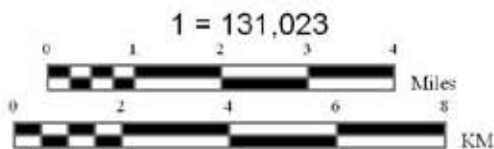
One of the biggest threats to the health of Aravaipa Creek and its native fish community is excessive sediment deposition (BLM 2010). While the proposed route is some distance from perennial reaches of the creek, erosion from construction and use of access routes would likely cause additional sedimentation that degrades one of the most important native fish habitats in the Southwest. The extremely rough terrain along the Galiuro portion of the proposed route would require extensive bulldozer work to reach many of the tower sites, which would create a high risk of sediment transport into the creek. This would also affect the Turkey Creek Riparian Area of Critical Environmental Concern. The effects would be a persistent problem, as line maintenance activities and recreational use of those access routes would be persistent.

Figure 4. Prescribed fire burn units for the BLM South Rim Allotment. SunZia route added for clarity.



Legend

- | | | | |
|------------------------------|--|--------------------------------|-------------------------|
| Private Lands | Bureau of Land Management (BLM) | BLM Wilderness Area | Maximum Manageable Area |
| State Lands | National Forest Lands (USFS) | Forest Service Wilderness Area | Rx Burn Unit Boundary |
| State Wildlife Area | National Park Service (NPS) | NPS Wilderness Area | Rx Burn Unit Boundary |
| City, State, County Parks | USFWS Service, National Wildlife Refuges | USFWS Service Wilderness Area | Rx Burn Unit Boundary |
| Indian Lands or Reservations | | | Rx Burn Unit Boundary |



United States Department of the Interior
 Bureau of Land Management
 Arizona State Office
 Land Status updated as of August, 2010
 Map created on Mar 11, 2012

The Bureau of Land Management (BLM) makes no representations or warranties regarding the accuracy or completeness of this map. This map does not address encroachments or questions of location, boundary, and area, which an accurate survey may disclose. This map is intended and is to be used as an illustration only. The map is merely representational, it and the data from which it was derived are not binding on the BLM and may be revised at any time in the future. The BLM shall not be liable under any circumstances for any direct, indirect, special, incidental, or consequential damages with respect to any claim by any user or any third party on account of or arising from the use of this map or the data from which it was derived.

Link C592 of this route would cross the San Pedro River at the 7B Ranch, an area managed for its conservation values and intended as partial compensation for anticipated impacts to federal lands near Superior, Arizona. Depending on the exact siting and construction, this route could damage portions of a large mesquite bosque with significant wildlife values.

If avoidance is not possible, we recommend at least the following mitigation measures.

Damage to the conservation values of the Aravaipa/Galiuro area cannot be adequately mitigated. If, however, there is a decision to site the SunZia lines along this route, the following is a minimum set of mitigation measures that should be required.

- Establish clear multi-agency agreements that wildland fire use in the Galiuro Mountains, using both natural and prescribed ignitions, would not be constrained.
- Require a high standard for prevention of soil erosion that would contribute sediment to Aravaipa Creek. That should include measures for both construction and operation phases.
- Use landscape features such as steep canyon walls to create permanent control points for access roads across the Galiuro Mountains. These should preclude access from both east and west sides, along with breaks in the middle. This will require not using mechanically-created access routes, even temporary ones, in strategic locations.
- Minimize damage to riparian forests along the San Pedro River by crossing at an ephemeral reach or using sufficiently tall towers to span them without vegetation clearing and maintenance.
- Compensation should be provided for the loss of mitigation and conservation lands, and for direct and indirect impacts to wildlife habitat.

North of Mount Graham (4A)

We recommend avoiding this route.

The rationale for avoiding this route is almost entirely the same as given for the Sulphur Springs Valley route.

In addition to fragmentation of the Galiuro/Aravaipa/Santa Teresa habitat block as described above, this route would sever arms off the Pinaleno Mountains habitat block (253,400 acres), separating about 16,000 acres.

Link B153b would cross an intermittent reach of Ash Creek, and likely affect the conservation investments made by Arizona Game and Fish Department there.

If avoidance is not possible, we recommend at least the following mitigation measures.

Damage to the conservation values of the Aravaipa/Galiuro area cannot be adequately mitigated. If, however, there is a decision to site the SunZia lines along this route, the following is a minimum set of mitigation measures that should be required.

- Establish clear multi-agency agreements that wildland fire use in the Galiuro Mountains, using both natural and prescribed ignitions, would not be constrained.

- Require a high standard for prevention of soil erosion that would contribute sediment to Aravaipa Creek. That should include measures for both construction and operation phases.
- Use landscape features such as steep canyon walls to create permanent control points for access roads across the Galiuro Mountains. These should preclude access from both east and west sides, along with breaks in the middle. This will require not using mechanically-created access routes, even temporary ones, in strategic locations.
- Minimize damage to riparian forests along Ash Creek by crossing at an ephemeral reach or using sufficiently tall towers to span them without vegetation clearing and maintenance.
- Minimize damage to riparian forests along the San Pedro River by crossing at an ephemeral reach or using sufficiently tall towers to span them without vegetation clearing and maintenance.
- Compensation should be provided for the loss of mitigation and conservation lands, and for direct and indirect impacts to wildlife habitat.

Tucson (4C3)

Among the alternatives in Route Group 4, the Tucson route has the least environmental impacts. Link F600 would affect Pima County's Cienega Creek Natural Preserve by crossing both Cienega Creek and Davidson Canyon.

We recognize that there could be significant social impacts from this route.

We recommend at least the following mitigation measures.

The following is a minimum set of mitigation measures that should be required.

- Minimize damage to riparian forests along the San Pedro River by crossing at an ephemeral reach or using sufficiently tall towers to span them without vegetation clearing and maintenance.
- Minimize damage to riparian forests along Cienega Creek by crossing at an ephemeral reach or using sufficiently tall towers to span them without vegetation clearing and maintenance.
- Minimize damage to riparian forests along Davidson Canyon by crossing at an ephemeral reach or using sufficiently tall towers to span them without vegetation clearing and maintenance.
- Compensation should be provided for the loss of mitigation and conservation lands, and for direct and indirect impacts to wildlife habitat.

New Mexico Route-specific Comments

Rio Grande Crossing (Subroutes 1A and 1B)

We recommend avoiding this route.

Both the North River Crossing (Subroute 1A) and the San Antonio Crossing (Subroute 1B) are located within the critical Middle Rio Grande wintering habitat area for sandhill cranes. The proposed crossings are just south of Sevilleta NWR and the Ladd S. Gordon Waterfowl Complex and just north of Bosque del Apache NWR. The Bosque del Apache is the single most important wintering location for sandhill cranes in the Rocky Mountain Region providing habitat for over 50% of the entire population (Dreweyn and Bizeau 1974). Bosque del Apache has been home to the annual Festival of the Cranes since 1989 and is listed as one of the Audubon Society's Important Bird Areas. The Audubon Society estimates the economic benefit of the Festival alone to be \$2.2 million and the local economic effects associated with

the Refuge to be more than \$20.3 million. The sandhill crane is a favorite among birders and hunters alike. The shallow water roosting sites and irrigated grain fields attract vast numbers of cranes to the area every winter.

Because of its importance as a continental flyway, U.S. Fish and Wildlife Service and its partners have been working to conserve and restore migratory bird habitat for many years. Considerable federal and partner investments will be adversely impacted by the placement of the SunZia Southwest Transmission Line Project in the Middle Rio Grande Valley. For example, in 2001, 58 acres of wetland habitat was acquired and 2,500 acres of wetland habitat was restored in the Middle Rio Grande Valley by U.S. Fish and Wildlife Service and its partners through a \$1 million North American Wetlands Conservation Act (NAWCA) grant and over \$2 million in matching funds. An additional \$1 million NAWCA grant was acquired in 2005 in phase two of this project to restore an additional 2,000 acres of wetland habitat and included over \$2.5 million in partner funds. In 2011, the Rio Grande Agricultural Land Trust acquired six easements in the area as part of a NAWCA grant for riparian restoration and easement purchase. Since 2001, the federal investment in the Middle Rio Grande is approximately \$9.5 million and has led to the restoration and protection of 7,500 acres.

The Middle Rio Grande Valley in New Mexico has experienced increasing human impacts that are compromising the long-term capability of these areas to provide adequate forage and roosting habitats to sustain cranes at current levels (Assoc. of Fish and Wildlife Agencies 2009). The trend toward alfalfa and vegetable production in place of small grains and the sale of farmland for real estate development has greatly reduced the availability of suitable winter food resources in the Middle Rio Grande. Due to limited wetlands and food resources, dense concentrations of roosting sandhill cranes have become increasingly susceptible to avian cholera outbreaks. Uncertainty in the future of water availability, increasing urban expansion, and changes in farming practices will further reduce the future value of the Middle Rio Grande Valley to cranes. Because of these existing and increasing threats to sandhill crane populations, any new impacts should be examined carefully.

Numerous studies have found that collisions with transmission lines are a significant cause of mortality for sandhill cranes (Ward et al. 1987, Windingstad 1988, Wright et al. 2009) and that such collisions are most likely in their daily flights between roosting and feeding areas (Bevanger 1994, Faanes 1987, Wright et al. 2009). The BLM preferred placement (Subroute 1B) and alternative placement (Subroute 1A) of the transmission lines cross the Rio Grande in critical habitat for sandhill cranes in New Mexico and both routes can be expected to have considerable impact on the sandhill crane population.

Underground burial of the transmission line is the only effective way to avoid significant impact to the sandhill crane population. There are no examples of undergrounding 500kV transmission lines in the United States and only a handful from elsewhere. The cost of using underground technology for the Middle Rio Grande Valley was evaluated in the SunZia Southwest Transmission Project Underground Technology and Cost Analysis (Cost Analysis) and, based on the data provided in the report, appears to be prohibitively expensive. However, the Cost Analysis does not account for total project costs including expenses such as maintenance of diverters on above ground lines and cost of mitigation. A recent study from Alberta Electric System Operator (<http://www.aeso.ca/downloads/UndergroundStudybackgrounderFeb24.pdf>) found that while installation costs for undergrounding 20km of 500kV transmission system were estimated to be 7 to 10 times higher, the total projects costs were only 2 to 3 times higher than the overhead option. TNC recommends an overall feasibility study be done for underground burial that includes mitigation costs and maintenance costs. In a recent study on

cranes and transmission lines, Wright et al. (2009) recommends immediate mitigation for transmission line placed near major roosting sites. The Nature Conservancy believes that the potential damage from above-ground placement to the sandhill crane population cannot be completely mitigated.

If avoidance of overhead transmission is not possible, we recommend at least the following mitigation measures.

- 1) Minimize collisions by installing diverter devices to make transmission lines more visible. Brown and Drewien (1995) found that powerlines equipped with plate diverters and long, closely-spaced spiral vibration dampers reduced mortality. A diverter that combines motion, light reflection, and luminescence (FireFly™, Firefly Diverters, LLC, Grantsville, Utah) is a new technique that may effectively reduce avian mortality at powerlines (Wright et al. 2009). However, the effectiveness of the FireFly technology needs to be more carefully studied. Installation of diverters will not ensure reduced mortality and consistent maintenance is required to ensure effectiveness of diverters.
- 2) Partially offset impacts to feeding areas by protecting agriculture lands. A recent study of cranes in the Platte River of Nebraska found that the likelihood of cranes using foraging habitats decreased with increasing distance from roosting habitat (Buckley 2011). This study also found the likelihood of use varied by crop type and showed that cranes had increased likelihood of using larger fields. Manipulation of crops within the crane flyway may be effective in changing crane flight patterns and minimizing the risk of collision. We recommend working with the U.S. Fish and Wildlife Service to study specific foraging preferences and movements of the Middle Rio Grande sandhill crane population to identify areas with best potential for changing current flight behavior patterns and to direct mitigation funds to existing conservation easement and habitat restoration programs in those areas identified by the study.

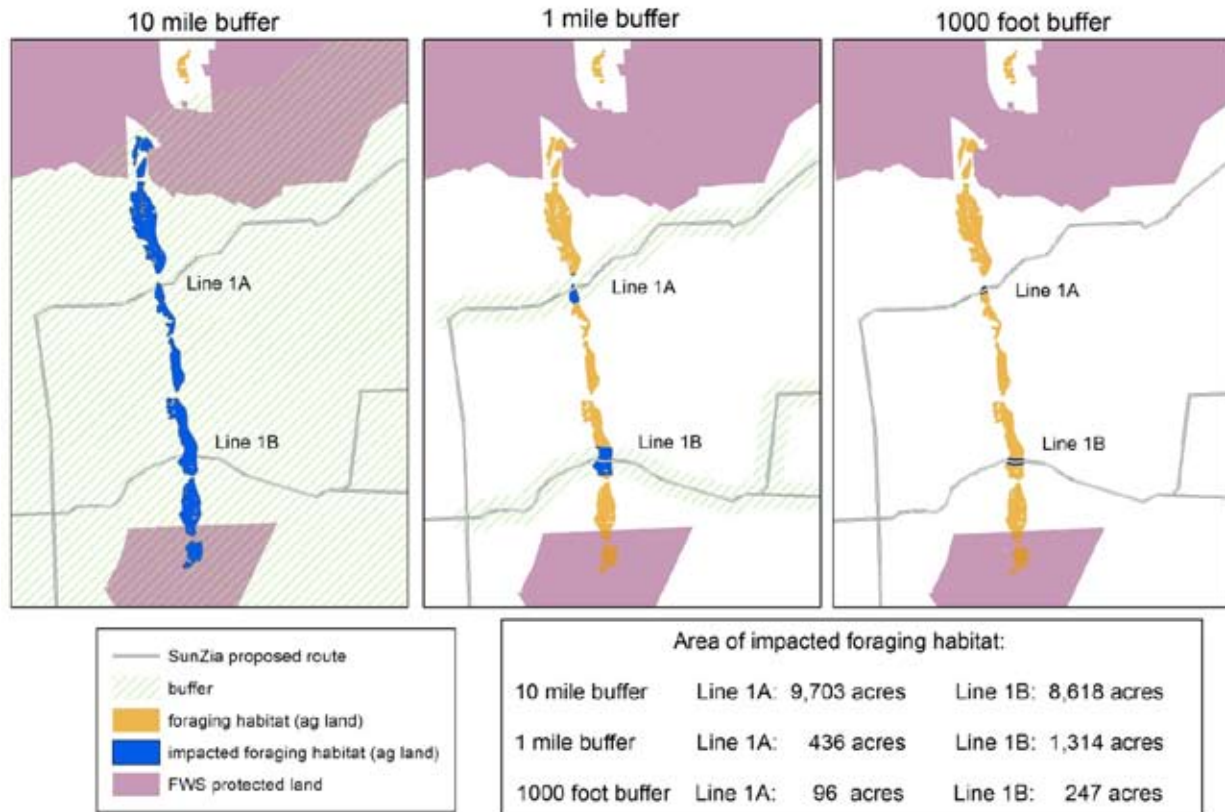
We evaluated foraging habitat potentially impacted by the proposed alternatives. Figure 5 summarizes the acreage of foraging habitat within three different buffer distances from the proposed transmission lines, to estimate both indirect and direct losses. The largest buffer distance is 10 miles and is based on a study by Lewis (1976) which found that optimal roosting sites are located within 10 miles of feeding areas. The second buffer distance of 1 mile is based on the current U.S. Fish and Wildlife Service best management practices (BMP) for minimizing whooping cranes impacts. This BMP recommends that diverters be placed on all transmission within 1 mile of roosting sites. A 1,000-foot buffer was also evaluated to show the direct losses expected from conversion of foraging habitat within the construction corridor.

Although the conclusion of the Analysis of Potential Avian Collisions with Transmission Lines at Four Locations on the Rio Grande in New Mexico (EPG Study; SunZia DEIS Appendix B2) is that the construction of the SunZia project “would have no significant effects on the population status of any species living in or migrating through the Rio Grande Valley,” TNC believes that collision fatalities and the resulting population effects on sandhill cranes are difficult to predict accurately and EPG’s conclusion is not supported by its study for the following reasons:

- 1) The survey periods are incomplete and do not contain the entire migration cycle. The year one survey, December 2009 – March 2010, excludes much of the fall migration. The year two survey, August 2010 – December 2010, misses the late winter and spring migrations. The EPG

Figure 5.

Impacted Sandhill Crane Foraging Habitat in the Middle Rio Grande Valley



survey results are not an accurate reflection of true population numbers.

- 2) EPG’s mortality estimates are based on assumptions about the effectiveness of a new technology (FireFly) from one study (Murphy et al. 2009) in which the authors conclude that a more rigorous study with experimental design is needed to draw any inferences about the effectiveness of this technology at decreasing crane mortality. Murphy et al. (2009) also assert that mitigation of collisions should integrate multiple tools, should not rely on minimization from diverter devices, and must be custom tailored for each site.

- 3) The EPG Study implies that the calculated low levels of mortality will have no population level impact and therefore can be ignored. Any killing of a migratory bird is a federal crime under the Migratory Bird Treaty Act and should be avoided. The expected mortality is additive mortality. Cumulative future impacts cannot be known nor assumed to be negligible, thus any new mortality should also be avoided.

Nutt Grasslands (Route Group 1)

The alternatives of Route group 1 will impact the relatively unfragmented Nutt Grasslands in northeastern Luna County and will cross The Nature Conservancy’s Double Lightning Conservation Easement. Construction of new utility towers is prohibited in the terms of this easement. The

known for its suite of rare species and wild rivers and is an important wildlife corridor connecting the Peloncillo Mountains to the Mogollon Mountains. These isolated “sky islands” are fragile ecosystems and are prone to multiple stressors. Because of their undeveloped nature, habitat fragmentation is a substantial threat. Actions should be taken to avoid and minimize fragmentation of the Gila River Complex.

Lordsburg Playa (Subroute 3A1 – BLM Preferred Alternative and Subroute 3B – South)

We recommend avoiding this route.

Subroute 3A1 crosses the Lordsburg Playa, a vast ephemeral saline lake that provides habitat to considerable numbers of waterfowl including sandhill cranes after large rain events. The alkaline soils are also home to several rare plants including the endangered night-blooming cereus. Although this route parallels an existing pipeline right of way, the impacts to waterfowl from a new transmission line project will likely be substantial and in no way related to previous disturbance from the pipeline installation.

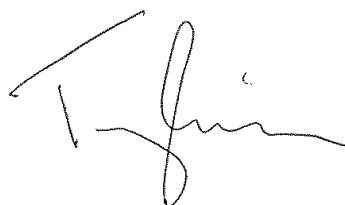
Conclusion

Thank you for the opportunity to comment on this document. We look forward to further involvement with this process.

Sincerely,



Patrick Graham
Arizona State Director



Terry Sullivan
New Mexico State Director

References

- Arizona Game and Fish Department (AGFD). 2011. Arizona's State Wildlife Action Plan: 2011 – 2021. Phoenix, AZ. 209 pp.
- Arizona Wildlife Linkage Workgroup. 2006. Arizona's Wildlife Linkages Assessment.
- Association of Fish and Wildlife Agencies. 2009. Priority Information Needs for Sandhill Cranes, Developed by the Migratory Shore and Upland Game Bird Support Task Force, compiled by D. J. Case and S. J. Sanders, 13pp.
- Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.
- Beier, P., E. Garding, and D. Majka. 2008. Arizona Missing Linkages: Galiuro-Pinaleño-Dos Cabezas Linkage Design. Report to Arizona Game and Fish Department. School of Forestry, Northern Arizona University. 118 pp.
- Bevanger, K. 1994. Bird interactions with utility structures: collision and electrocution, causes and mitigating measures. *Ibis* 136:412–425.
- Brand, L. A., D. J. Cerasale, T. D. Rich, and D. J. Krueper. 2009. Breeding and migratory birds: Patterns and processes. Pages 153–174 in *Ecology and Conservation of the San Pedro River* (J. C. Stromberg and B. Tellman, eds.). University of Arizona Press, Tucson.
- Brown, W. M., and R. C. Drewien. 1995. Evaluation of two power line markers to reduce crane and waterfowl collision mortality. *Wildlife Society Bulletin* 23:217–227.
- Buckley, T. J. 2011. Habitat Use and Abundance Patterns of Sandhill Cranes in the Central Platte River Valley, Nebraska, 2003–2010. Dissertations & Theses in Natural Resources. Paper 38. <http://digitalcommons.unl.edu/natresdiss/38>
- Bureau of Land Management, Wyoming Game and Fish Commission, Utah Division of Wildlife Resources, Nevada Department of Wildlife, and Ruby Pipeline, LLC. 2010. Ruby Project Cooperative Conservation Agreement for the Greater Sage-Grouse and Pygmy Rabbit.
- Bureau of Land Management. 1991. Safford District Resource Management Plan. U.S. Department of the Interior, Bureau of Land Management, Safford District Office, Arizona. 504 pp.
- Bureau of Land Management. 1998. Muleshoe Ecosystem Management Plan and Environmental Assessment. U.S. Department of the Interior, Bureau of Land Management, Tucson Field Office; USDA Coronado National Forest; Arizona Game and Fish Department; and The Nature Conservancy. 206 pp.
- Bureau of Land Management. 2004a. Proposed Arizona Statewide Land Use Plan Amendment for fire, fuels, and air quality management, Finding of No Significant Impact (FONSI) and Environmental Assessment. U.S. Department of the Interior, Bureau of Land Management, Arizona State Office.
- Bureau of Land Management. 2004b. Safford-Tucson Fire Management Zone Fire Management Plan. 110 pp.
- Bureau of Land Management. 2010. Draft Aravaipa Ecosystem Management Plan and Environmental Assessment. U.S. Department of the Interior, Bureau of Land Management, Safford Field Office, Arizona; Arizona Game and Fish Department Region V; and The Nature Conservancy. 196 pp.
- Coronado National Forest. 2010. Coronado National Forest Fire Management Plan. USDA Forest Service, Tucson, AZ. 30 pp.
- Council on Environmental Quality. 2011. Appropriate use of mitigation and monitoring and clarifying the appropriate use of mitigated findings of no significant impact. Memorandum for Heads of Federal Departments and Agencies, from Nancy H. Sutley, Chair, January 14, 2011.
- Drewien, R. C., and E. G. Bizeau. 1974. Status and distribution of greater sandhill cranes in the Rocky Mountains. *Journal of Wildlife Management* 38:720-742. Faanes, C. A. 1987. Bird behavior and

- mortality in relation to power lines in prairie habitats. U.S. Fish and Wildlife Service, Fish and Wildlife Technology Report 7.
- Environmental Protection Agency and Department of the Army. 1990. Memorandum of agreement between the Environmental Protection Agency and the Department of the Army concerning the determination of mitigation under the Clean Water Act Section 404(b)(1) guidelines.
- Kiesecker J.M., H. Copeland, A. Pocewicz, and B. McKenney. 2009. Development by design: blending landscape level planning with the mitigation hierarchy. *Frontiers in Ecology and the Environment*. doi:10.1890/090005
- Lewis, J. C. 1976. Roost habitat and roosting behavior of sandhill cranes in the southern central flyway. Pages 93-104 *in* J. C. Lewis, editor. *Proceedings 1975 Crane Workshop*, Oklahoma State University Publishing and Printing, Stillwater, OK.
- Murphy, R.K., S.M. McPherron, G.D. Wright, and K.L. Serbousek. 2009. Effectiveness of avian collision averters in preventing migratory bird mortality from powerline strikes in the central Platte River, Nebraska: 2008 – 2009 Final Report. Department of Biology, University of Nebraska-Kearney, Kearney, NE. 33 pp.
- Schussman, H., and D. Gori. 2004. An Ecological Assessment of the Bureau of Land Management's Current Fire Management Plans: Materials and Recommendations for Future Fire Planning. Report from The Nature Conservancy to the BLM, Arizona State Office, Phoenix. 101 pp.
- Skagen, S.K., C.P. Melcher, W.H. Howe, and F.L. Knopf. 1998. Comparative use of riparian corridors and oases by migrating birds in southeast Arizona. *Conservation Biology* 12, 896-909.
- Stromberg, J.C., and B. Tellman. 2009. *Ecology and conservation of the San Pedro River*. University of Arizona Press. 529 pp.
- Ward, J. P., J. J. Jenniges, and S. H. Anderson. 1987. Evaluation of the Platte River as a site to study powerline modification to reduce sandhill crane collisions: second annual report. Wyoming Cooperative Wildlife Research Unit, University of Wyoming, Laramie, Wyoming, USA.
- Windingstad, R. M. 1988. Nonhunting mortality in sandhill cranes. *Journal of Wildlife Management* 52:260–263.
- Wright, G.D.; T.J. Smith, R.K. Murphy, J.T. Runge, and R.R. Harms. 2009. Mortality of Cranes (Gruidae) Associated with Powerlines over a Major Roost on the Platte River, Nebraska. *Prairie Naturalist* 41: 116–120.