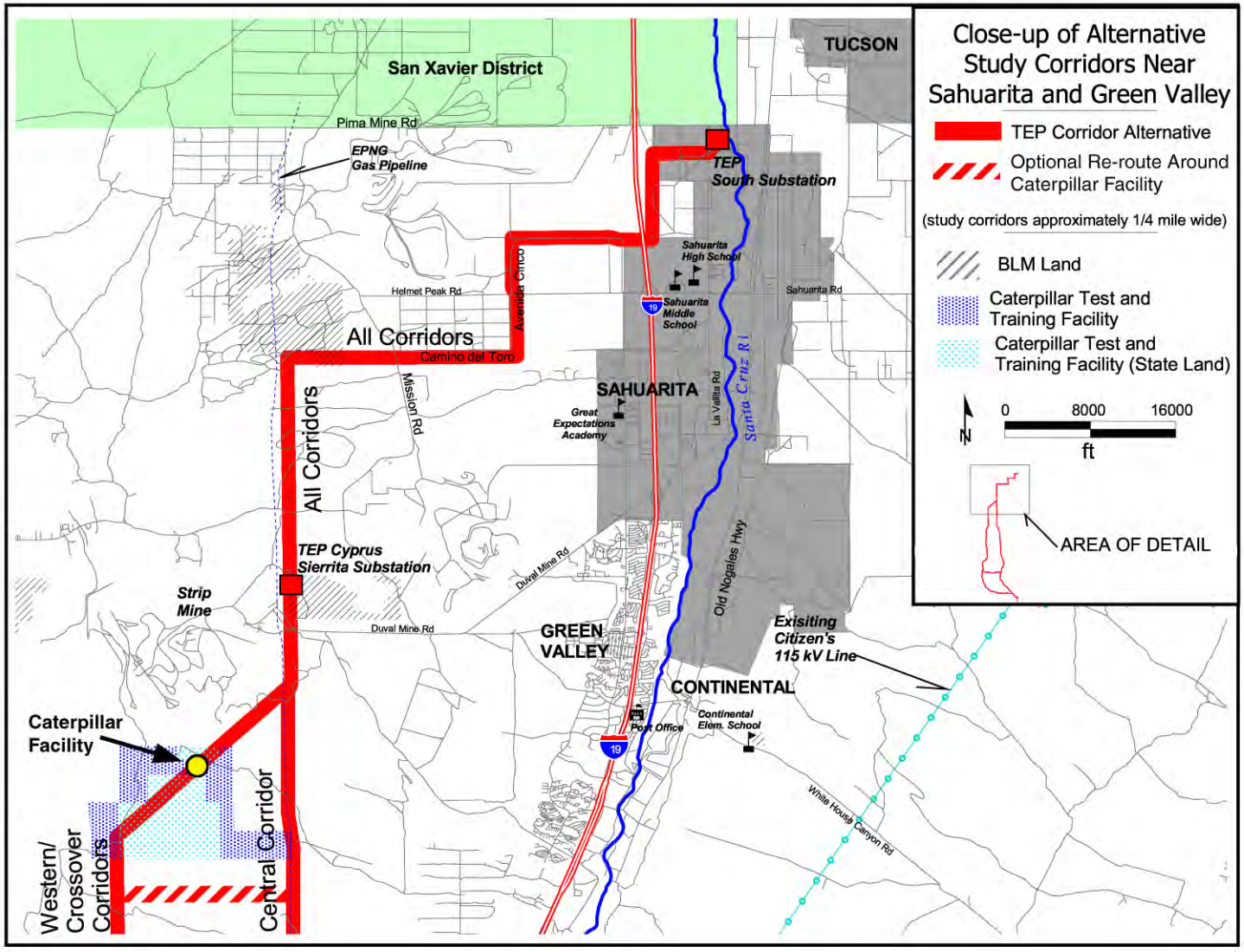


Figure 2.1–1. Close-up of Alternative Study Corridors Near Sahuarita and Green Valley.

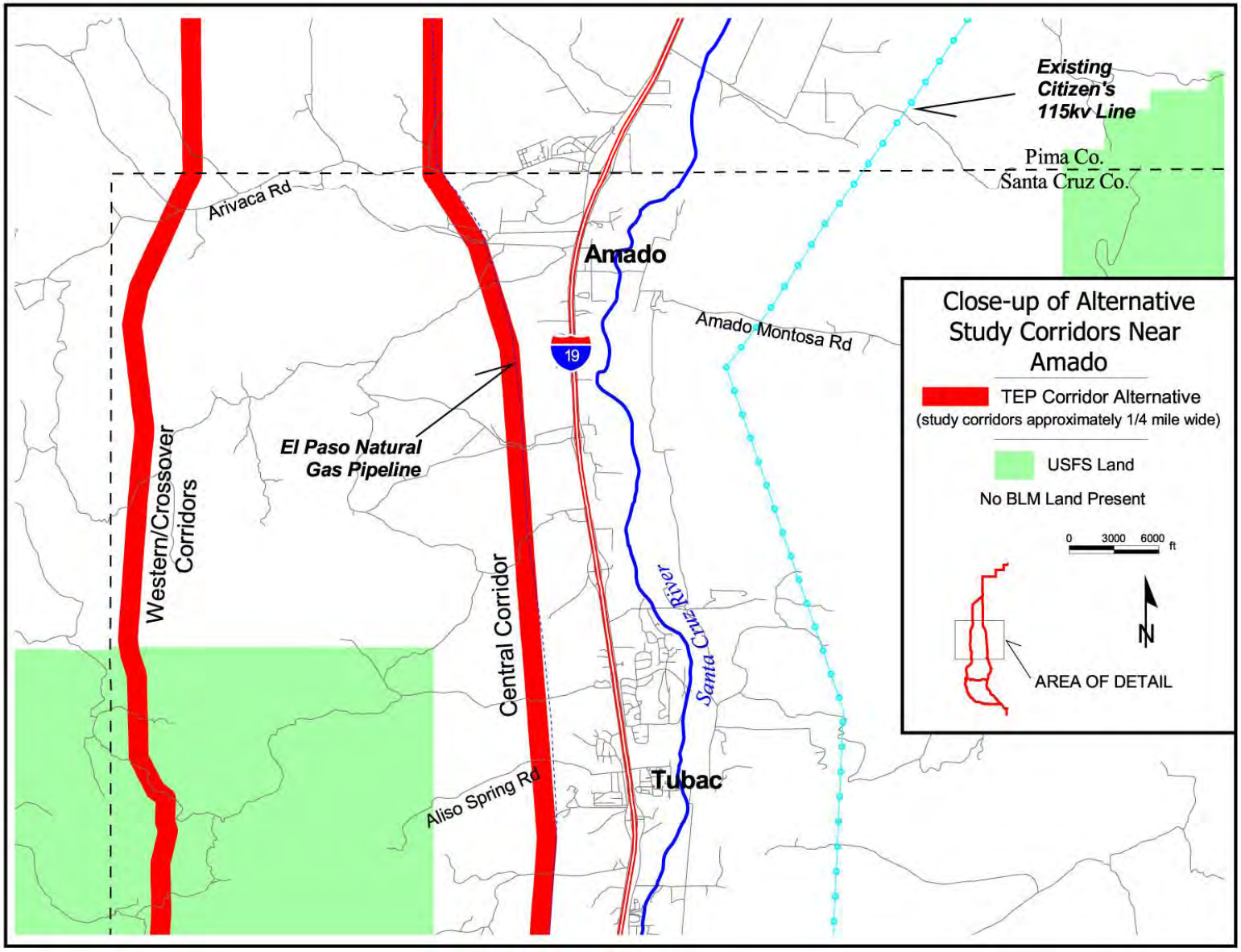


Figure 2.1–2. Close-up of Alternative Study Corridors Near Amado.

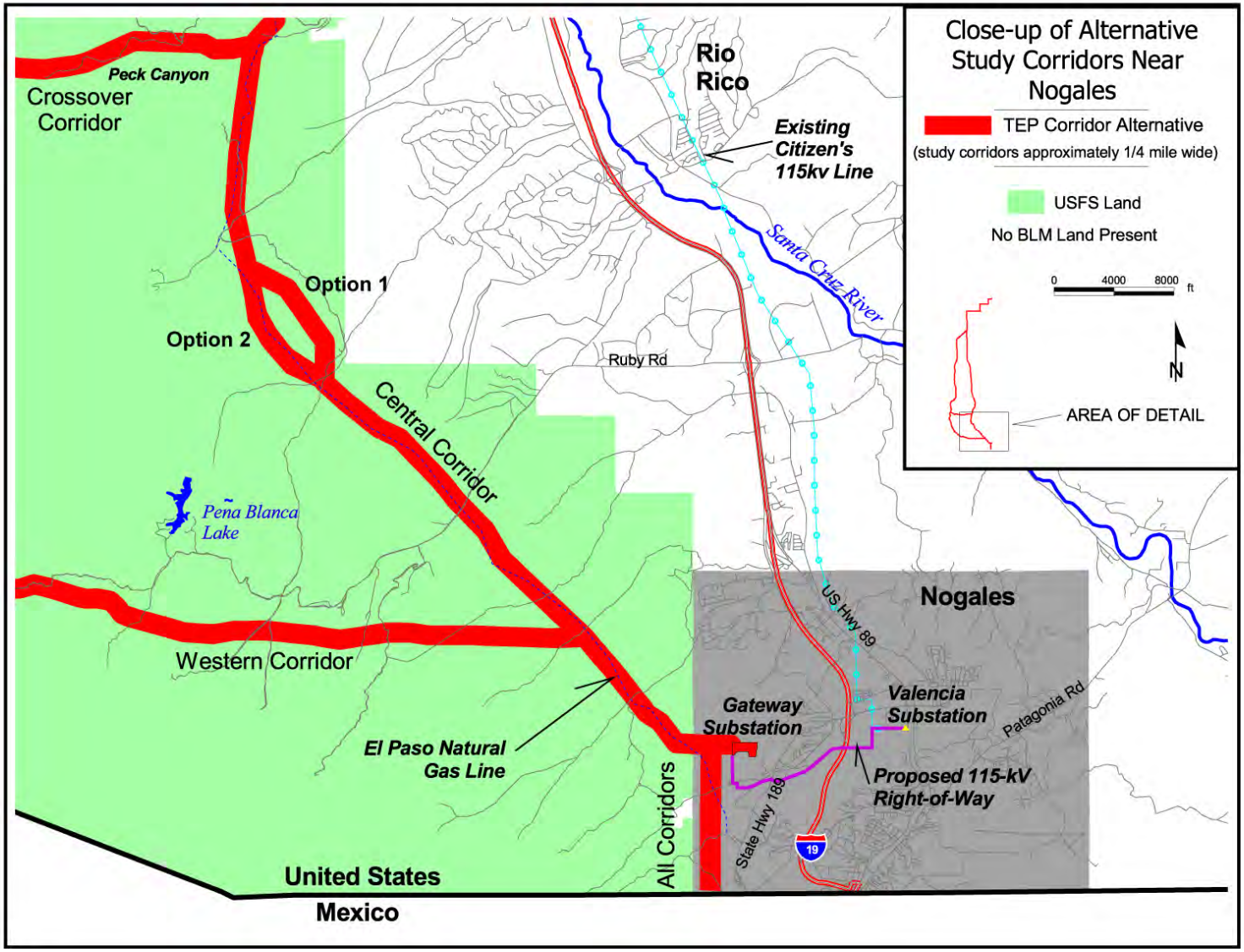


Figure 2.1–3. Close-up of Alternative Study Corridors Near Nogales.

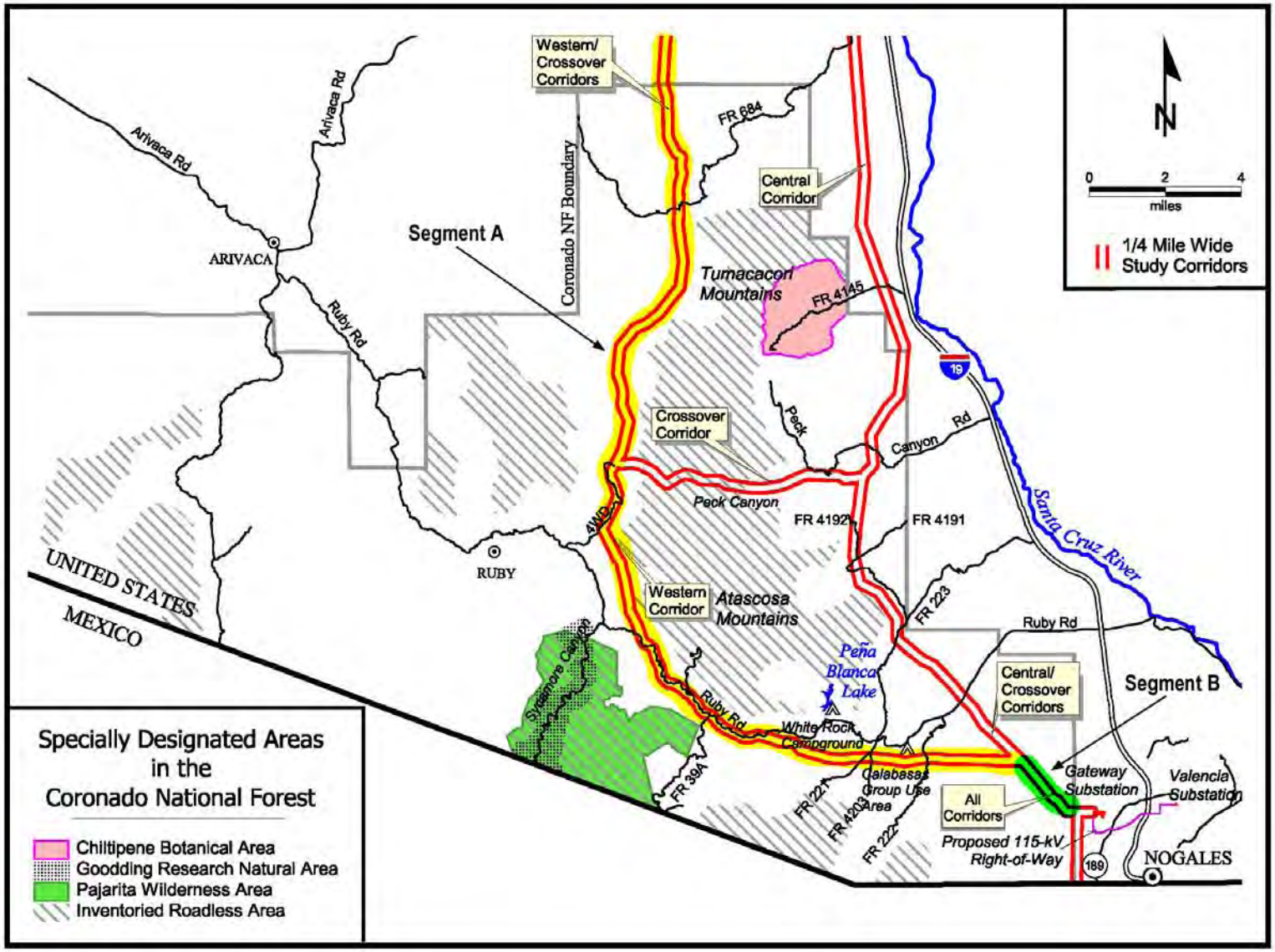


Figure 2.1-4. Western Corridor on the Coronado National Forest.

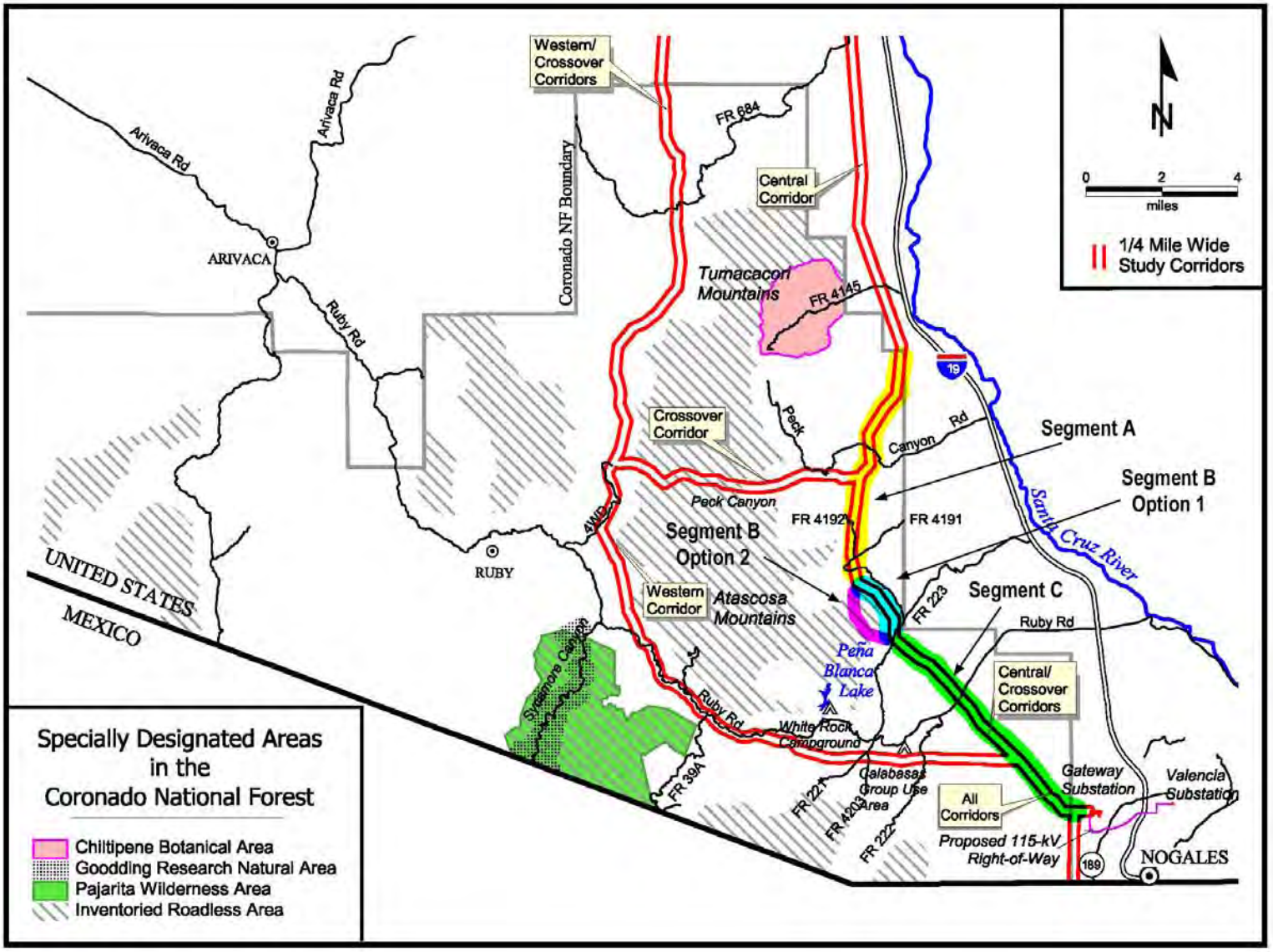


Figure 2.1-5. Central Corridor on the Coronado National Forest.

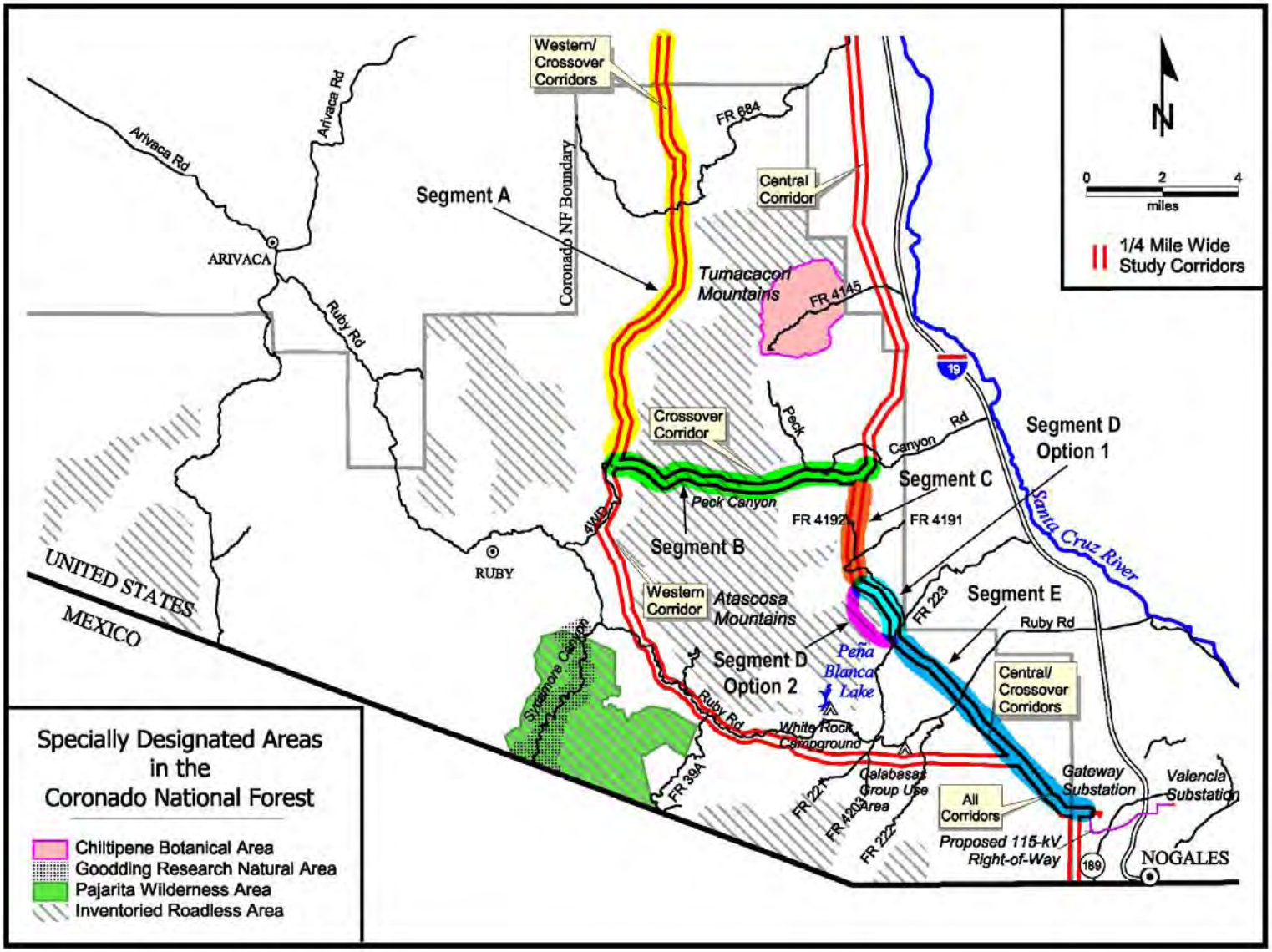


Figure 2.1-6. Crossover Corridor on the Coronado National Forest.

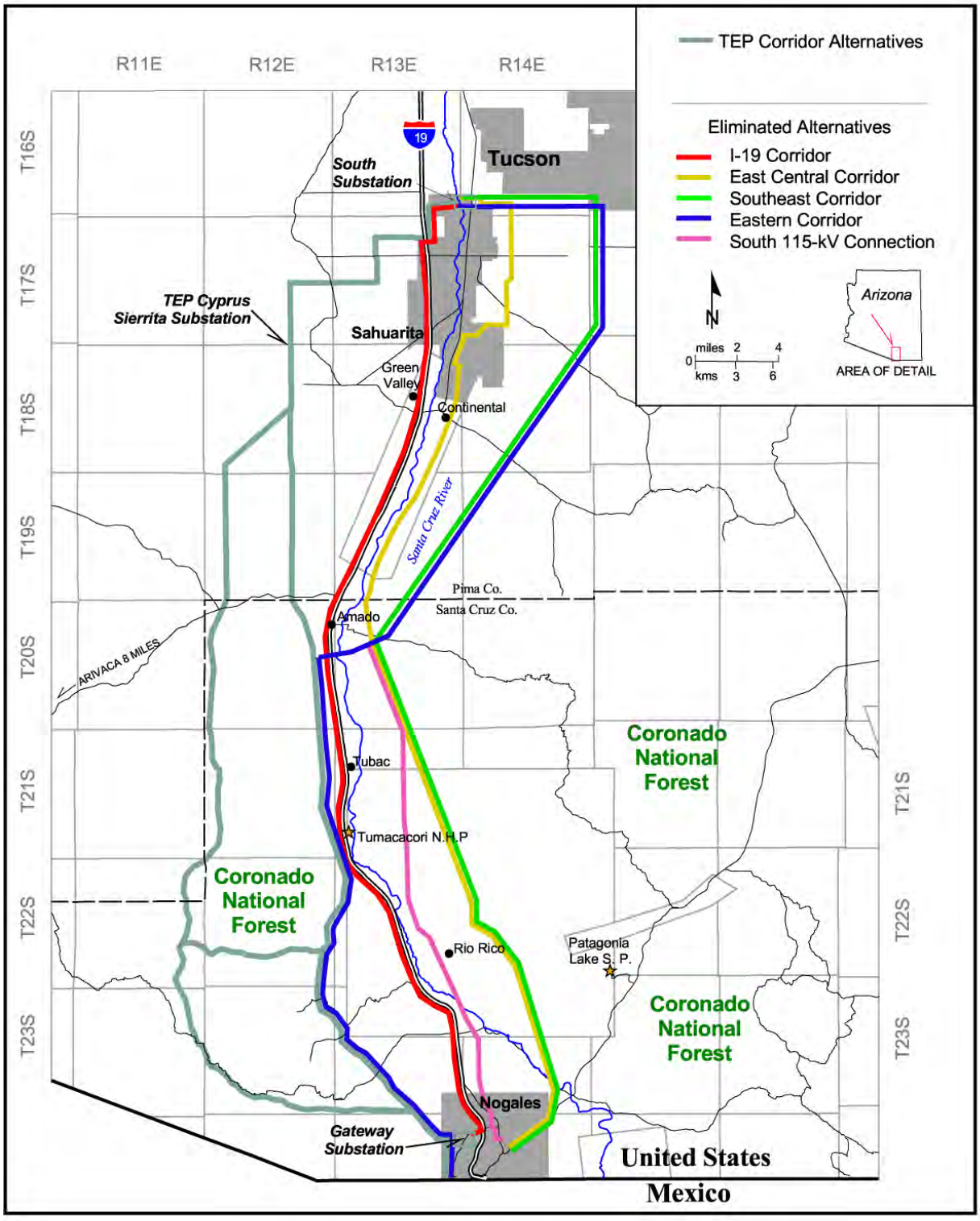


Figure 2.1–7. TEP Corridor Alternatives, Alternatives Eliminated From Further Analysis.

Water Truck

Backhoe Loader

Wheel Tractor Scraper

Dump Truck

Figure 2.2–1. Proposed Construction Equipment.

Excavator

Crane

Loader

Wheel Bulldozer

Figure 2.2–1. Proposed Construction Equipment (*continued*).

Excavator

Crane

Loader

Wheel Bulldozer

Figure 2.2–1. Proposed Construction Equipment (*continued*).

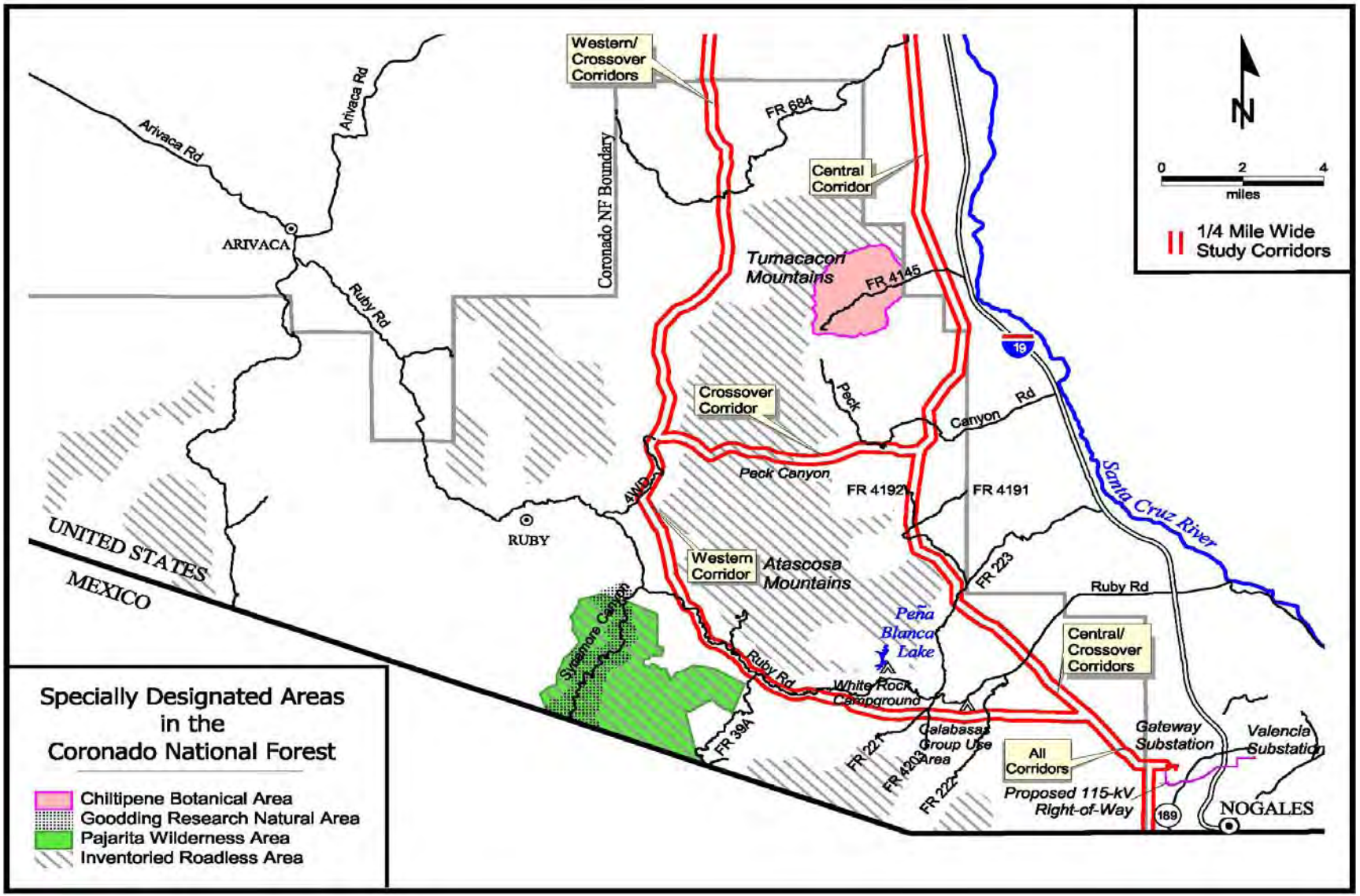


Figure 3.1–1. Specially Designated Areas on the Coronado National Forest.

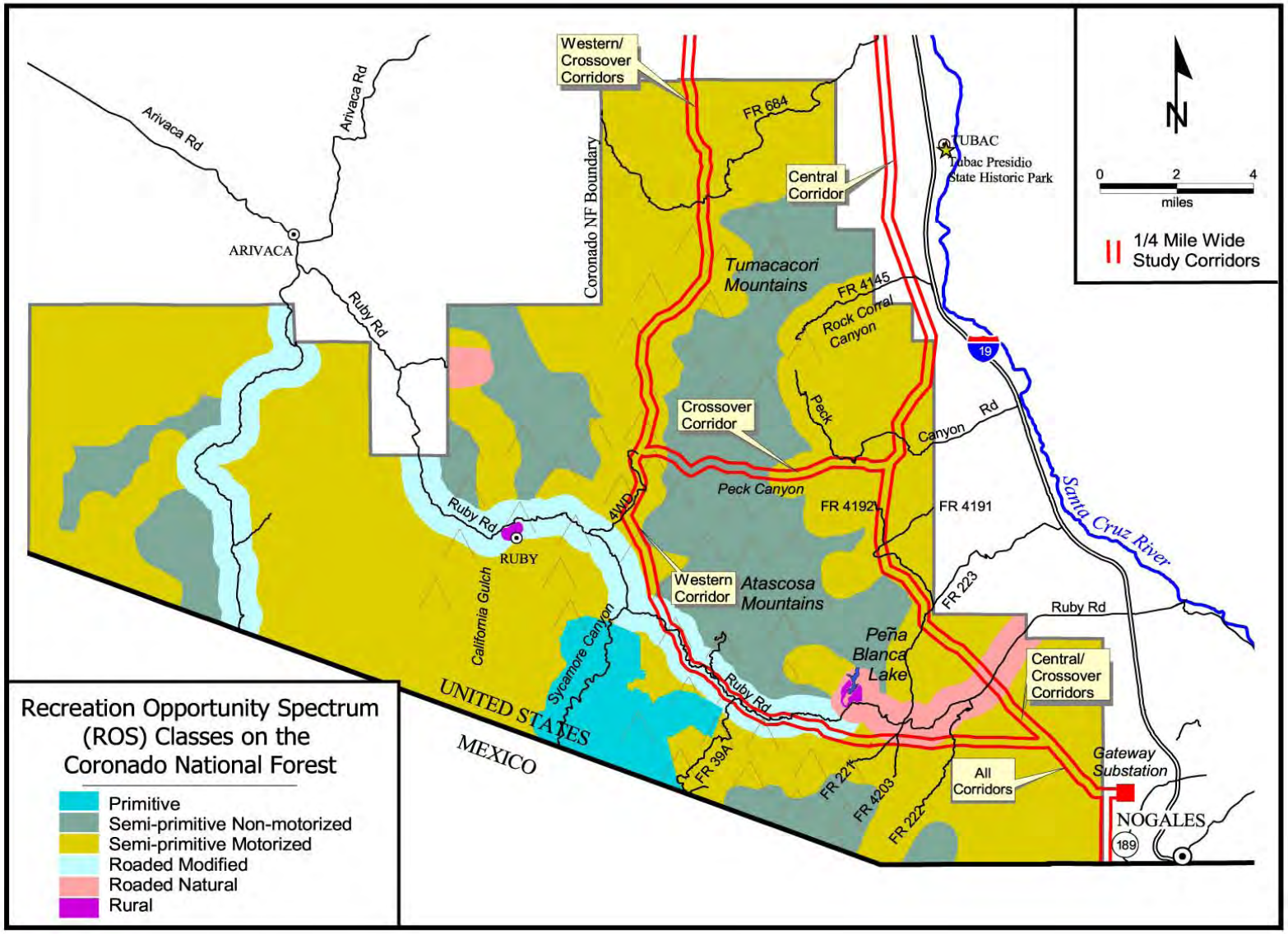


Figure 3.1–2. Recreation Opportunity Spectrum Classes on the Coronado National Forest.

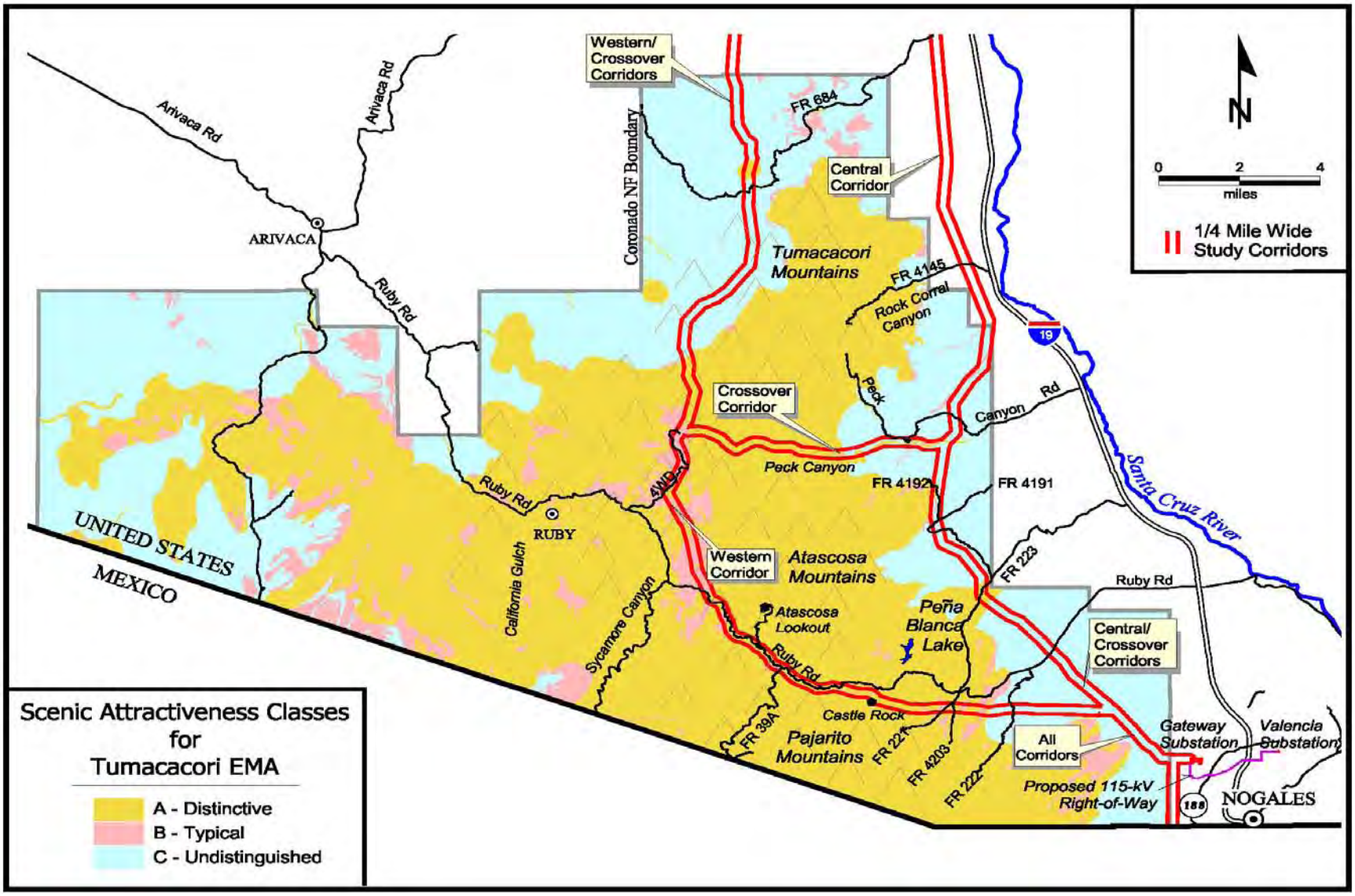


Figure 3.2–2. Scenic Attractiveness Classes for Tumacacori EMA.

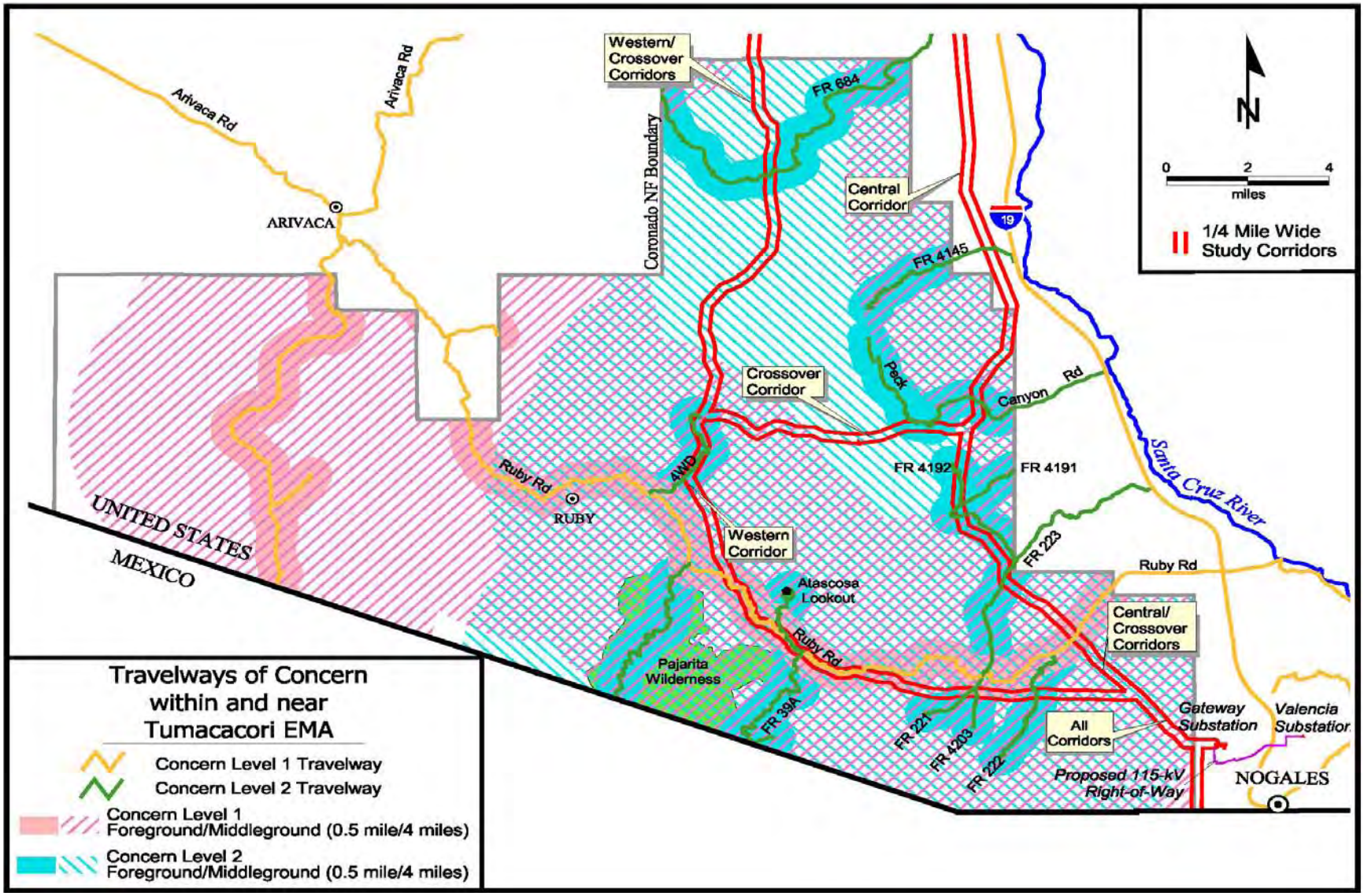


Figure 3.2–3. Travelways of Concern Within and Near Tumacacori EMA.

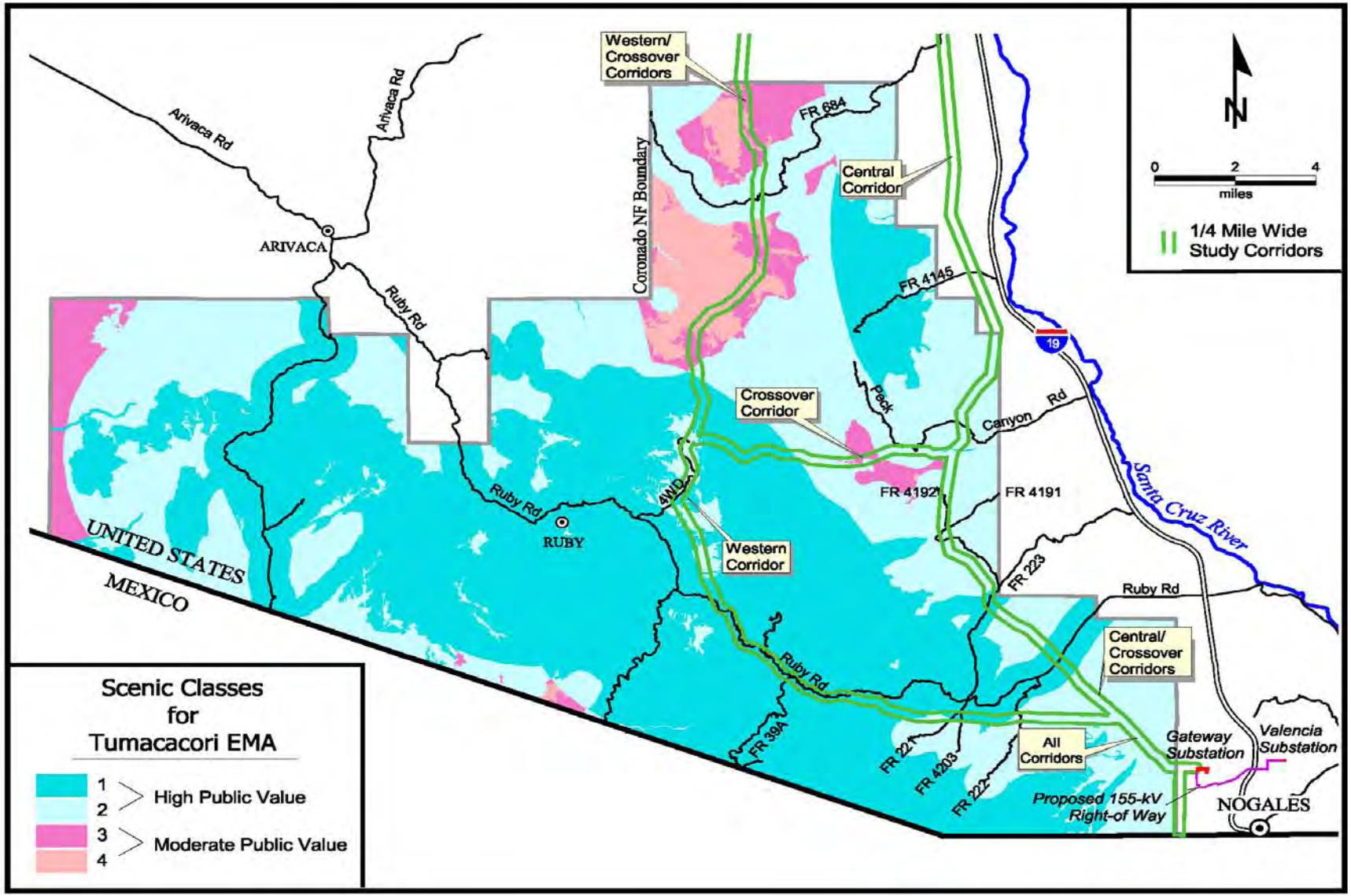


Figure 3.2–4. Scenic Classes for Tumacacori EMA.

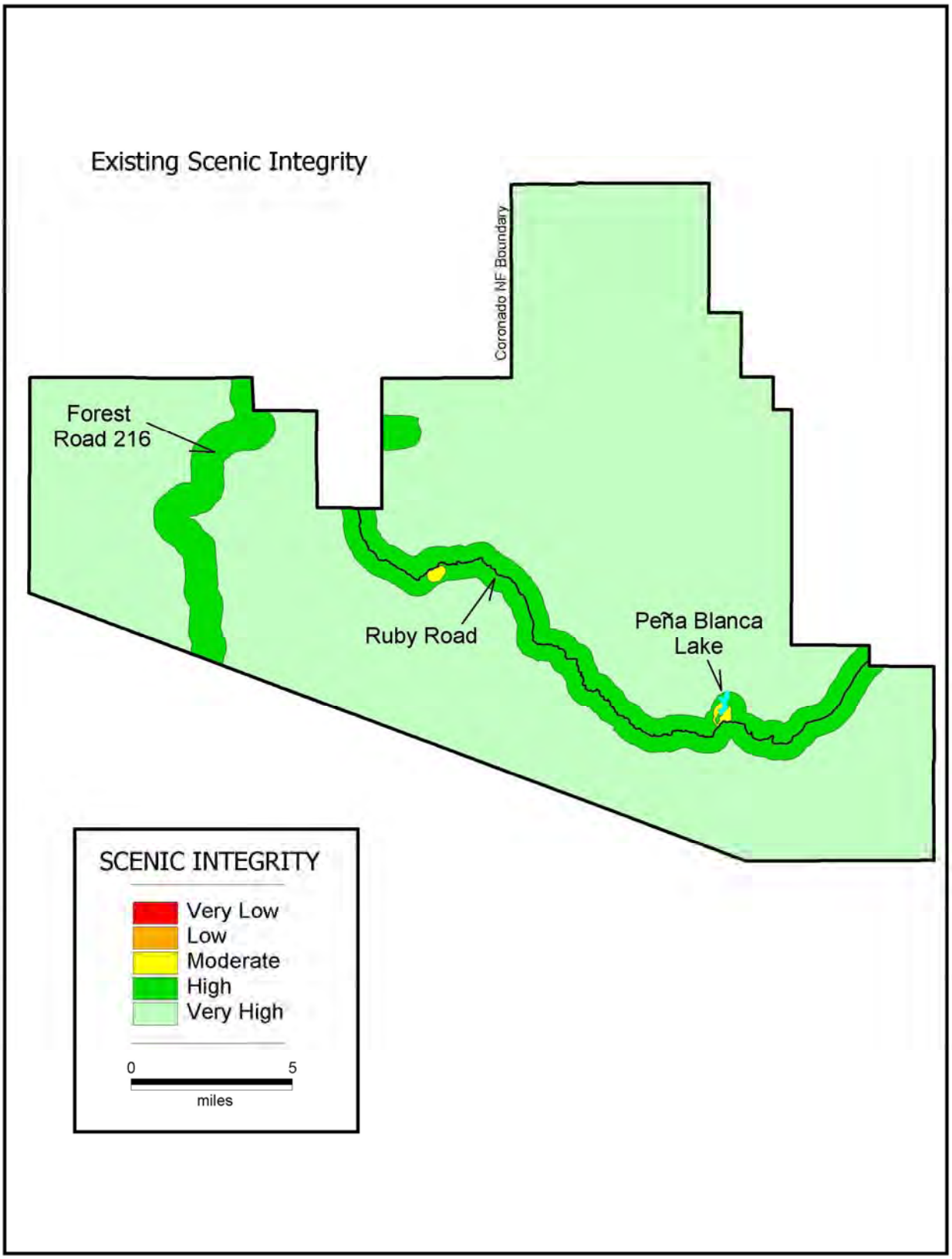


Figure 3.2–5. Coronado National Forest Existing Scenic Integrity.

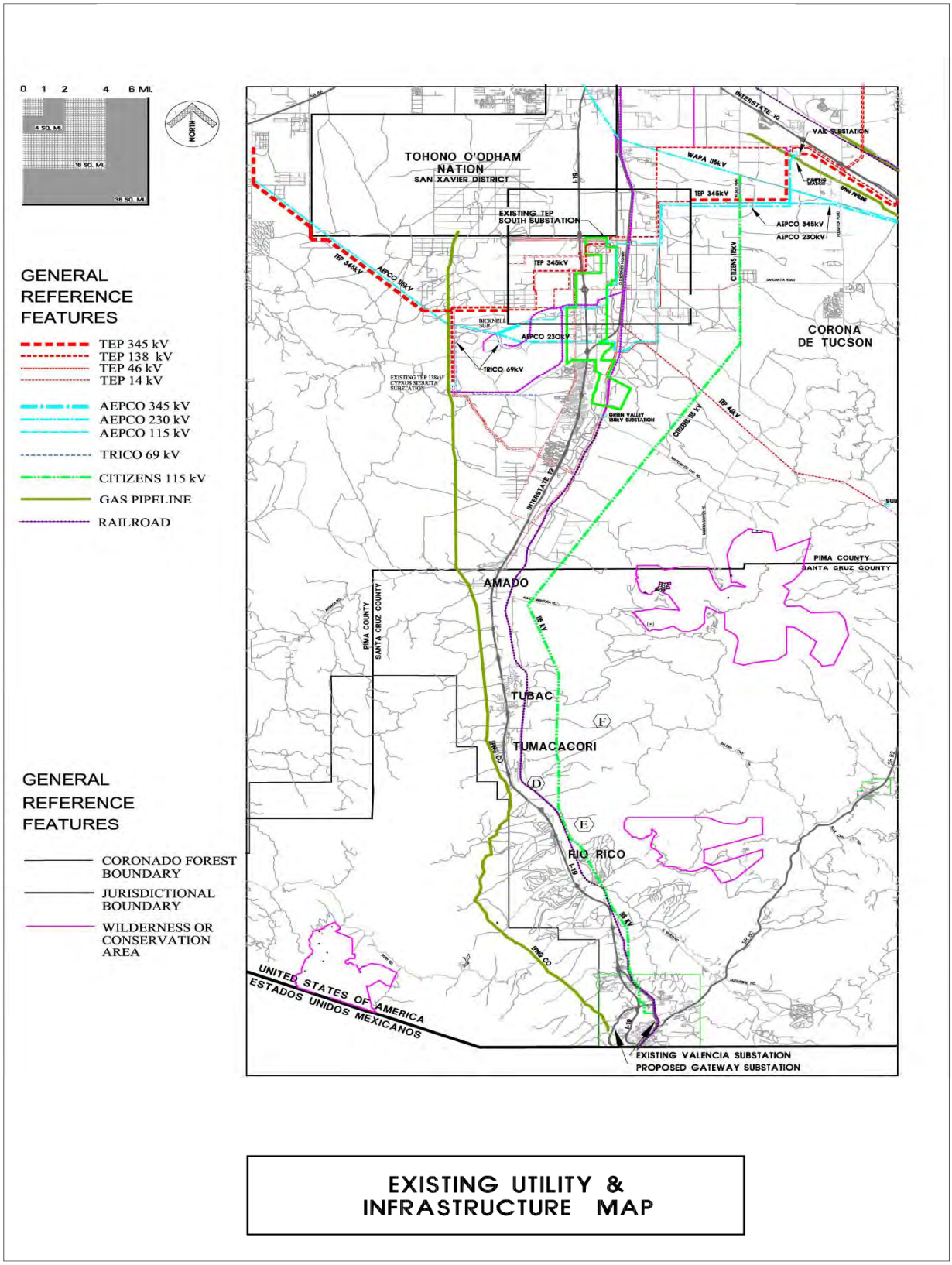


Figure 3.2–6. Existing Utility Infrastructure.

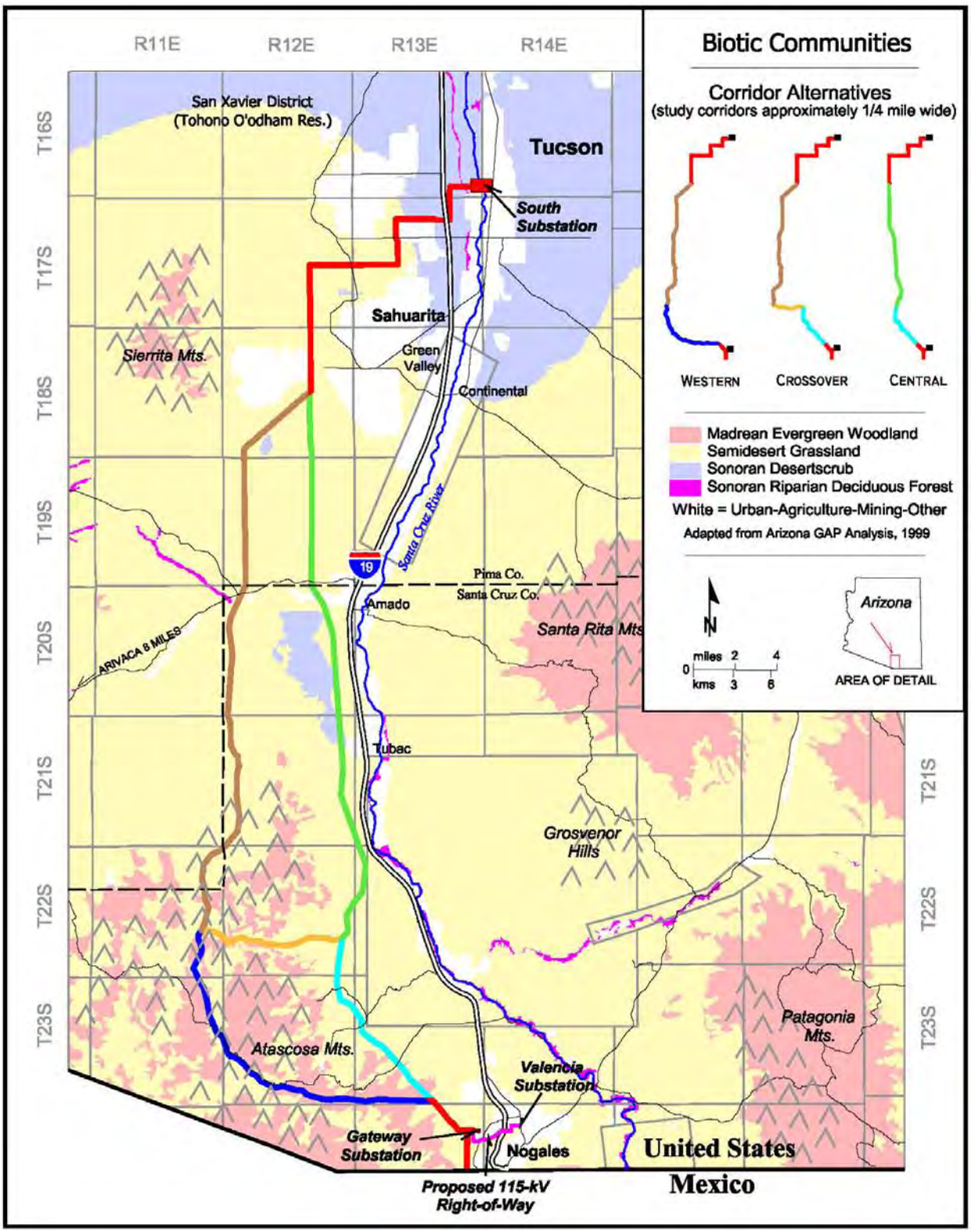


Figure 3.3–1. Biotic Communities in the Proposed Project Area.

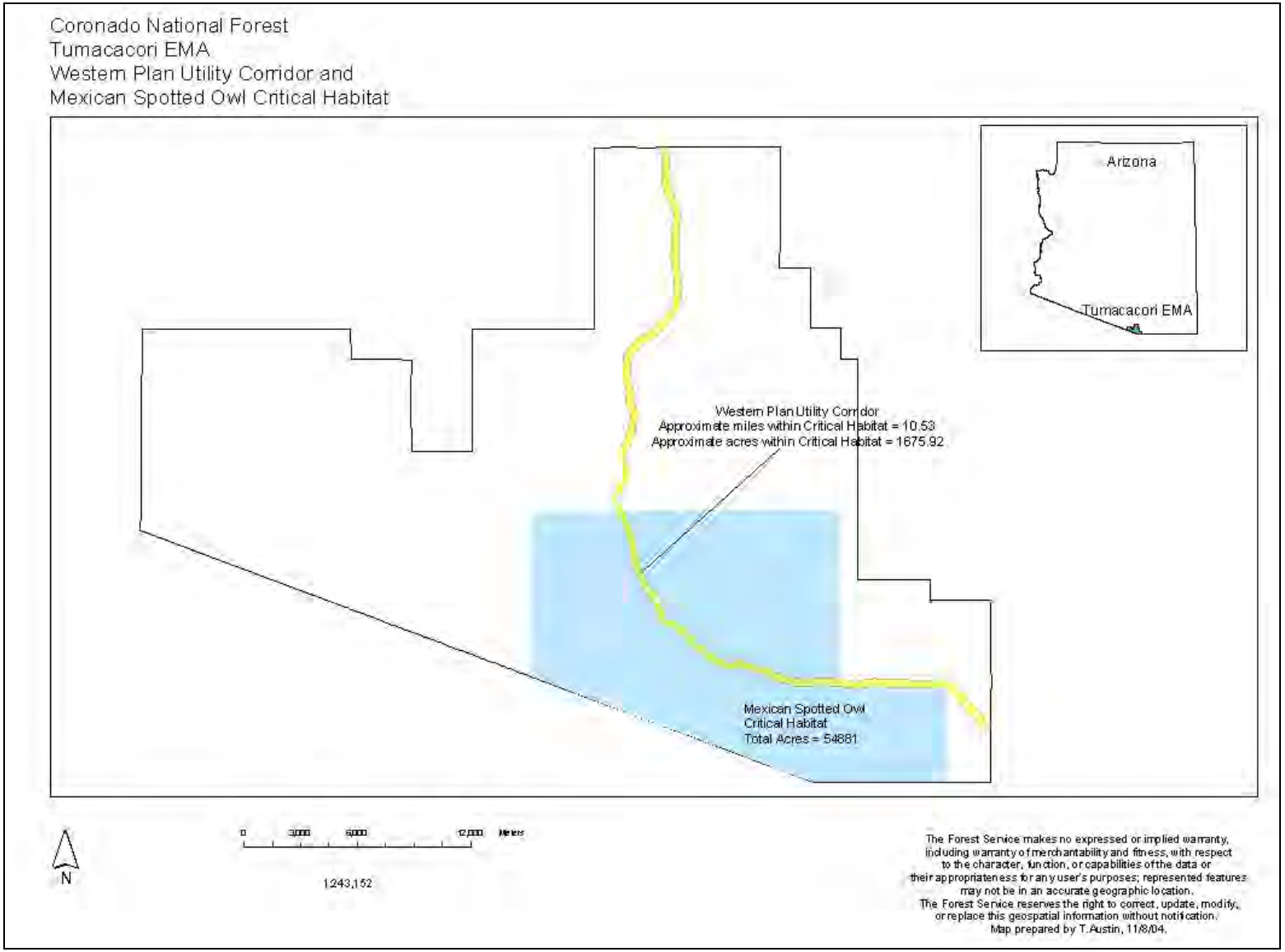


Figure 3.3–2. Mexican Spotted Owl Critical Habitat Designation.

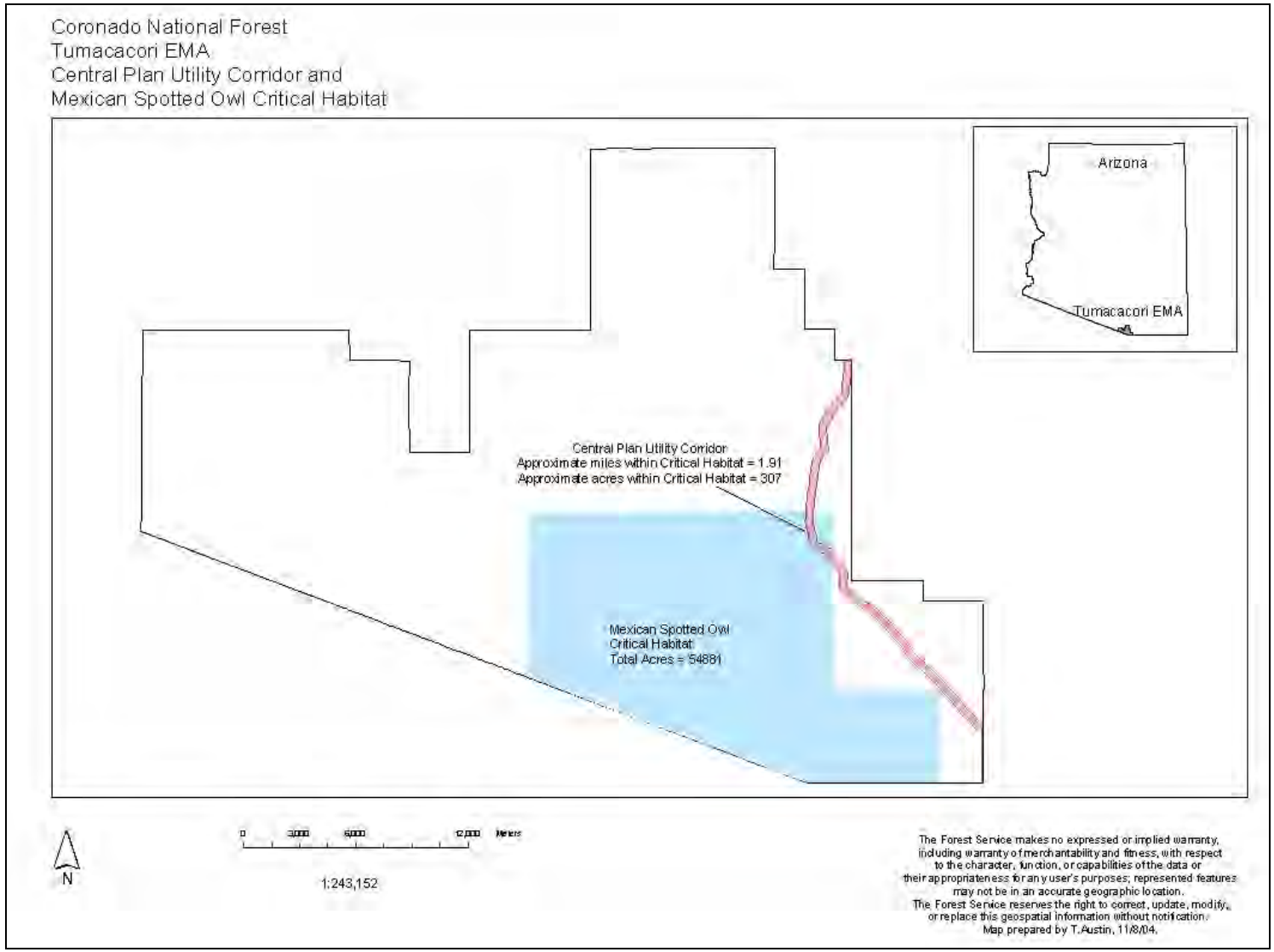


Figure 3.3–3. Mexican Spotted Owl Critical Habitat Designation.

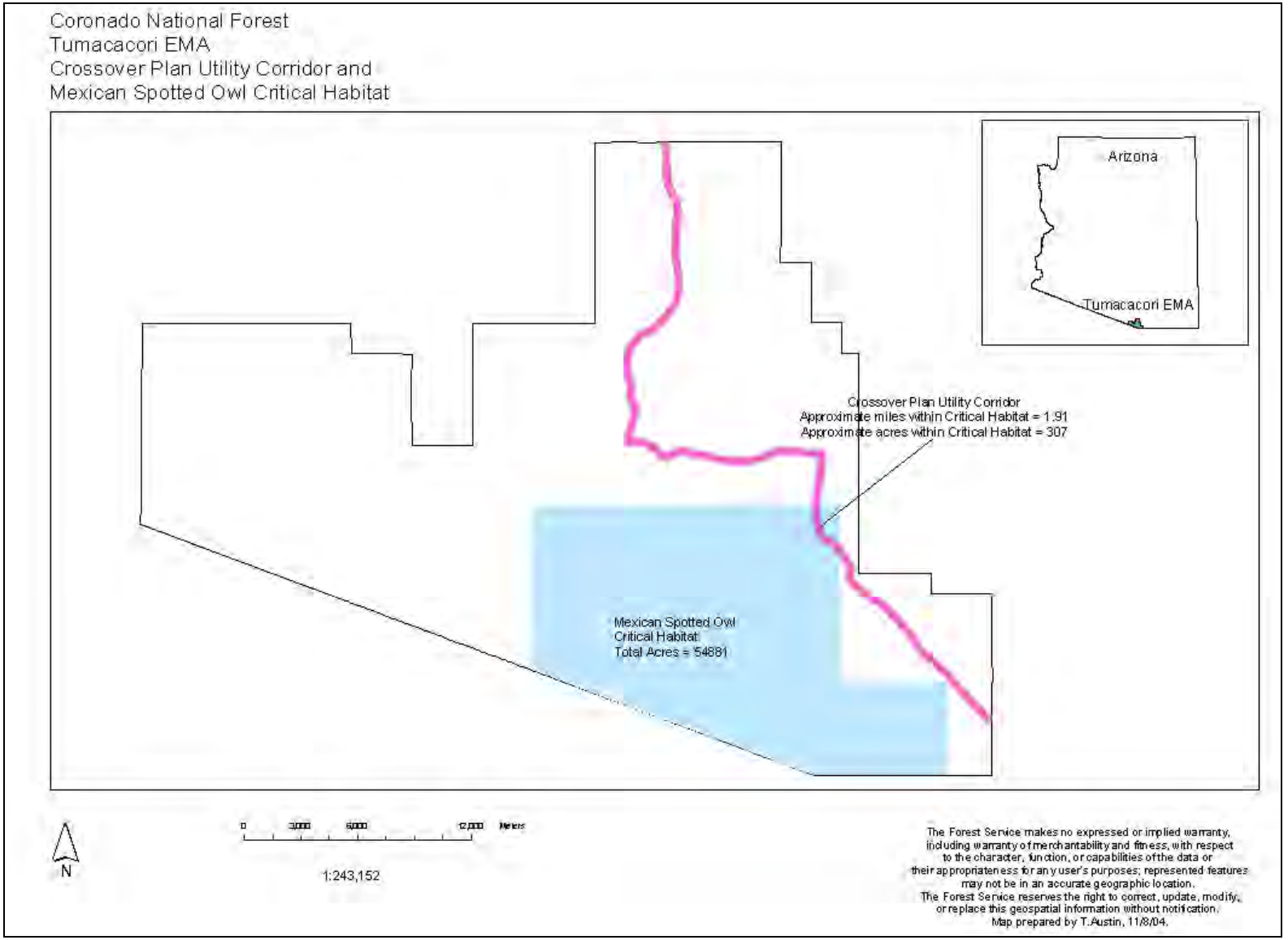
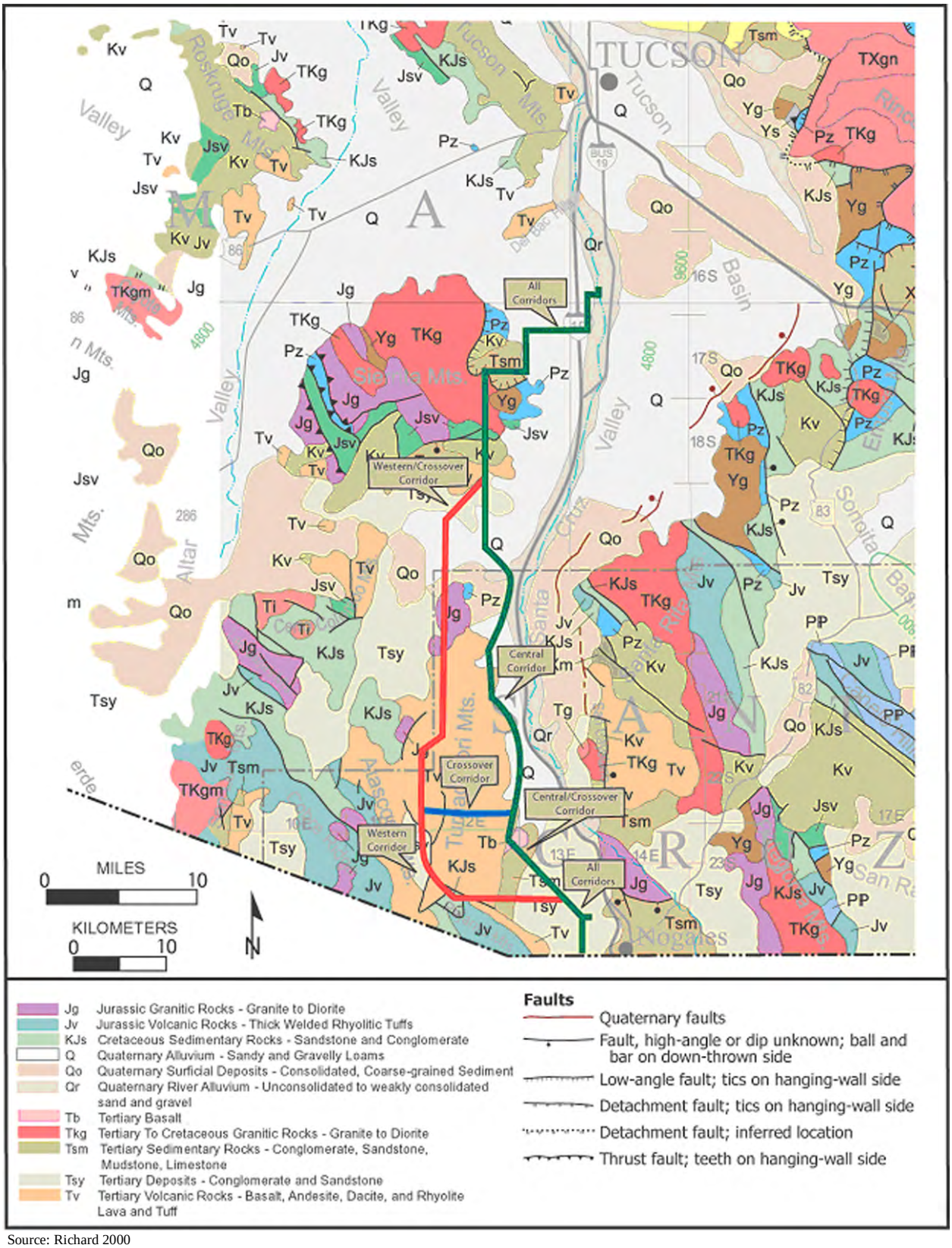


Figure 3.3–4. Mexican Spotted Owl Critical Habitat Designation.



Source: Richard 2000

Figure 3.6–1. Geology of the Proposed Project Area.

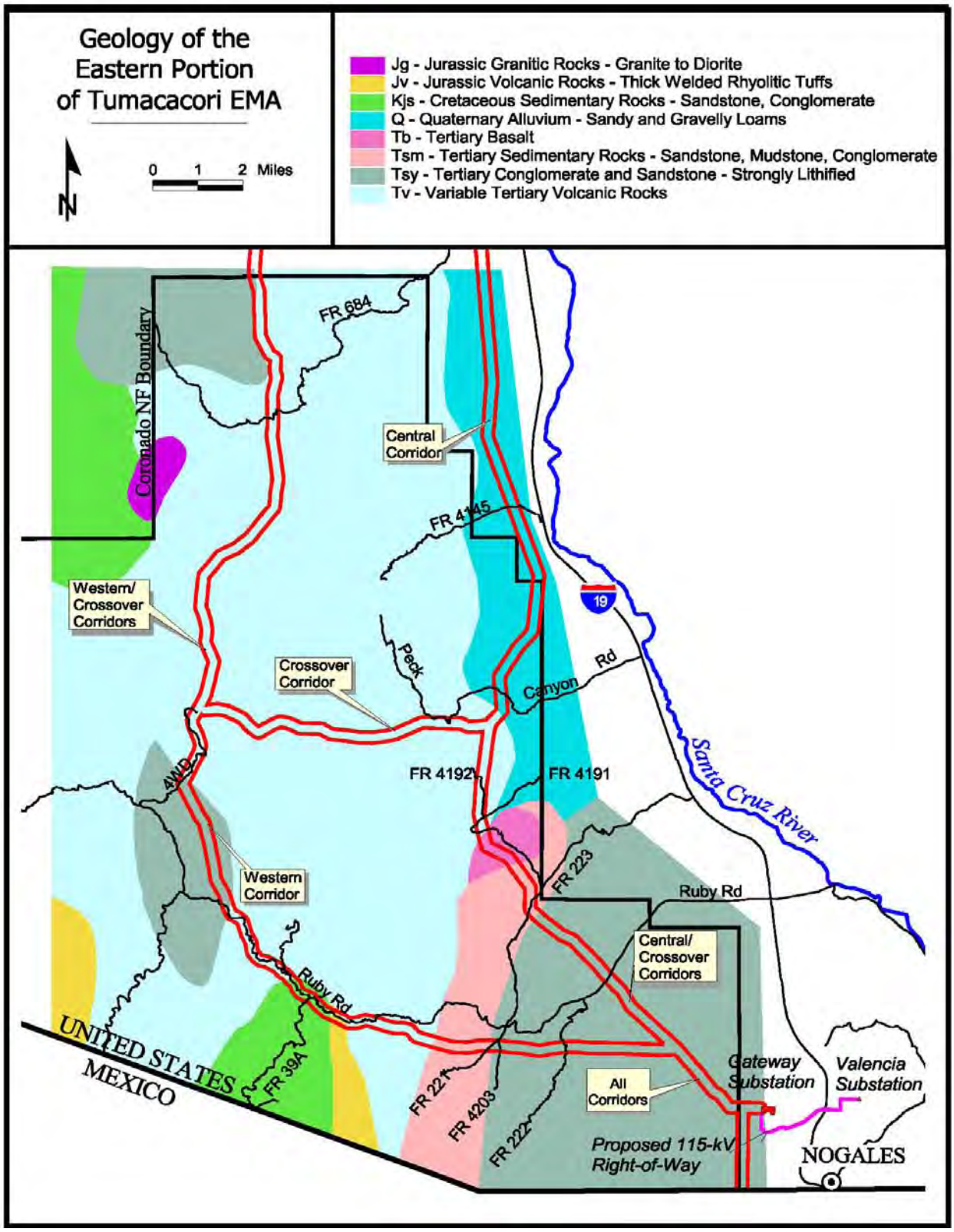


Figure 3.6–2. Geology of the Proposed Project Area on the Coronado National Forest.

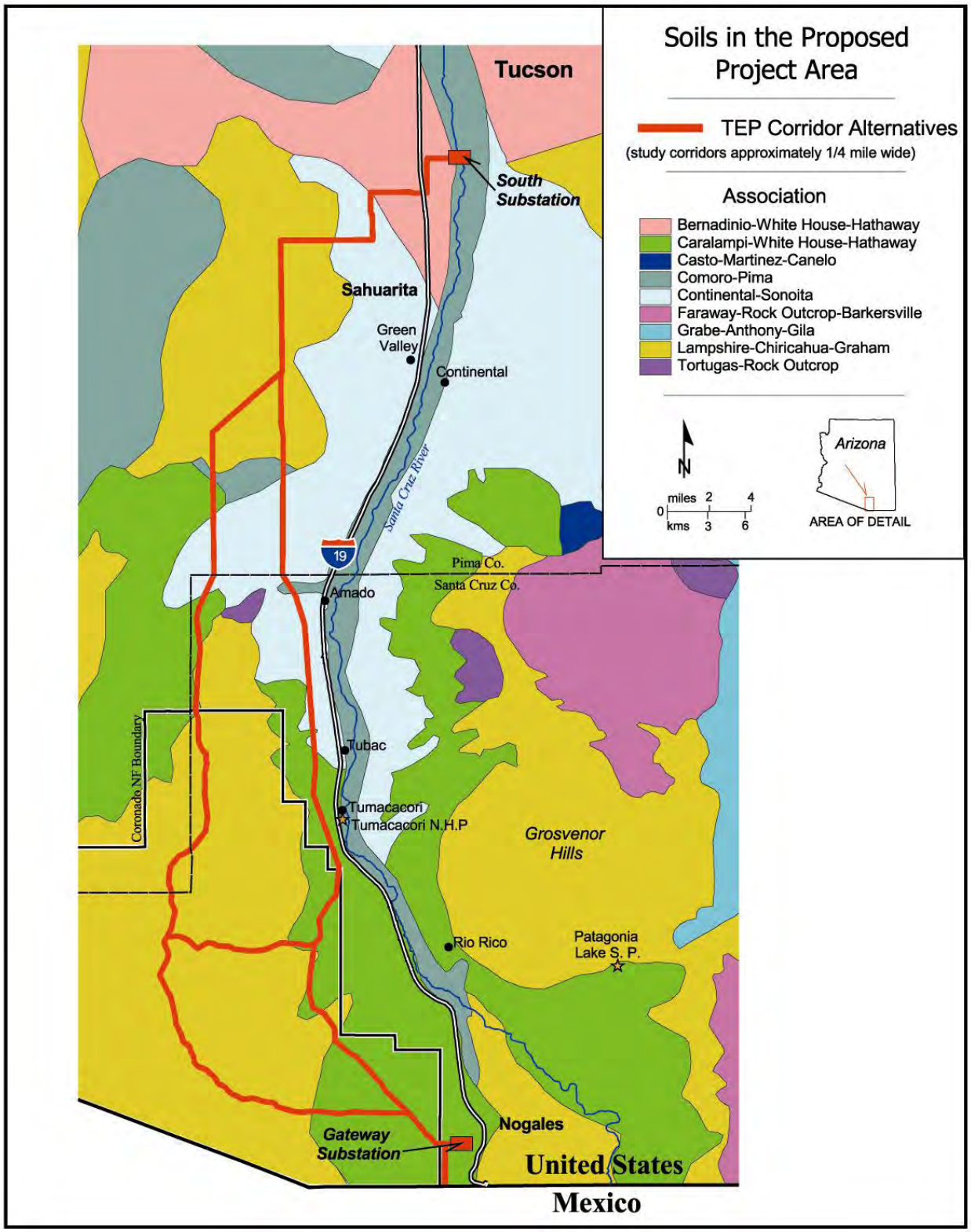


Figure 3.6–5. Soil Associations in the Proposed Project Area.

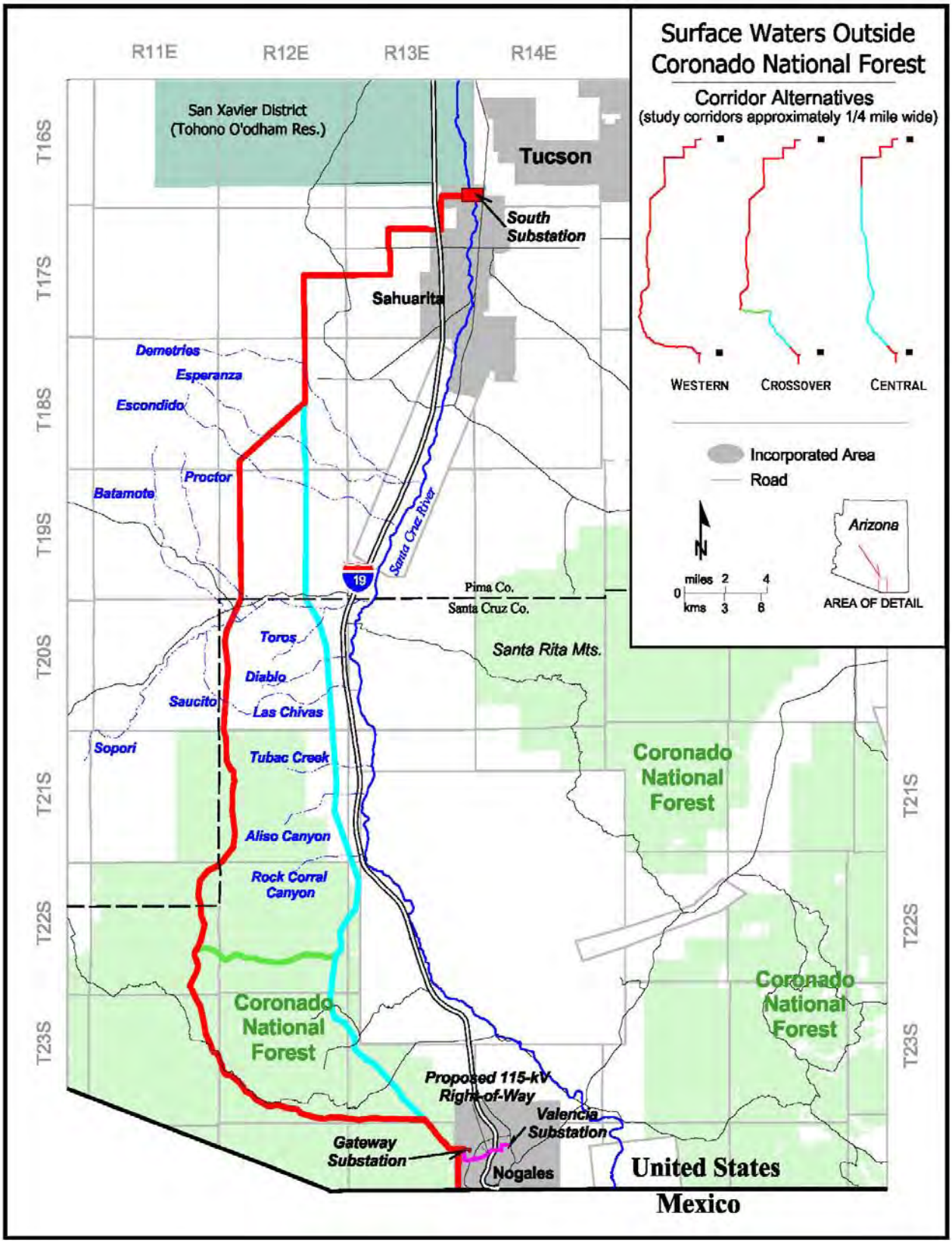


Figure 3.7–1. Surface Waters Outside the Coronado National Forest.

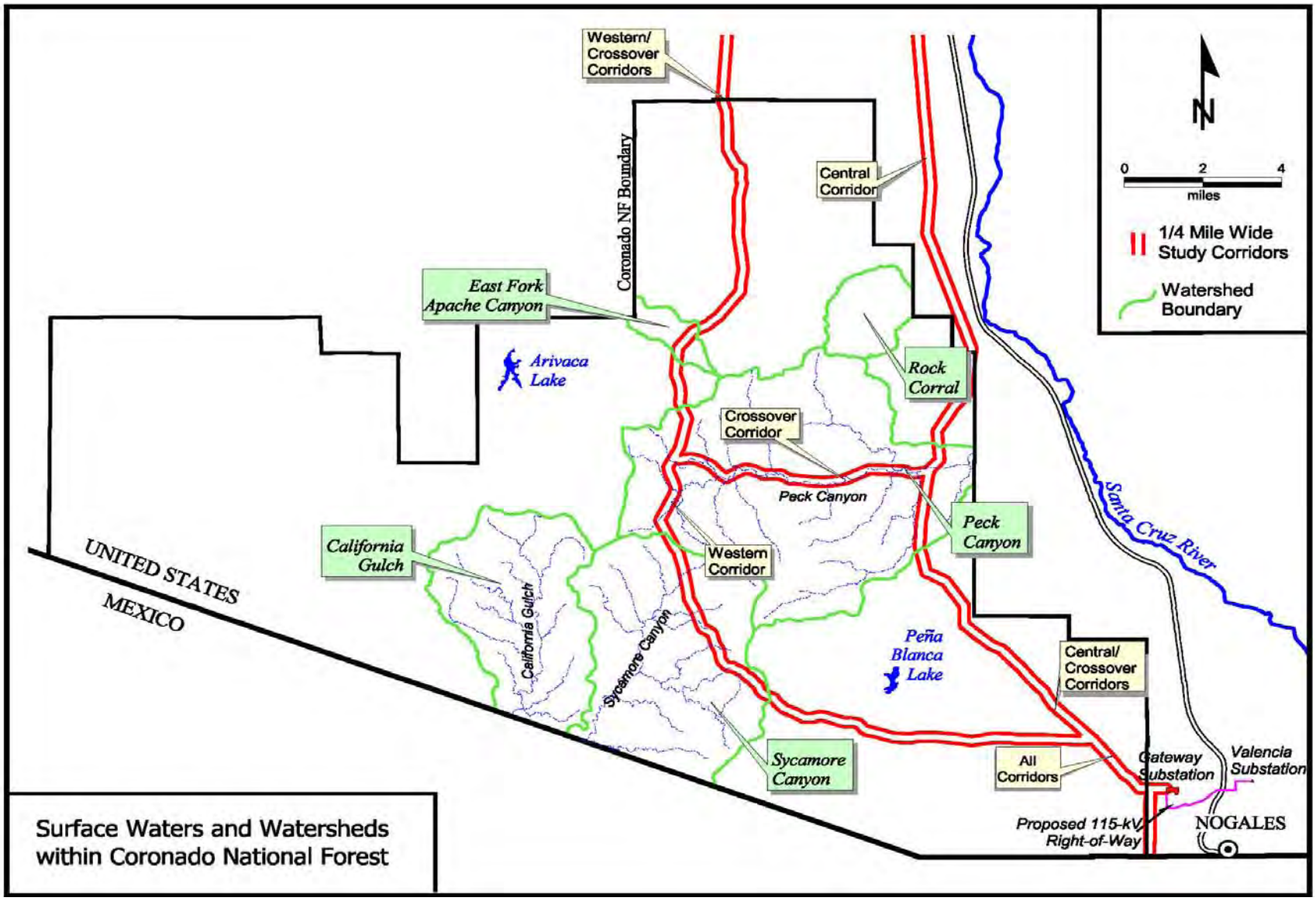


Figure 3.7–2. Surface Waters and Watersheds Within the Coronado National Forest.

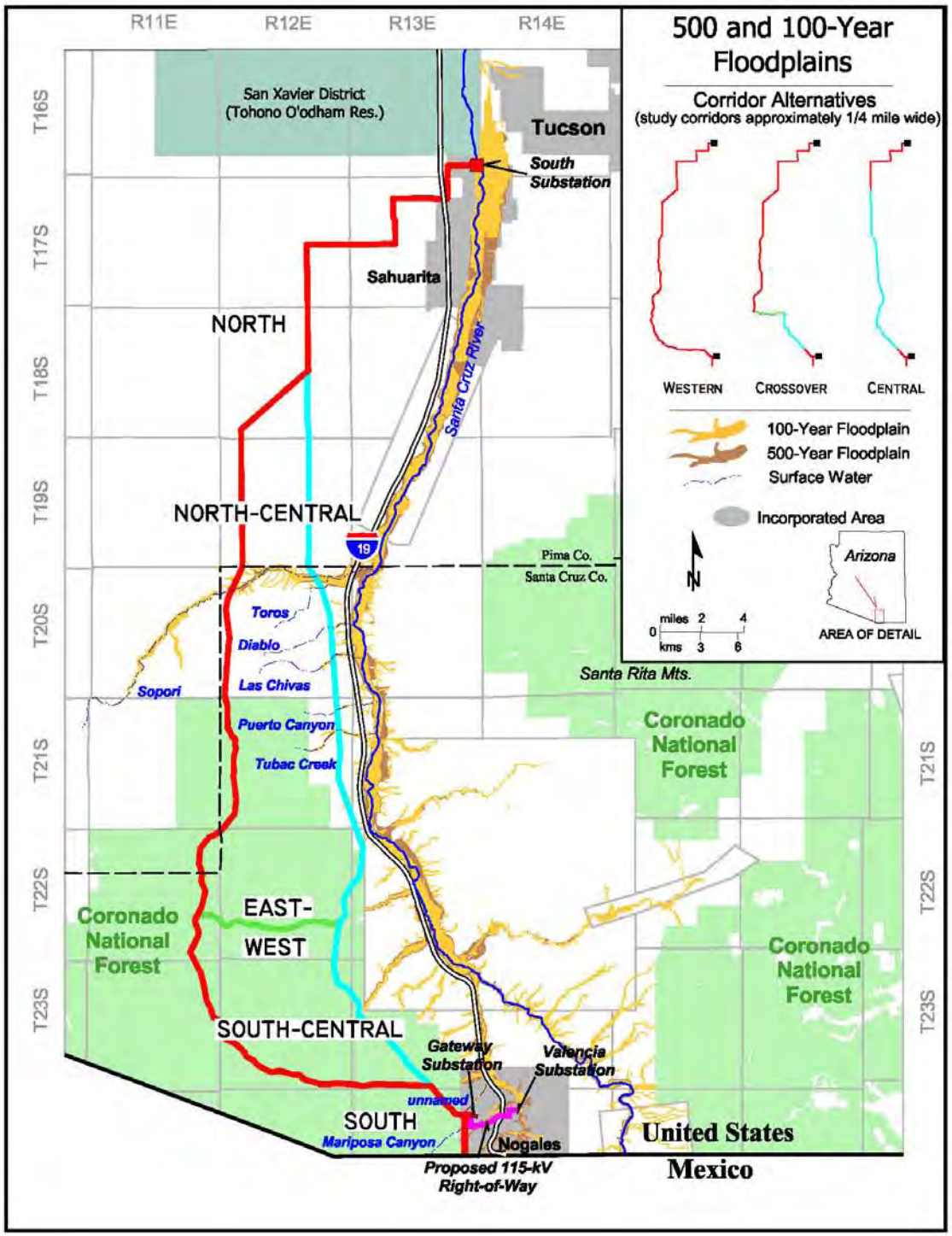


Figure 3.7–3. 500- and 100-year Delineated Floodplains and Associated Surface Waters Crossed by the Corridor Alternatives.

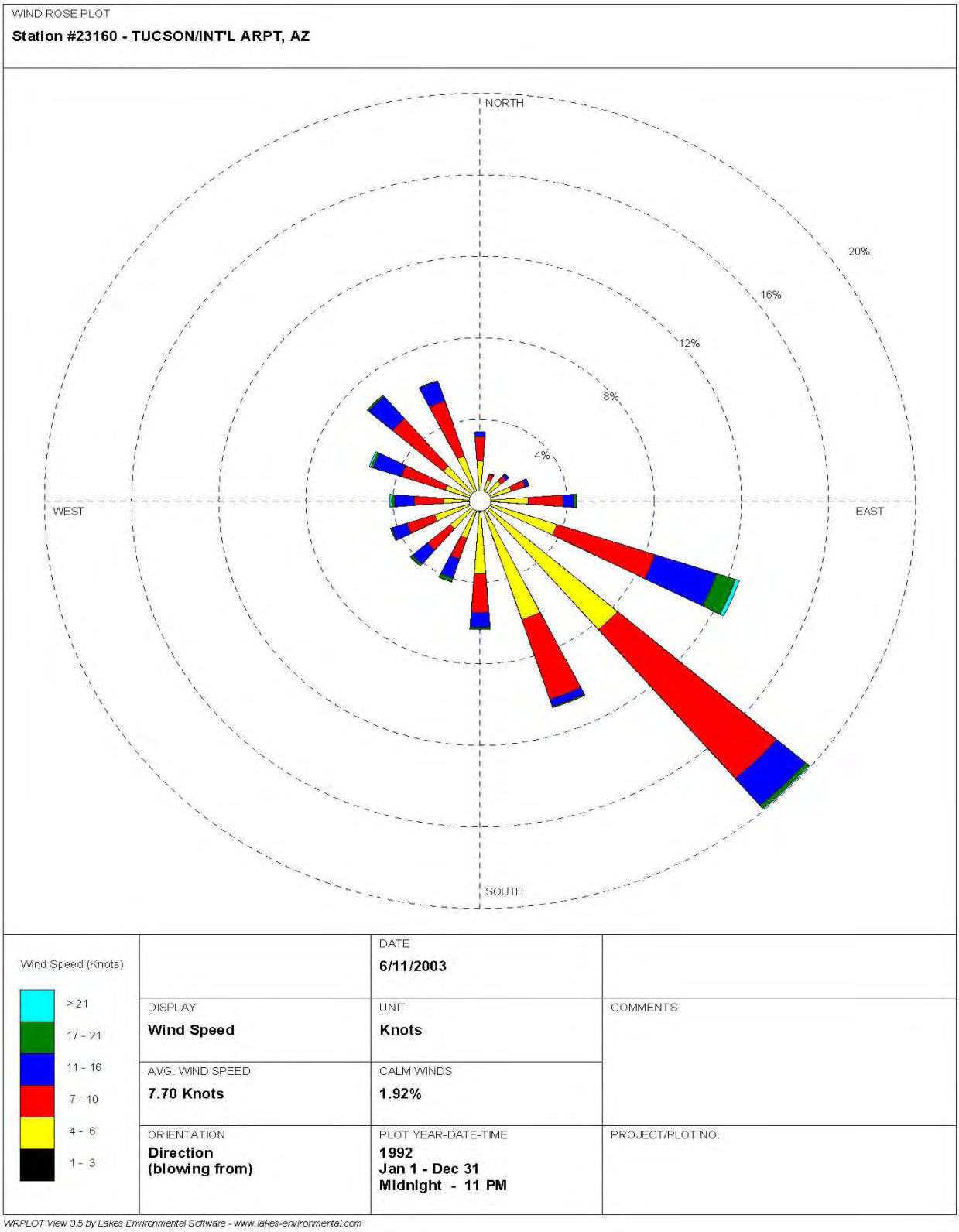


Figure 3.8–1. Wind Rose of Surface Winds at Tucson.

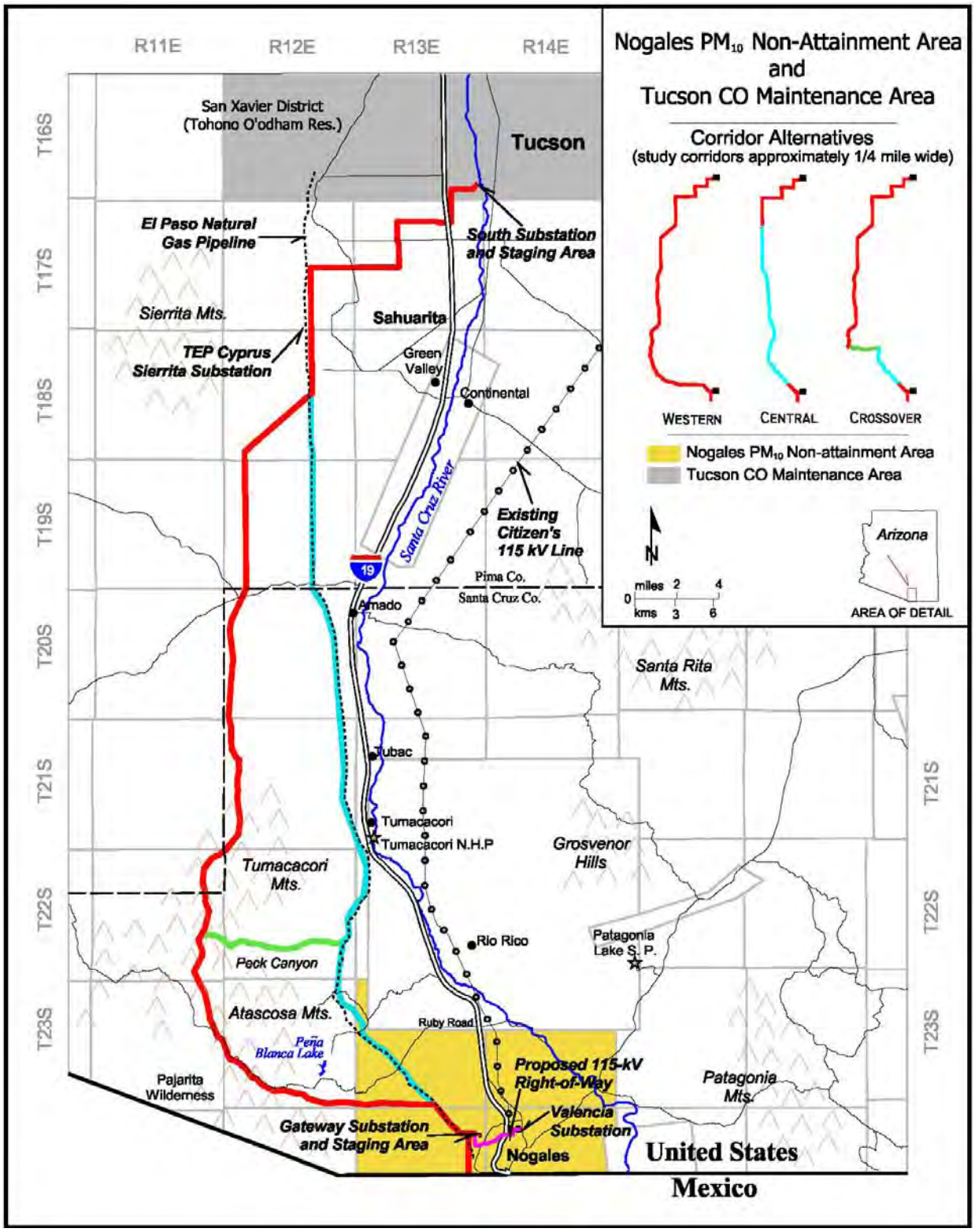


Figure 3.8–2. Nogales PM_{10} Non-attainment Area and Tucson CO Maintenance Area.

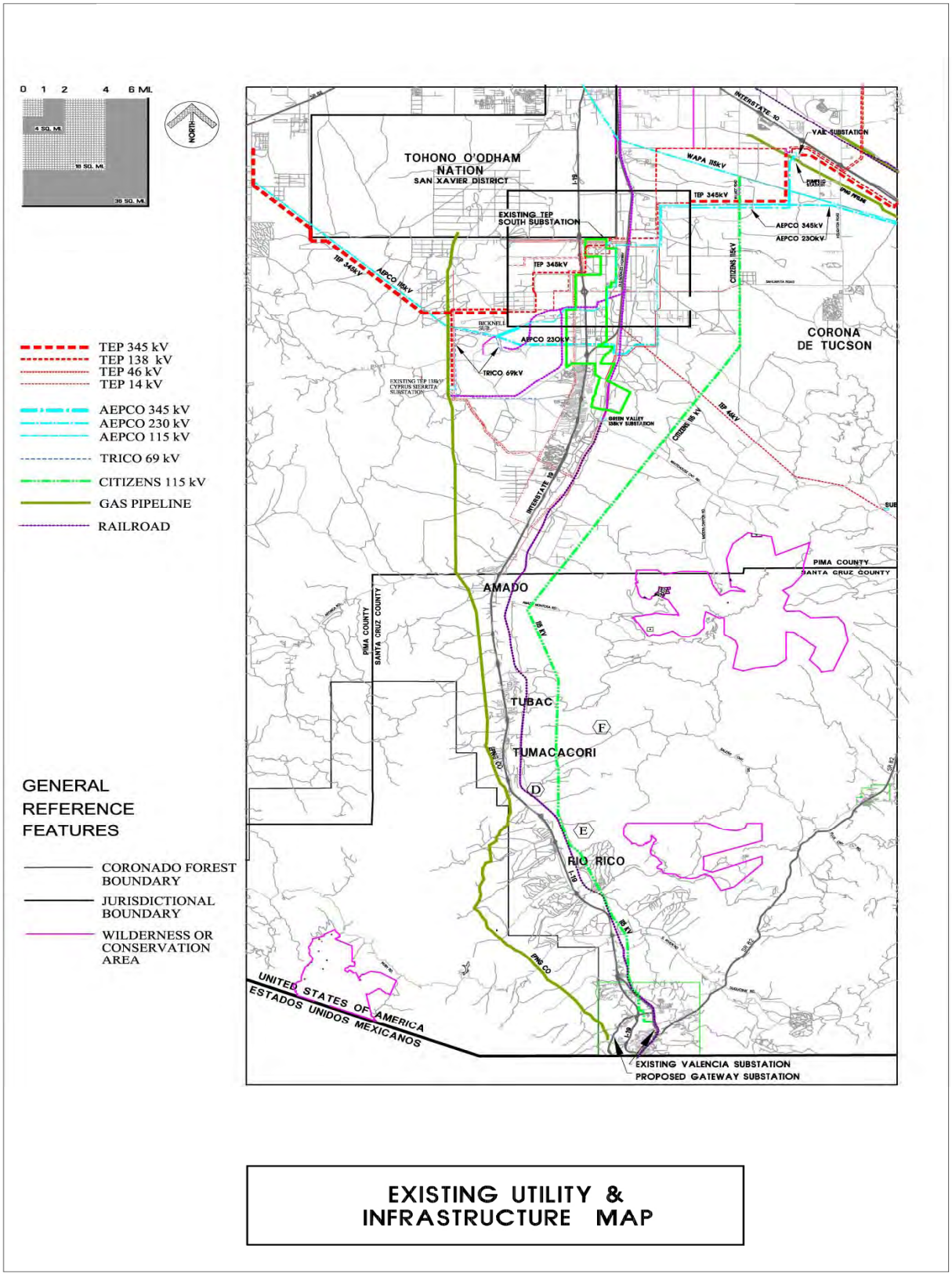


Figure 3.11–1. Existing Utility Infrastructure.

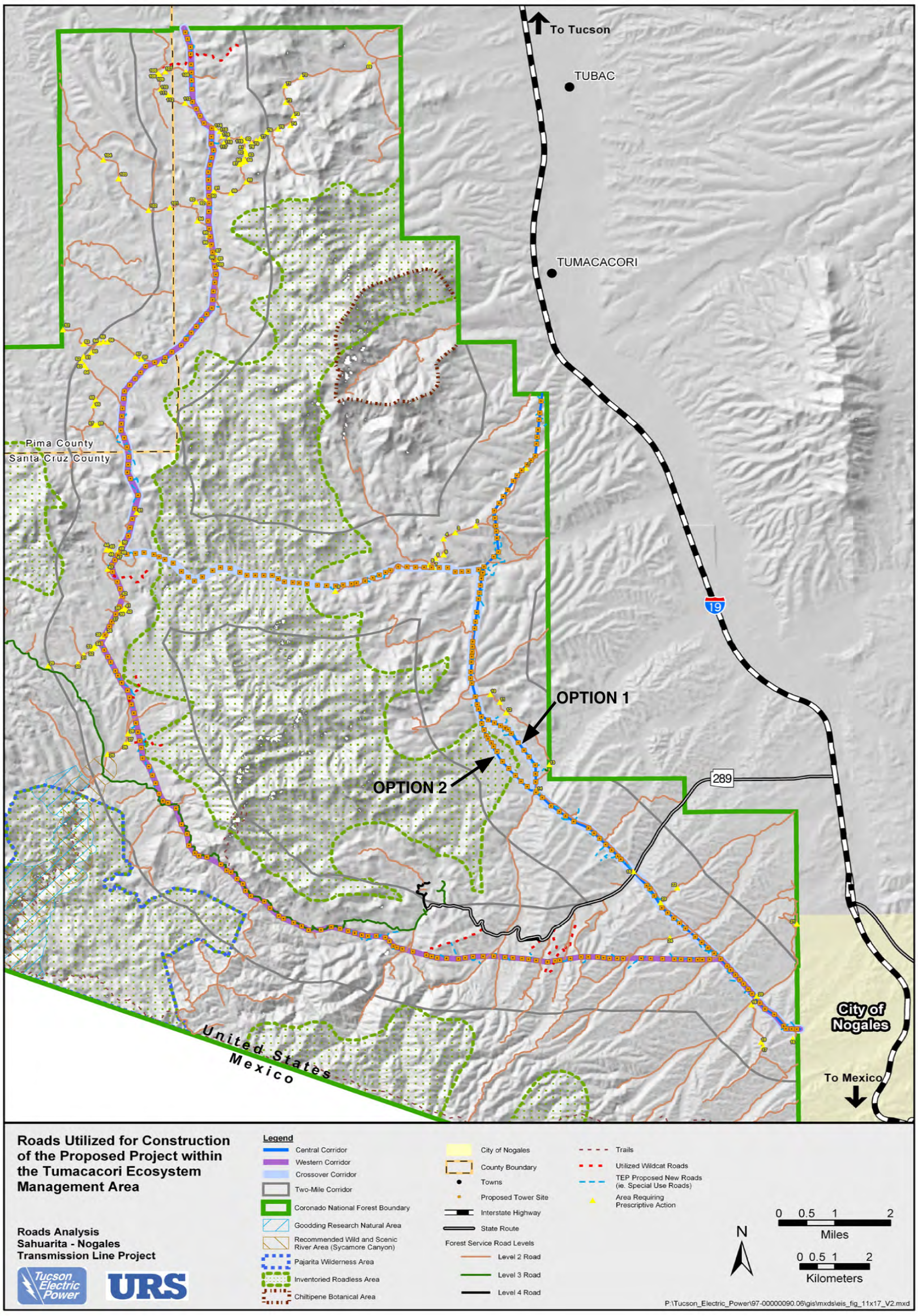
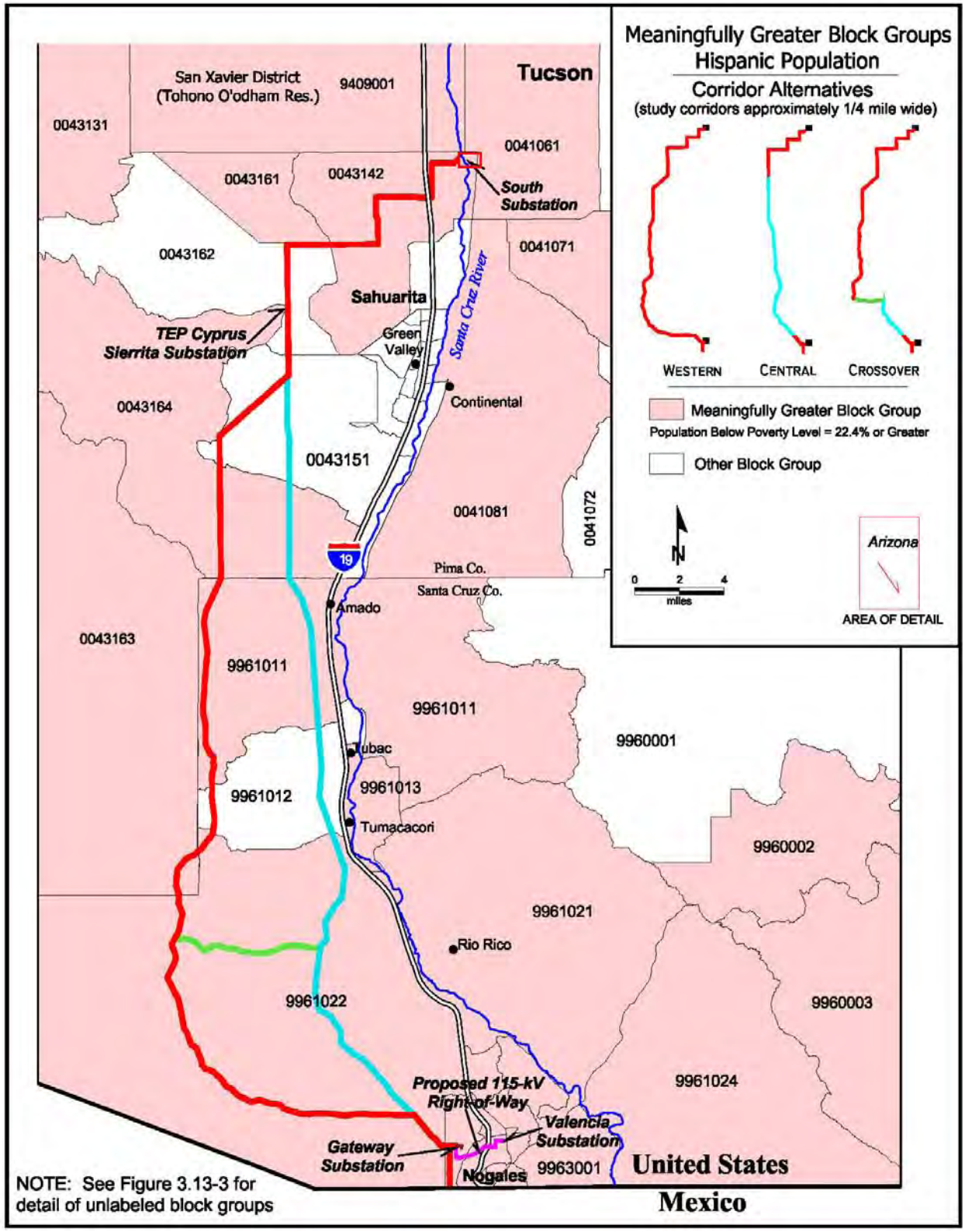
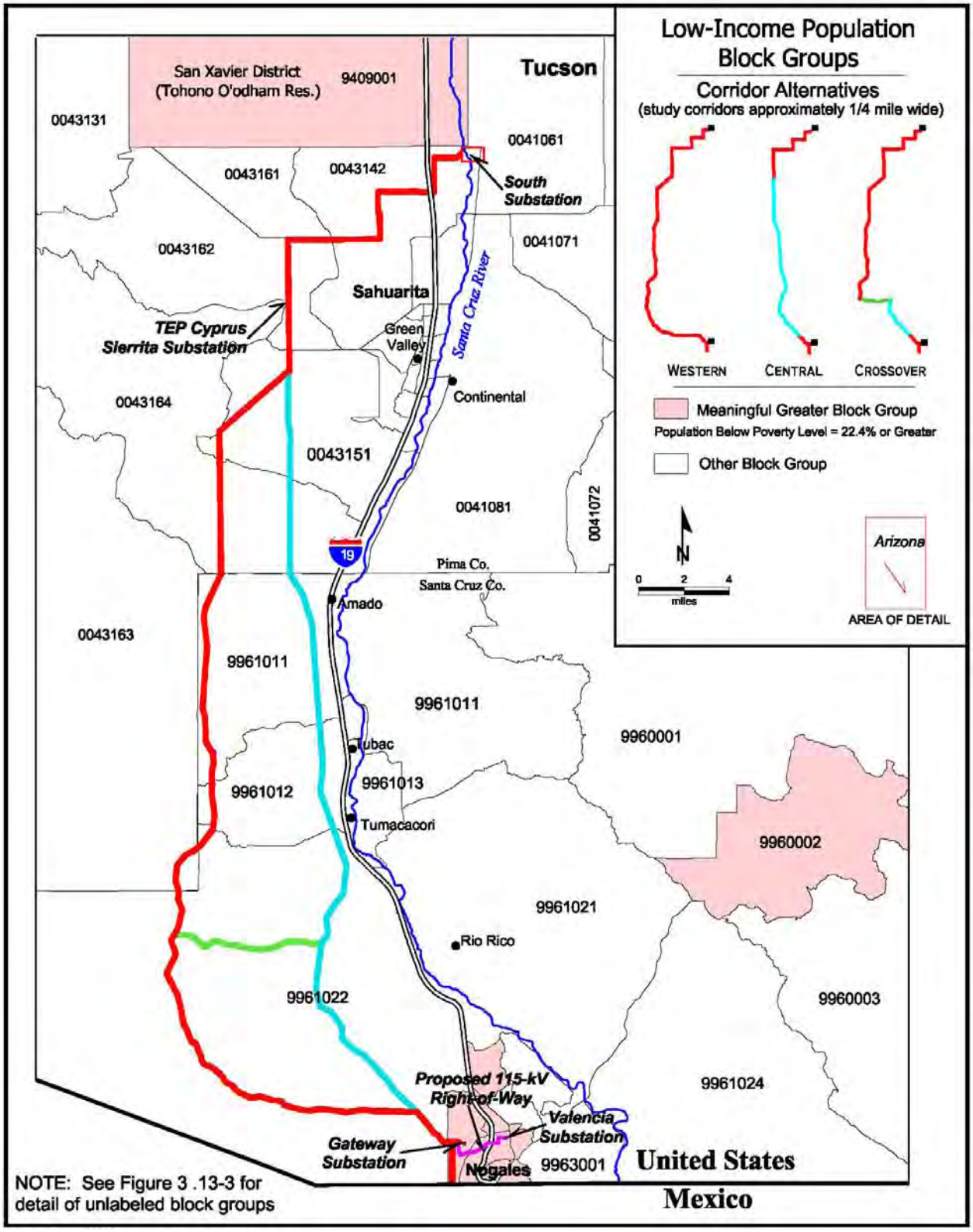


Figure 3.12–1. Roads Within the Tumacacori EMA.



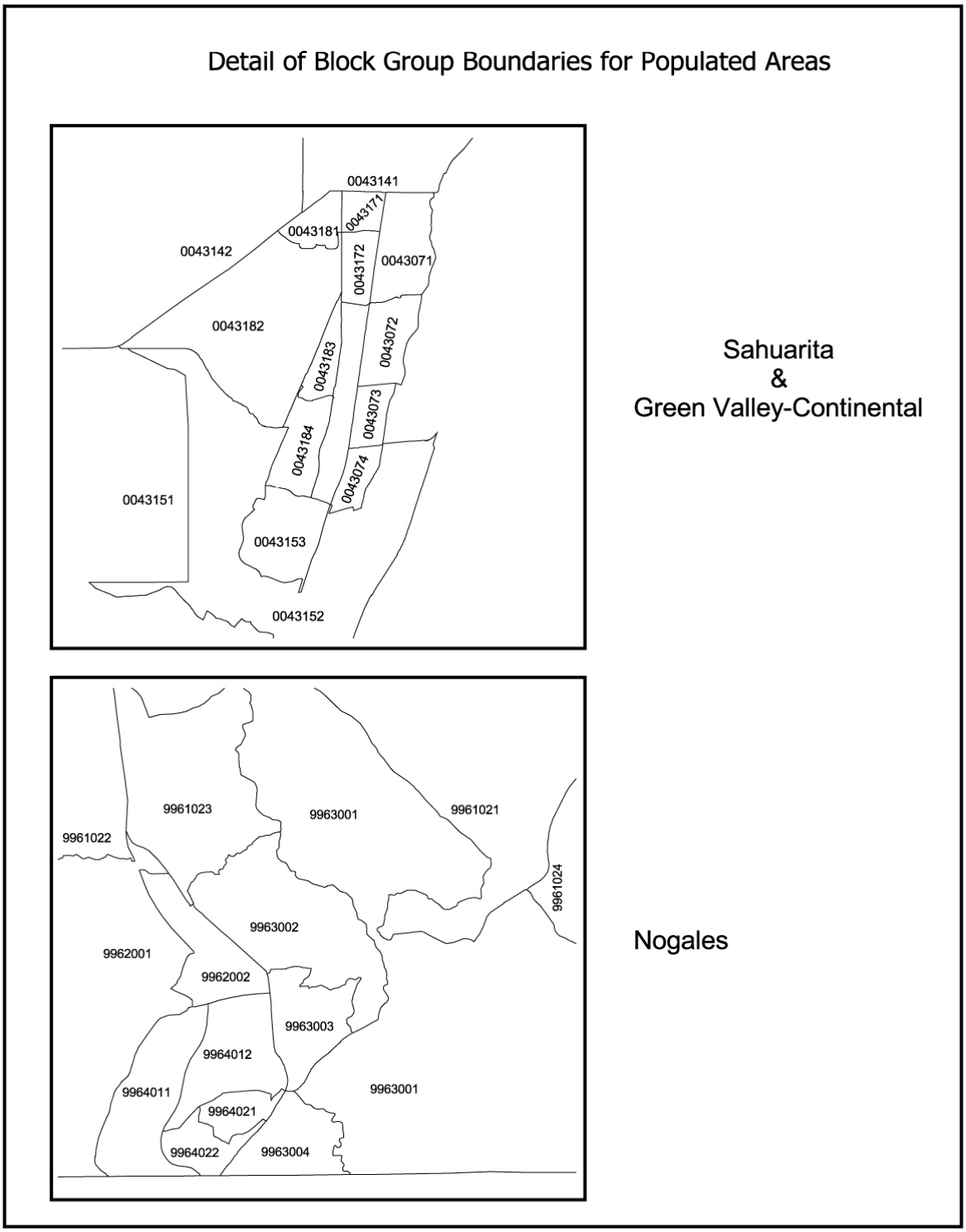
Source: Census 2000d.

Figure 3.13–1. Meaningfully Greater Minority Populations.



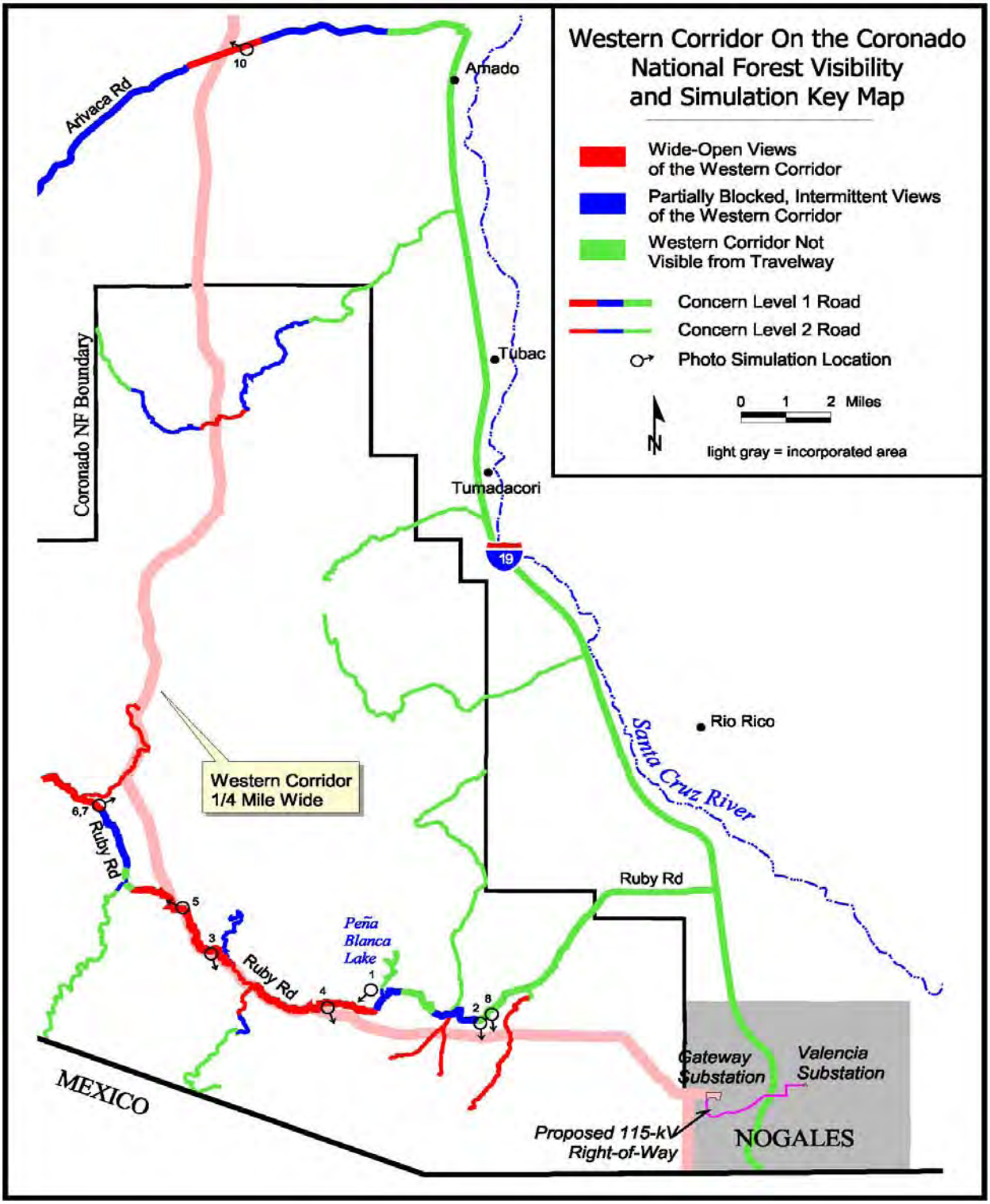
Source: Census 2000d. s

Figure 3.13–2. Low-Income Populations.



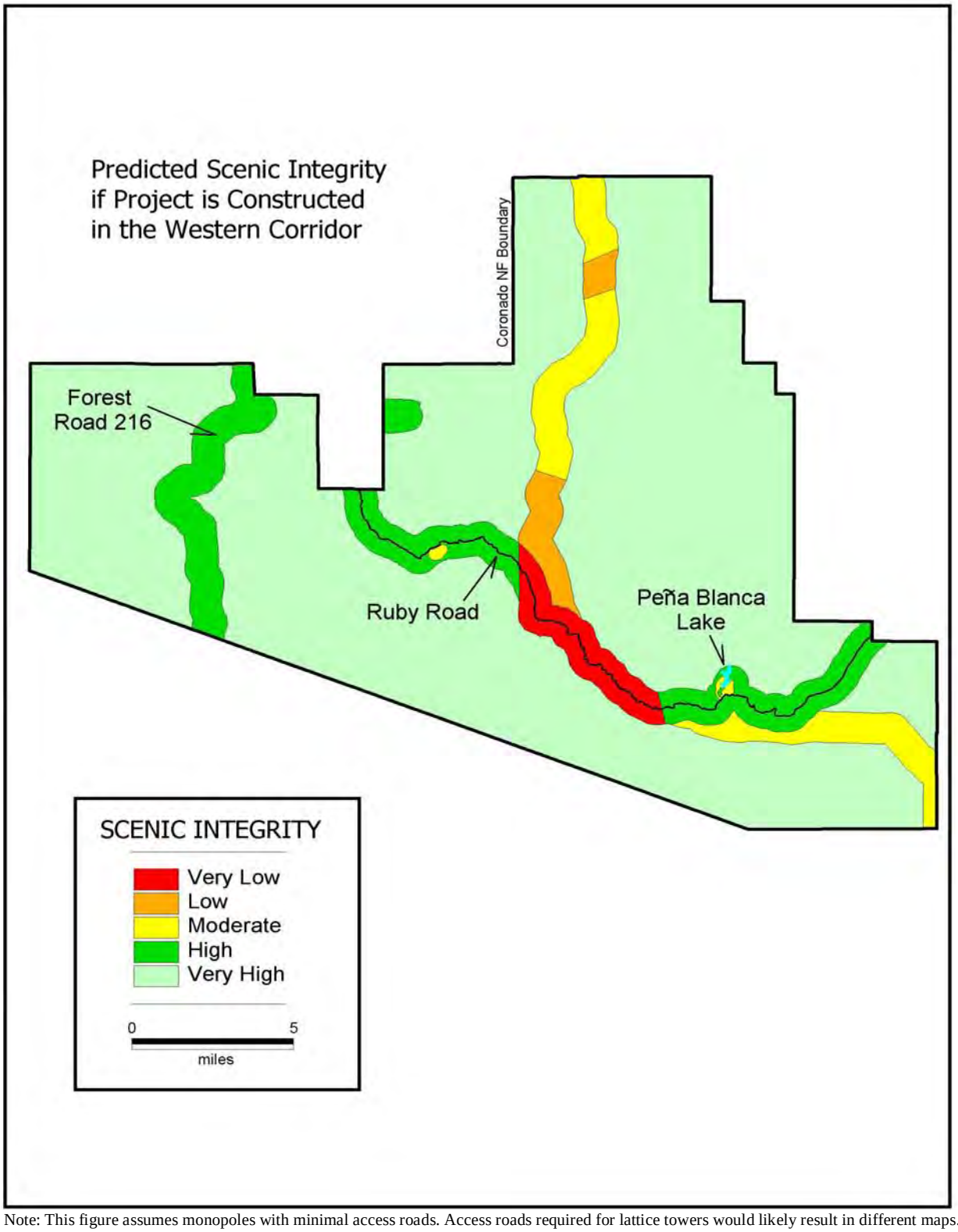
Source: Census 2000d.

Figure 3.13–3. Detail of Block Group Boundaries for Populated Areas.



Note: This figure assumes monopoles with minimal access roads. Access roads required for lattice towers would likely result in different maps.

Figure 4.2–1. Western Corridor on the Coronado National Forest Visibility and Simulation Key Map.



Note: This figure assumes monopoles with minimal access roads. Access roads required for lattice towers would likely result in different maps.

Figure 4.2–2. Predicted Scenic Integrity of the Western Corridor.

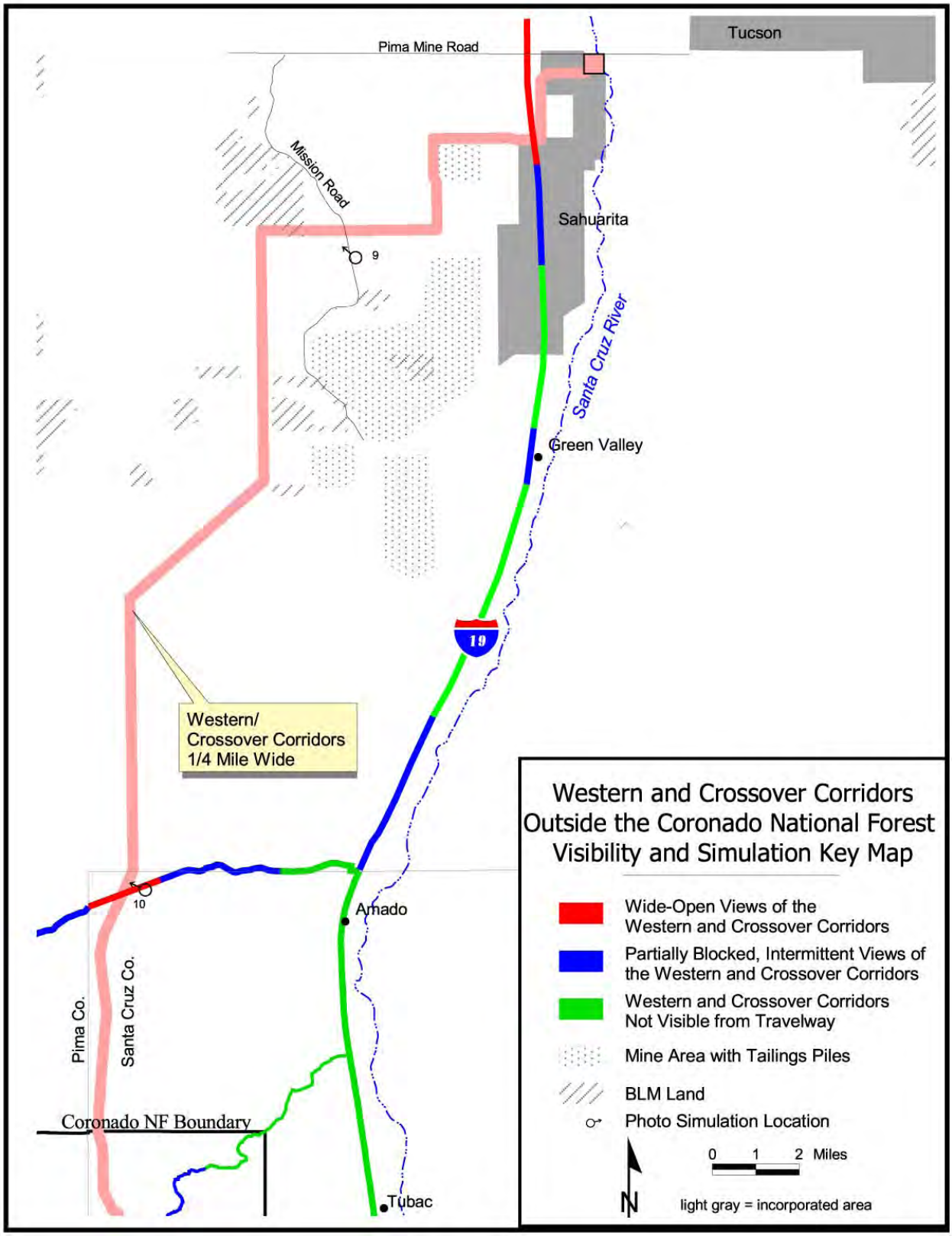


Figure 4.2–3. Western and Crossover Corridors Outside the Coronado National Forest Visibility and Simulation Key Map.

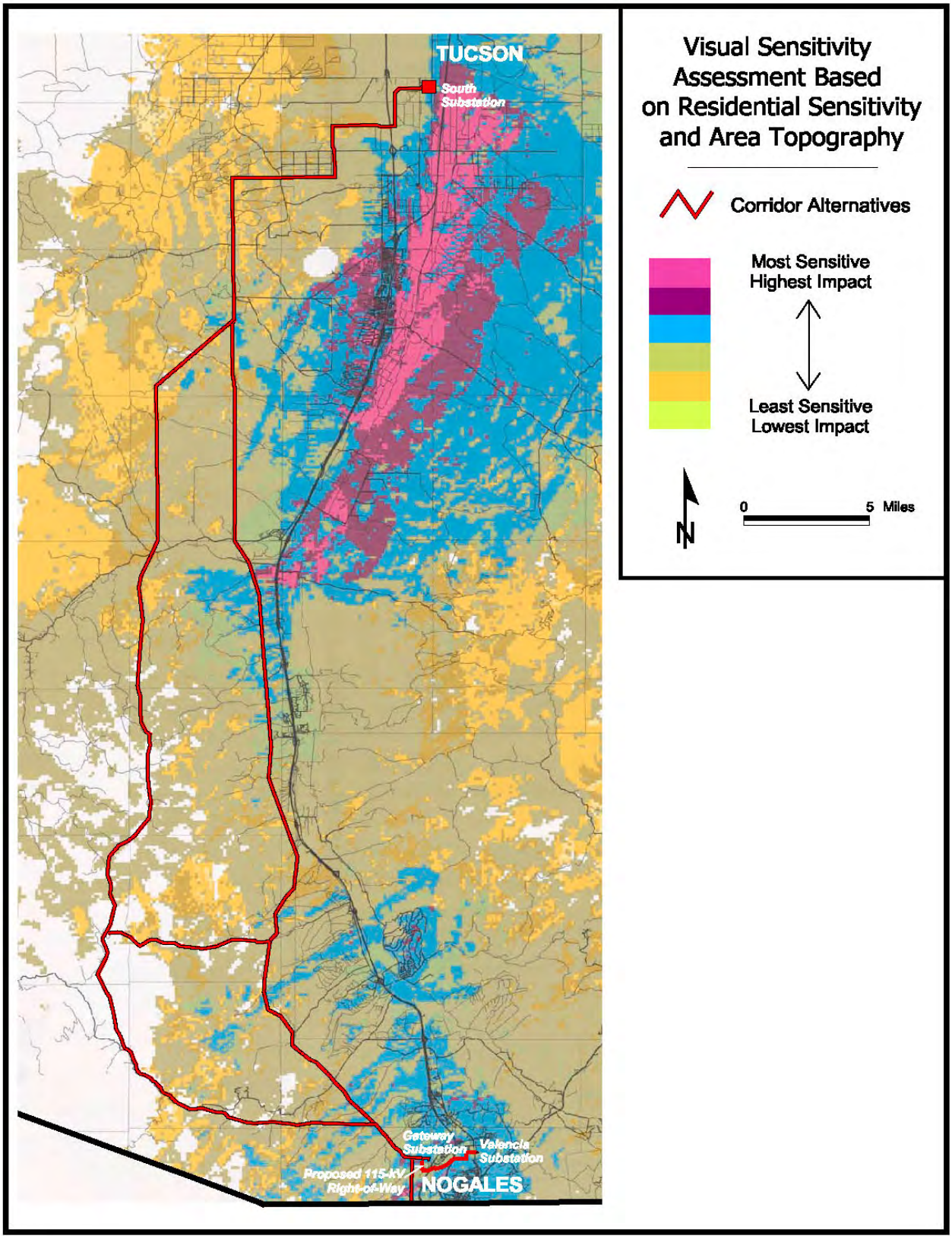
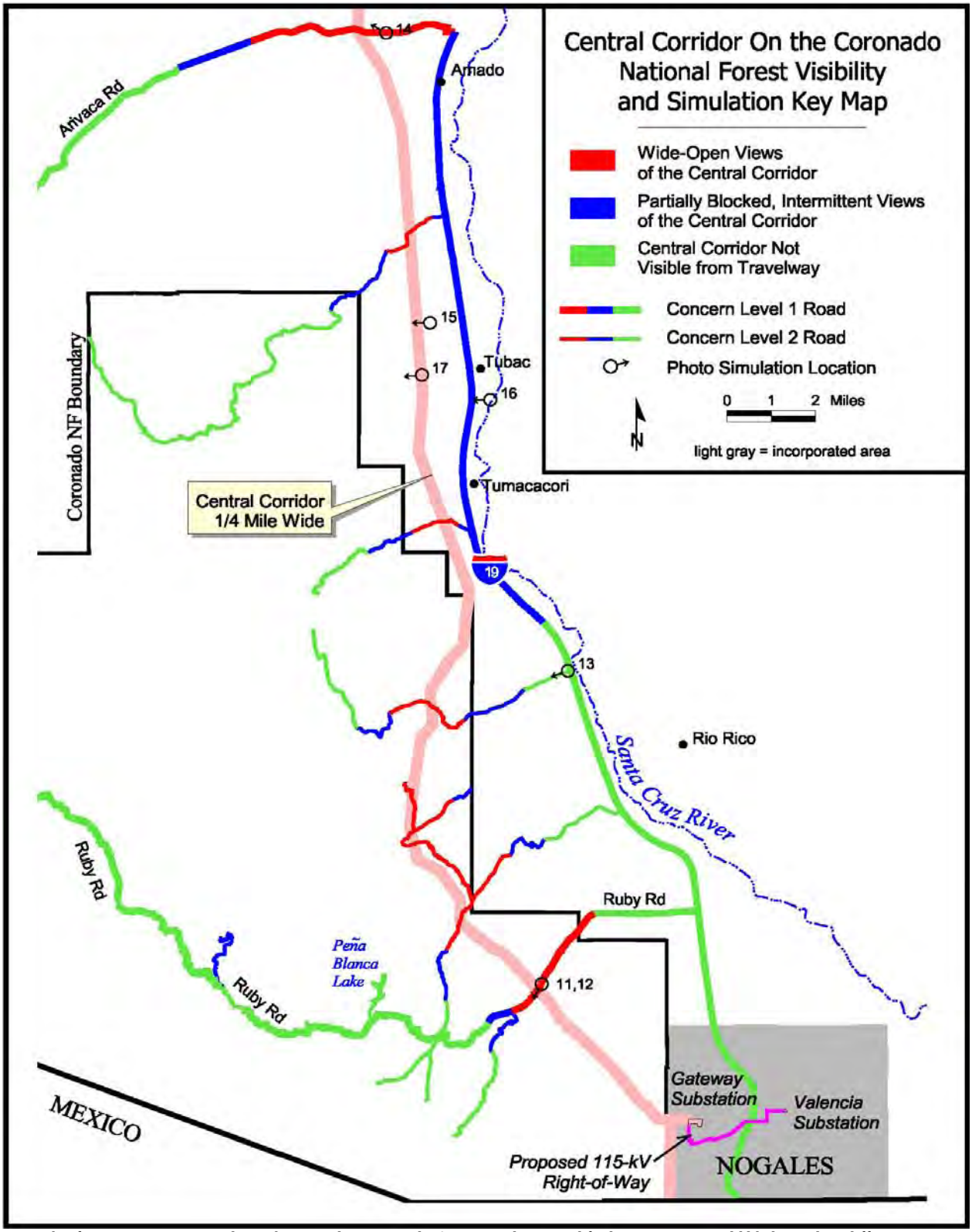
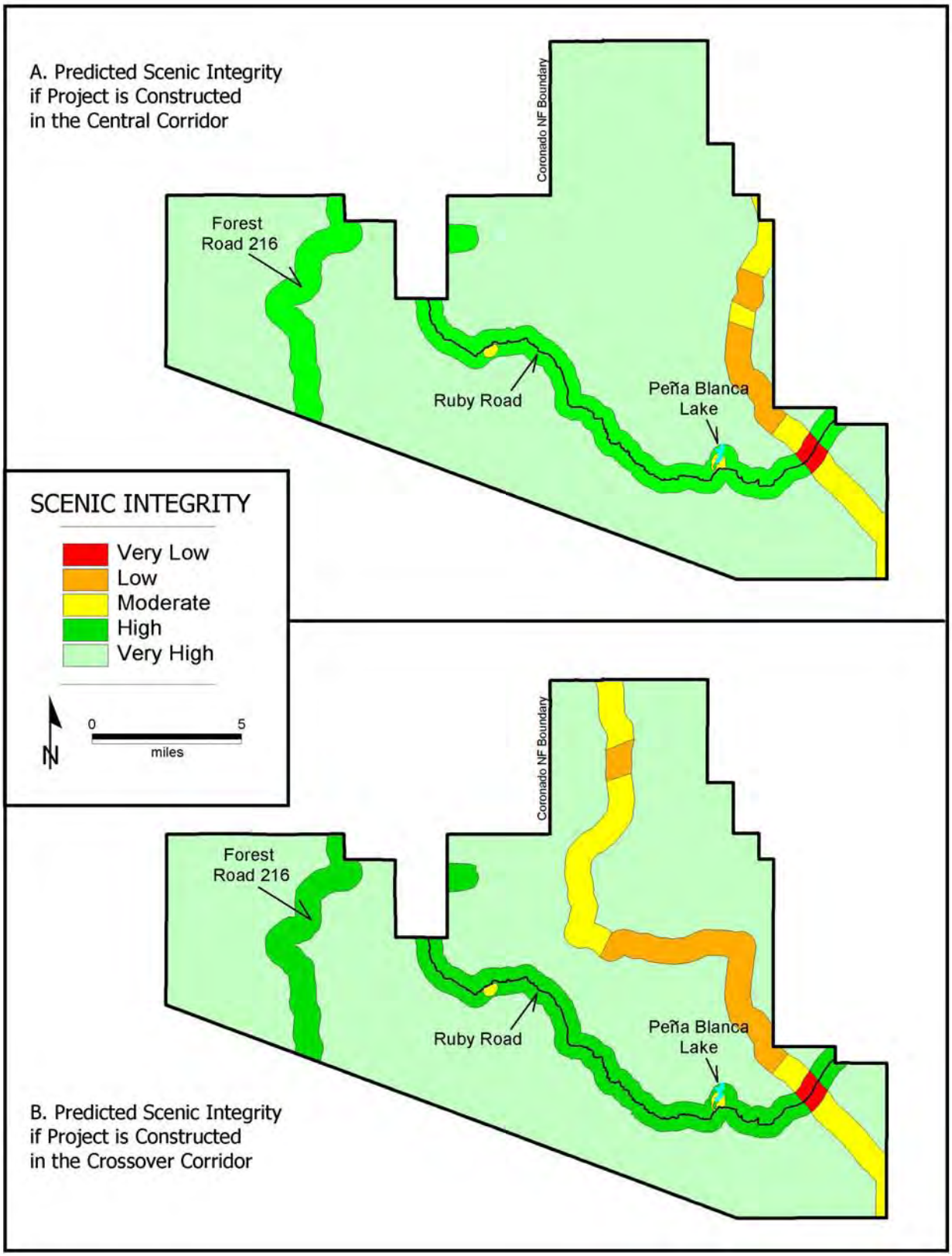


Figure 4.2–4. Visual Sensitivity Map.



Note: This figure assumes monopoles with minimal access roads. Access roads required for lattice towers would likely result in different maps.

Figure 4.2–5. Central Corridor on the Coronado National Forest Visibility and Simulation Key Map.



Note: This figure assumes monopoles with minimal access roads. Access roads required for lattice towers would likely result in different maps.

Figure 4.2–6. Predicted Scenic Integrity of the Central and Crossover Corridors.

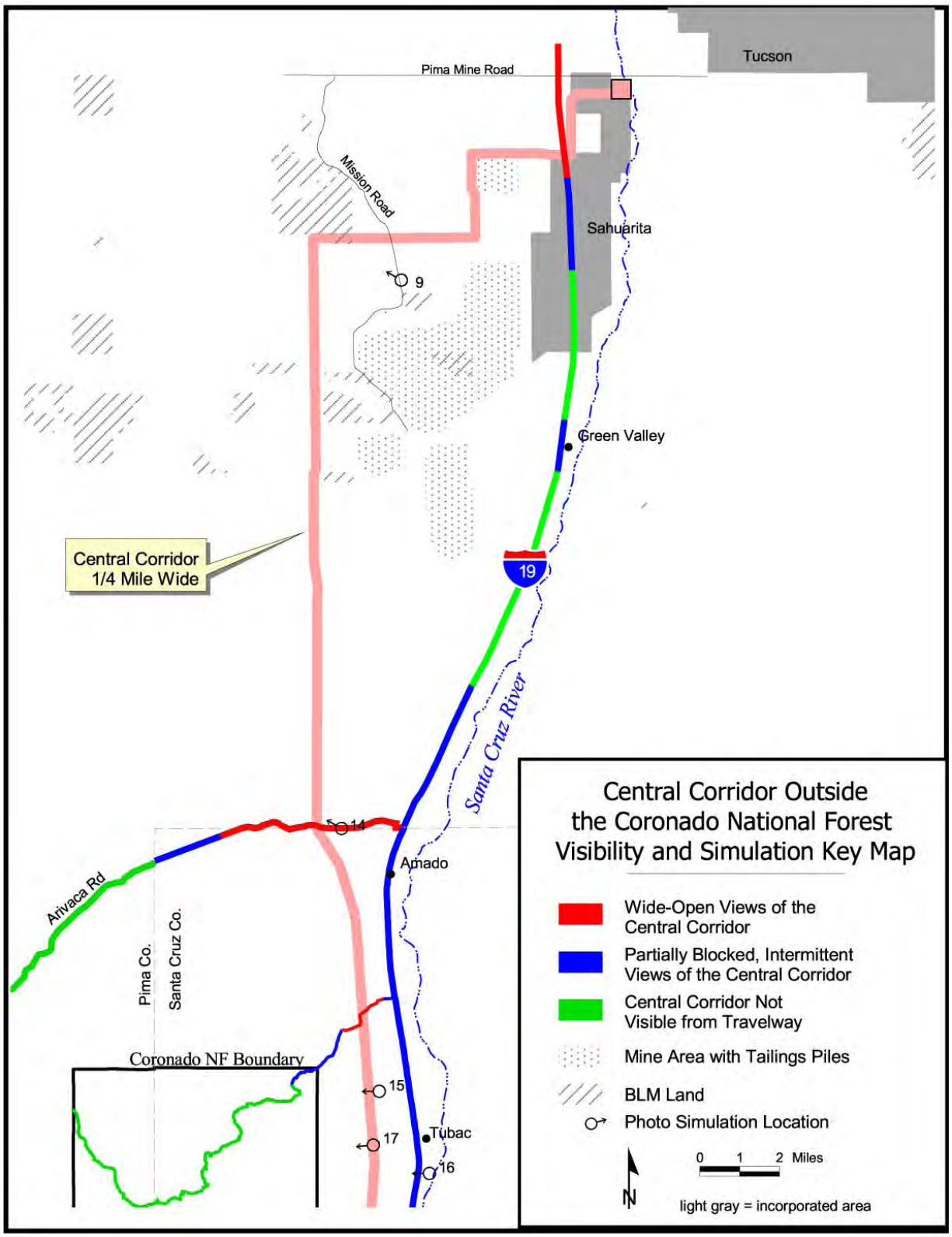
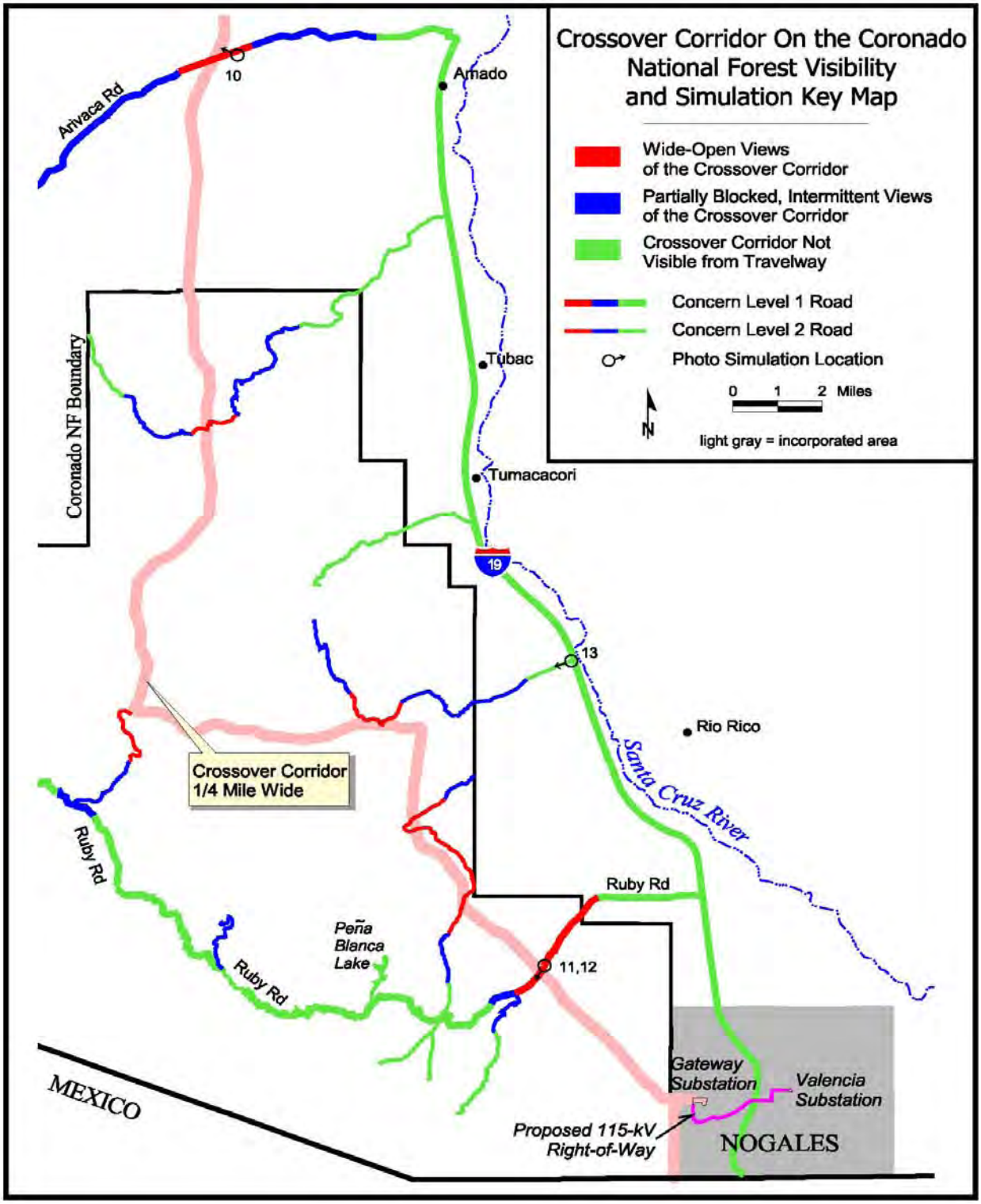


Figure 4.2–7. Central Corridor Outside the Coronado National Forest Visibility and Simulation Key Map.



Note: This figure assumes monopoles with minimal access roads. Access roads required for lattice towers would likely result in different maps.

Figure 4.2–8. Crossover Corridor on the Coronado National Forest Visibility and Simulation Key Map.

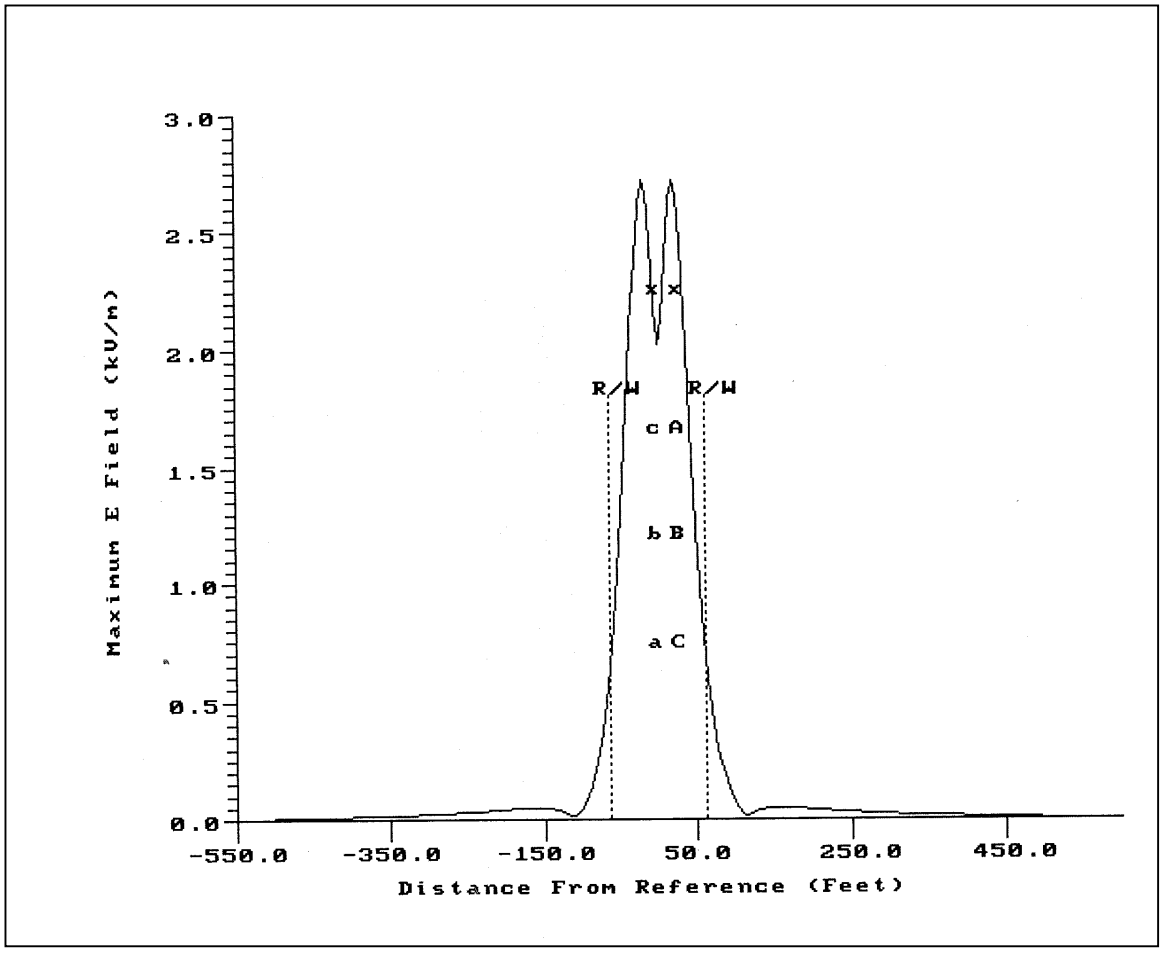


Figure 4.10–1. Electric Field Strength for Normal Operating Conditions, Optimized Phasing.

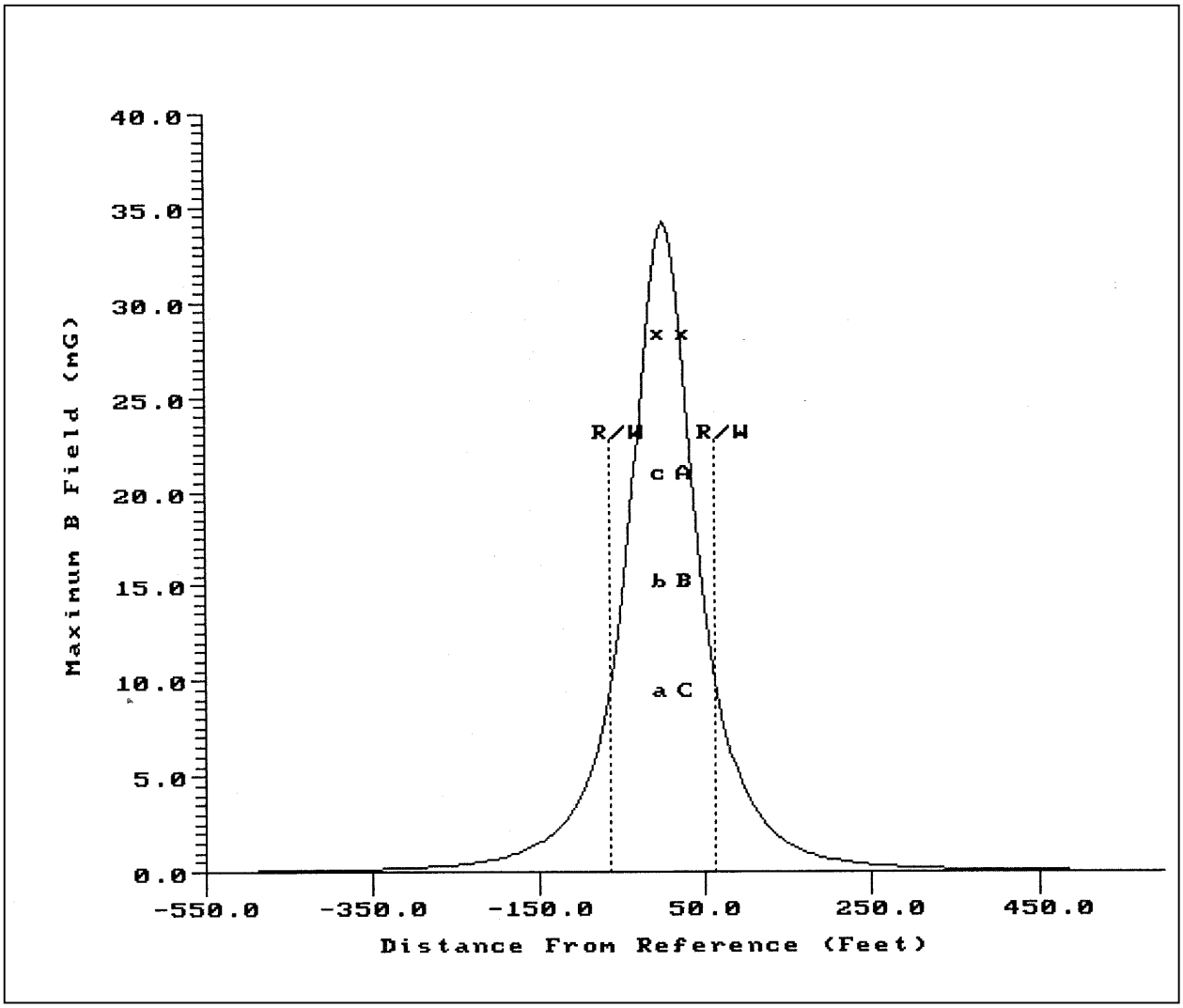


Figure 4.10–2. Magnetic Field Strength for Normal Operating Conditions, Optimized Phasing.

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Land Use				No impacts to existing land use.
Length	Estimated 65.7 mi (106 km)	Estimated 57.1 mi (91.9 km)	Estimated 65.2 mi (105 km)	
Length on CNF	Estimated 29.5 mi (47.5 km)	Estimated 15.1 mi (24.3 km)	Estimated 29.3 mi (47.2 km)	
Length on BLM	Estimated 1.25 mi (2.01 km)	Estimated 1.25 mi (2.01 km)	Estimated 1.25 mi (2.01 km)	
	Note that the Western and Crossover Corridors are identical outside of the Coronado National Forest (CNF).		Note that the Western and Crossover Corridors are identical outside of the CNF.	
Corridor length that follows or crosses the El Paso Natural Gas Company (EPNG) pipeline	Estimated 9.3 mi (15 km)	Estimated 43 mi (69 km) for Option 1 Estimated 45 mi (72 km) for Option 2	Estimated 17 mi (27 km) for Option 1 Estimated 19 mi (31 km) for Option 2	
Number of support structures (poles and towers):				
Total	Estimated 429	Estimated 373	Estimated 431	
On CNF	Estimated 191	Estimated 102	Estimated 196	
On BLM	Estimated 8	Estimated 8	Estimated 8	
Permanent area occupied by transmission line structures:				
Total	0.25 acres (0.10 ha)	0.21 acres (0.08 ha)	0.25 acres (0.10 ha)	
On CNF	0.11 acres (0.04 ha)	0.06 acres (0.02 ha)	0.11 acres (0.04 ha)	
On BLM	0.005 acres. (0.002 ha)	0.005 acres (0.002 ha)	0.005 acres (0.002 ha)	

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Land Use *(continued)*				
Permanent area occupied by substations and fiber-optic regeneration station	19.8 acres (8 ha)	19.8 acres (8 ha)	19.8 acres (8 ha)	
On the CNF: New permanent disturbance	Estimated 29 acres (12 ha)	Estimated 23 acres (9.3 ha)	Estimated 36 acres (15 ha)	
New temporary disturbance	Estimated 197 acres (79.7 ha)	Estimated 105 acres (42.5 ha)	Estimated 238 acres (96.3 ha)	
	The Western Corridor passes primarily through undeveloped land with few residences (five houses approximately 1,000 ft [305 m] from the centerline west of Sahuarita).	In addition to the residences near the Western Corridor, the Central Corridor centerline passes approximately 1,000 ft [305 m] from eight residences in the vicinity of Tubac, more than the Western or Crossover Corridors. The Central Corridor has the shortest segment on the CNF.	The Crossover Corridor passes primarily through undeveloped land with few residences (same as the Western Corridor, five houses approximately 1,000 ft [305 m] from the centerline west of Sahuarita). The Crossover Corridor passes through an inventoried roadless area (IRA) within Peck Canyon. TEP plans to use helicopter access in this area and would not build or upgrade any roads in this IRA.	
Compatibility with land use plans	*Per Appendix H, a Coronado National Forest Land and Resource Management Plan* (Forest Plan) amendment would be required to implement any of the three corridors on the CNF. To bring the Western Corridor, Crossover Corridor (Options 1 and 2), and the Central Corridor (Options 1 and 2) into compliance with the *Coronado National Forest Land and Resource Management Plan* (Forest Plan), the Forest Plan Transportation System and Utilities Corridor Map would be modified to include a new utility corridor. The width of this new utility corridor would be approximately 660 ft (201 meters) on either side of the centerline, or approximately ¼-mi (0.40 km). Outside of national forest land, all corridors are compatible with current land use and land use plans. TEP does not anticipate any ground disturbance in the reserved lands (120 ft [36.6 m] total) along the U.S.-Mexico border.			

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Recreation	Recreation activities in the vicinity of the proposed project would primarily be impacted by a change in the visual setting of the recreation.			No change in impacts to existing recreational resources. Current recreation activities including hiking, biking, birding, photography, rock climbing, horseback riding, and off-road vehicle use would be expected to continue.
CNF Recreation Opportunity Spectrum (ROS) Areas Crossed	Total 29.5 mi (47.5km) In order from most to least developed: Roaded Natural 1.7 mi (2.7 km) Roaded Modified 7.0 mi (11 km) Semi-Primitive Motorized 21 mi (34 km) Semi-Primitive Non-Motorized none, but passes within 0.25 mi of an area	Total 15.1. mi (24.3 km) In order from most to least developed: Roaded Natural 1.1 mi (1.8 km) Roaded Modified none Semi-Primitive Motorized 14 mi (23 km) for Option 1; 12 mi (19 km) for Option 2 Semi-Primitive Non-Motorized: none for Option 1 (but passes within 0.25 mi of an area); 1.9 mi (3.1 km) for Option 2	Total 29.3 mi (47.2 km) In order from most to least developed: Roaded Natural 1.2 mi (1.9 km) Roaded Modified none Semi-Primitive Motorized 25 mi (41 km) for Option 1; 23 mi (37 km) for Option 2 Semi-Primitive Non-Motorized: 3.3 mi (5.3 km) for Option 1; 5.2 mi (8.4 km) for Option 2	
ROS Area Classification	For each ROS area classification USFS has established the limits of acceptable change to certain setting indicators, classifying the changes as "fully compatible or normal," or "inconsistent" or "unacceptable". The setting indicators within each area would be impacted as follows: For Access, Social Encounters, Visitor Impacts, and Visitor Management, all alternatives would be compatible with all ROS area classifications. For Facilities and Site Management, most of the length of all three corridors would be inconsistent with all ROS area classifications. For Naturalness and Remoteness, impacts would be as follows:			

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Recreation *(continued)*	The Western Corridor would have an unacceptable impact on Naturalness where it runs adjacent to Ruby Road for approximately 4 mi (6 km) southwest of the Atascosa Mountains. Most of the Western Corridor would be inconsistent with Remoteness. The length of the Western Corridor on the CNF (29.5 mi [47.5 km], similar to the Crossover Corridor) affects the extent of potential recreation impacts on the CNF.	The Central Corridor would have an unacceptable impact on Naturalness where it crosses Ruby Road, in the same location as the Crossover Corridor. Most of the Central Corridor would be inconsistent with Remoteness. The length of the Central Corridor on the CNF (15.1 mi [24.3 km], approximately half the length of the other alternatives on the CNF) affects the extent of potential recreation impacts on the CNF. Options 1 and 2 would have similar impacts to ROS.	The Crossover Corridor would have an unacceptable impact on Naturalness within Peck Canyon and where it crosses Ruby Road, in the same location as the Central Corridor. The Crossover Corridor would also have a higher impact on Remoteness than the other alternatives, as approximately 3 mi (5 km) of the Crossover Corridor at Peck Canyon would have inconsistent impacts on Remoteness. The length of the Crossover Corridor on the CNF (29.3 mi [47.2 km], similar to the Western Corridor) affects the extent of potential recreation impacts on the CNF. Options 1 and 2 would have similar impacts to ROS.	
Impacts outside the CNF	Potential impacts on recreation activities would be similar to those within the CNF but would be lower given less recreational use of the Western Corridor outside the CNF.	Potential impacts on recreation activities would be similar to those within the CNF, as the Central Corridor crosses recreational trails where it parallels just outside the CNF boundary for approximately 7 mi (11 km) east of the Tumacacori Mountains.	Potential impacts on recreation activities would be similar to those within the CNF but would be lower given less recreational use of the Crossover Corridor outside the CNF.	

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Visual Resources	Visual impacts would occur from the introduction of steel support structures, access roads, and transmission line wires into the landscape. Structures would be primarily 140-ft (43-m) high self-weathering monopoles, similar in color to wood utility poles.			The existing landscape and Scenic Integrity would continue, subject to visual impacts from any potential development in the project area.
Outside the CNF	The Western Corridor passes through areas of existing development near Sahuarita and Nogales, and is shielded from Interstate 19 (I-19) outside these areas by mine tailing piles and natural terrain, passing through primarily undeveloped land. With the exception of a reduction in Scenic Integrity from High to Moderate/Low near the Pima and Santa Cruz county line, the existing Moderate to Low Scenic Integrity would not change.	The Central Corridor passes through areas of existing development near Sahuarita and Nogales, and passes a number of towns along I-19 including Amado, Tubac, and Tumacacori. The Central Corridor would be visible from more residences than Western although some potential views would be blocked by terrain. The existing Moderate to Low Scenic Integrity would not change. There would be no differences in visual impacts for Options 1 and 2.	The Crossover Corridor passes through areas of existing development near Sahuarita and Nogales, and is shielded from I-19 outside these areas by mine tailing piles and natural terrain, passing through primarily undeveloped land. With the exception of a reduction in Scenic Integrity from High to Moderate/Low near the Pima and Santa Cruz county line, the existing Moderate to Low Scenic Integrity would not change.	
Substations	The South Substation expansion would have minimal visual impact given that similar equipment already exists onsite. There would be little visual change introduced by construction of the new Gateway Substation because of existing industrial development in the area.			
On the CNF	Crosses approximately 30 mi (48 km) of mostly Scenic Class 1 and 2 areas, of high public value, and would be most visible from roadways in an approximately 4-mi (6-km) stretch in the immediate foreground of Ruby Road southwest of the Atascosa Mountains.	Crosses approximately 15 mi (24 km) of mostly Scenic Class 2 areas, of high public value but below Scenic Class 1. The primary visual impact of the Central Corridor when viewed from roadways would be at the crossing of Ruby Road, with two structures in the foreground. There would be no differences in visual impacts for Options 1 and 2.	Crosses approximately 30 mi (48 km) of mostly Scenic Class 1 and 2 areas, of high public value. The primary visual impact of the Crossover Corridor when viewed from roadways would be at the crossing of Ruby Road, with two structures in the foreground. There would be no differences in visual impacts for Options 1 and 2.	
	Is mostly blocked by terrain from I-19 and the eastern portion of Ruby Road.	Is mostly blocked by terrain from I-19, and is only visible from Ruby Road at the crossing area.	Is mostly blocked by terrain from I-19, and is only visible from Ruby Road at the crossing area.	

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Visual Resources *(continued)*	The existing Scenic Integrity of Peña Blanca Lake Recreation Area and the Pajarita Wilderness would not change.			
Scenic Integrity Changes	From: High/Very High To: Moderate/Low	From: Very High To: Moderate/Low	From: Very High To: Moderate/Low	
On the CNF	13, 870 acres (5,613 ha)	8,992 acres (3,639 ha)	18,060 acres (7,307 ha)	
Total Reduced Scenic Integrity On the CNF	From: High To: Very Low 4,641 acres (1,878 ha) 18,511 acres (7,491 ha)	From: High To: Very Low 676 acres (274 ha) 9,668 acres (3,912 ha)	From: High To: Very Low 676 acres (274 ha) 18,736 acres (7,582 ha)	
Biological Resources	Because the proposed project would be in an arid area, where vegetation recovers very slowly, disturbances due to construction could have long-term impacts. Habitat fragmentation would be least for the Central Corridor because it follows an existing utility corridor to the greatest extent and would require the least clearing of vegetation.			No impacts to biological resources associated with the project.
Vegetation communities potentially disturbed:		Options 1 and 2 would have similar impacts.	Options 1 and 2 would have similar impacts.	
Arizona Upland/Sonoran Desertscrub	Entire Corridor 119 acres (48 ha) CNF 0 acres BLM 0 acres Other Land Ownership 119 acres (48 ha)	Entire Corridor 119 acres (48 ha) CNF 0 acres BLM 0 acres Other Land Ownership 119 acres (48 ha)	Entire Corridor 119 acres (48 ha) CNF 0 acres BLM 0 acres Other Land Ownership 119 acres (48 ha)	

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Biological Resources *(continued)*				
Semidesert grassland	Entire Corridor 165 acres (67 ha) CNF 102 acres (41 ha) BLM 8 acres (3.2 ha) Other Land Ownership 55 acres (22 ha)	Entire Corridor 109 acres (44 ha) CNF 67 acres (27 ha) BLM 8 acres (3.2 ha) Other Land Ownership 34 acres (14 ha)	Entire Corridor 97 acres (39 ha) CNF 66 acres (27 ha) BLM 8 acres (3.2 ha) Other Land Ownership 23 acres (9.3 ha)	
Madrean Evergreen Woodland	Entire Corridor 95 acres (38 ha) CNF 95 acres (38 ha) BLM 0 acres Other Land Ownership 0 acres	Entire Corridor 38 acres (15 ha) CNF 38 acres (15 ha) BLM 0 acres Other Land Ownership 0 acres	Entire Corridor 72 acres (29 ha) CNF 72 acres (29 ha) BLM 0 acres Other Land Ownership 0 acres	
Sonoran Riparian Deciduous Forest	Entire Corridor 0.14 acres (0.06 ha) CNF 0 acres BLM 0 acres Other Land Ownership 0 acres	Entire Corridor 0 acres CNF 0 acres BLM 0 acres Other Land Ownership 0 acres	Entire Corridor 0 acres CNF 0 acres BLM 0 acres Other Land Ownership 0 acres	
Special status species	Both within and outside the CNF, there is a potential to impact habitat during construction of existing native plant communities located within the ROW and areas of new access roads. Biological Assessments (BAs) on federally listed species and reports on USFS Management Indicator Species (MIS) and Migratory Bird Treaty Act (MBTA) species were completed to evaluate impacts to species and their habitats and identify potential adverse effects for special status species that occur, or may occur, within each corridor. All three proposed corridors cross federally designated Critical Habitat for the Mexican spotted owl. There are approximately 54,881 acres (22,210 ha) of designated Critical Habit within the Coronado National Forest. The federally listed endangered Pima pineapple cactus is known to occur in each corridor. Additional species-specific surveys are recommended in some cases. For the Central and Crossover Corridors, no differences have been identified between Options 1 and 2.			

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Biological Resources *(continued)* Potential Adverse Effects to:	Includes habitat for the following 10 federally listed species: cactus ferruginous pygmy-owl, Chiricahua leopard frog, Gila topminnow, jaguar, lesser long-nosed bat, Mexican gray wolf, Mexican spotted owl, Pima pineapple cactus, Sonora chub, and southwestern willow flycatcher; and 1 candidate species: yellow-billed cuckoo. 58 special status species	Includes habitat for the following 7 federally listed species: cactus ferruginous pygmy-owl, Gila topminnow, jaguar, lesser long-nosed bat, Mexican gray wolf, Mexican spotted owl, and Pima pineapple cactus; and 1 candidate species: yellow-billed cuckoo. 50 special status species	Includes habitat for the following 9 federally listed species: cactus ferruginous pygmy-owl, Chiricahua leopard frog, Gila topminnow, jaguar, lesser long-nosed bat, Mexican gray wolf, Mexican spotted owl, Pima pineapple cactus, and southwestern willow flycatcher; and 1 candidate species: yellow-billed cuckoo. 55 special status species	
Cultural Resources	Cultural resource sites identified during pre-construction inventory would be avoided to the extent possible			No archaeological and historical sites would be disturbed under this alternative. No additional archaeological surveys or Native American consultation would be undertaken in a systematic study of these areas in the foreseeable future
	Twenty-two previously identified archaeological and historic sites have been documented. A low density of cultural resource sites is expected along a majority of the route.	Six previously identified archaeological and historic sites have been documented. However, due to proximity to the Santa Cruz River, a higher density of cultural resource sites is expected along the Central Corridor. No difference in site density is expected between Option 1 and 2.	Twenty-seven previously identified archaeological and historic sites have been documented. A low density of cultural resource sites is expected along a majority of the route, except along Peck Canyon, which is more likely to contain a high density of sites. No difference in site density is expected between Option 1 and 2.	
Native American	Tribal representatives have expressed opposition to all three proposed corridors.			

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Cultural Resources *(continued)*				
Consultations	Several tribes (Tohono O'Odham Nation, Gila River Indian Community, Ak-Chin Indian Community, Salt River Pima Maricopa Indian Community, Pascua Yaqui Tribe, and the Hopi Tribe) have stated that they value the landscape through which the Western Corridor passes and have expressed opposition to this corridor.	Several tribes (Ak-Chin Indian Community, Tohono O'Odham Nation, Gila River Indian Community, Salt River Pima Maricopa Indian Community and the Pascua Yaqui Tribe) stated that they would prefer that the project be constructed along the Central Corridor, if it was built at all. They view the Central Corridor as an already-disturbed area. None of the tribes wished to express approval of the project overall when stating this preference. The Hopi Tribe has expressed opposition to the Central Corridor because of the expected high density of important archaeological sites there.	Several tribes (Tohono O'Odham Nation and the Hopi Tribe) expressed specific opposition to this alternative during the public comment period on the Draft EIS. This corridor passes through portions of the landscape that have been identified as valued by several tribes. Tribal concerns have been stated regarding the unique portion of the Crossover Corridor.	Several tribes (Tohono O'Odham Nation and the Hopi Tribe) expressed specific support for this alternative during the public comment period on the Draft EIS.
Socioeconomics	Socioeconomic impacts would be similar for all corridors and corridor options. The proposed project would result in the creation of approximately 30 direct (construction) jobs, and approximately 31 indirect (service-related) jobs during construction. No influx of population or stress to community services would be expected because most of the jobs created would be filled by current residents. No adverse socioeconomic impacts would be expected from project operation.			No socioeconomic impacts associated with the project. Current socioeconomic trends would continue.

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Geology and Soils	No impact to geologic resource availability or mine tailings areas expected. The placement of poles and access roads would require some disturbance and removal of near-surface material. (See Land Use for estimates of areas disturbed). Structures on relatively intact shallow bedrock would be installed by rock bolting. Foundations for structures on unconsolidated alluvium probably would require direct embedment poles, requiring excavation of a large pit. Construction in alluvium containing large cobbles would require use of lean-concrete slurry for backfill of the pit because soils with large cobbles are difficult to compact adequately. Potential for ground failure exists in mountainous areas. Slope stability analysis for potential tower locations in mountainous areas would prevent slope failure. Low to moderate seismic risk would be considered in structure design.			No geologic or soils impacts associated with the project.
	There are limited areas of alluvium where direct embedment poles would be required, but steep terrain in the southern portion of the corridor increases potential for ground failure.	There are extensive areas of cobbly alluvium where direct embedment poles would be required, but relatively low relief reduces potential for ground failure. There are no meaningful differences in geology and soils between the Option 1 and 2 sub-routes.	There are limited areas of alluvium where direct embedment poles would be required, but rock bolting probably would be feasible in the unique portion of the Crossover Corridor. However, steep terrain in this section increases potential for ground failure. There are no meaningful differences in geology and soils between the Option 1 and 2 sub-routes.	
New roads on unconsolidated alluvium	Road construction on unconsolidated alluvium could cause soil erosion and compaction.			
On the CNF	Estimated 9 miles (15 km) of roads on unconsolidated alluvium.	Estimated 12 miles (19 km) of roads on unconsolidated alluvium.	Estimated 10 miles (16 km) of roads on unconsolidated alluvium.	
Prime farmland soils	All three proposed corridors cross soils considered to be prime farmland when irrigated. These soils would be spanned where feasible, and the total prime farmland soil converted to pole foundations would be less than 0.25 acres (0.1 ha).			

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Water Resources	No adverse impacts to groundwater or limited surface water resources. Construction activity that takes place within a jurisdictional water requires a Section 404 Permit from the U.S. Army Corps of Engineers (USACE); TEP would complete consultation with USACE for an applicability determination upon final selection of an alternative. For all alternatives, an estimated 1 acre-foot (1,233.5 cubic meter) of groundwater would be used during construction.			No water resource impacts associated with the project. Current water resource patterns would continue.
Floodplain Area Disturbed	Estimated 1.97 acres (0.80 ha) of 100-year floodplain, including the expansion of the South Substation, pole construction and laydown areas, and access roads.	Estimated 1.58 acres (0.64 ha) of 100-year floodplain, including the expansion of the South Substation, pole construction and laydown areas, and access roads.	Estimated 1.97 acres (0.80 ha) of 100-year floodplain including, the expansion of the South Substation, pole construction and laydown areas, and access roads. (same as Western Corridor).	
Large washes crossed	15	14	15	
Structures within a wash	1 in Sopori Wash, outside the normal flow line.	1 in Sopori Wash, outside the normal flow line.	1 in Sopori Wash, outside the normal flow line. Also 2 in the bottom of Peck Canyon	
Air Quality Construction	Temporary, localized fugitive dust emission impacts from construction activities would occur. A conformity review of the proposed project (required under Section 176[c] of the *Clean Air Act*) was conducted in accordance with EPA and DOE guidance. The review shows that the maximum year of construction project emissions of PM_{10} and CO for each alternative would be below the regulatory thresholds and below the regionally significant action level for carbon monoxide (CO). Specific results are as follows:			No impacts to air resources associated with the project. Current air quality trends would continue. Nogales, Arizona, within the proposed project vicinity, is not in attainment with the EPA's National Ambient Air Quality Standard (NAAQS) for PM_{10}.
PM_{10} in Nogales Non-attainment area	62 tons per year (tpy) (56 metric tpy[mtpy])	73 tpy (66 mtpy)	73 tpy (66 mtpy)	No PM_{10} emissions associated with the proposed project.
PM_{10} regulatory threshold	100 tpy (91 mtpy)	100 tpy (91 mtpy)	100 tpy (91 mtpy)	

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Air Quality *(continued)*				No CO emissions associated with the proposed project.
PM_{10} regionally significant action level	None	None	None	
CO in Tucson Maintenance area	24.2 tpy (21.9 mtpy)	24.2 tpy (21.9 mtpy)	24.2 tpy (21.9 mtpy)	
CO regulatory threshold	100 tpy (91 mtpy)	100 tpy (91 mtpy)	100 tpy (91 mtpy)	
CO regionally significant action level	11,866 tpy (10,765 mtpy)	11,866 tpy (10,765 mtpy)	11,866 tpy (10,765 mtpy)	
Operation	Impacts from operation and maintenance activities would be limited to dust from occasional access by TEP. Corona effects would generate less than 1 part per billion of ozone.			
Noise				No noise impacts would be associated with the project. Current noise patterns would continue, with background noise levels ranging from 30 to 60 decibels, depending on proximity to development and roads.
Construction	The primary effect of noise would be annoyance to the residents nearest to the ROW (see Land Use above) during construction and would be short-term.			
	Temporary construction noise increases would primarily impact residents in Sahuarita and Nogales and recreationalists.	Temporary construction noise increases would primarily impact residents in Sahuarita, Amado, Tubac, Tumacacori, and Nogales, and recreationalists.	Temporary construction noise increases would primarily impact residents in Sahuarita and Nogales and recreationalists (same as Western Corridor).	
Operation	Long-term noise from corona effect on transmission lines would generally be lost in background noise (ranging from 30 to 60 decibels, depending on proximity to residential areas and roads). Gateway and South Substations operational noise would be near background levels for the nearest receptors. (There are no residences within 0.5 mi [0.8 km] of either substation).			

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Human Health and Environment	EMF exposure at the nearest residences, schools, and commercial establishments would be well below 0.8 milligauss, the average daily exposure to maximum magnetic fields from some common household appliances. EMF exposure at the nearest residences (listed previously under Land Use) would be less than 10 percent of EMF exposure from common household appliances, and would decrease further at the nearest schools and commercial establishments. No health effects would be expected from this exposure. Corona effects (audible noise, radio and television interference, visible light, and photochemical reactions) would be minimal and would be mitigated using proper line design.			No EMF effects associated with the project. EMF exposure from existing transmission lines and household appliances would continue.
Infrastructure	The proposed project would increase electric transmission facilities, but would not otherwise affect existing infrastructure. Minimal municipal solid waste generated during construction and operation would be taken to appropriate landfill facilities. No hazardous waste would be generated from substation operation. Powerline reliability would increase.			No change to existing infrastructure. The unreliability of electricity in Nogales, Arizona would continue unless other transmission lines or power plants are built in the Nogales area.
Transportation	Short-term traffic disruptions on major roads such as Ruby Road could occur during construction. Where no access currently exists, new access ways would be required in coordination with land owners and managers, as follows:			Current traffic patterns and road use on the CNF would be expected to continue.
New roads (estimated)	No change to existing road density on the CNF. TEP would close 1.0 mi (1.6 km) of existing classified road for every 1.0 mi (1.6 km) of proposed new road to be used in the operation or long-term maintenance. Existing roads would be used for construction and maintenance access to the extent possible.	Same as Western, except that fewer new access roads would be required because a longer segment follows an existing utility (gas pipeline) ROW.	Same as Western.	
On CNF	20 mi (32 km)	14 mi (22 km) for Option 1. For Option 2, an additional 0.2 mi (0.34 km) of new roads would be built in an inventoried roadless area.	21 mi (33 km) for Option 1. For Option 2, an additional 0.2 mi (0.34 km) of new roads would be built in an inventoried roadless area.	
On BLM	0.9 mi (1.4 km)	Same as Western.	Same as Western.	

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Transportation (*continued*)				
Road Repairs and Upgrades	Spot repairs would be made to existing roads as needed.	Same as Western, except that extensive upgrades to existing pipeline access roads would be required.	Same as Western.	
On CNF	An estimated 95 locations on existing roads would require minor repairs or improvements.	An estimated 15 locations on existing roads would require minor repairs or improvements.	An estimated 98 locations on existing roads would require minor repairs or improvements.	
Helicopter Use	Helicopters would be used for stringing conductors, but are not expected to be used to bring in structures.	Same as Western.	Helicopters would be used for stringing conductors and to bring an estimated 20 to 25 structures to the Peck Canyon area.	
Traffic	Short-term traffic disruptions could occur during construction, particularly where a corridor crosses a major road such as Arivaca Road.			
Permanent Changes to Road System	Roads not required for long-term maintenance would be closed in coordination with land managers and owners.	Same as Western.	Same as Western.	

Table 2.3–1. Summary Comparison of Potential Environmental Effects of Alternatives *(continued)*

Resource	Western Corridor	Central Corridor	Crossover Corridor	No Action Alternative
Transportation (*continued*)				
On CNF	No net increase in road density. Roads not required for long-term maintenance would be closed, and the sites would be restored. For every mile of new road required for operation and maintenance of the project, TEP would close a mile of existing classified road. Roads required to remain open for project maintenance would be administratively closed, with restricted access.	Same as Western.	Same as Western.	
On BLM	0.9 mi (1.4 km) of additional roads.	Same as Western.	Same as Western.	
Environmental Justice	No disproportionately high and adverse impact to the minority or low-income populations.			Existing conditions would continue. No disproportionately high and adverse impact to the minority or low-income populations.

BA = Biological Assessment

BLM = Bureau of Land Management

CO = Carbon monoxide

CNF = Coronado National Forest

EMF = Electric and magnetic field

EPNG = El Paso Natural Gas Company

EPA = U.S. Environmental Protection Agency

ESA = *Endangered Species Act*

IRA = inventoried roadless area

MBTA = *Migratory Bird Treaty Act*

MIS = Management Indicator Species

PM_{10} = particulate matter with an aerodynamic diameter less than or equal to 10 microns

ROS = Recreation Opportunity Spectrum

ROW = right-of-way

TCP = Traditional Cultural Property

TEP = Tucson Electric Power Company

USFS = U.S. Forest Service

The data presented in this Table for both the Crossover Corridor and the Central Corridor are based on Option 1, the sub-route that avoids the 1.9 mi (3.1 km) stretch of the existing utility corridor that is designated as an IRA. Any potential differences between the sub-routes are noted. For most resource areas (visual, socioeconomics, water, air quality, noise, human health, infrastructure, and environmental justice), no potential for differences in impacts between Options 1 and 2 has been identified

Existing Conditions: Central Corridor crossing of Ruby Road looking westbound.

Visual Simulation: Depicting dulled galvanized lattice towers.

Visual Simulation 12:
Central Corridor Crossing of Ruby Road.

Wide-open view of the Central Corridor from a Concern Level 1 travelway.

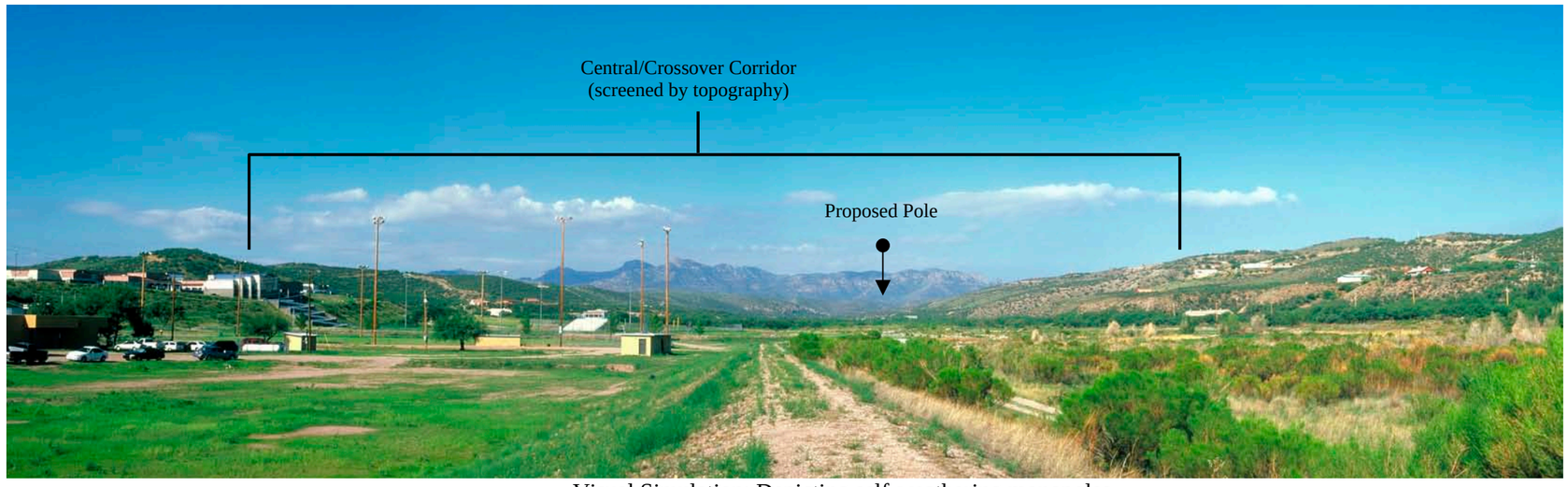
Direction: Southwest
Distance to Nearest Pole: 0.2 mi

Existing Conditions: Peck Canyon west of I-19 north of San Cayetano Elementary School.

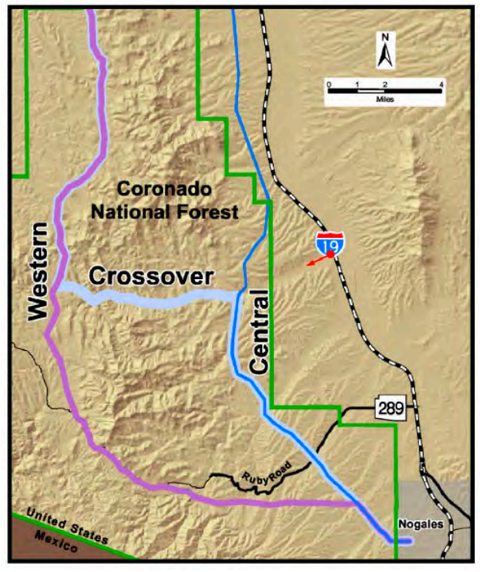
Visual Simulation 13:
Central or Crossover Corridor from Peck Canyon at I-19.

An example, partially blocked view of the Central Corridor from a Concern Level 1 travelway.

Direction: Southwest
Distance to Nearest Pole: 3.6 mi



Visual Simulation: Depicting self-weathering monopoles.



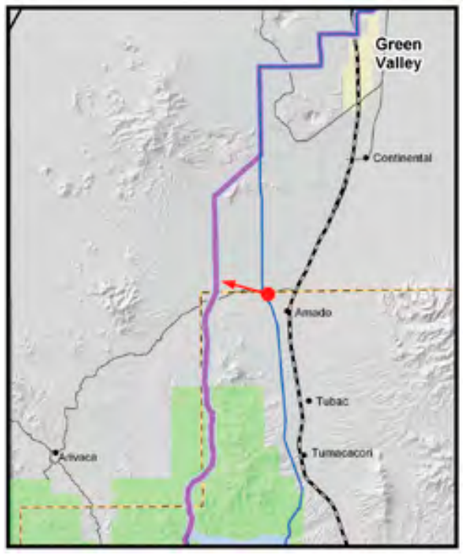
Existing Conditions: Central Corridor crossing site of Arivaca Road.

Visual Simulation 14:
Central Corridor Crossing Arivaca Road.

An example, wide-open view of the Central Corridor crossing Arivaca Road, north of the Coronado National Forest.

Direction: Northwest
Distance to Nearest Pole: 0.1 mi

Visual Simulation: Depicting self-weathering monopoles.



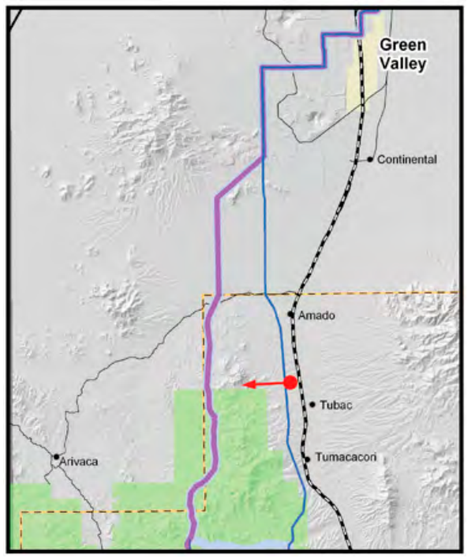
Existing Conditions: Northwest of Tubac, looking west.

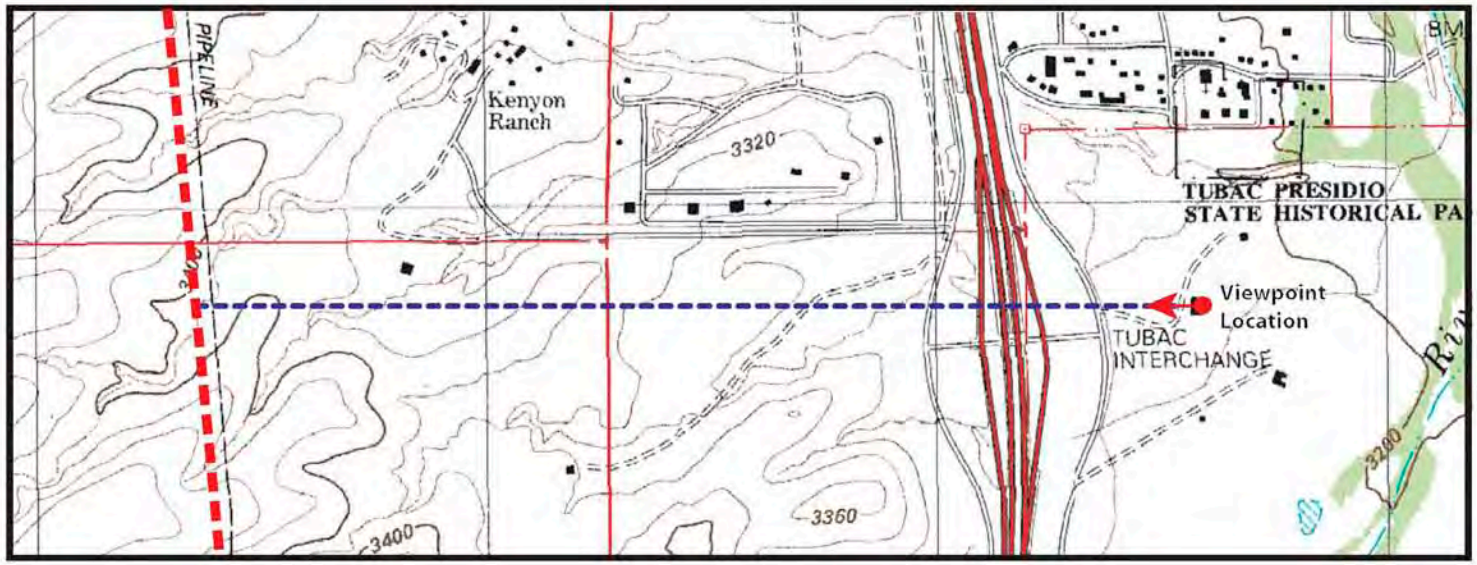
Visual Simulation 15:
Central Corridor Northwest of Tubac.

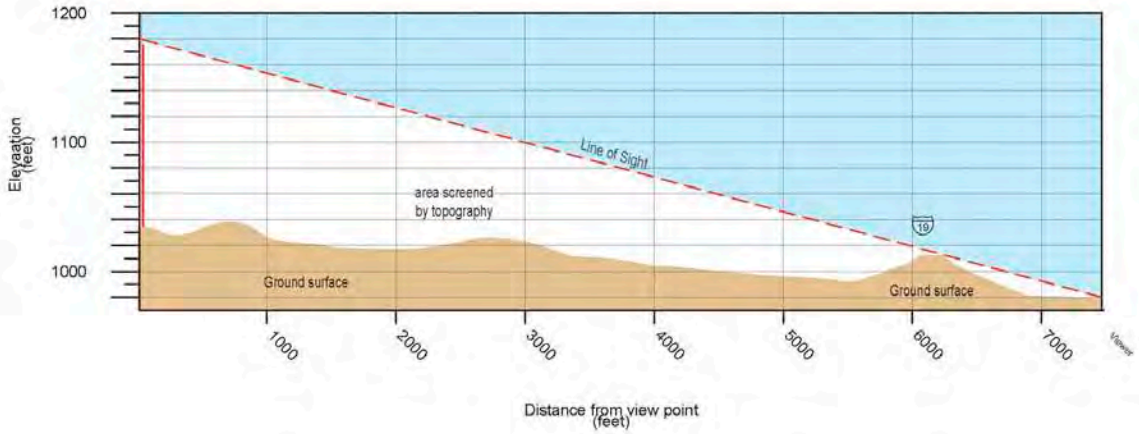
An example, wide-open view of the Central Corridor from the Burro Inn, with a partial backdrop of mountains.

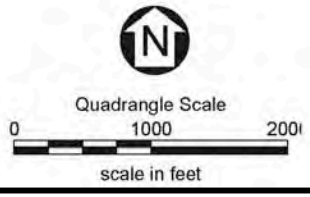
Direction: West
Distance to Nearest Pole: 0.1 mi

Visual Simulation: Depicting self-weathering monopoles.





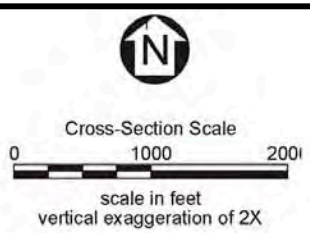




Visual Simulation 16: Example of partial terrain shielding along Central Corridor.

This topographic map and graph show that the Central Corridor would be mostly screened from view by topography from the Barrio de Tubac subdivision east of I-19.

Direction: West
Distance to Nearest Pole: 1.4 mi



Existing Conditions: Looking southwest near Piedra Drive in Tubac.

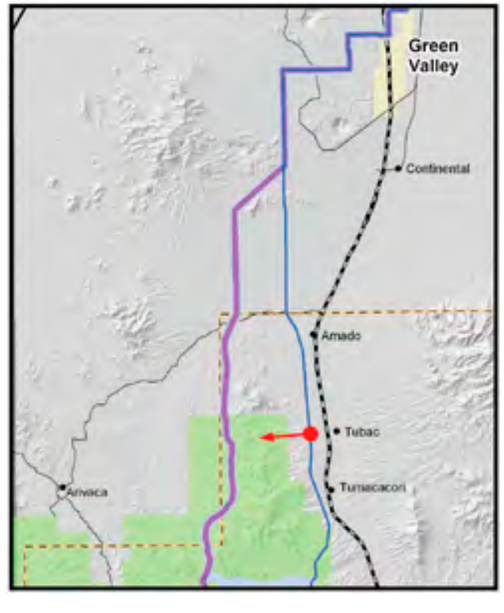
Visual Simulation Without Mitigation: Depicting lattice towers.

Visual Simulation With Proposed Mitigation: Depicting self-weathering monopoles.

Visual Simulation 17:
Central Corridor near Piedra Drive in Tubac.

An example, wide-open view of the Central Corridor in Tubac, west of I-19. The simulation without mitigation shows the overbearing structural look of lattice towers. The simulation with mitigation shows the simpler monopoles with a self-weathering finish.

Direction: West
Distance to Nearest Pole: 0.02 mi

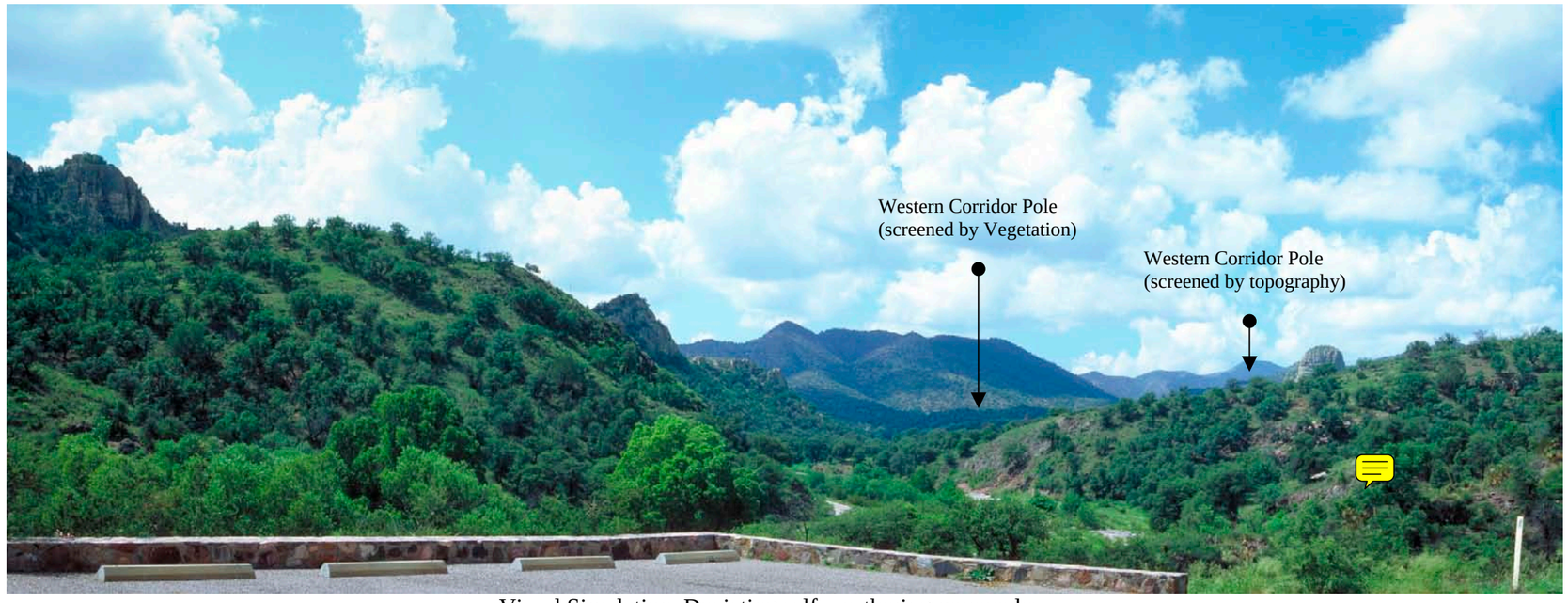


Existing Conditions: View from Upper Thumb Picnic Area looking down Peña Blanca Canyon towards Castle Rock.

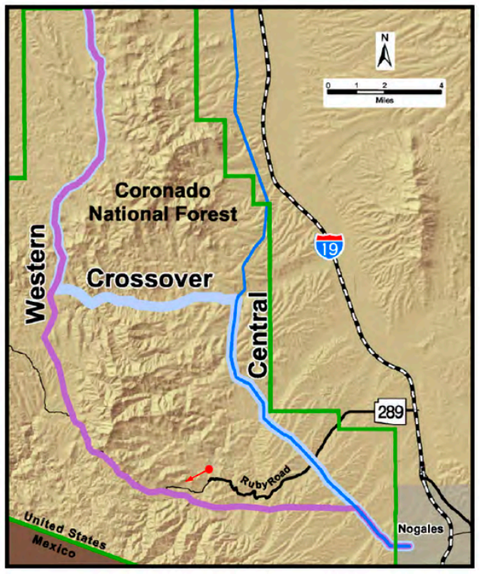
Visual Simulation 1:
Western Corridor from Upper Thumb Picnic Area at Peña Blanca Lake Recreation Area.

An example, partially-blocked view of the Western Corridor from a Concern Level 1 travelway.

Direction: Southwest
Distance to Nearest Pole: 1.2 mi



Visual Simulation: Depicting self-weathering monopoles.

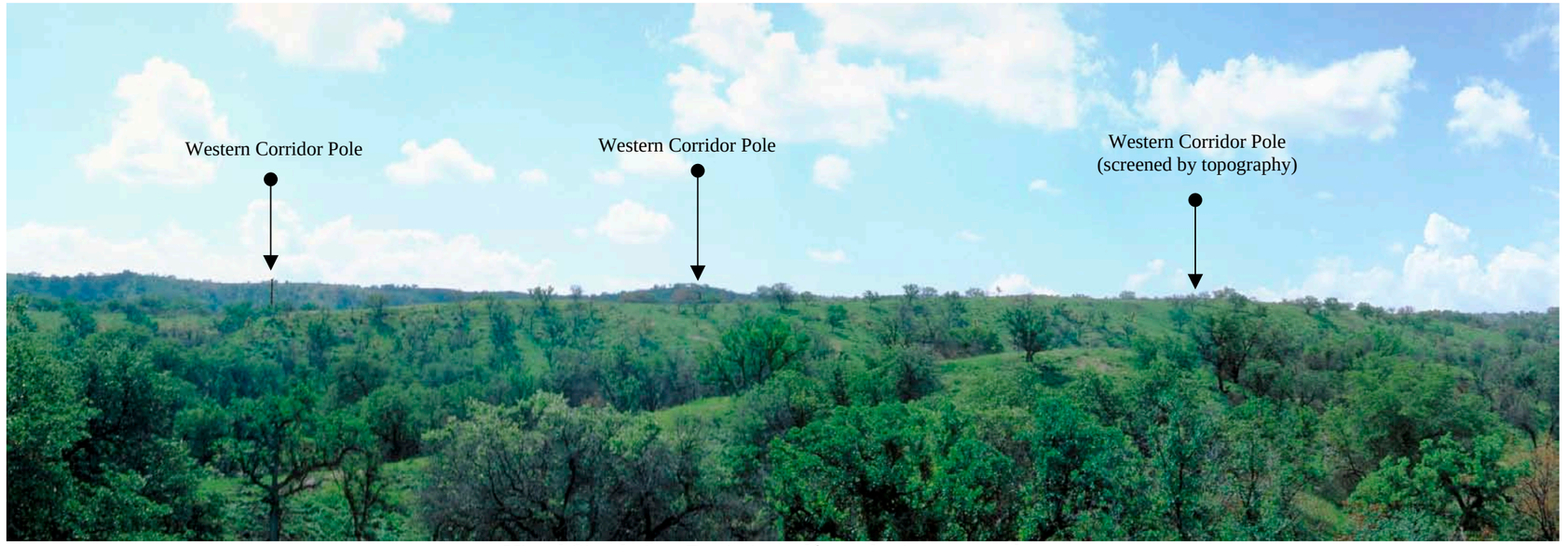


Existing Conditions: View from Ruby Road west of the Calabasas Group Area.

Visual Simulation 2:
Western Corridor from Ruby Road west of the Calabasas Group Area.

An example, partially-blocked view of the Western Corridor from a Concern Level 1 travelway.

Direction: South
Distance to Nearest Pole: 0.4 mi



Visual Simulation: Depicting self-weathering monopoles.

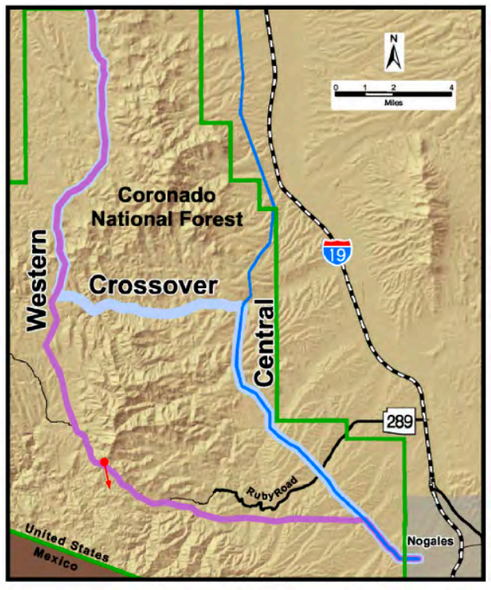
Existing Conditions: View looking southwest along Ruby Road, north of the Pajarita Wilderness.

Visual Simulation: Depicting self-weathering monopoles.

Visual Simulation 3: Western Corridor along Ruby Road north of Pajarita Wilderness.

An example, wide-open view of the Western Corridor from a Concern Level 1 travelway.

Direction: Southeast
Distance to Nearest Pole: .01 mi



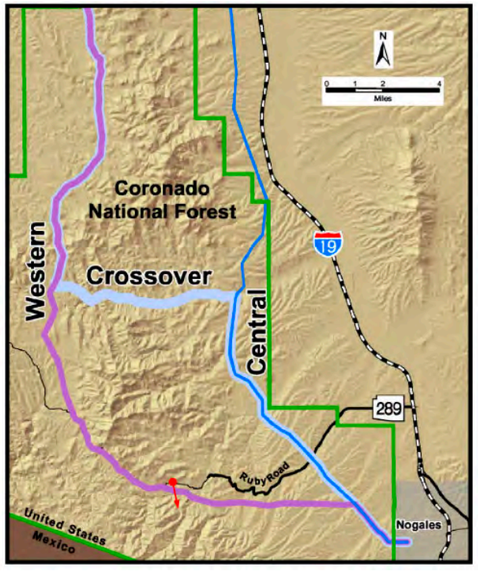
Existing Conditions: View from Ruby Road toward Castle Rock.

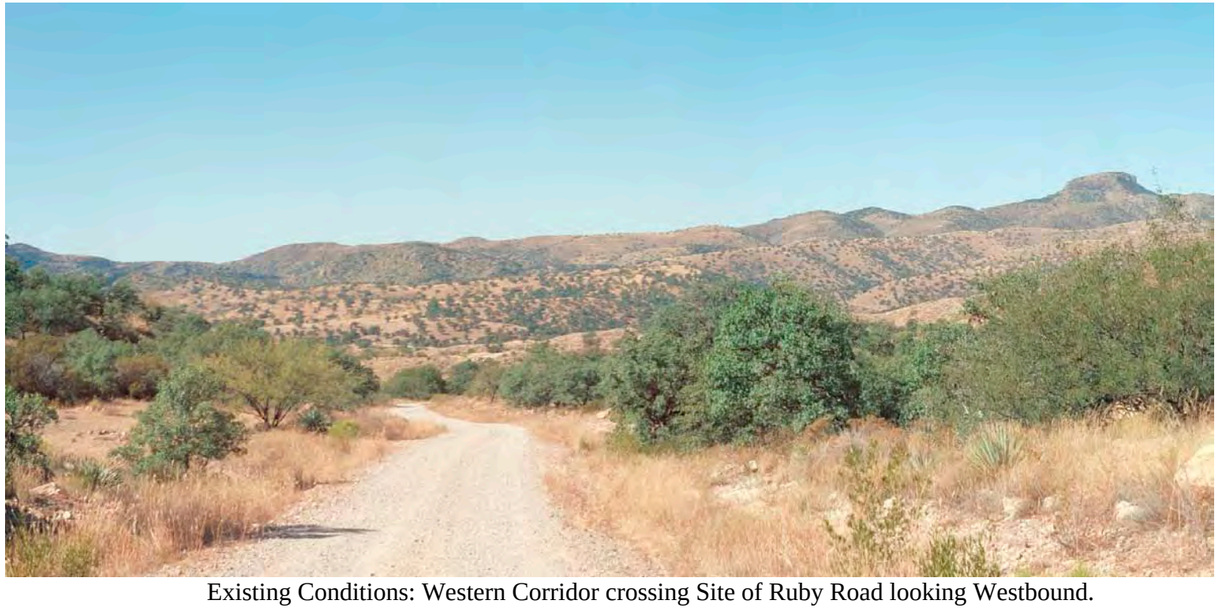
Visual Simulation: Depicting self-weathering monopoles.

Visual Simulation 4:
Western Corridor and Castle Rock from Ruby Road.

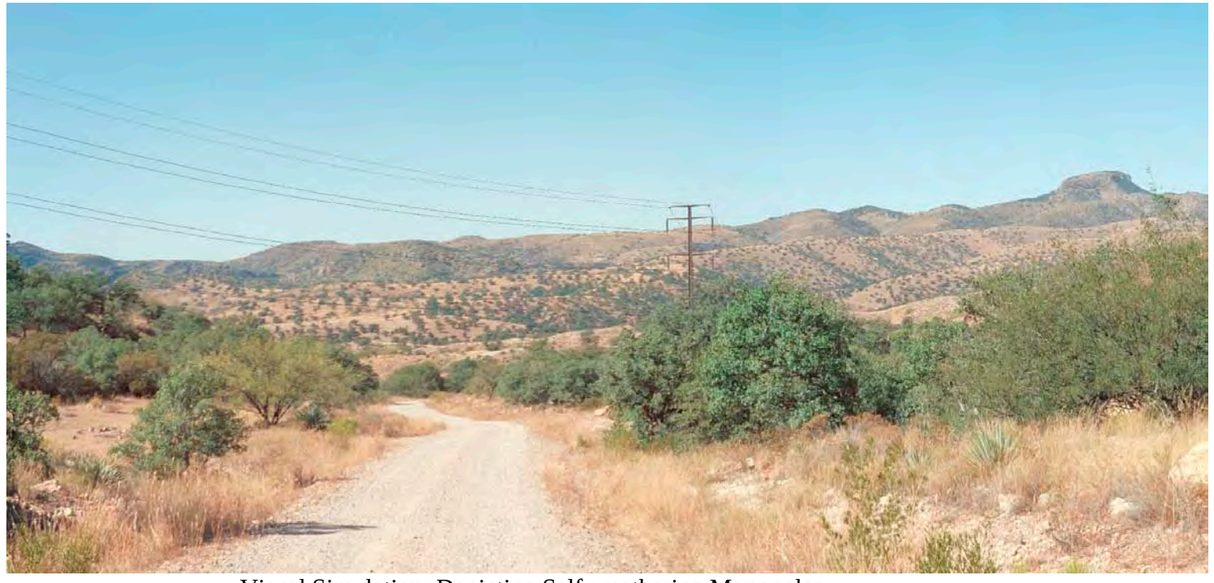
An example, partially-blocked view of the Western Corridor from a Concern Level 1 travelway.

Direction: Southeast
Distance to Nearest Pole: 0.4 mi





Existing Conditions: Western Corridor crossing Site of Ruby Road looking Westbound.

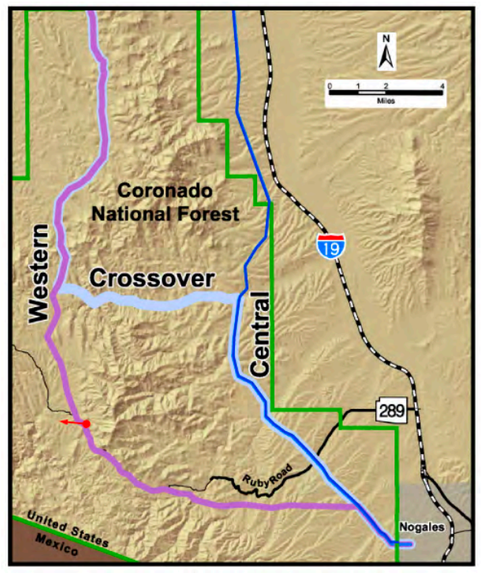


Visual Simulation: Depicting Self-weathering Monopoles.

Visual Simulation 5:
Western Corridor Crossing Ruby Road.

An example, wide-open view of the Western Corridor from a Concern Level 1 travelway.

Direction: West
Distance to Nearest Pole: 0.06 mi

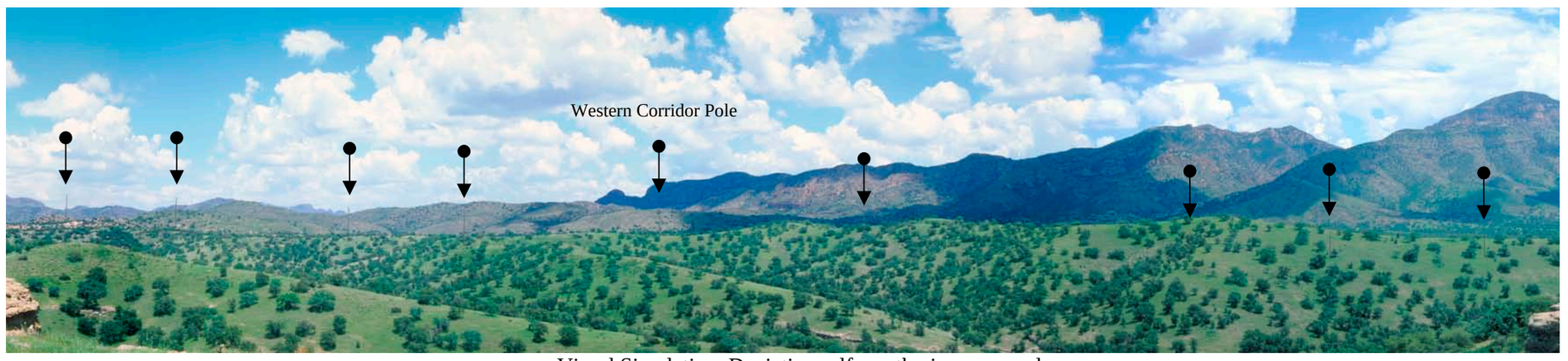


Existing Conditions: View from Ruby Road looking northeast along the west side of the Tumacacori Mountains.

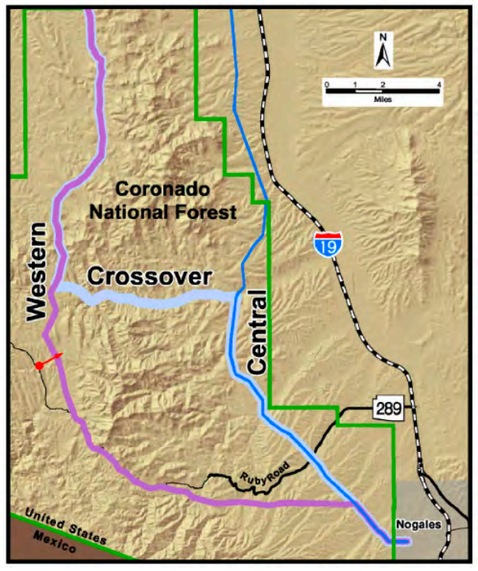
Visual Simulation 6: Western Corridor from Ruby Road west of the Tumacacori Mountains.

An example, wide-open view of the Western Corridor from a Concern Level 1 travelway.

Direction: Northeast
Distance to Nearest Pole: 0.8 mi



Visual Simulation: Depicting self-weathering monopoles.



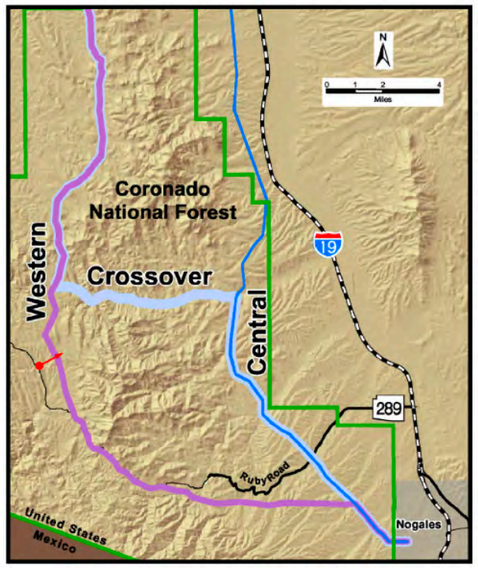
Existing Conditions: View from Ruby Road looking northeast along the west side of the Tumacacori Mountains.

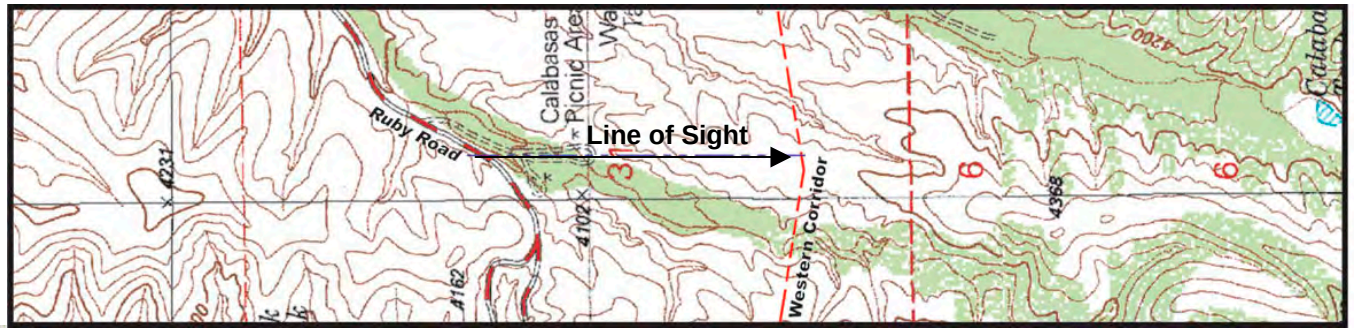
Visual Simulation 7:
Western Corridor from Ruby Road west of the Tumacacori Mountains.

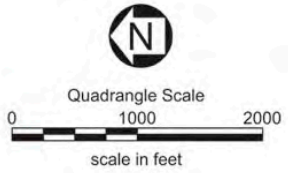
An example, wide-open view of the Western Corridor from a Concern Level 1 travelway.

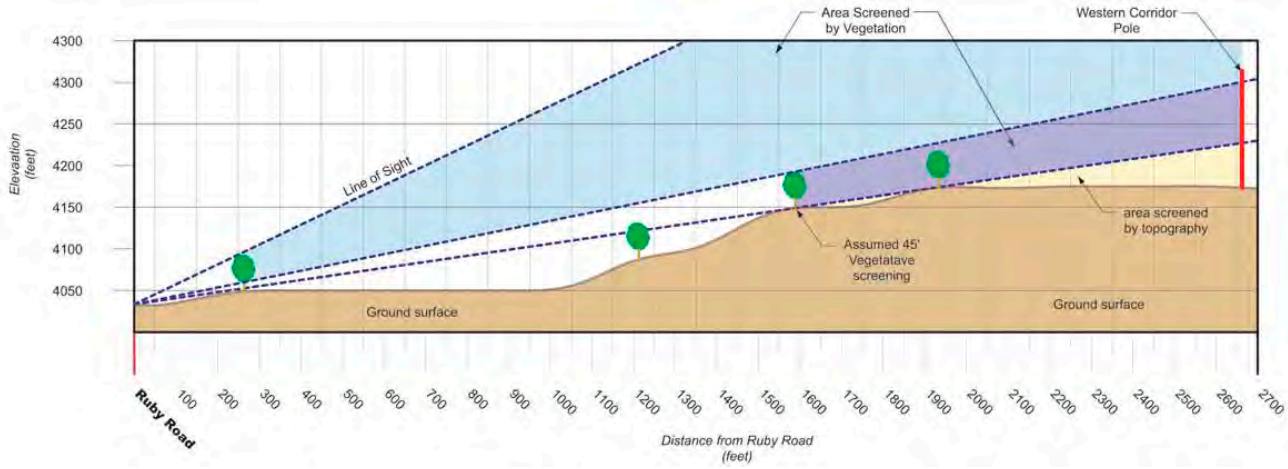
Direction: Northeast
Distance to Nearest Pole: 0.8 mi

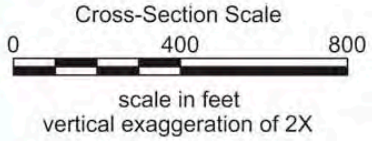
Visual Simulation: Depicting dulled galvanized lattice towers with access roads required for this type of structure.











Visual Simulation 8: Example of terrain and vegetation shielding along Western Corridor.

This topographic map and graph show that the Western Corridor would be mostly screened from view by topography and vegetation for viewers on Ruby Road looking towards the Calabasas Group Area.

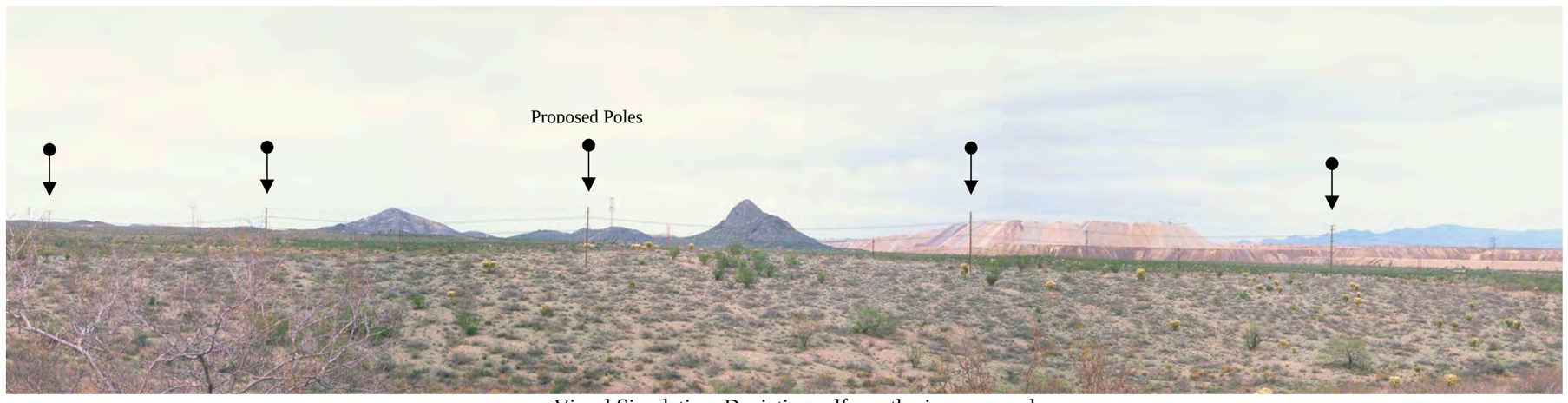
Direction: South
Distance to Nearest Pole: 3.6 mi

Existing Conditions: View of existing transmission lines on BLM land.

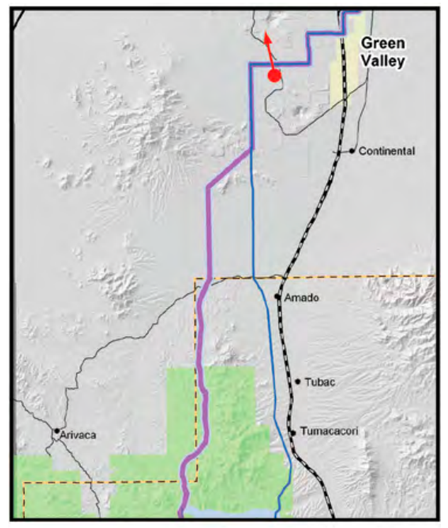
Visual Simulation 9:
All Three Corridors on BLM Land.

An example, wide-open view of a common segment of the Western, Central, and Crossover Corridors, adjacent to existing transmission lines near Mission Road.

Direction: Northwest
Distance to Nearest Pole: 0.4 mi



Visual Simulation: Depicting self-weathering monopoles.



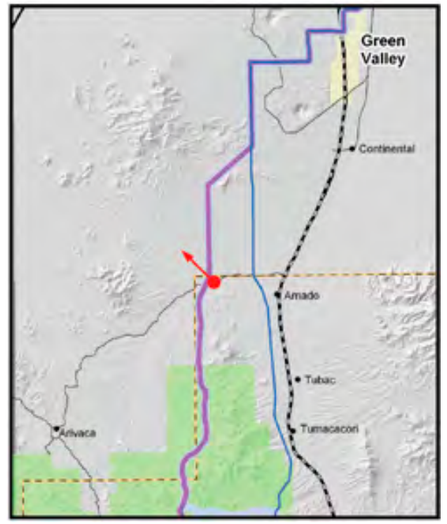
Existing Conditions: Western and Crossover Corridor crossing site of Arivaca Road.

Visual Simulation 10: Western and Crossover Corridor Crossing Arivaca Road.

An example, wide-open view of the Western Corridor crossing Arivaca, north of the Coronado National Forest.

Direction: Northwest
Distance to Nearest Pole: 0.1 mi

Visual Simulation: Depicting self-weathering monopoles.



Existing Conditions: Central Corridor crossing of Ruby Road looking westbound.

Visual Simulation: Depicting self-weathering monopoles.

Visual Simulation 11:
Central Corridor Crossing of Ruby Road.

Wide-open view of the Central Corridor from a Concern Level 1 travelway.

Direction: Southwest
Distance to Nearest Pole: 0.2 mi