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Environmental Assessment Youngs Canyon to Mormon Lake Substation 69kV Sub-Transmission Line Project

Coconino National Forest



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CHAPTER 1: PURPOSE AND NEED

Document Structure

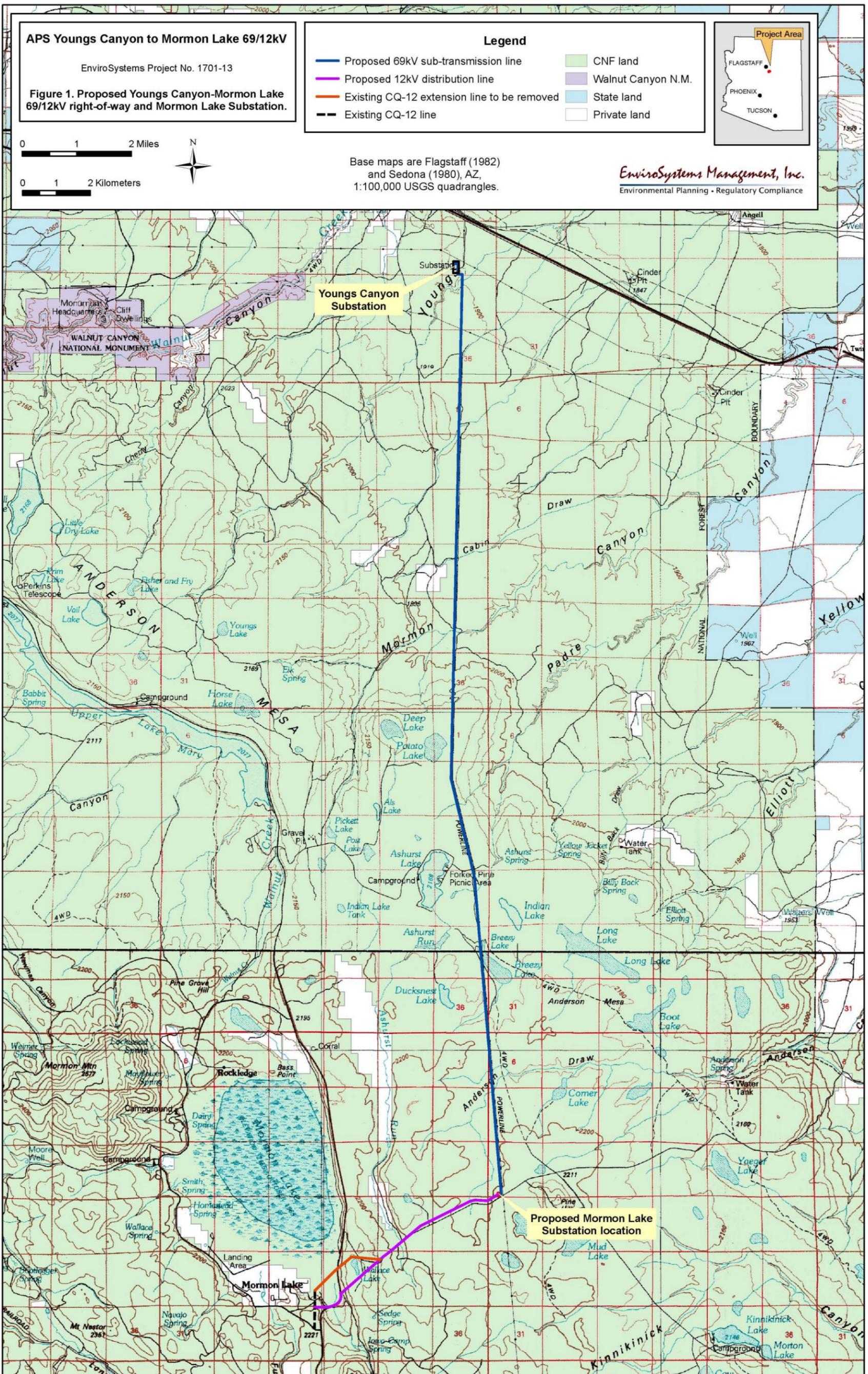
This Environmental Assessment (EA) has been prepared in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA discloses the direct, indirect, and cumulative environmental impacts that would result from the Proposed Action and alternatives. The document is organized into the following chapters:

- Purpose and Need: includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.
- Alternatives: provides a more detailed description of the agency's Proposed Action as well as the No Action Alternative and alternatives considered but dismissed from further analysis. This discussion also includes mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.
- Affected Environment and Environmental Consequences: describes the environmental effects of implementing the Proposed Action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation and comparison of the Proposed Action that follows.
- Consultation and Coordination: provides a list of agencies consulted and/or contacted during the development of the EA.
- List of Preparers: lists those persons who assisted in the preparation of this document.
- Appendices: provide more detailed information to support the analyses presented in the EA. The appendices include a vegetation management corridor plan, construction implementation plan, and table of cumulative events.

Background

The Coconino National Forest (COF) is proposing to issue a permit that would allow Arizona Public Service Company (APS) to construct, operate, and maintain a new 69kV sub-transmission line, substation, and 12kV distribution line on the Flagstaff Ranger District of the Coconino National Forest (COF) approximately 12 miles southeast of Flagstaff, Coconino County, Arizona (Figure 1).

- The proposed 69kV sub-transmission line would extend between the existing Youngs Canyon Substation southeast of Winona and a proposed Mormon Lake Substation east of Mormon Lake, a distance of approximately 17.36 miles on COF land.
- The proposed sub-transmission line would not cross private or State land.
- A 4.2-mile-long 12kV extension would be built westward from the proposed Mormon Lake Substation to an existing 12kV feeder, CQ-12, south of Mormon Lake.
- The proposed 12kV distribution line would be constructed partially aboveground (3.67 miles) and belowground (0.45 miles). In the southernmost portion of the proposed alignment near Forest Road (FR) 125 and crossing the Mormon Lake meadow, the existing 1.5-mile-long aboveground CQ-12 Extension to Flying M Ranch 12kV distribution line would be removed.



- The proposed 69kV sub-transmission line would require a 60-foot-wide right-of-way (ROW) and would parallel a Western Area Power Administration (Western) 345kV transmission line for its extent.
- The new westward 12kV distribution line would require a 20-foot-wide ROW.

The project has been carefully designed to avoid or mitigate environmental effects.

Project Location

The proposed project is located entirely on COF land located in Sections 24, 25, and 36 of T21N, R9E; Sections 1, 12, 13, 24, 25, and 36 of T20N, R9E; Sections 1, 12, 13, 24, 25, and 36 T19N, R9E; Section 1 of T18N, R9E; Sections 6, 7, 18, and 19 of T18N, R10E; and Sections 24, 23, 26, 27, 34, and 33 of T18N, R9E, G&SRM as depicted on the Winona (1991), Ashurst Lake (1991), and Mormon Lake (1991) Arizona, 1:100,000 USGS quadrangles (Figure 1). The proposed Mormon Lake Substation would be located in the southwest $\frac{1}{4}$ of Section 18 of T18N, R10E, G&SRM.

Elevations range from 6,178 to 7,362 feet above mean sea level (amsl) in the project area within the Colorado Plateau physiographic province (Cordell 1984). Major topographical features along the corridor route include Youngs Canyon to the north, Anderson Mesa in the central portion, and Ashurst and Mormon Lakes at the southern end. The project corridor along the Western 345kV transmission line lies largely within pinyon-juniper woodland and grassland (Figures 3-4). On north-facing slopes of Anderson Mesa and near FR 125, the project corridor transitions into ponderosa pine woodland.

Purpose and Need for Action

Existing Conditions

The existing CQ-12 distribution line extends 45 miles along Forest Highway (FH) 3, also known as Lake Mary Road, to Happy Jack. Voltage Range A (a low voltage class) states that the minimum voltage below 114V is not acceptable when nominal voltage is 120V. The customers' voltage range was reported below 114V at the end-of-line. Voltage in the Mormon Lake area and at the communications sites on Mormon Mountain falls below Class A, and the end-of-line voltage falls below 108V even with three existing voltage regulators in series. Lowell Observatory's Discovery Channel Telescope, a \$53 million project, is at the end of the CQ-12 line in Happy Jack. The telescope is the fifth largest in the continental United States. Due to the long feeder and small conductor, the impedance (a measure of the apparent resistance posed by an electrical circuit to an alternating current) between the substation and the end of the feeder line is very large. Because of this large impedance, when the air conditioner is started at the telescope, there is a 10 percent voltage drop. This drop causes problems at the facility and for other customers in the vicinity, such as poor efficiency and wasted energy, erratic power, and damage to equipment. Future load growth in the area would aggravate the current voltage problems and likely cause overloads.

Desired Conditions

APS and its customers along the CQ-12 line, including Lowell Observatory's Discovery Channel Telescope and the communities of Happy Jack and Mormon Lake, desire improved electrical power. This project would allow APS to meet the National Energy Policy requirements for consistent power for current and future users and allow the Forest Service to move toward the

Coconino National Forest Plan objectives, specifically the need to improve local reliable power. If there is no action taken, the end of line voltages would continue to suffer and violate ANSI Standard C84.1-2006 and a key customer, Discovery Channel Telescope, and surrounding loads would continue to experience voltage flicker problems. During the public scoping process, a longtime resident to the Mormon Lake area expressed support as he has “endured frequent power outages and marginal transmission quality.”

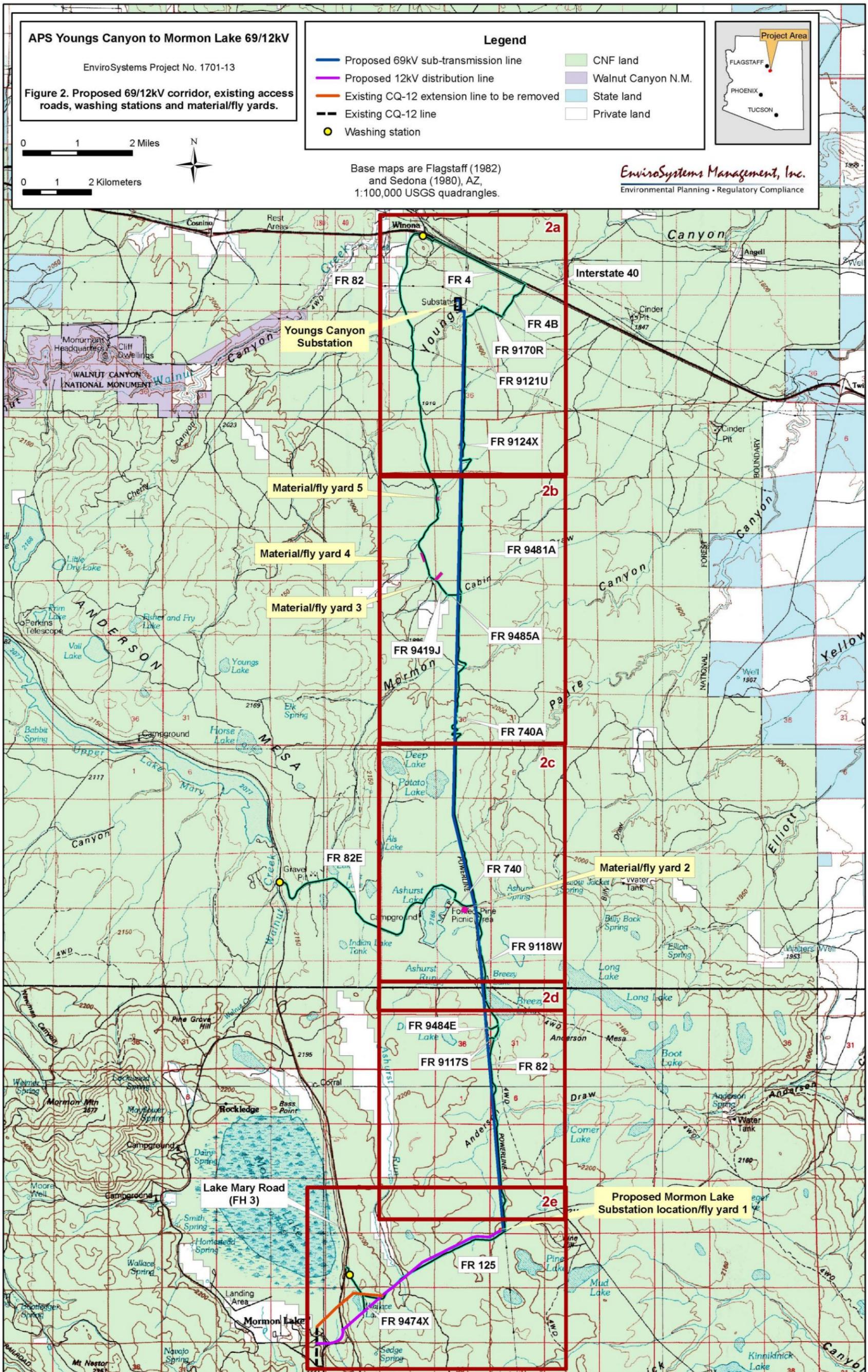
The proposed Mormon Lake Substation and connecting 69kV and 12kV lines would correct the low voltage and voltage drop problems at the telescope and in the Happy Jack and Mormon Lake communities. The peak load on CQ-12 was 11.8 Mega Volt Amperes (MVA) in January 2013. The load on the Mormon Lake Substation would be approximately 2 MVA. Because of the location of the proposed Mormon Lake Substation, it would be closer to the loads and would inherit 2 MVA of the excessive load that is currently on CQ-12. CQ-12 extends 45 miles to the Discovery Channel Telescope, which is located near the end-of-line. As it stands, the source cannot correct a problem, should one arise.

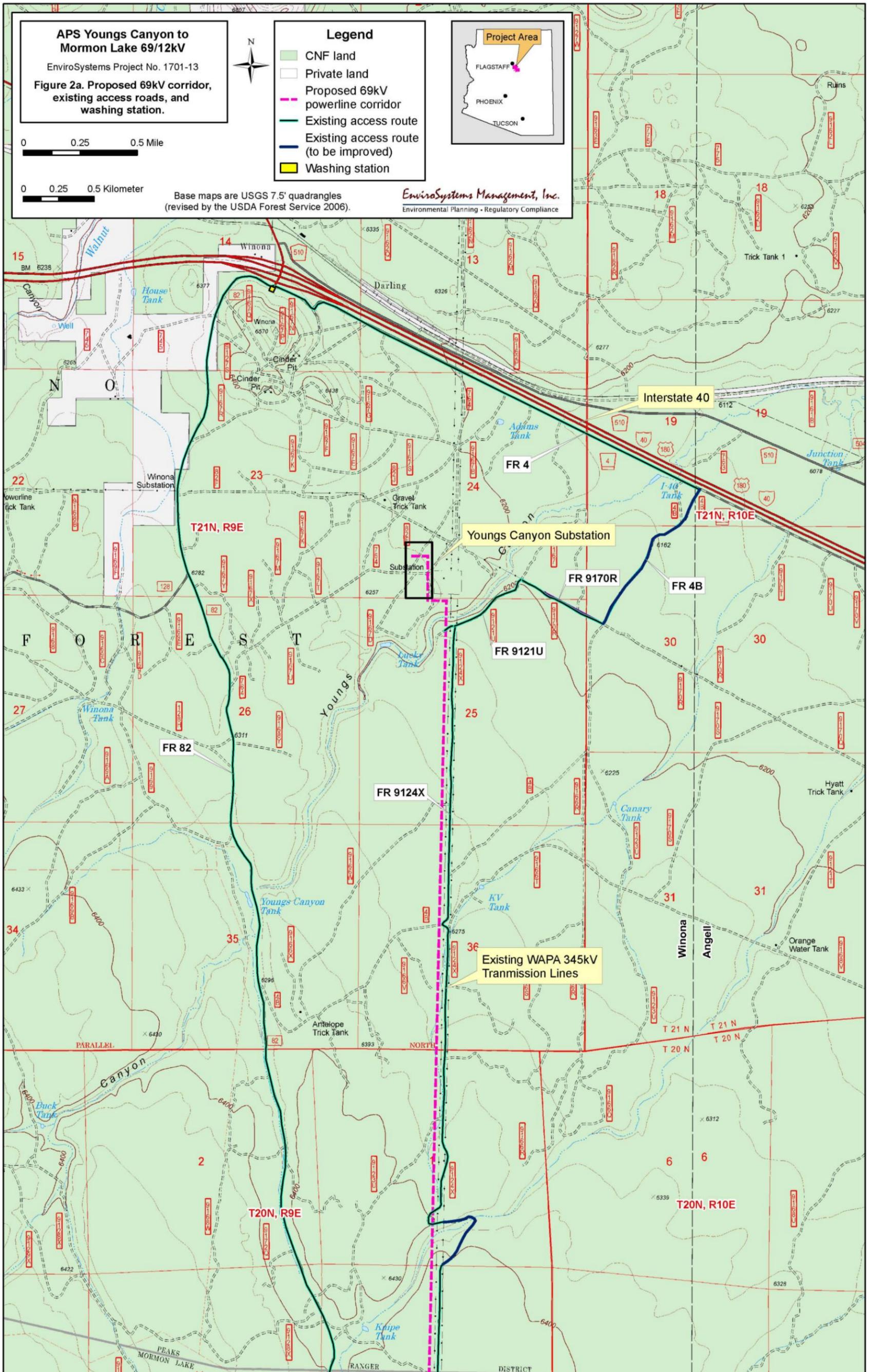
The COF Land and Resource Management Plan (Forest Plan; USDA 1987, page 24) identifies the need to manage special uses such as power lines on COF land with the goal to “administer special uses to best meet public needs.” The Forest Plan also discusses the importance of minimizing the development of utility corridors on COF land to protect forest values with the goal to “minimize the number of electronic sites and utility corridors consistent with appropriate public services that can only be met on Forest lands.” This project adheres to these Forest Plan objectives.

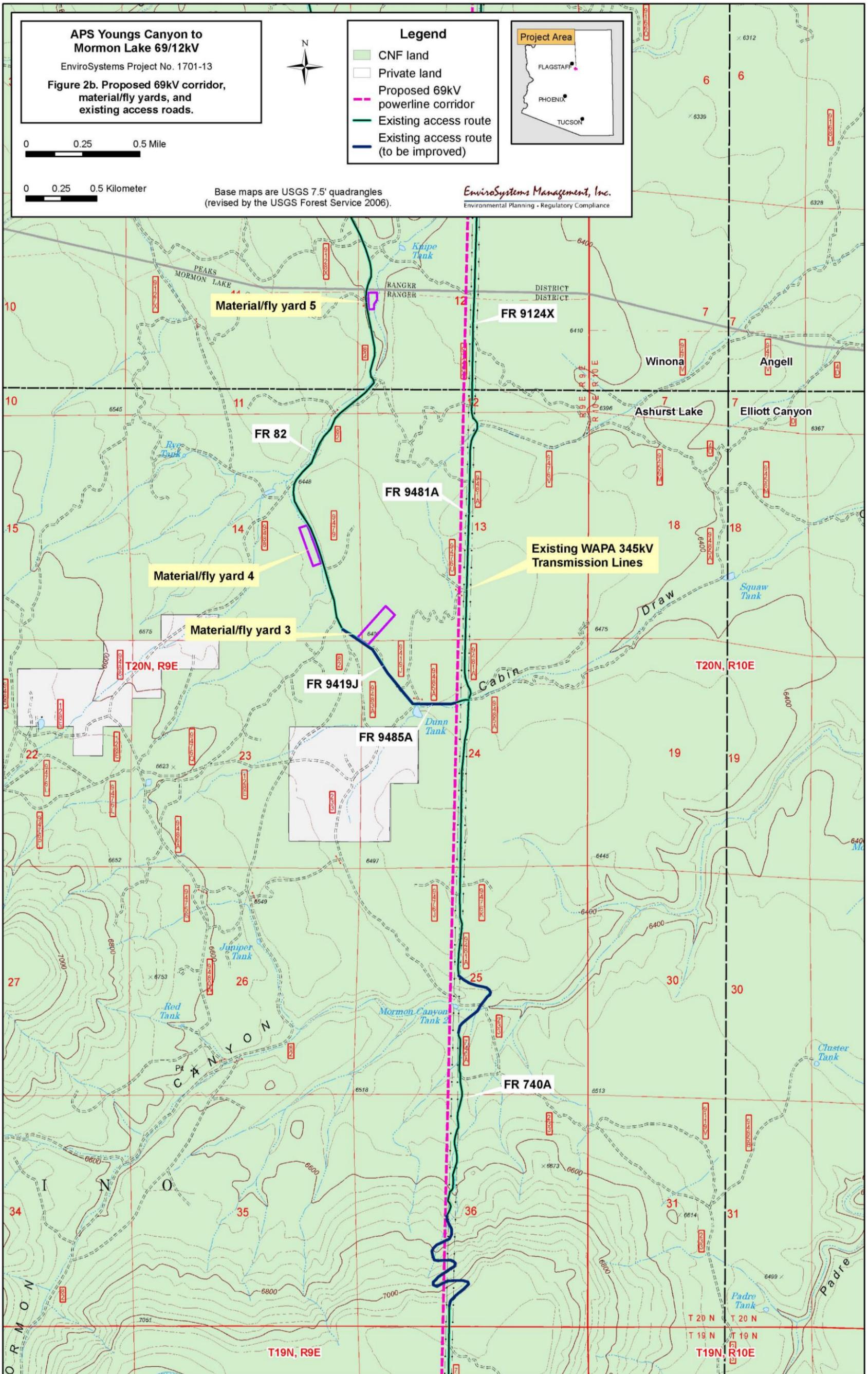
Proposed Action

The Proposed Action has been carefully designed to avoid or mitigate environmental effects. The major components of the Proposed Action (Figure 2), presented in more detail in Figures 2a-2e, are as follows:

1. Construct a 69kV sub-transmission line (with a 60-foot-wide ROW) with self-weathering, dark brown, steel poles for a total length of 17.36 miles on COF land adjacent to the Western 345kV transmission line ROW (Figures 3-4). An example of a similar pole is shown in Figure 5.
2. Construct the Mormon Lake Substation on 2.06 acres at the junction of FR 125 and the existing Western 345kV transmission line corridor (Figure 1).
3. Construct a 12kV distribution line (with a 20-foot-wide ROW) and accompanying access road aboveground from the proposed Mormon Lake Substation southwestward to FH 3 (Lake Mary Road) on 3.67 miles of COF land. Post-construction, permanent road access would be along FR 125.
4. Construct a 12kV distribution line (with a 20-foot-wide ROW) and accompanying access road belowground from east of FH 3 westward on 0.4 miles of COF land.
5. Construct a 12kV distribution line (with a 20-foot-wide ROW) and accompanying access road aboveground from just west of FH 3 westward to the existing CQ-12 distribution line on 0.2 miles of COF land.
6. Remove the existing 1.44-mile overhead CQ-12 Extension to Flying M Ranch 12kV distribution line from near the Flying M Ranch east of FH 3 to its intersection with the existing CQ-12 distribution line near the COF Mormon Lake Guard Station.
7. Use existing roads to access the ROW for the proposed 69kV sub-transmission line. A total of approximately 5.4 miles of existing roads located outside of the project ROW may require improvement to a maximum width of 12 feet (shown in Figures 2b - 2e).







8. Use five temporary material/equipment storage areas on COF land for equipment staging and helicopter landing throughout the construction phase (18 to 24 months). Helicopter work is expected to take approximately four weeks, but is largely dependent on weather conditions. The sizes of the five material/equipment storage areas are as follows: 1) 300 feet by 300 feet, 2) 600 feet by 600 feet, 3) 930 feet by 300 feet, 4) 950 feet by 200 feet, and 5) 390 feet by 200 feet. Fly/material yard No. 1 would be the location of the proposed Mormon Lake Substation and would be part of the 2.06 acres permanently disturbed as described in #2. Figures 2a-2e show the locations of the proposed material/fly yard storage areas. The staging areas would decrease in size as the poles are set. These areas would be restored following construction.



Figure 3. Existing Western 345-kV Transmission Line in pinyon-juniper woodland north of Anderson Mesa extending toward existing Youngs Canyon Substation.

9. Construct three temporary vehicle/equipment washing stations in existing disturbed areas at the junctions of paved FH 3 and FR 82E (75 feet by 35 feet), FH 3 and FR 125 (65 feet by 25 feet), and paved FR 82 and FR 4 (100 feet by 10 feet) just south of Interstate 40. Table 1 summarizes line construction and removal. Washing station restoration following construction would occur, if needed, due to repeated heavy truck traffic (locations shown in Figure 2).
10. Permitted vehicles can access in the utility corridor for maintenance activities. The USFS Travel Management Rule allows access for the permittee only, but not public travel.
11. During construction of the sub-transmission line and distribution line, vegetation clearing and trimming would occur at the site of the Mormon Lake Substation, along approximately 12.5 miles of the 17.36 mile 60-foot-wide 69kV sub-transmission line, and along 3.1 miles of the 20-foot-wide 12kV distribution line ROW (for a total of 101.93 acres) to remove vegetation that would interfere with the construction, operation, and maintenance of the proposed lines. Approximately 4.86 miles of the 69kV sub-transmission line runs



Figure 4. Existing Western 345-kV Transmission Line extending across grassland on Anderson Mesa.

through montane grassland atop Anderson Mesa, and vegetation clearing is not necessary throughout this portion unless any juniper or other taller growing vegetation is within 10-feet of pole locations or has potential to grow into the span of the line.

12. Removal of mature vegetation under or near the conductors would be done to provide adequate electrical clearance to reduce the risk of vegetation related outages as required by National Electrical Safety Code.
13. APS would perform routine maintenance, which includes mechanical mowing and/or manual cutting using hand tools and chain saws, on the clearing and trimming corridors approximately every five to ten years.
14. All vegetation that is removed (via clearing or trimming) would be lopped and scattered within the project corridor. For mowing operations, vegetation would be mulched by the mower and broadcast across the ROW to a maximum depth of three inches.



Figure 5. An example of a 69 kV steel pole.

Table 1. Summary of 69kV Sub-Transmission and 12kV Distribution Line Construction and Removal.

DESCRIPTION OF PROJECT SEGMENT	LENGTH (MILES)
69kV Proposed sub-transmission line to be built aboveground	17.36
12kV Proposed distribution line to be built aboveground	3.11
12kV Proposed distribution line to be built-in-place aboveground	0.56
12kV Proposed distribution line to be built underground	0.45
12kV Existing distribution line to be removed	1.44

Implementation of the Proposed Action would permanently impact 101.93 acres (includes vegetation clearing in wooded ROWs; access road improvements; and 69kV pole location sites) and temporarily impact 36.56 acres (includes 60-foot by 60-foot area around each 69kV pole location; 10-foot by 10-foot area around each 12kV pole to be constructed; five equipment/material storage areas; and three washing stations). Table 2 summarizes permanent and temporary impacts and the corresponding size of the area impacted. In addition to the aforementioned line construction and removal, the Mormon Lake Substation is another permanent impact, affecting 2.06 acres. Figure 6 shows a substation similar to that of the Proposed Action.

Table 2. Summary of Permanent and Temporary Impacts under the Proposed Action.

TYPE OF IMPACT	SIZE OF AREA IMPACTED
PERMANENT IMPACTS	
Vegetation clearing in wooded areas	98.45 acres (90.91 for 69kV & 7.54 for 12kV)
Access road improvement	1.31 acres, 5.4 miles x 2' wide
69kV pole locations	0.09 acre (total for all poles)
12kV pole locations	0.018 acre (total for all poles)

TYPE OF IMPACT	SIZE OF AREA IMPACTED
Mormon Lake Substation	2.06 acres
Total permanent disturbance	101.93 acres
TEMPORARY IMPACTS	
69kV construction	13.3 acres (60' x 60' area x 162 poles)
12kV construction	0.184 acre (10' x 10' area x 92 poles)
Underground 12kV construction	0.08 acre (2,300' x 1.6'-wide trench)
Material/fly yards	22.6 acres
Washing stations	0.4 acre
Total temporary disturbance	36.56 acres



Figure 6. An example of a substation and associated fence similar to the Proposed Action.

Decision Framework

Based on the analysis in this EA, the Deciding Official, the COF Supervisor, will decide whether to issue a permit to allow the construction, operation, and maintenance of the interrelated elements of the proposed 69kV sub-transmission and 12kV distribution lines on COF land from the Youngs Canyon Substation to the proposed Mormon Lake Substation and westward to CQ-12. The Deciding Official may choose the No Action Alternative, the Proposed Action, or a modified version of the Proposed Action. The decision will include the following:

- The location and construction scheduling of the proposed 69kV sub-transmission and 12kV aboveground and underground lines and associated infrastructure.
- The location and construction scheduling of the proposed Mormon Lake Substation.
- The location of the access roads, including which access roads would be improved.
- The location of the temporary material/equipment storage areas.
- The location of the temporary equipment washing stations.
- Any mitigation measures necessary.

Should the Deciding Official determine that the proposal will result in significant effect(s); additional analysis may be needed through the development of an Environmental Impact Statement.

Public Involvement

The proposal was listed in the Schedule of Proposed Actions on the COF website on January 1, 2013. On April 9, 2013, the original Proposed Action and accompanying maps were mailed via letters to agencies, organizations, and individuals as well as 13 Native American tribes interested in or determined to be potentially impacted by the Proposed Action (see Chapter Four for the list of agencies and other organizations contacted).

The official start of the 30-day scoping period was April 9, 2013. Announcements soliciting public input on the Proposed Action were also posted on the COF website.

A total of 21 comment correspondence items (e-mail, letter, etc.) were received by the COF concerning various aspects of the project. All comments and a Forest Service response are available in the Project Record. The majority of comments were concerning biological impacts, visual impacts, and a lack of alternatives. APS, working with a third-party consultant and the Forest Service, considerably revised the Proposed Action to effectively address these comments, most notably in terms of visual quality by 1) changing the westward extension from 69kV to 12kV, 2) moving the substation several miles east away from the Mormon Lake community, and 3) burying the 12kV line through the Mormon Lake meadow to retain the area's scenic quality.

A copy of the scoping document and comments received by the COF can be found in the Project Record, accessible at the COF Supervisor's Office.

Issues

Issues serve to highlight effects or unintended consequences that may result from the Proposed Action and alternatives, giving opportunities during the analysis to reduce adverse effects and compare trade-offs for the Deciding Official and public to understand. The following resources have been identified by the COF Inter-Disciplinary (ID) Team and/or the public as having potential issues resulting from the Proposed Action. Effects to these resources are analyzed in the EA.

Soil and Water: The Proposed Action would include removing an existing 12kV distribution line; installing metal poles on the 69kV sub-transmission line; improving several access roads; clearing vegetation; equipment fueling and oils, and using five temporary material/equipment storage areas and three temporary washing stations, all of which could affect soil resources. Effects to water resources are also analyzed in the context of erosion potential into waterways in the project area and vicinity, including Youngs Canyon.

Wildlife: Potential impacts to wildlife, including federally listed threatened or endangered species and Region 3 Forest Service Sensitive species, Management Indicator Species, and Migratory Birds, have been assessed. The ID Team biologist indicated potential habitat for special-status wildlife species in the vicinity and project area. Field visits to the project area confirmed the presence of potential habitat for special-status wildlife species.

Vegetation: Potential impacts to Region 3 Forest Service Sensitive plant species were evaluated, as well as the potential for spread and establishment of invasive/noxious weeds resulting from construction. Vegetation management activities proposed by APS throughout the duration of the project are also analyzed. During field visits to the project area, potential habitat was identified for special-status plants, and invasive/noxious weed species were observed.

Cultural Resources: Archaeological resources occur along the proposed corridor; potential effects to these resources, as well as proposed mitigation and monitoring to avoid such impacts, were evaluated.

Visual Resources: The proposed 69kV sub-transmission line would minimally affect the visual quality of the area. Effects to visual resources in the context of the Forest Service's Visual Management System and Scenery Management System were analyzed.

Air Quality: Effects to air quality are analyzed as they relate to construction and maintenance activities including travel off-road and on Forest Service system roads.

Socioeconomics/Environmental Justice: Effects to socioeconomics and potential environmental justice populations in the Project area under the No Action and Proposed Action alternatives are analyzed.

Recreation: Effects to recreationists in the context of the Forest Service's Recreation Opportunity Spectrum are analyzed as they relate to changes to the visual character of the landscape, potential access disruptions to Forest Service system roads, and noise from construction.

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CHAPTER 2: ALTERNATIVES

This chapter describes and compares the Proposed Action and No Action alternatives considered for the APS Youngs Canyon to Mormon Lake Substation 69kV Sub-Transmission Line Project. In addition, it provides a summary of the issues and environmental consequences of these alternatives and allows the public and Deciding Official to easily compare effects of each.

Alternatives

Alternative 1: No Action Alternative

Under the No Action Alternative, the proposed 69kV sub-transmission line, Mormon Lake Substation, and 12kV westward extension would not be constructed. Furthermore, 1.44 miles of the CQ-12 Extension to Flying M Ranch would not be removed, including that portion in the Mormon Lake meadow. Voltage problems would continue for communities in the area as well as at the Discovery Channel Telescope.

Alternative 2: Proposed Action

Under the Proposed Action, the Coconino National Forest would issue a permit to APS to construct, operate, and maintain a 17.36-mile-long 69kV sub-transmission line (with 60-foot-wide ROW) extending from the Youngs Canyon Substation to the new proposed Mormon Lake Substation. Figure 1 shows the project corridor in relation to land ownership boundaries. Figures 2a-2e show the project corridor, access roads, material/equipment storage areas, and washing stations.

Initiating at the Youngs Canyon Substation APS proposes to construct a 69kV sub-transmission line within a 60-foot ROW which would parallel the west side of the existing Western 345kV transmission line 300-foot ROW along FR 9124X, 740A, FR 9481A, and FR 82 for approximately 17.36 miles on COF land to FR 125. At the proposed 69kV sub-transmission line's intersection with FR 125 atop Anderson Mesa, APS proposes to construct the Mormon Lake Substation due west of Mormon Lake totaling 2.06 acres. From this substation APS proposes to construct a 12kV distribution line within a 20-foot ROW to the southwest for approximately 3.8 miles on COF land to its junction with FH 3. While the ROW would be used for construction, there would not be construction or maintenance of a permanent road and long-term maintenance of the line would be periodic. A few new spurs from FR125 would be created to allow APS long-term approved overland travel into the ROW. Utility vehicles would be able to travel on- or off-road within Project ROWs, but would not typically travel off-road outside of the ROWs. Where off-road travel would be necessary outside the Project ROWs, only rubber tired vehicles would travel off-road, with no off-road travel through wetlands or running streams. Approximately 0.56 miles of the 12kV line would be replacement of poles within the existing CQ-12 Extension to Flying M Ranch 12kV ROW. The 12kV ROW would overlap a 300-foot-wide COF-designated camping corridor by 10 feet for 2.67 miles along FR 125. Just east of FH 3, the line would be buried underground and would cross FH 3 and follow along the west and north side of FH 3 across the Mormon Lake meadow for approximately 0.4 miles. The line would then re-emerge aboveground for 0.2 miles and connect to the existing CQ-12 12kV distribution line.

Construction is scheduled to begin in late summer 2014 and end in 2016, while vegetation would be maintained regularly in the ROW, approximately every 5 years. Long-term maintenance activities would include periodic mowing and hand clearing of vegetation within the ROW. Regular climbing inspections of poles would also occur every five years. Construction and maintenance equipment and tools would include trucks, bulldozers, excavators, ATVs, mowers, and passenger

vehicles. These vehicles would be driving overland off-road to access poles within the ROW. Pole replacement and/or line repair after initial construction would require similar vehicles and tools.

Under the Proposed Action, APS would use existing access roads (roads open to the public as well as administrative use roads where approved) as much as possible for the duration of the project, though some roads would require improvement to expand them to a width of 10 to 12 feet (see Figures 2a-2e). The access roads (and approximate lengths of the roads where improvement is proposed) located outside of the project ROW that would require improvement include FR 9124X (1,175 feet), FR 740A (1,084 feet), FR 82 (2,346 feet), FR 125 (2,346 feet), and an unnamed section of road that connects the latter two forest roads (420 feet). To access pole locations from these access roads, APS would drive overland within the project ROW.

APS would use rubber-tired large utility trucks with augers to dig holes for the power poles, helicopters to set the poles, and line trucks to install the poles and to attach/string the wire. Five temporary material/equipment storage areas for equipment staging and helicopter landing would be used for approximately four weeks throughout the construction phase (18 to 24 months). APS would also use three temporary washing stations for washing equipment. Material/equipment storage areas and washing stations would be located in naturally occurring, open areas and would not require vegetation clearing.

Design Features

Applicable Forest Plan (USDA 1987, as amended) standards and guidelines, Best Management Practices (BMPs), and Forest Service Manual and Handbook direction would be incorporated in project design and implementation (Table 3).

Noxious or Invasive Weeds

BMPs as outlined in Appendix B of the “Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds” (USDA 2005) would be followed to incorporate weed prevention and control into the project. The following features would be integrated into project implementation:

- Construction and maintenance equipment including trucks, bulldozers, and excavators (no ATVs or passenger vehicles) would be kept free of noxious/invasive weed species by washing equipment prior to entering the construction site, prior to moving equipment from infested to non-infested areas of the project, and prior to departing the site.
- Equipment such as mowers and other tools used in routine maintenance should be cleaned periodically, especially when moving from infested areas to uninfested areas. This would prevent spread of weeds along the length of the corridor.
- Construction parking, fly yards, and staging areas would be located in sites that are free of noxious weeds.
- APS would avoid conducting major operational activities where known populations of invasive species exist.
- Where contact with a population of invasive weeds is unavoidable, APS would ensure that the population is treated prior to any activity in the area.
- Soil disturbance would be minimized to the extent practicable; vehicles would stay on existing access roads wherever possible.
- The use of off-site fill materials should be discouraged and excavated substrate from the proposed project ROW should be used whenever possible. Fill material should only come from weed-free sources.
- Areas affected by project construction should be re-vegetated and rehabilitated using certified, weed-free seed and weed-free mulch.

- After completion of construction activities, areas where ground disturbing activities occurred should be monitored annually for 5 years. Data collected from monitoring surveys would be compared to data from those conducted prior to activities occurring. If new populations are found, location information would be recorded and appropriate treatment of noxious and invasive weeds would occur.
- If any additional infestations of invasive weeds are encountered during implementation of the Proposed Action, the locations would be documented and reported to the COF.

Cultural and Historic Resource Protection

Most National Register of Historic Places eligible sites along the proposed 69kV sub-transmission line would be avoided by construction activities. However, National Register-eligible Site AR-03-04-02-1914 cannot be avoided. A pole is proposed within the site perimeter but in an area devoid of artifacts. Additionally, the pole would be placed 13 feet from limestone bedrock and 5 feet from the trunk of a mature juniper tree in sediments highly disturbed by tap root and lateral root growth. The strategic placement of the 69kV power pole near bedrock and within significantly disturbed sediments would ensure that no adverse effects would occur. A professional archaeologist permitted on the COF would also be present to monitor all construction activities (pole hole excavation and placement) within Site AR-03-04-02-1914 to ensure that significant cultural resources are not adversely affected. To ensure that the sites are not impacted by heavy equipment, the sites would be flagged for avoidance.

Should any previously unidentified, significant cultural resources be encountered during construction or the monitoring activities, then work in the vicinity of the discovery would be suspended and the Monitoring Archaeologist contacted immediately if not already present. The Forest Archaeologist or District Archaeologist must be notified within 24 hours of the finding. Pursuant to federal and state laws, should human remains be encountered, all work must cease and the District Archaeologist must be notified immediately at 928/526-0866 or the Forest Archaeologist at 928/527-3600.

Soils and Watershed Protection Measures

APS would follow direction of the COF Forest Plan (USDA 1987) and Forest Service Handbook 2509.22 (Soil and Water Conservation Handbook). APS would also prepare a Storm Water Pollution Prevention Plan for the proposed project in compliance with Arizona Pollutant Discharge Elimination System requirements.

The BMPs listed in Table 3 include construction designs that further detail management actions, mitigate environmental consequences, and establish priorities for implementation.

Table 3. BMPs Required for Implementation of the Proposed Action.

NO.	MITIGATION	PURPOSE
Air Quality		
AQ1	Dust generated during construction would be controlled by watering and/or other standard dust abatement measures before, during, and after construction.	To minimize air quality impacts caused by dust created during construction.
AQ2	Disturbed land in areas with temporary impacts would be revegetated (see BMP No. V1). This also applies to soil and water.	To discourage future off-road vehicular activities and to stabilize the soil from erosion.
AQ3	APS would ensure that vehicles and equipment used during construction are properly maintained and regularly inspected.	To minimize exhaust emissions (e.g., carbon monoxide, nitrogen oxide, sulfur dioxide, hydrocarbons, and particulate matter) during construction.

NO.	MITIGATION	PURPOSE
Cultural Resources		
CR1	Should any previously unidentified, significant cultural resources be encountered during construction or the monitoring activities, work in the vicinity of the discovery would be suspended and the Monitoring Archaeologist contacted immediately, if not already present. The Forest Archaeologist or District Archaeologist must be notified within 24 hours of the finding. Pursuant to federal and state laws, should human remains be encountered, all work must cease and the Flagstaff Zone Archaeologist must be notified immediately at 928/527-8261 or the Forest Archaeologist at 928/527-3600.	To avoid adverse impacts to cultural resources.
Hazardous Materials		
HM1	APS would require all employees to adhere to BMP guidelines, and all waste and spills generated on site would be disposed of in accordance with state and federal regulations.	To prevent leaking of hazardous materials (i.e., oil, gasoline, and other hydrocarbon fluids).
HM2	Only emergency equipment maintenance would be performed at construction site locations. Routine equipment maintenance would normally be conducted at APS facilities.	To prevent leaking of hazardous materials (i.e., oil, gasoline, and other hydrocarbon fluids).
HM3	Equipment for minor spills (shovels, construction bags, and absorbent material (for impervious surfaces) would be available at all construction locations.	To prevent impacts from f hazardous materials (i.e., oil, gasoline, and other hydrocarbon fluids).
HM4	All fueling of vehicles would be done on a designated, protected, upland site or off site at a fueling facility. If more than 1,320 gallons of petroleum products are to be stored on-site above ground or if a single container exceeds 660 gallons, then a Spill Prevention Control and Countermeasure Plan would be prepared as per 40 CFR 112. This also applies to soil and water.	To prevent contamination of soils and waters from accidental spills and to maintain water quality.
Noise		
N1	Construction machinery and equipment would be well-maintained.	To minimize construction-related noise for both wildlife and humans.
N2	Limit equipment on-site to the minimum necessary to complete construction. Helicopter use during construction is expected for approximately four weeks total.	To minimize construction-related noise for both wildlife and humans.
N3	Motorized closure from Ashurst Lake south to the substation location: No vehicles, helicopters, or equipment would be able to work along this portion of the line between April 15 and June 27.	To minimize construction-related noise for both wildlife and humans.
Recreation		
R1	Construction advisories would be posted at major entry points along the project corridor, on the COF website, and at the Flagstaff Ranger District.	To inform residents and recreation visitors of construction activities.
R2	Construction advisories and additional public notification (as needed) would be posted near Ashurst Lake. Minimize helicopter activity around Ashurst Lake during high use recreation times, from May through September and avoid weekends and holidays.	To ensure the safety of and inform recreation users.

NO.	MITIGATION	PURPOSE
R3	Access routes off designated corridors and routes would be blocked and restored.	To reduce minor adverse impacts to recreational users.
Soils & Water		
SW1	Soils would be managed in accordance with direction of the COF Forest Plan (USDA 1987) and would include actions to retain the soil during construction and stabilize the soil after construction.	To minimize and mitigate adverse impacts to soil stability and productivity.
SW2	A Stormwater Pollution Prevention Plan in compliance with Section 402 of the Clean Water Act would be prepared and adhered to throughout construction.	To minimize and mitigate potential soil movement during construction and protect watershed resources from sediment and/or contaminant runoff generated during and post construction activities.
SW3	During and after completion of the project, APS would maintain BMPs identified in the Forest Service Handbook 2509.22 and the Stormwater Pollution Prevention Plan for the period specified.	To help reduce soil loss during and after construction.
SW4	All drainages/washes along the project ROW (e.g., Youngs Canyon) would be spanned by the sub-transmission line when possible in attempt to avoid impacts in stream management zones. The Forest Plan identifies approximately 200 feet as a buffer for non-riparian stream courses.	To prevent impacts to water resource
SW5	The FH2 soils atop Anderson Mesa soils are particularly susceptible to damage, vegetation removal, and erosion when wet; APS would take measures to avoid overland travel during wet periods during construction and maintenance. Motor vehicles outside of permitted areas or off existing roads and off hardened surfaces should be avoided whenever possible.	To prevent impacts to soil resources.
Vegetation		
V1	Revegetate areas of temporary disturbance (fly yards, areas around steel poles, etc.) where construction has damaged or removed existing vegetation with seeds and/or vegetative mats (access road improvement locations and vegetation clearing/trimming corridors would not be revegetated). Seed mix would be determined in conjunction with the Forest Botanist and/or District Biologist to account for the different soils types across the project ROW. All mixes would be certified weed-free. Sites to be revegetated would be scarified prior to seeding. The substation is a permanent impact that would not be revegetated.	To restore natural vegetative communities and minimize the spread of invasive species.
V2	Allotment grazing fences impacted during construction activities would be repaired by APS, and APS would maintain fence closures during construction.	To maintain separation of designated grazing allotments.
V3	Temporary fencing or flagging would be used to restrict construction activities to the designated limits of the construction zone.	To minimize the area of vegetation impacts.
V4	Place boulders or other obstructions to prevent vehicular access to areas slated for vegetation re-establishment, as needed	To minimize the area of vegetation impacts.

NO.	MITIGATION	PURPOSE
V5	Where possible retain groups of trees near the perimeter of the substation.	To create a more natural appearing landscape.
V6	All vegetation that is removed (via clearing or trimming) would be lopped and scattered within the project corridor. For mowing operations, vegetation would be mulched by the mower and broadcast across the ROW to a maximum depth of three inches.	To decrease soil erosion and promote revegetation.
V7	Block access from FR 125 and FH3 to the old CQ-12 utility corridor made during utility line removal. To hasten recovery and help eliminate unauthorized motorized and non-motorized use of the temporary access roads, use physical measures such as re-contouring, pulling slash and rocks across the line, placing cull logs perpendicular to the route, and disguising entrances for the first 50'.	To help avoid illegal motorized use of the old corridor.
V8	Where possible, shape and/or feather the vegetation at the edges of the utility corridor to avoid abrupt changes between the corridor and surrounding forested landscape. Favor groups of trees that visually connect with the utility corridor edge to avoid abrupt and noticeable changes.	To reduce contrast between the utility corridor and the existing landscape character
V9	The use of off-site fill materials should be discouraged and excavated substrate from the proposed project ROW should be used whenever possible. Fill material should only come from weed free sources.	To reduce chances of noxious weed contamination or spread
V10	Water used for dust abatement and other construction activities should be obtained from a source free of invasive plant seeds.	To reduce chances of noxious weed contamination or spread
Wildlife		
W1	All trash, food items, and other solid waste shall be contained in closed containers and removed daily.	To prevent attraction of wildlife to the construction zone.
W2	Prior to moving vehicles and machinery, operators should inspect under and around wheels or tracks to verify that no wildlife are hiding under or around said vehicles or machinery. Helicopter use would be so limited that grazing animals in the area would not be affected.	To prevent inadvertent wildlife injury or fatality caused by moving vehicles or machinery.
W3	Operators of vehicles and machinery should adhere at all times to posted speed limits within the construction zone and limit maximum speeds to 25 mph on National Forest System roads.	To prevent inadvertent wildlife injury or fatality caused by moving vehicles or equipment.
W4	Within the designated COF Anderson Mesa pronghorn closure area, construction activities should occur outside of the pronghorn fawning season (April 15 – June 27).	To minimize disturbance to pronghorn during the sensitive fawning period and to comply with the COF seasonal vehicular restriction within the pronghorn reproductive area
W5	Power-lines and towers construction incorporate raptor-safe standards. Impacts to raptor nests are avoided by timing removal of any ponderosa pine vegetation outside of the breeding season (March 1 – August 31). If this is not feasible, surveys for raptor nests should be conductive to identify and avoid nest sites from construction activities.	To prevent impacts to raptors.

NO.	MITIGATION	PURPOSE
W6	Within 0.25 miles of the Mexican spotted owl Protected Activity center near Mormon Lake meadow, noise-producing construction activities should occur outside of the breeding season (March 1 – August 31).	To minimize noise disturbance to Mexican spotted owls.
Visual Quality		
VQ1	If possible, shiny surfaces would be avoided in construction of all substation facilities. Potential building colors include flat tans or browns such as Munsell Standard Environmental Color “desert brown”, Sherwin Williams SW 2050 (dormer brown) or SW 2051 (beach house).	To reduce the contrast between constructed features and the existing landscape character
VQ2	<p>If possible, building materials would avoid slick, shiny surfaces such as metal.</p> <ul style="list-style-type: none"> a. Block is the preferred building material because it can be produced or painted with the recommended color, and would have a rough texture that would not be shiny or slick. b. Roofing material should be metal, concrete or asphalt shingle and should be a similar brown color or slightly darker brown, but would have a flat or dull finish. <p>If metal buildings need to be used, the exterior finish should be matte or dull, not glossy or shiny and the color should resemble those noted above.</p>	To reduce the contrast between constructed features and the existing landscape character.
VQ3	Fencing would not need to be painted, but should have a flat or dull surface. Galvanized or flat grey wire fencing (chain link) or other open designs and non-shiny metal posts area appropriate.	To reduce the contrast between constructed features and the existing landscape character.
VQ4	Surfacing for the grounds of the substation should be stabilized natural soil, sand or cinders. If concrete surfaces are installed, the concrete would be colored to match the surfacing materials.	To reduce the contrast between constructed features and the existing landscape character.
VQ5	Lighting at the facility should be “down lighting” or “spot lighting” to preserve dark skies in the area.	To reduce light emissions around the substation and preserve dark skies in the area.
VQ6	The Forest Service Landscape Architect should be consulted to approve the final building style and colors, and fence design prior to construction.	To ensure appropriate measures have been taken to minimize the contrast between constructed features and the existing landscape character.

Forest Plan Compliance

The Proposed Action is consistent with standards and guidelines outlined in the COF Forest Plan (USDA 1987) for powerline corridors, including:

- “Existing direction for developing new transmission”...”corridors is used. Corridors are restricted to planned routes. New electronic facilities are limited to existing designated sites” (page 13).
 - The proposed action incorporates this direction by co-locating the proposed power lines along existing transmission line corridors, power line corridors, and roads to the extent feasible.

- “Use existing corridors to capacity with compatible utilities where additions are environmentally and visually acceptable before evaluating new routes. Overbuilding and under-building are considered for additions” (page 79).
 - The proposed action incorporates this direction by co-locating the proposed power lines along existing transmission line corridors, power line corridors, and roads to the extent feasible.
- “New corridors will avoid wildernesses, research natural areas, geological and botanical areas, Elden Environmental Study Area, and ... the mixed conifer vegetation type” (page 79). The project will not always avoid the ponderosa pine vegetation type.
 - The proposed disturbance corridor would not impact any existing or recommended wilderness, research natural areas, botanical areas, or environmental study areas, or mixed conifer vegetation. A portion of power line construction would involve the removal of ponderosa pine vegetation.
- “New corridors are managed to maintain current resource protection and outputs to the degree possible” (page 80).
 - The proposed action attempts to maintain resource protections by incorporating public comments regarding the location of the power lines and by including the removal of 1.44 miles of existing power line in an area with potential for high scenic integrity.
- “Power-lines and towers are built to specifications compatible with raptor use” (page 80).
 - This has been included as a design feature in the proposed action.

Management Areas

A total of six management areas (USDA 1987) are included in the Youngs Canyon to Mormon Lake Substation 69kV sub-transmission line analysis area (Table 4). Guidance for those management areas is provided by the COF Forest Plan and is also summarized in Table 4, which describes the management directions and standards for various resources.

Table 4. Summary of the Management Areas Included in the Youngs Canyon to Mormon Lake Substation 69kV Sub-Transmission Line Analysis Area.

MANAGEMENT AREA	DESCRIPTION OF MANAGEMENT AREA	MANAGEMENT EMPHASIS	ACRES WITHIN PROJECT AREA
3	Ponderosa pine and mixed conifer, less than 40% slope	Emphasizes a combination of sustained-yield of timber and firewood production, wildlife habitat, livestock grazing, high quality water, and dispersed recreation.	7.64 acres
6	Unsuitable timber land	Emphasize a combination of wildlife habitat, watershed condition, and livestock grazing. Other resources are managed in harmony with the emphasized resources.	7.93 acres
7	Pinyon-juniper on slopes less than 40%	Emphasizes firewood production, watershed condition, wildlife habitat, and livestock grazing.	68.22 acres
10	Grasslands and pinyon-juniper with less than 10% cover above the Mogollon Rim	Emphasizes range management, watershed condition, and wildlife habitat. Other resources are managed to improve outputs and quality. Emphasis is on prescribed burning to achieve management objectives.	54.57 acres

MANAGEMENT AREA	DESCRIPTION OF MANAGEMENT AREA	MANAGEMENT EMPHASIS	ACRES WITHIN PROJECT AREA
12	Riparian and Open Water	Emphasizes wildlife habitat, visual quality, fish habitat, and watershed condition on the wetlands, riparian forest, and riparian scrub. Also considered dispersed recreation, including wildlife and fish recreation, on open water.	0.61 acres
33	Doney Management Area	Reduce the risk of catastrophic wildfire, especially within the Urban/Rural Influence Zone. Reintroduce fire's natural role as much as possible. Emphasize daytime recreation activities, both motorized and non-motorized. Balance recreation demands with protection of soils, water, and vegetation. Maintain public access to public lands. Restore natural grasslands, and promote healthy pinyon/juniper woodland. Ponderosa pine lands progress towards desired forest structure (goshawk habitat). Reduce instances of illegal activities and trash dumping. Maintain scenic quality. Opportunities for firewood or other forest products are rare; however, firewood sales may be used as a tool for management.	1.67 acres

The proposed project is consistent with the management emphasis in these six management areas and, overall, consistent with direction in the COF Forest Plan (USDA 1987).

Alternatives Considered, but Eliminated from Further Analysis

Federal agencies are required by NEPA to explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14).

Munds Park Alternative

An alternate 69kV source from the Youngs Canyon Substation is the Coconino-Sedona 69kV sub-transmission line and Munds Park Substation approximately 13.5 miles west of Mormon Lake and FH 3. Using this source would have required rebuilding 1.5 miles of 69kV line to double-circuit west of Munds Park, expanding the Munds Park Substation to accommodate three 69kV breakers, and building 14.5 miles of new 69kV line through the forest between Munds Park and Mormon Lake. This stretch of forest includes numerous sensitive Mexican spotted owl and northern goshawk areas. The line also would not parallel an existing transmission line corridor. It was decided that this alternative would be more difficult to mitigate biology, recreation, and scenery concerns. The new construction of a power line corridor required by this alternative would conflict with Coconino National Forest Plan guidelines to minimize impacts in Region 3 Sensitive and Threatened Species habitat. Based on these impacts, this alternative was considered but eliminated from further analysis.

Alternate 69kV Sub-Transmission Line Westward Extension

Initial designs, which were shared during public scoping, had called for a 69kV line to extend from the Western line corridor westward to the existing CQ-12 line. Noting agency and public concerns of a larger line crossing the scenic Mormon Lake meadow, which offers views southward to forest and northward all the way to the San Francisco Peaks, as well as proximity to raptor use, APS investigated underground alternatives through the meadow area along FH 3. It was decided that a 12 kV westward extension would be more appropriate to place underground. A 12kV line does not require as much maintenance and does not produce as much heat making it more amenable and cost effective for placement underground. A 12 kV line would still improve the aforementioned voltage issues in the project area. The aboveground portion of the 12kV (versus the 69kV) would minimize /reduce visual and wildlife concerns since the corridor width is reduced from 60 feet wide to 20 feet wide. The upgrading of existing power lines near wildlife habitat required by this alternative would conflict with Coconino National Forest Plan guidelines to minimize impacts in Region 3 Sensitive and Threatened Species habitat as well as be inconsistency with the Bald and Golden Eagle Protection Act. Based on these impacts, this alternative was considered but eliminated from further analysis.

Alternate Mormon Lake Substation Location

Initial designs placed the Mormon Lake Substation just southwest of where the proposed new 69kV line was to cross FH 3 at the southwestern edge of the Mormon Lake meadow. A desire by the public to construct it further from residences in the Mormon Lake community prompted APS to consider other locations. APS is now proposing to construct the Substation at the junction of FR 125 and the Western transmission corridor. This alternate location was eliminated from further consideration due to aforementioned inconsistencies with the Coconino National Forest Plan.

Alternate Westward Extension Route

Initial designs placed the westward line extension from the Western line to the CQ-12 line largely along FR 125 for improved line access and to minimize ROW vegetation clearing. Agency and public concerns regarding the placement of this line within a designated camping corridor prompted reconsideration. The route now overlaps only 10 feet within the camping corridor to the north and then extends southwestward, crossing FR 125 just east of a draw that contains possible goshawk nesting habitat, before dropping off of Anderson Mesa and then underground across the Mormon Lake meadow.

Comparison of Alternatives

Table 5 compares the impacts of the alternatives to the key issues that were raised by the ID Team and during the scoping process. More detail concerning the environmental consequences of the alternatives can be found in Chapter 3 of this EA.

Table 5. Comparison of Key Issues for the Alternatives.

ISSUE	NO ACTION ALTERNATIVE – ALTERNATIVE A	PROPOSED ACTION – ALTERNATIVE B
Soil and Water	No effect	The Proposed Action would directly disturb soil at the substation and each of the power pole locations for the proposed sub-transmission line; where the old 12kV poles are removed; where vegetation clearing is proposed; within each of the temporary material/equipment storage areas and washing stations; and where access roads would be improved.

		<p>Material/equipment storage areas and washing stations would be located in naturally occurring, open areas and no blading would be required, reducing potential soil impacts.</p> <p>The project is not expected to permanently affect any water resources. The overhead 69kV line would span all drainages/washes, including Youngs Canyon.</p>
Wildlife	No effect	<p>Potential habitat for one federally listed Threatened species and ten Forest Service Sensitive wildlife species occurs within the project area. The proposed project's activities may impact individual Mexican spotted owls, but is not likely to cause a trend toward more serious federal listing or loss of viability. For the ten Forest Service Sensitive wildlife species, the proposed project's activities may also impact individuals, but is not likely to cause a trend toward federal listing or loss of viability.</p> <p>Human presence during construction, compromised air quality, and noise may temporarily impact local wildlife. Permanent impacts may include vegetation clearing, soil disruption, substation construction, and the presence of the new sub-transmission and distribution lines. Some mammals and birds (including federally Listed Threatened and Endangered species, Forest Service Sensitive Species, and state Wildlife of Special Concern) may temporarily avoid the project vicinity during construction and maintenance activities, but would return after project completion.</p> <p>Migratory birds would also temporarily avoid the project vicinity during construction and maintenance activities, but would return after project completion.</p> <p>No changes to the forest-wide population or habitat trends of Management Indicator Species would occur since less than 0.01% of available habitat for each species would be compromised during project construction.</p>
Vegetation	No effect	<p>Vegetation would be removed and trimmed within the 60-foot-wide ROW of the proposed sub-transmission line and substation site (see Figure 2 for proposed vegetation clearing and trimming corridors). Clearing/trimming activities would result in long-term changes to vegetation resulting in early successional plant communities within the ROW.</p> <p>Along the approximately 5.4-miles of access roads proposed for improvement (widening them from 10 feet to 12 feet), small amounts of vegetation would be damaged or destroyed. Also, some vegetation would be temporarily damaged where construction crews drive overland on spurs to access pole locations.</p> <p>Temporary material/equipment storage areas and washing stations may result in temporary impacts to vegetation, but would be expected to be short-term as these areas would be located in naturally occurring open areas and would be re-seeded at the end of project, if needed.</p> <p>Habitat for eight Forest Service Sensitive plant species occurs within the project area. Although no Forest Service Sensitive plant species were observed during field visits, the proposed project's activities may impact individual plants, but is not likely to cause a trend toward federal listing or loss of viability.</p>

<p>Archaeology</p>	<p>No effect</p>	<p>Most National Register-eligible cultural resources would be avoided and all would be flagged to ensure avoidance during construction. However, Site AR-03-04-02-1914 cannot be avoided as a pole would be placed in the site perimeter in an area devoid of artifacts, near bedrock, and within sediments highly disturbed by tree root growth. A professional archaeologist would be present to monitor all construction activities within Site AR-03-04-02-1914 to assure no adverse effects occur.</p>
<p>Visual Resources</p>	<p>The 12kV line currently crossing the Mormon Lake meadow would remain, and this area's Existing Scenic Integrity would remain Very Low</p>	<p>The overhead 69kV line would create a new visual obstruction to the surrounding area. However, the proposed 69kV line would parallel existing powerlines for most of its extent, where visual degradation has already occurred. No adverse impacts with regards to the Visual Management System or Scenic Management System would occur. The proposed 12kV line would only affect a small area near the FR 125/Western 345kV ROW junction on the southern end of the Project Area (shown in Figure 2e). The 12kV line in the Mormon Lake meadow would be removed, thus improving visual quality. Of the 4.12 miles of 12kV line proposed to be built, approximately 0.45 is below ground and 0.56 is to be built in place in the existing corridor.</p>
<p>Recreation</p>	<p>No effect</p>	<p>Recreationists wishing to use designated open motorized routes within the ROW during construction of the project could experience delays or be limited to alternative open designated routes. The majority of the ROW (the northern portion) is within the Recreation Opportunity Spectrum classification objective of Roaded Natural, with the rest of the ROW within the Rural classification (near the Mormon Lake community). The project is compatible with both Recreation Opportunity Spectrum objectives.</p>
<p>Air Quality</p>	<p>No Effect</p>	<p>Negligible adverse effect during construction</p>
<p>Socioeconomics and Environmental Justice</p>	<p>Negligible to minor adverse effect due to voltage problems in served communities</p>	<p>Negligible to minor beneficial effect due to increased reliability of electricity in served communities</p>