BLM

DOI-BLM-NV-S010-2009-1020-EA

Overton Power District No. 5 Power Transmission Expansion Project Environmental Assessment

Clark County, Nevada

March 2014

U.S. Department of the Interior
Bureau of Land Management
Las Vegas Field Office
4701 North Torrey Pines
Las Vegas, NV 89130
Phone: 702-515-5000

Table of Contents

List of Tables

List of Maps

List of Photos

APPENDICES

1.0 INTRODUCTION

Title:	Overton Power District No. 5 Power Transmission Expansion Project Environmental Assessment
EA Number:	DOI-BLM-NV-S010-2009-1020-EA
Type of project:	Electrical power upgrade and expansion
General location of proposal:	Project area encompasses 1,932 square miles in the eastern portion of Clark County, Nevada
Name and location of preparing office:	Las Vegas Field Office
Case file number:	N-87777
Applicant name:	Overton Power District No. 5

1.1 Background

Overton Power District No. 5 (Overton Power), located in Overton, Nevada, has filed an application with the BLM Las Vegas Field Office (LVFO) for the construction, operation, and maintenance of additional overhead transmission lines, substations, and associated facilities within the Overton Power District boundaries. Overton Power is a quasi-municipal state agency created in 1935, and has been in continuous operation since its inception. The District currently operates and maintains approximately 95 miles of 230-kilovolt (kV), 138-kV, and 69-kV power transmission lines, substations, and related facilities within its service area boundaries.

Overton Power's service territory begins approximately 30 miles east of Las Vegas, Nevada, and encompasses 1,932 square miles in the eastern portion of Clark County, Nevada, including the City of Mesquite, and the unincorporated communities of Bunkerville, Moapa, Glendale, Logandale, and Overton. The District is bounded on the north by Lincoln County, Nevada and on the east by the State of Arizona. The southern boundary of the District is set by the Colorado River and Lake Mead, except at the District's southwestern corner. The southern boundary of the District is north of Lake Mead's Boulder Basin and the District's western boundary follows township lines. The District's service area also includes Valley of Fire State Park, a portion of the Lake Mead National Recreation Area, and the Moapa Indian Reservation. Within this primarily rural area, the District provides electric service to approximately 13,444 customers, of which approximately 81% are residential customers, with the remaining balance consisting of commercial and irrigation customers.

Proposed new developments consist of approximately 98 miles of new or replaced transmission line, 117 new transmission line structures, and approximately 28.4 miles of access road (13.7 miles of which is planned new construction) needed to construct and maintain the new facilities. The planned expansion and improvements are programmed over a nine-year construction period. Most of the new developments would be located on BLM-administered surface.

The BLM has identified the LVFO as the lead federal agency for the Overton Power proposal and has determined that an Environmental Assessment (EA) will be prepared in compliance with the National Environmental Policy Act of 1969 (NEPA). The legal description of the project area is provided in **Table 1-1**.

Table 1-1. Legal Description of the Proposed Project Area (Mount Diablo Meridian).

Township 13 South, Range 68 East			
Unsurveyed lands			
Township 13 South, Range 69 East			
Unsurveyed lands			
Township 13 South, Range 70 East			
Section 8: S½ of the SE¼ NE¼ of the SE¼ SE¼ of the NE¼	Section 9: S½ of the NW¼ S½ of the NE¼	Section 10: SW¼ of the NW¼ N½ of the NW¼ N½ of the NE¼	Section 11: N½ of the NW¼ SE ¼ of the NW 1/4 SW¼ of the NE¼ N½ of the NE¼
Section 17: W½ of the SW¼ NE¼ of the SW¼ E½ of the NW¼ NW¼ of the NE¼	Section 19: E½ of the NE¼ E½ of the SE¼	Section 20: NW¼ of the NW¼	Section 30: E½ of the NE¼ E½ of the SE¼
Section 31: E½ of the NE¼ E½ of the SE¼	Section 34: SE¼ of the SW¼ S½ of the SE¼ NE¼ of the SE¼	Section 35: NW¼ of the SW¼ S½ of the NW¼ W½ of the NE¼ NE¼ of the NE¼	
Township 14 South, Range 66 East			
Section 33: N½ of the NE¼ SE¼ of the NE¼	Section 34: NW¼ of the NW¼ S½ of the NW¼ W½ of the NE¼ NE¼ of the NE¼	Section 35: N½ of the NW¼ N½ of the NE¼	Section 36: NW¼ of the NW¼ S½ of the NW¼ S½ of the NE¼ NE¼ of the NE¼ N½ of the SE¼ SE¼ of the SE¼ SE¼ of the SE¼
Township 14 South, Range 67 East			
Section 12: S½ of the SE¼ NE¼ of the SE¼	Section 13: W½ of the NW¼ NE¼ of the NW¼ NW¼ of the NE¼	Section 14: SE¼ of the SW¼ W½ of the SE¼ NE¼ of the SE¼ SE¼ of the NE¼	Section 20: S½ of the SE¼ NE ¼ of the SE 1/4
Section 21: W½ of the SW¼ SE¼ of the SE¼	Section 22: S½ of the SW¼ NE¼ of the SW¼ NW¼ of the SE¼ S½ of the NE¼ NE¼ of the NE¼	Section 23: NW¼ of the NW¼	Section 28: N½ of the NW¼ SE¼ of the NW¼ W½ of the NE¼ NE¼ of the NE¼
Section 29: S½ of the NW¼ NE¼ of the NW¼	Section 30: S½ of the SW¼ W½ of the SE¼ NE¼ of the SE¼ SE¼ of the NE¼	Section 31: NW¼ of the NW¼ S½ of the SW¼	Section 32: SE¼ of the SW¼ S½ of the SE¼
Section 33: S½ of the SW¼ SW ¼ of the SW ¼ W½ of the SE¼ NE¼ of the SE¼		Section 34: S½ of the SE¼ NW¼ of the SE¼ S½ of the SW¼ NE¼ of the SW ¼	

Table 1-1. Legal Description of the Proposed Project Area, continued

Township 14 South, Range 68 East			
Section 3: N½ of the NW¼	Section 4: S½ of the NW¼ W½ of the NE¼ NE¼ of the NE¼	Section 5: S½ of the SW¼ NE¼ of the SW¼ N½ of the SE¼ SE¼ of the NE¼	Section 6: SE¼ of the SE¼
Section 7: N½ of the SW¼ SE¼ of the NW¼ W½ of the NE¼ NE¼ of the NE¼		Section 36: E½ of the SE¼ SW¼ of the SE¼ SE¼ of the SW¼	
Township 14 South, Range 69 East			
Section 1: E½ of the NW¼ NE¼ of the SW¼ W½ of the SE¼ SE¼ of the SE¼	Section 11: SW¼ of the SW¼ E½ of the SW¼ NW¼ of the SE¼ S½ of the NE¼	Section12: N½ of the NW¼ SW¼ of the NW¼ E½ of the NE¼ SE¼ of the SE¼	Section 13: NE¼ of the NE¼ W½ of the NE¼ SE¼ of the NW¼ N½ of the SW¼ SW¼ of the SW¼
Section 14: NW¼ of the NW¼ SE¼ of the SE¼	Section 15: E½ of the NE¼ SW¼ of the NE¼ NW¼ of the SE¼ E½ of the SW¼ SW¼ of the SW¼	Section 16: SE¼ of the SE¼	Section 20: SE¼ of the SE¼
Section 21: NE¼ of the NE¼ W½ of the NE¼ SE¼ of the NW¼ N½ of the SW¼ SW¼ of the SW¼	Section 22: NW¼ of the NW¼ SE¼ of the SE¼	Section 23: N½ of the NE¼ SW¼ of the NE¼ SE¼ of the NE¼ N½ of the SW¼ SW¼ of the SW¼	Section 27: N½ of the NE¼ SW¼ of the NE¼ N½ of the SW¼ SE¼ of the NW¼
Section 28: S½ of the SE¼ NE¼ of the SE¼	Section 29: NW¼ of the SW¼ S½ of the NW¼ W½ of the NE¼ NE¼ of the NE¼	Section 30: S½ of the SE¼ NE ¼ of the SE ¼	Section 31: S½ of the NE¼ NW¼ of the NE¼ NE¼ of the NW¼ S½ of the NW¼ NW¼ of the SW¼
Section 32: S½ of the NE¼ S½ of the NW¼		Section 33: NW¼ of the NE¼ E½ of the NW¼ SW¼ of the NW¼	
Township 14 South, Range 70 East			
Section 3: W½ of the NW¼ NE¼ of the NW¼	Section 4: W½ of the SW¼ E½ of the SW¼ NW¼ of the SE¼ S½ of the NE¼	Section 5: SE¼ of the SE¼	Section 6: N½ of the SW¼ SE¼ of the NW¼ W½ of the NE¼ NE¼ of the NE¼
Section 7: S½ of the NE¼ NW¼ of the SE¼ N½ of the SW¼ SW¼ of the SW¼ SW¼ of the NW¼		Section 8: W½ of the NW¼ NE¼ of the NW¼ NW ¼ of the NE ¼	

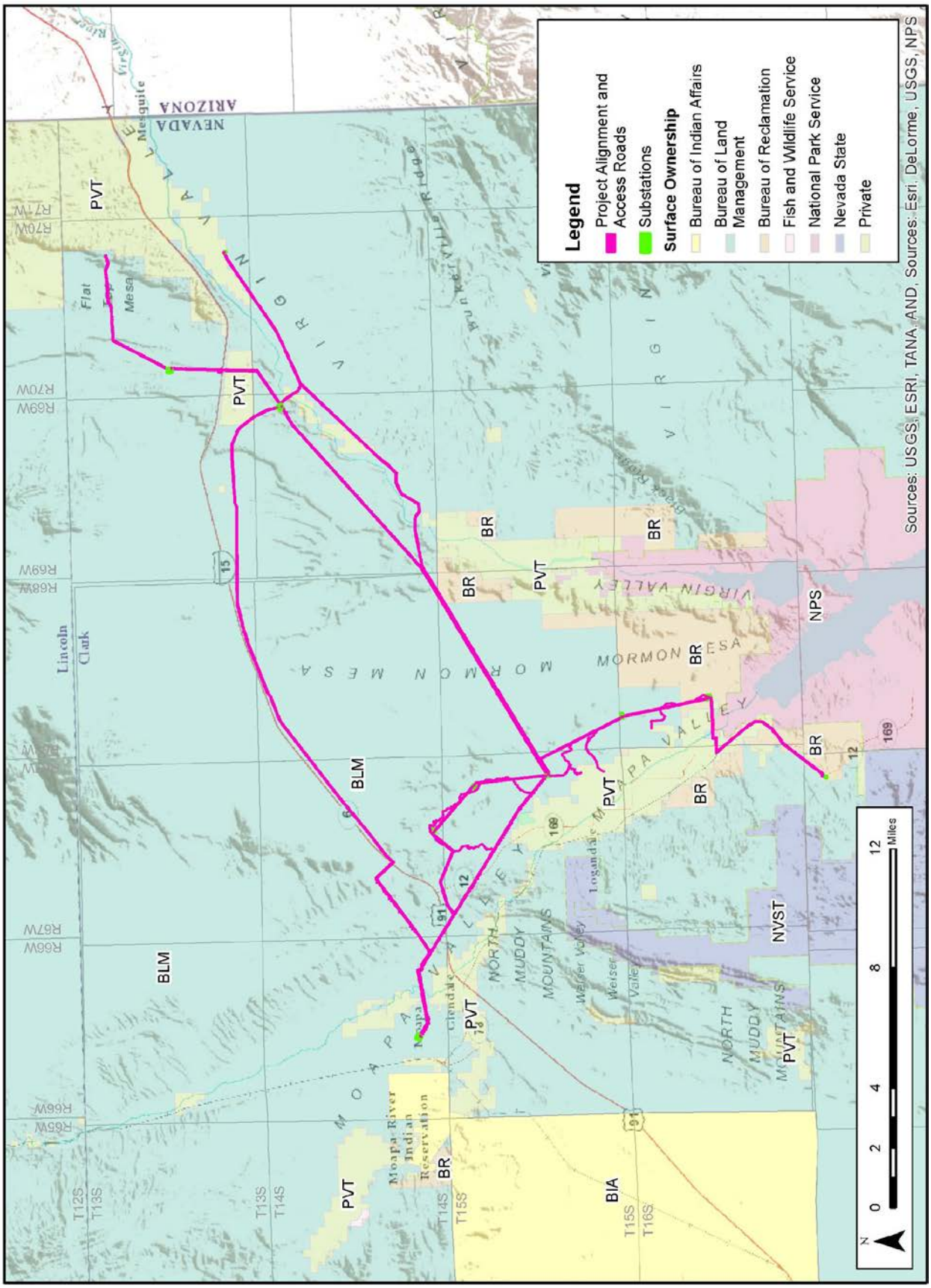
Table 1-1. Legal Description of the Proposed Project Area, continued

Township 15 South, Range 67 East			
Section 2: S½ of the SE¼ NW¼ of the SE¼ NE¼ of the SW¼ S½ of the NW¼ NW¼ of the NW¼	Section 3: NE¼ of the NE¼ NW ¼ of the NW ¼	Section 4: N ½ of the NW ¼ W ½ of the NE ¼ E ½ of the NE ¼	Section 5: SE ¼ of the NW ¼ NW ¼ of the NW ¼ N½ of the SW¼ SE¼ of the SW¼ S½ of the SE¼
Section 6: NE¼ of the NW¼ N½ of the NE¼ S½ of the NE¼	Section 8: NE¼ of the NE¼	Section 9: NW¼ of the NW¼ SE¼ of the SE¼ N½ of the SE¼ SW¼ of the NE¼ S½ of the NW¼	Section 10: S½ of the SW1/4
Section 11: NE ¼ of the NE ¼	Section 12: W½ of the NW¼ W½ of the SW¼	Section 13: W½ of the NW¼ W½ of the SW¼	Section 14: SW¼ of the SE¼ E½ of the SW¼ NW¼ of the SW¼ SW¼ of the NW¼
Section 15: S½ of the NE¼ NE¼ of the NW¼ NW ¼ of the NE ¼	Section 23: N ½ of the NE ¼ Se ¼ of the NE ¼	Section 24: W ½ of the NW ¼ N ½ of the SW ¼ SE ¼ of the NW ¼ E ½ of the SE ¼	
Township 15 South. Range 68 East			
Section 1: N½ of the NW¼	Section 2: NE¼ of the NE¼ S½ of the NE¼ SE¼ of the NW¼ NW¼ of the SE¼ N½ of the SW¼ SW¼ of the SW¼	Section 3: S½ of the SE¼	Section 8: SE¼ of the SE¼
Section 9: SE¼ of the NE¼ N½ of the SE¼ E½ of the SW¼ SW¼ of the SW¼	Section 10: NW¼ of the NE¼ N½ of the NW¼ SW¼ of the NW¼	Section 17: N½ of the NE¼ SW¼ of the NE¼ E½ of the NW¼ SW¼ of the NW¼ NW¼ of the SW¼	Section 18: SW ¼ of the SE ¼ N ½ of the SE 1/4 S½ of the SW¼
Section 19: NW¼ of the NW¼ SW¼ of the SW¼	Section 30: W½ of the NW¼ SE¼ of the NW¼ E½ of the SW¼ SW¼ of the SE¼	Section 31: W½ of the NE¼ N½ of the SE¼ SE¼ of the SE¼	
Township 16 South, Range 67 East			
Section 24: E½ of the NE¼		Section 36: SE¼ of the NE¼ N½ of the SE¼ SW¼ of the SE¼ SE¼ of the SW¼	

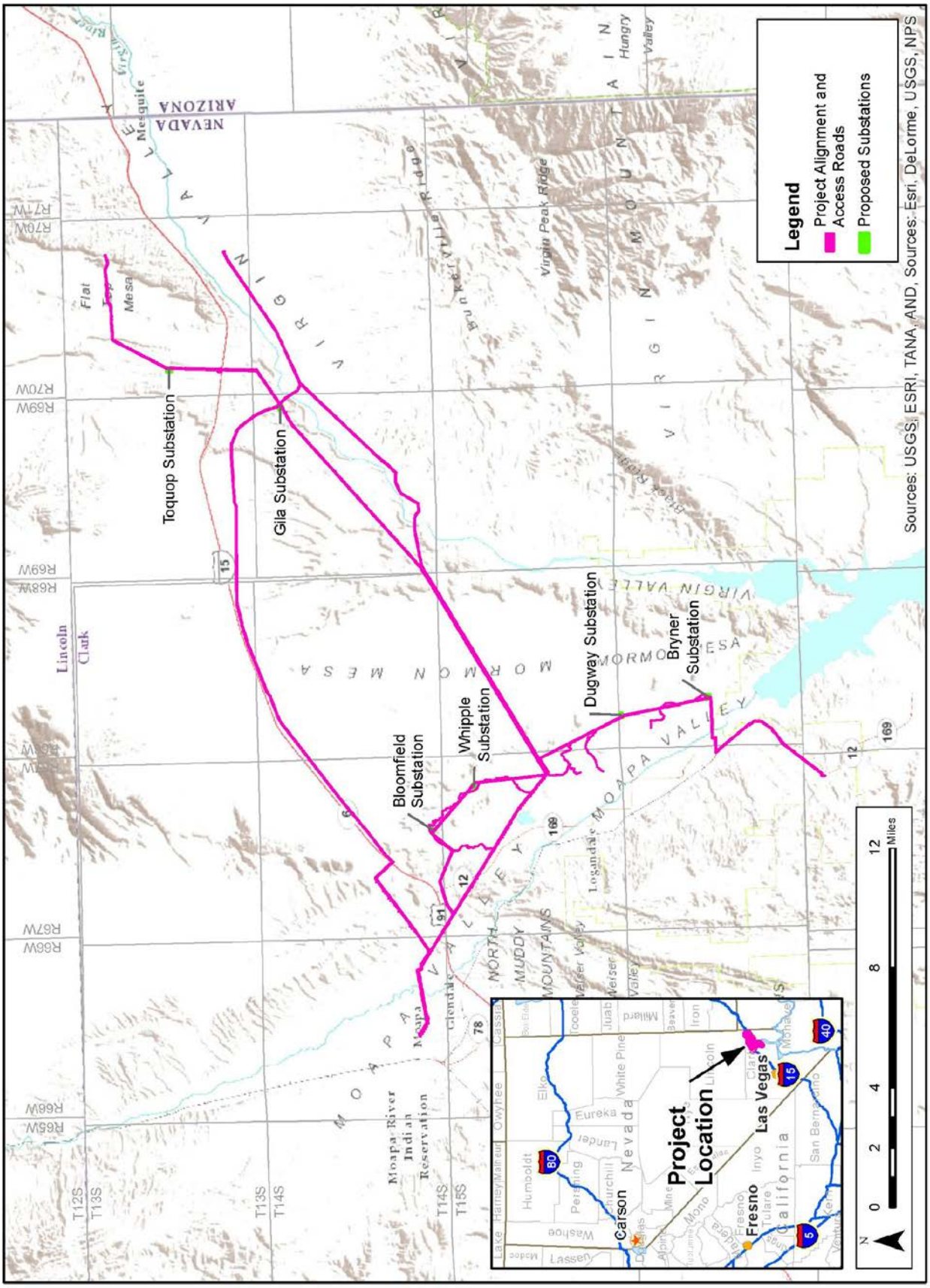
Table 1-1. Legal Description of the Proposed Project Area, continued

Township 16 South, Range 68 East			
Section 5: W½ of the NW¼ W½ of the SW¼	Section 6: NE¼ of the NE¼	Section 8: NW¼ of the NW¼ E½ of the NW¼ E½ of the SW¼	Section 17: E½ of the NW¼ NE¼ of the SW¼ W½ of the SE¼
Section 19: N½ of the NE¼ N½ of the NW¼ SW¼ of the NW¼ NW¼ of the SW¼ E½ of the SW¼	Section 20: NW¼ of the NE¼ N½ of the NW¼	Section 30: NE¼ of the NW¼ W½ of the NE¼ SE ¼ of the NE ¼ W½ of the SE¼ NE¼ of the SW¼	Section 31: N½ of the NW¼ SW¼ of the NW¼ NW ¼ of the NE ¼
Township 17 South, Range 67 East			
Section 1: N½ of the SW¼ SE¼ of the NW¼ W½ of the NE¼			

Map 1-1 shows surface ownership status for the project area and surrounding region. **Map 1-2** shows the project area and regional location.



Map 1-1. Land Ownership.



Map 1-2. Project Area and Location.

1.2 Purpose of and Need for the Proposed Action

Purpose Statement: The purpose of the project is to construct additional transmission, substation, and distribution infrastructure to serve growing industrial, commercial, and residential electrical loads within the Overton Power District No. 5 service area to year 2030.

Need Statement: The District anticipates through its ongoing resource Forecasting and Planning Program that the maximum capacity of the 138 kV transmission line will be reached in the next five years. This has prompted the District to request additional BLM right-of-way (ROW) needed to construct a transmission line that provides the requisite capacity.

Decision to be Made: The BLM will decide whether or not to grant ROW on BLM administered surface for upgrade of existing power transmission facilities and construction of additional facilities, and if so, under what terms and conditions.

1.3 Relationship to Statutes, Regulations, Plans or Other Environmental Analyses

1.3.1 Conformance With Land Use Plan

Las Vegas Resource Management Plan. The Las Vegas Resource Management Plan (LVRMP) (October, 1998) provides management direction for resources contained within the LVFO area. The project is in conformance with LVRMP direction pertaining to construction and operation of power transmission facilities, subject to compliance with project-specific mitigation and monitoring requirements determined through the environmental analysis process. The environmental analysis completed for this project will incorporate appropriate decisions, terms, and conditions of use described in the RMP decisions.

Use authorizations (i.e., ROW, permits, etc.) for roads, power lines, substations, and associated facilities would be processed through the BLM rights-of-way permitting process.

1.3.2 Local Land Use Plans

The Proposed Action would comply with all relevant federal, state, and local laws, and the Clark County Master Plan Update (2007).

1.3.3 Authorizing Actions

The proposed federal, state, county, and local actions required to implement the Overton Power Transmission Expansion Project are listed in **Table 1-2**.

1.4 Scoping, Public Involvement, and Issues

Environmental and social issues of local importance associated with the power transmission expansion project are identified as follows:

- Road development, increased traffic and associated impacts on existing county, state, and BLM roads.
- Social and economic impacts resulting from implementation of the proposed project.
- Potential impacts to steep slopes and sensitive soils within the project area.
- Impacts to air quality resulting from construction activities.

- Reclamation of disturbed areas and control of noxious weed invasions.
- Potential impacts to cultural and historical values within the analysis area.
- Potential impacts to Native American sacred sites and Traditional Cultural Properties.
- Cumulative effects of drilling and development activities when combined with other ongoing and proposed developments on lands adjacent to the Overton Power project area.
- Potential impact to listed, or proposed for listing, plant and animal species.
- Impacts to recreation.
- Potential impacts to paleontological resources.
- Impacts to visual resources.
- Potential conflicts with livestock management operations in the analysis area, including possible impacts to range improvements.

Table 1-2. Major Authorizations, Permits, and Approvals.

Action Requiring Permit, Approval, or Review	Responsible Agency	Permit or Approval	Statutory Reference
Federal			
Power line construction and operation on land under federal management	Bureau of Land Management (BLM)	ROW Grant	Federal Land Policy Management Act of 1976 (FLPMA); Public Law (PL) 94-579
	BLM	Finding of No Significant Impact or Record of Decision	National Environmental Policy Act (NEPA); Council on Environmental Quality; 40 Code of Federal Regulation (CFR)Part 1500 et seq.
	U.S. Army Corps of Engineers	Letter of Permission, Waters of the U.S.	Clean Water Act Section 404 (b) (1) 33 CFR 325.2(e)(1)(ii)
	U.S. Fish and Wildlife Service (FWS)	No Effect, Likely to Adversely Effect, or Not Likely to Adversely Affect Determination	Endangered Species Act (ESA) Section 7
	BLM and State Historic Preservation Office	Section 106 Compliance	National Historic Preservation Act (NHPA) of 1966; 36 CFR part 800; 16 United States Code (USC) 47
State of Nevada			
Encroachment into State Highway ROW	Nevada Department of Transportation (NDOT)	ROW Occupancy Permit	
Transmission line crossing; of State Lands	NV State Land Board	Grant of Easement	
Use of State Highways for oversized vehicles	NDOT	Permit for Oversize, Overlength, and Overweight Loads	

Table 1-2. Major Authorizations, Permits, and Approvals, continued

Action Requiring Permit, Approval, or Review	Responsible Agency	Permit or Approval	Statutory Reference
Local			
County road access and crossings	Clark County	Engineering Department	County Road Access and Crossing Permits
Dust control permit for construction within the PM_{10} non-attainment boundary	Clark County	Dept. of Air Quality and Environmental Management	

2.0 PROPOSED ACTION AND ALTERNATIVES

The BLM is considering the Proposed Action along with No Action relative to the project. These alternatives are described in this chapter.

2.1 Alternative I – No Action Alternative

Under the No Action Alternative, the proposed electrical transmission infrastructure, including high-voltage power lines and substations, would not be constructed and Overton Power would not be able to meet the requests of additional and reliable electricity in the district.

The residents of the cities and towns within the project area, including the City of Mesquite, and the unincorporated communities of Bunkerville, Moapa, Glendale, Logandale, and Overton, would continue to be serviced by existing electrical infrastructure located within the power district.

2.2 Alternative II – Proposed Action

The Proposed Action (**Map 2-1**) would consist of the construction and operation of six new high-voltage substations, four new 230-kV overhead transmission lines, two new 69-kV overhead transmission lines, one rebuild of a 69-kV overhead transmission line, and one 138-kV overhead transmission line. This project would add infrastructure to complete a loop of high-voltage power between the communities of the Moapa and Virgin Valleys in Clark County, Nevada. It would provide upgrades to existing lines (some of which are near their anticipated life expectancy), provide a loop to better insure uninterrupted service, and meet the demands of anticipated growth. The project would also help to meet current demands on the Overton Power District by the City of Mesquite to improve reliability issues within the existing system.

The design, construction, operation, and maintenance of the new transmission lines would meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor Occupational Safety and Health Standards, U.S. Department of Agriculture, Rural Utilities Service, and Overton Power's requirements for safety and protection of landowners and their property. Engineering plans, drawings, and construction stipulations are currently being prepared by Overton Power.

Components of the Proposed Action are described as segments which have similar proposed structures and resource constraints. The development plan for the Proposed Action is divided into 3-year, 7-year, and 9-year phases (**Map 2-2**), with the earlier phases addressing the most urgent needs. **Table 2-1** shows the elements of the Proposed Action and total acres of ROW included in each of the three plan periods, existing and new segments, and substations. A

complete set of detail maps for the 3-year, 7-year, and 9-year plans is included as Attachment A to **Appendix B, Revegetation Plan**.

Table 2-1. Right-of-Way Acreage by Project Segment and Plan Period, Proposed Action.

Segment	kV	BLM		BOR		Private		Total		New / Existing	Parallels Existing[2]
		Miles[1]	Acres	Miles[1]	Acres	Miles[1]	Acres	Miles[1]	Acres		
Entire 3 Year Line		35.6	647.2	0	0	1.3	24.6	36.9	671.8	New	Partial
Tortoise to Bloomfield	230	4.4	80.5	-	-	0.1	2.3	4.6	82.8	New	Yes
Bloomfield	230	3.3	59.6	-	-	-	-	3.3	59.6	New	Partial
Bloomfield to Whipple	230	2.0	36.3	-	-	-	-	2.0	36.3	New	Yes
Whipple to Sandhill	230	2.5	45.7	-	-	-	-	2.5	45.7	New	Yes
Sandhill to Gila	230	14.9	270.1	-	-	0.3	6.2	15.2	276.3	New	Yes
Gila to Toquop A	230	1.6	29.2	-	-	0.8	14.6	2.4	43.8	New	Yes
Gila to Toquop B	230	2.0	35.5	-	-	0.1	1.5	2.1	37.0	New	Yes
Toquop to Mesquite A	230	2.8	51.7	-	-	-	-	2.8	51.7	New	Yes
Toquop to Mesquite B	230	2.1	38.6	-	-	-	-	2.1	38.6	New	Yes
Entire 7 Year Line		20.0	362.4	0	0	2.2	39.3	22.1	401.7	Existing	-
Sandhill to Bunkerville	138	19.4	352.0	-	-	1.8	32.3	21.1	384.4	Existing	-
Gila to Bunkerville	138	0.6	10.4	-	-	0.4	7.0	1.0	17.5	Existing	-
Entire 9 Year Line		36.3	660.1	3.4	63.2	3.7	68.7	43.5	791.9	Partial	Partial
Tortoise to Gila A	230	12.8	232.3	-	-	0.1	2.3	12.9	234.5	Partial	Partial
Tortoise to Gila B	230	7.6	138.3	-	-	-	-	7.6	138.3	Existing	-
Tortoise to Gila C	230	3.7	67.1	-	-	0.4	7.8	4.1	74.8	Existing	-
Bloomfield to Sandhill	230	5.5	100.7	-	-	-	-	5.5	100.7	New	Yes
Sandhill to Dugway	69	3.6	65.3	-	-	-	-	3.6	65.3	New	No
Dugway to Bryner	69	2.1	37.5	1.0	18.9	-	-	3.1	56.5	New	No
Bryner to Payne	69	1.0	18.9	2.4	44.3	3.2	58.6	6.7	121.8	Existing	-
Subtotal segments		91.9	1,669.7	3.4	63.2	7.2	132.6	102.5	1,865.6		
Proposed Substations											
Bloomfield (3 Year)	-	-	5	-	-	-	-	-	5	New	-
Whipple (3 Year)	-	-	5	-	-	-	-	-	5	New	-
Gila (3 Year)	-	-	10	-	-	-	-	-	10	New	-
Toquop (3 Year)	-	-	10	-	-	-	-	-	10	New	-
Dugway	-	-	5	-	-	-	-	-	5	New	-
Bryner	-	-	-	-	10	-	-	-	10	New	-
Subtotal substations	-	0	35	0	10	0	0	0	45	New	-
Grand totals	-	91.9	1,704.7	3.4	73.2	7.2	132.6	102.5	1,910.6		
Grand total, public land	-	91.9	1,704.7	3.4	73.2				1,777.9		

[1] *Rounded up to the nearest 0.10 mile. Corridor width for each segment equals 150 feet.*
[2] *Applies to new or partially new alignments. Existing lines are to be replaced by upgraded lines.*

Table 2-2 summarizes the acres of disturbance on BLM and non-BLM lands for construction and operation of the Proposed Action by project phase, as follows:

- **New permanent disturbance** that will occur as a direct result of the Proposed Action on previously undisturbed ground that will be used continually after construction is completed.
- **New temporary disturbance** that will occur as a direct result of the Proposed Action on previously undisturbed ground that will be used only during the construction and restoration phases of the project.
- **Total Existing Disturbance**, which is all areas that were previously disturbed that will be used during construction, after construction, or continually during and after construction.

Table 2-2. Surface Disturbance (acres) by Phase, Proposed Action.

Project Phase and Surface Ownership	DISTURBANCE ACREAGE			
	New Permanent	New Temporary	Total Existing	Grand Total
3 Year Disturbance Summary	**74.3**	**47.4**	**101.5**	**223.2**
Mormon Mesa ACEC	13.5	4.9	7.3	25.7
Virgin River ACEC	2.8	4.7	6.4	13.9
BLM Non-ACEC	56.8	37.0	84.6	178.4
Private	1.2	0.8	3.2	5.2
7 Year Disturbance Summary	**4.7**	**19.2**	**65.1**	**89.0**
Virgin River ACEC	1.5	4.2	25.0	30.7
BLM Non-ACEC	3.0	12.6	32.1	47.7
Private	0.2	2.4	8.0	10.6
9 Year Disturbance Summary	**50.8**	**64.2**	**134.0**	**249.0**
Mormon Mesa ACEC	0.7	1.6	1.3	3.6
BLM Non-ACEC	36.0	49.8	95.7	181.5
Bureau of Reclamation	13.8	12.6	17.3	43.7
Private	0.3	0.2	19.7	20.2
Crossing Multiple Plans	**--**	**--**	**13.3**	**13.3**
BLM	--	--	13.3	13.3
Grand Total	**129.8**	**130.8**	**313.9**	**574.5**

Tables 2-3, 2-4, and **2-5** provide detailed breakdowns of ROW disturbance by plan phase and land ownership for construction of project elements including poles, turn and pull sites, temporary and permanent access roads, and substations.

Table 2-3. Breakdown of Proposed Surface Disturbance by Project Element, 3-Year Plan.

	BLM Land				Private Land				
	New Permanent Disturbance	New Temporary Disturbance	All Existing Disturbance	Total	New Permanent Disturbance	New Temporary Disturbance	All Existing Disturbance	Total	Grand Total
Pole Location	19.5	--	1.3	20.9	0.7	--	0.1	0.8	21.6
Mormon Mesa	2.0	--	0.1	2.1	--	--	--	--	2.1
Virgin River	1.4	--	--	1.4	--	--	--	--	1.4
Non-ACEC	16.1	--	1.2	17.3	0.7	--	0.1	0.8	18.1
Pull Location	--	14.8	0.9	15.7	--	0.8	--	0.8	16.5
Mormon Mesa	--	1.7	--	1.7	--	--	--	--	1.7
Virgin River	--	1.7	--	1.7	--	--	--	--	1.7
Non-ACEC	--	11.4	0.9	12.3	--	0.8	--	0.8	13.1
Turn Location	4.0	31.8	8.4	44.2	--	--	--	--	44.2
Mormon Mesa	0.4	3.2	0.0	3.6	--	--	--	--	3.6
Virgin River	0.6	3.0	0.6	4.2	--	--	--	--	4.2
Non-ACEC	3.0	25.6	7.8	36.4	--	--	--	--	36.4
Spur Road	9.3	--	0.1	9.4	0.5	--	--	0.5	9.9
Mormon Mesa	1.1	--	--	1.1	--	--	--	--	1.1
Virgin River	0.8	--	--	0.8	--	--	--	--	0.8
Non-ACEC	7.4	--	0.1	7.5	0.5	--	--	0.5	8.0
New Access Road	10.3	--	0.4	10.7	--	--	--	--	10.7
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	--	--	--	--	--	--	--	--	--
Non-ACEC	10.3	--	0.4	10.7	--	--	--	--	10.7
Existing Maintenance Road	--	--	75.6	75.6	--	--	3.1	3.1	78.7
Mormon Mesa	--	--	7.2	7.2	--	--	--	--	7.3
Virgin River	--	--	5.8	5.8	--	--	--	--	5.8
Non-ACEC	--	--	62.6	62.6	--	--	3.1	3.1	65.7
Temporary Use Road	--	--	11.6	11.6	--	--	--	--	11.6
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	--	--	--	--	--	--	--	--	--
Non-ACEC	--	--	11.6	11.6	--	--	--	--	11.6
Substation	30.0	--	--	30.0	--	--	--	--	30.0
Mormon Mesa	10.0	--	--	10.0	--	--	--	--	10.0
Virgin River	--	--	--	--	--	--	--	--	--
Non-ACEC	20.0	--	--	20.0	--	--	--	--	20.0
Grand Total	73.1	46.6	98.3	218.0	1.2	0.8	3.2	5.2	223.2

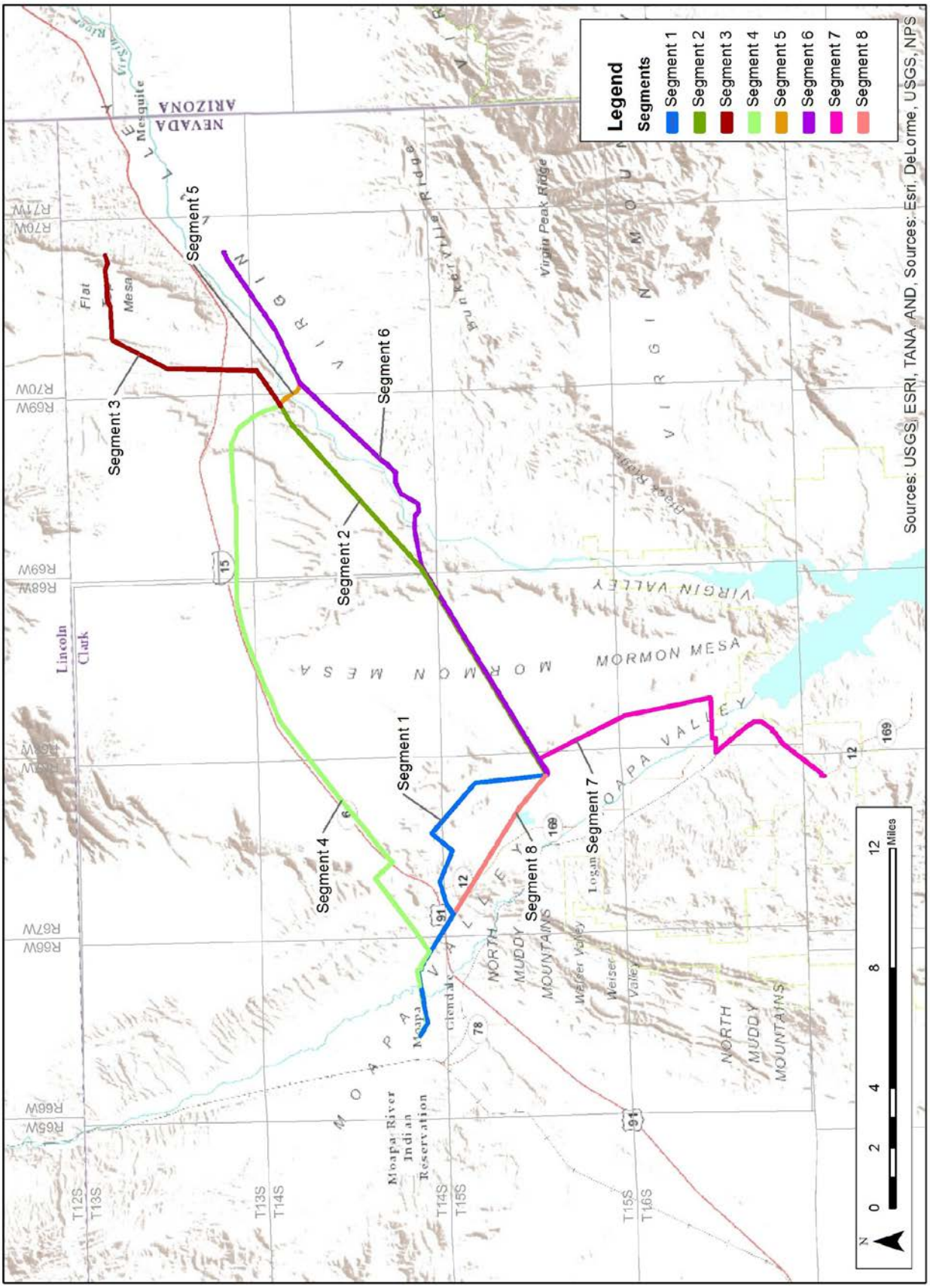
Table 2-4. Breakdown of Proposed Surface Disturbance by Project Element, 7-Year Plan.

	BLM Land				Private Land				Grand Total
	New Permanent Disturbance	New Temporary Disturbance	All Existing Disturbance	Total	New Permanent Disturbance	New Temporary Disturbance	All Existing Disturbance	Total	
Pole Location	3.3	--	6.3	9.6	0.1	--	1.0	1.1	10.7
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	1.2	--	1.3	2.5	--	--	--	--	2.5
Non-ACEC	2.1	--	5.0	7.1	0.1	--	1.0	1.1	8.2
Pull Location	--	6.0	3.7	9.7	--	--	1.6	1.6	11.3
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	--	0.5	1.1	1.6	--	--	--	--	1.6
Non-ACEC	--	5.5	2.6	8.1	--	--	1.6	1.6	9.7
Turn Location	0.8	10.8	21.0	32.6	--	2.4	2.3	4.7	37.3
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	0.3	3.7	12.4	16.4	--	--	--	--	16.4
Non-ACEC	0.5	7.1	8.6	16.2	--	2.4	2.3	4.7	20.9
Spur Road	0.4	--	--	0.4	0.1	--	--	0.1	0.5
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	0.0	--	--	0.0	--	--	--	--	0.0
Non-ACEC	0.4	--	--	0.4	0.1	--	--	0.1	0.5
New Access Road	--	--	--	--	--	--	--	--	--
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	--	--	--	--	--	--	--	--	--
Non-ACEC	--	--	--	--	--	--	--	--	--
Existing Maintenance Road	--	--	26.1	26.1	--	--	3.1	3.1	29.2
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	--	--	10.2	10.2	--	--	--	--	10.2
Non-ACEC	--	--	15.9	15.9	--	--	3.1	3.1	19.0
Temporary Use Road	--	--	--	--	--	--	--	--	--
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	--	--	--	--	--	--	--	--	--
Non-ACEC	--	--	--	--	--	--	--	--	--
Substation	--	--	--		--	--	--		
Mormon Mesa	--	--	--	--	--	--	--	--	--
Virgin River	--	--	--	--	--	--	--	--	--
Non-ACEC	--	--	--	--	--	--	--	--	--
Grand Total	4.5	16.8	57.1	78.4	0.2	2.4	8.0	10.6	89.0

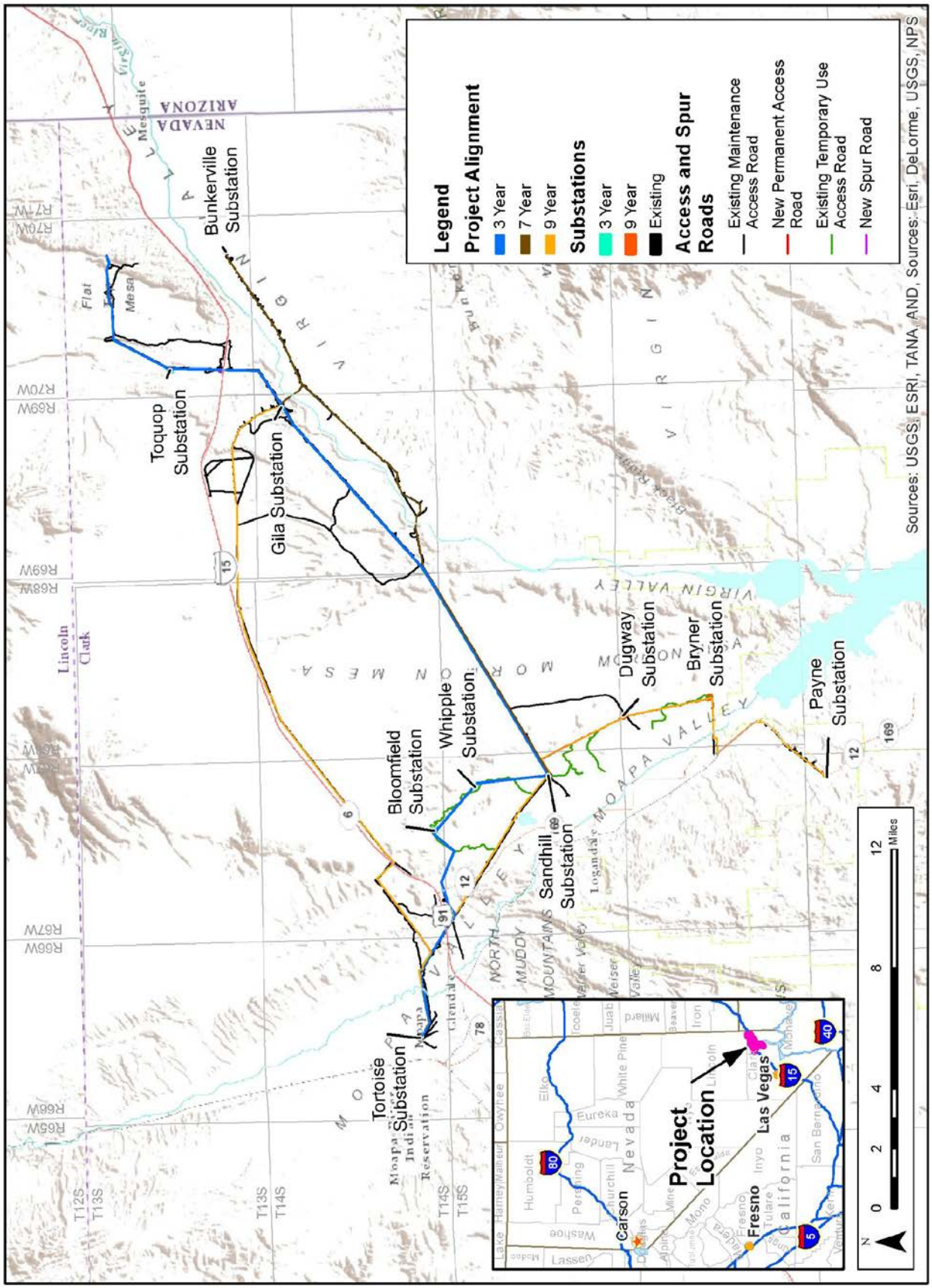
Table 2-5. Breakdown of Proposed Surface Disturbance by Project Element, 9-Year Plan.

	BLM Land				Reclamation Land				Private Land				Grand Total
	New Permanent Disturbance	New Temporary Disturbance	All Existing Disturbance	Total	New Permanent Disturbance	New Temporary Disturbance	All Existing Disturbance	Total	New Permanent Disturbance	New Temporary Disturbance	All Existing Disturbance	Total	
Pole Location	13.9	--	6.5	20.4	1.5	--	1.9	3.4	0.2	--	3.2	3.4	27.2
Mormon Mesa	0.3	--	0.0	0.3	--	--	--	--	--	--	--	--	0.3
Virgin River	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-ACEC	13.6	--	6.5	20.1	1.5	--	1.9	3.4	0.2	--	3.2	3.4	26.9
Pull Location	--	12.7	3.8	16.5	--	2.0	0.8	2.8	--	--	1.8	1.8	21.1
Mormon Mesa	--	--	--	--	--	--	--	--	--	--	--	--	--
Virgin River	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-ACEC	--	12.7	3.8	16.5	--	2.0	0.8	2.8	--	--	1.8	1.8	21.1
Turn Location	2.8	38.7	14.8	56.3	0.6	10.6	6.5	17.7	--	0.2	9.7	9.9	83.9
Mormon Mesa	0.2	1.6	0.0	1.8	--	--	--	--	--	--	--	--	1.8
Virgin River	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-ACEC	2.6	37.1	14.8	54.5	0.6	10.6	6.5	17.7	--	0.2	9.7	9.9	82.1
Spur Road	7.4	--	0.1	7.5	--	--	--	--	0.1	--	--	0.1	7.6
Mormon Mesa	0.2	--	--	0.2	--	--	--	--	--	--	--	--	0.2
Virgin River	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-ACEC	7.2	--	0.1	7.3	--	--	-	--	0.1	--	--	0.1	7.4
New Access Road	7.6	--	--	7.6	1.7	--	--	1.7	--	--	--	--	9.3
Mormon Mesa	--	--	--	--	--	--	--	--	--	--	--	--	--
Virgin River	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-ACEC	7.6	--	--	7.6	1.7	--	--	1.7	--	--	--	--	9.3
Existing Maintenance Road	--	--	63.3	63.3	--	--	6.5	6.5	--	--	4.1	4.1	73.9
Mormon Mesa	--	--	1.3	1.3	--	--	--	--	--	--	--	--	1.3
Virgin River	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-ACEC	--	--	62.0	62.0	--	--	6.5	6.5	--	--	4.1	4.1	72.6
Temporary Use Road	--	--	8.5	8.5	--	--	1.6	1.6	--	--	0.9	0.9	11.0
Mormon Mesa	--	--	--	--	--	--	--	--	--	--	--	--	--
Virgin River	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-ACEC	--	--	8.5	8.5	--	--	1.6	1.6	--	--	0.9	0.9	11.0
Substation	5.0	--	--	5.0	10.0	--	--	10.0	--	--	--	--	15.0
Mormon Mesa	--	--	--	--	--	--	--	--	--	--	--	--	--
Virgin River	--	--	--	--	--	--	--	--	--	--	--	--	--
Non-ACEC	5.0	--	--	5.0	10.0	--	--	10.0	--	--	--	--	15.0
Grand Total	36.7	51.4	97.0	185.1	13.8	12.6	17.3	43.7	0.3	0.2	19.7	20.2	249.0

Map 2-1 shows the locations of the proposed project segments and substations, which are further described below. **Map 2-2** shows the proposed construction that would occur during each plan period. A complete set of detail maps for the 3-year, 7-year, and 9-year plans is included in **Attachment A to Appendix B, Revegetation Plan**.



Map 2-1. Project Segments, Proposed Action.



Map 2-2. Project Elements and Plan Periods, Proposed Action.

Segment 1. Tortoise Substation to Bloomfield Substation to Whipple Substation to Sandhill Substation would include 12.4 miles (224.4 acres) of ROW. The line would cross over BLM and private lands and require 176 total structures with four wires on each structure. The proposed Bloomfield Substation would be constructed on a 5-acre parcel entirely on BLM lands approximately 2.5 miles west of the Moapa Valley Blvd. exit from I-15. The proposed Whipple Substation would be constructed on a 5-acre parcel entirely on BLM lands approximately 3 miles north of the existing Sandhill Substation.

Segment 2. Sandhill Substation to Gila Substation would include 15.2 miles (276.3 acres) of ROW. The line would cross BLM and private lands and require 166 total structures with four wires on each structure.

Segment 3. Gila Substation to Toquop Substation to Existing Infrastructure in the City of Mesquite would include 9.4 miles (171.1 acres) of ROW, crossing both private and BLM lands. This line would have 96 structures with four wires on each structure. The proposed Gila Substation would be constructed on a 10-acre parcel on BLM lands adjacent to SR-170 approximately 0.5 mile northwest of the Virgin River bridge. Two transformers at the Gila Substation would step down voltage from 230-kV to 138-kV and from 230-kV to 69-kV to be distributed to local customers by means of a new 69-kV distribution line from the substation to existing lines. The proposed Toquop Substation would be constructed on a 10-acre parcel approximately 2 miles north of I-15.

Segment 4. Tortoise Substation to Gila Substation (Via I-15) upgrade would include 24.6 miles (448 acres) of ROW. The line would cross BLM and private lands and require 245 structures, with each structure having four wires.

Segment 5. Gila Substation to Bunkerville 69-kV upgrade would include 1 mile (17.5 acres) of ROW on BLM and private lands. This line would have 13 structures.

Segment 6, Sandhill Substation to Bunkerville Substation upgrade would include 21.1 miles (384.4 acres) of ROW on BLM and private lands. This line would have 229 structures.

Segment 7, The Sandhill Substation to Dugway Substation to Bryner Substation to Payne Substation would include 13.4 miles (244 acres) of ROW on BLM, Reclamation, and private lands, and have 302 structures. The proposed Dugway Substation would be built on a 5-acre parcel adjacent to Mormon Mesa Road on BLM lands. The proposed Bryner Substation would be constructed on a 10-acre parcel on Reclamation lands near the east end of E. Lewis Ave.

Segment 8, Bloomfield to Sandhill would include 5.5 miles (100.7 acres) of ROW entirely on BLM Land. This line would require 57 structures each having four wires.

Table 2-6 summarizes construction time required for each project element under the Proposed Action.

Table 2-6. Construction Time Required for Segments and Substations, Proposed Action.

Project Element	Planning Period	Construction Time
230KV to Sandhill Substation	3 years	4 – 6 months
230KV Sandhill to Gila	3 years	6 – 9 months
230-kV Gila Sub – Dinosaur	3 years	6 – 9 months
Gila Substation	3 years	6 – 9 months
Toquop Substation	3 years	6 – 9 months
69-kV Along Virgin River to Gila	7 years	4 – 6 months
69-kV to Bunkerville – Upgrade 138	9 years	4 – 6 months
69-kV – Sandhill – Dugway to Payne	9 years	6 – 9 months
Whipple Substation	3 years	4 – 6 months
Dugway Substation	9 years	4 – 6 months
Bloomfield Substation	3 years	4 – 6 months
Bryner Substation	9 years	4 – 6 months
138 KV – Tortoise to Sandhills	9 years	4 – 6 months
230-kV – Tortoise to Gila (I-15)	9 years	9 – 12 months

2.2.1 Design and Construction, 230-kV Structures

The new 230-kV transmission line structures would be a combination of wood H-frame and steel monopole design approximately 75 to 80 feet tall. Monopoles would be used in critical habitat areas, except where H-structures are necessary. This would include 13 H structures for the 3-year plan, six for the 7-year plan (including three in the Virgin River ACEC), and six for the 9-year plan. Structures would be spaced approximately every 500 to 1,000 feet. Each pole would be designed to carry three electric cables on each side of the pole, extending out about 72 inches, and an optical or ground wire on either side. Dead-end structures and angle poles would be supported using guy wires to meet standard safety codes. Where steel poles were used, there would not be a need for down-guys. Each steel structure would be painted per BLM requirements. The tangent structures of the 230-kV line would have polymer suspension insulators 80 to 86 inches long. The angle and dead-end structures would have polymer insulators 92 to 99 inches long. One polymer insulator per phase would be used on all the tangent structures, and up to three insulators per phase would be used on the dead-end and angle structures. Perch deterrents and monitoring would be completed according to the Raven Management Plan.

2.2.1.1 Construction

Construction would commence upon receipt of the BLM ROW grant and notice to proceed, and in compliance with wildlife mitigation measures and seasonal wildlife timing restrictions where feasible. These restrictions would include planning land disturbance activities outside the Migratory Bird breeding season (February 15 through August 31) and/or outside the active desert tortoise season (March 1 through October 31). A biologist(s) would be present to survey for wildlife and ensure mitigation measures are adhered to in accordance with federal guidelines. Construction would be expected to take approximately 30 weeks to complete and would require approximately 16 construction personnel to be in the project area at any one time.

Construction would progress according to the following work plan. The pole locations would be surveyed and staked by a crew of 3 using survey equipment and a crew truck. Once the pole location survey is complete, each pole location area (50'x50') and lateral access (12-foot width) would be leveled off. Leveling of the pole sites and access roads would require a crew of 4 using a dozer or grader, backhoe, water truck, and 2 crew trucks (see Structure Site Clearing below). Pole delivery would take place following the leveling of the pole sites and access roads. Pole delivery would require a crew of 3 to 4 workers with a crew truck, a pole hauling trailer, and

a crane. After pole delivery, holes would be excavated at each pole location with a drill rig. Drilling activities would require a crew of 3 workers using a drill rig, water truck, and crew truck. Holes would be covered and barricaded upon excavation until poles are set with a crane. After the drilling crew has completed excavation, a crew of 6 workers would begin framing and setting poles. This activity would require a backhoe, crane, bucket truck, and two crew trucks to set 4 to 5 poles per day. Once all poles are set, the conductor would be pulled (8,000' per setup). The conductor pull would require a crew of 6 workers, two wire pull trailers, a backhoe, bucket truck, 2 crew trucks, and a 2-ton flatbed truck.

2.2.1.2 Structure Site Clearing

At each structure site, a leveled area (pad) would be needed to facilitate the safe operation of equipment such as construction cranes. The pad required for the location and safe operation of a large crane would be approximately 50'x50'. The work area would be cleared of vegetation with a dozer or grader and backhoe only to the extent necessary. After line construction, all pads would be graded to blend as closely as possible with the natural contours of the site and the disturbed area reseeded as necessary. The pads would need to remain as accessible as possible for future maintenance activities.

2.2.1.3 Pulling and Tensioning Site Clearing

Conductor pulling sites would be located at approximately 1-mile increments along the assumed centerline of the project. For sites exceeding the 150-foot ROW corridor width, a temporary-use permit would be obtained. The areas required for the location and safe operation of stringing and tensioning equipment for tangent pulling and tensioning sites would be approximately 50'x50'. The areas needed for the tangent pulling sites would be approximately 200'x200'. For angled pulling and tensioning sites an area approximately 50'x125' would be necessary for the safe operation and location of equipment. An area approximately 200'x300' would be used for the angled pulling and tensioning sites. Pulling and tensioning sites would be temporary use areas and would be subject to overland drive and crush type disturbance. **Map 2-3** shows the locations of the pulling and tensioning sites.

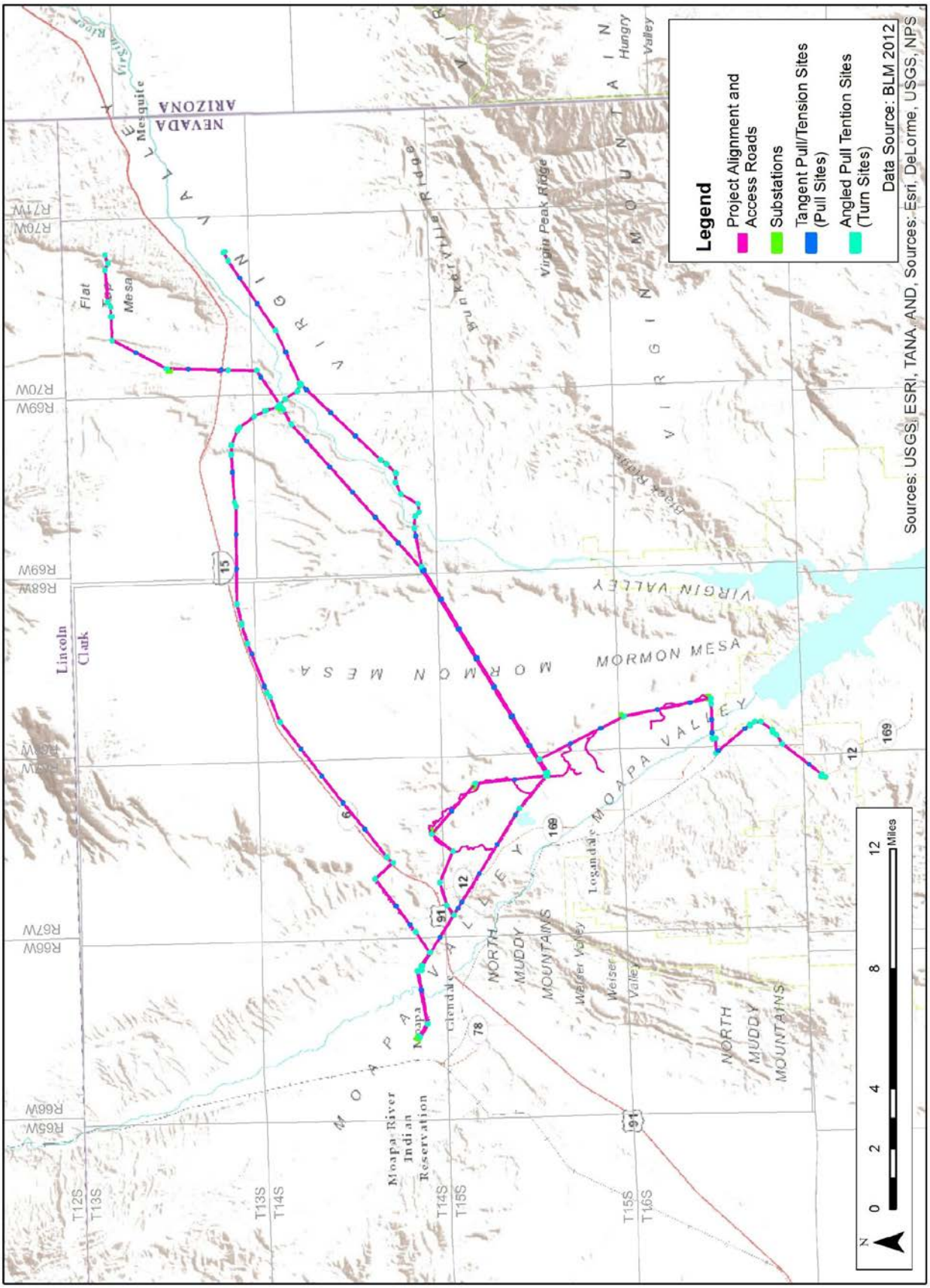
Wherever practical, Overton Power would use existing disturbed areas for construction staging. Additional staging areas may be required on private lands, which would be coordinated by the contractor with the landowner in advance of construction.

2.2.1.4 Conductors

The 230-kV line would consist of three conductors forming the three-phase single circuit, with an optical ground wire in the top position and a static wire on the opposite top position on each structure. Minimum conductor height above ground would be based on NESC and Overton Power standards. Conductors would be non-reflective.

2.2.1.5 Insulators and Associated Hardware

Angle and dead-end structures would have polymer insulators 92 to 99 inches long. One polymer insulator per phase would be used on all tangent structures, and up to three insulators per phase would be used on the dead-end and angle structures.



Map 2-3. Locations of pulling and tensioning sites.

2.2.2 Design and Construction, 69-kV Structures

The 69-kV structures would be a combination of wood H-frame and steel monopole design approximately 65 feet tall and spaced every 200 to 600 feet depending on topography, final design, and safety requirements for conductor clearances and line loading. Each pole would be designed to carry three electric cables on each side of the pole, extending out about 48 inches, with an optical ground wire on each side. Dead-end structures and angle poles would be supported using guy wires to meet standard safety codes. Where steel poles were used, there would not be a need for down-guys. Each steel structure would be painted Desert Tan, Federal standard color #23617. Perch deterrents and monitoring will be completed according to the Raven Management Plan.

2.2.2.1 Construction

Construction, structure site clearing, and pulling and tensioning site clearing for the 69-kV structures would be similar to the 230-kV structures.

2.2.2.2 Insulators and Associated Hardware

The tangent structures of the 69-kV line would have polymer suspension insulators 24 to 30 inches long. The angle and dead-end structures would have polymer insulators 42-48 inches long. One polymer insulator per phase would be used on all tangent structures, and up to three insulators per phase would be used on the dead-end and angle structures. The 69-kV lines (three existing and one new) would each require a 150-foot ROW. The standard pole for each segment would average 65 feet tall with four wires and a minimum clearance of 21 feet from the bottom wire to the ground. The wire size would be 795 acsr.

2.2.3 Design and Construction, 138-kV Structures

The 138-kV structures would be a combination of wood H-frame and steel monopole design approximately 75 feet tall and spaced every 300 to 800 feet depending on topography, final design, and safety requirements for conductor clearances and line loading. Each pole would be designed to carry three electric cables on each side of the pole, extending out about 108 inches, with an optical ground wire on each side. Dead-end structures and angle poles would be supported using guy wires to meet standard safety codes. Where steel poles were used there would not be a need for down-guys. Each steel structure would be painted Desert Tan, Federal standard color #23617. Perch deterrents and monitoring will be completed according to the Raven Management Plan.

2.2.3.1 Construction

Construction, structure site clearing, and pulling and tensioning site clearing for the 138-kV structures would be similar to the 230-kV structures.

2.2.3.2 Insulators and Associated Hardware

The tangent structures of the 138-kV line would have polymer suspension insulators 48-54 inches long. The angle and dead-end structures would have polymer insulators 64-76 inches long. One polymer insulator per phase would be used on all tangent structures, with up to three insulators per phase on the dead-end and angle structures.

2.2.4 Substations

The proposed 138-kV Toquop Substation and 230-kV Gila Substation would each be located on a 10-acre parcel of BLM land. Toquop substation would be located between Mormon and Flat Top Mesas. Gila Substation would be located three miles north of SR-170. Bloomfield, Whipple,

and Dugway Substations would each be located on a five-acre parcel of BLM-managed lands. The 230-kV Bloomfield and Whipple Substations would be located approximately two miles northeast of SR-169. Dugway Substation would be a 69-kV substation located 2.5 miles east of Logandale off of SR-169 and Whipple Avenue. The 69-kV Bryner Substation would be located east of Overton off of SR-169 and Lewis on 10 acres of Reclamation land. The substations would create a total of 35 acres of disturbance on BLM lands and 10 acres on Reclamation lands.

2.2.4.1 Construction

The construction of the substations would begin with excavation of each substation site surface to remove the topsoil layer and unwanted contours using a dozer and/or grader. The area would be graded and covered with rock/gravel using a grader and/or backhoe or loader. The substation site would be graded with imported gravel material to prevent pooling of precipitation and direct water away from the substation site, and drainage would be engineered to avoid erosion issues on adjacent lands. The sites would be graded to appropriate contours to accommodate auguring of holes for drilled cement piers and further excavation for other foundation work. Steel structure supports would be installed, followed by electrical equipment such as breakers, transformers, control houses, etc. using a forklift and backhoe. An 8-foot fence with grating and topped with one foot of razor wire would surround the substations upon completion. The fence surrounding the substations would also have tortoise-proof fencing attached in accordance with USFWS specifications.

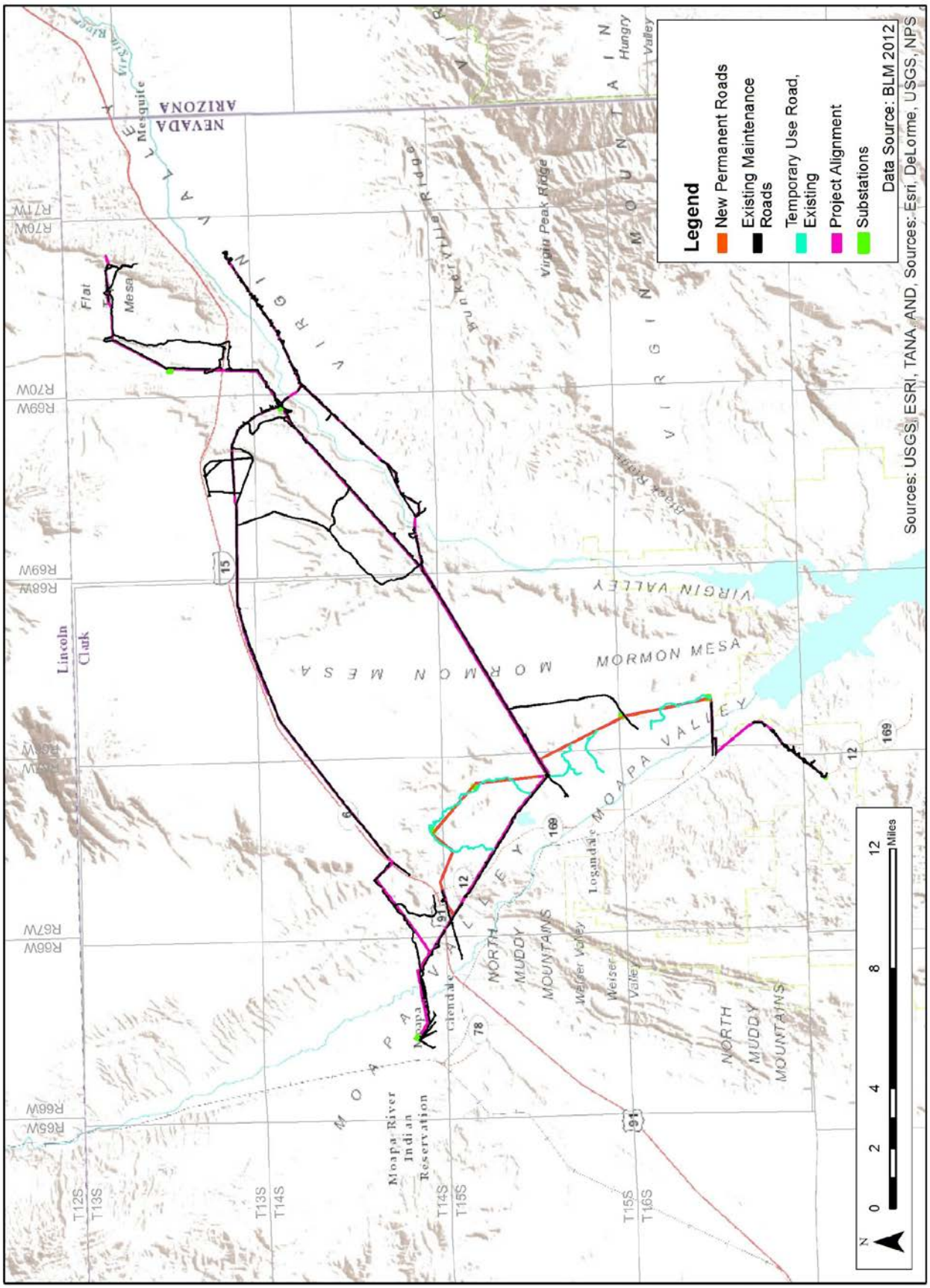
2.2.5 Access Roads

Site access would utilize permanent existing Power District maintenance roads wherever possible, particularly on proposed lines which follow existing power lines. There are a total of 134.2 miles (195.1 acres) of existing maintenance roads for the proposed project. In most cases, new spur roads would be needed along these roads to provide access at the pole locations. A total of 12.4 miles (17.8 acres) of new spur roads would be needed for the Proposed Action. For proposed power lines not following existing lines, a new permanent 12-foot-wide access road would be built within the approved ROW using a dozer or grader. In all, 13.8 miles (19.6 acres) of new permanent access roads are proposed. In addition, temporary use access roads (15.6 miles, 22.6 acres) are proposed which would be located within existing 2-track roads. These would be needed during construction in areas without existing lines and where no existing maintenance roads are available, but would not be modified. **Table 2.7** outlines proposed disturbance for the 3, 7, and 9-year plans within the permanent and new access roads for each land category. **Map 2-4** outlines the locations of all access roads.

Access roads for the Proposed Action would create a total disturbance of 255.7 acres on BLM, Reclamation and private land. The total project disturbance on BLM land for access roads would be 234 acres, of which 199 acres is existing and 35 acres would be new permanent disturbance. Disturbance on Reclamation land for access roads on the project would be 9.8 acres, of which 8.1 acres is existing and 1.7 acres would be new permanent disturbance. Access roads would also impact private lands, creating a total of 11.9 acres of disturbance; only 0.7 acres of this disturbance would be permanent.

Table 2.7. Access Road Disturbance for the 3, 7, and 9-Year Plans (acres).

	BLM		BLM Total	Reclamation		Reclamation Total	Private		Private Total	Grand Total
	New Roads	Existing Roads		New Roads	Existing Roads		New Roads	Existing Road		
3 Year	19.6	87.7	107.3	--	--	--	0.5	3.1	3.6	110.9
Existing Maintenance Road	--	75.6	75.6	--	--	--	--	3.1	3.1	78.7
Spur Road	9.3	0.1	9.4	--	--	--	0.5	--	0.5	9.8
New Access Road	10.3	0.4	10.7	--	--	--	--	--	--	10.7
Temporary Use Road	--	11.6	11.6	--	--	--	--	--	--	11.6
7 Year	0.4	26.1	26.5	--	--	--	0.1	3.1	3.2	29.7
Existing Maintenance Road	--	26.1	26.1	--	--	--	--	3.1	3.1	29.2
Spur Road	0.4	--	0.4	--	--	--	0.1	--	0.1	0.5
New Access Road	--	--	--	--	--	--	--	--	--	--
Temporary Use Road	--	--	--	--	--	--	--	--	--	--
9 Year	15.0	71.9	86.9	1.7	8.1	9.8	0.1	5.0	5.1	101.8
Existing Maintenance Road	--	63.3	63.3	--	6.5	6.5	--	4.1	4.1	73.9
Spur Road	7.4	0.1	7.5	--	--	--	0.1	--	0.1	7.6
New Access Road	7.6	--	7.6	1.7	--	1.7	--	--	--	9.3
Temporary Use Road	--	8.5	8.5	--	1.6	1.6	--	0.9	0.9	11.0
Crossing Multiple Plans	--	13.3	13.3	--	--	--	--	--	--	13.3
Existing Maintenance Road	--	13.3	13.3	--	--	--	--	--	--	13.3
Spur Road	--	--	--	--	--	--	--	--	--	--
New Access Road	--	--	--	--	--	--	--	--	--	--
Temporary Use Road	--	--	--	--	--	--	--	--	--	--
Grand Total	35.0	199.0	234.0	1.7	8.1	9.8	0.7	11.2	11.9	255.7



Map 2-4. Access Road Locations

2.2.6 Operation and Maintenance

New lines would be energized and operated 24 hours a day, 365 days per year. Maintenance would consist of periodic visual inspections, repairs, and replacements. Visual inspections of the line, access roads, and poles would be conducted annually and require 2 to 3 workers in a pickup truck. Repairs to the access roads typically consist of regrading washed-out areas once or twice annually. Repairs to the transmission line typically require a two- to three-person crew in a pickup truck and a lift truck to tighten bolts, hardware, and grounding and occasionally repair items on the poles. Replacement of poles would be rare, normally occurring once 40 to 50 years for wood poles unless severe damage results from a catastrophic event or storm.

2.2.7 Reclamation, Stabilization, and Abandonment

Construction crews would maintain disturbance to the minimum amount necessary to complete the work safely and effectively. All land clearing and disturbance would remain within the designated ROW boundaries and in accordance with proposed disturbance levels (permanent versus temporary) as outlined in the project-specific Revegetation Plan (**Appendix B**). ROW boundaries would be clearly marked to ensure disturbance remains within designated areas.

Overton Power would utilize the following methods for reclamation, stabilization, and abandonment of disturbed areas when construction of each temporary location, access road, and substation is complete:

1. Stockpile excess fill material within the ROW on the edge of permanent disturbance areas in accordance with BLM guidelines and the project-specific Revegetation Plan (**Appendix B**) until reclamation activities commence.
2. Recontour disturbed areas to approximate the original contours of the landscape.
3. Redistribute excess soil and reseed disturbed areas with a BLM-approved seed mixture.
4. Monitor restoration efforts to evaluate the success of restoration by measuring the success parameters (plant cover, density, and species richness) and other key site characteristics (i.e. erosion, pattern of vegetation, animal use, invasion by exotic species) in accordance with BLM guidelines and the project-specific Revegetation Plan.

2.2.8 Workforce

Prior to initial pole site clearing and road construction, a team of biologists would perform desert tortoise and Migratory Bird clearance surveys within areas proposed for disturbance in accordance with project-specific USFWS guidelines. A biologist would also be present during any project activities to ensure environmental mitigation measures are followed. Any personnel accessing the project would have received the worker environmental awareness program prior to working onsite.

After design and engineering functions are completed, a 3-person survey team, accompanied by a biologist(s), would set a stake at each pole and anchor location and would use stakes or ribbon to mark construction areas and areas that must be avoided. The survey crew would be followed by a 3- to 4-person team that delivers poles and hardware to each pole site. This team would also assemble and install the material on the pole. This activity would require a crew truck, pole hauling trailer, and a crane.

The delivery and assembly team would be followed by a 6-person pole-setting crew. The pole-setting crew would use an auger to drill a hole, then set the pole inside and backfill the hole. This crew would also install anchors and guy wires at the pole site if required. Typically, a construction manager would accompany the pole-setting crew to ensure and verify that the designed construction standards are followed.

The pole-setting crew would be followed by a 6-person wire-pulling crew. The wire-pulling crew would start at a pulling site, installing a rope from pole to pole for each wire that is to be installed along the entire length of the section. After the rope is installed, reels of wire would be transported to one end of the pulling section and a wire puller installed at the opposite end. The wire puller consists of a motorized rotating drum that simultaneously pulls the wire and winds the rope onto a drum reel, maintaining tension on the wire so it does not touch the ground. The crew would then tighten the wire to an engineered tension and terminate the wire at each end. The wire-pulling crew would then visit each pole to remove wire-pulling equipment and to attach the wire to the insulators using a bucket truck.

Following installation of wire, a 6-person wire-termination crew would visit each wire-pulling site to install the connections that make the wire a continuous connected circuit. This crew would also check guys and anchors for proper tension.

Finally, an inspection team would inspect the entire line before the line is energized. The inspection team would also identify any clean-up that requires follow-up action.

The entire process requires a total of 6 to 20 workers; each worker may perform tasks on more than one crew because the assembly and pole-setting crews complete their tasks before the wire pulling begins.

At least one authorized tortoise biologist would be onsite at all times. A tortoise monitor may also be onsite if supervised by the biologist. The biologist and tortoise monitor would be capable of keeping up with the construction activities because a crew is stationary at a site for hours at a time.

2.2.9 Hazardous Materials

No hazardous materials would be utilized in the construction, operations, or maintenance of the Proposed Action.

2.2.10 Applicant-committed Practices

Overton Power would utilize the following construction and operations/maintenance practices to reduce or eliminate resource impacts:

1. Use existing roads to the extent possible and minimize upgrades to access roads.
2. Minimize topsoil removal.
3. Keep work sites clean by properly containing trash. All construction waste including trash, litter, garbage, other solid waste, and petroleum products, will be removed to a disposal facility authorized to accept such materials.
4. Ensure vehicles and equipment are not leaking fluids and that fluid spills/leaks are contained and cleaned up on a regular basis.
5. Keep fire extinguishers and first aid kits in all vehicles.
6. Conduct a daily safety meeting onsite.
7. Supply authorized biologists and/or Desert Tortoise monitors to monitor construction activities for environmental compliance and an authorized biologist to provide worker environmental awareness training for all onsite workers.
8. Restrict all construction vehicle movement to pre-designated access, contractor acquired access, or public roads. Keep all vehicles within ROW and temporary disturbance areas. The limits of construction activities will be predetermined, with activity restricted to and confined within those limits. The ROW boundary will be flagged in environmentally

sensitive areas described in the plan of development to alert construction personnel that those areas will be avoided.

9. Clean and power wash all vehicles at established, identified wash areas and ensure they are free of soil and vegetation debris prior to initial entry onto the access roads.
10. Leave all existing county and state roads in a condition equal to or better than their condition prior to the construction of the Proposed Action.
11. Fences and gates on grazing lands, if damaged or destroyed by construction activities, will be repaired or replaced to their original predisturbed condition as required by the landowner or the land management agency.
12. Structures will be constructed to conform to Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006 (Avian Power Line Interaction Committee (APLIC) 2006).
13. Construction holes left open overnight will be covered to prevent livestock or wildlife from entrapment.
14. All terms and conditions for wildlife can be found wihtin the amended Biological Opinion.

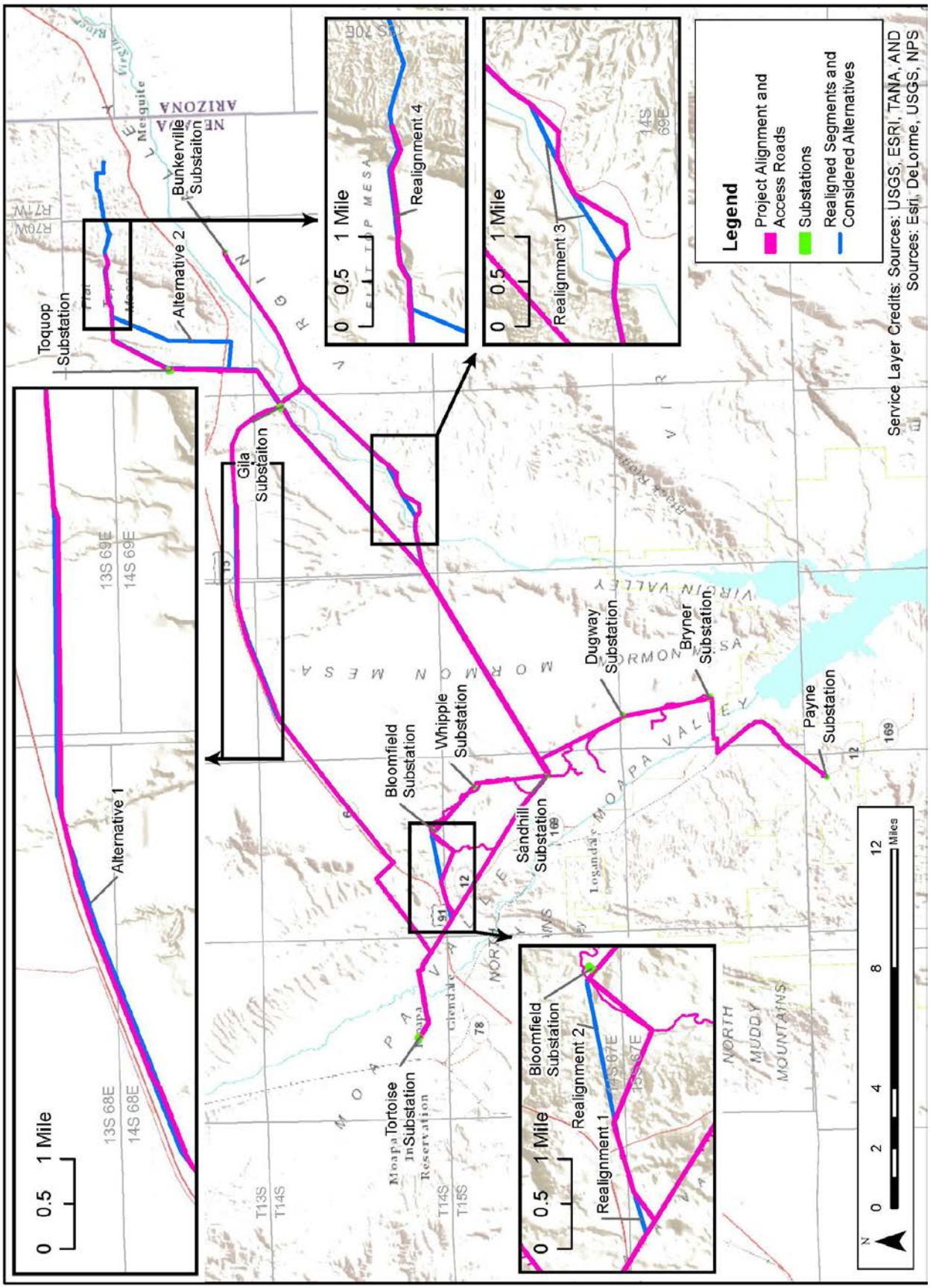
2.3 Alternatives Considered but not Analyzed in Detail

Alternative routes were considered in the following locations, but were rerouted prior to detailed analysis for the reasons shown below.

- **Alternative 1:** 9-Year Line on Mormon Mesa along the Arrowhead Highway
  Reason not analyzed in detail: The City of Mesquite submitted plans for a regional airport on Mormon Mesa. The power line would conflict with access to the runway.
- **Alternative 2:** 3-Year Line at Flat Top Mesa
  Reason not analyzed in detail: The area surrounding Flat Top Mesa includes an Area of Critical Environmental Concern. Two routes were considered and the route next to the existing power line to the west of Flat Top Mesa was selected as the route with the least amount of impact to the environment.

Additional realignments of the original route were made in consideration of specific resource conditions or impacts as described below (**Map 2-5**).

- **Realignment #1:** 9-Year Line near Overton/Logandale Exit on I-15
  Reason for change: The line was rerouted away from an Area of Critical Environmental Concern.
- **Realignment #2:** 9-Year Line near Bloomfield Substation
  Reason for change: This realignment change reduces the visual impact and the amount of earth work required for construction activities. Reducing the amount of earth work will reduce the associated land disturbance.
- **Realignment #3:** 7-Year Line at the BLM Fish Weir on the Virgin River
  Reason for change: The realignment was made at the request of the BLM Las Vegas office for the construction of a fish weir on the Virgin River.
- **Realignment #4:** 3-Year Line on Flat Top Mesa adjacent to the City of Mesquite
  Reason for change: The soil near the edge of the mesa is unstable due to erosion. The line was moved away from the edge to more stable soil. This realignment ensures that construction activities will not add to further erosion.



Map 2-5. Detail of realigned power line route segments, Proposed Action.

3.0 AFFECTED ENVIRONMENT

3.1 Introduction

The project area lies within low-elevation Mojave Desert, where vegetation cover consists of desert scrub. Historic and current land uses within the proposed project area and adjacent lands include livestock grazing, dispersed recreation, and wildlife habitat. Other land uses in the vicinity of the project area include wildlife habitat, access for natural gas exploration and development, and dispersed recreation. Electric power transmission lines and natural gas pipelines are also located within the proposed project ROW.

This section of the EA discusses environmental, social, and economic factors as they currently exist within the project area. The material presented here has been guided by management issues identified by the LVFO and by interdisciplinary field analysis of the area.

This proposal could potentially affect critical and non-critical elements of the human environment as listed in the BLM's NEPA Handbook H-1790-1. These elements and potential effects are discussed in the following sections 3.2 through 3.20.

The following are not present and will not be further analyzed:

- Prime or Unique Farmlands
- Native American Religious Concerns
- BLM Natural Areas
- Lands with Wilderness Characteristics
- Traditional Cultural Properties
- Wilderness

3.2 Climate and Air Quality

3.2.1 Climate

The project area is located in an arid (dry and warm) climate regime in southeast Nevada. The principal climatic features are abundant sunshine, small annual precipitation, and large daily variations in temperature. The climate is typical of the southern Nevada desert and is characterized by hot summers and mild winters. The nearest meteorological measurements were collected at Mesquite, Nevada (1942-2006), in the northeast portion of the project area at an elevation of 6,800 feet above mean sea level (amsl) (WRCC 2010).

The annual average total precipitation at Mesquite, Nevada is 5.85 inches, with annual totals ranging from 0.11 inches (1942) to 10.09 inches (1998). Precipitation is in the form of rain only and greatest in the winter months, tapering off to very limited rainfall in May and June.

The region is generally warm with average daily temperature (in degrees Fahrenheit [˚F]) ranging between 30˚F and 62˚F in January to between 70˚F and 108˚F in July. Extreme temperatures have ranged from 2˚F (1963) to 123˚F (1998). **Table 3.2-1** shows the mean monthly temperature ranges and total precipitation amounts.

Table 3.2-1. Mean Monthly Temperature Ranges and Total Precipitation Amounts.

Month	Average Temperature Range (˚F)	Total Precipitation (inches)
January	30-62	0.53
February	34-66	1.09
March	40-74	0.56
April	47-83	0.49
May	55-93	0.04
June	63-102	0.10
July	70-107	0.51
August	70-106	0.48
September	60-100	0.33
October	49-87	0.64
November	36-70	0.60
December	30-62	0.48
ANNUAL	66.6 (mean)	5.85 (mean)

Source: WRCC 2010.

The closest comprehensive wind measurements are collected at the St. George, Utah National Weather Service station located 50 km northeast of the project area. **Tables 3.2-2 and 3.2-3** provide the wind direction and wind speed distributions, respectively, at that site. The annual mean wind speed is 3.7 miles per hour (mph).

Table 3.2-2. Wind Direction Frequency Distribution, St. George, Utah, 2004-2007.

Wind Direction	Frequency (%)
N	0.041
NNE	0.030
NE	0.036
ENE	0.049
E	0.051
ESE	0.049
SE	0.063
SSE	0.072
S	0.082
SSW	0.071
SW	0.074
WSW	1.00
W	0.072
WNW	0.068
NW	0.081
NNW	0.063

Source: UDEQ-AQD, 2011.

Table 3.2-3. Wind Speed Distribution, St. George, Utah, 2004-2007.[1]

Wind Speed (mph)	Frequency (%)
0 – 4.0	65.2
4.0 – 7.5	21.9
7.5 – 12.1	10.3
12.1 – 19.0	2.4
19.0 – 24.7	0.2
Greater than 24.7	0.05

[1]*Source: UDEQ-AQD, 2011.*

3.2.2 Air Quality

The National Ambient Air Quality Standards (NAAQS) are health-based standards which define the maximum concentration of air pollutants allowed at all locations to which the public has access. Environmental Protection Agency (EPA) criteria air pollutants for which standards exist are carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns in effective diameter (PM_{10}), particulate matter less than 2.5 microns in effective diameter ($PM_{2.5}$), and sulfur dioxide (SO_2).

Air quality monitoring for O_3 is conducted by Clark County Department of Air Quality and Environmental Management (DAQEM) at Mesquite, Nevada. Monitoring was conducted for the Sithe Global Power Toquop Power Plant, near the project area, in 2006 and 2007 for NO_2, O_3, PM_{10}, and SO_2. CO and $PM_{2.5}$ are not currently monitored in the area, and regional monitoring results are reported here for these pollutants. CO and $PM2_{.5}$ have been monitored in north Las Vegas, Nevada at the J. D. Smith monitoring site.

The monitored concentrations described above are considered ambient air background concentrations, and are used as an indicator of existing conditions in the region. These concentrations are assumed to include emissions from industrial sources in operation and from mobile, urban, biogenic, and other non-industrial emissions sources. They are representative of background conditions within the project area, and are compared to the NAAQS in **Table 3.2-4**. The project area is designated as attainment for all criteria pollutants.

Federal air quality regulations adopted and enforced by the Clark County DAQEM limit incremental emission increases to specific levels defined by the classification of air quality in an area. The Prevention of Significant Deterioration (PSD) Program is designed to limit the incremental increase of specific air pollutant concentrations above a legally defined baseline level. Incremental increases in PSD Class I areas are strictly limited, while increases allowed in Class II areas are less strict. The project area and surrounding areas are classified as PSD Class II. Mandatory Federal PSD Class I areas within 100 kilometers of the project are Zion National Park (100 kilometers) and Grand Canyon National Park (80 kilometers). These sensitive areas have the potential to be impacted by project and cumulative sources.

Table 3.2-4. Monitored Air Pollutant Background Concentrations and National Ambient Air Quality Standards (µg/m^3).

Pollutant	Monitoring Site	Averaging Time	Measured Background Concentration	National Ambient Air Quality Standards	Incremental Increase Above Legal Baseline	
					PSD Class I	PSD Class II
CO	Las Vegas JD Smith Site 2009	1-hour	3,450	40,000	n/a	n/a
		8-hour	n/a	10,000	n/a	n/a
NO_2	Sithe Global Toquop Power Plant 2006/2007	Annual	7	100	2.5	25
		1-hour[1]	38	188	n/a	n/a
O_3	Mesquite DAQEM Site 2009	1-hour[2]	139	235	n/a	n/a
PM_{10}	Sithe Global Toquop Power Plant 2006/2007	24-hour[3]	41	150	8	30
		Annual	9	50	4	17
$PM_{2.5}$	n/a	24-hour[3]	95	9	n/a	n/a
		Annual	35	15	n/a	n/a
SO_2	Sithe Global Toquop Power Plant 2006/2007	1-hour[2]	41	196	n/a	n/a
		3-hour	28	1,300	25	512
		24-hour	19	365	5	91
		Annual	6	80	2	20

[1] *Annual 1-hour maximum monitored value.*
[2] *Highest monitored value.*
[3] *Highest, second-highest monitored value.*

The Clark County DAQEM, through authority given by the NDEP-BAPC in its EPA-approved State Implementation Plan, is the primary air quality regulatory agency responsible for determining potential impacts once detailed industrial development plans have been made, and those development plans are subject to applicable air quality laws, regulations, standards, control measures, and management practices. Therefore, the Clark County DAQEM has the ultimate responsibility for reviewing and permitting the project prior to its operation. Unlike the conceptual 'reasonable, but conservative' engineering designs used in NEPA analyses, any air quality preconstruction permitting demonstrations required would be based on site-specific, detailed engineering values which would be assessed in the permit application review. Any facility developed under the Proposed Action which meets the requirements set forth under Clark County air quality regulations would be subject to DAQEM permitting and compliance processes, including requirements for fugitive dust sources set forth in Sections 41 and 94 of the Clark County Air Quality Regulations.

All NEPA analysis comparisons to the PSD Class I and II Increments are intended to evaluate a threshold of concern, and do not represent a regulatory PSD increment consumption analysis. The determination of PSD increment consumption is an air-quality regulatory agency responsibility. Such an analysis would be conducted as part of the New Source Review process for a major source, as would an evaluation of potential impacts to Air Quality Related Values (AQRV) such as visibility, aquatic ecosystems, flora, fauna, etc. performed under the direction of the Clark County DAQEM in consultation with federal land managers, or would be conducted to determine minor source increment consumption.

The 1977 Clean Air Act amendments established visibility as an AQRV that Federal land managers must consider. The 1990 Clean Air Act amendments contain a goal of improving visibility within PSD Class I areas. The Regional Haze Rule finalized in 1999 requires the states,

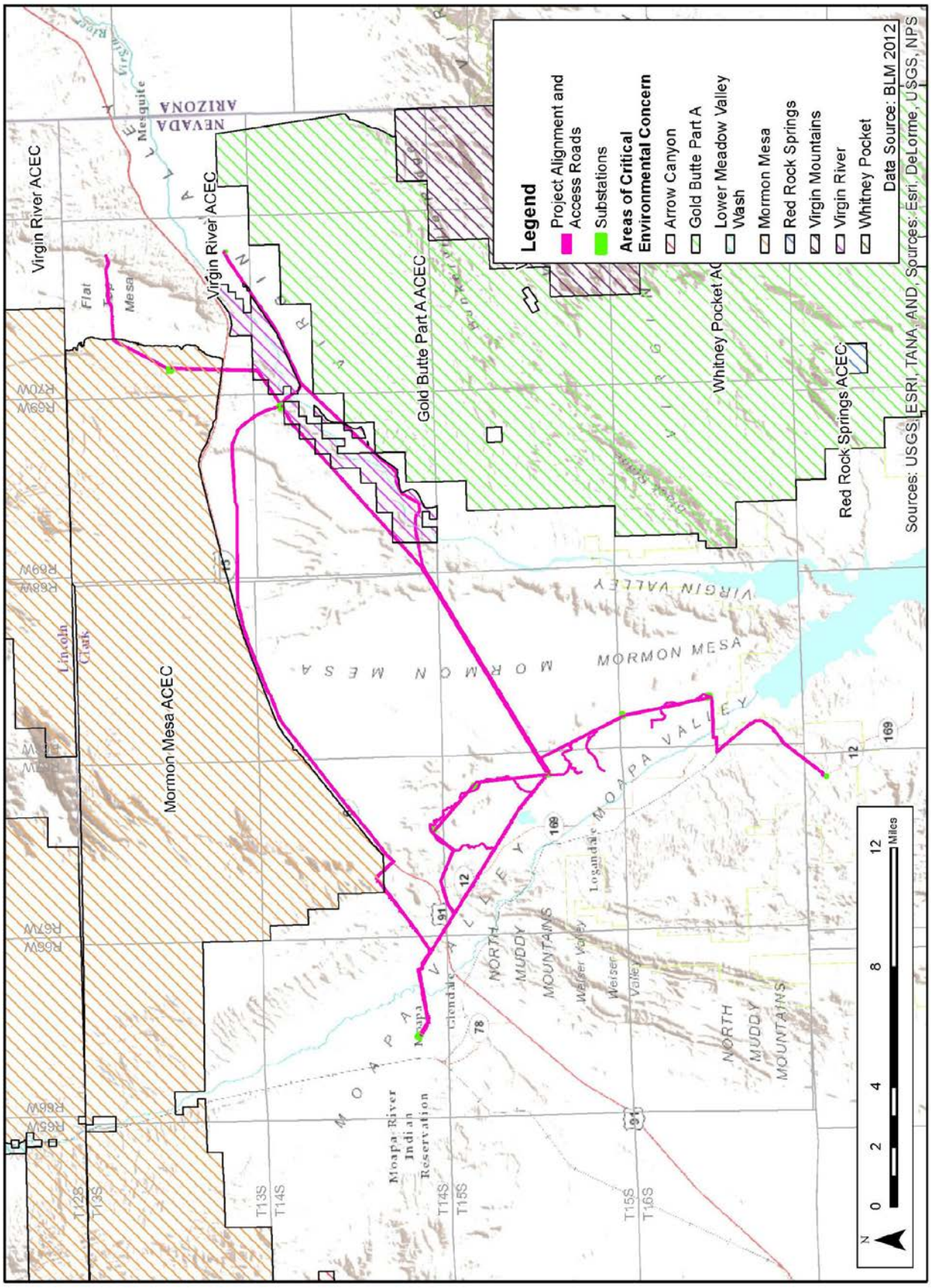
in coordination with federal agencies and other interested parties, to develop and implement air quality protection plans to reduce the pollution that causes visibility impairment.

Visibility conditions can be measured as standard visual range (SVR). SVR is the farthest distance at which an observer can just see a black object viewed against the horizon sky; the larger the SVR, the cleaner the air. Continuous visibility-related optical background data, representative of the project area, have been collected at Meadview Arizona, (located approximately 70 kilometers southeast of the project area), as part of the Interagency Monitoring of Protected Visual Environments (IMPROVE) program. Monitoring data from Meadview indicates that visibility conditions for the region are very good, with an average SVR of over 170 km (VIEWS 2011).

3.3 Areas of Critical Environmental Concern

A total of 213 acres of land within two Areas of Critical Environmental Concern (ACECs) are located within the project area: the 149,915-acre Mormon Mesa ACEC and the 2,599-acre Virgin River ACEC (**Map 3.3-1**). The Mormon Mesa ACEC is located along the Clark/Lincoln county line and is composed primarily of creosote-bursage scrub and mixed Mojave shrub communities. Its expansive bajadas are designated as critical Mojave desert tortoise habitat. The steep mountain ranges of the Mormon Mountains and Meadow Valley Mountain Wilderness Areas are also found within Mormon Mesa ACEC.

The Virgin River ACEC, located in northwest Clark County just south of the City of Mesquite, protects the river's wild and scenic character and riparian habitat. The ACEC contains portions of designated critical habitat for two endangered fish species, and one endangered bird species. Because riparian habitat is extremely limited in this eco-region, this habitat is important to maintain species diversity and to support bird migration.



Map 3.3-1. Areas of Critical Environmental Concern.

3.4 Wild and Scenic Rivers

The LVRMP and Final Environmental Impact Statement (October 1998), provided interim management protection for the Virgin River in Nevada, as an eligible river with a tentative classification of recreational.

A team of specialists from the southern Nevada District Office began the Wild and Scenic review process in April of 2010. Team members agreed to use the *Ecological Subregions* (USFS ECOMAP, 1993; as adapted from **Ecoregions of the United States**, R.G. Bailey, 1994). The data was organized according to fourth level of Hydrologic Unit Codes (HUC). The review was restricted to streams adjacent to BLM managed lands found on 1:100,000 scale maps with at least one mile of surface flows.

Streams were grouped by drainage within each HUC, and evaluated to determine whether or not they were free-flowing. The next step was to analyze free-flowing drainages for significant river-related resource values or features. These values were compared with values present in similar streams within the Ecological Subregion/sections. Streams or portions of streams with the most significant values, and those with multiple significant values rated the highest for "outstandingly remarkable values" (ORVs). Free-flowing streams with ORVs were given a tentative classification.

Five rivers in the Las Vegas and Pahrump Field Offices were determined to be free-flowing. The five rivers are the Virgin River, Muddy River, Meadow Valley Wash, Hiko Spring, and Carson Slough. Free-flowing is defined [in the Wild and Scenic Rivers Act Section 16(b)] "as applied to any river or section of a river, means existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway."

The BLM Las Vegas and Pahrump Field Offices interdisciplinary team found the Virgin and Muddy rivers, Meadow Valley Wash, Hiko Spring, and Carson Slough to be eligible for inclusion in the National System. The preliminary boundaries include ¼ mile from the ordinary high-water mark on both sides of the rivers. **Table 3.4-1** provides summary information about the river(s)/segments found to be eligible.

Table 3.4-1. River Segments Eligible for Designation as Wild and Scenic.

Watercourse, Segment Description and Approximate Length in Free-Flowing BLM River Miles (BLMRM), Total River Miles (TRM)*	Outstanding Remarkable Values	Tentative Classification
Virgin River		
Segment 1 Arizona/Nevada Stateline (Mile 0) to the bridge at Riverside (Mile 14) **(BLMRM 10) (TRM 14)**	Scenery, cultural, fish, wildlife	Recreational
Segment 2 Riverside Bridge (Mile 14) to the Overton State Wildlife Management Area (Mile 24) **(BLMRM 5) (TRM 10)**	Scenery, cultural, fish, wildlife	Recreational
Muddy River		
All portions of the Muddy River that are adjacent to BLM administered lands from Reed-Gardner power plant to private land just north of Logandale **(BLMRM 1.5) (TRM 11)**	Wildlife, cultural, fish	Recreational
Meadow Valley Wash		
Stuart Ranch to Glendale **(BLMRM 6) TRM 11)**	Wildlife, cultural, fish	Scenic

Table 3.4-1. River Segments Eligible for Designation as Wild and Scenic, continued

Watercourse, Segment Description and Approximate Length in Free-Flowing BLM River Miles (BLMRM), Total River Miles (TRM)*	Outstanding Remarkable Values	Tentative Classification
Hiko Spring Segment begins where Highway 163 curves north in Section 12, to ¼ mile downstream from lower waterfall **(BLMRM 2) (TRM 2)**	Wildlife, geology, cultural, scenery, recreation	Wild
Carson Slough Ash Meadows boundary to approximately 1 mile downstream **(BLMRM 1) (TRM 1)**	Wildlife, cultural	Wild

Source: BLM Las Vegas and Pahrump Field Offices – Wild and Scenic Rivers Eligibility Determination. This study was restricted to BLM-administered lands and related waters.

3.5 Cultural Resources

Cultural Chronology of the Area

Archaeological work in the Great Basin and adjacent areas has demonstrated that humans were in the area by approximately 15,000 years ago. Around 1,500 years ago, there was an influx of Puebloan inhabitants to the area, with clear evidence for Paiute in the project area appearing around 850 years ago. Historically, the area was settled by Mormon farmers and ranchers. **Table 3.5-1** provides a cultural chronology of the area.

Table 3.5-1. Cultural Chronology for Southern Nevada.

Period	Phase/Culture	Temporal Period	Diagnostic Artifacts
Paleoarchaic	Fluted Point	11,500 to 10,000 BP	Clovis Points Folsom Points
	Stemmed Point	10,000 to 7,000 BP	Silver Lake Point Lake Mojave Point Crescents Large Flake Tools
Archaic	Pinto	7,000 to 5,000 BP	Pinto Point Leaf-shaped knives Flat Milling Stones
	Gypsum	5,000 to 1,500 BP	Elko Eared Point Elko Corner-Notched Point Gypsum Point Humboldt Point Slab Metate
Formative	Ceramic/Saratoga Springs	1,500 to 850 BP	Rose Spring Point Grayware ceramics Black-on-gray ceramics Black-on-white ceramics Corrugated ceramics Black-on-red ceramics
Late Prehistoric/ Protohistoric	Numic (Paiute/Chemehuevi)	850 BP to 100 BP	Desert side-notched point Cottonwood triangular point Brownware ceramics Basketry
Historic	Numic/Anglo-American	100 BP to Present	Glass Metal

The cultural resource studies were conducted and consisted of both Class I and Class III investigations. The Class I investigation entailed a review of local histories, examination of

historic maps, and a review of previous inventory and field survey efforts. The Class I survey area extended for a distance of 1 mile from the edge of the area of potential effect (APE) along each power line.

The Class III investigation was aimed at locating and recording all historic properties and archeological resources that have surface and exposed-profile indications. This was accomplished through systematic pedestrian inspection of the defined 250-foot corridor using parallel transects spaced no more than 30 meters apart (spacing was shortened to 15 meters on Reclamation land). The power line APE was determined in the field from shapefiles downloaded to global positioning system (GPS) units. Site forms accompanied the field crew, and the locations of previously recorded sites and site leads were placed on a GPS unit to aid identification in the field. As reroutes were identified, a pedestrian survey was conducted to ensure all previously uninvestigated areas were examined. The investigation did not include subsurface testing.

Results

The Class I files and literature review identified 173 previous projects that crossed within one mile of the areas inventoried. The files search identified 460 previously recorded sites. The most common previously identified sites were prehistoric habitation (75 sites), lithic scatters (69 sites) and historic trash dumps (46 sites). Other site types present included rock rings, historic roads, historic buildings, rock shelters and roasting features.

The Class III inventory identified 104 sites and 66 isolated finds. The sites consist of 56 prehistoric sites, 46 historic sites, and 2 sites that contain both historic and prehistoric components. The prehistoric sites consist of 18 lithic scatters, 2 artifacts scatters, 19 sites with roasting features, 3 rock shelter sites, 1 pueblo/habitation site, 1 prehistoric trail, 5 sites with stone features (e.g. rock rings), and 7 sites with small features and artifact scatters. The historic sites consist of 12 roads, 22 trash dumps, 4 ranching-related sites, 3 utility lines, 3 campsites, 1 railroad, and 1 roadside rest area. Although no National Register of Historic Places (NRHP) determinations have been made, 49 sites are recommended eligible for the National Register, 51 are recommended not eligible and 4 sites are recommended unevaluated.

The prehistoric sites recommended eligible include 6 lithic scatters with rock features (rock rings or rock piles), 16 sites with roasting features, 2 lithic scatters, one pueblo/habitation site, three rock shelters, 1 site with rock rings, 1 prehistoric trail and 1 site with a lithic scatter and roasting features. Historic sites recommended eligible include an historic ranching site, 3 historic camps, the Arrowhead Highway (2 segments), the Mormon Wagon Road (5 segments), and an historic dump. One of the multi-component sites—an historic gas station and prehistoric roasting feature—is recommended eligible for both the prehistoric and historic components. Five of the sites that are recommended eligible are located just outside of the APE. In addition, 5 linear sites are recommended eligible, but the portions of the sites within the APE are recommended to be non-contributing to their overall eligibility.

The BLM has undertaken consultation with local Tribes that may attach religious and/or cultural significance to historic properties that may be affected by the Proposed Action. The Hopi Tribe would be requested to review and provide comment on any site-specific mitigation plans prepared for sites potentially affected by the Proposed Action.

3.6 Paleontological Resources

Fossils including those of vertebrates and their tracks and plants have been discovered in the Muddy Creek Formation. Fossil vertebrate remains are much more rare, but have also been discovered in overlying younger (chiefly Quaternary) deposits.

Within the Muddy Creek Formation some sandstone beds contain insect burrows, and root casts and bird and animal tracks. Fossil remains of *Megatylopus* (camels), *Hemiauchenia* (llamas), *Aelurodon* (dogs), *Indarctos* (bear), Equinae (horses), and *p Texoceros* (pronghorns) found in formations on the south side of the Virgin River southwest of Riverside indicate late Miocene age (R.H. Tedford, American Museum of Natural History, unpub. data, 1978).

Prior to field survey the San Bernardino County Museum (SBCM) was contacted about the paleontological potential of the transmission line corridors. Museum workers have many years' experience in conducting surveys and mitigation in the project area. In addition Dr. Gustav Winterfeld has conducted surveys in the project area associated for the City of Mesquite and the Kern River Pipeline Project.

Based on this collective experience it can be noted that although vertebrate fossils have been recovered from the formation, diagnostic fossils are infrequent at best. Discovered fossils occur infrequently and generally consist of isolated disarticulated distal limb elements or other fragmentary and poor diagnostic remains. Many of the fossils cannot be reliably identified to species and some cannot even be identified to genus.

Scott (2011) notes in his report 31 the known fossil localities that occur along or near to the transmission line corridors. The localities are concentrated in the Glendale area and between Toquop Wash and Town Wash where the Muddy Creek Formation (in the old sense) is well exposed. A few additional localities were found in younger sediments (identified in Scott's report as Muddy Creek Formation) southwest of SR-170 on the benches along the north side of the Virgin River west of the Riverside bridge.

Locality forms included in Scott's report indicate that only a few of these localities preserved fossils of scientific significance. Eratherm-Vanir Geological surveyed several of these localities in February 2011 and found no fossil remains of any kind, which suggests the original material—which was probably scarce—was collected. Field surveys revealed fossil vertebrate material at only one new location.

3.7 Soils

Soils data for the project area were compiled from U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) data from soil survey area reports and spatial data for the Virgin River Area, Nevada and Arizona (NV608, 2009) and Clark County Area, Nevada (NV755, 2007) (Table 1). In all, 37 soil map units are represented in the project ROW with 35 units (98.42% of the ROW area) covered by NV608 and 2 units (1.58% of the ROW area) covered by NV755. The six most-represented soil map units combined make up 66.92% of the ROW area with each of these soils covering at least 5% of the total area. An additional 13 soil map units range between 1-5% of the ROW area; combined, these units make up 25.97% of the total ROW. The remaining 18 soil map units are smaller than 1% of the total area and make up 7.11% of the area combined. **Appendix A** includes a table of soils for the project area.

The two most common soil types, the Typic Torriorthents-Badland Association and Mormon Mesa fine sandy loam, each cover between 17% and 21% of the project area. The Typic

Torriorthents-Badland Association is located on 30-75% slopes, and is well-drained. The surface layer (0 to 3 inches in depth) is composed of very gravelly sandy loam, with the underlying layer (3 to 60 inches) composed of a stratified, very fine sand to silty clay.

The Mormon Mesa fine sandy loam is present on top of Mormon Mesa, Flat Top Mesa, and similar environments (there are a few erosional remnants of Mormon Mesa that are scattered about the area). The Mormon Mesa fine sandy loam is located on slopes between 0% and 8%, with the sediment well-drained. The typical profile consists of fine sandy loam extending down to 16 inches, with cemented material present below 16 inches.

The other four soil units that comprise more than 5% of the project area are Bard Gravelly Fine Sand (9.31%), Bitter Spring-Arizo Association (8.20%), Badlands (5.80%) and Arada Fine Sand (5.33%). The Bard Gravelly Fine Sand is located on remnants of alluvial fans, with slopes from 4% to 15%. The sediment is well-drained, with depth to the water table in excess of 80 inches. The upper 5 inches of the typical profile consists of gravelly fine sand; between 5 and 19 inches is a fine sandy loam, and below 19 inches is cemented material.

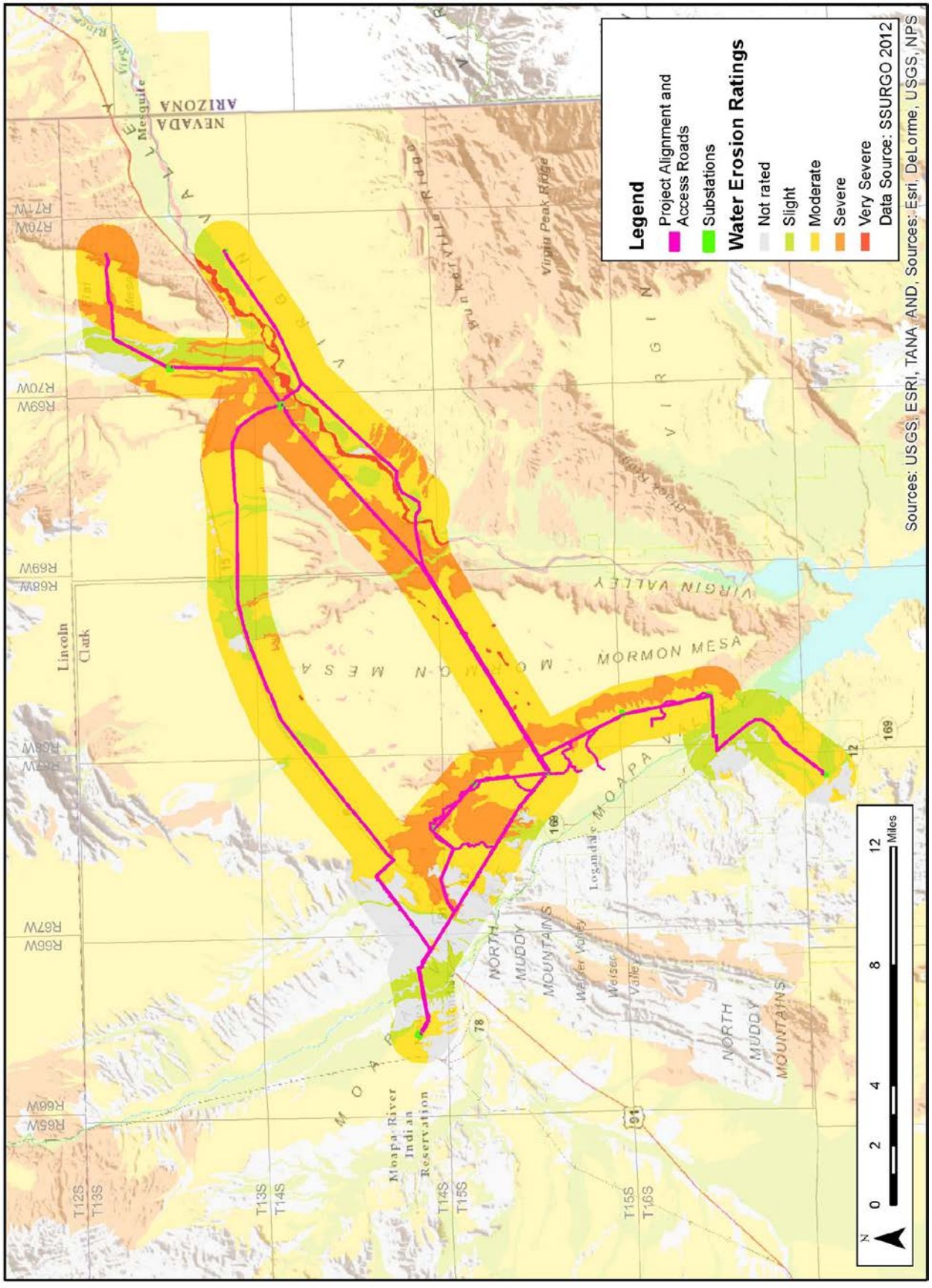
The Bitter Spring-Arizo Association is located on slightly convex alluvial fans, with a slope varying from 1% to 5%, occasionally as high as 8%. The sediment is well-drained, with the depth to water table in excess of 8 inches. From 0 to 8 inches, the sediment is characterized by a very gravelly loamy sand, and between 8 and 60 inches, the sediment is a stratified cobbly coarse sand to extremely gravelly sand.

The badland areas are highly dissected alluvial fan remnants that have little to no soil development on their surfaces. In some areas, particularly in the vicinity of Meadow Valley Wash, the badlands are capped with caliche.

Arada fine sand is located on fan remnants, particularly remnants of the Mormon Mesa fan. The sediment is present on 2-8% slopes, and is somewhat excessively drained. The surface layer (0-6 inches in depth) is composed of fine sand, with the depth to water table in excess of 80 inches. The typical profile is characterized by sand from 0-27 inches, gravelly loamy fine sand from 27-37 inches, and a stratified extremely gravelly loamy coarse sand to extremely gravelly fine sandy loam from 37-60 inches. Soil types in the project area are shown in **Table 3.7-1**. Water erosion ratings for the project area are shown on **Map 3.7-1**.

Table 3.7-1. Soil Types Present in the Overton Project Area.

	Soil Type	Percent
1	Mormon Mesa fine sandy loam, 0 to 8% slopes	20.52%
2	Typic Torriorthents-Badland association	17.76%
3	Bard gravelly fine sand, 4 to 15% slopes	9.31%
4	Bitter Spring-Arizo association, moderately sloping	8.20%
5	Badland	5.80%
6	Arada fine sand, 2 to 8% slopes	5.33%
7	Toquop fine sand, 2 to 8% slopes	3.89%
8	Tonopah very gravelly sandy loam, 4 to 15% slopes Total	3.76%
9	Arada fine sand, hardpan variant, 2 to 8% slopes	3.05%
10	Tonopah gravelly sandy loam, 0 to 4% slopes	2.90%
11	Bard gravelly fine sandy loam, 2 to 8% slopes	2.56%
12	Monger-Bard-Typic Torriorthents association	1.80%
13	Eastland gravelly sandy loam	1.72%
14	Arizo gravelly fine sand, 2 to 4% slopes	1.32%
15	Huevi-Badland association	1.31%
16	Gila loam, strongly saline	1.31%
17	Rock land-St. Thomas association, very steep	1.18%
18	Tobler fine sandy loam, strongly saline	1.17%
19	Bluepoint loamy fine sand	1.0%
20	Toquop fine sand, 0 to 2% slopes	0.97%
21	Ireteba loam, overflow	0.75%
22	Huevi-Badland association	0.66%
23	Oxyaquic Torriorthents-Toquop complex, 0 to 8% slopes	0.64%
24	Arada fine sand, gravelly substratum, 0 to 4% slopes	0.55%
25	Tobler fine sandy loam	0.53%
26	Calico loamy fine sand, coarse variant, strongly saline	0.32%
27	Toquop fine sandy loam, 0 to 2% slopes	0.27%
28	Cheme-Huevi association	0.25%
29	Playas	0.21%
30	Toquop fine sand, watertable, 0 to 2% slopes	0.20%
31	Underton extremely gravelly fine sandy loam, 2 to 8% slopes	0.20%
32	Alluvial land	0.16%
33	Riverwash-Water complex, 0 to 2% slopes	0.15%
34	Virgin River silty clay, strongly saline	0.14%
35	Tobler silt loam, wet	0.08%
36	Black Butte silt loam	0.05%
37	Calico fine sandy loam, strongly saline	0.01%

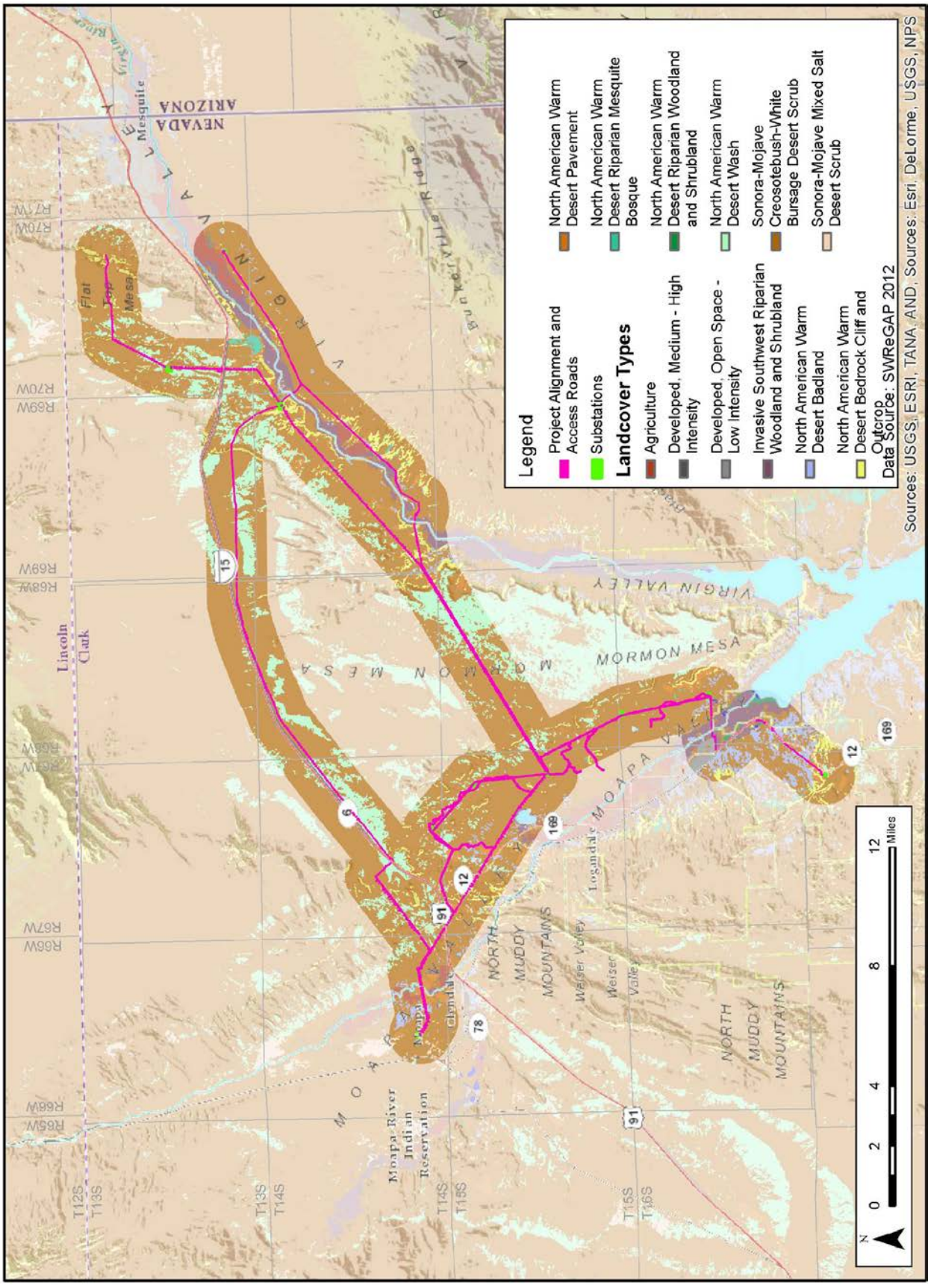


Map 3.7-1. Water Erosion Ratings for Soils in the Project Area.

3.8 Vegetation

Elevation in the project area ranges from ±2,350 feet on Flat Top Mesa to ±1,235 feet along the Muddy River south of Overton. The entire project area lies within low-elevation Mojave Desert consisting of desert scrub vegetation. Several generalized vegetation zones can be recognized within the project area (**Map 3.8-1**). These include creosote bush, saltbush, ephemeral desert wash, riparian, and a small isolated area of blackbrush on Flat Top Mesa. Within the creosote bush zone several factors influence the specific associations of plants and ultimately determine the overall plant distribution. Plant community types are primarily determined by substrate and include habitats dominated by loose or stabilized sand, gypsiferous soils, caliche and other cemented alluvium (consisting of varying degrees of sands and gravels), alluvial fan and pediment deposits, and sandstone and limestone rock. Additional factors noted in determining plant distribution include: climate and season, availability of water, slope, erosion by wind and water, and human impacts.

It is worth noting that none of the gypsum-bearing soils observed in the project area contained assemblages of rare plants (Las Vegas bearpoppy, sticky ringstem, silverleaf sunray, and Las Vegas buckwheat) that are observed elsewhere in the region. The majority of rare and sensitive plants noted in the project area were associated with stabilized sands of the Muddy Creek Formation in the creosote bush zone, and with loose sands on slopes or adjacent to and within ephemeral washes. Cacti were most abundant in rocky habitats including cemented alluvium, limestone outcrops, and alluvial deposits with a desert pavement or otherwise rocky surface cover. Joshua trees were observed on stabilized sands of Mormon Mesa and the terraces west of Toquop Wash.



Map 3.8-1. Vegetation Cover in the Project Area.

3.9 Invasive, Non-Native Species

Plant species recognized by the State of Nevada as noxious weeds are listed in **Table 3.9-1**.

Table 3.9-1. State of Nevada Noxious Weed List.

Common Name	Scientific Name
Category A Weeds: Weeds not found or limited in distribution throughout the state; actively excluded from the state and actively eradicated wherever found; actively eradicated from nursery stock dealer premises; control required by the state in all infestations.	
African Rue	*Peganum harmala*
Austrian fieldcress	*Rorippa austriaca*
Austrian peaweed	*Sphaerophysa salsula* / *Swainsona salsula*
Black henbane	*Hyoscyamus niger*
Camelthorn	*Alhagi camelorum*
Common crupina	*Crupina vulgaris*
Dalmation Toadflax	*Linaria dalmatica*
Dyer's woad	*Isatis tinctoria*
Eurasian water-milfoil	*Myriophyllum spicatum*
Giant Reed	*Arundo donax*
Giant Salvinia	*Salvinia molesta*
Goats rue	*Galega officinalis*
Green Fountain grass	*Pennisetum setaceum*
Houndstongue	*Cynoglossum officinale*
Hydrilla	*Hydrilla verticillata*
Iberian Starthistle	*Centaurea iberica*
Klamath weed	*Hypericum perforatum*
Malta Star thistle	*Centaurea melitensis*
Mayweed chamomile	*Anthemis cotula*
Mediterranean sage	*Salvia aethiopis*
Purple loosestrife	*Lythrum salicaria*, *L.virgatum* and their cultivars
Purple Star thistle	*Centaurea calcitrapa*
Rush skeletonweed	*Chondrilla juncea*
Sow Thistle	*Sonchus arvensis*
Spotted Knapweed	*Centaurea masculosa*
Squarrose knapweed	*Centaurea virgata*
Sulfur cinquefoil	*Potentilla recta*
Syrian Bean Caper	*Zygophyllum fabago*
Yellow Starthistle	*Centaurea solstiltialis*
Yellow Toadflax	*Linaria vulgaris*
Category B Weeds: Weeds established in scattered populations in some counties of the state; actively excluded where possible, actively eradicated from nursery stock dealer premises; control required by the state in areas where populations are not well established or previously unknown to occur.	
Carolina Horse-nettle	*Solanum carolinense*
Diffuse Knapweed	*Centaurea diffusa*
Leafy spurge	*Euphorbia esula*
Medusahead	*Taeniatherum caput-medusae*
Musk Thistle	*Carduus nutans*
Russian Knapweed	*Acroptilon repens*
Sahara Mustard	*Brassica tournefortii*
Scotch Thistle	*Onopordum acanthium*
White Horse-nettle	*Solanum elaeagnifolium*

Table 3.9-1. State of Nevada Noxious Weed List, continued

Common Name	Scientific Name
Category C Weeds: Weeds currently established and generally widespread in many counties of the state; actively eradicated from nursery stock dealer premises; abatement at the discretion of the state quarantine officer.	
Canada Thistle	*Cirsium arvense*
Hoary cress	*Cardaria draba*
Johnson grass	*Sorghum halepense*
Perennial pepperweed	*Lepidium latifolium*
Poison Hemlock	*Conium maculatum*
Puncture vine	*Tribulus terrestris*
Salt cedar (tamarisk)	*Tamarix* spp
Water Hemlock	*Cicuta maculata*

Knight and Leavitt Associates (K&LA) conducted noxious weed surveys during systematic and intuitive controlled surveys to identify rare plants and habitat during spring and fall 2009, and spring 2010/2011 survey periods. Throughout the survey periods, all noxious weeds and invasive plants observed were recorded using a GPS device and documented on the plant list kept for the project. Noxious weeds identified in the project area included Sahara mustard, saltcedar, Athel tamarisk, Malta star thistle, and Johnsongrass. Sahara mustard was common to abundant in sandy habitats and was present in almost all areas surveyed. The densest populations were noted near areas of disturbance, especially along roadways. Salt cedar was common in larger washes and near permanent water sources. The largest populations were observed in Meadow Valley Wash, near Bowman Reservoir, in the Muddy River flood channel south of Overton, adjacent to the Simplot mining operation along SR-169 (with Athel tamarisk), and within the Virgin River floodplain. Malta star thistle was observed in silty soils within small, low-lying depressions or catchment basins between I-15 and the old highway and adjacent to SR-169 south of Overton. Johnsongrass was also observed south of Overton along SR-169.

Both the Virgin River and Muddy River Valleys have been used agriculturally for well over a century and have long been exposed to the introduction of non-native plant species. It is therefore not unexpected that several non-native species are located in the survey area and in fact, 34 non-native species were recorded. These non-native plant species which have become naturalized, or fully established, in the survey area may be considered as invasive species which, at the very least, compete with native plants for available resources. In addition to the noxious weeds listed above, other invasive plant species are having a considerable impact in the area. At a minimum these include Russian thistle (*Salsola tragus* and *S. paulsenii*), African mustard (*Malcolmia africana*), brome grasses (*Bromus rubens, B. tectorum, and B. diandrus*), Mediterranean grass (*Schismus* sp.), smooth barley (*Hordeum murinum* ssp. *glaucum*) and other barley grasses, London rocket (*Sisymbrium iro*), cocklebur (*Xanthium strumarium*), and filaree (*Erodium cicutarium*). The potential is high for these weed species to spread outside of the project area. Similarly, with many species occurring in lands surrounding the project area and yet unknown species which could be brought into the area, the threat is high for the introduction of weed species into the project area.

3.10 Special Status Species

3.10.1 Special Status Wildlife and Fish Species

Threatened, Endangered, and Candidate Wildlife Species

A list of Threatened or Endangered (T&E) species and candidate species of concern for the project area (Clark County) was obtained from the U.S. Fish and Wildlife Service (USFWS) website http://www.fws.gov/nevada/protected_species/species_by_county.html.The most recent list available from the USFWS website at the time of this EA preparation was July 11, 2012.

The Endangered Species Act (ESA)-listed animal species for Clark County (USFWS 2012) were reviewed to determine their status in the project area (**Table 3.10-1**). Five federally listed species were documented to occur in the project area (described below and in **Appendix C**). These species are the Mojave Desert Tortoise (*Gopherus agassizii*), Virgin River chub, Virgin River population (*Gila seminuda*), Southwestern Willow Flycatcher (*Empidonax traillii extimus*), Yuma clapper rail (*Rallus longirostris yumanensis*), and Woundfin (*Plagopterus argentissimus*) One additional species, the Yellow-billed cuckoo (*Coccyzus americanus*) is a federally listed Candidate species and is documented to occur in the project area.

The Virgin River population of the Virgin River Chub (*Gila seminuda*) and the Woundfin (*Plagopterus argentissimus*) occur in the project area; however, they would not be affected by the project because it spans the river; therefore, these species will not be further discussed in this EA.

Table 3.10-1. Status of Federally Listed Animal Species in the Overton Project Area.

Common Name	Scientific Name	Status	Status in the Project Area	Affected by Project
Reptiles				
Mojave Desert Tortoise	*Gopherus agassizii*	Threatened	Present, designated critical habitat present	Likely to adversely effect
Birds				
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	Endangered	Within historic range, known occurrences, critical habitat present	Not likely to adversely effect
Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Within historic range, known occurrences	No effect, low probability of species presence
Yuma clapper rail	*Rallus longirostris yumanensis*	Endangered	Within historic range, known occurrences	No effect, low probability of species presence
Fishes				
Virgin River Chub (Virgin River pop.)	*Gila seminuda*	Endangered	Present	No effect, project spans river
Woundfin	*Plagopterus argentissimus*	Endangered	Present	No effect, project spans river

Reptiles

Mojave desert tortoise (*Gopherus agassizii*). The Mojave population of the desert tortoise was listed as Endangered under an emergency rule in August 1989. In October 1989, the Mojave population was officially proposed for listing and on April 2, 1990, the Mojave population was federally listed as threatened (USFWS 1990). Tortoises found within the project area are part of the federally listed Mojave population and can be further designated as the eastern Mojave subpopulation. The tortoises found in some portions of the project area are within ACECs (**Map 3.3-1**). One of these, Mormon Mesa, is an ACEC designated Critical Habitat by the USFWS. The second is the Virgin River ACEC. Formal surveys for the Mojave desert tortoise were

conducted within the project area during the Spring (April through early June) and Fall (September through October) of 2010 and 2011. Surveys were conducted by biologists from K&LA in accordance with USFWS protocols and guidance from biologists at the BLM LVFO. The desert tortoise is widely distributed in the project area. Numerous observations of the Mojave desert tortoise and sign were detected throughout the project area and surrounding areas. A total of 14 live desert tortoises greater than 160 millimeters (mm) midline carapace length were documented within the project area. According to an equation formulated by the USFWS to estimate desert tortoises using the number of live desert tortoise discovered, approximately 28 desert tortoises were present within the project area (USFWS 2010). Complete survey results and recommendations for Best Management Practices (BMPs) that reduce impacts to desert tortoises are found in the Biological Assessment (BA) submitted to the BLM LVFO (K&LA, August 2012) and in section 4.1.9.1.

Birds

Southwestern Willow Flycatcher (*Empidonax traillii extimus*). The Southwestern Willow Flycatcher (SWFL), federally listed as Endangered in 1995, breeds in dense, mesic riparian habitats at scattered, isolated sites in New Mexico, Arizona, southern California, southern Nevada, southern Utah, southwestern Colorado, and—at least historically—in extreme northwestern Mexico (McLeod and Koronkiewicz 2009). Factors contributing to the decline of SWFL on its breeding grounds include loss, degradation, and/or fragmentation of riparian habitat; invasion of riparian habitat by non-native plants; and brood parasitism by Brown-headed Cowbirds (*Molothrus ater*) (USFWS 1995).

SWFL are insectivores that forage within and occasionally above dense riparian vegetation, taking insects on the wing or from leaves. The habitat range of the SWFL extends throughout the southwest in spring and late summer, shifting to northern Nevada, Utah, all of Arizona (except in the south) and western/central New Mexico in summer. They prefer areas with large willow (*Salix*), cottonwood (*Populus*), and *Baccharis*, but will use salt cedar (*Tamarix*) and arrow weed (*Pluchea sericea*). Habitat for this species is known to occur in the Virgin River and Muddy River areas within the project area. Suitable breeding sites and active territories have been documented at various locations along the riverine and riparian habitats (NDOW 2010b).

SWFL studies have been conducted along the Virgin and lower Colorado Rivers and tributaries annually since 1996, in compliance with requirements set forth by the USFWS regarding routine operations and maintenance by Reclamation along the lower Colorado River. From 1997 to 2008, breeding populations of SWFL were documented by SWCA Environmental Consultants along the Virgin and lower Colorado Rivers and tributaries at eight study areas from Pahranagat National Wildlife Refuge, Nevada, south to the Bill Williams River in Arizona (McLeod and Koronkiewicz 2009). The study areas surveyed by SWCA near the project area included Mesquite, Mormon Mesa, and Muddy River, Nevada, all of which have been historically occupied by SWFL.

Within the Mesquite study site, 1 individual was documented in 2008 and a breeding site was observed. During presence/absence surveys at the Mormon Mesa study area in 2008, SWCA detected a total of 30 SWFL, of which 26 were residents and 4 were non-residents. At the Muddy River study area, 1 SWFL was detected at the Overton Wildlife Management Area (OWMA) A Pond and 10 were detected at the OWMA.

Yellow-billed cuckoo (*Coccyzus americanus*). The yellow-billed cuckoo is a USFWS Candidate species that seasonally utilizes riverine and riparian habitats along the Virgin and Muddy Rivers. The preferred habitat typically includes riparian areas, open woodlands, grasslands, and thickets. Yellow-billed cuckoos inhabit densely foliated, deciduous riparian thickets and shrubs

containing willow (*Salix*), but also mesquite (*Prosopis*). Populations have been reported outside the major portions of their range, but these populations are likely small and isolated. In Clark County, they may be found along the Virgin, Muddy and Colorado rivers, and in Las Vegas Wash (Hiatt and Boone 2003).

During SWFL studies conducted by SWCA in 2008, one yellow-billed cuckoo was seen and heard calling within the Mormon Mesa study area at the Virgin River #1 North Site (McLeod and Koronkiewicz 2009). This species has also been observed at the OWMA. Habitat for yellow-billed cuckoo overlaps that of the SWFL in the project area. No yellow-billed cuckoos were observed during wildlife studies of the project area; however, habitat is present to support them.

Yuma clapper rail (*Rallus longirostris yumanensis*). The Yuma clapper rail is a USFWS listed Endangered bird species. Reasons for its decline include habitat destruction due to channelization and elimination of marsh habitat.

Habitat of the Yuma clapper rail includes brackish or freshwater streamsides and marshlands, and the species is associated with dense riparian and marshland vegetation. The habitat range is along the marshy coastlines of California, Baja California, and Mexico. Yuma clapper rails are a rare sight around inland areas such as Nevada, but this subspecies is known to occur on the Colorado River from Lake Mead to Mexico. Habitat occurs along the banks of the Muddy and Virgin rivers in the project area. There is a documented historical occurrence of this species near the project area (NNHP 2009); however, this sighting was approximately 4 miles outside the project area in Lake Mead. The Yuma clapper rail has also been seen in the OWMA (NDOW 2010a). No Yuma clapper rails were observed during wildlife studies of the project area. Although the species is rarely seen in Nevada, habitat and historical observations suggest its presence is possible near the project area.

BLM Sensitive Species

The BLM, USFWS, Nevada Division of Wildlife (NDOW) and Nevada Natural Heritage Program (NNHP) provided information regarding other sensitive species that warrant special attention on BLM-administered lands (**Table 3.10-2**). Potential occurrences of these species were based on historical documentation or presence of habitat. Populations of these species may be declining in Nevada or across much of their range and/or are less common than currently thought and, as a result, these species could become at-risk in the future. BLM Sensitive animal species were reviewed to determine potential presence in the project area. Species known to occur or with potential habitat in the project area are discussed below.

Table 3.10-2. Status of BLM Sensitive Species in the Overton Project Area.

Common Name	Scientific Name	Habitat	Status in Project Area
Mammals			
Desert bighorn sheep	*Ovis canadensis nelsoni*	Rough, rocky, steep and open terrain	Present in surrounding mountainous areas
Reptiles			
Chuckwalla	*Sauromalus obesus*	Rocky slopes and flats, boulder outcrops, and lava flows	Present
Gila monster	*Heloderma suspectum*	Shrubby, grassy, succulent desert habitats, canyon bottoms or arroyos with permanent or intermittent streams	Present
Birds			
Bendire's thrasher	*Toxostoma bendirei*	Desert, especially areas of tall vegetation, cholla cactus, creosote bush and yucca, and in juniper woodland	Potentially Present
Ferruginous hawk	*Buteo regalis*	Open country, plains and badlands	Potentially Present
Golden eagle	*Aquila chrysaetos*	Open country, around mountains, hills, and cliffs	Potentially Present
Le Conte's thrasher	*Toxostoma lecontei*	Desert scrub, mesquite, tall riparian brush and, locally, chaparral	Potentially Present
Loggerhead shrike	*Lanius ludovicianus*	Open woodland and desert scrub	Present
Peregrine falcon	*Falco peregrinus*	Mixed conifer, pinyon-juniper, sagebrush, lowland riparian, and grassland areas. Nesting habitat on cliffs, in canyons, and cities	Potentially Present
Swainson's hawk	*Buteo swainsoni*	Open country such as grassland, shrubland, and agricultural areas	Potentially Present
Western burrowing owl	*Athene cunicularia hypugea*	Open, dry, Mojave desert scrub, sagebrush, and pinyon-juniper or mixed conifer communities	Potentially Present
Bats			
Allen's big-eared bat	*Idionycteris phyllotis*	Mine shafts, boulder piles, lava beds and beneath loose bark of ponderosa pine snags, rocky areas near riparian habitat and woodlands	Potentially Present
Fringed myotis	*Myotis thysanodes*	Desert scrub, pinyon-juniper and coniferous forest communities from 4000 to 7000 feet elevation	Potentially present in desert scrub type habitat
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	Open or forested areas with crevices for roosting and caves for hibernation	Potentially Present
Pallid bat	*Antrozous pallidus*	Southwest deserts and mountain forests, crevices and buildings	Potentially Present
Spotted bat	*Euderma maculatum*	Mountains of the ponderosa pine belt, pinyon-juniper zones of plateaus and mesa country	Potentially Present
Fishes			
Flannelmouth sucker	*Catostomus latipinnis*	Swift-water channels of deep, large rivers and tributaries riffles, pools, backwater and occasionally small creeks	Potentially Present
Virgin River Chub (Muddy River population)	*Gila seminuda*	Deep runs and pools with slow to moderate velocities and sand, large rocks, cover in the form of overhanging banks and tree roots	Potentially Present

Desert bighorn sheep (*Ovis canadensis nelson*) is a species of conservation priority. Populations of desert bighorn sheep inhabit the Muddy, North Muddy, Mormon, Arrow Canyon, Meadow Valley, Delamar, and Virgin mountain ranges surrounding the project area (NDOW

2010b). Desert bighorn are a BLM sensitive species and are afforded protection by the State of Nevada through its management as a high-profile big game mammal (NRS 501.005). A letter of consultation from the Nevada Department of Wildlife (NDOW) regarding bighorn sheep in the area can be found in **Appendix D.**

The 2010-2011 Big Game status report from NDOW was consulted to assess populations of desert bighorn within the mountain ranges surrounding the project area. An October 2010 aerial survey of the Muddy Mountains yielded a sample of 271 bighorn sheep at sex and age ratios of 114 rams and 24 lambs per 100 ewes. Bighorn sheep were widely distributed and encountered throughout much of the survey route. Aerial surveys of the Mormon Mountains were completed in September 2010 and resulted in the classification of 156 sheep consisting of 44 rams, 86 ewes and 26 lambs. In October 2009, an aerial bighorn sheep survey was conducted over the Bunkerville Ridge, Virgin Mountains, and northern portions of the Gold Buttes. The survey yielded a sample of 8 rams, 19 ewes and 10 lambs. The majority of the bighorn observations were in the northern portions of the Gold Buttes (NDOW 2010-2011).

Although the project area could support desert bighorn sheep, they are expected to remain within the higher-elevation limits outside the project area. One desert bighorn ram was observed during a survey of the project area, but was encountered in the additional survey transects outside the project area.

Chuckwalla (*Sauromalus obesus*). The chuckwalla lizard inhabits undisturbed rocky slopes, rocky flats, boulder outcrops, and lava flows. It typically uses high points in rocky habitat for basking, and retreats into rock crevices at night and when threatened. The chuckwalla's habitat range extends through most of the desert southwest from southern Utah into northern Mexico. In Clark County, this species occurs on virtually all undisturbed rocky hillsides up to about 4,920 feet in elevation (Hiatt and Boone 2003). Chuckwalla habitat occurs throughout the project area, overlapping with desert tortoise habitat, particularly in rocky areas. One live chuckwalla was encountered during a botanical survey of the project area.

Gila monster (*Heloderma suspectum*). Gila monsters are the only poisonous lizards found in North America. They feed upon a variety of small mammals, birds, lizards, and eggs of birds, lizards, snakes, and tortoises. Gila monsters dig underground burrows or use the burrows of other animals, where they spend 90% of their lives resting. They inhabit shrubby, grassy, and succulent desert habitats on the lower slopes of mountains and nearby plains. Few observation records exist to document the distribution and abundance of the species, but they have been found locally from Lake Mead to Valley of Fire State Park. According to NDOW biologists, the Gila monster is widely distributed in the project area (NDOW 2010b). Gila monster habitat overlaps with habitat of the desert tortoise, which covers the entire project area; however, no live Gila monsters were encountered during surveys of the project area.

Bendire's thrasher (*Toxostoma bendirei*) is a large, long-tailed songbird of 9 inches in length. It is a dull grayish-brown color all over its body with faint spots on its chest and belly. It has a long, slightly down-curved bill which it uses to forage on the ground for insects, spiders, seeds and berries. Habitat for the Bendire's thrasher can be found in desert areas, especially where there is tall vegetation, cholla cactus, creosote bush and yucca or in juniper woodland. Bendire's thrasher is a summer breeding resident of the Nevada desert. It is a BLM Sensitive species and State of Nevada protected species. This songbird was not encountered during a wildlife survey of the project area, but habitat is present to support the species.

Ferruginous hawk *(Buteo regalis)* is a rufous hawk with white underparts and a brown streaked head. Flight in this species reveals a white breast, flight feathers and tail. The wing linings are rusty in coloration and the thighs form a dark "V" pattern. Habitat of this species is found in arid

grasslands, farms and canyons, and nesting occurs on cliff, trees, and even man-made structures (Rogers, 2002). Their habitat range is Nevada, Utah, northern Arizona, and northern New Mexico in summer and throughout the southwest during winter, except in eastern Utah. The ferruginous hawk is a BLM Sensitive Species and a State of Nevada protected species under NRS 501 (Nevada Natural Heritage Data, 2003). Habitat is present to support ferruginous hawks, but none were observed during the survey of the project area.

Golden eagle (*Aquila chrysaetos*) is a majestic species of raptor that inhabits mountains, forests, and grasslands throughout the southwest. Adult golden eagles are dark brown with a golden nape, heavily feathered legs, yellow feet, and a banded gray tail base. Immature eagles look similar to adults, but are dark brown with a wide, white tail band and white at the base of the primary feathers. Full grown eagles are 30 inches long and have a wingspan of 80 inches (almost 7 feet). They prey upon mammals and birds which are hunted mainly from the air. Eagles fly with few wing beats or soar and have their wings slightly turned up as they fly. Golden eagles have State Protected Status in Nevada (NRS 501) and are a BLM Sensitive species. They are also protected under the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act and the Lacey Act.

Le Conte's thrasher (*Toxostoma lecontei*) is a slim, dull-colored bird with pale plumage. Its preferred habitat is dense growth of saltbush (*Atriplex sp*.) in low-lying, barren desert plains. Thought to be uncommon over its range, the thrasher occurs in California, Nevada, and Arizona. In Clark County, this species is a year-round resident in suitable habitat. The Le Conte's thrasher is considered a BLM Sensitive species and a State of Nevada protected species under NRS 501, but the species has no USFWS status. Habitat to support Le Conte's thrasher is present in the project area, but this species was not encountered during a survey.

Loggerhead shrike (*Lanius ludovicianus*) is a bluish-gray bird, with white and faintly striped underparts. It also has a black mask that extends above the eye and thinly across the top of the bill. Shrikes are also called butcher birds because they impale prey items on thorny bushes. The shrike prefers habitat in open desert, washes, or thinly wooded shrublands. The loggerhead shrike's habitat range extends from southern Canada to southern Mexico, and it is a year-round resident of Clark County, Nevada. The shrike is a USFWS Species of Concern, a BLM Sensitive species, and a State of Nevada protected species under NRS 501. Open desert and wash habitat to support the loggerhead shrike is present within the project area. The species was encountered during a survey of the project area.

Peregrine falcons (*Falco peregrinus)*. Peregrine falcons are sleek, powerful raptors that have long been considered the embodiment of speed and power. Once listed by the ESA as an Endangered species but delisted as of August 25, 1999, peregrine falcons are making a comeback (Hiatt and Boone 2003). The species almost died out at one time due to DDT poisoning because they prey upon smaller birds that eat insects. DDT bans and captive breeding/releasing programs have aided populations to increase. Peregrine falcons are now a BLM Sensitive species and a State of Nevada protected species (Nevada Revised Statutes [NRS] 501).

Peregrine falcon habitat is found in mixed conifer, pinyon-juniper, sagebrush, lowland riparian, and grassland areas on cliffs, canyons, and in cities where they construct nests, but the species will feed anywhere. Nests are shallow hollows in soil, rock ledges, small caves on cliffs, or man-made structures. Peregrine falcons are migrants or residents of the entire southwest region. In Clark County, they are known to occur in the Spring Mountains, Desert NWR, Logandale, Overton SWMA, and Newberry Mountains (Hiatt and Boone 2003). They are also known to nest in the Black Mountains, Lake Mead, and within the Las Vegas Valley area. Within the project area, habitat for peregrine falcons is expected to occur in low riparian areas near the city of

Logandale and in the Lake Mead area, as well as along the cliff walls below the mesas and within deep washes. No live peregrine falcons or nests were encountered during surveys of the project area.

Swainson's hawk (*Buteo swainsoni*) is a medium-sized hawk of 22 inches length with a stout body, broad wings, and medium-long rounded tail. Swainson's hawks have a white face and dark flight feathers contrasting with a pale inner wing. Their chest has a dark band and their tail is light colored with multiple thin, dark bands and one darker and broader near the tip of the tail. They are found in open country habitat such as grassland, shrubland, and agricultural areas. During the breeding season, this hawk eats mammals, birds, and reptiles, while the rest of the year it eats insects, especially grasshoppers and dragonflies. Swainson's hawk is a BLM Sensitive species and State of Nevada protected species. Habitat is present within the project area to support this species, but none were observed during the survey.

Western burrowing owl (*Athene cunicularia hypugea*). The western burrowing owl is a small, brown, ground-dwelling owl with long legs and a short, stubby tail. Its preferred habitat is open, dry, Mojave desert scrub, sagebrush, and pinyon-juniper or mixed conifer communities. Open areas with low, sparse vegetative cover provide foraging habitat and line-of-sight views of potential predators to which it is otherwise vulnerable. Burrowing owls use habitat that is or has been inhabited by desert tortoises, ground squirrels, or other small mammals, modifying and using their burrows as refuge and nesting sites. Prey species include insects, rodents, and small reptiles.

Habitat for western burrowing owls ranges throughout Nevada and the western United States in summer, but they winter or are residents in more southerly areas of the southwest, including southern Nevada. A live burrowing owl was encountered during 2010 surveys of the project area and habitat is present to support them.

Migratory Birds. The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, and transportation (among other actions) of migratory birds, their eggs, parts, and nests, except when specifically permitted by regulations. All birds encountered within the project area with the exception of sparrows, starlings, and pigeons would be covered by the MBTA. One bird species with special protection status was encountered during a survey of the project area: the loggerhead shrike, a BLM Sensitive Species. A list of bird species encountered during surveys of the project area by K&LA can be found in **Appendix C**.

Five BLM Sensitive bat species have the potential to occur within the project area: Pale Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), spotted bat (*Euderma maculatum*), pallid bat (*Antrozous pallidus*), Allen's big-eared bat (*Idionycteris phyllotis*) and fringed myotis (*M*yotis *thysanodes*). Sites such as caves and abandoned mines that are critical to these species for maternity colonies, hibernacula, and similar concentrations, are not present within the project area or immediate vicinity, although cliffs, crevices, and rocky outcroppings within the project area could support these bats. Riparian areas suitable to Allen's big-eared bat and Townsend's big-eared bat may occur along the Virgin and Muddy rivers near the project area, although this habitat is limited. Open water along the rivers and Bowman Reservoir would also serve as foraging areas for bats within the project area. The presence of these five species within the project area is expected only during nocturnal foraging bouts and migratory movements. Potential for occurrence within the project area during construction is expected to be very low for all BLM-listed bat species.

Flannelmouth sucker (*Catostomus latipinnis*): Flannelmouth sucker migrates upstream to spawn in riffles, over a substrate of coarse gravel. The species feeds on the substrate by scraping

algae, detritus, and small invertebrates from stones and submerged objects. It can be found in swift-water channels of deep, large rivers and tributaries. It can also be found in riffles, pools, backwater, and occasionally in small creeks. In Clark County, these fish occur in the Virgin River, but they are found infrequently in Lake Mead and the Colorado River below Davis Dam (Hiatt and Boone 2003). Habitat of these fish occurs in the Virgin River and Lake Mead near the project area. Because the power line would span the river, this species would not be impacted by the Proposed Action, and will not be further discussed.

3.10.2 Special Status Plants

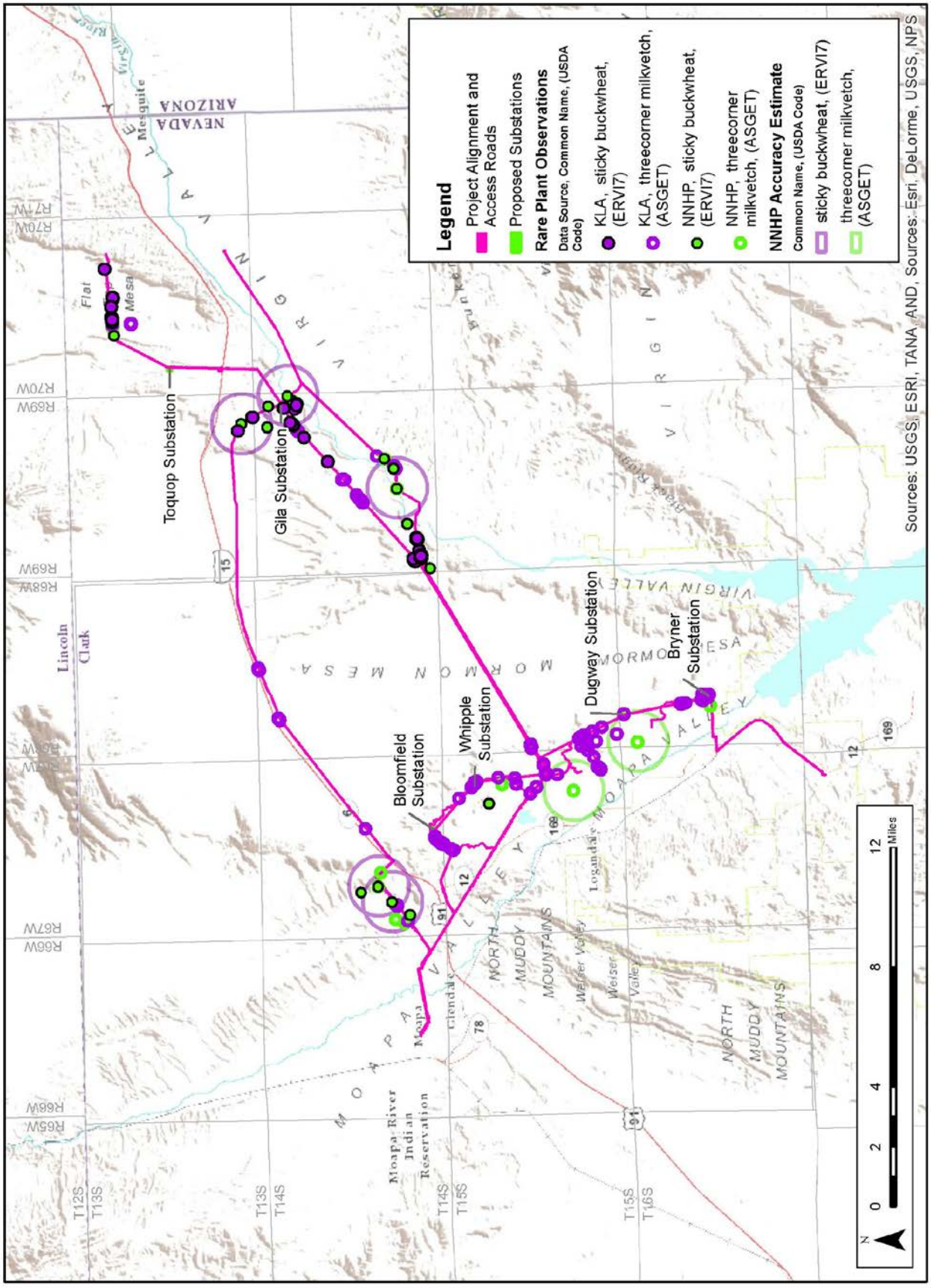
Rare and sensitive plant surveys were conducted by Knight & Leavitt Associates (K&LA) in the spring of 2010 and 2011 to determine the presence and distribution of rare plants in the project area. K&LA also made field observations in the area between 2006 and 2009. A detailed description of survey methods and results can be found in the *Botanical Survey of the Proposed Overton Power Nine Year Power Line Upgrades Project, Clark County Nevada* dated August 31, 2012 prepared by K&LA and submitted to the BLM LVFO.

Threatened and Endangered Plant Species

No plants listed as Endangered or Threatened species by the USFWS were identified or are known to occur in the project area.

Candidate Species

Las Vegas buckwheat (*Eriogonum corymbosum* var. *nilesii*), a USFWS Candidate species, grows in gypsum soils in Clark and Lincoln Counties, and is not known to occur, nor was it observed, in the project area. None of the gypsum soils identified in the project area contained Las Vegas buckwheat. Other rare plants typically associated with Las Vegas buckwheat, including Las Vegas bearpoppy (*Arctomecon californica*) and sticky ringstem (*Anulocaulis leiosolenus* var. *leiosolenus*), were also noted as being absent from the project area.



Map 3.10-1. Distribution of Sticky Buckwheat and Three-corner Milkvetch in the Project Area.

BLM Special Status Plant Species

Four species of plants listed as BLM Special Status species were located in the project area. These were **threecorner milkvetch** (*Astragalus geyeri* var. *triquetrus*) **sticky buckwheat** (*Eriogonum viscidulum*), **Straw milkvetch** (*Astragalus lentiginosus* var. *stramineus*), and **Beaver Dam breadrooot** (*Pediomelum castoreum*). Threecorner milkvetch and sticky buckwheat are also listed by the State of Nevada as critically endangered (NAC 527.010).

Threecorner milkvetch is an annual herb that is endemic to the eastern Mojave Desert. It grows in creosote bush scrub in loose, sandy soils or stabilized sands, occasionally with a light surface cover of caliche fragments or gravel. Threecorner milkvetch flowers in the early spring with average or higher precipitation and forms distinctive three-sided seed pods (Nature Conservancy, 2007). Frequently, but not always, threecorner milkvetch occurs with Beaver Dam breadrooot (*Pediomelum castoreum*).

In the project area, threecorner milkvetch was located in the eroding soils of the Muddy Creek Formation between the mesas and the valley floors. A few plants were also noted in similar soils on Mormon Mesa parallel to I-15 on the Tortoise to Gila Segments. Threecorner milkvetch was typically found on relatively flat terrain and in the shallow channels which form in these areas. It also occupied areas adjacent to roadways where slightly higher levels of moisture might be expected. Approximately 1.0 acre of threecorner milkvetch habitat was located in proposed areas of disturbance in the project area.

Sticky buckwheat is an annual herb found in sandy soils, stabilized dunes, and other sandy locations in the northeastern portion of Clark County. Populations also occur in Lincoln County, Nevada and in Mohave County, Arizona (Niles et al. 1995). Sticky buckwheat is endemic to the eastern Mojave where it flowers from late March to late May. It is most abundant in years of average to above-average rainfall. Most of its life history is spent as seeds stored in the sand substrates.

In the project area, sticky buckwheat was observed on sandy slopes and in the sandy substrates and terraces of tributary channels of the Virgin River as far north as Toquop Wash adjacent to Flat Top Mesa. All populations noted during the surveys from 2009 to 2011 were east of Mormon Mesa, although prior surveys indicate populations also occur west of Mormon Mesa. Approximately 0.5 acre of sticky buckwheat habitat is located in proposed areas of disturbance in the project area.

Straw milkvetch is one of several varieties of freckled milkvetch (*Astragalus lentiginosus*) which appears to be adapted to sandy environments (2008 Nevada Rare Plant Workshop, http://heritage.nv.gov/nrpw/commnt08.htm). It was noted as being locally common in sandy soils and washes in the northeast portion of the project area. The full distribution of variety *stramineus* and its exact relation to other varieties is not fully understood. It seems apparent, that the population in Toquop Wash represents the largest known grouping of this variety and is thought to be critical for the long-term survival of the taxon (ibid). Welsh et al. (2008) describe this variety as being a Beaver Dam-Virgin endemic and as being “the only member of the species having moderate sized flowers to occur in Washington County, [Utah].”

Straw milkvetch is capable of growth in disturbed habitats and has been observed in several areas which have previously been cleared. It has also been observed in soils prone to grazing and in loose, windblown sandy soils. The largest concentrations of this taxon were noted in the sandy soils west of Flat Top Mesa and east of the main channel of Toquop Wash. A population was noted near the proposed Toquop substation and in a sandy wash east of Mormon Mesa on the Tortoise to Gila C segment. Straw milkvetch was also observed with other sensitive species

including threecorner milkvetch, sticky buckwheat, and dune sunflower. Approximately 0.2 acre of straw milkvetch habitat is located in proposed areas of disturbance in the project area. Care should be taken to avoid long term disturbances in these areas, to protect the soils where straw milkvetch has been observed, and to preserve the integrity of this particular variety of freckled milkvetch.

Beaver Dam breadrooot was likely the most common and widespread sensitive plant species observed in the project area. This plant was most common on sandy soils with a stabilized soil surface and a light to moderate rock cover. It was commonly observed in association with threecorner milkvetch but was generally more widespread and occurred in larger numbers. Beaver Dam breadrooot was primarily associated with soils of the Muddy Creek Formation in areas where the soils were stabilized, but not too rocky, and topography was more or less level or only gradually sloped. It was occasionally observed in areas of disturbance including dirt roads, vehicular tracks and areas with cattle sign and recent grazing. The ability of Beaver Dam breadrooot to return from disturbances may be due to its life form as an herbaceous perennial which grows from a deep root stock each spring. As long as disturbances do not significantly destroy the subsurface soil layers, the plant has a good chance of recovery and survival. Beaver Dam breadrooot was not observed south of the proposed Dugway substation where populations of threecorner milkvetch were observed. Likewise, it was sparsely represented on Mormon Mesa and was not observed on Flat Top Mesa. Approximately 4.0 acres of Beaver Dam breadrooot habitat is located in proposed areas of disturbance in the project area.

Five additional BLM Special Status Plant Species have been noted near the project area but were not noted during the project surveys. These are Las Vegas bearpoppy, sticky ringstem (*Anulocaulis leiosolenus* var. *leiosolenus*), Virgin River thistle (*Cirsium virginense*), silverleaf sunray (*Enceliopsis argophylla*), and rosy twotone beardtongue (*Penstemon bicolor* ssp. *bicolor*).

The BLM protects special status species to “prevent a trend toward listing under the endangered species act” (BLM, 2008). Furthermore, the BLM is a signatory on the Clark County MSHCP under which threecorner milkvetch and sticky buckwheat are listed as covered species and Beaver Dam breadrooot is listed as a watch species. The management goal of the MSHCP is that there will be no net unmitigated loss of occupied habitat for covered plant species (Regional Environmental Consultants, 2000). All special status plant species habitat affected during the construction process will be mitigated to achieve these management objectives. The Revegetation Plan submitted by K&LA (July 2, 2013; **Appendix B**) addresses measures which will be implemented to restore lands temporarily disturbed during construction.

Additional information on sensitive plant species, including all Nevada Natural Heritage Program (NNHP) At-Risk Species, located within the project area, can be obtained from the botanical survey report submitted by K&LA to the BLM (August 31, 2012).

Cacti and Yuccas

All cacti and yucca species in the project area are considered property of the federal government and are regulated by the BLM forestry program. Sale and transport of cactus and yucca is regulated under Nevada Revised Statutes 527.060.120 (State of Nevada 2007). Under BLM guidelines, cacti and yucca are to be salvaged and used for revegetation using a qualified contractor with a minimum of three years experience in cactus and yucca salvage in the Mojave Desert; stockpiled; sold in a public sale; or purchased by the proponent. Guidelines for cactus and yucca salvage are discussed in the Revegetation Plan (**Appendix B**). In all, eleven species of cacti and two species of yucca were observed in the project area.

Silver cholla (*Cylindropuntia echinocarpa***)** and beavertail pricklypear (*Opuntia basilaris* var. *basilaris*) were the most common cacti, being found throughout the creosote bush zone. Cottontop cactus (*Echinocactus polycephalus* var*. polycephalus*) was also widely scattered, but was more restricted to rockier surfaces including moderately rocky slopes and flats containing generally barren soils. The remaining cactus species were more restricted to rocky surfaces and outcrops and were particularly common across Weiser Ridge, along the edges of mesas, near the upper portions of Halfway Wash on Mormon Mesa, on the bajada southeast of the Virgin River, and on the rocky terraces of the Virgin River and lower Toquop Wash.

Joshua tree (*Yucca brevifolia*) was the only common yucca in the project area. It was located in stabilized, sandy soils on Mormon Mesa and along the terraces of Toquop Wash. Only one group of Mojave yucca (*Yucca schidigera*) was observed near Halfway Wash on Mormon Mesa. An additional specimen was noted on Mormon Mesa south of the Carp/Elgin Exit which appears to have been planted at a now-abandoned cattle loading dock along the Old Arrowhead Highway.

An estimated ±4,250 cacti and ±80 Joshua trees are located in the project in areas of disturbance. Approximately 93 percent of all cacti observed were beavertail pricklypears and silver chollas.

Mesquite and Acacia

Neither mesquite nor acacia habitats make up a significant portion of the project area, but both species are present in and around the project right-of-way. Mesquite thickets were located in areas adjacent to perennial sources of water including Meadow Valley Wash, Bowman Reservoir, and the Muddy and Virgin Rivers. Roughly 10.6 acres were occupied by mesquite thickets within the ROW with only 0.6 acres in areas of proposed disturbance. Most of the suitable habitat for mesquite is now occupied primarily by tamarisk, a State of Nevada noxious weed. Acacia were more widely scattered and did not appear in thickets within the ROW. The BLM manages Mesquite and Acacia under the *Conservation Management Strategy for Mesquite and Acacia Woodlands in Clark County, Nevada* (Crampton et al., 2006). Mesquite thickets which are impacted by construction are to be mitigated to result in no net loss of habitat. Those plants which cannot be avoided are to be replaced at a ratio of 3 to 1 and those areas monitored as part of the Revegetation Plan.

3.11 Wildlife and Fisheries

General Wildlife

The majority of the project area falls within the creosote bush matrix of the Mojave Desert and is generally composed of low-elevation mixed desert scrub. Occasional areas of sand, alkali scrub, and Joshua tree forest are also dispersed on the tops of the mesas. Upland and riparian habitats are used by a variety of wildlife including jackrabbits, desert cottontail, bobcat, kit fox, coyote, other small mammals, large raptors, small birds, and various lizards and snakes. A list of wildlife observed during surveys of the project area can be found in **Appendix C**.

Desert riparian habitat, associated with the floodplain of the Muddy and Virgin rivers, is extremely important to wildlife populations. The dense shrubbery of desert wash habitat provides food and shelter for small mammals and many species of birds. Wet meadows and ponds within the riparian zones provide food, cover, and water for birds, mammals, reptiles, and amphibians. This habitat is essential for the southwestern willow flycatcher, an Endangered

species. Riparian habitat could also potentially support marsh birds such as the Endangered Yuma clapper rail.

The OWMA, near the project area, is an important stopover during fall and spring bird migrations. Commonly observed species include great blue herons, snowy egrets, and black-crowned night herons. Other wading birds include white-faced ibis and great egrets. Shorebirds that frequently use the OWMA include black-necked stilts, American avocets, Wilson's phalaropes, spotted sandpipers and killdeer. Infrequently observed shorebird species include greater yellow legs, lesser yellow legs, marbled godwits and long-billed curlews.

Songbirds documented in the OWMA include flycatchers, hummingbirds, woodpeckers, swallows, thrashers, vireos, blackbirds, and sparrows. Songbird populations generally peak during the spring migration period. Songbirds associated with willow/cottonwood habitats in the area include Bell's vireo, yellow warbler, song sparrow, yellow-breasted chat, and blue grosbeak. Songbirds associated with mesquite habitat include phainopepla, Lucy's warbler, western kingbird, and verdin. All of the bird species observed in the OWMA could be encountered in the project area due to its proximity to the OWMA.

Fisheries

The Virgin and Muddy Rivers provide year-round fishing opportunities. Anglers can catch trout, black bass, catfish, crappie, and striped bass in these rivers. The Lake Mead National Recreation Area, including the nearby Overton arm of Lake Mead that inundates the OWMA, supports some of the heaviest angler use on any reservoir in Nevada. Game fish include largemouth and smallmouth bass, channel catfish, black bullhead catfish, bluegill sunfish, green sunfish, black crappie, striped bass, rainbow trout, and walleye. The proposed project would not have any impacts on fish species or fisheries because the project spans the rivers.

Waterfowl

The Virgin and Muddy Rivers within the project area provide habitat to support a variety of waterfowl. The rivers provide food and water for waterfowl, while the riparian habitat along the rivers contains dense shrubbery for cover and protection. Bowman Reservoir, a man-made water impoundment located within the project area near Logandale, also provides a body of water and riparian habitat to support waterfowl species. Although the project would not impact the rivers or reservoir, waterfowl may be present during construction of the proposed upgrades. During a survey of the project area, no common species of waterfowl were observed, but it is anticipated that common species such as mallards, northern pintails, redheads and ruddy ducks could be present on the Virgin and Muddy Rivers or Bowman Reservoir. These species have been observed in the OWMA and Lake Mead near the project area; thus they could potentially be present on water sources within the project area.

The OWMA and Lake Mead near the project area provide habitat to support waterfowl species. Waterfowl hunting opportunities are available on OWMA, being the most popular hunting activity on the area. Over 22 species of ducks have been recorded on the OWMA. The most common species include northern pintails, green-winged teal, mallards, and ruddy ducks. Duck populations generally begin to build during late September and peak in January. Cinnamon teal and redheads are generally early migrants. Canada geese are the most commonly found goose species at the OWMA while white-fronted, snow, and Ross geese are occasional visitors. Tundra swans visit the OWMA but are relatively uncommon.

Small Game Species

In the greater Moapa Valley, the primary game species are Gambel's quail, desert cottontail, and wild turkey, although there are a limited number of introduced turkeys. Gambel's quail and desert cottontail are the primary game along the reaches of the Virgin River drainage and Gambel's quail are common. Rio Grande turkeys were introduced to the OWMA in 1991 and the current estimated population in all of Moapa Valley is between 350 and 500 birds.

Other game birds include mourning doves, which begin arriving during July and early August. By late August, the fall migration has begun and normally by mid- to late September, all but a few stragglers have left southern Nevada. White-winged doves also occur infrequently in the area. Controlled hunting for wild turkey on the Muddy River side of the OWMA takes place in spring and fall while mourning dove and waterfowl are hunted from fall to early winter (NDOW 2010a).

Raptors

High, jagged cliffs and rock faces in the Mormon, Arrow Canyon, Muddy, and Virgin Mountain ranges provide suitable breeding habitat for the peregrine falcon. Although delisted from protection under the ESA, the falcon remains classified by the State of Nevada as Endangered. Peregrine falcons use the Overton Arm and reaches of the Muddy and Virgin rivers as foraging areas.

Other raptors frequenting portions of the existing and proposed project alignment may include the golden eagle, northern harrier, and American kestrel. Ospreys and merlins may also use the area seasonally. During the project area surveys, three red-tailed hawk (*Buteo jamaicensis*) nests were encountered within or near the survey area. Additionally, a great horned owl (*Bubo virginianus*) nest was encountered south of the proposed Gila Substation, which was occupied by two owls.

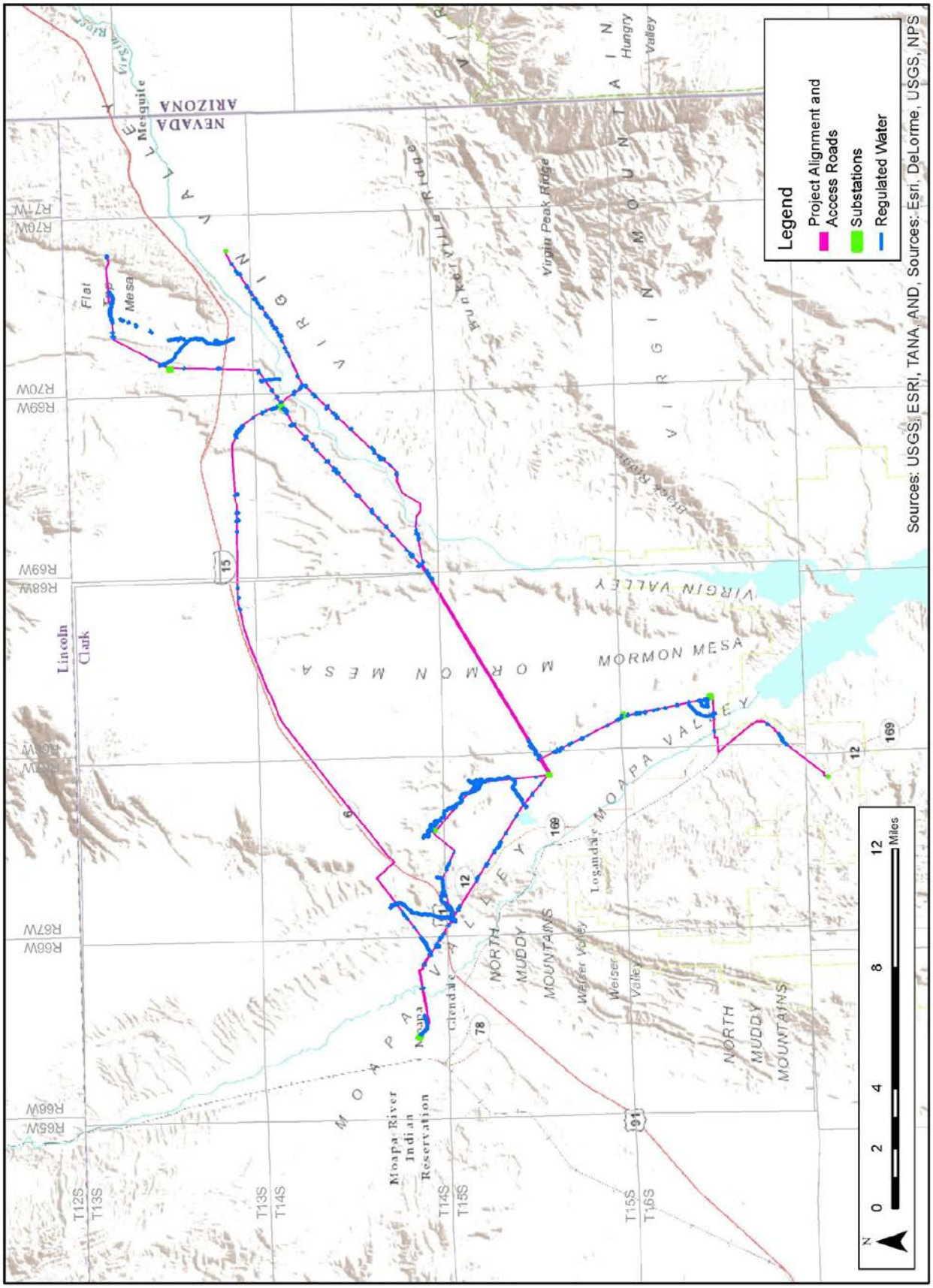
3.12 Wetlands and Riparian Zones

The United States Army Corps of Engineers states that wetlands have hydric soils, hydrology, and hydrophytic vegetation. Any wetlands that possess these three criteria are designated as jurisdictional wetlands. Surface water is much less prevalent in the project area than groundwater, and there are no known seeps, springs, or wetlands. However, the Muddy River and the Virgin River, both perennial rivers (flowing year-round), are located on or immediately adjacent to the project area (see **section 3.14**). Regulated waters in the project area and vicinity are shown on **Map 3.12-1**.

As stated above, the carbonate aquifer system is thought to be the source of the surface water in the springs that form the headwaters of the Muddy River, located about 5 miles west of Moapa and about ½ mile south of the alignment for the existing power line from the Moapa MX Well Site to the Tortoise Substation. Over the period of record, the annual average flow in the Muddy River at Moapa is 42 cubic feet per second (cfs) (BLM 1998, BLM 2006, Smith et al. 2004).

Precipitation runoff from the mountains is carried onto alluvial fans at the base of the mountains, then onto the more level basin lowlands. Drainage channels in the lowlands are generally poorly defined. Most runoff occurs as sheetflow, which is then concentrated in major dry washes with flows characterized by high speed and intensity. These dry washes carry water only after a rain storm or during the spring snowmelt. Because the dry wash channels in most locations are inadequately sized to pass even the minor storm, the channels are prone to lateral migration

and sudden relocation during large storm events. Channel migration is less common on well-defined washes, particularly where protective measures such as concrete lining or riprap have been implemented. In the project area, flows in the smaller dry washes are directed to the Muddy River and Virgin River and ultimately to Lake Mead and the Colorado River. Beneficial uses of surface waters in the project area include irrigation, watering of livestock, recreation not involving contact with the water, industrial, municipal, and domestic supply, propagation of wildlife, and propagation of aquatic life (BLM 1998, FEMA 2002a, Nevada DWR 1992, Nevada DWR 2007b, NAC 2003).



Map 3.12-1. Regulated Waters in the Project Area and Vicinity.

3.13 Floodplains

The project area is characterized by numerous dry washes that range in size from less than one foot to greater than 20 feet in width. The Virgin River, Muddy River, and Meadow Valley Wash are the only relatively permanent waters (i.e., flow more than three months per year) within the project area; all three discharge to Lake Mead, which is the nearest Traditional Navigable Water and is located approximately 20 miles south of Payne Substation (~28 river miles). Major washes in the project area include Weiser Wash—a tributary of the Muddy River—and Halfway, Toquop, and Nickel Washes, which are all tributaries of the Virgin River.

3.13.1 Muddy River

Floodplains along the Muddy River consist mainly of younger alluvial deposits that have been transported by water, but some wind-transported material is included on the low alluvial fans and floodplain. Floodplain dimensions within the project area are highly variable and are affected by soil characteristics and topography; the floodplain surrounding the Hidden Valley area ranges from 800 to 3,000 feet in width, whereas floodplain width at the Narrows area ranges between 500 and 1,800 feet. Riparian vegetation within the project area is present along the lower banks of the floodplain and is composed primarily of saltcedar (*Tamarix ramosissima*); other commonly observed riparian species included seep willow (*Baccharis salicifolia*), narrowleaf willow (*Salix exigua*), and saltgrass (*Distichlis spicata*). Beyond the riparian zone, upland vegetation is encountered at higher elevations within the floodplain and is dominated by saltbush (*Atriplex* spp.) and perennial herbs, such as Mojave seablite (*Suaeda moquinii*).

Flood events may inundate the floodplain and result in the river forming new channels, braiding, and oxbows. Typical flow within the Muddy River leaves fine to medium sand with lesser amounts of silt and gravel that accumulate into bar deposits and active and abandoned channel fill. Within the project area, the floodplain has been disconnected from the Muddy River for at least a century due to the deep entrenchment, straightening, and flood and sediment control (Provencher et al. 2005). In several areas the Muddy River streambed is deeply channelized, up to an approximate depth of 20 feet (Beck and Wilson 2006). Diversions off the main stem also affect both flood and base flows.

Groundwater discharge emanating from the Muddy River Springs area accounts for the majority of streamflow within the Muddy River. However, seasonal fluctuations in the Muddy River include high flows resulting from late summer monsoon and winter precipitation events. During these events, surface water enters the Muddy River through ephemeral tributaries near Moapa at California Wash and Glendale via Meadow Valley Wash.

The river channel is composed of mud, sand, gravel, and organic debris. Average flow data collected in the Muddy River from 2001 to 2011 show minimal variation in flow rate during a 10-year period. Streamflow measurements taken in 2001 at 29 sites within the Moapa Valley reported no measurable net gain or loss in streamflow along the entire reach (Beck and Wilson 2006). Overall, streamflow rates and seasonal fluctuations are much lower than those measured in adjacent river systems such as the Virgin River (USGS 2012). Data for Mean Suspended Sediment Discharge measured downstream of the project area in Overton, Nevada are also provided (USGS 2012). Recent wildfires and storm events in the project area in 2010 resulted in increased sediment discharge into the Muddy River (Shattuck et al. 2012).

3.13.2 Virgin River

The Virgin River flows over 200 miles from its headwaters near Zion National Park through Utah, Arizona, and Nevada to its present terminus in Lake Mead. Similar to other desert rivers, the Virgin River is characterized by large flow fluctuations and high salinity, temperature, and

turbidity. Streamflow is generally highest during the winter and spring months, particularly during spring runoff when flood events have occurred. Summertime base flows are typically much lower, although large flood events may occur following intense monsoon summer thunderstorms. The flow regime of the Virgin River and its tributaries has been modified by developments and diversions designed to capture and deliver water for municipal and agricultural use. As a result, streamflow is reduced relative to natural levels, particularly during summer months. Because of the lower flows, there are some reaches that experience extremely low streamflow and at times may be intermittent during summer months (Holden et al. 2005). This is not entirely due to the flow diversions, as historical data indicates the Virgin River within the Virgin River Gorge was historically intermittent (Addley and Hardy 1998). Rather, the periods of low or intermittent streamflow are a result of geologic conditions. The Virgin River Gorge consists of Paleozoic limestone formations that contain complex underground karst features (i.e., solution-widened fractures, caves, bedding planes, etc). These features capture Virgin River water at the upstream end of the Virgin River Gorge, which re-emerges into the river at a series of springs (Littlefield Springs) in the lower end of the Virgin River Gorge below the fish barrier.

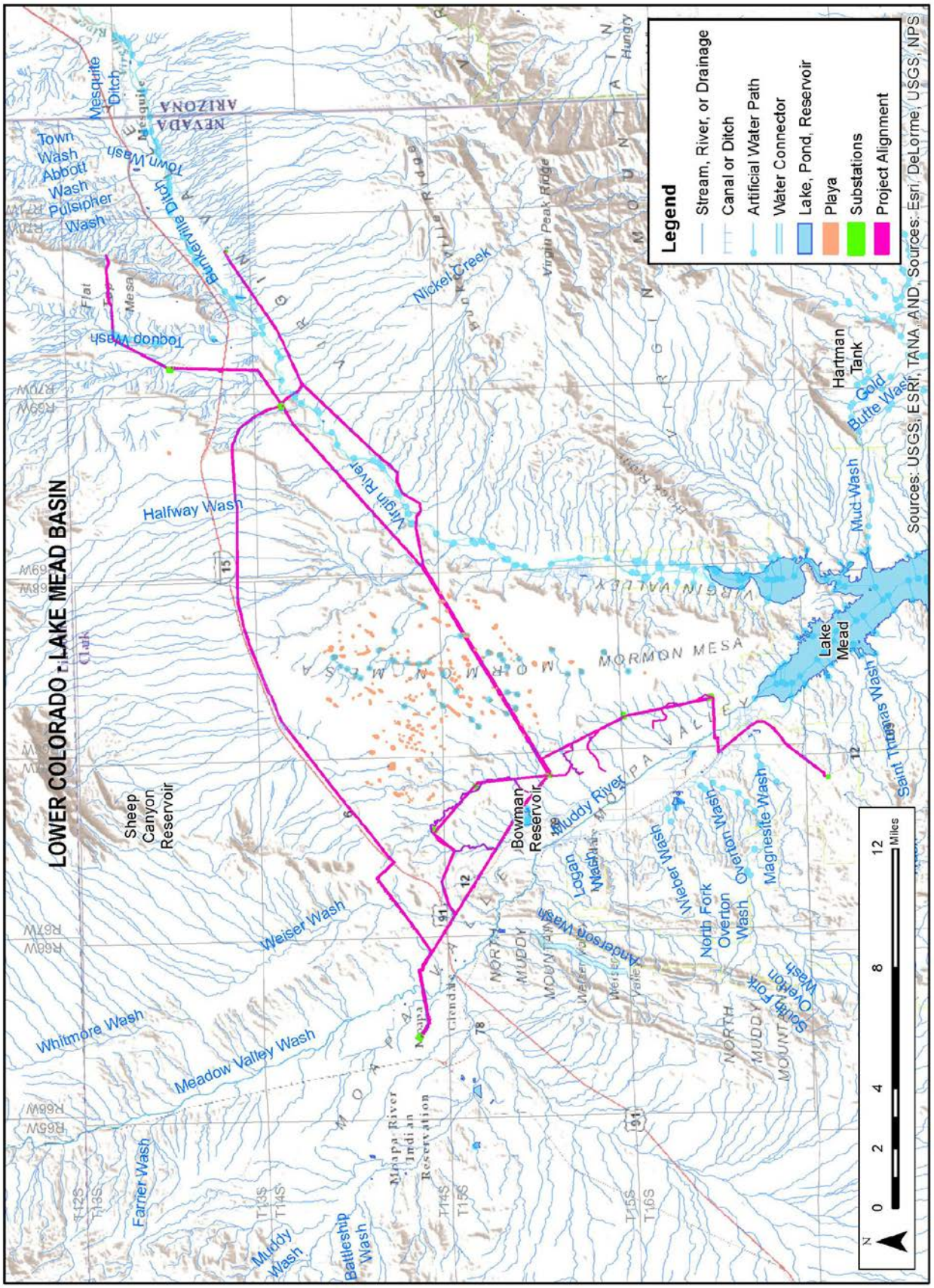
Vegetation in the Virgin River Basin includes four distinct communities. The Basin lies at the intersection of the Great Basin Desert to the north and the Mojave Desert to the south. Beginning at the headwaters, the river flows south through a fir-pine community into a juniper pinyon zone, a blackbrush zone, and finally a desert community dominated by creosote bush. This is where the project area lies. Along the river banks the transitional riparian community contains typical stream and desert riparian vegetation with an abundance of Russian olive and tamarisk. Aquatic vegetation is uncommon due to the rivers high sediment load.

Based on the Federal Emergency Management (FEMA) Flood Insurance Rate Maps for the area, the Proposed Action is located adjacent to, but not within the 100-year flood zone associated with the Virgin and Muddy River floodplains (FEMA 2002a, 2002b). The Proposed Action would rebuild the transmission lines in three existing crossings, including two for the Virgin River and one for the Muddy River. However, the route for the transmission line has been designed to avoid placing any structures within the 100-year floodplains. Although final structure locations will not be known until final design is complete, the final placement of structures would be outside of the floodplains due to the width of the Virgin and Muddy Rivers and the ability to span them.

3.14 Water Quality, Surface and Ground

Surface Water

Surface water resources near the project area include perennial, intermittent, and ephemeral stream drainages along with a reservoir, lakes, rivers, and underlying aquifers. Surface water resources in the project area and vicinity are shown on **Map 3.14-1**. Some of the prominent water resources in the project vicinity include Lake Mead, Muddy River, Virgin River, Meadow Valley Wash, Toquop Wash, Halfway Wash, Weiser Wash, Nickel Creek, and the Bowman Reservoir. The watershed of the entire project area is located within the Lower Colorado-Lake Mead Basin and Subregion which lies within the Lower Colorado Region. Sub-basins involved in the project area include Meadow Valley Wash, Lake Mead, Muddy, and the Lower Virgin. Watersheds involved are Lower Meadow Valley Wash, Lower Muddy River, Toquop Wash, Halfway Wash, Valley of Fire Wash, Sand Hollow Wash, and Upper Muddy River (EPA 2010a).



Map 3.14-1. Surface Water Resources in the Project Area.

The Muddy River and the Virgin River are the only perennial streams in the vicinity of the project area; however, Meadow Valley Wash runs underground year-round and often comes to the surface. The primary ephemeral/intermittent drainages include Toquop Wash, Halfway Wash, Nickel Creek, and Weiser Wash; these drainages are dry for extended periods and flow during precipitation events and possibly during snowmelt. Short-term flooding could occur in the smaller washes throughout the project vicinity during precipitation events. Bowman Reservoir contains water year-round as does Lake Mead which, although not within the project area, is located within less than a half mile of the proposed power transmission line when it is at capacity. A few areas located atop Mormon Mesa have also been designed to cache water for livestock.

Surface Water Quality. Several of the surface water bodies within the project area and vicinity have been assessed under Section 305(b) by the EPA including the Muddy River, Virgin River, Meadow Valley Wash, Bowman Reservoir, and Lake Mead. Lake Mead and the Muddy and Virgin Rivers are also listed as impaired under Section 303(d) with the Virgin River having a Total Maximum Daily Load (TMDL) report submitted to the EPA in 2002 for boron (EPA 2010b; NDEP 2002, 2012a).

Water bodies are categorized based on beneficial use attainment determinations. These categories range from 1 through 5, with 1 (Fully Supported) being that the water body supports all designated uses and 5 (Not Supported) indicating that at least one designated use is not supported. Category 5 water bodies are also known as 303(d) listed (see NDEP 2012a, p. 14 for full definitions).

The most recent finalized Muddy River water quality assessment (EPA 2004a) showed that aquatic life, irrigation, and watering of livestock were impaired, but industrial supply, municipal or domestic supply, propagation of wildlife, and recreation not involving contact with the water were good. The Muddy River from Wells Siding Diversion to River Mouth at Lake Mead shows the causes for impairment being boron (toxic inorganics); iron, manganese, and molybdenum (metals [other than mercury]); and water temperature making it 303(d) listed (Category 5). No causes have been listed for the water body impairment and no TMDL data has been recorded by the EPA (EPA 2006b).

The most recent study located in the Draft Nevada's 2008-2010 Water Quality Integrated Report (NDEP 2012a) and associated GIS information (NDEP 2012b) indicate some changes to the Muddy River from Wells Siding Diversion to River Mouth at Lake Mead. The segment of the Muddy River remains 303(d) listed (Category 5); however, the reasons are for *Escherichia* (*e.*) *coli* and Fecal Coliform. It was delisted for iron due to insufficient information, and for manganese, molybdenum, water temperature, and boron because it met Water Quality Standards.

The finalized water quality study for the Virgin River from Mesquite to River Mouth at Lake Mead indicates that aquatic life, irrigation, and watering of livestock were impaired while industrial supply, propagation of wildlife, and recreation not involving contact with the water were good (EPA 2004b). Causes for impairment include iron and manganese (Metals [other than mercury]), phosphorus (Nutrients), and water temperature making it 303(d) listed (Category 5). No causes were listed for the impairment (EPA 2006c). A TMDL document was prepared for boron (NDEP 2002).

The current draft 2008-2010 water quality report (NDEP 2012a) and map data (NDEP 2012b) indicate changes to the Virgin River segment. The river remains 303(d) (Category 5) listed for manganese, water temperature, and phosphorus. The river, however, has been delisted for iron due to insufficient information.

Meadow Valley Wash was assessed in the last final study (EPA 2004c) and was given a good status for aquatic life, industrial supply, irrigation, propagation of wildlife, recreation not involving contact with the water, and the watering of livestock. Currently in the draft 2008-2010 water quality study (NDEP 2012a) and map data (NDEP 2012b), the segment is classified as a Category 3 which is defined as having insufficient information.

The last final water quality study (EPA 2004d) for the Bowman Reservoir revealed a good status for aquatic life, industrial supply, irrigation, municipal or domestic supply, propagation of wildlife, recreation involving contact with the water, recreation not involving contact with the water, and watering of livestock. The 2008-2010 draft water quality report (NDEP 2012a) and map data (NDEP 2012b) indicate that the reservoir is classified as a Category 2 which means that some uses have been attained but others have insufficient data.

Lake Mead's Overton Arm has a fish consumption advisory which suggests that adults should not consume more than four meals per month of channel catfish, largemouth bass, smallmouth bass, and striped bass due to elevated mercury levels (NDOW 2012). Lake Mead was 303(d) listed (Category 5) in the 2008-2010 draft water quality report (NDEPa), and the map data indicates that aquatic life is not supported on Lake Mead (Nevada portion) excluding the area covered by NAC 445A-197 (NDEP 2012b). The lake is 303(d) listed for turbidity with further information needed regarding fish data.

Groundwater

The entire project area lies on an unconsolidated sand and gravel aquifer with carbonate rock aquifers in the vicinity. The closest carbonate rock aquifers lie 1.5 miles to the south, 3 miles to the north, and 6.5 miles to the west (USGS 2003). Most of Nevada's groundwater occurs in what is termed the 'Basin and Range aquifers' or basin-fill aquifers, which are generally produced by basin-fill deposits that range from unconsolidated to consolidated sand and gravel, volcanic, or carbonate rocks. Generally these basin fill aquifers are very productive and are drained into individual basins that are separated by mountains (USGS 2012c). The range of depth varies greatly but basin-fill aquifers can be and often are several hundred meters in depth. Unconsolidated sand and gravel aquifers are generally very vulnerable to contamination because of their naturally high hydraulic conductivity (USGS 2009a) which allows water to move easily and swiftly through the aquifer.

Groundwater flow systems in the basin-fill aquifers typically do not flow to a water body which flows into the ocean. The only exceptions are some small areas located around the Colorado River, which ultimately flow into an ocean. Most basin-fill aquifers flow into sinks or basins and terminate within the basins that are hydraulically connected. The project area is near the Colorado River and its tributaries (Virgin River, Muddy River, and ultimately Lake Mead) so some of the groundwater in the vicinity makes its way into the Colorado River which discharges into the ocean (Planert and Williams 1995). An example of this is the shallow groundwater located under Meadow Valley Wash that drains into the Muddy River, which drains into Lake Mead and is ultimately released into the Colorado River near Boulder City, Nevada on the Nevada/Arizona state line.

Basin and Range aquifers typically are confined to a few basins, but areas can be linked together for extended distances due to the underlying carbonate rock. Studies indicate that large amounts of groundwater flow through these carbonate rock layers from basin to basin even though each basin has its own basin-fill aquifer overlying the carbonate rock. Evidence does suggest that these systems act as one hydrologic unit. Carbonate rock is eroded, faulted, and deformed to such a degree that many of these carbonate rock areas form separate aquifers. The carbonate rock in the central portion of Nevada, however, has a corridor that is

connected for over 250 miles running north/south. This phenomenon has been studied in southern Nevada to a degree that two flow systems have been identified. One discharges in the Death Valley/Ash Meadows area and the other at the Muddy River Springs (Warm Springs near the project area). This regional flow system, however, does not have enough data to provide a detailed description.

At 76.8%, agriculture is the most prominent use of groundwater in the project area, followed by 17.7% for public water supply, 4.1% for mining and industrial use, and 1.4% for domestic and commercial use (Planert and Williams 1995).

Groundwater Quality. Groundwater is continually being studied in order to further understand the characteristics of aquifers; most studies are based upon flow and quality. An assessment was completed for a few wells that have been in operation for more than a decade to help understand how human activities and natural features affect aquifers. These studies were fairly broad and the findings concluded that shallow groundwater contaminants are widespread but in lower concentrations. Deeper aquifers tend to be more protected than shallow ones except in carbonate material because water can flow quickly and more deeply, making them more susceptible to contaminants. The aquifers in the vicinity of the project area are unconsolidated sand and gravel and carbonate. Water, and any contaminants within the water, can move quickly through aquifers that are sand and gravel, alluvial, and carbonate, making the aquifers in the project vicinity susceptible to this kind of contamination (Lapham, Hamilton, and Myers 2005).

A groundwater assessment was conducted for the southwest region of the United States (Anning et al. 2009), which included the project area. Studies and testing are just now establishing baseline data and the understanding of groundwater is still in its early stages. This study was conducted to understand the exposure and risk of contamination of basin-fill aquifers by establishing baseline data. Groundwater is typically limited to arid and semi-arid regions, making it very important for sustaining population. Modern activities using groundwater have created a discharge rate higher than the recharge rate; i.e., more water is being used than returned to the aquifers. As a result, groundwater movement has increased and groundwater is therefore much more prone to contaminants and degradation. If a contaminant is introduced, especially in a basin-fill aquifer, its presence will be most likely be irreversible because of the high cost of treatment and the almost impossible treatment options. Shallow aquifers are especially exposed to chemicals from fertilizers and oxidation due to irrigation. These shallow aquifers can move to deeper aquifers because there is more discharge (use) than recharge, making their contamination a threat to deeper aquifers. Pesticides and increased salinity caused by evaporation can pose similar risks as well.

A series of Hydrographic Reconnaissance Reports was completed in the 1960s where some testing of groundwater from wells in the general area of the proposed project was performed (Eakin 1964; Glancy and Van Denburgh 1969, Rush 1964, 1968), as follows:

- Groundwater testing from 16 wells in the Lower Moapa-Lake Mead Area measured silica, iron, sodium, potassium, fluoride, nitrates, boron, and dissolved solids. These tests from 1964 showed that most of the measured current standards (EPA 2012) were met except for the dissolved minerals (Rush 1968).
- Groundwater testing of one well from the Meadow Valley Wash Area measured calcium, magnesium, bicarbonate, chloride, hardness, silica, sodium and potassium, sulfate, nitrate, and dissolved solids. These tests showed that sulfate and dissolved solids were higher than the current standards (Rush 1964).

- In the Coyote Springs, Kane Springs, and Muddy River Springs area, spring discharge at Warm Springs and Iverson Springs was measured. The tests measured temperature, silica, calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, fluoride, nitrate, boron, hardness, and dissolved solids. The fluoride measured with a slightly higher reading than what is currently recommended, but within primary standards. Dissolved solids were high in both springs (Eakin 1964).
- The Lower Virgin Valley area studied over 24 wells and/or springs in the area. Calcium, magnesium, sodium/potassium, bicarbonate, sulfate, chloride, and dissolved solids were measured. Sulfates were high in 12 of these wells/springs, chloride was high in six, and dissolved solids were high in 15 of these wells/springs (Glancy and Van Denburgh 1969).

Two wells in the carbonate rock aquifer (USGS 2003) to the west of the project area are used for groundwater testing: One is in Coyote Springs Valley and the other is near the Muddy River Springs (Warm Springs). These wells are used for testing in association with the Nevada Test Site and were developed mainly to attempt to determine groundwater flow models (Graves 2009a, 2009b, USGS 2012d).

The well near the Muddy River Springs is located within Moapa Valley immediately west of the project area, and was drilled in 1985 to a depth of 478 feet below ground surface. The deposits ranged from gravel and sand (alluvium) to 19 feet, and then changed to dolomite to 76 feet and limestone for the remaining depth of the well. A 21-hour test was performed in 1986 with a constant discharge of 101 gallons per minute, during which the depth to water ranged from 390.76 to 420.90 feet and the drawdown maximum was at 30.14 feet (Graves 2009a).

Water quality testing at this well was conducted (USGS 2012e) in 1986, 2001, and 2003. This testing showed total dissolved solids, which is a general indicator of water quality, of 591 milligrams per liter in 2001. The secondary drinking water regulations state that 500 is the maximum for drinking water. Other secondary regulations that did not meet drinking water standards are aluminum, fluoride, iron, manganese, pH, silver, and zinc. Primary drinking water regulations that were not met in at least one of these testings include the disinfection by-product trihalomethanes; inorganic chemicals include arsenic, barium, beryllium, cadmium, chromium, lead, selenium, and thallium; and radionuclides include uranium (EPA 2012).

The well located near Coyote Springs Valley is also west of the project area and was drilled in 1981 to a depth of 1,221 feet. Testing occurred in 1986. Sand, clay, and gravel deposits went from the ground surface to a depth of 841 feet, followed by dolomite and limestone for the remaining depth of the well. The well was tested for 14 hours and pumped 77 gallons per minute during the test. The depth to water at the beginning of the test was at 604.3 feet, reaching a maximum depth of 617.3 feet during the test with a drawdown maximum of 13 feet (Graves 2009b).

Water quality testing at this well was conducted (USGS 2012f) in 2003 and 2010. These tests showed dissolved solids at 616 in 2003 and 195 in 2010. Secondary drinking water regulations that were not met include fluoride, iron, manganese, and pH. Primary drinking water regulations that were not met in at least one of these testing include: the inorganic chemicals of arsenic, barium, cadmium, chromium, and selenium (EPA 2012).

3.15 Wastes, Hazardous or Solid

The affected environment for hazardous materials includes air, water, soil, and biological resources that may potentially be affected by an accidental release of hazardous materials during transportation to and from the project area, storage, and use in construction and

operation of the Proposed Action. Sensitive areas for hazardous materials releases include areas adjacent to water bodies, above aquifers, and areas where humans or wildlife would be directly impacted. Portions of the project area are currently used for illegal dumping that is not related to operation of existing power transmission facilities.

3.16 Environmental Justice

Presidential Executive Order 12898 mandates that high and/or adverse environmental impacts resulting from federal actions will not be disproportionately borne by minority or low-income populations. Disproportionate impacts are those that would affect minority or low-income populations at levels appreciably higher than effects to non-minority or non-low income groups. Minority populations in Clark County are distributed among several ethnicities, including Hispanic/Latino (29%), (African American (10.47%), Asian (8.65%), Native American or Native Hawaiian/Pacific Islander (less than 1% each), other (13.45%), and two or more races (5%). These populations, with the exception of Asians, tend to have a median income ranging from 66% to 81% of the median income for Caucasians. Hispanics/Latinos tend to have the lowest median income.

3.17 Transportation and Access

The transportation system that serves the vicinity of the project area includes interstate and state highways. Most access to the project area and the area close by is via unimproved dirt roads. There are some small areas in the Moapa Valley where access to the project area can be gained from state highways. Most unimproved dirt roads are located on public lands and are generally used by grazing permittees and people pursuing recreational activities. Overton Power also uses these roads to access existing power transmission lines for day-to-day maintenance and operations. Access to the general vicinity of the project area is via I-15, SR-168, SR-169, and SR-170. These roads connect to the unimproved access roads leading to the project area or to the power transmission line itself. SR-169 (South Moapa Valley Boulevard) allows direct access to the proposed power transmission line upgrade located approximately three miles south of Overton in the southern portion of Moapa Valley. This is the only direct access to the project area from a state route.

The state routes are generally two-lane highways that connect with I-15; in some areas through Overton and Logandale in the Moapa Valley, SR-169 has four lanes. The Average Annual Daily Traffic (AADT) and the Level of Service (LOS) in the vicinity of the project area was studied recently as a Nevada Department of Transportation (NDOT) project. LOS is graded from A through F where A is defined as the best travel conditions and F as the worst travel conditions. Results of the study are summarized in **Table 3.17-1**.

Table 3.17-1. AADT and LOS on Highways in the Vicinity of the Project Area, 2011.

State Route / Highway	Off-Peak AADT	Peak AADT	Level of Service
SR-168	210	1,200	A
SR-169[1]	780	4,500	C
I-15	17,800	19,200	A

[1] *Parts of SR-169 through Logandale and Overton were not addressed in the study because it is a population area (Campbell and Wyszomirski 2011).*

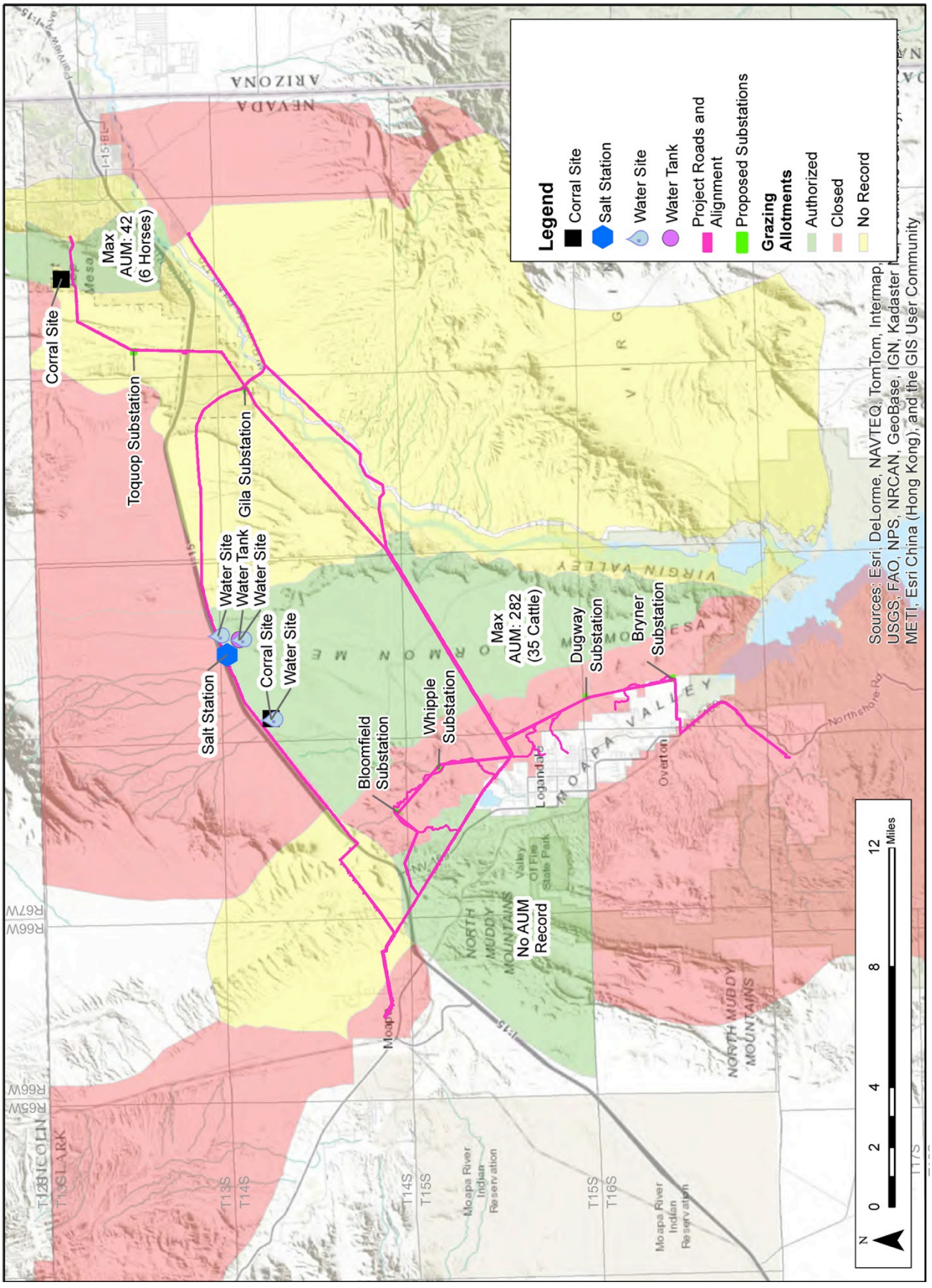
SR-170 was not addressed in this study; however, K&LA observed no more than 20 vehicles per day on this highway during 20 environmental field work days from May through December 2011. Fewer than 10 vehicles per day was more typical of traffic levels.

SR-168 from US 93 to I-15 is considered a high-risk rural road along with SR-169 from I-15 to milepost 25. The crash rate is higher than average on I-15 from the west to east Mesquite interchanges and from the Valley of Fire interchange to the Glendale interchange (Campbell and Wyszomirski 2011). The most recent Clark County statistics on automobile crashes is dated 2010. This study showed that Clark County had a total of 40,756 crashes with a crash rate of 275.75 per 100,000 vehicle miles travelled. There were three fatal accidents along I-15 in the vicinity of the project area in 2010 (NDOT; undated).

3.18 Rangeland Management

The BLM allots grazing rights as guided by the Taylor Grazing Act of 1934. Management of grazing lands is also governed by NEPA, FLPMA, the Endangered Species Act of 1973, and the Public Rangelands Improvement Act of 1978. The number of livestock authorized per grazing allotment on public land is measured using the Animal Unit Month (AUM) which is the amount of forage needed to sustain one cow and calf, one horse, or five sheep or goats for one month. Grazing is managed by the BLM so that the land can attain and maintain the desired condition defined by rangeland health standards and guidelines (BLM 2012a, 2012b). Based upon the level of management effort required to meet these healthy rangeland standards, from low to high, grazing allotments are categorized as Custodial, Maintain, or Improve.

Portions of two grazing allotments overlap the project area: Lower Mormon Mesa and Flat Top Mesa (**Map 3.18-1**). Both allotments have an ephemeral type of use (BLM 2012c) depending on the production of forage, which can change from year to year. The Lower Mormon Mesa allotment comprises 49,353 acres, of which 41,276 is BLM-administered land and the remaining 8,077 acres is managed by the Bureau of Reclamation (BLM 2013); 287 acres overlap the project area. The allotment is categorized as Improve, and requires 26.46 acres of forage per AUM. It is currently used for livestock, with 35 cattle reported for three Authorization Schedules. The Flat Top Mesa allotment comprises 5,338 acres of public land, 35.2 acres of which overlap the project area. The allotment requires 6.08 acres per AUM, and is categorized as Maintain. It is also used for livestock and 6 horses are reported for two Authorization Schedules.



Map 3.18-1. Grazing Allotments Overlapping the Project Area.

3.19 Fuels and Fire Management

Vegetation in the project area consists primarily of creosote bush scrub with spacing between shrubs being too high to carry a large fire. However, invasive species including Sahara mustard, Mediterranean grass, and red brome have filled in much of the inter-shrub space and may provide fuel loads sufficient to carry a potentially destructive fire in favorable years. In riparian areas, fire-tolerant shrubs such as tamarisk, big saltbush (*Atriplex lentiformis*), and arrowweed (*Pluchea sericea*) have displaced the less-tolerant mesquite thickets and provide fuel loads capable of generating a significant fire.

Fire management on BLM lands in Clark County is based on The Southern Nevada District Fire Management Action Plan. Location-specific guidelines in the project area provide the basis for decisions regarding fire and fuels management.

3.20 Noise

Noise is generally described as unwanted sound and is measured as sound pressure in units of decibels (dBAs). The decibel scale is logarithmic, or non-linear, because the range of sound that can be detected by the human ear is so great that it is convenient to compress the scale to encompass all the sounds that need to be measured. Each 20-unit increase in the decibel scale increases the sound loudness by a factor of 10.

The project area is primarily rural, with residential and commercial properties in the vicinity of the proposed transmission line corridor in Overton, Bunkerville, Moapa, and Mesquite. Localized sound in the project area and vicinity is primarily generated by vehicular traffic on I-15, SR-168, SR-169, and SR-170, as well as a few high-altitude jet aircraft flights and some smaller aircraft flying at lower altitudes from local airports. Local vehicular traffic on unimproved roads creates some brief sound disturbance. Ambient noise levels range from 35–40 dBA increasing up to 60 dBA with traffic (American Speech and Hearing Association, ASHA, 2008). As a basis for comparison, the noise level during normal conversation of two people 5 feet apart is 60 dBA.

3.21 Health and Safety

Existing human health and safety concerns in and adjacent to the project area include occupational hazards associated with maintaining the existing power lines, the operation of vehicles on improved and unimproved roads, seasonal driving and working conditions, firearms accidents related to hunting and target-shooting, and low-probability natural hazards associated with events such as flash floods and wildfires.

3.22 Recreation

Use of public and private lands within the project area is limited to dispersed, isolated activities since there are no developed recreation amenities within the project area itself. Most recreational opportunities are individually initiated and involve undeveloped or limited developed access. Off-highway vehicle (OHV) activity and recreational shooting (target-shooting and hunting) are the principal recreational uses of the area. Geo-caching and rock-hounding also occur along the unimproved roads near the project area. Developed/organized recreational opportunities within approximately 1 to 10 miles of the project area include: the Lost City Museum, Overton Wildlife Management Area, Valley of Fire State Park, Logandale Trail System, Lake Mead National Recreation Area, Clark County Fair and Rodeo, and various off-road guided tours. The Clark County Moapa Valley Trails project is proposed for more

developed areas of Moapa Valley. This project is still in the initial planning phases and may or may not come to fruition (Clark County 2009). Undeveloped recreation opportunities in the area include OHV use, boating, hunting, fishing, camping, and hiking.

3.23 Visual Resources

The project area is located in rural Clark County and is composed mostly of undeveloped open desert surrounding small rural communities, grazing, and agricultural lands. The project area is situated within low-elevation Mojave Desert that contains a variety of topographical features: perennial river valleys, ephemeral washes of varying size, mesas, eroding mesa slopes, and bajadas. Two large mesas, Mormon and Flat Top, lie at the center and highest vantage points of the project area and their prominence divides the project area into viewsheds and visual zones. The variety of features in the landscape adds diversity to the overall visual setting of the project area.

Depending on the location within the project area, the foreground in the valleys is dominated by urban, rural agricultural or undeveloped desert views. In urban and rural agricultural areas, a variety of man-made features including roads, transmission lines, canals, and buildings can readily be observed. The river valleys are largely dominated by man-made features whereas away from the rivers the landscape is dominated by the rolling slopes of the eroding mesas. Roads blend into the relatively monotone hues and occasional transmission lines or radio towers break the horizon. Although color and texture are generally consistent, spring is often accented with a burst of color and textures as annual plants demand the viewer's attention. With the onset of summer, these quickly fade to the browns, yellows, and grays of the small, scattered shrubs and soils which predominate throughout the year.

Distant views to the east include the Virgin Mountains, and to the west the Mormon Mountains. The project area can be viewed from primary roadways such as I-15, which runs north/south parallel to the project area; SR-168 to Moapa, which is situated northwest of the project area; SR-169, paralleling the project area along the southwest corridor; and SR-279 (170) and the Gold Butte Road on the southeast end of the project area. Some people may also view the area when using the unimproved and two-track roads that provide access to recreation areas, mesa tops, and livestock grazing sites within the project area. Highways within the project area are a gateway to scenic destinations such as Lake Mead National Recreation Area, Valley of Fire State Park and glowing lights in the City of Las Vegas.

Much of the existing visual disturbance can be viewed along the highways that pass through the project area. There are high levels of disturbance around the existing transmission lines and substations including off-road vehicle use, dumping, and impacts related to construction of the transmission lines in the distant past. Some areas along Lewis and Lamar Avenue and SR-169 in Overton are developed with residential neighborhoods.

Visual Resource Management. The BLM is responsible for managing public lands for multiple uses while ensuring that the scenic values and open space character of the public lands are considered before authorizing actions on public lands. The BLM accomplishes this through the Visual Resource Management (VRM) System. The VRM System classifies land based on visual appeal, public concern for scenic quality, and visibility from travel routes or observation points. The VRM classes are used to identify the degree of acceptable visual change within a landscape based on the physical and sociological characteristics: Classes I and II are the most valued; Class III represents a moderate value; and Class IV is of least value. Based on BLM guidelines:

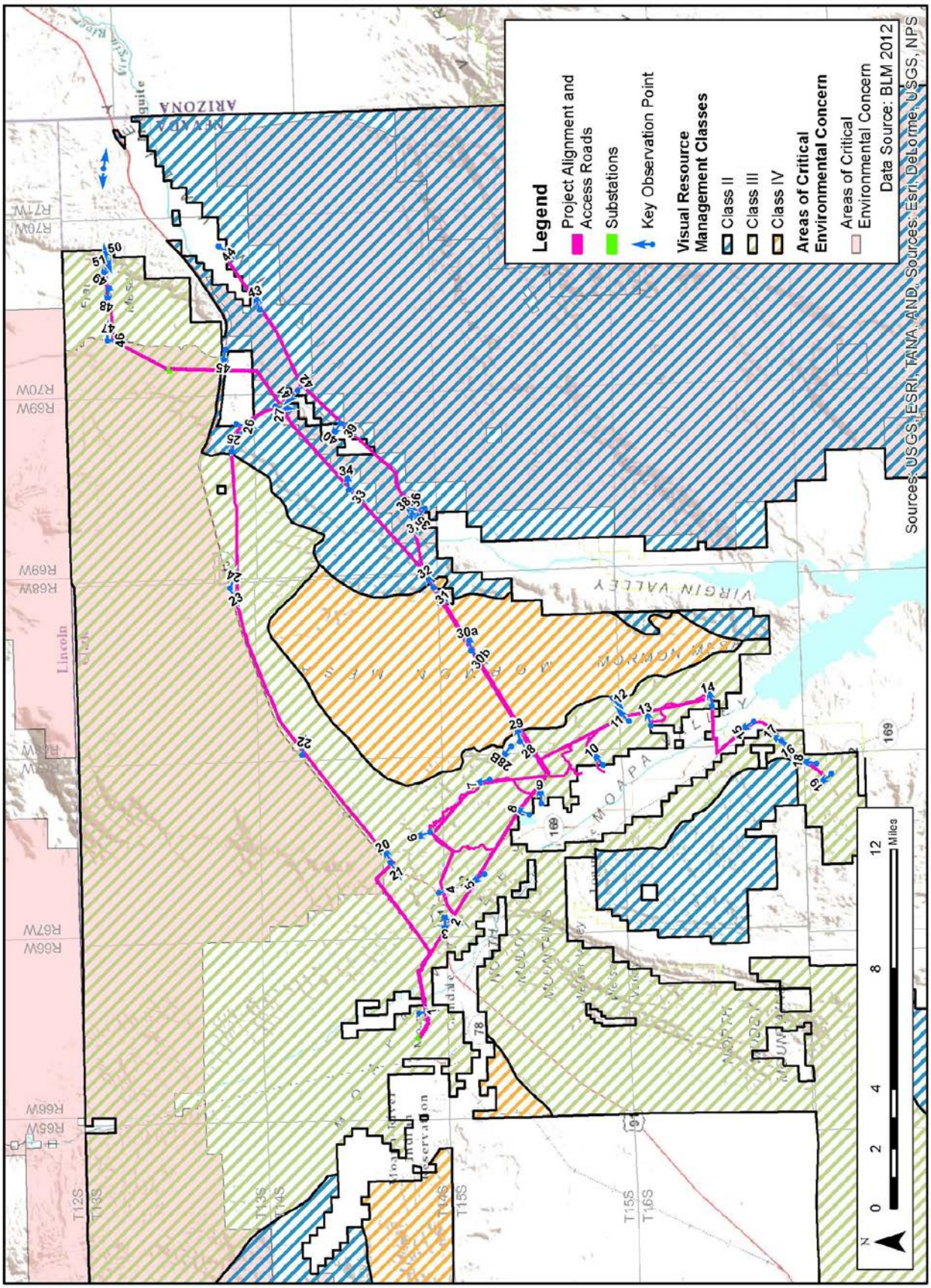
- Class II areas should retain the existing character of the landscape. Activities should not attract attention of the casual observer, and changes to the landscape should mimic the form, line, color, and texture of the natural landscape. Within the project area and vicinity, Class II areas are found along the Virgin River and its floodplains, SR-279 (170) through Bunkerville, Gold Butte Road, and a small portion of I-15 (**Map 3.23-1**).

- Class III areas should partially retain the existing character of the landscape. Activities should not dominate the view of the casual observer, and changes should repeat the basic elements found in the predominant natural landscape features. VRM Class III areas are generally found along highways, including I-15, SR-168 to Moapa, and SR-169.

- Class IV areas allow major modifications to the existing character of the landscape. However, management of Class IV areas should attempt to minimize the impact of activities through careful location, minimal disturbance, and repeating the basic elements. The primarily undeveloped area on top of Mormon Mesa, located far from visual corridors such as highways, is VRM Class IV.

Additionally, the LVFO RMP has established management objectives for special areas such as Natural Areas, Wilderness Areas or Wilderness Study Areas, Wild and Scenic Rivers, Scenic Areas, Scenic Roads or Trails, and ACECs, which requires special consideration for the protection of the visual values. This does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting. The management objectives for these areas may be used as a basis for assigning sensitivity levels.

Portions of the project area lie within the Mormon Mesa and Virgin River ACECs. The Virgin River ACEC is designated VRM Class II in order to retain the existing character of the landscape. Mormon Mesa lies within a designated VRM Class III management area which will partially retain the existing character of the landscape. A portion of the Virgin River within the project area is eligible for Wild and Scenic Status. The Wild and Scenic Rivers Act requires that the Outstandingly Remarkable Values and free-flowing nature of the river be maintained. Also, the visual character to the river corridor must not change.



Map 3.23-1. Key Observation Points and VRM Classes in the Project Area.

Viewer/User Groups. Travelers driving through the area have temporary views of the project area; passengers in moving vehicles have greater opportunities for off-road views than drivers. A majority of people using these roads consist of local residents from the City of Mesquite and the unincorporated communities of Bunkerville, Moapa, Glendale, Logandale, and Overton who are commuting within these communities and to the metropolitan area of Las Vegas or traveling to Los Angeles, CA or Salt Lake City, UT. These users are likely to be moderately sensitive to visual impacts. Other travelers include tourists traveling to and from Las Vegas or other metropolitan areas such as Los Angeles or Salt Lake City. Industrial users such as truckers and construction workers also travel through the area. Industrial users and tourists are expected to have a low sensitivity to changes in the landscape. Average daily traffic for regional highways and major roads is reported in section **3.17 Transportation**.

One percent of the population of Clark County lives in the City of Mesquite; 43 percent live in unincorporated areas including the smaller communities such as Bunkerville, Moapa, Glendale, Logandale, and Overton according to 2010 Clark County census data (Clark County, 2010). Residential homes are located in Mesquite (3-year plan), along SR-168 (3 and 9-year plans), SR-169 (3 and 9-year plans), SR-279 (SR-170) (3, 7, and 9-year plans), and along Gold Butte Road (7-year plan). Most residents are expected to be highly sensitive to changes in the landscape that can be viewed from their homes and neighborhoods, although much of the landscape already contains visual impacts from existing transmission lines.

Recreational users are also likely to be highly sensitive to visual changes in the landscape. These users travel on I-15 and SR-169 through the area to reach nearby destinations such as Lake Mead National Recreation Area, Valley of Fire State Park, Red Rock Canyon Conservation Area, and Mount Charleston.

Key Observation Points (KOPs) represent the most critical viewpoints or typical views encountered in representative landscapes with a view of the project area. Fifty-one KOPs were identified along the proposed transmission line routes; eight of these are discussed below (see **Photos 1 through 8**). All KOPs are discussed in the Visual Impact Assessment Report submitted by K&LA.

Photo 1 (KOP 3). Existing view looking south from I-15 (270°).

KOP 3 is located on I-15 southbound in VRM Class III and represents the current view when traveling south. I-15 is a major corridor for tourism-related traffic and is also used by industrial workers and residents. The highway cuts through a desert valley with patchy, low-growing vegetation and mountains in the background. The highway commands attention in this view, running diagonally through the photograph; the transmission line structures are apparent vertical structures on the landscape.

Photo 2 (KOP 4). Existing view looking south from SR-169 as drivers exit I-15 (165°).

KOP 4 looks south along SR-169 towards Logandale and Overton within VRM Class III representing the view while exiting the freeway. KOP 4 views the rolling hills around an eroding mesa within a low-growing creosote shrub community. SR-169 bisects the view and an existing power line crosses the highway.

Photo 3 (KOP 5). Existing view looking northwest from SR-169 where transmission line would cross the highway (324°).

KOP 5, a VRM Class III, views northwest along SR-169 and represents the view where the transmission line crosses the road. KOP 5 consists of relatively open, rolling hills surrounded by an eroding mesa in a low-growing creosote bush/shrub community. The view is bisected by the undulating pavement of SR-169, and the existing power poles are noticeable vertical structures within the landscape.

Photo 4 **(KOP 7). View of a sandy wash looking north where the proposed power line enters Whipple substation (342°).**

KOP 7 is within a VRM Class III and views a sandy wash looking north along the proposed power line route to Whipple substation. This KOP represents the view that the recreating public or 4-wheel-drive enthusiasts would experience while using in the area. KOP 7 is composed of a flat, dry wash in the foreground and a mesa surrounded by rolling foothills in the background. The vegetation is a low growing creosote bush plant community with a few acacia in the wash bottom.

Photo 5 (KOP 11). Viewing northeast from Mormon Mesa Rd. toward the proposed location of Dugway substation (48°).

KOP 11 views northeast from Mormon Mesa Road toward the proposed location of Dugway Substation. KOP 11 is also a Class III VRM area and represents the view of a local resident or the recreating public as they approach the panoramic overlook of the mesa top. KOP 11 consists of open desert valley with low-growing creosote bush community in the foreground and horizontal lines of the mesa creating the background.

Photo 6 (KOP 27). Viewing east while traveling south on SR-170 to a segment where the power line becomes geographically closer to the roadway (187°).

KOP 27 is within VRM Class II and looks east representing the view while traveling south on SR-170 where the power line becomes geographically closer to the roadway. KOP 27 contains an eroding mesa covered by low-growing creosote shrubs in the middle ground and peaks of mountains silhouetted in the background. The existing power poles add a vertical element and attention to the poles is aided by the disturbance created from dirt access roads, which otherwise would easily blend with the background.

Photo 7 (KOP 39). Viewing south on New Gold Butte Road where the 7-year transmission line would cross the road (216°).

KOP 39, a VRM Class II, views New Gold Butte Road at the proposed 7-year transmission line road crossing. The view at KOP 39 is oriented by the vertical line of the road cut through a low-growing creosote bush plant community. There are a few geometric residential buildings in the right middle ground and the flat slopes in the background create a horizontal line sloping to the Virgin River. The transmission lines mostly blend in with the high-elevation background and do not add many unexpected elements in the KOP.

Photo 8 (KOP 41). View to the northwest along Riverside Drive where the 7-year power line would cross the Virgin River (314°).

KOP 41 views northwest along Riverside Drive where the proposed 7-year transmission line would cross the Virgin River and is within VRM Class II. KOP 41 is composed of a roadway and gravel with patches of creosote bush plant community that continue up the eroding mesa slopes and disappear as the horizontal mesa dominates the background. The power poles add some

vertical element to this vantage point; however, the dominant structure is Riverside Road which creates an undulating vertical line.

3.24 Geology

The project area lies along the eastern edge of the Basin and Range physiographic province in southeastern Nevada (Williams and others 1997). The area extends from the towns of Moapa and Glendale eastward to the Mesquite-Riverside-Bunkerville area and southward to Overton. Prominent topographic features include from east to west the Meadow Valley Mountains, Meadow Valley Wash, the Mormon Mountains, Mormon Mesa, and Flat Top Mesa. It is along these mesas and prominent southward washes that drain into the Virgin River where sedimentary rocks of geological and paleontological interest are exposed as bedrock. West of Mormon Mesa these washes include Meadow Valley Wash, Weiser Wash, and the Muddy River. East of Mormon Mesa, between it and Flat Top Mesa, are Halfway Wash and Toquop Wash. East of Flat Top Wash are Pulsipher, Abbot, and Town washes, which have been extensively disturbed by the northward development of Mesquite. The Virgin River is the major river draining these washes into Lake Mead, then into the Colorado River, and eventually the Pacific.

The Virgin River depression, which lies between the Mormon Mountains, East Mormon Mountains, and Virgin Mountains, dominates the geology of the area. The Mormon Mountains fall within the Sevier thrust belt along which lower Paleozoic rocks have been thrust eastward over younger Paleozoic and lower Mesozoic rocks. The Virgin Mountains lie east of the thrust belt and consist of Paleozoic and Mesozoic rocks. The depression formed by extension during the Miocene and filled with thick deposits of basin fill sediments of the Muddy Creek Formation. Basalts within the formation have been dated at between 11.5 to 5.5 million years before present.

Deposition of the Muddy Creek Formation ceased and erosion began to remove earlier accumulated sediments after headward erosion led to the capture of and localization of the Virgin River through Lake Mead associated with the establishment of the Colorado River.

Mormon Mesa and Flat Top Mesa topographical features that dominate the central part of the area are the erosional remnants of lake and fluvial basin-fill deposits of the Muddy Creek Formation. The mesas are capped by an ancient carbonate-rich calcrete soil as much as 3 meters thick that formed after deposits filled the basin and prior to and during early incision of the area by the Virgin River.

The Muddy Creek Formation lacks coarse-grained clastic sediment. Conglomerates and overlying sediments traditionally included in the uppermost part of the formation probably belong to a younger, yet-to-be-named formation that is considerably younger than the underlying part of the Muddy Creek Formation. As noted by Williams (1997), with the exception of these conglomerates, there are few if any clasts larger than fine pebbles in the Muddy Creek Formation. The absence of coarse material in the formation suggests that no major streams carried gravels across the basin during the accumulation of most of the Muddy Creek Formation. By interpretation and implication, the predecessor of the modern Virgin River was absent.

Gravels appear abruptly upward in geologic section and have been included in the uppermost part of the Muddy Creek Formation. The conglomerates appear incised into the Muddy Creek Formation and include boulders of the Muddy Creek Formation giving evidence that they are

much younger than the Muddy Creek Formation. These gravels can readily be seen along both sides of I-15 a few miles west of Mesquite.

By the beginning of the Quaternary the Colorado-Virgin River system was entrenched to its modern depths. Quaternary-aged terrace gravel deposits accumulated along the Virgin River throughout Quaternary times, probably as a result of climatic fluctuations.

3.25 Socioeconomics

Clark County in Southern Nevada is the primary geographic area for the data utilized for potential socioeconomic effects of the Proposed Action. The specific areas in and around the vicinity of the project area are situated around Moapa Valley, Bunkerville, Moapa, and Mesquite in northern Clark County. Socioeconomic conditions include economics, population, housing, law enforcement, and emergency services.

The population of Clark County for 2011 was estimated to be 1,969,975, an increase of 1.0% over the 2010 population of 1,951,269. The Census Bureau classifies race and ethnicity as different components; therefore, the population numbers show race as well as ethnicity. Ethnicity in Clark County is Hispanic/Latino and Non-Hispanic/Non-Latino. Population and income are summarized in **Table 3.25-1**.

Table 3.25-1. Population and Income by Ethnicity for Clark County, Nevada – 2010.

Ethnicity	2010 Population	Percent of Population	Median Income
Non-Hispanic/Non-Latino			
White	1,188,122	60.89%	$34,239
African American	204,379	10.47%	$27,621
Asian	168,831	8.65%	$30,637
American Indian	14,422	0.74%	$24,895
Native Hawaiian/ Pacific Islander	13,628	0.70%	$25,293
Other	262,406	13.45%	$22,991
Two or more races	99,391	5.09%	$24,176
Hispanic/Latino [1]	568,644	29.14%	$22,688[2]

[1] *U.S. Census Bureau 2012d*
[2] *U.S. Census Bureau 2012e*

Economic Conditions

Southern Nevada's economy is generally based upon tourism supported by the legalized gambling industry. Las Vegas, located approximately 60 miles to the southwest of the project area, is the largest center for the gambling industry within the state of Nevada; however, casinos and resorts in the vicinity of the project area are important to the local economy. Most of these more localized casinos are situated in Mesquite. Some residents of northern Clark County commute to Las Vegas for employment. Service providers for the leisure and hospitality industry provide food, linen, and a variety of other services to the hospitality establishments as well as to the remaining population of the county.

Table 3.25-2 summarizes the primary job types for the main population areas in the vicinity of the proposed project.

Table 3.25-2. Job Types in Main Population Areas, Overton Project Vicinity.

Job Type	Mesquite	Moapa Valley	Bunkerville
Management, Business, and Financial	13.58%	12.64%	8.13%
Professional and Related	10.30%	19.17%	10.09%
Sales and Office	23.49%	19.21%	24.38%
Service	39.97%	19.59%	32.50%
Farming, Fishing, and Forestry	0.00%	0.42%	0.00%
Construction, Extraction, and Maintenance	7.48%	15.31%	14.15%
Production, Transportation, and Material Moving	5.18%	13.66%	10.75%

Sources: CLRSearch 2012a, 2012,b, 2012c; U.S. Census Bureau 2012a, 2012b

In 2011, Clark County had 856,174 jobs and 994,152 people in the labor force, resulting in an unemployment rate of 13.9%. The economic downturn produced high unemployment for the last several years; between May 2011 and June 2012 the unemployment rate was 13.6% for the general area of Clark County where the proposed project is located (US DOL BLS 2012). The annual unemployment rate had previously ranged from 4.2% in 2006 to 14.1% in 2010 (US DOL BLS 2012a). From 2001 to 2011, the largest industry segment was leisure and hospitality with an average 32.7% of all jobs (range from 30.99%-34.71%). The second-largest industry segment for the same period was trade, transportation, and utilities with an average of 19.25% of jobs (range from 18.42%-20.16%). The construction industry ranked fourth with an average of 9.83% of all jobs; however, the range varied widely over the 11-year period with a high of 12.42% in 2006 and 4.93% in 2011. These numbers clearly show the economic downturn of the last several years (US DOL BLS 2012b).

Average per-capita annual income was $27,422 for Clark County and $27,589 for the state of Nevada based upon the 2006-2010 American Community Survey Population Tables supplied by the U.S. Census Bureau (2012b, 2012c).

The average annual salary is $24,016 for Bunkerville, $25,742 for Mesquite, and $39,942 for Moapa Valley (Simply Hired 2012a, 2012b, 2012c; U.S Census Bureau 2012a, 2012b). Average per-capita income over the last 12 months in the U.S. Census Tracts where the proposed project is located are shown in **Table 3.25-3**.

Table 3.25-3. Average Per-Capita Income, Census Tracts in the Overton Project Area, 2011-2012.

Census Tract and Per-Capita Income									
56.07	56.12	56.13	56.14	56.15	59.02	59.03	59.04	59.05	76.00
$18,446	*$17,193*	*$25,154*	*$15,143*	*$25,505*	*$26,178*	*$33,415*	*$67,672*	*$30,071*	*$19,681*

Source: U.S. Census Bureau 2012b

Population

The population of Clark County for 2011 was estimated to be 1,969,975, a slight increase of 1.0% over 2010. Between 2000 and 2010, however, the population had increased by 41.8% (U. S. Census 2012c). Population within the ten census tracts shown in **Table 3.25-3** totaled 25,450 for 2010, a 36.6% increase from the 2000 population of 18,636 (U.S. Census Bureau 2012a).

Housing Resources

There were 840,343 housing units in Clark County based upon the 2010 U.S. Census, with 715,365 being occupied. Owner-occupied housing units totaled 408,206 and renter-occupied units totaled 307,159. Of the 124,978 vacant housing units, 47,504 were for rent and 26,963 for sale.

Housing units located in the Census Tracts shown in **Table 3.25-3** totaled 13,245 with 3,455 being vacant. Of this total, 9,790 were owner-occupied, with 2,807 being renter-occupied (U.S. Census 2012b). The average number of people living in an owner-occupied housing unit was 2.56. The average number of people living in a renter-occupied unit was 2.66. Of the vacant housing units, 680 were for rent and 494 for sale (U.S. Census Bureau 2012a).

Law Enforcement and Emergency Response

Clark County Law Enforcement is typically handled by the Clark County Sheriff's Department, which is known as Metro (Las Vegas Metropolitan Police/Clark County Police Department). Mesquite also has a police department. There is 24-hour service to the project area through these agencies. In addition, Moapa Indian Law Enforcement is located in the vicinity.

Fire protection consists of one fire station in Bunkerville, two in Logandale, one in Mesquite, two in Moapa, and two in Overton. The Moapa Valley Fire District provides fire protection and Emergency Medical Services. Mesquite's Mesa View Regional Hospital is the primary hospital in the area, and the Sunrise Children's Hospital is also in Mesquite. Within Moapa Valley, the Overton Medical Center provides medical assistance. Mesquite has an Emergency Management/Homeland Security office along with ambulance services from Emergency Medical Services that also service Bunkerville. Mesquite Operations also provides hazardous materials and other emergency response. Moapa Valley and Moapa have Air Ambulance provided by Air Trek, Inc.

Local Government and State Government Revenues

Revenue for Clark County and the cities and communities throughout Clark County include taxes based upon sales and real property value. Nevada does not have a state income tax. The sales tax rate for Clark County is 8.10% and some cities within the county also have their own add-on sales tax. Clark County's real property tax rate averages 0.72% of the estimated fair market value; the median property tax at $1,841 per year. Real Property taxes are used to fund school districts, public transportation, infrastructure, and local government projects (Clark County 2012; Nevada Department of Taxation 2012).

4.0 ENVIRONMENTAL EFFECTS

This portion of the EA provides an analysis of potential impacts of the Proposed Action assuming development of all proposed improvements under the 9-year Project Plan. This EA analyzes impacts to that portion of the project area found on public land only—a total of 1,788 acres.

New surface disturbance to federal lands within the project area would total 574.8 acres, or 31.9% of the project area, over the course of the 9-year project development period (**Table 2-2**). Restoration of construction areas including turn and pull sites would be ongoing as construction is completed for each segment of the transmission line. Following project completion, a total of 358.6 acres, or 19.8% of the project area, would remain permanently disturbed for pole sites, substations, and new access roads. The following sections discuss potential impacts to individual resources for the Proposed Action and No Action on federal surface.

4.1 Direct and Indirect Effects

4.1.1 Climate and Air Quality

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts to existing air quality would occur as a result of this project.

Alternative II – Proposed Action

Construction of the Proposed Action including transmission lines, substations, and associated access roads would produce emissions of particulate matter less than 10 microns in diameter (PM_{10}), nitrogen oxides (NO_x), and carbon monoxide (CO) from construction equipment and vehicle engines, as well as from dust on access roads and construction sites. These emissions would consist primarily of PM_{10} and the majority would be short-term and localized in nature. A low level of vehicle emissions and dust would be generated during semi-annual visits from maintenance vehicles.

No violations of applicable state or federal air quality regulations or standards would be expected to occur as a result of direct or indirect project-related emissions from project-related activity (including both construction and operation). No significant effect on local air quality would be expected as a result of the Proposed Action.

4.1.2 Areas of Critical Environmental Concern

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no impacts to the existing ACECs would occur as a result of this project.

Alternative II – Proposed Action

The Proposed Action would result in a small amount of surface disturbance in the Mormon Mesa and Virgin River ACECs from the construction of new power transmission lines, substations, and access roads. Project-related surface disturbance in the Mormon Mesa ACEC would total 29.3 acres, or less than 0.001% of the 149,915-acre surface area within the ACEC. Of the 29.3 acres of disturbance, 6.5 acres would be temporary during construction. Following reclamation of construction-related disturbance, 22.8 acres would be permanently disturbed.

For the Virgin River ACEC, project-related disturbance would total 44.6 acres, or 1.7% of the total 2,599-acre surface area within the ACEC. Of the 44.6 acres of disturbance, 21.5 acres would be temporary during construction. Following reclamation of construction-related disturbance, 23.1 acres would be permanently disturbed.

The Proposed Action would impact the ACECs by creating surface disturbance and vegetation loss which would create disturbance in habitat for wildlife and Special Status Species. This impact would be minor, and implementation of mitigation measures as discussed in sections **4.3.3 Cultural Resources, 4.3.6 Vegetation, 4.3.8 Special Status Species, and 4.3.9 Wildlife** would lessen the impacts for both of these ACECs.

4.1.3 Wild and Scenic Rivers

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no impacts to eligible Wild and Scenic Rivers would occur as a result of this project.

Alternative II – Proposed Action

Under the Proposed Action, two existing spans of the transmission line that cross the Virgin River would be rebuilt; however, construction activities would occur outside the river corridor. Therefore no direct or indirect impacts to Wild and Scenic Rivers would result from construction or operation of the Proposed Action.

4.1.4 Cultural Resources

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts to cultural resources would occur as a result of this project.

Alternative II – Proposed Action

Under the Proposed Action, 42 identified cultural sites would be present in the ROW and could be impacted by the project. Because some of the sites are present along more than one line, the number of eligible sites broken down by line exceeds 42. There are 11 National Register eligible sites in the proposed ROW for the 3-year line, 12 eligible sites for the 7-year line, and 19 eligible sites for the 9-year lines (14 for the line that would run from Tortoise Substation to the proposed Gila substation, and 5 for the line that would run from Weiser Wash to Payne Substation).

Most of the sites could be avoided during construction, by altering the width of the corridor. Three sites cannot be easily avoided, and site-specific mitigation would be necessary at these three sites. One of the three sites is located in the ROW for the 7-year line, and the other two in the ROW for the 9-year lines (one along each line).

4.1.5 Paleontology

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts would occur to paleontological resources within the project area as a result of this project.

Alternative II – Proposed Action

Excavation associated with the Proposed Action could result in the exposure and possible destruction of fossil resources of scientific significance, either directly as a consequence of construction or indirectly as a result of increased erosion rates. Increased access resulting from development may increase the visibility of fossil resources and lead to increased illegal fossil collection.

Conversely, excavation could result in the discovery of new fossil resources. If these newly discovered resources are properly recovered and catalogued into the collections of a museum repository, the Proposed Action and its alternatives could result in a better understanding and knowledge of this resource. In addition, increased access would allow easier access by professional, permitted paleontologists and geologists who hope to make scientifically significant discoveries.

Implementation of mitigation measures discussed in section **4.3.4 Cultural Resources** would result in minimal impacts for paleontological resources.

4.1.6 Soils

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts would occur to soils within the project area as a result of this project.

Alternative II – Proposed Action

Construction of the Proposed Action would result in new disturbance of approximately 127.3 acres of soils on federal land, or 7.11% of the project area, for construction of new access roads, substations, and power line support structures. Most of the disturbance to soils would be to the top one-foot during clearing of vegetation; disturbance to the lower horizons of soil would typically occur as a result of excavating holes for power line support structures. Following project completion, a total of 128.1 acres of federal land, or 7.16% of the project area, would remain permanently disturbed for pole sites, substations, and new access roads.

Potential impacts to soils from the Proposed Action include loss of soil productivity and increased susceptibility to erosion. Loss of soil productivity could result from the mixing of soil horizons when subsurface soils are brought to the surface and mix with or replace surface soils. The result could be less biologically productive surface soils due to elevated soil pH, increased soil salinity, higher sodium and calcium carbonate concentrations, decreased levels of soil nutrients and organic matter, and altered soil structure, texture, and rock content. The effects of soil mixing would be minimized or eliminated through proper soil handling and salvaging and prompt attention to soil stabilization using Best Management Practices.

Compaction of soil as a result of heavy equipment operation during construction could also reduce soil productivity. Soil compaction impacts soil structure and reduces pore size. Excessive compaction could reduce water infiltration and permeability of water through the soil; reduce diffusion of oxygen, carbon dioxide, and other gases into and out of the soil; reduce plant root penetration; and reduce plant growth and production. The effects of compaction would be reduced at the time of reclamation through sound site-preparation BMPs.

Susceptibility to erosion is increased when construction activities disturb the soil resource. Areas with steep slopes are prone to erosion regardless of soil type. The possibility of increased erosion at construction sites, especially in steeper terrain, would be reduced through proper implementation of erosion-control methods and successful, timely reclamation of disturbed areas, including revegetation, erosion control mats, and water bars to divert stormwater runoff.

Existing and proposed access roads for the project area are surfaced with dirt or gravel and are therefore susceptible to dust formation and subsequent wind erosion during periods of dry weather. During construction, topsoil piles and other exposed areas would also be subject to erosion from wind and precipitation, creating a potential loss of viability for reclamation purposes. Adherence to applicable BMPs and mitigation measures as discussed in section **4.3.6 Soils** would minimize the potential for impacts to soil resources from generation of dust and potential wind and water erosion.

4.1.7 Vegetation

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts to vegetation would occur as a result of this project.

Alternative II – Proposed Action

The Proposed Action would result in the temporary disturbance of 574.5 acres of land, or approximately 32% of the public lands in the project area, over the course of the 9-year construction period. Following restoration of temporary disturbance areas according to current BLM restoration guidelines and the project-specific Revegetation Plan (**Appendix B**), a total of 443.7 acres, or 25% of the public lands on the project area, would remain permanently disturbed for pole sites, substations, and new access roads. The direct impact to vegetation at all permanent disturbance locations would include the loss of all vegetation except for cacti and yuccas which would be salvaged and planted elsewhere in the ROW as outlined in the Revegetation Plan. Topsoil removed from areas of permanent disturbance would also be salvaged and utilized for site restoration.

Implementation of mitigation measures as discussed in section **4.3.7 Vegetation** and in accordance with the project-specific Revegetation Plan should return impacts to vegetation to near pre-disturbance levels.

4.1.8 Non-Native, Invasive Species and Noxious Weeds

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts from the spread of non-native, invasive species or noxious weeds would occur as a result of this project.

Alternative II – Proposed Action

Five species of noxious weeds were observed within the project area and at least 10 others occur nearby (Swearingen, 1981 and Powell, 2001). At least 34 additional non-native plants were recorded during the survey periods (spring/fall 2009 and spring 2010/2011), many of which have become naturalized or are well established, outcompeting the native vegetation. More non-native plants occur in the developed and agricultural lands of the surrounding communities (Swearingen, 1981).

Introduction of invasive weeds into native habitats may occur within temporary disturbance areas during construction of the Proposed Action, which could ultimately reduce habitat quality in the region. It is also likely that weed species now occurring in the project area could be spread to new locations through persons and/or equipment transporting weed fragments or seeds outside the project area.

To prevent the spread of noxious and invasive weeds, a Weed Plan has been developed for the Proposed Action and has been submitted by K&LA to the BLM (August 24, 2012). The Weed Plan includes specific mitigation measures which are to be followed to reduce the potential for the spread of noxious and invasive weeds into and out of the project area. Additional resources are also provided in the Weed Plan which may assist efforts to control weed species during and following construction. Restoration procedures as outlined in the project-specific Revegetation Plan (**Appendix B**) would further reduce the potential for weeds (K&LA, August 27, 2012). Mitigation measures are further discussed in section **4.3.6**.

4.1.9 Special Status Species

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts would occur to special status wildlife, fish, or plant species within the project area as a result of this project.

Alternative II – Proposed Action

4.1.9.1 Special Status Wildlife Species

Information presented in this section reflects information received through consultation with the BLM, USFWS, NDOW (see **Appendix D**), and other available data sources.

Overton Power has completed formal consultation with the BLM Las Vegas Field Office and USFWS in Las Vegas, Nevada to identify the potential presence of Threatened and Endangered species in the vicinity of the Proposed Action (see **sections 3.9.1 and 3.9.2**). The Mojave desert tortoise is a federally-listed Threatened species known to occur in the project area, and two designated Critical Habitat areas for the desert tortoise overlap the project area (section **3.9.1**). Four federally-listed Endangered species are known to occur within the vicinity of the project area. One Candidate species—the yellow-billed cuckoo—is potentially present in the project area. Potential impacts to special status species and migratory birds are discussed in the following sections.

Threatened and Endangered Species

Reptiles

Mojave desert tortoise. The Proposed Action would result in the temporary and permanent disturbance of 574.5 acres of potential desert tortoise habitat on federal surface, or 32% of the public lands in the project area, during construction. This disturbance would occur in stages during construction of the 3-year, 7-year, and 9-year phases of the Proposed Action, as summarized in **Table 2.1,** and would result in the destruction of vegetation that desert tortoises use for forage and cover. Following restoration of temporary disturbance areas including turn and pull sites, a total of 443.7 acres of habitat, or 25% of the public lands in the project area, would remain permanently disturbed for pole sites, substations, and new access roads.

The Mojave desert tortoise is widely distributed throughout the project area and it is highly likely that tortoises may enter or cross the project area during construction of the transmission line and access roads, as well as during operations and maintenance. This activity could potentially result in injury or death from being run over by a piece of heavy equipment or service vehicle. Trenches and shallow holes would temporarily displace tortoises attempting to move across the project area, and open excavations could potentially become traps resulting in injury or death. Minimizing the potential for tortoise encounters within the project area would reduce the likelihood of death of injury. The following BMPs would reduce the risk of killing or injuring a desert tortoise:

1. An appropriate number of authorized biologists and desert tortoise monitors would be employed during construction to monitor activities for desert tortoises.
2. Prior to initiation of construction, all on-site construction personnel would participate in a desert tortoise awareness program. The program would contain information concerning the biology and distribution of the desert tortoise, its legal status and occurrence in the project area; the definition of “take” and associated penalties; responsibilities of workers, monitors and biologists; and report procedures to be implemented in case of desert tortoise encounters or non-compliance with stipulations. Responsibilities of workers may include checking under vehicles for tortoises and contacting a biologist when desert tortoises are encountered.

3. Temporary and permanent desert tortoise exclusion fence would be constructed around portions of the project alignment to prevent tortoises from entering the construction area. A biologist would be present during fence construction to ensure no harm to desert tortoises.
4. Authorized desert tortoise biologist(s) would conduct desert tortoise clearance surveys prior to surface-disturbing activities. During the survey, all desert tortoise burrows would be examined to determine whether the burrow is occupied by desert tortoises. Tortoise burrows would be cleared of tortoises and eggs, and collapsed or blocked. All burrow excavations and tortoise handlings would be conducted in accordance with USFWS-approved protocol.
5. Desert tortoises or eggs found in harm's way during any construction activities would be relocated to adjacent land outside the project area in accordance with USFWS approved protocol.
6. Construction traffic would be confined to fenced areas, the existing or dedicated roads and within designated right-of-way. Workers would be instructed to obey required speed limits to protect wildlife.
7. Water application for dust control should avoid pooling of water on roadways that may act as an attractant to desert tortoises.
8. All desert tortoises observed within the project area or access road would be reported immediately to the authorized biologist. The biologist would halt activities as necessary to avoid harm to a desert tortoise until the desert tortoise moves—or is moved by an authorized desert tortoise biologist—out of harm's way.
9. Trash and food items should be promptly disposed of to prevent attracting ravens and other desert tortoise predators to the project site. Regular trash collection would prevent accumulation and overflow, thus reducing the presence of predatory species. Installation of scavenger-proof trash receptacles would prevent attracting additional predatory species. Detailed mitigation measures specific to ravens are included in **Appendix E**, Raven Management Plan.
10. Holes and trenches should be covered or fenced overnight to prevent desert tortoise entrapment. If trenches cannot be covered or fenced, escape ramps should be constructed along the trench to allow wildlife a means to escape.
11. All terms and conditions for wildlife can be found within the amended Biological Opinion.

Excavation activities during project construction would disturb and compact the soils in which desert tortoise burrows are constructed. Surveys for desert tortoise burrows would be conducted and all burrows would be examined to determine whether the burrow is occupied by desert tortoises and/or eggs. Tortoise burrows would be cleared of tortoises and eggs, and collapsed resulting in loss of desert tortoise habitat. Desert tortoises or eggs found in harm's way during any construction activities would be relocated to adjacent land outside the project area in accordance with USFWS-approved protocol.

Indirect short-term impacts to desert tortoises during project construction would include disturbance from noise and vibrations from use of construction equipment that could modify tortoise behavior, accidental encounters with humans, and increased wind and heat resulting from loss of surface vegetation. Edge effects on tortoise habitat could also be created from loss of vegetation and soil cover. Indirect long-term impacts resulting from increased access to the project area would include potential injuries or death resulting from accidental encounters with

operations and maintenance personnel, recreationists, and domestic pets; collisions with recreational and maintenance vehicles; and collection of tortoises for pets.

The vicinity of the project area is utilized by the recreating public and although the ROW is primarily accessible from existing power line access roads, post-construction restoration would help prevent increased public use of the alignment for recreation, including OHV use. Continued recreational use by the public could increase the chances for desert tortoises to be harassed, injured, or killed by vehicles and domestic pets and further degrade habitat in the area. The presence of humans and illegal trash dumping would create the potential for an increase in the number of predatory and scavenger species. It is well-documented that species such as coyotes and ravens have adapted well to exploiting human encroachment on their traditional habitat. As a result, the potential upward trend of predatory species may impact hatchlings or sub-adult Mojave desert tortoises within the project area. Indirect habitat loss could also occur as a result of degradation due to spread of noxious weeds. Roads to and from the project area would provide vectors for invasion by weedy plant species resulting in potential degradation of habitat. Noxious weeds compete with the native vegetation, which provides forage and cover for desert tortoises, and increase the risk of fire in the Mojave desert.

Birds

The Southwestern Willow Flycatcher has been documented near the project area and has been observed in the past at the OWMA. Critical habitat exists near riparian portions of the project area along the Virgin River. The Proposed Action could have effects on this species, especially when the river corridor is used during breeding season.

Birds inhabiting the project area are likely to experience direct impacts associated with construction of the transmission lines including habitat disturbance, disruption of reproductive activities, and potential for injury or death. In order to mitigate these impacts, construction activities should be monitored by qualified biologists. A biological monitor onsite during project construction could halt work if it is determined that active nests are being disturbed by construction activities, set up a buffer around the nest in accordance with USFWS guidelines, and ensure the nest is not disturbed until the young have fledged.

Pre-construction surveys for nests should be conducted during the bird breeding season (February 15 through August 31 for most species), although construction in riparian habitat for SWFL would need to be avoided (May through July). If active nests with eggs or chicks are found, the area around the nest must be avoided by an appropriately sized buffer, as determined through coordination with USFWS wildlife staff. These nests would remain protected until such time as the young have fledged.

Further, the work should be confined to the designated ROW, reducing habitat disturbance to the minimum amount necessary to perform the job safely and as designed. Transmission lines should be constructed to be avian safe according to *Suggested Practices for Avian Protection on Power Lines* (Avian Power Line Interaction Committee (APLIC) 2006). Post-construction restoration to a natural state would allow habitat to recover and should include the re-planting of native trees (i.e. mesquite) removed during construction. The trees should be maintained (watered) until they are established well enough to survive on their own.

The yellow-billed cuckoo (*Coccyzus americanus*) has been documented near the project area within riparian habitat similar to that of the SWFL. This species could also be affected by the Proposed Action, but there is very low probability because this species is not abundant in the project area and would only possibly be present during breeding season. Impacts and mitigation measures similar to those identified above for the SWFL could be implemented,

including presence of a biologist to survey for nests. However, since construction in riparian habitat would not occur during the breeding season, the species would be not likely be affected by the Proposed Action.

The Yuma clapper rail's (*Rallus longirostris yumanensis*) habitat range is normally along the marshy coastlines of California, Baja, and Mexico, but rail habitat occurs along the banks of the Muddy and Virgin Rivers in the project area and there are documented historical occurrences of this species near the project area (NNHP 2009). Because this species is so rare within inland areas, and historical occurrences of this species near the project area are 4 miles away, no impacts to this species are anticipated as a result of the Proposed Action.

BLM Sensitive Species

Chuckwalla (*Sauromalus obesus*): A live chuckwalla was encountered and habitat occurs throughout the Power District ROW, overlapping with desert tortoise habitat particularly in rocky areas where chuckwallas can bask and retreat when threatened. There is potential for impacts to chuckwallas and their habitat from the Proposed Action. There would be habitat loss in the form of crushing, clearing, and grubbing vegetation for pole sites, access roads, substations, and turn/pull sites. Rocky slopes where chuckwallas bask and retreat may also be disturbed if those areas are cleared for transmission line structures resulting in loss of chuckwalla habitat. Chuckwallas may be injured or killed by crushing when heavy equipment clears habitat for construction or from encounters with other vehicles on the project site. Mitigation measures such as having a biologist survey the area for chuckwalla prior to construction and to relocate any chuckwallas at risk of being harmed would lessen the impacts to this species.

Gila monster (*Heloderma suspectum*): Gila monster habitat occurs within the Proposed Action in addition to historical documentation of Gila monsters by NNHP and NDOW. It is possible Gila monsters may be impacted by the Proposed Action. Habitat loss would result from clearing and grubbing of vegetation and impaction of soils in which Gila monsters construct burrows. Gila monsters would be at risk of death or injury from crushing by heavy equipment and vehicles during construction work. The presence of a biologist during construction would mitigate the impacts to this species. A biologist would survey in accordance with NDOW survey protocols for Gila monsters at risk of being harmed and relocate them safely out of the work areas. Habitat impacts to Gila monsters would be lessened by confining construction only to designated work areas and implementing a post-construction Revegetation Plan (**Appendix B**) to restore habitat.

Sensitive bird species encountered or potentially present in the project area such as the peregrine falcon, western burrowing owl, loggerhead shrike, LeConte's thrasher, Bendire's thrasher, golden eagle, ferruginous hawk, and Swainson's hawk are likely to experience impacts associated with construction of the transmission lines including habitat disturbance, disruption of reproductive activities and potential for injury or death. Measures would be taken during project construction to minimize impacts to these species, including pre-construction surveys, avoidance and restoration of habitat, in addition to making sure transmission lines are avian safe.

Impacts to habitat can be minimized by confining activities to the designated ROW and lessening habitat disturbance to the minimum amount necessary to perform the job safely and as designed. Additionally, implementation of a project-specific Revegetation Plan (**Appendix B**) would allow habitat to recover following construction.

Monitoring of construction activities by qualified biologists and having the area surveyed for nests prior to project implementation could also lessen impacts to these species. If active nests with eggs or chicks are found, the area around the nest must be avoided by an appropriately

sized buffer, as determined through coordination with USFWS wildlife staff. These nests would remain protected until such time as the birds have fledged the nest. In addition, all transmission and sub-transmission towers and poles should be designed to be avian-safe in accordance with *Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006* (Avian Power Line Interaction Committee (APLIC), 2006).

Western burrowing owl (*Athene cunicularia hypugea*): A live burrowing owl was encountered during 2010 surveys of the project area and habitat is present to support the species. It is possible burrowing owls may be impacted by the Proposed Action. Clearing and grubbing activities would crush or destroy vegetation in habitat that the owl utilizes for foraging. These activities would also impact soils or destroy underground tunnels (burrows) that the owl uses for nesting and roosting. Clearing and grubbing activities may also pose a threat to the owl in the form of injury or mortality.

In order to lessen the impacts to this species, habitat disturbance should only occur in the designated work areas and disturbance should be kept to the minimum amount necessary to perform the job safely and as designed. A biologist present during construction would lessen the impacts to this species by performing surveys for burrowing owls and their burrows prior to the start of construction activities. Any active nests discovered would be protected by a buffer as designated by the federal agencies until young fledge the nest. During winter, burrowing owl burrows within areas proposed for disturbance could be collapsed by a biologist to prevent future delays in construction during breeding season as long as there are no owls occupying the burrows in winter. Burrowing owl habitat lost as a result of construction could be restored according to the project-specific Revegetation Plan (**Appendix B**). Lastly, all transmission and sub-transmission towers and poles should be designed to be avian-safe in order to protect raptors such as the burrowing owl.

4.1.9.2 Special Status Plant Species

Threatened and Endangered Plant Species

The Proposed Action is not expected to directly or indirectly impact any USFWS Threatened or Endangered plant species or habitat.

Candidate Species

Las Vegas Buckwheat was the only USFWS Candidate plant species considered as possibly present in the project area. However, neither Las Vegas Buckwheat nor any other Candidate species or habitat were observed in the project area. The Proposed Action is therefore not expected to directly or indirectly impact any USFWS Candidate species or habitat.

BLM Special Status Plant Species

Four BLM Sensitive plants—Beaver Dam breadrooot, straw milkvetch, threecorner milkvetch, and sticky buckwheat—occur in the project footprint and may be adversely affected by the Proposed Action.

Threecorner milkvetch occurs on 2.58 acres within the project area. A total of 0.98 acres, or 38% of the species population within the project area, occurs within proposed areas of disturbance. Following reclamation, 0.43 acres would remain permanently disturbed. Sticky buckwheat occurs on 2.84 acres within the project area. A total of 0.50 acres, or 17.6% of the species population, occurs within proposed areas of disturbance. Following reclamation, 0.39 acres would remain permanently disturbed. Thus approximately 0.43 acres of threecorner

milkvetch habitat and 0.39 acres of sticky buckwheat habitat would be permanently lost under the Proposed Action.

Both species are found in sandy soils of the Muddy Creek formation which is exposed along the eroding edges of Mormon and Flat Top Mesas. Threecorner milkvetch tends to occupy areas of stabilized sand with a light surface cover while sticky buckwheat is more often located in areas of loose sand. Additional habitat for both species is located in the project vicinity and more populations can be expected beyond the project ROW. These populations may be impacted by increased public use of areas containing populations of both plants. This increase may be minimal, however, as numerous 4-wheel-drive roads and utility access roads already provide access points to the areas in question. Improvements in existing roads and construction of new roads may, on the other hand, may provide better access than is available at present.

Populations of these two native plants are also threatened by increases in non-native plant species, particularly Mediterranean grass and Sahara mustard which tend to occupy the same types of habitats. Increased abundance of invasive weeds in rare plant habitat is a significant threat to these species. Sahara mustard has been described as releasing chemicals into the soil which inhibit seed germination of native species, leading to nearly pure stands of mustard under favorable conditions. Sahara mustard—as with many invasive weeds—germinates sooner, lives longer, and produces higher volumes of seed than do native species, providing intense competition for already strained resources (http://www.desertmuseum.org/invaders/invaders_sahara-mustard.php). Invasive weeds typically occupy disturbed areas but frequently spread into native habitats. Vehicles, equipment, and personnel can be primary vectors.

Beaver Dam breadrooot, considered an At-Risk species by the NNHP, is also common in the survey area, but is thought to have a fairly limited range. This species may be adversely affected by the Proposed Action. Efforts to protect threecorner milkvetch and sticky ringstem would likewise offer protection to Beaver Dam breadrooot, as they frequently occur in the same areas.

Straw milkvetch also has limited distribution in the project area. The populations of straw milkvetch in the Toquop Wash area are considered invaluable to the survival of this taxon (see NNHP, 2006) and should be treated with the same level of sensitivity as threecorner milkvetch and sticky buckwheat. The Proposed Action may adversely affect this species of milkvetch. Every effort should be made to avoid disturbance to all straw milkvetch populations and individuals. Restoration efforts as outlined in the Revegetation Plan would be recommended for temporary disturbance areas, while mitigation for permanently disturbed areas would be the same as for threecorner milkvetch, and sticky buckwheat.

Adverse effects to threecorner milkvetch, sticky buckwheat, Beaver Dam breadrooot, and straw milkvetch would be mitigated to result in a zero net loss through one or more of the mitigation measures described in section **4.3.9.2, Special Status Plant Species**.

Two additional BLM Special Status Plant Species—silverleaf sunray and rosy twotone beardtongue—were considered as possibly present but were not found on public lands within the project area. No direct or indirect impacts to these plants are anticipated from the Proposed Action.

Cacti and Yuccas

Eleven cactus species and one yucca would be affected by the Proposed Action. The most common species of cacti occurring in most habitats of the project area are beavertail pricklypear (*Opuntia basilaris* var. *basilaris*) and silver cholla (*Cylindropuntia echinocarpa*). The remaining

species are primarily located in areas with rocky surfaces or substrates. Joshua trees are present in stabilized sandy soils on Mormon Mesa and along the terraces west of Toquop Wash. Mormon Mesa near the upper portions of Halfway Wash and the bajada southeast of the Virgin River contained the highest concentrations and diversity of cactus and yucca species. An estimated ±4,330 cacti and ±80 Joshua trees are located within areas of proposed new disturbance.

All cacti and yuccas are protected by Nevada State law. Due to the potential for construction equipment to run over and crush individual plants, all cacti and yuccas occurring in construction areas would need to be salvaged and relocated elsewhere inside of the ROW or replanted in temporary disturbance areas during restoration. Success rates of cactus and yucca salvage are highly variable. BMPs including correct orientation, depth, watering, and monitoring would insure the highest possible success rate; however, some cactus and yucca species would still be lost as a result of the Proposed Action. The mitigation measures listed in section **4.3.9.2 Special Status Plants**, as well as procedures discussed in the Revegetation Plan (**Appendix B**), would help to reduce this loss. The Revegetation Plan considers an evaluation of the success of the revegetation efforts for bonds held by the BLM to be released.

Mesquite and Acacia

Mesquite and acacia trees both occur within the ROW, but only mesquite forms larger thickets which are essentially located adjacent to riparian areas. Mesquite populations make up 10.6 acres within the ROW. A total of 0.5 acres, or 4.7% of the species population in the ROW, occurs in areas of proposed new disturbance. Acacia are generally widely scattered, but do create modified habitats which favor a wider variety of plant and animal life. It is the goal of the Clark County MSHCP and the governing agencies which manage federal land within the county to protect mesquite and acacia habitats from further reductions in size and to improve the quality of habitat for the multiple species which utilize these habitats (Crampton et al., 2006). As would be expected, avoidance is preferable to mitigation. Therefore, it would be better to relocate disturbance areas out of mesquite and acacia habitat. Mitigation measures are discussed in section **4.3.9.2 Special Status Plants**.

4.1.10 Wildlife and Fisheries

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no project-related impacts to wildlife and fisheries would occur.

Alternative II – Proposed Action

Wildlife within the project area would be impacted by loss of habitat in the form of vegetation loss and soil disturbance from clearing activities. Wildlife would also be potentially injured or killed as a result of vegetation clearing by machinery or contact with vehicles and construction equipment in the area. There would be temporary disturbance and displacement as a result of noise from construction and the presence of humans in the area. The Proposed Action would result in the temporary and permanent disturbance of 574.5 acres of potential wildlife habitat on federal surface, during construction. Following restoration of temporary disturbance areas including turn and pull sites, a total of 443.7 acres of habitat, would remain permanently disturbed for pole sites, substations, and new access roads.

Following completion of construction, all temporarily disturbed lands would be reclaimed as required by federal agencies and in accordance with their guidance and approval, using a project-specific Revegetation Plan (**Appendix B)**. The duration of impacts to wildlife habitat would depend, in part, on the success of mitigation and reclamation efforts and the time needed

for natural succession to return revegetated areas to suitable conditions. Grasses and forbs are expected to become established within the first several years following reclamation; however, much more time would be required to achieve reestablishment of shrub communities. Consequently, disturbance of shrub communities would result in a longer-term loss of those habitats.

In addition to the direct loss of habitat due to construction of the transmission line, disturbances from human activity and traffic would lower wildlife utilization of habitat immediately adjacent to these areas. Species that are sensitive to indirect human disturbance (noise and visual disturbance) would be impacted most. Habitat effectiveness of these areas would be lowest during the construction phase when human activities are more extensive and localized. Following construction and reclamation of temporary disturbance, many animals could become accustomed to the new facilities and could once again use habitats adjacent to disturbance areas.

General Wildlife

Numerous wildlife species are present within the project area, including a variety of migratory birds, waterfowl, snakes, lizards, and small mammals such as rabbits, rodents, kit foxes, and coyotes, or small game species such as dove and quail. Construction of the Proposed Action and the resultant surface disturbance would have a direct impact on these species including some direct mortality, displacement, and loss of habitat. Birds and some small mammals are highly mobile and would be minimally impacted by direct mortality during project construction because these species would likely flee the immediate area of construction activity. A slight increase in mortality from increased vehicle use of roads in the project area, and therefore an increased potential for vehicle/wildlife collisions, would be expected during construction. Quantification of mortality as a result of construction is not possible; however, the impact is likely to be low over the short term. Additionally these animals would experience habitat loss in the form of vegetation and soil disturbance for development of the pole sites, turn and pull sites, access roads, and substations. Habitat loss would be minor relative to available habitat in the area. Areas that are designated for temporary use would allow for habitat recovery through the Revegetation Plan (**Appendix B**) over time.

This project-specific habitat Revegetation Plan would aid in habitat recovery for these species and confining construction activity to the designated work area would lessen the impacts to habitat and wildlife. There would likely be impacts to wildlife from noise and ground vibrations which would disrupt normal behavior patterns, but these effects would be temporary. The presence of a biologist during construction to identify and relocate these species would also reduce the impacts. A biologist would conduct a pre-construction clearance sweep to relocate wildlife from construction sites or identify migratory bird nests for avoidance. Should ground disturbance occur during the Migratory Bird breeding season (February 15 through August 31), a biologist would conduct a migratory bird survey in areas proposed for disturbance and in accordance with federal agency guidelines. During the survey, the biologist would search for nesting migratory birds and observe whether breeding behavior in birds is occurring. If migratory bird nests are found, a buffer would be established around active nests to protect them until young have fledged. Provided that avoidance and mitigation measures for the project are adhered to, minimal impacts to wildlife would be expected from the Proposed Action. Due to the relatively high production potential of these species and minimization of habitat disturbed, general wildlife populations would quickly rebound to pre-disturbance levels following reclamation of disturbance areas.

Raptors

Potential impacts of the Proposed Action to raptors would include: (1) nest abandonment and/or reproductive failure caused by project-related disturbance, (2) increased public access and subsequent human disturbance resulting from the construction of the transmission lines, and (3) small, temporary reductions in prey populations. Raptors frequenting the project area and vicinity may include, but would not be limited to the golden eagle, osprey, red-tailed hawk, prairie falcon, northern harrier, American kestrel, great horned owl, and burrowing owl. Ospreys and merlins may also use the area seasonally. Potential impacts to these species from the Proposed Action would include habitat loss, injury, or death.

Fisheries

Fisheries are situated outside the project area and the area of potential effect, and would therefore be unaffected by construction, operations, or maintenance activities.

Mitigation measures for wildlife, raptors, and fish are discussed in section **4.3.10 Wildlife and Fisheries.**

4.1.11 Wetlands and Riparian Zones

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no impacts to wetlands and riparian zones would occur as a result of this project.

Alternative II – Proposed Action

Regulations that apply to wetlands and riparian zones include Section 404 of the Clean Water Act that includes Executive Order 11990 for wetland protection. Section 3.2.2 also contains wetland and riparian stipulations. No jurisdictional wetlands occur within the project area. Wetlands were avoided in the design and layout of the Proposed Action; therefore there would be no impacts to wetlands with implementation of the Proposed Action.

4.1.12 Floodplains

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no impacts to floodplains would occur as a result of this project.

Alternative II – Proposed Action

Regulations that apply to floodplains include Section 404 of the Clean Water Act that includes Executive Order 11988 for floodplain management. Section 3.2.2 also contains floodplain stipulations. There is a possibility that some relatively minor drainage diversions would be created due to the grading for the Proposed Action. These minor drainage diversions would be evaluated as part of the final engineering design and constructed such that drainage facilities are adequate to handle increased flows. Impacts related to floodplains for individual structures and roads would be negligible. No changes would occur to the drainage patterns of the floodplains crossed.

4.1.13 Water Quality, Surface and Ground

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no impacts to surface and groundwater would occur as a result of this project.

Alternative II – Proposed Action

Surface water and groundwater quality effects are denoted by changes in the water quality parameters that are measured. The potential hydrology effects can be measured by any differences in the quantity and normal flow movement resulting from activities in the project area. Erosion, drainage pattern, and channel morphology changes would also suggest changes in the physical hydrology of the water.

Short-term direct and indirect impacts would be at their highest levels during construction of the Proposed Action, with these levels dropping immediately after completion of the construction as reclamation and stabilization of disturbance occur.

Potential impacts to water resources would correspond to new surface disturbance (**Table 2-2**) and the level of impacts would potentially increase in areas where steeper slopes are present. Direct and indirect effects on water resources would be reduced below the level of significance through the implementation of BMPs and mitigation measures as discussed in section **4.3.13**.

Surface Water

Disturbance of the ground surface has the potential to affect surface water quality from an increase in sedimentation and runoff. Erosion would be more likely to occur where the ground surface has been disturbed and/or stripped of vegetation, which could cause increased sediment in surface water during runoff events. Runoff can pick up several substances that are considered detrimental to the quality of surface water including, but not limited to salts, chemicals, metals, and organic materials that can be carried with the sediment to the surface water. Any increase in surface runoff and erosion would generally be short-term during project construction. Revegetation and stabilization of ground deposits and soils during reclamation/ restoration of disturbed areas would minimize the potential for long-term impacts.

Accidental spills of hazardous substances also have the potential to affect surface water and to some degree, groundwater. The use of hazardous substances during construction and operation of the Proposed Action would be limited to vehicle fuel, and the risks of a spill would be low since fueling operations would take place offsite.

Surface waters would not be depleted or used during construction of the Proposed Action; however, disturbance from construction activities may alter drainage patterns on a localized level. Being as this impact would be localized; it would not have an impact on the overall surface water or watershed pattern. Proper design, engineering, and the implementation of the Storm Water Pollution Prevention Plan, along with following best management practices as recommended by the BLM, would reduce any effects to the drainage patterns and surface water quality. Implementation of these mitigation measures would insure that the surface and groundwater would not be significantly degraded.

The total disturbance resulting from construction of the Proposed Action would be 574.8 acres. Following reclamation of construction and staging areas, a total of 358.6 acres would remain permanently disturbed as a result of the Proposed Action. The overall impact to surface water would be insignificant if all recommendations are implemented during the construction of the Proposed Action.

Groundwater

The Proposed Action would not have any anticipated interception with groundwater except where it crosses Meadow Valley Wash, which has a shallow flow of groundwater within the project area and vicinity. The proposed power transmission line access in the Meadow Valley

Wash area would be adjacent to an existing access road so the disturbance to any groundwater would only occur if the placement of the power poles intercepts the underground flow of this wash/drainage. If this occurs, small amounts of silt, clay, and other sediments lying within the drainage may seep into the groundwater flow. The seepage would be temporary and minimal and would release only small quantities into the shallow groundwater located within Meadow Valley Wash. The Proposed Action would, therefore, have no long-term impact on the groundwater resources located in the project area.

Surface water and groundwater rights and/or sources would not be adversely affected because the Proposed Action would have very little water demand. The construction of permanent water-resistant surfaces and other new permanent disturbance within the project area would total 358.6 acres, of which 316.3 acres would be located on BLM-managed lands. No long-term impact to water resources is expected from the small increase in water-resistant surfaces within the proposed project area.

4.1.14 Wastes, Hazardous or Solid

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts from the generation of hazardous or solid waste would occur within and surrounding the project area as a result of this project. Current impacts to the project area from illegal dumping would continue to occur.

Alternative II – Proposed Action

No chemical or other hazardous wastes would be generated by construction or operation of the Proposed Action. Portable toilets would be installed at construction sites for the disposal of human waste.

In addition to construction materials for transmission line structures, transmission lines, and substations, solid waste generated during project construction would include food and beverage containers and similar trash. Trash containers installed at each construction site would be emptied on a regular basis and removed following project construction.

4.1.15 Environmental Justice

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no impacts to Environmental Justice would occur as a result of this project.

Alternative II – Proposed Action

The location and construction of project features would not disrupt any identified minority and/or low-income communities. The Proposed Action would, in fact, provide additional job opportunities during the 9-year project construction period. No disproportionate negative impacts to the human or economic health of these communities are anticipated as a result of the Proposed Action. Indirect economic benefits resulting from increased property tax and sales/use tax generated by operation of the project would accrue to all populations.

4.1.16 Transportation and Access

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts would occur to the transportation network within and surrounding the project area as a result of this project. Current access to the project area would remain as is.

Alternative II – Proposed Action

Construction of the Proposed Action would result in a slight increase in traffic on I-15, SR-168, SR-169, and SR-170 as a result of transporting construction workers, machinery, and materials to and from construction areas. Construction equipment and vehicles, including dirt-moving equipment, blade(s), loader(s), scraper(s), a drilling rig, backhoe, water truck(s), hauling truck, and bucket trucks would be transported over local transportation routes under their own power or via trailer or tractor trailer. Much of the equipment would remain onsite until construction and reclamation is complete. Sporadic increases in traffic would result from transporting equipment between sites.

Daily commuting by a maximum of 14 construction workers would generate a maximum of 28 additional vehicle trips per day (14 trips each direction) on the affected portions of I-15, SR-168, SR-169, and SR-170. This represents an increase of less than 1% in AADT during peak travel times on all roads. Carpooling would further reduce the number of daily trips. Increased project-related traffic would not produce a noticeable decrease in the current LOS on any of these routes.

All new access roads would be designed and constructed using the BLM standards for roads (BLM 2011) along with proven and safe engineering practices. The access roads would be maintained by Overton Power and its contractors during construction and reclamation.

4.1.17 Rangeland Management

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts to livestock grazing or other land uses would occur as a result of this project.

Alternative II – Proposed Action

Construction of upgrades to the power transmission line would transect the Lower Mormon Mesa and Flat Top Mesa grazing allotments. New surface disturbance would be created for the placement of power transmission support structures and turn and pull locations for new transmission lines. Existing access roads, which are currently used for transmission line maintenance, would be used for construction of the new facilities as well as for continued operations and maintenance. However, new spur roads may also be constructed to the new power pole locations, resulting in additional new disturbance.

The total new project-related surface disturbance, including both allotments, would be 35.03 acres, or 0.006% of the total 54,691 acres. Following reclamation of construction-related disturbance, 10.1 acres of permanent disturbance would remain.

The terms and conditions of the grazing permit allow AUMs to be used by livestock and by season in an unrestricted fashion so long as abuse to the federal range does not occur. For the 49,353-acre Lower Mormon Mesa allotment, the current single AUM is calculated at 26.46 acres (1,865 AUMs for the total allotment). Under the Proposed Action, total new surface disturbance would be 24.82 acres (15.91 acres of temporary disturbance and 8.91 acres of permanent disturbance). Therefore, construction of the Proposed Action would initially result in the loss of just less than one AUM. Following reclamation, the total AUMs affected would decrease to 0.34 on the Lower Mormon Mesa allotment. The allotment reports three time periods with 35 livestock (cattle) for each. This total is well below the defined sustainable number of 1,865 AUMs for the allotment.

For the 5,338-acre Flat Top Mesa allotment, a total of 10.21 acres would be disturbed following reclamation. The current single AUM is 6.08 acres (886 AUMs for the entire allotment).

Construction of the Proposed Action would initially result in the loss of 1.68 AUMs. Following reclamation, the total AUMs affected would decrease to 0.2 on the Flat Top Mesa allotment. The allotment reports two time periods with six livestock (horses) each, also well below the defined sustainable number of AUMs for the allotment.

During construction in these allotment areas, there would be a slightly increased risk of livestock/vehicle collisions; however, the number of AUMs affected would be minor. Since the total amount of disturbance, both temporary and permanent, would be far below 1% of the total acreage in the allotments, the Proposed Action would have minimal impact on the range resources being utilized.

4.1.18 Fuels and Fire Management

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts to fuel loading and fire management would occur within the project area as a result of this project.

Alternative II – Proposed Action

Any wildfire has the potential to impact natural and human-made resources and activities in the project area and vicinity. The lands within and surrounding the project area do not contain fire-adapted habitats; however, the majority of the project area is in creosote-bursage habitat which generally has minimal fuel loads capable of sustaining a significant fire. Weeds may increase fuel loads and likewise increase fire potential. Efforts at controlling weed species as outlined in the Weed Management Plan developed for this project (K&LA, August 24, 2012) would significantly reduce fuel loads capable of carrying a fire in the project area. These actions can be considered effective fuel reduction mitigation methods. Overton Power also maintains a 50-foot buffer around all wooden poles which is clear of vegetation. Potential impacts from wildfires within the project area are expected to be low. Project-specific measures would significantly reduce the potential for a fire and/or insure timely suppression if a human-caused fire were to ensue. Such measures include providing and maintaining fire suppression equipment (fire extinguishers) on all construction vehicles, having a readily available source of water from a J-stand or water truck during all construction activities, and maintaining minimal levels of weed species in proximity to all structures and work areas.

Mitigation measures specific to wildfire are further discussed in section **4.3.18 Fuels and Fire Management**.

4.1.19 Noise

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts would occur within the project area as a result of noise generated by this project. Existing sources, including maintenance trucks for the existing power transmission lines, would continue generating noise at present levels.

Alternative II – Proposed Action

Several factors affect the perception of noise including wind speed and direction, topography, vegetation, humidity, air density, noise pitch, and distance from the source. Noise levels above 55 dBA (the maximum acceptable level of noise for a sustained period of time under OSHA standards) would be considered a significant impact. Noise generated at individual sites within the project area could briefly exceed 55 dBA for short periods of time between 7 a.m. and 7 p.m. during construction of the Proposed Action. Construction of access roads would generate

temporary, sporadic noise from use of dirt-moving equipment, water truck(s), blade(s), loader(s), scraper(s), and haul truck(s). Short-term, sporadic noise would also be generated by the drilling rig, backhoe(s), and bucket truck(s) used for placement of transmission line support structures.

Noise generated during construction and reclamation could modify animal behavior (see additional discussion in section **4.1.10 Wildlife**) and affect human comfort levels. The nearest receptors to structures associated with the Proposed Action are identified in **Table 4.1.19-1**.

Table 4.1.19-1. Noise Receptors and Distance from Proposed Action.

Noise Receptor		Facility associated with the Proposed Action	
Type	**Location**	**Type**	**Distance from Receptor**
Residence	Overton	Existing power pole	30 ft
Residence	Bunkerville	Existing power pole	55 ft
Public park	Mesquite	Existing power pole	350 ft
Residence	Moapa	Existing power pole	700 ft
School	Moapa	Proposed power pole	0.25 mi
Commercial gravel pit	SE of Toquop	New Toquop substation	1.25 mi
Riverside Inn	SE of Gila	New Gila substation	0.36 mi
Sewage treatment ponds	WSW of Bryner	New Bryner substation	0.10 mi
Residence	SSW of Dugway	New Dugway substation	0.97 mi
Bowman Reservoir	SW of Whipple	New Whipple substation	1.70 mi
Residences	SSW of Whipple	New Whipple substation	1.94 mi
NDOT maintenance facility	W of Bloomfield	New Bloomfield substation	2.00 mi
Abandoned industrial site	SW of Bloomfield	New Bloomfield substation	1.60 mi

Impacts from noise would be short-term and temporary during construction. When construction and reclamation of construction-related disturbance are complete, project-related noise would be limited to transient noise generated by semi-annual maintenance and repair vehicles and activities.

4.1.20 Health and Safety

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts to human health and safety would occur as a result of this project.

Alternative II – Proposed Action

Human health and safety risks associated with the Proposed Action include occupational hazards related to the construction, operation, and maintenance of the new power transmission line and its associated substations and access roads; increased potential for vehicle collisions resulting from increased project-related traffic on access roads; seasonal working conditions such as extreme heat; seasonal driving conditions; natural hazards associated with events such as wildfires and flash floods; and firearms accidents related to recreational target-shooting and hunting in the vicinity.

Occupational Hazards. Line installers and repairers who would be employed for power line construction and operations are subject to occupational hazards that require following stringent procedures to insure their safety (US DOL BLS 2012a), as are access road construction workers. Both occupations are categorized as heavy and civil engineering construction. Injury and illness rates for this work category for 2010 were 3.8 out of each 100 full-time workers (US DOL BLS 2012b). Estimating a maximum workforce of 14 during construction and reclamation, and 8 for ongoing operations and maintenance of the completed project, 1 to3 injuries could be expected every 2 to 3 years. Since construction of the power line upgrades and new access

roads would occur mostly in rural areas, it is highly unlikely that injury would result from a non-construction vehicle breaching the construction area, which is where most roadway construction injuries and fatalities occur.

A few sections of the proposed transmission line would cross into the more urbanized areas of Moapa Valley and Mesquite. However, these sections are relatively short and the remainder of the project area is generally rural. Health and safety risks would generally be focused on the employees and contractors rather than the public-at-large since the project is generally in rarely used rural areas.

Other Risks and Hazards. Most of the unimproved roads that access the transmission lines and their upgrades have minimal use. The land use in the vicinity of the transmission line and access roads is generally for OHVs and recreational shooting that may include hunting. Firearms-related risk could increase in the areas where new access roads would be built due to the new accessibility of the area. Activity along these access roads, however, could encourage hunters and target-shooters to find a more isolated area for their activity which would reduce accidents. Highway safety is addressed in section **4.1.16 Transportation**.

Wildfire risk in the project area would increase, especially during construction. All rules and regulations administered by the BLM regarding prevention, use, or suppression of fire on federal lands would be followed. Overton Power would notify the BLM Authorized Officer and/or any other necessary organization of any fires occurring during construction. If fire were to occur, Overton Power and/or the contractors would initiate fire suppression within the work area and continue until the fire is completely extinguished or until they are released to leave by an authorized representative of the agency managing the land where the fire occurred. Overton Power and/or the contractors would be responsible for all costs associated with the fire and the rehabilitation necessary from the resulting damage. No heavy equipment would leave the approved ROW during a fire unless there is imminent danger to property and/or life. Overton Power would designate a fire control representative during construction of the project and that representative would ensure that each construction crew has fire-fighting tools and equipment (extinguishers, shovels, axes, etc.) appropriate to the number of people working the area. Limited public use of the project area is expected to continue and therefore risk to the public due to wildfire would be minor. Risk would increase to personnel associated with fighting or suppressing fires, but is expected to remain at a low level.

4.1.21 Recreation

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts would occur to recreation resources within the project area as a result of this project.

Alternative II – Proposed Action

Construction of the Proposed Action would temporarily interrupt the use of portions of the project area for dispersed recreational activities including OHV use, and recreational shooting. Geo-caching and rock-hounding generally occur along access roads outside the project area. The permanent presence of new transmission power lines and access roads would diminish the quality of recreational activities for some users. However, several other areas in the vicinity are available for these activities and project-related impacts would therefore be minimal. Following construction and reclamation, the presence of new access roads associated with the Proposed Action could attract more recreational activity since access to the area would be increased.

4.1.22 Visual Resources

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be built and there would be no change to existing visual resources in the rural communities of Mesquite, Logandale, Moapa, and Overton in Clark County as a result of this project.

Alternative II – Proposed Action

The Proposed Action would potentially affect visual resources in the rural communities of Mesquite, Logandale, Moapa, and Overton in Clark County if it were to introduce disruptive elements to the landscape which distract the viewer, thereby contributing to lowered aesthetic values and appreciation of those values by persons viewing the area. A number of conditions must be met to create an impact to visual resources. The conditions are contingent upon managing for landscape character and quality, an uncharacteristic change to the landscape, viewer exposure to the landscape, and a reaction from a set of viewers who are attuned to landscape quality and aesthetics.

Construction of the transmission line infrastructure would introduce short-term visual impacts through the clearing of vegetation along the power line corridor, and the resulting creation of contrast within the landscape. However, vegetation such as creosote and shrubs would be crushed rather than removed, which would reduce visual contrast. Crushed vegetation would regenerate more quickly than reclamation by reseeding. Reclamation of surface disturbances immediately following construction at the substations and any areas with vegetation disturbance beyond temporary crushing of creosote and shrubs would reduce short-term impacts related to color and line contrasts from exposed soils.

Long-term impacts to the visual quality and character of the landscape from the Proposed Action would range from weak to strong along the transmission line corridor. As illustrated by the following photo simulations, the level of impact would depend on the VRM classification for each KOP. The project would not have a significant effect on the overall visual quality of the landscape.

Of the eight KOPS discussed in section **3.23 Visual Resources**, VRM Class objectives would be met at all but KOP 27 (VRM Class II), and KOPs 7 and 11 (VRM Class III). Projects in VRM Class II should not attract the attention of the casual observer; however, the simulation showed moderate to strong contrasts with the existing landscape. Class III areas are managed to retain the existing character of the landscape, and projects may attract attention but should not dominate the view of the casual observer. The overall level of change should be moderate.

The following photo simulations demonstrate the strong visual impacts at KOP 7, KOP 11 and KOP 27.

Photo 9. Simulation of KOP 7 (342°)

The new transmission line is shown in the simulated photograph. The new line adds apparent vertical elements with the new monopoles creating a strong contrast against the existing flat landscape. The project would not meet the VRM class III criteria with an overall strong contrast rating. The transmission upgrade would dominate the view and demand the attention of the casual observer at this KOP. However, sensitivity to changes in visual resources in this area are expected to be low because this KOP is located in a rural desert setting where users would consist of a small number of local residents who recreate or are off-road enthusiasts. Impacts to the quality of the visual resource values in this area would be mitigated by painting structures to blend with the natural surroundings and implementing a Revegetation Plan (**Appendix B**) to res-establish vegetation within this habitat.

Photo 10. Simulation of KOP 11 (48°)

KOP 11 views northeast from Mormon Mesa Rd. toward the proposed location of Dugway substation. The simulation includes Dugway substation, associated transmission line structures, and lines of the new transmission line upgrade. The project would add new horizontal elements in the view repeating those of the existing landscape. However, the poles would add dominant contrasting vertical elements in a horizontally orientated landscape and therefore would have a strong contrast rating. The project would not meet VRM Class III criteria at this KOP.

The view represents what a local resident or the recreating public would encounter as they approach the panoramic overlook of the mesa top. To mitigate the effects of the project on visual resources at this KOP, the structures could be painted colors that blend with the natural surroundings, berms could be built around the substation to reduce geometric shapes using earth spared from bringing the substation to level grade, and poles made of different materials or sizes could reduce contrast.

Photo 11. Simulation of KOP 27 (187°)

KOP 27 views east to represent the view a motorist would have while traveling south on SR-170 to a segment where the power line becomes geographically closer to the roadway. The existing transmission line structures would add a vertical element and attention to the poles would be aided by the disturbance created from dirt access roads, which otherwise would easily blend with the background. The photo simulation of KOP 27 shows Gila substation with more transmission lines that occur in the middle ground creating a strong contrast between the structural elements in the landscape which dominate the view. The project would not meet the VRM Class II criteria from this KOP by creating overall strong contrast.

Users of this area would be local residents who would be highly sensitive to visual impacts, although there are existing impacts to visual resources in this area created by transmission lines, access roads, and grazing/ranching activities. To mitigate the effects of visual resource disturbance at this KOP, the structures could be painted colors that blend with the natural surroundings, berms could be built around the substation to reduce geometric shapes using earth spared from bringing the substation to level grade, and poles made of different materials or sizes could reduce contrast.

In the three simulations above, the disturbance and structures could not be overlooked by observers; the project would catch and demand their attention, and the character of the landscape would not be retained. The strong ratings are due to new substations and the accompanying structures.

KOPS located within or near the Mormon Mesa and Virgin River ACECs (KOPs 33 through 38 and 45 through 47) would meet the VRM Class management objectives; however, because these KOPs are situated within or near the ACECs, protection of scenic values through mitigation would be required in order to reduce impacts from the Proposed Action. Site-specific mitigation measures as discussed in section **4.3.22 Visual Resources** would be implemented to lessen the visual impacts from these structures.

The Proposed Action would affect visual resources where disturbance associated with the transmission line, access road, and substation construction would create variations from the line, form, color, and texture of the characteristic landscape. The severity of the impact would be limited because of terrain and distance of the project area from local highways—the viewpoint for most observers. The impacts would affect residents, visitors who recreate in the area and regional through traffic with the severity of the visual contrast rating ranging from weak to strong. Residents and visitors who recreate in the area would experience a greater visual impact, but recreational use of the area would be low to moderate except in developed recreation areas surrounding the Proposed Action in Lake Mead National Recreation Area and Valley of Fire State Park.

A few segments where the new transmission line parallels and crosses I-15 would be viewed by a large number of user groups; however, a majority of the transmission lines would travel through desert that is only open to the public by way of the power line access roads and has very few users annually. The relatively few users that recreate on these roads would be local residents. A few sections of the upgrade project that travel near local roads (SR-169, Gold Butte Road, Riverside Road) used mainly by residents of Logandale, Overton, Moapa, and Mesquite would have a slightly higher number of viewers. These viewers would be more sensitive to change; however, most upgrades would occur along existing power line corridors that currently have vertical and horizontal structural elements. Impacts to visual resources from the Proposed Action would be weak to moderate overall because the visual resource management objectives would be met within a majority of the project area and most of the transmission structure upgrades would follow the existing transmission line corridor. In areas where new transmission lines and roads would be constructed, the VRM class objectives would be met or the transmission line would not be visible to sensitive user groups from local transportation corridors.

VRM class objectives and design considerations have been analyzed throughout the project planning process. Various alignments and pole materials were considered to reduce visual impacts of structures within sensitive areas. A complete list of suggested visual resource mitigation measures is included in section **4.3.22 Visual Resources**.

4.1.23 Geology

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts to existing geology and mineral resources would occur as a result of this project.

Alternative II – Proposed Action

Overall, the impacts to geology from the Proposed Action would be minimal, since construction and excavation activity would be limited to surface and near-surface deposits. It is possible that the Proposed Action could increase the likelihood of erosion or mass wasting by the clearing of vegetation over soils.

There are no active mining claims within the project area, and therefore no claims would be affected. The Proposed Action would not hinder future access to mineral resources, and would possibly be beneficial in that the project would facilitate the acquisition of electricity for mining operations within or adjacent to the project area.

No indirect impacts to the geology and minerals have been identified.

The magnitude of impacts to geology and associated geological hazards would be reduced to a minimal level or completely eliminated by the implementation of mitigation measures as discussed in sections **4.3.6 Soils, 4.3.7 Vegetation, 4.1.13 Water Resources, and 4.3.23 Geology.**

4.1.24 Socioeconomics

Alternative I – No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed and no additional impacts would occur to recreation resources within the project area as a result of this project.

Alternative II – Proposed Action

Economic and Employment Effects. Economic and employment effects of the Proposed Action would include increased short-term employment and income during the construction and upgrade of the proposed power transmission line and access roads, as well as during reclamation of construction-related disturbance. The construction workforce would likely not exceed 20 workers and would vary from approximately 8 to 20 workers during construction. Ongoing maintenance of the completed power transmission line would provide long-term employment for approximately 8 workers. An increase in indirect employment for services and retail would not be expected.

Other service and commercial industries such as food services and retail would be indirectly affected. It is estimated that approximately $100,000 would be spent for materials locally (within a 100-mile radius) during construction, adding to the local economy.

Population Effects. Impacts to population are not anticipated as a result of the Proposed Action. Given the high unemployment rate within Clark County, it is likely that the short-term increase in employment created by construction and reclamation of the Proposed Action would have only a brief effect of sustaining a small portion of the current population and would not generate any population growth.

Housing Demand. The workforce required for the Proposed Action would easily be sustained by the local population and if any workers are brought into the area specifically for this project, rental housing units or local hotels/motels would easily accommodate these workers.

Law Enforcement and Emergency Response. The demand for law enforcement and emergency management services associated with the Proposed Action would be short-term and easily accommodated by the current law enforcement and emergency management resources available.

Fiscal Effects. The Proposed Action would generate increased sales tax revenues through increased sales of power and increased property tax revenues through new construction facilitated by the improved infrastructure. These revenues would increase incrementally as each phase of the project is completed, as summarized in **Table 4.1.24-1.**

Table 4.1.24-1. Projected New Customer and Revenue Volumes, Proposed Action.

Phase	New Customers			New Revenue (annual average)		
	Residential	Commercial	Total	Residential	Commercial	Total
3-Year Line	450	3	453	$ 756,000	$ 9,900	$ 765,900
7-Year Line	1,100	11	1,111	$1,848,000	$36,300	$1,884,300
9-Year Line	1,500	15	1,515	$2,520,000	$49,500	$2,569,500

4.2 Cumulative Effects

4.2.1 Introduction

Cumulative effects are those effects to the environment and socioeconomic conditions resulting from the addition of the Proposed Action to past, present, and reasonably foreseeable future actions, "regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 C.F.R. § 1508.7). The cumulative impact analysis area (CIAA) for the Proposed Action varies according to the element of the affected environment being analyzed and is defined for each element discussed in this section. This assessment also examines a longer time frame than the environmental effects assessment in **Section 4.1**.

Indirect effects are defined as effects "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 C.F.R. § 1508.8).

Cumulative environmental and socioeconomic effects were considered as potentially occurring if all three of the following conditions were met:

- the Proposed Action would result in a residual environmental or socioeconomic effect on a component of the biophysical or human environment that can be measured, or can be expected to occur; and
- the Proposed Action's residual environmental or socioeconomic effect on that component would, or would be likely to, act in a cumulative fashion with the effects of other past or future projects and activities that are likely to occur; and
- the Proposed Action's contribution to cumulative effects could be reasonably expected to affect the viability or sustainability of the resource or a value such as a regulatory 'threshold' or standard.

Historically, portions of the project area have been affected by highway and utility projects. Natural gas and potable water pipelines, as well as power transmission lines, traverse the study area, and the Nevada Department of Transportation (NDOT) has ongoing highway improvement projects. Most of these projects have been analyzed under separate consultations. The area continues to be used by the public for OHV, rock hounding, and other recreational activities. There is also ranching and cattle grazing on lands within the project area. Over 95% of the project area is located on, and surrounded by, federal lands. Any new actions proposed in these areas would undergo consultation with the appropriate agencies. Although growth and development in Mesquite has slowed with the economic downturn, future growth in Mesquite is anticipated. Areas not protected within the ACECs (Mormon Mesa and Virgin River) are federal lands or are zoned for residential and commercial use.

Several developments have been completed in the City of Mesquite adjacent to the regional park boundaries, resulting in the need for infrastructure improvements and placing increased demands on the natural resources of the area. The Clark County Moapa Valley Trails project is a system of recreational trails for public use that would utilize mostly developed areas near the project alignment (Clark County 2009). In addition, demands for natural energy sources have increased pressures to develop solar power in the region on both public and private lands. In 2009, the City of Mesquite was planning 17 major renewable energy projects in the area (http://mesquitenv.gov/GeneralInfo/LifeInMesquite). It appears, however, that none of these proposals are moving forward at this time.

Table 4.2-1 summarizes existing, approved, and proposed facilities and sites for electrical transmission and power distribution, wind energy, solar energy, pipelines, communications, mining, airport leases, and highway projects that intersect the project area. A set of detailed maps showing the locations of these actions is included in **Appendix F**, and a complete list of actions and corresponding maps is included in the Administrative Record for this EA.

Table 4.2-1. Other Actions in the Cumulative Impact Analysis Area.

Owner and Serial No.	Map No.	Action Area		Description
		Total Acres	Intersects Project Area	
APPROVED ACTIONS				
BOR, City of Los Angeles, and Nevada Power NVN 004790	1	2,562	420’ x 350’	Navajo-McCullough 550-kV transmission line and maintenance roads;105.31 miles x 200-foot aerial
Clark County Regional Flood Control NVN 052748	2	0.01	3' x 585' 3' x 293’ 3' x 207'	Rain gauge (3' X 3') 12-inch diameter standpipe; intersects project area in 3 locations.
Holly Energy Partners NVN 082385	3	1	150’ x 150’ (see Kern River)	ROW for 12-inch refined petroleum products pipeline from Woods Cross, UT to Las Vegas and two refined products bulk-loading terminals
Kern River Gas Transmission Co. NVN 042581	4	728	226' x 206' 150'x150' odd shape, 85,813 sf	El Dorado pipeline Kern River pipeline Mojave pipeline
Los Angeles Dept. of Water & Power NVN 010683	5	1	420’ x 300’	Two 500-kV electrical transmission lines in conjunction with U-42519
Moapa Valley Telephone NVN 055241	6	7	10' x 264' 10' x 150' 10' x 309'	Buried optic cables (5.55 mi)
NVN 056807	7	31	17’ x 150’	Conduits to 2 buried splice vaults placed every 3,000-5,000 feet along fiber-optic line
Nevada Dept. of Transportation NVN 0007427	8	641	400' x 300'	13.1 miles of 400-foot wide corridor
NVN 0051855	9	90	578'x150'	Non-energy facilities
NVCC 0016459	10	480	0'	7 materials sites
NVCC 0018310	11	170	250' x 400'	CCR12, Section B1 from Junction 6 to Logandale (3.51 mi)
NVCC 0020826	12	105	250' x 400'	CCR 6, Section F (2.17 mi)
NVCC 0020836	13	105	250' x 400'	CCR 6-F1.6 - F2 and 6G, 1 mile south of Glendale to 1 mile north of the west slope of Mormon Mesa

Table 4.2-1. Other Actions in the Cumulative Impact Analysis Area, continued

Owner and Serial No.	Map No.	Action Area		Description
		Total Acres	Intersects Project Area	
APPROVED ACTIONS				
NVCC 0020886	14	175	39' x 400'	CCR 6-F1.6 - F2 and 6G, 1 mile south of Glendale to 1 mile north of the west slope of Mormon Mesa
NVN 007490	15	50	15’ x 150’	Highway
NVN 0052889	16	0.001	431’ x 150’ 300’ x 150’	Amendment including 13.67 acres of highway previously authorized by ROW CC-020523; from 0.5 miles SW of junction with US 93 near Glendale to 5 miles NE on US 91, Clark County
NVN 0065014	17	0.001	400' x 300'	East edge of Mormon Mesa to 2 miles west of Mesquite (9.8 miles)
Nevada Power Co. NVN 039815	18	176	250’ x 130’	Pecos-Harrisburg 345 kV power
Overton PD NVN 006038	19	2	25’ x 464’	7.2/12.47 kV power distribution line (3,439.53 feet)
NVN 036114	20	2	--	12.5 kV buried power line (5,125.08 feet)
Rio Virgin Telephone NVN 058344	21	11	10’ x 730’	Fiber optic telephone cable (9.4 miles)
PENDING ACTIONS				
Bright Source Energy Solar Partners NVN 083914	22	14,960	29,784' x 300'	12 solar power plants and related structures/facilities on Mormon Mesa; proposed 400-megawatt capacity; would utilize OPD#5 power lines
Clark County Dept. of Public Works NVN 089674	23	10	60’ x 300’	Henrie Road improvements; ROW for road and drainage located in Moapa
Lincoln County Power District #1 NVN 085095	24	951	9,592' x 300'	Overlapping ROW for 38.3 miles of new 230kV electric transmission line and associated ancillary facilities; LCPD#1 and OPD#5 are aware
City of Mesquite NVN 060589	25	5,320	15,111' x 150'	Airport lease (Flattop Mesa)
NVN 066240	26	2,560	16,467' x 150'	Airport lease
Nevada Dept. of Transportation NVN 076263	27	2	300’ long inside I-15 corridor	Water pipeline
Transwest Express, LLC NVN 086732	28	1	250' x 300' 250' x 150' 250' x 300'	500-600kv power transmission line, Lincoln County to Las Vegas; proposed ROW for 3 locations in preferred alignment

Potential cumulative impacts of the Proposed Action are discussed by resource in the following sections.

4.2.2 Air Quality

The CIAA for air quality is defined as the airshed within a 100-kilometer (approximately 62-mile) radius of the project area. When combined with existing and reasonably foreseeable actions, emissions generated by equipment used during construction and operation of the Proposed Action would not add noticeably to deterioration of regional air quality. Implementation of dust-control measures would prevent cumulative impacts from dust generated during construction and maintenance.

4.2.3 Areas of Critical Environmental Concern

The CIAA for the Mormon Mesa and Virgin River ACECs is defined by the ACEC boundaries, a small portion of which is included within the project area. Special management measures for these areas established in the Las Vegas RMP would minimize cumulative effects to ACECs from the Proposed Action combined with existing and reasonably foreseeable future actions including ongoing energy development for infrastructure, wind, and solar along with gas exploration, and transportation projects.

The Proposed Action and reasonably foreseeable future actions would impact the ACECs by creating surface disturbance and vegetation loss which would create disturbance in habitat for wildlife and special status species. These projects could also directly impact wildlife in the form of potential injury or mortality and displacement from habitat. Implementation of mitigation measures as discussed in Sections **4.3.3 Cultural Resources, 4.3.6 Vegetation, 4.3.8 Special Status Species, and 4.3.9 Wildlife** would lessen the impacts for both of these ACECs.

4.2.4 Wild and Scenic Rivers

The CIAA for Wild and Scenic Rivers is defined by the portion of the Virgin River within the project area boundary that is eligible for designation as a Wild and Scenic River. Two existing spans of the transmission line over the Virgin River would be rebuilt as part of the Proposed Action; however, no new disturbance and no cumulative impacts to wild and scenic rivers are anticipated as a result of the Proposed Action, when added to other existing and reasonably foreseeable actions within the CIAA.

4.2.5 Cultural Resources

The CIAA for cultural resources is defined by the project area boundary. Disturbance and/or loss of other unidentified sites or artifacts resulting from the implementation of the Proposed Action, when added to other existing and reasonably foreseeable actions in the project area, could add to the cumulative loss of information about our heritage in the analysis area and in the region if these sites or resources are not identified and inventoried prior to disturbance. Any loss or damage to unidentified cultural or historical sites or resources associated with the Proposed Action could be substantial. However, such losses are not expected because mitigation measures would be implemented.

4.2.6 Paleontological Resources

The CIAA for paleontological resources is defined by the project area boundary. Potential cumulative effects to paleontology from the Proposed Action, when added to existing and reasonably foreseeable actions in the project area, include loss of scientifically significant resources. Because of the limited number of locations that contain skeletal remains and limited number of paleontological resources in the project area, however, the probability for cumulative impacts to paleontological resources would be low.

4.2.7 Soils

The CIAA for soils is defined by the project area boundary. Based upon the amount of surface disturbance associated with the Proposed Action, combined with existing and reasonably foreseeable activities in the area, the likely incremental cumulative impact of productivity loss and erosion on the existing soil resource would be low. With successful implementation of soil salvaging and reclamation, it is expected that soil productivity and soil erosion losses in the project area would be controlled and therefore minimal cumulative impacts would occur. It is likely that planned activities would add to fine sediment delivery to drainage systems, but this

increased delivery would be over a period of years during project build-out and would not likely be noticeable.

4.2.8 Vegetation

The CIAA for vegetation is defined as the project area and immediate vicinity. Future construction related to power infrastructure, wind and solar energy projects, gas exploration, and transportation projects would act cumulatively with impacts from the Proposed Action and past activities where construction occurs within areas consisting of native Mojave desert scrub or blackbrush vegetation communities. These activities contribute to the removal of native vegetation resulting in long-term habitat loss through loss of vegetation and soils that contain the native seed bed. Native vegetation loss also results in shifts in vegetation community types from established native vegetation to invasion by noxious weeds and non-native species.

The successful application of BMPs and recommended mitigation measures for the construction and post-construction phases would minimize the impacts on representative vegetation, particularly in the temporary disturbance areas.

4.2.9 Invasive, Non-Native Species and Noxious Weeds

The CIAA for invasive, non-native species and noxious weeds is defined as the project area and immediate vicinity. Noxious weeds and non-native plants were identified in the project area, and in particularly high densities near areas of disturbance along roadways. These species could spread outside the project area to new locations and further degrade habitat quality in the region as a result of the Proposed Action in combination with proposed development of power infrastructure, wind and solar energy, gas exploration, and transportation projects in the area. All of these projects could promote the spread of non-natives and noxious weeds through persons and/or equipment transporting weed fragments or seeds; it is also likely that weed species now occurring in the area could be spread. These activities would also contribute to the removal of native vegetation and increase the susceptibility of the area to establishment of noxious weeds and non-native plant species. The successful application of BMPs and recommended mitigation measures for controlling the establishment and spread of invasive, non-native species would minimize these impacts.

4.2.10 Special Status Species

The CIAA for Special Status Species is defined as the project area and immediate vicinity. Other impacts or activities in the immediate area currently and for potential future development include ranching operations, recreation (hiking and hunting), mining, and development for utilities such as power (solar, wind) and natural gas. Impacts from present and foreseeable future actions are anticipated to be similar to the Proposed Action, and minimized when mitigated by special management measures.

Threatened and Endangered Wildlife Species

Cumulative impacts are expected for the Mojave desert tortoise as a result of this project combined with present and reasonably foreseeable future actions. Desert habitat found within the area provides essential habitat for desert tortoises. Tortoises may be injured or killed when they enter construction areas and encounter vehicles, and equipment, or become trapped in holes or trenches. Tortoises would also be temporarily displaced by construction due to exclusion fence and holes or permanently displaced from their burrows in the permanent disturbance areas. Habitat loss, risk for injury or death, and displacement due to construction would continue to have an impact on the desert tortoise and its habitat. However, mitigation

measures similar to those recommended for the Proposed Action would minimize these impacts over the long term by protecting the desert tortoise and habitat (section **4.1.9.1**).

Cumulative effects from the Proposed Action and present or foreseeable future actions on the southwestern willow flycatcher and yellow-billed cuckoo are expected to be minimal since the project would avoid habitat to support these species during the breeding season, and the project would impact such a small portion of their habitat. Potential impacts to these species would include habitat disturbance, disruption of reproductive activities and potential for injury or death. These effects would be minimized by avoidance of activities in target habitat during breeding season (February 15 through August 31), providing a biologist to monitor for nests during construction activities. If active nests with eggs or chicks are found, the area around the nest must be avoided by an appropriately sized buffer, as determined through coordination with USFWS wildlife staff. The nests would remain protected until such time as the birds have fledged the nest. These mitigation measures for the Proposed Action as outlined in section **4.1.9.1** would minimize the cumulative impacts from proposed development activities.

BLM Sensitive Wildlife Species

Cumulative impacts to sensitive species known to occur in the area, including the chuckwalla, Gila monster, burrowing owl, and loggerhead shrike, may occur if or when they are present in the area, but are not expected to be significant. These impacts would occur indirectly from the temporary loss of habitat, forage, or prey species and directly from vehicle/equipment collision mortalities or inadvertent burial during excavations. Bird species are highly mobile and therefore should be minimally impacted. In addition, the disturbance associated with the Proposed Action when added to other reasonably foreseeable future actions is not expected to significantly impact any of the sensitive species listed because habitat in temporary disturbance areas would be restored through succession and the project-specific Revegetation Plan (**Appendix B**). Construction would be confined to designated work areas, lessening habitat impacts within the project area. Additional mitigation measures as discussed in section **4.3.9** would reduce the impacts to these species.

Special Status Plant Species

The CIAA for Special Status Species is defined as the project area and immediate vicinity. The trail system that is proposed as part of the regional park east of Flat Top Mesa would provide increased public access to portions of the Muddy Creek Formation east of Flat Top Mesa, which includes potential habitat for threecorner milkvetch, sticky buckwheat, Beaver Dam breadrooot, straw milkvetch, dune sunflower, and multiple cactus and yucca species. However, the project area generally would remain in a natural state. Therefore, incremental negative impacts to Special Status plants and habitat resulting from project effects combined with other effects from reasonably foreseeable future projects are not anticipated.

4.2.11 Wildlife and Fisheries

The CIAA for wildlife and fisheries includes the project area and immediate vicinity. Due to the mobility of most wildlife species and their ability to migrate among BLM, state, and private lands in the area, negative cumulative impacts to wildlife and wildlife habitat as a result of the Proposed Action combined with existing and reasonably foreseeable actions are not anticipated to be significant.

Cumulative impacts would include increased traffic and human encounters with wildlife. Habitat would be impacted by land requirements to construct future development projects.

The potential residual effects associated with the construction of the Proposed Action and infrastructure on wildlife and wildlife habitat include:

- Temporary alteration and human disturbance of native desert habitats;
- Temporary loss of habitat connectivity;
- Disturbance of wildlife, including displacement away from construction activities during both sensitive and non-critical periods; and
- Potential for wildlife mortality due to: wildlife-traffic collisions during construction and commute; destruction of undiscovered nests, dens, hibernacula, or other habitats on the right-of-way, and animals caught in trenches or holes during construction activities.

In general, the potential residual effects of power line construction and operation on wildlife and wildlife habitat are expected to be localized, short-term, and low to moderate in impact. There are no cases where a permanent or long-term effect of significant or measurable impact at the population level of a species is predicted. With employment of measures to minimize and mitigate impacts, the potential environmental effects of wildlife habitat alteration, wildlife disturbance and mortality are predicted not to be significant.

4.2.12 Wetlands and Riparian Zones

Jurisdictional wetlands or riparian zones were avoided in the design and layout of the Proposed Action; therefore, there would be no cumulative effects to wetlands and riparian zones.

4.2.13 Water Quality, Surface and Ground

Watersheds within the CIAA include portions of the Lower Muddy River, Upper Muddy River, Halfway Wash-Virgin River, Valley of Fire Wash-Virgin River, Sand Hollow Wash-Virgin River, Lower Meadow Valley Wash, and Toquop Wash. Activities and developments already present include population areas, agriculture, ranching, mining, roads, and oil and gas exploration. Reasonably foreseeable actions include construction of additional electrical transmission lines, rain gauges, pipelines, buried telephone and fiber optic cables, transportation corridors, and solar power facilities as described in **Table 4.2-1**.

The proposed power line crossing of the Muddy River, the two crossings of the Virgin River, and the crossing of Meadow Valley Wash pose the greatest risk to water resources. The two crossings of the Virgin River would not place any pole in or near the river and the distance from the power poles to the river varies from 90 feet to 250 feet. The power poles would be located on already existing access roads. The Muddy River crossing would occur near the discharge to Lake Mead and the power poles would be along an already existing street (Lewis Avenue). The crossing at Meadow Valley Wash would also be located along an existing access road and the power poles would be aligned off this road with a minimum amount of disturbance in the wash itself. None of these crossings would have a long-term cumulative effect on the water resources in the vicinity of project area.

Implementation of Operator-committed mitigation measures and those mitigation measures recommended in the Storm Water Pollution Prevention Plan would minimize impacts to water resources.

4.2.14 Wastes, Hazardous or Solid

The CIAA for hazardous and solid waste is limited to the project area. No hazardous wastes would be generated by construction or operation of the Proposed Action and solid waste generated during construction and operations would be regularly removed to approved disposal

sites in Clark County. The Proposed Action would not add to the cumulative effects of existing illegal dumping within the project area.

4.2.15 Environmental Justice

The CIAA for environmental justice includes the project area and surrounding communities in Clark County. Short-term cumulative impacts, when added to existing, planned, and reasonably foreseeable energy and development activities in the area, would include increased employment opportunities for construction workers and laborers during the build-out of the project. However, with a maximum workforce of 14, the effect would not be noticeable as a percentage of overall employment. Similarly, long-term cumulative impacts would not be noticeable since the workforce would be reduced to a maintenance and operations crew of approximately 8 people.

4.2.16 Transportation and Access

The CIAA for transportation and access includes the project area and transportation network in the surrounding Clark County communities. Short-term cumulative effects would include increased traffic resulting from transport of construction equipment and materials, plus a workforce of up to 20 during construction of the power transmission line, substations, and associated new access roads. Heavy equipment would be moved to the work area but remain in the project area during construction. When added to existing and reasonably foreseeable future activities in the project area and vicinity, the increase in average daily traffic during the 9-year construction period would be barely noticeable and would not decrease current levels of service on area roads and highways. The current workforce of approximately 8 personnel would continue to serve ongoing maintenance and operations requirements, resulting in no net long-term cumulative effect.

4.2.17 Rangeland Management

The CIAA for rangeland management is limited to those portions of the Flat Top Mesa and Lower Mormon Mesa grazing allotments that fall within the project area boundary. The total area affected by construction and operation of the Proposed Action would amount to less than 1% of the total acreage of these allotments. Short-term impacts would result in the loss of approximately 2 AUMs in these allotments, both of which support far fewer livestock than allowed. When added to existing and reasonably foreseeable future actions in the area, the Proposed Action would therefore have no cumulative effect on rangeland management.

4.2.18 Fuels and Fire Management

The CIAA for fuels and fire management includes the project area and immediate vicinity. With the reduction of fuel loads in the immediate area of the power transmission lines during construction, and ongoing monitoring of fuel loads during operations, the Proposed Action is not anticipated to cumulatively increase the risk of fire when added to existing and reasonably foreseeable future actions in the region.

4.2.19 Noise

The CIAA for noise includes the project area and immediate vicinity. Construction of the Proposed Action would generate noise at levels that could briefly and sporadically exceed 55 dBA at individual construction sites during work hours, affecting human comfort levels and modifying wildlife behavior. When added to noise generated by existing and reasonably foreseeable future actions, the cumulative impact of noise from the Proposed Action would be low overall. Following completion of construction and reclamation, project-related effects would be limited to transient noise generated by maintenance and repair vehicles and activities, and

would minimally add to noise levels from existing and reasonably foreseeable activities in the area.

4.2.20 Health and Safety

The CIAA for health and safety is limited to the project area. The primary risks to health and safety resulting from the Proposed Action would be construction-related injuries for project workers and increased potential for vehicle collisions resulting from increased traffic and accessibility to the project area by both construction workers and the public. However, the relatively small size of the workforce (8 to 20 workers with an estimated 1 to 3 injures every two years) would result in a minimal level of risk when added to existing and reasonable foreseeable actions in the project area. The presence of the workforce in the project area during construction, operations, and maintenance would likely reduce the overall use of recreational/casual firearms in the project area, creating a positive cumulative effect.

4.2.21 Recreation

The CIAA for recreation is limited to the project area and immediate vicinity. Activities and noise associated with the construction of the Proposed Action, when added to existing and reasonably foreseeable actions in the area, could diminish the quality of recreational activities in the immediate area for some users during the 9-year construction period. However, the low use of the area for recreational activities and the availability of many nearby areas for the same activities would reduce these impacts to a minimal level. Cumulative impacts during operations and maintenance would be minimal.

4.2.22 Visual Resources

The CIAA for recreation includes the project area and the viewshed within 3 to 5 miles of the project area boundary. Visual impacts would include modifications to the visual character of the landscape resulting from access road and power transmission line construction. These impacts would be lessened by the mitigation measures identified above, but would be evident for as long as the road and transmission line remain. Development of the transmission line upgrades would create visual impacts for travelers on local highways resulting from disturbance, but the upgrades utilize primarily existing transmission line corridors and roads where there have already been impacts to visual resources and therefore cumulative effects of the Proposed Action on the visual character of the landscape combined with other activities in the area would be minimal.

4.2.23 Geology

The CIAA for geology and minerals is limited to the project area. When added to existing and reasonably foreseeable actions, the cumulative impacts to geology and minerals would be minimal and would include increased potential for erosion.

4.2.24 Socioeconomics

The CIAA for socioeconomics includes the project area and surrounding Clark County communities. Cumulative impacts resulting from the construction and operation of the Proposed Action, in combination with existing and reasonably foreseeable actions in the CIAA, are described as follows.

Employment and Income Effects. The proposed power transmission line upgrades and new access roads would generate employment and income for 8-20 workers during construction and 8 workers for day-to-day operations after construction, resulting in no noticeable cumulative impact on employment or income levels.

Population Effects. Workers used to fill positions for the proposed power transmission line upgrades and access roads would be drawn from the existing population in the southern Nevada labor pool, resulting in little or no effect on the population.

Housing Demand. Since the workers required for the proposed project are likely to be hired from the local labor pool, there would be or little—if any—effect on local housing demand.

Law Enforcement and Emergency Response. The Proposed Action would require a small crew of employees who would likely be drawn from the existing population. Demand for law enforcement and emergency services would therefore not increase noticeably as a result of this project in combination with other existing and reasonably foreseeable actions. Fire control would be maintained by work crews at each job site along with emergency medical equipment during construction and operations. Workers would also be trained in fire suppression and emergency first aid.

Fiscal Effects. Fiscal effects would be minimal with regard to revenue created through sales tax on consumer goods, entertainment, and services purchased by project workers. The increase in sales of materials needed for project construction would produce a small, short-term increase in revenue from sales tax. There would not likely be any additional revenue generated from personal property tax since it is unlikely that property would be purchased as a result of the Proposed Action by either the proponent or any of its employees.

4.3 Mitigation Measures Considered

CEQ regulations direct resource specialists to describe ways in which potentially adverse environmental impacts may be mitigated. For the Proposed Action, a broad set of discretionary mitigation measures would be applied when appropriate as a matter of project design by the proponent and the BLM. These measures are frequently referred to as Best Management Practices (BMPs). The LVRMP (October 1998) also provides BMPs that could be applied by the BLM as necessary. This section describes additional mitigation measures specific to the Proposed Action.

4.3.1 Climate and Air Quality

No additional mitigation measures specific to climate and air quality were considered for the Proposed Action.

4.3.2 Areas of Critical Environmental Concern

Mitigation measures applicable to ACECs are discussed in the biology and cultural resources sections.

4.3.3 Wild and Scenic Rivers

No additional mitigation measures specific to Wild and Scenic Rivers were considered for the Proposed Action.

4.3.4 Cultural Resources

A mitigation/monitoring plan would be prepared, discussing mitigation at the three sites that would be directly affected as well as the monitoring procedures to ensure that additional sites are not affected.

4.3.5 Paleontology

No specific monitoring is recommended due to the limited proposed surface disturbance at each transmission support structure and substation site. Discovery contingency and specimen curation measures described below should be invoked only if fossil material or suspected fossil materials are encountered during excavation. Deviation from the survey corridor would require additional surveys and analysis to determine if appropriate mitigation would be necessary. Future projects slated to disturb larger surface areas also would require surveys and perhaps specific mitigation such as monitoring.

General fossil resource protection measures that should be applied to the entire project area include:

- *Worker Instruction*: Construction personnel should be instructed about the types of fossils they could encounter and the steps to take if they uncover what might be significant fossils anywhere during construction of the project. Instruction should also stress the non-renewable nature of paleontological resources, and that collection or excavation of fossil materials from federal land without a federal permit is illegal.
- *Discovery Contingency*: Contingency plans should be made in the unlikely event that significant fossils are discovered during project implementation. Construction activities that could adversely affect the fossils should be redirected until a qualified paleontologist has determined the importance of the uncovered fossils and the extent of the fossiliferous deposits, and has implemented recommendations regarding mitigation measures, if any are warranted. If fossils or scientific significance are discovered and collected as a result of the discovery contingency, the following action also is recommended:
    - *Specimen Curation*: Fossil specimens considered to have scientific significance that are recovered during excavation should be curated into the collections of the Nevada State Museum. Specimens should be prepared to the point of identification, identified as completely as possible, and catalogued into the permanent collections of the listed repository.
    - *Final Technical Report Submission*: If any fossils are collected and curated, a final technical report must be prepared. This report should contain the mitigation work conducted, including an accession list of fossil specimens collected (listed by locality), and the final disposition of the fossils. The report should also contain a discussion of the scientific significance of the specimens and geologic and paleontological setting of the fossils and their localities. A confidential appendix containing copies of locality maps and standard locality data sheets for each locality, should be appended to the report and copies of the report should be filed with the BLM and the repository where the fossils are curated.

4.3.6 Soils

The implementation of a Stormwater Pollution Prevention Plan would help to reduce erosion problems. In addition, revegetation of the temporary disturbance areas would also reduce the effects to soils.

4.3.7 Vegetation

Impacts to native plant communities within the project footprint will be minimized by the preparation, implementation of a project revegetation plan. The proponent will post a bond to ensure successful revegetation. The project revegetation plan will be finalized and approved by

the LVFO botanist before a notice to proceed with construction is issued. Additional mitigation measures specific to general vegetation include the following:

- Ensure ROW boundaries are clearly marked and all work remains within the boundaries to protect vegetation from disturbance.
- Conduct environmental awareness training for all employees working on the project highlighting specific protection measures for vegetation prior to commencement of work.
- Limit the size of any vegetation and/or ground disturbance to the absolute minimum necessary to perform work activities safely and as designed.
- Perform restoration in accordance with the project-specific Revegetation Plan (**Appendix B**), which may include:

  Pre-construction

  - Seed collection
  - Plant propagation
  - Cactus and yucca salvage
  - Windrow and separate to the side of disturbance surface vegetation (i.e. vertical mulch), topsoil, and subsurface soils. Surface vegetation and topsoil should not be mixed with subsurface soils.

  Post-construction

  - Earthworks: selectively decompact terrain, if required, or erase tracks, pitting or imprinting to enhance water retention
  - Shrub outplanting, if required
  - Stabilize soil surface
  - Reseed
  - Install restoration signs
  - Monitor
  - Permeon application, if required
  - Process, remove, or color caliche
  - Install restoration signs

4.3.8 Invasive, Non-Native Species and Noxious Weeds

Potential impacts resulting from noxious weeds will be minimized by the preparation and implementation of a project weed management plan. The project weed management plan will be finalized and approved by the SNDO weed management lead before a notice to proceed with construction is issued. Mitigation measures for invasive, non-native species include the following:

- All employees working in the project area should undergo invasive weed instruction as part of their environmental training.
- Overton Power shall coordinate project activities with the BLM Weed Management Specialist (702-515-5000) regarding any proposed herbicide treatment. Overton Power shall prepare, submit, obtain and maintain a pesticide use proposal (PUP) for the use of any herbicides in the project area.
- Before ground-disturbing activities begin, Overton Power shall review the weed risk assessment and the Weed Management Plan which inventories and prioritizes weed infestations for treatment within the project footprint. Should weeds spread beyond the project footprint then these will be treated as a part of the project. This is to include all access routes.

- Overton Power shall limit the size of any vegetation and/or ground disturbance to the absolute minimum necessary to perform work activities safely and as designed. Overton Power will avoid creating soil conditions that promote weed germination and establishment.
- Overton Power shall begin project operations in weed-free areas whenever feasible before operating in weed-infested areas.
- Overton Power shall locate equipment storage, machine and vehicle parking, or any other area needed for the temporary placement of people, vehicles, machinery, and supplies in areas that are relatively weed-free.
- Overton Power shall avoid or minimize all types of travel through weed-infested areas or restrict major activities to periods of time when the spread of seed or plant parts are least likely.
- Overton Power is responsible for ensuring that all project-related vehicles and equipment arriving at the site do not transport noxious weeds into the project area. The operator shall ensure that all such vehicles and equipment that will be traveling off constructed and maintained roads or parking areas within the project area have been power washed, including the undercarriage, since their last off-road use and prior to off-road use on the project. When beginning off-road use on the project, such vehicles and equipment shall not harbor soil, mud, or plant parts from another locale.
- Overton Power will be required to have on-site wash areas identified and readily available for equipment and vehicles leaving the project area. All equipment and vehicles traveling through weed-infested areas shall be power washed (**this especially includes the nooks and crannies of undercarriages**) prior to leaving the site, at established, identified wash areas. Wash water and sediment shall be contained in a catchment basin. Seeds and plant parts will be collected, bagged, and deposited in dumpsters destined for local landfills. Cleaning areas shall be inspected regularly for the presence of undesirable weed species. If observed, these are to be appropriately controlled.
- Project workers shall inspect, remove, and dispose of weed seed and plant parts found on their clothing and personal equipment, bag the product, and dispose of such in a dumpster for deposit in local landfills.
- Overton Power shall evaluate options, including area closures, to regulate the flow of traffic on sites where native vegetation needs to be established.
- Overton Power will insure that all straw or hay bales used during the project, such as for sediment barriers or for mulch distribution, are from state cleared sources and are certified weed-free.
- When removing topsoil from weed-infested areas, the Overton Power shall stockpile all infested soil adjacent to areas from which it was removed. No infested topsoil will be moved to new locations or will be transported off of the jobsite.
- Reclamation work will proceed immediately following construction as outlined in the reclamation plan. Overton Power will insure that all topsoil and vegetative material which was removed from infested sites is returned to the areas from which it was stripped.

4.3.9 Special Status Species

4.3.9.1 Special Status Wildlife

A final risk assessment, as well as a baseline monitoring plan (pre- through post-construction phases) would be completed following the completion of ongoing field monitoring. The results of the baseline studies would be used to develop mitigation plans to avoid and minimize impacts to

potentially affected species. To prevent long-term loss of disturbed habitat form and function, wildlife habitat needs would be incorporated in reclamation and habitat revegetation planning.

Mitigation measures specific to special status wildlife species include the following:

- An appropriate number of authorized biologists and desert tortoise monitors would be employed during construction to monitor construction activities and allow work to proceed with minimal threats to the local desert tortoise population. Biologists would follow USFWS-approved desert tortoise handling protocols (USFWS 2010) and would be skilled and experienced to a level that ensures they are capable of implementing desert tortoise protective measures.
- All on-site construction personnel would be presented a desert tortoise and environmental awareness program prior to initiation of construction. The program would contain information concerning the biology and distribution of the desert tortoise, their legal status and occurrence in the project area; the definition of "take" and associated penalties; responsibilities of workers, monitors and biologists; and report procedures to be implemented in case of desert tortoise encounters or non-compliance with stipulations. The training program would also contain information on the biology, distribution and protective measures for migratory birds and other sensitive species in the project area.
- An authorized desert tortoise biologist(s) would conduct desert tortoise clearance surveys prior to surface disturbing activities. Areas requiring clearance surveys should be surveyed using USFWS approved techniques that provide 100 percent coverage. During the survey, all desert tortoise burrows would be examined to determine whether the burrow is occupied by desert tortoises. Tortoise burrows would be cleared of tortoises and eggs, and collapsed.
- Desert tortoises or eggs found in harm's way during any construction activities would be relocated to adjacent land outside the project area in accordance with USFWS approved protocol (USFWS 2010).
- Impacts to habitat would be minimized by confining activities to the designated ROW and roads utilizing the minimum amount of habitat necessary to perform the job safely and as designed.
- A project-specific Revegetation Plan (**Appendix B**) would aid in habitat recovery following construction. Habitat would be restored to a natural state and any trees removed in riparian areas would be re-planted with the native trees.
- Construction within or near riparian habitat would occur outside the migratory bird breeding season to avoid impacts on the Southwestern Willow Flycatcher. SWFL typically arrive on breeding grounds between early May and early June (United States Department of Interior 1997) and breed through July. Breeding for the Yuma clapper rail generally occurs from March through June (USFWS 2011).
- A qualified avian biologist(s) would be onsite during construction to survey for and monitor migratory birds and their nests during the breeding season of February 15 through August 31. An avian biologist onsite during project construction would halt work if it is determined that active nests are being disturbed by construction activities, until further direction or approval to work is obtained from the appropriate agencies.
- Surveys for migratory birds and nests would be conducted by a qualified avian biologist prior to project implementation and construction activities. If active nests with eggs or chicks are found, the area around the nest must be avoided by an appropriately sized

buffer, as determined through coordination with USFWS wildlife staff. These nests would remain protected until which time the birds have fledged the nest.

- Detailed mitigation and monitoring requirements for ravens are included in **Appendix E, Raven Management Plan**.
- All transmission and sub-transmission towers and poles would be designed to be avian-safe in accordance with the *Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006* (Avian Power Line Interaction Committee (APLIC) 2006).
- In order to insure compliance with Nevada Administrative Code 503.080, 503.090 and 503.093, the listed actions are required following an encounter with a banded Gila monster during construction activities.
    1) Any encounters during the project construction must be reported immediately to the Nevada Division of Wildlife (NDOW) at telephone number (702) 486-5127.
    2) Live Gila monsters found in harm's way on the construction site will be captured and detained in a cool, shaded environment (<85ºF) by the project biologist trained in handling venomous reptiles until a NDOW biologist can arrive for documentation purposes. A clean 5-gallon plastic bucket with a secure ventilated lid, an 18" x 18" x 4" plastic sweater box with a secure vented lid, or a tape sealed cardboard box of similar dimension may be used for safe containment. Written information identifying mapped capture location, date, time, circumstances, and habitat description will also be provided to NDOW.
    3) Injuries to Gila monsters may occur during excavation, road grading, or other construction activities. In the event a Gila monster is injured, it should be transferred to a veterinarian proficient in reptile medicine for evaluation of appropriate treatment. Rehabilitation or euthanasia expenses will not be covered by NDOW. However, NDOW will be immediately notified during normal business hours. If an animal is killed or found dead, the carcass will immediately be frozen and transferred to NDOW with a complete written description of the situation, circumstances, habitat, and mapped location.
    4) Should NDOW assistance be delayed, biological personnel on site may be requested to remove and release the Gila monster out of harm's way. Should NDOW not be immediately available to respond for photo-documentation, a 35mm camera will be used to take good quality photographs of the Gila monster in situ at the location of live encounter or dead salvage. The pictures, preferably on slide film, will be provided to NDOW and will include: encounter location (landscape overview with Gila monster in clear view); a clear overhead shot of the entire body with a ruler for scale (Gila monster should fill the camera's field of view); an overhead close-up photo of head only.
- All terms and conditions for wildlife can be found within the amended Biological Opinion.

4.3.9.2 Special Status Plants

Temporary adverse effects to threecorner milkvetch, sticky buckwheat, and Beaver Dam bread root will be minimized by following methods:

- All temporary disturbance areas within habitat for BLM special status plants will be restored using the methods and performance criteria described in the revegetation plan.
- Where it is no longer practicable to restore rare plant habitat or where achieving the performance criteria is unlikely, the proponent will have the opportunity to perform out of

kind mitigation (such as off site inventories, protection or enhancement that will be developed in coordination with BLM.

Adverse effects to threecorner milkvetch and sticky buckwheat would be mitigated to result in a zero net loss through one or more of the following mitigation methods:

- Collection of seed from affected rare plant populations for storage under the Center for Plant Conservation's National Collection of Endangered Plants (see http://www.centerforplantconservation.org);
- Construction of post and cable fencing on BLM lands to protect rare plant populations;
- Restoration of habitat where rare plant populations have been degraded from weeds, illegal dumping, OHV disturbances, or other factors; or
- Inventories of BLM lands to identify unknown rare plant populations.

Adverse effects to cactus and yucca would be reduced through use of the following mitigation methods:

- Identify cacti and yuccas in areas of temporary disturbance and flag for orientation before removal.
- Replant individuals into one or more nurseries located within the ROW and maintain until they can be returned to the temporary disturbance areas as part of the restoration process.
- Yuccas frequently occur in small clusters of plants. Count individual plants separately but move and replant as a group to reduce disturbance to the root system.
- Move cactus species together when they occur in clusters.
- In areas of permanent disturbance, move cacti and/or yuccas into an undisturbed portion of the ROW rather than moving the specimens twice, or use individuals in restoration of temporary disturbance areas.
- Hand tools are generally favored over mechanical methods for removal, but a small rubber-tired backhoe may be used for larger specimens.
- Persons experienced in cactus and yucca salvage should be utilized to complete or directly monitor the salvage process.
- Keep records of all salvaged specimens, including their original locations, for use in analyzing the success of the salvage efforts.

Where disturbance in mesquite and acacia habitats is unavoidable, the following are recommended as mitigation measures:

- Fully restore woodland areas following disturbance or alternatively restore an equal amount of acreage in mesquite woodlands that have been lost to OHV use, tamarisk invasion, or other disturbances. This may be an opportune time to attempt the restoration of areas in critical habitat where tamarisk is now under pressure from the recently introduced tamarisk leaf beetle (*Diorhabda carinulata*; a map of the 2011 distribution of the tamarisk beetle is available from the Tamarisk Coalition at http://www.tamariskcoalition.org).
- Promote public appreciation of mesquite and acacia woodlands using signs or other acceptable methods.

- Limit OHV use in sensitive mesquite habitat using various methods to deter vehicular traffic.

4.3.10 Wildlife and Fisheries

- Impacts to habitat would be minimized by confining activities to the designated ROW and roads utilizing the minimum amount of habitat necessary to perform the job safely and as designed.
- A site-specific Revegetation Plan (**Appendix B**) would be implemented to aid in habitat recovery following construction. Habitat would be restored to a natural state and riparian areas would be re-planted utilizing native trees.
- A qualified avian biologist(s) would be onsite during construction to survey for and monitor migratory birds and their nests during the breeding season of February 15 through August 31. Project construction would be halted if it were determined that active nests were being disturbed by construction activities, until further direction or approval to work is obtained from the appropriate agencies.
- Surveys for migratory birds and nests would be conducted by a qualified avian biologist prior to project implementation and construction activities. If active nests with eggs or chicks were found, the area around the nest must be avoided by an appropriately sized buffer, as determined through coordination with USFWS wildlife staff. These nests would remain protected until such time as the birds fledge the nest.
- All transmission and sub-transmission towers and poles would be designed to be avian-safe in accordance with the *Suggested Practices for Avian Protection on Power Lines: the State of the Art in 2006* (Avian Power Line Interaction Committee (APLIC) 2006).

4.3.11 Wetlands and Riparian Zones

No additional mitigation measures specific to wetlands and riparian zones would be required.

4.3.12 Floodplains

No additional mitigation measures specific to floodplains would be required.

4.3.13 Water Quality, Surface and Ground

Construction activities would comply with all regulations associated with the Clean Water Act (Section 404). A National Pollutant Discharge Elimination System (NDPES) permit would also be required, including preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), which would define the BMPs required for the project. Other mitigation measures that would minimize potential impacts to water resources include:

- All of the proposed transmission power line crossings of surface water, both perennial and intermittent, are located at points that minimize disturbance to the stream channel and associated habitat (i.e. if possible, the power line will span the channel). No disturbance is expected near high banks (over 50 feet) of perennial streams or rivers, but if this does occur, the construction will be engineered to protect the river from any issues that could affect fish habitat (including all life stages) within that river or stream. All disturbances occurring on a river or stream bank over 50 feet high will be reclaimed to maintain proper functioning of the channel.
- Power pole installation and placement will be identified before construction to insure the best placement and installation of the power pole with regard to water resources.

- Erosion control measures will be utilized where it is prudent to avert erosion from ground disturbance from reaching streams and rivers.

After each phase of the project (3-year, 7-year, and 9-year) if the BLM recognizes unauthorized surface disturbance, they will notify Overton Power to implement erosion control measures and reclamation to control any erosion of sediment transport in the surface water.

4.3.14 Wastes, Hazardous or Solid

No additional mitigation specific to hazardous or solid waste would be required.

4.3.15 Environmental Justice

No additional mitigation specific to environmental justice would be required.

4.3.16 Transportation and Access

No additional mitigation measures specific to transportation and access would be required.

4.3.17 Rangeland Management

The proponent, its contractors, and workers should coordinate with potentially affected livestock operators to avoid and minimize any disruption to livestock operations. Potential impacts to livestock management operations in the Flat Top and Lower Mormon Mesa allotments will be minimized. Before a notice to proceed with construction is issued, best management practices for construction within the Lower Mormon Mesa and Flat Top Mesa will be finalized and approved by the LFVO range lead.

4.3.18 Fuels and Fire Management

Mitigation methods to minimize fuel loading and prevent fire on the job site include the following:

- Smoking or discarding of cigarettes outside of vehicles will not be permitted.
- Open flames of any kind will not be permitted on the job site.
- The use of all welding equipment will be restricted to specified areas as necessary to complete the proposed project.
- All project vehicles must carry and maintain fire suppression equipment (fire extinguishers) at all times.
- Overton Power shall maintain a readily available source of water (such as would also be used for dust control) near all working construction equipment.
- The levels of weed species in proximity to all structures and work areas will be controlled as outlined in the Weed Management Plan (K&LA, August 24, 2012).

4.3.19 Noise

No additional mitigation specific to noise would be required.

4.3.20 Health and Safety

No additional mitigation specific to health and safety would be required.

4.3.21 Recreation

No additional mitigation specific to recreation would be required.

4.3.22 Visual Resources

Mitigation measures to minimize impacts to visual resources include the following:

- Use of 23617 Federal standard desert tan will blend with vegetation and create less contrast against the lighter sky with increased distance.
- Use smaller poles within the upgrade proposed along the Virgin River where VRM classification criteria require a low contrast rating for new structures. Consideration of smaller poles along the lines would help lessen contrast ratings with decreased vertical element.
- Set structures back at maximum distances from major crossings and use right angles at these crossings.
- Avoid straight line-of-sight clearing of vegetation for the construction of the substation areas, access roads, and rights-of-way; vary the edge of the vegetation removal at the edge of construction where it may cause a strong visual contrast in the landscape.
- Save and store removed vegetation (e.g., cacti, yuccas) for use during reclamation.
- Scarify, or roughen, the surface soils prior to reseeding to create soil pockets for seed and water to collect and increase the success of reclamation and reduce visual contrast from a smooth surface.
- Place dead vegetation on reseeded areas to reduce contrast, provide visual screening, and create microhabitat for wildlife.
- If rock is removed, stockpile for reclamation and redistribute randomly throughout the seeding area as part of interim reclamation.
- Complete reclamation as soon as possible so that successful revegetation can be established to stabilize soils, reduce weed effects, and reduce visual contrast.
- Clear and cut only where necessary within the designated construction area to the minimum amount needed to complete construction safely.
- Do not cut new access roads unless needed; utilize existing roads.
- Choose construction equipment selectively to minimize impacts.
- Build berms around substations to reduce geometric shapes using earth spared from bringing pad to level grade.
- Consider poles of different materials or color to reduce contrast.
- Relocation of substations away from high potential areas of public view to reduce impact and strong contrasts.

4.3.23 Geology and Minerals

Preparation of a Stormwater Pollution and Prevention Plan would minimize the possibility of erosion or mass wasting. No additional mitigation measures specific to geology would be required.

4.3.24 Socioeconomics

No additional mitigation specific to socioeconomics would be required.

5.0 TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED

Name	Affiliation
Lauren Brown Kirsten Cannon Nora Caplette Lisa Christianson Jill E. Craig John Evans Susan Farkas Sendi Kalcic Jill Pickren Boris Poff Amelia Savage Fred Edwards Lucas Rhea Phil Rhinehart Susanne Rowe Billy Williams Lewis Brownfield Carla Wise	Bureau of Land Management
Mr. Harold Wittwer Mr. Donald G. Whitney	Grazing allotment holders
Jeanie Rutherford Becci Rogers Faye Streier Kay Sundberg Pat Hicks Theresa Olson Ray Ahlbrandt Mark Slaughter	Bureau of Reclamation
Pat McQueary	U.S. Army Corps of Engineers
Greg Beatty Robert Williams	U.S Fish and Wildlife Service
Karyn de Defour	Nevada State Historic Preservation Office
Pat Cummings Brad Hardenbrook	Nevada Department of Wildlife
Randall Ozaki Wayne Paice Mendis Cooper Luke Whitney Brett Gale	Overton Power District No. 5

6.0 LIST OF PREPARERS

Name	Affiliation	Responsibility
Gary Holsan	Knight and Leavitt Associates	Interdisciplinary team leader, NEPA Coordinator
Kenneth C. Knight	Knight and Leavitt Associates	Principal
Crystal Cogar	Knight and Leavitt Associates	Supervising Biologist
DeVon Ekenstam	Knight and Leavitt Associates	Lead Botanist
Jeffrey Baker	Knight and Leavitt Associates	Principal Archaeologist
Annette J. Thompson	Knight and Leavitt Associates	Cultural Resources Manager
JoAnne Robben	Resource Concepts, Inc.	Senior Environmental Specialist
John Ellis	Knight and Leavitt Associates	GIS Specialist
Terry Reynolds	The Reynolds Corporation	Water Resources, Wetlands, Floodplains, Wild & Scenic Rivers
Gustav Winterfeld, Ph.D.	Erathem-Vanir Geological Consultants (EVG)	Paleontologist

6.1 LIST OF REVIEWERS, BLM LAS VEGAS FIELD OFFICE

Name	Responsibility
Kirsten Cannon	Public Affairs
Lisa Christianson	Air Quality
John Evans	Planning and Environmental Coordinator
Susan Farkas	Environmental Justice, Socioeconomics
Sendi Kalcic	Visual Resources
Jill Pickren	
Boris Poff	Hydrology, Soils
Amelia Savage and Carla Wise	Wildlife Biologist
Fred Edwards	Botanist
Lucas Rhea	Fire Management Specialist, Fuels
Phil Rhinehart	
Susanne Rowe	Abandoned Mine Lands, Cultural Resources, Native American Interests
Billy Williams and Lauren Brown	Noxious Weeds

7.0 REFERENCES

Anning, D. W., S.A. Thiros, L.M. Bexfield, T.S. McKinney, and J. M. Green. 2009. *Southwest Principal Aquifers Regional Ground-Water Quality Assessment*. USGS National Water-Quality Assessment Program. Electronic document accessed September 19, 2012. http://pubs.usgs.gov/fs/2009/3015/pdf/fs2009-3015.pdf.

Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines*: the State of the Art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA.

BLM (U.S. Department of the Interior, Bureau of Land Management). 2008. *BLM Manual 6840 Special Status Species Management.* Release 6-125.

BLM. 2010. Personal communication with BLM biologists, Mark Slaughter and Amelia Savage, during a meeting held at the LVFO on February 1, 2010.

BLM. 2011. *BLM Manual 9113 Roads*. Release 9-390.

BLM. 2012a. *Fact Sheet on the BLM's Management of Livestock Grazing*. Electronic document accessed August 21, 2012.

BLM. 2012b. *The Taylor Grazing Act*. Electronic document accessed August 21, 2012. http://www.blm.gov/nv/st/en/prog/taylor_grazing_act.print.html.

BLM. 2012c. *Reports Menu for RAS Public Reports: RAS Operator Information Report, RAS Permit-Schedule Information Report, RAS Allotment Information Report, RAS Authorized Use by Allotment Report, and RAS Allotment Master* Report. Electronic document accessed August 23, 2012. http://www.blm.gov/landandresourcesreports/rptapp/menu.cfm?appCd=6

BLM. 2013. *Allotment Master Report NV02013 Lower Mormon Mesa.* Electronic document accessed August 15, 2013. https://www.blm.gov/workspace/ihtml/OpenDoc?DocInstanceID=3&DocUUID=0000010c1214c4b1-0000-691d-0a780c38&DocVersion=1&isSmartcut=true

Campbell, Donald and Stephen Wyszomirski. 2011 *APEX to Mesquite and Moapa Valley Corridor, Final Report*. Prepared for the Nevada DOT by CA (Caviola Anson) Group and CH2MHill.

Clark County. 2000. *Final Clark County Multiple Species Habitat Conservation Plan and Environmental Impact Statement for Issuance of a Permit to Allow Incidental Take of 79 Species in Clark County, Nevada*. September 2000. Las Vegas, Nevada.

Clark County. 2009. *Moapa Valley Trails Study Final Report*. 87pp. Available online at: http://www.clarkcountynv.gov/blob/comprehensive_planning/MoapaValleyTrailsStudy.pdf Accessed August 15, 2012.

Clark County. 2012. *2012 State Tax Rates & Exemptions*. Electronic document accessed August 20, 2012. http://www.tax-rates.org/nevada/clark_county_property_tax.

CLRSearch. 2012a. *Bunkerville Employment, Occupation and Industry*. Electronic document accessed August 9, 2012. http://www.clrsearch.com/Bunkerville_Demographics/NV/Employment-Occupation-and-Industry?compare=Mesquite%2C+NV.

CLRSearch. 2012b. *Mesquite Employment, Occupation and Industry*. Electronic document accessed August 9, 2012. http://www.clrsearch.com/Mesquite_Demographics/NV/Employment-Occupation-and-Industry?compare=Mesquite%2C+NV.

CLRSearch. 2012c. *Moapa Valley Employment, Occupation and Industry*. Electronic document accessed August 9, 2012. http://www.clrsearch.com/Moapa_Valley_Demographics/NV/Employment-Occupation-and-Industry?compare=Mesquite%2C+NV.

Crampton, L., Krueger, J., & Murphy, D. 2006. *Conservation management strategy for mesquite and acacia woodlands.* United States Department of the Interior Bureau of Land Management. Las Vegas Field Office. Las Vegas, Nevada.

Department of Comprehensive Planning. 2010. Clark County, Nevada 2010 population estimates. Las Vegas, Nevada: Clark County Department of Comprehensive Planning Retrieved November 14, 2011 from: http://www.clarkcountynv.gov/Depts/comprehensive_planning/demographics/Documents/CityPopulation.xls

Eakin, Thomas E. 1964. *Water-Resources Appraisal of Coyote Spring and Kane Spring Valleys and Muddy River Springs Area, Lincoln and Clark Counties, Nevada*. Water Reconnaissance Series Report 25. State of Nevada, Department of Conservation and Natural Resources, Division of Water Resources with Geological Survey, Carson City, Nevada.

EPA (U.S. Environmental Protection Agency). 2004a. *2004 Water body Report for the Muddy River*. Electronic document accessed September 11, 2012. http://ofmpub.epa.gov/waters10/attains_water body.control?p_au_id=NV13-CL-12_00&p_cycle=2004.

EPA. 2004b. *2004 Water body Report for Virgin River*. Electronic document accessed September 11, 2012. http://ofmpub.epa.gov/waters10/attains_water body.control?p_au_id=NV13-CL-09_00&p_cycle=2004.

EPA. 2004c. *2004 Water body Report for Meadow Valley Wash*. Electronic document accessed September 11, 2012. http://ofmpub.epa.gov/waters10/attains_water body.control?p_au_id=NV13-CL-13_00&p_cycle=2004.

EPA. 2004d. Hey, almost*2004 Water body Report for Bowman Reservoir*. Electronic document accessed September 11, 2012. http://ofmpub.epa.gov/waters10/attains_water body.control?p_au_id=NV13-CL-23-C_00&p_cycle=2004.

EPA. 2006a. *2006 Water body Report for the Muddy River*. Electronic document accessed September 11, 2012. http://ofmpub.epa.gov/waters10/attains_water body.control?p_list_id=NV13-CL-12_01&p_cycle=2006&p_report_type=T.

EPA. 2006b. *2006 Water body Report for the Muddy River*. Electronic document accessed September 11, 2012. http://ofmpub.epa.gov/waters10/attains_water body.control?p_list_id=NV13-CL-12_02&p_cycle=2006&p_report_type=T.

EPA. 2006c. *2006 Water body Report for Virgin River*. Electronic document accessed September 11, 2012. http://ofmpub.epa.gov/waters10/attains_water body.control?p_list_id=NV13-CL-09_00&p_report_type=T.

EPA. 2010a. *Watershed Boundary Dataset*. Electronic GIS map data accessed September 5, 2012. Data Source: http://www.ncgc.nrcs.usda.gov/products/datasets/watershed/index.html. Accessed by ArcGIS 10.1 Online: http://www.epa.gov/waters/doc/auxiliary/wbd.html.

EPA. 2010b. *Water Quality*. Electronic GIS Map Data Accessed September 11, 2012. Information at: http://water.epa.gov/type/ and http://www.epa.gov/waters/data/downloads.html. Accessed by ArcGIS10.1.

EPA. 2012. *Drinking Water Contaminants: National Primary Drinking Water Regulations and National Secondary Drinking Water Regulations*. Electronic Document Accessed November 6, 2012. http://water.epa.gov/drink/contaminants/index.cfm.

Glancy, Patrick A. and A. S. Van Denburgh. 1969. *Water-Resources Appraisal of the Lower Virgin River Valley Area, Nevada, Arizona, and Utah*. Water Reconnaissance Series Report 51. State of Nevada, Department of Conservation and Natural Resources, Division of Water Resources with Geological Survey, Carson City, Nevada.

Golden, M.E. and P.B. Holden. 2004. Summary of Lower Virgin River studies 1996-2002, final report. Prepared for the Department of Resources, Southern Nevada Water Authority. BIO-WEST Report PR-449-2.

Graves, Robert. 2009a. Aquifer-Test Report for Test Well MX-CSV-2. United States Geological Survey, Water Resources Division, Las Vegas. Electronic document accessed September 19, 2012. http://nevada.usgs.gov/water/AquiferTests/nts_singlewell_MX-CSV-2.cfm?studyname=nts_singlewell_MX-CSV-2.

Graves, Robert. 2009b. Aquifer-Test Report for Test Well MX-CE-VF-2. U.S. Geological Survey, Water Resources Division, Las Vegas. Electronic document accessed September 19, 2012. http://nevada.usgs.gov/water/AquiferTests/nts_singlewell_MX-CE-VF-2.cfm?studyname=nts_singlewell_MX-CE-VF-2.

Hiatt, Hermi and Boone, Jim. 2003. Clark County, Nevada; *Species Account Manual*. Department of Comprehensive Planning. Las Vegas, Nevada.

Holden, P.B. and P.D. Abate. 1999. Fisheries survey of the Lower Virgin River, Beaver Dam Wash, Arizona to Lake Mead, Nevada (July 1993 - December 1997). Prepared for the Department of Resources, Southern Nevada Water Authority. BIO-WEST Report PR-449-1.

K&LA (Knight and Leavitt Associates). August 24, 2012. *Weed management plan for the proposed Overton Power system upgrades project, Clark County, Nevada*. Knight and Leavitt Associates, Las Vegas, NV.

K&LA. July 2, 2013. *Revegetation Plan for the Overton Power District #5 9-year plan for power line upgrades, Clark County, Nevada*. Knight and Leavitt Associates, Las Vegas, NV.

K&LA. August 31, 2012. *A botanical survey of the proposed Overton Power nine year power line upgrades project, Clark County, NV*. Knight and Leavitt Associates, Las Vegas, NV.

Lapham, Wayne W., Pixie A. Hamilton, and Donna N. Myers. 2005. *National Water-Quality Assessment Program – Cycle II, Regional Assessments of Aquifers*. United State Geological Survey. Electronic document accessed September 20, 2012. http://pubs.usgs.gov/fs/2005/3013/pdf/PASforWeb.pdf.

McLeod, M.A., and T.J. Koronkiewicz. 2009. *Southwestern Willow Flycatcher surveys, demography, and ecology along the lower Colorado River and tributaries, 2008*. Annual report submitted to U.S. Bureau of Reclamation, Boulder City, NV by SWCA Environmental Consultants, Flagstaff, AZ. 153 pp.

The Nature Conservancy. 2007. *A conservation management strategy for nine low elevation rare plants in Clark County, Nevada*. The Nature Conservancy, Nevada Field Office. Reno, Nevada. 390 pages.

Nevada Department of Conservation and Natural Resources: Nevada Natural Heritage Program (NNHP). 2009. *Letter of response to data request for Overton Power line Upgrade Project dated January 15, 2009*. Carson City, Nevada. On file at K&LA office.

NDEP. (Nevada Division of Environmental Protection, Bureau of Water Quality Planning). 2002. Lower Virgin River – Boron Total Maximum Daily Loads. Department of Conservation and Natural Resource. Electronic document accessed September 11, 2012. Information: http://ofmpub.epa.gov/waters10/attains_impaired_waters.tmdl_report?p_tmdl_id=3951. Publication: http://www.epa.gov/waters/tmdldocs/3951_lower_virgin121503.pdf.

NDEP. 2012a DRAFT Nevada's 2008-10 Water Quality Integrated Report. Prepared in accordance with the requirements of Sections 303(d)/305(b)/314 of the Clean Water Act. Electronic document accessed September 10, 2012. http://ndep.nv.gov/bwqp/file/303d_draft_2008-10_IR%20.pdf.

NDEP. 2012b NDEP 303(d)_Review and NDEP_eMap_GeoData. Electronic map aata accessed September 12, 2012. http://ndep-emap.nv.gov/arcgis/services.

Nevada Department of Taxation. 2012. County Map of Nevada. Electronic document accessed August 20, 2012. http://tax.state.nv.us/documents/Sales_Tax_Map.pdf.

NDOT (Nevada Department of Transportation). Not dated. *Nevada Traffic Crashes 2010*. Nevada Department of Transportation Safety Engineering Division in Cooperation with the Nevada Department of Motor Vehicles, Nevada Department of Public Safety, and Local Law Enforcement Agencies, Carson City, Nevada.

NDOW (Nevada Department of Wildlife). 2010a. Wildlife Management Areas. Retrieved March 7, 2010 at: http://www.ndow.org/hunt/areas/wma.shtm#overton.

NDOW. 2010b. Letter in response to wildlife information request for proposed Overton Power 9-year plan upgrades. Dated February 5, 2010 (NDOW-SR-#: 10-219) on file at K&LA.

NDOW. 2010-2011. *Big Game Status Report*. Retrieved August 23, 2012 at: http://ndow.org/about/pubs/reports/2011_bg_status.pdf.

NDOW. 2012. *Fish Nevada – Mercury in the Environment*. Electronic document accessed September 11, 2012. http://www.ndow.org/fish/health/.

Nevada Legislation. 1998. Adopted Regulation of the State Environmental Commission of the State Department of Conservation and Natural Resources. LCB File No. R062-98. Electronic document accessed September 21, 2012. https://www.leg.state.nv.us/register/1998Register/R062-98A.pdf.

Nevada Natural Heritage Program, 2006. Nevada Rare Plant Workshop: 2006 meeting notes. Retrieved November 2010 from http://heritage.nv.gov/notes06.htm.

Niles, W. E., P. J. Leary, J. S. Holland, F. H. Landau. 1995. Occurrence and distribution of *Astragalus geyeri* var. *triquetrus* (three-cornered milkvetch) and *Eriogonum viscidulum* (sticky buckwheat) in Lake Mead National Recreation Area and adjacent regions of Nevada and Arizona. Las Vegas: University of Nevada, prepared for the Lake Mead National Recreation Area.

NRCS (U.S. Department of Agriculture Natural Resources Conservation Service). September 25, 2009. *Soil Survey Geographic (SSURGO) database for Virgin River Area Nevada and Arizona, Parts of Clark and Lincoln Counties Nevada, and Mohave County, Arizona.* Fort Worth, Texas.

NRCS. May 1, 2007. *Soil Survey Geographic (SSURGO) database for Clark County Area, Nevada*. Fort Worth, Texas.

Planert, Michael and John S. Williams. 1995. *Ground Water Atlas of the United States – California, Nevada*. Basin and Range Aquifers. U.S. Geological Survey Publication HA

730-B. Electronic document accessed September 19, 2012. http://pubs.usgs.gov/ha/ha730/ch_b/B-text2.html.

Powell, Elizabeth A. 2001. *Checklist of vascular plants of Lake Mead National Recreation Area*. National Park Service.

Regional Environmental Consultants. 2000. *Final Clark County Multiple Species Habitat Conservation Plan and Environmental Impact Statement*. Clark County Department of Comprehensive Planning. Las Vegas, Nevada. Retrieved February, 2008 from http://www.accessclarkcounty.com/depts/dagem/epd/Documents/ccfeis.pdf

Rush, F. Eugene. 1964. *Water-Resources Appraisal of the Meadow Valley Area, Lincoln and Clark Counties, Nevada*. Water Reconnaissance Series Report 27. State of Nevada, Department of Conservation and Natural Resources, Division of Water Resources with Geological Survey, Carson City, Nevada.

Rush, F. Eugene. 1968. *Water-Resources Appraisal of the Lower Moapa-Lake Mead Area, Clark County, Nevada*. Water Reconnaissance Series Report 50. State of Nevada, Department of Conservation and Natural Resources, Division of Water Resources with Geological Survey, Carson City, Nevada.

Simply Hired. 2012a. *Bunkerville Jobs*. Electronic document accessed August 9, 2012. http://www.simplyhired.com/a/local-jobs/city/1-Bunkerville%2C+NV.

Simply Hired. 2012b. *Mesquite Jobs.* Electronic document accessed August 9, 2012. http://www.simplyhired.com/a/local-jobs/city/1-Mesquite%2C+NV.

Simply Hired. 2012c. *Moapa Valley Jobs*. Electronic document accessed August 9, 2012. http://www.simplyhired.com/a/local-jobs/city/1-moapa+valley,+NV.

State of Nevada. 2007. Nevada Revised Statutes. Carson City, NV: Nevada Legislative Counsel Bureau. Retrieved February 19, 2010 from http://www.leg.state.nv.us/law1.cfm

Swearingen, T. A. 1981. *The vascular flora of the Muddy Mountains, Clark County, Nevada*. Las Vegas: University of Nevada, M. S. thesis.

UDEQ-AQD. Meteorological observations collected at St. George, Utah. Utah Department of Environmental Quality – Air Quality Division, 2011.

U.S. Census Bureau. 2012a. *2010 Census Interactive Population Search*. Electronic document accessed August 9, 2012. http://2010.census.gov/2010census/popmap/ipmtext.php?fl=32.

U.S. Census Bureau. 2012b. *American Fact Finder* Electronic document accessed August 10, 2012. http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml.

U.S. Census Bureau. 2012c. *State and County Quick Facts: Clark County, Nevada*. Electronic document accessed August 20, 2012. http://quickfacts.census.gov/qfd/states/32/32003.html.

U.S. Census Bureau. 2012d. *2010 Population Finder/2010 Demographic Profile NV – Clark County*. Electronic document accessed September 25, 2012. http://www.census.gov/popfinder/.

U.S. Census Bureau. 2012e. *American Fact Finder: Income/Earning (Individual), Race and Ethnicity*. Electronic Documents Accessed September 25, 2012. http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?ref=top&refresh=t.

US DOL BLS (U.S. Department of Labor Bureau of Labor Statistics). 2012a. *Line Installers and Repairers Work Environment*. From the Occupational Outlook Handbook. Electronic document accessed on August 8, 2012. http://www.bls.gov//ooh/installation-maintenance-and-repair/line-installers-and-repairers.htm.

US DOL BLS (U.S. Department of Labor Bureau of Labor Statistics). 2012b. *Heavy and Civil Engineering Construction: NAICS 237*. Electronic Document Access on August 8, 2012. http://www.bls.gov/iag/tgs/iag237.htm.

US DOL BLS (U.S. Department of Labor Bureau of Labor Statistics). 2012a. *Local Area Unemployment Statistics*. Electronic document accessed August 10, 15, 2012. http://www.bls.gov.lau/tables.htm and http://data.bls.gov/pdq/SurveyOutputServlet;jsessionid=6C96945EE31EEB93C8A47722A60C1E23.tc_instance5.

US DOL BLS. 2012b. *Databases, Tables, & Calculators by Subject, Employment and Wages.* Electronic document accessed August 15, 2012. http://data.bls.gov/pdq/querytool.jsp?survey=en.

USFWS (U.S. Fish and Wildlife Service). 1990. *Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Mojave Population of the Desert Tortoise*. Federal Register, Vol. 55, No. 63 (Monday, April 2, 1990).

USFWS. 1995. *Final Rule Determining Endangered Status for the Southwestern Willow Flycatcher.* Federal Register 60: 10694 (February 27, 1995). http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nv4651

USFWS. 2010. *Desert Tortoise Field Manual*. Nevada State Office. Reno, Nevada. Available online at: http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/.

USFWS. 2011. *Species Profile-Environmental Conservation Online System*. Available online at: http://ecos.fws.gov/tess_public/.

USFWS. 2012. Nevada Fish and Wildlife Office, Nevada's Protected Species by County. Accessed July 11, 2012 at: http://www.fws.gov/nevada/protected_species/species_by_county.html.

USGS (United States Geological Survey). 2003. Principal Aquifers of the 48 Conterminous United States, Hawaii, Puerto Rico, and the U.S. Virgin Islands v 1.0. Madison, WI. Electronic GIS Map Data Accessed September 5, 2012. http://nationalatals.gov/atlasftp.html.

USGS. 2009a. *Aquifer Basics – Unconsolidated and Semiconsolidated Sand and Gravel Aquifers*. Electronic document accessed September 18, 2012. http://water.usgs.gov/ogw/aquiferbasics/uncon.html.

USGS. 2012a. *Virgin River*. Electronic Documents Accessed September 18, 2012. Surface-Water Annual Statistics for Nevada and Peak Stream Flow for Nevada USGS 09415190 Virgin Rv at Riverside, NV and USGS 09415230 Virgin Rv Abv Halfway Wash Nr Riverside, NV. http://nevada.usgs.gov/water/lake_rivers/virgin_river.htm.

USGS. 2012b. *Muddy River*. Electronic Documents Accessed September 18, 2012. Surface-Water Annual Statistics for Nevada and Peak Stream Flow for Nevada USGS 09419000 Muddy Rv Nr Glendale, NV and USGS 09419507 Muddy Rv at Lewis Avenue at Overton, NV. http://nevada.usgs.gov/water/lake_rivers/muddy_river.htm.

USGS. 2012c. *Groundwater*. Electronic document accessed September 18, 2012. http://nevada.usgs.gov/water/groundwater/groundwater.htm.

USGS. 2012d. *Aquifer Tests*. Electronic document accessed September 19, 2012. http://nevada.usgs.gov/water/AquiferTests/index.htm.

USGS. 2012e. *Annual Water Data Reports – Current Condition for Nevada: Groundwater – Clark County Station Number 364650114432001, Station Name 219 S13 E65 28BDBA1 USGS CSV-2*. Electronic Document Accessed November 6, 2012. http://waterdata.usgs.gove/nv/nwis/current/?type=gw.

USGS. 2012f. *Annual Water Data Reports – Current Condition for Nevada: Groundwater – Clark County Station Number 364204114454501, Station Name 219 S13 E65 19CBDBA1 BW-01*. Electronic Document Accessed November 6, 2012. http://waterdata.usgs.gove/nv/nwis/current/?type=gw.

VIEWS 2011. Visibility Information Exchange Web System. Regional Haze Rule Summary Data. Means for Best, Middle, and Worst 20% Visibility Days. Online at http://views.cira.colostate.edu/web/Trends/. Accessed June 2011.

Welsh, S. L., Atwood, N. D., Goodrich, S., & Higgins, L. C. [eds]. 2008. *A Utah flora* (4th ed.). Provo, UT: Brigham Young University Press.

WRCC (Western Regional Climate Center). 2010. Historical climate information: Nevada, average wind speed. Retrieved August 2, 2010 at: http://www.wrcc.dri.edu/htmlfiles/westwind.final.html.

WRCC 2011. Western Regional Climate Center. Historical climate data for Mesquite, Nevada. Online at http://www.wrcc.dri.edu. Accessed May 2011.

This page left blank for 2-sided copying.