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Bureau of Land Management

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YELLOW PINE SOLAR PROJECT

Final Environmental Impact Statement

Volume I: Chapters 1–4

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EIS Costs to Date:
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The Bureau of Land Management is responsible for the stewardship of our public lands. The BLM’s mission is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Southern Nevada District Office
4701 N. Torrey Pines Drive
Las Vegas, Nevada 89130
http://www.blm.gov/nevada

Dear Reader:

Enclosed for your review and comment is the Final Environmental Impact Statement (EIS) for the Yellow Pine Solar Project (project). The Final EIS was prepared by the U.S. Department of the Interior, Bureau of Land Management (BLM) pursuant to the Federal Land Policy and Management Act of 1976 and the National Environmental Policy Act of 1969.

The project includes two separate right-of-way applications: 1) the construction, operation, maintenance, and decommissioning of an approximately 500-megawatt photovoltaic solar electric generating facility, including access roads, generation tie-line, and associated substation, and 2) a 230-kilovolt (kV) substation and associated 230-kV transmission line facilities. The proposed project facilities are located on approximately 3,000 acres of public lands administered by the BLM.

In preparing the Final EIS, the BLM has developed a range of alternatives to resolve resource conflicts by considering: 1) issues raised through the public scoping and public comment periods and consultation and coordination with participating and cooperating agencies and American Indian tribes, 2) issues raised by agency resource specialists, and 3) applicable planning criteria. This process has resulted in the development of two alternatives in addition to the Proposed Action. These alternatives are described in Chapter 2 of the Final EIS. The BLM has identified the Proposed Action layout using the Mowing Alternative construction method as the preferred alternative. Chapter 3 presents the affected environment and analyzes the potential impacts on resources or resource uses from implementation of the alternatives. Chapter 4 describes the BLM's consultation and coordination efforts throughout the process.

The BLM released the Yellow Pine Solar Project Draft EIS for public comment from March 20, 2020 until May 4, 2020. Comments on the Draft EIS and responses are included in Appendix I of the Final EIS. To assist the reader, a black line has been added in the margin of the Final EIS to indicate where text has been revised from the Draft EIS.

The BLM decision maker may select various components from each of the alternatives analyzed in the EIS that best meet the purpose and need for the project. The decision maker considers the identified impacts, public comments, and information from consulting parties to make a decision that protects resource values and provides for multiple uses.

The Final EIS is available on the project website at: https://eplanning.blm.gov/eplanning-ui/project/81665/510. Hard copies may also be available for public review at the BLM Southern Nevada District Office. Following guidance from the White House, Centers for Disease Control

and Prevention, and state and local public health authorities, the BLM Southern Nevada District Office is temporarily restricting in-person public access. Before making plans to visit the office, please contact BLM Project Manager, Whitney Wirthlin at wwirthli@blm.gov or (702) 515-5284 to determine if the office is open for review of hard copies or for alternative methods to review the documents for this project.

Thank you for your continued interest in the Yellow Pine Solar Project.

Sincerely,

Angelita S. Bulletts
District Manager
Southern Nevada District

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE YELLOW PINE SOLAR PROJECT

Responsible Agency: United States Department of the Interior, Bureau of Land Management

Document Status: Draft () Final (X)

Abstract: Yellow Pine Solar, LLC (Yellow Pine Solar), and GridLiance West, LLC (GLW) (collectively, applicants), have applied separately to the U.S. Department of the Interior, Bureau of Land Management (BLM) Las Vegas Field Office for rights-of-way on public land to construct, operate, and maintain 1) a Yellow Pine Solar 500-megawatt (MW) photovoltaic (PV) solar energy generating facility and associated substation, and 2) a GLW 230-kilovolt (kV) substation and associated 230-kV transmission line. The proposed project is located approximately 10 miles southeast of Pahrump and approximately 32 miles west of Las Vegas in Clark County, Nevada. This Final Environmental Impact Statement (EIS) includes analysis of a proposed 500-MW solar PV energy generation station and ancillary facilities including battery storage, and the proposed GLW Trout Canyon Substation and associated transmission tie line facilities. The approximately 3,085-acre project would be located within the 5,032-acre study area.

The BLM has prepared this Final EIS to analyze the effects of and alternatives to construction, operation, maintenance, and decommissioning of the Yellow Pine Solar Project (project). The development of this Final EIS is governed by the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code 4321), and the BLM is the lead agency. This Final EIS has been prepared in compliance with the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 Code of Federal Regulations 1500). The BLM has prepared this Final EIS with input from cooperating agencies[1] and American Indian tribes to address the direct, indirect, and cumulative impacts of the project. The cooperating agencies include the Clark County Desert Conservation Program, the Nevada Department of Wildlife, and the United States Environmental Protection Agency (EPA).

This Final EIS evaluates the Proposed Action, two alternatives to the Proposed Action, and the No Action Alternative. The Proposed Action and the alternatives involve development on approximately 3,000 acres of land within the 5,032-acre study area. Major environmental and planning issues addressed include impacts on the federally listed threatened Mojave desert tortoise and include translocating all Mojave desert tortoise located within the project area to the nearby Stump Springs Desert Tortoise Translocation Area.

Availability Period: The Final EIS for the Yellow Pine Solar Project will be made available for 30 calendar days following publication of the EPA's Notice of Availability in the *Federal Register*.

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ePlanning website: https://goo.gl/gNbjnz.

[1] Cooperating agencies are any federal agency, other than the lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact that could occur with implementation of a proposed project or alternative.

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ES-1 INTRODUCTION

This Final Environmental Impact Statement (EIS) has been prepared by the U.S. Department of the Interior (DOI) Bureau of Land Management (BLM) to analyze the effects of and alternatives to construction, operation, maintenance, and decommissioning of the Yellow Pine Solar Project (project). The development of this Final EIS is governed by the National Environmental Policy Act of 1969 (NEPA), as amended (42 United States Code [USC] 4321), and the BLM is the lead agency. This Final EIS has been prepared in compliance with the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] 1500).

Yellow Pine Solar, LLC (Yellow Pine Solar), and GridLiance West, LLC (GLW) (collectively, applicants or project proponent), have applied separately to the BLM Las Vegas Field Office for rights-of-way (ROWs) on public land to construct, operate, and maintain 1) a Yellow Pine Solar 500-megawatt (MW) photovoltaic (PV) solar energy generating facility and associated substation, and 2) a GLW 230-kilovolt (kV) substation and associated 230-kV transmission line. The proposed project is located approximately 10 miles southeast of Pahrump and approximately 32 miles west of Las Vegas in Clark County, Nevada. This Final EIS includes analysis of a proposed 500-MW solar PV energy generation station and ancillary facilities, including battery storage, and the proposed GLW Trout Canyon Substation (TCS) and associated transmission tie line facilities.

ES-1.1 BLM PURPOSE AND NEED

In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), public lands are to be managed for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The BLM is authorized to grant ROWs on public lands for systems of generation, transmission, and distribution of electrical energy (Section 501(a)(4)). Taking into account the BLM's multiple-use mandate, the BLM's purpose and need for this action is to respond to the FLPMA ROW applications submitted by Yellow Pine Solar and GLW under Title V of FLPMA (43 USC 1761) to construct, operate, maintain, and decommission a solar generation power plant and ancillary facilities on approximately 2,994.7 acres (approximately 1,211.9 hectares) of BLM land in Clark County, Nevada, in compliance with FLPMA, BLM ROW regulations, the BLM NEPA Handbook (BLM 2008), DOI NEPA regulations, and other applicable federal and state laws and policies.

ES-1.2 APPLICANTS' PROJECT OBJECTIVES

The objective of Yellow Pine Solar is to construct, operate, and maintain an efficient, economic, reliable, safe, and environmentally sound solar-powered generating facility that would provide approximately 500 MW of solar-generated electricity. The objective of GLW is to construct, operate, and maintain a 230-kV substation that will facilitate renewable and non-renewable energy developers' access to the overall GLW electrical utility grid. The project would help meet the goals and requirements set forth by the State of Nevada and the State of California for renewable energy resources. The Nevada Renewable Portfolio Standard (RPS) (Nevada Revised Statutes [NRS] 704.7801), first adopted by the State Legislature in 1997, mandates a minimum amount of electricity that electric utilities acquire from renewable energy sources. The Nevada RPS was revised and signed on April 22, 2019, by Senate Bill 358 to state that by calendar year 2025, no less than 34% of the total amount of electricity sold by NV Energy to its retail customers in Nevada must be from renewable energy resources. In addition, legislation by the State of California in 2002 established the California RPS. Subsequent amendments to the law have resulted in a requirement for California's electric utilities to have 60% of their retail sales derived from eligible renewable energy resources in 2030.

ES-2 CONSULTATION AND COORDINATION

ES-2.1 PUBLIC PARTICIPATION

The BLM conducted internal agency scoping with the interdisciplinary team for the proposed Yellow Pine Solar Project in November 2016 and June 2018. BLM resource staff reviewed the Proposed Action, identified preliminary issues and concerns, and determined preliminary data necessary for completion of the Draft EIS analysis.

The BLM initiated the public scoping process with the publication of a Notice of Intent (NOI) to prepare an EIS in the *Federal Register* on June 1, 2018. The BLM mailed the scoping notice to an initial mailing list and hosted two public scoping meetings on June 27, 2017, at the Pahrump Nugget (located at 681 South Highway 160 in Pahrump, Nevada), and on June 28, 2017, at the Suncoast Hotel and Casino (located at 9090 Alta Drive in Las Vegas, Nevada). Scoping comment submittals were received via email, verbal public comment, and formal letter. In total, 239 comments were identified in the submittals received. The scoping period for submitting comments was 90 days; however, the BLM will continue to accept comments throughout the EIS process. Additional detail regarding the scoping process and comments received is in the Scoping Report, available on the BLM ePlanning project website (available at: https://goo.gl/gNbjnz).

On March 20, 2020, publication of the Notice of Availability (NOA) of the Draft EIS in the *Federal Register* initiated the 45-day public review and comment period. In all, 93 public comment letters on the Draft EIS were received via email and formal letter. In total, 511 individual comments were identified in the public comment letters received. A detailed summary of the public comment process, response, and revision of the Draft EIS is provided in Appendix I of the Final EIS.

ES-2.2 INTERAGENCY CONSULTATION AND COORDINATION

On September 13, 2018, the BLM Las Vegas Field Office sent formal letters to 46 federal, state, and local agencies inviting them to become cooperating agencies for the proposed project. The following agencies accepted the invitation: Clark County Desert Conservation Program, the Nevada Department of Wildlife, and the U.S. Environmental Protection Agency.

The BLM Las Vegas Field Office also initiated consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) on January 7, 2020. A Biological Assessment (BA) has been prepared and submitted to the USFWS. The USFWS has evaluated the BA and prepared a Biological Opinion (BO), dated July 14, 2020. Implementation of the project would be in accordance with the requirements identified in the BO.

As part of the Section 106 process under the National Historic Preservation Act of 1966 (54 USC 306108), the BLM has conducted consultation with the Nevada State Historic Preservation Office (SHPO) to identify potential historic properties and to assess project effects on those historic properties. Consultation was initiated on September 30, 2019, and is currently ongoing.

ES-2.3 TRIBAL CONSULTATION AND COORDINATION

In accordance with Executive Order 13175 (*Consultation and Coordination with Indian Tribal Governments*, November 6, 2000), the BLM sent letters to 11 tribes to inform them of the project, including: the Paiute Indian Tribe of Utah; Timbisha Shoshone Tribe; Chemehuevi Indian Tribe; Twenty-nine Palms Band of Mission Indians; Bishop Paiute Tribe; Big Pine Paiute Tribe of the

Owens Valley; Moapa Band of Paiute Indians; Las Vegas Paiute Tribe; Fort Mojave Indian Tribe; Fort Independence Community of Paiute; and the Colorado River Indian Tribes.

From September 18, 2017, to March 25, 2019, the BLM conducted 16 separate tribal consultation meetings regarding the project with the Timbisha Shoshone Tribe, Chemehuevi Indian Tribe, Twenty-nine Palms Band of Mission Indians, Moapa Band of Paiute Indians, Las Vegas Paiute Tribe, Fort Mojave Indian Tribe, and the Colorado River Indian Tribes. Following these consultation meetings, the Fort Mojave Indian Tribe submitted a letter to the BLM (dated July 23, 2019) stating that, in general, trail systems and travel corridors are of cultural importance to the Mojave where trail systems typically connect traditional places of cultural and religious importance, including the Old Spanish National Historic Trail and Mormon Road. Additionally, it was expressed that some cultural resources identified in the project area could be associated with such aboriginal trails in the vicinity.

On May 5, 2020, the Colorado River Indian Tribes (Tribes) submitted a letter to the BLM noting concerns related to the potential removal of artifacts from the area of the proposed project and the corresponding destruction of the Tribes' footprints on the landscape. It was requested that all prehistoric cultural resources be avoided if feasible, particularly those resources that could not be moved. Additionally, the letter expressed that any prehistoric cultural resources that are not eligible for protection under the National Historic Preservation Act or the Archaeological Resources Protection Act (16 USC 470aa–mm) also be protected as part of the cultural landscape. The BLM considered the letter submitted by the Colorado River Indian Tribes as part of the public comment period on the Draft EIS and those comments are detailed in Appendix I with the BLM's response to each comment.

ES-3 AREAS OF CONTROVERSY

In accordance with NEPA Section 40 CFR 1502.6, the BLM developed a list of issues related to areas of controversy to address in the Administrative Final EIS using comments from the public, agencies, and the internal interdisciplinary team.

Areas of controversy (40 CFR 1502.10) raised during scoping by the public and agencies that are relevant to the environmental analysis are detailed in Table ES-1. Several other resources in addition to those listed in the table below are analyzed in the Administrative Final EIS, including greenhouse gases/climate change, realty, soils, transportation and traffic, vegetation, and noxious weeds.

ES-4 PROPOSED ACTION AND ALTERNATIVES

Several potential alternatives were identified and considered by the BLM. Of the various alternatives considered, the Proposed Action, the No Action, and two additional alternative actions—the Modified Layout Alternative (Alternative Action 1) and the Mowing Alternative (Alternative Action 2)—were identified for analysis in the Administrative Final EIS. Each action alternative would include approval of a ROW grant by the BLM. Alternative Action 2 modifies vegetation management of either the Proposed Action or the Modified Layout Alternative (Alternative Action 1).

ES-4.1 PROPOSED ACTION

The applicants are requesting BLM authorization to construct, operate, maintain, and decommission a 500-MW PV solar electric generating facility and associated infrastructure. This section provides a summary of the proposed Yellow Pine Solar Project and TCS facilities. The Proposed Action includes the construction, operation, maintenance, and decommissioning of the project, which consists of five primary types of facilities: 1) PV solar panels and the Yellow Pine Solar substation; 2) an energy storage system

(batteries); 3) linear facilities (including access roads, electrical distribution lines, communication cables, and 230-kV generation tie line [gen-tie line]); 4) operation and maintenance (O&M) facilities; and 5) the TCS and associated GLW 230-kV transmission line. A detailed explanation of each component and its corresponding construction requirements is provided in the Draft Yellow Pine Solar Plan of Development (POD) and the Draft TCS POD (see Appendix F of this Final EIS).

The Proposed Action would permanently occupy 2,908.4 acres and be located approximately 10 miles southeast of Pahrump and approximately 32 miles west of Las Vegas. To avoid three large washes that cross the project area, the Proposed Action would be split into four sub-areas (A, B, C, and D). An approximately 500-foot buffer on either side of each wash was created to provide a corridor of approximately 1,000 feet or more between sub-areas.

Construction methods for the Proposed Action involve grading up to 21% of the site, clear and cut (3 inches) with soil removal (tilling) on up to 36% of the site, and clear and cut (3 inches) on up to 42% of the site. The remaining 10% of the site would be constructed using drive and crush methods or left as intact propagule islands (12 acres distributed through sub-areas B through D as described in the project POD [see Appendix F]). Any vegetation outside of propagule islands that recovers after construction would be maintained at no higher than 12 inches. Propagule islands are only a design feature of the Proposed Action.

As part of project revegetation efforts related to Proposed Action, the applicant has designed the project to include propagule islands. Propagule islands are patches of intact vegetation and soils that provide seeds and soil microbial propagules that facilitate revegetation and/or recolonization of adjacent disturbed areas. These areas would also maintain native vegetation, which may support pollinator species. Propagule islands (or smaller fertile islands) are a concept that has not been used for solar facilities to date, but has been proposed in recent studies (Abella et al. 2105). Therefore, several different methods would be deployed on site and tested as part of the project, and a 3-year study would be implemented to test the efficacy of these propagule islands.

ES-4.2 MODIFIED LAYOUT ALTERNATIVE (ALTERNATIVE ACTION 1)

The Modified Layout Alternative (Alternative Action 1) would involve moving all proposed solar arrays, energy storage, associated substation, and O&M facilities into one combined project area (no sub-areas). The proposed TCS design and location would remain the same as under the Proposed Action. This alternative design was developed in response to comments and concerns related to the proximity of project construction and operation to Tecopa Road, State Route (SR) 160, and the Stump Springs Desert Tortoise Translocation Area. Shifting the location of these project facilities west into a single boundary would remove the need for additional access roads and underground collection between the sub-areas; however, an approximately 1-mile-long, overhead 230-kV gen-tie line and associated access road would be needed between the project area and the proposed TCS. The primary differences between the Proposed Action and the Modified Layout Alternative (Alternative Action 1) are the location and arrangement of the facilities within the project area.

Construction methods for the Modified Layout Alternative (Alternative Action 1) would be similar to the Proposed Action and include grading up to 24% of the site, clear and cut (3 inches) with soil removal (tilling) on up to 35% of the site, clear and cut (3 inches) on up to 40% of the site, and using drive and crush methods on up to 1% of the site. Any vegetation that recovers after construction would be maintained at no higher than 12 inches. The Modified Layout Alternative (Alternative Action 1) does not include propagule islands and does not avoid washes as described in the Proposed Action.

ES-4.3 MOWING ALTERNATIVE (ALTERNATIVE ACTION 2)

This alternative modifies vegetation management of either the Proposed Action or the Modified Layout Alternative (Alternative Action 1). The footprint, project components, construction methods, and O&M activities described for the Proposed Action and the Modified Layout Alternative (Alternative Action 1) described above would remain the same under the Mowing Alternative (Alternative Action 2), with the following exceptions: 1) the propagule islands under the Proposed Action are not needed as the entire site is mowed and vegetation maintained; 2) the length of time to construct the project would increase by 10% to 20%; and 3) vegetation management (as described below).

Construction methods for the Mowing Alternative would include grading up to 21% of the site. The vegetation on the remaining 79% of the site would be mowed between 18 and 24 inches and cacti and yucca would be left on-site. Vegetation would also be crushed during construction. Any vegetation that recovers after construction would be maintained at 18 to 24 inches during operations.

ES-5 COMPARISON OF EFFECTS

Table ES-2 summarizes the ground disturbance by alternative. Table ES-3 compares the anticipated effects of the Proposed Action and each alternative action on the resources analyzed in this Final EIS. The No Action Alternative would have no effects on any of the environmental resources listed, as the project would not be authorized and would not be built. The No Action Alternative is not included in Table ES-3.

CHAPTER 1. INTRODUCTION

Yellow Pine Solar, LLC (Yellow Pine Solar), and GridLiance West, LLC (GLW) (applicants, or project proponent), applied separately to the Bureau of Land Management (BLM) Las Vegas Field Office for rights-of-way (ROWs) on public land to construct, operate, and maintain 1) a Yellow Pine Solar 500-megawatt (MW) photovoltaic (PV) solar energy generating facility and associated substation, and 2) a GLW 230-kilovolt (kV) substation and associated 230-kV transmission line (herein collectively called the Yellow Pine Solar Project, YPSP, or project). The proposed YPSP application area is located approximately 10 miles southeast of Pahrump and approximately 32 miles west of Las Vegas in Clark County, Nevada. This environmental impact statement (EIS) includes analysis of a proposed 500-MW solar PV energy generation station and ancillary facilities, including battery storage, and the proposed GLW Trout Canyon Substation (TCS) and associated transmission tie line facilities. The project would be located on approximately 3,000 acres. The figures and tables for the Final EIS are provided in appendices. The Final EIS appendices are organized as follows:

- Appendix A. Glossary, Acronyms, Tables, and Index
- Appendix B. Project-Incorporated Design Features, Applicant Committed Environmental Protection Measures, and Management Plans
- Appendix C. Environmental Impact Statement Figures
- Appendix D. References and Literature Cited
- Appendix E. List of Preparers
- Appendix F. Plans of Development
    - Yellow Pine Solar Project Plan of Development
    - Plan of Development for the Trout Canyon Substation
- Appendix G. Yellow Pine Solar Alternatives Development
- Appendix H. Laws, Ordinances, Regulations, and Standards
- Appendix I. Public Comments

The decision of whether to authorize these ROW applications is a major federal action requiring compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] 4321). To comply with the requirements of NEPA, this EIS has been prepared to disclose the potential environmental impacts associated with the project's construction, operation, maintenance, and decommissioning. This EIS also analyzes alternatives to the proposed project. This EIS has been prepared in compliance with the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] 1500). The BLM is the lead agency for the preparation of this EIS.

1.1 BACKGROUND AND PROJECT HISTORY

1.1.1 Solar Generating Facilities

In October 2011, Boulevard Associates, LLC, a subsidiary of Yellow Pine Solar, filed an application for a ROW grant (N-090788) with the Southern Nevada District Office of the BLM for the Sandy Valley Solar Project. This original application included an area of approximately 9,290.0 acres on BLM-administered lands and extended north and south of Tecopa Road (Figure C-2). The original application was later amended on June 24, 2016, and resubmitted by Yellow Pine Solar under the new name, Yellow Pine Solar Project (YPSP). In the amended application, the portion of the original application area south of Tecopa Road was eliminated from further evaluation due to public comments and potential resource

conflicts (see Figure C-2), leaving an approximately 5,032.2-acre area[1] north of Tecopa Road. The proposed YPSP 500-MW PV energy generation facilities would consist of solar arrays, energy storage system, access and maintenance roads, YPSP substation and generation tie line (gen-tie line), operation and maintenance structures, and fencing.

The proposed YPSP would provide renewable energy to the electrical transmission grid via the proposed TCS, which would be owned, constructed, and operated by GLW, and is described below.

1.1.2 Trout Canyon Substation

GLW is the owner of the existing Pahrump to Sloan Canyon Switch 230-kV transmission line, which serves the city of Pahrump and would support new power project developments along the facilities alignment. GLW and Yellow Pine Solar have entered into a Large Generator Interconnection Agreement to connect the YPSP to the Pahrump to Sloan Canyon Switch transmission line via a proposed substation that GLW would own and operate. The TCS would be located directly adjacent to the YPSP to consolidate facilities to the extent practicable and reduce potential impacts associated with construction and operation of the facilities. The TCS would consist of structures, breakers, transformers, high-voltage electrical controls, combining switchgear, and related structures, as well as the appurtenant 230-kV transmission corridor and maintenance road. The TCS is covered in a separate application submitted to the BLM by GLW (N-098565); however, because the YPSP Proposed Action is to use the TCS for electrical transmission, it is being analyzed in this EIS. See Section 2.2.1.10 for detail.

The TCS would occupy 30.0 acres and use approximately 39.4 acres for the associated GLW transmission infrastructure to convey power from the proposed TCS to the existing Pahrump to Sloan 230-kV transmission line (see Figure C-3). The total acreage of disturbance for these facilities would be 69.4 acres and would be located entirely within the 5,032.2-acre study area.

1.1.3 The Project and Final Rights-of-Way

The ROW requested comprises approximately 3,000 acres, which would include the YPSP solar generating facilities and the proposed TCS 230-kV substation facilities.[2] For the purpose of this EIS analysis, the proposed YPSP and the proposed TCS together define the project, and are hereafter collectively referred to as "YPSP." See Figure C-4 for a Public Land Survey System (PLSS) locational information.

1.2 BLM PURPOSE AND NEED

In accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), public lands are to be managed for multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The BLM is authorized to grant ROWs on public lands for systems of generation, transmission, and distribution of electrical energy (Section 501(a)(4)). Taking into account the BLM's multiple-use mandate, the BLM's purpose and need for this action is to respond to the FLPMA ROW applications submitted by Yellow Pine Solar and GLW under Title V of FLPMA (43 USC 1761) to construct, operate, maintain, and decommission a solar generation power plant and ancillary facilities on approximately 3,000 acres (approximately 1,214 hectares) of BLM land in Clark County, Nevada, in compliance with FLPMA, BLM ROW regulations, the BLM NEPA Handbook (BLM 2008),

[1] For reference, data collection and survey reports refer to the 5,032.2-acre area as the "study area." Within the study area, the proposed facilities would occupy an approximately 3,000-acre area known as the "project area."

[2] Final acreage would be dependent on final project design.

U.S. Department of the Interior NEPA regulations, and other applicable federal and state laws and policies.

1.3 DECISIONS TO BE MADE

The purpose of the BLM's action is to respond to the Yellow Pine Solar and GLW applications for use of BLM-administered lands for new utility ROW. The BLM will decide whether to deny the proposed ROWs, grant the ROWs, or grant the ROWs with modifications. The BLM may include any terms, conditions, and stipulations it determines to be in the public interest and may include modifying the proposed use or changing the location of the proposed facilities (43 CFR 2805.10(a)(1)). In the decision process, the BLM must consider how the BLM's resource management goals, objectives, opportunities, and/or conflicts relate to this non-federal use of public lands.

1.4 APPLICANTS' PROJECT OBJECTIVES

The objective of Yellow Pine Solar is to construct, operate, and maintain an efficient, economic, reliable, safe, and environmentally sound solar-powered generating facility that would provide up to 500 MW of solar-generated electricity. The objective of GLW is to construct, operate, and maintain a 230-kV substation that would facilitate renewable and non-renewable energy developers' access to the overall GLW electrical utility grid. The project would help meet the goals and requirements set forth by the State of Nevada and the State of California for renewable energy resources. The Nevada Renewable Portfolio Standard (RPS) (Nevada Revised Statutes [NRS] 704.7801), first adopted by the State Legislature in 1997, mandates a minimum amount of electricity that electric utilities acquire from renewable energy sources. The Nevada RPS was revised and signed on April 22, 2019, by Senate Bill 358 to state that by calendar year 2025, no less than 34% of the total amount of electricity sold by NV Energy to its retail customers in Nevada must be from renewable energy resources. NV Energy is expecting to acquire renewable energy from multiple generating facilities to meet, at a minimum, the mandated RPS target of 20% of retail sales coming from renewable resources to 24% in 2021, 29% in 2022–2023, 34% in 2024–2026, 42% in 2027–2029, 50% in 2030, and 100% (zero carbon) by 2050.

In addition, legislation by the State of California in 2002 established the California RPS. Subsequent amendments to the law have resulted in a requirement for California's electric utilities to have 60% of their retail sales derived from eligible renewable energy resources in 2030.

1.5 AUTHORIZING LAWS, REGULATIONS, PERMITS, AND GUIDELINES

To implement any of the alternatives analyzed in this EIS, the project proponent must acquire applicable federal, state, county, and local permits and approvals, as necessary. Major authorizing laws and regulations, and potentially applicable permits or approvals are listed in Table 1.5-1. Note that this list is not all-inclusive.

1.6 RELATIONSHIP OF THE PROJECT TO BLM POLICIES, PLANS, AND PROGRAMS, AND LAND USE PLAN CONFORMANCE DETERMINATION

1.6.1 BLM Las Vegas Resource Management Plan

Resource management plans (RMPs) provide direction in managing the resources and resource uses of public lands. Management objectives for lands managed by the BLM Las Vegas Field Office are described in the Las Vegas RMP (BLM 1998). The proposed YPSP is located entirely on federal land managed by the BLM Las Vegas Field Office. Management direction is provided in land use plans or RMPs for each BLM Field or District Office. The BLM must review relevant land use plans and RMPs to determine whether a proposed project is in conformance with the management decisions and objectives of those plans. If a proposed project is not in conformance, the BLM can choose to deny the project, adjust the project to conform to the RMP, or amend the plan to address nonconformance (BLM 2005). Table 1.6-1 provides a summary of applicable RMP objectives, directions, and requirements within the RMP and a brief discussion on how the project is in conformance with those requirements.

1.6.2 Final Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States

In addition to the BLM Las Vegas RMP, the project is located within a six-state study area evaluated by the BLM within the *Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States* (BLM and U.S. Department of Energy [DOE] 2012); herein called the Solar PEIS). The Solar PEIS provides an amendment to the RMP and establishes guidelines that help limit the scope and streamline the NEPA process for solar energy projects. These guidelines are applicable to all "new" solar development applications proposed in Solar Energy Zones after June 30, 2009 and in variance areas filed after the publication of the Supplement to that Draft EIS on October 28, 2011. The project is located within a variance area as identified in the Solar PEIS (BLM and DOE 2012). The original Sandy Valley Solar Project application was filed on October 21, 2011, prior to the publication of the Supplement to the Draft EIS, and, as a pending solar application at the time, was considered exempt from the revised requirements. The application was amended in 2016 and resubmitted by the project proponent as the YPSP. As a result, this EIS is being completed on behalf of the resubmitted YPSP and uses the pre-2011 guidelines and evaluation requirements within the analysis in accordance with BLM protocol.

1.6.3 Final Programmatic Environmental Impact Statement for Vegetation Treatment Using Herbicides in 17 Western States

Vegetation management for the project is also regulated by a PEIS for *Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States* (BLM 2016a). This PEIS tiers to the *Record of Decision—Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (September 2007)* (BLM 2007), analyzes three additional herbicides and additional treatment methods, and includes new risk assessment documents.

1.6.4 Pahrump Regional Planning District Master Plan

Although the project is not located within the jurisdiction of the Pahrump Regional Planning District Master Plan Update 2014 (Nye County 2014, herein called Pahrump Master Plan), a portion of the analysis area is located within the western portion of the unincorporated town of Pahrump. The Access

Management, Corridor & Community Gateways Plan of the Pahrump Master Plan provides guidance in regard to transportation corridors within the Master Plan area. The Master Plan includes goals to "provide opportunities for the development of renewable energy projects and other similar and supportive industries" to ensure that renewable energy projects and related facilities are viable, adequately maintained, compatible with surrounding land uses, and that site rehabilitation would be completed upon termination of the project (Nye County 2014). Implementation of the project design features, including the site-specific traffic plan and decommissioning plan, would provide conformance with the requirements of the Pahrump Regional Planning District Master Plan.

1.7 INTERAGENCY COORDINATION

1.7.1 Cooperating Agencies

On September 13, 2018, the BLM Las Vegas Field Office sent formal letters to 46 federal, state, and local agencies inviting them to become cooperating agencies on behalf of an EIS for the proposed YPSP. The following agencies accepted the invitation:

- Clark County Desert Conservation Program (October 23, 2018)
- Nevada Department of Wildlife (October 25, 2018)
- U.S. Environmental Protection Agency (October 31, 2018)

1.7.2 U.S. Fish and Wildlife Service

The BLM Las Vegas Field Office also initiated consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) on January 7, 2020. Section 7 of the ESA requires federal agencies to ensure that their actions do not jeopardize the continued existence of threatened or endangered species or result in the destruction of their designated critical habitat. A Biological Assessment (BA) has been prepared and submitted to the USFWS (SWCA 2020a). The USFWS has evaluated the BA and prepared a Biological Opinion (BO), dated July 14, 2020. Implementation of the project would be in accordance with the requirements identified in the BO.

1.7.3 State Historic Preservation Office

As part of the Section 106 process, the BLM has conducted consultation with the Nevada State Historic Preservation Office (SHPO) to identify potential historic properties and to assess project effects on those historic properties. The consultation was initiated on September 30, 2019, and is currently ongoing.

1.8 SCOPING AND ISSUE IDENTIFICATION

Scoping provides an opportunity for members of the public and agencies to learn about a proposed project and share their concerns. Input from the scoping process is used to determine the issues requiring analysis in the EIS and potential alternatives to the Proposed Action. The scoping process also helps identify issues that are not considered relevant and can be eliminated from detailed analysis in the EIS. The BLM conducted internal agency scoping with the interdisciplinary team for the proposed YPSP in November 2016 and June 2018. BLM resource staff reviewed the Proposed Action, identified preliminary issues and concerns, and determined preliminary data necessary for completion of the EIS analysis.

The BLM initiated the public scoping process with the publication of a Notice of Intent (NOI) to prepare an EIS in the *Federal Register* on June 1, 2018. The BLM mailed the scoping notice to an initial mailing list and hosted two public scoping meetings on June 27, 2018, at the Pahrump Nugget (located at 681 South Highway 160 in Pahrump, Nevada), and on June 28, 2018, at the Suncoast Hotel and Casino

(located at 9090 Alta Drive in Las Vegas, Nevada). Scoping comment submittals were received via email, verbal public comment, and formal letter. In total, 239 comments were identified in the submittals received. The scoping period for submitting comments was 90 days; however, the BLM continued to accept comments throughout the EIS process. Additional detail regarding the scoping process and comments received is in the Scoping Report (BLM 2019a), available on the BLM ePlanning project website.[3] In accordance with NEPA Section 40 CFR 1502.6, the BLM developed a list of issues to address in the EIS using comments from the public, agencies, and the internal interdisciplinary team.

1.8.1 Analysis Issues

The issues for detailed analysis identified during public and agency scoping are summarized in Table 1.8-1 and in the following pages. The impact indicators are used to measure the environmental effects for each analysis issue. Issues that were addressed but not analyzed in detail were those that were 1) outside the scope of the Proposed Action; 2) already decided by law, regulation, or other higher-level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The CEQ guidelines on NEPA (40 CFR 1500–1508) explained this delineation in Section 1501.7, which requires agencies to "identify and eliminate from detailed study the issues which are not significant, or which have been covered by prior environmental review (Sec. 1506.3)." These issues and the rationale for not analyzing them in detail are discussed in Table 1.8-2.

1.8.2 Organization of the Final EIS

The sections included within this EIS have been completed in accordance with the requirements and guidelines of NEPA, the CEQ, 40 CFR 1500–1508, and the BLM NEPA Handbook, H-1790-1 (BLM 2008). The following discussions have been included within this EIS: Chapter 1 (Introduction); Chapter 2 (Proposed Action and Alternatives); Chapter 3 (Affected Environment and Environmental Impacts); and Chapter 4 (Consultation and Coordination). In addition, this EIS includes project-specific appendices that provide more detailed information to support the analyses presented throughout the EIS. Project design features are located in Appendix B. The figures and maps are located in Appendix C. The analysis included within this EIS is based on information and data collected during site-specific surveys and documented within YPSP baseline reports. Baseline reports are available for public review on the BLM ePlanning project website.

[3] Available at: https://goo.gl/gNbjnz.

CHAPTER 2. PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

NEPA requires that a reasonable range of alternatives be considered and evaluated; these alternatives must meet the BLM's purpose and need while minimizing or avoiding environmental impacts. This reasonable range of alternatives is formulated to address issues and concerns raised by the public and by agencies during scoping. The CEQ defines reasonable alternatives as those that are technically, economically, and environmentally practical and feasible. NEPA also requires that a no action alternative be evaluated for comparison with the other alternatives analyzed in the EIS. If alternatives do not meet the purpose and need or are unreasonable, as suggested, a detailed analysis of these alternatives is not required and rationale for elimination is provided.

In addition to the Proposed Action and No Action Alternative, two alternative actions (Alternative Action 1 – Modified Layout, and Alternative Action 2 – Mowing Alternative) were identified in response to issues raised by the public and agency considerations (see Appendix I). The BLM has identified the Proposed Action layout using the Mowing Alternative construction method as the preferred alternative. Several other alternatives were identified and considered but were eliminated from detailed analysis. These alternatives are described in Section 2.7, which provides the rationale for eliminating them from detailed analysis.

2.2 PROPOSED ACTION

The Proposed Action includes the construction, operation, maintenance, and decommissioning of the YPSP, which consists of five primary types of facilities: 1) PV solar panels and the Yellow Pine Solar substation; 2) an energy storage system (batteries); 3) linear facilities (including access roads, electrical distribution lines, communication cables, and 230-kV gen-tie line; 4) operation and maintenance facilities; and 5) the TCS and associated GLW 230-kV transmission line. Please see Appendix C for the figures, including the Proposed Action. The Proposed Action would be located approximately 10 miles southeast of Pahrump and approximately 32 miles west of Las Vegas (see Figures C-1 and C-2).

The Proposed Action was refined to respond to public comments received during the 90-day public scoping period in the summer of 2018, and comments received during the Draft EIS 45-day public comment period in the spring of 2019. See Section 1.8 for a summary of issues identified during the BLM and public scoping periods, and Section 4.4 for a summary of Public Participation.

2.2.1 Proposed Action Project Components

This section provides a summary of the proposed YPSP and TCS facilities. A detailed explanation of each component and its corresponding construction requirements is provided in the Draft YPSP Plan of Development (POD) and the Draft TCS POD (see Appendix F of this EIS). The BLM, in coordination with the project proponent, evaluated a study area for locating the YPSP facilities. Within the study area, the Proposed Action would occupy approximately 2,994.7 acres for construction, operation, maintenance, and decommissioning of proposed YPSP solar facility (see Figure C-3). The Proposed Action would be offset from Tecopa Road and Nevada State Route (SR) 160 to provide a minimum buffer of 400 feet from both roads. To avoid three large washes transecting the project area, the Proposed Action would be split into four sub-areas (A, B, C, and D) (see Figure C-3). An approximately 500-foot buffer on either side of each wash was created to provide a corridor of approximately 1,000 feet or more between sub-areas. A list of the Proposed Action project components and the associated temporary and permanent disturbance acreages are included in Table 2.2-1, and a description of each component is described below.

2.2.1.1 *Solar Modules/Array*

The YPSP would use PV technology by which the sun's light energy is converted directly into direct current (DC) electrical energy within the PV panels, referred to as "modules." The PV modules would be mounted together in different configurations, depending on the equipment selected, and on a common support framework. The completed assembly of PV modules mounted on a framework structure is called a "tracker," as it tracks the sun from east to west; the rows of module trackers are referred to as "arrays."

The PV arrays would be located in Sub-areas A, B, C, and D. They would be approximately 10 feet in height with arrays placed to fit within the sub-areas (see Figure C-3). Spacing would be identified in the final design, but the anticipated configuration includes spacing that is approximately 16.5 feet between rows (post to post), which allows 12 feet of clearance for maintenance vehicles and panel access. Current technology panels are approximately 6.5 feet (78.2 inches) high and 3.25 feet (39.1 inches) wide and are installed on a racking system with support piles driven into the ground (see Section 1.3.3.2 of the POD). For maximum efficiency, panels are typically installed between 16 and 24 inches off the ground when at their lowest point, which would result in a maximum height of 8.5 feet from ground level. However, engineering constraints may require an increase in height for some panels. For this reason, the analyses presented in Chapter 3 assume a height of approximately 10 feet to the top from ground level once installed. Current PV technology could generate 1 MW of electricity per 6 to 9 acres of lands suitable for construction of PV arrays and associated facilities. However, PV technology is rapidly improving, and the potential MW/acre may increase prior to the start of project construction. For purposes of this EIS, a 500-MW project is assumed. The exact final project output may be higher or lower, depending on the procured panel technology.

Each sub-area would be connected using underground 34.5-kV collection lines parallel and adjacent to the sub-area access roads (see Figure C-3). Electrical collection lines would be installed within the access road corridor, using direct bury methods, although conduit could be used in some situations. It is anticipated that during the phased construction a temporary disturbance width of approximately 150 feet would be needed for the sub-area access roads/34.5-kV collection lines. Once complete, the temporary 150-foot-wide disturbance corridor would be restored, leaving only the 20-foot-wide sub-area access road as permanent disturbance.

2.2.1.2 *Energy Storage System (Batteries)*

The YPSP would use an energy storage system that would have a capacity no larger than the solar facility and would be connected using either an alternating current (AC)-coupled or DC-coupled system. Selection of an AC- or DC-coupled system is ultimately determined through off-taker preference and contract terms. Up to 50 acres would be needed for either the AC- or DC-coupled system energy storage system.

The AC-coupled system would be connected to a bi-directional inverter to convert DC energy to AC energy, allowing for energy to flow in or out of the batteries in order to provide charge and discharge. This AC energy would be coupled to the PV array at the 34.5-kV busbars. Power switches and relays would protect the system. The system would consist of several housing units, similar to shipping containers. The containers would be placed on concrete pads and would occupy up to 50 acres, depending on the size of the system contracted and technology selected. Concrete needed for construction of the energy storage system and other components would be sourced from locally available commercial sources (likely in Pahrump or Las Vegas). The equipment enclosures and buildings would be located next to the YPSP substation and operations and maintenance (O&M) building. If a DC-coupled system is used, battery units would be stored in containers. Those containers would make use of the solar inverters, feeding them in DC power. Therefore, the battery containers would be distributed throughout the solar

arrays, adjacent to their respective inverters. The containers would be similar in size (20–40 feet long) to the solar inverter skids.

2.2.1.3 *Roads and Access*

Only a small portion of the overall proposed roads and access would be paved, primarily the YPSP main access road and areas around the administration/O&M building and YPSP substation, and only if geotechnical conditions require this. The remaining portions of the project area would remain unpaved with select roadways improved with road base and/or gravel. Gravel and aggregate would be supplied from commercially available sources produced in the nearby communities, most likely Pahrump or Las Vegas.

The main access to the YPSP facilities would be obtained from Tecopa Road approximately 0.6 mile south of the SR 160 intersection. From Tecopa Road to the YPSP substation, the main access road would be an all-weather improved access road with one lane in each direction, approximately 20 to 24 feet in width. The road would be sized to handle all potential vehicle traffic during construction and closed to public access.

Auxiliary roads inside the facility footprint would be 12 to 20 feet wide, use compacted native materials or gravel surface. Roads between sub-areas would include room for the electrical collection system as described in Section 2.2.1.1 above. All roads would be used for construction and maintained for operations and maintenance of YPSP facilities.

2.2.1.4 *Distribution Power*

If feasible for construction, local distribution power would be brought to the trailer area and the project substation area from the Valley Electric Association (VEA) 138-kV transmission line, located across SR 160, or another distribution line to be identified by VEA. Even if not used for construction, distribution power would be brought to the project substation to serve as backup power and to the O&M building for normal power requirements.

If distribution power cannot be delivered to the site from VEA or another nearby distribution line, diesel generators would be installed for station power. Up to four 500-kilowatt diesel or propane generators, or the equivalent, would be used. Approximately 10,000 gallons of fuel would be stored at the O&M facility.

2.2.1.5 *Propagule Islands*

As part of project revegetation efforts related to the Proposed Action, the applicants have designed the project to include propagule islands. Propagule islands are patches of intact vegetation and soils that provide seeds and soil microbial propagules that could facilitate revegetation and/or recolonization of adjacent disturbed areas. These areas would also maintain native vegetation, which may support pollinator species. Propagule islands (or smaller fertile islands) are a concept that has not been used for solar facilities to date. Therefore, several different methods will be deployed on-site and tested as part of the project, and the effects of these vegetation islands will be studied for 3 years. Approximately 12 acres of propagule islands will be included as described below and shown in the conceptual drawing (see Figure C-5):

- Sub-area A—control site; no propagule islands.
- Sub-area B—three propagule islands: each island would be approximately 10 feet wide and run from east to west across the sub-area.

- Sub-area C—three propagule islands: each island would be approximately 20 feet wide and run from east to west across the sub-area.
- Sub-area D—two propagule islands: each island would be approximately 30 feet wide and run from east to west across the sub-area.

2.2.1.6 *YPSP Substation and 230-kV Gen-Tie Line*

The proposed YPSP substation would be constructed inside Sub-area A, adjacent to the TCS, and would be approximately 600 × 600 feet (approximately 8.3 acres located entirely within Sub-area A). The height of components in the YPSP substation varies, with the highest being the gen-tie line structure at 120 feet. The YPSP substation would be a series of 35-kV breakers for collection of power from the solar modules via the electrical collection system (see Section 2.2.1.1 above), a common busbar, and a step-up transformer. The YPSP substation and interconnections would be built for 230 kV and would operate at that nominal voltage.

The electrical power from the proposed YPSP substation would be transmitted through an approximately 200-foot-long, 230-kV gen-tie line to the proposed TCS. This gen-tie line consists of "H-frame" structures between 90 and 120 feet tall. Final substation equipment would be determined during final engineering of the proposed interconnection.

To comply with the grid interconnect, the YPSP must provide redundant communications to the plant. Technology is changing rapidly in the field of plant control communications, but for the purposes of this EIS, it is assumed that the connection would include the installation of an overhead fiber-optic cable on the proposed transmission structures.

2.2.1.7 *Buildings*

The proposed YPSP would include an administration/O&M facility, housed in an approximately 3,500-square-foot building, located adjacent to the YPSP substation. The administration/O&M facility would include a small administrative area that would be air-conditioned and include offices, a break room, restrooms, locker rooms with showers, a work area for performing minor repairs, and a storage (or warehouse) area for housing spare parts, transformer oil, and other incidental chemicals. The building would be a pre-engineered metal building with metal siding and roof.

Plant auxiliary systems would be designed to control, protect, and support the YPSP and its operation. These systems include the lighting system and the fire protection system, as described below.

2.2.1.8 *Plant Auxiliary Systems*

Lighting System. Permanent outdoor night lighting would be provided at the administration/O&M building and the YPSP substation, although some portable lighting may be required for some maintenance activities that must be performed at night. Lighting would be kept to the minimum required for safety and security. Sensors, switches, and timers would be used to keep lighting turned off when not required, and all lights would be hooded and directed downward, to minimize backscatter and off-site light. Lighting would be attached to buildings and other structural supports where possible or affixed to ground-mounted poles of approximately 15- to 20-foot height.

Fire Protection. Fire protection would be necessary for the YPSP during project construction and operations. The BLM and local emergency services would have emergency access to the project area via a locked gate to facilitate response time for wildfire and non-wildfire incidents. A Fire Management Plan would be implemented to reduce fire risk to the project area and surrounding public lands for the life of

the project. During construction activities, a water truck or other portable trailer-mounted water tank would be kept on-site and available to workers for use in extinguishing small human-made fires. All vehicles working on-site would also carry a portable fire extinguisher.

YPSP operations would typically have a low risk of introducing fires because the majority of the materials within the solar arrays are non-combustible (aluminum, steel, or glass). The fire protection systems for the YPSP operations would include a fire protection water system for the administration/ O&M building, portable water tanks (Buffalos), and portable fire extinguishers. The fire protection water system for the O&M building would be supplied from an adjacent 25,000-gallon water storage tank located within the project area that would be needed for construction, operation, and maintenance of the proposed solar facilities.

2.2.1.9 *Fencing*

Prior to site-preparation activities, temporary desert tortoise exclusion fencing would be installed along the site perimeter, including across the washes between sub-areas, extending to SR 160 and Tecopa Road (see Figure C-6). Prior to construction of each sub-area, the temporary desert tortoise fencing would be removed and replaced with permanent security and attached desert tortoise fencing, and installed around each sub-area. The security fence would be approximately 7 feet tall, including approximately 1 foot of barbed wire (three strands) mounted on 45-degree extension arms. The fence posts would be set in concrete or driven into the ground. Controlled access gates would be located at all entrances to the facility. All site security fencing would be constructed within the sub-area boundaries. Temporary tortoise fencing between sub-areas would remain in place to ensure that tortoises are kept out of construction areas. Tortoise fencing would include tortoise-proof gates or cattle guards at entrances to sub-areas with a well-maintained path of escape for tortoises, in accordance with USFWS-recommended specifications for desert tortoise exclusion fencing.

2.2.1.10 *Trout Canyon Substation and 230-kV Transmission Line*

The YPSP would provide renewable energy to the electrical transmission grid via the TCS, which would be owned and operated by GLW. The TCS would be located on 30 acres within the project area adjacent to Sub-area D (see Figure C-3). The TCS is covered in a separate application submitted to the BLM by GLW (N-098565); however, because the YPSP Proposed Action is to use the TCS for electrical transmission, it is being analyzed in this EIS.

The proposed TCS would consist of structures, breakers, and controls that allow for transmission of power to occur with and without the proposed YPSP interconnected. In addition, the substation would include transformers, high-voltage electrical controls, combining switchgear, and related structures. The substation would be fenced as described for the YPSP. The electrical power from the on-site YPSP substation would be transmitted through a 0.1-mile-long gen-tie line for delivery to the TCS.

The proposed GLW 230-kV transmission line would then exit the TCS to the north, adjacent and west of the existing materials pit, and cross SR 160, connecting to the existing 230-kV Pahrump to Sloan transmission line (see Figure C-3). The proposed GLW 230-kV transmission line corridor is approximately 0.8 mile long and 400 feet wide and would consist of five to eight typical steel monopole and H-frame self-weathering structures approximately 90 to 120 feet in height. Construction of the TCS and associated transmission line could occur prior to or within the construction timeline for the Yellow Pine Solar PV generation facilities. Chain-link security fencing would be installed around the substation site perimeter in order to limit site access to authorized personnel; no fence would be installed around the transmission infrastructure alignment. Construction of the TCS is anticipated to take approximately 18 months.

2.2.1.11 *Proposed Action Summary of Disturbance*

The Proposed Action components would result in temporary and permanent disturbance within the YPSP study area. Temporary disturbance areas include temporary workspaces, yards, and staging areas as well as temporary tortoise fencing needed for construction, which would be restored in accordance with the BLM-approved Site Restoration and Revegetation Plan following the completion of primary construction activities (see Section 2.2.2 below). Permanent disturbance is associated with all long-term project components needed for operation and maintenance of the YPSP and associated facilities throughout the 30-year lifespan of the project, including the solar modules/arrays, energy storage system, roads and access routes, distribution power, substations, gen-tie and transmission infrastructure, and permanent fencing. These areas would not be reclaimed until the end-of-life of the project, and would occur in accordance with the BLM-approved Decommissioning, Abandonment, and Site Reclamation Plan.

Table 2.2-1 summarizes anticipated temporary and permanent disturbance associated with the Proposed Action.

2.2.2 Project Construction

2.2.2.1 *Site Preparation*

Prior to the start of construction, a land surveyor would obtain or calculate benchmark data, grades, and alignment from plan information and provide control staking to establish the alignments, benchmarks, and elevations. The detailed design documents would provide data for the horizontal and vertical control points and horizontal alignments, profiles, and elevations.

Prior to the start of construction, security and desert tortoise exclusion fencing would be installed (see Section 2.2.1.9 and Figure C-6). A 20-foot buffer along the outside perimeter of the fences would be established as a temporary work area for fence construction and maintenance access. Vehicular access through the temporary perimeter work area would primarily be overland travel (drive and crush only); however, certain areas may need some improvement, depending on the conditions at the time of the fence installation. The temporary perimeter work area would be used to conduct regular fence inspections while the fence is in use, to check the integrity of the fence, and to perform repairs. Temporary tortoise fencing between sub-areas would remain in place to ensure that tortoises are kept out of construction areas. Following the completion of project construction activities, all temporary tortoise fencing would be removed, and any associated disturbance would be restored in accordance with the approved project restoration plan.

Following fence installation, construction activities would begin with the preparation of the solar array, roads, and other site facilities. The site vegetation would be cleared to a height of no more than 3 inches using a bush hog, or similar tractor-mounted brush cutter. The method is known as *clear and cut* and is designed to reduce potential disturbance to the soil seed bank and soil structure compared with grading techniques. Section 4.2 in the POD describes maintenance of vegetation during operation. Any vegetation that is able to resprout would be maintained at a height of up to 12 inches during operation. Areas that contain large shrubs such as creosote bush cannot be only cleared, as the larger stumps can cause vehicle damage and impede construction activities. In those areas where construction access is impeded, the *clear and cut (3 inches) with soil removal* method would be implemented and the surface would be tilled to remove stumps while leaving the root structure in place to the greatest extent practicable; topsoil would be mixed using this technique but would largely remain on-site. Any vegetation outside of construction areas would be left intact. *Grading and leveling* would occur only in the areas where the elevation would need to be changed to accommodate the tracker/racking system tolerances, site drainage, roads, laydown

areas, and foundations. *Drive and crush only* does not use any vegetation clearing, but instead vegetation and soils are driven over and crushed by vehicle and equipment tires or tracking machinery.

Estimates are based on full build-out of sub-areas A through D (2,834.9 acres), plus the temporary perimeter work area (66.2 acres), main access road (1.0 acre), the sub-area access/collection roads (23.2 acres), and the TCS (69.4 acres), totaling 2,994.7 acres of permanent and temporary disturbance.

The organic matter that remains after site preparation would remain within the construction area (except in trenches and under equipment foundations). During the site clearing process, the site also would be cleared of refuse, as necessary. Refuse materials would be recycled or disposed.

Materials suitable for compaction would be stored in stockpiles at designated locations using proper erosion prevention methods. Where possible or practicable, weed-free materials would be used. Materials unsuitable for compaction, such as debris and large rocks, would be stockpiled at designated locations on site. Materials would not be disposed of off site without required approval from the BLM.

Appropriate dust abatement measures would be identified in the YPSP Dust Control Plan, to be implemented during construction, in compliance with the Clark County Dust Control Permit. These measures shall include restriction of vehicle speeds, watering of active areas, watering of stockpiles, watering on roadways, track-out control at site exits, and other measures as required by the BLM.

2.2.2.2 Temporary Construction/Laydown Areas

All staging would be established within the fenced project area. Temporary staging would include fenced parking, covered trash disposal facilities, construction trailers, a laydown area, and portable toilets and potable water for the construction staff. Mobile trailers or similar suitable facilities (e.g., modular offices) would be used as construction offices for YPSP and subcontractor personnel. During construction, temporary utilities would be provided for the construction offices, laydown area, and project area. Prior to the availability of permanent distribution power, temporary construction power would be provided by Valley Electric Association or would come from temporary diesel generators located in the staging area (see Section 2.2.1.4). Temporary lighting would be provided and strategically located to ensure safety and security of the construction area (see Section 2.2.1.7).

No staging areas would be needed outside the project area or the proposed TCS site footprint. For the proposed GLW 230-kV transmission line from the proposed TCS to the existing Pahrump to Sloan 230-kV Transmission Line, laydown areas would be located within the TCS footprint, and all work would be performed within the 400-foot ROW.

2.2.2.3 Solar Modules/Array Installation

Construction of the tracker/mounting assemblies may be conducted in a single area, and then the assemblies would be transported to the proper location and placed on the pre-installed supports. Alternatively, the array assembly may occur at the installation point. Final assembly typically involves tractors, as well as forklifts to place the tracker/mounts onto the support structures. During this work, there would be multiple crews working the site with vehicles, including special vehicles for transporting the arrays.

The tracker/mount installations would be constructed using driven steel posts or possibly concrete foundations if required. As the solar arrays are installed, the balance of the plant would be constructed concurrently. Within the sub-areas, the electrical and instrumentation/control wiring would be installed in underground trenches. The wiring would be run to the location of the solar field controls and the circuits would be checked.

2.2.2.4 *Energy Storage System Installation*

If a DC system is used, a shallow foundation would be placed next to as many inverters as are needed to achieve the required battery storage capacity. The battery containers would be delivered directly to the inverter locations and placed on the concrete foundation. The battery containers would then be connected to the inverters by installing DC cable, AC auxiliary power, and fiber optics. Up to 50 acres would be needed for a DC-coupled energy storage system.

If an AC system is used, the collector substation area would be expanded by up to 50 acres to incorporate additional space required for the battery storage system and additional inverters. The ground would be graded, and level concrete pads would be poured for battery containers. The battery containers would be placed and connected to the grounding grid. Underground conduit would be installed to connect the batteries and inverters to the control house inside the substation. Medium-voltage conductors from the inverters would be connected to the substation medium-voltage busbar.

2.2.2.5 *YPSP Substation and Generation Tie-Line*

The construction of the YPSP substation would begin early in the construction process. Heavy foundations and equipment pads would be constructed using trenching machines, compactors, concrete trucks and pumpers, vibrators, forklifts, boom trucks, and large cranes. Similar to site grading and excavation, appropriate dust abatement measures would be identified as described above.

Crews would work continuously along the ROW to construct the proposed transmission line. Construction of the line would include the following activities:

- Clearing and grading of pole sites (if required)
- Foundation preparation and pole installation (if required)
- Conductor installation
- Cleanup and site restoration

2.2.2.6 *Trout Canyon Substation and GLW 230-kV Transmission Line*

During site preparation for the proposed TCS, the approximate 30.0-acre site would be graded and leveled. After grading, the concrete foundation would be constructed to support the substation components. Structural components would be transported to the site by truck. Construction materials and equipment would be placed within the substation area.

Construction of the proposed GLW 230-kV transmission line would commence from the north side of the proposed TCS substation side and progress north across SR 160 to tie into the existing Sloan to Pahrump 230-kV transmission line. The length of the proposed GLW 230-kV transmission line from the TCS to the existing Sloan to Pahrump 230-kV transmission line would be approximately 0.8 mile, and would require a 400-foot-wide corridor. Within the proposed corridor approximately five to eight 230-kV steel monopole and H-frame self-weathering structures approximately 90 to 120 feet tall would be installed.

Various activities would occur during construction, with several construction crews operating simultaneously at different locations. Appropriate dust abatement measures would be identified in the TCS fugitive dust control plan. These measures may include restriction of vehicle speeds, watering of active areas, watering of stockpiles, watering on roadways, track-out control at site exits, and other measures.

The GLW 230-kV transmission line would be constructed with crews working continuously along the transmission line ROW. The ROW construction of the line would include the following activities:

- Clearing and grading of pole sites (if required)
- Foundation preparation and installation of poles (if required)
- Conductor installation
- Clean-up and site restoration

2.2.2.7 Construction Schedule and Personnel Requirements

Construction of the Proposed Action is expected to occur over a period of 24 months, which includes mobilization, construction/installation, commissioning/testing, and demobilization. However, the project may be completed in phases, depending on power purchase agreements or other contractual agreements. The smallest phase contemplated would be 50 MW (in which case up to 10 phases could be constructed). In general, construction of a smaller phase would occur in one sub-area before beginning in the next; however, it is possible that a phase could require a portion of multiple sub-areas depending on the total MW size of that phase. The on-site workforce would consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. Table 2.2-2 provides the Proposed Action phase timing and anticipated workforce requirements for the YPSP.

The YPSP would not provide on-site residential areas for construction workers. Construction workers would most likely commute from the Pahrump and Las Vegas areas. During peak construction times, (anticipated to occur between months 4 to 10), up to 400 workers would be on-site. Approximately 200 to 300 workers are anticipated for non-peak construction periods during the typical a.m. and p.m. peak hours. In addition, while the majority of workers are expected to arrive and depart during these peak hours, specialty workers are expected to arrive on-site during non-peak hours. Approximately 25 trucks per day are expected to deliver various materials and construction equipment during non-peak periods, and five trucks per day during peak periods. A Traffic Management Plan would be prepared prior to construction for review by the BLM.

Construction would generally occur between 7 a.m. and 7 p.m., Monday through Saturday. During the project start-up phase, some activities (such as equipment and system testing) may continue 24 hours per day, 7 days per week. Table 2.2-3 depicts a proposed construction plan for the YPSP. Construction of the TCS and 230-kV transmission line would take between 6 and 18 months and could begin prior to construction of the YPSP PV generation facilities and associated YPSP substation.

Construction Equipment. For ground construction, a crane would be used to erect the structure. Equipment could include cranes, augers, bulldozers, bucket trucks, backhoes, air compressors, electric generators, pickup trucks, and other vehicles, machinery, and field equipment. Typical equipment that would be used for the YPSP PV generation facilities and associated YPSP substation includes the following:

- Graders
- Excavators
- Bulldozers
- Backhoes
- Cutting machines
- End loaders
- Delivery trucks
- Trenching machines
- Pile drivers
- Flatbed trucks
- Cranes
- Rollers
- Water supply trucks
- Water spray trucks
- Forklifts and carry decks
- Electrical test equipment
- Concrete mixers
- Compaction machines
- Survey equipment
- Off-road buggies
- Light trucks

Table 2.2-4 identifies the type and number of equipment to be used for the construction of the TCS and GLW 230-kV transmission line facilities.

2.2.3 Project Operations and Maintenance

Following project construction, the operation of the YPSP could require up to 10 permanent employees working a single shift. Depending on final project design, the site could potentially operate an unmanned facility without permanent staff on-site. If the facility is manned, the typical employee traffic is not expected to occur until after the peak period of construction is completed. Vegetation would be maintained at a height of up to 12 inches on-site through a combination of mowing native species and herbicide application for non-native species. Please see the YPSP and TCS PODs in Appendix F for a complete description of operations and maintenance activities, which includes materials use and storage.

2.2.4 Project Termination, Decommissioning, and Site Reclamation

The project proponent is required to post a reclamation bond as a condition of authorization issuance in order to ensure the availability of funds for site decommission and reclamation. The project's bond would be based on the approved Decommissioning, Abandonment, and Site Reclamation Plan and Weed Management Plan, which would be completed prior to construction. The YPSP would have a useful life of approximately 30 years. The draft Decommissioning, Abandonment, and Site Reclamation Plan would be based on BLM's most updated Restoration Plan Template and approved prior to issuance of Notice to Proceed (NTP).

The Decommissioning, Abandonment, and Site Reclamation Plan would provide detail regarding the removal of all project components, reuse of materials to the extent feasible, and site restoration activities to pre-project specifications. The Decommissioning, Abandonment, and Site Reclamation Plan would discuss all currently applicable laws, ordinances, regulations, and standards associated with the reuse, safe storage, or disposal of project materials. The plan would also include a description of procedures for removal and for notification of regulatory agencies. The BLM would review and approve the plan prior to NTP.

2.3 ALTERNATIVE ACTION 1 – PHOTOVOLTAIC/ENERGY STORAGE LAYOUT ALTERNATIVE (MODIFIED LAYOUT)

Alternative Action 1 – Photovoltaic/Energy Storage Layout Alternative (Modified Layout) shifts all proposed YPSP PV, energy storage, and YPSP substation and O&M facilities into one combined project area (no sub-areas) on the west side of the study area (see Figure C-7). The proposed TCS design and location would remain the same as under the Proposed Action. This alternative design is in response to comments and concerns related to the proximity of project construction and operation to Tecopa Road, SR 160, and the Stump Springs Desert Tortoise Translocation Area. Shifting the location of these project facilities west into a single boundary removes the need for additional access roads and underground collection between the sub-areas; however, an approximately 1-mile-long, overhead 230-kV gen-tie line and associated access road would be needed between the project area and the proposed TCS.

The primary differences between the Proposed Action and Alternative Action 1 (Modified Layout) are the location and arrangement of the facilities within the project area. The description of the differences between the Proposed Action and Alternative Action 1 (Modified Layout) are presented below.

2.3.1 Alternative Action 1 – Modified Layout Project Components

The energy storage system, distribution power, communication cables/lines, project buildings, and security fencing would remain the same as described for the Proposed Action. The TCS and 230-kV transmission line would be as described for the Proposed Action. Project construction, scheduling, personnel, and equipment requirements would mostly remain the same as that described for the Proposed

Action; however, construction is anticipated to be longer in duration. Operations and decommissioning would remain the same as that described for the Proposed Action.

Solar Array. The solar arrays would be arranged within the boundary on the west side of the project area. The number and arrangement of panels would be similar to the Proposed Action (see Figure C-7).

Access Roads. Regional access to the Alternative Action 1 (Modified Layout) project area would be the same as that described for the Proposed Action: SR 160 to Tecopa Road. Alternative Action 1 would require an approximately 20-foot-wide, 1-mile-long access road from Tecopa Road, via the TCS to the project area (see Figure C-7).

YPSP Substation and 230-kV Gen-Tie Line. The YPSP substation would be located approximately 1 mile from the TCS (within the solar array area) and would require an approximately 1-mile-long, 230-kV gen-tine line between the YPSP and the TCS (see Figure C-7). The 230-kV gen-tie line facilities would be placed within a ROW with a requested width of 125 feet. The access road described above would be included within this ROW.

Tortoise Fencing. Temporary desert tortoise exclusion fencing would be installed around the entire solar site with an approximately 20-foot-wide perimeter work area to allow for maintenance and access during construction. The total length of the temporary tortoise fencing is approximately 43,837 feet (8.3 miles). The buffer area would total approximately 20.1 acres.

2.3.1.1 *Alternative Action 1 (Modified Layout) Summary of Disturbance*

Table 2.3-1 summarizes anticipated temporary and permanent disturbance associated with Alternative Action 1 (Modified Layout).

2.4 ALTERNATIVE ACTION 2 – MOWING ALTERNATIVE

Alternative Action 2 (Mowing Alternative) was developed to address the difficulty in restoration of Mojave Desert ecosystems after disturbance; conservative estimates are that disturbed soils in the Mojave Desert can take a century to recover. Vegetation and/or soil removal at these large scales removes multi-use functionality from the site, long after the 30-year ROW has ended (Abella 2010; Chambers et al. 2013; Copeland et al. 2017; Lovich and Bainbridge 1999).

Recommendations from scientific literature and an agency-funded research synthesis indicate that the best management option is to limit the extent and intensity of impacts during project planning as much as possible, given the cost, difficulty, and time it takes to restore desert ecosystems, and the ecosystem services that may be permanently lost (Abella 2010; Abella and Newton 2009; Chambers et al. 2013; Copeland et al. 2017; Lovich and Bainbridge 1999; Lovich and Ennen 2011; Macknick et al. 2013; Millennium Ecosystem Assessment 2005).

Mowing is becoming the standard on large site-type ROWs to prevent permanent impairment of public lands (as mandated by FLPMA) (Kobelt 2020) and in lieu of off-site mitigation as demonstrated by the Ivanpah Solar Electric Generating System (ISEGS) Project (BLM 2010), the Crimson Solar Project (BLM and California Department of Fish and Wildlife [CDFW] 2019), the Gemini Solar Project (BLM 2019b), the VEA Community Solar Project (VEA 2020) constructed in 2016, and others (Beatty et al. 2017; Sinha et al. 2018). BLM's Instruction Memorandum (IM) 2019-018 states BLM has an obligation to ensure that actions do not result in undue and unnecessary degradation (BLM 2019c). The BLM Southern Nevada District Office is working toward minimizing impacts of development through on-site project development minimization measures, such as mowing. Mowing methods are designed to help

preserve soils, biological soil crusts, soil seed banks, native perennial vegetation diversity and structure, and cacti and yucca species, and to resist weed invasions, dust, and erosion.

This alternative would modify vegetation management of either the Proposed Action or Alternative Action 1 (Modified Layout). The footprint, project components, construction methods, workforce, schedules, and operations and maintenance activities described for the Proposed Action and Alternative Action 1 (Modified Layout) described above would remain the same except for 1) vegetation would be mowed to a height of 18 to 24 inches throughout the project site prior to construction and maintained at a height of 18 to 24 inches in areas outside of areas where grading is required, as described in the Proposed Action (areas would be graded to level for pads, O&M building, roads, etc.), 2) no propagule islands would be included as described in Section 2.2.1.5 because vegetation would be maintained throughout most of the site, and 3) the applicants predict the length of time to construct the YPSP PV generation facilities as identified in Section 2.2.2.5 may increase by 10% to 20%. However, vegetation under panels has been shown to decrease temperatures and therefore increase panel performance by up to 1% annually, which would both positively impact the efficiency of energy production at the site and reduce the "heat island" effect of the project (Barron-Gafford et al. 2019).

Under this alternative, vegetation will be maintained within the solar facility, and so wildlife is expected to remain within the solar facility to some extent. Wildlife access holes (12 inches tall by 12 inches wide) will be installed within the permanent security fencing, but above the permanent tortoise fencing that is attached to the perimeter fence. These wildlife access holes will be designed to be used by small to medium-sized mammals, like kit foxes, desert cottontails, and black-tailed jackrabbits, as well as larger bird species like greater roadrunners. The wildlife access holes will have wooden platforms on each side to allow for easy access in and out of the facility and will be installed in the middle of a 20 × 4–foot screen or tarp secured to the fence. Installing the wildlife holes in the screen will make the holes more visible and easier to find for wildlife. These wildlife access holes will be placed every 0.25 mile around the perimeter of the sub-areas. It is anticipated that wildlife will use these access holes to move in and out of the solar facility. Other solar facilities (ISEGS) in the Mojave Desert have installed these wildlife access holes and they have been heavily used by greater roadrunners, and the holes have decreased the number of roadrunner mortalities at the facilities.

2.5 NO ACTION ALTERNATIVE

CEQ regulations (40 CFR 1500–1508) for implementing NEPA require that an EIS alternatives analysis include a No Action Alternative. Under the No Action Alternative, the BLM would not issue a ROW grant, the proposed YPSP and TCS would not be constructed, and existing land uses in the project area would continue. The BLM would continue to manage the land consistent with the 1998 Las Vegas RMP.

2.6 DESIGN FEATURES, APPLICANT COMMITTED ENVIRONMENTAL PROTECTION MEASURES, AND STANDARD AGENCY PERMIT REQUIREMENTS

The following analysis (see Chapter 3, Sections 3.2–3.16) assumes that all design features, Applicant Committed Environmental Protection Measures (ACEMs), and standard agency permit requirements would be implemented. These measures are included within the YPSP administrative record and were used within the environmental analysis of this EIS to determine the potential impacts from project activities. Revised language and additional measures may be added to final work plans as necessary; however, any modifications or revisions to project design would require approval from the BLM and any and all applicable permitting agencies. All measures are listed and described within Appendix B and were used to meet the minimum requirements for analysis within the EIS. Any modifications or revisions to

project design would need to provide greater or equal protection to environmental resources in order to meet conditions of approval.

Conservation measures to be implemented using remuneration fees collected from the applicants, as required by the Biological Opinion through Section 7 consultation with the USFWS, would be used for on-site mitigation to reduce the adverse impacts to the Mojave desert tortoise from construction of the YPSP, and may include:

1. Installation of desert tortoise fencing on the south side of Tecopa Road, starting at SR 160 going southwest to the California state line, preventing resident and especially translocated tortoises from being killed or injured by vehicle strikes on Tecopa Road.
2. Modifying or retrofitting up to nine highway culverts and existing desert tortoise fencing to allow for desert tortoises to pass through, thus increasing genetic connectivity between the fragmented habitat on each side of SR 160.
3. Supporting the implementation of a 5-year study on desert tortoise use of the modified culverts to document their effectiveness in facilitating movement under SR 160 and thus connectivity between the Trout Canyon and Stump Springs translocation areas.
4. Supporting the implementation of a large-scale treatment of invasive grasses in the Stump Springs and Trout Canyon translocation areas. Invasive annual grasses are almost ubiquitous in the Eastern Mojave Recovery Unit for the Mojave desert tortoise. In some areas, cover of invasive grass is higher than the cover of perennial shrubs. It is widely accepted that invasive annual grasses, including *Bromus* spp. and *Schismus* spp., are not nutritionally beneficial to desert tortoises, and in the case of juvenile tortoises, can lead to mortality if eaten as a large percentage of their diets (Drake et al. 2016). The goal of this project is to reduce invasive grasses, thus increasing availability of more nutritious annual forbs for Mojave desert tortoises, especially juveniles, in the translocation area.
    - Invasive annual grasses in the translocation areas would be treated using a pre-emergent herbicide (Imazapic) during the desert tortoise inactive season. In some plots, a new herbicide (Indaziflam) will be tested both independently, and in a tank mix with Imazapic to see whether application will extend the length of control of invasive annual grasses. Indaziflam, the active ingredient in Esplanade 200 SC, is a cellulose-biosynthesis inhibitor. Indaziflam works by inhibiting cellulose deposition in the plant cell wall, which affects cell wall formation and disrupts normal root growth and development. Indaziflam has a long period of soil residual activity, which has few non-target impacts on perennial vegetation (Clark et al. 2019; Sebastian et al. 2017). Its impacts on native annual plants are not well understood to date. Imazapic is currently not a BLM-approved herbicide. An extensive effects analysis will need to be conducted as well as consultation with the USFWS before this herbicide can be used. Consultation with the USFWS on this herbicide is occurring.
    - This project will look at the large-scale effects of Imazapic on invasive annual grasses under several temporal treatment strategies and will incorporate a trial of Indaziflam to compare long-term invasive annual grass control, and response of native vegetation community components (annual and perennial forbs, grasses, and shrubs) to each of these herbicides. Indaziflam has not been studied in the Mojave to date, but has had several trials in the Great Basin, where it has been shown to decrease *Bromus* spp. over a period of 3 years (Sebastian et al. 2017), with a positive response from native perennial grass and forb species as a result of treatment (Clark et al. 2019).

2.7 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Federal agencies are required under NEPA to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternative not developed in detail (40 CFR 1502.14). A number of alternatives were considered during the development and scoping phases of the project. Some were eliminated from further analysis using the following criteria:

- The alternative was ineffective (it would not respond to the purpose and need).
- The alternative was technically or economically infeasible.
- The alternative was inconsistent with the basic policy objectives for the management of the area (such as, not in conformance with the land use plan).
- Implementation of the alternative was remote or speculative.
- The alternative was substantially similar in design to an alternative that is analyzed.
- The alternative was substantially similar in effects to an alternative that is analyzed.

Table 2.7-1 identifies the alternatives that were considered and provides the rationale for eliminating those alternatives from detailed study in this EIS.

2.8 COMPARISON OF ALTERNATIVES

This section provides a summary of the effects of implementing each alternative. Table 2.8-1 presents the comparison of solar facility components by alternative, and Table 2.8-2 provides a comparison of effects by alternative. Figure 2.8-1 presents representative vegetation heights as described under each alternative for construction and maintenance of proposed project facilities. Table 2.8-3 provides a summary of effects of the Proposed Action in comparison with the action alternatives.

Figure 2.8-1. Representative vegetation heights during construction and maintenance.

2.8.1 BLM Preferred Alternative

The BLM has identified the Proposed Action layout using the Mowing Alternative construction method as the agency’s Preferred Alternative. See Table 2.8-1 for acres of ground disturbance for the BLM Preferred Alternative, noted under Alternative Action 2 (Mowing Alternative) as applied to the Proposed

Action. The BLM Preferred Alternative differs from the Proposed Action, Modified Layout (Alternative Action 1) because the proponent would mow the vegetation to heights between 18 and 24 inches throughout the project site, instead of clear and cut and clear and cut with soil removal to remove cut stumps.

CHAPTER 3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1 INTRODUCTION

The figures are located in Appendix C. The following analysis is based on information and data collected during site-specific surveys and documented within YPSP baseline reports. Baseline reports are available for public review on the BLM National NEPA ePlanning project website and include the following:

Site-Specific Baseline Reports

- Preliminary Biological Site Assessment for the Proposed Pahrump Valley Solar Energy Facility, 2013
- YPSP Draft Biological Assessment, 2020
- YPSP Botanical Survey Report, 2019
- YPSP Mojave Desert Tortoise Survey Report, 2020
- YPSP Pre-construction Avian Field Surveys Report, 2018
- YPSP Class III Cultural Resources Inventory, 2019 (Confidential; not available for public review)
- YPSP Sensitive Plant Species Habitat Assessment, 2017
- YPSP Visual Resources Technical Report, 2020
- YPSP Inventory and Impacts Analysis for the Old Spanish National Historic Trail, 2019
- YPSP Aquatic Resources Delineation, 2018

3.2 EFFECTS ANALYSIS

Preliminary design/engineering of the proposed YPSP was developed by Yellow Pine Solar and GLW for use in this analysis. Section 2.2 in Chapter 2, the YPSP POD and TCS POD in Appendix F, and the Design Features and ACEMs in Appendix B, describe the components of the project that were factored into the disturbance estimates. While final project design may change the discrete location of surface and subsurface disturbance, the maximum disturbance acreage for each site construction method identified in Table 2.8-1 would not be exceeded during construction.

This chapter identifies and describes the current condition and trend of elements or resources in the human and natural environment, which may be affected by the Proposed Action, Alternative Action 1 (Modified Layout), Alternative Action 2 (Mowing Alternative), or the No Action Alternative.
The Affected Environment as described is the same for all alternatives. This chapter also describes the potential effects, which summarizes direct, indirect, and irreversible and irretrievable effects on resources that may result from the Proposed Action or alternative. The effects analysis takes into account the design features associated with the specific resources as identified in Section 2.6 and described in Appendix B of this EIS.

Impacts can either be short term (temporary) or long term (permanent). Short term generally refers to impacts during construction and up to 5 years (through restoration when vegetation has been reestablished in construction areas). Long term generally refers to impacts lasting more than 5 years or for the life of the project, which includes disturbance associated with operations and maintenance and any impacts that may persist after decommissioning. Additional information about impact duration is provided within each resource analysis where necessary.

3.2.1 Types of Disturbance

The following types of disturbance associated with construction and operation of the Proposed Action and action alternatives are considered in the analysis.

Grading and Leveling: Grading and leveling would be done only in the areas where the elevation would need to be changed to accommodate the tracker/racking system tolerances, site drainage, roads, laydown areas, and foundations. Areas where grading would be required include roadways, access ways, and areas where concrete foundations are used for inverter equipment, substations, drainage facilities, and other structures. Grading would consist of the excavation and compaction of earth to meet the design requirements.

Clearing and Cut with Soil Removal: Vegetation would be cut to a height of no more than 3 inches using a bush hog or similar tractor-mounted brush cutter. Areas that contain large shrubs such as creosote bush would be tilled to remove large stumps. With tilling, vegetation would be removed, and soils would be mixed but left in place. Soils would not be compacted after tilling.[4]

Clearing and Cut: Vegetation would be cut to a height of no more than 3 inches using a bush hog or similar tractor-mounted brush cutter.

Mowing: Vegetation would be mowed to a height of between 18 and 24 inches and maintained at a height of 18 to 24 inches using a bush hog or similar tractor-mounted brush cutter. This includes areas beneath solar arrays. Mowing would only be used if Alternative Action 2 (Mowing Alternative) is selected. Areas that are mowed would also be subjected to drive-and-crush techniques to some extent as described below.

Drive and Crush: This method does not use any vegetation clearing, but instead vegetation and soils are driven over and crushed by vehicle and equipment tires or tracking machinery. Areas where drive-and-crush is used are limited to areas used for storage of certain materials that cannot be damaged by vegetation, two-track access roads, and buffer areas where construction work is not directly taking place (i.e., around temporary fencing).

3.2.2 Cumulative Actions Analysis

The cumulative analysis addressed the potential for cumulative impacts in the vicinity of the project. Cumulative impacts are defined by the CEQ regulations as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Federal agencies have the responsibility of determining how and the extent to which cumulative impacts are assessed in NEPA documents and documenting that effort. A cumulative impact analysis is generally achieved through the implementation of the following steps:

- Establishment of the geographic scope of the analysis.
- Establishment of the time frame for the analysis.
- Identification of the significant cumulative effects associated with the project and alternatives in conjunction with the list of potentially cumulative projects.
- Completion of a cumulative effects analysis and discussion.

The geographic extent of impacts varies by resource area and the distance from which an impact may extend. A discussion on cumulative analysis based on the geographic and temporal nature of the project and potential impacts is provided under the section for each resource area analyzed within the project EIS.

[4] See the POD in Appendix F for a list of proposed equipment for tilling activities.

In addition, a summary of the geographic extent and of the cumulative impact analysis for potentially affected resources evaluated on behalf of the proposed project is provided in Table 3.2-1.

The time frame for cumulative impact analysis also varies by resource area and includes those activities that are ongoing and would occur up to 30 years in the future (the length of the proposed project lease). The time frame for cumulative projects is often speculative, as information for future projects becomes less available farther into the future as some projects may not yet be conceived.

3.2.2.1 *Past and Present Actions*

Past and present actions in the vicinity of the proposed YPSP include land development for rural and urban residential areas, roads, and transmission and renewable energy facilities. These include Tecopa Road, SR 160 and the parallel overhead power line, the existing gravel pit, the unincorporated community of Calvada Springs (California), the Front Sight Firearms Training Institute, and the town of Pahrump, as well as various roads and streets. The impacts of these past and present actions are reflected in the affected environment under each resource.

3.2.2.2 *Reasonably Foreseeable Future Actions*

The cumulative scenario (Table 3.2-2 and Figure C-8) includes all future actions related to renewable energy, transportation, infrastructure, electrical transmission, and any other known large-scale projects that meet the following criteria:

- Actions for which environmental documents are in preparation or finalized
- Actions in detailed design or planning phase
- Actions approved but not yet under construction
- Actions currently under construction
- Actions in the bidding or research phase that are reasonably foreseeable and could result in cumulative impacts.

3.3 AIR QUALITY AND GREENHOUSE GASES/CLIMATE CHANGE

3.3.1 Introduction

This section describes air quality conditions that occur within the project's analysis area. Air quality is characterized by ambient air quality standards, and county emission inventories. Calculated estimates of how much of each pollutant the project would create are compared with the county emission inventories in order to show the amount of pollution caused by the project, compared with the annual pollution contribution of each county.

3.3.2 Analysis Area

Impacts resulting from construction, operation, and decommissioning activities occurring within the study area have the potential to affect resources located outside of the project area. As a result, NEPA requires an evaluation of resources within the geographic area where the project impacts are anticipated to accrue and within the time frame in which the effects of the proposed project would occur.

For air quality, the analysis area contains portions of three counties: Clark and Nye Counties in Nevada, and Inyo County in California. Air pollutants tend to disperse into the atmosphere, becoming less concentrated as they travel away from a source of pollution, and therefore cannot be confined within defined boundaries, such as the boundary of the ROW or county lines. Because of the nature of air

pollutants, the air quality analysis area for direct, indirect, and cumulative impacts extends 5 miles in all directions beyond the project area.

Due to the nature of global climate change, greenhouse gases are generally analyzed from a global perspective. Cumulative impacts were considered for renewable energy associated with Nevada and California for offsetting emissions from carbon-based energy sources.

3.3.3 Affected Environment

Portions of Clark County and Inyo County have been designated as nonattainment and maintenance areas; however, the nonattainment and maintenance areas are located outside the analysis area for this project. The portion of Clark County that is designated as a nonattainment area for ozone (O_3) and a maintenance area for particulate matter 10 microns or smaller (PM_{10}) falls outside the air quality analysis area for this EIS. The nonattainment and maintenance area is approximately 13.5 miles to the east of the project area and surrounds the city of Las Vegas. The closest nonattainment area in California is located approximately 16.5 miles south of the project site and the nearest maintenance area in California is approximately 80 miles west of the project site. There are no nonattainment or maintenance areas within the analysis area for this project. Thus, the General Conformity Rule does not apply.

3.3.3.1 *Emission Inventories for Counties in the Analysis Area*

Emission inventories are useful in comparing emission source categories to determine which industries or practices are contributing to the general level of pollution in the three counties crossed by the project analysis area. Emission inventories provide an overview of the types of pollution sources in the area, as well as the amount of pollution being emitted on an annual basis by said sources. For the purposes of this assessment, the most recent National Emissions Inventory conducted in 2017 was summarized.

The National Emissions Inventory is a detailed annual estimate of criterial pollutants and hazardous air pollutants (HAPs) from air emission sources. Data are collected from State, local, and Tribal air agencies and supplemented with data from the U.S. Environmental Protection Agency (EPA) (2019a).
The National Emissions Inventory includes estimates of emissions from many sources including point sources, nonpoint sources, on-road sources, non-road sources, and event sources, in order to create as complete an inventory as possible. Point sources are sources of air pollutants located at a fixed point. Point sources include facilities such as power plants and airports, as well as commercial sources. Nonpoint sources are those that are too small to pinpoint as point sources. Nonpoint sources include emission sources such as asphalt paving, solvent use, and residential heating. On-road sources are emissions from on-road vehicles. Non-road sources are mobile sources of emissions that operate off road such as construction equipment, lawn and garden equipment, trains, and emissions from barges, ships, and other marine vessels. Event sources include emissions from sources such as prescribed fires and wildfires. This inventory is a good estimate of how much each county and state is contributing to air pollution for a given year. The emission inventory data for 2017 for each county are presented in Table 3.3-1.

Table 3.3-1 shows that out of the three counties crossed by the project analysis area, Clark County contributed the most to carbon monoxide (CO), oxides of nitrogen (NO_X), particulate matter 2.5 microns or smaller ($PM_{2.5}$), sulfur dioxide (SO_2), and carbon dioxide equivalent (CO_2e) pollution in 2017.
Nye County contributed the most to particulate matter 10 microns or smaller (PM_{10}), volatile organic compound (VOC), and HAP pollution. Mobile emissions were the biggest contributors to NO_X and CO_2e pollution and biogenic emissions were the biggest contributors to VOC and HAP pollution in all three counties. Biogenic emissions also contributed the most to CO pollution in Inyo and Nye Counties, whereas in Clark County mobile sources contributed the most. Dust was the biggest source of PM_{10} and $PM_{2.5}$ emissions in Clark and Inyo Counties, but industrial processes was the biggest source in Nye

County. In Clark and Inyo Counties, fuel combustion contributed the most to SO_2 pollution, but wildfires contributed the most in Nye County.

3.3.3.2 *Greenhouse Gases/Climate Change*

Climate change is a global issue that results from several factors, including, but not limited to, the release of greenhouse gases (GHGs), land use management practices, and the albedo effect, or reflectivity of various surfaces (including reflectivity of clouds). Specific to the project, GHGs are produced and emitted by various sources during the development and operational phases of transmission lines and substations. The primary sources of GHGs associated with transmission lines and substations are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) from fuel combustion in construction and maintenance vehicles and equipment, as well as operational emissions of sulfur hexafluoride (SF_6) associated with potential leakage from gas-insulated circuit breakers at the substation.

An analysis of regional climate impacts prepared by the Third National Climate Assessment (Garfin et al. 2014) suggests that recent warming in the Southwest was among the most rapid nationally. They conclude that this warming is causing decline in spring snowpack and reducing flow in the four major Southwest rivers. Their projections of future climate change indicate that further strong warming will reduce precipitation. Analysis of past records and future projections indicates an overall increase in regional temperatures, including the analysis area. As has been observed at many sites to date, the observed increase is largely the result of the warmer nights and effectively higher average daily minimum temperatures at many of the sites in the region. The most recently available data on GHG emissions in the United States indicate that annual GHG emissions in 2016 were an estimated 6,511 million metric tons of GHG (EPA 2018).

3.3.4 Environmental Consequences

This section describes the potential impacts to air quality associated with the construction, operation and maintenance of the solar panels, transmission line, and substations. Impacts to air quality are discussed in terms of project emissions of criteria air pollutants, HAPs, and GHGs. Impacts to climate change are also discussed in a qualitative manner. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.3.4.1 *Methodology*

Emissions calculations for the project were subdivided into construction-related emissions (those emissions that are expected to be temporary in nature) and operational-related emissions (those emissions that are expected to occur throughout the operational lifetime of the project). Construction-related emissions include the following:

- Exhaust from on- and off-road construction vehicles and equipment.
- Exhaust from on-road construction worker commuter vehicles.
- Exhaust from on-road construction material and equipment delivery vehicles.
- Fugitive dust from vehicle travel on paved and unpaved roads.
- Fugitive dust from earthmoving and general construction activities.

The following assumptions were used to complete the air quality impact analysis for the project:

- Emissions associated with heavy-duty on-road construction equipment were estimated using South Coast Air Quality Management District (SCAQMD) emission factors for Heavy-Heavy-

Duty-Vehicles (with vehicle weights ranging from 33,001 to 60,000 pounds) for 2019 (SCAQMD 2007a).

- Emissions from off-road construction equipment and vehicles were estimated using composite off-road emission factors for the 2019 vehicle fleet from the California Air Resource Board's Off- Road Model (SCAQMD 2007b). The type of equipment used for construction and the quantity of each type was based on similar projects. The appropriate emission factor, equipment type, quantity of equipment needed, and duration of use during construction of the project were used in determining emissions from construction equipment.
- Exhaust emissions from construction worker commuting, some on-road construction equipment, and equipment delivery were calculated using SCAQMD emission factors for On-Road Passenger Vehicles and Delivery Trucks for the 2019 vehicle fleet (SCAQMD 2007a).
- An estimated maximum number of 300 construction worker commuters are assumed to commute from Las Vegas, Nevada—an average distance of 120 miles round trip per day. An additional maximum number of 100 construction worker commuters are assumed to commute from Pahrump, Nevada—an average distance of 30 miles round trip per day.
- Heavy-hauling trucks would be used to deliver materials and equipment from Pahrump, Nevada (approximately 15 miles away), or Las Vegas, Nevada (approximately 60 miles away).
- Concrete trucks would be used for 12 months commuting from Las Vegas, Nevada, approximately 60 miles away.
- Fugitive dust emissions from vehicle travel on paved and unpaved roads were estimated using emission factor calculations from EPA's compilation of air pollutant emission factors (Sections 13.2.1 and 13.2.2 in EPA 2006 and 2011, respectively).
- Fugitive dust emissions from earthmoving were estimated using the Western Regional Air Partnership's (2006) Fugitive Dust Handbook.
- Construction and operational emissions estimated using published and agency-accepted emission factors, such as AP-42 emission factors when appropriate, to estimate GHG emissions.

Impact intensity is assessed by comparing emissions associated with the project with the emission inventories of the impacted counties.

3.3.4.2 *Issue Indicators*

Impact indicators used to analyze impacts to air quality include the following:

- Emission estimates for regulated air pollutants and GHGs.
- Comparison of project emission estimates to county emission inventories.
- Exceedance of Federal Land Manager's Air Quality-Related Values Workgroup screening-level criteria.
- Distance to Class I areas.
- Acres of surface disturbance, including access roads.
- Metric tons of GHG emissions from construction.

3.3.5 Proposed Action

3.3.5.1 *Construction Impacts*

Construction activities would result in air pollutant emissions from equipment exhaust during construction; vehicle exhaust caused by travel to and from the project site; and fugitive dust from soil

disturbance. Fugitive dust emissions would be mitigated to the extent practicable thorough implementation of dust control measures outlined within the Fugitive Dust Control Plan (see Appendix B for detail). Table 3.3-2 presents the estimated total criteria, HAPs, and GHG emissions that would occur from project construction.

Table 3.3-2 presents the estimated total project construction emissions that would be emitted during a 2-year construction period. The top of the table presents construction activity emission sources by pollutant. The next segment of the table presents the annual emissions at the county level and emissions from the construction of the project as a percentage of the county's total emissions. Overall, the total pollutants emitted from project construction in each county would be much smaller than the county's total projected annual emissions. The county that could see the largest impact for all pollutants evaluated, except sulfur oxides (SO_X), from the Proposed Action is Inyo County, with the Proposed Action's construction emissions equaling up to 0.72% of the county's total emission inventory for CO, 5.14% for NO_X, 8.25% for PM_{10}, 4.30% for $PM_{2.5}$, 0.37% for VOCs, and 0.22% for HAPs. This comparison would be even smaller when the project's construction emissions contributions are divided between the 2 years of construction or if construction takes longer than 2 years, with the impacts being at least halved. The construction emissions would be temporary and transient in nature. Construction of the project would have short-term air quality impacts, occurring only during the duration of the construction phase of the project. Construction activities would result in a maximum of 60.39 tons of CO, 42.53 tons of NO_X, 0.16 ton of SO_X, 485.06 tons of PM_{10}, 51.34 tons of $PM_{2.5}$, 9.07 tons of VOCs, and 0.90 ton of HAPs being emitted.

GHG emissions from construction would result in a maximum of 14,062 metric tons of CO_2e being emitted during the construction phase of the project. The greatest air quality impact in terms of GHG emissions resulting from construction activities associated with the Proposed Action would be seen in Nye County, where the project emissions could equal up to 5.25% of the county's total emission inventory for CO_2e.

3.3.5.2 *Operation and Maintenance Impacts*

Operations-related emissions are summarized in Table 3.3-3 and include the following:

- Emissions from inspection activities such as exhaust from on-road inspection vehicles and fugitive dust from travel on paved and unpaved roads.
- Emissions from maintenance activities, including exhaust from worker vehicles and any needed equipment, as well as fugitive dust from travel on paved and unpaved roads.
- Emissions from solar panel washing such as exhaust from the water truck and fugitive dust from travel on paved and unpaved roads.
- Emissions of SF_6 from operation of any new gas-insulated circuit breakers.

Table 3.3-3 shows the annual operational-related emissions. The table is organized with emissions for each of the operational activities at the top, followed by the total operational emissions, and then the operational emissions are compared with the county emission inventories by calculating the operational emissions as a percentage of each county's annual emissions as estimated in the 2017 National Emissions Inventory. Operation and maintenance emissions would include vehicle exhaust caused by travel to substations and the transmission line for routine inspection, vehicle exhaust from the water trucks used to wash the solar panels, and potential SF_6 emissions from the operation of gas-insulated circuit breakers at the new YPSP Substation and the TCS.

Emissions from vehicle travel during operations and maintenance would be minimal, and mileage for vehicle travel to the substations and along the transmission line for routine inspection would be much less

than during construction. Emissions from vehicle exhaust during operation and maintenance would be lower than the emissions generated by construction. The greatest impact due to operation and maintenance activities could be seen in Inyo County, where operation and maintenance emissions could equal up to 0.01% of the county's total emission inventory for CO, less than 0.01% for NO_X, 0.05% for SO_X, less than 0.01% for PM_{10}, less than 0.01% for $PM_{2.5}$, less than 0.01% for VOCs, and less than 0.01% for HAPs. Operation and maintenance activities could result in 0.22 ton of CO, 0.40 ton of NO_X, 0.01 ton of SO_X, 0.39 ton of PM_{10}, 0.07 ton of $PM_{2.5}$, and 0.06 ton of VOCs being emitted.

GHG emissions from the operation and maintenance of the project under the Proposed Action (including potential SF_6 leaks from circuit breakers) would result in 461 metric tons of CO_2e being emitted each year, for the duration of the project. The greatest air quality impact in terms of GHG emissions resulting from operation and maintenance activities associated with the Proposed Action would be seen in Nye County, where the project emissions could equal up to 0.17% of the county's total emission inventory for CO_2e, annually.

3.3.5.3 *Decommissioning Impacts*

During decommissioning the project would create the same or less emissions as during construction; therefore, impacts to air quality from decommissioning would be less than or equal to the impacts to air quality due to construction.

3.3.5.4 *Cumulative Impacts*

Past and present actions, including existing land development, have contributed to the existing air quality and greenhouse gas conditions in the analysis area. In general, cumulative impacts to air quality and GHG conditions from project components under the Proposed Action, when considered with existing impacts to these resources and reasonably foreseeable future actions, could happen where construction associated with land development occurs within the analysis area. Construction-related ground disturbance projected for other projects in the analysis area within the next 5 years would result largely from the Nevada Department of Transportation (NDOT) SR 160 Blue Diamond Rehabilitation as well as the additional solar development projects immediately around the project area if they occur within that time frame. Collectively, these future solar projects would add approximately 17,169 acres of additional solar generation capacity. The contribution to cumulative impacts from the Proposed Action would constitute an incremental increase of air pollutants and GHGs within the analysis area. However, cumulative GHG emission increases may be offset in whole or in part by reductions in GHG emissions from current or future non-renewable electric generation displaced by the proposed project.

In 2010, the U.S. Forest Service, National Park Service (NPS), and USFWS collaborated on the publication of the *Federal Land Managers' Air Quality Related Values Work Group (FLAG) Report* (U.S. Forest Service et al. 2010), which offers guidance on the protection of visual resources and addresses assessments for sources proposed near Class I airsheds.

Specifically, if Q (tpy)/d (km) < 10, no further analysis is required, where Q is the combined emissions increase from a source of SO_2, NO_x, PM_{10}, and sulfuric acid (H_2SO_4) mist in tons per year (tpy) based on 24-hour maximum allowable emissions (which are annualized) and d is the nearest distance to a Class I area in kilometers (km) from the source. Based on the proximity of the closest Class I area (Grand Canyon National Park, approximately 162 km east of the project site) the Q/d screening approach demonstrates no further analysis is required.

3.3.6 Alternative Action 1 – Modified Layout

3.3.6.1 *Construction Impacts*

If Alternative Action 1 (Modified Layout) were constructed instead of the Proposed Action, an additional 1-mile-long access road and gen-tie line would be constructed. It was assumed a maximum of 100 workers would commute from Pahrump, Nevada. Construction of the access road and gen-tie line would take approximately 6 weeks. The construction emissions for Alternative Action 1 are given in Table 3.3-4.

There would be slightly more emissions from construction if Alternative Action 1 (Modified Layout) were constructed instead of the Proposed Action. However, the overall projected emission estimate for each pollutant from the construction of the project is small, compared with the proportion each pollutant contributes to each county's annual emissions. The county that could see the largest impact for all pollutants evaluated, except SO_X, from Alternative Action 1 is Inyo County, where the project's construction emissions could equal up to 0.73% of the county's total emission inventory for CO, 5.35% for NO_X, 8.28% for PM_{10}, 4.32% for $PM_{2.5}$, 0.38% for VOCs, and 0.23% for HAPs. The county that could see the largest impact in terms of SO_X emissions is Nye County, with project emissions could equal up to 0.73% of the county's total emission inventory. This comparison would be even smaller when the project's construction emissions contributions are divided between the 2 years of construction, with the impacts being at least halved. The construction emissions would be temporary and transient in nature. Construction of the project would have short-term air quality impacts, occurring only during the duration of the construction phase of the project. Construction activities would result in a maximum of 61.44 tons of CO, 44.24 tons of NO_X, 0.16 ton of SO_X, 486.80 tons of PM_{10}, 51.60 tons of $PM_{2.5}$, 9.30 tons of VOCs, and 0.92 ton of HAPs being emitted.

GHG emissions from construction would result in a maximum of 14,412 metric tons of CO_2e being emitted, occurring only during the construction phase of the project. The greatest impact in terms of GHG emissions resulting from construction activities associated with Alternative Action 1 would be seen in Nye County, where the project emissions could equal up to 5.38% of the county's total emission inventory for CO_2e.

3.3.6.2 *Operation and Maintenance Impacts*

There would be no changes to project operation and maintenance if Alternative Action 1 (Modified Layout) were constructed instead of the Proposed Action. Impacts to air quality and GHGs due to operation of Alternative Action 1 would be the same as for the Proposed Action.

3.3.6.3 *Decommissioning Impacts*

There would be no changes to project decommissioning if Alternative Action 1 (Modified Layout) were constructed instead of the Proposed Action. Impacts to air quality and GHGs due to the decommissioning of Alternative Action 1 would be the same as Proposed Action.

3.3.6.4 *Cumulative Impacts*

Cumulative impacts to air quality and GHGs under Alternative Action 1 (Modified Layout) would be the same as those described above under the Proposed Action.

3.3.7 Alternative Action 2 – Mowing Alternative

Under Alternative Action 2 (Mowing Alternative), both the Proposed Action and Alternative Action 1 (Modified Layout) would maintain the same footprint and design (see Sections 2.3 and 2.4), while maintaining 18 to 24 inches of vegetation in areas outside necessary vegetation removal (areas that would be graded to level for pads, O&M building, roads, etc.), as opposed to the clearing and tilling of the site as described in the Proposed Action and Alternative Action 1. This would reduce fugitive dust and GHG emissions during all project phases (Beatty et al. 2017; Hernandez et al. 2014; Hernandez, Hoffacker, and Field 2015; Hernandez, Hoffacker, Murphy-Mariscal, et al. 2015; Sinha et al. 2018). However, the vegetation mowing may extend the projected construction schedule by 2.5 to 5 months.

3.3.7.1 *Construction Impacts*

Under Alternative Action 2 (Mowing Alternative), mowing would occur as a part of site clearing, grading, and excavation. No changes to areas mowed during construction activities are being considered for Alternative Action 2, though the height to which the vegetation would be cut would differ from the Proposed Action and Alternative Action 1 (Modified Layout). This may result in less frequent mowing, as allowing the vegetation to maintain a greater length may cause it to grow less rapidly. The construction emissions for Alternative Action 2 are given in Table 3.3-5 and assume an extended projected construction schedule by 5 months. Though not quantified as a part of this analysis, this would result in fewer products of combustion being emitted (primarily CO and NO_X), as well as less particulate matter being emitted. This would reduce the impacts from PM_{10} and $PM_{2.5}$ for fugitive dust, as shown in Table 3.3-5.

3.3.7.2 *Operation and Maintenance Impacts*

It is possible that by maintaining the vegetation at a greater height, emission reductions could be achieved due to less soil disturbance and the decreased frequency of mowing that could potentially lessen the impacts of the project. Fewer acres of soil disturbance would occur under this alternative, which would reduce the likelihood of fugitive dust emissions, and reduce water consumption dedicated to dust suppression (Beatty et al. 2017; Hernandez et al. 2014; Hernandez, Hoffacker, and Field 2015; Hernandez, Hoffacker, Murphy-Mariscal, et al. 2015; Sinha et al. 2018). Reductions associated with this alternative during the operation and maintenance phase would be more sizable than during construction due to the ongoing need for mowing during this phase of the project, which is expected to exceed the construction phase in duration. However, vegetation under panels has been shown to decrease temperatures and therefore increase panel performance by up to 1% annually, which would positively impact the efficiency of energy production at the site, which would offset additional GHG emissions by creating more energy over the life of the project (Barron-Gafford et al. 2019).

3.3.7.3 *Decommissioning Impacts*

There would be fewer air quality impacts during project decommissioning with Alternative Action 2 (Mowing Alternative). More vegetation would exist within the site, and soils, biological soil crusts, and desert pavement would all be more intact than as described in the Proposed Action and Alternative Action 1 (Modified Layout). Therefore, there would be fewer dust particles in the air with this alternative.

3.3.7.4 *Cumulative Impacts*

Cumulative impacts to air quality and GHGs under Alternative Action 2 (Mowing Alternative) would be the same as those described under the Proposed Action.

3.3.8 No Action Alternative

Under the No Action Alternative, the solar facility, transmission line, and substations would not be developed. No surface disturbance would occur, and air resources would not be affected. Climate change would continue as defined by current trends.

3.3.9 Irreversible or Irretrievable Impacts

GHG emissions from the construction, operation, and maintenance of the project (including potential SF_6 leaks from circuit breakers) would result in an increase in GHGs (relative to local, national, and/or global GHG emissions) that would occur for the duration of the project. The greatest construction-related air quality impact in terms of GHGs could be seen under Alternative Action 2 (Mowing Alternative) in Nye County, where the project emissions could equal up to 6.89% of the county's total emission inventory for CO_2e, with 18,458 metric tons of CO_2e being emitted. These emissions would only occur during the construction phase of the project. The greatest air quality impact due to operation and maintenance activities in terms of GHGs under the Proposed Action or action alternatives would be seen in Nye County, where the project emissions could be equal to approximately 0.17% of the county's total emission inventory for CO_2e, with 461 metric tons of CO_2e being emitted annually. These emissions would occur for the duration of the project. Depending on the increase in availability of renewable energy made possible due to the YPSP, an increase or decrease in the amount of GHGs from the generation of fossil fuels could occur.

Emissions of air pollutants associated with construction activities would result in short-term increases in the amount of pollutants in the local, ambient air. Sources of air pollution associated with long-term operations would increase as a result of substation and solar facility maintenance, but at a much lower level than during the construction phase (less than 1% of the impacted counties' total emission inventory for all evaluated pollutants).

Localized increases in the amount of air pollutants would persist during the operation of the project but would dissipate relatively quickly following the closure of the project. Therefore, there would be no irreversible impacts on air quality in the area. However, the impacts to air quality during the operations would constitute an irretrievable impact.

3.4 BIOLOGICAL RESOURCES – GENERAL WILDLIFE

3.4.1 Introduction

General wildlife includes all wildlife species that are not federally or state-designated as threatened, endangered, or candidate species. Impacts on migratory birds are discussed in Section 3.5 (Biological Resources – Special Status Species).

3.4.2 Analysis Area

The analysis area for general wildlife consists of an approximately 4-mile buffer of the study area,[5] consisting of approximately 68,103 acres of wildlife habitat. This area is intended to capture existing conditions and potential impacts to individuals, habitats, and movement corridors for species with larger home ranges. For other wildlife species with smaller home ranges (such as reptiles and small mammals) many impacts would be limited to the project area and vicinity. Observations are based on biological surveys conducted between 2015 and 2019 (SWCA Environmental Consultants [SWCA] 2018a, 2020b).

[5] The 4-mile analysis area is consistent with the NDOW sensitive data query radius (NDOW 2019).

Biological surveys were conducted across a broader area (often including areas along both sides of Tecopa Road), resulting in a total 9,290-acre survey area (see Figure C-9).

3.4.3 Affected Environment

The analysis area supports a variety of desert-adapted wildlife species that use the vegetation communities described in Section 3.14, Vegetation and Noxious Weeds. There are no permanent natural or developed sources of water within the analysis area, although several ephemeral washes traverse the analysis area; therefore, wildlife species with the potential to use the habitats within the analysis area and those recorded during site visits were representative of desert scrub communities. Ephemeral washes are used as movement corridors by many wildlife species.

The reptilian fauna with potential to occur in the analysis area include more than 30 snake and lizard species (some of which are discussed in Section 3.5, Biological Resources – Special Status Species), one amphibian species (red-potted toad), and one tortoise species (discussed in Section 3.5, Biological Resources – Special Status Species) (Nevada Department of Wildlife [NDOW] 2019). Besides the Mojave desert tortoise, nine reptile species have been recorded in the vicinity of the project area, including long-nosed leopard lizard (*Gambelia wislizenii*), side-blotched lizard (*Uta stansburiana stejnegeri*), desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus draconoides*), Great Basin western whiptail (*Aspidoscelis tigris* ssp. *tigris*), coachwhip (*Masticophis flagellum* ssp. *flagellum*), Mohave western patch-nosed snake (*Salvadora hexalepis mojavensis*), northern Mohave rattlesnake (*Crotalus scutulatus scutulatus*), and sidewinder (*Crotalus cerastes*) (SWCA 2013).

The mammalian fauna is dominated by small, mostly nocturnal species of rodents (such as kangaroo rats [*Dipodomys* sp.] and deer mice [*Peromyscus* sp.]) and bats. Bats may use rocky outcrops, cliffs with crevices, caves, and/or abandoned mines as roosting habitat; however, there are no known abandoned mine lands within 1 mile of the potential disturbance area (special status bat species are discussed in Section 3.5, Biological Resources – Special Status Species), though crevice habitat may be present. It is unlikely that project-related activities would disturb roosting habitat for bat species that may be located more than 1 mile from the potential disturbance area.

Diurnal mammals are also common and include hares, rabbits, and ground squirrels. Larger mammalian species that are also likely present include mountain lion (*Puma concolor*) (recorded within the analysis area [NDOW 2019]), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), and American badger (*Taxidea taxus*). Mammal species observed during site visits include white-tailed antelope squirrel (*Ammospermophilus leucurus*), Merriam kangaroo rat (*Dipodomys merriami*), and black-tailed jackrabbit (*Lepus californicus*) (SWCA 2013).

Elk (*Cervus canadensis*) is the only big-game species with identified habitat present within the analysis area (NDOW 2019); however, the species has not been recorded within the analysis area and suitable habitat is limited to approximately 3,347 acres and located approximately 2.5 miles northeast of the project area. It is unlikely that project-related activities would disturb this species. Other big-game habitat present within the analysis area includes that of desert bighorn sheep (*Ovis canadensis nelsoni*), mule deer (*Odocoileus hemionus*), and mountain lion. Desert bighorn sheep may use the analysis area to move between populations located in surrounding mountain ranges.

3.4.4 Environmental Consequences

This section describes the potential impacts to general wildlife associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.4.4.1 *Methodology*

Impacts to general wildlife are discussed in terms of potential changes to habitat, habitat use, and/or behavior.

3.4.4.2 *Issue Indicators*

Impact indicators used to analyze impacts to general wildlife include

- Area of existing habitat that would be disturbed;
- Area of existing habitat that would be precluded from use; and
- Miles of access road within existing habitat.

3.4.5 Proposed Action

3.4.5.1 *Construction Impacts*

Construction of the proposed project would include grading, clear and cut (3 inches), clear and cut (3 inches) with soil removal (tilling), and drive and crush activities associated with solar arrays, improvements to and construction of access roads, collection lines, TCS, and other associated facilities (see Table 2.8-1). Direct impacts to wildlife would include destruction and modification of wildlife habitat, habitat fragmentation and barriers to gene flow, direct mortality, increased noise, dust and dust-suppression effects, light pollution effects, microclimate alteration, and increased fire risk (Abella 2010; De Marco et al. 2014; Hernandez et al. 2014; Lovich and Bainbridge 1999; Lovich and Ennen 2011). Grading, roads, and fences not only fragment habitat but also can cause habitat degradation and increase some species' vulnerability to predators (Moore-O'Leary et al. 2017). These activities have the potential to result in injury or direct mortality via crushing or burying smaller or less-mobile individuals (such as small mammals or reptiles) that are unable to escape into adjacent habitat. Construction vehicles and/or equipment could injure or kill wildlife species along regional roadways and site access roads via vehicle strikes. Human noise and activity associated with construction may also disturb wildlife species in the vicinity of the area of the disturbance; however, as construction activities would be temporary and intermittent, it is not anticipated to result in long-term disturbance or avoidance. For more mobile species (such as coyotes or rabbits), because large expanses of habitat available adjacent to the area of disturbance are of similar quality and composition as that which would be disturbed, affected individuals may be able to shift use to these adjacent areas.

Construction of the Proposed Action would result in disturbance of approximately 2,994.7 acres of habitat (approximately 4% of the analysis area) (see Table 3.14-3 for a general overview of cover types subject to disturbance). Disturbance of wash habitat would be minimized by avoiding construction in washes within the project area, which would retain movement corridors for wildlife species through the project area. Up to 42% of the site would be clear and cut (3 inches) and up to 36% of the site would be clear and cut (3 inches) with soil removal, which would result in a total loss of wildlife habitat in the short term. Other impacts include increased risk of introduction and spread of invasive weed species into adjacent habitat, which would degrade the habitat quality by reducing the availability of native forage and cover plant species and increase the risk of fire due to the increase in fire prone invasive vegetation and weeds.

The temporary tortoise fencing would fragment existing habitat for some ground-dwelling species (such as big-game species). As the four solar array sub-areas would be sited around large wash channels, access to these habitats by most ground-dwelling species would be temporarily precluded (see Figures C-5, C-6, and C-9). Temporary tortoise fencing would preclude access to existing habitat that would remain largely undisturbed, resulting in the short-term loss of access to suitable wildlife habitat (approximately

1,008 acres). However, avoidance of wash habitat would retain some areas of existing vegetation and habitat for bats and pollinator species for which access would not be precluded by fencing. Following construction, the temporary tortoise fencing would be removed and access for wildlife species restored.

Construction activities are anticipated to result in an increase in project-related traffic along regional transportation routes. The increase in traffic would result in an increase in the risk of direct mortality or injury of wildlife individuals from vehicle strikes; however, due to the temporary fencing of the disturbance area and the implementation of site-specific speed limits on new-build access roads, this increased risk is anticipated to be low. The increase in potential for direct mortality along Tecopa Road and SR 160 would be temporary and limited to the construction period.

Night-lighting installed for safety purposes may create light pollution in bat foraging areas, which may disorient foraging bats (Longcore and Rich 2004). However, because construction activities would primarily occur during daylight hours, minimal security lighting would be required, large areas of similar foraging habitat are available adjacent to the project area, and construction-related lighting would be temporary, it is unlikely that lighting would have a measurable impact on bat populations within the analysis area. All lighting on-site would be directed downward with shields in order to reduce light pollution and impacts to wildlife, such as bats and migrating birds.

3.4.5.2 *Operation and Maintenance Impacts*

Construction of the Proposed Action would result in long-term disturbance of approximately 2,908.4 acres of habitat (see Table 3.14-3 for a general overview of cover types subject to disturbance), which would remain disturbed throughout project operations. Impacts would include habitat loss, habitat fragmentation, barriers to gene flow, modification of adjacent wildlife habitat, direct mortality, increased noise, dust and dust-suppression effects, light pollution effects, and increased fire risk as a result of introduction and spread of invasive weed species (Abella 2010; Chambers et al. 2013; De Marco et al. 2014; Hernandez et al. 2014; Lovich and Bainbridge 1999; Lovich and Ennen 2011; Moore-O'Leary et al. 2017). Larger-bodied ground-dwelling wildlife species (such as big game) would be unlikely to be able to access the project area during operation as the permanent tortoise fencing and security fencing would preclude use. Wildlife access holes in the perimeter fence would allow use of habitats within the fenced project area by small to medium-sized animals such as greater roadrunners, rabbits, and foxes. Species that may use the project area for foraging and breeding would also experience long-term impacts as a result of disturbance and loss of habitat. There is similar habitat adjacent to the project area, and it is anticipated that affected individuals may be able to shift use to these adjacent areas. The Proposed Action would retain areas of ephemeral washes containing xeroriparian vegetation between sub-areas, which may function as movement corridors across the landscape for larger-bodied wildlife species (such as big game) and those more sensitive to disturbance. Wildlife habitat between the sub-areas would be subject to higher rates of disturbance and potential for invasive weed introduction and spread than larger habitat areas. Vegetation within the perimeter fence would be allowed to grow up to 12 inches in height, but is unlikely to be of similar composition as existing vegetation. However, it may provide habitat for some small-mammal, bird, reptile (except desert tortoise), and pollinator species. Propagule islands may provide areas of foraging or resting areas for wildlife species within the fenced project area, but as these areas may be limited to approximately 12 acres of the project area, they would be unlikely to provide breeding habitat for most species. Species that may benefit include scavenger species that adapt easily to human-altered landscapes and small mammals or lizards that may be less vulnerable to predation within facility fences (Moore-O'Leary et al. 2017).

The Proposed Action includes roadway improvements to approximately 0.6 mile of Tecopa Road and construction of approximately 0.6 mile of sub-area access roads. Routine operations and maintenance activities are anticipated to result in slight increases in traffic along regional transportation routes

(SR 160 and Tecopa Road). The increase in traffic would result in a slight increase in the risk of direct mortality or injury of wildlife individuals from vehicle strikes; however, due to the relatively low level of operations and maintenance-related traffic, fencing of the completed solar facilities, and the implementation of site-specific speed limits, this increased risk is anticipated to be negligible.

The presence of the facility and associated operations and maintenance activities would increase the likelihood of introduction and spread of invasive weeds, which would degrade habitat within and adjacent to the project area. Many invasive weed species can increase fire risk in wildlife habitat. A noxious weed and invasive plant management plan would be implemented, which would reduce the risk of fire and/or habitat degradation of surrounding habitat.

As with temporary construction lighting, permanent lighting associated with operational safety could result in light pollution in bat foraging areas. As minimal security lighting would be required, operational lighting would be activated by motion sensor, illuminated only intermittently, and would be positioned downward, and large areas of similar foraging habitat are available adjacent to the project area, it is unlikely that lighting would have a measurable impact on bat populations within the analysis area.

3.4.5.3 *Decommissioning Impacts*

Following the end of project operations, decommissioning and reclamation would occur. The use of heavy equipment and other activities associated with decommissioning of the project would result in impacts similar to those described above for construction.

Following decommissioning activities and removal of the perimeter fence, wildlife species could access the project area. Desert ecosystems can take from 70 to over 200 years to recover from disturbance (Abella 2010), and long-term habitat quality would be degraded, which would continue to have indirect impacts on adjacent habitat. However, as vegetation would be removed from portions of the project area and adjacent habitats would be at a greater risk for establishment of invasive plant species during operations, wildlife habitats may not return to pre-disturbance conditions. Areas where vegetation would have been cleared (up to 42% of the project area), may be able to recover more quickly than areas subject to soil disturbance within the project area (up to 57% of the project area).

3.4.5.4 *Cumulative Impacts*

The analysis area for cumulative wildlife impacts includes projects within 5 miles of the Proposed Action. Reasonably foreseeable future projects that have been identified with potential to affect wildlife include 1) the proposed development of three additional solar facilities adjacent to the YPSP totaling 17,169.4 acres (Copper Rays Solar Project [approximately 6,047.2 acres proposed], the Rough Hat Clark County Solar Project [approximately 2,396.0 acres proposed], and the Sagittarius Solar Project [approximately 8,726.2 acres proposed]), 2) pavement preservation and rehabilitation along SR 160, and 3) land use proposals that include the designation of the lands along the southeastern boundary of the project area as an Area of Critical Environmental Concern (ACEC).

The Clark County Public Lands proposal would designate BLM-administered lands along southeastern boundary of the project area as the Stump Springs ACEC, which would have an overall beneficial effect on wildlife habitats in the analysis area. Development of projects (the proposed solar facilities and construction of a college) within the analysis area would result in the long-term disturbance of up to 17,169.4 acres of wildlife habitat. The pavement preservation project could disturb wildlife in the vicinity of the project area, but the impacts are not anticipated to be long-term nor would it result in long-term disturbance of wildlife habitat. When considered with these reasonably foreseeable future projects, the Proposed Action would have cumulative adverse effects on wildlife populations and habitat in the analysis area. Effects include risk of mortality of wildlife from construction and increased pressure on

adjacent habitats, as well as long-term loss (from development) and degradation (from increased risk of introduction and spread of invasive plant species and fire) of wildlife habitat in the analysis area.

The Clark County Public Lands proposal would designate BLM-administered lands along the southeastern boundary of the project area as the Stump Springs ACEC, which would manage the area for wildlife habitat values and would have a beneficial impact on wildlife habitat.

3.4.6 Alternative Action 1 – Modified Layout

Alternative Action 1 (Modified Layout) would consolidate the four solar array sub-areas into a single solar array. The majority of impacts related to the construction and operations and maintenance under Alternative Action 1 would be similar to those described for the Proposed Action. While the total project development area would remain similar to the Proposed Action (approximately 3,085 acres of long-term disturbance and 20.1 acres of temporary disturbance), the area of long-term disturbance would increase by approximately 176.6 acres. Where impacts differ between the alternatives, they are described in the appropriate section below.

3.4.6.1 *Construction Impacts*

Construction of Alternative Action 1 (Modified Layout) would result in short-term disturbance of approximately 3,105.1 acres of habitat (approximately 5% of the analysis area) (see Table 3.14-3 for general cover types subject to disturbance). Under Alternative Action 1, approximately 176.6 more acres of existing habitat would be disturbed long-term, compared with the Proposed Action. In addition, disturbance of ephemeral wash habitat would not be minimized under this alternative, resulting in the disturbance of approximately 1,008 acres of xeroriparian habitat.

3.4.6.2 *Operation and Maintenance Impacts*

Under Alternative Action 1 (Modified Layout), approximately 1 mile of new access road from Tecopa Road to the project area would be required, in addition to the improvements on 0.6 mile of Tecopa Road. The use of the new access road from Tecopa Road to the project area would commensurately increase the risk for direct mortality via vehicle strike for wildlife species, compared with the Proposed Action.

Additionally, as the solar array would be condensed into one continuous area and would not preserve wash corridors, Alternative Action 1 (Modified Layout) may create a larger movement barrier for some wildlife species (such as big-game species), compared with the Proposed Action. While the total project development area would remain similar to the Proposed Action (approximately 3,085 acres), the area of long-term disturbance would increase by approximately 176.6 acres.

3.4.6.3 *Decommissioning Impacts*

Decommissioning impacts under Alternative Action 1 (Modified Layout) would be similar to those described for the Proposed Action.

3.4.6.4 *Cumulative Impacts*

Cumulative impacts under Alternative Action 1 (Modified Layout) would be similar to those described for the Proposed Action.

3.4.7 Alternative Action 2 – Mowing Alternative

Under Alternative Action 2 (Mowing Alternative), the project footprint and design would remain the same as that described for either the Proposed Action or Alternative Action 1, while mowing vegetation to 18 to 24 inches in height in areas outside necessary vegetation removal (areas that would be graded to level for pads, O&M building, roads, etc.), and then maintaining vegetation at heights between 18 and 24 inches. Vegetation mowing would be carried out on a minimum of 79% of the site under this alternative. Construction, operation and maintenance, and decommissioning impacts under Alternative Action 2 (Mowing Alternative) and the Proposed Action and/or Alternative Action 1 (Modified Layout) would be similar. Where differences in impacts differ, they are described in this section.

3.4.7.1 *Construction Impacts*

Construction methods under Alternative Action 2 (Mowing Alternative) would result in less overall soil disturbance, and mowing would leave more vegetation in place within the project area. The reduced ground disturbance would allow existing vegetation under 18 to 24 inches to remain largely in place. This would result in the potential for reduced direct mortality of wildlife individuals that would remain in the mowed areas. Mowing would retain cacti and yucca in areas, which provide forage and shelter components for many wildlife species, particularly birds. Retaining vegetation within a greater portion of the project area would also reduce the risk of introduction and spread of invasive plant species into adjacent habitat, though areas that would be subject to surface disturbance would continue to have risk.

3.4.7.2 *Operation and Maintenance Impacts*

Vegetation within the project area would be allowed to grow to heights of up to 24 inches. Wildlife habitat under Alternative Action 2 (Mowing Alternative) would retain more diversity and may experience higher plant survival, diversity, and cover over time, and reduce the potential for introduction and spread of invasive plant species compared with the Proposed Action and Alternative Action 1 (Modified Layout). This would result in increased habitat availability for smaller ground-dwelling wildlife species (such as lizards) for which the perimeter fence would not preclude access, compared with the Proposed Action and Alternative Action 1. Additionally, increased vegetation height would provide additional and/or higher-quality habitat for wildlife species such as birds, bats, and pollinators, compared with the Proposed Action and Alternative Action 1 (Modified Layout). Opportunities for introduction and spread of invasive plant species would be reduced, compared with the other alternatives because soils and vegetation communities would remain largely intact, which would reduce the risk of habitat degradation within the project area and adjacent habitats.

3.4.7.3 *Decommissioning Impacts*

Under Alternative Action 2 (Mowing Alternative), mowed vegetation is anticipated to recover slowly during operations and more quickly after decommissioning because larger areas of existing vegetation would be retained, when compared to the Proposed Action and Alternative Action 1 (Modified Layout). As there would be less total project area that would require reclamation at decommissioning, there would be fewer direct impacts during this phase. Wildlife habitats are anticipated to recover more quickly overall, and wildlife habitat would be of higher quality and available sooner than under the Proposed Action and Alternative Action 1 (Modified Layout).

3.4.7.4 *Cumulative Impacts*

When considered with these reasonably foreseeable future projects, Alternative Action 2 (Mowing Alternative) would have cumulative adverse effects on wildlife and wildlife habitat in the analysis area;

however, these impacts would be less than those anticipated for the Proposed Action and/or Alternative Action 1 (Modified Layout), as wildlife habitat recovery after decommissioning would occur more quickly.

3.4.8 No Action Alternative

Under the No Action Alternative, the BLM would not issue ROW grants or special use permits and the project would not be constructed. No habitat disturbance or increase in traffic would occur, and wildlife would not be affected.

3.4.9 Irreversible and Irretrievable Impacts

Across all alternatives, the implementation of project design features would minimize many of the construction and operation and maintenance impacts to wildlife; however, some impacts would remain. The fully fenced project area would result in long-term loss of available habitat for wildlife species for the life of the project; however, with implementation of wildlife access holes into the perimeter fence, small to medium-sized animals such as greater roadrunners, rabbits, and foxes would be able to access habitats within the project area. New access roads would continue to increase the risk for direct mortality via vehicle strike for wildlife. The loss of habitat productivity would occur for the life of the project (approximately 30 years). Following that, restoration/revegetation efforts would work toward returning the project area to pre-construction conditions and project-related traffic would cease. Final restoration success would be based on criteria approved by the BLM and other applicable agencies within the final Decommissioning, Abandonment, and Site Reclamation Plan. However, impacts to wildlife habitat would not fully recover until soils and vegetation were returned to pre-project conditions. Due to the timescale to restore desert vegetation communities (70 to over 200 years) (Abella 2010), habitat loss in disturbed areas could also be considered irreversible.

3.5 BIOLOGICAL RESOURCES – SPECIAL STATUS SPECIES

3.5.1 Introduction

Some species of plants and wildlife are accorded special status by federal and state agencies largely because they are either scarce on a regional level, facing clearly defined threats, or in a position within the regional landscape to potentially become scarce. Special status species include the following designations:

- Federally listed species as threatened, endangered, proposed, or candidates for listing under the ESA or state equivalents. An endangered species is any species that is in danger of extinction throughout all or a substantial portion of its range. A threatened species is any species that is likely to become an endangered species within the foreseeable future throughout all or a substantial portion of its range. Candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities.
- Sensitive species designated by the BLM Nevada State Director in accordance with Manual Section 6840. Sensitive species are those species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. In addition to those species designated as sensitive by the State Director, all federal candidate species and delisted species in the 5 years following delisting are to be conserved as Bureau Sensitive species. Sensitive species are managed as special status species, along with federally listed and proposed species, which are automatically treated as special status species.

- Species protected by under Title 47, Chapter 527 (Protection and Preservation of Timbered Lands, Trees and Flora) of the Nevada State Code.
- At-risk taxa tracked by the Nevada Natural Heritage Program (NNHP) within the Nevada Department of Conservation and Natural Resources (DCNR).
- Avian species protected under the Migratory Bird Treaty Act of 1918 (MBTA).
- Avian species protected under the Bald and Golden Eagle Protection Act (BGEPA).

3.5.2 Analysis Area

Species identified for analysis were derived from 1) an online review of the USFWS Information for Planning and Consultation (IPaC) listed species for Clark County (USFWS 2019a), 2) the BLM Southern Nevada District Office list of Sensitive Species (BLM 2017), 3) species protected by the State of Nevada (Nevada Administrative Code [NAC] 527), 4) species identified by NDOW as species of conservation priority (NDOW 2012), and 5) the listing of special status species maintained by the NNHP (DCNR 2019). Background information on those species that have the potential to occur within the project area has been provided within the project Biological Resource Supporting Information.

For special status species (with the exception of bald and golden eagles), the analysis area consists of a 1-mile buffer around the project area. This analysis area is intended to capture existing conditions and potential impacts to individuals and habitats and is based on biological surveys, including a survey of avian species (SWCA 2018a) and a survey of Mojave desert tortoises (SWCA 2020b).

The analysis area for bald and golden eagles is an approximately 10-mile radius around the study area. This analysis area is intended to capture potential nesting areas and potential impacts to foraging habitat.

3.5.3 Affected Environment

Data obtained from the USFWS, BLM, and NDOW indicate that habitats located within the analysis area may be suitable for approximately 150 different special status species, or the analysis area is within the potential range for these species. Based on a review of habitat requirements and historic and recent observations, 46 of these species have been determined to have the potential to occur within the analysis area and/or have been observed during site-specific biological field surveys. These species include 19 bird species, two insect and invertebrate species, 17 mammal species, seven reptile species, and one plant species. Table 3.5-1 provides detail on the individual special status species that may be present within the analysis area; migratory birds are discussed as a group in a section below. In addition, as the Mojave desert tortoise is the only ESA-listed species likely to occur within the analysis area (USFWS 2019a), it is discussed in more detail below.

3.5.3.1 *Migratory Birds*

Migratory bird species known to occur within the analysis area are commonly found within the Mojave Desert Ecoregion, and include ash-throated flycatcher (*Myiarchus cinerascens*), barn swallow (*Hirundo rustica*), Bewick's wren (*Thryomanes bewickii*), black-throated sparrow (*Amphispiza bilineata*), black-tailed gnatcatcher (*Polioptila melanura*), Brewer's sparrow (*Spizella breweri*), cactus wren (*Campylorhynchus brunneicapillus*), gray flycatcher (*Empidonax wrightii*), horned lark (*Eremophila alpestris*), loggerhead shrike (*Lanius ludovicianus*), rock wren (*Salpinctes obsoletus*), sagebrush sparrow (*Artemisiospiza nevadensis*), and yellow-rumped warbler (*Setophaga coronata*). The black-throated sparrow was the most abundant migratory bird species observed during avian surveys, followed by horned lark and sagebrush sparrow. Most of the migratory bird observations were recorded in the spring, which indicates that the analysis area is likely most important to the avian community as breeding or migratory habitat. No waterbirds were observed during site-specific avian surveys (SWCA 2018a).

The USFWS identified the Bendire's thrasher (*Toxostoma bendirei*), black-chinned sparrow (*Spizella atrogularis*), and Le Conte's thrasher (*Toxostoma lecontei*) as Birds of Conservation Concern that may be present within the project area (USFWS 2019c).

3.5.3.2 *Mojave Desert Tortoise*

The analysis area is located within the Eastern Mojave Recovery Unit as revised in the most recent recovery plan (USFWS 2011), though it is not located in or near any critical habitat units or ACECs designated for desert tortoise. The nearest critical habitat unit (Ivanpah) is approximately 30 miles (48 km) to the south. Mojave desert tortoise are known to occur in the analysis area.

A portion of the analysis area (the proposed project footprint and vicinity [5,032.2 acres]) was surveyed (SWCA 2020b) in accordance with USFWS Mojave desert tortoise survey protocol (USFWS 2017). Fifty-four tortoises were encountered during the surveys, 41 of which met the USFWS criteria (adult tortoises greater than 180 mm) to be included in a population estimate (SWCA 2020a). Tortoise density was estimated at 3.04 adult tortoises per square km (km^2).

The estimated number of adult tortoises within the surveyed area is 62, as well as an estimated 322 subadult and juvenile tortoises (Table 3.5-2).

3.5.4 Environmental Consequences

This section describes the potential impacts to special status species associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.5.4.1 *Methodology*

Impacts to special status species are discussed in terms of potential changes to habitat, habitat use, and/or behavior.

3.5.4.2 *Issue Indicators*

Impact indicators used to analyze impacts to special status species include the following:

- Area of existing habitat that would be disturbed,
- Area of existing habitat that would be precluded from use,
- Miles of access roads within existing habitat, and
- Miles of transmission line within existing habitat.

3.5.5 Proposed Action

The majority of impacts related to construction, operations and maintenance, and decommissioning activities to special status species would be similar to those described for general wildlife under the Proposed Action (Section 3.4.5). Where impacts may be more specific to species groups or individual species, they are discussed in more detail below.

3.5.5.1 *Construction Impacts*

Construction activities would lead to impacts to special status and migratory birds. Construction activities would result in the short-term loss of bird nesting and foraging habitat. Ground-disturbing activities such

as clearing and grading would reduce available cover, nesting and perching substrate, and foraging areas, and would result in displacement of bird populations. Indirect effects from noise and vibration associated with construction activities and increased human noise and activity may also disturb bird behavior in the vicinity of the activities, resulting in potential nest abandonment. However, for most avian species, large expanses of habitat available adjacent to the project area are of similar quality and composition as that which would be lost. Additionally, as eagles are wide-ranging species and use a variety of habitats for foraging, the impacts related to loss of foraging habitat associated with the Proposed Action would be minimal. Therefore, impacts associated with project construction to migratory and special status bird species are not expected to result in a large reduction in migratory bird population levels, however, displacement of species from this area may put pressure on adjacent habitats.

Impacts to special status bat species are anticipated to be limited to disturbance of foraging habitat. As there are no roosting or bat attractant features within the area of disturbance or in the vicinity, impacts to bat roosting habitat are not anticipated to occur as a result of construction activities. Additionally, as construction activities would largely be limited to daytime (some activities, such as equipment and system testing, may continue 24 hours per day) and bat species are primarily active in the late afternoon and evening hours, potential disturbance of individual bats foraging in the vicinity would be limited.

Night lighting may create light pollution in bat foraging habitat. The site-specific Lighting Plan would minimize impacts from light and glare. As lighting sources for construction would be temporary and short-term and large areas of similar foraging habitat is available adjacent to the project area, it is unlikely that it would have a measurable impact on bat populations within the analysis area. A Bird and Bat Conservation Strategy (see Appendix B) would be approved by the BLM and implemented throughout project-related activities as required.

The disturbance area under this alternative does not contains soils that may provide suitable habitat for Pahrump Valley buckwheat (*Eriogonum bifurcatum*) and as vegetation surveys of the area did not record the species, construction-related impacts to Pahrump Valley buckwheat are not anticipated. Overall, impacts to special status species individuals as a result of construction is not anticipated to result in a loss of short or long-term viability for the species.

Based on population estimates, approximately 53 adult desert tortoises, 276 subadults or juveniles, and 69 hatchlings are anticipated to be displaced by project-related construction activities via translocation. Construction activities would result in fragmentation and loss of desert tortoise habitat, degradation of adjacent habitat from non-native plant species and/or wildfire, disturbance of individuals from human noise and activity, increased predation due to increases in litter, and other human-caused attractive nuisances and/or predators (such as ravens [*Corvus corax*]) to equipment and overhead lines as perching areas, increased risk of vehicle strikes along regional roadways caused by increased traffic from equipment delivery and commuting and/or crushing of individual tortoises, and/or risk of exposure to pesticides or herbicides. Handling, monitoring, and moving desert tortoises from existing habitat to translocation areas may result in increased mortality and stress, or an increase in mortality and stress to tortoises currently living in the Stump Springs Desert Tortoise Translocation Area caused by the introduction of new tortoise individuals. However, translocation of tortoises would prevent direct mortality of individuals during construction activities. Tortoise fencing would also reduce the risk for individuals to move back into the disturbance area; however, disturbance and fencing would result in the loss of available habitat.

The project has been designed to reduce potential impacts to these species through the implementation of project design features and other plans. Project remuneration fees would be used to initiate several studies as described in Section 2.6 and Table B-3 of Appendix B. The Desert Tortoise Translocation Plan would address the outstanding data needs for translocation of desert tortoises outside of the area contained

within the preclusion fencing, and describe the USFWS-approved procedures and protocols for relocation. The Stump Springs Desert Tortoise Translocation Area has been identified as the recipient area where tortoises would be translocated. In addition to the Desert Tortoise Translocation Plan, a Long-Term Monitoring Plan is being developed through coordination between the BLM and USFWS to establish a 30-year study to monitor the long-term impacts of translocation on desert tortoises to the Stump Springs Desert Tortoise Translocation Area.

The BLM is engaged in formal consultation with USFWS under Section 7 of the ESA, during which impacts will be assessed and additional measures identified as necessary to minimize impacts to the species.

3.5.5.2 *Operation and Maintenance Impacts*

Operation of the proposed project would result in the long-term loss of up to 2,908.4 acres of nesting and foraging habitat for migratory bird species. Habitat loss is likely to have some effect on localized use by migratory bird species. Habitat within the Proposed Action area is not unique relative to the surrounding landscape, and operation and maintenance of the Proposed Action would not preclude birds from using the surrounding habitat. Propagule islands may provide small areas of foraging or resting areas for migratory birds, but would be unlikely to provide nesting habitat. Long-term increases in human presence during operation and maintenance may also result in long-term disturbance to migratory birds.

Operation of the Proposed Action may result in migratory bird mortalities resulting from collision and/or electrocution associated with the proposed solar facility, gen-tie line, and/or substation. Collision with PV solar panels presents a direct mortality risk to migratory birds, which would be greatest during the breeding season, when birds are more active (Dietsch 2017), or accentuated in insectivorous species attracted by high concentrations of insects drawn to the solar arrays (Horváth et al. 2009). Collision with buildings, radio towers, and other structures, especially those with night lighting, is an important source of mortality in small migrating birds (Longcore et al. 2012; Loss et al. 2014). Birds flying at night, which are usually migrants, adjust their flight altitudes according to weather conditions, and may be attracted to steady light sources (Gauthreaux 1991; Longcore et al. 2012). However, although permanent outdoor night lighting would be provided at the administration/O&M building and the YPSP substation, and some portable lighting may be required for maintenance activities that must be performed at night, lighting would be kept to the minimum required for safety and security. Sensors, switches, and timers would be used to keep lighting turned off when not required and all lights would be hooded and directed downward, to minimize backscatter and off-site light.

Little research exists regarding population-level impacts of PV facility mortality on small birds; however, some solar facilities may attain similar rates of mortality as wind energy facilities (Walston 2016), and most passerine populations in North America were deemed unlikely to be affected by currently operating wind energy facilities (American Wind Wildlife Institute 2017) because of their high reproductive potential and ability to absorb annual mortalities (Kuvlesky et al. 2007). It should be noted that Walston (2016) includes solar concentrating facilities in the analysis and that this facility type is a different technology in comparison to the proposed YPSP.

Waterbird species may potentially mistake the solar panels for water features on which the birds can land; this theory has been coined the “lake effect hypothesis” (Horváth et al. 2009). These behaviors may lead to collisions with PV solar panels resulting in mortality, injury, or stranding of those species that require water to take off again (e.g., grebes and loons). Because bird fatality data for PV solar facilities have only recently become available, and these data are exceptionally limited, science-based predictions of potential bird risk are limited. Unlike wind energy, few studies currently address bird impacts from PV solar and risks to these species are not well understood (BSG Ecology 2014; Clement et al. 2014; Walston et al. 2015). Additional structured studies of utility-scale PV facilities are necessary before statistically

significant conclusions about bird risk and mortality associated with solar facilities can be drawn. No waterbirds were observed during avian surveys of the project area. There are no major water bodies to concentrate waterbirds during migration, breeding, or stopover periods near the project area; the nearest major water bodies are Lake Mead and the Colorado River, located far outside of the analysis area. Because waterbirds generally move along migratory corridors with existing water sources and available stopover habitat, waterbirds and other bird species concentrate along the Colorado River, reducing the likelihood of these species to be present within the project area.

Electrocution at transmission lines is another risk to birds during the operations phase. Electrocution occurs when a bird contacts two conductors of different voltages at the same time, such as an energized wire conductor and an electrical ground. This can occur when a bird's wings connect two different wires, or when it perches where a wire connects to a support pole. Electrocution risk varies among avian species, and is highest for avian species with greater wingspans, e.g., raptors and larger waterbirds such as herons, cranes, and egrets (Avian Power Line Interaction Committee [APLIC] 2006; Janss 2000). The APLIC has published comprehensive recommendations to minimize the electrocution and collision hazards posed by electrical transmission infrastructure (APLIC 2006, 2012). Electrocution hazards are minimized by spacing energized components apart beyond the reach of large birds' wingspans, installing covers on energized potential perches, and by reducing perches and nest sites on supporting poles and towers. The project's transmission infrastructure would be built to industry standards in accordance with APLIC recommendations in order to minimize potential electrocution impacts to birds.

Operational impacts would affect other special status species primarily through the long-term loss of 2,908.4 acres of potential habitat. The inclusion of propagule islands within the fenced project area may increase the establishment of native vegetation adjacent to the vegetation islands, but this effect would likely be localized and is not anticipated to create significant additional habitat during operations. Permanent fencing surrounding the solar facilities would remain intact after construction and desert tortoise would not be allowed to re-enter the fenced sub-areas. Potential impacts would be reduced through implementation of the project design features and plans.

Lighting would not exceed 16–20 feet in height and would be amber in color or less than or equal to 3500 Kelvin color temperature (warm-white). With the implementation of these design features, lighting associated with the project (either construction or operations and maintenance) is not anticipated to impact migratory birds.

Overall, impacts to special status species individuals as a result of operation and maintenance is not anticipated to result in a loss of short- or long-term viability for the species.

The presence of the gen-tie line and other structures would increase perching opportunities for avian species (such as ravens) that may prey on desert tortoises, particularly hatchlings and juveniles. In addition, the presence of trash and other human-related nuisances may attract predatory species. The Raven Management Plan (BLM 2014) includes measures intended to deter raven presence and potential predation of desert tortoises, which would reduce the risk for mortality.

3.5.5.3 *Decommissioning Impacts*

Following the end of project operations, decommissioning and reclamation would occur. The use of heavy equipment and other activities associated with decommissioning of the project would result in impacts similar to those described above for construction.

3.5.5.4 *Cumulative Impacts*

The analysis area for cumulative impacts to special status species includes projects within 4 miles of the Proposed Action. Reasonably foreseeable future projects that have been identified with potential to affect these species include 1) the proposed development of three additional solar facilities adjacent to the YPSP totaling 17,169.4 acres (Copper Rays Solar Project [approximately 6,047.2 acres proposed], the Rough Hat Clark County Solar Project [approximately 2,396.0 acres proposed], and the Sagittarius Solar Project [approximately 8,726.2 acres proposed]), 2) pavement preservation and rehabilitation along SR 160, and 3) land use proposals that include the designation of the lands along the southeastern boundary of the project area as an ACEC.

Cumulative impacts to special status species under this alternative would be similar to those described for general wildlife.

3.5.6 Alternative Action 1 – Modified Layout

The majority of impacts related to construction, operations and maintenance, and decommissioning activities on special status species would be similar to those described for general wildlife under the Alternative Action 1 (Section 3.4.6). Where impacts may be more specific to species groups or individual species, they are discussed in more detail below.

3.5.6.1 *Construction Impacts*

Overall, impacts on special status species under Alternative Action 1 (Modified Layout) would be similar to those under the Proposed Action for special status species and under Alternative Action 1 for general wildlife (see Section 3.4.6). Alternative Action 1 would disturb more xeroriparian habitat (ephemeral washes) that the Proposed Action would retain, and as ephemeral washes provide high-quality habitat for desert species (particularly migratory birds), this alternative would result in greater impacts to this habitat and species that use it than the Proposed Action.

Based on population estimates, approximately 37 adult desert tortoises, 195 subadults or juveniles, and 49 hatchlings are anticipated to be displaced by project-related construction activities via translocation under this alternative.

The southwestern portion of the project area under this alternative contains soils that were identified as habitat for Pahrump Valley buckwheat. Vegetation surveys of the area did not record the species; therefore, construction-related impacts to Pahrump Valley buckwheat are not anticipated.

3.5.6.2 *Operation and Maintenance Impacts*

Overall, impacts on special status species under Alternative Action 1 would be similar to those under the Proposed Action for special status species and under Alternative Action 1 for general wildlife (see Section 3.4.6).

3.5.6.3 *Decommissioning Impacts*

Overall, decommissioning impacts on special status species under Alternative Action 1 would be similar to those under the Proposed Action for special status species and under Alternative Action 1 for general wildlife.

3.5.6.4 *Cumulative Impacts*

Cumulative impacts to special status species under this alternative would be similar to those described for general wildlife.

3.5.7 Alternative Action 2 – Mowing Alternative

The majority of impacts related to construction, operations and maintenance, and decommissioning activities to special status species would be similar to those described for general wildlife under Alternative Action 2 (see Section 3.4.7). Vegetation mowing would be carried out on a minimum of 79% of the site under this alternative. This is anticipated to result in less vegetation mortality than the Proposed Action and Alternative Action 1 (Modified Layout), preserve soil characteristics, result in less wildlife mortality during construction, provide sensitive species habitat during O&M, and recover more quickly after decommissioning (Grodsky and Hernandez 2020; Kobelt 2020). Where impacts may be more specific to species groups or individual species, they are discussed in more detail below.

3.5.7.1 *Construction Impacts*

Construction impacts to special status species would be similar to those described for general wildlife under Alternative Action 2 (see Section 3.4.7).

3.5.7.2 *Operation and Maintenance Impacts*

Operations and maintenance impacts to special status species would be similar to those described for general wildlife under Alternative Action 2 (see Section 3.4.7).

3.5.7.3 *Decommissioning Impacts*

Overall, decommissioning impacts on special status species under Alternative Action 2 (Mowing Alternative) would be similar to those described under Alternative Action 2 for general wildlife. The more efficient recovery of vegetation and improved habitat quality would increase the likelihood that sensitive species, including the Mojave desert tortoise, could eventually reoccupy this area after decommissioning and reclamation.

3.5.7.4 *Cumulative Impacts*

Cumulative impacts to special status species under Alternative Action 2 (Mowing Alternative) would be similar to those described for general wildlife. Cumulative impacts would be lessened under this alternative, as the habitat is expected to be able to eventually return to a semblance of pre-disturbance condition, which would prevent the degradation of the approximately 3,000 acres this project would occupy.

3.5.8 No Action Alternative

Under the No Action Alternative, the BLM would not issue ROW grants or special use permits and the project would not be constructed. No habitat disturbance or increase in traffic would occur, and special status species would not be affected.

3.5.9 Irreversible and Irretrievable Impacts

The majority of impacts related to construction, operations and maintenance, and decommissioning activities to special status species would be similar to those described for general wildlife (see Section 3.4.9).

3.6 CULTURAL RESOURCES

3.6.1 Introduction

Cultural resources are generally defined as physical manifestations (human-made and natural physical features) associated with past or extant cultures that are, in most cases, finite, unique, fragile, and nonrenewable. These resources include prehistoric and historic-era archaeological sites, historic buildings and structures (architectural), and the locations of important historic events. Cultural resources may also refer to places that are areas of traditional religious and cultural importance, including archaeological sites, landscapes, natural landforms, or small, discrete use areas important to practice and continuity of traditional practices, or necessary for maintaining the community's cultural identity.

3.6.2 Analysis Area

As defined under Section 106 of the National Historic Preservation Act of 1966 (NHPA), the area of potential effects (APE) is a geographic area or areas within which impacts from an undertaking may directly or indirectly affect cultural resources that are listed in or eligible for the National Register of Historic Places (NRHP) (i.e., historic properties). As the lead federal agency, the BLM determined the APE by considering potential direct and indirect impacts to historic properties from the construction, operation, maintenance, and decommissioning of the proposed YPSP facilities. The analysis area for indirect impacts on cultural resources is defined as a 5-mile buffer extending from the study area, coinciding with the APE established to encompass the probable extent of where visual changes from the Proposed Action and alternatives would be most visible relative to cultural resources. This analysis area accounts for potential direct, indirect, as well as cumulative impacts from implementation of the YPSP that could result in adverse effects on historic properties (i.e., cultural resources that qualify for the NRHP) as defined under 36 CFR 800.5(a)(1) (Criteria of Adverse Effect).

3.6.3 Affected Environment

This section discusses affected environment in the analysis area as related to cultural resources that may be impacted by the proposed solar array and associated facilities. The affected environment includes past actions as they have contributed to existing conditions.

The analysis area is located in the Pahrump Valley, surrounded by the Spring Mountains to the north around to the southeast, the Kingston Range to the south, and the Nopah Range to the west. The valley contains many springs that were most likely used by prehistoric groups, later supporting agricultural and ranching activities historically. The analysis area is characterized by alluvial fans cut by shallowly incised drainages, with southern desert shrub, pinyon-juniper, with creosote, yucca, and grasses. Anthropomorphic modifications to the landscape have occurred over time, including the divided highway corridor of SR 160 and the parallel power line, Tecopa Road/Old Spanish Trail Highway, the Hidden Hills Ranch and aircraft landing strip (not currently in use), and the unincorporated community of Pahrump northwest of the proposed project.

Pursuant to its obligation under the Section 106 review, the BLM must make a "reasonable and good faith effort" to identify and inventory historic properties that may be affected by implementation of the

proposed project as a federal undertaking (36 CFR 800.4(b)(1)). The inventory encompassed approximately 5,200 acres of BLM-managed lands to evaluate potential effects from the Proposed Action, Alternative Action 1 (Modified Layout), Alternative Action 2 (Mowing Alternative), and associated linear facilities. The results of the inventory—which included an archival literature review, an intensive Class III pedestrian survey, and a visual assessment of the analysis area—are presented in SWCA (2019d) and are briefly summarized below.

In all, the inventory conducted for the YPSP identified 60 cultural resource sites within the extent of the analysis area, of which eight are newly recorded archaeological resources identified within the YPSP study area during the pedestrian survey.[6] Sites 26CK10740, 26CK10741, 26CK10742, 26CK10743, and 26CK10744 all consist of historic-era trash scatters and, in consultation with SHPO, the BLM determined that none of these five archaeological sites within the YPSP study area qualify for listing and none are eligible for the NRHP (SWCA 2019d).

The three remaining archaeological resources newly documented in the YPSP study area—26CK10751, 26CK10752, and 26CK10753—are sites containing rock rings of possible prehistoric origin, none of which qualify for listing in the NRHP under Criterion A (event), B (person), or C (design). Because no associated artifacts or diagnostic materials were identified at these sites, temporal and cultural affiliation cannot be definitively determined; however, as these archaeological sites contain rock features that may be associated with Native American belief systems, they may at the same time possess the potential to contribute important information related to prehistoric ideology and belief systems. As such, these sites cannot be evaluated under Criterion D (information) until further investigations can be conducted and therefore, they remain unevaluated for the NRHP. Therefore, while there are no agency-determined historic properties (i.e., cultural resources listed in or eligible for listing in the NRHP) in the YPSP study area, the three unevaluated archaeological sites (26CK10751, 26CK10752, and 26CK10753) are treated as if they were eligible for listing under Criterion D following BLM cultural resources management guidelines.

Additionally, 52 known cultural resources (49 in Nevada and 3 in California) were identified from the archival literature review of the lands encompassed by the 5-mile buffer (but outside the YPSP study area) established to assess indirect impacts from project implementation. To determine the extent of project visibility within the analysis area, the BLM conducted a viewshed analysis to delineate those portions of the landscape demonstrating a direct line of sight to and from the proposed project. In all, 14 cultural resources (all of which are located in Nevada) were identified within the viewshed of the analysis area, of which two are historic properties as defined under Section 106. The first of these is a segment of the Old Spanish Trail–Mormon Road (26CK3848), which intersects through the southern portion of the analysis area. This segment of the historic trail route was listed in the NRHP in 2001 as part of the Old Spanish Trail–Mormon Road Historic District. Additionally, an approximately 0.6-mile segment of the trail through Stump Spring in the analysis area was identified in the NRHP nomination as contributing element to the significance of the historic district (NPS 2001).

The second historic property in the analysis area is a multicomponent archaeological site (26CK301/26CK4169) at Stump Spring, consisting of a prehistoric campsite and historic foundation through which the contributing segment of the Old Spanish Trail–Mormon Road Historic District passes. The site was previously determined eligible for the NRHP and because of its cultural value, Stump Spring has also been designated as an ACEC.

The portion of the Old Spanish Trail–Mormon Road Historic District (including the segment of the Old Spanish Trail–Mormon Road recorded as 26CK3848) through the analysis area and the

[6] The survey also recorded 14 isolated occurrences of cultural material and/or features. None of these isolated occurrences are considered significant cultural resources and are not eligible for the NRHP (SWCA 2019d).

NRHP-eligible site at Stump Spring (26CK301/26CK4169) have been directly impacted by extensive past and ongoing all-terrain vehicle (ATV) activity. Vehicles have used (and continue to use) the two-track road that delineates the historic trail route through the analysis area.[7] ATV use is also apparent along user-created two-track roads and in off-road areas in and around Stump Spring.

The remaining 12 cultural resources identified in the viewshed of the 5-mile buffer consist of both prehistoric and historic-era resources. Four of these sites have been previously determined not eligible for the NRHP, including a historic Native American cemetery that is protected by separate legislation under the Native American Graves Protection and Repatriation Act (NAGPRA). Two remain unevaluated for the NRHP, including 26CK5035—a series of prehistoric circular rock alignments located in the northeastern portion of the analysis area near Trout Canyon; this site has been previously affected by the construction of Trout Canyon Road as well as by two four-wheel-drive, two-track roads that bound the mapped site boundary. Likewise, 26CK400 is recorded as a prehistoric artifact scatter located in the southwestern portion of the analysis area, which appears to have been directly impacted by the construction of the Front Sight Firearms training facility. As one of the most prominent land developments in this portion of the analysis area, the mapped location of 26CK400 (the large artifact scatter) places it underneath one of the existing firing ranges. Lastly, six sites (26CK9627, 26CK9637, 26CK9649, 26CK9691, 26CK9779, and 26CK9780) are unknown in terms of both components and NRHP eligibility (SWCA 2019d).

3.6.4 Environmental Consequences

This section discusses the potential direct, indirect, and cumulative impacts to important cultural resources that could result from construction, operation, and decommissioning of the proposed project related to the Proposed Action, Alternative Action 1 (Modified Layout), Alternative Action 2 (Mowing Alternative), and No Action Alternative. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.6.4.1 *Methodology*

Impacts to these resources are discussed in terms of direct, indirect, and cumulative impacts from each alternative that could result in an adverse effect on historic properties. As defined under 36 CFR 800.5(a)(1) (Criteria of Adverse Effect), an adverse effect occurs when a federal undertaking directly or indirectly alters any characteristics of a historic property that qualify it for the NRHP. An adverse effect on a historic property is not limited to physical destruction or damage, but also includes relocation of the property, changes in the character of the setting of the property, and the introduction of visual, atmospheric, or audible intrusions. Impacts from a federal undertaking that result in an adverse effect on a historic property may also include reasonably foreseeable effects caused by the undertaking that may occur later in time (i.e., cumulative impacts). The BLM must determine whether the alteration of character-defining features of a historic property results in the diminishment of the aspects of integrity (i.e., location, design, setting, materials, workmanship, feeling, and association [NPS 1997]) to the extent that the degree of alteration would constitute an adverse effect under Section 106 of the NHPA.

3.6.4.2 *Impact Indicators*

In consideration of potential adverse effects on historic properties, the issues for analysis identified for the proposed YPSP relative to cultural resources include the following:

[7] The trail route here is labeled OLD SPANISH TRAIL (4WD) on the USGS Stump Spring 7.5-minute quadrangle.

- How would ground disturbance from construction, operation, and decommissioning of project components affect historic properties and unevaluated cultural resources treated as eligible for the NRHP?
- How would changes to the landscape introduced by project components affect historic properties, and those cultural resources treated as eligible for the NRHP, sensitive to visual impacts?

The proposed YPSP would adversely affect historic properties, as defined under 36 CFR 800.5(a)(1) (Criteria of Adverse Effect), if the Proposed Action or alternatives resulted in

- alterations/changes to all or part of a historic property that result in the loss or degradation of its physical character-defining features that qualify it for inclusion in the NRHP; and/or
- alterations/changes to the character and/or important features of a historic property's setting that contribute to its historic significance through the introduction of visual, atmospheric, or audible intrusions.

There are types of cultural resources that are considered particularly sensitive to visual impacts associated with land development. Changes to the aesthetic quality and/or value from modifications to the surrounding landscape constitute visual impacts. For the purposes of analysis, "sensitivity" to visual impacts for a cultural resource is based on NRHP status, where resources that are listed in or eligible for inclusion in the NRHP are considered more susceptible to degradation of their historic setting through alterations to the surrounding landscape. More specifically, cultural resources listed in and/or eligible for the NRHP under Criterion A, B, or C, are historically important partly because of their integrity of setting. Historic properties that qualify for the NRHP under any of these three criteria typically demonstrate an important relationship with the surrounding environment and they retain their historic character relative to their setting. Likewise, the setting of such a historic property typically also retains certain aspects of character that reflects the historic environment, which can be impacted by modern intrusions or alterations to the landscape. Historic properties that are only important for their potential to contribute meaningful data to scientific research (i.e., those that qualify under Criterion D) are not eligible for their setting and are therefore unlikely to be sensitive to visual impacts (indirect), but still may be adversely affected (as defined under Section 106) by direct impacts if located in areas where ground disturbance occurs.

Therefore, historic properties within the analysis area that qualify under Criterion A (there are no historic properties listed in or eligible for the NRHP under Criterion B or C) are analyzed in terms of visual impacts. These resources include the portion of the Old Spanish Trail–Mormon Road Historic District (including the segment of the Old Spanish Trail–Mormon Road recorded as 26CK3848) and the multicomponent archaeological site at Stump Spring (26CK301/26CK4169) located in the analysis area. Because the BLM typically manages cultural resources that have yet to be evaluated for the NRHP as though they were eligible, the two unevaluated archaeological sites (26CK400 [prehistoric artifact scatter]) and 26CK5035 [prehistoric rock circles]) are also analyzed.[8]

Lastly, while they could potentially be affected by changes to setting if indeed eligible under Criterion A, there are no records available for the six unknown sites within the analysis area and, as such, the extent of visual impacts to these resources is difficult to ascertain without more specific information related to site

[8] These two archaeological sites (26CK400 [prehistoric artifact scatter] and 26CK5035 [prehistoric rock circles]) have not been evaluated for the NRHP relative to any of the National Register criteria (A, B, C, or D). It is important to note that in general, artifact scatters are not considered to have a reasonably important relationship to the surrounding landscape to the same extent that sites with aboveground structures or rock art possess. That is, the visual setting of an artifact scatter is not a critical component of its eligibility for the NRHP. Because these two sites are located outside the proposed YPSP project area, they would not be directly impacted by the Proposed Action or any of the alternatives. However, because neither has been formally evaluated for the NRHP, both are analyzed herein relative to indirect visual impacts in accordance with Section 106 of the NHPA.

characteristics and/or components. As a result, these sites are excluded from analysis pending additional site data needed for evaluation.

3.6.5 Proposed Action

3.6.5.1 *Construction Impacts*

Construction under the Proposed Action would result in the disturbance of approximately 2,994.7 acres across four discrete sub-areas, the TCS, and internal access roads and collection lines (see Section 2.2 above). The five historic-era archaeological sites (trash scatters) and 11 isolated occurrences of cultural materials and/or features identified in the YPSP study area are not eligible for the NRHP. These resources cannot be adversely affected as defined under Section 106 because they do not qualify as historic properties.

As discussed above in Section 3.6.4, the three archaeological rock ring sites—26CK10751, 26CK10752, and 26CK10753—remain unevaluated for the NRHP under Criterion D and are treated as eligible in accordance with BLM cultural resources management. As currently designed, while these three sites are within the YPSP study area, they are outside the project area footprint under the Proposed Action and would thereby be avoided by ground-disturbing activities, including installation of the temporary tortoise fence prior to construction. Because they would be avoided in this manner, there would be no ground disturbance in or within 2,000 feet of the sites; therefore, there would be no direct impacts from the construction phase of the project that would result in adverse effects on 26CK10751, 26CK10752, or 26CK10753.

Construction activities would introduce temporary, non-physical changes to the surrounding area due to increased noise from heavy equipment and an increase in construction-related traffic in and within the vicinity of the YPSP project area. These atmospheric and audible changes to setting would be short term and last only the duration of construction, which would last 24 months if completed in a single phase, or implemented in multiple phases, and would not diminish the integrity of any of the historic properties located outside the YPSP project area in the analysis area under the Proposed Action to the extent that they no longer qualify (or may qualify if presently unevaluated) for the NRHP.

Construction of the proposed solar development and associated facilities would be obscured visually by local topography, vegetation, existing structures, and distances from the YPSP project area as seen within the viewshed of the Proposed Action. There would be no indirect visual impacts to the Old Spanish Trail–Mormon Road Historic District, the NRHP-eligible site at Stump Spring (26CK301/26CK4169), or the two unevaluated sites (prehistoric artifact scatter 26CK400, likely impacted by previous development, and the prehistoric rock rings site 26CK5035), to the extent that they no longer qualify (or may qualify if presently unevaluated) for the NRHP. Therefore, there would be no adverse effects to historic properties in the analysis area.

3.6.5.2 *Operation and Maintenance Impacts*

There would be no direct impacts to historic properties (or unevaluated cultural resources treated as eligible for the NRHP) under the Proposed Action for the reasons discussed above for the construction phase. In terms of impacts related to visual changes to the landscape that could diminish the integrity of setting for those visually sensitive historic properties, the long-term presence of the YPSP—anticipated to last 30 years from the commercial operation date—would introduce visual intrusions into the landscape that are not currently present in the analysis area. However, similar to construction impacts, changes to the landscape and historic setting of the analysis area resulting from the solar development and associated facilities once in operation would be weak relative to the undisturbed areas in the analysis area as seen

within the viewshed of the Proposed Action. Therefore, there would be no changes to the historic setting that would constitute adverse impacts to the Old Spanish Trail–Mormon Road Historic District, the multicomponent site at Stump Spring (as a component of a designated ACEC), or the unevaluated sites that may be sensitive to visual impacts in the analysis area.

3.6.5.3 *Decommissioning Impacts*

Under the Proposed Action, project decommissioning activities would involve removal of the solar array and associated facilities and reclamation of the site to pre-project conditions (to the extent practicable). The use of heavy equipment and other activities associated with decommissioning of the project would result in impacts similar to those described above for construction. The increased noise levels from crews working to remove project infrastructure would introduce temporary, short-term audible and atmospheric changes that would last only the duration of these activities and would conclude once decommissioning was complete. The time needed for decommissioning and site reclamation would be dependent on the procedures for removal of the solar facilities and associated infrastructure and would be stipulated in the Decommissioning, Abandonment, and Site Reclamation Plan (see Section 2.2.4); however, it is anticipated that decommissioning activities would require a similar timeline as project construction activities (i.e., 24 months). There would be no direct impacts to historic properties and indirect impacts to sensitive resources would be temporary. Given the intent of decommissioning would be to return the area to pre-project conditions to the greatest extent feasible, changes to the landscape that would affect visually sensitive historic properties, including the Old Spanish Trail–Mormon Road Historic District, the NRHP-eligible site at Stump Spring (26CK301/26CK4169), and the unevaluated sites, would result from partial and/or complete restoration of certain elements of the historic environment.

3.6.5.4 *Cumulative Impacts*

Past and present actions, including existing land development, have contributed to the existing effects on historic properties in the analysis area where ground disturbance has already impacted these resources. Cumulative impacts to historic properties, as well as the unevaluated archaeological sites treated as eligible for the NRHP for the undertaking, from project components under the Proposed Action or action alternatives, when considered with existing impacts to these resources and reasonably foreseeable future actions, would happen where land development occurs in close proximity to the Old Spanish Trail–Mormon Road Historic District (including the listed segment recorded as 26CK3848), the NRHP-eligible Stump Spring site (26CK301/26CK4169), and the two unevaluated archaeological sites (26CK400 and 26CK5035). Because such actions on federal lands prefer to avoid historic properties (or unevaluated cultural resources treated as eligible for the undertaking) to the extent practicable because of adverse effects considerations under Section 106 of the NHPA, cumulative impacts from project components under the Proposed Action would primarily occur where existing and future land development introduce visual intrusions into the viewshed of these resources that are considered sensitive to visual changes in historic setting.

The ground disturbance projected for other projects in the analysis area within the next 5 years would result largely from the NDOT SR 160 Blue Diamond Rehabilitation as well as the additional solar development projects (see Figure C-8) if they occur within that time frame, the visual effects of which would last the life of the proposed YPSP where disturbed areas within the viewshed are not reclaimed or rehabilitated, and where any long-term facilities remain up to 30 years from the commercial operation date. The contribution to cumulative impacts from the Proposed Action would constitute up to an additional 2,994.7 acres of ground disturbance, of which 2,908.4 acres would be permanent, within the analysis area.

3.6.6 Alternative Action 1 – Modified Layout

3.6.6.1 *Construction Impacts*

Impacts to historic properties from construction activities under Alternative Action 1 (Modified Layout) would be largely consistent with those described above under the Proposed Action because activities associated with this phase of the project would the same. However, unlike the Proposed Action, the three archaeological rock ring sites (26CK10751, 26CK10752, 26CK10753) are located within the modified project area footprint under this alternative and thereby could be directly impacted if construction activities occur in or near these site boundaries. Design features common to all action alternatives (see Section 2.6 above) would include measures to avoid potential adverse effects (as defined under Section 106 implementing regulations) to these unevaluated sites from ground-disturbing activities during construction. If these sites could not be avoided, the BLM may determine that the undertaking would result in an adverse effect, which would require those effects to be resolved through the development of a historic properties treatment plan and a fully executed memorandum of agreement with the Nevada SHPO prior to the authorization of the project under Alternative Action 1 (Modified Layout).

3.6.6.2 *Operation and Maintenance Impacts*

Impacts to historic properties from operation activities under Alternative Action 1 (Modified Layout) would be consistent with those described above under the Proposed Action because activities associated with this phase of the project would the same.

3.6.6.3 *Decommissioning Impacts*

Impacts to historic properties from project termination, decommissioning, and site reclamation activities under Alternative Action 1 (Modified Layout) would be consistent with those described above under the Proposed Action because activities associated during this phase of the project would the same.

3.6.6.4 *Cumulative Impacts*

Cumulative impacts to historic properties under Alternative Action 1 (Modified Layout) would be consistent with those described above under the Proposed Action. The contribution to cumulative impacts under this alternative would constitute up to an additional 3,105.1 acres, of which 3,085.0 acres would be permanent, in the analysis area.

3.6.7 Alternative Action 2 – Mowing Alternative

3.6.7.1 *Construction Impacts*

Impacts to historic properties from construction activities under Alternative Action 2 (Mowing Alternative) would be largely consistent with those described above under the Proposed Action and Alternative Action 1 (Modified Layout). That is, under the Mowing Alternative, historic properties would still be avoided. Conversely, the three archaeological rock ring sites would not be avoided under Alternative Action 1 (Modified Layout), which could result in adverse effects on these resources because the alternative mowing methods implemented in the areas of the solar panel facilities would still constitute ground disturbance relative to historic properties.

Vegetation modifications described as part of this alternative would reduce the amount of disturbed soils and overall contrast between vegetation and exposed soils during construction, compared with the Proposed Action and Alternative Action 1. Construction-related indirect visual effects would be

temporary and not readily discernible. Therefore, indirect effects associated with construction activities under Alternative Action 2 (Mowing Alternative) would be less than those described under the Proposed Action.

3.6.7.2 *Operation and Maintenance Impacts*

Impacts to historic properties from operation and maintenance activities under Alternative Action 2 (Mowing Alternative) would be consistent with those described above under the Proposed Action because activities associated with this phase of the project would the same and no additional impacts to historic properties would occur once construction is complete. Indirect impacts would also be the same because the solar panels and associated infrastructure would remain the dominant visual element introduced to the historic setting of the area, obscuring and/or greatly reducing the visibility of the mowed areas relative to the areas graded and leveled for pads, O&M buildings, and access roads.

3.6.7.3 *Decommissioning Impacts*

Impacts to historic properties from project termination, decommissioning, and site reclamation activities under Alternative Action 2 (Mowing Alternative) would be consistent with those described above under the Proposed Action because activities associated during this phase of the project would the same.

3.6.7.4 *Cumulative Impacts*

Cumulative impacts to historic properties under Alternative Action 2 (Mowing Alternative) would be consistent with those described above under either the Proposed Action or Alternative Action 1 (Modified Layout), depending on which of those action alternatives is selected.

3.6.8 No Action Alternative

Under the No Action Alternative, the solar modules/array, Trout Canyon Substation, 230-kV transmission line, energy storage system, and associated linear facilities would not be developed because the BLM would not issue the ROW grant. No ground disturbance would occur and there would be no changes or alterations to the landscape, therefore, there would be no impacts to historic properties or unevaluated cultural resources that are sensitive to visual changes to setting. Existing conditions in the analysis area would continue.

3.6.9 Irreversible or Irretrievable Impacts

Irreversible or irretrievable impacts are those that cannot be reversed or recovered. Because cultural resources are generally fragile and finite resources, direct disturbance of the three unevaluated archaeological rock ring sites from project activities would constitute irreversible and irretrievable impacts where such disturbance physically alters or destroys all or part of these resources. Changes to the historic setting of the Old Spanish Trail–Mormon Road Historic District, the NRHP-eligible Stump Spring site, and the unevaluated archaeological sites outside the YPSP study area within the analysis area would occur over the 30-year lifetime of the project. These visual intrusions to setting would represent irretrievable impacts during construction, operation, and decommissioning of the project, but would not create irreversible impacts. Once the solar facilities and associated infrastructure are removed from the project area, reclamation would aim to recover vegetation to its preconstruction conditions. While this could take years to occur depending on which alternative is selected, during which time the project footprint would remain discernible, in comparison with the surrounding landscape, once the vegetation is established and productivity has recovered, the characteristics of the historic setting as seen from the Old Spanish Trail–Mormon Road Historic District, the NRHP-eligible Stump Spring site, and the unevaluated

archaeological sites, would be restored where reclamation of vegetation is successful. Provided environmental conditions and the associated levels of soil and vegetation disturbance permit, these visible differences would be reduced under the Mowing Alternative due to the increased numbers of cacti and Mojave yucca that would be left intact during project implementation and the extent to which revegetation is successful after decommissioning.

3.7 LAND USE AND REALTY

3.7.1 Introduction

This section addresses land use and realty within the project area, including their proximity to ACECs and other regulated land uses, as well as conformance with applicable regional plans and programs.

3.7.2 Analysis Area

Impacts resulting from construction, operation, and decommissioning activities occurring within the project area have the potential to affect lands and realty located outside (i.e., indirectly or cumulatively) the project area. As a result, the analysis area for lands and realty is an approximately 5-mile radius surrounding the study area within the state of Nevada. The 5-mile radius represents a reasonable distance where potential impacts to lands and realty impacts may occur, and ensures that all land uses that would be affected by the construction and operation of the project are taken into consideration; beyond 5 miles, the lands and realty impacts would diminish due to topography and line-of-sight distance. The nearest town is unincorporated Pahrump, approximately 15 miles to the northwest of the project. Local road and highway networks provide connections to Death Valley in California and Las Vegas to the east.

3.7.3 Affected Environment

The project is located on undeveloped BLM-administered lands (see Figure C-2). Applicable land use plans and regulations are shown in Table 3.7-1. Additional discussion of related land use plans and project conformance is provided in Section 1.6 and Table 1.6-1.

The analysis area consists primarily of open space. Other land uses consist of recreational sight-seeing along Tecopa Road, recreation activities (dispersed recreation like hiking, a paintball complex, and firearms training academy), some residential areas (within the southwestern corner of Pahrump), and transportation corridors (including private air travel from Hidden Hills airport and transportation routes to Death Valley and Las Vegas). The analysis area is crossed by the federal Section 368 energy corridor 224/225 (North Pahrump/U.S. Route 95 [U.S. 95] to Las Vegas/Ivanpah Valley) at the Clark County/Nye County border; and transmission lines are located along the SR 160 ROW directly adjacent to the project area.

The analysis area includes a BLM-designated ACEC: Stump Springs. No Wilderness Areas are within the analysis area. The analysis area also overlaps partially with the Spring Mountains National Recreation Area, located north of the Proposed Action, which is part of the Humboldt-Toiyabe National Forest managed by the U.S. Forest Service.

3.7.4 Environmental Consequences

This section describes the potential impacts to land use and realty associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.7.4.1 *Methodology*

Existing land use data were collected through analysis of aerial photography, field verification, review of existing studies and plans, and coordination with local and county agencies.

3.7.4.2 *Issue Indicators*

The project would adversely affect land use and realty if the construction or operation of the Proposed Action or alternatives:

- conflicted with existing federal, state, or local plans or policies;
- conflicted with existing BLM land use authorizations;
- conflicted with management policies for lands with wilderness characteristics or ACECs; or
- conflicted with existing or proposed transmission line corridors.

3.7.5 Proposed Action

3.7.5.1 *Construction Impacts*

Land use and realty impacts associated with construction activities for the Proposed Action would primarily be associated with vehicle and equipment access to the proposed project site. The project area is located adjacent to existing regional transportation corridors to take advantage of infrastructure and consolidate resources and potential impacts; there would be no construction conflicts with existing transmission line corridors. Transportation routes in the project region would see an increase in vehicle traffic during project construction activities, especially during project mobilization and demobilization activities (see Section 3.13). However, project construction activities would not be permanent, lasting approximately 2 years, and would not block or preclude existing land use authorizations located within or adjacent to the analysis area. Traffic concerns would be addressed within the Traffic Management Plan (Trans-1) and would not cause an impact to adjacent landowners, land uses, or transportation routes to adjacent land. The Traffic Management Plan would provide for coordination with NDOT to ensure continued access along SR 160 and Tecopa Road in accordance with the goals of the Pahrump Regional Planning District Master Plan (Nye County 2014).

The NDOT provides jurisdiction and maintenance of SR 160. Implementation of the project-specific Traffic Management Plan protocols would reduce any potential impacts to access of lands and realty during construction of the Proposed Action. The Stump Springs ACEC is not within the project footprint and would not be impacted during construction. Construction of the Proposed Action would therefore not conflict with any existing land use plans, policies, or authorizations, and no impacts would result.

3.7.5.2 *Operation and Maintenance Impacts*

Operational impacts to lands and realty are limited to the potential for conflict with existing land use programs, plans, policies, or authorizations (refer to Section 1.6). Implementation of the Proposed Action would potentially preclude the development of other uses on or adjacent to the project area and could affect the overall type of land use opportunities within the analysis area. The FLPMA, as amended, establishes the BLM's multiple-use mandate. Preclusion of public lands from other land uses would result in an impact to those lands if the action were not in conformance with the BLM's multiple-use mandate. However, due to the type of action proposed and its location within an area of open-space use, the proposed solar energy facility would not conflict with any existing land uses in the analysis area. As detailed in Section 1.6 and Table 1.6-1, the Proposed Action would be in conformance with the

applicable Las Vegas RMP objectives, policies, goals, or requirements, including those for air, visual resources, ACECs, recreation, land use and realty, and Mojave desert tortoise.

The project is not located within any wilderness areas or ACECs and would be required to implement a site-specific Desert Tortoise Translocation Plan (see Appendix B) in accordance with the BLM's Stump Springs Desert Tortoise Translocation Plan. The analysis area is crossed by the federal Section 368 energy corridor 224/225 (North Pahrump/U.S. 95 to Las Vegas/Ivanpah Valley) at the Clark County/Nye County border; and transmission lines are located along the ROW of SR 160 directly adjacent to the project area.

The Proposed Action was designed to use existing transmission corridors and ROWs in order to reduce the potential impacts caused by constructing new transmission lines or construction within new utility corridors. The project location was chosen specifically to allow for tie-in into the existing energy corridor and to use the energy capabilities already proposed within the TCS. As a result, long-term operation of the project would remain in accordance with the existing federal, state, or local land use plans and policies for land use and energy corridors. Implementation of the Proposed Action would not conflict with existing BLM land use authorization, nor would it conflict with management policies for lands with wilderness characteristics or ACECs. Operation of the Proposed Action would therefore not conflict with any existing land use plans, policies, or authorizations. No impacts to realty or land uses would result.

3.7.5.3 *Decommissioning Impacts*

Land use and realty impacts associated with decommissioning and reclamation activities for the Proposed Action would be similar to those associated with construction. Transportation routes in the project region would see an increase in vehicle traffic during project decommissioning activities especially during mobilization of equipment and vehicles (see Section 3.13, Transportation and Traffic, for details). However, project decommissioning activities associated with traffic and transportation would be addressed within a site-specific decommissioning Traffic Management Plan (Trans-1) and impacts to adjacent landowners and uses would be temporary. Decommissioning of the Proposed Action would occur in conformance with project reclamation plans, which would be reviewed by the BLM and required to include any new or revised land use policies. Decommissioning activities are therefore not anticipated to result in impacts to surrounding land uses and realty.

Following facility decommissioning and reclamation activities, lands associated with the Proposed Action would be reclaimed and returned to their pre-project state to the extent feasible. Lands associated with the Proposed Action would remain under the management of BLM and would be available for use in accordance with the BLM's multiple-use mandate. No long-term impacts to lands and realty from decommissioning activities would result.

3.7.5.4 *Cumulative Impacts*

The geographic scope of the cumulative effects analysis area includes the 5-mile buffer around the project study area. Potential cumulative effects on lands and realty could occur during project construction, during its anticipated 30-year life span, or during end-of-life project decommissioning and removal activities. The majority of development of approximately 17,169 acres of utility-scale solar generation reasonably foreseeable future actions (RFFAs) identified in Section 3.2.2.2 above would primarily occur within the analysis area. When considered with these RFFAs, the Proposed Action could incrementally impact land use and realty considerations in the analysis area by incrementally developing approximately 15% to 18% additional lands for utility-scale solar generation. However, because project activities would occur entirely on BLM lands in an area that is not currently developed with relatively little planned development, impacts associated with incremental changes to lands and realty considerations are not

anticipated to cumulatively impact management policies or objectives identified in the Las Vegas RMP for the analysis area. Other incremental land use impacts are associated with recreation uses and transportation and traffic described in Sections 3.10 and 3.13, respectively.

3.7.6 Alternative Action 1 – Modified Layout

3.7.6.1 *Construction Impacts*

Impacts to adjacent land uses and realty during construction of Alternative Action 1 (Modified Layout) would be the same as those discussed for the Proposed Action.

3.7.6.2 *Operation and Maintenance Impacts*

Impacts to land uses and realty during construction of Alternative Action 1 (Modified Layout) would be the same as those discussed for the Proposed Action.

3.7.6.3 *Decommissioning Impacts*

Impacts to adjacent land uses and realty during decommissioning and reclamation of Alternative Action 1 (Modified Layout) would be the same as those discussed for the Proposed Action.

3.7.6.4 *Cumulative Impacts*

Cumulative impacts to adjacent lands and realty associated with Alternative Action 1 (Modified Layout) would be the same as those discussed for the Proposed Action.

3.7.7 Alternative Action 2 – Mowing Alternative

3.7.7.1 *Construction Impacts*

Mowing height would not affect adjacent land uses or realty. Impacts to adjacent land uses and realty during construction of Alternative Action 2 (Mowing Alternative) would be the same as those discussed for the Proposed Action. However, under Alternative Action 2, the construction period, and associated transportation traffic effects, would occur for an additional 2.5 to 5 months.

3.7.7.2 *Operation and Maintenance Impacts*

Impacts to land uses and realty during construction of Alternative Action 2 (Mowing Alternative) would be the same as those discussed for the Proposed Action.

3.7.7.3 *Decommissioning Impacts*

Impacts to adjacent land uses and realty during decommissioning and reclamation of Alternative Action 2 (Mowing Alternative) would be the same as those discussed for the Proposed Action.

3.7.7.4 *Cumulative Impacts*

Cumulative impacts to adjacent lands and realty associated with Alternative Action 2 (Mowing Alternative) would be the same as those discussed for the Proposed Action.

3.7.8 No Action Alternative

Under the No Action Alternative, the BLM would not authorize a ROW grant and the proposed YPSP would not be implemented. The public lands in the project area would continue to be managed by the BLM in accordance with existing land use designations, which may include the construction and operation of a different solar project or other energy development. There would be no use of the land area or designated utility corridors and therefore no addition to cumulative land use impacts.

3.7.9 Irreversible and Irretrievable Commitments of Resources

There would be no irreversible commitments of resources because the area would be reclaimed after termination of the project and these uses could then be reestablished.

3.8 NATIONAL TRAIL RESOURCES

3.8.1 Introduction

The Old Spanish National Historic Trail (OSNHT, Old Spanish Trail, or trail), which spans approximately 2,706 miles from Santa Fe, New Mexico, to Los Angeles, California, was designated as a National Historic Trail by Congress in 2002. The OSNHT is formally administered jointly by the BLM and NPS. The management of the trail is detailed in the Old Spanish National Historic Trail Comprehensive Administrative Strategy (BLM and NPS 2017).

The informal trail protection corridor extends from 0 up to 5 miles outward from either side of the trail centerline, which includes the "the nearest elements of the view shed, parts of the cultural landscapes, landmarks, and traditional cultural properties near the trail" (BLM and NPS 2017:5). Although the proposed project does not physically intersect the OSNHT, the project falls within the OSNHT's informal protection corridor maximum range of 5 miles on lands administered by the BLM. Stump Springs, a 641-acre ACEC designated by the BLM (1998), was one of the few watering locations in the Pahrump Valley available to the original users of the OSNHT. It is located about 4.0 miles south of the project and can be accessed about 0.3 mile southeast of Tecopa Road. Stump Springs is considered a high-potential site associated with the OSNHT and falls within the trail's informal protection corridor (BLM and NPS 2017).

3.8.2 Analysis Area

Project impacts resulting from construction, operation, and decommissioning activities have the potential to affect national trail resources outside the project area (no national trails are located within the project area). This analysis evaluates national trail resources and associated project effects throughout the geographic area where direct and indirect project impacts are anticipated to occur and in the time frame in which project effects would occur. For the purposes of this evaluation, the analysis area is the maximum extent of the OSNHT's protection corridor (5 miles) within the project's viewshed extent (15 miles) (see Figure C-10). The project's viewshed is detailed in Section 3.15, Visual Resources. This analysis area (236,498 acres) was selected in order to provide a conservative range that would capture the potential impacts to the OSNHT that could be expected from the project. The project is located approximately 3.8 miles from the nearest physical component of the OSNHT (Stump Springs) and about 5.5 miles south of the nearest designated trail route.

3.8.3 Affected Environment

Table 3.8-1 summarizes the results for each inventory observation point (IOP). Site data and photographs for each IOP are provided in the inventory and impacts analysis for the Old Spanish National Historic Trail prepared in accordance with BLM Manual 6280 (BLM 2012a; SWCA 2019e).

3.8.4 Environmental Consequences

This section describes the potential impacts to national trail resources associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.8.4.1 *Methodology*

The methods employed in this inventory and impact analysis are consistent with BLM Manual 6280; specifically, Section 5.3 (B)(2), which indicates that, for projects having potential to affect designated national trails, an inventory and assessment is required. In accordance with Manual 6280, this analysis inventories and assesses all segments of the trail, including high-potential segments and high-potential sites within the analysis area. Specifically, this analysis inventories the resources, qualities, values settings, and primary uses as they relate to the nature and purpose of the trail and assesses the potential impact to these characteristics that may result from the project.

In total, 12 representative locations in the analysis area were selected as data collection points, referred to in this analysis as IOPs. All IOPs were located on public lands managed by the BLM. In general, the IOPs were selected based on their relatively high calculated visibility to project facilities, as well as their proximity to public roadways or public access points. The placement of IOPs also considered other factors detailed in the inventory and impacts analysis conducted for the YPSP (SWCA 2019e). To the extent practicable, the IOPs were placed at regularly spaced intervals within the analysis area along the OSNHT to reduce gaps in the analysis.

The intent of collecting data at the IOPs was to capture the baseline conditions of individual resources, qualities, and values and associated settings of the OSNHT for the average OSNHT user. The collected data could then be used to determine how the project could adversely affect these characteristics, and to determine whether the project could affect the nature and purpose of the OSNHT at these representative locations.

BLM Manual 6280 establishes that, for proposed actions such as the YPSP, an inventory and analysis must be completed to determine potential adverse impacts. For the purposes of this analysis, field data collection methods are detailed below under four primary data types: scenic resources, historic and cultural resources, recreational opportunities, and natural resources. Detailed information regarding specific inventory methodology for each of the four data types can be found in the associated inventory and impacts analysis (SWCA 2019e).

Construction and operation of the project could result in impacts to the scenic resources, cultural and historic resources, recreation opportunities, and natural resources and associated settings for these resources related to the OSNHT.

No direct physical impacts would occur, as the project footprint would not overlap the OSNHT. Therefore, this impact assessment evaluates effects on the trail and its associated resources and settings by evaluating the potential for visible project-related impacts to be experienced by users along the OSNHT. This assessment evaluates the potential impacts at the 12 IOPs as detailed in the associated

inventory and impacts analysis (SWCA 2019e). This impact assessment was developed in consultation with the NPS and is consistent with BLM Manual 6280. The proposed project was evaluated to determine whether project-related activities would significantly interfere or be incompatible with the nature and purposes of the OSNHT based on the trail's existing resources and settings.

3.8.5 Proposed Action

3.8.5.1 *Construction Impacts*

Impacts to the scenic resources and settings inventoried are anticipated to be typically weak, with little potential to be affected by the project. This impact intensity of "Weak" was determined based either on the project area being obscured by localized topography or by distances of several miles (between 4.4 and 13.0 miles away) or by both geographic interference and distance together which influences the ability to discern project components. There were two locations (IOP 10 and IOP 11) where visibility of the project, and thus impacts to scenic resources and settings, was assessed as being "Moderate" based on the project's relatively lower elevation and a clear line-of-sight from the IOPs, but impacts would be moderated by the 11-mile distance between the project area and the IOPs. The overall effect of the project to the scenic resources and settings along the OSNHT would be direct and weakly adverse. Visual impacts on National Trail resources from project construction are anticipated to occur throughout the projected 18-month construction period.

The Visual Resource Inventory (VRI) process is the BLM's method of evaluating scenic values of a given area based on three criteria: scenic quality evaluation, sensitivity level analysis, and delineation of distance zones. The most relevant VRI components, as they relate to the setting of the OSNHT, are scenic quality and sensitivity. The majority of the analysis area is identified as having a scenic quality of B (moderate scenic quality), and a moderate to high level of sensitivity.

Impacts on historic and cultural resources and settings inventoried are likely to be weak to none, with little potential to be affected by the project. The impact intensity of "Weak to None" was determined based either on the project area being obscured by localized topography or by distances of several miles (between 4.4 and 13.0 miles away), or by both geographic interference and distance together. Additionally, the visual obscurity (low visual contrast) of the project area from the OSNHT implies the historic and cultural setting would remain essentially intact. There were two locations (IOP 10 and IOP 11) where visibility of the project, and thus impacts to historic and cultural resources and settings, was assessed as being "Moderate" based on the project's relatively lower elevation and a clear line-of-sight to the IOPs. Impacts would be moderated by the 11-mile distance between the project area and the IOPs. The overall effect of the project to the historic and cultural resources and settings along the OSNHT would be direct, and weakly adverse.

The visual aspect of recreational opportunities and settings would be subject to a mostly weak impact from the project, with little potential to be affected. This impact intensity of "Weak" was determined based either on the project area being obscured by localized topography or by distances of several miles (between 4.4 and 13.0 miles away), or by both geographic interference and distance together. These factors equate to an overall low visual contrast of project activities as observed from the OSNHT. There were two locations (IOP 10 and IOP 11) where visibility of the project, and thus impacts to the recreational opportunities and settings, was assessed as being "Moderate" based on the project's relatively lower elevation and a clear line-of-sight to the IOPs. Impacts would be moderated by the 11-mile distance between the project area and the IOPs. The overall effect of the project to recreational opportunities and settings along the OSNHT would be direct, and weakly adverse.

The project is not expected to affect natural resources and settings. The impact intensity of "None" was determined based on the project's physical distance from the natural resources and settings along the

OSNHT (between 4.4 and 13.0 miles away). It was also assumed that visibility of the project would have no effect on these resources and settings.

3.8.5.2 *Operation and Maintenance Impacts*

The visibility of the project (described above in Section 3.8.6.1, Construction Impacts) from the OSNHT would remain for the life of the project (approximately 30 years). It is possible that some constructed project features (e.g., solar arrays, power poles, or substation) could be visible to users of the OSNHT.

3.8.5.3 *Decommissioning Impacts*

The effects of project decommissioning on National Trail resources would roughly mirror those discussed above in Section 3.8.6.1, Construction Impacts. Impacts from decommissioning along the OSNHT would differ from construction in that lands previously visible (for the 30-year project lease period) would likely become less visible due to reclamation activities. However, it could take years before the project footprint is no longer visible and the vegetation returns to its preconstruction condition based on environmental conditions and levels of disturbance (Abella 2010). This visible difference would allow for the project footprint to be visible from the OSNHT for many years beyond the project completion.

3.8.5.4 *Cumulative Impacts*

The analysis area for cumulative impacts to the OSNHT includes the maximum extent of the OSNHT's protection corridor (5 miles) within the project's viewshed (15-mile buffer around the Proposed Action) (236,498 acres). Since the only impacts to the OSNHT from project activities are visual impacts, this analysis considers only cumulative visual impacts. Past and present actions in the analysis area cannot be fully described using existing data sources; therefore, this analysis uses the cumulative acres of anthropomorphic disturbances presented in the U.S. Geological Survey's (USGS's) LANDFIRE dataset (USGS 2011) as a proxy for past and present actions having potential to visually affect National Trail resources. Identified anthropomorphic disturbances in the analysis area equate to approximately 14,786 acres (2.6% of the analysis area). Reasonably foreseeable future actions associated with cumulative projects as described in Table 3.2-2 would contribute an additional 17,169 acres of disturbance that would impact visual resources; the majority of these visual impacts on National Trails are from several large proposed solar facilities. Past, present, and reasonably foreseeable actions, together with the Proposed Action, would contribute approximately 32,355 acres of disturbance in the analysis area. These actions would constitute a cumulative increase of approximately 13.7% of visual impacts in the analysis area.

3.8.6 Alternative Action 1 – Modified Layout

3.8.6.1 *Construction Impacts*

Impacts from construction actions associated with Alternative Action 1 (Modified Layout) would be the same as those described for the Proposed Action.

3.8.6.2 *Operation and Maintenance Impacts*

Impacts from operation actions associated with Alternative Action 1 (Modified Layout) would be similar to those described for the Proposed Action.

3.8.6.3 *Decommissioning Impacts*

Impacts from decommissioning actions associated with Alternative Action 1 (Modified Layout) would be similar to those described for the Proposed Action.

3.8.6.4 *Cumulative Impacts*

Cumulative impacts to National Trails under Alternative Action 1 (Modified Layout) would be the same as those described under the Proposed Action.

3.8.7 Alternative Action 2 – Mowing Alternative

3.8.7.1 *Construction Impacts*

Impacts from construction actions associated with Alternative Action 2 (Mowing Alternative) would be the same as those described for the Proposed Action.

3.8.7.2 *Operation and Maintenance Impacts*

Impacts from operation actions associated with Alternative Action 2 (Mowing Alternative) would be similar to those described for the Proposed Action, with the exception that the construction schedule would be extended and visual impacts from construction would occur for up to an additional 5 months.

3.8.7.3 *Decommissioning Impacts*

Impacts from decommissioning actions associated with Alternative Action 2 (Mowing Alternative) would be similar to those described for the Proposed Action to the extent that environmental conditions and associated levels of disturbance permit the regeneration of vegetation; the impacts to the viewshed experienced by users of the OSNHT would be reduced in addition to the preservation of cacti and Mojave yucca under this alternative.

3.8.7.4 *Cumulative Impacts*

Cumulative impacts to National Trails under Alternative Action 2 (Mowing Alternative) would be the same as those described under the Proposed Action and Alternative Action 1 (Modified Layout), except where future solar field development identified in the analysis area implements similar methods of vegetation management. Where these RFFAs incorporate vegetation mowing and retention of cacti and yucca, the overall contribution to cumulative impacts to National Trails under this alternative would be reduced as compared to the Proposed Action and Alternative Action 1 because visual differences in vegetation on the landscape would be less discernible as experienced by users of the OSNHT.

3.8.8 No Action Alternative

Under the No Action Alternative, the project would not be developed and there would be no visual impacts to the OSNHT; therefore, there would be no impacts to the OSNHT in the analysis area.

3.8.9 Irreversible or Irretrievable Impacts

Irreversible or irretrievable impacts are those that cannot be fully reversed or recovered. This analysis considers irreversible impacts as those that permanently affect the OSNHT, e.g., not addressable through project restoration or reclamation. Irretrievable impacts are those lost opportunities that occur during the

lifespan of the project, which would be reinstated only after project reclamation is complete.
The Proposed Action and its alternatives are anticipated to share the following irreversible or irretrievable impacts:

- Project components would be visible during construction and operation, and
- Landscape scarring and revegetation long after project reclamation is complete (the extent of which depends on the alternative selected).

Changes to the characteristic landscape from constructed project components over the 30-year lifetime of the project would represent an irretrievable impact but would not create irreversible impacts. After the life of the project is over, the visible structures and materials would be removed from the project area. However, it could take years before the project footprint is no longer visible and the vegetation returns to its preconstruction condition (Abella 2010). The vegetation that would be established during reclamation efforts would take several growing seasons to recover and the composition of species in the recovery area would, for several seasons, be visibly different than the original and surrounding vegetation communities depending on the alternative selected. This visible difference would allow for the project footprint to be visible from the OSNHT for many years beyond the project completion and would represent an irreversible impact. Provided environmental conditions and the associated levels of soil and vegetation disturbance permit, these visible differences would be reduced under the Mowing Alternative due to the increased numbers of cacti and Mojave yucca that would be left intact during project implementation and the extent to which revegetation is successful after decommissioning.

3.9 PUBLIC HEALTH AND SAFETY

3.9.1 Introduction

This section describes potential public health and safety as related to hazardous materials and sources within the analysis area, and potential risks associated with interactions with known hazards in the analysis area.

3.9.2 Analysis Area

The public health and safety analysis area includes the study area plus a 1-mile buffer. This analysis area was selected to encompass the areas in which existing public health and safety issues may overlap the project area and proposed use of potentially hazardous materials. Downstream and end-use hazards associated with recycling and waste processing for hazardous materials are not included in this analysis as the project would use permitted facilities for these activities. Table H-7 in Appendix H lists the relevant public and health and safety regulations.

3.9.3 Affected Environment

A review of aerial imagery identified one existing potential source for hazardous materials in the analysis area: an unnamed sand and gravel pit approximately 0.13 mile from the project area. Primary access to the sand and gravel pit is Tecopa Road, which would be the same access road used for the proposed project. No specific health and safety issues have been identified for the sand and gravel pit, and it is assumed that the facility is operated in compliance with all applicable laws and regulations regarding sand and gravel pits. No other potential sources of hazardous materials were identified within the analysis area, as the area is primarily undeveloped. Based on a review of aerial photographs, there is no evidence of recognized environmental conditions in connection with the project area (Google Earth 1994–2019).

3.9.4 Environmental Consequences

This section analyzes impacts associated with the Proposed Action, Alternative Action 2 (Mowing Alternative), and No Action Alternative on the public health and safety issue of hazardous materials identified during scoping, including potential hazardous materials associated with solar panels (which contain toxic materials), waste and recycling hazards posed by batteries, battery storage, semiconductors, transformers, and inverters. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

A comprehensive analysis of hazardous materials and environmental exposure from PV solar panels, batteries, battery storage systems, semiconductors, transformers, inverters, was completed and included in the Draft Solar Energy Development Programmatic Environmental Impact Statement[9] (Draft Solar PEIS) (BLM and DOE 2010).

As described in the Draft Solar PEIS, solar panels for utility-scale facilities would likely use nonhazardous silicon-based semiconductor material; however, some solar panels may use semi-conductors containing heavy metals, such as cadmium, selenium, and arsenic (BLM and DOE 2010). These metals are fully contained within the solar panels and would not be released under normal operating circumstances.

Battery electrolyte is a fluid material associated with batteries and is mostly contained and used in lead-acid storage batteries that are used for vehicle, equipment, and backup power source batteries (BLM and DOE 2010). Batteries associated with the battery storage system would be lithium-ion-based batteries, which include industry standard design features to greatly reduce the potential of a spill or leak (Saf-8).

Hazardous materials from vehicles and equipment would include lubricating oils, hydraulic fluids, brake fluids, glycol-based coolants, and dielectric fluids. These fluids are necessary for proper maintenance and support of vehicles and construction equipment, including compressors and backup generators.

3.9.4.1 *Methodology*

To conduct this analysis, existing public health and safety issues were identified in the analysis area and compared with the project's construction, operations, and decommissioning impacts to determine whether effects on public health and safety would occur.

3.9.4.2 *Issue Indicators*

Effects to public health and safety would occur if the project would

- result in the acute or chronic exposure of the public or occupational workers to hazardous materials through the generation or storage of hazardous materials, accidental release of hazardous materials from project equipment, or accidental release of heavy metals contained in solar panels or batteries.

[9] The Final Solar Energy Development PEIS was published in 2012 (BLM and DOE 2012). The Final Solar PEIS is condensed and references the Draft Solar PEIS extensively; therefore, the Draft Solar PEIS is referenced here.

3.9.5 Proposed Action

3.9.5.1 *CONSTRUCTION IMPACTS*

Hazardous materials from vehicles and equipment, including lubricating oils, hydraulic fluids, brake fluids, glycol-based coolants, and dielectric fluids could pose a risk to individuals should direct exposure occur. However, proper maintenance of vehicles and equipment in accordance with manufacturers specifications reduces the risk for unanticipated spills or leaks.

Project design features include the development and approval of several programs and plans to ensure that industry standard best management practices (BMPs) and protocols are implemented during project activities to ensure avoidance of hazardous spills to soils, waters of the U.S., and potential exposure to individuals (see Appendix B). The entire site would be fenced appropriately to restrict public access during construction and operations. Chain-link security fencing would be installed around the site perimeter, substation, and other areas requiring controlled access. Implementation of these industry-standard BMPs would reduce the risk of exposure to individuals during construction-related activities.

Additionally, construction and operation of the project would occur in accordance with all applicable laws and regulations governing health and safety, including the Occupational Safety and Health Act of 1970 as administered by the Occupational Safety and Health Administration (OSHA). Implementation of these standard practices would reduce potential occupational health and safety risks.

3.9.5.2 *Operation and Maintenance Impacts*

The Proposed Action includes the use of small quantities of potentially hazardous materials contained within the solar panels, batteries, battery storage systems, transformers, semiconductors, and inverters. As described in the Draft Solar PEIS (BLM and DOE 2010), the release of cadmium and other heavy metals from solar panels, under normal operations, could occur through leaching from broken or cracked modules. However, researchers have concluded that such releases would likely result in a negligible potential for human exposure (Fthenakis and Zweible 2003; Tetra Tech, Inc. 2003).

Routine maintenance during operation of the solar panels, such as washing, would not increase the risk of harmful exposure of hazardous materials associated with solar panels, unless the panels are damaged. As part of the maintenance protocols, panels would be thoroughly inspected prior to the start of washing or repairing to ensure there is no damage to any components. Yellow Pine Solar would avoid or service any damaged solar panels, transformers, and inverters prior to washing. Any associated chemicals released would be appropriately cleaned and discarded in accordance with the site Spill Prevention, Control, and Countermeasures (SPCC) Plan. Damaged panels would be removed from the site and disposed of or recycled in accordance with federal and state laws.

The battery storage systems are primarily self-contained and would be located within areas providing secondary containment reducing the potential for leakage or hazardous waste exposure. Yellow Pine Solar would inspect battery storage systems for damage prior to installation and during routine maintenance and operations. Damaged systems would be handled in accordance with manufacturers specifications. Damaged or spent batteries would be removed from the site and disposed of or recycled in accordance with federal and state laws. All releases of potentially hazardous materials would be handled in accordance with the approved Hazardous Materials Management Plan for operations and maintenance of the facility (see Appendix B). This plan would also include a list of required notifications to make in the unlikely event of a major spill or risk to the public from potentially hazardous materials.

3.9.5.3 *Decommissioning Impacts*

Risks to public health and safety from decommissioning activities would be similar to those associated with construction. The site-specific Decommissioning, Abandonment, and Site Reclamation Plan would be required to include measures to reduce potential impacts to the public and occupational workers from project activities to the extent feasible in accordance with federal and State laws (see Appendix B). All potential sources of hazardous materials would be removed from the site during decommissioning (i.e., solar panels, battery storage systems, transformers, and inverters) and disposed of or recycled in accordance with manufacturers specifications. Following decommissioning, no hazardous materials or associated risks to public health and safety would persist on-site.

3.9.5.4 *Cumulative Impacts*

Portions of three RFFAs identified in Section 3.2.2.2 would be located within the 1-mile analysis area for public health and safety. When considered with these RFFAs, the Proposed Action could incrementally increase the risk of public or occupational exposure to hazardous materials in the analysis area. Because these RFFAs are all located on BLM-managed lands they would be subject to the same health and safety measures as the Proposed Action; therefore, cumulative impacts would be minimized.

3.9.6 Alternative Action 1 – Modified Layout

Under Alternative Action 1 (Modified Layout), project construction, operations, and decommissioning activities related to hazardous materials would remain the same as the Proposed Action; therefore, impacts to public health and safety would be the same.

3.9.6.1 *Cumulative Impacts*

Under Alternative Action 1 (Modified Layout), cumulative impacts to public health and safety would be the same as under the Proposed Action.

3.9.7 Alternative Action 2 – Mowing Alternative

Under Alternative Action 2 (Mowing Alternative), project construction, operations, and decommissioning activities related to hazardous materials would remain the same as the Proposed Action except construction-related activities and associated impacts could be extended by an additional 2 to 5 months.

3.9.7.1 *Cumulative Impacts*

Under Alternative Action 2 (Mowing Alternative), cumulative impacts to public health and safety would be the same as under the Proposed Action.

3.9.8 No Action Alternative

Under the No Action Alternative, the project would not be developed, and there would be no hazards or risks introduced to the public. Therefore, there would be no impacts to public health and safety in the analysis area.

3.9.9 Irreversible or Irretrievable Impacts

An irreversible or irretrievable impact would occur if the public or workers were exposed to hazardous materials; however, it is unlikely that the accidental release of hazardous materials would result from the

construction, operations, and decommissioning of the project. If an accidental release were to occur, exposure to hazardous materials would be minimized by the implementation of the project design features and the various health and safety plans.

There are no reasonably foreseeable future actions that would cumulatively increase the risk of public or occupational exposure to hazardous materials in the analysis area.

3.10 RECREATION

3.10.1 Introduction

Public lands in the wider region of Nevada that include the Proposed Action offer unique and diverse settings and opportunities for recreation. Key recreation areas include the Humboldt-Toiyabe National Forest, Red Rock Canyon National Conservation Area, and the OSNHT (Figure C-11). Demand for recreational opportunities in the region is currently high and increasing due to the expansion of greater Las Vegas (BLM 1998).

3.10.2 Analysis Area

The project study area consists of approximately 5,032.2 acres, within which the Proposed Action or action alternatives could ultimately occupy approximately 3,000 acres. Project impacts resulting from construction, operation, and decommissioning activities have the potential to affect recreational resources both in the project study area and, to some degree, outside the project area. This document evaluates recreational resources and associated project effects throughout the geographic area where direct and indirect project impacts are anticipated to occur and in the time frame in which project effects would occur. For the purposes of this evaluation, the analysis area (totaling 571,771 acres) is considered as the project study area and the 15-mile buffer around the project study area, which corresponding to the visual impact analysis area (see Section 3.15). The buffer associated with visual impacts is considered an appropriate geographic extent for potential recreation impacts because recreational users within this area could potentially be visually affected by the project. The analysis area is shown in Figure C-11. The Proposed Action and alternatives, as described in Chapter 2, are completely within the study area.

3.10.3 Affected Environment

This section describes the recreational setting in terms of recreation opportunities in the analysis area, such as designated recreation sites, recreation access points, designated trails, and dispersed and non-designated recreation activities present.

The analysis area is located primarily within the Southern Nevada Extensive Recreation Management Area (ERMA), where recreational opportunities are administered by the BLM under the Las Vegas RMP (BLM 1998). The analysis area also includes relatively smaller portions of the Humboldt-Toiyabe National Forest, Red Rock Canyon National Conservation Area, Nopah Range Wilderness Area, Pahrump Valley Wilderness, and Mt. Charleston Wilderness. Recreational access throughout the analysis area consists primarily of paved roadways (SR 160, Tecopa Road, and the Old Spanish Highway), existing dirt roads (Pahrump Road and multiple undesignated two-track roads), undesignated trails, and dry washes. Within the analysis area there are several recreational trails and access points located in Humboldt-Toiyabe National Forest near Mt. Charleston and the Red Rock Canyon National Conservation Area. No formal route designation process has been completed on BLM lands in or around the analysis area.

3.10.3.1 *Southern Nevada Extensive Recreation Management Area*

The analysis area is located primarily within the 2,243,358-acre Southern Nevada ERMA, which includes most public lands managed by BLM in southern Nevada east and west of Las Vegas (except Red Rock Canyon National Conservation Area). The Southern Nevada ERMA is managed by the BLM for dispersed and diverse recreation opportunities that meet Recreation Opportunity Spectrum (ROS) objectives described in the Las Vegas RMP. Recreation opportunities in the ERMA generally include hiking, camping, hunting, horseback riding, cycling, driving for pleasure, off-highway vehicle (OHV) use, and photography. Organized, permitted, and competitive uses such as model airplane and rocketry fly-ins, dog field trials, horse endurance rides, and competitive OHV events also occur. Five recreation categories within the ROS have been identified for the Southern Nevada ERMA including: Semi-Primitive Nonmotorized, Semi-Primitive Motorized, Roaded Natural, Rural, and Modern Urban (BLM 1998).

The project study area within the larger analysis area is designated as mostly Modern Urban, which is generally reserved for areas having relatively modified environments where the sights and sounds of human use predominate. Most of the analysis area is relatively flat and sparsely vegetated, with gently sloping topography and a few small and shallow dry washes draining toward the southwest. The drainage area into and out of Stump Spring is slightly more vegetated, with relatively greater topographic relief. Primary recreation opportunities in the analysis area are limited to casual, dispersed recreation, with some motorized recreation occurring on unauthorized or non-designated trails and in dry washes. Desert washes traverse the analysis area in a northwest to southwest direction of flow. These washes provide unique recreation settings and experiences, used for both motorized and non-motorized recreation. While motorized use does occur in the desert washes, this is an unauthorized use but is not enforced. Actual recreational uses within the project study area are not documented, but motorized use of the desert washes, camping, and target shooting are known to occur. Access to the area for recreational purposes is considered minimal. The nearest designated area is the Stump Springs ACEC, approximately 3.8 miles south of the project analysis area, and the OSNHT, approximately 5.5 miles south of the project analysis area.

3.10.3.2 *Other Federal Lands*

Although most of the analysis area falls within the Southern Nevada ERMA, the analysis area also includes portions of the Humboldt-Toiyabe National Forest, Red Rock Canyon National Conservation Area, and Nopah Range Wilderness Area. Segments of both the South Loop Trail and Griffith Peak Trail in the Humboldt-Toiyabe National Forest fall within the analysis area, as do several designated recreation sites (U.S. Forest Service 2019). There are four designated trailheads in the Red Rock Canyon National Conservation Area portion of the analysis area, and there are no designated recreational sites in the Nopah Range Wilderness Area or Pahrump Valley Wilderness (BLM 2019d), and no designated recreational sites in the Mt. Charleston Wilderness (U.S. Forest Service 2019).

3.10.3.3 *South Pahrump Area OHV Trails*

The DCNR's Off-Highway Vehicles Program promotes safe and responsible use of Nevada's outstanding opportunities for off-road recreation. The program provides grants to fund OHV-related projects throughout the state, including trail improvements, mapping, signage, law enforcement, education, safety training, restoration, and other projects. Off-Road Nevada is a collaborative effort between the State of Nevada DCNR, Commission on Off-Highway Vehicles and Clark County, Nevada. The program identifies 60 different areas, including the South Pahrump Area OHV Trails (DCNR 2020). Over 500 miles of these motorized and non-motorized trails (two-track and single track) are within the analysis area. The Nye County Sherriff's Office and BLM provide enforcement of these trails.

3.10.3.4 *Hunting*

The project area is located in Game Management Unit (GMU) 262 managed by the NDOW. Big-game hunting in GMU 262 is primarily focused on elk and desert bighorn sheep. Hunting seasons for these species range from late summer to fall for archery, fall for muzzleloader, and fall through winter for modern rifle hunting. Although both bighorn sheep and elk are regularly harvested in GMU 262, a search of recent annual records indicates that none were taken in or near the project area, which is consistent with the lack of suitable habitat (see Section 3.4, Biological Resources – General Wildlife). Additionally, no designated or established undesignated shooting areas have been identified in project area.

Detailed data on the taking of small game are not readily available for GMU 262; however, upland birds and small-game species such as mourning dove (*Zenaida macroura*) and white-winged dove (*Zenaida asiatica*), Gambel's quail (*Callipepla gambelii*), chukar (*Alectoris chukar*), American crow (*Corvus brachyrhynchos*), rabbit (*Sylvilagus audubonii*), jackrabbit (*Lepus californicus*), and general varmint can legally be taken in the project area. The practice of falconry is allowed for game animals in GMU 262, as well as trapping for fur-bearing animals.

3.10.4 Environmental Consequences

This section describes the potential impacts to recreation associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.10.4.1 *Methodology*

Determination of potential impacts to recreation from the Proposed Action and alternatives is primarily based on existing recreation resource management data provided by the BLM Las Vegas Field Office and U.S. Forest Service recreation data from the Humboldt-Toiyabe National Forest. Spatial/geographic information system (GIS) information and recent aerial images were also used in this analysis to identify potential non-designated recreational opportunities and uses.

Impacts to recreation within the analysis area have been determined based on changes to the issue indicators, which are used to assess how the Proposed Action and the alternatives would affect recreation opportunities and the overall recreation setting. Impacts to recreation have been quantified where possible, and if not quantifiable, impacts have qualitatively discussed.

3.10.4.2 *Issue Indicators*

The following issue indicators are the specific metrics used in this analysis to determine whether recreational resources or recreational access would be affected by the Proposed Action or alternatives.

- Miles of designated recreation routes (e.g., hiking, biking, OHV), and number of designated recreation access points affected by the project
- Visual, noise, and traffic impacts

The following discussion evaluates the Proposed Action and each alternative against these issue indicators to determine whether there would be project-related effects.

3.10.5 Proposed Action

The Proposed Action would construct solar arrays in four discrete sub-areas connected by access roads, resulting in both temporary and permanent losses of recreational access and opportunity.

3.10.5.1 *Construction Impacts*

Recreation-related construction impacts would include disturbing and temporarily excluding recreational uses on the entire the 2,908-acre fenced-in area (see Figures C-5 and C-11, respectively), which is primarily undisturbed native landscape. Public dispersed recreation access and opportunities would be denied during construction. The fence line would preclude 4.8 miles of single track that would no longer be available for public access. Construction is expected to be visible by recreational users from approximately 0.4 mile of the Griffith Peak Trail and 3.3 miles of the South Loop Trail.

Construction vehicles (up to 425 trips daily) and up to 400 workers daily would arrive and depart the Proposed Action area for up to 24 months, 7 days a week, and through 12-hour work cycles (7 a.m. to 7 p.m.) until construction is completed. It is possible that the construction of some project features (e.g., solar arrays, power poles, or substation) could be visible to dispersed recreational users for distances of up to 15 miles. Construction noise might be audible to nearby recreational users during the 60-month construction period (potentially ten 50-MW phases, each taking up to 6 months to complete).

Construction traffic would create minor congestion and intermittent slow-downs for recreation-related traffic along SR 160 near its intersection with Tecopa Road and along Tecopa Road. The Stump Springs ACEC and OSNHT are located approximately 1 mile east of Tecopa Road and 4.5 miles south of the Proposed Action. While not designated as recreation areas, they do offer points of interest to potential recreational users in the area, which could be affected by project-related construction traffic on Tecopa Road. Impacts to recreation-related traffic would be mitigated through implementation of a project-specific Traffic Management Plan (see Appendix B).

3.10.5.2 *Operation and Maintenance Impacts*

Approximately 2,908.4 acres of the 5,032.2-acre project area would be fenced for security (see Figure C-3), which would exclude public recreational uses near the solar arrays, substations, and other facilities during the operational life of the project (approximately 30 years). Recreation access and opportunities on public lands adjacent to the Proposed Action would be publicly accessible from Tecopa Road or SR 160, either south or north of the Proposed Action, respectively. Although traversed by project-related access roads, the principal washes crossing the project area would remain unfenced, which would permit some level of public access from northeast to southwest through the project area. Routine operations and maintenance activities are expected to require a staff of up to four workers who would arrive and depart the Proposed Action area weekly during daylight hours, which could affect recreation-related traffic. No measurable amount of project noise is expected during day-to-day operational tasks; therefore, no noise impacts are expected for recreational users. Operational activities are not expected to affect recreation access or opportunities on the Stump Springs ACEC and OSNHT because of their distances from the Proposed Action, and the relatively minor increase in operations-related traffic. It is possible that some constructed project features (e.g., solar arrays, power poles, or substations) could be visible to dispersed recreational users for distances of up to 15 miles. Project operations (mainly the constructed features) are expected to be visible by recreational users from approximately 0.4 mile of the Griffith Peak Trail and 3.3 miles of the South Loop Trail. Additional visual impact details area provided in Section 3.15, Visual Resources.

3.10.5.3 *Decommissioning Impacts*

The effects of project decommissioning on recreation access and opportunity would roughly mirror those discussed above. Impacts from decommissioning on recreation would differ from construction in that lands previously restricted (for the 30-year project lease period) would once again become publicly accessible. Project decommissioning would occur following the project-specific Decommissioning, Abandonment, and Site Reclamation Plan, as well as a Site Restoration and Revegetation Plan (PD-5 and PD-6). This plan would outline decommissioning activities, safety and protection measures, reclamation procedures, and success criteria, as well as notification and abandonment scheduling. The plan would also include requirements for long-term monitoring and maintenance as needed to ensure that restoration goals are attainable and completed. Visual, noise, and traffic impacts on project decommissioning experienced by recreational users are anticipated to closely mirror those expressed above.

3.10.5.4 *Cumulative Impacts*

The analysis area for cumulative recreation impacts includes the 15-mile buffer around the project study area (571,771 acres). The effects on recreation from past and present projects in the analysis area have not been documented. However, reasonably foreseeable future actions that could incrementally contribute to potential recreation impacts include several projects on BLM lands ranging from less than 1 acre to 74 acres and totaling 17,169 acres (see Table 3.2-2). Additionally, NDOT intends to implement a future pavement preservation project on SR 160 near Blue Diamond (approximately 50 acres). Using disturbance areas for planned cumulative projects as a proxy for reasonably foreseeable future recreation impacts, the Proposed Action would increase the cumulatively affected recreation acreage within the analysis from 400 acres to approximately 3,472 acres, which would represent an eightfold increase in potential recreation impact.

3.10.6 Alternative Action 1 – Modified Layout

3.10.6.1 *Construction Impacts*

Overall, construction-related impacts to recreation and recreational access under Alternative Action 1 (Modified Layout) would remain similar to those described under the Proposed Action, but with a larger footprint with an additional 110.4 acres disturbed under this alternative. The chief variation is that Alternative Action 1 would condense the four discrete solar arrays described in the Proposed Action into a single location at the west end of the project area irrespective of the bisecting washes. Condensing the four discrete solar array locations into a larger single area would result in the loss of approximately 1,008 acres (approximately 8 total linear miles) of desert washes that would have remained available for recreational uses under the Proposed Action. Visual impacts to recreational users on designated trails would be the same as those discussed above for construction of the Proposed Action.

3.10.6.2 *Operation and Maintenance Impacts*

Most recreation impacts resulting from operations and maintenance of Alternative Action 1 (Modified Layout) are expected to be the same as those described for the Proposed Action, e.g., same maintenance schedule, same project lifespan, same use of access roads off Tecopa Road, etc. The primary differences in operational impacts would be related to the longer main access road from Tecopa Road to the project area, and the loss of approximately 1,008 acres (approximately 8 linear miles) of desert washes for non-motorized and motorized recreation. Under Alternative Action 1 (Modified Layout), the longer access road would be gated only at the entrance at the solar array instead of gated closer to Tecopa Road, allowing recreational users access to approximately 1.1 new miles of maintained roadway within the project area. Approximately 1,008 acres of xeroriparian wash habitat would become unavailable for

recreation uses for the duration of the 30-year operational project period under Alternative Action 1. Visual impacts to recreational users on designated trails would be the same as those discussed above for operation of the Proposed Action.

3.10.6.3 *Decommissioning Impacts*

Decommissioning impacts associated with Alternative Action 1 (Modified Layout) would be the same as described above for the Proposed Action. Alternative Action 1 would include decommissioning approximately 12 additional acres compared with the Proposed Action. Project decommissioning would occur following the same project-specific Decommissioning, Abandonment, and Site Reclamation Plan, as well as a Site Restoration and Revegetation Plan (see Appendix B) as described above for the Proposed Action.

3.10.6.4 *Cumulative Impacts*

Cumulative impacts to recreation under Alternative Action 1 (Modified Layout) would be the same as those described above under the Proposed Action.

3.10.7 Alternative Action 2 – Mowing Alternative

3.10.7.1 *Construction Impacts*

There is no difference between Alternative Action 2 (Mowing Alternative) and the Proposed Action as it relates to recreation. The modified mowing plan proposed under Alternative Action 2 would not change the previously described impacts to recreation and/or recreation access described under the Proposed Action or Alternative Action 1 (Modified Layout). Impacts to recreational users and desired recreation experiences on designated trails would be the same as those discussed above for construction of the Proposed Action. Vegetation recovery would occur sooner, benefiting the dispersed recreation setting.

3.10.7.2 *Operation and Maintenance Impacts*

The modified mowing plan proposed under Alternative Action 2 would be carried forward through the same 30-year operational lifespan for the project for the Proposed Action and Alternative Action 1. Impacts to recreation and/or recreation access during project operation would be the same as previously described under the Proposed Action and Alternative Action 1 (Modified Layout).

3.10.7.3 *Decommissioning Impacts*

Decommissioning impacts associated with the modified mowing option described in Alternative Action 2 would be the same as described above for the Proposed Action and Alternative Action 1 (Modified Layout). Project decommissioning would occur following the same project-specific Decommissioning, Abandonment, and Site Reclamation Plan (see Appendix B) as described above for the Proposed Action.

3.10.7.4 *Cumulative Impacts*

Cumulative impacts to recreation under Alternative Action 2 (Mowing Alternative) would be the same as those described above under the Proposed Action.

3.10.8 No Action Alternative

Under the No Action Alternative, the project would not be constructed, operated, or decommissioned; therefore, existing recreational uses would continue in the project study area and adjacent public lands. The landscape and existing non-designated roads and trails would not be altered, and there would be no changes to the scenery, traffic, or levels of noise. Therefore, the existing recreation activities, settings, and experiences would remain the same (no change from current conditions).

3.10.9 Irreversible or Irretrievable Impacts

Irreversible or irretrievable impacts are those that cannot be fully reversed or recovered. This analysis considers irreversible impacts as those that permanently affect future recreational uses, e.g., not addressable through project restoration or reclamation. Irretrievable impacts are those lost recreation opportunities that occur during the lifespan of the project, which would be reinstated only after project reclamation is complete; irreversible impacts would never be reinstated. The Proposed Action and its alternatives are anticipated to share the following irretrievable impacts:

- Public access restrictions to and through the project area,
- Slight traffic increases on Tecopa Road and SR 160 by maintenance and operational staff,
- Project components visible to recreational users, and
- Landscape scarring and revegetation visible long after project reclamation.

The project would convert up to 3,105 acres of public land available for recreation into land inaccessible by the public and used for renewable energy purposes. By excluding public access to the project area (desert washes notwithstanding, as they will be available for public access under all alternatives except Alternative Action 1 – Modified Layout) recreational access and opportunities in the project area would be irretrievably lost with no provision for public access during the project duration. Additionally, the project would irretrievably alter dispersed recreation use patterns because public access would be denied to and through the project area. The project would present irretrievable impacts on traffic along Tecopa Road and SR 160, as operations traffic would routinely access the project area. Additionally, the project would create irretrievable impacts on the recreational setting during the operational life of the project by being visible to recreational users.

The project area would be reclaimed after the lifespan of the project (30 years), which would reinstate public access and allow dispersed recreation opportunities to return. However, it could take years before the reclaimed area is open to recreational uses, and vegetation may not fully recover for a period of up to 200 years (see Section 3.14 for details). The reclaimed project footprint could visibly persist for years beyond reclamation, which could constitute an irreversible impact to the recreational setting.

3.11 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.11.1 Introduction

This section analyzes the impacts of the Proposed Action and alternatives on the socioeconomic and environmental justice issues identified during scoping, which include project-related economic expenditures and job creation, population and housing impacts, effects on tourism and recreation economies, and high or disproportionate effects on minority and/or low-income communities.

3.11.2 Analysis Area

The analysis area is Clark and Nye Counties (Nevada), including the communities of Pahrump (Nye County) and Las Vegas (Clark County), with the state of Nevada used as context. The rural unincorporated community of Charleston View (California), located along the California/Nevada state line, is also included in the analysis area. Charleston View is not recognized as a Census Designated Place by the U.S. Census Bureau and therefore community-specific socioeconomic data are limited. Where data are not available, it is assumed that Pahrump, being the closest population center, is representative of Charleston View.

This analysis area was selected to encompass the area in which impacts of the Proposed Action and alternatives are most likely to occur. Although the project area is located in the Pahrump Valley, it is anticipated that many project inputs (workforce, equipment, materials, and supplies) would originate from the greater Las Vegas metropolitan area.

3.11.3 Affected Environment

3.11.3.1 *Demographics*

3.11.3.1.1 POPULATION, ETHNICITY, AND RACE

The nearest population center to the project area is Pahrump, located approximately 15 miles to the northwest of the project area in Nye County. Charleston View, with an estimated population of 64 in 2016, is located approximately 6 miles to the south of the project area in Inyo County, California (Inyo County 2016). The Las Vegas metropolitan area is located approximately 50 miles east of the project area in Clark County. Since 2010, population in Las Vegas and Clark County has grown, while population in Pahrump and Nye County has declined slightly (Table 3.11-1). The greatest population growth occurred in Clark County, which experienced a 11.4% population increase from 2010 to 2017.

Population ethnicity and race of the analysis area in 2017 is provided in Table 3.11-2. Minority populations occur throughout the analysis area, with the largest populations occurring in Las Vegas and Clark County. The largest minority population in the analysis area is Hispanic or Latino (of any race), followed by Black or African-American, and Asian.

3.11.3.1.2 EMPLOYMENT, INCOME, AND POVERTY

Unemployment rates in the analysis area have declined sharply since 2010. Unemployment is greatest in Nye County, with a rate of 5.7% in 2018. The Clark County unemployment rate of 4.8% is slightly above the state of Nevada unemployment rate of 4.6% (Headwaters Economics 2019b).

The top three industries by employment in the analysis area are the professional, management, administration, and waste management industry, education, health care, and social assistance industry, and the retail trade industry (Table 3.11-3). Rates of employment by industry are consistent across all geographic areas within the analysis area and are comparable to statewide industry employment.

Per capita income in the analysis area is lowest in Pahrump. Per capita income in Pahrump is approximately $5,000 less than in Las Vegas and $6,000 less than the State of Nevada. The percentage of people living below poverty level is also highest in Pahrump at 17.8%, or 3.6% greater than the State of Nevada's poverty rate.

3.11.3.1.3 HOUSING

Housing units and occupancy rates in the analysis area are distributed as expected between the more developed areas of Las Vegas and Clark County and the rural, less-densely populated areas of Pahrump and Nye County (Table 3.11-4). Pahrump and Nye County have higher housing vacancy rates—15.8% and 19.1%, respectively—than Las Vegas, Clark County, or the state of Nevada. Las Vegas has the highest occupancy rate in the analysis area at 87.6% occupied. Most parcels in Charleston View are owned by people who do not live in the area and are undeveloped parcels. Of the locally owned parcels, there are approximately 23 built residences (Inyo County 2016).

3.11.3.2 *Tourism and Recreation Economy*

Tourism is the number one industry in the state of Nevada, which in Fiscal Year 2018 accounted for 55.6 million visitors and approximately $4.8 billion in state and local tax revenue (Nevada Division of Tourism 2018). Outdoor recreation consumer spending in Nevada is estimated at $12.6 billion annually (Outdoor Industry Association 2017). The analysis area includes tourism-centered developments in Las Vegas, as well as the tourism and recreation gateway from the Las Vegas area to Death Valley National Park and other public recreation areas along the southern Nevada/California border. Pahrump and Nye County have reported recent growth in year over year tourism-related economic impact, traffic, and room occupancy rates (*Pahrump Valley Times* 2018). The category of arts, entertain, recreation, accommodations, and food is also the largest employment industry category in the analysis area, as shown in Table 3.11-3; however, employment in this category is likely concentrated around the gaming industry.

3.11.3.3 *Access to Local Emergency Services*

The BLM is responsible for managing and responding to all wildfires on BLM-managed public lands. The BLM fire program does not respond to structure fires, hazardous material incidents, or other non-wildfire emergencies, and therefore, non-wildfire emergency response falls to the local jurisdiction. The proposed project falls within the jurisdiction of Clark County Rural Fire Department. The closest emergency responder is Pahrump Valley Fire and Rescue.

3.11.3.4 *Environmental Justice Communities*

Environmental justice communities (i.e., minority and low-income populations), are present in the analysis area (see Tables 3.11-2 and 3.11-3). Combined, the minority populations in Las Vegas and Clark County are greater than 50% of the population. In Pahrump and Nye County, combined minority populations are much lower at 20.3% and 22.8%, respectively. Compared with the state of Nevada, the analysis area has lower incomes and higher rates of poverty. Pahrump has a per-capita income of $22,887 and 17.8% of people living below the poverty line.

3.11.4 Environmental Consequences

This section describes the potential impacts to socioeconomic factors and environmental justice populations associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.11.4.1 *Methodology*

Economic Impact Analysis for Planning (IMPLAN) modeling was used to identify the direct, indirect, and induced effects of the project (IMPLAN Group, LLC 2019). The IMPLAN model estimates effects using localized economic data from Clark and Nye Counties with the anticipated project construction- and operations-related employment and expenditures.

The economic analysis presents direct, indirect, and induced effects of the project. Direct effects are those effects specific to the construction of the solar facility, such as purchasing of materials and supplies and employee wages. Indirect effects are those effects occurring in response to the direct effects, such as expenditures and employee wages of the businesses supplying the solar facility construction. Induced effects capture the consumer expenditures that result from the direct and indirect effects, including consumer expenditures on food, entertainment, and other local goods and services.

For this analysis, is assumed that a portion of employees would originate from nearby Pahrump (Nye County); but the majority would be from the greater Las Vegas metropolitan area (Clark County). Following the employee assumption, the analysis also assumes that most expenditures would likely occur in the greater Las Vegas metropolitan area.

The analysis defines temporary impacts as those occurring within the 24-month construction period. Long-term impacts are those that would occur during the 30-year operations period.

3.11.4.2 *Issue Indicators*

Effects to socioeconomics and environmental justice would occur if the project would:

- result in economic contribution (direct, indirect, and induced) to the analysis area as illustrated by socioeconomic modeling tools (IMPLAN model);
- increase the number of temporary construction and long-term operation jobs in the analysis area, including changes in area population and housing from project-related jobs;
- impact tourism and recreation-related economic inputs in the analysis area;
- affect local emergency services and capacity to respond to wildfire, non-wildfire, and other related emergencies in the analysis area; or
- result in high or disproportionate effects (socioeconomic or environmental) to environmental justice populations relative to effects in the analysis area as a whole.

3.11.5 Proposed Action

3.11.5.1 *Construction Impacts*

3.11.5.1.1 SOCIOECONOMICS

Employment and Income

Project construction would temporarily increase employment in the analysis area during construction. In the single construction phase, the project's construction workforce over 24 months would average 200 to 300 workers, with up to 400 workers at peak construction. If constructed in ten 50-MW phases, the peak construction workforce for each phase would be up to 200 workers over 9 months. Construction workers would most likely commute from the Pahrump (Nye County) and Las Vegas (Clark County) areas. The existing construction workforce in the analysis area, 1,125 in Nye County and 60,671 in Clark County (see Table 3.11-3), would accommodate the project's temporary construction needs.

Project construction would temporarily increase regional labor income and economic output during construction. Table 3.11-5 summarizes the direct, indirect, and induced economic impacts during construction of a 500-MW project. For every $1 million in construction expenditures (which is roughly equivalent to approximately 1 MW of industrial PV solar construction), the project would generate approximately 7.3 direct jobs, 1.3 indirect jobs, and 2.5 induced jobs. Total temporary construction output, including labor income and value-added income[10] is approximately $789 million (IMPLAN Group, LLC 2019).

Housing

It is anticipated that most construction workers would commute from nearby communities and therefore not require temporary housing. However, there are approximately 2,800 vacant housing units in the Pahrump area that could accommodate a temporary influx of construction workers (see Table 3.11-4).

Tourism and Recreation

Project construction impacts may result in temporary decline in tourism and recreation-related expenditures in the analysis area. Construction traffic impacts on area roads, restrictions on recreational access in the project area, and construction visual impacts could temporarily diminish the tourism and recreation experience within the immediate vicinity of the project (i.e., the Pahrump Valley area). However, construction would not affect the region's main draw for tourism (gaming industry) or recreation (Death Valley and other prominent regional recreation destinations). Additionally, because the project would not result in a high demand for temporary housing, tourism and recreation-related expenditures in area hotels and other lodging accommodations would be unaffected.

Access to Local Emergency Services

The BLM would have direct access to the project area in the event of a wildfire emergency.
Fire protection standards would be outlined in a Fire Management Plan approved by the BLM prior to construction, which would be implemented to reduce fire risk to the project area and surrounding public lands. The Fire Management Plan would be prepared to meet Clark County and/or relevant state or federal standards as appropriate and would implement measures to minimize the potential for human-caused fire incidents. Construction activities occurring between May 15 and October 1 (generally defined as wildfire season in the analysis area) may be subject to fire restrictions, which could preclude certain activities known to increase the risk of wildland fire. All wildland fires would be reported to the BLM via the Las Vegas Interagency Communication Center or local 911 emergency services.

Fencing, gates, and controlled access to the project area would allow access for local emergency response. Coordination and communication on non-wildfire emergency response would occur with Clark County and Clark County Rural Fire Department as the responding jurisdiction. Because the closest emergency responder is Pahrump Valley Fire and Rescue, coordination between Nye County Emergency Management and Clark County would also take place to ensure that local resources are informed on construction activities. Were an emergency to occur during construction, the Emergency Response Plan developed for the project would be implemented and would detail contact information, notification, and standard operating procedures for local medical, fire, police, and other emergency services.
The Emergency Response Plan would require BLM approval prior to issuance of a notice to proceed with construction. Depending on the level of emergency, there could be temporary demands on local emergency services lasting the duration of the response time to the incident.

[10] A measure of indirect business taxes (including excise, sales, and property taxes; fees; fines; licenses; and permits) and other property type income (such as rent payments and interest income).

3.11.5.1.2 ENVIRONMENTAL JUSTICE COMMUNITIES

Environmental justice communities in the analysis area include combined minority populations greater than 50% in the Las Vegas metropolitan area and Clark County and low-income populations of approximately 20% in the Pahrump area and Nye County. Relative to the analysis area as a whole, the project construction's adverse environmental, cultural, visual, and human health impacts would not result in high or disproportionate impacts to these environmental justice communities. Measures to minimize effects would be implemented during construction, including a Fugitive Dust Plan, Traffic Management Plan, and Health and Safety Program (refer to Appendix B of this EIS). All populations in the analysis area, including minority and low-income communities, could benefit from the project construction's temporary increase job opportunities and labor income.

3.11.5.2 *Operation and Maintenance Impacts*

3.11.5.2.1 SOCIOECONOMICS

Employment and Income

Operations of the project could require up to 10 employees; however, it is possible that the facility could be operated remotely without permanent staff on-site. The addition of up to 10 permanent operations staff would result in a long-term increase in employment and labor income for the analysis area. The total economic impact of this employment would be beneficial, but the addition of 10 permanent jobs would not appreciably change existing economic conditions in the analysis area.

Housing

Similar to the construction phase, it is likely that operations staff would commute from nearby communities. If operations employees move into the analysis area from elsewhere, vacant housing in the Pahrump and Las Vegas metropolitan areas could accommodate a nominal increase in employees (up to 10).

Tourism and Recreation

Operation of the project would not impact tourism or recreation economies in the analysis area. Operations would not result in traffic impacts on area roads or a shortage of lodging accommodations. While dispersed recreation opportunities in the project area would no longer be accessible to the public, the project area is not a main driver of recreation-related expenditures in the analysis area and the impact of its loss on the recreation economy would be negligible. The project would be visible from several viewing locations in the analysis area during operations, including vehicular travel routes and recreation areas (see Section 3.15, Visual Resources). The visual presence of the project in the landscape is not likely to impact the tourism or recreation economies over the long term as views of the project from the prominent local tourism and recreation areas would be mostly screened by topography and vegetation.

Access to Local Emergency Services

Impacts to local emergency services during operation and maintenance of the project would be similar to those described above for construction. Both the BLM and local rural first responders would have emergency access to the site via a locked gate. Improved access to the project area, including paved and maintained graveled roads, under the Proposed Action would facilitate local emergency response in the event of a wildfire or non-wildfire emergency at the site.

The Fire Management Plan implemented during construction would also be implemented for the life of the project and would incorporate vegetation management strategies for ongoing operation and maintenance of the solar panels and associated facilities as compatible with fire risk management. For non-wildfire emergencies falling under the jurisdiction of the Clark County Rural Fire Department and the nearest emergency responder (Pahrump Valley Fire and Rescue), coordination with local fire departments and other emergency services would continue throughout the life of the project.

3.11.5.2.2 ENVIRONMENTAL JUSTICE COMMUNITIES

Operation of the project would not have a high or disproportionate impact on environmental justice communities.

3.11.5.3 *Decommissioning Impacts*

Because decommissioning activities would be similar in time frame and employment to the construction period, the socioeconomic and environmental justice impacts would be similar to those described above for construction.

3.11.5.4 *Cumulative Impacts*

Continued population growth in the Las Vegas region's communities (and in the Southwest in general) would result in increased employment and economic outputs associated with the population growth. Cumulative projects whose construction overlaps the project's construction, including the SR 160 Blue Diamond Rehabilitation project and additional solar field projects, would have similar socioeconomic effects as the Proposed Action. During project construction, the construction of the additional solar fields would result in a competing interest for construction workforce or temporary housing. Estimates on workforce are unavailable for these projects; however, given the existing construction workforce (61,796) and temporary housing (2,800 vacant units) in the analysis area, cumulative demand would not surpass the local resources. Post-construction, these project would not cumulatively contribute to the region's economic growth forecasts as long-term employment and spending associated with solar project operations is low. Similar to the Proposed Action, the additional solar field projects transportation, recreation, and visual impacts could temporarily diminish the tourism and recreation experience within the immediate vicinity of the project (i.e., the Pahrump Valley area), but would not affect regional tourism and recreation destinations like Death Valley, which are located farther away from the analysis area.

Cumulative impacts to access to local emergency services would primarily occur where existing and future land development rely on these same services. The contribution to cumulative impacts from the Proposed Action and additional solar field projects, a combined total of 20,164 acres, would increase the demand for local emergency services lasting the life of the projects. The Proposed Action's contribution to this increase, by acreage, is approximately 15%.

Cumulative projects whose construction overlaps with the project's construction, including the SR 160 Blue Diamond Rehabilitation project and additional solar field projects, would have similar adverse environmental, cultural, visual, and human health impacts as the Proposed Action. The SR 160 Blue Diamond Rehabilitation project (expected to be completed in 2020) may minimally overlap in construction time frame with the Proposed Action and cumulative effects during this time would primarily consist of increased construction traffic. The additional solar field projects, which combined equate to approximately 17,169 acres of BLM lands in the analysis area, are in closer proximity to the communities of Pahrump and Charleston View than the Proposed Action. These solar projects would have similar short- and long-term environmental effects as described for the Proposed Action, including short-term fugitive dust emissions, long-term reduction in lands available for recreation, and visual effects. The additional solar field projects would also result in similar temporary increases in job

opportunities and labor income as the Proposed Action. While measures to minimize environmental effects would be required for the additional solar projects on BLM lands, including measures for dust, traffic, health and safety, recreation, and visual resources, adverse and beneficial effects on environmental justice communities would still occur from the cumulative solar development in the analysis area. In acreage, the Proposed Action represents approximately 15% of the cumulative solar development scenario.

3.11.6 Alternative Action 1 – Modified Layout

Under Alternative Action 1 (Modified Layout), construction, operations, and decommissioning methods, scheduling, and personnel would remain the same as the Proposed Action; therefore, impacts to socioeconomic and environmental justice communities would be the same as those under the Proposed Action.

3.11.7 Alternative Action 2 – Mowing Alternative

Under Alternative Action 2 (Mowing Alternative), the project could take 10% to 20% longer (an additional 2.5 to 5 months) to construct and would employ the estimated daily workforce for a longer time. As a result, the construction effects under Alternative Action 2 would be similar to those described under the Proposed Action, but would occur for a slightly longer time frame of construction employment and associated housing and economic effects. The operations and decommissioning methods, scheduling, and personnel would remain the same as the Proposed Action; therefore, impacts to socioeconomic and environmental justice communities during these phases would be the same as those under the Proposed Action.

3.11.8 No Action Alternative

Under the No Action Alternative, the project would not be constructed or operated, and there would be no change from current conditions.

3.11.9 Irreversible or Irretrievable Impacts

There are no irreversible or irretrievable impacts that would affect socioeconomic conditions or environmental justice populations.

3.12 SOILS

3.12.1 Introduction

This section identifies the soils resources within and adjacent to the proposed project that would be affected by construction, operation, and decommissioning of the proposed project, and discusses the applicable regulations. Information in this section is largely based on information collected by the USGS and the Nevada Bureau of Mines and Geology.

3.12.2 Analysis Area

The project study area consists of approximately 5,032.2 acres north of Tecopa Road (see Figure C-12). Impacts resulting from construction, operation, and decommissioning activities occurring within the project area have the potential to affect resources located outside the project area. As a result, the soil resources impact analysis area aligns with the study area covered by the YPSP Botanical Survey Report

(SWCA 2019a). This 5,032.2-acre analysis area is used to provide context for current conditions, and ultimately for the direct, indirect, and cumulative impacts related to loss of soil resources or productivity.

3.12.3 Affected Environment

Soil resource inventory data for the analysis area were gathered from two primary sources: 1) the U.S. Department of Agriculture (USDA) National Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (NRCS 2019), which delineates unique soil map units; and 2) the YPSP Botanical Survey Report (SWCA 2019a), which identifies the presence of biotic soils and desert pavements.

3.12.3.1 *Soil Types*

There are four soil types (SSURGO Map Units) within the analysis area (Table 3.12-1) (NRCS 2019). The majority of the study area is the Commski-Oldspan-Lastchance association (59% of the study area) and Lastchance-Commski association (32%), with the remaining 9% of the study area falling within the Commski-Lastchance association and Comcreek-Badland-Pahrump association (see Table 3.12-1). Soils in the analysis area are predominantly composed of well-drained finer textured soils (loam to silt loam) to extremely gravelly sandy loam and cemented materials (i.e., petrocalcic horizons), with some smaller areas containing badlands.

3.12.3.2 *Sensitive Soils*

A number of sensitive soils, including 1) biotic soils and desert pavements, 2) highly erodible soils, and 3) corrosive soils, have been identified within the analysis area, which are detailed in the following sections and summarized in Table 3.12-1.

3.12.3.2.1 BIOTIC SOILS AND DESERT PAVEMENT

Biotic soils and desert pavement commonly occur as a mosaic, covering arid soil surfaces (Williams et al. 2013). Desert pavements are a matrix of rock fragments that form smooth, pavement-like surfaces (Wood et al. 2005). Biotic soils are “living” surface features composed of soil particles enmeshed in a complex web of cyanobacteria, mosses, lichens, bacteria, algae, and fungi (Eldridge and Greene 1994). Both desert pavements and biotic soils provide a protective soil covering that reduces to wind and water erosion potential and further impact soil moisture dynamics (Neuman et al. 1996; Wood et al. 2005). Disruption of fragile biotic soils or removal of desert pavements generally increase wind and water erosion potential (Belnap et al. 2007; Goossens and Buck 2009). The YPSP Botanical Survey Report (SWCA 2019a) identified biotic soils and desert pavements within all soil types, with the greatest density of biotic soil cover estimated within the Lastchance-Commski association and the greatest cover by desert pavements estimated to occur within Corncreek-Badland-Pahrump association (see Table 3.12-1).

3.12.3.2.2 SOIL STABILITY

Water Erosion (K-Factor)

The soil erodibility factor (known as factor “K”) is used to quantify a soil’s susceptibility to water erosion in two erosion models: the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE2) (USDA 2019a). K factor values range from 0.02 (least erodible soils) to 0.64 (most erodible soils). The NRCS assigns two separate K factors to SSURGO-level soil map units (USDA 2019b): the Kf factor applies to fine-grained surface soils (i.e., soil particles less than 2.0 mm in diameter); and the Kw factor applies to fine-grained surface soils adjusted for the impacts of rock fragments. Soil unit erodibility potential can be categorized in one of the following (Michigan State

University 2002): Low Erodibility – Kf or Kw 0.02 to 0.24; Moderate Erodibility – Kf or Kw 0.25 to 0.4; or High Erodibility – Kf or Kw greater than 0.4. All soils types within the study area have one or more soil components with high water erosion potential, as shown in Table 3.12-1.

Wind Erosion (Wind Erodibility Groups)

Wind Erodibility Groups (WEGs) reflect a given soil's susceptibility to wind erosion, which varies according to soil texture, organic matter content, soil carbonate, rock and pararock fragment content, and mineralogy (USDA 2019a). WEG values are assigned soil map units within the SSURGO system (USDA 2019b) and range from a value of 1 to 8: high wind erosion susceptibility (WEG 1 or 2), moderate wind erosion susceptibility (WEG 3, 4, or 4L), slight wind erosion susceptibility (WEG 5, 6, or 7), and no susceptibility to wind erosion (WEG 8). Only 2% of the study area soil types have at least one component with moderate wind erosion susceptibility and the remaining 98% of soils have slight wind erosion susceptibility.

Soil Corrosion Potential

Potential corrosion of both concrete and uncoated steel is functionally defined by the USDA into three categories (Low Corrosion Potential, Moderate Corrosion Potential, and High Corrosion Potential), which are assigned at the soil map unit level within the SSURGO system (USDA 2019a, 2019b). Corrosion potential for concrete is a function of soil texture/reaction, presence of sodium or magnesium sulfates, and presence of sodium chloride. Potential corrosion of steel varies as a function of soil drainage class/texture, total acidity, resistivity at saturation, and soil conductivity (saturated extract). All of the soil types within the study area have one or more component with high steel corrosion potential. Only 2% of the soils within the study area have high concrete corrosion potential, with the remaining 98% of soils having moderate concrete corrosion potential.

Soil Productivity (T-factor, Soil Loss Tolerance)

An important factor in the consideration of soil productivity are thresholds for soil loss due to erosion. The T-factor is defined as the soil loss tolerance (as measured in tons per acre), which is the maximum amount of soil erosion at which the quality of a soil as a medium for plant growth can be maintained. The erosion losses are general defined by USLE or RUSLE2. Erosion classes range on a scale of 1 to 5, with the greater the number being more resilient to future erosional losses of soil (USDA 2019a). For the purposes of this analysis, T-factors classes of 1 to 2 are considered to have low soil loss tolerance (i.e., highly susceptibility to erosion impacts and loss of soil productivity). Ninety-eight percent of soils within the study area have components with low soil loss tolerance, and the remaining 2% of soils have moderate soil loss tolerance.

3.12.4 Environmental Consequences

This analysis presents the anticipated disturbance impacts to soil resources based on preliminary engineering of the Proposed Action and alternatives and takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS. While final project design may change the discrete location of surface and subsurface disturbance, the maximum soil disturbance by construction type shown in Table 2.8-1 would not change. The soil resource impacts described in this section are anticipated to be representative in scale to the final project disturbance areas. Five site preparation methods are proposed for the project's construction phase, which would directly influence the expected environmental consequences and impacts: 1) grading and leveling, 2) clear and cut with soil removal (tilling), 3) clear and cut (removal of all vegetation to 3 inches), 4) mowing of vegetation to 18 to 24 inches, and 5) drive-and-crush disturbance. The acreage of each site preparation method varies by

facility component and for each alternative, as described in Table 2.8-1 and in the Alternatives Development Report (BLM 2019e).

3.12.4.1 *Methodology*

To conduct the analysis, the SSURGO soils data (NRCS 2019) were first overlaid with the footprint of each alternative. Acreages of different sensitive soil attributes (biotic soils, desert pavements, erodible soils, and corrosive soils) within each alternative were calculated. Where attributes were given as numerical values or indices, ranges of data were classified as "high," "moderate," and "slight" or "low," and acreages of high potential risk or susceptibility are provided for each alternative.

A qualitative analysis was also completed to assess the relative impacts of the proposed site preparation methods on soil and vegetation resources, which would vary among the alternatives. For this analysis, impacts to soil and vegetation characteristics were ranked based on their estimated level of impact. The estimated levels of disturbance decrease as follows: grading and leveling (greatest disturbance for most types of impacts), clear and cut with soil removal (soils tilled, mixing soil layers), clear and cut (vegetation removed to 3 inches without tilling), mowing (mowing vegetation to 18–24 inches), and drive and crush (least disturbance for most impacts). Case studies of best management practices at utility-scale solar facilities have found that mowing helps to maintain the native seed and root structures in the soil, minimizing wind and water erosion risks and increasing the likelihood of natural rehabilitation (Sinha et al. 2018).

3.12.4.2 *Issue Indicators*

Effects on soil resources would occur if the project:

- Substantially alters the structure or function of sensitive soils (biotic soils, desert pavements, erodible soils, and corrosive soils) (described in Section 3.12.5.1);
- Changes or modifies soil productivity; or
- Changes vegetation community structure and function, thereby altering soil stability and/or productivity.

Surface disturbance to soils from vegetation clearing/mowing/crushing, soil tilling, and earthwork during all project phases would impact soil function in several ways. Table 3.12-2 summarizes the estimated area of sensitive soils (biotic soils, desert pavements, erodible soils, and corrosive soils) within the footprint of each alternative. Table 3.12-3 summarizes and qualitatively ranks (on a scale of 1 to 5) the estimated impacts of each of the five site preparation methods to soil resources and vegetation structure and function, and provides the approximate cover of these methods for each alternative.

3.12.5 Proposed Action

3.12.5.1 *Construction Impacts*

The Proposed Action would cause variable levels of construction disturbance within approximately 2,994.7 acres, which includes areas for solar arrays, energy storage facilities, ancillary facilities, and access roads. Construction site preparation methods would include grading and leveling, clear and cut (3 inches) with soil removal (tilling), clear and cut (3 inches), and drive-and-crush disturbance.

3.12.5.1.1 IMPACTS TO SENSITIVE SOILS

Sensitive soils, including biotic soils, desert pavements, erodible soils, and corrosive soils, are those soils that are most vulnerable to disturbance impacts. For example, biotic soils and desert pavements may be impacted (to some degree) by any surface disruption within the entire project footprint, with many soil disturbances increasing wind and water erosion susceptibility. The Proposed Action would impact up to 100.1 acres of biotic soils, 364.8 acres of desert pavement, 2,994.7 acres of soils with high water erosion potential, 0.2 acre of soils with moderate or greater wind erosion potential, and 2,994.7 acres of soils with low soil loss tolerance (see Table 3.12-2).

The magnitude of disturbance during construction is primarily based on the site preparation methods applied, which affects the level of impacts to biotic soils and desert pavements. Grading and leveling would completely remove all biological soil crusts and desert pavements, causing the greatest disturbance and loss of these resources. Soils exposed by removal or disruption of vegetation, biotic soils or desert pavements (Belnap et al. 2007; Goossens and Buck 2009), by grading, tilling, and excavation would be subject to accelerated erosion by wind and water, the effects of which would be most pronounced in erosion-prone soils and where losses of soil cover are greatest. Vegetation clearing and drive-and-crush would cause the least amount of soil disruption. The greater the impact to soils (such as grading or tilling) the greater the likelihood for impacts to biotic soils (see Table 3.12-2).

Generally, biotic soils require tens to thousands of years to recover after loss from disturbance (Belnap and Warren 2002; Williams et al. 2013). The vesicular soil horizons that develop below biotic soils and desert pavements develop through incremental dust capture over decades to millennia (Williams et al. 2013). Therefore, loss of desert pavements, biotic soils, and vesicular horizons through disturbance and erosion would have long-lasting impacts on soil function.

3.12.5.1.2 IMPACTS TO SOIL PRODUCTIVITY

Construction activities would strongly affect soil productivity, with the greatest impacts associated with the highest disturbance site preparation methods. Permanent soil productivity loss would occur where soils are completely covered by project structures and no longer available for production, or where soils are removed for structural foundations. Other site preparation methods may have short- to long-term impacts on soil productivity. In the Proposed Action, up to 21% of the site would be graded, and up to 36% of the site would be prepared using clear and cut (3 inches) with soil removal (tilling) Therefore, over half of the site would be constructed using techniques that disturb soils and remove productivity. Most of the remaining site would be prepared with clear and cut (3 inches) (42%), resulting in moderate to high impacts to soil resources.

Compaction has been shown to challenge reclamation and revegetation efforts. Even relatively “light” disturbance from foot traffic and small vehicles can sufficiently compact and/or destroy natural soil structure (such as fragile biotic soil structures [Williams et al. 2012]) to impact native plant growth (Lovich and Bainbridge 1999). Natural recovery from soil compaction may require 92 to 124 years (Webb et al. 1986) and would likely be slowest for high-disturbance construction activities such as grading and leveling and tilling (see Table 3.12-2).

Soil compaction and earthwork activities would likely also decrease water infiltration and run-off, leading to changes in natural water flow paths and redistribution of soil moisture (Abella 2017). These perturbations to soil water distribution may further impact vegetation productivity within the immediate landscape (Schwinning et al. 2011). These impacts would be most pronounced in areas where leveling and grading occur and less impactful in areas where vegetation clearing occurs.

Mixing and/or removal of topsoil (associated with grading, leveling, and tilling) would result in losses of important soil resources such as the native seedbank, fertile islands, soil nutrients, organic matter and microbial communities (including biotic soils) that support healthy vegetation communities (Abella 2010; Belnap et al. 2007; Goossens and Buck 2009; Lovich and Bainbridge 1999). Loss of shrub cover associated with vegetation clearing to 3 (inches) or less would cause less direct loss of these soil features; however, loss of vegetation canopy cover would increase potential for erosion of these resources.

Soil erosion, losses of surface soils and soil productivity, and soil compaction from surface disturbance would delay reestablishment of native plant communities after construction and decommissioning (Abella 2010; Lovich and Bainbridge 1999; Macknick et al. 2013). Disturbance from ground-disturbing activities can take decades to centuries to recover (Abella 2010; Chambers et al. 2013; Copeland et al. 2017; Lovich and Bainbridge 1999). Additionally, mobilization of soils during ground-disturbing activities and from resulting wind and water erosion could impact downstream surface waters and air quality (see Sections 3.16 and 3.3, respectively).

Soil disturbance has also been identified as an important consideration in non-native species dynamics (Chambers et al. 2013; Copeland et al. 2017; DeFalco and Esque 2014; Gelbard and Belnap 2003; Lovich and Ennen 2011). For example, non-native plant invasion has been shown to be higher in areas with greater levels of soil disturbance (Gelbard and Belnap 2003), making minimization of disturbance critical to reducing invasive species impacts (DeFalco and Esque 2014). While treatment with herbicides is expected to reduce non-native species impacts across all site preparation types, areas being graded and leveled or tilled are expected to have the greatest potential for invasion and spread of non-native species (see Table 3.12-3). Excavation for structural foundations, as well as other grading and leveling activities, would cause mixing of subsurface soils, which commonly have elevated concentrations of calcium carbonate and other salts (Buck et al. 2006; Machette 1985) with surface soils, thereby inhibiting plant growth. Depending on the depth of soil tilling, this soil mixing could also expose salt-rich subsurface soils. Some salt-affected soils within the Proposed Action area have high steel corrosion potential (2,994.7 acres) and high concrete corrosion potential (2.0 acres), which are important considerations for construction and longevity of infrastructure within the project area (see Table 3.12-2).

3.12.5.1.3 IMPACTS TO VEGETATION STRUCTURE AND FUNCTION

The presence of vegetation structure and its ecological function is important to short- and long-term soil health. Construction activities would have direct impacts on vegetation, causing a net loss of vegetation cover and structure on all but 1% of the project area (see Table 3.12-2) (Abella 2010; Chambers et al. 2013; Copeland et al. 2017). Vegetation losses and changes to species composition would be greatest where vegetation is removed (due to grading and leveling), where root structures are disrupted by tilling, or where vegetation is cleared. Areas where drive-and-crush is used for construction would facilitate more efficient recovery of vegetation; however, this would occur on less than 1% of the site under this alternative. Loss of native vegetation on-site, and extensive soil disturbance, would lead to an increased likelihood of weed invasion and spread (Gelbard and Belnap 2003). Long-term loss of vegetation structure (associated with grading and tilling) can cause permanent to temporary loss of nurse plants, which are critical to the germination of some desert plant species, and can cause high mortality of vegetation (McAuliffe 1988).

3.12.5.2 *Operation and Maintenance Impacts*

Following construction, areas of temporary disturbance (approximately 86.3 acres) would be partially revegetated. Where vegetation is able to grow back in cleared areas, vegetation would be allowed to grow up to 12 inches in height. Reduction of perennial vegetation cover across the site would result in continued soil surface disturbance during operation of the site, and increase the potential for weeds to

invade and further degrade soil quality (Chambers et al. 2013; Copeland et al. 2017; DeFalco and Esque 2014). Increases in invasive species cover would increase the frequency and intensity of herbicide treatments, which can be damaging to biological soils (Von Reis 2015). Maintenance of access roads would prevent the deterioration of road conditions that lead to wind and water erosion. The operation and maintenance of aboveground structures is anticipated to have minimal additional impact on soil resources beyond that of the construction disturbance.

3.12.5.3 *Decommissioning Impacts*

Decommissioning would include removal of all facility components within the project sub-areas, TCS, linear facilities, and access roads. The decommissioning disturbance area would be similar to that disturbed during project construction. Decommissioning equipment, techniques, and personnel would also be similar to the level and type of impacts described for the construction process. In accordance with project plans, decommissioning would be conducted in accordance with project design features discussed in Appendix B, including the Site Restoration and Revegetation Plan and the Decommissioning, Abandonment, and Site Reclamation Plan. As discussed above, permanent soil productivity loss would occur where soils are completely covered by project structures and no longer available for production, or where soils are removed for structural foundations.

The timeline for successful restoration and revegetation is expected to be influenced by the level of disturbance over the life of the project. Because vegetation would be removed from most of the site under the Proposed Action, and soils would be disturbed on over half of the site, soil recovery after decommissioning is expected to take decades to centuries. Managing invasive weed cover would include herbicide treatments that impair soil function, ultimately slowing recovery.

3.12.5.4 *Cumulative Impacts*

Cumulative impacts within the project region are limited to those that would disturb soils within 5 miles of the project site, as well as other projects located within soils similar to those of the proposed project. Reasonably foreseeable future projects that have been identified with potential to impact soils include the development of three additional solar facilities adjacent to the YPSP totaling 17,169.4 acres (Copper Rays Solar Project, the Rough Hat Clark County Solar Project, and the Sagittarius Solar Project). Cumulatively, this would result in almost 20,000 acres of soil disturbance. There would be cumulative impacts in the form of loss of soil productivity, loss of sensitive soils, degradation of plant communities as a result of soil degradation, and weed invasions, as well as increased indirect and edge effects from cumulative effects. Because biotic soils require tens to thousands of years to recover after loss from disturbance, any disturbances that remove biotic soils is considered permanent (Belnap and Warren 2002; Williams et al. 2013). Permanent loss of soils to utility-scale soar projects has not been quantified or addressed within regional plans, including the *Approved Resource Management Plan Amendments/Record of Decision (ROD) for Solar Energy Development in Six Southwestern States* (BLM 2012b). However, the BLM ROD (2012b) identified approximately 60,395 acres considered potentially viable locations for future solar development. However, this acreage does not account for solar projects like YPSP located in areas outside solar energy zones, nor does it provide cumulative analysis of losses of habitat and soil types for those areas.

3.12.6 Alternative Action 1 – Modified Layout

3.12.6.1 *Construction Impacts*

Construction impacts would be similar to those described under the Proposed Action, as the mechanisms for construction would be the same. Implementation of project plans and design features would be

implemented for all project alternatives in order to reduce potential risks caused by construction activities to the extent feasible. The only variation is the location of the construction and the acres of direct impacts, although the total acres affected include a nominal change, representing an increase of approximately 110.4 acres over the Proposed Action (see Table 3.12-2). There are some small differences in the potential impacts to sensitive soils, compared with the Proposed Action, with total impacts as follows: 93.2 acres of biotic soils (slight decrease, compared with the Proposed Action), 403.7 acres of desert pavement (slight increase compared to Proposed Action), 3,105.1 acres of soils with high water erosion potential (moderate increase, compared with the Proposed Action), 124.2 acres of soils with moderate or greater wind erosion potential (moderate increase, compared with the Proposed Action), 2,980.8 acres of soils with low soil loss tolerance (slight decrease, compared with Proposed Action), 3,105.1 acres of soils with high steel corrosion potential (moderate increase, compared with the Proposed Action), and 124.2 acres of soils with high concrete corrosion potential (moderate increase over Proposed Action) (see Table 3.12-2).

3.12.6.2 *Operation and Maintenance Impacts*

Operation impacts would be similar to those described under the Proposed Action, as the operational activities would be the same. Long-term operations would include project design features common to all project alternatives in order to reduce potential risks caused by construction activities.

3.12.6.3 *Decommissioning Impacts*

Decommissioning impacts would be similar to those described under the Proposed Action, as the decommissioning activities would be the same. The only variation is the location of the facilities and the increased length of the access road and gen-tie line. Decommissioning disturbance impacts would be reduced through the implementation of the project design features discussed in Appendix B, including the Decommissioning, Abandonment, and Site Reclamation Plan; however, permanent impacts to soil resources are still expected, given the level of ground disturbance proposed in Alternative Action 1 – Modified Layout (see Appendix B).

3.12.6.4 *Cumulative Impacts*

Alternative Action 1 (Modified Layout) would result in a similar level of impact to soil resources as the Proposed Action. The acreage and nature of disturbance would be comparable, with similar long-term and large-scale impacts to biotic soils and potential loss of soils from erosion. Alternative Action 1 (Modified Layout) would impact soil resources in drainages, whereas the Proposed Action would avoid impacts to drainages.

3.12.7 Alternative Action 2 – Mowing Alternative

3.12.7.1 *Construction Impacts*

Alternative Action 2 (Mowing Alternative) would grade the same percentage of the site as described in either the Proposed Action or Alternative Action 1 (Modified Layout). The rest of the site (a minimum of 79% of the site), would be mowed instead of cleared or tilled. Vegetation would be mowed to 18 to 24 inches. The footprint of impacts would remain the same as the Proposed Action and/or Alternative Action 1 – Modified Layout (see Table 3.12-2).

Vegetation would be maintained on most of the site under this alternative, and vegetation mortality and soil disturbance would be lower as a result (Sinha et al. 2018) (see Table 3.12-3). As detailed in Section 3.12.6.1, maintaining greater intact vegetation (up to 24 inches tall) and avoidance of tilling and

vegetation clearing during construction would help maintain the integrity of sensitive soil resources (biotic soils, desert pavements, erodible soils, and corrosive soils) and reduce soil erosion potential (Chambers et al. 2013; Copeland et al. 2017; DeFalco and Esque 2014; Gelbard and Belnap 2003; Lovich and Ennen 2011). Likewise, these site preparation methods would reduce losses of soil resources, changes to soil structure, soil compaction, and impacts to surface hydrological dynamics, compared with the Proposed Action and Alternative Action 1 (Modified Layout). Compared with the other two alternatives, the Mowing Alternative would reduce impacts to soils, including sensitive soils, throughout most of the project area during construction. This would result in reduced soil erosion and runoff, which would also decrease indirect impacts by reducing erosion potential.

3.12.7.2 *Operation and Maintenance Impacts*

Compared with the other alternatives, soils would remain mostly intact and be subject to less disturbance under the Mowing Alternative. Vegetation would be maintained at 18 to 24 inches throughout the site and is expected to have higher survival rates than cleared vegetation in the other alternatives. This would improve soil health by maintaining symbiotic relationships between living desert shrubs and soil microbial communities (Sinha et al. 2018). Less soil disturbance under the Mowing Alternative would resist weed invasion more effectively than the other two alternatives, which would then lessen the frequency and intensity of herbicide treatments, resulting in fewer impacts to biological soil crusts (Chambers et al. 2013; Gelbard and Belnap 2003).

3.12.7.3 *Decommissioning Impacts*

Under the Mowing Alternative, fewer soils would have been disturbed during construction and O&M, and vegetation, having been maintained at 18 to 24 inches, would still occupy the site and support soil health and stability. Reduced disturbance would allow for more efficient recovery after decommissioning relative to the other alternatives (Sinha et al. 2018). The Mowing Alternative would result in fewer direct and indirect impacts to soils during decommissioning, as they are anticipated to recover to a more natural state at the end of the project. Soils would still be disturbed through compaction during the decommissioning process, but are expected to recover in a matter of years as opposed to centuries for the other alternatives (Chambers et al. 2013; Copeland et al. 2017; DeFalco and Esque 2014; Gelbard and Belnap 2003; Lovich and Ennen 2011).

Other decommissioning impacts under Alternative Action 2 (Mowing Alternative) would be similar to those described for the Proposed Action and Alternative Action 1 (Modified Layout).

3.12.7.4 *Cumulative Impacts*

The Mowing Alternative (Alternative Action 2) would have fewer cumulative impacts than the Proposed Action and Alternative Action 1 (Modified Layout). Comparatively, the Proposed Action and Alternative Action 1 (Modified Layout) would result in greater disturbance to soil resources (within the project footprint), including disturbance to biotic soils and desert pavements, loss of natural soil structure, and mixing of soils from tilling. Because loss of biotic soils and soil loss from erosion is considered permanent, Alternative Action 2 (Mowing Alternative) would cause fewer long-term impacts to soil resources and would result in a much smaller footprint of permanent disturbance.

3.12.8 No Action Alternative

Under the No Action Alternative, the BLM would not issue ROW grants or special use permits and the project would not be constructed. No surface disturbance would occur, and soils would not be affected.

3.12.9 Irreversible and Irretrievable Impacts

Soil impacts associated with project-related activities are related to long-term loss of productivity. Decommissioning would be conducted in accordance with project design features discussed in Appendix B, including the Site Restoration and Revegetation Plan (PD-5) and the Decommissioning, Abandonment, and Site Reclamation Plan (PD-6). However, as discussed above, permanent soil productivity loss would occur where soils are completely covered by project structures and no longer available for production, or where soils are removed for structural foundations. Soil compaction would decrease water infiltration and run-off, leading to a redistribution of soil moisture and vegetation productivity response within the immediate landscape. Generally, because biotic soils require tens to thousands of years to recover after loss from disturbance, any disturbances that remove biotic soils is considered permanent (Belnap and Warren 2002; Williams et al. 2013). Long-term losses to soil productivity would be a loss to the region and would be significant under the Proposed Action and Alternative Action 1 (Modified Layout). The Mowing Alternative would result in much less disturbance of soils and loss of sensitive soils, relative to the other alternatives.

3.13 TRANSPORTATION AND TRAFFIC

3.13.1 Introduction

This section describes the existing transportation and traffic conditions in the analysis area. This analysis is limited to non-recreation transportation routes that would be used for the transportation of materials, equipment, and as commuter routes during construction, operations, and decommissioning of the Proposed Action and alternatives. An analysis of project impacts on recreation access routes is provided in Section 3.10, Recreation.

3.13.2 Analysis Area

The analysis area for transportation and traffic is a 5-mile radius around the project area and focuses on the primary public transportation routes that would be used by the project. These include SR 160 and Tecopa Road (see Figure C-2). Front Sight Road, Cathedral Canyon, and Hidden Hills Ranch Road are also within the 5-mile radius around the project area; however, these roads are not anticipated to be used as transportation routes by the project. While materials, equipment, and commuter trips may originate outside of the 5-mile analysis area, project-related traffic on busier transportation corridors, such as Interstate 15 or roads within the Las Vegas metropolitan area, would have no notable impact on transportation and are therefore not discussed in detail in this section. Additionally, newly created roads internal to the project area would not be open to the public and are therefore not analyzed.

3.13.3 Affected Environment

SR 160 is the primary transportation route between the Pahrump Valley and the Las Vegas metropolitan area. The road is located northeast and directly adjacent to the project area. In the analysis area, SR 160 is a generally flat, paved, four-lane, rural divided highway with a speed limit of 75 miles per hour (mph). The route has cross overs and turn lanes every mile, including a turn-around and a turn lane at Tecopa Road, which intersects the highway. Local traffic on this route would be used by individuals seeking access to Pahrump Valley (north of the project area) and the greater Las Vegas metropolitan area (east of the project area). SR 160 is also the primary route from these areas to Death Valley National Park. NDOT estimates that the average annual daily traffic count for SR 160 is approximately 9,100 (NDOT 2017).

Tecopa Road is a Clark County–maintained road that provides northeast-southwest access to the OSNHT and the community of Charleston View in California. The road is located adjacent to the project area, on the southeast side. Tecopa Road is a paved, two-lane, rural road, and is generally flat with a speed limit of 55 mph. Local traffic consists of individuals accessing SR 160 to and from the community of Charleston in California, and for those needing access to and from Front Sight Road and Cathedral Canyon and the associated private facilities. Traffic counts are unavailable for Tecopa Road; however, due to its rural nature, traffic counts are expected to be much less than those described for SR 160.

Several other small private roadways are located within the analysis area. These include Front Sight Road, Cathedral Canyon Road, and Hidden Hills Ranch Road. Front Sight Road is a local, two-lane, paved rural road that connects to the west side of Tecopa Road and ends at a private firearms training facility. Front Sight Road is approximately 3.12 miles from the YPSP entrance road. Cathedral Canyon Road is a local, unpaved rural road that connects the west side of Tecopa Road to Hidden Hills Ranch Road and is approximately 4.8 miles from the YPSP entrance road. Hidden Hills Ranch Road is a local, unpaved rural road that connects to a network of other local, unpaved, unnamed roads south and west of the project area. Traffic counts on these three local roads are unknown but are anticipated to be much less than SR 160 and Tecopa Road due to their rural nature and limited service areas.

3.13.4 Environmental Consequences

This section describes the potential impacts to transportation and traffic associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.13.4.1 *Methodology*

To conduct the transportation and traffic analysis, project-related traffic was compared with existing traffic levels of service in the analysis area to determine whether a change in the capacity of the existing transportation system would occur as a result of construction, operations, and decommissioning of the project.

3.13.4.2 *Issue Indicators*

Effects on transportation and traffic would occur if the project would:

- increase traffic relative to existing conditions that would change the capacity of the transportation system; or
- disrupt vehicular access on analysis area roads.

The analysis defines temporary impacts as those occurring within the 24-month construction period. Long-term impacts are those that would occur during the 30-year operations period.

3.13.5 Proposed Action

3.13.5.1 *Construction Impacts*

SR 160 and Tecopa Road are the main transportation routes that would be used for transporting project-related materials, equipment, and personnel to the project area. Prior to construction, the project would provide improvements to approximately 3,000 feet of Tecopa Road from SR 160 to the YPSP access road. Improvements would include adding a turn-out lane to the YPSP access road to allow for construction access and to minimize congestion to existing traffic.

During construction, the project would temporarily increase traffic in the analysis area. The increase in traffic would be most noticeable in the vicinity of SR 160 and Tecopa Road, where construction traffic would be entering and exiting the SR 160. Construction would generally occur between 7 a.m. and 7 p.m., Monday through Friday. During the project start-up phase, some activities (such as equipment and system testing) may continue 24 hours per day, 7 days per week during the 24-month construction period. Construction vehicle trips could be up to 425 trips per day over one 24-month period. On SR 160, construction-related traffic would result in an increase of up to 4.6% in vehicle trips over the 2017 traffic count.

Local traffic on Tecopa Road and associated rural roads, including Front Sight Road, Cathedral Canyon, and Hidden Hills Ranch Road, may experience intermittent delays due to construction traffic from the SR 160 turn off to the YPSP entrance on Tecopa Road during the construction period. Traffic on Tecopa Road would increase by 425 trips at peak single-phase construction or 325 trips at peak multiphase construction. Temporary impacts from increased construction traffic would be greater on the Tecopa Road than SR 160 due to a lower existing traffic volume on this rural road.

Project design features, including the implementation of a Traffic Management Plan (Trans-1) approved by the BLM and NDOT, would reduce impacts from project construction activities to the extent practicable. Design features that would minimize impacts include improvements at the intersection of Tecopa Road and SR 160 and encouraging commuter carpooling and other trip reduction strategies.

3.13.5.2 *Operation and Maintenance Impacts*

The YPSP would be staffed by up to 10 operations personnel during the site's daytime working hours. Operations personnel would work a single daytime shift, Monday through Friday, and would access the site using SR 160 and Tecopa Road. The vehicle trips associated with the up-to-10 operations personnel would not impact transportation or traffic in the analysis area.

3.13.5.3 *Decommissioning Impacts*

Impacts to transportation and traffic during decommissioning would be similar to those described above for construction because similar vehicle trips would be required to decommission the facility. The improvements to Tecopa Road made during construction would remain post-decommissioning.

3.13.5.4 *Cumulative Impacts*

The NDOT SR 160 Blue Diamond Rehabilitation project's construction traffic and associated traffic delays may overlap the construction of the Proposed Action. Traffic in the immediate vicinity of the Blue Diamond Rehabilitation Project would increase due to the addition of YPSP construction vehicle trips. This cumulative traffic increase would be limited to the 24-month construction period. Furthermore, construction activities associated with the Blue Diamond Rehabilitation Project are expected to be complete in 2020. If scheduling remains on track, construction activities would not conflict or would only overlap slightly with construction of the YPSP, proposed to begin in 2021. There would be a short-term cumulative increase in traffic on SR 160 and Tecopa Road if the additional solar field projects identified in the analysis area are constructed in the same time frame as the project. If construction access for these projects occurs from Tecopa Road, there would be additional traffic delays and congestion at the SR 160 and Tecopa Road intersection. Similar to the Proposed Action, the additional solar projects would be located on BLM lands and be subject to similar environmental measures as the Proposed Action, including requirements for traffic management plans and measures to minimize transportation effects.

3.13.6 Alternative Action 1 – Modified Layout

Under Alternative Action 1 (Modified Layout), construction, operations, and decommissioning vehicular trips and access routes would remain the same as the Proposed Action; therefore, impacts to transportation and traffic would be the same.

3.13.6.1 *Cumulative Impacts*

Cumulative impacts under Alternative Action 1 (Modified Layout) would be the same as those described for the Proposed Action.

3.13.7 Alternative Action 2 – Mowing Alternative

Under Alternative Action 2 (Mowing Alternative), the project would take 10% to 20% longer (an additional 2.5–5 months) to construct. As a result, the transportation and traffic construction effects under Alternative Action 2 would be similar to those described under the Proposed Action, but would occur for a slightly longer time frame. The operations and decommissioning vehicular trips and access routes would remain the same as the Proposed Action; therefore, impacts to transportation and traffic during these phases would be the same. There would be a short-term cumulative increase in traffic on SR 160 and Tecopa Road if the additional solar field projects identified in the analysis area are constructed in the same time frame as the project. If construction access for these projects occurs from Tecopa Road, there would be additional traffic delays and congestion at the SR 160 and Tecopa Road intersection. Similar to the Proposed Action, the additional solar projects would be located on BLM lands and be subject to similar environmental measures as the Proposed Action, including requirements for traffic management plans and measures to minimize transportation effects.

3.13.7.1 *Cumulative Impacts*

Cumulative impacts under Alternative Action 2 (Mowing Alternative) would be the same as those described for the Proposed Action.

3.13.8 No Action Alternative

Under the No Action Alternative, the project would not be developed, and there would be no transportation and traffic issues. Therefore, there would be no impacts to transportation and traffic in the analysis area.

3.13.9 Irreversible or Irretrievable Impacts

There are no irreversible or irretrievable impacts on transportation or traffic.

3.14 VEGETATION AND NOXIOUS WEEDS

3.14.1 Introduction

The following section presents the existing environment within the proposed project area as well as the potential impacts associated with the action alternatives. The existing setting is based on a combination of GIS desktop analysis, field data, and consultation with the BLM Las Vegas Field Office. Following the BLM Assessment, Inventory, and Monitoring Strategy protocol for Grassland, Shrubland, and Savanna Ecosystems, botanists conducted field surveys in 2016, 2018, and 2019 (SWCA 2016, 2017, 2019a, 2019b) to 1) map special status plants, and non-native and noxious weed populations; 2) calculate

cacti/yucca density estimates based on soil types within the project area; 3) collect quantitative vegetation cover data in undisturbed areas to inform post-construction restoration efforts; and 4) collect floristic diversity. These surveys were completed within an approximately 5,032-acre study area that exceeds the current project area boundary.

3.14.2 Analysis Area

Impacts resulting from construction, operation, and decommissioning activities occurring within the project area have the potential to affect resources located outside the project area. As a result, NEPA requires an evaluation of resources within the geographic area where the project impacts are anticipated to accrue and within the time frame in which the effects of the proposed project would occur.

The analysis area for botanical resources includes the project area and an approximately 5-mile buffer around the project area, including all lands surveyed during the previous botanical surveys.

3.14.3 Affected Environment

The project area is situated along the lower alluvial fans of the west side of the Spring Mountains in Pahrump Valley. The Mojave Desert contains myriad vegetation species, and plant communities are generally driven by soils, precipitation, elevation, and aspect.

Extensive surveys were conducted within the project area. These surveys included a reconnaissance visit, targeted special status plant survey, invasive and noxious weed inventory, cactus and yucca density estimates, quantitative survey transects (e.g., line-point intercepts, vegetation height measurements, canopy and basal gaps) (SWCA 2019a), and plant species inventory for diversity (SWCA 2019b). Surveys for the YPSP were conducted over multiple months. Sensitive species reconnaissance surveys were conducted on March 30, 2017, while targeted sensitive species surveys were conducted on June 16 and 17, 2018, and all other botanical baseline surveys began on October 8 and continued through October 27, 2018 (SWCA 2019a). Additionally, because the bulk of the baseline survey occurred in October, a species diversity survey was conducted in March 2019 (SWCA 2019b). All portions of the surveys or inventories were performed following BLM requirements and protocols (SWCA 2019a, 2019b).

3.14.3.1 *Vegetation, Including Cactus and Yucca*

The native vegetation communities that form the study area are common desert shrubland and wash communities of the Mojave Desert and are typical natural communities of the region. Vegetation communities within the project area are presented as land cover types within the USGS Southwest Regional Gap Analysis Project (SWReGAP) (USGS 2004) (Table 3.14-1). General descriptions of the project area land cover types are listed in Table 3.14-1.

Sonora-Mojave Creosotebush-White Bursage Desert Scrub. This vegetation community occurs in broad valleys, lower bajadas, plains, and low hills in the Mojave Desert and lower Sonoran Desert. This system ranges from sparse to moderately dense layer (2%–50% cover). Creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) are the typical dominant species, but a variety of shrub, dwarf-shrub, and cacti may be present to co-dominant. Additional species may include fourwing saltbush (*Atriplex canescens*), desert holly (*Atriplex hymenelytra*), brittlebush (*Encelia farinosa*), ephedra (*Ephedra* spp.), ocotillo (*Fouquieria splendens*), wolfberry (*Lycium andersonii*), and beavertail prickly pear (*Opuntia basilaris*). Herbaceous species are sparse but may be seasonally abundant with annual species such as sandmat (*Chamaesyce* spp.), desert trumpet (*Eriogonum inflatum*), wooly fluffgrass (*Dasyochloa pulchella*), forget-me-not (*Cryptantha* sp.), and scorpionweed (*Phacelia* sp.) (USGS 2004).

Mojave Mid-Elevation Mixed Desert Scrub. This vegetation community consists of desert scrub in the transition zone above creosote-bursage scrub and below the montane woodlands occurring in the eastern and central Mojave Desert. The vegetation forming this ecological system is quite variable but generally consists of blackbrush (*Coleogyne ramosissima*), California buckwheat (*Eriogonum fasciculatum*), ephedra (*Ephedra* sp.), hopsage (*Grayia spinosa*), spiny menodora (*Menodora spinescens*), beargrass (*Nolina* sp.), buckhorn cholla (*Cylindropuntia acanthocarpa*), bladdersage (*Salazaria mexicana*), Parish's goldeneye (*Viguiera parishii*), Joshua tree (*Yucca brevifolia*), or Mojave yucca (*Yucca schidigera*). A variety of grasses may be found and could include Indian ricegrass (*Achnatherum hymenoides*), desert muhly (*Muhlenbergia porter*), or galleta (*Pleuraphis* spp.) (USGS 2004).

Inter-Mountain Basins Semi-Desert Shrub Steppe. This vegetation community occurs at lower elevations on alluvial fans and flats with moderate to deep soils. This semiarid shrub-steppe ecological system is typically dominated by graminoids but has an open shrub layer. Typical grass species include Indian ricegrass, blue grama (*Bouteloua gracilis*), saltgrass (*Distichlis spicata*), needle and thread (*Hesperostipa comata*), Sandberg bluegrass (*Poa secunda*), and alkali sacaton (*Sporobolus airoides*). The shrub layer includes fourwing saltbush (*Atriplex canescens*), big sagebrush (*Artemisia tridentata*), rubber rabbitbrush (*Ericameria nauseosa*), snakeweed (*Gutierrezia sarothrae*), and winterfat (*Krascheninnikovia lanata*) (USGS 2004).

Sonora-Mojave Mixed Salt Desert Scrub. This system includes open-canopy shrub communities occurring in saline basins in the Mojave and Sonoran Deserts and can generally be found around playas. Vegetation is typically composed of one or more saltbush species such as fourwing saltbush or cattle saltbush (*Atriplex polycarpa*) along with other species of saltbush. Species of salt-tolerant plants such as iodine bush (*Allenrolfea occidentalis*), pickleweed (*Salicornia* sp.), and seepweed (*Suaeda* sp.), are generally co-dominant. Some grass species may be present, such as alkali sacaton or saltgrass at varying densities (USGS 2004).

Within these vegetation communities six species of cactus and one species of yucca were recorded. The total number of individuals estimated to occur is found in Table 3.14-2. Cactus and yucca species are protected and regulated by the BLM and by the Nevada Division of Forestry. Cacti and yucca numbers were determined first from performing counts within 66 belt transects across a larger study area (analysis area) relative to the proposed project area (SWCA 2019a). The transects were then clipped to the current project boundary and subsequent estimates across the entire project boundary were derived from numbers counted within the belt transects. The greatest density estimate is for Mojave yucca at approximately 30 per acre; the remainder of the cacti range from 2 or less per acre.

3.14.3.2 *Invasive Plant Species*

As part of the biological surveys conducted within the larger analysis area, non-native species were recorded (SWCA 2019a, 2019c). A variety of invasive, non-native plant species were observed within the analysis area: red brome (*Bromus madritensis* var. *rubens*), cheatgrass (*Bromus tectorum*), Mediterranean grass (*Schismus barbatus*), African mustard (*Malcomia africana*), Indian hedgemustard (*Sisymbrium orientale*), saltlover (*Halogeton glomeratus*), Russian thistle (*Salsola tragus*), and redstem stork's bill (*Erodium cicutarium*). Both red brome and Mediterranean grass are common throughout the analysis area with Mediterranean grass being the most ubiquitous throughout the project area. Mediterranean grass was the only invasive species found within the project area at a percent cover greater than 10% in approximately 73% of the transects sampled (SWCA 2019a). Noxious weeds were not encountered during the surveys.

Non-native species, particularly invasive plant species, have been expanding throughout the Mojave Desert. Within portions of the Mojave Desert, Mediterranean grass has become widespread and this

species occurs throughout the southwestern states. According to California Invasive Plant Council (2018), both species of grass contribute to the conversion of desert shrubland into annual grassland by carrying fire across open areas, where they ignite and kill native shrubs. Annual grasses dry after setting seed at the end of their lifecycle and become highly combustible.

3.14.4 Environmental Consequences

This section describes the potential impacts to vegetation and noxious weeds associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS. Additionally, selection of the Proposed Action would include a study to determine effectiveness in propagule islands in supporting restoration.

3.14.4.1 *Methodology*

Project impacts are analyzed as short- and long-term impacts. Essentially, short-term impacts include those acres of disturbance that can be reclaimed; long-term would be disturbance of acres not reclaimed. Comparison of alternatives and environmental changes are described in terms of the temporal scale, spatial extent, and intensity where appropriate. NEPA analysis determines whether direct or indirect effects on biological resources would result from the project and explains the degree of those effects in the project area using indicators of effect. Project-related effects can be broken into three impact levels as they relate to the indicators.

- *High*—impacts that could cause substantial change to vegetation resources over the long term or result in significant impacts to vegetation communities.
- *Moderate*—impacts that could potentially cause change in the vegetation community within the area of effects would be readily apparent but not beyond the area of effect. Vegetation communities would be suitable for succession over time post-disturbance.
- *Low*—impacts that could be detectable, though slight; or not identifiable.

3.14.4.2 *Issue Indicators*

Effects on biological resources would occur if the project would:

- substantially alter the structure and functions of sensitive upland, riparian, or aquatic vegetative communities;
- change the diversity or substantially alter the numbers of a local population of plant species;
- introduce and/or increase the potential for introduction of invasive, non-native, or noxious weeds to an area; or
- increase acres of fire-prone vegetation.

3.14.5 Proposed Action

The Proposed Action would include a variety of facilities and support features that would result in permanent and temporary disturbance to approximately 2,994.7 acres. Installation of the solar arrays constitutes approximately 98% of the long- and short-term vegetation disturbance anticipated to occur as a result of project implementation. Table 3.14-3 includes the solar panel sub-areas arrays and their potential impacts to each vegetation community or land cover type (see Figure C-13). These acreages encompass the permanent and temporary disturbance from project implementation.

3.14.5.1 *Construction Impacts*

Implementation of the Proposed Action would result in direct and indirect impacts on vegetation communities through direct removal of plant material and soil (including cacti and yucca, soil seedbanks, and biotic soils) over 99% of the project area, where the land is graded, tilled, or cleared for project components (see Table 2.8-1). Installation of the components would result in a long-term impact on vegetation communities through the disturbance of approximately 2,908.4 acres. Impacts vary by the type of pre-construction site preparation and construction techniques employed.

Grading involves removing all vegetation and removing and leveling soil to create a flat surface. Grading activities would be used for a maximum of 21% of the project site (see Table 2.8-1). Clear and cut would involve cutting vegetation to a height of no more than 3 inches using a bush hog, or similar tractor-mounted brush cutter. This method involves cutting all vegetation but leaving soils intact. High vegetation mortality is expected to occur as a result of this methodology, but soil seed banks would remain in place and some vegetation may resprout. If vegetation does resprout, it would be maintained at a height of up to 12 inches during operation. Clear and cut is the anticipated methodology employed on up to 42% of the site. Areas that contain large shrubs such as creosote bush would be tilled (clear and cut with soil removal) to remove stumps. This would occur on no more than 36% of the site. This method would disturb the soil (see Section 3.12.5.1 in Soils) and therefore is expected to lead to long-term impacts related to loss of soil seed bank, weed invasion of disturbed areas, and loss of perennial vegetation, which could take centuries to recolonize the site even with restoration of the site (Grodsky and Hernandez 2020; Kobelt 2020).

Long-term impacts are anticipated throughout the project site in direct impact areas. Anywhere soil disturbance is incorporated into site preparation there would be long-term impacts that would persist well past the anticipated 30-year ROW period (Abella 2010; Chambers et al. 2013; Copeland et al. 2017; Lovich and Bainbridge 1999; Lovich and Ennen 2011; Sinha et al. 2018). Disturbance of soils results in loss of the soil seed bank, which not only results in a loss of diversity from the area, but also creates pressure on native seed sources in the Mojave Desert, since most of the commercial seed available for restoration comes from wildland collections. Soil disturbance also increases the likelihood of invasive species introductions and spread and makes management and long-term restoration of the site more difficult (Chambers et al. 2013). Clear-and-cut site preparation would keep the soil seed bank in place, but due to the expected mortality of vegetation during construction, this method is also expected to have long-term negative impacts across the project site (Grodsky and Hernandez 2020; Kobelt 2020).

Short-term impacts would occur on approximately 86.3 acres through construction of temporary use areas for fence installation and access roads, with approximately 60% of the impacts by driving and crushing. All forms of site preparation and construction would result in disturbance or alteration of soils and vegetation community by driving across the site with machinery, direct contact with mowing blades, soil trenching, and excavation.

Implementation of design features (see Appendix B) would reduce short-term and long-term effects from these impacts, but project impacts would remain high anywhere there is soil disturbance. Project implementation would result in a long-term alteration of the existing function and diversity of the vegetative community.

3.14.5.1.1 VEGETATION COMMUNITIES

Construction impacts on vegetation communities would occur through blading and direct removal of plants as well as soil disturbance and soil removal. Most of the project-related impacts would occur within the Sonoran-Mojave Creosotebush-White Bursage Desert Scrub vegetation community, accounting for approximately 82% of the project impacts. Some species within this vegetation community may

resprout after clear-cutting, however, high mortality of perennial shrubs is anticipated from this method. Construction impacts would alter vegetation communities throughout the project site, especially where soil disturbance takes place. This would result in long-term impacts throughout the project site. There would be indirect impacts on adjacent vegetation communities from edge effects and colonization and spread of non-native and invasive species. Implementation of the project design features listed in Appendix B would decrease the risk of additional indirect impacts, however, the Proposed Action would result in a high level of impacts to vegetation communities as defined by the indicators.

3.14.5.1.2 CACTUS AND YUCCA

Construction impacts to cactus and yucca would be the direct removal of approximately 104,536 total cactus and yucca, which is 57% of the yucca and cactus within the study area. This percentage is based on cactus and yucca density surveys performed for the project. Most of the species removed would be Mojave yucca, totaling approximately 90,672 individuals. Most species of cactus and yucca are common throughout the Mojave Desert, except for *Grusonia parishii*, which is a sensitive species in California, and has a limited range in Nevada. Given the slow regeneration of cacti and yucca, this would be a permanent loss of cacti and yucca within the project area, as it is unlikely these species would recolonize the site within several centuries given the loss of seed bank. Cacti typically reproduce through vegetative propagation and not from seed, and so are difficult to reestablish within disturbed areas. Mojave yucca are very long-lived and would take several hundred years to reach maturity. Cacti and yucca are valued for their symbolism to the desert environment, but also provide important habitat and food sources for wildlife. The Proposed Action is anticipated to result in a high level of impact as defined by the indicators as it would permanently remove over 104,536 cacti and yucca from the site.

3.14.5.1.3 INVASIVE SPECIES

Invasive plant species, including red brome, cheatgrass, Mediterranean grass, African mustard, Indian hedgemustard, saltlover, Russian thistle, and redstem stork's bill, are present within the project area. Of the invasive species, Mediterranean grass was noted as being most dense and was observed and recorded during surveys at a density of greater than 10% within 73% of the transects sampled within the study area. Implementation of the proposed project would temporarily remove some invasive grasses. Disturbance of soil increases potential the spread of invasive species (BLM 2020; Brooks and Pyke 2001; Chambers et al. 2013; Chambers, Bradley, et al. 2014; Chambers, Pyke, et al. 2014; Copeland et al. 2017; Davies and Johnson 2011; Grodsky and Hernandez 2020; Lovich and Bainbridge 1999; West 2020). The Proposed Action, given the level of soil disturbance proposed under this alternative, has high potential to cause increased invasive species densities and the introduction of other invasive or noxious weed species adjacent to the areas of construction impacts (Chambers, Bradley, et al. 2014; Chambers, Pyke, et al. 2014; Davies and Johnson 2011; Grodsky and Hernandez 2020; Lovich and Bainbridge 1999). This would affect the surrounding landscape by modifying native plant assemblages, reducing biodiversity, increasing competition with native species, and potentially increasing fire hazards.

Project design features outlined in Appendix B would reduce the risks associated with invasive plant species but would ultimately still result in a higher cover and density of invasive plant species within the project area and in adjacent habitat over time.

The Southern Nevada District Office has identified that implementation of weed management plans is challenging due to rapid weed colonization of disturbed native vegetation within lands managed by the Southern Nevada District Office (Abella 2010; BLM 2020; Brooks and Pyke 2001; Chambers et al. 2013; Chambers, Bradley, et al. 2014; Chambers, Pyke, et al. 2014; Copeland et al. 2017; Lovich and Bainbridge 1999; Lovich and Ennen 2011; West 2020). A weed management plan approved by the BLM prior to receiving notice to proceed To would be developed to reduce the spread of invasive and noxious weeds.

3.14.5.1.4 POTENTIAL FIRE RISK

Native Mojave Desert vegetation communities, including Creosotebush-White Bursage Desert Scrub Communities, are environmentally constrained and adapted to be discontinuous. Under natural conditions, shrub interspaces are clear of vegetation during most of the year within these communities (Brooks and Pyke 2001; Chambers, Bradley, et al. 2014; Chambers, Pyke, et al. 2014; Davies and Johnson 2011; Grodsky and Hernandez 2020). During peak fire season, individual shrubs may ignite, but there is negligible risk that a fire could spread to adjacent vegetation within the project study area. For example, based on BLM Nevada State Office corporate fire history data (Short 2017), from 1992 to present, a total of six fires has occurred within the proposed ROW area, with reported fire size ranging from 0.1 to 0.3 acre. Three of the fires were human caused, and three were natural. The proposed project area was found to have no history of fire from 1992 to present.

Fire risk is limited when fuels are discontinuous (LANDFIRE 2014). However, presence of continuous invasive annual grass substantially increases fire risk. Non-native grass invasion and associated fire risk has been identified as the greatest threat to upland areas in southern Nevada (Chambers et al. 2013). Based on the botanical report for the project study area (SWCA 2019a), invasive annual grasses are present but not continuous. The project proposes controls and mitigation measures to control invasive plant species. If weed treatments described in the Weed Management Plan are successfully implemented, wildfire risk due to fuels would be low to very low under any alternative, including the Proposed Action.

Conducting activities that could cause a fire outside of the normal fire season, in addition to other planned minimization measures, would reduce risk. Remaining fire risk in vegetated areas, if invasive species are controlled, would be the same or less than current conditions and represents a low risk and therefore low impact.

3.14.5.2 *Operation and Maintenance Impacts*

Operational impacts are anticipated to result in continued mortality of perennial vegetation within the site because of continued clearing of vegetation between ground level and 12 inches. Areas where soil disturbance occurred would be at a higher risk for invasive species spread and new invasion. Project design features outlined in Appendix B would reduce the risks associated with invasive plant species (including fire risk), but impacts from this alternative are expected to be high overall.

3.14.5.3 *Decommissioning Impacts*

The post-project decommissioning and restoration would result in plant assemblages different than pre-project plant assemblages. Lower perennial and annual plant diversity is anticipated wherever soil disturbance took place during construction. The Mojave Desert has diverse annual plant communities (Turney and Fthenakis 2011), whose seed bank would be lost within the project area where soil disturbance took place. In clear-and-cut areas, the intact seed bank and some live residual vegetation species may facilitate site restoration on the 42% of the site constructed using this method. Additionally, project design features include the implementation of a Decommissioning, Abandonment, and Site Reclamation Plan, which would include descriptions of decommissioning activities, safety and protection measures, reclamation procedures, and success criteria, as well as notification and abandonment scheduling. Temporary disturbance areas would be immediately replanted and/or reseeded with native plants in order to begin the restoration process. Ongoing invasive species treatments would be part of the plan to reduce the potential for invasive species introductions and spread (and associated fire risk) during decommissioning. Although decommissioning itself is expected to result in low impacts, long-term and permanent impacts on vegetation communities from project construction would persist, and are expected to be high over time (see Appendix B).

Restoration after large-scale habitat disturbance, as in the Proposed Action, is costly and time consuming to implement. The BLM Southern Nevada District Office recently completed a large-scale restoration project where the average cost of restoration was over $5,000 per acre (Smith 2020), which did not include repeated weed treatment and achieve the higher cover standards of recent solar project restoration plans such as the Gemini Solar Project (Solar Partners XI, LLC 2019), the Silver State Solar Power South Project (Honer 2014), the Harry Allen Solar Energy Project (Harry Allen Energy, LLC), and the Boulder Solar Power Project (Newfield 2015). Based on the recent Southern Nevada District Office restoration project, the applicants may be required to pay additional bonding costs to cover true costs of large-scale restoration.

3.14.5.4 *Cumulative Impacts*

Cumulative impacts to this resource include potential loss of vegetation throughout the project area and the potential disturbance of the soil seed bank and loss of both perennial and annual plant diversity. Southern Nevada has multiple confounding factors that are removing habitat in these lower elevations, including urban expansion, OHV use and trail proliferation, and solar energy siting. Vegetation loss in this region consolidates other resource pressures onto remaining vegetation communities—for example, solar development removes OHV routes, and further concentrates public land users into smaller areas. This can lead to increases in habitat disturbance and loss in sensitive plant communities, and also to the very common, but also commonly impacted lower-elevation plant communities. Lower-elevation Mojave Desert plant communities provide carbon sequestration as well as habitat for innumerous wildlife species, most of which depend on large home ranges to survive because key resources in the desert can be scarce. Permanent habitat loss for large site-type ROWs (such as solar), which are only viable for 30 to 40 years, continuously reduces the chances of implementing threatened and endangered species recoveries in the Mojave Desert—such as for the Mojave desert tortoise. This species, in particular, requires large expanses of lower-elevation Mojave vegetation to survive, and the more is permanently removed, the harder it is for this species to persist. Solar development may be able to coexist with the Mojave desert tortoise where less impactful techniques are used.

Cumulative impacts associated with the project would occur from the construction and operation of other solar projects or other large-scale installations within the same desert ecosystem, which may involve grading and removal of vegetation communities and habitat that could lead to an increased risk of invasive species. Reasonably foreseeable future actions account for approximately 17,000 acres of additional disturbance from proposed large-scale solar energy generation facilities (see Section 3.2.2.2). The Proposed Action would incrementally impact approximately 3,000 acres of vegetation. This cumulative vegetation loss, cacti and yucca loss, soil health loss, and an increased risk of invasive species would result in high impacts to these resources throughout the region, resulting in additional negative impacts to quality of wildlife habitat and reduced recreational opportunities. Larger-scale projects would also be required to implement invasive species and noxious weed management plans, thereby reducing the risks associated with invasive and noxious species.

3.14.6 Alternative Action 1 – Modified Layout

As described in Chapter 2, the primary differences between the Proposed Action and Alternative Action 1 (Modified Layout) are the location and arrangement of the facilities within the project area. Chiefly, the solar arrays are not arranged in sub-areas but rather are consolidated into one single block or zone that does not avoid drainages and therefore impacts desert washes and xeroriparian habitat. Alternative Action 1 (Modified Layout) facilities are located within the western two-thirds of the project area. The location of Alternative Action 1 (Modified Layout) increases the length of the 230-kV gen-tie transmission line to approximately 1 mile but reduces some roads and belowground connections (see Figure C-7). Vegetation potentially affected is presented in Table 3.14-4.

3.14.6.1 *Construction Impacts*

Construction impacts under Alternative Action 1 (Modified Layout) would be as those described under the Proposed Action since the mechanisms for construction would be the same. Comparatively, both the Proposed Action and Alternative Action 1 would maintain vegetation height at or below 12 inches, after the vegetation is initially mowed to 3 inches. Implementation of project design features would occur for all project alternatives in order to reduce potential risks caused by construction activities. This includes implementation of the previously described design features Bio-3, Saf-6, and PD-5. The only variation is the location of the construction and the acres of direct impacts, although the acres affected include a minor change, varying by approximately 177 acres. All construction-related effects are expected to be high because although the vegetation communities and cactus or yucca species are widespread and relatively common throughout the region, impacts are anticipated to be long term; the plant communities would lose large amounts of both perennial and annual plant diversity and vegetation structure may take over a century to recover.

3.14.6.1.1 VEGETATION COMMUNITY

Acres of disturbance for Sonora-Mojave Mixed Salt Desert Scrub would remain the same as the Proposed Action under Alternative Action 1 (Modified Layout). Acres of disturbance for Sonora-Mojave Creosotebush-White Bursage Desert Scrub would be greater under Alternative Action 1 by approximately 93.1 acres. Acres of disturbance for Inter-Mountain Basins Semi-Desert Shrub Steppe and Mojave Mid-Elevation Mixed Desert Scrub would be greater for Alternative Action 1 (by approximately 10.1 acres and 73.2 acres, respectively). Overall, construction-related impacts to vegetation from implementation of Alternative Action 1 (Modified Layout) have a relatively small increase in disturbance of an additional 110.4 acres, compared with the Proposed Action.

3.14.6.1.2 CACTUS AND YUCCA

Impacts to cacti and yucca under Alternative Action 1 (Modified Layout) would be as described for the Proposed Action.

3.14.6.1.3 INVASIVE SPECIES

Invasive species impacts under Alternative Action 1 (Modified Layout) would be as described for the Proposed Action. Potential impacts would be minimized as described for the Proposed Action in Section 3.14.5.

3.14.6.1.4 POTENTIAL FIRE RISK

Potential fire risk under Alternative Action 1 (Modified Layout) would be as described for the Proposed Action. Potential impacts would be minimized as described for the Proposed Action in Section 3.14.5.

3.14.6.2 *Operation and Maintenance Impacts*

Operational impacts from Alternative Action 1 (Modified Layout) would be similar to those presented under the Proposed Action. Operational impacts are anticipated to result in continued mortality of perennial vegetation within the site because of continued clearing of vegetation between ground level and 12 inches. Areas where soil disturbance occurred would be at a higher risk for invasive species spread and new invasion. Project design features outlined in Appendix B would reduce the risks associated with invasive plant species (and associated fire risk) but are still anticipated to have a high effect over time.

3.14.6.3 *Decommissioning Impacts*

Decommissioning impacts under Alternative Action 1 (Modified Layout) would be as described for the Proposed Action.

3.14.6.4 *Cumulative Impacts*

Alternative Action 1 (Modified Layout) would result in a similar level of impact to vegetation communities and noxious weeds as the Proposed Action. The acreage and nature of disturbance would be similar and is expected to be restored or recover from disturbance in a similar time frame as the Proposed Action. The difference in impacts is that Alternative Action 1 would impact vegetation communities in drainages, whereas the Proposed Action would avoid impacts to drainages.

3.14.7 Alternative Action 2 – Mowing Alternative

Alternative Action 2 (Mowing Alternative) would grade the same percentage of the site as proposed in either the Proposed Action or Alternative Action 1 (Modified Layout). The rest of the site (79% of the site), would be mowed instead of clearing or tilling. Vegetation would be mowed to 18 to 24 inches. Vegetation would then be maintained at 18 to 24 inches during operations. The footprint of the impacts would remain the same as under the Proposed Action or Alternative Action 1 (Modified Layout).

Vegetation would be maintained on most of the site under this alternative, and vegetation mortality and soil disturbance would be much lower as a result. As detailed in Section 3.12.6.1, maintaining greater intact vegetation (up to 24 inches tall) and avoidance of tilling and vegetation clearing during construction would help maintain the integrity of sensitive soil resources (biotic soils, desert pavements, erodible soils, and corrosive soils) and reduce soil erosion potential (Chambers et al. 2013; Copeland et al. 2017; DeFalco and Esque 2014; Gelbard and Belnap 2003; Lovich and Ennen 2011).

Compared with the other two alternatives, the Mowing Alternative would reduce impacts to vegetation and preserve wildlife habitat throughout most of the project area during construction. This would result in fewer weed invasions, reduced weed spread, and reduced soil erosion and runoff (Davies and Johnson 2011). These effects would all contribute to fewer direct and indirect impacts for multiple resources both on- and off-site.

There are recent studies and decisions supporting collocation of solar with vegetation and using less impactful construction techniques (Barron-Gafford et al. 2019; Beatty et al. 2017; BLM 2010, 2019b; BLM and CDFW 2019; Macknick et al. 2013; Sinha et al. 2018; VEA 2020). Low-impact construction techniques are supported by BLM guidance (IM 2019-018 [BLM 2019c]) and can reduce construction costs (Macknick et al. 2013), and reduce heat under panels increasing solar panel efficiency (Barron-Gafford et al. 2019). Low-impact construction methods reduce restoration and weed treatment costs and reduce herbicide use, resulting in a benefit to vegetation communities and wildlife habitat after the project is decommissioned. Current research points toward cost-benefits in reducing impacts up front to decrease long-term ecological impacts and extensive costs associated with soil disturbance in the Mojave Desert (Abella 2010; Brooks and Pyke 2001; Chambers et al. 2013; Copeland et al. 2017; Davies and Johnson 2011; Hernandez et al. 2014; Lovich and Bainbridge 1999).

3.14.7.1 *Construction Impacts*

Where perennial vegetation is mowed, recovery is expected to be relatively quick, although there may be some perennial plant mortality as a result of crushing during construction. However, photosynthetic parts of the plants will remain, soil seed banks would remain in place, and biological soils would remain relatively undisturbed, except for compaction that would occur during construction. Cacti and yucca

would also be maintained on-site. These less impactful construction techniques, compared with the Proposed Action and Alternative Action 1 (Modified Layout), are expected to result in the site being more resistant to weed invasions, and result in higher vegetation survival and higher plant diversity within the project site (Chambers, Bradely, et al. 2014; Copeland et al. 2017; Davies and Johnson 2011; Grodsky and Hernandez 2020; Kobelt 2020; Lovich and Bainbridge 1999; Lovich and Ennen 2011; Sinha et al. 2018).

3.14.7.1.1 VEGETATION COMMUNITIES

Vegetation communities under the Mowing Alternative would retain more of their diversity and would experience higher perennial plant survival over time, compared with the Proposed Action and Alternative Action 1 (Modified Layout). Opportunities for infestations of invasive species are expected to be reduced, compared with the other alternatives because soils and plant communities would remain largely intact. Disturbances would result in some plant mortality and soil disturbance, but overall both short-term and long-term impacts are expected to be reduced, and plant communities are expected to recover to a functional structure within the lifetime of the project (Grodsky and Hernandez 2020). Indirect impacts are also anticipated to be fewer due to the decreased disturbance within the project footprint. Impacts are expected to be low to moderate under this alternative and with implementation of the project design features.

3.14.7.1.2 CACTUS AND YUCCA

Under the Mowing Alternative, all cacti and yucca would be left on-site and treated the same as any other vegetation—they would be mowed or ground down to between 18 and 24 inches. Some cacti may be crushed as part of construction activity, but cacti can successfully reproduce vegetatively, so they may be able to resprout even if crushed. Most of the cacti species within the project area are under 24 inches, so they would avoid most impacts if they are not directly crushed. Mojave yucca does resprout from the base after damage, so although some mortality is expected, these species may be able to resprout. As a result, cacti and yucca diversity is expected to be retained within the project area, as opposed to the Proposed Action and Alternative Action 1 (Modified Layout) (Grodsky and Hernandez 2020). The impacts of the Mowing Alternative are expected to have a low to moderate effect because of the site preparation method and with implementation of project design features.

3.14.7.1.3 INVASIVE SPECIES

Retaining diverse and resilient native plant communities reduces risk of invasion by non-native species and therefore reduces treatment costs, herbicide use, and indirect impacts of weeds in adjacent vegetation communities (Brooks and Pyke 2001; Chambers et al. 2013; Chambers, Bradley, et al. 2014; Chambers, Pyke, et al. 2014; Copeland et al. 2017; Grodsky and Hernandez 2020; Lovich and Bainbridge 1999; Lovich and Ennen 2011). Combined with design features and fewer overall weeds to treat, the Mowing Alternative would result in the effects of invasive species being a low or moderate impact to vegetation resources.

3.14.7.1.4 POTENTIAL FIRE RISK

According to BLM Nevada State Office corporate fire history data (Short 2017), from 1992 to present a total of six fires have occurred with the proposed ROW and no wildfires have been documented to occur within the proposed project area. The six fires found to have occurred within the ROW ranged in size from 0.1 to 0.3 acres. Three of the fires were human caused and three were natural, or caused by lightning. Desert vegetation native to the Mojave Desert is generally not fire adapted and typically does not carry fire (Brooks and Pyke 2001; Chambers et al. 2013; Grodsky and Hernandez 2020; Lovich and Bainbridge 1999). Where native Mojave Desert vegetation is predominant, fire risk is low, especiallyin

the lower elevation native vegetation communities . The project proposes minimization and mitigation measures to control invasive plant species for all alternatives. Implementing the Project Weed Management Plan would help ensure wildfire risk would continue to be low to very low. Avoiding activities that could cause a wildfire during fire season,, in addition to planned minimization measures, would further reduce risk. Fire risk in vegetated areas, if invasive species are controlled and mitigation measures are properly implemented, would be the same or less under the Mowing Alternative than current conditions and represent a low risk and therefore low impact.

3.14.7.2 *Operation and Maintenance Impacts*

Operations for maintaining the vegetation community post-construction would entail physically pruning to lower the vegetation height to ensure vegetation does not shade the solar panels. Vegetation would be trimmed to no less than 18 inches, but would preferably be maintained at 24 inches. Trimming may reduce plant vigor and survival and may remove flowers and seeds depending on when the plants are trimmed. However, compared with the Proposed Action and Alternative Action 1 (Modified Layout), the Mowing Alternative is expected to result in perennial plant survival, including cacti and yucca (Grodsky and Hernandez 2020). Soil seed banks, soils, biological soils, all of which support healthy, resilient plant communities, would also be more intact under the Mowing Alternative. As functional vegetation communities are more likely to resist weed invasions, operations would have fewer impacts to native plant communities because there would be less competition from non-native species and less herbicide use would be required within the facility. Operations is expected to have a low to moderate impact to vegetation resources.

3.14.7.3 *Decommissioning Impacts*

Under the Mowing Alternative, the vegetation community would recover to a functional system more efficiently than the Proposed Action or Modified Layout (Alternative Action 1); it is anticipated that vegetation would be largely intact during the operation of the facility (Grodsky and Hernandez 2020). Decommissioning may therefore have more impacts on the site under this alternative than the other alternatives because there is more vegetation on-site. However, decommissioning is anticipated to be relatively low impact, and it is expected that the vegetation within the project area would recover more easily after decommissioning and require far fewer inputs to restore the site than under either of the other two alternatives. Costs would be several orders of magnitude less expensive, as the site should require almost no additional inputs within mowed areas. Intensive restoration would only be needed in graded areas. This would result in less stress on adjacent lands for wildland seed collections to restore the site and would result in far fewer costs for both the proponent and BLM to restore and monitor the site after decommissioning. Most importantly, it is expected that the site would recover more quickly, allowing for multiple uses to potentially again occur within the area within 5 to 10 years after decommissioning, as opposed to centuries for a full recovery compared with the Proposed Action and Alternative Action 1 (Abella 2010; Chambers et al. 2013; Hernandez et al. 2014; Lovich and Bainbridge 1999). The long-term project impacts to vegetation communities would be substantially lessened. The anticipated effects would be low to moderate over time because of the site preparation implemented under this alternative and implementation of design features.

3.14.7.4 *Cumulative Impacts*

The Mowing Alternative (Alternative Action 2) would have lower cumulative impacts than the Proposed Action and Alternative Action 1 (Modified Layout). Comparatively, the Proposed Action and Alternative Action 1 (Modified Layout) would result in long-term vegetation loss that would have cumulative impacts on the Mojave Desert for five to 10 times the length of the project. Compounded with additional reasonably foreseeable solar projects in the region, as well as currently constructed projects,

there would be high cumulative impacts over the next 50 years. The Mowing Alternative would still have impacts but the cumulative impacts, especially as this construction approach is becoming a precedent, would result in fewer cumulative effects on the Mojave Desert and southern Nevada in particular. Because the anticipated recovery time post-ROW is expected to be much less for the Mowing Alternative than for the other two alternatives (5–10 years, as opposed to hundreds of years), there would be fewer cumulative impacts to the area over time.

3.14.8 No Action Alternative

Under the No Action Alternative, the vegetation communities would exist as they currently do, as no project would be implemented, and removal of plants would not occur. The vegetation communities currently exhibit gradual encroachment from invasive species, which may continue to exist or expand over time. Cactus and yucca would remain.

3.14.9 Irretrievable and Irreversible Impacts

Irreversible or irretrievable impacts are those that cannot be reversed or recovered. Implementation of either the Proposed Action or Alternative Action 1 would result in permanent loss or degradation of native vegetation on up to 2,000 acres. Restoration, even with substantial inputs, is not expected to recover the project area to pre-existing conditions. Restoration could take decades on a project of this size, and repeated restoration efforts will be necessary.

The Mowing Alternative would result in irreversible or irretrievable impacts where the site is graded, but mowed areas would not experience irreversible or irretrievable impacts, as vegetation is expected to eventually recover.

3.15 VISUAL RESOURCES

3.15.1 Introduction

This section follows four steps to assess the existing visual environment and impacts to the visual environment from the proposed project: 1) define analysis area based on viewshed analysis from the project location to determine areas from where the project may be visible and VRM classifications within the project; 2) describe existing visual resources (i.e., values) within the analysis area to identify impacts to visual values resulting from the introduction of project components; 3) use the viewshed analysis in coordination with BLM to identify viewing locations (key observation points [KOPs]) from where the project may be viewed; and 4) complete contrast rating worksheets based on field observations incorporating environmental factors with supporting photographic simulations from each KOP to assess conformance with VRM objectives.

Visual resources (the landscape) consist of landform (topography and soils), vegetation, bodies of waters (lakes, streams, and rivers), and human-made structures (roads, buildings, and modifications of the land, vegetation, and water). These elements of the landscape can be described in terms of their form, line, color, and texture.

The following analysis is based on information and data summarized in the YPSP Visual Resources Technical Report (SWCA 2020c), which is available for public review on the BLM National NEPA ePlanning project website for the YPSP.

3.15.2 Analysis Area

The project study area consists of approximately 5,032.2 acres north of Tecopa Road, within which the Proposed Action would ultimately occupy approximately 2,994.7 acres. Project impacts resulting from construction, operation, and decommissioning activities have the potential to affect visual resources both in the project area and outside the project area. This document evaluates visual resources and associated project effects throughout the geographic area where direct and indirect project impacts are anticipated to occur and in the time frame in which project effects would occur. For the purposes of this evaluation, the analysis area (totaling 571,967 acres) is considered the project study area and the 15-mile buffer around the project study area. The analysis area is where potential visual effects from the YPSP may be discerned by the casual observer and illustrates where, in the surrounding landscape, the project would theoretically be visible (see Figure C-14). The Proposed Action and alternatives, as described in Chapter 2, are completely within the analysis area.

3.15.3 Visual Resource Management Classifications

The BLM uses the Visual Resource Management (VRM) system to manage visual resources on BLM-administered lands (BLM 1984, 1986a, 1986b). This system provides a framework in which four VRM class objectives describe the different degrees of modification allowed to the basic elements of the landscape (i.e., line, form, color, and texture) (Table 3.15-1).

The BLM uses RMPs to provide management direction and adapt to the changing resource and use demands, balanced with compliance with other federal, State, and local laws and policy. The RMP provides direction in managing the resources and resource uses of public lands. The project area is managed by the BLM under the 1998 RMP that designates 4,043 acres of the study area as VRM Class III and 989 acres as Class IV (see Table 3.15-1 and Figure C-14). This analysis considers existing conditions and proposed project impacts to determine whether the project would conform with these VRM class objectives.

3.15.4 Affected Environment

3.15.4.1 *Visual Resource Inventory Process*

Existing visual conditions (i.e., values) relate to cultural resource modifications of the landscape that contribute to the overall visual character associated with a given area of land. These conditions can be documented through the BLM Visual Resource Inventory (VRI) process. The information collected provides descriptions and analysis of the landscape and viewer sensitivity in the YPSP area and is broken down into three categories: scenic quality, visual sensitivity, and distance zones (BLM 2019d). The existing conditions for each category are described below.

3.15.4.1.1 SCENIC QUALITY

The YPSP is located within the 188,373-acre Pahrump Valley Scenic Quality Rating Unit (SQRU) that was inventoried in 2010 and that extends north of Pahrump, west following the state line, and southeast to the Bird Springs Range Unit. The Pahrump Valley SQRU was rated a Scenic Quality Class B. There are approximately 5,032.2 acres of the project area that occur within Scenic Quality Class B (BLM 2019d).

Disturbance from human activities in the district, specifically rural residential development along roadways and the urban area of Pahrump, Nevada, was used to determine the rating. The Pahrump Valley

SQRU is defined in the analysis as a broad and expansive valley with Mohave Desert vegetation that is confined by the Spring Mountains to the east and the Nopah Range in California to the southwest.

3.15.4.1.2 VISUAL SENSITIVITY

Visual sensitivity reflects attitudes and perceptions held by people regarding the landscape and in general, reflect the public's level of sensitivity for noticeable change to the landscape. The YPSP is in a Sensitivity Level Rating Unit (SLRU) high classification zone. This Visual Sensitivity classification, recorded in 2010, was determined by assessing the area's number of viewers, level of interest, and types of viewers. This unit classified the maintenance of the Visual Quality as having a high visual value because of the public sensitivity for cultural, historic, and natural features associated with the OSNHT and Tecopa Road (BLM 2019d).

3.15.4.1.3 DISTANCE ZONES

The BLM VRM system provides the foundation for defining distance zones, as described in Inventory Manual 8410-1 (BLM 1986c). The BLM typically defines distance zones as foreground/middle ground (KOP to a distance of 3–5 miles), background (3–5 miles to a maximum of 15 miles based on atmospheric conditions), and seldom seen (portions of the landscape that are not visible from KOPs or distances greater than 15 miles). These definitions are used as a framework for the contrast analysis. The contrast analysis assesses the level of visual change associated with the project evaluating fundamental design elements of (form, color, texture, and scale) and environmental factors, which can influence the level of contrast based on viewer perspective. For this analysis, the following distance zones were applied: foreground, 0 to 2 miles; middle ground, 2 to 5 miles; and background, 5 to 15 miles.

3.15.4.2 *Sensitive Viewers*

Sensitive viewing platforms represent specific places, areas, and features that have visual importance relative to one's home, social, business, and recreation environment. Sensitive viewing platforms represent viewing locations (KOPs) where the public would view the YPSP both from a stationary location (e.g., residential area) or a linear (e.g., major roadway) location. Identification of KOPs were based on a review of aerial photography and topographic maps, coordination with BLM Las Vegas Field Office staff, and field investigations. Sensitive viewing locations included the following:

- **Vehicular travel routes—**highways and roads used by origin/destination travelers, designated scenic or historic byways, and recreation destination roads (i.e., roads that provide access to designated recreation areas)
- **Recreation areas—**existing uses at dispersed recreation areas for picnicking, camping, hiking, off-highway vehicle driving, as well as designated recreational uses at scenic overlooks, hiking trails or trailheads, or rest areas
- **Residences—**single-family detached structures and permanent mobile homes or mobile home parks

Eleven KOPs were selected to represent the views of the project and the rationale for selection is provided below. SWCA conducted in-field assessments the week of November 26, 2018, at each of the following KOPs implementing protocols and methods for contrast rating evaluation as in BLM Manual 8431 *Visual Resource Contrast Rating*. Data collected at each of the KOPs included the following: global positioning system (GPS) location, a digital photographic panorama of the viewshed (which is used for visual simulations), required information to complete the BLM's Visual Contrast Rating Worksheet, time of day and atmospheric conditions, and existing structures and roads in the viewshed.

Using the viewshed analysis, KOPs were selected that represent typical viewing conditions from which a sensitive viewer would have prominent views of the project area. In total, 11 KOPs were selected to represent typical viewing conditions for each of the three sensitive viewer user types: travel routes (eight KOPs), residential areas (five KOPs), and recreation areas (eight KOPs) (Table 3.15-2). A KOP may represent more than one sensitive viewer type.

The viewshed analysis identified that the project site is not easily visible from Pahrump, Nevada, because of the undulating topography of the valley. Residents and vehicular traffic in Pahrump would have limited visibility of the project due to screening from vegetation, existing buildings, and natural topography. Additionally, based on the results of the viewshed analysis, the town of Mountain Springs would not have a view of the project area due to topography. Therefore, further study was not warranted, as potential effects would be negligible.

A brief description of each KOP is provided below. More detailed descriptions of each KOP and the rationale for selection are provided in the YPSP Visual Resources Technical Report (SWCA 2020c).

3.15.5 Environmental Consequences

This section describes the potential impacts to visual resources associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.15.5.1 *Methodology*

3.15.5.1.1 CONTRAST RATING ANALYSIS

Contrast rating analysis is a method that measures potential project-related changes to the landscape. The method allows for a level of objectivity and consistency in the process and reduces subjectivity associated with assessing landscape character and scenic quality impacts. Using the BLM's Visual Resource Contrast Rating system, as outlined in BLM Manual 8431 (BLM 1986b), the level of contrast for the YPSP was evaluated for each KOP to determine the degree to which the YPSP would affect the intrinsic visual character and in turn the scenic quality of a landscape based on the level of contrast created between the proposed project and the existing landscape. In the context of the YPSP (form, line, color, and texture) associated with the landform, vegetation, and existing facilities within and adjacent to the project area. The degree of contrast for each landscape element was evaluated (e.g., land/water, vegetation, and structures) as none, weak, moderate, or strong (Table 3.15-3).

Environmental factors can influence the amount of visual contrast, dominance, and level of attraction introduced by project components. For this analysis, the factors considered and evaluated as part of the determination of the level of contrast from each KOP include visibility conditions, angle of view (relative viewer position and view orientation), duration of view (in time or distance), and scale and spatial relationship (degree of contrast) of the project (BLM 1986c).

Visibility conditions refer to how the project components (arrays and associated infrastructure) would be viewed in the landscape from KOPs, not whether the proposed project would be seen or not seen from KOPs. These conditions are assessed by looking at the relationship of the project components in the context of the landscape. One condition is whether the project components would be seen predominantly skylined along the horizon line of a landform or whether they would be seen backdropped against a landform. The second condition is whether the views of project components would be predominantly unobstructed or obstructed from the KOP. The third condition is the influence of lighting conditions and the consideration of the intensity of reflection or shadowing (see Glare Analysis, Section 3.4 of the Visual

Technical Report, which can be found on the BLM National NEPA ePlanning project website for the YPSP). The angle of observation from the KOP is also evaluated to determine whether or not the project components would be seen in the same viewing direction as a dominant visual feature in the landscape.

The duration of view is how long, in time or distance, the project components would be seen from KOPs. For linear KOPs, the duration of view can be calculated in terms of both time and distance by determining the total travel time (typically minutes) along the platform (miles) that the project components would be seen. To calculate travel time, the posted speed (45–55 mph) was used as the average rate of speed for paved roadways, and 25 mph was used for unpaved roadways.

The last two environmental factors used in this analysis, scale and spatial relationship, evaluate the degree of contrast of the proposed project components in relation to the surrounding landscape when viewed from KOPs. Scale refers to the size of the project components relative to various landscape features. The larger the project components would appear, the less they would repeat the common elements and patterns in the surrounding landscape; that is, the project components would appear to dominate the landscape.

In addition to scale, the arrangement or spatial relationship of landscape features can also affect the visual prominence of project components from KOPs. Consideration of the amount of visual contrast created is directly related to the amount of attention that is drawn to an element in the landscape. For example, if the view from a platform is of a panoramic or expansive landscape, the project components would be less prominent (lower contrast), whereas if the view is of an enclosed, or encircled landscape such as a narrow valley, the project components would be more prominent and would appear to dominate the landscape (higher contrast). The amount of visual contrast created is directly related to the amount of attention that is drawn to an element in the landscape. For this analysis, contrast is assessed by comparing the project with the major features in the existing landscape.

Environmental conditions such as haze, dust, and sun angle, as well as viewer position and perspective of seasonal users within the analysis area and from KOPs, may influence visibility of project components. Due to the variable nature of these elements, they were not evaluated further in the determination of contrast.

Visual contrast typically results from 1) landform modifications that are necessary to prepare a project site or right-of-way for construction, 2) the removal of vegetation to construct and maintain facilities, and 3) the introduction of new aboveground facilities into the landscape.

3.15.5.1.2 VISUAL SIMULATIONS AND ANALYSIS

Visual simulations, which provide a theoretical view of the proposed project, were prepared for each KOP. A digital rendering of the solar project facility was superimposed upon the KOP baseline photographs, illustrating a simulated view the facility. This information was used to aid in determining the level of visual contrast of the YPSP before and after construction.

3.15.5.1.3 GLARE ANALYSIS

A separate analysis of the YPSP facility's glare potential was completed using the ForgeSolar Solar Glare Hazard Analysis Tool (SGHAT) and was not included in the determination of contrast associated with the contrast rating analysis. The SGHAT meets Federal Aviation Administration glare analysis requirements (49 USC 471) and was developed in cooperation with the U.S. Department of Energy. The SGHAT is designed to determine whether a proposed solar energy project would result in the potential for ocular impact (i.e., retinal damage or burn), and whether the project demonstrates compliance with the standards for federally obligated airports. Glare is defined as a semi-continuous and sustained presence of light that

may appear to sparkle from viewing locations. The effects of glare can vary from insignificant momentary blinding to temporarily seeing spots or after-images; if intense enough or of a long enough duration, glare can cause permanent vision damage. The analysis tool does not take into account existing vegetation or structures when calculating results. The potential glare of this project was analyzed from the selected KOP locations by specifying them in the SGHAT as Discrete Observation Receptors, user-prescribed observation points.

3.15.6 Proposed Action

The construction, operation, and maintenance of the Proposed Action would result in effects on visual resources. An analysis of visual dominance, scale, continuity, and contrast was used in determining to what degree the YPSP would attract attention and to assess the relative change in character and scenic quality, compared with the existing characteristic landscape. Table 3.15-4 defines the threshold of the visual resources impacts on the casual observers at the viewing platforms incorporating environmental factors and to the existing landscape's scenic quality and landscape character. The magnitude of impact ranges from none to high.

3.15.6.1 *Construction*

As proposed, the YPSP would include building or installing PV solar panels, a lithium-ion–based energy storage facility (battery), internal roads, an operations and maintenance building, the TCS, and transmission lines located within the project lease area. Construction associated with the YPSP is expected to occur over a period of 24 months if occurring in one phase. Depending on contractual agreements, the construction could happen over ten 50-MW phases, each taking up to 6 months to complete. Multiple phases may be constructed concurrently; thus, construction could take less than 60 months to complete. The longer construction schedule of ten 50-MW phases would create more opportunities for temporary visual disturbance to the area and, therefore, a moderate visual impact.

Construction of the project would require the removal of vegetation and grading to achieve a level grade to form access ways, roadways, and areas where concrete foundations are used for inverter equipment, substations, drainage facilities, and other structures. Grading would consist of the excavation and compaction of earth to meet the design requirements. Vegetation would be cleared for site preparation to no more than 3 inches, and large shrubs like creosote bush would be tilled to remove stumps. During construction, materials suitable for compaction would be stored in stockpiles at designated locations on site using proper erosion prevention methods, while unsuitable materials, such as debris would be removed from the site.

The solar field is divided into four sub-areas near three large washes that intersect the project area. The sub-areas are connected to six access roads that cross the washes and would require a potentially permanent disturbance corridor approximately 1,000 feet long and up to 25 feet wide for each road. Underneath each access road would be electrical collection and communication lines connecting the sub-areas to the energy storage system. These communication lines would only be used for communication between project components and located only within the project area. The potentially permanent road grading is anticipated to have a minimal change within the landscape since most of the grading changes for the access roads would be within the washes. The subterranean connection corridor that would be located under the access roads would have low to no visual impact since this area would already be disturbed and would minimize any overhead or exposed cables.

3.15.6.2 *Operation and Maintenance*

3.15.6.2.1 VEHICLE TRAVEL ROUTES

There would be low impacts to vehicular travel routes from project components to KOP 3/4 Tecopa Road/ Old Spanish Highway (California) and KOP 6/8 SR 160. The introduction of project components within the landscape would be visually subordinate when viewed from these KOPs. Weak contrast is associated with the introduction of elements in the landscape associated with line and color that would not attract attention of the casual observer traveling along the routes. The landscape character of the project area would appear intact.

Glare Analysis

Travelers along SR 160 (KOPs 6 and 8) are associated with views that are southeast from and about 200 feet in elevation above the project area. Glare would be visible from these superior viewing locations because a larger portion of the project area would be visible. At KOP 6 viewers would have low potential for temporary after-image glare with a 1- to 15-minute duration in the morning hours from October through April. The potential for glare, area, and duration would be the greatest at KOP 6. The KOPs along Tecopa Road/Old Spanish Trail Highway (KOPs 3 and 4) have potential for glare that would last 2 to 5 minutes in January and December. The glare at these KOPs would have a low potential to cause temporary after-image damage because it comes from localized areas in the project area.

3.15.6.2.2 RECREATION AREAS

Impacts from project components at KOPs 1, 2, 5, and 7 would range from none to moderate. There would be no impacts to KOP 2 due to obstructed views associated with topography and intervening vegetation. Low impacts are associated with limited visibility and proximity of project components to KOPs 1 and 7. The introduction of project components within the landscape would be visually subordinate when viewed from these KOPs. Weak contrast is associated with the introduction of elements in the landscape that would not attract attention of the casual observer from these KOPs. The landscape character of the project area would appear intact. There would be moderate impacts associated with color contrast from solar array shadowing when viewed from KOP 5. The contrast would be visually prominent and would begin to dominate the visual setting.

Glare Analysis

The glare analysis identified that there would be no glare visible at identified recreation areas (KOPs 1, 2, 5, and 7).

3.15.6.2.3 RESIDENTIAL AREAS

There would be no impacts from project components for KOPs 9a, 9c, and 9d. The casual observer would not perceive project components due to distance from project components, intervening topography, vegetation, and structures.

Glare Analysis

Residents in Pahrump and Charleston View (KOPs 9a, 9c, and 9d) would have low to no glare from the YPSP because of intervening topography, vegetation, and existing structures. Pahrump residents' views are generally south-facing in the direction of the project, which would be oriented to the non-reflective side of the solar array; thus, the view from Pahrump would have low or no impacts from glare. Charleston View residents would have low impacts from glare in the evening.

3.15.6.3 *Decommissioning Impacts*

The effects of project decommissioning on visual resources would roughly mirror those discussed above under Construction Impacts. Impacts from decommissioning would differ from construction in that lands previously visible (for the 30-year project lease period) would likely become less visible due to reclamation activities and removal of associated infrastructure. However, there would be an unknown duration of time for the project footprint to be no longer visible and the vegetation returns to its preconstruction condition, which would be dependent on environmental factors and associated levels of disturbance at the time of decommissioning (Abella 2010). This visible difference would allow for the project footprint and contrast to be visible from KOPs for many years beyond the project completion.

3.15.6.4 *Proposed Action Conformance with BLM Objectives*

The Proposed Action would create moderate to no contrast in VRM Class III and IV areas when viewed from the above KOPs. The Proposed Action would meet VRM Class III and IV objectives from those locations as allocated in the Las Vegas Field Office RMP.

3.15.6.5 *Cumulative Impacts*

The analysis area for cumulative impacts includes the 15-mile buffer around the project area (571,771 acres). For this analysis, acres of anthropomorphic disturbances, as presented in the USGS's LANDFIRE dataset (USGS 2011), have been used as a proxy for visual impacts for past and present actions that could contribute to impacts on visual resources. Identified anthropomorphic disturbances in the analysis area equate to approximately 31,955.4 acres (2.9% of the analysis area). Reasonably foreseeable future actions associated with cumulative projects as described in Table 3.2-2 would contribute an additional 17,169.4 acres of disturbance that may impact visual resources. Past, present, and reasonably foreseeable actions, together with the Proposed Action, would contribute approximately 35,431.4 acres of disturbance in the analysis area. These actions would constitute a cumulative increase of approximately 3.2% of visual impacts in the analysis area.

3.15.7 Alternative Action 1 – Modified Layout

3.15.7.1 *Construction Impacts*

Impacts from construction actions associated with Alternative Action 1 (Modified Layout) would be the same as those described for the Proposed Action.

3.15.7.2 *Operation and Maintenance Impacts*

Impacts from operation and maintenance actions associated with Alternative Action 1 (Modified Layout) would be similar to those described for the Proposed Action.

3.15.7.3 *Decommissioning Impacts*

Impacts from decommissioning actions associated with Alternative Action 1 (Modified Layout) would be similar to those described for the Proposed Action.

3.15.7.4 *Cumulative Impacts*

Cumulative impacts to visual resources under Alternative Action 1 (Modified Layout) would be consistent with those described above under the Proposed Action.

3.15.8 Alternative Action 2 – Mowing Alternative

3.15.8.1 *Construction Impacts*

Vegetation modifications described as part of Alternative Action 2 (Mowing Alternative) would reduce the amount of disturbed soils and overall contrast between vegetation and exposed soils during construction, compared with the Proposed Action and Alternative Action 1 (Modified Layout). Vegetation would be maintained at a height of 18 to 24 inches in areas outside of necessary vegetation removal (areas that would be graded to level for pads, O&M building, roads, etc.). Construction-related visual impacts would be temporary and not readily discernible to the casual observer. Therefore, visual impacts associated with construction activities would be less than those described under the Proposed Action and Alternative Action 1 (Modified Layout), with the exception that the construction schedule would be extended under this alternative and visual impacts from construction would occur for up to an additional 5 months.

3.15.8.2 *Operation and Maintenance Impacts*

Impacts from operation and maintenance actions associated with Alternative Action 2 (Mowing Alternative) would be similar to those described for the Proposed Action and Alternative Action 1 (Modified Layout). The casual observer would not be able to discern differences in vegetation heights due to the project components being the more dominant visual element. The solar arrays and associated infrastructure would either obscure or greatly reduce the visibility of mowed areas.

3.15.8.3 *Decommissioning Impacts*

Impacts from decommissioning actions associated with Alternative Action 2 (Mowing Alternative) would be similar to those described for the Proposed Action to the extent that environmental conditions and associated levels of disturbance permit the regeneration of vegetation. The impacts to the viewshed would be reduced in addition to the preservation of cacti and Mojave yucca under this alternative.

3.15.8.4 *Cumulative Impacts*

Cumulative impacts to visual resources under Alternative Action 2 (Mowing Alternative) would be consistent with those described above under the Proposed Action and Alternative Action 1 (Modified Layout), except where future solar field development identified in the analysis area implements similar methods of vegetation management. Where these RFFAs incorporate vegetation mowing and retention of cacti and yucca, the overall contribution to cumulative impacts to visual resources under this alternative would be reduced as compared to the Proposed Action and Alternative Action 1 (Modified Layout) because visual differences in vegetation on the landscape would be less discernible.

3.15.9 No Action Alternative

The current landscape in the visual analysis area is characterized by Pahrump Valley's flat to low desert hills and washes with southern desert shrub vegetation. Existing human modifications in the project area is limited to OHV travel in washes. Under the No Action Alternative, the landscape would continue to be influenced by these factors, and it would meet the BLM's objectives for management of VRM Classes III and IV.

3.15.10 Irreversible or Irretrievable Impacts

Irreversible or irretrievable impacts are those that cannot be fully reversed or recovered. This analysis considers irreversible impacts as those that permanently affect visual uses, e.g., not addressable through project restoration or reclamation. Irretrievable impacts are those lost visual resource opportunities that occur during the lifespan of the project, which would be reinstated only after project reclamation is complete. The Proposed Action and its alternatives are anticipated to share the following irreversible or irretrievable impacts:

- Project components would be visible, and
- Landscape scarring and revegetation would be visible long after project reclamation.

Changes to the characteristic landscape over the 30-year life of the project would represent an irretrievable impact but would not create irreversible impacts. After the life of the project is over, the visible structures and materials would be removed from the project area. However, it could take years before the project footprint is no longer visible and the vegetation returns to its preconstruction condition (Abella 2010). The vegetation that would be reestablished during reclamation efforts would take several growing seasons and the composition of species in the recovery area would for several seasons be visibly different than the original and surrounding vegetation communities, depending on the alternative selected. This visible difference would allow for the project footprint to be visible for many years beyond the project completion and would represent an irreversible impact. Provided environmental conditions and the associated levels of soil and vegetation disturbance permit, these visible differences would be reduced under the Mowing Alternative due to the increased numbers of cacti and Mojave yucca that would be left intact during project implementation and the extent to which revegetation is successful after decommissioning.

3.16 WATER RESOURCES

3.16.1 Introduction

This section provides an overview of the surface and groundwater resources potentially affected by the Proposed Action and alternatives.

3.16.2 Analysis Area

Potential impacts resulting from construction, operation, and decommissioning activities occurring within the project area have the potential to affect resources located outside the project area.

The analysis area for surface water and jurisdictional waters consists of the 5,032.2-acre study area. This analysis area encompasses all anticipated surface water-impacting activities associated with the construction, operation, and decommissioning of the YPSP. The analysis area for groundwater and water consumption consists of the Pahrump Valley administrative groundwater basin, with the assumption that water for the construction and operation of the YPSP would be sourced from within the same basin.

3.16.3 Affected Environment

The affected environment includes all surface and groundwater resources that could be impacted through the development of the Proposed Action and action alternatives.

3.16.3.1 *Surface Water*

The proposed YPSP lies within the Ivanpah-Pahrump Valleys' 8-digit hydrologic unit (16060015), as defined by the National Hydrography Database. The Pahrump Valley sub-basin has no downstream surface water connections to another basin, and surface water flows terminate in a topographically and hydrographically closed dry lakebed in California's Inyo County. Most washes within the analysis area have an ephemeral flow regime, only conveying stormwater flow during heavy precipitation events, though some may also convey snowmelt, discharged from intermittent springs in years with heavy snowfall. The nearest USGS stream gauge data available are for Stump Spring (USGS 355906115492601 162 S23 E55 05BAAB1 STUMP SPRING), an ephemeral wash that measures flow approximately 5 miles south of the analysis area. The gauge data indicate that measurable flows typically occur only one to two times per year.

An aquatic resources delineation conducted in 2016 identified 12 interconnected ephemeral washes ranging in size from small (2- to 5-foot-wide) wash features to medium, broad (6- to 11-foot-wide) drainages (SWCA 2018b). The active flow channels of these drainages were generally devoid of vegetation, displayed bed and bank, and changes in substrate, which included gravel, sand, and various finer sediment sorting. A request for an approved jurisdictional determination was originally submitted to the U.S. Army Corps of Engineers in September 2018. The U.S. Army Corps of Engineers issued an Approved Jurisdictional Determination Memorandum for Record January 8, 2019 (U.S. Army Corps of Engineers 2019). The determination concurred with the results of the delineation report and identified 9.64 acres/89,810 linear feet of ephemeral channel present within the surveyed area as jurisdictional waters of the U.S. (WUS) under Section 404 of the Clean Water Act (CWA).

On June 22, 2020, the Navigable Waters Protection Rule was implemented in the State of Nevada. Under this new rule, ephemeral features that flow only in direct response to precipitation, including ephemeral streams, swales, gullies, rills, and pools, are excluded from the definition of WUS. Pursuant to the new rule, the ephemeral surface waters within the survey area would no longer be considered jurisdictional or protected under Section 404 of the CWA, regardless of their interstate connection. Yellow Pine Solar must submit a new request for a jurisdictional determination to the U.S. Army Corps of Engineers for concurrence of that status. Yellow Pine Solar plans to submit and obtain a new jurisdictional determination prior to the start of construction activities but must proceed under the assumption that the 2019 jurisdictional determination remains valid until a new one is received.

3.16.3.2 *Groundwater*

The proposed YPSP is in the Pahrump Valley (Sub-basin 162), in the Central Region (Region 10) of the Nevada Division of Water Resources (NDWR) administrative groundwater basins (Nye County Water District 2018). The Pahrump Valley Groundwater Basin has a total surface area of 93,100 acres (145 square miles) (California Department of Water Resources 2003). USGS publications indicate the presence of a hydraulic connection between Pahrump Valley and the Amargosa Desert through Stewart Valley, located northwest of the Pahrump Valley (Belcher et al. 2018; Faunt et al. 2010). The Pahrump Valley sub-basin has been classified as a "designated groundwater basin" by the State of Nevada, meaning that all permitted groundwater rights are approaching or exceed the estimated average annual recharge. The Pahrump Valley sub-basin has an estimated annual recharge rate of 22,000 acre-feet per year, with permit allocations greatly exceeding that number. The NDWR estimated that groundwater withdrawal from the basin of all permitted, certificated, claims of vested right groundwater rights, and exempt domestic wells located within Pahrump Valley for calendar year 2019 (January 1, 2019 through December 31, 2019) was approximately 14,482 acre-feet, with a perennial yield of 20,000 acre-feet annually (NDWR 2019).

3.16.4 Environmental Consequences

This section describes the potential impacts to water resources associated with the construction, operation, and maintenance of the solar panels, transmission line, and substations. The analysis takes into account the ACEMs incorporated into the Proposed Action and alternatives to reduce potential project impacts (see Section 2.6 above). These measures are described in detail in Appendix B of this EIS.

3.16.4.1 *Methodology*

3.16.4.1.1 ISSUE INDICATORS

The Proposed Action would affect water resources if it would

- degrade the quality of surface water by increasing erosion, increasing sedimentation;
- result in a dredge or fill of surface waters determined to be jurisdictional by the U.S. Army Corps of Engineers in accordance with Section 404 of the CWA; or
- decrease groundwater supply or interfere substantially with groundwater recharge.

3.16.5 Proposed Action

3.16.5.1 *Construction Impacts*

3.16.5.1.1 SURFACE WATERS

The Proposed Action includes construction within four distinct sub-areas that are designed to avoid the four major ephemeral washes in the project area. Avoidance of the four washes would avoid potential impacts on surface and jurisdictional waters. Of the approximately 9.6 acres of potential jurisdictional water surfaces south of SR 160, access road construction between sub-areas would permanently impact approximately 0.024 acre/277 linear feet of potentially jurisdictional surface waters. Approximately 0.078 acre/762 linear feet of potentially jurisdictional surface waters would be temporarily impacted during construction of the perimeter fencing and collector lines. Following installation of perimeter fencing and collector lines, pre-construction contours would be restored to the extent feasible.

3.16.5.1.2 GROUNDWATER SUPPLY

During earthwork for the grading of access roads, foundations, equipment pads, and appurtenant components, the main use of water would be for compaction and dust control. Smaller quantities would be required for preparation of the concrete required for foundations and other minor uses. Subsequent to the earthwork activities, water usage would be in support of normal construction water requirements that are associated with construction of the building, substation, internal access roads, and solar arrays. The total water usage during construction would be approximately 1,200 acre-feet over a 24-month period for full build. A single 50-MW phase would use approximately 120 acre-feet over a 9-month construction period.

Because the hydrographic basin beneath the project area is a “designated groundwater basin,” all water rights in the area have already been appropriated. If the project were to use groundwater, construction activities would withdraw as much as 600 acre-feet per year; however, these withdrawals would be purchased from existing basin allocations and thus there would be no new overdraw associated with the Proposed Action. Construction water needs for dust control and other washing needs would be obtained from a commercially available source and trucked to the site. The water would be stored in an aboveground 25,000-galllon tank that would be filled on a daily basis during the construction period.

Aquifers are recharged by infiltration of precipitation to the subsurface. Increasing the acreage of impervious surfaces in an area can adversely affect groundwater recharge by decreasing the amount of water that infiltrates to the subsurface. Impervious surfaces resulting from project construction would total approximately 93.7 acres (0.2 square mile) or approximately 3% of the total project area or <0.1% of the entire 93,100-acre Pahrump Valley Groundwater Basin (Table 3.16-1).

Clark County may request an approved drainage study for sites associated with construction of a new facility requiring more than 2 acres within Clark County, depending upon the scope of federal, state, and local jurisdiction. Drainage studies would be used to inform a project-specific Site Drainage Plan (PD-4) developed by the project proponent and approved by the BLM prior to the start of project construction activities. The Site Drainage Plan would be used in conjunction with Project Grading Plans (PD-3) to establish drainage patterns on-site that reduce the risk of surface water run-off to the extent feasible. Implementation of these industry-standard design plans would reduce potential risks to water quality from impervious surface drainage.

3.16.5.2 *Operation and Maintenance Impacts*

Project operations would avoid jurisdictional waters. Impacts on jurisdictional waters would be limited to temporary construction activities and no impacts would result from project operations.

3.16.5.2.1 SURFACE WATER

Of the approximately 9.6 acres of water surfaces south of SR 160, access road construction between sub-areas would permanently impact approximately 0.024 acre/277 linear feet of potentially jurisdictional surface waters.

3.16.5.2.2 GROUNDWATER SUPPLY

The PV technology proposed for the YPSP does not require water for the generation of electricity. During operations, water use would be limited primarily to PV array washing, potable water for employees, and the potential for periodic dust control and maintenance applications. The Pahrump Valley sub-basin has an estimated annual recharge rate of 22,000 acre-feet per year. Groundwater withdrawal from the basin in 2019 was estimated to be 14,482 acre-feet annually. The amount of water required to clean the PV modules four times per year is estimated to be up to 6 million gallons per year (approximately 20 acre-feet per year). Depending on site events and conditions, the cleaning frequency may be less. The water used for module cleaning is not anticipated to require disposal due to the extremely high evaporation rate at the site. Drinking (potable) water would be supplied for workers on-site and stored in the proximity of the O&M building, in an approximately 1,000-gallon aboveground tank. Potable water is estimated to be approximately 300 gallons per month, varying seasonally and by work activities. Operational water needs would be obtained from a commercially available source and trucked to the site. Groundwater withdrawals associated with operational water needs would be purchased from existing basin allocations, and no new overdraw would be associated with the Proposed Action.

3.16.5.3 *Decommissioning Impacts*

No new fill would be required during project decommissioning activities. Impacts on surface water and groundwater from decommissioning activities would be similar to those associated with project construction and would be mitigated through the implementation of BMP measures. Following decommissioning, potentially hazardous materials, including hydrocarbons, would be removed from the site and disposed of in accordance with the Decommissioning, Abandonment, and Site Reclamation Plan (PD-6). No new impacts would result.

3.16.5.4 *Cumulative Impacts*

Cumulative impacts to water resources under the Proposed Action would be limited to the Pahrump Valley Groundwater Basin. Temporary impacts to surface water would occur from other projects located adjacent to the project site (i.e., Copper Rays Solar Project, Rough Hat Solar Project, Sagittarius Solar Project, and NDOT SR 160 Blue Diamond Rehabilitation) would have the potential to increase sediment or contaminants to the surface flow areas. These projects would be subject to the same requirements such as a Site Drainage Plan and Stormwater Pollution Prevention Plan (SWPPP) to prevent sedimentation.

Potential impacts to groundwater resources are limited to the overuse and overdraw of groundwater resources in the basin. Withdrawals would be purchased from existing basin allocations and no new overdraw would be associated with the Proposed Action. Cumulative projects in the area would be subject to the same water rights application process as the Proposed Action and thus would also be required to purchase water from existing allocations. Therefore, no new or previously unknown cumulative impacts would result.

3.16.6 Alternative Action 1 – Modified Layout

3.16.6.1 *Construction Impacts*

In terms of water resources, the primary difference between the Proposed Action and Alternative Action 1 (Modified Layout) is that Alternative Action 1 is not designed to avoid the four ephemeral washes located on-site. Instead, Alternative Action 1 (Modified Layout) would modify the Proposed Action by consolidating the four sub-areas into a single solar array area. The total project development area would remain similar to the Proposed Action (approximately 3,105.1 acres) but shifted to the west side of the 5,032.2-acre project area. Although the overall project area would remain the same, consolidation of the sub-areas would mean that construction activities include permanent impacts to jurisdictional waters within approximately 1,580 acres of avoidance area that includes ephemeral washes as well as the 500-foot buffer on either side to provide a corridor of approximately 1,000 feet or greater between sub-areas. As a result, Alternative Action 1 (Modified Layout) would permanently impact up to approximately 8.01 acres/63,133 linear feet of potentially jurisdictional surface waters south of SR 160. Access road construction to the solar array area would permanently impact approximately 0.001 acre/21 linear feet of potentially jurisdictional surface waters. Approximately 0.07 acre/821 linear feet of potentially jurisdictional surface waters would be temporarily impacted during construction of the perimeter fencing. Following installation of perimeter fencing, pre-construction contours would be restored to the extent feasible. Alternative Action 1 (Modified Layout) would be designed to maintain positive drainage across the development area, which would avoid impacts to riparian vegetation downstream by allowing passage of flows from permanently impacted surface waters.

3.16.6.2 *Operation and Maintenance Impacts*

Operational impacts would remain the same for Alternative Action 1 (Modified Layout) as they are for the Proposed Action.

3.16.6.3 *Decommissioning Impacts*

Impacts to water resources from Alternative Action 1 (Modified Layout) decommissioning activities would be similar to those discussed above for the Proposed Action. No new impacts would result.

3.16.6.4 *Cumulative Impacts*

Cumulative impacts to water resources under Alternative Action 1 (Modified Layout) would be the same as those described under the Proposed Action.

3.16.7 Alternative Action 2 – Mowing Alternative

3.16.7.1 *Construction Impacts*

Alternative Action 2 (Mowing Alternative) would maintain vegetation in areas outside of necessary vegetation removal and increase the length of time to construct the YPSP PV generation facilities by 10% to 20%. This means that the total water usage during construction would likely also be approximately 10% to 20% greater, with up to 1,320 to 1,440 acre-feet over a 27- to 29-month period for full build. Construction impacts to surface waters and potentially jurisdictional waters under Alternative Action 2 (Mowing Alternative) would be the same as for the Proposed Action.

3.16.7.2 *Operation and Maintenance Impacts*

Operational impacts would remain the same for Alternative Action 2 (Mowing Alternative) as described under the Proposed Action.

3.16.7.3 *Decommissioning Impacts*

Impacts to water resources from Alternative Action 2 (Mowing Alternative) decommissioning activities would be similar to those discussed above for the Proposed Action. No new impacts would result.

3.16.7.4 *Cumulative Impacts*

Cumulative impacts to water resources under Alternative Action 2 (Mowing Alternative) would be the same as those described under the Proposed Action.

3.16.8 No Action Alternative

The No Action Alternative would result in no impacts to surface water, groundwater, or potentially jurisdictional waters. Surface water would continue to flow unobstructed and no groundwater resources would be consumed in the construction or operation of the Proposed Action. Water resources would not be affected.

3.16.9 Irreversible or Irretrievable Impacts

No irreversible or irretrievable impacts to water resources or hydrology would result from implementation of the Proposed Action or alternatives. Surface waters impacted by the construction of access roads associated with the project could be restored to pre-construction contours to the extent feasible after the 30-year lifespan of the project.

CHAPTER 4. CONSULTATION AND COORDINATION

4.1 INTRODUCTION

This section describes BLM-conducted tribal and agency consultations and coordination for the YPSP.

4.2 SUMMARY OF TRIBAL CONSULTATION AND COORDINATION

Federal agencies are required to consider the effects of their actions on sites, areas, and other resources (including plants and animals) that are of cultural and religious significance to tribal communities. Pursuant to Executive Order 13175 (*Consultation and Coordination with Indian Tribal Governments*, November 6, 2000), the BLM recognizes tribal sovereignty, self-determination, and self-government in the development of agency policy, land use decisions, and other actions that may impact tribal communities. The BLM participates in regular, meaningful consultation and collaboration with tribal governments following established policy direction in BLM Manual 1780 (*Tribal Relations*) implemented through BLM Handbook H-1780-1 (*Improving and Sustaining BLM–Tribal Relations*) (BLM 2016b, 2016c).

As part of the Government-to-Government consultation efforts for the proposed YPSP, letters were sent to 11 tribes to inform them of the Proposed Action. These letters were sent on July 16, 2018, and mailed to the following tribes: Paiute Indian Tribe of Utah; Timbisha Shoshone Tribe; Chemehuevi Indian Tribe; Twenty-nine Palms Band of Mission Indians; Bishop Paiute Tribe; Big Pine Paiute Tribe of the Owens Valley; Moapa Band of Paiute Indians; Las Vegas Paiute Tribe; Fort Mojave Indian Tribe; Fort Independence Community of Paiute; and the Colorado River Indian Tribes. Additional correspondence was sent informing them of the public scoping meetings they could attend. The letters and ensuing conversations between the BLM and consulted tribes resulted in one field meeting to examine the proposed project area. This site visit took place on February 15, 2019, and included members of the Twenty-Nine Palms Band of Mission Indians and the Colorado River Indian Tribes.

From September 18, 2017, to March 25, 2019, the BLM conducted 16 separate tribal consultation meetings regarding the YPSP with the following tribes. The outcome of those consultation meetings is summarized in Table 4.2-1.

Following the consultation meeting on March 25, 2019, the Fort Mojave Indian Tribe submitted a letter to the BLM Southern Nevada District Office (dated July 23, 2019) stating that, in general, trail systems and travel corridors are of cultural importance to the Mojave where trail systems typically connect traditional places of cultural and religious importance, including the Old Spanish Trail and Mormon Road. Additionally, it was expressed that some cultural resources identified in the project area (see Section 3.6, Cultural Resources) could be associated with such aboriginal trails in the vicinity.

After the comment period for the Draft EIS ended on May 4, 2020, the Colorado River Indian Tribes (Tribes) submitted a letter to the BLM. The letter, dated May 5, 2020, noted the Tribes' concerns related to the potential removal of artifacts from the area of the proposed project and the corresponding destruction of the Tribes' footprints on the landscape. The Tribes also requested that all prehistoric cultural resources be avoided if feasible, particularly those resources that could not be moved. It was also expressed that, any prehistoric cultural resources that are not eligible for protection under the NHPA or the Archaeological Resources Protection Act (16 USC 470aa–mm) also be protected as part of the cultural landscape. The comments submitted by the Tribes in the May 5, 2020, letter, which was considered as part of the public comment period on the Draft EIS by BLM, are detailed in Appendix I, with the BLM's response to each comment.

The BLM recognizes the importance of traditional resources central to community-held practices, beliefs, values in maintaining cultural identity and tribal heritage. The BLM is committed to formal consultation and to continual and ongoing engagement with tribal communities to strengthen these Government-to-Government relationships.

4.3 SUMMARY OF OTHER AGENCY CONSULTATION AND COORDINATION

Consultation with the USFWS is required under Section 7 of the ESA, when a project that is carried out, funded, or authorized by a federal agency may affect species listed under the ESA. A BA was prepared, and on January 7, 2020, the BLM initiated Section 7 Consultation with the USFWS. The USFWS issued its BO on July 14, 2020, concluding consultation.

4.4 SUMMARY OF PUBLIC PARTICIPATION

4.4.1 Scoping

A 90-day public scoping process was initiated with an NOI published in the *Federal Register* on June 1, 2018. The BLM collected a total of 57 comment letter submittals during the planned 90-day scoping period. Please see Section 1.8 of this EIS and for an overview of the scoping comments.

In June 2018, the BLM hosted two public meetings to inform the public of the proposed project. The two meetings had a combined total of 28 attendees. During the meeting, the BLM Field Manager provided an introduction to the scoping period, SWCA explained the scoping process, timelines, and EIS steps, and Yellow Pine Solar provided summaries of the project and project facilities. Meetings were held at the following two locations.

Scoping Meeting 1, June 27, 2018—Pahrump Nugget, 681 South Highway 160, Pahrump, Nevada 89048

Scoping Meeting 2, June 27, 2018—Suncoast Hotel and Casino, 9090 Alta Drive, Las Vegas, Nevada 89145

4.4.2 Public Comment on the Draft EIS

A 45-day public comment period for the Draft EIS was initiated on March 20, 2020, with a Notice of Availability (NOA) published in the *Federal Register*. The public comment period closed on May 4, 2020. A total of 93 submittals was received by the BLM during the Draft EIS comment period. Please see Appendix I for more information on the public comment process, responses, and revisions of the Draft EIS.