# RECORD OF DECISION

# Yellow Pine Solar Project

Case File Numbers: N-90788, N-98565

DOI-BLM-NV-S010-2017-0110-EIS

November 2020

Prepared by

United States Department of the Interior
Bureau of Land Management
Las Vegas Field Office
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BLM

# Executive Summary

This document constitutes the Record of Decision (ROD) of the United States Department of the Interior (DOI), Bureau of Land Management (BLM) regarding the Yellow Pine Solar, LLC and GridLiance West, LLC (Applicants) application for a right-of-way (ROW) grant for the Yellow Pine Solar Project (Project) and the associated connected actions. This decision is supported by the analysis included in the Final Environmental Impact Statement (Final EIS) for this Project that was published on September 4, 2020.

This ROD makes two decisions:

- First, it approves the issuance of a Federal Land Policy and Management Act (FLPMA) Title V ROW grant to Yellow Pine Solar, LLC to construct, operate, maintain, and decommission a solar facility analyzed in the Final EIS as the Mowing Alternative within the Proposed Action layout.
- Second, it approves the issuance of a FLPMA Title V ROW grant to GridLiance West, LLC for the Trout Canyon Substation analyzed in the Final EIS as the Proposed Action.

This decision reflects careful consideration of the Proposed Action, the various alternatives, and the issues identified in the Final EIS. This decision best fulfills the BLM's statutory mission and responsibilities.

# Introduction

Boulevard Associates, LLC, a subsidiary of the Applicants, filed an application for a ROW grant (N-90788) for the Sandy Valley Solar Project in October 2011. This original application included an area of approximately 9,290 acres on BLM-administered lands and extended north and south of Tecopa Road. The original application was later amended on June 24, 2016 and resubmitted by the Applicant. As part of the ROW grant application process, the Applicant submitted a Plan of Development (POD) for the Project to the BLM with the application followed by revised versions of the POD, with the final version dated July 6, 2020 to supplement information provided in the original submittal. The Project would include a solar generation power plant and ancillary facilities on approximately 3,000 acres (1,214 hectares) of BLM land in Clark County, Nevada, that would produce approximately 500-megawatts alternating current. The Project also includes an application from GridLiance West, LLC (GLW) to construct the Trout Canyon Substation (TCS) and associated GLW 230-kV transmission line (N-98565).

In accordance with FLPMA, public lands are to be managed for multiple uses in a manner that accounts for a combination of balanced and diverse resource uses that consider 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 (§ 501(a)(4)). Taking into account the BLM's multiple-use and sustained yield mandates, the BLM’s purpose and need for this action was to respond to the ROW application submitted by the Applicant under Title V of FLPMA (43 United States Code (USC) § 1761) (serial number N-90788) to construct, operate, maintain, and decommission the Project in compliance with FLPMA, DOI NEPA regulations, BLM ROW regulations, the BLM NEPA Handbook, and other applicable federal and state laws and policies. Under FLPMA, the BLM was required to decide whether to deny the proposed ROW, grant the ROW, or grant the ROW with modifications. The BLM would decide whether to include terms, conditions, and stipulations it determined to be in the public interest and may include modifying the proposed use or changing the location of the proposed facilities (43 CFR Subpart 2805).

The Final EIS for this Project was published on September 4, 2020.

# Overview of Alternatives

The Final EIS evaluated four alternatives relating to the proposed Project. They are summarized below. A complete description of the Proposed Action and all the alternatives analyzed can be found in Chapter 2 of the Final EIS, including maps and the alternatives considered but eliminated from detailed analysis.

1. Proposed Action - The Proposed Action includes BLM's authorization to construct, operate, maintain, and decommission a 500-MW photovoltaic (PV) solar electric generating facility and ancillary facilities. The proposed on-site solar facilities include PV solar arrays and substations, electrical collection lines, an energy storage system (batteries), access roads, electrical distribution and transmissions lines, communication cables, 230-kV gen-tie line, operation and maintenance facilities, perimeter fencing, portable water tanks for fire protection, drainage control features, and the TCS and associated GLW 230-kV transmission line. The Proposed Action includes four solar array sub-areas A, B, C, and D, connected using underground collection lines parallel or adjacent to sub-area access roads. Approximately 12 acres of patches of intact vegetation and soils would be included in sub-areas B, C, and D. The facility would be constructed by clearing and cutting vegetation to a height of no more than three inches. In areas where construction access is impeded, vegetation would be cleared and cut to three inches and the surface would be tilled to remove stumps while leaving the root structure in place to the greatest extent practicable. The Project would result in the permanent disturbance of approximately 2,908 acres within the approximately 5,000-acre ROW application area.

1. Alternative 1, Modified Layout Alternative – The main difference between the Modified Layout Alternative and the Proposed Action is the location and arrangement of the proposed facilities. The Modified Layout Alternative consolidates the proposed photovoltaic, energy storage, and the substation and operations and maintenance facilities into one project area, with no sub-areas. The TCS location would remain the same as the Proposed Action. A one-mile long overhead 230-kV gen-tie line, with associated access road, would be installed between the project area and the proposed TCS. Many facilities would remain the same as those described in the Proposed Action, including the energy storage system, distribution power, communication cables/lines, project buildings, security fencing, and TCS. Under the Modified Layout Alternative, construction is anticipated to take longer than that of the Proposed Action, with operations and decommissioning remaining the same as the Proposed Action. The solar array, access roads, substation, 230-kV gen-tie line, and tortoise fencing would differ from the Proposed Action. Moving the proposed facilities into a single area would remove the need for additional access roads and underground collection. The total permanent disturbance acreage for the Modified Layout Alternative is 3,085 acres.
2. Alternative 2, Mowing Alternative – The Mowing Alternative was developed to address Mojave Desert ecosystem restoration concerns after the proposed project disturbance. The Mowing Alternative would modify the vegetation management proposed for site preparation under the Proposed Action and the Modified Layout Alternative to include vegetation mowing to a height of 18 to 24 inches through the project site prior to construction. Vegetation would be maintained at 18 to 24 inches in areas where grading is not required. Propagule islands proposed under the other action alternatives would not be needed as vegetation would be maintained throughout the majority of the site.

   Mowing methods were 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.

3. No Action Alternative - Under the No Action Alternative, the BLM would not authorize a ROW grant for the Project. No solar field, substation(s), collector routes, gen-tie lines, O&M facilities, or other project components would be constructed. The BLM would continue to manage the land consistent with the 1998 Las Vegas RMP. Any future solar applications for development of the site would be subject to the site-specific conditions identified in the 2012 Solar PEIS and the applicable laws and land use plans in place at the time of application.

**Alternatives Considered but Eliminated from Detailed Analysis:**

According to the Council on Environmental Quality's (CEQ) NEPA Regulations (40 CFR 1502.14)[1], the alternatives section in an EIS shall rigorously explore and objectively evaluate all reasonable alternatives; however, for alternatives which were eliminated from detailed study, the EIS shall briefly discuss the reasons for their having been eliminated.

Several alternative sites, technologies, and methods were considered but eliminated, as described in Table 1. Additional information on the alternatives considered but eliminated are provided in the *Yellow Pine Solar Alternatives Development* report (DOI-BLM 2019), included as Appendix G in the Final EIS.

**Table 1 Summary of Alternatives Considered but Eliminated from Detailed Analysis**

| Alternative | Description and Rational for Dismissal |
|---|---|
| **Site Alternatives** | |
| Southern project area | This alternative included development of the southern portion of the application area (south of Tecopa Road). This alternative was eliminated from further evaluation due to public comments and potential conflicts with future Mojave desert tortoise relocation efforts. Specifically, the Stump Springs Desert Tortoise Translocation Area is a proposed tortoise release area as described in the Draft Tortoise Translocation Plan (Great Basin Institute 2014). Although still in draft form, the plan indicated a priority release area that overlaps with the southern portions of the project area. As a result, the project proponent reduced the project area to avoid inconsistencies with future plan objectives for the Draft Tortoise Translocation Plan. |
| Off-set project area | This alternative included a project area split into two sub-areas of approximately 1,500 acres each, in order to avoid a single large wash transecting the area. This alternative provided some minimization of impacts to surface water features (ephemeral streams) but was substantially similar in design to the Proposed Action and was eliminated to avoid additional seasonal waterways. |
| Northern substation | An alternative location for the TCS was evaluated, north of SR 160 along the GLW 230-kV transmission line ROW. The BLM noted that the area north and along SR 160 is a Mojave desert tortoise connectivity corridor. Further, this location would require future transmission lines to the TCS from new solar development projects located across SR 160 (southwest side of SR 160) to cross SR 160 in potentially multiple locations, increasing potential resource effects. After consultation with the BLM, this location was eliminated due to inconsistencies with land management objectives. |
| Sandy Valley Substation | This alternative included connection to the Sandy Valley Substation instead of the TCS. The alternative was eliminated due to technical infeasibility resulting from a lack of capacity at Sandy Valley Substation, as well as the identification of additional environmental effects associated with a longer transmission route. |
| Interconnection loop-in | Under this alternative, the Project would interconnect with the grid using the on-site substation and loop into the existing nearby GLW 230-kV transmission line, bypassing the need for connection with the TCS. This alternative was eliminated due to technical |

[1] As this analysis was begun before September 14, 2020, all references to CEQ's NEPA regulations are to the 1978 version, as amended, at 40 CFR parts 1500-1508.

| | |
|---|---|
| | infeasibility because it would require duplicate infrastructure already provided by the proposed TCS, and the current interconnection agreement in place with GLW would not be honored. |
| Modified fence | The BLM Las Vegas Field Office evaluated a "modified fence" management alternative that would include tortoise fencing during project construction, followed by alteration of the fencing to allow for Mojave desert tortoise reestablishment after construction is complete and during solar field operation. The habitat within the fenced project area would be altered from pre-disturbance conditions. Impacts to the project area from construction and operation of the Project would also likely impact adjacent habitat, leading to edge effects. It is anticipated that future land development in the area would have similar effects on the environment. These conditions would fragment existing tortoise habitat further, leading to decreased population connectivity. Tortoise densities within the project area and translocation areas were also below the minimum population viability for tortoises, and translocation of tortoises is possible. As a result, this alternative was eliminated from further analysis because it yielded similar effects as the Proposed Action, and no distinct advantages to the tortoise. |

In accordance with 40 CFR 1505.2(b), the BLM identified the No Action Alternative as the environmentally preferred alternative because it would cause the least damage to the biological resources, and physical environment in the project area. The Final EIS identified the Proposed Action layout using the Mowing Alternative construction as the BLM Preferred Alternative.

# Decision

Consistent with the requirements of Title V of FLPMA (43 USC § 1761 et seq.) and the implementing regulations (43 CFR Part 2800), the decision is hereby made to approve the Mowing Alternative within the Proposed Action layout (Selected Alternative), as described in the Final EIS for the Yellow Pine Solar Project, and to approve ROW grants for a solar facility, substation and associated infrastructure on public land managed by the BLM in Clark County, Nevada. This decision fulfills BLM's legal requirements for managing public lands and contributes to the public interest in developing renewable power to meet federal and state renewable energy goals. Specifically, this ROD approves the construction, operation, maintenance, and decommissioning of the 500 MW PV solar power generating facility with battery storage, and the TCS and associated transmission line on BLM-administered land in Clark County, Nevada.

The project site is situated approximately 10 miles southeast of Pahrump and approximately 32 miles west of Las Vegas in Clark County, Nevada. The Project is located within Mount Diablo Meridian, Nevada, T.21S., R.55E., secs. 31-35; and T.22S., R.55E., secs. 2-10. Appendix A shows the location of the project site.

The ROW grants will authorize the Applicants to use, occupy, and develop the described public lands to construct, operate, maintain, and decommission a 500 MW PV solar power generating facility and ancillary facilities, including battery storage and the TCS and associated transmission line. In addition to the acres of the public lands needed for construction, the Project's operation and maintenance over the full term of the ROW will result in the disturbance of approximately 3,100 acres (1,255 hectares) within the ROW application area. The Applicants develop the minimum acreage needed to generate 500 MW of power plus battery storage.

As approved by this decision, the Selected Alternative is expected to be constructed in phases. The first phase of power could come on-line in early 2022. The BLM will issue the ROW grants to the Applicants for a term of 30 years and may be renewed, subject to the BLM's discretion. In addition, the BLM will condition the initiation of construction on the BLM's issuance of a Notice to Proceed (NTP) for each phase or partial phase of construction. If the approved Project does not progress to construction or operation or is proposed to be changed to the extent that it appears to BLM to be a new project proposal on the approved site, that proposal may be subject to additional review under NEPA and may require additional approval from the BLM.

The ROWs are conditioned on compliance with: (i) the terms and conditions in the grant; (ii) the Project-Incorporated Design Features, Applicant Committed Environmental Protection Measures, and Management Plans provided in Appendix B of this ROD; (iii) the Biological Opinion (BO) issued by the United States Fish and Wildlife Service (USFWS) provided in Appendix C of this ROD; and (iv) all other necessary local, state, and federal approvals, authorizations, and permits.

This ROD applies only to BLM-administered lands and to BLM's decisions approving the Selected Alternative. Other agencies, including but not limited to Clark County and USFWS, are responsible for issuing and enforcing their own decisions and applicable authorizations for the Project.

# Rationale for Decision

The BLM determined that the Selected Alternative, as described in the Final EIS, was the Agency's preferred alternative. The selection of this alternative reflects careful balancing of many competing public interests in managing public lands in accordance with the principles of multiple use and sustained yield and other obligations in FLPMA, including those in Title V. In particular, the Selected Alternative involves construction of the solar arrays using mowing, thereby reducing the Project's impacts as compared with the Proposed Action. The site preparation methods described under the Proposed Action can help to keep the soil seed bank in place, but due to the expected mortality of vegetation from this method, and from the additional passes by machinery that would be needed, the Proposed Action method is expected to have long-term negative impacts on soils and vegetation. The Selected Alternative site preparation method would involve fewer passes by equipment over vegetation and soils resulting in less disturbance to soils and vegetation and therefore fewer impacts to resources. As described in the Final EIS, mowing vegetation to a height of approximately 18 – 24 inches under the Selected Alternative would allow the greatest potential survival rates of those plants. Mowing vegetation below 18 inches could result in higher levels of mortality. Through comprehensive environmental analysis and public involvement in accordance with NEPA, the BLM has determined that use of the Selected Alternative method will result in fewer impacts on native vegetation, reduce impacts to soils that contain seed banks, and reduce impacts related to the spread of invasive weeds when compared to the Proposed Action. In accordance with 40 CFR 1505.2(c), the BLM has adopted all practicable means to avoid or minimize environmental harm from the alternative selected. The BLM and the Applicant have developed a series of project design features to avoid, minimize, and mitigate impacts to various resources including, but not limited to, visual resources, cultural and tribal resources, vegetation, air quality, and general wildlife. The Selected Alternative and mitigation measures were developed in coordination with cooperating agencies, including the U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (USEPA), Department of Defense (DoD), USFWS, Nevada Department of Wildlife (NDOW), Nevada Division of Forestry, the State Historic Preservation Office (SHPO), and Clark County. The BLM also developed an impact assessment of the potential visual project-related impacts the Old Spanish National

Historic Trail (OSNHT) in consultation with the National Park Service (NPS), a participating agency and co-administrator. The BLM determined that the project would not significantly interfere or be incompatible with the nature and purpose of the OSNHT. See Final EIS at Section 3.8.4.1 and 3.8.5.

The Selected Alternative will contribute to the public interest by facilitating infrastructure investments that will create jobs and economic activity, increasing safe and environmentally sound production and transmission of renewable energy on public lands to meet Federal and state goals, and protecting sensitive natural, cultural, and recreational resources. By approving the Project, the BLM will promote the policy objectives described in applicable Executive Orders and Secretary's orders, including:

- Executive Order 13783 (March 28, 2017) promoting "clean and safe development of our Nation's vast energy resources, while at the same time avoiding regulatory burdens that unnecessarily encumber energy production, constrain economic growth, and prevent job creation."
- Executive Order 13807 (August 15, 2017) and Secretary's Order 3355 (August 31, 2017) establishing policy to prioritize infrastructure projects and streamline the environmental review process.

This decision promotes additional Department of the Interior priorities, including: to sustainably develop our energy and natural resources by approving 500 MW of solar energy; ensure Tribal sovereignty is honored by engaging in government-to-government consultation; increase revenues to support the Department and national interests – the Project will provide approximately $3 million annually to the U.S. Treasury; strike a regulatory balance by selecting a site that reduces the environmental effects and develops the most energy possible through efficient use of space; and modernize our infrastructure by allowing the development of new technology. This decision achieves the BLM leadership priorities of energy independence, shared conservation stewardship, job creation, and serving America. Project construction will generate total compensation of approximately $297 million and total economic output would be $789 million through the end of the construction period. At its peak, construction of the Project will create up to 400 jobs. The Project would produce approximately 500 MW with an integrated battery storage system, or enough energy to power approximately 100,000 households. Solar electric power is produced during daylight hours when electricity demand is highest. The State of Nevada has enacted legislation to encourage the development of renewable energy generation. Nevada's Renewable Portfolio Standard requires that 50 percent of all energy generated in Nevada be derived from renewable sources by 2030.

**Mojave Desert Vegetation**

The Selected Alternative, which requires mowing plants to a height of 18 – 24 inches during site preparation, would preserve most, if not all, of the photosynthetic material of the most common perennial shrubs in the project area. These shrubs are important to conserve the vegetation on the site, reduce weed invasions, and effectively minimize project impacts on site. With the Selected Alternative, the BLM is balancing the benefits of large-scale renewable energy production and battery storage, with a site preparation method that reduces the long-term adverse impacts to perennial native vegetation within the project area.

**Desert Tortoise**

The Selected Alternative is expected to result in adverse impacts to the federally threatened desert tortoise. The BLM conducted extensive consultation with the USFWS. Implementation of project-specific

mitigation measures identified in the Final EIS, and terms and conditions identified in the Biological Opinion are expected to further reduce adverse impacts. The BLM believes that, on balance, the benefits associated with large-scale renewable energy production and battery storage capacity outweigh the impacts to the desert tortoise.

# Consultation and Coordination

## Endangered Species Act - Section 7 Consultation

The BLM submitted a Biological Assessment (BA) describing the Proposed Action to the USFWS. Following review of the BA, the USFWS issued a final BO on July 14, 2020 (File No. 08ENVS00-2020-F-0071). (The final BO is included in this ROD as Appendix C.) The USFWS concurred with the BLM's determination that, if authorized, the Proposed Action alternatives would affect and would be likely to adversely affect the Mojave desert tortoise. The final BO identified a series of proposed minimization measures developed by the BLM and the Applicant and additional conservation measures to be implemented during all phases of the life of the Project. The USFWS concluded that the Proposed Action is not likely to jeopardize the continued existence of the Mojave desert tortoise or result in adverse modification of any designated critical habitat, taking into account the mitigation measures designed to avoid and minimize impacts. Implementation of these measures is mandatory and a requirement of this ROD and the ROW.

## NHPA Section 106 Consultation

As described in detail in Section 1.7.3 of the Final EIS, federal agencies must demonstrate compliance with the National Historic Preservation Act (NHPA) (54 USC § 300101 et seq.). NHPA Section 106 requires a federal agency with jurisdiction over a project to consider the effect of the proposed project on historic properties included on, or eligible for inclusion on, the National Register of Historic Places (54 USC § 306108). Federal agencies also must provide the Advisory Council on Historic Preservation an opportunity to comment on the undertaking. Under NHPA Section 106, the BLM consults with the SHPO and other consulting parties, including Indian tribes, as part of its responsibilities to identify, evaluate, and resolve adverse effects to historic properties affected by BLM undertakings. The BLM determined that the proposed action would not adversely affect historic properties.

## Government-to-Government Consultation with Tribes

As described in detail in Section 4.2 of the Final EIS, the BLM formally invited the following eight federally recognized tribes to consult on a government-to-government basis for the Project: Moapa Band of Paiutes, Las Vegas Paiute Tribe, Fort Mojave Tribe, Twenty-Nine Palms Band of Mission Indians, Chemehuevi Indian Tribe, Bishop Paiute Tribe, Timbisha Shoshone Tribe, and Colorado River Indian Tribes. Consultation was initiated in accordance with several authorities including, but not limited to, NEPA, NHPA, the American Indian Religious Freedom Act, Executive Order 13175, Executive Order 13007, Secretarial Order 3317, and DOI's Tribal Consultation Policy (Dec. 1, 2011). The federally recognized tribes were invited to be consulting parties as provided in 36 CFR Part 800, the implementing regulations for Section 106 of NHPA. Table 2 identifies the tribes which participated Section 106 consultation for the Project.

Consistent with policy, the BLM notified and formally requested consultation with the above-listed Indian tribes by letter and traveled to and consulted with the above-listed tribes. The BLM Field Manager and staff have actively responded to all requests to meet with tribal leaders and staff throughout project review. A summary of the consultations conducted by BLM are listed below in Table 2.

**Table 2 Federally Recognized Tribes with Traditional Ties to the Project Site**

| Tribe | Location | State | Date Consultation Conducted by BLM |
|---|---|---|---|
| Moapa Band of Paiutes | Moapa | Nevada | September 18, 2017; September 11, 2018; February 13, 2019 |
| Las Vegas Paiute Tribe | Las Vegas | Nevada | November 13, 2017; September 4, 2018; February 27, 2019 |
| Fort Mojave Indian Tribe | Needles | California | July 13, 2018; March 25, 2019 |
| Twenty-Nine Palms Band of Mission Indians | Coachella | California | July 18, 2018; March 20, 2019 |
| Chemehuevi Indian Tribe | Lake Havasu | California | July 28, 2018; March 18, 2019 |
| Bishop Paiute Tribe | Bishop | California | August 1, 2018 |
| Timbisha Shoshone Tribe | Bishop | California | August 20, 2018; March 18, 2019 |
| Colorado River Indian Tribes | Parker | Arizona | March 25, 2019 |

## Federal Agency Coordination

### U.S. Environmental Protection Agency

The BLM coordinated with the USEPA during the administrative draft EIS process. The USEPA submitted comments on the Draft EIS during the public comment period encouraging continued coordination with agencies to minimize impacts to sensitive resources, regarding impacts to air quality, hydrology and flood management, desert tortoise, vegetation and special-status plants, land use, and OSNHT, and consideration of design refinements to reduce resource impacts. The USEPA's comments are addressed in Appendix I of the Final EIS.

### United States Army Corps of Engineers

As explained in Section 3.16 of the Final EIS, USACE has jurisdiction to protect the aquatic ecosystem, including water quality and wetland resources, under Clean Water Act Section 404. Under that authority, USACE regulates the discharge of dredged or fill material into waters of the United States, including wetlands, through the Section 404 permit program. No wetlands are found within the Project site.

On August 27, 2020, the USACE notified the BLM of completion of the approved jurisdictional determination (AJD) for the Yellow Pine Solar Project. The USACE determined through the AJD that there were no waters of the U.S. on the project site, and therefore the proposed construction of road crossing and associated utilities within ephemeral drainages does not require authorization under Section 404 of the Clean Water Act. No additional permitting is required from the USACE.

# Public Involvement

## Scoping

The BLM published a NOI to prepare an EIS for the Project in the Federal Register on June 1, 2018, which initiated a 90-day public scoping period for the Project, ending on August 30, 2018. The BLM hosted two public scoping meetings for the Project, one on June 27, 2018 in Pahrump, Nevada and one on June 28, 2018 in Las Vegas, Nevada. The scoping meeting on June 27 was attended by 19 people and the scoping meeting on June 28 was attended by nine people. The BLM received 57 submittals during the scoping period. A *Scoping Report* was prepared to summarize the comments addressed and posted to the Project's ePlanning page (DOI-BLM 2018). The BLM also sent letters in September 2018 to invite agencies to become cooperating agencies. The cooperating agencies include Clark County Desert Conservation Program, Nevada Department of Wildlife, and USEPA. The BLM has coordinated with the Co-Administrators of the OSNHT.

## Public Comments on the Draft EIS

Concurrent with the publication of a Notice of Availability in the Federal Register, the Draft EIS was published on March 20, 2020. This was followed by a 45-day public comment period ending on May 4, 2020. The BLM did not hold public meetings for the Draft EIS due to the COVID-19 pandemic situation. Public meeting materials were posted to the project ePlanning webpage for review to provide the public with information on the Draft EIS.

The BLM received written comments by mail, email, and through the online comment form on the ePlanning project website. The BLM received a total of 90 submissions; 55 of these were considered unique submissions, and 32 were form letter campaigns. All comments on the Draft EIS were given equal consideration, regardless of the method of submittal and whether the submittal was part of an organized letter writing campaign. In responses to the substantive comments (as defined under 40 CFR 1503.4(b)) received, the BLM made corrections to analyses or data used in the EIS or explained why the comments did not warrant additional changes to the EIS. Appendix I of the Final EIS included the substantive and non-substantive comments received, the BLM's response to substantive comments, and additional information regarding the comment receipt and response process.

## Public Comments on the Final EIS

On September 4, 2020, the BLM published the Notice of Availability (NOA) for the Yellow Pine Solar Project Final EIS.

Whereas the publication of a Draft EIS triggers a formal public comment period (typically 45 days), a formal comment period does not accompany the publication of an Final EIS.

Interested parties, however, still submit comments during the 30-day "availability" period following publication of the Final EIS. This was the case for the Project's Final EIS during the 30 days following its publication on September 4, 2020. BLM received six comments from various Federal/state agencies, organizations, and stakeholder entities. A summary of Final EIS comments received is provided below. These comments were considered by the BLM in choosing the selected alternative.

No comments received on the Final EIS represent significant new circumstances or information relevant to environmental concerns that would require a supplement consistent with 40 CFR 1502.9(c)(1)(i). Inaccuracies discovered in the Final EIS will be acknowledged and corrected in the Errata to the Final EIS.

- United States Environmental Protection Agency

  USEPA supports selection of the BLM's preferred alternative (Mowing Alternative with Proposed Action layout). The preferred alternative is expected to result in fewer impacts to soil and botany resources. USEPA made the following recommendations to the BLM: [1] if the BLM ultimately selects the Proposed Action instead of the preferred alternative, require that at least one of the Project's subareas adhere to the Mowing Alternative in order to compare vegetation recovery under multiple construction methods; [2] salvage cacti and Mojave yucca within the project area for habitat restoration, and incorporate small propagule islands around dense stands of cacti and Mojave yucca; [3] for future projects, ensure the various management plans listed in Tables B-1 and B-2 are available for public access in a timely manner.

- State of Nevada – Department of Conservation and Natural Resources – Division of Water Resources

  The Nevada Division of Water Resources (DWR) commented that the Project proposal is "supported as written", and DWR also provided a list of general agency comments regarding the need to comply with all state water laws and water permitting requirements for surface and groundwater use via the State Engineer's Office.

- State of Nevada – Department of Conservation and Natural Resources – Division of Environmental Protection – Bureau of Water Pollution Control

  The Nevada Bureau of Water Pollution Control (BWPC) provided comments explaining that the Project may be subject to BWPC permitting related to discharges into surface waters and groundwater of the State, and that such permits must be issued prior to the construction of any treatment works.

- State of Nevada – Department of Wildlife

  The Nevada Department of Wildlife (NDOW) commented that they cannot support the Project Proposed Action, and their position is that Alternative 2 (Mowing Alternative) offers the greatest potential for combining solar development with habitat conservation and economic opportunities. They remain available for further coordination and opportunities to provide feedback for the Project.

- Desert Tortoise Council

  On September 7, 2020, Basin and Range Watch forwarded correspondence from the Desert Tortoise Council (DTC) to BLM wherein DTC expressed concern that their previous comments regarding the Draft EIS were not acknowledged in the Response to Comments section of the Final EIS. (DTC's original May 2020 comments to the Draft EIS were attached to Basin and Range Watch's email.) A detailed review of DTC's comments to the Draft EIS shows that DTC did not use the correct email address for their comment submittal. The correct email address was presented in the Federal Register Notice of Availability (NOA) for the Draft EIS and associated press release (both dated March 20, 2020). The correct email address was blm_nv_sndo_yellowpine@blm.gov, but DTC sent their comments to blm_nv_sndoyellowpine@blm.gov. (Note the missing underscore character after "sndo".) Thus, DTC's comments to the Draft EIS were never received by BLM until forwarded by Basin and Range Watch on September 7, 2020 – four months after the conclusion of the formal 45-day comment period for the Draft EIS (March 20 through May 4, 2020).

  It should also be noted that DTC expressed concern that the Final EIS only named 12 of 13 organizations submitting comments to the Draft EIS, and that perhaps DTC was the unnamed thirteenth commenter and were overlooked in BLM's substantive responses to comments

received. This was not the case. A review of Table 3 in Appendix I of the Final EIS shows that indeed all 13 commenting organizations are individually identified/named. Their unique assigned sender ID's are 21, 85, 87, 89, 90, 91, 92, 93, 94, 95, 96, 97, and 98 – thirteen in total, none of which are DTC.

Importantly, a substantive review of DTC's mis-sent comments to the Draft EIS shows that the issues they raised were also raised by other commenting entities and are addressed in Appendix I of the Final EIS. DTC's comments focused on development of alternatives, protection of the Mojave desert tortoise, analysis of the Mowing Alternative, tortoise population trends, analysis of socio-economic impacts, and analysis of cumulative impacts on tortoises.

- Yellow Pine Solar LLC (Project applicant)

  The Applicant submitted comments to BLM highlighting various inconsistencies between the Final EIS and the latest version of the Plan of Development (POD). These highlighted inconsistencies focused on items such as alternative site preparation methods, project area fencing design, access road dimensions, tortoise fencing, propagule islands, and identification of jurisdictional waters.

# Availability of the Record of Decision

Electronic copies of this ROD are available on the Internet at https://eplanning.blm.gov/eplanning-ui/project/81665/510 . Paper and electronic copies may be viewed at the following location:

BLM Las Vegas Field Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

# Appeal

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR Part 4 and the enclosed Form 1842-1 (Appendix D).

# Final Agency Action

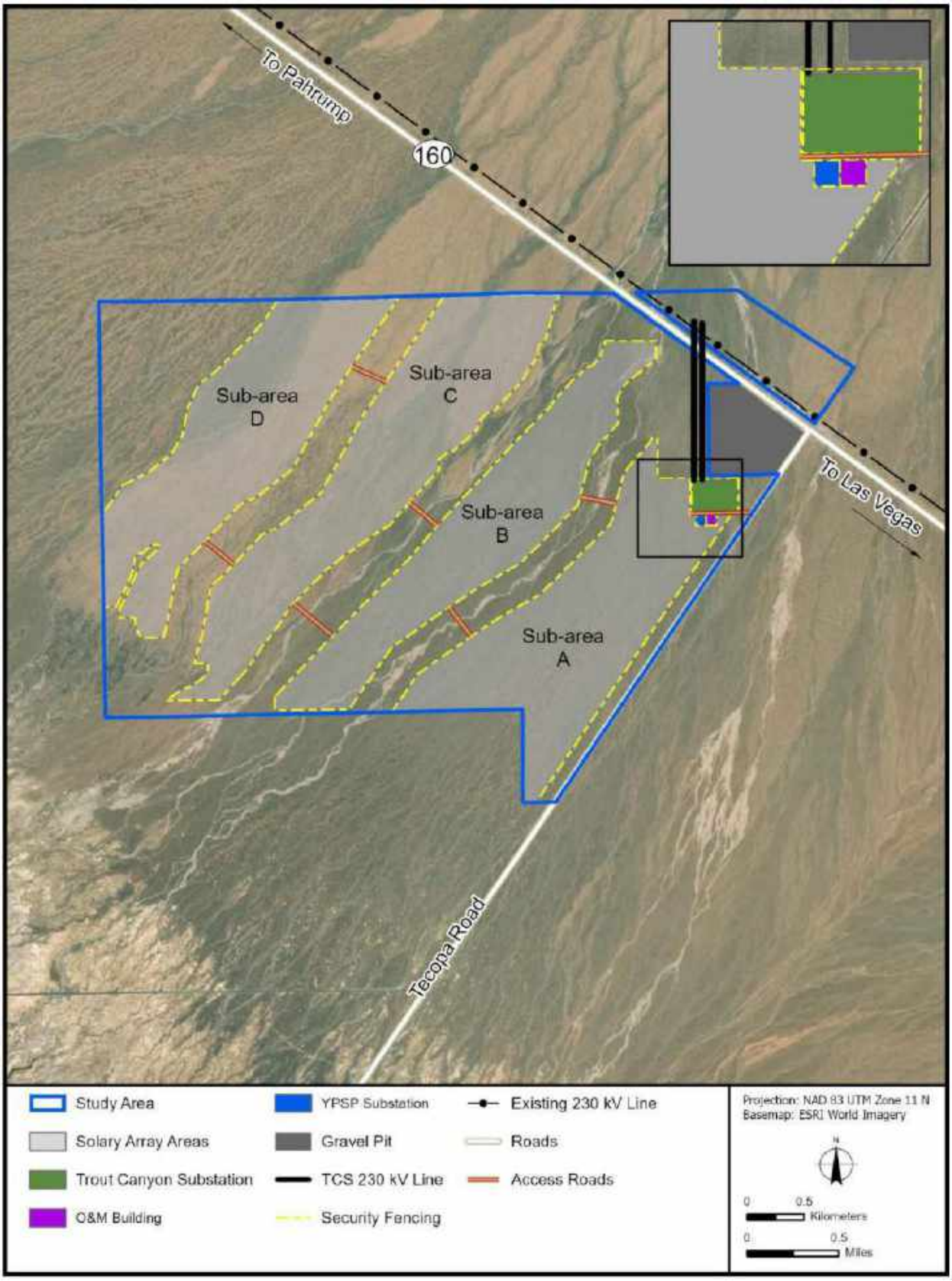
It is my decision to approve the solar energy and substation ROW grants to the Applicants for the Mowing Alternative within the Proposed Action layout, subject to terms, conditions, stipulations, Plan of Development, and the environmental protection measures developed by the Bureau of Land Management and reflected in this Record of Decision. The Final EIS fully analyzes the impacts of these actions. These decisions are effective on the date this Record of Decision is signed.

DATE: 11/06/2020

Angelita S. Bulletts
District Manager
Southern Nevada District Office
Bureau of Land Management
United States Department of the Interior

# APPENDIX A

## Map


To Pahrump
160
Sub-area D
Sub-area C
Sub-area B
Sub-area A
To Las Vegas
Tecopa Road
Study Area
Solary Array Areas
Trout Canyon Substation
O&M Building
YPSP Substation
Gravel Pit
TCS 230 kV Line
Security Fencing
Existing 230 kV Line
Roads
Access Roads
Projection: NAD 83 UTM Zone 11 N
Basemap: ESRI World Imagery
N
0 0.5 Kilometers
0 0.5 Miles

# APPENDIX B

## Project-Incorporated Design Features, Applicant Committed Environmental Protection Measures, and Management Plans

# PROJECT-INCORPORATED DESIGN FEATURES, APPLICANT COMMITTED ENVIRONMENTAL PROTECTION MEASURES, AND MANAGEMENT PLANS FOR THE YELLOW PINE SOLAR PROJECT

Design features are any and all features that are incorporated into a proposed action and alternatives with the intent to reduce potential project impacts. Design features include project components, applicant-committed measures, and management plans. Design features are based on Bureau of Land Management (BLM) direction and policy, best available science, site-specific evaluations, and proven industry standards and best management practices. Design features may also include standard or common federal, State, and local agency requirements.

Yellow Pine Solar, LLC, in coordination with the BLM, developed the following design features for implementation during all applicable phases of the Yellow Pine Solar Project (YPSP). These measures are included within the YPSP administrative record and were used within the environmental analysis of the YPSP Final Environment Impact Statement (Final EIS) to determine potential impacts from project activities. Each of the design features analyzed within the Final EIS would become a condition of BLM approval. 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 applicable permitting agencies. Measures identified within this appendix were used to meet the minimum requirements for analysis within the EIS and 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.

Project design features would include management plans and programs to be implemented during construction and/or operations of the YPSP in accordance with BLM requirements and approval. Table B-1 includes a summary of all YPSP plans and programs and their corresponding location within the Final EIS. Table B-2 provides a summary of design features and measures, implementation procedures, implementation timing, the party responsible for implementation, as well as a column for verification following completion of the measure. Table B-3 includes a summary of additional desert tortoise measures that would be implemented under the project's remuneration fee.

**Table B-1. Design Features and Applicable Location(s) within the Final EIS**

| Identification No. | Project Plan or Program | Applicable Location(s) within Final EIS |
|---|---|---|
| PD-1 | Construction Plan(s) | Section 2.2 |
| PD-2 | Worker Environmental Awareness Program (WEAP) | Section 3.4; Section 3.5; Section 3.6 |
| PD-3 | Grading Plan | Section 3.12; Section 3.14; Section 3.16 |
| PD-4 | Site Drainage Plan | Section 3.16 |
| PD-5 | Site Restoration and Revegetation Plan | Section 3.4; Section 3.5; Section 3.6; Section 3.8; Section 3.12; Section 3.14; Section 3.15; Section 3.16 |
| PD-6 | Decommissioning, Abandonment, and Site Reclamation Plan | Section 3.4; Section 3.5; Section 3.6; Section 3.8; Section 3.10; Section 3.12; Section 3.14; Section 3.15; Section 3.16 |
| PD-7 | Fencing | Section 3.9 |
| Saf-1 | Health and Safety Program | Section 3.9; Section 3.11 |
| Saf-2 | Fire Management Plan | Section 3.9; Section 3.11; Section 3.12 |

| Identification No. | Project Plan or Program | Applicable Location(s) within Final EIS |
|---|---|---|
| Saf-3 | Lighting Plan | Section 3.5; Section 3.9 |
| Saf-4 | Hazardous Materials Management Plan | Section 3.9 |
| Saf-5 | Spill Prevention, Control, and Countermeasures (SPCC) Plan | Section 3.9 |
| Saf-6 | Pesticide Management Plan | Section 3.5; Section 3.9; Section 3.14 |
| Saf-7 | Emergency Response Plan | Section 3.9; Section 3.11 |
| Saf-8 | Battery Storage | Section 3.9 |
| Saf-9 | Signage | Section 3.13 |
| AQ-1 | Fugitive Dust Control Plan | Section 3.3; |
| Bio-1 | Desert Tortoise Translocation Plan | Section 3.5; Section 3.7 |
| Bio-2 | Desert Tortoise Safety and Avoidance Measures | Section 3.5 |
| Bio-3 | Invasive Plant Species and Noxious Weed Management Plan | Section 3.5; Section 3.14 |
| Bio-4 | Bird and Bat Conservation Strategy (BBCS) Plan | Section 3.5 |
| Bio-5 | Raven Management Plan | Section 3.5 |
| Cultural-1 | Cultural Resources Avoidance and Minimization Measures | Section 3.6 |
| Trans-1 | Traffic Management Plan | Section 3.3; Section 3.4; Section 3.5; Section 3.7; Section 3.9; Section 3.10; Section 3.13 |
| Soils-1 | Soil and Vegetation Disturbance Minimization Measures | Section 3.5; Section 3.12; Section 3.14 |
| Soils-2 | Corrosion Avoidance Measures | Section 3.12 |
| Visual-1 | Visual Resource Best Management Practices (BMPs) | Section 3.15 |
| Water-1 | Stormwater Pollution Prevention Plan | Section 3.9; Section 3.16 |
| Water-2 | Water Treatment Plan | Section 3.16 |

## Table B-2. Design Features and Corresponding Location within the Final EIS

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| PD-1 | Construction Plan(s) | Construction Plans would include all relevant plans submitted for approval and/or as a permit condition to Bureau of Land Management (BLM) or other relevant agencies. Following approval of project plans, all measures would become part of project design and implemented as necessary. | Primary Construction Contractor under Applicant | Approved Plans, Programs, and Measures would be implemented prior to construction of the proposed action, during construction of the proposed action, and following completion of the proposed action as necessary | Approval by BLM prior to the start of construction work |
| PD-2 | Worker Environmental Awareness Program (WEAP) | WEAP training would include a pre-work orientation for every member of the construction team. Following initial WEAP training, Project Managers would be required to ensure that any new employees be trained in accordance with the WEAP. WEAP topics would include Project Plans, Programs, and Mitigation Measures required for project activities as well as a communication and notification list for reporting and questions. | Applicant in coordination with the Primary Contractor | Prior to the start of project construction-related activities and whenever new construction teams or members are required on-site | Sign-in sheets retained by Primary Contractor and Applicant |
| PD-3 | Grading Plan | The Project Grading Plan would be completed prior to the start of project construction and approved by the BLM and, if applicable, Clark County in accordance with applicable permits. | Primary Construction Contractor under Applicant | Compliance with the Grading Plan would occur during project grading activities. | Approval by BLM prior to the start of construction work |
| PD-4 | Site Drainage Plan | The Site Drainage Plan would be implemented to control on-site drainage and off-site discharge to public lands. The plan would be submitted to the BLM and relevant agencies with the Project Plan and approved prior to the start of project activities.<br>If drainage studies are required pursuant to relevant federal, state, and local laws and regulations, these studies would be used to inform the project-specific site drainage plan. The Site Drainage Plan would be used in conjunction with site Grading Plans to establish drainage patterns on-site that reduce the risk of surface water run-off to the extent feasible. Project Drainage Plan would include, at a minimum, locations of future on-site and off-site flow concentration points, Best Management Practice (BMP) locations and erosion control plans sufficient to minimize potential impacts from erosion to the extent feasible. | Primary Construction Contractor under Applicant | Implementation of the Grading Plan would occur during project construction and features maintained throughout the life of the project as necessary. | Submittal to BLM prior to the start of construction work |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| PD-5 | Site Restoration and Revegetation Plan | The Site Restoration and Revegetation Plan would be submitted to BLM and relevant agencies for approval prior to the start of project activities. Measures within the Site Restoration and Revegetation Plan would be implemented following construction-related activities and throughout the life of the project as necessary. In order to reduce potential impacts to native species, revegetated areas would be immediately replanted and or re-seeded with native plants in order to begin the restoration process and prevent invasive species from dominating the site.<br>The plan would incorporate fire safety requirements for mowed vegetation maintained below photovoltaic (PV) panels. Maintaining this cover would minimize losses to soil resources and maintain soil health for post-decommissioning restoration. Temporary disturbance areas from construction would be revegetated as practicable (e.g., revegetation/reseeding, regrading, and decompaction).<br>The plan would incorporate any applicable measures outlined within the Pesticide Management Plan (Saf-6) and the Invasive Plant Species and Noxious Weed Management Plan (Bio-3) as applicable. | Primary Construction Contractor under Applicant | Implementation of the Site Restoration and Revegetation Plan would occur during Project construction and following completion of primary construction activities in order to restore site conditions to the extent practicable. Some applicable measures within the plan would be maintained throughout the life of the project as necessary. | Approval by BLM prior to the start of construction work. Monitoring and reporting would occur as outlined within the plan until restoration success criteria are met |
| PD-6 | Decommissioning, Abandonment, and Site Reclamation Plan | The Decommissioning, Abandonment, and Site Reclamation Plan would be submitted to BLM and relevant agencies for approval prior to end of operations. The plan would include descriptions of decommissioning activities, safety and protection measures, reclamation procedures, and success criteria, as well as notification and abandonment scheduling. In order for restoration efforts to be successful, the approved Reclamation Plan would include details on long-term monitoring and maintenance as needed to ensure restoration goals are attainable and completed. | Primary Construction Contractor under Applicant | Following the end-of-life of the project | Submittal to BLM prior to end-of-life of the project decommissioning. BLM to approve plan prior to the start of any decommissioning, abandonment, or reclamation activities |
| PD-7 | Fencing | 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. Construction site access would be limited to the extent practical. Operational site access would be consolidated to a single location off Tecopa Road for the life of the project to reduce impacts to vehicles and motorists.<br>Project fencing would also consist of temporary and permanent desert tortoise fencing in accordance with the project-specific Desert Tortoise Relocation Plan. | Primary Construction Contractor or Fencing Contractor under Applicant | Implementation would occur prior to the start of project construction-related activities. Permanent fencing would remain in place until decommissioning. Desert tortoise fencing would be implemented in accordance with requirements of the Project Biological Assessment, Biological Opinion, and Desert Tortoise Translocation Plan as applicable. | Submittal to BLM prior to the start of construction work |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Saf-1 | Health and Safety Program | The Health and Safety Program would be completed prior to the start of Project construction and would include a description of anticipated operations, safety protocols, notification structure, risk assessments, applicable rules, regulations and codes, and applicable communication procedures.<br>The Health and Safety Program would be used in coordination with the Emergency Response Plan (Saf-7) as applicable. | Primary Construction Contractor under Applicant | Implementation would occur during project construction-related activities and throughout the life of the project as necessary | Submittal to BLM prior to the start of construction work |
| Saf-2 | Fire Management Plan | A Fire Management Plan would be implemented to reduce fire risk to the project area and surrounding public lands. The plan would include a description of facilities, fire hazard analysis, fire prevention measures, training protocols, emergency planning, and reporting and notification requirements. The plan would also detail any necessary fire restrictions to be implemented during wildfire season, generally occurring between May 15 and October 1.<br>The Fire Management Plan would incorporate vegetation mowing heights to provide a balance between fire safety and vegetation and soils management. During operations, some low-growing or patchy vegetation would be maintained below PV panels, as compatible with fire risk management. Maintaining vegetation cover would minimize losses of soil resources and maintain soil health for post-decommissioning restoration. | Primary Construction Contractor under Applicant | Implementation would occur during project construction-related activities and throughout the life of the project as necessary | Submittal to BLM prior to the start of construction work |
| Saf-3 | Lighting Plan | The Lighting Plan would include detail on temporary construction lighting and the locations of permanent lighting if applicable. The plan would also include measures designed to minimize lighting and glare in order to minimize potential impacts to wildlife and surrounding transportation areas. | Primary Construction Contractor under Applicant | Implementation would occur during project construction-related activities and throughout the life of the project as necessary | Submittal to BLM prior to the start of construction work |
| Saf-4 | Hazardous Materials Management Plan | The Hazardous Materials Management Plan would identify potential hazardous materials during construction and operation of the project, applicable laws, regulations, and guidelines, cleanup and disposal requirements, and reporting and notification requirements.<br>The Hazardous Materials Management Plan would outline safety measures to be implemented during the cleaning, washing, or servicing of project facilities and equipment. Hazardous materials would be handled and disposed of or recycled in accordance with federal and State laws. | Primary Construction Contractor under Applicant | Implementation would occur during project construction-related activities and throughout the life of the project as necessary | Submittal to BLM prior to the start of construction work |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Saf-5 | Spill Prevention, Control, and Countermeasures (SPCC) Plan | If required by applicable law or regulation, the SPCC Plan would identify potential spill risks associated with construction and operation of the project, applicable laws, regulations, and guidelines, spill prevention measures, clean-up and disposal measures, and reporting and notification requirements. The SPCC Plan would include a list of industry standard BMPs that would reduce risks associated with unanticipated leaks or spills as well as any site-specific measures required by the BLM or other applicable agencies to reduce potential spills. | Primary Construction Contractor under Applicant | Implementation would occur during project construction-related activities and throughout the life of the project as necessary | Submittal to BLM prior to the start of construction work |
| Saf-6 | Pesticide Management Plan | The Pesticide Management Plan would provide a list of all approved pesticides for use on the project site, applicable treatment procedures, disposal methods, protocols, and safety measures. Rodenticides would be prohibited from use on all project areas.<br>The Pesticide Management Plan would be used in coordination with the Site Restoration and Revegetation Plan (PD-5) and the Invasive Plant Species and Noxious Weed Management Plan (Bio-3) as applicable. | Primary Construction Contractor under Applicant | Implementation would occur during project construction-related activities and throughout the life of the project as necessary | Submittal to BLM prior to the start of construction work |
| Saf-7 | Emergency Response Plan | The Emergency Response Plan would include a description of facilities, emergency analysis, training protocols, planning requirements, and reporting and notification requirements. Emergency Response Plan would also provide contact information and procedures to follow should an emergency occur.<br>The Emergency Response Plan would also provide contact information and locations for local medical, fire, police, and other emergency responders.<br>The Emergency Response Plan would be used in coordination with the Health and Safety Program (Saf-1) as applicable. | Primary Construction Contractor under Applicant | Prior to the start of project construction-related activities and whenever new construction teams or members are required on-site | Submittal to BLM prior to the start of construction work |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Saf-8 | Battery Storage | Batteries associated with the battery storage system would be lithium-ion-based, or similar, which include industry standard design features to significantly reduce the potential of a spill or leak. Battery storage systems would be designed to provide secondary containment. YPSP would be required to 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 an approved Hazardous Materials Management Plan, Emergency Response Plan, or other applicable plan for operations and maintenance of the facility. | Primary Construction Contractor under Applicant | Implementation would occur during project construction-related activities and throughout the life of the project as necessary | Submittal to BLM prior to the start of construction work |
| Saf-9 | Signage | Signage would be installed around constructed facilities and across project maintenance roads to notify public of any potential hazards and to prevent potential injury. Signage would be maintained throughout the life of the project in order to ensure it is easily recognized and legible to the public. | Primary Construction Contractor or Signage Contractor under Applicant | Prior to the start of project construction-related activities and continuing during the life of the project | Submittal to BLM prior to the start of construction work |
| AQ-1 | Fugitive Dust Control Plan | The Fugitive Dust Control Plan would include measures for the reduction of fugitive dust during project grading, construction, and maintenance activities. Fugitive Dust Plan measures would be approved and monitored by the Clark County Department of Air Quality. | Primary Construction Contractor under Applicant | Throughout all construction-related activities | Submittal and approval by BLM prior to the start of construction work |
| Bio-1 | Desert Tortoise Translocation Plan | The Desert Tortoise Translocation Plan would outline measures regarding fencing, minimization of potential impacts to tortoises during project activities, relocation of desert tortoises to the Stump Springs Translocation Site, minimization of stress, disturbance, and injury during relocation activities, monitoring requirements and success criteria. The Desert Tortoise Relocation Plan would also include any BLM standard stipulations for desert tortoise including, but not limited to, 25-mile-per-hour (mph) speed limits, and parked vehicle checks as outlined within the Desert Tortoise Safety and Avoidance Measures (Bio-2). | Applicant in coordination with BLM and USFWS | Prior to the start of project activities and throughout all construction-related activities | Submittal and approval by BLM prior to the start of construction work |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Bio-2 | Desert Tortoise Safety and Avoidance Measures | The following desert tortoise safety and avoidance measures would be implemented during all project construction and operations activities as necessary. Additional desert tortoise safety and avoidance measures identified within the site Desert Tortoise Translocation Plan (Bio-1) and the project-specific Biological Opinion (BO) would also be required as necessary.<br>The applicants would employ Authorized Desert Tortoise Biologists (ADTBs) and desert tortoise monitors to ensure compliance with protective measures for the Mojave desert tortoise. Use of ADTBs and desert tortoise monitors would be in accordance with the most up-to-date USFWS guidance and would be required for monitoring of any pre-construction, construction, operation, or maintenance activities that may result in take of the desert tortoise. The current guidance is provided in Chapter 3 of the Desert Tortoise Field Manual (USFWS 2009).<br>The applicants would provide the qualifications of all individuals seeking approval as ADTBs to the USFWS. The USFWS would review these and determine whether the individuals are qualified within 30 days.<br>The applicants would designate a Field Contact Representative (FCR) who would oversee compliance with protective measures during pre-construction, construction, operations and maintenance (O&M), and decommissioning activities that may result in injury or mortality of desert tortoises. If the FCR, ADTB, or desert tortoise monitor identifies a violation of the desert tortoise measures, they would halt work in the relevant area until the violation is corrected.<br>The applicants would develop and implement a WEAP for all workers (pre-construction, construction, O&M, and decommissioning) that would address the following: 1) types of construction activities that may affect the desert tortoise, 2) the required desert tortoise protective measures, 3) desert tortoise life history and threats, 4) legal protections and penalties, and 5) reporting requirements.<br>The applicants would fence the boundaries of the project sites with desert tortoise fencing and clear these areas of all desert tortoises prior to construction. Pre-construction activities such as geotechnical work or meteorological tower installation may occur before fence construction. | In coordination with BLM and USFWS | Prior to the start of project activities and throughout all construction-related activities | Submittal and approval by BLM prior to the start of construction work |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Bio-2 (Contin.) | Desert Tortoise Safety and Avoidance Measures | Noise reduction devices (e.g., mufflers) would be employed to minimize the impacts on listed species. Explosives would be used only within specified times and at specified distances from sensitive wildlife or surface waters as established by the BLM or other federal and State agencies. Operators would ensure that all equipment is adequately muffled and maintained in order to minimize disturbance to wildlife.<br><br>The applicants would develop and implement a Weed Management Plan consistent with applicable regulations and agency policies for the control of noxious weeds and invasive plant species. The plan would address monitoring; right-of-way (ROW) vegetation management; use of certified weed-free seed and mulching; cleaning of vehicles to avoid introducing invasive weeds; and education of personnel on weed identification, the manner in which weeds spread, and methods for treating infestations.<br><br>Principles of integrated pest management, including biological controls, would *be used to prevent the spread of invasive species in accordance with the Record of Decision—Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement* (BLM 2007), and the National Invasive Species Management Plan: 2016–2018 (National Invasive Species Council 2016). The plan would cover periodic monitoring, reporting, and immediate eradication of noxious weed or invasive species occurring within all managed areas.<br><br>A controlled inspection and cleaning area would be established to visually inspect construction equipment arriving at the project area and to remove and collect seeds that may be adhering to tires and other equipment surfaces. To prevent the spread of invasive species, project developers would work with the local BLM field office to determine whether a pre-activity survey is warranted and, if so, to conduct the survey. If invasive plant species are present, project developers would work with the local BLM field office to develop a control strategy. The plan would include a post-construction monitoring element that incorporates adaptive management protocols. | | | |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Bio-2 (Contin.) | Desert Tortoise Safety and Avoidance Measures | Only herbicides with low toxicity to wildlife and non-target native plant species would be used, as determined in consultation with the USFWS. The typical herbicide application rate rather than the maximum application rate would be used where this rate is effective.<br>As required by law, a Spill Prevention, Control, and Countermeasures Plan would be developed that considers sensitive ecological resources. Spills of any toxic substances would be promptly addressed and cleaned up before they can enter aquatic or other sensitive habitats as a result of runoff or leaching.<br>A Fire Management Plan would be developed to implement measures that minimize the potential for a human-caused fire to affect ecological resources and that respond to natural fire situations.<br>Water needed for construction should be stored in tanks. If evaporation ponds are used, they would be fenced to prevent use by wildlife and treated in a manner approved by the BLM and USFWS to prevent drowning. Wildlife escape ramps would be installed, and the liner would be textured sufficiently to ensure that all wildlife can escape if they enter the pond. The ponds and fence shall be inspected at least daily.<br>A Decommissioning, Abandonment, and Site Reclamation Plan specific to the project would be developed in coordination with appropriate federal and state agencies, approved by the BLM, and implemented by the applicants. The plan would include, as applicable the mitigation measures stipulated in the project-specific BO.<br>Post-translocation tortoise monitoring would occur in accordance with the translocation plan (SWCA 2020b) and long-term monitoring plan.<br>The applicants would implement the Common Raven Management Plan for Energy Development Within the BLM Southern Nevada District (BLM 2014) to minimize effects of ravens on the desert tortoise. | | | |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Bio-2 (Contin.) | Desert Tortoise Safety and Avoidance Measures | Reports are required quarterly during the duration of construction and annually during O&M for the life of the facilities. The BLM may delegate this responsibility to the applicants. In addition, a final construction report would be submitted to the USFWS within 60 days of completion of construction of the project. All quarterly reports are due by the 10th of each of the following months (January, April, July, October), and annual reports are due February 1 of each year. Annual status updates shall be provided to the USFWS during O&M activities for the life of the facility. Specifically, all reports must include information in the table below on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar incidents from recurring.<br><br>Additionally, the reports should provide detailed information regarding each desert tortoise handled or observed and the names of all monitors involved in the project and the ADTBs who supervised their actions. Information would include the following: location (GPS), date and time of observation, whether desert tortoise was handled, general health, and whether it voided its bladder, location desert tortoise was moved from and location moved to, unique physical characteristics of each tortoise, and effectiveness and compliance with the desert tortoise protection measures. Any incident occurring during project activities that was considered by the FCR, ADTB, or monitor to be in non-compliance with the BO issued for the project would be documented immediately by the ADTB.<br><br>In the event that unforeseen circumstances prevent translocation from occurring immediately following the issuance of the BO for the project, the applicants would be responsible for monitoring all transmitter equipped tortoises on their project site until the time of translocation. This effort would include monitoring tortoises twice a month during the active season and monthly monitoring during the less active season, as defined in the translocation plan (SWCA 2020b). Transmitters would be repaired and replaced as needed. This monitoring would continue until all tortoises for the project are translocated or, in the event they are not translocated, until their transmitters are removed. Quarterly reporting (email) of the pre-translocation monitoring shall be provided to the BLM. All other protocols and guidance during this monitoring would adhere to the translocation plan. | | | |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Bio-3 | Invasive Plant Species and Noxious Weed Management Plan | The Invasive Plant Species and Noxious Weed Management Plan would include a description of the site, a prioritized list of potential invasive and weed species, management goals, restoration success criteria, a weed management schedule, weed removal procedures, and monitoring requirements. The Invasive Plant Species and Noxious Weed Management Plan would also include measures, or incorporate by reference, the Pesticide Management Plan (Saf-6), the Site Restoration and Revegetation Plan (PD-5), and the Invasive Grass Study Plan (Bio-6) as applicable. | Primary Construction Contractor under Applicant in coordination with BLM | Throughout all construction-related activities | Submittal and approval by BLM prior to the start of construction work |
| Bio-4 | Bird and Bat Conservation Strategy (BBCS) Plan | The BBCS would include detail on the project site, site surveys, habitat assessments, risk assessments, avoidance and minimization measures, monitoring requirements and reporting procedures. | Primary Construction Contractor under Applicant in coordination with BLM | Prior to the start of project activities and throughout all construction-related activities | Submittal and approval by BLM prior to the start of construction work |
| Bio-5 | Raven Management Plan | A Raven Management Plan would be completed in accordance with the Common Raven Management Plan for Energy Development within the BLM Southern Nevada District. The Raven Management Plan would include measures intended to deter raven predation on special status species, especially hatchling and juvenile desert tortoises. Implementing the measures contained in the Plan would discourage proclivity of raven occurrences within an energy project's cumulative effects study area, thereby reducing potential for inducement of indirect take of the desert tortoise attributable to avian predation. The plan would identify BMPs, ensuring that the design of power line and other infrastructure precludes or minimizes perching, roosting, and nesting opportunities and minimizes the potential for ravens to occupy the project site during all phases of development and use (i.e., construction, O&M, and decommissioning). | | | |
| Cultural-1 | Cultural Resources Avoidance and Minimization Measures | In the event that any cultural resource (historic or prehistoric) is encountered during project activities, the unanticipated discovery would be immediately reported to the BLM, and all activities (construction, operation, decommissioning) would be suspended within the area of the unanticipated discovery until authorization to proceed is issued by the BLM. In addition, the area of discovery would be covered, stabilized, or otherwise protected. | Primary Construction Contractor under Applicant in coordination with BLM | Throughout all construction-related activities | Submittal and approval by BLM and State Historic Preservation Office prior to the start of construction work |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Trans-1 | Traffic Management Plan | A site-specific Traffic Management Plan would be developed and implemented for project construction activities. The Traffic Management Plan would require approval by the BLM prior to the start of project activities. The Traffic Management Plan would identify how vehicle access would be coordinated and maintained on-site during construction of the project. The Traffic Management Plan would provide analysis of roadway operations, identify traffic safety measures, speed limits, and other measures to implemented throughout project activities. In addition, the Traffic Management Plan would provide detail on the proposed improvements to Tecopa Road and SR 160 including turn lanes, signage, traffic control, flaggers, parking, construction schedule, and safety protocols. | Primary Construction Contractor under Applicant | Prior to the start of project activities and throughout all construction-related activities | Submittal and approval by BLM prior to the start of construction work |
| Soils-1 | Soil and Vegetation Disturbance Minimization Measures | Disturbance minimization to biotic soils, desert pavements, vegetation cover, and topsoil resources is the best method to promote the health and function of soils during all project phases. Soil and vegetation disturbance minimization measures include the following:<br>The project contractor shall limit the size or amount of any vegetation and/or ground disturbance to the absolute minimum necessary to perform the activity safely and as designed.<br>The project contractor would avoid creating soil conditions that promote weed germination and establishment.<br>Disturbance would be minimized in order to maintain cover by biotic soils, desert pavements, and vegetation.<br>Drive and crush or vegetation trimming/mowing would be implemented in place of blading, grading, or excavating, as possible.<br>Subsurface soils (if excavated) would be used as fill after disturbance is complete to prevent soil mixing.<br>Disturbance to wet soils would be minimized to avoid soil compaction. | Primary Construction Contractor under Applicant | Prior to and throughout all construction-related activities as necessary | On-site inspections as necessary |
| Soils-2 | Corrosion Avoidance Measures | Corrosion resistant materials, application of protective coatings, and corrosion monitoring would be implemented to reduce effects of soil corrosion on steel and/or concrete project features. | Primary Construction Contractor under Applicant | Throughout all construction-related activities | Submittal and approval by BLM prior to the start of construction work |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Visual-1 | Visual BMPs | Incorporating BMPs for reducing visual impacts of renewable energy generation facilities on BLM-administered lands (BLM 2013). | Primary Construction Contractor under Applicant | Prior to the start of project activities and throughout all construction-related activities | Approval of applicable BMPs by BLM prior to the start of construction work |
| – | 4.5 – Use Color-Treated Solar Collectors and Support Structures | The backs and support structures for PV panels, heliostats, parabolic trough mirrors, and solar dishes, as well as other facility components that would cause substantial contrasts as seen from sensitive offsite viewing locations, would have non-reflective finish or be color-treated to reduce visual contrast. Colors would be selected from the BLM Standard Environmental Colors Chart CC-001 | | | |
| – | 4.6 – Maintain Color-Treated Surfaces of Solar Collectors | Color-treated surfaces of mirror, dish, and heliostat backs would be kept in good repair. | | | |
| – | 4.7 – Avoid Complete Removal of Vegetation beneath Solar Collector Array | Consistent with safety and operational requirements, complete removal of vegetation beneath solar collectors would be avoided where feasible. Low vegetation would be left in place or trimmed to lowest height tolerable for plant survival. | | | |
| – | 6.3.5 – Minimize Use of Signs and Make Signs Visually Unobtrusive | The use of permanent signs and project construction signs would be minimized. Beyond those required for basic facility and company identification for safety, navigation, and delivery purposes, commercial symbols or signs and associated lighting on buildings and other structures would be minimized. All commercial symbols and signs and associated lighting would be designed to minimize offsite visibility. Necessary signs would be made of non-glare materials and utilize unobtrusive colors. The reverse sides of signs and mounts would be painted or coated using the most suitable color selected from the BLM Standard Environmental Color Chart CC-001 to reduce contrasts with the existing landscape. See Saf-9 (Signage) for details on project signage. | | | |
| – | 6.4.4 – Color Treat Structures to Reduce Contrasts with Existing Landscape | Unless safety or functional requirements preclude it, all structures, including but not limited to buildings, tanks, fences and railing, poles, aboveground pipes and culverts, and reverse sides of signs and guardrails, would be color treated to reduce contrasts with existing landscape, using the most suitable color selected from the BLM Standard Environmental Color Chart CC-001. | | | |
| – | 6.4.5 – Use Non-reflective Materials, Coatings, and/or Paint | Materials, coatings, or paints that have little or no reflectivity would be used on structures including, but not limited to, buildings, tanks, fences and railing, poles, aboveground pipes and culverts, and reverse sides of signs and guardrails. Semi-gloss finishes would be used rather than flat or gloss finishes. Substation equipment should be specified with a low-reflectivity, neutral finish. Insulators at substations and on takeoff equipment should be non-reflective and non-refractive. The surfaces of substation structures would be given low-reflectivity finishes with neutral colors to minimize the contrast of the structures with their backdrops. Chain-link fences surrounding the substations should have a dulled, darkened finish to reduce contrast. | | | |
| – | 6.4.6 – Select Surface Treatment Colors from the BLM Standard Environmental Colors Chart | Colors for paints, stains, coatings, and other surface color treatments to be used on structures would be selected from the BLM Standard Environmental Colors Chart CC-001. | | | |
| – | 6.4.8 – Color Treat Grouped Structures Using the Same Color | Grouped structures would be color treated using the same color to reduce visual complexity and color contrast. | | | |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| – | 6.4.12 – Maintain Painted, Stained, or Coated Surfaces Properly | Painted, stained, or coated surfaces would be kept in good repair, and the surface treatment would be reapplied when necessary, as the surface color fades or the coating flakes or otherwise deteriorates. | | | |
| – | 6.5.4 – Direct Lights Properly to Eliminate Light Spill and Trespass | Construction and permanent lighting would be mounted and directed to focus light only on the intended area, and to avoid light spill and offsite light trespass. Lights pointing upward or horizontally would be avoided. | | | |
| – | 6.5.6 – Minimize Lighting Usage during Construction and Operations | Consistent with safety requirements, lighting use would be minimized during construction and operations. During construction, localized and portable lighting would be used where and when the work is occurring. Lighting would be powered by generators and have switches to cut power when lighting is not required during construction, where practicable.<br>Lighting for facilities would not exceed the minimum number, intensity, and coverage required for safety and basic security. All area lighting would be divided into separately controlled zones to focus lighting on smaller areas where tasks are being performed and to avoid illuminating unused space. Area lighting would be controlled by timers, sensors, or switches available to facility operators; dusk-to-dawn lighting controlled by photocell alone would not be allowed except where required for safety. The facility operators would identify those components/structures that do not require continuous lighting for safety reasons. Area lights would only be switched on when there is a specific need (e.g., cleaning mirrors and panels at a solar facility, pumping fuel, persons occupying an area, or alarm situation). When not needed, lights would be switched off. Exceptions to switched-off lighting for safety purposes would be identified in the BLM-approved lighting plan (see Saf-1 [Lighting Plan] above). Focused task lighting, portable light towers, or flashlights would be used instead of area lighting (where practicable), and retro-reflective or luminescent markers would be used in lieu of permanent lighting where feasible. | | | |
| – | 6.6.4 – Confine Construction Activities and Facilities to Pre-Defined Areas | Personal vehicles, sanitary facilities, and work areas would be confined to clearly delineated construction boundaries specified in the plan of development. For construction and prolonged operations and maintenance projects, maintenance equipment, materials, and vehicles would be stored at the sites where activities would occur, or at specified maintenance yards. | | | |
| – | 6.7.1 – Implement Dust and Wind Erosion Control Measures | Dust abatement measures would be implemented in arid environments and areas with air quality regulations (i.e., air quality non-attainment and maintenance areas) to minimize the impacts of vehicular and pedestrian traffic, construction, and wind on exposed surface soils. This may also require limiting the types of equipment, vehicle speeds, and routes utilized during construction. Open-bodied trucks that transport materials that could be sources of airborne dust would be covered while transporting the materials. Access roads, onsite roads, and parking lots would be surfaced with aggregate with hardness sufficient to prevent vehicles from crushing the aggregate and thus causing dust. Access roads and other areas of ground disturbance within the construction limits would be watered, as needed, to avoid the creation of dust. All soil disturbance activities and travel on unpaved roads would be suspended during periods of high winds. In areas subject to wind erosion, appropriate BLM-approved measures, such as the application of fine water spray, plastic sheeting, mulch, gravel, chemical soil stabilizers, or chemical dust suppressants, would be used to reduce impacts. Stockpiles would be sprayed with water, covered with tarpaulins, and/or treated with appropriate dust suppressants, especially in preparation for high-wind or storm conditions. All measures taken to reduce fugitive dust would be identified in the BLM-approved Fugitive Dust Control Plan (see AQ-1 above). | | | |
| – | 6.8.9 – Revegetate Using Salvaged Native Plants and Approved, Weed-free Seed Mixes | As identified in the Site Restoration and Revegetation Plan (see PD-5 above), disturbed surfaces would be revegetated using salvaged native vegetation or using BLM-approved seed mixes consisting of weed-free native grasses, forbs, and shrubs representative of the surrounding and intact native vegetation composition. The seed would be appropriate to the geographic and elevation characteristics of the area to be seeded. The seed would be tested for viability no more than 1 year prior to application. The seed mix would be specified as pure live seed (PLS) pounds per acre and seed delivered would be labeled as to the content (species, PLS). Certified “noxious weed-free” seed would be used on all areas to be restored. Other construction material, such as fill and straw mulch, would also be free of noxious weed seed. These measures would be consistent with those identified for vegetation and habitat management (see Bio-2 [Desert Tortoise Safety and Avoidance] and Bio-3 [Invasive Plant Species and Noxious Weed Management Plan] above). | | | |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| – | 6.8.11 – Monitor and Maintain Revegetation Areas until Vegetation is Self-Sustaining | As identified in the Site Restoration and Revegetation Plan (see PD-5 above), revegetated surfaces would be monitored and maintained. Corrective measures would be conducted as needed until a self-sustaining stand of vegetation is re-established and visually adapted to the undisturbed surrounding vegetation. No new disturbance would be created during operations without completion of a Visual Resource Management analysis and approval by the authorized officer. These measures would be consistent with those identified for vegetation and habitat management (see Bio-2 [Desert Tortoise Safety and Avoidance] and Bio-3 [Invasive Plant Species and Noxious Weed Management Plan] above). | | | |
| – | 6.9.2 – Begin Site Reclamation during Construction and Operations, Immediately after Disturbances | Site restoration activities would commence during construction and during operations, as soon as possible after disturbances as identified in the Site Restoration and Revegetation Plan (see PD-5 above). Site reclamation would follow the approved Decommissioning, Abandonment, and Site Reclamation Plan (see PD-6 above). | | | |
| – | 6.9.9 – Remove Above-Ground and Near-Ground Structures | Aboveground structures and near-ground pipelines, conduits, and other connecting structures would be removed upon completion of the project in accordance with the BLM-approved Decommissioning, Abandonment, and Site Reclamation Plan (see PD-6 above). | | | |
| – | 6.9.10 – Remove or Bury Gravel and Other Surface Treatments | Gravel and other surface treatments would be removed or buried as part of project decommissioning in accordance with the BLM-approved Decommissioning, Abandonment, and Site Reclamation Plan (see PD-6 above). | | | |
| – | 6.10.1 – Develop "Housekeeping" Procedures | "Housekeeping" procedures would be developed for the project to ensure that the project site and lands adjacent to the project site are kept clean of debris, garbage, graffiti, fugitive trash, or waste generated onsite; procedures would extend to control of "trackout" of dirt on vehicles leaving the active construction site and controlling sediment in stormwater runoff (see PD-4 [Site Drainage Plan] above). | | | |
| – | 6.10.2 – Maintain a Clean Worksite | Facilities and off-site surrounding areas would be kept clean of debris, fugitive trash or litter, and graffiti. Surplus, broken, and used materials and equipment of any size would not be allowed to accumulate. Scrap heaps and materials dumps would be prohibited. Materials storage yards would be kept to a minimum. | | | |
| – | 6.10.4 – Use Exit Tire Washes and Vehicle Tracking Pads to Reduce the Tracking of Sediment onto Roads | Construction sites would have entrances, exits, and parking areas with exit tire washes and/or vehicle tracking pads to reduce the tracking of sediment onto roads; these areas would be kept clean. Site access would be controlled (see PD-7 [Fencing] above]) and traffic management would be guided by the BLM-approved Traffic Management Plan (see Trans-1 above). | | | |
| – | 6.10.7 – Remove Stakes and Flagging | All stakes and flagging would be removed from the construction area and disposed of in an approved facility. | | | |

| # | Plan, Condition, or Measure | Implementation Procedure or Action (Documentation Required) | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| Water-1 | Stormwater Pollution Prevention Plan (SWPPP) | The project SWPPP would include information regarding existing and proposed drainage, permits and governing documents, potential discharges and sources, protection measures and BMPs, training requirements, storm event planning and preparation, and maintenance and reporting procedures. The SWPPP would outline specific water erosion control measures such as seeding, mulch, blankets, detention basins, certified weed-free straw bales, or silt fences to be implemented to minimize soil erosion and loss of soil productivity. | Primary Construction Contractor under Applicant | Throughout all construction-related activities | Submittal and approval by BLM prior to the start of construction work, completion of SWPPP documentation and submittal to BLM as required |
| Water-2 | Water Treatment Plan | A site-specific Water Treatment Plan would be developed and implemented for project construction activities. The Water Treatment Plan would approval by the BLM prior to the start of project activities. | Primary Construction Contractor under Applicant | Throughout all construction-related activities | Submittal and approval by BLM prior to the start of construction work |

## Table B-3. Additional Desert Tortoise Measures*

| # | Action | Description | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| DT-1 | Installation of Desert Tortoise Fencing along Tecopa Road | New desert tortoise fence would be installed on the south side of Tecopa Road starting at State Route (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. | Primary Construction Contractor or Fencing Contractor under Applicant | Desert tortoise fencing would be implemented in accordance with requirements of the project Biological Assessment, Biological Opinion, and Desert Tortoise Translocation Plan as applicable. | Submittal to BLM prior to the start of construction work |
| DT-2 | SR-160 Retrofitting of Existing Culverts and Existing Tortoise Fencing | Highway culverts and existing desert tortoise fencing would be modified/retrofitted to allow for desert tortoises to pass through, thus increasing genetic connectivity between the fragmented habitat on each side of SR 160. | Primary Construction Contractor and Fencing Contractor under Applicant in coordination with BLM and U.S. Fish and Wildlife Service (USFWS) | After completion of construction-related activities | |
| DT-3 | Desert Tortoise 5-Year Study | A 5-year study on desert tortoise use of the modified/retrofitted culverts on SR 160 would be designed and implemented to monitor and record use and movement. | In coordination with BLM and USFWS | After completion of construction-related activities | |

| # | Action | Description | Party Responsible for Implementation* | Implementation and Compliance Timing | Verification Method |
|---|---|---|---|---|---|
| DT-4 | Invasive Grass Study | Implement a large-scale treatment of invasive grasses in the Stump Springs and Trout Canyon Desert Tortoise Translocation Areas.<br>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) would be tested both independently, and in a tank mix with imazapic to see if application would extend the length of control of invasive annual grasses.<br>This Invasive Grass Study would look at the large-scale effects of imazapic on invasive annual grasses under several temporal treatment strategies, and would incorporate a trial of indaziflam to compare long-term invasive annual grass control, and response of native vegetation community components (annual and perennial plants, forbs, grasses, and shrubs) to each of these herbicides.<br>The goal of this study would be to increase annual forb availability for Mojave desert tortoises in the translocation area, especially juvenile tortoises.<br>The Invasive Grass Study Plan would also include measures, or incorporate by reference, the Pesticide Management Plan (Saf-6), and the Site Restoration and Revegetation Plan (PD-5). | In coordination with BLM and USFWS | | |

* These measures would be funded by the project's remuneration fee payments.

# APPENDIX C

## Biological Opinion

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Southern Nevada Fish and Wildlife Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130

IN REPLY REFER TO:
File No. 08ENVS00-2020-F-0071

July 14, 2020

Memorandum

To: Assistant Field Manager
Division of Renewable Resources
Southern Nevada District Office
Bureau of Land Management
Las Vegas, Nevada

From: Field Supervisor
Southern Nevada Fish and Wildlife Office
Las Vegas, Nevada

Subject: Formal Consultation under Section 7 of the Endangered Species Act for the Yellow Pine Solar Project, Nye County, Nevada

This transmits the U.S. Fish and Wildlife Service's (Service) biological opinion in response to your memorandum received January 13, 2020, requesting formal consultation for the Yellow Pine Solar Project (YPSP) in Nye County, Nevada. The applicant for this project is Yellow Pine Solar, LLC which is a subsidiary of NextEra Energy Resources, LLC. Also, a second applicant named GridLiance West, LLC (GLW) is developing the Trout Canyon Substation (TCS) which conveys power from the YPSP. This biological opinion addresses potential effects to the federally threatened Mojave desert tortoise (*Gopherus agassizii*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 et seq.) and 50 CFR § 402 of our interagency regulations governing section 7 of the Act. Neither the YPSP nor the TCS is within desert tortoise designated critical habitat.

This biological opinion is based on information provided in your memorandum; the biological assessment prepared for the BLM by SCWA Environmental Consultants (June 2020), correspondence between the Service and BLM; interagency section 7 consultation regulations in 50 CFR Part 402; scientific publications, articles, and reports; and our files. A complete project file of this consultation is available in the Service's Southern Nevada Fish and Wildlife Office in Las Vegas.

# Biological Opinion for Yellow Pine Solar Project

File No. 08ENVS00-2020-F-0071

Issued to:

Bureau of Land Management
Las Vegas Field Office
4701 North Torrey Pine Drive
Las Vegas, Nevada

by:

U.S. Fish and Wildlife Service
Southern Nevada Fish and Wildlife Office
4701 North Torrey Pine Drive
Las Vegas, Nevada

July 14, 2020

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BIOLOGICAL OPINION (FILE NO. 08ENVS00-2020-F-0071)

## CONSULTATION HISTORY

April 11, 2018 - Early coordination began between the BLM and Service with discussion of translocation and mitigation options.

December 6, 2018 – The BLM and Service met to further discuss mitigation and translocation options after tortoise surveys were completed in fall of 2018.

January 13, 2020 - The Service received BLM's biological assessment and request to initiate formal consultation for the Yellow Pine Solar Project to address potential adverse effects to the desert tortoise, at which time formal consultation was initiated. The Service also received BLM's draft desert tortoise translocation plan.

January 14, 2020 - The Service provided comments on the biological assessment to BLM.

February 13, 2020 - The final draft of the biological assessment was received from BLM. Comments from the Service were addressed, and the consultation package was considered complete. The request for formal consultation was initiated.

February 13, 2020 - The Service provided comments on the translocation plan to the BLM.

May 04, 2020 – BLM notified the Service that NextEra requested a change to EIS alternatives related to desert tortoise fencing design and construction, requiring BLM to update the biological assessment and translocation plan.

May 07, 2020 – BLM notified the Service that NextEra requested that the BLM separate the projects into two consultations, and BLM advised them that we could separate respective fees, take, and T&C under the same BO.

May 14, 2020 – BLM confirmed to the Service by email that they would be requesting a 30-day extension in order for BLM to get the updated biological assessment from SWCA Environmental Consultants and to complete the translocation plan.

June 2020 – the new due date of July 17, 2020 was published in the President's Federal Infrastructure Permitting Dashboard as a FAST-41 Covered Project.

June 21, 2020 - The BLM provided the Service with the final desert tortoise translocation plan and the revised final draft of the biological assessment.

July 10, 2020 - The Service provided a draft biological opinion to the BLM and applicant. The

BLM provided comments on the draft to the Service on July 12, and July 13, 2020.

July 14, 2020 – The Service addressed the BLM comments on the draft biological opinion.

## DESCRIPTION OF THE PROPOSED ACTION

### Description of the Action Area

The Yellow Pine Solar Project (YPSP) and the Trout Canyon Substation (TCS) (collectively known as Projects) would be located within Pahrump Valley, approximately 10 miles (16 kilometers [km]) southeast of Pahrump, Nevada, and approximately 32 miles (51 km) west of Las Vegas, Nevada (Figure 1). The project would be bounded by Nevada State Route 160 (SR 160) to the north and Tecopa Road to the east. The action area contains the 5,032-acre survey area, which will encompass the Tortoise Clearance Area from which all tortoises will be removed and areas of temporary and permanent disturbance associated with the 230-kV transmission line that will occur outside of the fence on the north side of SR 160; and the 85,000-acre recipient site, the Stump Springs Translocation Area (Figure 2).

### Proposed Action

Yellow Pine Solar, LLC (YPS), a subsidiary of NextEra Energy Resources, LLC, applied to the BLM Las Vegas Field Office for a right-of-way (ROW) grant on BLM land to construct, operate, maintain, and decommission a solar energy generating facility and substation on public land in Clark County, Nevada. The YPSP would be a photovoltaic (PV) solar generating facility anticipated to generate approximately 500-megawatt (MW); however, the exact final project output may be higher or lower, depending on design constraints as well as the procured panel technology, as technology is rapidly improving. The YPSP includes the construction, operation, maintenance, and decommissioning of the solar facilities, which consists of: (1) photovoltaic (PV) solar panels; (2) an energy storage system (batteries); (3) linear facilities (including access roads, distribution power; communication cables or lines, and 230-kV gen-tie; 4) the YPSP substation; and 5) support buildings (e.g., O&M building and Administration, etc.).

The YPSP would provide renewable energy to the electrical transmission grid via a generation tie-in transmission line (gen-tie line) at a new proposed regional substation, the Trout Canyon Substation (TCS), owned by GridLiance West, LLC (GLW). The TCS would be located directly adjacent to the YPSP and would convey power from the substation to the Pahrump to Sloan Canyon Switch 230-kV transmission line (Figure 3). The TCS is covered in a separate ROW grant application submitted to the BLM by GLW. Therefore, the overall proposed action consists of both the YPSP and the TCS (collectively referred to as the Projects), which would each be implemented by YPS and GLW, respectively.

All facilities related to the Projects would occur within an approximately 5,032-acre survey area. The survey area contains habitat which supports the Mojave desert tortoise. At full build-out, the YPSP and TCS would disturb a combined area of approximately 3,006.7 acres (Table 1). However, construction may be phased which would result in lower acres of disturbance.

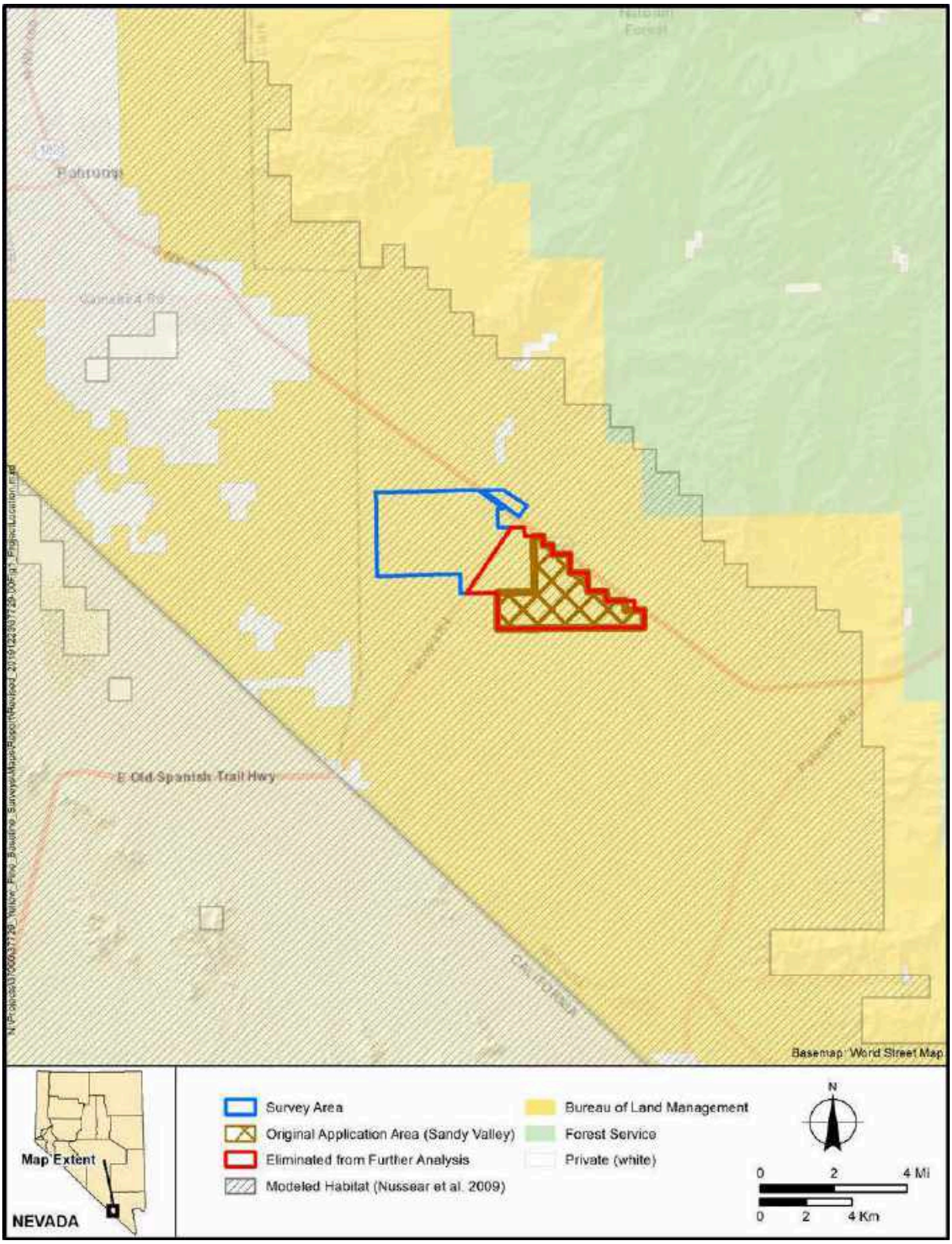


**Figure 1. Location of Projects (in blue).**

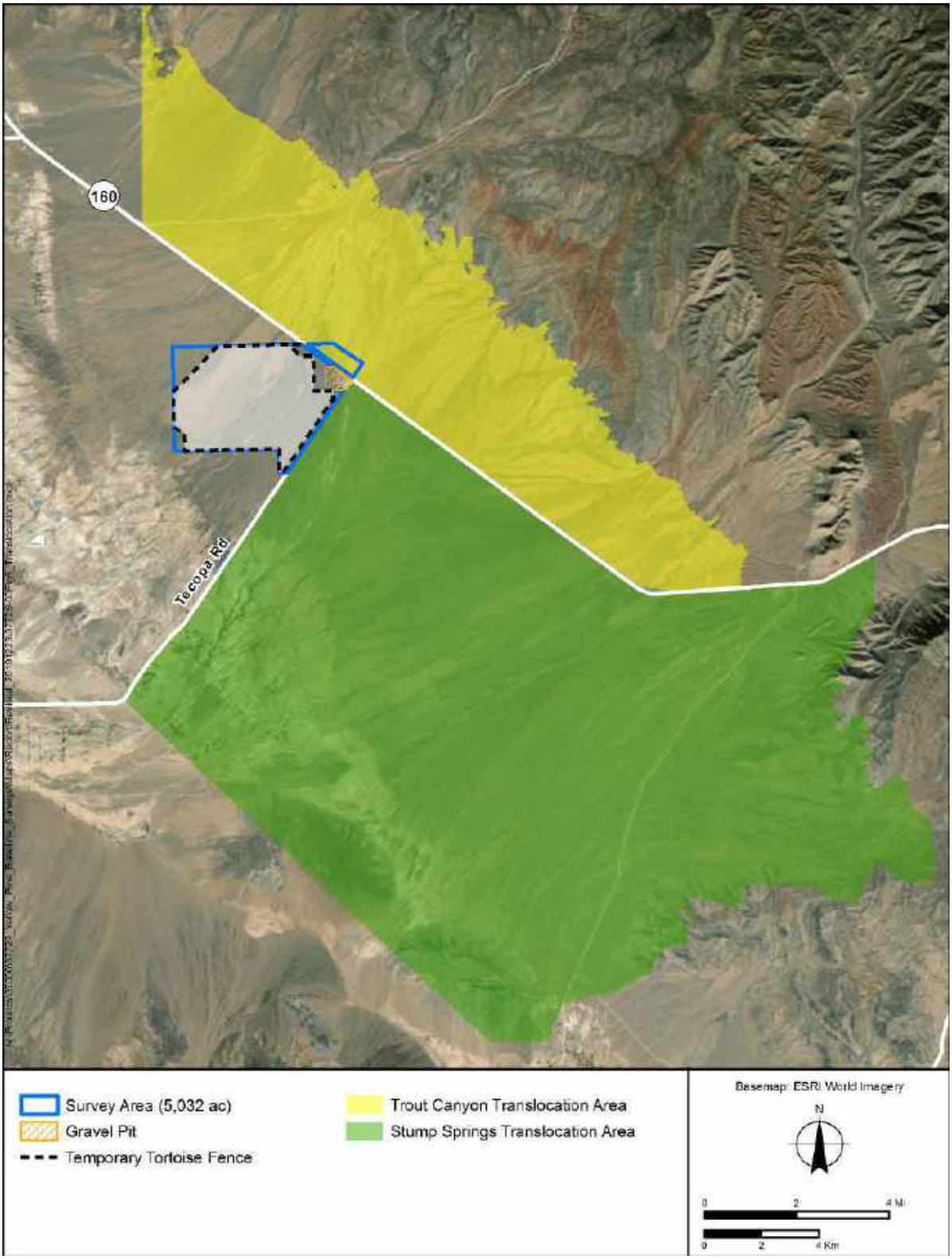


**Figure 2. Yellow Pine Solar survey area (blue) and Stump Springs Translocation Area (green).**

Acres by each project and disturbance type are outlined in Table 1 and include 2,937.3 acres for the YPSP and 69.4 acres for the TCS. The YPSP acreage includes 12 acres of undisturbed propagule islands within Sub-Areas. The TCS project area includes acreage for the 230-kV transmission line that would be constructed by GLW. Disturbance acres are further described in the following subsequent sections under separate headers for each applicant (YPS and GLW).

**Table 1. Proposed acres of disturbance for the full buildout of the Projects.**

| Project | Temporary Disturbance (acres) | Permanent Disturbance (acres) | Other | Total (acres) |
|---|---|---|---|---|
| **YPSP** | 86.3 | 2,839.0 | 12 acres of propagule islands* | 2,937.3 |
| **TCS**** | 0.0 | 69.4 | N/A | 69.4 |
| **Combined** | 86.3 | 2,908.4 | 12 | 3,006.7 |

*12 acres of undisturbed propagule islands within Sub-Areas (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).
**Includes the 230-kV transmission line associated with the TCS.

All areas planned for construction would be fenced with desert tortoise fencing. Permanent tortoise fencing would be installed inside the project boundary for those Sub-Areas to be built at the time of construction. In addition to permanent fencing, temporary tortoise fencing would be installed between Sub-Areas, and extending to SR 160 and Tecopa Road (Figure 3). This combination of permanent and temporary fencing would create a Tortoise Clearance Area from which tortoises would be translocated. An approximately 20-foot buffer between the fencing and the boundary perimeter would be established as a temporary work area for fence construction access. If construction proceeds for all Sub-Areas at once (Full Build), a combination of temporary and permanent desert tortoise fencing would enclose a total of approximately 4,284.5 acres, including acres for the TCS (the Full Build Tortoise Clearance Area; Figure 2; Table 2). However, currently only Sub-Areas A, B, C of the YPSP and the TCS would be constructed during Phase I of construction (the Phase I Tortoise Clearance Area [3,233.5 acres]; Table 2). Any Sub-Areas not included in the initial phase of construction (i.e. Sub-Area D) would be added at a later date by YPS. All fencing would be completed by YPS except for the 30 acres around the TCS which would be completed by GLW.

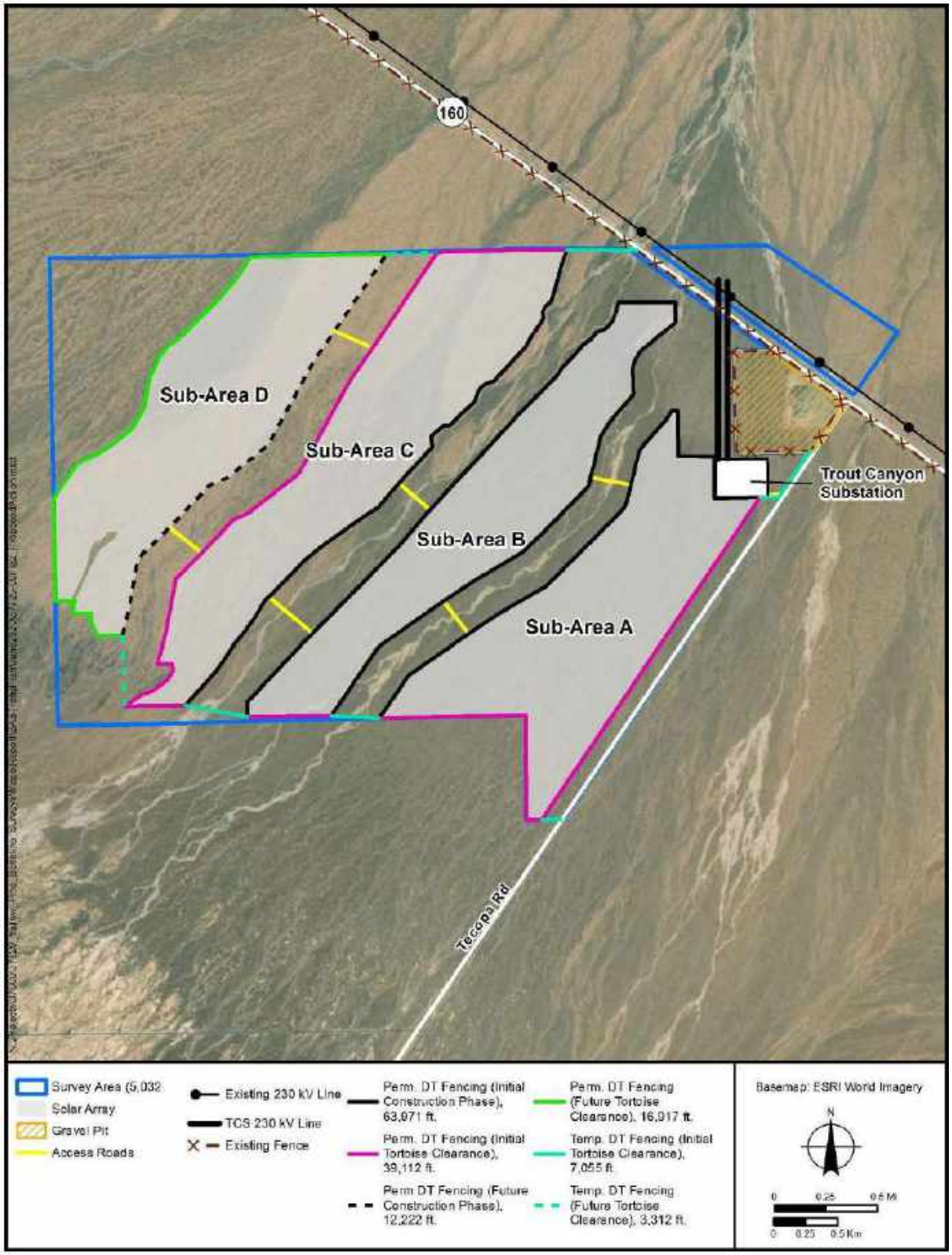


**Figure 3. Solar array areas and project components within the footprint of the Projects.**

**Table 2. Fenced acres and disturbed acres, by proponent, under YPS's Full Build and Phase I scenarios.**

| | **YPS - Full Buildout (sub-Areas A-D)** | **GLW*** | **Total** |
|---|---|---|---|
| Acres Fenced (cleared)** | 4,215.1 | 69.4 | 4,284.5 |
| Acres Disturbed | 2,937.3 | 69.4 | 3,006.7 |
| | **YPS - Phase 1 (Sub-Areas A-C)** | **GLW** | **Total** |
| Acres fenced (cleared)** | 3,164.1 | 69.4 | 3,233.5 |
| Acres Disturbed | 2,203.4 | 69.4 | 2,272.8 |

*GLW acres fenced and disturbed do not change because their proposed action is the same regardless of the construction scenario.
**Acres fenced (cleared) is also referred to as the tortoise clearance area

## Yellow Pine Solar – Project Description and Components

This section provides an overview of the proposed YPSP facilities, with each of the facilities noted in bold. The YPSP would be offset from Tecopa Road and SR 160 to provide a minimum buffer of 400 feet from both roads. The 400-foot offset to these two major roads is included to provide a safe distance for vehicular traffic, prevent any damage to the site from beyond the security fence, and reduce visibility of the site from public use areas. To avoid three large washes transecting the Projects, the YPSP would be split into four Sub-Areas (A–D) (Figure 3, Table 3). An approximately 500-foot buffer on either side of each wash was created to provide a corridor of approximately 1,000 feet or greater between Sub-Areas. Table 4 provides a summary of anticipated temporary and permanent disturbance associated with the proposed action. All habitat acres within the Tortoise Clearance Area that are not included in the acres of disturbance in Table 2 will be left intact (approximately 1,277.8 acres at full buildout).

**Table 3. Solar footprint sub-area acres.**

| **Sub-Area** | **Fenced Acres (Approximate)** |
|---|---|
| Sub-Area A | 739.4 |
| Sub-Area B | 617.3 |
| Sub-Area C | 779.6 |
| Sub-Area D | 710.6 |
| **Total** | **2,846.9** |

**Table 4. Summary of YPSP components and permanent and temporary disturbance (Full Buildout).**

| Project Component | Estimated Temporary Disturbance (acres) | Estimated Permanent Disturbance (acres) |
|---|---|---|
| Project Main Access Road | 0.0 | 1.0 |
| Sub-area Access Roads/34.5-kilovolt (kV) Collection Lines | 20.1 | 3.1 |
| Sub-areas A-D, including Internal Auxiliary Roads, solar arrays, YPSP substation, YPSP gen-tie line, inverters, battery storage, operations and maintenance (O&M) building, distribution power, and staging areas, yards, and laydown areas | 61.4 | 2,834.9 |
| Temporary Tortoise Fencing (between washes) | 4.8 | 0.0 |
| **Total*** | **86.3** | **2,839.0** |

*Totals for estimated temporary and permanent disturbance do not include an additional 12 acres of propagule islands within the project area. Total acres required for construction are 2,937.3 acres (Temporary Disturbance + Permanent Disturbance + Propagule Islands).

**Solar Modules/Array** – The YPSP would use state-of-the-art PV technology by which the sun's light energy is converted directly into DC electrical energy within the PV panels, referred to as "modules." The PV modules can be mounted together in different configurations, depending on the equipment selected, and on a common support framework.

The modules are grouped together in solar arrays. The size of the array is based on the capacity of the equipment selected and is intended to generate the desired overall voltage and current output. Current technology panels are approximately 6.5 feet (78.2 inches) high by 3.25 feet (39.1 inches) wide and are installed on a racking system with support piles driven into the ground. Options for both a tracker that uses one module in portrait format or two modules in portrait exist, with the latter being favored if bifacial PV modules are used. 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 if a single portrait module is used, or 12.5 feet if a dual portrait module is used. However, engineering constraints may require an increase in height for some panels; therefore, the panels may be approximately 10-14 feet to the top from ground level once installed. Based on the current conceptual design, each solar array is intended to produce a net power output of approximately 4 MW (as AC). The overall capacity of the conceptual YPSP design (500 megawatts per acre [MW/acre]) is achieved with sufficient AC arrays to deliver 500 MW at the point of interconnection. Because solar energy technologies continue to evolve at a rapid rate, the exact arrangement and nature of the PV systems would be determined during the final design, and appropriate updates would be made to the plan of development (POD) prior to construction.

**Solar Trackers/Fixed Support Structures –** There are different types of mounting structures for the modules, depending on whether the modules would be fixed in one position or track the

sun's position during the day. A solar tracking mechanism is used to maximize the solar energy conversion efficiency by keeping the modules perpendicular to the sun's energy rays throughout the day. This completed assembly of PV modules mounted on a framework structure is called a "tracker," as it tracks the sun from east to west. The PV module rows would be oriented north-south based on the mounting structure design; however, exact module support structure types would be determined during the final project design. The single-axis tracker configuration is more complicated and is discussed in more detail below. A fixed support structure is also possible. The fixed structure would orient the panels in a permanent position facing south at a certain angle to optimize production throughout the year without any mechanical movement or drive motors.

Currently, there are two types of tracker systems that may be selected for the YPSP: 1) a ganged tracker system; or, 2) a standalone tracker system. A ganged tracker system uses one actuator to control multiple rows of PV modules through a series of mechanical linkages and/or gearboxes. A standalone tracker system uses a single actuator for each row of PV modules. The exact tracker manufacturer and model would be determined in the final design. All trackers are intended to function the same in terms of following the position of the sun.

Module layout and spacing is optimized to balance energy production versus peak capacity and would depend on the sun's angle and shading caused by the horizon surrounding the YPSP. The spacing between the rows of trackers is dependent on site-specific features and tracker selection. Spacing would be identified in the final design, but the current 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.

**Electrical Collection System –** PV modules generate a low-voltage DC electrical output that is not suitable for direct connection to the AC utility grid used in the United States. The electrical collection system would be designed to convert the output power from the PV modules from DC to AC, transform the power from low voltage to transmission-level voltage for connection to the grid, and supply auxiliary power to the tracker systems. The DC output from the PV arrays would be transmitted to inverters through a combination of aboveground and underground DC electrical cables. As currently configured, the YPSP would use about 135 power inverter packages to accomplish the DC-to-AC power conversion process. The number of modules connected to each inverter is dependent on the specific model of modules, inverters, and their capacities, which would be selected in the final design. In order to allow for greater electrical production in off-peak hours and an overall increase in power production, the DC quantity would exceed the AC plant rating in the range of 25% to 40%. The resulting AC current from each individual inverter package would then be routed through cable or solid busbars to the adjacent medium-voltage step-up transformer. The output voltage from each inverter would be increased to the desired substation feed voltage (34.5 kV) by these step-up transformers. From the inverter pads, the collected 34.5 kV of AC power would be delivered to the on-site project substation.

Each sub-area would be connected using underground 34.5-kV collection lines parallel and adjacent to the sub-area access roads. Electrical collection lines would likely 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 and 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.

**Energy Storage System (Batteries)** – The YPSP would use an energy storage system (batteries) that would have a capacity no larger than the solar facility and would be connected using either an AC- or DC-coupled system. Selection of an AC- or DC-coupled system is ultimately determined through off-taker preference and contract terms.

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 approximately up to 50 acres, depending on the size of the system contracted and technology selected. The equipment enclosures and buildings would be located next to the YPSP substation and 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. The battery and solar inputs would be metered separately prior to signal inversion. The charge and discharge of the DC-coupled batteries would be controlled by signal from the inverters. As is typical for the industry, inverters would be controlled by a central control system. The protections to the batteries would be internal to the battery management systems and control boxes located within the containers and inverters.

A battery supplier has not been selected at this time due to changing markets; however, past suppliers have included LG Chem, Samsung, BMW, Tesla, and Lishen. Inverter suppliers would likely include ABB, Parker Hannifin, S&C Electric, Eaton, Princeton Power, DynaPower, Power Electronics, and Ideal Power. The final battery supplier(s) would be selected prior to project construction and would be subject to an industry-standard pre-qualification process.

**Step-Up Transformation/On-Site YPSP Substation –** The AC current would leave the step-up transformers via underground 34.5-kV lateral lines that may be routed into overhead electrical feeder lines. The feeder lines would be supported by multiple-circuit 34.5-kV poles and would dead-end at the on-site YPSP substation. The YPSP substation would occupy approximately 8 acres within the project area. The YPSP substation would consist of parallel sets of internal power distribution systems (i.e., 34.5-kV buses and circuit breakers, disconnect switches, and main step-up transformer) to increase the voltage to the 230-kV substation and transmission line voltage. The YPSP substation and interconnections would be built for 230 kV and would operate at that nominal voltage.

**Interconnection to the TCS and the GLW 230-kV Transmission Line –** The electrical power from the on-site YPSP substation would be transmitted through a 0.1-mile gen-tie line for delivery to the TCS, which is a new substation to be constructed and operated by GLW. The TCS will be on the south side of SR 160, northwest of Tecopa Road. The gen-tie would be constructed for the nominal operating voltage of the substation, which is 230 kV. If required, the conductor wires would be supported by an intermediate structure of either a monopole or H-frame design. Final hardware design would be determined during final engineering of the gen-tie.

**Administration/Operations and Maintenance Building, Control Room, and Warehouse Locations** – The YPSP would include an administration/O&M facility, housed in an approximately 3,500-square-foot building. The administration/O&M building would be located near the YPSP access road. The administration/O&M building would be a pre-engineered metal building with metal siding and roof. The building would provide a small administrative area, 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 supported on reinforced concrete mat foundations or individual spread footings. The floor would consist of a reinforced concrete slab. The administration/O&M building, control room, and warehouse would be air-conditioned and would include offices, a break room, restrooms, and locker rooms with showers. The design and construction of the administration/O&M building, control room, and warehouse would be consistent with all applicable state and local building codes.

In the event that an O&M facility is not needed on-site, storage containers similar to CONEX boxes would be placed in the designated O&M facility area to store spare parts and equipment.

**Roads and Access –** Access to the YPSP facilities would be from Tecopa Road approximately 3,000 feet south of the SR 160 intersection. From Tecopa Road to the YPSP substation, the road would be an all-weather improved access road with one lane in each direction, approximately 20 to 24 feet wide. 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 and would use compacted native materials or gravel surface. The finished width of the internal roads and roads between the sub-areas would be up to 20 feet wide and graded and would include room for the electrical collection system, as described above.

Only a small portion of the overall plant site may 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. 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. 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. Site gates would be swing- or rolling-type access gates. Desert tortoise crossing guards would be installed at all gate locations along perimeter fencing. Access through the main gate would require an electronic swipe card to prevent unaccompanied visitors from accessing the facility. All facility personnel, contractors, agency personnel, and visitors would be logged into and out of the facility at the main office during normal business hours. Visitors and non-YPSP employees (except agency personnel on government business) would be allowed entry only with approval from a staff member at the facility. Additional security may be provided through the use of closed-circuit video surveillance cameras and anti-intrusion systems, as required, for protection of the power production facility.

**Plant Auxiliary Systems –** 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.

**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 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 that are approximately 15 to 20 feet high. Additional lighting considerations will be discussed in the YPSP's Lighting Plan.

**Fire Protection –** Fire protection would be necessary for the YPSP during project construction and operations. 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 YPSP's fire protection water system for the O&M building would be supplied from an adjacent water storage tank located within the project area.

Additional emergency response would be provided externally by local municipalities, if required. The YPS would develop a Fire Management Plan in consultation with the BLM. This plan would be approved by the BLM and become part of the authorization for operations at the YPSP.

**Fencing** – If the Proposed Action is approved, prior to clearance surveys, all areas planned for construction would be fenced with desert tortoise fencing. Permanent tortoise fencing would be installed inside the project boundary for those Sub-Areas to be built at the time of construction. In addition to permanent fencing, temporary tortoise fencing would be installed between Sub-

Areas, and extending to SR 160 and Tecopa Road. This combination of permanent and temporary fencing would create a Tortoise Clearance Area from which tortoises would be translocated. An approximately 20-foot buffer between the fencing and the boundary perimeter will be established as a temporary work area for fence construction access. If construction proceeds for all Sub-Areas at once, a combination of temporary and permanent desert tortoise fencing would enclose a total of approximately 4,284.5 acres (the Full Build Tortoise Clearance Area; see Figure 3). However, at present it is assumed that only Sub-Areas A, B, C, and the TCS, would be constructed during Phase I of construction (the Phase I Tortoise Clearance Area [3,233.5 acres]). Any Sub-Areas not included in the initial phase of construction (i.e. Sub-Area D) would be added at a later date. In the event that Sub-Area D is developed in a later phase, the additional acres of disturbance would follow the same translocation procedures as Phase I. All fencing would be completed by YPS except for the 30 acres around the TCS which would be completed by GLW.

Temporary fencing may be bent at the bottom and buried or tacked down if the final surface disturbance would be less than trenching in the fence. Temporary fencing will avoid active tortoise burrows. Tortoise guards will be placed at all road access points where desert tortoise-proof fencing is interrupted to exclude desert tortoises from the Tortoise Clearance Area until construction is complete. Gates or tortoise exclusion guards will be installed with minimal ground clearance and shall deter ingress by desert tortoises. Tortoise fencing installation and maintenance would occur in accordance with the Service (2009) regulations and requirements.

Shade structures (PVC or equivalent half pipe) will be placed every 300 meters (approximately 1,000 feet) along the fence perimeter to provide shade for any tortoises pacing/walking along the fence. The shelters will be designed and installed to provide shelter for both small and large tortoises. Shelters will be made from either PVC tubes or similar material with a diameter of 12 to 15 inches or greater. Tubes should be cut into 6-foot length and cut horizontally. Each shade structure would have 3 to 4 inches of soil piled on top to keep them from being blown away and to assist with thermoregulation within the shelter. Shade structures will be built and installed based on Service guidance.

All tortoise exclusion fencing will be inspected monthly during construction, quarterly for the life of the Projects, and immediately following all major rainfall events. Any damage to the fence will be repaired within 2 days of observing the damage and be reported to the Service to determine whether additional measures are necessary. During all fence monitoring, shade structures will be inspected for their effectiveness and adjusted as needed to increase their effectiveness.

In addition to perimeter tortoise fencing, temporary cross-fencing may be implemented to optimize clearance surveys. Temporary cross-fencing may consist of standard tortoise fence materials or more expedient materials such as silt fencing.

**Yellow Pine Solar - Construction**

**Site Preparation –** Traditional site preparation method was originally considered as the site preparation technique for the entire project. Site preparation under this method, would be completed using "disk and roll," which includes complete removal of vegetation and the compaction of the soil surface across the entire project site. This method is currently the industry standard for utility-scale solar development in the region and would result in the loss of all vegetation within the solar field and the compaction of soils. While this method is standard practice for industry and provides a simpler way to construct, YPS has developed a less invasive approach for the Proposed Action called mow-and-go, which reduces impacts to vegetation and soils, and improves restoration potential. The mow-and-go method has been implemented at other utility-scale projects and has been shown to be successful; however, further measures have been incorporated into the Proposed Action to benefit site restoration/revegetation.

As part of the revegetation efforts related to the YPS-proposed mow-and-go methods, they have designed the YPSP 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) represent a concept that has not been used for solar facilities to date but has been proposed in recent studies (see Bengtson et al. 2020). Therefore, several different methods will be deployed on-site and tested as part of the project. Propagule islands will be included as described below:

- Sub-area A – Control site; no propagule islands.
- Sub-area B – Three propagule islands: Each island would be approximately 10 feet wide and run east-west across the sub-area. Islands would be spaced approximately equally across the sub-area and include two approximately 20-foot-wide access roads through them.
- Sub-area C – Three propagule islands: Each island would be approximately 20 feet wide and run east-west across the sub-area. Islands would be spaced approximately equally across the sub-area and include two approximately 20-foot-wide access roads through them.
- Sub-area D (if/when built) – Two propagule islands: Each island would be approximately 30 feet wide and run east-west across the sub-area. Islands would be spaced equally across the sub-area and include two approximately 20-foot-wide access roads through them.

Prior to site preparation activities, temporary desert tortoise exclusion fencing would be installed along the site perimeter, including across the washes between sub-areas and extending to SR 160 and Tecopa Road (see Figure 3). Following fence installation, construction activities would begin with the preparation of the solar array, roads, and other site facilities. A minimal disturbance approach is used that limits earthwork activities on-site. Depending on the BLM's selection of a preferred alternative for site preparation, the site may be mowed to a height of 18 to 24 inches. An alternative includes mowing to a height of no more than 3 inches using a bush hog or similar tractor-mounted brush cutter. This method is known as "mow and go" and minimizes physical disturbance on vegetation and soil crust. BLM is also considering a

combination of these methods. Depending on the vegetation, topography, engineering/construction constraints, and the construction activities, it is necessary that some mowing areas which contain large shrubs such as creosote bush also use surface tilling. Surface tilling removes stumps while leaving the root system in place to the greatest extent practicable. Alternatively, more traditional disk and roll methods could be used in place of mow and go with tilling.

In some areas, drive-and-crush would be used during construction. This method does not use any vegetation clearing; 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).

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. Grading within the solar field would match existing contours to the extent feasible. Some existing contours would need to be smoothed out for access purposes, but the macro-level topography and stormwater drainage would remain similar to pre-graded conditions. To the extent practical, grading of an area would take place shortly before trenching and post-installation in order to minimize the area of open, uncovered ground present at any one time during construction. The portions of the YPSP site that would be graded are expected to result in a balanced cut-and-fill quantity of earthwork to maintain the existing conditions to the extent practical for the protection of the equipment and facilities. Fill would be compacted as necessary, and appropriate dust abatement measures would be implemented in accordance with the project 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 minimal disturbance approach helps preserve the underground root structure, topsoil nutrients, seed base, and pre-construction site hydrology. The inclusion of propagule islands maintains intact vegetation and soil patches which further facilitate revegetation of the area. Table 5 provides an estimated range for the amount of each site preparation method used for project construction. Estimates are based on full build-out of the 2,851-acre project area (including 12 acres of undisturbed propagule islands within Sub-Areas), plus the temporary disturbance of 86.3 acres, totaling 2,937.3 acres. Each site preparation method identified will be implemented for construction. However, the amounts provided are estimates only; actual amounts will vary based on multiple factors, including vegetation type and density, topography, soils, geology, panel and racking manufacturer, AC/DC ratio, ground cover ratio, energy storage type, and safety considerations.

**Table 5. Approximate site preparation method and estimated range of use (percentage).**

| Site Preparation Method | Percent | *Acres* | | Percent | *Acres* |
|---|---|---|---|---|---|
| Grading and Leveling | 5 | *140.2* | to | 20 | *588* |
| Mow and Go with Tilling | 5 | *149.7* | to | 36.4 | *1,069* |
| Mow and Go | 86.6 | *2,545.6* | to | 42.2 | *1,238.4* |
| Propagule Islands* | 0.4 | *12* | to | 0.4 | *12* |
| Drive-and-Crush | 3 | *89.8* | to | 1 | *29.9* |
| **Total Project** | **100** | ***2,937.3*** | to | **100** | ***2,937.3*** |

*Propagule islands are specifically associated with the implementation of mow and go, and mow and go with tilling methods.

BLM and the Service discussed undergoing formal consultation for the Projects prior to BLM's selection of its preferred alternative, and determined that this was acceptable in order to maintain the FAST-41 schedule. BLM is considering the full mowing alternative that would mow the vegetation to a height of 18 to 24 inches throughout the site. This would further preserve the topsoil, seed base, underground root structure, pre-construction site hydrology, and would allow for greater restoration success at project termination. BLM also is considering a combination of mow-and-go and full mowing to 18 to 24 inches to preserve on-site site resources. Any vegetation treatment method that BLM selects in the final Decision Record does not change the analysis of effects to the desert tortoise since all vegetation treatment methods occurring within the exclusion fencing require that all desert tortoises be cleared and translocated to the Stump Springs Translocation Area.

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 encountered would be recycled or disposed.

Materials suitable for compaction would be stored in stockpiles at designated locations using proper erosion prevention methods. Materials unsuitable for compaction, such as debris and large rocks, would be stockpiled at designated locations for subsequent disposal at an acceptable off-site location. Contaminated materials are not anticipated; however, if contaminated materials are encountered during excavation, they would be disposed of in accordance with applicable laws, ordinances, regulations, and standards.

**Temporary Construction and Laydown Areas –** A temporary staging area for construction laydown and parking would be established. Temporary staging areas would include fenced parking, covered trash disposal facilities, construction trailers, a laydown area, and sufficient portable toilets and potable water for use by the construction staff. Mobile trailers, modular offices, or an equivalent 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 (VEA) or would come from temporary diesel generators located in the staging area. Temporary lighting would be provided and strategically located to ensure safety and security of the construction area. No staging areas would be needed outside the YPSP area.

**Blasting –** It may be necessary to blast rock to achieve the necessary slope and gradient for interior roads or for foundation construction. If required, blasting would be conducted in accordance with a Blasting Plan prepared prior to issuance of the NTP and approved by the BLM. The approved Blasting Plan would identify potential blasting locations, safety protocols, and notification procedures. The Blasting Plan would be completed when final engineering, design, and geotechnical information is available and would be made available on the BLM website and/or at the local BLM offices. Blasting would be pre-engineered with each location assessed for apparatus or structures in the vicinity to determine the suitability of that location for blasting. Procedures identified by the construction contractor for conducting such work, as well as applicable federal and state regulations, would be followed. Explosives would only be used within times and at specified distances from sensitive wildlife or surface waters, as established by the BLM or other federal and state agencies. Explosive material would be handled only by a licensed, State-approved contractor who would have full responsibility for control and use of the material. The material would be transported to and from the project site on an as-needed basis in accordance with the Occupational Safety and Health Administration's regulations for surface transportation of explosives, found at 29 Code of Federal Regulations (CFR) 1926.902.

**Solar Array and YPSP Substation 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 solar fields, 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.

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

practicable; leaving only the 20-foot-wide sub-area access road as permanent disturbance (see Table 4).

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 in a YPSP Fugitive Dust Control Plan. The administration/O&M building foundation and framework for the buildings would be placed as the construction progresses.

**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 foundation. The battery containers would then be connected to the inverters by installing DC cables, AC auxiliary power, and fiber optics.

If an AC system is used, the collector substation area would be expanded by up to 50 acres to incorporate the 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.

**Generation Tie-Line Construction –** The YPSP gen-tie line would be constructed from the YPSP substation to the GLW owned TCS. The proposed gen-tie is approximately 550 feet long and would only require a structure within the YPSP sub-station fence and a structure within the TCS fence. Stringing would be accomplished from within the two sub-stations, and no construction work is needed between the two.

Similar to YPSP site development, appropriate dust abatement measures would be identified in the YPSP 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.

**Gravel, Aggregate, Concrete Needs, and Sources –** Minimal concrete would be required for construction of the foundations, equipment pads, and other facilities. The primary material required for construction is gravel and aggregate for road construction. Concrete would be supplied from commercially available sources produced in the nearby communities, most likely Pahrump or Las Vegas. Temporary batch-plant activities are not expected to occur on-site.

**Water Use –** Initial construction water usage would be in support of site preparation and grading activities. During earthwork for the grading of access roads, foundations, equipment pads, and YPSP 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 dust suppression and 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.

Construction water needs for dust control and washing would be obtained from a commercially available source and trucked to the site. The water would be stored in an aboveground tanks with a storage capacity of up to 250,000 gallons. The tanks may be filled on a daily basis or as needed, during the construction period.

**Construction Schedule and Personnel Requirements –** Construction of the entire YPSP in a single phase 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 (PPAs) and/or other contractual agreements. The smallest phase contemplated would be 50 MW, in which case up to 10 phases could be constructed. Currently, it is anticipated that the first construction phase would consist of two 125-MW projects built starting approximately 6 months apart which together would represent the first construction phase. Completion of all phases would take no more than 10 years from the start of the first construction phase. 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. Table 6 provides the approximate timing and workforce requirements for a range of construction options from the full build-out phase option to a small 50-MW construction phase option.

**Table 6. Examples of approximate timing and workforce requirements**

| Item | Single Construction Phase | Four, 125-MW Phases | Ten 50-MW Phases |
|---|---|---|---|
| Construction Schedule | 24 months | 12 months per phase | 9 months per phase |
| Operations Schedule | 30–40 years from COD* | 30–40 years from COD* of the last phase | 30–40 years from COD* of the last phase |
| Construction Workers | Up to 400 at peak | Up to 300 at peak | Up to 200 at peak |
| Construction Vehicle Trips | Up to 425/day at peak | Up to 375/day at peak | Up to 325/day at peak |

* Commercial operation date

The on-site workforce would consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. Construction would generally occur between 7 a.m. and 7 p.m., Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. For instance, during placement of concrete or during hot weather, it may be necessary to start work earlier to avoid

some activities during high ambient temperatures. During the start-up phase of the YPSP, some activities (such as equipment and system testing) may continue 24 hours per day, 7 days per week. Table 7 depicts a proposed Construction Plan for the YPSP.

**Table 7. Preliminary general construction schedule (YSPS)**

| Activity | 500-MW Construction | 125-MW Construction | 50-MW Construction |
|---|---|---|---|
| Install perimeter tortoise fence | Pre-Construction | Pre-Construction | Pre-Construction |
| Clearance surveys and desert tortoise translocation | Pre-Construction | Pre-Construction | Pre-Construction |
| Mobilization | Month 1 | Month 1 | Month 1 |
| Delineate and mark the boundaries of the construction zone | Month 1 | Month 1 | Month 1 |
| Establish parking and staging areas for vehicles and deliveries | Month 1 | Month 1 | Month 1 |
| Establish laydown area(s) for materials storage/staging | Months 1–2 | Months 1–2 | Months 1–2 |
| Clear and grub | Months 1–12 | Months 1–4 | Months 1–2 |
| Install certified weed-free fiber rolls or silt fence at the base of slopes adjacent to delineated sensitive areas (i.e., wetlands), if any; install or repair best management practices | Months 1–2 | Months 1–2 | Months 1–2 |
| Road construction | Months 2–12 | Months 2–6 | Months 2–4 |
| Assemble and erect PV trackers and panels | Months 2–16 | Months 2–11 | Months 2–8 |
| Construct gen-tie line | Months 10–12 | Months 5–6 | Months 5–6 |
| Construct O&M building | Months 4–5 | Months 4–5 | Months 4–5 |
| Assemble and install energy storage system | Months 12–15 | Months 3–9 | Months 3–8 |
| Construct on-site substation | Months 6–10 | Months 2–9 | Months 2–8 |
| Commissioning and testing | Months 12–18 | Months 9–12 | Months 7–9 |
| Commercial operation | Month 24 | Month 12 | Month 9 |

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 and 10), up to 400 workers would be on-site. Approximately 200 to 300 workers are anticipated for non-peak construction periods.

At the peak of construction, approximately 400 vehicles carrying construction workers would be driving to and from the project area each day 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, with five trucks per day during peak periods. A Traffic Management Plan would be prepared prior to construction for review by the BLM.

**Construction Equipment –** Typical equipment used for the project 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

**Yellow Pine Solar - Operations and Maintenance**

Following project construction, the operation of the YPSP would require approximately five to 10 permanent employees. Operations personnel would work a single daytime shift, Monday through Friday. During time periods when the facility is not fully staffed, the YPSP would be monitored remotely from the Applicant's parent company's Fleet Performance and Diagnostic Center in Juno Beach, Florida. Under emergency conditions, YPSP staff would be notified and would return to the facility, as required. Specialty personnel may also be located on-site during non-working hours to perform specific maintenance functions as required.

Following project construction, the temporary tortoise fence will be removed leaving only the permanent fence surrounding each of the Sub-Areas. After removal of the temporary fence the access roads between Sub-Areas will no longer be fenced. Operations and maintenance vehicles would include ¾-ton pickup trucks and small utility vehicles to perform on-site welding, lubricating, panel washing, and other maintenance activities. In addition, flatbed trucks, dump trucks, and front-end loaders may be present on-site at various times. Heavy-haul transport equipment would be brought to the site as needed for any major maintenance or equipment repair or replacement.

The plant would be maintained by staff personnel for normal preventative maintenance. This would include up to daily inspection of field components, condition assessment of critical equipment, and routine lubrication of equipment. The YPSP facilities would be repainted on a regular basis to maintain its appearance and protect it from the elements.

Based on data from PV plant operations in the project fleet across the county, it is not anticipated that panel washing would be needed. However, in a worst-case scenario the PV panels would be washed up to four times per year to increase the average optical transmittance of the flat panel surface. Panel washes are likely to occur during off-peak hours. The demand for water to wash the panels is approximately 50,000 gallons per day. It would take approximately 10 people with five wash trucks 30 days to complete washing for this project at full build-out.

Vegetation would be maintained on-site through a combination of mowing and herbicide application. Areas that were mowed during construction would be maintained at a height of approximately 12 inches, which would be trimmed once or twice a year, as necessary. Equipment includes a commercial-sized raised deck mower, or similar. A bush hog or similar typically is not needed but could be used in limited areas if vegetation becomes thick. Herbicide application would be applied following the BLM-approved Pesticide Use Proposal in the Pesticide Management Plan.

Road maintenance would be performed, as needed. Paved roads would be swept, sealed, and/or overlaid as needed to preserve the asphalt surface from degradation. Potholes or damage to the road would be repaired as soon as practical. Grading and drainage would be maintained for gravel and earthen roads. Water would be applied, as required, to limit fugitive dust.

The YPSP may operate as either a manned or unmanned site, to be determined after final design. Under normal circumstances for an unmanned site, the YPSP substation would be controlled remotely, and routine inspections by personnel would occur on a weekly basis or as needed under emergency conditions. In addition, all of the YPSP substation structures would be annually inspected from the ground for corrosion, misalignment, and foundation condition. Ground inspection would include the inspection of hardware, insulator keys, and conductors. This inspection would also check conductors and fixtures for corrosion, breaks, broken insulators, and bad splices.

Battery systems have an initial right-size capacity (this includes auxiliary loads and losses) to deliver nameplate energy beginning the first day of operation. In order to maintain the same level of nameplate energy throughout the duration of the agreement, it is necessary to add new batteries in order to compensate for degradation of the initial batteries. The original building would be constructed to allow for the addition of new batteries as necessary. Periodic replacement of the batteries is expected as often as every 5 years based on usage and quarterly inspections, though it is not uncommon for the batteries to last longer than 10 years. Inspections of the batteries would be performed as part of the preventive maintenance program. Spent batteries would be recycled or disposed of off-site in accordance with 40 CFR 273.2 and 40 CFR 266.

Electric lines, support systems, and instrumentation and controls would be inspected regularly to ensure the safe, efficient, and economical operation of the YPSP.

The water storage tanks installed as part of the YPSP construction phase would remain for operations, or it would be replaced with a new tank of similar size if necessary. The water tank would require frequent inspection and may need occasional repairs. This maintenance would include routine painting of the storage tanks to protect them from corrosion.

**Yellow Pine Solar - Project Termination, Decommissioning, and Site Reclamation**

The YPSP would have a useful life of approximately 30 to 40 years. The YPS would be required to post a reclamation bond as a condition of authorization issuance. The value of this bond would be determined subject to BLM policy, and remains to be determined. A Decommissioning, Abandonment, and Site Reclamation Plan would be submitted to the BLM prior to the NTP and would be updated and approved by BLM prior to any decommissioning activities. At the end of the useful life of the facility and the termination of the ROW grant, the YPS would remove all improvements. During improvement removal, the site would remain fenced and gated. Materials that could be reused or recycled would be hauled away from the site and sold. Materials that could not be reused or recycled would be dismantled and hauled to the nearest approved landfill. Hazardous materials that could not be reused or recycled would be disposed of at approved facilities. The YPS would remove foundations to 3 feet below ground surface, restore contours

over the foundations to pre-project conditions, remove the stormwater management berms, and restore the pre-project contours to the maximum extent possible. During these reclamation operations, it is anticipated that fugitive dust abatement measures comparable to those applied during the YPSP construction would be implemented. Weed control would be implemented as described above.

The transmission line and towers may be removed. Some structures and equipment may be required to remain in place based on final interconnection agreements. Conductors and tower steel would be sold for reuse or recycling. The YPSP substation, including all structures and fencing, would be removed. Foundations for the towers and substation facilities would be removed to 3 feet below the ground surface, and contours would be restored.

It is not possible to predict the conditions and management objectives that would exist at the time of decommissioning. Therefore, decommissioning details would be developed and provided to the BLM when the time for permanent closure is closer and more information is available. The BLM would require the Applicant to submit a Decommissioning, Abandonment, and Site Reclamation Plan that would be reviewed and revised as needed. The plan would include all activities required to dispose of or store all hazardous and toxic materials and chemicals associated with the YPSP. This plan would discuss all currently applicable laws, ordinances, regulations, and standards associated with the safe storage or disposal of these materials. The plan would also include a description of procedures for notification of regulatory agencies. The BLM would review and approve the plan.

**GridLiance West - Project Description and Components**

The TCS would be located on 30 acres immediately adjacent to Sub-Area A. A 230-kV transmission line would connect the TCS to the existing 230-kV Pahrump to SCS transmission line and would require an additional 39.4 acres of disturbance. This section provides a summary of the facilities and Table 8 provides a summary of acres of disturbance by each component. Table 9 provides a general work timeline and workforce estimate for the TCS and transmission line.

While it is currently anticipated that the YPSP and TCS would be built at similar times, it is possible that either component (YPSP or TCS) would be built on a completely different construction schedule or not at all. However, because of its location immediately adjacent to the YPSP, if construction of the YPSP occurs prior to the TCS, GLW will be required to perform fencing and translocation activities concurrently with the YPSP. If the TCS is built prior to a known construction start date for the YPSP, GLW would fence, survey, and translocate tortoises from the 30-acre TCS, independent from the YPSP. Under this scenario, fencing, clearance surveys, and translocation would not be necessary for the 39.4 acres of disturbance associated with the 230-kV transmission line and would instead use qualified desert tortoise monitors during construction as stipulated in the Biological Assessment and Biological Opinion.

**Table 8. GLW components and permanent and temporary disturbance.**

| Project Component | Estimated Temporary Disturbance (acres) | Estimated Permanent Disturbance (acres) |
|---|---|---|
| Trout Canyon Substation | 0.0 | 30.0 |
| 230-kV Transmission Line | 0.0 | 39.4 |
| **Total** | **0.0** | **69.4** |

**Table 9. Proposed TCS timing and workforce.**

| Item | Timing and Workforce |
|---|---|
| Construction schedule | 6-18 months |
| Operations schedule | 30 years from COD |
| Construction workers | Up to 15 |
| Construction vehicle trips | Up to 25 at peak |

**Trout Canyon Substation –** The TCS would consist of structures, breakers, and controls that allow for transmission of power to occur with and without the solar project interconnected. In addition, the substation would include main step-up transformers, high-voltage electrical controls, combining switchgear, and related structures. The electrical power from the on-site YPSP substation would be transmitted through a 0.1-mile gen-tie line for delivery to the TCS.

The TCS would be fenced appropriately to restrict public access during construction and operation. Chain-link security fencing would be installed around the site perimeter, substation, and other areas requiring controlled access. 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. Tortoise fencing would be installed in connection with the security fence to exclude desert tortoises from potentially harmful situations, including interactions with construction equipment and vehicles. Tortoise fencing installation and maintenance would occur in accordance with Service (2009) regulations and requirements. In general, the bases of tortoise fences would be buried a minimum of 12 inches below the ground surface, leaving approximately 22 to 24 inches standing aboveground. The top portions of tortoise fences would be secured to livestock wire or perimeter fencing at 12- to 18-inch intervals.

**230-kV Transmission Line –** The TCS 230-kV transmission line would exit from the TCS going north and crossing SR 160, connecting to the existing 230-kV Pahrump to SCS transmission line. The transmission line would be an overhead 230-kV line on steel monopole and H-frame self-weathering structures approximately 90 to 120 feet tall. The alignment is approximately 4,288 feet long × 400 feet wide (approximately 39.4 acres of disturbance), which would require five to eight structures. Construction of the TCS and associated transmission line is expected to occur within the construction timeline for the YPSP.

**GridLiance West - Construction**

**Trout Canyon Substation –** The construction of the TCS would require approximately 30 acres of permanent disturbance. Construction of the TCS is anticipated to take between 6 and 18 months to complete.

During construction, the area would be cleared of vegetation and graded. After grading, the concrete foundation would be constructed to support the substation components. Structural components would be transported to the site by truck. 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. Construction materials and equipment would be placed within the substation area. The transmission line construction would commence from the substation side and move north across SR 160.

**Transmission Line Construction –** Crews would work continuously along the ROW to construct the 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 reclamation

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. Construction of the transmission line would take between 6 and 18 months.

**Temporary Construction / Laydown Areas –** No staging areas would be needed outside the project area or the TCS. For the 230-kV transmission line from the TCS to the existing Pahrump to SCS 230-kV transmission line, laydown areas would be located within the TCS, and all work would be performed within the 400-foot ROW.

**Water Use –** Initial construction water usage would support site preparation and grading activities. During earthwork for grading of the foundations, substation pad, and transmission line, water would primarily be used for compaction and dust control.

The total water usage during construction would be approximately 25 acre-feet. Water would be obtained from a commercially available source and trucked to the site. Water would be stored at the substation area in a 10,000-gallon aboveground tank. Once constructed, the facility would require no water.

**Construction Schedule and Personnel Requirements –** GLW would hire new work force as needed for construction. GLW would run a competitive bidding RFP process with a group of pre-approved utility contractors to provide construction services needed for the project. Table 10 provides the numbers of personnel and equipment needed for the project.

**Table 10. Estimated Personnel and Equipment numbers.**

| Activity | Number of Workers | Type and Numbers of Equipment |
|---|---|---|
| Substation pad construction | Up to 10 workers* | One D9 dozer, one D12 dozer, backhoes, two heavy loaders, two crawler loaders |
| Substation electrical construction | Up to 10 workers* | One drill rig, one backhoe, one dump truck, five concrete trucks, one forklift, 50 T crane, two bucket trucks, xx two-man lifts, one welding truck |
| T-line and overhead optic ground wire | Up to 10 workers* | One drill rig, one concrete truck, two dump trucks, one backhoe, four bucket trucks, four line trucks, one puller and tensioner, two cranes, one flatbed truck, five pickup trucks |

*Additional personnel may be needed to meet the project schedule.

The project would require approximately 10 to 15 workers. GLW would not provide on-site residential areas for construction workers. Construction workers would most likely commute to the project area from the Pahrump and Las Vegas areas. Worker commute to and from the site would take place during the typical morning and evening peak hours. In addition, specialty workers are expected to arrive on-site during non-peak hours. Approximately five trucks per day are expected to deliver various materials and construction equipment. The applicant would prepare a traffic management plan for BLM review before construction begins.

**Construction Equipment –** Typical equipment that would be used for the project includes the following:

- Graders
- Excavators
- Bulldozers
- Backhoes
- Heavy loaders
- Crawler loaders
- Delivery trucks
- Line trucks
- Drill rig
- Flatbed trucks
- Cranes
- Bucket trucks
- Welding trucks
- Water supply trucks
- Water spray trucks
- Puller and tensioner
- Forklifts and carry decks
- Electrical test equipment
- Concrete mixers
- Compaction machines
- Survey equipment
- Off-road buggies
- Light trucks

## GridLiance West - Operations and Maintenance

With construction complete, the operation of the TCS would require an annual inspection and periodic maintenance.

**GridLiance West - Project Termination, Decommissioning, and Site Reclamation**

The Project Area would have a useful life of at least 30 to 40 years. GLW would be required to post a reclamation bond as a condition of authorization issuance. The value of this bond would be determined subject to BLM policy. At the end of the useful life of the facility and the termination of the ROW grant, the applicant would remove all improvements. During improvement removal, the site would remain fenced and gated. Materials appropriate for reuse or recycling would be hauled away from the site and sold. Materials inappropriate for reuse or recycling would be dismantled and hauled to the nearest approved landfill. Hazardous materials inappropriate for reuse or recycling would be disposed of at approved facilities. The applicant would remove foundations to 3 feet below ground surface, restore the foundation locations to pre-project contours, remove stormwater management berms, and restore the berm locations to pre-project contours to the extent possible. During these reclamation operations, it is anticipated that fugitive dust abatement measures comparable to those applied during the YPSP construction would be implemented. The applicant would prepare a decommissioning and site reclamation plan.

The transmission line and towers may be removed. Some structures and equipment may be required to remain in place based on final interconnection agreements. Conductors and tower steel may be sold for reuse or recycling.

It impossible to predict the conditions and management objectives that would exist at the time of decommissioning. Therefore, the applicant would develop decommissioning details and provide them to the BLM when the time for permanent closure draws near and more information is available. The BLM would require the applicant to submit an abandonment plan that would undergo review and revision as needed for the agency's approval. The plan would include all activities required to dispose of or store all hazardous and toxic materials and chemicals associated with the substation. This plan would detail all currently applicable laws, ordinances, regulations, and standards associated with the safe storage or disposal of these materials. The plan would also include a description of procedures for notification of regulatory agencies.

**Desert Tortoise Translocation for YPSP and TCS**

*Translocation Procedures Summary*

The combined Projects for both the YPSP and TCS would occur within an approximately 5,032-acre survey area (Figure 2). The survey area contains habitat which supports the desert tortoise which also is protected by the state of Nevada (Nevada Administrative Code 503.080). In September and October of 2018, SWCA Environmental Consultants (SWCA) conducted protocol-level presence/absence surveys for desert tortoise in the survey area.

Prior to clearance surveys, all areas planned for construction would be fenced with desert tortoise fencing. Permanent tortoise fencing would be installed inside the project boundary for those Sub-Areas to be built at the time of construction. In addition to permanent fencing, temporary tortoise fencing would be installed between Sub-Areas, and extending to SR 160 and Tecopa Road. This combination of permanent and temporary fencing would create a Tortoise Clearance Area from

which tortoises would be translocated (see Table 3). An approximately 20-foot buffer between the fencing and the boundary perimeter will be established as a temporary work area for fence construction access. If construction proceeds for all Sub-Areas at once, a combination of temporary and permanent desert tortoise fencing would enclose a total of approximately 4,284.5 acres (the Full Build Tortoise Clearance Area). However, currently only Sub-Areas A, B, C of the YPSP, and the TCS, would be constructed during Phase I of construction (the Phase I Tortoise Clearance Area [3,233.5 acres]). Any Sub-Areas not included in the initial phase of construction (i.e. Sub-Area D) would be added at a later date. In the event that Sub-Area D is developed in a later phase, the additional acres of disturbance would follow the same translocation procedures as Phase I. All fencing would be completed by YPS except for the 30 acres around the TCS which would be completed by GLW.

The TCS is being developed by a separate company (GLW) which would be responsible for all fencing and clearance activities within the 69.4-acre footprint of the substation and 230-kV transmission line. However, because of its location immediately adjacent to the YPSP, if construction of the YPSP occurs prior to the TCS, GLW will be required to perform fencing and translocation activities concurrently with the YPSP. If the TCS is built prior to a known construction start date for the YPSP, GLW would fence, survey, and translocate tortoises from the 30-acre TCS, independent from the YPSP. Under this scenario, fencing, clearance surveys, and translocation would not be necessary for the 39.4 acres of disturbance associated with the 230-kV transmission line and would instead use qualified desert tortoise monitors during construction as stipulated in the Biological Assessment and this Biological Opinion.

The desert tortoise translocation procedures are described in detail in the Appendix. The steps for translocation are summarized as:

1. Track radio-tagged tortoises (n = 10) at an existing USGS study site (Sandy Valley) during 8-week survey period of release, control, and project sites. Data collected during telemetry monitoring at Sandy Valley will be used to estimate a correction factor that will account for the number of tortoises below ground during surveys of the release, control, and project sites to yield more accurate density estimates.
2. Identify and survey release locations within recipient area and confirm tortoise abundance.
    - Includes visual health assessment, venipuncture, and tissue sampling.
3. Identify and survey control site.
    - Includes visual health assessment, venipuncture, and tissue sampling.
4. Conduct initial surveys of Phase I Tortoise Clearance Area.
    - Includes venipuncture, tissue sampling, and two visual health assessments completed 14 to 30 days apart.
5. Submit translocation review package (TRP) to Service for review.
6. Desert tortoises will be passively excluded during fence construction
7. Conduct clearance surveys (2 to 3 passes) of Phase I Tortoise Clearance Area.
    - Includes venipuncture, tissue sampling (lab results good for ≤ 1 year), and two visual health assessments completed 14 to 30 days apart.
8. Translocate individuals after approval of TRP.

9. Compile subsequent TRP addenda, including health data and photographs and translocation of additional individuals and juveniles.

*Monitoring of Translocated Desert Tortoises*

**Radio-telemetry Monitoring**

The environmental services team, for both YPS and GSW, would monitor the tortoises translocated during this project for a maximum of 1 year from each individual's translocation date. The following schedule outlines the monitoring frequency for the first year in accordance with Service (2019a):

- Once within 24 hours of release
- At least twice weekly for the first 2 weeks after release
- Starting the third week after release
  - At least once a week from March through October
  - Once every other week from November through February

This schedule provides an outline for radio-telemetry monitoring translocated tortoises; however, adjustments to this schedule may be necessary to account for a variety of scenarios. Tortoises that move farther than expected, are consistently found along a fence line, are not seeking suitable shelter, or have a low body condition score may require more frequent monitoring.

In addition to radio-telemetry monitoring of translocated tortoises, the resident and control tortoise groups would be tracked at least once per week during the active season (March through October) and once every other week during the inactive season (November through February) for the duration of the study. Transmitters would be changed as necessary over the course of monitoring.

In addition to radio-telemetry monitoring, translocated, resident, and control tortoises would be weighed, measured, and receive health assessments twice each year (spring and fall). Any health problems documented during the health assessments should be reported in a timely manner to the USFWS and Nevada Department of Wildlife to determine appropriate actions.

After the conclusion of the 1-year post-translocation radio-telemetry monitoring period, the YPS and GLW would no longer be responsible for monitoring radio-tagged tortoises and individuals would be transitioned into the Long-Term Monitoring Plan as directed by the agencies.

**Long-term Monitoring**

A 30-year Long-Term Monitoring Plan to examine the short- and long-term effects of translocation is currently under development, in collaboration with the BLM, Service, and Nevada Department of Wildlife (NDOW). The Long-Term Monitoring Plan will be funded through the Stump Springs translocation fee collected from projects utilizing the Stump Springs Translocation Area, including the YPSP. See the Conservation Measures section for fee calculations.

**Regulatory Required Plans**

Detailed structure access and location drawings would be developed in the final PODs pending final design for the YPSP and TCS. The BLM requires a final POD for the development and implementation of the Projects. The final PODs will include instructions to construction contractors, agency personnel, resource inspectors, and monitors for construction, operation, and maintenance of the YPSP and TCS. The PODs also contain a project description, resource protection, conservation measures, and environmental compliance field activities.

In addition, the following plans would be appendices to the final PODs. The YPSP and TCS would use the same plans, and all plans listed below would apply to both projects. Plans describe the conservation measures and environmental protection measures that would be followed during pre-construction, construction, operations, maintenance, and decommissioning activities of all elements of the Projects:

- Grading Plan
- Construction Plan(s)
- Traffic Management Plan
- Fugitive Dust Plan
- Stormwater Pollution Prevention Plan
- Worker Environmental Awareness Program
- Health and Safety Program
- Fire Management Plan
- Site Restoration and Revegetation Plan
- Hazardous Materials Management Plan
- Weed Management Plan
- Pesticide Plan
- Raven Management Plan
- Spill Prevention, Control, and Countermeasures Plan
- Bird and Bat Conservation Strategy
- Desert Tortoise Translocation Plan
- Decommissioning, Abandonment, and Site Reclamation Plan
- Blasting Plan

**Proposed Minimization Measures (YPSP and TCS)**

The following are minimization measures proposed by YPS and GLW to avoid and/or minimize the potential impacts of the Proposed Action on federally listed species, specifically the desert tortoise. These measures will also serve to ensure that all project activities (construction, operations, maintenance, and decommissioning) are implemented in compliance with local, state, and federal laws, guidelines, and protocols. These measures will be implemented during all pre-construction, construction, operations, maintenance, and decommissioning activities:

1. Both YPS and GLW will employ Authorized Desert Tortoise Biologists (ADTBs) and desert tortoise monitors to ensure compliance with protective measures for the desert tortoise. Use of ADTBs and desert tortoise monitors will be in accordance with the most up-to-date Service guidance and will be required for monitoring of any pre-construction, construction, operation, or maintenance activities that may result in take of the desert tortoise. The current guidance is provided in Chapter 3 of the Desert Tortoise Field Manual (Service 2009).

2. Both YPS and GLW will provide the qualifications of all individuals seeking approval as ADTBs to the Service. The Service will review these and determine whether the individuals are qualified within 30 days.
3. Both YPS and GLW will designate a Field Contact Representative who will oversee compliance with protective measures during pre-construction, construction, operations, maintenance, and decommissioning activities that may result in injury or mortality of desert tortoises. If the Field Contact Representative, ADTB, or desert tortoise monitor identifies a violation of the desert tortoise measures, they will halt work in the relevant area until the violation is corrected.
4. Both YPS and GLW will develop and implement a Worker Environmental Awareness Program for all workers (pre-construction, construction, operations, maintenance, and decommissioning) that will address the following: a) types of construction activities that may affect the desert tortoise, b) the required desert tortoise protective measures, c) desert tortoise life history and threats, d) legal protections and penalties, and e) reporting requirements.
5. Both YPS and GLW will fence the boundaries of the project sites with desert tortoise fencing and clear these areas of all desert tortoises prior to construction. Pre-construction activities such as geotechnical work or meteorological tower installation may occur before fence construction. Fence installation and pre-construction activities will follow USFWS guidance (fencing, clearance, and translocation) and will be monitored by an ADTB. For construction activities that occur outside the fence, work areas will be cleared for desert tortoise and any tortoises located will be moved a short distance away into adjacent suitable habitat, but these tortoises will not be considered translocated.
6. Both YPS and GLW will inspect all tortoise exclusion fencing for their respective project monthly during construction, quarterly for the life of the Project, and immediately following all major rainfall events. Any damage to the fence will be repaired within 2 days of observing the damage and be reported to the Service to determine whether additional measures are necessary. During all fence monitoring, shade structures will be inspected for their effectiveness and adjusted as needed to increase their effectiveness.
7. Noise reduction devices (e.g., mufflers) will be employed by YPS and GLW to minimize the impacts on listed species. Explosives will be used only within specified times and at specified distances from sensitive wildlife or surface waters as established by the BLM or other federal and state agencies. Operators will ensure that all equipment is adequately muffled and maintained in order to minimize disturbance to wildlife.
8. Both YPS and GLW will develop and implement a Weed Management Plan consistent with applicable regulations and agency policies for the control of noxious weeds and invasive plant species. The plan will address monitoring; ROW vegetation management; use of certified weed-free seed and mulching; cleaning of vehicles to avoid introducing invasive weeds; and education of personnel on weed identification, the manner in which weeds spread, and methods for treating infestations. Principles of integrated pest management, including biological controls, will be used to prevent the spread of invasive species in accordance with the *Final Programmatic Environmental Impact Statement,*

*Vegetation Treatments Using Herbicides on BLM Lands in 17 Western States* (BLM 2007), and the *National Invasive Species Management Plan: 2016–2018* (National Invasive Species Council 2016). The plan will cover periodic monitoring, reporting, and immediate eradication of noxious weed or invasive species occurring within all managed areas. A controlled inspection and cleaning area will be established to visually inspect construction equipment arriving at the project area and to remove and collect seeds that may be adhering to tires and other equipment surfaces. To prevent the spread of invasive species, project developers will work with the local BLM field office to determine whether a pre-activity survey is warranted and, if so, to conduct the survey. If invasive plant species are present, project developers will work with the local BLM field office to develop a control strategy. The plan will include a post-construction monitoring element that incorporates adaptive management protocols.

9. Both YPS and GLW will use only herbicides approved for use in desert tortoise habitat by the BLM and the Service, as outlined in the BLM Southern Nevada District Office's current Programmatic Biological Opinion (File No. 08ENVS00-2019-F-0153). They include aminopyralid, clopyralid, imazapyr, imazapic, glyphosate, metasulfuron methyl, and rimsulfuron.
10. As required by law, a Spill Prevention, Control, and Countermeasures Plan will be developed by YPS and GLW that considers sensitive ecological resources. Spills of any toxic substances will be promptly addressed and cleaned up before they can enter aquatic or other sensitive habitats as a result of runoff or leaching.
11. A Fire Management Plan will be developed by YPS and GLW to implement measures that minimize the potential for a human-caused fire to affect ecological resources and that respond to natural fire situations.
12. Water needed for construction will be stored in tanks.
13. A Decommissioning, Abandonment, and Site Reclamation Plan specific to each project will be developed in coordination with appropriate federal and state agencies, approved by the BLM, and implemented by the respective applicant. The plan will include, as applicable the reasonable and prudent measures stipulated in the project specific BO.
14. Both YPS and GLW will implement post-translocation tortoise monitoring in accordance with the translocation plan (SWCA 2020b) and long-term monitoring plan (to be determined).
15. Both YPS and GLW will implement the *Common Raven Management Plan for Energy Development Within the BLM Southern Nevada District* (BLM 2018) to minimize effects of ravens on the desert tortoise. To reduce the attractiveness of the area to predators such as coyotes, foxes, and ravens all trash and food items will be disposed of properly in predator proof containers with resealing lids. Trash will be emptied and removed from the project site on a periodic basis as they become full. Long-term ponding of water will not be permitted, and structures would be designed to discourage potential nest sites.
16. Reports are required quarterly during the duration of construction and annually during operations and maintenance for the life of the facilities. The BLM may delegate this responsibility to YPS and GLW. In addition, each Applicant will submit a final

construction report to the Service within 60 days of completion of construction of the project. All quarterly reports are due by the 10th of each of the following months (January, April, July, October), and annual reports are due February 1 of each year. Annual status updates shall be provided to the Service during operations and maintenance activities for the life of the facility. Specifically, all reports must include information in the form below on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar incidents from reoccurring. Additionally, the reports should provide detailed information regarding each desert tortoise handled or observed and the names of all monitors involved in the project and the ADTBs who supervised their actions. Information will include the following: location (GPS), date and time of observation, whether the desert tortoise was handled, general health, and whether it voided its bladder, location from which desert tortoise was moved and location to which it was moved, unique physical characteristics of each tortoise, and effectiveness and compliance with the desert tortoise protection measures. Any incident occurring during project activities that was considered by the Field Contact Representative, ADTB, or monitor to be in non-compliance with the BO issued for the project will be documented immediately by the ADTB. Figure 3 shows an incidental take form.

**Figure 3. Example desert tortoise incidental take form.**

Desert tortoise actual incidental take reporting for project

| Activity | Actual No. Mortality and Injury | | Actual No. Captured | | Actual Habitat Loss (ac) |
|---|---|---|---|---|---|
| | Adult[1] | Juvenile[1] | Adult[1] | Juvenile[1] | Non-critical |
| Pre-construction | | | | | |
| Construction | | | | | |
| Operation and Maintenance | | | | | |
| Predation | | | | | |
| **Minimization Measure Implemented** | **Effectiveness and Recommendations** | | | | |
| | | | | | |

[1]adults are 180 millimeters in length and larger; juveniles are less than 180 millimeters

17. All tortoises within the Tortoise Clearance Area will be translocated prior to the start of construction by the applicable company. In the event that unforeseen circumstances prevent translocation from occurring immediately following the issuance of the BO for each project, each Applicant will be responsible for monitoring all tortoises with transmitters on their project site until the time of translocation. This effort will include monitoring tortoises once a week during the active season and once every other week

during the less active season, as defined in the translocation plan (SWCA 2020d). Transmitters will be repaired and replaced as needed. This monitoring will continue until all tortoises for the project are translocated or, in the event that translocation is delayed, until their transmitters are removed. Quarterly reporting (email) of the pre-translocation monitoring shall be provided to the BLM. All other protocols and guidance during this monitoring will adhere to the translocation plan.

**Conservation Measures**

Coordination between YPS, GLW, their environmental services teams, and the BLM and Service to address the outstanding data needs for translocation of desert tortoises is ongoing and outlined in the *Draft Mojave Desert Tortoise Translocation Plan for the Yellow Pine Solar Project* (SWCA 2020d). The BLM and Service have identified the Stump Springs Translocation Area as the recipient area where tortoises from the YPSP and TCS will be translocated (Figure 2). The Stump Springs Translocation Area has been designated as a Regional Population Augmentation Site by the BLM and USFWS. Translocation of tortoises from the Tortoise Clearance Area (Full Build or Phase I) will reduce the adverse impacts of the Proposed Action by minimizing the direct loss of individual tortoises during construction. In addition to project surveys, YPS and GLW will also be required to survey a release site within the Stump Springs Translocation Area to determine resident tortoise density, disease prevalence, and attach transmitters to adult tortoises (n = 20) to monitor impacts of translocation to resident tortoises.

The Service and BLM have indicated that the Trout Canyon Translocation Area will serve as the control site for monitoring the success of the YPSP translocation. Because the YPSP is the first project to utilize the Stump Springs Translocation Area, YPS will complete initial surveys of the control site (not to exceed $1,000,000) for the BLM and Service. The BLM and Service have determined that project applicants that use the Stump Springs Translocation Area, which has been designated as a Regional Population Augmentation Site, will be required to pay a Stump Springs translocation fee of $450 per acre cleared[1] (i.e. $1,423,845 for the 3,164.1-acre Phase I Tortoise Clearance Area of YPSP) to help cover the costs of a 30 year long-term monitoring study on the effects of tortoise translocation. The fee of $450 per acre will be in addition to remuneration fees calculated to offset loss of desert tortoise habitat. Fees will be assessed separately for each applicant, and fee totals for Phase I and the Full Buildout are included in Table 11 and Table 12, respectively. Because the initial control site surveys will be used to support all future projects using the translocation site, YPSP will be reimbursed through an equal reduction in long-term monitoring fee costs. For example, if initial control site surveys cost YPS $1,000,000, YPS would pay the long-term monitoring fee minus $1,000,000 (for example $1,423,845 fee - $1,000,000 survey cost = $423,845 final fee amount). For the TCS and 230-kV transmission line, GLW will be responsible for payment of $31,230 ($450 x 69.4 acres). Project applicants that use the Stump Springs Regional Population Augmentation Site will also be required to pay a flat fee of $3,000 to the University of California, Los Angeles to cover archival fees associated with samples expected to be collected during the pre-translocation and post-translocation monitoring periods.

[1] The Stump Springs translocation fee will be indexed to the Consumer Price Index annually in future years.

**Table 11. Applicable fees, per proponent, for Phase I scenario.**

| | **YPS Phase 1** | **GLW*** | **Total** |
|---|---|---|---|
| Acres fenced (cleared) | 3,164.1 | 69.4 | 3,233.5 |
| *LTMP Fee ($450.00 per acre)* | *$1,423,845* | *$31,230* | *$1,455,075* |
| Acres Disturbed | 2,203.4 | 69.4 | 2,272.8 |
| *Remuneration Fees ($902.00 per acre)* | *$1,987,466* | *$62,598* | *$2,050,064* |

**Table 12. Applicable fees, per proponent, for Full Build scenario.**

| | **YPS Full Buildout** | **GLW** | **Total** |
|---|---|---|---|
| Acres Fenced (cleared) | 4,215.1 | 69.4 | 4,284.5 |
| *LTMP Fee ($450.00 per acre)* | *1,896,795* | *$31,230* | *$1,928,025* |
| Acres Disturbed | 2,937.3 | 69.4 | 3,006.7 |
| *Remuneration Fees ($902.00 per acre)* | *$2,649,444* | *$62,598* | *$2,712,042* |

In addition to desert tortoise translocation activities and fees listed above, YPS and GLW will pay a remuneration fee in the amount of $902 per acre permitted for each project. At full buildout, it is estimated YPS would provide remuneration fees in the amount of $902.00 per acre permitted for use (e.g. YPS would pay $902.00 × 2,937.3 acres = $2,649,444.6 under full buildout; GLW would pay $902.00 × 69.4 acres = $62,598.8). If Phase I is the only development to occur and no future phases are developed, remuneration fees for YPS would be $1,987,466.8 ($902.00 x 2,203.4 acres). Fees collected will be used to reduce the adverse impacts to the threatened desert tortoise from construction of the YPSP and TCS, which 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 (Bayer CropScience), 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 to 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 and 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).

Both YPS and GLW are not responsible for contributing any further funding or support for these or other measures beyond the remuneration and Stump Springs translocation fees described above.

## ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Section 7(a)(2) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.) requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed Federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the Status of the Species, which describes the rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the Effects of the Action, which determines all

consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities that are reasonably certain to occur in the action area on the species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the species, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the species in the wild by reducing the reproduction, numbers, and distribution of that species.

## STATUS OF THE SPECIES

### Listing History

The Service listed the Mojave population of desert tortoise (all tortoises north and west of the Colorado River in Arizona, Utah, Nevada, and California) as threatened on April 2, 1990 [55 Federal Register (FR) 12178]. The Service issued an initial recovery plan (Service 1994) and a revised recovery plan (Service 2011a) for the desert tortoise. A five-year review was completed in 2010 (Service 2010a).

### Species Biology and Life History (reproduced from Service 2010a, see Service 2010a for references)

"The desert tortoise is a large, herbivorous reptile that reaches 20 to 38 centimeters (8 to 15 inches) in carapace (upper shell) length and 10 to 15 centimeters (4 to 6 inches) in shell height. Hatchlings emerge from eggs at about 5 centimeters (2 inches) in length. Adults have a domed carapace and relatively flat, unhinged plastrons (lower shell). Their shells are greenish-tan to dark brown in color with tan scute (horny plate on the shell) centers. Adult desert tortoises weigh 3.6 to 6.8 kilograms (8 to 15 pounds). The forelimbs have heavy, claw-like scales and are flattened for digging. Hind limbs are more elephantine (Ernst et al. 1994).

Desert tortoises are well adapted to living in a highly variable and often harsh desert environment. They spend much of their lives in burrows, even during their seasons of activity. In late winter or early spring, they emerge from overwintering burrows and typically remain active through fall. Activity does decrease in summer, but tortoises often emerge after summer rain storms to drink (Henen et al. 1998). Mating occurs both during spring and fall (Black 1976; Rostal et al. 1994). During activity periods, desert tortoises eat a wide variety of herbaceous vegetation, particularly grasses and the flowers of annual plants (Berry 1974; Luckenbach 1982; Esque 1994). During periods of inactivity, they reduce their metabolism and water loss and consume very little food. Adult desert tortoises lose water at such a slow rate that they can survive for more than a year without access to free water of any kind and can apparently tolerate large imbalances in their water and energy budgets (Nagy and Medica 1986; Peterson 1996a,b; Henen et al. 1998).

In drought years, the availability of surface water following rains may be crucial for desert tortoise survival (Nagy and Medica 1986). During these unfavorable periods, desert tortoises decrease surface activity and remain mostly inactive or dormant underground (Duda et al. 1999), which reduces water loss and minimizes energy expenditures (Nagy and Medica 1986). Duda et al. (1999) showed that home range size, number of different burrows used, average distances traveled per day, and levels of surface activity were significantly reduced during drought years.

The size of desert tortoise home ranges varies with respect to location and year (Berry 1986a) and also serves as an indicator of resource availability and opportunity for reproduction and social interactions (O'Connor et al. 1994). Females have long-term home ranges that may be as little or less than half that of the average male, which can range to 200 or more acres (Burge 1977; Berry 1986a; Duda et al. 1999; Harless et al. 2009). Core areas used within tortoises' larger home ranges depend on the number of burrows used within those areas (Harless et al. 2009). Over its lifetime, each desert tortoise may use more than 3.9 square kilometers (1.5 square miles) of habitat and may make periodic forays of more than 11 kilometers (7 miles) at a time (Berry 1986a).

Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential (Turner et al. 1984; Bury 1987; Germano 1994). Growth rates are greater in wet years with higher annual plant production (e.g., desert tortoises grew an average of 12.3 millimeters [0.5 inch] in an El Niño year compared to 1.8 millimeters [0.07 inches] in a drought year in Rock Valley, Nevada; Medica et al. 1975). The number of eggs as well as the number of clutches that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition (Turner et al. 1986, 1987; Henen 1997; McLuckie and Fridell 2002). The success rate of clutches has proven difficult to measure, but predation, while highly variable (Bjurlin and Bissonette 2004), appears to play an important role in clutch failure (Germano 1994)."

**Recovery Plan**

The Service issued an initial recovery plan (Service 1994) and a revised recovery plan (Service 2011a) for the desert tortoise. The 1994 recovery plan recommended that a scientifically credible monitoring plan be developed to determine that the population exhibit a statistically significant upward trend or remain stationary for at least 25 years and that enough habitat would be protected within a recovery unit or the habitat and populations be managed intensively enough to ensure long-term viability. Because both minimum population densities and minimum population numbers need to be considered to ensure recovery, the Service further recommended that reserves be at least 1,000 square miles. Smaller reserves that provide high-quality, secure habitat for 10,000 to 20,000 adult desert tortoises should provide comfortable persistence probabilities for the species well into the future when populations are well above minimum viable density (e.g., 30 or more adults per square mile) and population growth rates (lambda, $\lambda$) can be maintained (see page C54 of Service 1994). Conversely, populations with densities below approximately 10 adults per square mile (3.9 per square kilometer) are in danger of extinction (see page 32 of Service 1994).

"Adult" desert tortoise connotes reproductive maturity. Desert tortoises may become reproductive at various sizes. The Service based its 2010 survey protocol on the methodology used in range-wide sampling but erred in citing 160 millimeters as the size below which surveyors' ability to detect desert tortoises decreases. In range-wide sampling, the Service uses 180 millimeters as its cut-off length for counting desert tortoises, at least in part because the Styrofoam models used for training are 180 millimeters in length. The Service changed the survey protocol to use 180 millimeters in the revised version. We have used the term "adult" to indicate reproductive status and those animals larger than 180 millimeters to conform to the Service's protocols for range-wide sampling and pre-project surveys.

The revised recovery plan for the desert tortoise (Service 2011a) lists three objectives and associated criteria to achieve delisting. The first objective is to maintain self-sustaining populations of desert tortoises within each recovery unit into the future; the criterion is that the rates of population change for desert tortoises are increasing (i.e., $\lambda > 1$) over at least 25 years (i.e., a single generation), as measured by extensive, range-wide monitoring across conservation areas within each recovery unit and by direct monitoring and estimation of vital rates (recruitment, survival) from demographic study areas within each recovery unit.

The second objective addresses the distribution of desert tortoises. The goal is to maintain well-distributed populations of desert tortoises throughout each recovery unit; the criterion is that the distribution of desert tortoises throughout each conservation area increase over at least 25 years.

The final objective is to ensure that habitat within each recovery unit is protected and managed to support long-term viability of desert tortoise populations. The criterion is that the quantity of desert tortoise habitat within each conservation area be maintained with no net loss until population viability is ensured.

The revised recovery plan (Service 2011a) also recommends connecting blocks of desert tortoise habitat, such as critical habitat units and other important areas to maintain gene flow between populations. Linkages defined using least-cost path analysis (Averill-Murray et al. 2013a) illustrate a minimum connection of habitat for desert tortoises between blocks of habitat and represent priority areas for conservation of population connectivity. Figure 4 illustrates that, across the range, desert tortoises in areas under the highest level of conservation and management remain subject to numerous threats, stresses, and mortality sources.

## Threats

The threats described in the listing rule and both recovery plans (Service 1994, 2011a) continue to affect the species. The most apparent threats to the desert tortoise are those that result in mortality and permanent habitat loss across large areas, such as urbanization and large-scale renewable energy projects and those that fragment and degrade habitats, such as proliferation of roads and highways, off-highway vehicle (OHV) activity, wildfire, and habitat invasion by non-native invasive plant species.

We remain unable to quantify how threats affect desert tortoise populations. The assessment of the original recovery plan emphasized the need for a better understanding of the implications of multiple, simultaneous threats facing desert tortoise populations and of the relative contribution of multiple threats on demographic factors (i.e., birth rate, survivorship, fecundity, and death rate; Tracy et al. 2004).

To better understand the relationship of threats to populations of desert tortoises and the most effective manner to implement recovery actions, the Desert Tortoise Recovery Office developed a spatial decision support system that models the interrelationships of threats to desert tortoises and how those threats affect population change. The spatial decision support system describes the numerous threats that desert tortoises face, explains how these threats interact to affect individual animals and habitat, and how these effects in turn bring about changes in populations. For example, we have long known that the construction of a transmission line can result in the death of desert tortoises and loss of habitat. We have also known that common ravens, known predators of desert tortoises, use transmission line pylons for nesting, roosting, and perching and that the access routes associated with transmission lines provide a vector for the introduction and spread of invasive weeds and facilitate increased human access into an area. Increased human access can accelerate illegal collection and release of desert tortoises and their deliberate maiming and killing, as well as facilitate the spread of other threats associated with human presence, such as vehicle use, garbage and dumping, and invasive plants (Service 2011a). Changes in the abundance of native plants, because of invasive weeds, can compromise the physiological health of desert tortoises, making them more vulnerable to drought, disease, and predation. The spatial decision support system allows us to map threats across the range of the desert tortoise and model the intensity of stresses that these multiple and combined threats place on desert tortoise populations.

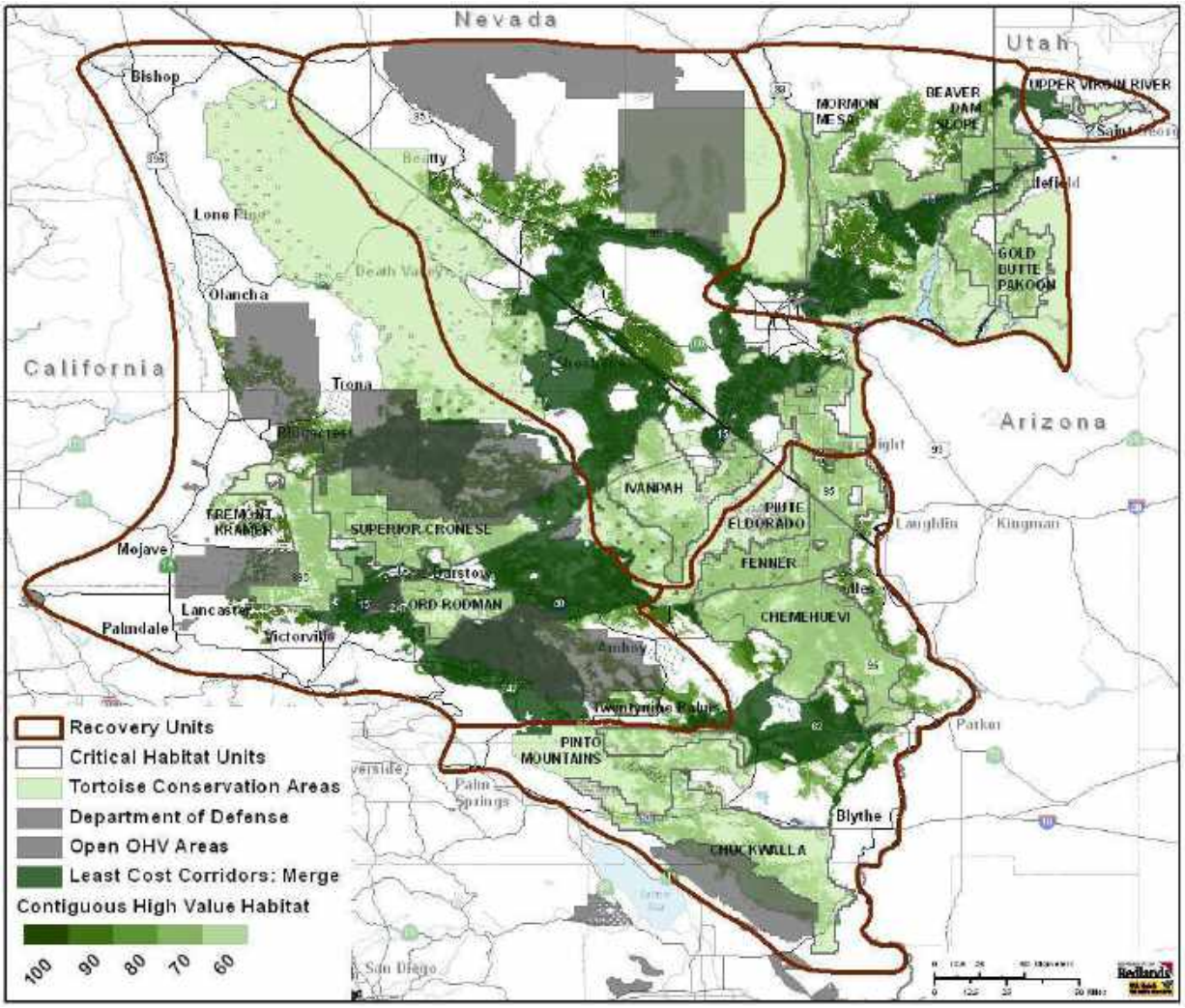


**Figure 4. Recovery units, critical habitat units, conservation areas, and contiguous high value habitat.**

The following map (Figure 5) depicts the 12 critical habitat units of the desert tortoise, linkages between conservation areas for the desert tortoise and the aggregate stress that multiple, synergistic threats place on desert tortoise populations, as modeled by the spatial decision support system. Conservation areas include designated critical habitat and other lands managed for the long-term conservation of the desert tortoise (e.g., the Desert Tortoise Natural Area, Joshua Tree National Park, and the Desert National Wildlife Refuge).

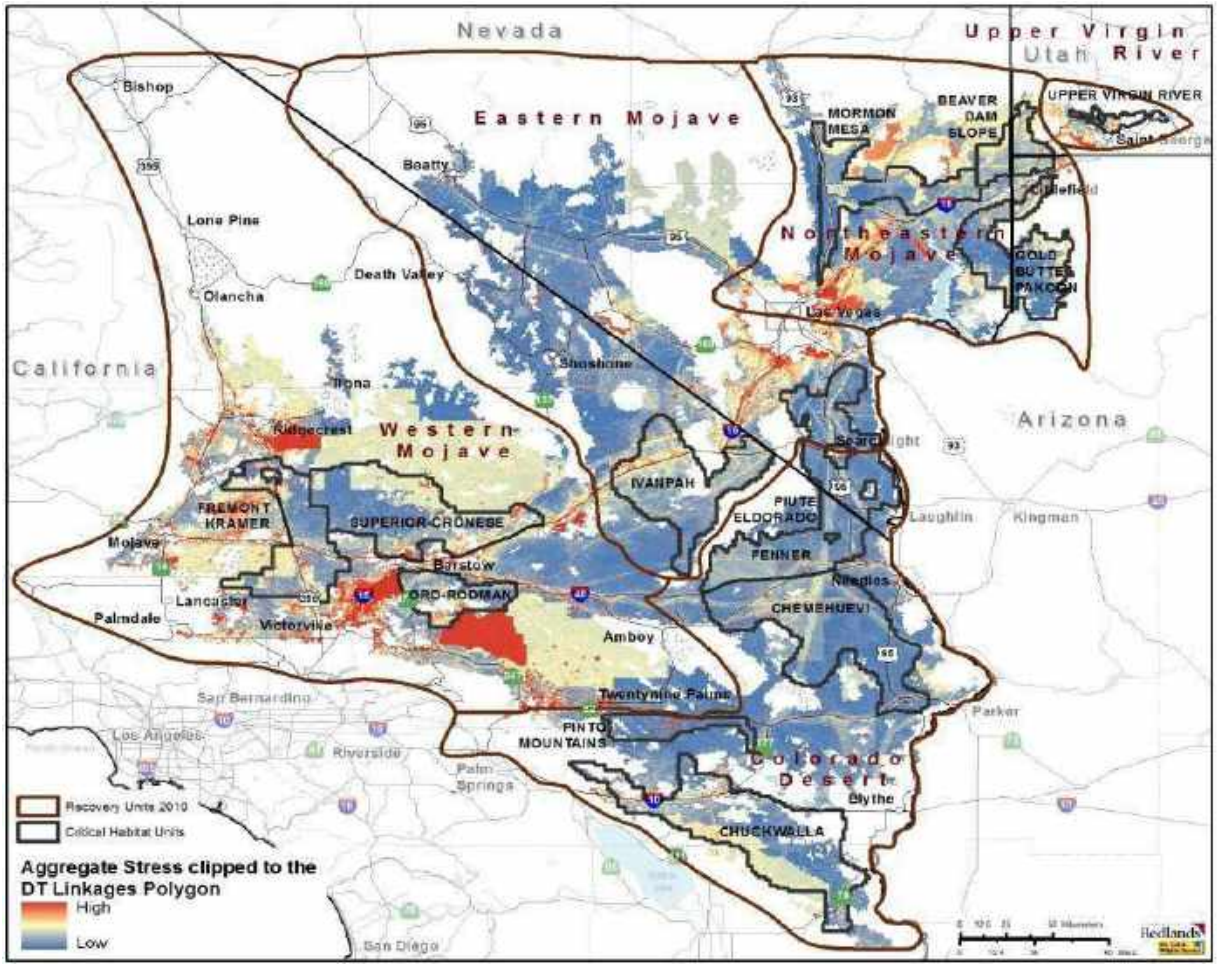


**Figure 5. Critical habitat units, recovery units, and linkages.**

## Five-Year Review

Section 4(c)(2) of the Endangered Species Act requires the Service to conduct a status review of each listed species once every 5 years. The purpose of a 5-year review is to evaluate whether the species' status has changed since it was listed (or since the most recent 5-year review); these reviews, at the time of their completion, provide the most up-to-date information on the rangewide status of the species. For this reason, we are appending the 5-year review of the status of the desert tortoise (Service 2010a) to this biological opinion and are incorporating it by reference to provide most of the information needed for this section of the biological opinion. The following paragraphs provide a summary of the relevant information in the 5-year review.

In the 5-year review, the Service discusses the status of the desert tortoise as a single distinct population segment and provides information on the Federal Register notices that resulted in its listing and the designation of critical habitat. The Service also describes the desert tortoise's ecology, life history, spatial distribution, abundance, habitats, and the threats that led to its listing (i.e., the five-factor analysis required by section 4(a)(1) of the Endangered Species Act). In the 5-year review, the Service concluded by recommending that the status of the desert tortoise as a

threatened species be maintained.

With regard to the status of the desert tortoise as a distinct population segment, the Service concluded in the 5-year review that the recovery units recognized in the original and revised recovery plans (Service 1994 and 2011a, respectively) do not qualify as distinct population segments under the Service's distinct population segment policy (61 FR 4722; February 7, 1996). We reached this conclusion because individuals of the listed taxon occupy habitat that is relatively continuously distributed, exhibit genetic differentiation that is consistent with isolation-by-distance in a continuous-distribution model of gene flow, and likely vary in behavioral and physiological characteristics across the area they occupy as a result of the transitional nature of, or environmental gradations between, the described subdivisions of the Mojave and Colorado deserts.

The Service summarizes information in the 5-year review with regard to the desert tortoise's ecology and life history. Of key importance to assessing threats to the species and to developing and implementing a strategy for recovery is that desert tortoises are long lived, require up to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential. The number of eggs that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition. Predation seems to play an important role in clutch failure. Predation and environmental factors also affect the survival of hatchlings. The Service notes in the 5-year review that the combination of the desert tortoise's late breeding age and a low reproductive rate challenges our ability to recover the species.

The 5-year review also notes that desert tortoises increase their reproduction in high rainfall years; more rain provides desert tortoises with more high quality food (i.e., plants that are higher in water and protein), which, in turn, allows them to lay more eggs. Conversely, the physiological stress associated with foraging on food plants with insufficient water and nitrogen may leave desert tortoises vulnerable to disease, and the reproductive rate of diseased desert tortoises is likely lower than that of healthy animals. Young desert tortoises also rely upon high-quality, low-fiber plants (e.g., native annual plants) with nutrient levels not found in the invasive weeds that have increased in abundance across its range (Oftedal et al. 2002; Tracy et al. 2004). Compromised nutrition of young desert tortoises likely represents an effective reduction in reproduction by reducing the number of animals that reaches adulthood. Consequently, although we do not have quantitative data that show a direct relationship, the abundance of weedy species within the range of the desert tortoise has the potential to affect the reproduction of desert tortoises and recruitment into the adult population in a negative manner.

The vast majority of threats to the desert tortoise or its habitat are associated with human land uses. Using captive neonate and yearling desert tortoises, Drake et al. (2015) found that individuals "eating native forbs had better body condition and immune functions, grew more, and had higher survival rates (>95%) than (desert) tortoises consuming any other diet"; health and body condition declined in individuals fed only grasses (native or non-native). Current information indicates that invasive species likely affect a large portion of the desert tortoise's

range. Furthermore, high densities of weedy species increase the likelihood of wildfires; wildfires, in turn, destroy native species and further the spread of invasive weeds.

Drake et al. (2015) "compared movement patterns, home-range size, behavior, microhabitat use, reproduction, and survival for adult desert tortoises located in, and adjacent to, burned habitat" in Nevada. They noted that the fires killed many desert tortoises but found that, in the first five years post-fire, individuals moved deeper into burned habitat on a seasonal basis and foraged more frequently in burned areas (corresponding with greater production of annual plants and herbaceous perennials in these areas). Production of annual plants upon which desert tortoises feed was 10 times greater in burned versus unburned areas but was dominated by non-native species (e.g., red brome [*Bromus rubens*]) that frequently have lower digestibility than native vegetation. During years six and seven, the movements of desert tortoises into burned areas contracted with a decline in the live cover of a perennial forage plant that rapidly colonizes burned areas. Drake et al. (2015) did not find any differences in health or survivorship for desert tortoises occupying either habitat (burned or unburned) during this study or in reproduction during the seventh year after the fire.

Various human activities have introduced numerous species of non-native invasive plants into the California desert. Routes that humans use to travel through the desert (paved and unpaved roads, railroads, motorcycle trails, etc.) serve as pathways for new species to enter habitat of the desert tortoise and for species that currently occur there to spread. Other disturbances of the desert substrate also provide invasive species with entry points into the desert. Figure 6 depicts the potential for these species to invade habitat of the desert tortoise. The reproductive capacity of the desert tortoise may be compromised to some degree by the abundance and distribution of invasive weeds across its range; the continued increase in human access across the desert likely continues to facilitate the spread of weeds and further affect the reproductive capacity of the species.

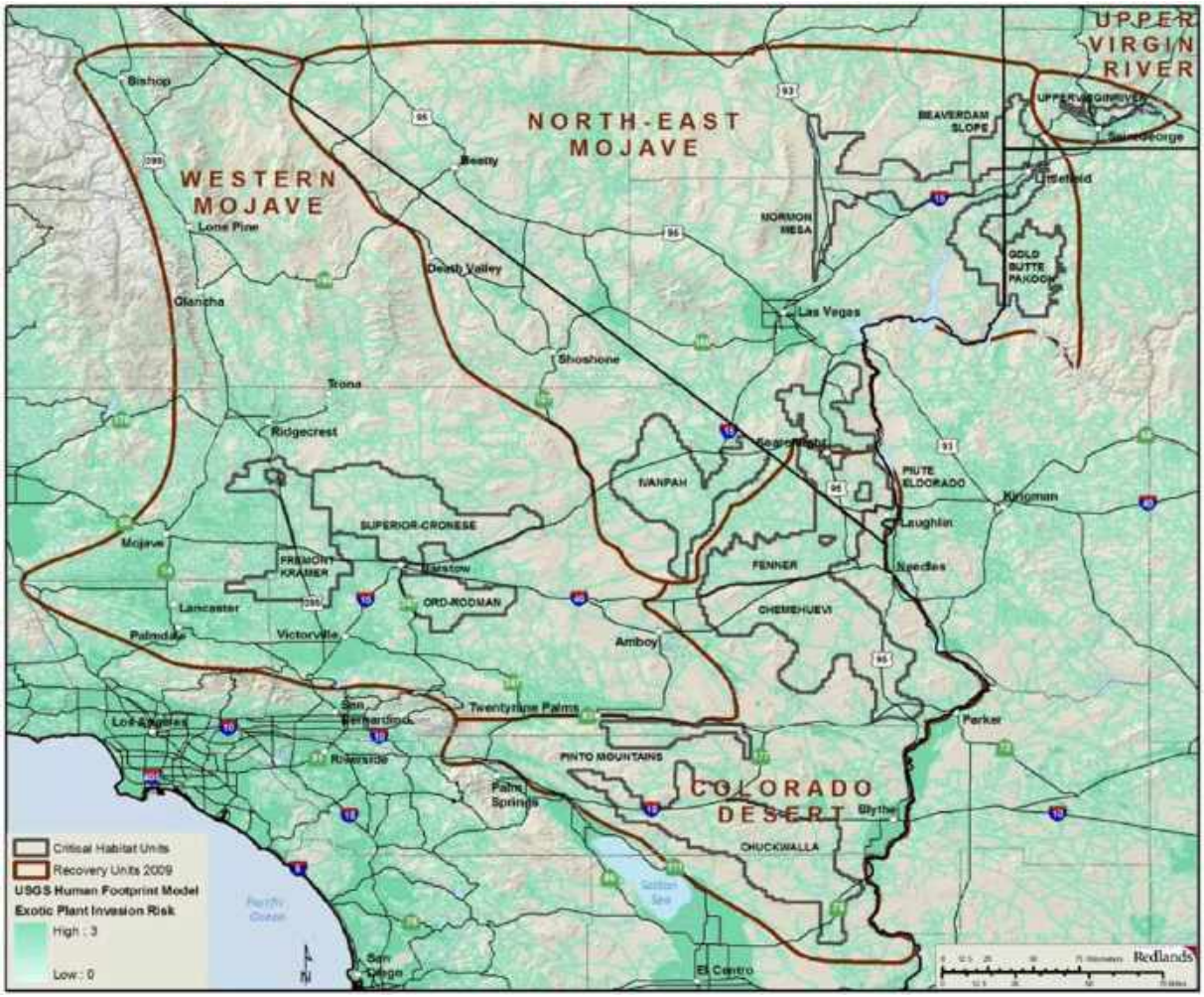


**Figure 6. Potential for exotic plant invasion in desert tortoise habitat.**

Since the completion of the 5-year review, the Service has issued several biological opinions that affect large areas of desert tortoise habitat because of numerous proposals to develop renewable energy within its range. These biological opinions concluded that proposed solar plants were not likely to jeopardize the continued existence of the desert tortoise primarily because they were located outside of critical habitat and desert wildlife management areas that contain most of the land base required for the recovery of the species. The proposed actions also included numerous measures intended to protect desert tortoise during the construction of the projects, such as translocation of affected individuals. In aggregate, these projects would result in an overall loss of approximately 48,041 acres of habitat of the desert tortoise. We also predicted that the project areas supported up to 4,363 desert tortoises; we concluded that most of these individuals were small desert tortoises, that most adults would likely be translocated from project sites, and that most mortalities would be small desert tortoises (< 180 mm) that were not detected during clearance surveys. To date, 660 desert tortoises have been observed during construction of solar projects (Table 6); most of these individuals were translocated from work areas, although some desert tortoises have been killed. The mitigation required by the BLM and California Energy Commission (the agencies permitting some of these facilities) resulted in the acquisition of

private land and funding for the implementation of various actions that are intended to promote the recovery of the desert tortoise. These mitigation measures are consistent with recommendations in the recovery plans for the desert tortoise; many of the measures have been derived directly from the recovery plans and the Service supports their implementation. We expect that, based on the best available scientific information, they will result in conservation benefits to the desert tortoise; however, it is difficult to assess how desert tortoise populations will respond because of the long generation time of the species. Table 13 summarizes information regarding the solar projects that have undergone formal consultation with regard to the desert tortoise.

**Table 13. Solar projects for which the Service has issued biological opinions or incidental take permits. References are in Literature Cited.**

| Project and Recovery Unit | Acres of Desert Tortoise Habitat | Desert Tortoises Estimated[1] | Desert Tortoises Observed[2] | Citations[3] |
|---|---|---|---|---|
| **Eastern Mojave** | | | | |
| Ivanpah Solar Electric Generating System | 3,582 | 1,136 | 175[7] | Service 2011b, Davis 2014 |
| Stateline | 1,685 | 947 | 55 | Service 2013a, Ironwood 2014 |
| Silver State North – NV | 685 | 14[6] | 7 | Service 2010b, NewFields 2011 |
| Silver State South – NV | 2,427[4] | 1,020[4] | 152 | Service 2013a, Cota 2014 |
| Amargosa Farm Road – NV | 4,350 | 4[6] | - | Service 2010f |
| Nevada Solar One - NV | 400 | [5] | [5] | Burroughs 2012, 2014 |
| Copper Mountain North - NV | 1,504 | 10[5] | 3[5] | Service 2011c, 2013b; NewFields 2014 |
| Copper Mountain - NV | 380 | [5] | [5] | Burroughs 2012, 2014 |
| Townsite - NV | 905 | 4[8] | -[5] | Service 2014a |
| Techren Boulder City - NV | 2,291 | 15[9] | -[5] | Service 2012a |
| Valley Electric Association - NV | 80 | 4 | 4[10] | Service 2015a |
| Canyon Mesa - NV | 123 | 2 | - | Service 2019a |
| **Western Mojave** | | | | |
| Mojave Solar, Abengoa Harper Lake | Primarily in abandoned agricultural fields | 4[6] | - | Service 2011d |
| Chevron Lucerne Valley | 516 | 10 | - | Service 2010c |
| Cinco | 500 | 53 | 2 | Service 2015b, Daitch 2015 |

| Project and Recovery Unit | Acres of Desert Tortoise Habitat | Desert Tortoises Estimated[1] | Desert Tortoises Observed[2] | Citations[3] |
|---|---|---|---|---|
| Soda Mountain | 1,726 | 78 | - | Service 2015c |
| **Northeastern Mojave** | | | | |
| Res Americas Moapa Solar Energy Center - NV | 951 | 95 | - | Service 2014b |
| Moapa K Road Solar | 2,141 | 186 | 177 | Service 2012b, Cardno, Inc 2018 |
| Playa Solar | 1,538 | 258 | 77 | Service 2015d, Ironwood Consulting 2016 |
| Invenergy Harry Allen Solar | 594 | 242 | - | Service 2015d |
| NV Energy Dry Lake Solar Energy Center | 751 | 45 | - | Service 2015d |
| NV Energy Dry Lake Solar Energy Center at Harry Allen | 55 | 15 | - | Service 2015d |
| Aiya Solar | 672 | 91 | - | Service 2015e |
| Mountainview | 146 | [5] | [5] | Wise 2018 |
| Gemini Solar | 7,113 | 2,076 | - | Service 2019b |
| Eagle Shadow Mountain Solar | 2,285 | 795 | - | Service 2019c |
| **Colorado** | | | | |
| Genesis | 1,774 | 8 | 0 | Service 2010d, Fraser 2014a |
| Blythe | 6,958 | 30 | 0 | Service 2010e, Fraser 2014b |
| Desert Sunlight | 4,004 | 56 | 7 | Service 2011e, Fraser 2014a |
| McCoy | 4,533 | 15 | 0 | Service 2013c, Fraser 2014b |
| Desert Harvest | 1,300 | 5 | - | Service 2013d |
| Rice | 1,368 | 18 | 1 | Service 2011f, Fraser 2014a |
| **Total** | 57,337 | 7,236 | 660 | |

[1]The numbers in this column are not necessarily comparable because the methodologies for estimating the numbers of desert tortoises occasionally vary between projects. When available, we included an estimate of the numbers of small desert tortoises.
[2]This column reflects the numbers of desert tortoises observed within project areas. It includes translocated animals and those that were killed by project activities. Project activities may result in the deaths of more desert tortoises than are found. Dashes represent projects for which we have no information at this point; some projects have not broken ground at the time of this biological opinion.
[3]The first citation in this column is for both the acreage and the estimate of the number of desert tortoises. The second is for the number of desert tortoises observed during construction of the project; where only one citation is

present, construction has not begun or data are unavailable at this time.
[4]These numbers include Southern California Edison's Primm Substation and its ancillary facilities.
[5]These projects occurred under the Clark County Multi-species Habitat Conservation Plan; the provisions of the habitat conservation plan do not require the removal of desert tortoises. We estimate that all six projects combined will affect fewer than 50 desert tortoises.
[6]These estimates do not include smaller desert tortoises.
[7]In the table attached to the electronic mail, the number of desert tortoises translocated from the project site is represented by the total number of translocated animals minus the number of animals born in the holding pens.
[8]The estimate of the number of desert tortoises is from the portion of the project on BLM land (20.39 acres). The remaining lands are covered by the Clark County Multi-species Habitat Conservation Plan; see footnote 5.
[9]The estimate of the number of desert tortoises is from both BLM (104 acres) and private (2,200 acres) land. The remaining lands are covered by the Clark County Multi-species Habitat Conservation Plan; see footnote 5.
[10]Of the 80-acre project site, 76.4 acres were left intact (there was crushing and mowing of vegetation but no blading) with openings along the bottom of the fence for tortoise. After project completion, four tortoises were released back into the solar facility on September 25, 2017. Two adults have remained in the area and continued to enter the facility since it was completed.

In August 2016, the Service (2016a) issued a biological opinion to the BLM for a land use plan amendment under the Desert Renewable Energy Conservation Plan. The land use plan amendment addressed all aspects of the BLM's management of the California Desert Conservation Area; however, the Service and BLM agreed that only those aspects related to the construction, operation, maintenance, and decommissioning of renewable energy facilities were likely to adversely affect the desert tortoise. The land use plan amendment resulted in the designation of approximately 388,000 acres of development focus areas where the BLM would apply a streamlined review process to applications for projects that generate renewable energy; the BLM estimated that approximately 11,290 acres of modeled desert tortoise habitat within the development focus areas would eventually be developed for renewable energy. The BLM also adopted numerous conservation and management actions as part of the land use plan amendment to further reduce the adverse effects of renewable energy development on the desert tortoise.

The land use plan amendment also increased the amount of land that the BLM manages for conservation in California (e.g., areas of critical environmental concern, National Conservation Lands, etc.) from 6,118,135 to 8,689,669 acres (BLM 2015); not all of the areas subject to increased protection are within desert tortoise habitat. The BLM will also manage lands outside of development focus areas according to numerous conservation and management actions; these conservation and management actions are more protective of desert tortoises than direction contained in the previous land use plan. The Service (2016) concluded that the land use plan amendment was not likely to jeopardize the continued existence of the desert tortoise and would benefit its recovery.

In addition to the biological opinions issued for solar development within the range of the desert tortoise, the Service (2012c) also issued a biological opinion to the Department of the Army (Army) for the use of additional training lands at Fort Irwin. As part of this proposed action, the Army translocated approximately 650 adult desert tortoises from 18,197 acres of the southern area of Fort Irwin, which had been off-limits to training, to lands south of the base that are managed by the BLM and the Army. The Army would also use an additional 48,629 acres that lie east of the former boundaries of Fort Irwin; much of this parcel is either too mountainous or

too rocky and low in elevation to support numerous desert tortoises.

The Service also issued a biological opinion to the Department of the Navy (Navy) that considered the effects of the expansion of the Marine Corps Air Ground Combat Center at Twentynine Palms (Service 2017a). We concluded that the Navy's proposed action, the use of approximately 167,982 acres of public and private land for training, was not likely to jeopardize the continued existence of the desert tortoise. Most of the expansion area lies within the Johnson Valley Off-highway Vehicle Management Area. As part of this proposed action, the Navy translocated 997 adult desert tortoises from the expansion area to four recipient sites to the north and east of the expansion area (Henen 2019). The Lucerne-Ord and Siberia sites are entirely within BLM-managed lands, and the Rodman-Sunshine Peak North and Cleghorn sites overlap BLM-managed lands and lands managed by the Navy. The Lucerne-Ord site lies within the Ord-Rodman desert tortoise critical habitat unit. The tortoises that were translocated by the Navy from the Johnson Valley Off-highway Vehicle Management Area were moved into populations that were below the Service's established minimum viable density, to attempt to augment these populations and make them more viable in the long-term.

The incremental effect of the larger actions (i.e., solar development, the expansions of Fort Irwin and the Marine Corps Air Ground Combat Center) on the desert tortoise is unlikely to be positive, despite the numerous conservation measures that have been (or will be) implemented as part of the actions. The acquisition of private lands as mitigation for most of these actions increases the level of protection afforded these lands; however, these acquisitions do not create new habitat and Federal, State, and privately managed lands remain subject to most of the threats and stresses we discussed previously in this section. Although land managers have been implementing measures to manage these threats and we expect, based on the best available scientific information, that such measures provide conservation benefits to the desert tortoise, we have been unable, to date, to determine whether the expected benefits of the measures have yet been realized, at least in part because of the low reproductive capacity of the desert tortoise. Therefore, the conversion of habitat into areas that are unsuitable for this species continues the trend of constricting the desert tortoise into a smaller portion of its range.

As the Service notes in the 5-year review (Service 2010a), "(t)he threats identified in the original listing rule continue to affect the (desert tortoise) today, with invasive species, wildfire, and renewable energy development coming to the forefront as important factors in habitat loss and conversion. The vast majority of threats to the desert tortoise or its habitat are associated with human land uses."

Another factor affecting the existence of the desert tortoise is climate change, which is likely to affect the prospects for the long-term conservation of the desert tortoise. For example, predictions for climate change within the range of the desert tortoise suggest more frequent and/or prolonged droughts with an increase of the annual mean temperature by 3.5 to 4.0 degrees Celsius. The greatest increases will likely occur in summer (June-July-August mean increase of as much as 5 degrees Celsius [Christensen et al. 2007]). Precipitation will likely decrease by 5 to 15 percent annually in the region; with winter precipitation decreasing by up to 20 percent and summer precipitation increasing by up to 5 percent. Because germination of the desert tortoise's

food plants is highly dependent on cool-season rains, the forage base could be reduced due to increasing temperatures and decreasing precipitation in winter. Although drought occurs routinely in the Mojave Desert, extended periods of drought have the potential to affect desert tortoises and their habitats through physiological effects to individuals (i.e., stress) and limited forage availability. To place the consequences of long-term drought in perspective, Longshore et al. (2003) demonstrated that even short-term drought could result in elevated levels of mortality of desert tortoises. Therefore, long-term drought is likely to have even greater effects, particularly given that the current fragmented nature of desert tortoise habitat (e.g., urban and agricultural development, highways, freeways, military training areas, etc.) will make recolonization of extirpated areas difficult, if not impossible.

Reproduction

In the 5-year review, the Service notes that desert tortoises increase their reproduction in high rainfall years; more rain provides desert tortoises with more high quality food (i.e., plants that are higher in water and protein), which, in turn, allows them to lay more eggs. Conversely, the physiological stress associated with foraging on food plants with insufficient water and nitrogen may leave desert tortoises vulnerable to disease (Oftedal 2002 in Service 2010a), and the reproductive rate of diseased desert tortoises is likely lower than that of healthy animals. Young desert tortoises also rely upon high-quality, low-fiber plants (e.g., native annual plants) with nutrient levels not found in the invasive weeds that have increased in abundance across its range (Oftedal et al. 2002; Tracy et al. 2004). Compromised nutrition of young desert tortoises likely represents an effective reduction in reproduction by reducing the number of animals that reaches adulthood; see previous information from Drake et al. (2015). Consequently, although we do not have quantitative data that show a direct relationship, the abundance of weedy species within the range of the desert tortoise has the potential to affect the reproduction of desert tortoises and recruitment into the adult population in a negative manner.

Various human activities have introduced numerous species of non-native invasive plants into the California desert. Routes that humans use to travel through the desert (paved and unpaved roads, railroads, motorcycle trails, etc.) serve as pathways for new species to enter habitat of the desert tortoise and for species that currently occur there to spread. Other disturbances of the desert substrate also provide invasive species with entry points into the desert. The reproductive capacity of the desert tortoise may be compromised to some degree by the abundance and distribution of invasive weeds across its range; the continued increase in human access across the desert likely continues to facilitate the spread of weeds and further affect the reproductive capacity of the species.

Numbers

In the 5-year review, the Service discusses various means by which researchers have attempted to determine the abundance of desert tortoises and the strengths and weaknesses of those methods. Due to differences in area covered and especially to the non-representative nature of earlier sample sites, data gathered by the Service's current rangewide monitoring program cannot be reliably compared to information gathered through other means at this time.

Data from small-scale study plots (e.g., one square mile) established as early as 1976 and surveyed primarily through the mid-1990s indicate that localized population declines occurred at many sites across the desert tortoise's range, especially in the western Mojave Desert; spatial analyses of more widespread surveys also found evidence of relatively high mortality in some parts of the range (Tracy et al. 2004). Although population densities from the local study plots cannot be extrapolated to provide an estimate of the number of desert tortoises on a range-wide basis, historical densities in some parts of the desert exceeded 100 adults in a square mile (38 per square kilometer; Tracy et al. 2004). The Service (2010a) concluded that "appreciable declines at the local level in many areas, which coupled with other survey results, suggest that declines may have occurred more broadly."

The range-wide monitoring that the Service initiated in 2001 is the first comprehensive attempt to determine the densities of desert tortoises in conservation areas across their range. The Desert Tortoise Recovery Office (Allison and McLuckie 2018) used annual density estimates obtained from this sampling effort to evaluate range-wide trends in the density of desert tortoises over time. (All references to the density of desert tortoises are averages. Some areas support higher densities and some lower; desert tortoises are not distributed in uniform densities across large areas.) This analysis indicates that densities in the Northeastern Mojave Recovery Unit have increased since 2004, with the increase apparently resulting from increased survival of adults and sub-adults moving into the adult size class. The analysis also indicates that the populations in the other four recovery units are declining; Table 14 depicts the estimated abundance of desert tortoises within the recovery units and the change in abundance. Surveys did not include the steepest slopes in these desert tortoise conservation areas; however, the model developed by Nussear et al. (2009) generally rates steep slopes as less likely to support desert tortoises.

**Table 14. Tortoise estimates within recovery units and change in abundance (Allison and McLuckie 2018).**

| Recovery Unit | Modeled Habitat ($km^2$) | 2004 Abundance | 2014 Abundance | Change in Abundance |
|---|---|---|---|---|
| Western Mojave | 23,139 | 131,540 | 64,871 | -66,668 |
| Colorado Desert | 18,024 | 103,675 | 66,097 | -37,578 |
| Northeastern Mojave | 10,664 | 12,610 | 46,701 | +34,091 |
| Eastern Mojave | 16,061 | 75,342 | 24,664 | -50,679 |
| Upper Virgin River | 613 | 13,226 | 10,010 | -3,216 |
| **Total** | 68,501 | 336,393 | 212,343 | -124,050 |

In the previous summary of the results of range-wide sampling (Service 2015f), we extrapolated the densities obtained within conservation areas (e.g., desert wildlife management area, Desert Tortoise Research Natural Area, Joshua Tree National Park) to all modeled habitat of the desert tortoise. This extrapolation may have exaggerated the number of desert tortoises because we applied the values for areas where densities are generally highest (i.e., the conservation areas) to areas where desert tortoises exist in very low densities (e.g., the Antelope Valley). We are also aware of a few areas where the density of desert tortoises outside of conservation areas is higher than inside.

To further assess the status of the desert tortoise, the Desert Tortoise Recovery Office (Service 2015f) used multi-year trends from the best-fitting model describing loge-transformed density of adult animals per square kilometer. In 2014, 3 of the 5 recovery units supported densities below 3.9 adult animals per $km^2$ [Western Mojave (2.8), Eastern Mojave (1.5), and Colorado Desert (3.7); see table 10 in Service 2015f], which is the minimum density recommended to avoid extinction in the 1994 recovery plan. The Northeastern Mojave Recovery Unit supported 4.4 adult desert tortoises per $km^2$ and the Upper Virgin River Recovery Unit, which is by far the smallest recovery unit, supported 15.3 adults per $km^2$.

Allison and McCoy (2014) evaluated changes in size distribution of desert tortoises since 2001. In the Western Mojave and Colorado Desert recovery units, the relative number of juveniles to adults indicates that juvenile numbers are declining faster than adults. In the Eastern Mojave, the number of juvenile desert tortoises is also declining, but not as rapidly as the number of adults. In the Upper Virgin River Recovery Unit, trends in juvenile numbers are similar to those of adults; in the Northeastern Mojave Recovery Unit, the number of juveniles is increasing, but not as rapidly as are adult numbers in that recovery unit. Juvenile numbers, like adult densities, are responding in a directional way, with increasing, stable, or decreasing trends, depending on the recovery unit where they are found.

In this context, we consider "juvenile" desert tortoises to be animals smaller than 180 millimeters in length. The Service does not include juveniles detected during range-wide sampling in density estimations because they are more difficult to detect and surveyors frequently do not observe them during sampling. However, this systematic range-wide sampling provides us with an opportunity to compare the proportion of juveniles to adults observed between years.

Distribution

Prior to 1994, desert tortoises were extirpated from large areas within their distributional limits by urban and agricultural development (e.g., the cities of Barstow and Lancaster, California; Las Vegas, Nevada; and St. George, Utah; etc.; agricultural areas south of Edwards Air Force Base and east of Barstow), military training (e.g., Fort Irwin, Leach Lake Gunnery Range), and off-road vehicle use (e.g., portions of off-road management areas managed by the BLM and unauthorized use in areas such as east of California City, California).

Urban development around Las Vegas has likely been the largest contributor to habitat loss throughout the range since 1994, but there are other large areas of habitat loss. Desert tortoises have essentially been removed from the 18,197-acre southern expansion area at Fort Irwin (Service 2012c). The development of large solar facilities has also reduced the amount of habitat available to desert tortoises. No solar facilities have been developed within desert tortoise conservation areas, such as desert wildlife management areas, although such projects have occurred in areas that the Service considers important linkages between conservation areas (e.g., Silver State South Project in Nevada).

In recognition of the absence of specific and recent information on the location of habitable areas

within the Mojave Desert, especially at the outer edges, Nussear et al. (2009) developed a quantitative, spatial habitat model for the desert tortoise north and west of the Colorado River (Figure 8). The model incorporates environmental variables such as precipitation, geology, vegetation, and slope and is based on occurrence data of desert tortoises from sources spanning more than 80 years, including data from the 2001 to 2008 range-wide monitoring surveys. The model predicts the relative potential for desert tortoises to be present in any given location, given the combination of habitat variables at that location in relation to areas of known occupancy throughout the range; calculations of the amount of desert tortoise habitat in the 5-year review (Service 2010a); and the use of a threshold of 0.5 or greater predicted value for potential desert tortoise habitat in this biological opinion. The model does not account for anthropogenic effects to habitat and represents the potential for occupancy by desert tortoises absent these effects.

Table 15 and Figure 7 depicts acreages of habitat (as modeled by Nussear et al. 2009, using only areas with a probability of occupancy by desert tortoises greater than 0.5 as potential habitat) within the recovery units of the desert tortoise and of impervious surfaces as of 2006 (Fry et al. 2011); calculations are by Darst (2014). Impervious surfaces include paved and developed areas and other disturbed areas that have zero probability of supporting desert tortoises. All units are in acres.

**Table 15. Acres of desert tortoise habitat within recovery units.**

| Recovery Units | Modeled Habitat | Impervious Surfaces (percentage) | Remaining Modeled Habitat |
|---|---|---|---|
| Western Mojave | 7,585,312 | 1,989,843 (26) | 5,595,469 |
| Colorado Desert | 4,950,225 | 510,862 (10) | 4,439,363 |
| Northeastern Mojave | 3,012,293 | 386,182 (13) | 2,626,111 |
| Eastern Mojave | 4,763,123 | 825,274 (17) | 3,937,849 |
| Upper Virgin River | 231,460 | 84,404 (36) | 147,056 |
| **Total** | 20,542,413 | 3,796,565 (18) | 16,745,848 |

The Service (2010a) concluded in its 5-year review that the distribution of the desert tortoise has not changed substantially since the publication of the original recovery plan in 1994 in terms of the overall extent of its range. Since 2010, we again conclude that the species' distribution has not changed substantially in terms of the overall extent of its range, although desert tortoises have been removed from several thousand acres because of solar development, military activities, and other project development.

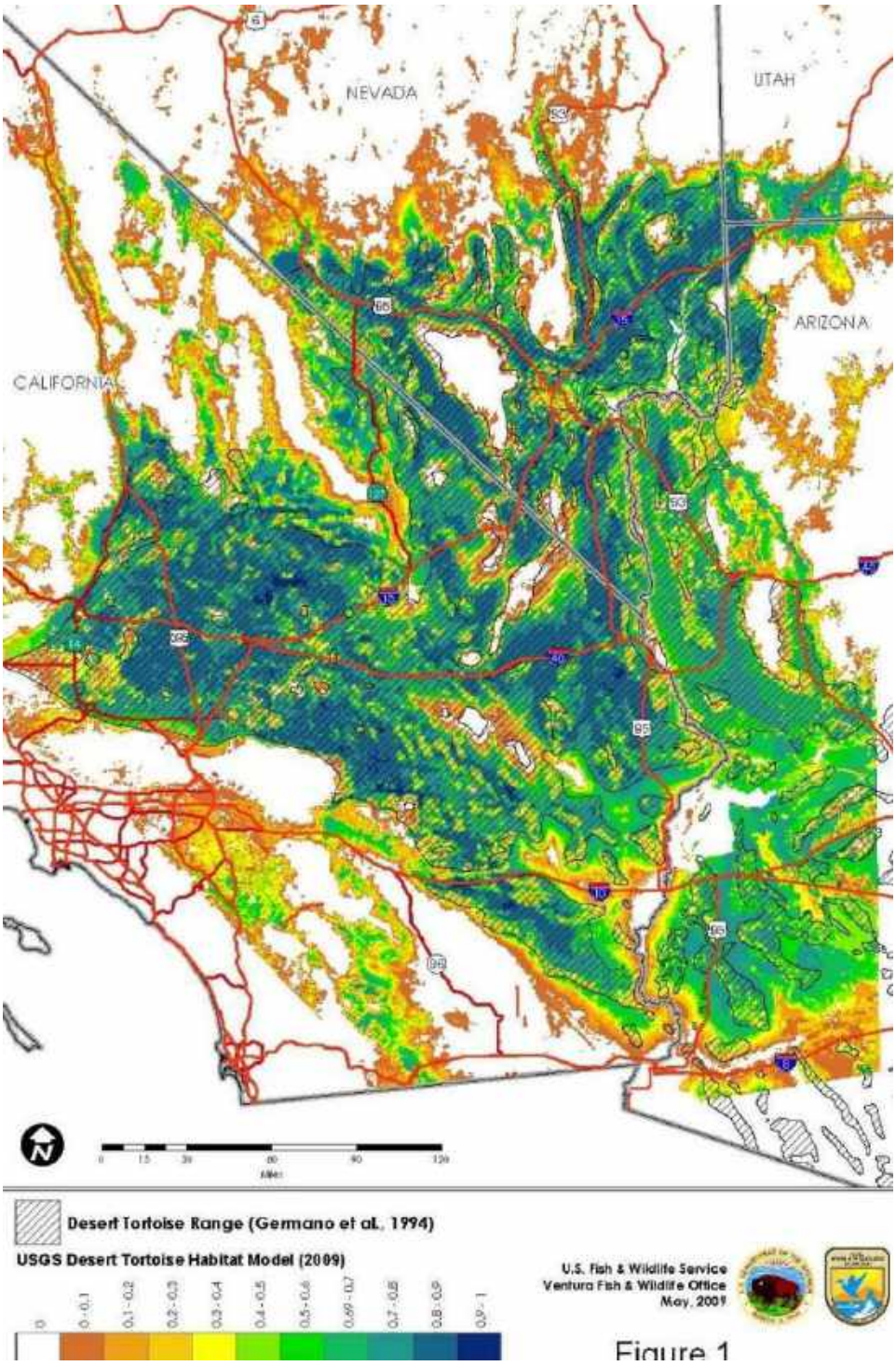


**Figure 7. Modeled tortoise habitat within recovery units.**

ACTION AREA

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action, including interrelated and interdependent actions, and not merely the immediate area involved in the action (50 CFR § 402.02). Subsequent analyses of the environmental baseline, effects of the action, cumulative effects, and levels of incidental take are based upon the action area as determined by the Service. Regulations implementing the Act define the environmental baseline as the past and present effects of all Federal, State, or private actions and other human activities in the action area (50 CFR § 402.02). Also included in the environmental baseline are the anticipated effects of all proposed Federal projects in the action area that have undergone section 7 consultation, and the effects of state and private actions that are contemporaneous with the consultation in progress.

The action area for the Project includes the areas affected directly and indirectly by the federal action. The action areas for desert tortoise are defined as (1) the area of direct effects resulting from the YPSP and TCS (solar field, access roads, substation, gen-tie line, and tortoise fencing; up to 4,284.5 acres), (2) the area of indirect effects (the Stump Springs Translocation Area, or recipient site: 85,000 acres), and (3) the areas of tortoise connectivity north to northwest of the project area and south to southeast of the project area.

ENVIRONMENTAL BASELINE

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

**Status of Desert Tortoise in the Action Area**

*Recovery Unit*

The action area occurs within the Eastern Mojave recovery unit as described in the revised desert tortoise recovery plan (Service 2011a). This recovery unit is similar to the 1994 designation, spanning the Nevada-California border, including Oasis Valley, Amargosa Desert, Pahrump Valley, and extending south into Shadow Valley, but now including habitat north of the Spring Mountains east to the Sheep Mountains as well as Las Vegas and Eldorado valleys north to the city of Las Vegas. The Eastern Mojave Recovery Unit borders the Northeastern Mojave Recovery Unit to the east, extending down the Sheep Mountains to the Spring Mountains, east to Las Vegas Bay on Lake Mead, then down the Colorado River. From the Colorado River at approximately Cottonwood Cove, the southern boundary extends west through Searchlight,

down the New York and Providence mountains to the Granite Mountains. From there the western boundary extends north through the Bristol Mountains, Soda Lake, and Silurian and Death valleys. The Spring Mountains, which provided much of the separation between the former Northeastern Mojave and Eastern Mojave recovery units, narrowly channel gene flow through habitat corridors to the north and south, connecting this recovery unit to the Northeastern Mojave Recovery Unit (Hagerty 2008; Hagerty et al. 2011).

A majority of this unit had not been previously sampled; however, recent microsatellite data reflect unique nuclear allele frequencies, indicating that this area is relatively isolated from other recovery units (Hagerty and Tracy 2010). Allele frequencies from tortoises at Amargosa Desert and Pahrump Valley sites also form a homogeneous cluster different from other Nevada sites (Britten et al. 1997). The Sheep Mountains appear to form a barrier to tortoise movement between the eastern side of the recovery unit and the Northeastern Mojave Recovery Unit. The New York and Providence mountains isolate Ivanpah/Shadow valleys from Eldorado/Fenner valleys in the Colorado Desert Recovery Unit to the east. Saline Valley and Death Valley extending south into Silurian Valley and Soda Dry Lake act as a barrier between this recovery unit and the Western Mojave Recovery Unit. Although gene flow likely occurred intermittently during favorable conditions across this western edge of the recovery unit, this area contains a portion of the Baker Sink, a low-elevation, extremely hot and arid strip that extends from Death Valley to Bristol Dry Lake. This area is generally inhospitable for desert tortoises.

Desert tortoises in this recovery unit are generally found in creosote bush scrub communities of flats, valley bottoms, alluvial fans, and bajadas, but they occasionally use other habitats such as rocky slopes and blackbrush scrub. As in the northeastern Mojave Desert, desert tortoises are often active in this recovery unit in late summer and early fall, in addition to spring, reflecting the fact that this region receives up to about 40 percent of its annual rainfall in summer and supports two distinct annual floras on which tortoises can feed. They typically eat summer and winter annuals, cacti, perennial grasses, and herbaceous perennials. Average daily winter temperatures usually fluctuate above freezing, except in the higher elevations. Summer temperatures are typically a few degrees cooler, except in the lowest elevations of Death Valley, than the recovery units to the south and west.

The recovery unit includes the east side of Death Valley National Park, much of Mojave National Preserve, and Lake Mead National Recreation Area between Las Vegas Bay and Cottonwood Cove, as well as the Nevada National Security Site (formerly the Nevada Test Site) and the western end of Desert National Wildlife Range. It also includes the Ivanpah Valley critical habitat unit and the Eldorado Valley portion of the Piute-Eldorado critical habitat unit. A lack of desert tortoise habitat dedicated to conservation to the west of the Spring Mountains and in Las Vegas Valley highlights the need for careful management in these areas to maintain connectivity among populations and the genetic variation within this recovery unit. Corridors north and south of the Spring Mountains warrant particular management attention to prevent genetic isolation of populations on either side of this mountain range.

*Habitat*

**Project Site**

The project is within a large contiguous area of modeled suitable desert tortoise habitat. Within the survey area, the modeled habitat suitability is 0.9 out of 1.0, indicating that the area has a high probability of being suitable for desert tortoises (Nussear et al. 2009). The soil report indicates that the soils are expected to be suitable for burrowing by desert tortoises (Natural Resources Conservation Service 2018). Elevation is also suitable for desert tortoises and ranges from 915 to 1,050 meters (m) (3,002 to 3,445 feet). Vegetation cover in the survey area is typical of desert tortoise habitat and consists of Mojave desert scrub dominated by creosote bush (*Larrea tridentata*) and burrobush (*Ambrosia dumosa*), with scattered Mojave yucca (*Yucca schidigera*). Based on the results of quantitative vegetation sampling, the species with the highest average percent foliar cover in all four soil associations were Mediterranean grass (*Schismus barbatus*), white bursage, and creosote bush. The main differences between vegetation cover among the soil associations was in the estimated percent foliar cover which ranged from 8.7% to 25.1% and species diversity which ranged from 4 to 19 species.

**Recipient Site**

The BLM and Service identified the Stump Springs Translocation Area (recipient site) (BLM 2017) as the most suitable recipient site for tortoises from the Projects' site. The BLM and Service further identified a 21,000-acre release site within the Stump Springs Translocation Area where project tortoises will be translocated. Specific release points will be selected close to the time of release and will take into account conditions at that time. The Stump Springs Translocation Area covers approximately 85,000 acres (344 $km^2$) of desert scrub habitat on land managed by the BLM as an undesignated multiple-use area and is southeast of the intersection of SR 160 and Tecopa Road, with the Spring Mountains forming the eastern border and the California state line to the southwest (Figure 2).

The translocation area is within the Eastern Mojave Recovery Unit, as revised in the most recent recovery plan (USFWS 2011). The area is not in or near any critical habitat units or ACEC designated for desert tortoise.

The recipient site is within a large contiguous area of modeled desert tortoise habitat (see Figure 2). Within the Stump Springs Translocation Area, the modeled habitat suitability ranges from 0.6 to 0.9 out of 1.0, indicating the area has a high probability of being suitable for desert tortoise (Nussear et al. 2009). The soil report indicates that the soils are expected to be suitable for burrowing by desert tortoise (Natural Resources Conservation Service 2018). Elevation of the site ranges from 822 to 1,560 m (2,697 to 5,118 feet) (U.S. Geological Survey 2018). Vegetation within the Stump Springs Translocation Area is dominated by Mojave Desert scrub, with small amounts of salt desert scrub, gypsum soils, and mesquite/catclaw habitats in the southern portion of the site (Clark County and USFWS 2017).

Current anthropogenic impacts to the recipient site include vehicle use, and existing and proposed energy infrastructure. Several unpaved roads cross the site, one of which, Sandy Valley

Road, is well used and connects the town of Sandy Valley, Nevada, to SR 160. Sandy Valley Road is also used as part of the route for the annual Barstow to Las Vegas dual sport event, which is held in November and involves the use of street-legal motorcycles traveling on existing roads and trails. All off-highway vehicle use is restricted to existing roads and trails within the translocation area (Clark County and USFWS 2017).

Two existing utility corridors bisect the recipient site: The West Wide Energy Corridor and a second corridor designated in the BLM's Resource Management Plan. However, the only existing development within these corridors is the GLW Pahrump to SCS 230-kV transmission line within the Resource Management Plan corridor. This existing transmission line uses steel monopoles, thus reducing its potential to be used as nesting substrate for common ravens (*Corvus corax*). There are not currently any solar development applications within the translocation area (Clark County and Service 2017).

For a full description and analysis of the Stump Springs Translocation Area and its suitability as a translocation recipient site, please refer to the associated environmental assessment (BLM 2017) and Stump Springs Translocation Plan (Clark County and USFWS 2017).

*Population Monitoring Data in the Action Area*

In 1999, the Desert Tortoise Management Oversight Group endorsed the use of line distance sampling as the most appropriate method for estimating rangewide desert tortoise density. Fifteen monitoring strata were established which approximate the boundaries of the CHUs. Desert tortoise population monitoring began rangewide in 2001. Long-term monitoring of desert tortoise population growth and distribution, habitat quality and quantity, and the presence and intensity of threats to the desert tortoise are recovery actions identified in the revised recovery plan (Service 2011a).

Desert tortoise density estimates are generated separately for each monitoring stratum, then weighted by stratum area to arrive at average density in the monitored area of each recovery unit. When the annual estimates are imprecise, it should not be expected that there will be a close match from one year to the next. Over a period of many years, however, any underlying trend in the number of tortoises should be obvious.

Service (2016b, 2018) desert tortoise monitoring data included the five strata in the action area, Beaver Dam Slope, Coyote Spring Valley, Gold Butte-Pakoon, Mormon Mesa, and Piute-Eldorado. The monitoring strata approximate the CHUs and desert tortoise Areas of Critical Environmental Concern (ACECs) and represent the 1994 delineation of recovery units, which would not include the Colorado Desert Recovery Unit. The most recent results for the Eastern Mojave Recovery Unit are provided in Table 16. For additional or updated information on desert tortoise population monitoring, visit the Desert Tortoise Recovery Office website at: https://www.fws.gov/nevada/desert_tortoise/dtro/dtro_monitor.html

**Table 16. Desert tortoise density estimates for strata in the action area (Service 2016b, 2018).**

| Recovery Unit | Stratum | Area Sampled ($mi^2/km^2$) | Number Transects | Total Transect Length (mi/km) | No. Tortoises Observed | Density Estimate ($mi^2/km^2$) |
|---|---|---|---|---|---|---|
| Eastern Mojave | Ivanpah Valley* | 434/1,124 | 74 | 341/882 | 23 | 4.9/1.9 |
| | Eldorado Valley* | 445/1,153 | 89 | 387/1,002 | 22 | 7.0/2.7 |
| | Eldorado Valley | 445/1,153 | 86 | 363/940 | 38 | 14.6/5.6 |

*Data is from Service 2016b. The remaining data is from Service 2018.

*Desert Tortoises in the Action Area*

Following Service survey protocol (Service 2017b), SWCA Environmental Consultants biologists conducted 100% coverage presence/absence surveys of the 5,032-acre survey area for all desert tortoises aboveground (both outside burrows and within burrows but still visible) and desert tortoise sign (burrows, scat, tracks, carcasses, etc.) using 10-m-wide (approximately 33-foot-wide) east–west belt transects. Surveys were conducted between September 17 and October 23, 2018, and transects totaled 2,518 km (1,565 miles). During surveys, biologists documented 54 live tortoises, 41 of which were included in the population estimate (adult tortoises greater than 180 mm in midline carapace length, or MCL) (Figure 8, Table 17).

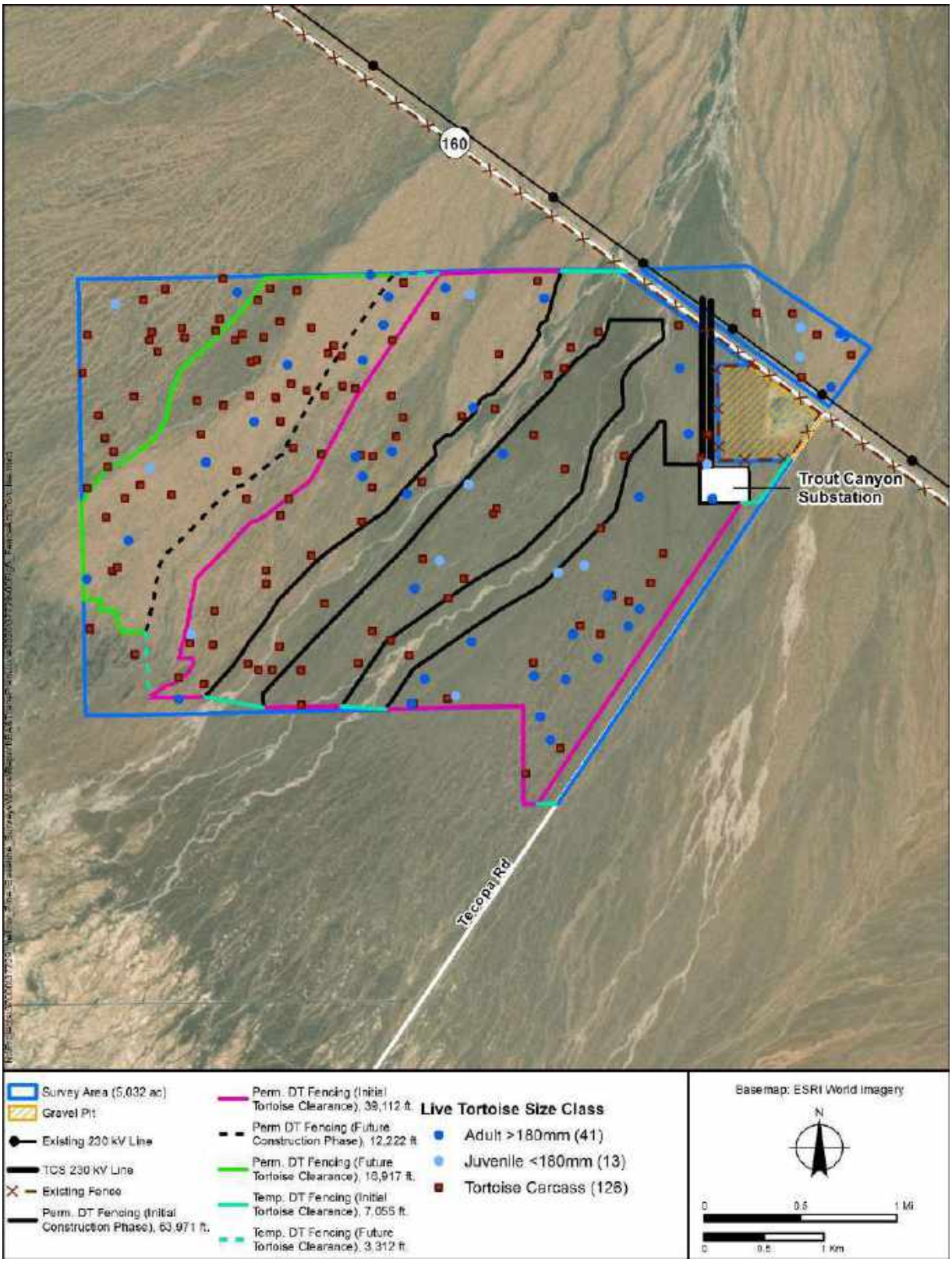


**Figure 8. Locations of adult and juvenile desert tortoises and carcasses observed during surveys.**

**Table 17. Live desert tortoises observed during surveys.**

| Observation Type | Female | Male | Unknown | Combined |
|---|---|---|---|---|
| Adult ≥ 180 mm | 7 | 12 | 22 | 41 |
| Juvenile < 180 mm | 2 | 0 | 11 | 13 |
| **Total** | **9** | **12** | **33** | **54** |

The observed tortoise sign throughout the survey area included burrows, scat, tracks, and carcasses, and found numerous tortoise burrows in good condition (Class 1 or Class 2) (Table 18). The biologists recorded 126 tortoise carcasses ranging from Class 2 to Class 5 during the surveys.

**Table 18. Desert tortoise burrows observed during surveys.**

| Burrow Class | Count |
|---|---|
| Class 1: Currently active, with desert tortoise or recent desert tortoise sign | 351 |
| Class 2: Good condition, definitely desert tortoise; no evidence of recent use | 1,022 |
| Class 3: Deteriorated condition; definitely desert tortoise, including collapsed burrows | 366 |
| Class 4: Good condition; possibly desert tortoise | 345 |
| Class 5: Deteriorated condition; possibly desert tortoise, including collapsed burrows | 45 |
| **Total** | **2,129** |

To estimate the number of tortoises that live within the Project Survey Area, the formula (equation in Figure 9) divides the number of adult tortoises observed during the survey by the product of the probability that a tortoise is aboveground during the survey (Pa), and the probability that a surveyor would see the tortoise if it is aboveground (the searcher efficiency, Pd). Pa is relative to the previous winter's rainfall recorded between October and March by the Western Regional Climate Center. Per the protocol, Pa for this Project is equal to 0.85 because the previous year's rainfall in the region was greater than 1.5 inches, and Pd is equal to 0.63, which is the standard searcher efficiency for presence/ absence surveys.

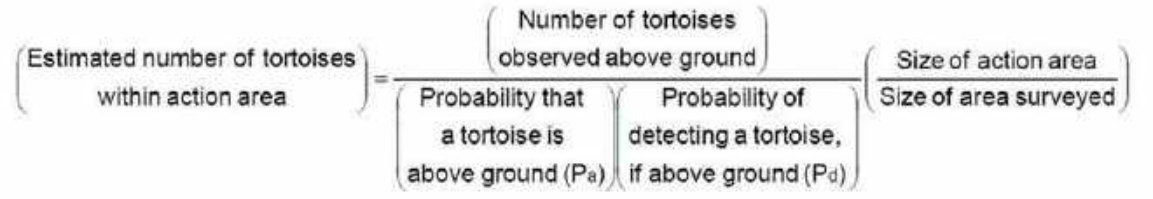


**Figure 9. Equation used for tortoise estimates.**

Based on the Service population estimate spreadsheet, the estimated tortoise density is 3.04 adult tortoises per square km ($km^2$). The estimated number of adult tortoises within the 5,032 acres survey area is 62 (Table 19). Based on full build-out of the Proposed Action, tortoises would have to be removed from 4,284.5 acres of habitat enclosed by a combination of temporary and permanent fencing (the Full Build Tortoise Clearance Area, including YPSP and TCS). The estimated number of adult tortoises within the fenced footprint of the Projects is 53. To better account for numbers of tortoises expected to occur within each of the separate projects (YPSP and TCS), the disturbance acres and estimated number of tortoises within the TCS's 69.4 acres of disturbance were subtracted from the Projects' combined totals. Under the full build scenario, an estimated 52 adults (95% Confidence Interval [CI] = 35 to 77) would be translocated by YPS and 1 adult (95% CI = 0 to 2) would be translocated by GLW (Table 19). If construction is started in phases, the Phase I Tortoise Clearance Area would enclose an area of 3,233.5 acres from which an estimated 39 adults (95% CI = 27 to 59) would need to be translocated by YPS and 1 adult (95% CI = 0 to 2) would be translocated by GLW. In addition to adult tortoises, it is estimated that many more juvenile tortoises will also require translocation, see Table 19 for estimates of the numbers of juvenile and hatchling tortoises that may also be impacted.

**Table 19. Desert tortoise population estimates**

| Tortoise Size Class | Survey Area (5,032 acres) | YPSP Full Build Tortoise Clearance Area ( 4,215.1 acres) | YPSP Phase I Tortoise Clearance Area (3,164.1 acres) | TCS Project Footprint (69.4 acres*) |
|---|---|---|---|---|
| Adult ≥ 180 mm | 62 (41 to 93) | 52 (35 to 77) | 39 (27,to 59) | 1 (0, 2) |
| Juvenile < 180 mm | 322 (213 to 484) | 272 (182 to 401) | 206 (140 to 307) | 4 (0, 10) |
| Hatchlings (young-of-year) | 81 (53 to 121) | 68 (46 to 100) | 51 (35 to 76) | 1 (0, 3) |

Note: Numbers in parentheses next to estimates represent the 95% lower and upper CIs for that estimate. *The TCS footprint includes a small amount of disturbance that will occur on the north side of SR 160 which will not be included in the perimeter fencing.

Previous solar projects have found more tortoises during clearance surveys than were originally estimated. Because tortoises are mobile, there may be more within the action area than were originally estimated based on tortoise survey data. The K Road solar project found 13.6 percent more tortoises during clearance surveys than estimated, and the Silver State South solar project found 23.6 percent more tortoises than estimated in their biological opinion. Because such higher percentages have been found compared to the estimated numbers, we allow for a 25 percent buffer for additional tortoises to be captured and moved. Adding 25 percent to the estimated 62

adult tortoises within the entire survey area puts the total estimate of adult tortoises at 78.

Turner et al. (1987) developed a life table for female desert tortoises based on studies conducted at Goffs, California, in 1983. They estimated that approximately 13.2 percent of the desert tortoises in that population were larger than 180 millimeters in length. The methodology and calculations in Table 20 were used to estimate the number of all desert tortoises within the solar facility.

**Table 20. Number of tortoises estimated to occur within the YPSP and TCS sites.**

| **Tortoise Calculation** | **Tortoise total estimate in 5,032-acre action area** (95% confidence interval) | **Tortoise estimate in 4,284.5-acre fenced solar footprint** (95% confidence interval) | **Tortoise estimate in 747.5-acre area outside of fenced solar footprint** |
|---|---|---|---|
| Estimated number (point estimate) of desert tortoises larger than 180 mm (95% confidence interval) | 62 (41-93) | 53 (35-79) | 9 |
| Estimate of adults (estimate + 25 %) | 78 (51-116) | 66 (44-99) | 12 |
| Translocation of adults ([estimate + 25 %] from solar footprint | N/A | 66 | N/A |
| Capture and move adults outside fenced solar footprint but within action area (78-66) | N/A | N/A | 12 |
| Percentage of desert tortoises in size classes larger than 180 millimeters (from Turner et al. 1987, table 32) | 13.2 | 13.2 | 13.2 |
| The total number of desert tortoises; calculated by 78/0.132 ; 66/0.132 ; 12/0.132 | 591 (386-879) | 500 (333-750) | 91 |
| The number of juvenile desert tortoises; calculated by total – adults | 513 (335-763) | 434 (289-651) | 79 |

Two caveats apply to this estimate. The table in Turner et al. (1987) is based only on females, and we assume that the size classes also apply to males. The demography of the population at the solar facility may be different from Goffs at the time of the work conducted by Turner et al., but we do not have complete information on the demography of the population at the solar facility. Although the estimate of the number of desert tortoises on the project site is based on the best

available information, the overall number of animals may be different.

In addition, we expect the project area to support desert tortoise eggs if cleared during the desert tortoise nesting period, approximately May and June (Turner et al. 1984; Wallis et al. 1999). Estimating the number of tortoise eggs is extremely difficult given that the eggs are buried beneath the soil surface. Applying any assumptions has an unknown and high level of uncertainty. Therefore, we cannot calculate a precise estimate for the number of eggs that may be affected by the proposed project.

No health assessments have been completed on tortoises in the Projects' area or the control site. During surveys of the recipient site in 2014, five tortoises were accessible and received a visual health assessment and tissue collection according to standardized protocols (Clark County and USFWS 2017; USFWS 2016). None of the collected samples tested positive for antibodies to either of the *Mycoplasma* species (Clark County and USFWS 2017).

During the Service's annual range-wide monitoring program in 2008, two survey areas on BLM-administered land in the Pahrump Valley (Pahrump North and Pahrump South) were included. Survey of these areas was conducted using Service range-wide monitoring program line distance sampling procedures (Service 2012d). The density estimates for these areas were 1.7 tortoises/$km^2$ for Pahrump North and 2.9 tortoises/$km^2$ for Pahrump South (Service 2012d). The area surveyed in 2008 for Pahrump South overlaps the Projects' survey area, and the estimate of 3.04 adult tortoises/$km^2$ suggests little change in the tortoise density of the survey area between 2008 and 2018. However, pre-translocation surveys conducted in the fall of 2014 for the Stump Springs Translocation Area, located across from the survey area on the east side of Tecopa Road and also overlapping the 2008 Pahrump South survey area, recorded only nine live tortoises for an estimated density of 0.9 adult tortoise/$km^2$ (Clark County and Service 2017).

Tracy et al. (2004) analyzed the ratio of dead to live tortoise observations recorded during Service line distance sampling surveys from 2001 to 2003, with the assumption that tortoise populations with roughly equal numbers of live animals and carcasses were likely to be healthier than populations with disproportionately large numbers of carcasses. Out of 15 Desert Wildlife Management Areas (DWMAs), the average dead to live tortoise ratio was 1.92 and ranged from 1.08 in the Pinto Mountains DWMA to 3.67 in the Fenner DWMA (Tracy et al. 2004). In the study, 126 tortoise carcasses were observed during 2018 presence/absence surveys in the survey area, compared with 54 live tortoise observations, a ratio of dead to live tortoises of 2.33. Unpublished data from the Service recorded during the 2008 surveys of the Pahrump Valley (Pahrump North and Pahrump South combined) yielded 28 observations of shell remains and 30 live tortoise observations, a ratio of 0.93 dead to live tortoises; this ratio exceeded all other areas surveyed that year in Nevada (Averill-Murray et al. 2013b). In the spring of 2013, surveys of the Greater Trout Canyon Translocation Area (also in the Pahrump Valley) found 24 carcasses and 22 live tortoises, a ratio of 1.09 dead to live tortoises (Averill-Murray et al. 2013b). Surveys of the Stump Springs Translocation Area in the fall of 2014 yielded 111 carcasses, compared with only nine live tortoises, a ratio of 12.33 dead to live tortoises (Clark County and Service 2017). However, because tortoise carcasses can persist for many years, it is difficult to pinpoint the timing and duration of a possible die-off. In the case of this study, most of the carcasses observed

were Class 3 or greater, which suggests that the die-off likely happened at least several years ago.

The estimated density for the Eastern Mojave Recovery Unit (which includes Pahrump Valley) was only 1.5 adult tortoises/km$^2$ (Service 2018). Therefore, the survey area yielded a higher density (3.04 adult tortoises/km$^2$) than calculated within the Eastern Mojave Recovery Unit. The ratio of dead to live tortoises of 2.33 is slightly higher than average, compared with data from 2001 through 2003 (Tracy et al. 2004), and may indicate that the survey area has suffered from a period of high mortality at some point in the past few years. However, this die-off has clearly been less severe than that observed in the Stump Springs Translocation Area (Clark County and Service 2017). Many factors may have contributed to the large number of tortoise carcasses, including drought, disease (particularly *Mycoplasma agassizii* and/or *M. testudineum*), and predation. Based on winter rainfall data for the area, it appears that there was a period from 2011 to 2014 where two out of the three winters had reduced levels of rainfall, which may have created drought conditions in the Pahrump Valley. However, without additional data it is difficult to pinpoint the precise timing or cause of the large number of tortoise carcasses observed in the survey area and the nearby Stump Springs Translocation Area. Although a relatively recent die-off in the survey area was apparent, the local population seems to be relatively stable.

*Habitat and Population Connectivity*

Quantifying the degree to which a landscape promotes or hinders movements among patches of habitat for a given species, hereafter referred to as “habitat connectivity” (Fischer and Lindenmayer 2007), has become increasingly important relative to desert tortoise recovery. As we evaluate utility-scale solar development and other land uses within the range of the species, it is essential that habitat linkages between and among populations are conserved. For gene flow to occur across the range, populations of desert tortoises need to be connected by areas of occupied habitat that support sustainable numbers of reproductive individuals. Recent research provides evidence that genetic differentiation within the Mojave desert tortoise is consistent with isolation by distance in a continuous-distribution model of gene flow. Populations at the farthest extremes of the distribution are therefore the most differentiated, and a gradient of genetic differentiation occurs between those populations across the range of the species (Britten et al. 1997, Edwards et al. 2004a, Murphy et al. 2007, Hagerty and Tracy 2010). Genetic analyses also suggest that levels of gene flow among subpopulations of desert tortoises likely were high, corresponding to high levels of habitat connectivity (Murphy et al. 2007, Hagerty 2008).

Demographic connectivity describes a pattern of habitat or vegetation that is connected with other areas of similar habitat or vegetation. It refers to the degree to which population growth and vital rates are affected by dispersal (BLM and DOE 2012). The concept of demographic connectivity differs subtly from genetic connectivity as it refers to a more geographic concept of how habitat, vegetation, and dispersal (immigration and emigration) affect survival of a species through birth and growth rates. Demographic connectivity would assume a greater geographic connectedness of habitat and vegetation than genetic connectivity, but both rely on suitable habitat that can be occupied by desert tortoises. The Mojave desert tortoise historically represents

a series of continuous, overlapping home ranges within suitable habitats whose boundaries between divergent units may be validated by ecological or major topographic features, such as steep mountainous terrain or, even more significantly, the Colorado River (Germano et al. 1994, Nussear et al. 2009).

Individual desert tortoises can make long-distance movements through restricted habitats, which may contribute to gene flow (Berry 1986, Edwards et al. 2004b), though we do not know the extent to which individuals utilize narrow corridors of relatively intact habitat. The underpinning of the continuous-distribution model of gene flow described above, and the evidence from desert tortoise population genetic studies and distribution, is that individual desert tortoises breed with their neighbors, those desert tortoises breed with other neighbors, and so on. The movements that maintain the genetic diversity across populations occur over generations and not necessarily during the life span of a single desert tortoise. Therefore, for gene flow to happen reliably, populations need to be connected across the range by occupied areas of habitat linkages that support sustainable numbers of desert tortoises.

To define the area required to maintain resident populations within the linkages, we considered desert tortoise home range size and the magnitude of edge effects. The size of desert tortoise home ranges varies with respect to location and year (Berry 1986) and may serve as an indicator of resource availability and opportunity for reproduction and social interactions (O'Connor et al. 1994). Females have long-term home ranges that may be as little as or less than half that of the average male, which can range to 200 acres (Burge 1977, Berry 1986, Duda et al. 1999, Harless et al. 2009). Core areas used within the lifetime home range of desert tortoises depend on the number of burrows used within those areas (Harless et al. 2009). Over its lifetime, a desert tortoise may use more than 1.5 $mi^2$ of habitat and may make periodic forays of more than 7 miles at a time (Berry 1986). We therefore assess the viability of the linkages based on the ability of those linkages to maintain the lifetime home range of a desert tortoise or the ability of home ranges of this size to connect to one another absent any barriers. Because we expect lifetime home ranges to expand and contract over time, we can consider whether the linkage could remain viable in a year where decreased resource availability results in a smaller population of individuals that respond by expanding their home ranges.

In assessing lifetime home ranges, the Service (1994) assumed a circular configuration of this area when using it in the population viability assessment. We based this assumption on the fidelity that desert tortoises exhibit towards an overwintering burrow year after year. Consequently, the overwintering burrow serves as an anchor point from which the lifetime utilization area radiates out. Using a circular lifetime home range of 1.5 $mi^2$ for a desert tortoise, we estimate that a linkage would need to be at least 1.4 miles wide to accommodate the width of a single home range. Although these figures provide a means for characterizing the potential minimum width of a linkage, we do not know the exact area or land configuration required to support a sustainable population of resident desert tortoises within any particular linkage, which would be dependent upon several factors.

Based on the best available information, occupancy likely depends on many site-specific factors, including: (1) desert tortoise densities in the vicinity (i.e., lower density sites require larger areas

to reliably support sustainable numbers of desert tortoises); (2) length-to-width ratio of the linkage (i.e., longer linkages may need to be wider to preserve the dynamic home ranges and interactions required for gene flow); and (3) potential edge effects and integrity of the ecosystem within and adjacent to the linkage. Another consideration is the extent to which slope and ruggedness of the terrain allows desert tortoise occupancy or passage. In addition, maintaining connectivity of desert tortoise habitats and populations should reflect results from the landscape genetic analyses of Hagerty (2008) and Hagerty et al. (2011). These analyses showed that desert tortoise gene flow generally occurred historically in a diffuse pattern across the landscape unless otherwise constrained to more narrow, concentrated pathways created by topographic barriers (e.g., around the Spring Mountains in western Nevada). As a result, it is evolutionarily imperative that conservation is focused on maintaining a series of redundant linkages between core populations and critical habitats.

Desert tortoises need to have overlapping home ranges and at least semi-permeable barriers for tortoises to be assumed to be connected across the landscape. Potential movement of desert tortoises of the action area is restricted by SR 160 to the north, the Spring Mountain range to the east and north, and the city of Pahrump to the west. If tortoises move through the modified culverts under the SR 160, they would be restricted to the north and east by the Spring Mountains but would be able to move north into the Trout Canyon Translocation area and northwest between the city of Pahrump and the Spring Mountains. The Stump Springs translocation area allows for connectivity to the south into California and occurs within a block of contiguous desert tortoise habitat that may be valuable for population connectivity (i.e., between the Ivanpah Critical Habitat Unit, Death Valley National Park, and areas to the north).

*Desert Tortoise Translocation Areas*

Desert tortoise translocation areas include sites and areas where displaced tortoises will be released; area(s) that are established as recipient areas (areas where most tortoises establish following release), maximum dispersal area (the area that encompasses the maximum distances tortoises are anticipated to move following translocation and release), and a control area where resident tortoises will be monitored to compare with translocated tortoises. The recipient site for tortoises translocated from the Projects' site is the 85,000 acre (344 $km^2$) Stump Springs Translocation Area. Tortoises will be released in the 21,150-acre release zone within the Translocation Area, but are expected to disperse across the Translocation Area. Desert tortoise relocation areas were selected following Service guidelines (2019e), habitat models, size requirements, and recommendations by BLM and the Service. Vegetation within the Stump Springs Translocation Area is dominated by Mojave Desert scrub, with small amounts of salt desert scrub, gypsum soils, and mesquite/catclaw habitats in the southern portions of the site (Clark County and USFWS 2017).

Once data are collected on the tortoises affected by the Projects, both the YPS and GLW will prepare a desert tortoise disposition plan for each tortoise for the Service (see Appendix H in Service 2019e). The plan must be completed within the spring or fall season in which translocation occurs. Based on the health status of those tortoises, the Service will approve or make recommendations on the disposition of the tortoises to be translocated.

Based on the number of tortoises found within the action area, it is estimated that 53 tortoises will need to be translocated for the Projects to be built. An additional 25 percent was added to that number to account for more tortoises in the area than during the survey, making the total estimate 66.

The Service guidance includes establishing a control area to be used in the translocation program to monitor natural effects on resident populations relative to translocated tortoises and tortoises that are resident in the recipient area. The control area should be similar in habitat type and quality, desert tortoise population size and structure, and disease status to the recipient areas (Service 2019e). The control site for the LTMP is the Trout Canyon Translocation Area, which lies north of SR 160, opposite the Stump Springs Translocation Area.

The health of translocated tortoises and resident tortoises at the recipient area and the control area will be assessed and a radio transmitter attached to each tortoise (Service 2019e). The translocation process includes gathering data on sex, age, and health conditions of resident tortoises. This information will be used in conjunction with the same information collected from desert tortoises in the project area during clearance surveys to develop desert tortoise disposition plans and determine placement of translocated tortoises.

**Factors Affecting the Desert Tortoise in the Action Area**

*BLM Biological Opinions for Projects in the Action Area.*

Several programmatic biological opinions have been issued to the BLM that include land in the action area.

On June 18, 1998, the Service issued a PBO (1-5-98-F-053; Service 1998) to BLM for implementation of various land management programs within desert tortoise habitat and the Las Vegas planning area, including desert tortoise critical habitat and ACECs. Activities that were proposed that may have affected the desert tortoise in the action area included recreation, designation of utility corridors and mineral material extraction areas, and designation of the desert tortoise ACECs.

On June 17, 2010, the BLM submitted a programmatic biological assessment to the Service to request consultation for program-level and project level actions that may affect and are likely to adversely affect 19 threatened and endangered species, including the desert tortoise, of which 13 have designated critical habitat within the action area for the consultation. On January 2, 2013, the Service issued a non-jeopardy PBO to the BLM based on review of these activities (84320-2010-F-0365; Service 2013e). While the BLM's 1998 resource management plan remains in effect, the 2013 PBO replaces the Service's 1998 document, which covered a 10-year period. The PBO has been reinitiated six times to include additional acres or activity changes. The BLM requested reinitiation of the PBO in November 2017. This new PBO (08ENVS00-2019-F-0153;

Service 2019d) was signed on January 14, 2020, and replaces the 2013 document.

*Other Biological Opinions for Projects in the Action Area*

Federal Highway Administration PBO

On September 27, 2010, the Service issued a PBO (84320-2010-F-0285; Service 2010g) to the Federal Highway Administration (FHWA) for funding road and highway projects and use of mineral material sites for these projects over a 10-year period. The Nevada Department of Transportation is the primary non-Federal proponent of projects and activities under the PBO. The FHWA and the Service anticipate that up to 4,468 acres of non-critical and 1,170 acres of critical desert tortoise habitat may be disturbed as a result of programmatic activities. This PBO is currently undergoing reinitiation.

Advanced Rail Energy Storage Nevada, LLC (ARES)

In 2016, the Service issued an append (File Nos. 84320-2016-F-0010) to the BLM Southern Nevada PBO (84320-2010-0365.R003) for the Advanced Rail Energy Storage project in the Carpenter Canyon Area. The project involved the construction, operation, and maintenance of a regulation energy management facility in western Clark County, Nevada. The project will disturb 106 acres of desert tortoise non-critical habitat.

Habitat fragmentation caused by project will be minimized with the installation of dual purpose drainage and connectivity culverts, a single strategically placed desert tortoise crossing, and under-rail tortoise escapes; dual purpose drainage and connectivity culverts will also ensure that local hydrologic dynamics and dependent plant communities are minimally impacted. Drainage and connectivity structures will be 36 or 48 inches in diameter, depending on the size and characteristics of the drainage channel encountered, and will be accessible to tortoises via tortoise ramps or other appropriate designs. Under-rail tortoise escape passages will be installed approximately every 1000 feet to prevent tortoises from becoming trapped on the rail line and to provide additional avenues for connectivity. This level of connectivity is necessary to maintain local desert tortoise populations. Additionally, this ROW is approximately 0.6 mile from the northwest corner of the Trout Canyon Desert Tortoise Translocation Site; therefore, these connectivity measures will help ensure long-term viability of this investment in the recovery of local desert tortoise populations.

The append identified that 63 adults and sub-adult desert and 31 hatchling and juvenile tortoises could be taken by capture within the action area and four tortoises of all age classes could be taken due to injury or mortality. The project has not yet been constructed.

*Habitat Conservation Plans (HCPs)*

Valley Electric Association Solar

An HCP for the Valley Electric Association Solar project was completed in 2015 (Service 2015a). The project is on 80 acres of private land in southern Nye County. The project is a 15 MW fixed panel photovoltaic solar power generation plant. The project has 76 acres that are mowed, trimmed, or crushed, leaving habitat in place. This area was fenced with openings every 260 feet along the bottom to allow tortoises to remain using the habitat after project installation. The remaining 4 acres was disturbed for permanent infrastructure.

Project construction began in 2016. Four tortoises were within the project footprint and moved into holding pens off site. After project completion in 2017, the tortoises were transmittered and released back into the project area. All four tortoises were found both within and outside of the fenced project area in 2018. Two of those tortoises were found using the site in 2019.

Canyon Mesa Solar

The Canyon Mesa Solar project was signed in September 2019 (Service 2019a) and is on 165.6 acres of private land in southern Nye County east of Pahrump. The project is an 18 MW photovoltaic solar power generation plant with integrated battery storage systems and single axis tracking panels. The project will have 88.3 acres that are mowed, clipped, or crushed, leaving tortoise habitat in place. This area will be fenced with openings along the bottom to allow tortoises to remain using the habitat after project installation. The remainder of the project contains 35.7 acres that are previously disturbed and not tortoise habitat, 6.6 acres that will be temporarily disturbed, and 35 acres that will permanently disturbed by project construction.

Tortoise surveys completed found no live tortoises, 14 burrows, and two carcasses. Any tortoises found within the construction area will be moved to the closest adjacent habitat area within 300 meters of the project boundary. The incidental take permit estimates that two tortoises may be captured and moved during construction and that two tortoises may be killed or injured within the solar facility in any calendar year and no more than five during the lifetime of the project. This project has not yet been constructed.

Spring Mountain Raceway Expansion Project

An HCP for the Spring Mountain Raceway Expansion project was completed in September 2012 for the disturbance of 120 acres of desert tortoise habitat. The project site is located adjacent to the original raceway facility to the west and State Route 160 to the southwest.

Surrounding urban development had affected the quality of the habitat in the general vicinity of the project, although the actual project site was relatively undisturbed until the raceway expansion was constructed. Surveys conducted on the project site did not detect desert tortoises; however, eight burrows were noted within the site. To minimize and mitigate the impacts of the taking authorized by the permit, the permittee agreed to fence the property with tortoise-proof fencing, clear all tortoises from the project area prior to commencement of construction activities, provide desert tortoise awareness information to all construction workers, control and contain trash, and provide funding to contribute to desert tortoise conservation and recovery efforts.

A HCP is currently in progress for a second raceway expansion project. This could result in the disturbance of up to 227 acres of desert tortoise habitat surrounding the existing raceway.

*Other Existing Linear Disturbances and Anthropogenic Features*

State Route 160 occurs just north of the project site, running southeast and northwest of the action area. Portions of SR 160 have been fenced to exclude tortoises and thus restricts northeast-southwest movement of tortoises in the area. Several large culverts exist under SR 160, but are currently unpassable for desert tortoise. Tecopa Road provides public and project access to the action area as well as travel to Shoshone, CA. Powerlines run along SR 160 as well as through the Stump Springs Translocation Site to Sandy Valley.

Other anthropogenic features include collection of desert tortoises for pets, food, and commercial trade; collision with vehicles on roads and highways; mortality from gunshots; predation; and OHV travel cross-country.

*Connectivity- All Projects*

Genetic and demographic connectivity occurs throughout the Pahrump and Mesquite Valleys. The southern portion of the Stump Springs translocation site is located within the modeled least cost corridor for the desert tortoise. Least-cost path models identify potential linkages within which an animal would have the best chance of survival according to a specified "cost surface." High-probability, high-quality habitat corresponds to "low cost" for tortoise occupancy (Averill-Murray et al. 2013a). This type of evaluation provides an estimation of relative potential for animal passage across the entire landscape, including the identification of potential barriers to movement. Contiguous high-value habitat exists within the Stump Springs translocation site and runs northwest along a narrow corridor between the Spring Mountains and SR 160. Predictors of habitat quality for tortoise movement include intermediate distances from minor roads, increasing density of desert washes, and increasing amounts of vegetation cover (Gray et al. 2019).

In order to retain genetic connectivity and gene flow, populations of desert tortoises need to be connected by areas of occupied habitat that support sustainable numbers of reproductive individuals. It is likely that the desert tortoise population within the action area is genetically connected to the populations to the south within California along the least-cost corridor. Home ranges of the desert tortoises within the action area likely overlap with the ranges of tortoises found in the connectivity corridor allowing for reproduction and exchange of genes between the two populations.

Demographic connectivity describes a pattern of habitat or vegetation that is connected with other areas of similar habitat or vegetation. Demographic connectivity also refers to the degree to which population growth and vital rates are affected by dispersal. Demographic connectivity exists between the desert tortoise population in the action area and the populations in the surrounding areas because some of the existing barriers are permeable. Desert tortoise fencing on

SR 160 and existing culverts under the highway should substantially reduce road mortality and actually increase tortoise survival and connectivity once the culverts are retrofit.

*Recreation*

Recreational use on roads and trails, and large-volume, high-speed travel on major roads and highways has contributed to desert tortoise mortality, habitat loss, habitat degradation, and habitat fragmentation. Many highways have been fenced to exclude tortoises which includes U.S. Highway 95 south of Las Vegas; U.S. Highway 93 north of Las Vegas; State Routes 161, 163, 164, and 165; Interstate 15 northeast of Las Vegas and in California; and Interstates 10 and 40, and Highways 58, 62, and 395 in California.

*Upper Respiratory Tract Disease*

Upper respiratory track disease (URTD) was discovered in 1990 and is currently a major cause of mortality in portions of their range. Habitat degradation, poor nutrition, and drought have increased the desert tortoises' susceptibility to this disease (Service 1994). It is thought that URTD is transmitted between desert tortoise populations when desert tortoises are captured as pets and subsequently released. No health assessments have been completed on tortoises in the Projects' area or the control site. During surveys of the Stump Springs in 2014, five tortoises were accessible and received a visual health assessment and tissue collection according to standardized protocols (Clark County and USFWS 2017; USFWS 2016). None of the collected samples tested positive for antibodies to either of the Mycoplasma species (Clark County and USFWS 2017).

## EFFECTS OF THE PROPOSED ACTION

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

The revised Endangered Species Act regulations (84 FR 44976) combine effects into "all effects." Even though we discuss separate categories of effects, direct and indirect effects, this biological opinion complies with the new regulations.

### **Direct Effects**

Direct effects are the immediate effects of the action and are not dependent on the occurrence of any additional intervening actions for the effects to species or critical habitat to occur. The direct and indirect impacts of the Projects were determined based on Projects-specific characteristics, such as area of proposed land disturbance, and amount of earth-moving or surface alteration required, and area where tortoises will be cleared during the implementation of the Projects. Based on full buildout of the Projects, tortoises would have to be removed from a combined

4,284.5 acres of habitat enclosed by a combination of temporary and permanent fencing (i.e., the Full Build Tortoise Clearance Area) prior to construction. The general discussion of effects that follows is understood to apply to both of the Projects, unless effects are clearly delineated by YPS or GLW.

*YPS – Direct Effects*

The proposed YPSP will permanently and temporarily affect, including clearing tortoises from, up to approximately 4,215.1 acres of desert tortoise habitat at the Project's site. The YPSP will also contribute towards the combined effects to the 85,000-acre recipient area as a result of translocation of project tortoises as discussed in the translocation effects section. The project will permanently and temporarily affect approximately 0.11 percent (rounded from 0.107) of the total 3,937,849 million acres available within the Eastern Mojave Recovery Unit (Darst 2014). Under the full build scenario, an estimated 52 adults (95% Confidence Interval [CI] = 35 to 77) would be translocated by YPS (Table 19). However, it has been determined that Sub-Area D may not be developed, and the initial construction may only include Sub-Areas A, B, C and the TCS. The Phase I Tortoise Clearance Area would enclose an area of 3,233.5 acres from which an estimated 39 adults (95% CI = 27 to 59) would need to be translocated by YPS. In addition to adult tortoises it is estimated that many more juvenile tortoises will also require translocation. See Table 19 for estimates of the numbers of juvenile and hatchling tortoises that may also be impacted. If the Proposed Action is developed in an initial Phase 1, then 1,051 acres and an estimated 13 adult tortoises associated with construction of Sub-Area D would remain undisturbed until such time as Sub-Area D is needed for development. In the event that Sub-Area D is developed in a later phase, the additional 1,051 acres would follow the same translocation procedures as the initial phase of construction. During YPSP implementation, YPS may encounter tortoises up to an additional 25 percent beyond the estimated 52, for a project total of 64 tortoises for the YPSP.

*GLW – Direct Effects*

The proposed TCS will permanently and temporarily affect 69.4 acres of desert tortoise habitat at the Projects' site. The TCS will also contribute towards the combined effects to the 85,000-acre recipient area as a result of translocation of project tortoises as discussed in the translocation effects section. The project will permanently and temporarily affect less than 0.01 percent of the total 3,937,849 million acres available within the Eastern Mojave Recovery Unit (Darst 2014). Under the full build or Phase I scenario, 1 adult (95% CI = 0 to 2) would be translocated by GLW (Table 19). In addition to adult tortoises it is estimated that many more juvenile tortoises will also require translocation. See Table 19 for estimates of the numbers of juvenile and hatchling tortoises that may also be impacted. During the TCS project implementation, GLW may encounter tortoises up to an additional 25 percent beyond the estimated one tortoise. Therefore, there may be effects to up to two tortoises.

*Construction and O&M Effects on Desert Tortoises (YPS and GLW)*

Injury and Mortality

Death and injury of desert tortoises could result from excavation activities such as clearing and grubbing of vegetation; trenching activities and entrapment in open trenches and pipes; and collisions with or crushing by vehicles or heavy equipment, including individuals that take shelter under parked vehicles and are killed or injured when vehicles are moved. Desert tortoises that enter or attempt to cross project access or gen-tie roads may be struck resulting in death or injury. Mortality mechanisms also include individual desert tortoises or their eggs being crushed or buried in burrows during construction and O&M-related activities. Because of increased human presence in the area, desert tortoises may be killed or injured due to collection or vandalism associated with increased encounters with workers, visitors, and unauthorized pets. Desert tortoises also may be attracted to the construction area by application of water to control dust, placing them at higher risk of death or injury.

We estimate that all life stages of desert tortoise that occur within the direct effects action area may be adversely affected by the proposed action. Our estimate of the numbers of desert tortoises that are likely to occur within the action area is from pre-project survey data. We acknowledge, however, that not all individuals killed or injured during construction and O&M activities of the Projects will be detected by biologists, biological monitors, or project staff and subsequently reported to the Service. The inability to detect all tortoises is largely due to the cryptic nature of desert tortoises, fossorial habits, and limited abundance. In the case of juveniles and eggs, their small size and location underground reduce detection probabilities of these life stages. Another confounding factor is that scavengers may locate, consume, or remove carcasses before monitors can locate them.

Overall, we expect death and injury of most subadult and adult tortoises to be avoided during construction and O&M activities through the implementation and compliance of Minimization Measures, including the use of authorized desert tortoise biologists and biological monitors who will be onsite during pre-construction and construction activities. A Worker Environmental Awareness Program will inform all personnel about the desert tortoise, including checking under vehicles prior to moving them and what to do should they encounter a tortoise. Tortoise injury and mortality will also be minimized through flagging and fencing the construction boundaries, installing and monitoring desert tortoise fencing around construction areas, and clearing and translocating tortoises within the project areas prior to beginning work. Enforced speed limits and signs will also aid in preventing injury or mortality to desert tortoise.

Vibration

Heavy equipment (e.g., bulldozers and backhoes) that would cause surface disturbance and otherwise operate during YPSP and TCS construction would be needed to construct or install several components of the Projects, including YPS access roads, the YPS O&M building, YPS solar arrays and poles, the TCS and associated transmission line. A few areas that are just outside of the action area may experience short-term or temporary vibrations that could potentially disturb desert tortoises. Vibration from typical construction equipment is barely perceptible farther than 40 to 50 feet beyond the source. Ground vibrations could cause stress to tortoises,

which may result in avoidance of the area, thereby increasing the risk of mortality from increased temperatures or predators. The majority of the Projects' area will be enclosed by tortoise exclusion fencing, and all tortoises in the Tortoise Clearance Area will be translocated from the site. Tortoises that remain outside the Projects' fencing would only be affected by vibration if vibration-causing activities occurred within 50 feet of the exclusion fencing, or in the minimal acres of disturbance outside of tortoise exclusion fencing. Therefore, the number of tortoises that could be affected by vibration is expected to be minimal, if any.

Ground-disturbing activities during O&M of the YPSP or TCS will be substantially less than during construction of the Projects, such that no adverse effects from ground vibration on desert tortoises are expected to occur during O&M.

Dust

YPSP or TCS construction activities and operational vehicle traffic on the roads within the action area could generate dust that could affect vegetation adjacent to and within the action area during construction. Long-term adverse effects from dust on vegetation are not expected to occur. The buildup of dust on plant leaves could affect photosynthetic productivity and nutrient and water uptake, resulting in loss of potential foraging plants for desert tortoise. It is assumed that this low-level dusting effect during construction would be minimal and most likely washed away during rainstorms. Dust levels are expected to be reduced in areas slated for mowing as compared to areas developed using traditional methods, due to retention of plants and less disturbance to soil crusts and desert pavement.

Effects from dust would be addressed through implementation of a Dust Abatement Plan with project design features to control dust impacts during all phases of the Projects.

Noise

Existing noise sources around the action area include road traffic from SR 160 and Tecopa Road. Noise generated during construction of the Projects would be temporary in nature. The construction of the YPSP is expected to last approximately 24 months, and construction for the TCS is expected to last between 6 and 18 months. Construction activities would require the use of dozens of pieces of equipment. Noise levels at 50 feet from the two loudest equipment types for each construction activity, representing a conservative noise level, are expected to be between 68 and 85 decibels. Desert tortoises outside of the proposed solar facility boundary may experience intermittent exposure to increased noise levels but the impacts would be temporary, and desert tortoise are not expected to be substantially affected given their range of movement.

Noise levels during the O&M phase of the Projects are expected to be insignificant. The amount of noise during O&M would not represent a significant change from the current ambient levels.

Increased noise levels may affect desert tortoise foraging and sheltering behavior, leading to poor health and increased risk of mortality, during construction and operations of the facility over a 30-40 year period. While limited data exist on the effect of noise on desert tortoises, Bowles et

al. (1999) demonstrated that the species has relatively sensitive hearing (i.e., mean = 34 dB SPL) but few physiological effects were observed with short-term exposures to jet aircraft noise and sonic booms. These results cannot be extrapolated to chronic exposures over the lifetime of an individual or a population. Based on the ability of other species to adapt to noise disturbance, noise attenuation as distance from the project increases, and the fact that desert tortoises do not rely on auditory cues for their survival, we do not expect any desert tortoises to be injured or killed as a result of project-related noise impacts. In addition, YPS and GLW have included a measure as part of the proposed action to minimize noise-related impacts to the species. Minimization Measure 7 for noise reduction includes using noise reduction devices (e.g., mufflers) to minimize the effects to listed species. Operators will ensure that all equipment is adequately muffled and maintained in order to minimize disturbance to desert tortoise.

Project Access (Roads and Fencing)

Primary access to the site of the Projects would be via SR 160 and Tecopa Road. Access to project work areas outside of the fenced facilities may kill or injure desert tortoises due to increased use of existing routes.

When fencing is installed, tortoises that are released outside of the fenced area can find their access to previously used burrows cut off. This can lead to exposure to high temperatures that can raise carapace temperature to lethal limits (Peaden et al. 2017). The same study documented increasing carapace temperatures due to pacing along the fence. There is no published literature on how long a tortoise can withstand prolonged extreme temperatures before succumbing to death. Shrubs remaining along and near fences would help in preventing such mortality by providing shade.

The primary effect of YPSP access or the TCS project access on desert tortoises is the risk of vehicle strikes. Because all YPSP and TCS workers will participate in the WEAP (Minimization Measure 4), workers may be less likely to strike desert tortoises than a casual user. In addition, clearance surveys (Minimization Measure 5) and the use of authorized desert tortoise biologists and monitors during construction (Minimization Measures 1 and 2) will also be implemented.

We cannot predict how many individuals will be killed or injured due to project-related access because of variables such as weather conditions, the nature and condition of roads, public use that may be confused with project use, and activity patterns of desert tortoises at the time the roads are in use; however, we expect this number to be small.

*Effects of Loss of Habitat*

Construction of the Projects would directly impact the amount of available desert tortoise habitat in and around the Projects. Under the full build plan, a combined total of 4,284.5 acres will be fenced, initially, and all tortoises within this area will be translocated to the Stump Springs Translocation Area. Permanent perimeter fencing would be constructed inside of the exclusion fencing. The YPSP would permanently disturb 2,839 acres of occupied desert tortoise habitat and temporarily disturb 86.3 acres. The TCS and associated transmission line would permanently

disturb 69.4 acres (see Table 1). Permanent disturbance includes the clearing of vegetation along access roads, at the TCS and YPSP O&M building, at inverters, and along cable trenches. As the YPSP construction of the four Sub-Areas is completed, the temporary fencing would be removed, and the undeveloped wash corridors between the Sub-Areas would be reopened, allowing tortoises to move onto and through the site during operations.

Construction equipment would not operate beyond the fenced boundary with the exception of the access road and the gen-tie ROWs. Roads that are not designated as open by the BLM are not to be used by project personnel unless accompanied by an authorized biologist.

Because recovery of vegetation in the desert can take decades or longer, ground-disturbing impacts associated with the Projects may be long-term. Vasek et al. (1975) found that the Mojave Desert transmission line construction and O&M activities resulted in an unvegetated maintenance road, enhanced vegetation along the road edge and between tower sites (often dominated by nonnative species), and reduced vegetation cover under the towers, which recovered significantly but not completely in about 33 years. Webb (2002) determined that absent active restoration following extensive disturbance and compaction in the Mojave Desert, soils in this environment could take between 92 and 124 years to recover. Other studies have shown that recovery of plant cover and biomass in the Mojave Desert could require 50 to 300 years in the absence of restoration efforts (Lovich and Bainbridge 1999). Based on a quantitative review of studies evaluating post-disturbance plant recovery and success in the Mojave and Sonoran deserts, Abella (2010) found that reestablishment of perennial shrub cover (to amounts found on undisturbed areas) generally occurs within 100 years but no fewer than 40 years in some situations. He also found that a number of variables likely affect vegetation recovery times, including but not limited to climate (e.g., precipitation and temperatures), invasion by nonnative plant species, and the magnitude and extent of ongoing disturbance. Depending on the BLM alternative that is selected for the Projects, vegetation treatment could include drive and crush, mow-and-go, mowing, or a combination of methods. All three alternatives are likely to result, to varying degrees, in faster vegetation recovery than if the vegetation was completely removed.

In addition to the combined approximately 4,284.5 acres that the Projects will permanently and temporarily affect, the Projects will contribute towards the effects to the 85,000-acre recipient area as a result of translocation of all project tortoises as discussed in the translocation effects section. By project, the YPSP will permanently and temporarily affect up to approximately 4,215.1 acres, which accounts for approximately 0.11 percent (rounded from 0.107) of the 3,937,849 million acres available within the Eastern Mojave Recovery Unit (Darst 2014). The TCS disturbance would account for less than 0.01 percent of the total recovery unit area. The combined 4,284.5 acres of direct impacts from the Projects accounts for approximately 0.11 percent of the total acres within the recovery unit. While the model does not take into account anthropomorphic disturbances that have historically or are currently affecting the species, it is unlikely that consideration of these would result in a substantial change in this estimate.

While the combined percentage (0.11) does not constitute a numerically significant portion of the Eastern Mojave Recovery Unit, we do not have the ability to place a numerical value on edge effects, habitat degradation, and overall fragmentation that the proposed action may cause or that

occurs in the recovery unit as a whole. As a result, the low percentage of habitat within the recovery unit that would be lost underestimates impact of the proposed project on the desert tortoise, especially in light of existing land uses, changes in species composition, and fire regimes due to establishment of nonnative plant species, existing and increasing disease and predation rates, and the expansion of human occupancy in what were once remote desert landscapes. The revised recovery plan (Service 2011a) and 5-year review (Service 2010a) provide detailed discussions of these and other past, present, and future threats facing the desert tortoise.

*Handling and Translocation Effects*

All desert tortoises found on the project site will be captured and removed according to the Translocation Plan (Appendix). Effects would occur both to the translocated tortoises and to the resident tortoises where translocatees are moved. An estimated combined 53 adult tortoises will be moved to the translocation site during implementation of the YPSP and TCS project. This number could be higher depending upon the actual number of tortoises in the area during clearance. We estimate that the totals could be as much as 25 percent higher (66 translocated tortoises). As stated in the *YPS – Direct Effects* and *GLW – Direct Effects* sections above, YPS may translocate 64 adult tortoises, and GLW may translocate 2 adult tortoises. Translocated tortoises would be handled, have transmitters affixed, given health assessments with tissue sampling, and moved. Tortoises could incur injury or death. Smaller, juvenile tortoises would be moved under the same geographic criteria as adults.

Capture and translocation of desert tortoises may result in accidental death and injury from stress or disease transmission associated with handling tortoises, stress associated with moving individuals outside of their established home range, stress associated with artificially increasing the density of tortoises in an area and thereby increasing competition for resources, and disease transmission between and among translocated and resident desert tortoises. Capture and handling of translocated and resident desert tortoises for the purposes of conducting health assessments, which includes visual inspection relative to body condition, clinical signs of disease, and collection of biological samples for disease screening (i.e., blood samples to test for antibodies to pathogens), could result in accidental death or injury.

Capturing, handling, and moving tortoises for the purposes of translocating them out of the project areas or out of harm's way (during all phases of the project) may result in accidental death or injury if these methods are performed improperly, such as during extreme temperatures or if individuals void their bladders and are not rehydrated. Averill-Murray (2002) determined desert tortoises that voided their bladders during handling had lower overall survival rates (0.81 to 0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures and procedures, such as reusing latex gloves, pathogens may be spread among individuals. The Applicant's translocation plan will include protocols to minimize translocation effects and would continue to be adaptively managed over time to facilitate successful translocation. Because the Applicant would employ authorized desert tortoise biologists approved by the Service and adhere to the most recent Service guidance in addition to implementing the conservation measures outlined in the proposed action, we

anticipate any mortality or injury to desert tortoises from activities associated with removing individuals from the proposed project sites is unlikely.

Translocation has the potential to increase the prevalence of diseases, such as URDT, in translocated and resident desert tortoises. Physiological stresses associated with handling and movement or from density-dependent effects could exacerbate this risk in translocated individuals with subclinical URTD or other diseases that present symptoms subsequent to translocation. This potential conversion of translocated desert tortoises from a non-contagious to contagious state may increase the potential for infection in the resident population above pre-translocation levels. To minimize this risk, health assessments (physical and biological) would be conducted on all desert tortoises to be translocated prior to being released in accordance with the most recent Service guidance (Service 2019e).

Translocated desert tortoises will not be released into the recipient areas until results of the disease tests have been received and the Service approves the disposition plan for each individual. While awaiting test results, desert tortoises will be monitored *in-situ* or penned (i.e., quarantined) onsite no longer than 12 months. Handling and blood collection may result in elevated stress levels that render individuals more susceptible to disease or dehydration from loss of fluids. Because the Applicant will employ experienced biologists, approved by the Service and trained to perform health assessments and collection of biological samples, we do not expect these activities to result in death or injury of any individuals. Furthermore, disease screening and quarantine procedures will reduce the potential for introduction and spread of disease due to translocation.

Desert tortoises in quarantine pens could increase their exposure and vulnerability to stress, dehydration, and inadequate food resources. However, because desert tortoises will be monitored regularly, care will be administered following specific procedures, and the quarantine period should not exceed one year, we anticipate that any quarantined individuals are unlikely to experience death or injury from the vulnerabilities identified above. The potential exists, however, for predators or poachers to target quarantined desert tortoises. This risk also is expected to be minimized through regularly scheduled monitoring in accordance with the desert tortoise translocation plan. Desert tortoises monitored *in-situ* may be subject to similar effects as those in quarantine pens; however, because these individuals will be confined to large areas within their existing home ranges, we anticipate that the potential for increased stressors would be relatively low and adequate shelter and food resources would be accessible until translocation.

While we cannot reasonably predict if an increase in disease prevalence within the resident population may occur due to translocation, we believe the following measures will reduce the magnitude of this risk:

- YPS and GLW will use experienced biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels in translocated animals;
- desert tortoises in the project footprint are currently part of a continuous population with the resident populations of the recipient site and are likely to share similar pathogens and

immunities;
- density-dependent stresses are unlikely to occur for reasons stated below;
- any animal that has clinical signs of disease or ELISA-positive blood test will not be translocated; and
- long-term monitoring of translocated individuals will be implemented to determine the prevalence of disease transmission.

Because ELISA testing can yield false-positive results (i.e., an animal may test positive even though it is not a carrier of the disease), the removal of healthy individuals from the translocated population may occur due to concern over disease. These individuals would be removed from the wild and, thereby, no longer contribute to the environmental baseline for the action area. Removing these individuals may inadvertently reduce the resistance of the population to disease outbreaks. Because YPS and GLW would coordinate with the Service and follow-up testing of ELISA-positive individuals would be performed, the potential for removing false-positive individuals from the translocated population is low. Consequently, we conclude that few, if any, desert tortoises would be removed from the population due to false-positive results. Similarly, some of the animals that test positive may have survived past disease infections and remain healthy. Despite gaps in our knowledge relative to disease pathology and recognition that removal of seropositive desert tortoises may eliminate individuals with superior fitness and genetic adaptations for surviving disease from the gene pool, the low number of individuals expected to be removed would not be large enough to affect population genetics in the wild.

Boarman (2002), in a review of literature on threats to the desert tortoise, stated that the adverse effects of translocating desert tortoises include increased risk of mortality, spread of disease, and reduced reproductive success. Translocated desert tortoises have a tendency, at least initially, to spend more time aboveground moving through their environment than animals within their home ranges; this tendency exacerbates at least some of these threats.

Field et al. (2007), Nussear (2004), and Nussear et al. (2012) have conducted studies focused on translocating desert tortoises and found that translocated animals seem to reduce movement distances following their first post-translocation brumation to a level that is not significantly different from resident populations. As time increases from the date of translocation, most desert tortoises change their movement patterns from dispersed, random patterns to more constrained patterns, which indicate an adoption of a new home range (Nussear 2004). Walde et al. (2011) found that movement patterns of desert tortoises translocated from Fort Irwin differed from those of animals studied elsewhere but describe their results as “apparent trends” because they have not completed analyses to determine if these trends were statistically significant. Translocated animals moved greater distances than residents and controls through the four years of their study.

Desert tortoises that were translocated short distances moved much shorter distances than those that were translocated long distances. Moving desert tortoises shorter distances can result in the animals attempting to return to their original capture site. Attempts to return to the capture site would cause individuals to spend relatively greater amounts of time aboveground; if they encounter and follow fence lines during this movement, it may further increase the amount of time they spend aboveground. These behaviors may expose them to elevated risks of predation

and exposure to temperature extremes that they would otherwise avoid. YPS and GLW propose to locate desert tortoises translocated from the solar facility via telemetry as outlined in the LTMP to ensure that they are not exhibiting behaviors that may endanger their well-being such as walking along the exclusion fence. Overall, because we expect desert tortoises would be moved and monitored by authorized biologists, few, if any, tortoises are likely to be killed or injured as a result of being translocated from the Project site.

Hinderle et al. (2015) found that almost half of desert tortoises translocated 2 km returned to their capture site; only one desert tortoise moved 5 km returned to the capture site; and no desert tortoises returned home from 8 km away. The propensity for desert tortoises to attempt to return to their capture site would increase the likelihood that they would encounter an exclusion fence and pace it; while pacing the fence, they may be attacked by predators or exposed to extreme weather. Despite the fact that Hinderle et al. (2015) found that almost half of the animals in their study returned to their capture sites, more than half did not. The potential exists that these animals remained within their home ranges after translocation and made no effort to return to the capture site, at least immediately.

Desert tortoises that spend less time aboveground are less vulnerable to predation and environmental extremes. Regardless of the distance desert tortoises would be moved, we expect that animals that are moved from the project sites would spend more time aboveground and moving, at least during the first year, which means they would be more vulnerable to predators, adverse interactions with other desert tortoises, and weather conditions than resident or control animals. During this first year of increased movement, desert tortoises would also be more likely to engage in fence pacing behavior, which can lead to hyperthermia and death.

As with prior translocations (Nussear 2004, Field et al. 2007), we anticipate that predation is likely to be the primary source of post-translocation mortality particularly for small tortoises. The level of winter rainfall may dictate the amount of predation observed in desert tortoises (Drake et al. 2009, Esque et al. 2010). We are aware of two instances where monitoring of large numbers of control and resident desert tortoises accompanied the translocation of desert tortoises (Fort Irwin and Ivanpah Solar Electric Generating System). At Fort Irwin, Esque et al. (2010) found that “translocation did not affect the probability of predation: translocated, resident, and control tortoises all had similar levels of predation.” At the Ivanpah Solar Electric Generating System, the numbers of translocated, resident, and control desert tortoises that have died since the onset of work at the Ivanpah Solar Electric Generating System are roughly equal (Davis 2014), which seems to indicate that translocation is not a factor in these mortalities; among translocated, resident, and control animals, predation by canids is the greatest source of mortality. To minimize the risk of predation, the Disposition Plan will include release sites preferentially located away from known areas of concentrated predator sign if any are identified.

Drought conditions seem to affect translocated and resident desert tortoises similarly. Field et al. (2007) monitored translocated and resident desert tortoises during drought conditions and found no significant difference between resident and translocated animals. Field et al. (2007) noted that most of the translocated desert tortoises “quickly became adept at life in the wild,” despite the harsh conditions. Consequently, we have concluded that the amount of rainfall preceding

translocation is not likely to decrease the survival rate of desert tortoises that would be moved from within the project areas.

Nussear et al. (2012) investigated the effects of translocation on reproduction in 120 desert tortoises. They found that, in the first year since translocation, the mean reproductive effort for translocated desert tortoises was slightly less than that of residents. Nussear et al. (2012) noted that the translocated animals may have benefited from being fed while in the pre-translocation holding facility. If the food provided in the facility increased their production of eggs in the first year after translocation, translocated desert tortoises that were not held in captivity and fed prior to release may have produced fewer eggs than he observed in his experiment. In the second and third year after translocation, the mean number of eggs was not different between resident and translocated desert tortoises. Given the long reproductive life of desert tortoises and the fact that translocated animals produced the same number of eggs as residents the first year after translocation, the decrease in the output of eggs from translocation desert tortoises for a year will not have a measurable effect on the overall health of the population, either locally or on a broader scale.

In spring 2009, 570 tortoises were translocated from the United States Army National Training Center at Fort Irwin in California south of the project boundary. Genotypes were determined for the translocated male tortoises and an additional 190 resident male tortoises (Mulder et al. 2017). In 2012, 96 female tortoises (50 resident and 46 translocated) were tracked, and nests were visited until blood samples were taken from all live hatchlings (97 hatchlings from 36 nests) and genotyped. The paternity was determined for 35 hatchlings, and all 35 hatchlings were found to be offspring of resident males, with translocated males producing no offspring (Mulder et al. 2017). Translocated males could have reduced fitness due to stress or expended energy in a new environment. Since this is only one study, it is not known if this occurs for all translocated males and, if so, how long it takes before translocated males start breeding.

Translocation also affects resident desert tortoises within the maximum dispersal area due to local increases in population densities. Desert tortoises from the solar facility site would be moved to areas now supporting a resident population, which may result in increased inter-specific encounters and, thereby, an increased potential for spread of disease, potentially reducing the health of the overall population; increased competition for shelter sites and other limited resources; increased competition for forage, especially during drought years; and increased incidence of aggressive interactions between individuals (Saethre et al. 2003). To minimize potential density-dependent effects, recipient areas must be of sufficient size to accommodate and maintain the resident and translocated desert tortoises (Service 2015g).

The 85,000-acre recipient site represents 2.16 percent of the 3,937,849 million acres of remaining desert tortoise habitat in the Eastern Mojave Recovery Unit. The estimated pre-translocation density of tortoises within the recipient site is approximately 0.9 tortoises per $km^2$. The low population density of tortoises within an area of apparently suitable habitat contributed to the decision to use the Stump Springs Translocation Area as a recipient site to augment the existing population (BLM 2017). The maximum recommended post-translocation density within the Eastern Mojave Recovery Unit is 2.0 adult tortoises per $km^2$ (Service 2019e). Tortoise status

and habitat conditions in the translocation area will be re-evaluated before density exceeds 2.0 adult tortoises per $km^2$. According to the revised *Translocation Plan for the Stump Springs Regional Augmentation Site* (dated June 5, 2020), that density would not be reached until 339 adult tortoises are translocated to the translocation area. Based on survey data from the YPSP and TCS survey area, an estimated 66 adult tortoises, total, may be translocated to the translocation site as a result of the Projects. Therefore, post-translocation tortoise density at the Stump Springs Translocation Area will remain below the threshold for re-evaluation.

We anticipate that density-dependent effects on resident desert tortoise populations are likely to be minor for the following reasons:

- Health assessments will be performed on all desert tortoises prior to translocation, thus decreasing the potential for introduction of infectious diseases to the recipient areas;
- specific release points will be selected close to the time of release and take into account conditions at that time to minimize potential affects to resident or translocated tortoises;
- tortoises will be released broadly rather than released within one localized area;
- tortoises released are expected to disperse across the Translocation Area;
- the recipient areas are contiguous with suitable desert tortoise habitats, which will facilitate dispersal into other areas; and
- long-term monitoring will provide opportunities to implement adaptive management to address any observed unanticipated effects.

During the translocation work at Fort Irwin, researchers tested over 200 desert tortoises for differences in the levels of corticosterone, which is a hormone commonly associated with stress responses in reptiles; Drake et al. (2012) “did not observe a measureable physiological stress response (as measured by [corticosterone]) within the first two years after translocation”. The researchers found no difference in stress hormone levels among resident, control, and translocated desert tortoises. For these reasons, we conclude that the addition of translocated desert tortoises to the recipient areas would not result in detrimental effects to translocated or resident animals.

Various studies have documented mortality rates of 0, 15, 21, and 21.4 percent of translocated desert tortoises in other areas (Nussear 2004, Field et al. 2007). Nussear (2004) found that mortality rates among translocated desert tortoises were not statistically different from that observed in resident populations. However, this study did not compare mortality rates in resident populations to those in control groups; therefore, we cannot determine if the translocation caused increased mortality rates in the resident population. Recent studies in support of the Fort Irwin expansion compared mortality rates associated with resident and translocated desert tortoise populations with that of control populations; preliminary results indicated translocation did not increase mortality above natural levels (Esque et al. 2010). This and other fieldwork indicate that desert tortoise mortality is most likely to occur during the first year after release. After the first year, translocated individuals are likely to establish new home ranges and mortality is likely to decrease.

The probability for survival for tortoises over 160 mm was studied in the vicinity of the Ivanpah solar facility during a 5-year study (58 translocated tortoises, 112 resident tortoises, and 149 control tortoises; Dickson et al. 2019). Translocated tortoises were found to have 89% to 99% the survival rates of resident or control tortoises. This may be because tortoises were released within 500 meters of their home range or because tortoises were translocated in early spring, giving them time to dig burrows and become familiar with the environment before the heat of the summer. Another study of four translocation sites (Nafus et al. 2017) tested the relationship of habitat features to translocation dispersal and survival of juvenile desert tortoises in southern Nevada. Findings indicated that the presence of rodent burrows, substrate texture, and wash presence provided refugia, allowing tortoises to avoid predator detection and reduce overall mortality.

Natural mortality rates of juvenile desert tortoises are greater than those of adult tortoises. In general, we expect that healthy populations have a large number of desert tortoises smaller than 180 mm (Turner et al. 1987), but only limited information exists on the actual numbers of small tortoises in a given area. Additionally, juvenile desert tortoises use resources differently than do adults (Wilson et al. 1999) and we expect that juveniles and adults interact much less frequently than do adults. Due to differences in habitat use influenced by both physical and physiological differences between adult and juvenile desert tortoises, we expect overlapping of ranges during growth and dispersal of the juvenile desert tortoise. Consequently, we do not expect translocating juvenile desert tortoises at higher densities than adult animals would result in any density-dependent adverse effects.

Tortoises that move over large areas can result in greater overlap with other desert tortoise home ranges. If translocated animals have disproportionately higher contact opportunities and increase the connectivity of animals across the landscape, they could rapidly facilitate disease spread if infected. Translocated animals, though often healthy at the time of selection, may be at high risk of acquiring infection from residents and facilitating spread. High mobility after release may increase contact opportunity, and stress associated with translocation may increase susceptibility or make a virulent infection more virulent (Aiello et al. 2014). Several circumstances that are likely to reduce the magnitude of the threat of disease prevalence being exacerbated by translocation include (1) YPS and GLW will use experienced authorized biologists and approved handling techniques that are unlikely to result in substantially elevated stress levels in translocated animals; animals are less likely to succumb to disease when they are not stressed; (2) desert tortoises on the project site are currently part of a continuous population with the resident populations of the recipient sites and are likely to share similar pathogens and immunities; (3) Drake et al. (2012) indicated that translocation does not seem to increase stress in desert tortoise; (4) density-dependent stress is unlikely to occur for the reasons discussed previously in this section; and (5) Service-trained biologists will perform health assessments using Service-approved protocols (Service 2015g) and will not translocate any desert tortoise

Based on the information described above, we anticipate that survival rates of adult desert tortoises moved from the project sites will not significantly differ from that of animals that have not been moved. We expect that desert tortoises would be at greatest risk during the time they are

spending more time aboveground than resident animals. We cannot precisely predict the level of risk that will occur after moving desert tortoises because regional factors that we cannot control or predict (e.g., drought, predation related to a decreased prey base during drought, etc.) would likely exert the strongest influence on the mortality rates.

We do not anticipate that capture and moving desert tortoises out of harm's way would result in death or injury because these individuals would remain near or within their existing home range, which is not likely to result in significant social or competitive impacts to resident desert tortoises in the area. Following release of desert tortoises translocated outside of their home range, a small number may die due to exposure, stress, dehydration, inadequate food resources, and increased predation. We anticipate most of this mortality is likely to occur in the first year after release, during the period that translocated animals are attempting to establish new home ranges. In addition, we anticipate that a small number of resident desert tortoises at the recipient area may die from natural causes due to these same vulnerabilities. However, we cannot determine if mortality rates in the translocated or resident populations would be above natural mortality levels for the recipient area. In addition, the potential impacts of capturing, handling, and moving tortoises for the purposes of translocation would be avoided or reduced through implementation of the actions specified in the implementation of the Service-approved translocation plan (Appendix A).

*Post-Translocation Monitoring*

Translocation of tortoises from the Projects' site are part of a larger Stump Springs regional augmentation plan, headed by the Desert Tortoise Recovery Office (DTRO) in Reno, Nevada. Therefore, effects that would result from activities required for post-translocation monitoring, including attaching transmitters and conducting initial health assessments in advance of the Projects' implementation, and effects of post-translocation monitoring activities, as described in the translocation plan (Appendix), will be covered under the section 10(a)(1)(A) recovery permit issued to the DTRO or an appropriate partner.

**Indirect Desert Tortoise Effects (YPS and GLW)**

Indirect effects are those for which the proposed action is an essential cause, and that are later in time, but still reasonably certain to occur. If an effect will occur whether or not the action takes place, the action is not an essential cause of the indirect effect. In contrast to direct effects, indirect effects are more subtle and may affect tortoise populations and habitat quality over an extended period of time, long after surface-disturbing activities have been completed. Indirect effects are of particular concern for long-lived species such as the desert tortoise because project-related effects may not become evident in individuals or populations until years later.

The area of indirect effects is defined as the area within 0.5 mile of the project area including the proposed translocation area. Indirect effects do not involve ground-disturbing activities but instead consider effects from habitat fragmentation, decreased connectivity, fugitive dust, noise, lighting, herbicide use, and accidental spills of hazardous materials associated with the project that have the potential to impact desert tortoise and their habitat in the surrounding area. The

magnitude of indirect effects is expected to decrease as distance from the action area increases. Potential indirect effects from the proposed action would be addressed through implementation of project design features that control impacts such as soil erosion, dust, stormwater runoff, and water quality during all phases of the project. In addition, YPS and GLW will prepare and implement a Worker Environmental Awareness Program; Raven Management Plan; Weed Management Plan; Pesticide Plan; Spill Prevention, Control, and Countermeasures Plan; Hazardous Materials Management Plan; and Fugitive Dust Plan.

*Lighting*

Temporary lighting would be present in areas of active construction during the construction phase of the Projects. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward facing and shielded to focus illumination on the desired areas only. However, this lighting would only be installed during construction. Nighttime construction would be rare, but artificial lighting could cause behavioral changes in tortoises, causing them to come out of their burrows. This could expose them to possible mortality from predators or stress-induced fence pacing.

During O&M, the lighting systems would provide personnel with illumination for both normal and emergency conditions near the main entrance and the YPSP substation and TCS. Lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be downward facing and shielded to focus illumination on the desired areas only. There would be no lighting in the solar field. Therefore, light trespass on surrounding properties would be minimal. If lighting at individual solar panels or other equipment is needed for night maintenance, portable lighting would be used. Project lighting is not expected to have a more than negligible effect on desert tortoises near and adjacent to the Project.

*Predator Subsidies*

Avian predators, such as the common ravens, and scavengers (e.g., coyotes) benefit from a myriad of resource subsidies provided by human activities as a result of substantial development within the desert because food and water subsidies and roosting and nesting substrates would otherwise be unavailable; these animals prey on tortoise eggs, juvenile tortoises, and adult desert tortoises. These subsidies can include food (e.g., garbage), water (e.g., detention ponds), nesting substrates (e.g., transmission lines and fencing), cover, and safety from inclement weather or predators (e.g., office buildings). Human activities also facilitate expansion of raven and coyote populations into areas where they were previously absent or in low abundance. Ravens likely will frequent the project areas because of the potential availability of such subsidies. Road-kill of wildlife along SR 160 provides additional attractants and subsidies for opportunistic predators and scavengers but is not likely to increase appreciably as a result of the project. Carcasses of any type (bird, mammal, etc.) may attract predators to the project site. Removal of carcasses when found would eliminate the odor and further attraction to the site by predators.

Facility infrastructure, such as gen-tie and transmission lines, fences, buildings, and other structures on the project site may provide perching, roosting, and nesting opportunities for ravens

and other avian predators. Natural predation rates may be altered or increased when natural habitats are disturbed or modified. Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in the Mojave Desert prior to 1940, the existing level of raven predation on juvenile desert tortoises is considered an unnatural occurrence (BLM 1990). In addition to ravens, feral dogs have emerged as significant predators of desert tortoises adjacent to residential areas. Though feral dogs may range several miles into the desert and have been found digging up and killing tortoises (Evans 2001), there have not been any reports of feral dogs in the area of the Projects.

There has also been confirmed predation on desert tortoise by red-tailed hawks (*Buteo jamaicensis*). In spring 2015, a study in the Chemehuevi critical habitat unit in California, found juvenile tortoise scutes within red-tailed hawk pellets under transmission line structures (Anderson and Berry 2019). Of the pellets collected, 4.4 percent contained one to several juvenile tortoise scutes. This is the first report of predation on tortoises by red-tailed hawks.

To avoid and minimize the availability of project sources for predator, subsidies will be minimized by Minimization Measure 15 which proposes trash and litter control and monitoring for the presence of ravens and other predators. A Raven Management plan will be implemented if predator densities substantially increase near the facility. Specific minimization actions to be implemented include onsite trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for presence of ravens.

*Exposure to Chemicals*

The primary wastes generated at the Projects during construction, operation, and maintenance would be nonhazardous solid and liquid wastes. Limited quantities of hazardous materials would be used and stored on the Projects' site. The primary hazardous materials onsite during construction would be the fuels, lubricating oils, and solvents associated with construction equipment, which could impact desert tortoise through poisoning causing decreased health or mortality. The nonhazardous wastes produced by construction and O&M activities would include defective or broken electrical materials and batteries, empty containers, the typical refuse generated by workers and small office operations, and other miscellaneous solid wastes.

YPS and GLW will prepare a Spill Prevention, Control, and Countermeasures Plan and a Hazardous Materials Management Plan to address waste and hazardous materials management including BMPs related to storage, spill response, transportation, and handling of materials and wastes. Waste management would emphasize the recycling of wastes where possible and would identify the specific landfills that would receive wastes that cannot be recycled.

Herbicides may be used for the treatment of non-native plant species, which could cause decreased health or mortality to tortoises. Herbicide use would follow those approved in BLM's Programmatic EIS (PEIS) for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Managed Lands in 17 Western States (BLM 2007, 2016). YPS and GLW

would implement a Site Restoration Plan and an Integrated Weed Management Plan that specifies procedures for managing vegetation and minimizing the spread of non-native and noxious weeds, including integrated pest management and use of herbicides. Standard Operating Procedures will be incorporated into the Integrated Weed Management Plan and implemented. The herbicides that may be used, based on those allowed on BLM lands, include aminopyralid, clopyralid, imazapyr, imazapic, glyphosate, metasulfuron methyl, and rimsulfuron. These herbicides are considered to have very low toxicity to mammals, birds, and fish when applied in accordance with all product label requirements and restrictions. There is limited literature on toxicity trials involving reptiles, but exposure to such chemicals may cause changes in behavior, symptoms of poisoning (swollen eyes, nasal discharge, immobility, etc.), or even mortality with repeated exposure. Effects from exposure would be much greater in juvenile tortoises than larger adults. Herbicides that are believed to have deleterious effects on reptiles, such as 2,4-D, would not be allowed. Any herbicide use would be implemented during the less active tortoise season.

Proposed Conservation Measure 4 is a project that 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 is currently not a BLM approved herbicide. An extensive effects analysis and consultation with the Service will need to be conducted before this herbicide can be used. Consultation with the Service on this herbicide is upcoming.

*Nonnative Plant Species*

Another indirect effect from the development of the Projects is the potential introduction and spread of nonnative, potentially invasive plant species into habitats adjacent to or within the project sites. Invasive plant species reduce habitat quality for desert tortoise, in particular, foraging habitat (Tracy et al. 2004), leading to reduced tortoise health and potentially mortality.

Construction and O&M activities of the Projects may increase distribution and abundance of nonnative species within the action area due to ground-disturbing activities that favor these species. Project equipment may transport nonnative propagules into the project area where they may become established and proliferate. In addition, the introduction of nonnative plant species may lead to increased wildfire risk, which ultimately may result in future habitat losses (Brooks and Esque 2002) and changes in forage opportunities for desert tortoises.

Invasion of non-native plants can affect the quality and quantity of plant foods available to desert tortoises. Nonnative species generally do not provide adequate nutrition to desert tortoises (Abella and Berry 2016); when they out-compete native forage plants, they reduce the amount of food available to desert tortoises. Drake et al. (2016) studied captive Mojave desert tortoises and their response to a variety of diets ranging from all native grass to all invasive grass (*Bromus rubens*). They found that 37 percent of the tortoises given only an invasive grass diet were found dead or were removed from the experiment due to poor body condition. The all-invasive grass group fared the worst of all diet groups, including those that mixed native and invasive grasses.

Implementation of the Weed Management Plan would reduce the spread and colonization of weeds on site and off site in both disturbed areas and downwind of the Projects. The goal of the Weed Management Plan would be to minimize potential effects from weeds and invasive species within the action area and adjacent lands, as well as to avoid adverse effects on desert tortoise foraging habitat on and off site. The Weed Management Plan would identify specific management and monitoring practices to avoid the introduction or spread of existing invasive species within the action area during construction and operation. Any plan that includes the use of herbicides would require review and approval by the BLM, which includes Pesticide Use Proposal (PUP) information. If approved, herbicides would be limited to within roads, fenced areas, other areas of disturbance within the Project site. Desert tortoises may also be directly impacted by herbicide application. The Weed Management Plan and PUP would include measures to minimize impacts of herbicide application to desert tortoises. Only certain herbicides are allowed for use in desert tortoise habitat, as described earlier in this biological opinion.

Diets that include invasive species in the Mojave Desert may decrease desert tortoise health and therefore, survivorship and reproduction potential. Females may lay fewer eggs, although we are unaware of any research that demonstrates this effect; many other factors influence egg production in desert tortoises. We expect no injury or mortality to desert tortoises from the presence of non-native species, but there could be a decrease in reproduction and an effect on how tortoises are distributed across the range.

While we cannot reasonably predict the increase in nonnative species abundance that the Projects may cause within the action area, the degradation of habitat due to spread of nonnative plants would be minimized through the measures outlined in the Weed Management Plan. The Service has determined that successful implementation of the Weed Management Plan (Minimization Measure 7) will sufficiently minimize potential effects of weeds in the action area.

*Edge Effects*

The edge effect is a term commonly used in conjunction with the boundary between natural habitats and disturbed or developed land. Typical edge effects that can degrade the surrounding habitat include increased human foot traffic, vehicle use, trash, predation, and invasive species. The Project includes placement of a permanent security fence along the solar field boundary. The fence may create roosting sites for ravens or birds of prey; however, these effects would be reduced through implementation of anti-perching devices and other control measures detailed in the approved Raven Management Plan. Introduction of weeds from construction or soil disturbance has been addressed.

Because few data exist relative to edge effects from noise, light, vibration, and increased dust from construction and O&M activities, we cannot determine how these potential impacts may affect desert tortoise populations adjacent to the development sites. The lack of information is especially relevant when evaluating effects to individuals within the habitat linkage that would be impacted by the proposed project. Thus, the magnitude and extent of these edge effects cannot

be articulated at this time but could conceivably disturb individual desert tortoises to the extent that they abandon all or a portion of their established home ranges and move elsewhere.

*Effects on Population Connectivity*

Landscape genetic analysis performed by Latch et al. (2011) identified both natural (slope) and anthropogenic (roads) landscape variables that significantly influenced desert tortoise gene flow of a local population. Although they found a higher correlation of genetic distance with slope compared to roads, desert tortoise pairs from the same side of a road exhibited significantly less genetic differentiation than tortoise pairs from opposite sides of a road. Project access roads are not anticipated to decrease population connectivity substantially beyond the existing conditions.

As discussed in the revised recovery plan (Service 2011a) and elsewhere, habitat linkages are essential to maintaining rangewide genetic variation (Edwards et al. 2004b, Segelbacher et al. 2010) and the ability to shift distribution in response to environmental stochasticity, such as climate change (Ricketts 2000, Fischer and Lindenmayer 2007). Natural and anthropomorphic constrictions (e.g., SR 160) can limit gene flow and the ability of desert tortoises to move between larger blocks of suitable habitat and populations. In the action area, existing anthropomorphic constrictions compound effects of natural barriers on desert tortoise population connectivity.

The proposed Project would be constructed in the Pahrump Valley with some existing barriers to tortoise movement. Potential movement of desert tortoises of the action area is restricted by SR 160 to the north, the Spring Mountain range to the east and north, and the city of Pahrump to the west. If tortoises move through the modified culverts under the SR 160, they would be restricted to the north and east by the Spring Mountains but would be able to move north into the Trout Canyon Translocation area and northwest between the city of Pahrump and the Spring Mountains. We do not anticipate that the proposed action would affect potential movement of tortoises south of the action area into California once tortoises are moved into the Stump Springs Translocation Site. The Stump Springs translocation area occurs within a block of contiguous desert tortoise habitat that may be valuable for population connectivity (i.e., between the Ivanpah Critical Habitat Unit, Death Valley National Park, and areas to the north). Due to this, we anticipate that opportunities for desert tortoise connectivity would not be significantly modified by the construction of the Project.

*Effects Associated with Climate Change*

Increases in atmospheric carbon are responsible for changes in climate. As we discussed in the *Status of the Species - Rangewide* section for desert Tortoise of this biological opinion, climate change is likely to cause frequent or prolonged droughts with an increase of the annual mean temperature in the range of the desert tortoise. Increased temperatures would likely adversely affect desert tortoises by limiting their ability to be aboveground. A decrease in rainfall would

likely result in fewer annual plants that are important for the nutritional well-being of desert tortoises.

Plant communities in arid lands sequester carbon by incorporating it into their tissues. Plants also respire carbon into the substrate, where it combines with calcium to form calcium carbonate; calcium carbonate also sequesters carbon (Allen and McHughen 2011). The removal of plant life from approximately 2,908.4 acres within the action area through permanent disturbance would likely reduce the amount of carbon that natural processes can sequester in this localized area. Because the Projects will be mowed and regrowth of shrubs would occur, this effect would be greatly reduced, though we do not have the ability to quantify the difference that mowing would cause.

The Projects are unlikely to affect desert tortoises in a measureable manner with regard to carbon sequestration. The amount of carbon sequestration that would be lost would be minor because the Project would affect a small portion of the entire Mojave desert. Some researchers have questioned the amount of carbon sequestration that occurs in arid areas. Schlesinger et al. (2009) contend that previous high estimates of carbon sequestration in the Mojave Desert bear re-examination. The reduction in the use of fossil fuels, due to the use of the proposed solar facility, would prevent more carbon from entering the atmosphere than would occur by the vegetation that is currently present within the areas being disturbed by construction.

The Projects are unlikely to alter the surface albedo[2] of the action area to the degree that it affects local climatic conditions. Millstein and Menon (2011) found that large-scale PV plants in the desert could lead to significant localized temperature increases (0.4 ˚C) and regional changes in wind patterns because the solar panels are less reflective than many substrates in the desert. As we discussed above, increases in temperatures would likely impair the activity patterns of desert tortoises.

The Projects are unlikely to affect desert tortoises in a measurable manner with regard to changes in the albedo of the action area. Although Millstein and Menon's model raises an important issue to consider, it is based on numerous assumptions that would affect how a solar facility may actually affect the local environment. Millstein and Menon acknowledge that their assumptions regarding the density of solar panels within the plant and the effectiveness of the panels would influence predictions of the amount of heat generated by the facility. Specifically, they assumed that solar panels would completely cover the ground surface (the panels generally do not cover the entire surface of the ground, which could alter the reflectivity they predicted) and a specific efficiency of the panels (they acknowledge that more efficient panels are being developed that generate less heat). Additionally, the model assumes specific reflectivity of the desert surface in two places (near Harper Dry Lake in western Mojave Desert and near Blythe in the Colorado Desert) that may be substantially different than that of the action area. All of these factors would

[2] Albedo is the amount of light reflected by an object. An object that reflects more light is heated less. The opposite is also true; an object that reflects less light is heated more.

likely render the model's predictions somewhat different than real-world conditions and outcomes.

Millstein and Menon's model may be inappropriate for the scale of this biological opinion. The two modeled solar plants in Millstein and Menon's model covered 4,633,207 acres. The area covered by solar panels under consideration in the proposed action for this biological opinion would be approximately 2,846.9 acres (see Table 3). Consequently, the modeled solar plants that generated a local temperature increase of 0.4 degree Celsius were approximately 1,544 times larger than the solar array areas within the perimeter fence of the proposed solar facility. Therefore, the proposed action is unlikely to change local temperatures or regional wind patterns.

**Effects of Habitat Compensation**

To offset the loss and modification of tortoise habitat, YPS and GLW will each separately provide habitat compensation as described in the Conservation Measures section. The funds from the mitigation per-acre fees will be used for four on-site mitigation projects: (1) installing tortoise fencing along Tecopa Road, (2) modifying or retrofitting nine culverts along SR 160, (3) implementing a five-year study on tortoise use of the modified culverts, and (4) implementing a large-scale treatment of invasive grasses in the Stump Springs and Trout Canyon Relocation Areas.

Costs associated with project construction monitoring, survey and removal of tortoises and their disposition (e.g., translocation, care at an onsite facility) are in addition to the Stump Springs translocation fee and remuneration fee, and are the responsibility of YPS and GLW, separately.

**Desert Tortoise Conclusions**

*Reproduction*

Disturbance associated with solar facility construction would not have a measurable long-term effect on reproduction of individual desert tortoises that live adjacent to the solar facility because intense construction activity would occur over a relatively brief period of time (e.g., 24 months) relative to the reproductive life of female desert tortoises. Furthermore, desert tortoises are well adapted to highly variable and harsh environments and their longevity helps compensate for their variable annual reproductive success (Service 1994).

Because the desert tortoises within the solar facility will be translocated from the site prior to construction and all of the adult individuals will be found, we expect that few, if any, adult animals will die as a result of construction within the fenced facility. Tortoises outside of the fenced facility (TCS and gen-tie lines) are more vulnerable to injury or mortality if not detected. Juvenile desert tortoises inside and outside of the fenced facility may be killed because they are more difficult to find; however, the reproductive ecology of the desert tortoise is such that reproductive individuals (i.e., adult animals) play a more important role in maintaining populations than those that are not able to reproduce (i.e., juvenile animals), in large part because of the higher mortality rates of eggs and juvenile desert tortoises. Consequently, the loss of

juvenile animals and eggs would not have a measurable effect on the reproductive capacity of desert tortoises in the area.

We expect that translocated desert tortoises may exhibit decreased reproduction in the first year following translocation. However, research conducted by Nussear et al. (2012) suggests the reproductive rates of translocated desert tortoises are likely to be the same as those of resident animals in subsequent years. Based on work conducted by Saethre et al. (2003), we do not expect the increased density of desert tortoises that would result from translocation to affect the reproduction of resident animals.

While we cannot estimated the number of eggs that would be lost as a result of surface disturbance from program activities, we anticipate that the loss of eggs would not be significant at a population level because areas where eggs would be lost within the action area and the population of reproductive adults within these areas that would produce them comprises a small proportion of the reproductive capacity of the action area. In addition, most of the eggs that may be lost due to program activities are unlikely to produce individuals that would reach reproductive age due to high rates of natural mortality.

For these reasons, we expect that the proposed action is likely to have a minimal negative effect on the reproductive capacity of desert tortoises in the action area.

*Numbers*

We expect that the construction of the Projects (solar arrays and facilities, substations, and gen-tie lines) is likely to injure or kill few adult desert tortoises. Many more tortoises are likely to be captured and moved prior to project activities. Based on tortoise surveys of the 5,032 acre survey area and a 25 percent buffer, we estimate that, during implementation of the Projects, up to 78 adult tortoises and 513 juvenile tortoises may experience some type of take (Table 20). This includes an estimated 66 adults and 434 juveniles within the 4,284.5 acres that will be fenced for the duration of construction, and sites outside of the exclusion fencing where additional take may occur. Although we expect most tortoises to be captured and moved, some may be injured or killed.

The proposed minimization measures, including the installation of exclusion fencing around the perimeter of the project and surveys by qualified biologists, will detect and remove tortoises from areas within the perimeter fence during construction. The perimeter fence will reduce the likelihood of injury or mortality to tortoises that may enter project areas from adjacent habitat. Based on the results of studies of translocated tortoises conducted at Fort Irwin and the Ivanpah Solar Electric Generating System, we expect that the majority of these animals will survive the translocation and reinhabit the project site after construction. We expect that the greatest risk to adult desert tortoises would occur during construction when numerous workers and heavy equipment will be present.

We expect even fewer desert tortoises to be killed or injured during O&M, since the site will fenced to prevent tortoise access and vehicles will remain on access roads outside of the solar

facility. We assume that most of the mortalities during O&M will be juvenile tortoises that are difficult to see.

The 2014 abundance estimate for the Eastern Mojave Recovery Unit is 24,664 adult desert tortoises (Allison and McLuckie 2018). The overall number of desert tortoises would greatly increase if we included individuals smaller than 180 mm. Consequently, even the loss of all 78 adult desert tortoises estimated to be translocated, moved from the project, or otherwise taken during project implementation within the Projects' survey area would comprise a very small portion (approximately 0.32 percent) of the overall population within the Eastern Mojave Recovery Unit and an even smaller portion (0.04 percent) of desert tortoises rangewide (212,343 tortoises).

We expect that many of the juvenile desert tortoises and eggs within the boundaries of the solar facilities are likely to be killed or injured during construction because of their small size and cryptic nature. We also expect that YPS and GLW would likely find some juvenile animals and translocate or move them out of harms way.

Although we are not comparing the overall estimate of the numbers of juvenile desert tortoises likely to be killed or injured to the overall numbers within the recovery unit, we can reasonably conclude that the number of juvenile desert tortoises affected by the proposed projects is a small percentage of the population in the Eastern Mojave Recovery Unit. Since juvenile tortoises have naturally higher mortality rates than adult tortoises, the loss of these juveniles is not likely to appreciably diminish the overall tortoise population. The key to recovery is to ensure that reproducing adult tortoises have high survival rates and are reproducing.

For these reasons, we expect that the proposed action is likely to have a minimal negative effect on the numbers of desert tortoises in the action area.

*Distribution*

Based on the Nussear et al. (2009) model and our calculations (Darst 2014), 3,937,849 acres of desert tortoise habitat remain in the Eastern Mojave Recovery Unit. The amount of desert tortoise non-critical habitat proposed to be permanently and temporarily disturbed is small (3,006.7 acres) relative to the amount available in the action area and within the Eastern Mojave Recovery Unit. The proposed action would result in a permanent and temporary loss of approximately 0.11 percent of the habitat in the recovery unit (3,937,849 acres) and only 0.02 percent of habitat rangewide (16,745,848 total acres). The Projects would result in the permanent loss of 2,908.4 acres (see Table 1) of desert tortoise habitat from construction, or approximately 0.07 percent of the total amount of desert tortoise habitat in the Eastern Mojave Recovery Unit and approximately 0.02 percent of the total amount of desert tortoise habitat rangewide (16,745,848 acres). Consequently, the loss of desert tortoise habitat that would result from construction of the Projects would not appreciably reduce the distribution of the desert tortoise.

Because the Projects' tortoises within the solar array will be moved to a designated translocation area and culverts under SR 160 will be retrofitted as a result of the Projects, the connectivity

north/northwest and south/southwest of the translocation area is expected to be improved. The existing connectivity in the action area is discussed in the *Factors Affecting the Desert Tortoise in the Action Area* section.

For these reasons, we expect that the proposed action is likely to have a minimal negative effect on the distribution of desert tortoises in the action area.

*Effects on Recovery*

To achieve recovery, each recovery unit must contain well distributed, self-sustaining populations across a sufficient amount of protected habitat to maintain long-term population viability and persistence (Service 2011a).

We do not have the ability to place a numerical value on edge effects, habitat degradation, impacts to habitat connectivity, and overall fragmentation that the proposed action may cause. As a result, the percentage of habitat within the recovery unit that would be affected may be greater than the area physically disturbed; however, we still expect the direct and indirect disturbance would not constitute a numerically significant portion of the affected recovery unit. Therefore, we anticipate adequate intact habitat will remain in which desert tortoises will be able to forage, breed, and shelter.

The construction, O&M, and decommissioning of the Projects are unlikely to negatively affect the ability of the desert tortoise to reach stable or increasing population trends in the future, since the proposed action will only have a negligible to minimal negative effect on reproduction, numbers, and distribution of desert tortoises in the action area. The site does not contain desert tortoise designated critical habitat and is not located in an area that is considered important for the recovery of the desert tortoise (e.g., critical habitat or ACEC for the desert tortoise). Therefore, we conclude that the proposed action will not appreciably reduce the likelihood of recovery of the Mojave desert tortoise.

## CUMULATIVE EFFECTS

Cumulative effects are those effects of future State or private activities, not involving Federal activities that are reasonably certain to occur within the action area of the particular Federal action subject to consultation pursuant to section 7 of the Act. Cumulative effects do not include future Federal activities that are physically located within the action area of the particular Federal action under consultation. Past and present impacts of non-federal actions are considered part of environmental baseline conditions. Most of the action area is federally owned, and any future projects on these lands would be subject to separate section 7 consultation.

Projects that may result in adverse effects to the desert tortoise on private (non-Federal) land are anticipated to fall under purview of a HCP and associated incidental take permit.

The Canyon Mesa Solar project was signed in September 2019 and is on 165.6 acres of private land in southern Nye County east of Pahrump. The project will have 88.3 acres that are mowed, clipped, or crushed, leaving tortoise habitat in place. This area will be fenced with openings along the bottom to allow tortoises to remain using the habitat after project installation. The remainder of the project contains 35.7 acres that are previously disturbed and not tortoise habitat, 6.6 acres that will be temporarily disturbed, and 35 acres that will permanently disturbed by project construction. The incidental take permit estimates that two tortoises may be captured and moved during construction and that two tortoises may be killed or injured within the solar facility in any calendar year and no more than five during the lifetime of the project. This project has not yet been constructed.

There is currently a HCP being developed for the expansion of the Spring Mountain Raceway in Pahrump, Nevada in Nye County. The proposed project is to expand the existing facility another 227 acres that were recently purchased from BLM.

Increased development would cause continued habitat loss, degradation, and fragmentation for the local desert tortoise population, as well as increased harm of individual desert tortoises, contributing to the cumulative degradation of the area. Planned future actions such as future transmission line and road corridors, electrical power substations, and industrial solar power plants would likely continue this trend. Most future actions in the action area would likely require section 7 consultation.

## CONCLUSION

### Jeopardy Conclusion

When determining whether a proposed action is likely to jeopardize the continued existence of a species, we are required to consider whether the action would "reasonably be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02).

After reviewing the current status of the species, the environmental baseline for the project area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that implementation of the action as proposed in the biological assessment is not likely to jeopardize the continued existence of the desert tortoise. The Service has reached this conclusion based on the following:

1. The Projects' impacts to the desert tortoise will be minimized or avoided through implementation of measures described in the proposed action. The BLM, YPS and GLW and their contractors will implement numerous measures (e.g., clearance surveys, use of authorized desert tortoise biologists and desert tortoise monitors) to ensure that most tortoises are located and moved out of harms way and potential desert tortoise injury and mortality is minimized on project work sites.
2. Most adult desert tortoises on the Projects' site will be found and translocated; most or all

of these tortoises will survive the translocation.
3. Genetic and demographic connectivity will be minimally reduced and continue to function.
4. Long-term monitoring will likely identify any significant adverse population effects, if they occur, which can be addressed.
5. The Projects would not significantly affect the rangewide number, distribution, population connectivity, or reproduction of the desert tortoise. Desert tortoises that are moved out of harm's way and placed within their home range will remain in the wild with no long-term adverse effects to survival and reproduction.
6. The number of desert tortoises anticipated to be killed or injured is low relative to the estimated number of tortoises occurring within the action area and impacted recovery unit. Even if all 78 estimated adult tortoises within the survey area of the Projects were lost due to the Projects' activities, the loss would account for 0.32 percent of all adult tortoises within the recovery unit and an even lower percent (0.04) of all adult tortoises rangewide. Biologists will find most adult desert tortoises during clearance surveys or during implementation of minimization measures, so killing all 78 adult tortoises would not occur.
7. The amount of desert tortoise non-critical habitat proposed to be permanently and temporarily disturbed is small (3,006.7 acres) relative to the amount available in the action area and within the Eastern Mojave Recovery Unit. The proposed action would result in a loss of approximately 0.11 percent of the habitat in the recovery unit (3,937,849 acres) and only 0.02 percent permanent loss of habitat rangewide (16,745,848 total acres).
8. There will be no impacts to designated desert tortoise critical habitat.
9. The magnitude of the effects to the desert tortoise is not capable of delaying or precluding recovery of this species.

## INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(0)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

In June 2015, the Service finalized new regulations implementing the incidental take provisions of section 7(a)(2) of the Act. The new regulations also clarify the standard regarding when the Service formulates an incidental take statement [50 CFR 402.14(g)(7)], from "…if such take

may occur" to "…if such take is reasonably certain to occur." This is not a new standard, but merely a clarification and codification of the applicable standard that the Service has been using and is consistent with case law. The standard does not require a guarantee that take will result; only that the Service establishes a rational basis for a finding of take. The Service continues to rely on the best available scientific and commercial data, as well as professional judgment, in reaching these determinations and resolving uncertainties or information gaps.

The measures proposed by BLM as part of these incidental take statements are nondiscretionary and must be implemented by BLM, or other jurisdictional Federal agencies as appropriate, so that they become binding conditions of any project, contract, grant, or permit issued by BLM, or other jurisdictional Federal agencies as appropriate, in order for the exemption in section 7(o)(2) to apply. The Service's evaluation of the effects of the proposed actions includes consideration of the measures developed by BLM, to minimize the adverse effects of the proposed action on the desert tortoise. Any subsequent changes in the minimization measures proposed by BLM, or other jurisdictional Federal agencies as appropriate, may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR § 402.16.

The BLM, or other jurisdictional Federal agency, has a continuing duty to regulate the activity that is covered by these incidental take statements as long as the affected area is retained in Federal ownership or control. If BLM, or other jurisdictional Federal agency, (1) fails to require the project proponents to adhere to the action-specific terms and conditions of their respective incidental take statement through enforceable terms that are added to the permit or grant document or (2) fails to retain oversight to ensure compliance with action-specific terms and conditions, the protective coverage of section 7(o)(2) may lapse.

## AMOUNT OR EXTENT OF TAKE ANTICIPATED

The proposed action will result in take (primarily by capture) of all desert tortoises that occur within the temporarily or permanently fenced perimeter(s) of the Projects. Take would also occur if tortoises were found in harms way within the development areas of the transmission line or access road outside of the fenced area, or as exclusion fencing is being constructed. Because the Projects rely on the same survey data and because tortoises in the vicinity of the Projects move freely without regard for project boundaries, take thresholds were first calculated for the proposed action, as a whole. Take thresholds for YPS and GLW, separately, were then determined as subsets of total take thresholds based on respective project acreage, survey data, and construction plans. Additional desert tortoises in the action area, including buffer areas, may be affected by the project to the extent that incidental take may occur; however, such effects are anticipated to be minor and involve mostly alteration in feeding, sheltering, and reproduction behavior due to reduction or fragmentation of their home ranges.

We acknowledge that we cannot precisely quantify the amount of take that will occur during all project activities. Some of the constraints that make it difficult to determine desert tortoise densities and abundance include the cryptic nature of the species (i.e., individuals spend much of their lives underground or concealed under shrubs), inactivity in years of low rainfall, and low

abundance across a broad distribution within several different habitat types. In addition, population numbers and distribution of individuals fluctuate in response to weather patterns and other biotic and abiotic factors over time. The number of juvenile desert tortoises and eggs is even more difficult to quantify because of small size, their location underground, and low detection probabilities during surveys. The following paragraphs define the form of take and the number of individuals we anticipate will be taken during activities related to the Projects.

Areas Associated with Construction, O&M, and Decommissioning Activities

All desert tortoises and most nests with eggs within the proposed fenced perimeter for the Projects will be taken as a result of the Projects. Both YPS and GLW will conduct activities within the fenced perimeter of the Projects that could result in take. The actual number of individuals missed during clearance surveys and killed during construction is unknown. We expect most tortoises missed would be hatchlings and juveniles. Locating the carcasses of small tortoises or egg fragments is unlikely. To address this issue, we have used the total estimate of subadult and adult individuals (up to 78 tortoises) in the survey area of the Projects as a surrogate measure of mortality of the smaller size classes and eggs. Using this threshold as a surrogate assumes that our method of calculating the number of reproductive females, which is based on the estimated abundance of subadult and adult desert tortoises at the Projects' site, allows us to also calculate the number of juveniles and eggs that may be affected. Detecting more than 78 subadult and adult desert tortoises on the Projects' site would indicate that a larger number of juveniles and eggs may be killed or destroyed during construction.

Based on the measures proposed by BLM, desert tortoise survey data, and the proposed action, we anticipate that of the 78 estimated adult and subadult tortoises in the survey area, up to 66 adult and sub-adult tortoises will be captured inside the fenced perimeter of the Projects and translocated; and up to 2 adult or sub-adult desert tortoises may be killed or injured inside the fenced perimeter of the Projects. YPS or GLW activities could result in take of these tortoises; however, based on survey data and the respective YPSP and TCS acreage, we estimate that the majority of take inside the exclusion fencing is likely to occur in YPSP acres.

We do not know exactly how many desert tortoises will be encountered in harms way outside of the exclusion fencing for the Projects; however, take in the form of capture and moving of desert tortoises resulting from these incidental detections is estimated and exempted to ensure mortality and injury of desert tortoises is minimized. Based on the survey results, we anticipate that of the 78 estimated adult and subadult tortoises in the survey area, 12 adult or subadult tortoises may be in the area immediately surrounding the fenced Clearance Area of the Projects. YPS or GLW activities could result in take of these tortoises; however, based on survey data and project construction plans, we estimate that take of tortoises outside of exclusion fencing is more likely to occur in the project area of the TCS and 230-kV transmission line. We estimate that no more than one subadult or adult desert tortoise may be injured or killed during construction outside of the fenced perimeter.

As stated in the *GridLiance West – Project Description and Components* section, if the TCS is built prior to a known construction start date for the YPSP, GLW would fence, survey, and

translocate tortoises from the 30-acre TCS, independent from the YPSP. Under this scenario, fencing, clearance surveys, and translocation would not be necessary for the 39.4 acres of disturbance associated with the 230-kV transmission line and GLW would instead use qualified desert tortoise monitors during construction. If this scenario were to occur, tortoises could wander into the project site during construction. Due to the linear nature of the transmission line project, the projected 6-18 months of construction, and the lack of a barrier to tortoise movement, the number of tortoises captured and moved out of harms way along the transmission line could reasonably be expected to exceed 12 adult or subadult tortoises. To account for this possibility, we estimate that up to 40 desert tortoises may occur in harms way outside the fenced perimeter during construction and would be captured and moved. A portion of the transmission line project north of SR 160 will occur outside of exclusion fencing regardless of whether YPSP or TCS undergo construction first.

For all construction activities (both inside and outside of fenced areas), we estimate that up to 36 juvenile tortoises (those that will be detected) may be captured and moved or translocated and 441 juveniles may be incidentally killed or injured (although only up to 36 of those may actually be detected) during construction. An undetermined number of tortoise eggs will be destroyed as a result of the project.

O&M activities for the Projects may result in incidental take, in the form of mortality or injury, of no more than two subadult or adult desert tortoises per year or a total of 7 for the life of the Projects inside and outside of the fenced areas. O&M activities may also result in mortality or injury of 3 juvenile desert tortoises in a single year, not to exceed 36 for the life of the Projects (includes both inside and outside of fenced areas)[3]. It is difficult to know how many tortoises may be in the action area when decommissioning activities occur over 30 years in the future. Because we cannot estimate, we have combined take for O&M and decommissioning activities. It is also not possible to estimate the number of juveniles that may be injured or killed during O&M and decommissioning activities that will not be detected.

Estimating the number of adult and juvenile tortoises captured and moved during O&M and decommissioning is also difficult. The tortoises that will get captured and moved during O&M and decommissioning could be outside of the fenced perimeter(s) or inside should a breach in the fence occur allowing access inside. Capturing and moving adults and juveniles could occur during O&M due to daily driving to and within the site to perform needed activities. We estimate that few adults and juveniles would get captured and moved on an annual basis. Over the life of the Projects, excluding construction, we estimate the total take for capturing and moving adults and juveniles would be up to 60 adults and 300 juveniles. A subset of this total take was estimated for YPS and GLW, separately along with corresponding annual thresholds to aid in tracking this take from year to year.

[3] Note that for the Projects, we anticipate that a total of 36 hatchling and juvenile desert tortoises could be captured and moved for construction, a separate 36 could be killed during construction, and an additional 36 could be killed during O&M activities; see Tables 21 and 22.

Table 21 and Table 22 identify the incidental take threshold for all age classes of desert tortoises during construction and O&M activities for YPSP and TCS, separately.

**Table 21. Desert tortoise incidental take thresholds for YPSP.**

| Type of take | Construction (detected) | Construction (not detected) | O&M and decommissioning activities | Total Incidental Take |
|---|---|---|---|---|
| Death or injury-subadults & adults (≥180 mm) inside fenced perimeter(s) | 1 | 0 | 5[1] | 6 |
| Death or injury-subadults & adults (≥180 mm) outside fenced perimeter | 0 | 0 | 5[1] | 5 |
| Death or injury-hatchlings & juveniles (<180 mm) inside and outside solar field | 31 | 379[2] | 31[3] | 441 |
| Capture-subadults & adults (≥180 mm) | We estimate that 64 adults & subadults may be moved within the fenced perimeter and 2 may be moved outside the fenced perimeter | N/A[4] | 52[5] | 118 |
| Capture-hatchling & juveniles (<180 mm) | We estimate that 31 juveniles may be moved during all construction activities | N/A[4] | 258[6] | 289 |

[1] Not to exceed 1 per calendar year or 5 during the life of the project inside and outside of fenced areas.
[2] Not detected due to their small size and location underground.
[3] Not to exceed 2 per calendar year or 31 during the life of the project.
[4] Not applicable - It is not possible to not detect a tortoise that has been captured and moved.
[5] Not to exceed 2 per calendar year or 52 during the life of the project.
[6] Not to exceed 9 per calendar year or 258 during the life of the project.

**Table 22. Desert tortoise incidental take thresholds for TCS.**

| Type of take | Construction (detected) | Construction (not detected) | O&M and decommissioning activities | Total Incidental Take |
|---|---|---|---|---|
| Death or injury-subadults & adults (≥180 mm) inside fenced perimeter* | 1 | 0 | 2[1] | 3 |
| Death or injury-subadults & adults (≥180 mm) outside fenced perimeter | 1 | 0 | 2[1] | 3 |
| Death or injury-hatchlings & juveniles (<180 mm) inside and outside fenced perimeter | 5 | 62[2] | 5[3] | 72 |
| Capture-subadults & adults (≥180 mm) | We estimate that 2 adults & subadults may be moved inside the fenced perimeter and 38 may be moved outside the fenced perimeter | N/A[4] | 8[5] | 48 |
| Capture-hatchling & juveniles (<180 mm) | We estimate that 5 juveniles may be moved during all construction activities | N/A[4] | 42[6] | 47 |

[1] Not to exceed 1 per calendar year or 2 during the life of the project inside and outside of fenced areas.
[2] Not detected due to their small size and location underground.
[3] Not to exceed 1 per calendar year or 5 during the life of the project.
[4] Not applicable - It is not possible to not detect a tortoise that has been captured and moved.
[5] Not to exceed 1 per calendar year or 8 during the life of the project.
[6] Not to exceed 2 per calendar year or 42 during the life of the project.

Construction of the proposed solar project, substations, gen-tie line, and access roads, and tortoise clearance activities across up to 4,284.5 acres of habitat may result in harm to desert tortoises that use this area as part of their home range. If the proposed Projects-related activities

result in effects to desert tortoise habitat beyond this acreage, the amount or extent of take will be exceeded.

Our estimate of the numbers of desert tortoises that are likely to occur within the action area is derived from the pre-project survey data, estimates based on recent tortoise density, and other solar project clearance data. We acknowledge that more individuals may be killed or injured during construction and O&M activities than is in the incidental take statement because they will not be detected. The inability to detect all tortoises is largely due to the cryptic nature of desert tortoises, their fossorial habits, and their limited abundance; and in the case of juveniles and eggs, their small size and location underground that reduce detection probabilities of these life stages. Another confounding factor is that scavengers may locate, consume, or remove carcasses before biologists or monitors can locate them. If detected injury and mortality numbers exceed those in the incidental take statement, we will assume that the take for non-detected injury and mortality has also been exceeded. Reinitiation will then occur for both detected and non-detected injury and mortality take.

The number of desert tortoise eggs taken as a result of the proposed action is unknown, but we exempt the incidental take of all eggs. In the effects analysis, we explained that we cannot estimate the number of eggs that may be present if surface disturbance occurs during the tortoise nesting season (approximately May through September). So while we cannot estimate the number of eggs, should more than 106 adult and sub-adult tortoises be moved from the Projects' site, reinitiation would occur. Reinitiation could indicate that more eggs may be destroyed during construction due to higher numbers of tortoises in the action area.

Should the extent of incidental take exceed the level identified, reinitiation of consultation would be required (see Reinitiation Requirement).

Areas Associated with Translocation

Take in the form of capture would occur affecting up to 106 adult and subadult desert tortoises in harms way (66 within fenced areas and 40 outside of fenced areas), and up to 36 juvenile tortoises in harms way (inside or outside fenced areas). Although the release of translocated adult and juvenile tortoises may disrupt normal behaviors of resident tortoises in the recipient area, we do not believe this level of disruption will result in incidental take of resident tortoises. We do not anticipate that the collection of blood samples of those animals that will be translocated out of the Projects' site will result in the death or injury of any individuals because Service-approved authorized desert tortoise biologists will perform health assessments in accordance with the most recent Service guidance (Service 2019e).

Take resulting from activities associated with the post-translocation monitoring program, including attaching transmitters and conducting periodic health assessments of tortoises after translocation, is not included in the Incidental Take Statement of this Biological Opinion. Take resulting from monitoring activities will be covered under the DTRO's section 10(a)(1)(A) recovery permit, or a partner's equivalent permit, because those activities are part of a larger, regional augmentation site study of the Stump Springs Translocation Area. If post-translocation

monitoring of tortoises translocated from the Projects reveal mortality or injury of translocated tortoises, YPS, GLW, and/or the BLM will coordinate with the DTRO to determine if take, as outlined in this ITS, has occurred.

An unknown number of translocated desert tortoises may be preyed upon by predators. If monitoring determines that predation of translocated tortoises exceeds 10 percent of the tortoises translocated, the BLM, Service, YPS, and GLW will meet and consider additional measures to minimize this effect.

## EFFECT OF TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the Mojave desert tortoise. This determination is based in part on the implementation of minimization measures detailed in this BO and BA provided by BLM with their request for consultation and subsequent discussions during the consultation period.

## REASONABLE AND PRUDENT MEASURES WITH TERMS AND CONDITIONS

The BLM and applicant will implement numerous minimization measures included as part of the proposed action to minimize the incidental take of Mojave desert tortoise. Our evaluation of the proposed action is based on the assumption that the actions as set forth in the "Proposed Minimization Measures" section of this biological opinion will be implemented. The Service believes these measures are adequate and appropriate to minimize the incidental take of desert tortoise. Therefore, we are not including any reasonable and prudent measures with terms and conditions in this incidental take statement.

Any proposed changes to the minimization measures or in the conditions under which project activities were evaluated may constitute a modification of the proposed action. If this modification causes an effect to Mojave desert tortoise not considered in this biological opinion, reinitiation of formal consultation pursuant to the implementing regulations of section 7(a)(2) of the Act (50 CFR § 402.16) may be warranted.

To be exempt from the prohibitions of section 9 of the Act, the BLM, YPS and GLW, including all agents, consultants, and contractors, must each comply with the proposed measures in the *Description of the Proposed Action* incorporated into this incidental take statement by reference. Collectively, these measures are intended to minimize the impact of incidental take of Mojave desert tortoise. These measures are non-discretionary.

## REPORTING REQUIREMENTS

The BLM must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. The BLM will ensure that a report documenting desert

tortoise encounters, incidental take (including capture and relocation), and effectiveness and compliance with the desert tortoise protection measures is prepared and submitted to the Service's Southern Nevada Fish and Wildlife Office in Las Vegas.

Reports are required quarterly during the duration of construction and annually during O&M for the life of the facilities. The BLM may delegate this responsibility to YPS and GLW, separately. In addition, final construction reports will be submitted to the Service within 60 days of completion of construction of the Projects. All quarterly reports are due by the 10th of each of the following months (January, April, July, October), and annual reports are due February 1 of each year. The Service anticipates the first annual report by February 1, 2021, if construction or project activities occur in 2020. Annual status updates shall be provided to the Service during O&M activities for the life of the facilities.

Specifically, all reports must include information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar incidents from reoccurring. Additionally, the reports should provide detailed information regarding each desert tortoise handled or observed and the names of all monitors involved in the project and the authorized desert tortoise who supervised their actions. Information will include the following: location (GPS), date and time of observation, whether desert tortoise was handled, general health, and whether it voided its bladder, location desert tortoise was moved from and location moved to, unique physical characteristics of each tortoise, and effectiveness and compliance with the desert tortoise protection measures. Any incident occurring during project activities that was considered by the FCR, authorized desert tortoise biologist, or biological monitor to be in non-compliance with this biological opinion will be documented immediately by the authorized desert tortoise biologist.

Additional reporting requirements for translocation and monitoring are within the Translocation Plan and Long Term Monitoring Plan.

## DISPOSITION OR CARE FOR DEAD OR INJURED DESERT TORTOISES

To ensure that the protective measures are effective and are being properly implemented, BLM shall contact the Service immediately if a desert tortoise is killed or injured as a result of any activity covered under this biological opinion. Upon locating a dead or injured desert tortoise within the action area, notification must be made by phone to the Southern Nevada Fish and Wildlife Office at (702) 515-5232. At that time, the Service and BLM shall review the circumstances surrounding the incident to determine whether additional protective measures are required. Care should be taken in handling sick or injured animals to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death.

In conjunction with the care of sick or injured desert tortoises or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by the Service to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed.

Injured desert tortoises shall be delivered to any qualified veterinarian for appropriate treatment or disposal. Dead desert tortoises suitable for preparation as museum specimens shall be frozen immediately and provided to an institution holding appropriate Federal and State permits per their instructions. Should no institutions want the desert tortoise specimens, or if it is determined that they are too damaged (crushed, spoiled, etc.) for preparation as a museum specimen, then they may be buried away from the project area or cremated, upon authorization by the Service. BLM, YPS, or GLW shall bear the cost of any required treatment of injured desert tortoises, euthanasia of sick desert tortoises, or cremation of dead desert tortoises. Should sick or injured desert tortoises be treated by a veterinarian and survive, they may be transferred as directed by the Service.

## CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. In order for the Service to be kept informed of actions that either minimize or avoid adverse effects or that benefit listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations. The Service hereby makes the following conservation recommendations:

1. We recommend the BLM work with each of the solar energy companies, YPS and GLW, to design and construct solar projects in desert tortoise habitat to allow all vegetation to remain underneath the solar panels and allow tortoise to repatriate these areas following construction.
2. We recommend that the BLM salvage plants on the solar project site for use in habitat enhancement or restoration. If the BLM chooses to salvage plants from permanent disturbance on the project site, these plants may be held in a nursery or other temporary holding location until needed; no monitoring or other requirements would be required for these plants.

## REINITIATION NOTICE

This concludes formal consultation on the actions outlined in your request received June 11, 2019. As required by 50 CFR § 402.16, reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or (4) a new species is listed or critical habitat designated that may be affected by

the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

An agency shall not be required to reinitiate consultation after the approval of a land management plan prepared pursuant to 43 U.S.C. 1712 or 16 U.S.C. 1604 upon listing of a new species or designation of new critical habitat if the land management plan has been adopted by the agency as of the date of listing or designation, provided that any authorized actions that may affect the newly listed species or designated critical habitat will be addressed through a separate action-specific consultation. This exception to reinitiation of consultation shall not apply to those land management plans prepared pursuant to 16 U.S.C. 1604 if (1) fifteen years have passed since the date the agency adopted the land management plan prepared pursuant to 16 U.S.C. 1604 and (2) five years have passed since the enactment of Public Law No. 115-141 [March 23, 2018] or the date of the listing of a species or the designation of critical habitat, whichever is later.

If you have any questions about this biological opinion, please contact Jessica Zehr in the Southern Nevada Fish and Wildlife Office at 702-515-5232, or by e-mail at Jessica_Zehr@fws.gov. Please reference File No. 08ENVS00-2020-F-0071 in future correspondence concerning this consultation.

Appendices

cc: Supervisory Biologist - Habitat, Nevada Department of Wildlife, Las Vegas, Nevada

# LITERATURE CITED

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# APPENDIX - TRANSLOCATION PLAN

# MOJAVE DESERT TORTOISE TRANSLOCATION PLAN FOR THE YELLOW PINE SOLAR PROJECT

Prepared for

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SWCA Project No. 37729

June 2020

# EXECUTIVE SUMMARY

Yellow Pine Solar, LLC (YPS or Applicant), a subsidiary of NextEra Energy Resources, LLC, has applied to the BLM Las Vegas Field Office for a right-of-way on public land to construct, operate, maintain, and decommission a solar energy generating facility (herein called the Yellow Pine Solar Project, or YPSP) on public land in Clark County, Nevada. The YPSP would be anticipated to generate approximately 500-megawatts (MW); however, the exact final project output may be higher or lower, depending on design constraints as well as the procured panel technology, as technology is rapidly improving. The YPSP would be located within Pahrump Valley, approximately 10 miles (16 kilometers [km]) southeast of Pahrump, Nevada, and approximately 32 miles (51 km) west of Las Vegas, Nevada. The YPSP would be bounded by Nevada State Route 160 to the north and Tecopa Road to the east.

The YPSP would provide renewable energy to the electrical transmission grid via a generation tie-in transmission line (gen-tie line) at a proposed regional substation, the Trout Canyon Substation (TCS), owned by GridLiance West, LLC. The TCS would be located directly adjacent to the YPSP and would convey power from the substation to the Pahrump to Sloan Canyon Switch 230-kilovolt transmission line. The combined project areas of the YPSP and TCS would occur within an approximately 5,032-acre survey area. The survey area contains habitat suitable for the Mojave desert tortoise, a species federally listed as threatened (U.S. Fish and Wildlife Service [USFWS] 1990) and protected by the state of Nevada (Nevada Administrative Code 503.080). SWCA Environmental Consultants (SWCA) was retained to conduct protocol-level presence/absence surveys for desert tortoise in the survey area.

If the Proposed Action is approved, prior to clearance surveys, all areas planned for construction would be fenced with desert tortoise fencing. Permanent tortoise fencing would be installed inside the project boundary for those Sub-Areas to be built at the time of construction. In addition to permanent fencing, temporary tortoise fencing would be installed between Sub-Areas, and extending to SR 160 and Tecopa Rd. This combination of permanent and temporary fencing would create a Tortoise Clearance Area from which tortoises would be translocated. An approximately 20-foot buffer between the fencing and the boundary perimeter will be established as a temporary work area for fence construction access. If construction proceeds for all Sub-Areas at once, a combination of temporary and permanent desert tortoise fencing would enclose a total of approximately 4,284.5 acres (the Full Build Tortoise Clearance Area). However, at present it is assumed that only Sub-Areas A, B, C, and the TCS, would be constructed during Phase I of construction (the Phase I Tortoise Clearance Area [3,164.1 acres]). Any Sub-Areas not included in the initial phase of construction (i.e. Sub-Area D) would be added at a later date. In the event that Sub-Area D is developed in a later phase, the additional acres of disturbance would follow the same translocation procedures as Phase I. All fencing would be completed by YPS except for the 30 acres around the TCS which would be completed by GLW.

The TCS is being developed by a separate company (GLW) which would be responsible for all fencing and clearance activities within the 69.4-acre footprint of the substation and 230-kV transmission line. However, because of its location immediately adjacent to the YPSP, if construction of the YPSP occurs prior to the TCS, GLW will be required to perform fencing and translocation activities concurrently with the YPSP. If the TCS is built prior to a known construction start date for the YPSP, GLW would fence, survey, and translocate tortoises from the 30-acre TCS, independent from the YPSP. Under this scenario, fencing, clearance surveys, and translocation would not be necessary for the 39.4 acres of disturbance associated with the 230-kV transmission line and would instead use qualified desert tortoise monitors during construction as stipulated in the Biological Assessment and Biological Opinion.

Surveys for the YPSP began on September 17, 2018, and continued through October 23, 2018. Biologists surveyed 2,518 km (1,565 miles) of transects. In total, 54 live tortoises were encountered during surveys,

41 of which were included in the population estimate (adult tortoises greater than 180 millimeters in midline carapace length). Based on the USFWS population estimate spreadsheet, the estimated tortoise density is 3.04 adult tortoises per square kilometer.

The purpose of this document is to outline the steps and actions required to ensure successful translocation of Mojave desert tortoises from the Proposed Action Tortoise Clearance Area (Full Build or Phase I) to the Stump Springs Translocation Area.

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# CONTENTS

# Figures



# Tables

# ACRONYMS

| | |
|---|---|
| ºC | degrees Celsius |
| ºF | degrees Fahrenheit |
| ACEC | Area of Critical Environmental Concern |
| ADTB | Authorized Desert Tortoise Biologist |
| BLM | Bureau of Land Management |
| CI | Confidence Interval |
| DTRO | Desert Tortoise Recovery Office |
| DWMA | Desert Wildlife Management Area |
| ELISA | enzyme-linked immunosorbent assay |
| g | grams |
| GIS | geographic information system |
| GLW | GridLiance West, LLC |
| km | kilometers |
| $km^2$ | square kilometers |
| kV | kilovolt |
| m | meter |
| MCL | midline carapace length |
| ml | milliliters |
| mm | millimeters |
| MW | megawatts |
| NEER | NextEra Energy Resources, LLC |
| qPCR | quantitative polymerase chain reaction |
| SCS | Sloan Canyon Switch |
| SR 160 | Nevada State Route 160 |
| SWCA | SWCA Environmental Consultants |
| TCS | Trout Canyon Substation |
| TRP | translocation review package |
| USFWS | U.S. Fish and Wildlife Service |
| YPS | Yellow Pine Solar, LLC |
| YPSP | Yellow Pine Solar Project |

# 1 INTRODUCTION

## 1.1 Project Description

Yellow Pine Solar, LLC (YPS), a subsidiary of NextEra Energy Resources, LLC (NEER), has applied to the BLM Las Vegas Field Office for a right-of-way (ROW) on public land to construct, operate, maintain, and decommission a solar energy generating facility (herein called the Yellow Pine Solar Project [YPSP]) on public land in Clark County, Nevada. The YPSP is a proposed approximately 500-megawatt (MW) project; however, the exact final project output may be higher or lower, depending on design constraints and the procured panel technology, as technology is rapidly improving. The YPSP includes the construction, operation, maintenance, and decommissioning of the solar facilities, which consists of photovoltaic (PV) solar panels, an energy storage system (batteries), linear facilities (including access roads, distribution power, communication cables or lines, and the YPSP substation and 230-kilovolt [kV] generation tie [gen-tie] line), and support buildings.

The YPSP would provide renewable energy to the electrical transmission grid via a generation tie-in transmission line (gen-tie line) at a proposed regional substation, the Trout Canyon Substation (TCS), owned by GridLiance West, LLC (GLW). For the purpose of the draft Environmental Impact Statement (draft EIS; BLM 2020), the YPSP and the TCS were analyzed in a single document. The Proposed Action consisting of both the YPSP and the TCS would be located within Pahrump Valley, approximately 10 miles (16 kilometers [km]) southeast of Pahrump, Nevada, and approximately 32 miles (51 km) west of Las Vegas, Nevada (Figure 1).

## 1.2 Background and Project History

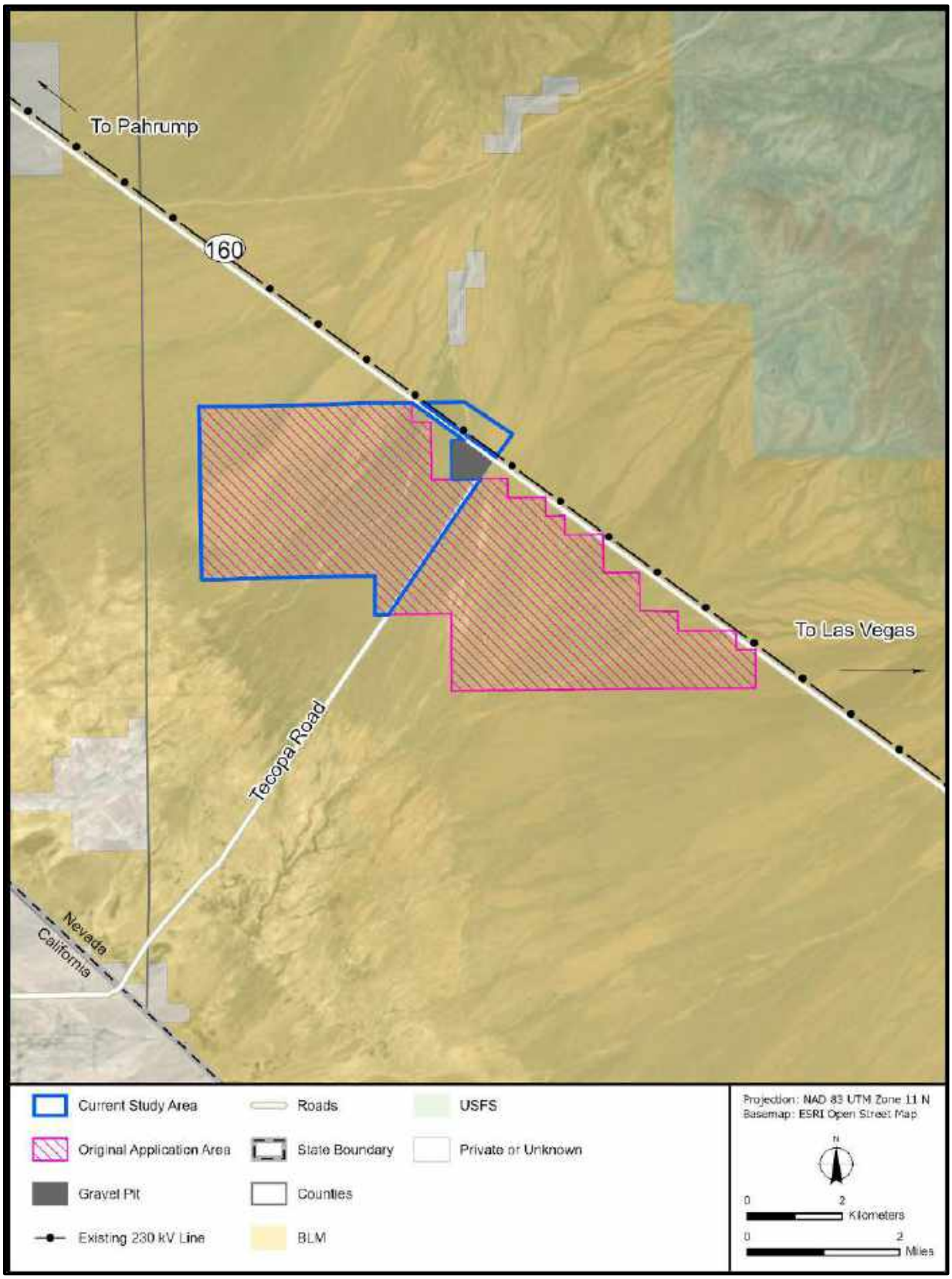
### *1.2.1 Solar Generating Facilities*

In October 2011, Boulevard Associates, LLC, a subsidiary of NEER, filed an application for a ROW grant (N-090788) with the Southern Nevada District Office of the BLM for the Sandy Valley Solar Project. The application was appended on June 24, 2016, and submitted by YPS, under the new name, YPSP. Since the appended application, the portion of the proposed project area south of Tecopa Road was eliminated from further evaluation due to public comments and potential resource conflicts, leaving the area north of Tecopa Road for development of the proposed YPSP (see Figure 1).

### *1.2.2 Trout Canyon Substation*

GridLiance West, LLC, is the owner of the Pahrump to Sloan Canyon Switch (SCS) 230-kV transmission line, which serves the city of Pahrump and would support new power project developments along the facility alignment. YPS and GLW have entered into a Large Generator Interconnection Agreement to connect the YPSP to the Pahrump to SCS transmission line via the proposed TCS that GLW would own and operate. The TCS would be located directly adjacent to the YPSP and would consist of structures, breakers, main step-up transformers, high-voltage electrical controls, combining switchgear, and related structures as well as the appurtenant 230-kV transmission corridor and maintenance road to convey power from the substation to the Pahrump to SCS transmission line.

**Figure 1. Yellow Pine Solar Project and Trout Canyon Substation application areas.**



### *1.2.3 The Proposed Action*

The combined project areas of the YPSP and TCS would occur within an approximately 5,032-acre survey area (Figure 2). The survey area contains habitat suitable for the Mojave desert tortoise, a species federally listed as threatened (U.S. Fish and Wildlife Service [USFWS] 1990) and protected by the state of Nevada (Nevada Administrative Code 503.080). SWCA Environmental Consultants (SWCA) was retained to conduct protocol-level presence/absence surveys for desert tortoise in the survey area.

If the Proposed Action is approved, prior to clearance surveys, all areas planned for construction would be fenced with desert tortoise fencing. Permanent tortoise fencing would be installed inside the project boundary for those Sub-Areas to be built at the time of construction. In addition to permanent fencing, temporary tortoise fencing would be installed between Sub-Areas, and extending to SR 160 and Tecopa Rd. This combination of permanent and temporary fencing would create a Tortoise Clearance Area from which tortoises would be translocated (see Figure 2). An approximately 20-foot buffer between the fencing and the boundary perimeter will be established as a temporary work area for fence construction access. If construction proceeds for all Sub-Areas at once, a combination of temporary and permanent desert tortoise fencing would enclose a total of approximately 4,284.5 acres (the Full Build Tortoise Clearance Area). However, at present it is assumed that only Sub-Areas A, B, C, and the TCS, would be constructed during Phase I of construction (the Phase I Tortoise Clearance Area [3,233.5 acres]). Any Sub-Areas not included in the initial phase of construction (i.e. Sub-Area D) would be added at a later date. In the event that Sub-Area D is developed in a later phase, the additional acres of disturbance would follow the same translocation procedures as Phase I. All fencing would be completed by YPS except for the 30 acres around the TCS which would be completed by GLW.

The TCS is being developed by a separate company (GLW) which would be responsible for all fencing and clearance activities within the 69.4-acre footprint of the substation and 230-kV transmission line. However, because of its location immediately adjacent to the YPSP, if construction of the YPSP occurs prior to the TCS, GLW will be required to perform fencing and translocation activities concurrently with the YPSP. If the TCS is built prior to a known construction start date for the YPSP, GLW would fence, survey, and translocate tortoises from the 30-acre TCS, independent from the YPSP. Under this scenario, fencing, clearance surveys, and translocation would not be necessary for the 39.4 acres of disturbance associated with the 230-kV transmission line and would instead use qualified desert tortoise monitors during construction as stipulated in the Biological Assessment and Biological Opinion.

# 2 PLAN OVERVIEW

The purpose of this document is to outline the steps and actions required to ensure a successful translocation of Mojave desert tortoises from the Proposed Action Tortoise Clearance Area to the Stump Springs Translocation Area. It is anticipated that the Proposed Action will be constructed in at least two separate development phases. The first phase is anticipated to include Sub-Areas A, B, C and the TCS, while the second phase would add Sub-Area D at a later date.

The following steps provide general guidelines for gathering the information necessary to develop a translocation plan as recommended by the USFWS (2019a). The updated translocation guidance is based on three principles; 1) how tortoises proposed for translocation can best contribute to recovery of the species, 2) the use of rigorous monitoring to document this contribution and effectiveness of translocation in minimizing impacts to affected tortoises (Translocated and Resident), and 3) minimization of risk to affected tortoises (Translocated and Resident) particularly concerning transmission of disease.

**Steps Completed (Sections 1 through 4):**

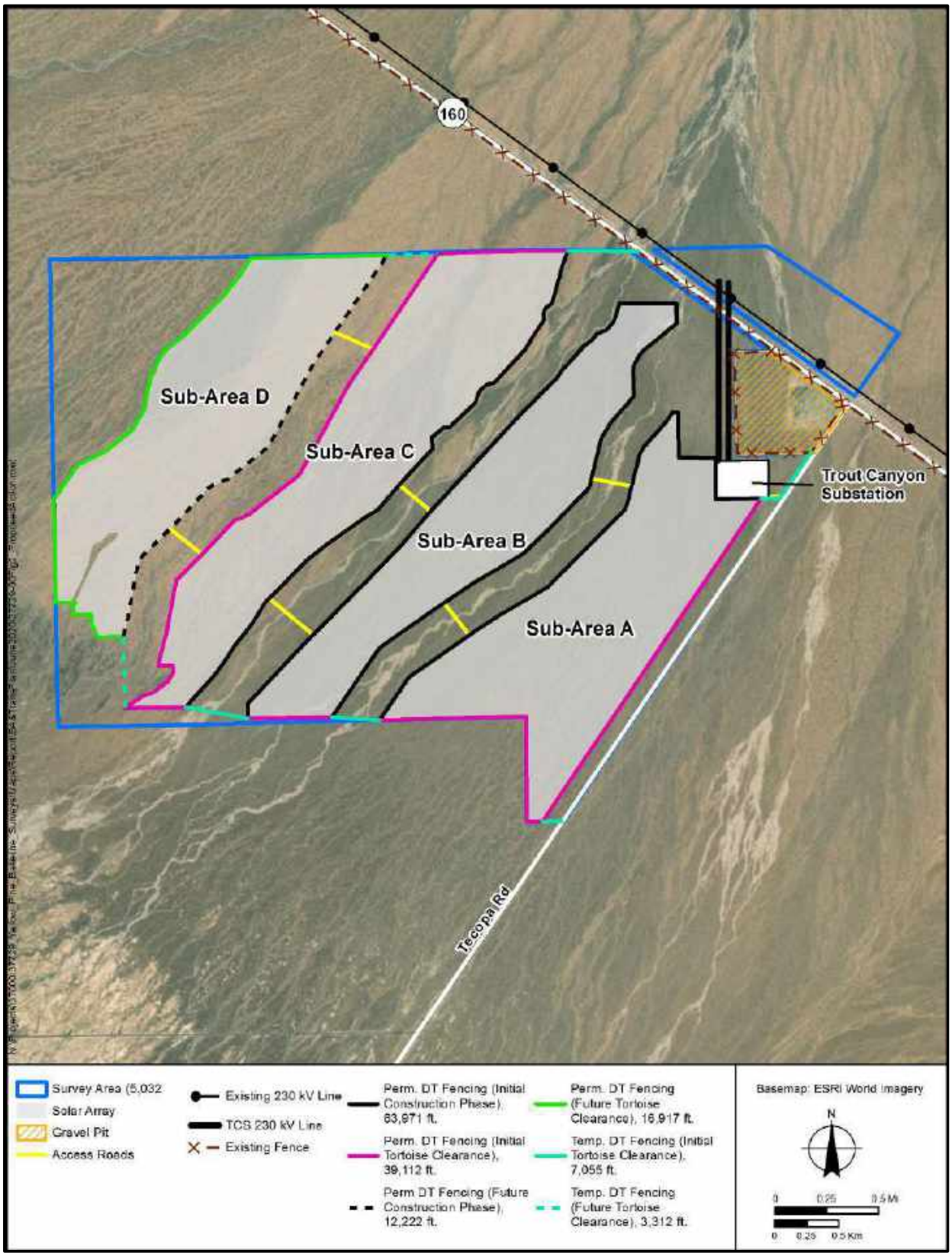
- Determine need for translocation of desert tortoises (Section 1.1).

- Estimate the number of desert tortoises that would be affected at the project site (Section 3.2).
- Identify potential recipient and control sites for the project (Section 4.1).
- Estimate desert tortoise abundance at selected recipient site (Section 4.2).

**Steps Remaining (Sections 5 and 6):**

- Develop translocation plan and associated effectiveness monitoring program (Sections 5 and 6).
- Identify release site and survey to confirm desert tortoise abundance in release site as in situ health-assessment sampling takes place and transmitters are attached (Section 5.2).
- Identify control site and survey to locate desert tortoises as in situ health-assessment sampling takes place and transmitters are attached (Section 5.3).
- Initial survey of project site as in-situ health-assessment sampling takes place and transmitters are attached (Section 5.4).
- Construct project fencing (Section 5.5), conduct protocol clearance surveys of the project site as in situ health-assessment sampling takes place and transmitters are attached to any new tortoises (Section 5.6).
- Translocate desert tortoises following acceptance of translocation-review package (Sections 5.7 and 5.8).
- Implement post-translocation monitoring and adaptive management to evaluate effectiveness of translocation as a take-minimization measure (Sections 6.1–6.3).
- Compile and synthesize data throughout duration of translocation and monitoring (Section 6.4).

**Figure 2. Proposed Action fencing plan.**



# 3 YELLOW PINE SOLAR PROJECT SURVEY AREA, TORTOISE ESTIMATES AND HEALTH

## 3.1 Survey Area Description

The project is in the Eastern Mojave Recovery Unit as revised in the most recent recovery plan (USFWS 2011). The YPSP is not located in or near any critical habitat units or Areas of Critical Environmental Concern (ACECs) designated for desert tortoise. The nearest critical habitat unit (Ivanpah) is approximately 30 miles (48 km) to the south of the survey area.

The project is within a large contiguous area of modeled desert tortoise habitat. Within the survey area the modeled habitat suitability is 0.9 out of 1.0, indicating that the area has a high probability of being suitable for desert tortoises (Nussear et al. 2009). The soil report indicates that the soils are expected to be suitable for burrowing by desert tortoises (Natural Resources Conservation Service 2018). Elevation is also suitable for desert tortoises and ranges from 915 to 1,050 meters (m) (3,002 to 3,445 feet) (U.S. Geological Survey 2018). Vegetation cover in the survey area is typical of desert tortoise habitat and consists of Mojave desert scrub dominated by creosote bush (*Larrea tridentata*) and burrobush (*Ambrosia dumosa*), with scattered Mojave yucca (*Yucca schidigera*).

## 3.2 Surveys and Tortoise Density

Following USFWS survey protocol (USFWS 2017), SWCA biologists conducted 100% coverage presence/absence surveys of the survey area for all desert tortoises aboveground (both outside burrows and within burrows but still visible) and desert tortoise sign (burrows, scat, tracks, carcasses, etc.) using 10-m-wide (approximately 33-foot-wide) east–west belt transects. For a complete summary of survey methods and results, please refer to the *Mojave Desert Tortoise Survey Report for the Yellow Pine Solar Project* (SWCA 2020a). Surveys for the project began on September 17, 2018, and continued through October 23, 2018. The biologists surveyed 2,518 km (1,565 miles) of transects and encountered 54 live tortoises, 41 of which were included in the population estimate (adult tortoises greater than 180 millimeters [mm] in midline carapace length [MCL]) (Table 1, Figure 3).

**Table 1. Live Desert Tortoises Observed during Presence/Absence Surveys**

| Observation Type | Female | Male | Unknown | Combined |
|---|---|---|---|---|
| **Adult ≥ 180 mm** | **7** | **12** | **22** | **41** |
| In burrow | *1* | *3* | *20* | *24* |
| Out of burrow | *6* | *9* | *2* | *17* |
| **Juvenile < 180 mm** | **2** | **0** | **11** | **13** |
| In burrow | *1* | *0* | *7* | *8* |
| Out of burrow | *1* | *0* | *4* | *5* |
| **Total** | **9** | **12** | **33** | **54** |

Based on the USFWS population estimate spreadsheet, the estimated tortoise density is 3.04 adult tortoises per square km ($km^2$). Based on full build-out of the Proposed Action, tortoises would have to be removed from 4,284.5 acres of habitat enclosed by a combination of temporary and permanent fencing (the Full Build Tortoise Clearance Area). To better account for numbers of tortoises expected to occur within each of the separate projects (YPSP and TCS), the disturbance acres and estimated number of tortoises within the 69.4 acres of disturbance for the TCS was subtracted from the full acreage estimates for the combined projects. Under the full build scenario, an estimated 52 adults (95% Confidence Interval [CI] = 35 to 77) would be translocated by YPS and 1 adult (95% CI = 0 to 2) would be translocated by GLW (Table 2). If construction

is started in phases, the Phase I Tortoise Clearance Area would enclose an area of 3,233.5 acres from which an estimated 39 adults (95% CI = 27 to 59) would need to be translocated by YPS and an additional 1 adult (95% CI = 0 to 2) would be translocated by GLW. In addition to adult tortoises it is estimated that many more juvenile tortoises will also require translocation, see table 2 for estimates of the numbers of juvenile and hatchling tortoises that may also be impacted.

**Table 2. Desert Tortoise Population Estimates**

| Tortoise Size Class | Survey Area (5,032 acres) | YPSP Full Build Tortoise Clearance Area (4,215.1 acres) | YPSP Phase I Tortoise Clearance Area (3,164.1 acres) | TCS Project Footprint (69.4 acres*) |
|---|---|---|---|---|
| Adult ≥ 180 mm | 62 (41, 93) | 52 (35, 77) | 39 (27, 59) | 1 (0, 2) |
| Juvenile < 180 mm | 322 (213, 484) | 272 (182, 401) | 206 (140, 307) | 4 (0, 10) |
| Hatchlings (young-of-year) | 81 (53, 121) | 68 (46, 100) | 51 (35, 76) | 1 (0, 3) |

Note: Numbers in parentheses next to estimates represent the 95% lower and upper CIs for that estimate. *The TCS footprint includes a small amount of disturbance that will occur on the north side of SR 160 which will not be included in the perimeter fencing.

SWCA observed tortoise sign throughout the survey area, including burrows, scat, tracks, and carcasses, and found numerous tortoise burrows in good condition (Class 1 or Class 2) (Table 3). The biologists recorded 126 tortoise carcasses ranging from Class 2 to Class 5 during the surveys (Table 4).

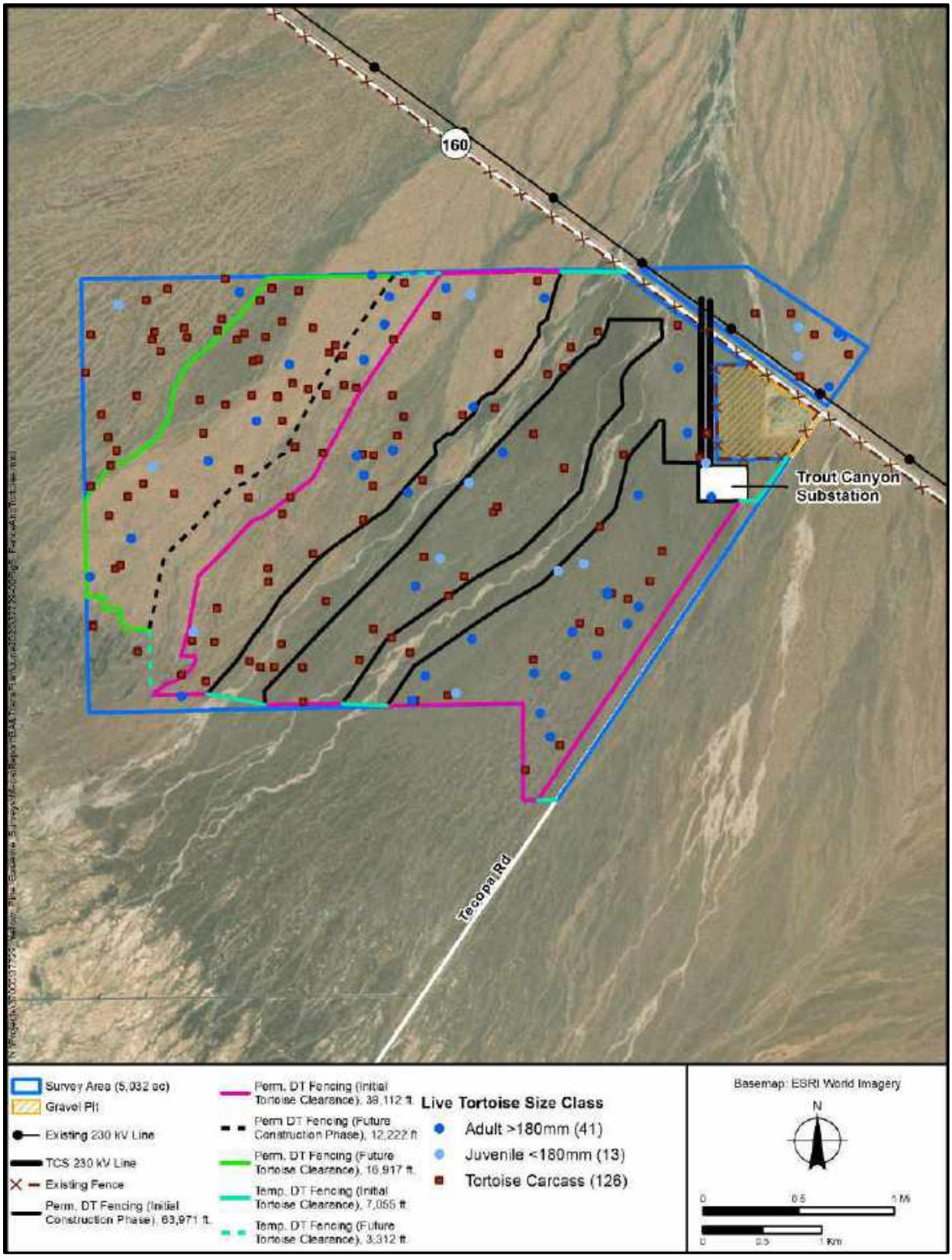
**Table 3. Desert Tortoise Burrows Observed during Presence/Absence Surveys**

| Burrow Class | Count |
|---|---|
| Class 1: Currently active, with desert tortoise or recent desert tortoise sign | 351 |
| Class 2: Good condition, definitely desert tortoise; no evidence of recent use | 1,022 |
| Class 3: Deteriorated condition; definitely desert tortoise, including collapsed burrows | 366 |
| Class 4: Good condition; possibly desert tortoise | 345 |
| Class 5: Deteriorated condition; possibly desert tortoise, including collapsed burrows | 45 |
| **Total** | **2,129** |

**Table 4. Desert Tortoise Carcasses Observed during Presence/Absence Surveys**

| Carcass Class | Count |
|---|---|
| Class 1: Fresh or putrid | 0 |
| Class 2: Scutes adhering to bone | 11 |
| Class 3: Scutes peeling off bone | 35 |
| Class 4: Shell falling apart | 23 |
| Class 5: Disarticulated and scattered | 56 |
| Unknown | 1 |
| **Total** | **126** |

**Figure 3. Locations of adult and juvenile desert tortoises and carcasses observed during presence/absence surveys.**



Tortoise estimates are known to be affected by the amount of rainfall during the previous winter. Winter precipitation preceding the 2018 season (Table 5) was above the 40-mm threshold (1.57-inch threshold) that the USFWS uses to determine the probability that a desert tortoise will be visible (USFWS 2017).

**Table 5. Monthly Winter Precipitation in Millimeters for Pahrump, Nevada**

| Year | October | November | December | January | February | March | Total Winter Precipitation |
|---|---|---|---|---|---|---|---|
| 2007–2008 | 0.0 | 0.0 | 18.0 | 17.0 | 3.8 | 0.0 | **38.9** |
| 2008–2009 | 0.3 | 16.5 b | 10.2 a | 2.5 | 29.5 | 0.3 o | **59.2** |
| 2009–2010 | 0.0 | 0.0 | 16.3 | 36.3 | 34.8 | 5.3 a | **92.7** |
| 2010–2011 | 18.3 | 6.4 | 79.0 e | 0.0 z | 11.4 i | 5.8 | **120.9** |
| 2011–2012 | 1.0 | 1.0 i | 0.0 z | 1.3 | 0.0 c | 7.9 | **11.2** |
| 2012–2013 | 29.2 | 0.0 | 17.3 | 14.0 | 2.0 | 8.4 | **70.9** |
| 2013–2014 | 5.1 | 21.1 | 0.0 | 0.0 | 0.3 | 9.1 a | **35.6** |
| 2014–2015 | 0.0 | 0.0 | 31.2 | 17.8 | 15.7 | 6.6 | **71.4** |
| 2015–2016 | 63.0 | 3.6 | 1.5 | 22.1 | 17.8 | 7.1 | **115.1** |
| 2016–2017 | 28.7 | 3.3 | 23.6 | 49.0 | 24.6 | 0.0 | **129.3** |
| 2017–2018 | 0.0 | 0.0 | 0.0 | 28.7 | 5.1 | 15.2 | **49.0** |

Source: Western Regional Climate Center (2019)

Note: a = 1 day missing, b = 2 days missing, etc., z = 26 or more days missing

During the USFWS's annual range-wide monitoring program in 2008, the agency included two survey areas on BLM-administered land in the Pahrump Valley (Pahrump North and Pahrump South). Survey of these areas was conducted using USFWS range-wide monitoring program line distance sampling procedures (USFWS 2012). The density estimates for these areas were 1.7 tortoises/km$^2$ for Pahrump North and 2.9 tortoises/km$^2$ for Pahrump South (USFWS 2012). The area surveyed in 2008 for Pahrump South overlaps the YPSP survey area, and SWCA's estimate of 3.04 adult tortoises/km$^2$ suggests little change in the tortoise density of the survey area between 2008 and 2018. However, pre-translocation surveys conducted in the fall of 2014 for the Stump Springs Translocation Area, located across from the survey area on the east side of Tecopa Road and also overlapping the 2008 Pahrump South survey area, recorded only nine live tortoises for an estimated density of 0.9 adult tortoise/km$^2$ (Clark County and USFWS 2017).

Tracy et al. (2004) analyzed the ratio of dead to live tortoise observations recorded during USFWS line distance sampling surveys from 2001 to 2003, with the assumption that tortoise populations with roughly equal numbers of live animals and carcasses were likely to be healthier than populations with disproportionately large numbers of carcasses. Out of 15 Desert Wildlife Management Areas (DWMAs), the average dead to live tortoise ratio was 1.92 and ranged from 1.08 in the Pinto Mountains DWMA to 3.67 in the Fenner DWMA (Tracy et al. 2004). In SWCA's study, 126 tortoise carcasses were observed during 2018 presence/absence surveys in the survey area, compared with 54 live tortoise observations, a ratio of dead to live tortoises of 2.33. Unpublished data from the USFWS recorded during the 2008 surveys of the Pahrump Valley (Pahrump North and Pahrump South combined) yielded 28 observations of shell remains and 30 live tortoise observations, a ratio of 0.93 dead to live tortoises; this ratio exceeded all other areas surveyed that year in Nevada (Averill-Murray et al. 2013). In the spring of 2013, surveys of the Greater Trout Canyon Translocation Area (also in the Pahrump Valley) found 24 carcasses and 22 live tortoises, a ratio of 1.09 dead to live tortoises (Averill-Murray et al. 2013). Surveys of the Stump Springs Translocation Area in the fall of 2014 yielded 111 carcasses, compared with only nine live tortoises, a ratio of 12.33 dead to live tortoises (Clark County and USFWS 2017). However, because tortoise carcasses can persist for many years, it is difficult to pinpoint the timing and duration of a possible die-off. In the case of this study, most of the

carcasses observed were Class 3 or greater, which suggests that the die-off likely happened at least several years ago.

Overall, the results of SWCA's surveys, when compared with the total recovery unit–level tortoise density estimate of 3.10 adult tortoises/km$^2$, which was calculated using range-wide monitoring data recorded in 2014 (Allison and McLuckie 2018), indicate that a tortoise population of moderate density exists in the survey area. However, the estimated density for the Eastern Mojave Recovery Unit (which includes Pahrump Valley) was only 1.5 adult tortoises/km$^2$ (Allison and McLuckie 2018). Therefore, the survey area yielded an approximately equal density to what was observed across the tortoise's range but higher than the density calculated within the Eastern Mojave Recovery Unit. The ratio of dead to live tortoises of 2.33 is slightly higher than average, compared with data from 2001 through 2003 (Tracy et al. 2004), and may indicate that the survey area has suffered from a period of high mortality at some point in the past few years. However, this die-off has clearly been less severe than that observed in the Stump Springs Translocation Area (Clark County and USFWS 2017). Many factors may have contributed to the large number of tortoise carcasses, including drought, disease (particularly *Mycoplasma agassizii* and/or *M. testudineum*), and predation. Based on winter rainfall data for the area (see Table 5), it appears that there was a period from 2011 to 2014 where two out of the three winters had reduced levels of rainfall, which may have created drought conditions in the Pahrump Valley. However, without additional data it is difficult to pinpoint the precise timing or cause of the large number of tortoise carcasses observed in the survey area and the nearby Stump Springs Translocation Area. Although a relatively recent die-off in the survey area was apparent, the local population seems to be relatively stable.

# 4 RECIPIENT AND CONTROL SITES

## 4.1 Recipient Site Description

The BLM and USFWS identified the Stump Springs Translocation Area (BLM 2017) as the most suitable recipient site for tortoises from the proposed YPSP. The Stump Springs Translocation Area covers approximately 85,000 acres (344 km$^2$) of desert scrub habitat on land managed by the BLM as an undesignated multiple-use area and is southeast of the intersection of SR 160 and Tecopa Road, with the Spring Mountains forming the eastern border and the California state line to the southwest (Figure 4). The translocation area is within the Eastern Mojave Recovery Unit, as revised in the most recent recovery plan (USFWS 2011). The area is not in or near any critical habitat units or ACEC designated for desert tortoise.

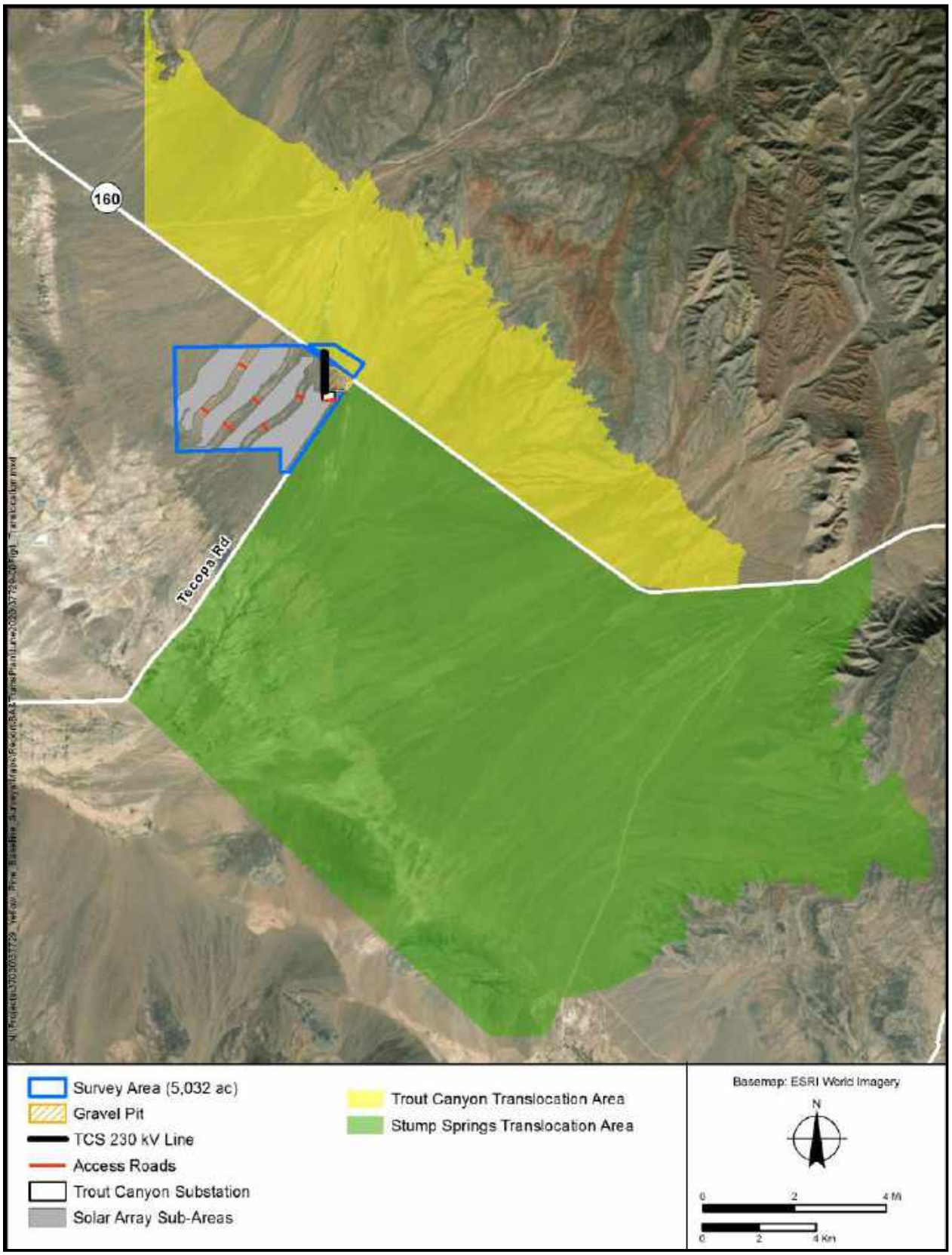
The recipient site is within a large contiguous area of modeled desert tortoise habitat (see Figure 4). Within the Stump Springs Translocation Area, the modeled habitat suitability ranges from 0.6 to 0.9 out of 1.0, indicating the area has a high probability of being suitable for desert tortoise (Nussear et al. 2009). The soil report indicates that the soils are expected to be suitable for burrowing by desert tortoise (Natural Resources Conservation Service 2018). Elevation of the site ranges from 822 to 1,560 m (2,697 to 5,118 feet) (U.S. Geological Survey 2018). Vegetation within the Stump Springs Translocation Area is dominated by Mojave Desert scrub, with small amounts of salt desert scrub, gypsum soils, and mesquite/catclaw habitats in the southern portion of the site (Clark County and USFWS 2017).

Current anthropogenic impacts to the recipient site include vehicle use, and existing and proposed energy infrastructure. Several unpaved roads cross the site, one of which, Sandy Valley Road, is well used and connects the town of Sandy Valley, Nevada, to SR 160. Sandy Valley Road is also used as part of the route for the annual Barstow to Las Vegas dual sport event, which is held in November and involves the use of street-legal motorcycles traveling on existing roads and trails. All off-highway vehicle use is restricted to existing roads and trails within the translocation area (Clark County and USFWS 2017).
Two existing utility corridors bisect the recipient site: The West Wide Energy Corridor and a second corridor designated in the BLM's Resource Management Plan. However, the only existing development

within these corridors is the GLW Pahrump to SCS 230-kV transmission line within the Resource Management Plan corridor. This existing transmission line uses steel monopoles, thus reducing its potential to be used as nesting substrate for common ravens (*Corvus corax*). As discussed previously (see Section 1.3.1), the Proposed Action was shifted to the west side of Tecopa Road and no longer overlaps the Stump Springs Translocation Area (see Figure 4), thus removing the last remaining solar development application within the translocation area (Clark County and USFWS 2017).

For a full description and analysis of the Stump Springs Translocation Area and its suitability as a translocation recipient site, please refer to the associated environmental assessment (BLM 2017) and Stump Springs Translocation Plan (Clark County and USFWS 2017).

**Figure 4. Proposed Action and Trout Canyon and Stump Springs Translocation Areas.**



## 4.2 Recipient Site Surveys and Tortoise Density

The Stump Springs Translocation Plan (Clark County and USFWS 2017) involved site-specific surveys completed in fall 2014. Biologists surveyed 1,068 km (664 miles) of transects and located a total of nine live tortoises, resulting in an estimated density of 0.9 adult tortoises/km$^2$ (95% CI = 0.24 to 3.45; Clark County and USFWS 2017). This estimated density is comparable to the 1.5 adult tortoises/km$^2$ estimated for the Eastern Mojave Recovery Unit in 2014 (Allison and McLuckie 2018). However, it is considerably lower than the 3.9 adult tortoises/km$^2$ estimated as the minimum viable density needed to sustain tortoise populations in the original recovery plan (USFWS 1994). In addition to the nine live tortoises observed during the surveys, the biologists located 110 tortoise carcasses, indicating the local population likely experienced a substantial die-off at some point (BLM 2017).

The presence of upper respiratory tract disease, specifically that caused by *Mycoplasma agassizii* or *M. testudineum,* is a frequent concern with tortoise conservation. Five of the nine tortoises observed during the surveys were accessible and received a visual health assessment and tissue collection according to standardized protocols (Clark County and USFWS 2017; USFWS 2016). None of the collected samples tested positive for antibodies to either of the *Mycoplasma* species (Clark County and USFWS 2017).

The low population density of tortoises within an area of apparently suitable habitat contributed to the decision to use the Stump Springs Translocation Area as a recipient site to augment the existing population (BLM 2017). This site has been identified as a regional population augmentation site for future developments in the area (USFWS 2019a). Although the sample size was low, test results do not indicate the presence of *M. agassizii* or *M. testudineum* in the resident population. These factors suggest that the Stump Springs Translocation Area would be a suitable location to release tortoises from the YPSP. Current plans for the Stump Springs Translocation Area include the translocation of tortoises displaced during private-land development activities by Clark County (Clark County and USFWS 2017). Under this plan, up to 10 tortoises would be translocated per year for 5 years, up to a total of 50 tortoises (Clark County and USFWS 2017). Although the maximum density of 2.0 adult tortoises/km$^2$ would still be below the minimum viable density of 3.9 adult tortoises/km$^2$, currently there are no studies or methods that can quantify whether habitat can support higher tortoise densities (BLM 2017).

## 4.3 Control Site

A control site is a location separate from both the project and release site and is used for monitoring purposes relative to translocated and resident tortoises. The BLM and USFWS have identified that the Trout Canyon Translocation Area will be surveyed and used as the control site for the YPSP translocation effort and will be part of the development of the 30-year long-term monitoring plan for the Stump Springs Regional Population Augmentation Site.

# 5 TRANSLOCATION PROCEDURES

## 5.1 Overview of Translocation Procedures

The following are the remaining steps that would need to take place in chronological order:

- Radio-tagged tortoises (n = 10) at an existing USGS study site (Sandy Valley) will be tracked twice per week during the approximately 8-week survey period of release, control, and project sites. Data collected during telemetry monitoring at Sandy Valley will be used to estimate a correction factor that will account for the number of tortoises below ground during surveys and yield more accurate density estimates.

- Identify and survey release site (Complete 2,500 km of transects or until 20 adult tortoises have been radio-tagged). Confirm abundance of tortoises in release site.
    - Locate, measure, and mark tortoises.
    - Attach radio-transmitters to resident tortoises of adequate size (n = 20 adults ≥ 180 mm MCL).
    - Conduct visual health assessments, venipuncture, and tissue sampling (lab results good for 1 year).
        - A visual health assessment should be conducted on tortoises during the same season as translocation; however, sample collection is not needed if within 1 year.
    - Identify release locations for project tortoises.
    - Summary information for sampled tortoises submitted to USFWS following format for the translocation review package/disposition plan as outlined in section 5.7.
    - Only required prior to first construction phase
- Identify and survey control site (Complete 2,500 km of transects or until 20 adult tortoises have been radio-tagged and 100 tortoises have been sampled for disease testing).
    - Locate, measure, and mark tortoises.
    - Attach radio-transmitters to control tortoises of adequate size (n = 20 adults ≥ 180 mm MCL).
    - Conduct visual health assessments, venipuncture, and tissue sampling for tortoises of adequate size (n = 100 tortoises ≥ 100 grams [g]).
        - A visual health assessment should be conducted on tortoises during the same season as translocation; however, sample collection is not needed if within 1 year
    - Summary information for sampled tortoises submitted to USFWS following format for the translocation review package/disposition plan as outlined in section 5.7.
    - Only required prior to first construction phase
- Conduct initial surveys of Phase I Tortoise Clearance Area.
    - Locate, measure, and mark tortoises.
    - Attach radio-transmitters to all tortoises of adequate size (≥ 110 mm in MCL, transmitter package should be < 10% of mass).
    - Conduct visual health assessments, venipuncture, and tissue sampling (lab results good for 1 year).
        - A series of two visual health assessments must be completed 14 to 30 days apart.
        - Venipuncture and tissue samples only need to be collected during one of the health assessments.
    - Same process would be used for future construction phases.
- Submit translocation review package (TRP) to the USFWS for review.
    - Must allow > 14 days for TRP approval.
- Ensure passive exclusion of tortoises during fence construction.
- Conduct clearance surveys (2 to 3 passes) of Phase I Tortoise Clearance Area.
    - Locate, measure, and mark any new tortoises.
    - Attach radio-transmitters to all new tortoises of adequate size (≥ 110 mm in MCL, transmitter package should be < 10% of mass).
    - Juvenile tortoises too small to receive radio-transmitters will be translocated as long as they pass a visual inspection and appear to be in good health. The disposition of unhealthy juveniles will be coordinated with the USFWS.

  - Conduct visual health assessments, venipuncture, and tissue sampling on new tortoises (lab results good for 1 year).
    - A series of two visual health assessments must be completed 14 to 30 days apart.
    - Venipuncture and tissue samples only need to be collected during one of the health assessments.
  - Same process would be used for future construction phases.
- Translocate individuals after approval of TRP.
  - All translocated tortoises will receive a third and final health assessment immediately (1 to 2 days) before translocation.
  - Any tortoises that fail the health screening criteria will not be translocated and will require further coordination with USFWS to determine an appropriate disposition.
- Compile subsequent TRP addenda, including health data and photographs and translocation of additional individuals and juveniles.

## 5.2 Identification and Survey of Release Site

The goal of release site identification is to locate an area with desert tortoises at a low enough density that the addition of translocated tortoises from YPSP will not have a detrimental impact on resident tortoises while also bringing the population closer to the minimum viable density of 3.9 adult tortoises/km$^2$ (USFWS 1994). Based on the results of surveys, 53 adult tortoises, but up to 79 based on the 95% CI will be translocated to the release site under the full project buildout. The maximum allowable tortoise density for the Eastern Mojave Recovery Unit after translocation is 4.0 adult tortoises/km$^2$ (USFWS 2019a). The BLM and USFWS have identified a 21,000-acre release site within the Stump Springs Translocation Area where project tortoises will be translocated. Release site surveys will total no more than 2,500 km and will be considered complete once a total of 20 adult tortoises (> 180 mm MCL) have been radio-tagged and received visual health assessments including biological sample collection.

All live tortoises encountered during release site surveys would receive a unique identifier (as provided by the USFWS) and be weighed and measured, and tortoises of adequate size (≥ 180 mm in MCL; n = 20) would be equipped with radio-transmitters. Tortoises equipped with transmitters would be tracked at least once per week during the active season (March through October) and once every other week during the inactive season (November through February) unless otherwise specified by the USFWS. Release site tortoises will be monitored until a maximum of one year after the translocation date of the last tortoise moved from the YPSP.

Radio-tagged tortoises (n = 10) at an existing USGS study site (Sandy Valley) will be tracked twice per week during the approximately 8-week survey period of release, control, and project sites. Data collected during telemetry monitoring at Sandy Valley will be used to estimate a correction factor that will account for the number of tortoises below ground during surveys and yield more accurate density estimates.

In addition to determining the density of resident tortoises within the release site, data are also needed to assess the prevalence of disease within the resident population prior to translocation of project tortoises. All tortoises located during release site surveys would also receive a visual health assessment as described by the USFWS (2019b). In addition to a visual health assessment documenting physical signs of upper respiratory tract disease infection and/or poor health, all radio-tagged tortoises would undergo biological sample collection. This would include venipuncture to collect 0.25 to 2.00 ml of blood for processing and collection of two oral swabs. A plasma sample would be submitted to the University of Florida for enzyme-linked immunosorbent assay (ELISA) testing to determine the presence of *M. agassizii* and/or *M. testudineum* antibodies. Additional quantitative polymerase chain reaction (qPCR) testing will be performed on the oral swabs to test for both *Mycoplasma* species and Testudinid herpesvirus 2. Any remaining tissue collected would be submitted to a facility selected by the USFWS for long-term storage. The designated

storage facility is currently the University of California, Los Angeles and will also require the payment of $3,000 to cover archival fees associated with samples expected to be collected during the pre-translocation and post-translocation monitoring periods.

## 5.3 Identification and Survey of Control Site

The USFWS and BLM have indicated that the Trout Canyon Translocation Area will serve as the control site for monitoring the success of the YPSP translocation. Because the YPSP is the first project to utilize the Stump Springs Translocation Area, YPS will complete initial surveys of the control site (not to exceed $1,000,000) for the BLM and USFWS. The BLM and USFWS have determined that project applicants that use the Stump Springs Translocation Area, which has been designated as a Regional Population Augmentation Site, will be required to pay a fee of $450 per acre cleared (i.e. $1,423,845 for the 3,164.1-acre Phase I Tortoise Clearance Area of YPSP) to help cover the costs of a 30 year long-term monitoring study on the effects of tortoise translocation. The fee of $450 per acre will be in addition to remuneration fees calculated to offset loss of desert tortoise habitat. The Stump Springs translocation fee will be indexed by the Consumer Price Index annually. Fees will be assessed separately for each applicant. Because the initial control site surveys will be used to support all future projects using the translocation site, YPSP will be reimbursed through an equal reduction in long-term monitoring fee costs. For example, if initial control site surveys cost YPS $1,000,000, YPS would pay the long-term monitoring fee minus $1,000,000 (for example $1,423,845 fee - $1,000,000 survey cost = $423,845 final fee amount). For the TCS and 230-kV transmission line, GLW will be responsible for payment of $31,230 ($450 x 69.4 acres).

Control site surveys will total no more than 2,500 km over the Trout Canyon Translocation Area and surveys will be considered complete once a total of 20 adult tortoises (> 180 mm MCL) have been radio-tagged and a total of 100 tortoises (> 100 g) have received visual health assessments including biological sample collection. All live tortoises encountered during control site surveys would receive a unique identifier (as provided by the USFWS) and be weighed and measured, and tortoises of adequate size (≥ 180 mm in MCL; n = 20) would be equipped with radio-transmitters. Tortoises equipped with transmitters would be tracked at least once per week during the active season (March through October) and once every other week during the inactive season (November through February) unless otherwise specified by the USFWS. Control site tortoises will be monitored until a maximum of one year after the translocation date of the last tortoise moved from the YPSP.

The prevalence of disease within the control population is also an important factor in determining the control site's suitability as a reference for translocation monitoring. The control site should be selected such that tortoises have a similar prevalence of disease compared to the project and release site tortoise populations. Tissue sample collection would include venipuncture to collect 0.25 to 2.00 ml of blood for processing and collection of two oral swabs. A plasma sample would be submitted to the University of Florida for ELISA testing to determine the presence of *M. agassizii* and/or *M. testudineum* antibodies. Additional qPCR testing will be performed on the oral swabs to test for both *Mycoplasma* species and Testudinid herpesvirus 2. Any remaining tissue collected would be submitted to a facility selected by the USFWS for long-term storage, currently the University of California, Los Angeles.

## 5.4 Initial Project Surveys and Health Assessments

Unless otherwise directed by the BLM and/or USFWS, translocation activities for the YPSP would begin with initial surveys and health assessments of tortoises within the Phase I Tortoise Clearance Area (currently anticipated to be Sub-Areas A, B, C, the TCS, and areas inside perimeter fencing; see Figure 2). Any area not included in the first phase of construction (i.e. Sub-Area D) would be surveyed, fenced, and cleared prior to construction of that phase following the same procedures as the initial construction phase as outlined in sections 5.4 through 6.5.

Biologists would survey the Phase I Tortoise Clearance Area, using belt transects spaced 10 m (approximately 33 feet) apart. All live tortoises encountered during surveys would receive a unique identifier (as provided by the USFWS) and be weighed and measured, and those of adequate size (≥ 110 mm) would be equipped with radio-transmitters. Tortoises equipped with transmitters would be tracked at least once per week during the active season (March through October) and once every other week during the inactive season (November through February) until they are translocated. After translocation, tortoises will be monitored until a maximum of one year after their translocation date.

All tortoises located during surveys would receive an initial visual health assessment as described by the USFWS (2019b). A second visual health assessment would be required 14 to 30 days after the initial health assessment to confirm absence of signs which can be intermittent. In addition to a visual health assessment documenting physical signs of upper respiratory tract disease infection and/or poor health, all tortoises that weigh ≥ 100 g would undergo biological sample collection. This would include venipuncture to collect 0.25 to 2.00 ml of blood for processing and collection of 2 oral swabs. A plasma sample would be submitted to the University of Florida for ELISA testing to determine the presence of *M. agassizii* and/or *M. testudineum* antibodies. Additional qPCR testing will be performed on the oral swabs to test for both *Mycoplasma* species and Testudinid herpesvirus 2. Any remaining tissue collected would be submitted to a facility selected by the USFWS for long-term storage, currently the University of California, Los Angeles. A third visual health assessment of each tortoise would take place immediately before its translocation (see Section 5.8).

## 5.5 Fence Construction and Passive Exclusion

Tortoises within the fenced area would remain in situ until translocation. Fence construction may occur during any season and would occur in accordance with USFWS (2009) recommendations. Any tortoises encountered on the fencing pathway during fence construction would be moved to adjacent habitat outside the fence line, receive a unique identifier, undergo a health assessment, and be fitted with a radio-transmitter. As long as these individuals remain outside the fenced area, they would not need to be translocated, and their transmitters may be removed once the fence is complete. Tortoises equipped with transmitters would be tracked at least once per week during the active season (March through October) and once every other week during the inactive season (November through February) until they are translocated or their transmitters are removed once fencing is complete.

If the Proposed Action is approved, prior to clearance surveys, all areas planned for construction would be fenced with desert tortoise fencing. Permanent tortoise fencing would be installed inside the project boundary for those Sub-Areas to be built at the time of construction. In addition to permanent fencing, temporary tortoise fencing would be installed between Sub-Areas, and extending to SR 160 and Tecopa Rd. This combination of permanent and temporary fencing would create a Tortoise Clearance Area from which tortoises would be translocated. An approximately 20-foot buffer between the fencing and the boundary perimeter will be established as a temporary work area for fence construction access. If construction proceeds for all Sub-Areas at once, a combination of temporary and permanent desert tortoise fencing would enclose a total of approximately 4,284.5 acres (the Full Build Tortoise Clearance Area). However, at present it is assumed that only Sub-Areas A, B, C, and the TCS, would be constructed during Phase I of construction (the Phase I Tortoise Clearance Area [3,233.5 acres]). Any Sub-Areas not included in the initial phase of construction (i.e. Sub-Area D) would be added at a later date. In the event that Sub-Area D is developed in a later phase, the additional acres of disturbance would follow the same translocation procedures as Phase I. All fencing would be completed by YPS except for the 30 acres around the TCS which would be completed by GLW.

The TCS is being developed by a separate company (GLW) which would be responsible for all fencing and clearance activities within the 69.4-acre footprint of the substation and 230-kV transmission line. However, because of its location immediately adjacent to the YPSP, if construction of the YPSP occurs prior to the TCS, GLW will be required to perform fencing and translocation activities concurrently with the YPSP. If

the TCS is built prior to a known construction start date for the YPSP, GLW would fence, survey, and translocate tortoises from the 30-acre TCS, independent from the YPSP. Under this scenario, fencing, clearance surveys, and translocation would not be necessary for the 39.4 acres of disturbance associated with the 230-kV transmission line and would instead use qualified desert tortoise monitors during construction as stipulated in the Biological Assessment and Biological Opinion.

Temporary fencing may be bent at the bottom and buried or tacked down if the final surface disturbance would be less than trenching in the fence. Temporary fencing will avoid active tortoise burrows. Tortoise guards will be placed at all road access points where desert tortoise-proof fencing is interrupted to exclude desert tortoises from the Tortoise Clearance Area until construction is complete. Gates or tortoise exclusion guards will be installed with minimal ground clearance and shall deter ingress by desert tortoises.

Shade structures (PVC or equivalent half pipe) will be placed every 300 meters along the fence perimeter to provide shade for any tortoises pacing/walking along the fence. The shelters will be designed and installed to provide shelter for both small and large tortoises. The shelters will be installed with one smaller sized shelter placed in between each larger shelter in order to provide additional locations for subadults and juveniles. Shelters will be made from either PVC tubes or similar material with a diameter of 14 inches (36 centimeters) or greater for the larger shelters and 6 to 8 inches (15 to 20 centimeters) for the smaller ones. Tubes should be cut into 2-to 3-foot (0.61-to 0.91-meter) length and cut horizontally. Each shade structure would have soil piled on top to keep them from being blown away and to assist with thermoregulation within the shelter.

All tortoise exclusion fencing will be inspected monthly during construction, quarterly for the life of the Project, and immediately following all major rainfall events. Any damage to the fence will be repaired within 2 days of observing the damage and be reported to the USFWS to determine whether additional measures are necessary. During all fence monitoring, shade structures will be inspected for their effectiveness and adjusted as needed to increase their effectiveness.

In addition to temporary perimeter fencing, temporary cross-fencing may be implemented to optimize clearance surveys. Temporary cross-fencing may consist of standard tortoise fence materials or more expedient materials such as silt fencing.

In addition to perimeter tortoise fencing, each Sub-Area would be fenced appropriately to restrict public access during construction and operations. Chain-link security fencing would be installed around the Sub-Area perimeters, substation, and other areas requiring controlled access. 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. Site gates would be swing- or rolling-type access gates and desert tortoise crossing guards would be installed at all gate locations.

## 5.6 Clearance Surveys and Final Health Assessments

After fence construction, biologists would survey the Phase I Tortoise Clearance Area, using USFWS protocol clearance surveys (USFWS 2009). Clearance surveys differ from presence/absence surveys primarily in that they are spaced 5 m (approximately 16 feet) apart. Clearance surveys typically require two to three passes of the project site to ensure the location of all tortoises within the Tortoise Clearance Area. All tortoise scat encountered during clearance surveys should be removed or destroyed to facilitate locating tortoises that have yet to be encountered. All new tortoises encountered during clearance surveys would receive a unique identifier (as provided by the USFWS) and be weighed and measured, and those of adequate size (≥ 110 mm) would be equipped with radio-transmitters. Tortoises equipped with transmitters would be tracked at least once per week during the active season (March through October) and once every other week during the inactive season (November through February) until they are translocated. After translocation, tortoises will be monitored until a maximum of one year after their translocation date.

All new tortoises located during clearance surveys would receive an initial visual health assessment as described by the USFWS (2019b). A second visual health assessment would be required 14 to 30 days after the initial health assessment to confirm absence of signs which can be intermittent. In addition to a visual health assessment documenting physical signs of upper respiratory tract disease infection and/or poor health, all tortoises that weigh ≥ 100 g would undergo biological sample collection. This would include venipuncture to collect 0.25 to 2.00 ml of blood for processing and collection of 2 oral swabs. A plasma sample would be submitted to the University of Florida for ELISA testing to determine the presence of *M. agassizii* and/or *M. testudineum* antibodies. Additional qPCR testing will be performed on the oral swabs to test for both *Mycoplasma* species and Testudinid herpesvirus 2. Any remaining tissue collected would be submitted to a facility selected by the USFWS for long-term storage, currently the University of California, Los Angeles. While all new tortoises located during clearance surveys will be tested for disease, disease results may not be available before translocation activities would have to begin to meet the necessary weather requirements (see Section 5.8). As long as new tortoises meet the visual health requirements for translocation they would be included in the same translocation cohort as the tortoises from the initial project surveys (see Section 5.4).

## 5.7 Translocation Review Packages and Disposition Plans

All data from project clearance surveys, and health assessments would be compiled into a TRP, which would include the following:

- Disposition plan for each tortoise within the Tortoise Clearance Area (Full Build, Phase I, or Future Phase)
    - Health assessment data sheets if not already provided
    - Photographs of individual tortoises
    - Completed disposition template and recommendation
- Updated information on density of tortoises within the release site (as provided by BLM and USFWS)
    - Locations of all burrows observed in the release site
    - Locations of all predator sign (areas with a high density of predator sign would be excluded as potential release locations)
- Maps of the project site that
    - Include all relevant geographic information system (GIS) layers
    - Illustrate the distribution and health status of project tortoises
    - Depict the proposed release locations of tortoises to be moved < 300 m (if applicable)
- Maps of the release site that
    - Include all relevant GIS layers
    - Illustrate the distribution and health status of resident tortoises
    - Depict the proposed release locations of project tortoises
- Any other project-specific information needed to clarify decisions

## 5.8 Translocation of Known Individuals

Translocation of individuals described in the TRP must occur within the same spring or fall season for which the disposition plan was proposed. Any delays in the project that cause a delay in translocation would necessitate updating health assessment data (results from biological samples are valid for 1 year) and revising the disposition plan as necessary. The USFWS would have a minimum of 2 weeks to review and approve the TRP before translocation can proceed.

Spring translocations (April 1 through May 31) are preferred but fall translocations (September 1 through September 30) are acceptable if weather conditions are favorable. The following weather conditions must be met for release of translocated tortoises:

- Temperatures at the time of release must be 18 to 30 degrees Celsius (ºC) (65–85 degrees Fahrenheit [ºF]).
- Temperatures must not be forecasted to exceed 32ºC (90ºF) within 3 hours.
- Temperatures must not be forecasted to exceed 35ºC (95ºF) within 1 week.
- Temperatures must not be forecasted to drop below 10ºC (50ºF) within 1 week.

Desert tortoises would be transported to their release locations in clean, ventilated containers. Containers would either be single use or, if reused, would be disinfected using Rescue Ready to Use by Virox, a 10% bleach solution, or trifectant between tortoises. All tortoises that void during handling or transport would be hydrated according to existing protocols (USFWS 2019b), and other tortoises may also receive hydration on an as-needed basis because of environmental conditions or hydration state. Translocated tortoises would be released into unoccupied shelter sites at the release location, as previously identified in their respective disposition plans. Shelter sites include unoccupied burrows, spaces within rock outcrops, caliche caves, and the shade of shrubs.

All tortoises would receive a third health assessment within 24 to 48 hours of their translocation. Any tortoises that exhibit signs that disqualify them from translocation would not be translocated. The disposition of any tortoises too unhealthy to be translocated would be determined after coordination with the BLM and USFWS.

# 6 MONITORING, ADAPTIVE MANAGEMENT, AND REPORTING

## 6.1 Data Management

All field activities would be conducted by qualified contractors providing Authorized Desert Tortoise Biologists (ADTBs) and tortoise monitors as approved under the project Biological Opinion and incidental take statements. All data sheets, electronic forms, and databases would be standardized and approved by the USFWS and BLM to conform with data requirements. Monitoring and other compliance actions under this plan would commence after the project receives approval and before construction begins.

## 6.2 Radio-telemetry Monitoring

The Applicants' environmental services team would monitor the tortoises translocated during this project for a maximum of 1 year from each individual's translocation date. The following schedule outlines the monitoring frequency for the first year in accordance with USFWS (2019a):

- Once within 24 hours of release
- At least twice weekly for the first 2 weeks after release
- Starting the third week after release
    - At least once a week from March through October
    - Once every other week from November through February

This schedule provides an outline for radio-telemetry monitoring translocated tortoises; however, adjustments to this schedule may be necessary to account for a variety of scenarios. Tortoises that move

farther than expected, are consistently found along a fence line, are not seeking suitable shelter, or have a low body condition score may require more frequent monitoring.

In addition to radio-telemetry monitoring of translocated tortoises, the resident and control tortoise groups would be tracked at least once per week during the active season (March through October) and once every other week during the inactive season (November through February) for the duration of the study. Transmitters would be changed as necessary over the course of monitoring.

In addition to radio-telemetry monitoring, translocated, resident, and control tortoises would be weighed, measured, and receive health assessments twice each year (spring and fall). Any health problems documented during the health assessments should be reported in a timely manner to the USFWS and Nevada Department of Wildlife to determine appropriate actions.

After the conclusion of the 1-year post-translocation radio-telemetry monitoring period, the Applicants would no longer be responsible for monitoring radio-tagged tortoises and individuals would be transitioned into the Long-Term Monitoring Plan as directed by the agencies.

## 6.3 Long-Term Monitoring Plan

A 30-year Long-Term Monitoring Plan to examine the short- and long-term effects of translocation is currently under development, in collaboration with the BLM, USFWS, and Nevada Department of Wildlife (NDOW). The Long-Term Monitoring Plan will be funded through the Stump Springs translocation fee collected from projects utilizing the Stump Springs Translocation Area, including the YPSP.

## 6.4 Adaptive Management

Coordination among the Applicants, their environmental services team, the BLM and USFWS would be necessary throughout the duration of the translocation efforts described above.

*If conditions in the field **pose an immediate threat** to one or more tortoises*, the Applicants' field staff would be allowed to make adaptive management decisions in the best interest of the tortoise(s). Field staff would notify agency personnel and the Applicants of any adaptive management decisions by telephone within 24 hours to describe the actions taken and their results. Field staff would follow up with an email report to thoroughly describe the reasons for acting, the actions taken, and the results of those actions.

*If conditions in the field are of concern but **do not pose an immediate threat** to one or more tortoises*, the Applicants' field staff would notify the BLM and USFWS of the proposed adaptive management decisions via email. Field personnel would wait up to 1 week for concurrence or additional direction from agency personnel before taking any action.

## 6.5 Reporting

All data collected for the project would follow established standardizations and minimum requirements as determined by the BLM and USFWS. The Applicants' environmental services team would submit the data, findings, and recommendations to the USFWS and appropriate agencies as directed by the BLM and USFWS.

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# APPENDIX D

## Form 1842-1
## Information on Taking Appeals to the Interior Board of Land Appeals

Form 1842-1
(September 2020)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

# INFORMATION ON TAKING APPEALS TO THE INTERIOR BOARD OF LAND APPEALS

DO NOT APPEAL UNLESS

1. This decision is adverse to you,

AND

2. You believe it is incorrect

IF YOU APPEAL, THE FOLLOWING PROCEDURES MUST BE FOLLOWED

**I. NOTICE OF APPEAL.....**

A person who wishes to appeal to the Interior Board of Land Appeals must file in the office of the officer who made the decision (not the Interior Board of Land Appeals) a notice that they wish to appeal. A person served with the decision being appealed must transmit the *Notice of Appeal* in time for it to be filed in the office where it is required to be filed within 30 days after the date of service. If a decision is published in the FEDERAL REGISTER, a person not served with the decision must transmit a *Notice of Appeal* in time for it to be filed within 30 days after the date of publication (43 CFR 4.41 I and 4.413).

**2. WHERE TO FILE**

NOTICE OF APPEAL.....

U.S. Department of the Interior, Bureau of Land Management
4701 N. Torrey Pines Drive, Las Vegas, Nevada 89130

WITH COPY TO SOLICITOR.....

USDOI Office of the Solicitor, Pacific Southwest Region
2800 Cottage Way, Room E-1712, Sacramento, CA 95825-1890

**3. STATEMENT OF REASONS**

Within 30 days after filing the *Notice of Appeal,* file a complete statement of the reasons why you are appealing. This must be filed with the United States Department of the Interior, Office of Hearings and Appeals, Interior Board of Land Appeals, 801 N. Quincy Street, MS 300-QC, Arlington, Virginia 22203. If you fully stated your reasons for appealing when filing the *Notice of Appeal,* no additional statement is necessary (43 CFR 4.412 and 4.413).

WITH COPY TO SOLICITOR.....

DOI Office of the Solicitor, Pacific Southwest Region
2800 Cottage Way, Room E-1712, Sacramento, CA 95825-1890

**4. SERVICE OF DOCUMENTS**

A party that files any document under 43 CFR Subpart 4, must serve a copy of it concurrently on the appropriate official of the Office of the Solicitor under 43 CFR 4.413(c) and 4.413(d). For a notice of appeal and statement of reasons, a copy must be served on each person named in the decision under appeal and for all other documents, a copy must be served on each party to the appeal (including intervenors). Service on a person or party known to be represented by counsel or other designated representative must be made on the representative. Service must be made at the last address of record of the person or party (if unrepresented) or the representative, unless the person, party or representative has notified the serving party of a subsequent change of address.

**5. METHOD OF SERVICE....**

If the document being served is a notice of appeal, service may be made by (a) Personal delivery; (b) Registered or certified mail, return receipt requested; (c) Delivery service, delivery receipt requested, if the last address of record is not a post office box; or (d) Electronic means such as electronic mail or facsimile, if the person to be served has previously consented to that means in writing. All other documents may be served by (a) Personal delivery; (b) Mail; (c) Delivery service, if the last address of record is not a post office box; or (d) Electronic means, such as electronic mail or facsimile, if the person to be served has previously consented to that means in writing.

**6. REQUEST FOR STAY.....**

Except where program-specific regulations place this decision in full force and effect or provide for an automatic stay, the decision becomes effective upon the expiration of the time allowed for filing an appeal unless a petition for a stay is timely filed together with a Notice of Appeal (43 CFR 4.21). If you wish to file a petition for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Interior Board of Land Appeals, the petition for a stay must accompany your Notice of Appeal (43 CFR 4.21 or 43 CFR 2801.10 or 43 CFR 2881.10). A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the Notice of Appeal and Petition for a Stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay. Except as otherwise provided by law or other pertinent regulations, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards: (1) the relative harm to the parties if the stay is granted or denied, (2) the likelihood of the appellant's success on the merits, (3) the likelihood of immediate and irreparable harm if the stay is not granted, and (4) whether the public interest favors granting the stay.

Unless these procedures are followed, your appeal will be subject to dismissal (43 CFR 4.402). Be certain that **all** communications are identified by serial number of the case being appealed.

**NOTE:** A document is not filed until it is actually received in the proper office (43 CFR 4.401(a)). See 43 CFR Part 4, Subpart B for general rules relating to procedures and practice involving appeals.

(Continued on page 2)

**43 CFR SUBPART 1821-GENERAL INFORMATION**

Sec. 1821.10 Where are BLM offices located? (a) In addition to the Headquarters Office in Grand Junction, CO and seven national level support and service centers, BLM operates 12 State Offices each having several subsidiary offices called Field Offices. The addresses of the State Offices can be found in the most recent edition of 43 CFR 1821.10. The State Office geographical areas of jurisdiction are as follows:

STATE OFFICES AND AREAS OF JURISDICTION:

Alaska State Office ---------- Alaska
Arizona State Office ---------- Arizona
California State Office --------- California
Colorado State Office ---------- Colorado
Eastern States Office ---------- Arkansas, Iowa, Louisiana, Minnesota, Missouri
and, all States east of the Mississippi River
Idaho State Office ---------- Idaho
Montana State Office --------- Montana, North Dakota, and South Dakota
Nevada State Office---------- Nevada
New Mexico State Office ------ New Mexico, Kansas, Oklahoma, and Texas
Oregon State Office ---------- Oregon and Washington
Utah State Office ---------- Utah
Wyoming State Office --------- Wyoming and Nebraska

(b) A list of the names, addresses, and geographical areas of jurisdiction of all Field Offices of the Bureau of Land Management can be obtained at the above addresses or any office of the Bureau of Land Management, including the Headquarters Office, Bureau of Land Management, 760 Horizon Drive, Grand Junction, CO 81506.