

## **Appendix B. 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:  
2025-0055609-S7-001

April 9, 2025  
*Sent electronically*

## Memorandum

To: Chief  
Resource Management Office  
Bureau of Reclamation  
Boulder City, Nevada

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

Subject: Biological Opinion on the City of Henderson Lake Mead Parkway Utilities and  
Drainage Channel Project

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the Bureau of Reclamation (Reclamation) license issuance to the City of Henderson's (COH) proposed Lake Mead Parkway Infrastructure Project and its effects on 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.). We received your biological assessment and request for formal consultation on February 10, 2025.

We have based this biological opinion on information that accompanied your February 10, 2025, request for consultation, including the biological assessment prepared for the COH and Pulte Group, Inc.; correspondence between the Service and Reclamation; scientific publications, articles, and reports; and our files.

## BIOLOGICAL OPINION

### DESCRIPTION OF THE PROPOSED ACTION

#### **Action Area**

The action area (referred to as the “analysis area” in the Biological Assessment [UES 2025] and in Figure 1) for this biological opinion is located in the northeast region of Henderson, Nevada. The action area is the area where all project activities would occur. The action area is approximately 310 acres (UES 2025). The proposed construction activities would cover approximately 50.8 acres of temporary (25.4 acres) and permanent (25.4 acres) right-of-way (ROW) grants to the COH from Reclamation (Figure 1). The 50.8 acres of ROW includes areas for a concrete storm drain channel (facility 1; approximately 1,250 linear feet of Reclamation managed land), a sewer force main (facility 2; approximately 4,520 linear feet of Reclamation managed land), a water transmission main and R-68 reservoir (facility 3; approximately 2,600 linear feet of Reclamation managed land), and permanent trail segments in undetermined areas within the action area (facility 4; approximately 4,000 feet long by up to 25 feet wide). Power, gas, fiber optic and telecommunications lines and new trail locations within the action area are to be determined. See figure 1 for an overview of the action area.

#### **Proposed Action**

The COH has proposed a utilities and drainage channel infrastructure project (Project) as part of a Master Transportation Plan. The proposed Project includes land managed by Reclamation (50.8 acres), which requires compliance with federal regulations under 43 CFR 429. The COH requires explicit written authorization from Reclamation prior to the start of Project activities. The Project would consist of the construction of (1) a concrete storm drain channel, (2) a sewer force main, (3) a water transmission line, (4) new temporary and permanent trail segments, (5) power, gas, fiber optics and telecommunications lines, and (6) general construction activities (Figure 1). Each of the Project activities are outlined below.

#### Concrete Storm Drain Channel (Facility 1)

The COH has proposed to construct a concrete storm drain channel that would connect to an existing Southern Nevada Water Authority facility. The proposed storm drain channel would flow north to existing concrete boxes under Lake Mead Parkway. The proposed storm drain would measure 20 feet by 5 feet with a width varying at transitions (up to 52 feet) and a total length of approximately 1,250 feet. The concrete storm drain channel would be constructed at-grade with a six-foot post a cable fence that extends above grade. All excess excavated material would be removed from site and stockpiled on private property within the analysis area to be used at a later time as backfill and erosion control. The width of the permanent ROW for this facility would vary with a maximum width of 125 feet. Construction is scheduled to begin in May 2025 and be completed in November 2025.

#### Sewer Force Main (Facility 2)

The COH has proposed to install three underground sewer force main lines (10-inch, 12-inch, and 16-inch) running parallel to Lake Mead Parkway from the Lakemoor Lift Station to First

Dawn Street, then south along First Dawn Street to the Pulte Homes property at Athens Drive. All three sewer force main lines would be installed concurrently in separate trenches measuring approximately 4 feet wide, 7 feet deep, and approximately 1,150 feet long. The permanent ROW for this facility would have a maximum width of 70 feet and a temporary ROW near Athens Drive would be approximately 0.65 acres in size. Grading for the facility would be completed by bulldozer, loader, excavator, and water trucks. A manhole for transition from a force main to gravity sewer would be installed at the end of Athens Drive. Construction is scheduled to begin in May 2025 and be completed in November 2025.

#### Water Transmission Main and R-68 Reservoir (Facility 3)

The COH has proposed to install a water transmission main in two phases. Phase 1 would include the installation of a 16-inch water transmission main from R-7 to R-12 reservoir. The installation area would first be trenched using a trencher. The water transmission main would then be installed using an excavator and backfilled with a loader and water trucks. Power and telecommunications conduit would be installed alongside the water transmission main. The Phase 1 pipeline would consist of approximately 4,200 feet (2,600 feet on Reclamation managed lands) of ductile iron pipe and would be equipped with isolation valves located within the valve vaults, above-ground air valves within covered structures, blowoff facilities, and cathodic protection to mitigate corrosion. Construction of Phase 1 is scheduled to begin in June 2025 and be completed in February 2026.

Phase 2 of the water transmission main installation would include the construction of a new R-68 concrete reservoir and the installation of two water transmission mains (16-inch and 24-inch) from R-7 to the new R-68 reservoir. The installation area would first be trenched 6 feet wide and 8 feet deep and approximately 2,500 feet long using a trencher. The water transmission main would then be installed using an excavator and backfilled with a loader and water trucks. Power and telecommunications conduit would be installed alongside the water transmission main. The R-68 reservoir would be concrete, above ground, and have approximately 1.4 million gallon capacity. Excavation would be completed with a bulldozer with a ripper, an excavator, and water trucks. Reservoir construction would be completed using work trucks, a crane, man-lifts, excavator, loaders, concrete trucks, and water trucks. All excess excavated material would be removed from site and stockpiled on private property within the analysis area to be used at a later time as backfill and erosion control. The ROW for this facility would have a maximum width of 75 feet, excluding the reservoir, which would measure 500 feet by 600 feet. Construction of Phase 2 and the R-68 reservoir is scheduled to begin in March 2026 and be completed in April of 2027.

#### Temporary and Permanent Trail Segments (Facility 4)

The construction of temporary trail segments would be required to create temporary diversions of the Mountain Loop Trail during construction of the water transmission main facility. The total length of temporary trail is approximately 400 feet. The temporary trail would be constructed using minimum grading to create a safe surface for all permitted activities of the Mountain Loop Trail. A permanent trail diversion would be required after construction of the water transmission main facility. The total length of the permanent trail would be approximately 489 feet.

An additional 4,000 feet of new permanent trails would be created within the Project action area.

These trails would initially be graded dirt but would ultimately be constructed using asphalt or concrete. The maximum width of these trails would be 25 feet. The total area disturbed for permanent trails would be up to approximately 2.3 acres (4,000 feet by up to 25 feet). Detailed features of these anticipated trails are not yet available, but all disturbances for trails would occur within the action area. The construction schedule for new trails is to be determined.

#### Power, Gas, Fiber Optics, and Telecommunication Lines (Facility 5)

No specific designs are available at this time. It is anticipated that no more than 3,547 linear feet of underground power, gas, fiber optic, and telecommunication lines would be installed. There would be no above ground gas, power, fiber optic, or telecommunications lines. Fiber optic and telecommunications lines would be installed between 24 and 48 inches deep and would be buried based on location of other installed utilities.

According to Southwest Gas, any gas line installation would include 4-inch PVC natural gas sleeving installed 30 inches below finished grade and 12 inches above electric lines within a joint trench, trenches would be at least 34 inches from final grade, shading material would be 1.5 minus in size and 6 inches above sleeving, and there would be a minimum clearance between all utilities.

According to NVEnergy, all power lines would be installed underground by NVEnergy based on NVEnergy RT-G, Revision 6 general requirements for underground service. Lines would be buried a minimum of 36 inches from the edge of water and gas pipes. All excavated material would be placed a minimum of two feet from either edge of the trench. Backfill would be performed according to RT-1 general requirements and would meet all applicable government codes and ordinances. The minimum trench depth for electric conduit would be 48 inches. The construction schedule of power, gas, fiber optics and telecommunications lines is to be determined.

#### General Construction Activities

The following general construction activities that would occur during construction include (1) survey and boundary marking, (2) erosion and sediment control measures, (3) backfill and site recontouring, and (4) pipe assembly and testing. Survey crews would use surveying equipment to measure precise locations of the Project boundary, ensuring all construction activities take place in the appropriate areas. A Stormwater Pollution Prevention Plan would be developed for all areas with disturbances over 1 acre, which would be designed to ensure significant amounts of erosion and sedimentation do not occur. Excavated materials would be used to back fill areas of excavation. Back filled areas would be graded back to original contours. All temporary ROW areas will be restored to the preconstruction conditions following the completion of the construction phase of the Project. Prior to laying pipe into trenches, a bedding of sand or gravel would be laid at the base of the trench, ensuring the piping has stable support beneath it. As sewer and water lines are assembled, they would be joined together using gaskets, sealants, couplings, mechanical joints, and welding. Sewer and water lines will be pressure tested to see if any leaks are detected.

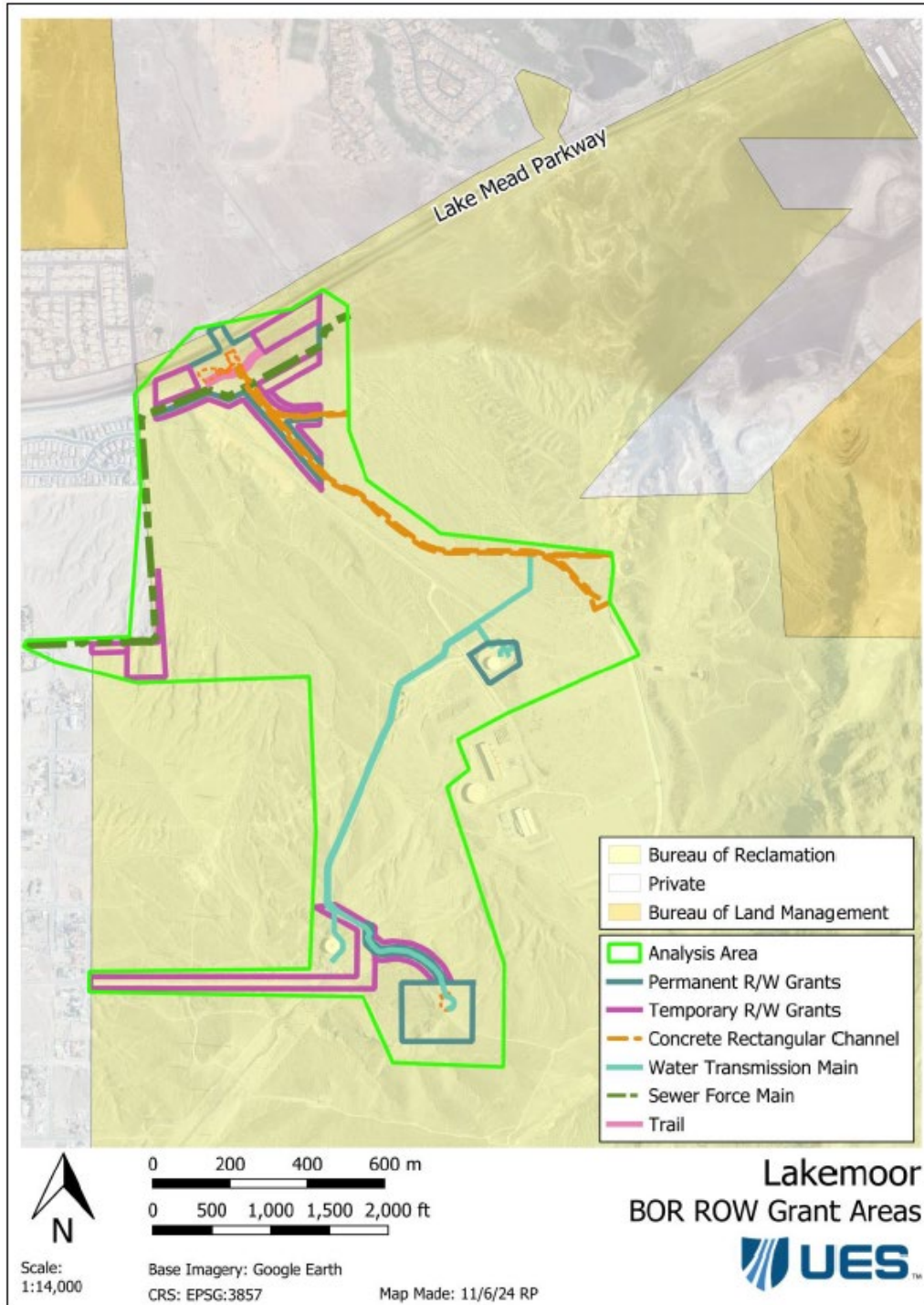


Figure 1. This figure contains the action area (labeled “analysis area”), temporary and permanent right-of-way (R/W), and the Project activities (1) a concrete rectangular drain channel, (2) a sewer force main, (3) a water transmission line, (4) new temporary and permanent trail segments. Project activities not pictured in this figure but still occurring within the analysis area are (5) power, gas, fiber optics and telecommunications lines and (6) general construction activities.

### Maintenance Activities

Maintenance of newly constructed facilities would follow a scheduled maintenance plan while repairs would occur when necessary. Maintenance would be performed by the COH Department of Utility Service. The COH has a “Pre-Approved Materials List” to ensure infrastructure improvement projects are built with high quality material that creates reliable systems and requires minimal maintenance. The COH would perform the following routine maintenance activities: (1) channel and pipe inspections, (2) pump servicing and lubrication, (3) leak, crack and joint failure repairs, (4) aging and damaged pipe replacement, (5) flushing of pipes for sediment removal. Following the completion of the construction phase, the COH in cooperation with Reclamation would assume maintenance responsibilities of the trail.

### **Proposed Minimization Measures**

The following proposed minimization measures (MM) would be implemented as part of the construction and maintenance phases of the Project to avoid or reduce environmental impacts associated with the Project on species listed under the Act. These minimization measures were designed to comply with the Service’s guidelines.

1. Before construction, an authorized desert tortoise biologist (ADTB) would conduct pre-activity surveys in suitable habitat within the Project action area to ensure no Mojave desert tortoise are present.
2. During all Project phases, an ADTB would monitor active work areas to detect and manage any potential encounters with Mojave desert tortoises. The ADTB would inspect areas immediately prior to disturbance.
3. Off-highway vehicles and other construction vehicles would be restricted to designated routes to avoid accidental encounters with Mojave desert tortoises.
4. All vehicle traffic in the Project action area would operate at speeds of 15 miles per hour or less.
5. The area underneath all vehicles, equipment, and material would be checked by operators for Mojave desert tortoises before they are moved or operated.
6. Open trenches left open overnight would be covered or provided with escape ramps to prevent tortoise entrapment, injury, or mortality. ADTB would inspect all open trenches each morning.
7. All staff and contractors working within the Project action area would receive worker environmental awareness program (WEAP) training from an ADTB before engaging in any activities in the Project action area. WEAP training would focus on Mojave desert tortoise awareness training before initiating work. The program will consist of either a presentation or fact sheet as determined by project level consultation between Reclamation and the Service. Information included will consist of, at a minimum: 1) objectives of environmental compliance; 2) life history of the Mojave desert tortoise; 3) legal status of the Mojave desert tortoise; 4) description of and definitions included in the

Act; 5) actions if a Mojave desert tortoise is encountered; 6) mitigation measures being taken to protect the Mojave desert tortoise; 7) penalties for non-compliance with stated protection measures; 8) habitat protections; and 9) other environmental compliance stipulations.

8. If Mojave desert tortoises are encountered during construction, only an ADTB would move tortoises out of harms way.
9. The Service would be notified immediately of any Mojave desert tortoise death or injury due to project implementation or activities or if one is found in the action area.
10. Litter control (including any food related waste) would be implemented and enforced by the Project proponent.
11. Workers will be notified that feeding wildlife would not be allowed.
12. All temporary ROW (25.4 acres) areas will be restored to the existing conditions following completion of the construction phase of the Project.
13. Reclamation or the applicant would compensate for the 25.4 acres of permanent disturbance by paying the current remuneration fee of \$1,135 per acre as determined by the Service. The total fee for this Project would be \$28,829 (\$1,135 x 25.4 acres).

## ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

### **Jeopardy Determination**

Section 7(a)(2) of the Act 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 relies on four components: (1) the Status of the Species, which describes the current rangewide condition of the Mojave desert tortoise, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the Mojave desert tortoise in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the Mojave desert tortoise; (3) the Effects of the Action, which determines all consequences to the Mojave desert tortoise caused by the proposed action that are reasonably certain to occur in the action area; 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 Mojave desert tortoise.

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 Mojave desert



tortoise, 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 Mojave desert tortoise in the wild by reducing the reproduction, numbers, and distribution of that species.

## STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

### **Listing History**

The Service listed the Mojave population of desert tortoise (all desert tortoises north and west of the Colorado River in Arizona, Utah, Nevada, and California) as threatened on April 2, 1990 [55 Federal Register 12178; Service 1990].

### **Recovery Plan**

In the revised recovery plan for the Mojave desert tortoise, the Service (2011) identified the need for “conservation areas” to protect existing desert tortoise populations and habitat. Box 2 and Figure 2 in the recovery plan (Service 2011) describe and depict these areas in a generalized manner, respectively.

The revised recovery plan 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 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 2011) 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. 2013) illustrate a minimum connection of habitat for desert tortoises between blocks of habitat and represent priority areas for conservation of population connectivity.

### **Threats**

The threats described in the listing rule and both recovery plans (Service 1994, 2011) 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 activity, wildfire, and habitat invasion by non-native invasive plant species.

We remain unable to precisely quantify how particular threats affect desert tortoise populations relative to other threats. 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).

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 (*Corvus corax*), 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 2011). 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.

### **Five-Year Reviews**

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 listing (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 range-wide status of the species.

The Service's (2022) second 5-year review of the status of the desert tortoise summarizes the information from its initial 5-year review (Service 2010) and describes substantive new information since 2011 (from the release of the updated recovery plan) relative to changes in threats, conservation measures, and regulatory mechanisms that pertain to the five listing factors outlined in section 4(a)(1) of the (Endangered Species) Act. For this reason, we are incorporating the 5-year review of the status of the desert tortoise (Service 2022) by reference to provide most of the information needed for this section of the biological opinion; because it contains background information that is not in the recent document, we have also incorporated the 2010 5-year review by reference. The following paragraphs provide a summary of the relevant information in the most recent 5-year review. All references to "the 5-year review" in this section of the biological opinion are to the most recent document (Service 2022), unless otherwise noted.

The 5-year review is replete with references to numerous studies and reports. We have not included references to those studies and reports in the following summary; the full citations are available in the 5-year review.

The 5-year review notes that while the Mojave distinct population segment of the desert tortoise was elevated to species status in 2011 as *Gopherus agassizii*, with most desert tortoises east of

the Colorado River recognized as *G. morafkai*, “nine local populations that include *G. agassizii* or hybrids with *G. morafkai* have been genetically identified east of the Colorado River in Arizona.” The 5-year review recommends evaluating the Federal listing status of the Mojave desert tortoise relative to its current taxonomy and distribution.

In the revised 5-year review, the Service concluded that the “condition of most threats is similar to that described in the previous (2010) status review” and summarized the new information within the context of the five listing factors outlined in section 4(a)(1) of the Endangered Species Act. We summarize that information below.

#### Factor A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Various types of anthropogenic impacts continue to cause the loss of desert tortoise habitat. The Service has issued biological opinions or incidental take permits for approximately 96,300 acres of utility-scale solar energy development in occupied desert tortoise habitat. Solar development has largely occurred outside of desert tortoise conservation areas, as described in the recovery plan (Service 2011).

The 5-year review also describes the Marine Corps’ expansion of training onto approximately 167,982 acres of public and private land the Department of Army’s plans to expand activities onto approximately 62,045 acres of its western training area in the near future. These activities are in the Western Mojave Recovery Unit.

Legal and illegal cannabis cultivation is causing smaller scale, more widely distributed losses of habitat, particularly in the Western Mojave Recovery Unit; illegal operations are likely to indirectly affect additional habitat because of various types of waste.

Wildfires fueled by invasive grasses have burned extensive areas of desert tortoise habitat. For example, fires in 2020 occurred in desert tortoise habitat in the Mojave National Preserve (Dome Fire, 43,273 acres), Nevada (Meadow Valley Fire, 23,500 acres), and the Red Cliffs Desert Reserve in the Upper Virgin River Recovery Unit (11,000 acres in several fires). The latter fire killed at least 25 desert tortoises.

The 5-year review notes that desert tortoises are “essentially absent” from habitat within 1 kilometer (km) of areas with greater than 10 percent development; “development” includes urban areas, cultivated agriculture, energy facilities, mines and quarries, pipelines, transmission lines, roads and railroads. Approximately 5 percent of modelled desert tortoise habitat within conservation areas had development levels that exceeded this threshold. See Table 1 and Figure 7 in the 5-year review. Desert tortoise populations declined in conservation areas where the density of paved and unpaved roads exceeded 0.75 km/km<sup>2</sup>; population trends varied at lower density of routes. See Figure 8 in the 5-year review.

#### Factor B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The 5-year review notes that the Service continues to have little information on threats under Factor B. However, the potential for negative impacts to desert tortoise populations exists from collection and deliberate maiming/killing as a result of human access, vehicles on paved/unpaved roads, and non-motorized recreation. The 5-year review also notes that the effects of research

activities permitted for the purposes of enhancing the recovery and conservation of the desert tortoise have been minor while providing valuable information that can be used to recover and improve management of the desert tortoise.

#### Factor C: Disease or Predation

The 5-year review notes that “current research suggests that direct disease management of wild (desert) tortoise populations is less important ... than managing factors that affect their habitat and its capacity to support healthy (desert) tortoises. However, management of disease when translocating desert tortoises between populations remains important. As an example of managing habitat, red brome (*Bromus rubens*), which is a non-native invasive plant, negatively affects the health and survival of juvenile desert tortoises.

Badgers (*Taxidea taxus*), coyotes (*Canis latrans*), kit foxes (*Vulpes macrotis*), dogs (*Canis familiaris*), common ravens, and red-tailed hawks (*Buteo jamaicensis*) prey on desert tortoises. Badgers can have severe effects on desert tortoise populations at the local level; DNA analysis of scats suggest that badgers, coyotes, kit foxes, dogs, and red-tailed hawks may prey on desert tortoises more frequently than previously thought.

Common ravens, because their populations have greatly increased through human subsidies, severely affect the recruitment of desert tortoises into the breeding population through predation on small individuals. In California, management includes the broad-scale removal of common ravens from critical habitat of the desert tortoise.

#### Factor D: Inadequacy of Existing Regulatory Mechanisms

The BLM continues to face challenges in managing compliance with use of its off-highway vehicle network in the Western Mojave Recovery Unit. As of 2019, the BLM documented 24,518 km of ground transportation linear features in this area, which is more than 2.5 times the 9,651 km designated as open or limited. The BLM has an active program of restoring unauthorized routes and signing open routes.

Unauthorized cattle grazing continues within the Gold Butte National Monument in Nevada. We discussed cannabis farming in California previously in this section.

#### Factor E: Other Natural or Manmade Factors Affecting its Continued Existence

The 5-year review notes that, in the southwestern United States, 2000 through 2021 was the driest 22-year period in over 1,200 years; drought is likely to continue beyond 2022. Drought reduces the amount of annual plant forage for desert tortoises and, over longer times, will kill shrubs that desert tortoises rely on for cover.

Increased temperatures may affect hatchling sex ratios. Changes in climate may shift the timing of egg production and extend the egg-laying period. This change in egg production may not compensate for changes in the environment, such as the length of time eggs spend above their critical thermal maximum temperature and whether forage is available to support the production of eggs and forage for hatchlings. If climate change results in an overall decrease in reproduction, human-subsidized predation on young desert tortoises, particularly by common

ravens, would exacerbate issues with the recruitment of desert tortoises into the breeding population.

### Synthesis

Given the reproductive ecology of the desert tortoise, measurable increases in the size of populations will require years.

The Management Oversight Group for the desert tortoise “has taken steps to prioritize and implement actions that would be most effective at facilitating recovery across the range.” The Departments of Defense and the Interior have initiated a Recovery and Sustainment Partnership with the goal of implementing actions that would accelerate recovery of the desert tortoise while reducing the regulatory burden on military installations. The action plan focuses on identifying ways to accelerate habitat restoration, fencing conservation areas and roadways, and addressing unauthorized routes in the Western Mojave Desert Recovery Unit.

In California, the BLM’s Desert Renewable Energy Conservation Plan Land Use Plan Amendment to the California Desert Conservation Act Plan of 1980 included numerous conservation and management actions that addressed issues relevant to the desert tortoise. As part of the land use plan amendment, the BLM established new limits on ground-disturbing activities of 0.1–1.0 percent relative to its lands within desert tortoise conservation areas and mapped linkages between these areas. 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, California Desert National Conservation Lands, etc.) from 6,118,135 to 8,689,669 acres. All of these areas are not within desert tortoise habitat; however, management as conservation areas will likely benefit desert tortoises indirectly because conservation management would limit subsidies to common ravens and other indirect effects.

The threats that led to the listing of the desert tortoise (i.e., the five-factor analysis required by section 4(a)(1) of the Endangered Species Act) continue. The status of the desert tortoise has continued to decline and most of the previously identified threats continue to affect populations.

In the 5-year review, the Service concluded by recommending that the status of the desert tortoise as a threatened species be maintained because of the large extent of its range and a total number in the “hundreds of thousands of individuals (all size classes) at last estimate.”

### Recommendations for Future Actions

The 5-year review provided eight recommendations for the highest priority actions over the next 5 years. These recommendations are from the revised recovery plan (Service 2011); their full text is in the 5-year review.

1. More aggressive implementation of habitat restoration, targeted predator control and limitation of subsidies, fencing priority stretches of highways, fire management planning and implementation, and environmental education;
2. Maintaining landscape connectivity and the resilience of desert tortoise conservation areas by managing all desert tortoise habitat for persistence and connectivity, limiting

landscape-level disturbance across habitat managed for the desert tortoise by extending surface-disturbance caps similar to those enacted by the BLM in California to the rest of the Mojave desert tortoise's range, maximizing passage under roads, and adapting management based on information from research on: the effects of climate change on desert tortoise habitat, distribution, and population connectivity; the effects of large-scale fires, especially within repeatedly burned habitat, on desert tortoise distribution and population connectivity; the ability of solar energy facilities or similar developments to support desert tortoise movement and presence by leaving washes and native vegetation intact; and the design and frequency of underpasses necessary to maintain functional demographic and genetic connectivity across roads and highways;

3. Increasing law enforcement efforts across the range of the desert tortoise, especially within conservation areas to minimize impacts of habitat destruction and degradation as a result of unauthorized off-highway vehicle use, unpermitted cannabis farms, and trespass grazing;
4. Using population augmentation to help achieve recovery criteria in each of the five recovery units according to the Service's population augmentation strategy;
5. Updating the taxonomy, distribution, and listed status of the species, which we discussed previously in this section;
6. Incorporating updated population trend analysis and climate change and land-use modeling into the next 5-year review to inform management strategies under a framework for ecological adaptation;
7. Sustaining and more fully implementing range-wide monitoring efforts; and
8. Developing a revised spatial decision support system to improve models of threats, recovery actions, and demographics, using up-to-date underlying geospatial data, evaluation of prior conceptual models, and improved operationalization of recovery action terminology.

### **Core Criteria for the Jeopardy Determination**

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). We have used the best available information to summarize the status of the desert tortoise with respect to its reproduction, numbers, and distribution.

#### Reproduction

In the previous 5-year review, the Service (2010) 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. 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.

Various human activities have introduced numerous species of non-native invasive plants into habitat of the desert tortoise. 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 abundance and distribution of invasive weeds may compromise, at least to some degree in localized areas across its range, the reproductive capacity of the desert tortoise; 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 previous 5-year review, the Service (2010) discussed 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 study sites, data gathered by the Service's current range-wide monitoring program cannot be reliably compared to information gathered through other means at this time.

Range-wide monitoring from any single year samples a portion of the desert tortoise conservation areas; the conservation areas comprise only a portion of the recovery units. Additionally, any single-year estimate of the number of desert tortoises should be viewed as a snapshot that several variables likely influence. Consequently, considering trends derived from years of range-wide monitoring provides a more accurate view of the status of desert tortoise populations.

Allison and McLuckie (2018) used annual density estimates obtained from range-wide monitoring from 2004 through 2014 to evaluate range-wide trends in the density of desert tortoises over time. Allison and McLuckie (2018) extrapolated the densities of large desert tortoises derived by range-wide monitoring in the conservation areas to all modeled habitat in the recovery unit; the abundance columns in Table 1 contain these extrapolated numbers, which overestimate the number of desert tortoises.

Table 1. Change in desert tortoise abundance in recovery units between 2004 and 2014 (Allison

and McLuckie 2018)\*.

Recovery Unit	Modeled Habitat (km <sup>2</sup> )	Conservation Area (km <sup>2</sup> )	2004 Abundance	2014 Abundance	Difference in Abundance
Western Mojave	23,139	6,873	131,540	64,871	-66,668
Colorado Desert	18,024	13,530	103,675	66,097	-37,578
Northeastern Mojave	10,664	4,889	12,610	46,701	34,091
Eastern Mojave	16,061	3,720	75,342	24,664	-50,679
Upper Virgin River	613	115	13,226	10,010	-3,216
<b>Total</b>	<b>68,501</b>	<b>29,127</b>	<b>336,393</b>	<b>212,343</b>	<b>-124,050</b>

\*Allison and McLuckie (2018) used modeled habitat within the entire range of the desert tortoise for this estimate. In other discussions in this biological opinion, we used information only from areas of monitored habitat within desert tortoise conservation areas to estimate the number of desert tortoises in the recovery unit.

Zylstra et al. (2023) developed a hierarchical model for distance-sampling data and applied their model to 20 years of line-distance sampling for the desert tortoise (2001-2020) to produce abundance estimates and trends. Their analysis incorporated spatial covariates (e.g., topography, geomorphology, climate, vegetation, proximity to human development), temporal covariates (e.g., precipitation), detection probability, and predicted tortoise densities for four of the five recovery units. Zylstra et al. (2023) excluded the Upper Virgin River recovery unit from their analysis because survey methods, tortoise density, and habitat features differed from elsewhere in the range. The Service considers these estimates to be the best available and they reflect our current understanding of abundance in the recovery units (Table 2). However, because the Upper Virgin River recovery unit was not analyzed by Zylstra et al. (2023), we chose to maintain the Allison and McLuckie (2018) analysis in this status of the desert tortoise to provide context for the Upper Virgin River in relation to the other recovery units. While the methodologies differ between Allison and McLuckie (2018) and Zylstra et al. (2023), both found declines in tortoise abundance throughout the majority of the range.

Table 2. Change in predicted desert tortoise abundance and modeled areas in recovery units between 2001 and 2020 (Zylstra et al. 2023).

Recovery Unit	2001 Area (km <sup>2</sup> )	2001 Abundance	2020 Area (km <sup>2</sup> )	2020 Abundance	Difference in Abundance*
Western Mojave	50,623	206,540	50,444	94,433	-112,020



Colorado Desert	30,815	75,918	30,723	62,820	-12,782
Northeastern Mojave	19,537	24,322	19,437	25,255	1,124
Eastern Mojave	39,778	53,564	39,567	48,692	-5,081
<b>Total</b>	140,753	362,290	140,171	234,197	-129,380

\*Differences in abundance between 2001 and 2020 were computed for each model iteration and then summarized. Thus, calculated differences in the rightmost column may not equal the difference between summarized values in the Abundance columns.

### Distribution

We discussed specific activities that have resulted or will result in the loss of desert tortoise habitat in the Factor A portion of this section of the biological opinion. Here, we summarize their overall effect on the distribution of the desert tortoise.

The 5-year review notes that the absolute amount of desert tortoise range-wide decreased by approximately 163,700 acres between 2005 and 2017, based on sudden changes in LandSat imagery in the trend of the normalized difference vegetation index at image pixels over time. However, several utility-scale solar energy developments have been approved or constructed since 2017; additionally, LandSat imagery would not detect areas from which desert tortoises have been or will be translocated that have not undergone changes in vegetation to date.

Attempting to quantify the amount of habitat lost is difficult because of the varying methods used in studies. Also, models depicting desert tortoise habitat cannot differentiate between areas where desert tortoise populations maintain the ability to recruit young animals to breeding age and areas where recruitment has likely not occurred for years.

In summary, human activities have continued to reduce the distribution of the desert tortoise. Most of the losses of habitat have occurred outside of desert tortoise conservation areas, with the exception of those associated with Fort Irwin. The large size of the potential range of the desert tortoise and difficulties associated with determining areas that it actually occupies within that area (i.e., not including areas from which it has been extirpated or that are unsuitable habitat) precludes quantifying its distribution with precision.

### ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a)(2) (50 CFR 402.02) define the environmental baseline as “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 impacts to listed species or designated critical habitat from

Federal agency activities or existing Federal agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.”

### **Description of the Action Area**

The implementing regulations for section 7(a)(2) of the Act (50 CFR 402.02) define the “action area” as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The action area (referred to as the “analysis area” in the Biological Assessment and in Figure 1) for this biological opinion is located in the northeast region of Henderson, Nevada. The action area is the area where all project activities would occur. The action area is approximately 310 acres. The proposed construction activities would cover approximately 50.8 acres of temporary (25.4 acres) and permanent (25.4 acres) right-of-way (ROW) grants to the COH from Reclamation (Figure 1). The 50.8 acres of ROW includes the concrete storm drain channel (facility 1; approximately 1,250 linear feet of Reclamation managed land), the sewer force main (facility 2; approximately 4,520 linear feet of Reclamation managed land), the water transmission main and R-68 reservoir (facility 3; approximately 2,600 linear feet of Reclamation managed land), and permanent trail segments in undetermined areas within the action area (facility 4; approximately 4,000 feet long by up to 25 feet wide). Power, gas, fiber optic and telecommunications lines and new trail locations within the action area are to be determined. See figure 1 for an overview of the Project action area.

### **Previous Consultations in the Action Area**

#### Programmatic Biological Opinions for Projects in the Action Area

##### *BLM Programmatic Biological Opinions*

Ongoing land uses covered under previously issued biological opinions have allowed for take of desert tortoises and degradation of tortoise habitat in the vicinity of the Project. Several programmatic biological opinions (PBO) have been issued to the BLM that include land in the action area. The first one was issued on November 25, 1997 (Service 1997), for implementation of various land management programs within the Las Vegas District planning area excluding desert tortoise critical habitat, ACECs, and the Las Vegas Valley. Activities proposed that may affect the desert tortoise in the action area include issuance of ROWs, Recreation and Public Purposes Act leases, mineral material sales and leases, and mining plans of operation. The programmatic consultation was limited to activities that could affect up to 240 acres per project and a cumulative total of 10,000 acres, excluding land exchanges and sales. Only land disposals by sale or exchange in Clark County, but outside the Las Vegas Valley, were covered under the consultation up to a total of 14,637 acres.

On June 18, 1998, the Service issued a PBO (Service 1998) to the 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 (Service 2013a). While the BLM's 1998 resource management plan remains in effect, the 2013 PBO replaces the Service's 1998 document. The PBO has been reinitiated seven times to include additional acres and activity changes. The BLM requested reinitiation of the PBO on July 24, 2023 to address acreage allowances and take of desert tortoise for pre-project geotechnical activities under the ROW Program and a new PBO has been issued (Service 2024).

On July 20, 2012, the Service issued a PBO to the BLM (Service 2012a) regarding its proposed Solar Energy Program in six western states and its effects on 17 listed species. The PBO addresses landscape-level effects of designating Solar Energy Zones (SEZs); excluding certain areas from eligibility for solar development; reviewing applications in variance areas outside of SEZs; applying design features to future solar projects; and amending land use plans in six southwestern states (Arizona, California, Colorado, Nevada, New Mexico, and Utah). Two SEZs were designated in southern Nevada. The Dry Lake Valley SEZ, which is approximately 46 miles southeast of the Project, has been developed and tortoises were translocated from these project sites to the Dry Lake Valley Translocation Area. Approximately 5,717 acres were developed in this SEZ across four projects (Playa Solar, NV Energy Dry Lake Solar Energy Center, NV Energy Dry Lake Solar Energy Center at Harry Allen, and Invenergy Harry Allen Solar Energy; Service 2015). The Amargosa SEZ, approximately 44 miles northwest of the Project, is currently under review for development and totals 7,226 acres. On December 20, 2024, the BLM published a Record of Decision on an updated Utility-Scale Solar Energy Development PEIS that replaces the BLM's 2012 PBO (BLM 2024). The updated Solar PEIS includes five additional states (Washington, Oregon, Idaho, Montana, and Wyoming) and revises lands available and excluded from future solar development. Approximately 490,830 acres of suitable habitat within the desert tortoise range (total range is 30,603,052 acres) overlaps with the action area for the updated Solar PEIS.

On September 21, 2015, the Service issued a PBO (84320-2015-F-0120; Service 2015) to the Western Area Power Administration for proposed O&M activities to the West Area Transmission System infrastructure. This transmission system extends from southern Nevada through southern California and Arizona within an existing utility corridor ROW. Because the O&M activities are mostly within existing ROWs, the Service estimated that no more than 50 acres of new disturbance to desert tortoise habitat would occur during the actions completed under the PBO.

On April 18, 2022, the Service issued a PBO (2022-0030693-S7; Service 2022b) to the Federal Highway Administration (FHWA) for funding road and highway projects and use of mineral and material sites for these projects over a 10-year period. The Nevada Department of Transportation (NDOT) is the primary non-Federal Applicant of projects and activities under the PBO. The FHWA and the Service anticipate direct impacts to desert tortoise from implementation of activities covered under all programs in this PBO (including material sites) are estimated to be no more than 20,396 acres of suitable habitat and 768 acres of critical habitat.

### *Other Programmatic Biological Opinions*

On September 21, 2015, the Service issued a PBO (84320-2015-F-0120; Service 2015) to the Western Area Power Administration for proposed O&M activities to the West Area Transmission System infrastructure. This transmission system extends from southern Nevada through southern California and Arizona within an existing utility corridor ROW. Because the O&M activities are mostly within existing ROWs, the Service estimated that no more than 50 acres of new disturbance to desert tortoise habitat would occur during the actions completed under the PBO.

On April 18, 2022, the Service issued a PBO (2022-0030693-S7; Service 2022b) to the Federal Highway Administration (FHWA) for funding road and highway projects and use of mineral and material sites for these projects over a 10-year period. The Nevada Department of Transportation (NDOT) is the primary non-Federal Applicant of projects and activities under the PBO. The FHWA and the Service anticipate direct impacts to desert tortoise from implementation of activities covered under all programs in this PBO (including material sites) are estimated to be no more than 20,396 acres of suitable habitat and 768 acres of critical habitat.

### *Other Biological Opinions for Projects in or near the Action Area*

In 2001, the Service completed informal consultation with the Army Corp of Engineers (File No. 1-5-01-I-428) on the effects of construction of the Wetlands Park on the Yuma Ridgway's rail, southwestern willow flycatcher, and razorback sucker (*Xyrauchen texanus*). This included an evaluation of effects from restoration projects, including building proposed erosion control structures, stockpiles, trails and roads, and the Ducks Unlimited wetland project. The restoration projects included the construction of weirs for erosion control and the creation of wetland habitat.

On August 28, 2006, the Service completed a biological opinion with Reclamation (File No. 1-5-06-F-515) for the threatened Mojave desert tortoise (*Gopherus agassizii*) on essentially the same actions previously consulted on in 2001 (e.g., habitat enhancements/restoration, trails and roads, and the Duck Creek wetland project, formerly the Ducks Unlimited wetland project, File No. 1-5-01-I-428). Greater specificity was provided for the trail, road and Duck Creek erosion control/habitat restoration projects. The effects of the proposed action included long-term visitor use, habitat disturbance, effects of recreation and increased predation from subsidized predators. The Service estimated that no more than two desert tortoises would be killed or injured and no more than two would be taken by capture.

In 2006, the Service completed informal consultation with Reclamation on the use of an 18.5-acre East Diversion Channel Soil Stockpile site to stockpile materials associated with weir construction. The Service concurred with Reclamation that the project was not likely to adversely affect desert tortoise, primarily because desert tortoises were not expected to be present in the 64-acre action area (see File No. 1-5-06-I-481).

The Service completed reinitiation of formal consultation with Reclamation on the 2006 biological opinion on April 23, 2009 (File No. 84320-2009-F-0165). Similarly to the 2006 biological opinion, the proposed action included weir construction activities within the Wetlands Park for the construction of erosion control structures in the Wash. The action area for these

projects was the Wetlands Park and a dirt road and soil stockpile area outside the Wetlands Park boundary known as the North Stockpile site. We estimated that no more than three desert tortoises would be killed or injured and no more than four tortoises would be taken by capture and moving out of harms way. In 2014, the Service completed a reinitiation of this consultation ((File No. 84320-2009-F-0165.R001) to increase take from capture from 4 to 8 tortoises as more tortoises were found in the action area than expected.

In 2015, the Service completed informal consultation with Reclamation (File No. 84320-2015-I-0122) on Wash activities similar to previous consultations (File No. 1-5-01-I-428, File No. 1-5-06-F-515, File No. 84320-2009-F-0165) on the newly ESA-listed as threatened western distinct population segment (DPS) of the yellow-billed cuckoo (File No. 84320-2015-I-0122).

In 2023, the Service completed a formal consultation with Reclamation (2023-0120717-S7-001 and 2023-0120717-S7-002) on the Las Vegas Wash Long-Term Operating Plan. The Service determined that the project may affect, but is not likely to adversely affect the federally endangered Yuma Ridgway's rail (*Rallus obsoletus yumanensis*), federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*), and federally threatened yellow-billed cuckoo (*Coccyzus americanus*).

#### *Habitat Conservation Plans and Associated Incidental Take Permits*

On November 19, 2000, the Service issued the Intra-Service Biological and Conference Opinion on Issuance of an Incidental Take Permit to Clark County, Nevada for a Multi-Species Habitat Conservation Plan (MSHCP; File No. 1-5-00-FW-575). On January 9, 2001, the Service issued an incidental take permit (TE-034927-0) to Clark County, Nevada, including NDOT ROWs and cities within Clark County. This HCP is the only regional HCP in place that overlaps the action area. The incidental take permit allows incidental take of Mojave desert tortoise and other covered species for a period of 30 years on 145,000 ac of non-Federal land in Clark County, and within NDOT's ROWs, south of the 38th parallel in Nevada. The MSHCP and EIS (RECON 2000) serve as the permittees' HCP and details their proposed measures to minimize, mitigate, and monitor the effects of covered activities. Additionally, a \$550 per acre mitigation fee was imposed to fund conservation programs and establish and manage the Boulder City Conservation Easement. The Service concluded that the MSHCP was not likely to jeopardize the desert tortoise or southwestern willow flycatcher or result in the adverse modification of critical habitat for either species. As of the 2021 Biennium Report (Desert Conservation Plan 2021), approximately 99,963 acres subject to mitigation fees had been disturbed and 15,000 acres of municipal development, exempt from mitigation fees, had been disturbed. The MSHCP and permit covers effects to Mojave desert tortoise, southwestern willow flycatcher, the yellow-billed cuckoo, and 75 other species on non-Federal lands under Section 10 of the ESA in the action area.

#### **Habitat Characteristics of the Action Area**

The USGS habitat model for desert tortoise (Nussear et al. 2009) shows habitat values within the Project action area between 0.7 and 0.9 (total range from 0 to 1.0), indicating that the area is highly suitable for Mojave desert tortoise. The Project action area is characterized by creosotebush-white bursage desert scrub. This vegetation cover is typical of desert tortoise habitat. Plants found in the Project action area during a pre-project survey include creosote bush (*Larrea*

*tridentata*) and white bursage (*Ambrosia dumosa*). Additional plants found during surveys included cheesebush (*Ambrosia salsola*), saltbush species (*Atriplex* spp.), desertbroom (*Baccharis sarothroides*), devil's spineflower (*Chorizanthe rigida*), cholla species (*Cylindropuntia* spp.), low woolygrass (*Dasyochloa pulchella*), cottontop cactus (*Echinocactus polycephalus*), brittlebush (*Encelia farinosa*), desert trumpet (*Eriogonum inflatum*), flatcrown buckwheat (*Eriogonum deflexum*), smallseed sandmat (*Euphorbia polycarpa*), catclaw acacia (*Senegalia greggii*), and desert globmallow (*Sphaeralcea ambigua*). Two invasives, Asian mustard (*Brassica tournefortii*) and red brome (*Bromus rubens*) were also present in the action area during the survey (UES 2025). Although habitat within and around the Project is suitable desert tortoise habitat, the action area has Mojave desert tortoise fencing to prevent tortoises from accessing several roads and facilities in the action area and the area is also in close proximity to existing anthropogenic disturbances that have impacted connectivity of the site to adjacent habitats, including housing and other city infrastructure west, southwest, north, northwest, and northeast of the action area. The area is also impacted by off-highway vehicle use and illegal dumping (UES 2025).

### **Status of the Species in the Action Area**

#### Eastern Mojave Recovery Unit

The Project occurs within the southeastern portion of the Eastern Mojave Recovery Unit as described in the revised desert tortoise recovery plan (Service 2011). This recovery unit spans the Nevada-California border including Oasis Valley, Amargosa Desert, Pahrump Valley, Spring Mountains, Las Vegas Valley, Eldorado Valley, and extending south into Shadow Valley. The Eastern Mojave Recovery unit is adjacent to the Northeastern Mojave Recovery Unit to the northeast, the Colorado Desert Recovery Unit to the southeast, and the Western Mojave Recovery Unit to the west.

Recent microsatellite data indicate that much of the Eastern Mojave Recovery Unit is relatively isolated from other recovery units (Hagerty and Tracy 2010). 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). 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.

As summarized in the Status of the Species section, the number of adult desert tortoises in conservation areas in the Eastern Mojave Recovery Unit is declining annually and decreased by 67.3 percent from 2004 to 2014 (Allison and McLuckie 2018). Furthermore, the proportion of juveniles decreased by 23 percent in the same time period. In the Eldorado Valley Tortoise

Conservation Area specifically, tortoise density declined from 2.6 tortoises per square kilometer to 0.9 tortoises per square kilometer.

### Project Survey

A Mojave desert tortoise presence/absence survey was performed from 8 a.m. until 5 p.m. on October 27, 2024, during the active season. Approximately 300 acres of the 310-acre Project action area was surveyed, including the 50.8 acres of temporary (25.4 acres) and permanent (25.4 acres) Reclamation managed ROW (UES 2025). No details regarding transect length were included in the biological assessment, but the survey covered 100% of the Project action area (UES 2025). During surveys, no tortoises or sign of tortoises that indicate their presence, such as scat, burrows or carcasses were observed. Pallets in caliche were observed, but no scat or other tortoise sign was found to indicate that the observed pallets were being used by tortoises. Although neither tortoises nor tortoise sign were found within the action area during surveys, the area may be part of an individual's home range. The home range of a female desert tortoise averages 0.15 to 0.16 km<sup>2</sup> (35 to 40 acres), which is about one third the size of male home ranges (0.39 to 0.47 km<sup>2</sup> or 96 to 116 acres; Harless et al. 2009). Therefore, projects that are less than 0.8 km<sup>2</sup> (200 acres) may overlap only part of a tortoise's home range.

Surveys generally do not detect all desert tortoises in an area because they spend so much time underground. Because no tortoises were observed during the survey, we are unable to provide an accurate estimate for the number of tortoises in the action area by using the equation in the Service's protocol (Service 2009). However, based on the location of the proposed Project, its proximity to existing development, and the lack of recent tortoise sign during the survey, we expect tortoise density to be no more than the average density reported for the Eastern Mojave Recovery Unit (1.5 tortoises per square kilometer; Allison and McLuckie 2018). Thus, we estimated that the 310-acre action area supports 1 large adult desert tortoise (Table 3).

Table 3. Estimated number of Mojave desert tortoises that may occur in the Project action area.

<b>Tortoise Calculation</b>	<b>Tortoise Estimate</b>
Estimated number of desert tortoises larger than 180 mm (calculated by 310 acres * 0.004 acres/km <sup>2</sup> )	1.24 (1)
Percentage of desert tortoises in size classes larger than 180 mm (from Turner et al. 1987, Table 32)	13.2%
Total number of desert tortoises (1 / 0.132)	7.6 (8)
Number of juvenile desert tortoises (8 - 1)	7

Because tortoises are mobile, there may be more within the action area than were originally estimated in Table 3. Some recent projects have found more tortoises during clearance surveys than were originally estimated from pre-project surveys. For example, the K Road solar project found 13.6 percent more tortoises during clearance surveys than estimated in their biological opinion (Service 2012b), while the Silver State South solar project found 23.6 percent more

tortoises than estimated (Service 2013b). Because such higher percentages have been found compared to estimated numbers, we allow for a 25 percent buffer for additional tortoises to be captured and moved. However, due to the low density of desert tortoises in the Project action area, adding 25 percent to the estimated 1 adult tortoise within the Project action area does not result in an increase to the total estimate of adult tortoises.

Turner et al. (1987) developed a life table for female desert tortoises based on studies conducted at Goffs, California in 1983. They estimated that 13.2 percent of the desert tortoises in that population were larger than 180 mm in length. To estimate the number of all desert tortoises within the Project action area, we used the methodology and calculations in Table 3. We estimate that 1 adult tortoise and 7 juvenile tortoises may be present in the Project action area.

We are unable to provide estimates for the number of desert tortoise hatchlings or eggs that could occur in the Project action area. Estimating the number of tortoise hatchlings and eggs is extremely difficult because the eggs are buried beneath the soil surface and numbers vary depending on the season (i.e., eggs are present during one time of the year but become hatchlings later in the year). Applying any assumptions has an unknown and high level of uncertainty. Therefore, we cannot calculate a precise estimate for the number of hatchlings or eggs that may be impacted by the proposed Project.

### 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.

Due to the increasing expansion and growth of the city of Henderson, the connectivity of the tortoise population in the Project action area is limited. Habitat connectivity is blocked northeast, northwest, west, and southwest of the Project action area due to residential development. Habitat connectivity is impeded by Lake Mead Parkway and blocked by the Las Vegas Wash to the north. Habitat connectivity to the east is likely blocked by the River Mountains, an area of relatively steep mountainous terrain north of Boulder City and east of Henderson. There is a narrow region of connectivity moving south from the Project action area. Therefore, there is potential that Mojave desert tortoises in the Project action area could move south or tortoises south of the Project action area could move north, but habitat connectivity to the Project action area from all other directions is likely low to limited.

## **Recovery**

As discussed above, the revised recovery plan for the desert tortoise outlines three objectives: (1) maintain self-sustaining populations, (2) maintain well-distributed populations, and (3) protect habitat within each recovery unit to support long-term viability of the species. In addition, the recovery plan recommends connecting blocks of desert tortoise habitat to support gene flow between regions.

The Project action area is located within the Eastern Mojave Recovery Unit and contains suitable desert tortoise habitat. However, the habitat in the Project action area is degraded and movement into and out of the Project action area is blocked by the Las Vegas Wash to the north, development to the northeast, northwest, west, and southwest, and potentially impeded by mountainous terrain to the east. The area is also impacted by off-highway vehicle use and illegal dumping. For these reasons, the further development and degradation of this 310-acre parcel and the permanent loss of the 25.4-acre ROW, will likely have little effect on the recovery of the Mojave desert tortoise.

## **EFFECTS OF THE ACTION**

The implementing regulations for section 7(a)(2) define effects of the action as “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 but that are not part of the 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” (50 CFR 402.02).

In conducting this analysis, we have considered factors such as previous consultations, 5-year reviews, recovery plans, published scientific studies and literature, and professional expertise of Service personnel in determining whether effects are reasonably certain to occur. Several aspects of the proposed action may affect desert tortoises within the action area, including the killing or injuring of individuals and crushing of their burrows and eggs during construction and operation and maintenance activities, habitat degradation, habitat loss, and other miscellaneous effects. We have also determined that certain consequences are not caused by the proposed action, such as the increase or spread of disease, poaching, or collecting, because they are so remote in time, or geographically remote, or separated by a lengthy causal chain, so as to make those consequence not reasonably certain to occur. We conclude this section by integrating our analysis with the best available information with regard to the numbers of desert tortoises and amount of habitat in the action area and recovery unit to determine whether the proposed action is likely to jeopardize the continued existence of the desert tortoise.

### **Effects of the Proposed Action on the Mojave desert tortoise**

The construction and operations and maintenance of the Project could result in death or injury to Mojave desert tortoises from the following activities: (1) project equipment usage and construction activities, (2) increased traffic and road access, (3) loss of habitat, and (4) an increase in habitat degradation and predator populations. To minimize incidental death and injury of Mojave desert tortoises residing in or entering the Project action area, the Project proponent would implement the actions specified in the Proposed Minimization Measures section of this biological opinion as part of the proposed action. The remainder of this section outlines risks to Mojave desert tortoises throughout all phases of the Project along with specific Minimization Measures (MM) the Applicant would use to avoid and minimize adverse effects to the Mojave desert tortoise.

#### Construction

Construction activities, including vehicle strikes or other adverse interactions with equipment, could injure or kill tortoises. Prior to construction activities, an ADTB would conduct pre-activity surveys in the Project action area (MM 1) to prevent tortoises from being harmed during construction. Additionally, during all Project phases, an ADTB would be present to monitor work areas for Mojave desert tortoises, including areas immediately prior to disturbance (MM 2). Off-highway vehicles and construction equipment would be limited to designated routes to avoid potential interactions with desert tortoises (MM 3). To prevent vehicle strikes when moving to and from facilities, workers would operate vehicles at speeds of 15 miles per hour or less (MM 4). Prior to vehicles being moved, the area underneath vehicles, equipment, and material would be checked for tortoises prior to moving or operating (MM 5). Any trenches left open overnight would be covered or have escape routes installed to prevent tortoise entrapment and would be inspected for tortoises each morning (MM 6). All staff and contractors working in the Project action area would receive WEAP training from an ADTB before engaging in any activities in the Project action area (MM 7). Only an ADTB would move tortoises encountered during

construction activities out of harms way (MM 8). Should any construction activities during Project implementation cause the death of a desert tortoise, the Service would be notified immediately (MM 9). Litter control would be implemented by the Project proponent to prevent subsidizing common predators (ravens and coyotes) of the Mojave desert tortoise (MM 10). Additionally, workers would be notified that they should not feed any wildlife in the Project action area (MM 11).

### Operations and Maintenance

Any operations and maintenance activities outside of facilities enclosed with desert tortoise exclusion fencing would be expected to follow all the minimization measures outlined in the “construction” section above. Additionally, travel within the Project action area would be restricted to designated routes (MM 3) at speeds of 15 miles per hour or less (MM 4). All employees responsible for operations and maintenance who have not received WEAP training would receive WEAP training before entering the Project action area (MM 7). Additionally, we would expect workers responsible for operations and maintenance would be informed not to litter (MM 10) nor feed wild animals (MM 11). Finally, if a Mojave desert tortoise is injured or found dead, the Service would be notified immediately (MM 9).

### Habitat Loss and Degradation

The Project would result in the permanent loss of 25.4 acres of suitable desert tortoise habitat. 25.4 acres of desert tortoise habitat would also be temporarily modified due to Project activities. Restoration of all temporary disturbance areas (25.4 acres) would commence following the completion of the construction phase of the Project (MM 12). However, full recovery of desert vegetation can take several decades (Abella 2010). To offset the permanent loss of desert tortoise habitat, the Project proponent would pay a remuneration fee to Reclamation for the 25.4-acre permanent disturbance in the Project action area (MM 13).

## **Effects on Recovery**

### Reproduction

Disturbance associated with the construction of the Project would not have a measurable long-term effect on reproduction of individual desert tortoises that live within or adjacent to the Project action area because construction activities would occur over a relatively brief period of time (approximately 25 months for most activities) relative to the reproductive life of female desert tortoises. Additionally, desert tortoises are well adapted to highly variable and harsh environments and their longevity helps compensate for their variable annual reproductive success (Service 1994). Disturbance associated with operations and maintenance of the Project would also not have a measurable effect on reproduction of individual desert tortoises for the reasons discussed above. Additionally, due to the proximity to the COH and the lack of suitable habitat connected to the Project action area, both the number of tortoises in the Project action area and the impacts to the species reproduction are expected to be low. For these reasons, we expect that the proposed action is likely to have a negligible effect on the reproductive capacity of desert tortoises in the action area.

### Numbers

We expect that the construction, operations, and maintenance of the Project is likely to injure or kill few, if any, adult tortoises. Desert tortoise abundance in the action area is estimated to be very low. We estimate approximately 1 adult (greater than 180 mm) tortoise and 7 juvenile tortoises may occur in areas of suitable habitat that may be disturbed. The Service (2019) estimates that 24,664 adult desert tortoises (i.e., those greater than 180 millimeters in length) occupy modeled habitat within the Eastern Mojave Recovery Unit. Consequently, the loss of 1 adult desert tortoise potentially exposed to injury or mortality during construction would comprise a very small portion (0.004%) of the estimated adult population within the Eastern Mojave Recovery Unit. We also expect the proposed MM, including the use of ADTB during construction for pre-activity checks, vehicle use restricted to designated roads, vehicle speed limits of 15 miles per hour or less, vehicle and equipment checks before use, and other MM would limit the likelihood of tortoise injuries or death. For these reasons, we expect that the proposed action is likely to have a negligible effect on the numbers of desert tortoises in the action area.

### Distribution

Direct impacts to desert tortoise habitat from implementation of the project would be no more than 310 acres of non-critical desert tortoise habitat and 0 acres of designated critical habitat. The project would result in the permanent loss of 25.4 acres. Based on the Nussear et al. (2009) model and estimations of impervious surfaces (Fry *et al.* 2011), we estimate that approximately 3,937,849 acres of desert tortoise habitat remain in the Eastern Mojave Recovery Unit (Darst 2014). The permanent loss of 25.4 acres represents a small percentage (approximately 0.0006 percent) of the estimated desert tortoise habitat in the Eastern Mojave recovery unit, and an even smaller percentage range wide. We also do not expect the loss of habitat from this Project to appreciably impact regional population connectivity based on a qualitative evaluation of existing priority habitat and linkages for desert tortoise (Averill-Murray et al. 2013). Due to the Project's proximity to the COH and existing disturbances, very little desert tortoise habitat remains within and outside the Project boundary. Additionally, due to pre-construction surveys, we do not expect this area supports many desert tortoises, and any desert tortoises that are present may already be isolated from other habitat in the Eastern Mojave Recovery Unit. For these reasons, we expect that the proposed action is likely to have a negligible effect on the distribution of desert tortoises in the action area and this habitat loss would not appreciably reduce the distribution of the desert tortoise in the Eastern Mojave recovery unit or range wide.

### **Summary of Effects to 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 2011). The loss of habitat from the proposed Project will not impede the recovery of the desert tortoise because the Project is not located within any designated critical habitat or protected conservation areas for tortoises. Additionally, the habitat in the action area has already been disturbed by COH infrastructure, off-highway vehicle use, illegal dumping, and is already surrounded in most directions by existing disturbances and development. The Project action area is also likely to become increasingly isolated from other

desert tortoise habitat due to additional development in the future. Based on these considerations, the proposed action is expected to have a negligible effect on the reproduction, numbers, and distribution of desert tortoises in the action area and will not appreciably diminish the ability of the desert tortoise to reach stable or increasing population trends in the future.

## CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. We do not consider future Federal actions that are unrelated to the proposed action in this section because they require separate consultation pursuant to section 7 of the Act.

Projects that may result in adverse effects to the desert tortoise on private and non-federal land are anticipated to fall under purview of existing Habitat Conservation Plans and associated incidental take permits. Much of the land surrounding the action area in the COH is owned by privately owned. There are many residential developments near the proposed Project site in addition to the utilities and infrastructure in the Project action area. Additional projects could also occur on Reclamation managed lands in the vicinity of the Project action area.

Increased development would cause continued habitat loss, degradation, and fragmentation for the local desert tortoise population, as well as increased harm of individual tortoises, contributing to the cumulative degradation of the area. Future actions such as additional residential developments, utilities, and infrastructure are likely to continue this trend. However, as described above, much of the area surrounding the Project site has already been developed.

Based on these considerations, the proposed action is expected to have a negligible effect on the reproduction, numbers, and distribution of desert tortoises in the action area, and therefore, will not appreciably diminish the ability of the desert tortoise to reach stable or increasing population trends in the future.

## CONCLUSION

### **Jeopardy Conclusion**

The regulatory definition of “to jeopardize the continued existence of the species” focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the Mojave desert tortoise status as the basis to assess the overall effect of the proposed action on the species.

After reviewing the current status of Mojave desert tortoise, the environmental baseline for the action area, the effects of the proposed Project and the cumulative effects, it is the Service's biological opinion that the Project, as proposed, is not likely to jeopardize the continued existence of the Mojave desert tortoise because:

1. The Project impacts to desert tortoise will be minimized or avoided through implementation of minimization measures described in the proposed action. The project proponent and the COH will implement numerous minimization measures (e.g.,

- authorized desert tortoise biologist during Project activities, Project action area speed limits, designated routes for all vehicles and equipment, etc.) to ensure that most tortoises are located and moved out of harm's way and potential desert tortoise injury and mortality is minimized.
2. The Project would have a low effect on reproduction of the species in the Project action area and would not appreciably reduce reproduction of the species within the Eastern Mojave Recovery Unit or rangewide.
  3. The number of desert tortoises anticipated to be killed or injured is very low relative to the estimated number of tortoises rangewide and would not cause an appreciable decrease in the number of individuals within the Eastern Mojave Recovery Unit or rangewide.
  4. The Project would not appreciably reduce the species' distribution rangewide and would have little effect on genetic and demographic connectivity. Additionally, the Project will not considerably affect desert tortoise habitat connectivity overall.
  5. There will be no impacts to critical habitat.
  6. Remuneration fees, based on permanent acres disturbed, will contribute to funding desert tortoise recovery actions.
  7. This Project would not cause any effects that would preclude our ability to recover the 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 wildlife 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 in the definition of "take" in the Act means an act which actually kills or injures wildlife. Such [an] act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose 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.

#### AMOUNT OR EXTENT OF TAKE

We anticipate the take of all desert tortoises and nests with eggs in the Project action area; we estimate that 1 adult desert tortoises and 7 juvenile desert tortoises reside in the Project action area and could ultimately all be killed or injured, although we anticipate most will survive. We expect that most desert tortoises in the Project action area will be captured, as the form of take, and translocated. Because implementation of the Project will require a combination of construction activities including excavation, trenching, grading, and overland travel, we expect that most desert tortoises and nests with eggs that are not detected during clearance surveys may be killed or injured; however, the MMs proposed by Reclamation are likely to prevent mortality or injury of most individuals.

We cannot quantify the precise number of Mojave desert tortoises that may be taken as a result of the proposed action because Mojave desert tortoises move over time; for example, animals may have entered or departed the action area since the time of pre-activity surveys in suitable

habitat. Other individuals may not be detected due to their cryptic nature, small size, and low mobility. The protective measures proposed by Reclamation are likely to prevent mortality or injury of most individuals. In addition, finding a dead or injured Mojave desert tortoise is unlikely because the species is cryptically colored to avoid predation and spends the majority of its life inhabiting burrows to avoid environmental extremes or predation. Consequently, we are unable to reasonably anticipate the actual number of Mojave desert tortoises that would be taken by the proposed action; however, we must provide a level at which formal consultation would have to be reinitiated. We anticipate that adverse effects, and therefore also take, of Mojave desert tortoise would likely be low given the nature of the proposed activities. We also recognize that for every Mojave desert tortoise found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

For the purposes of this analysis, we estimate that 1 adult desert tortoise and 7 juvenile tortoises reside in the Project action area. Our estimate is derived from the average density of the Eastern Mojave Recovery Unit, and we expect that we have overestimated the number of individuals that are present because no tortoises or recent sign were observed during the pre-construction survey. We anticipate that the number of individuals killed or wounded resulting from construction of the Project would be a subset of the number of desert tortoises in the Project action area; however, because the number of desert tortoises in the Project action area is so small, we are exempting take in the form of mortality or injury for all individuals. For these reasons, we will consider that the Project proponent exceeded the amount or extent of take if more than 1 adult desert tortoise is killed or injured during construction. We used adult desert tortoises to establish this amount of take because juvenile desert tortoises are difficult to find and locating the carcasses of small tortoises is unlikely. Therefore, detecting more than 1 killed or injured adult desert tortoise on the Project site would require Reclamation to contact our office immediately to reinitiate formal consultation. Project activities that are likely to cause additional take should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9. All incidental take is outlined in Table 4.

Table 4. Mojave desert tortoise incidental take thresholds.

Project Activity	Exempted Mortality or Injury		Exempted Capture and Relocation (all age classes)	Anticipated Habitat Loss (acres)	
	Adults and sub-adults ( $\geq 180$ mm)	Juveniles ( $< 180$ mm)		Critical	Non-critical
Construction, operation, and maintenance	1	7	All Mojave desert tortoises in harm's way may be captured or moved; we estimate that up to 5 tortoises may be moved during the project.	0	25.4

We acknowledge that more individuals may be killed or injured during construction, operation, and maintenance 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 the species, 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. The number of Mojave desert tortoise hatchling and 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 why we cannot estimate the number of eggs that may be present because they are underground and vary with the season. Although we cannot estimate a level of incidental take for these life stages, we expect it would be low.

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

#### REASONABLE AND PRUDENT MEASURES

The measures described below are non-discretionary, and must be undertaken by the Reclamation or made binding conditions of any grant or permit issued to the COH, as appropriate, for the exemption in section 7(o)(2) to apply. Reclamation has a continuing duty to regulate the activity covered by this incidental take statement. If Reclamation (1) fails to assume and implement the terms and conditions or (2) fails to require the COH to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Reclamation or the COH must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

The Service believes the proposed minimization 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 proposed minimization measures or in the conditions under which these activities



will occur may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR § 402.16.

## REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), Reclamation must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. Reclamation will ensure that reports documenting Mojave desert tortoise encounters, incidental take (including capture and relocation), and effectiveness and compliance with the Mojave desert tortoise proposed minimization measures is prepared and submitted to the Service's Southern Nevada Fish and Wildlife Office. Reclamation may delegate this responsibility to the COH.

Reclamation must submit reports and accompanying raw data twice a year during the duration of construction and annually during O&M for the life of the facilities. Final construction reports will be submitted to the Service within 90 days of completion of construction of the Project. All construction reports are due by the 10<sup>th</sup> of each of the following months (May and November), and annual reports submitting during operation and maintenance are due January 31<sup>st</sup> of each year post-construction. The report and accompanying raw data should be sent to the contact identified in this document and must describe all activities that were conducted under this biological opinion, including activities and conservation measures that were described in the proposed action and required under the terms and conditions, and discuss any problems that were encountered in implementing conservation measures or terms and conditions and any other pertinent information. The report must also include the following information:

Specifically, all reports must include information and accompanying GIS shapefile data (e.g., location of each take or observation; or other GIS data as requested) 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 details regarding each Mojave desert tortoise handled or observed and the name of the ADTB who handled or observed the tortoise. Information will include the following: date and time of observation, whether the desert tortoise was handled, general health, whether it voided its bladder, location that the 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 ADTB to be in non-compliance with this biological opinion will be documented immediately by the ADTB.

## DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured Mojave desert tortoise, initial notification within 3 working days of its finding must be made by telephone and in writing to the Southern Nevada Fish and Wildlife Office (702-515-5230). The report must include the date, time, location of the carcass, a photograph, cause of death or injury, if known, and any other pertinent information.

Reclamation or the COH must take care in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. Reclamation or the COH must transport injured animals to a qualified veterinarian. Should

any treated Mojave desert tortoise(s) survive, Reclamation or the COH must contact the Service regarding the final disposition of the animal(s). Reclamation or the COH 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. The conservation recommendation below is a discretionary agency activity 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 and can be used by Reclamation or the COH to fulfill their 7(a)(1) obligations.

1. We recommend that Reclamation or the COH salvage plants in the action area for use in habitat enhancement or restoration of the areas disturbed by the Project activities. If the Reclamation or the COH choose to salvage plants from permanent and/or temporary disturbances on the project site, these plants may be held in a nursery or other temporary holding location until needed.

The Service requests notification of the implementation of any conservation recommendations so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

## REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request for consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency 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 not considered in this opinion; 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, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Vance Imhoff of my staff at (702) 515-5253, or by electronic mail at [vance\\_imhoff@fws.gov](mailto:vance_imhoff@fws.gov).

cc: Wildlife Biologist, Nevada Department of Wildlife, Las Vegas, Nevada

## LITERATURE CITED

- Abella, S.R. 2010. Disturbance and Plant Succession in the Mojave and Sonoran Deserts of the American Southwest. *International Journal of Environmental Research and Public Health* 7:1248-1284. doi:10.3390/ijerph7041248
- Allison, L.J. and A.M. McLuckie. 2018. Population trends in Mojave desert tortoises (*Gopherus agassizii*). *Herpetological Conservation and Biology* 13(2):433-452.
- Averill-Murray, R., C.R. Darst, N. Strout, and M. Wong. 2013. Conserving population linkages for the Mojave desert tortoise. *Herpetological Conservation Biology* 8(1):1-15.
- Berry, K.H. 1986. Desert tortoise (*Gopherus agassizii*) relocation: implications of social behavior and movements. *Herpetologica* 42(1):113-125.
- Britten, H.B., B.R. Riddle, P.F. Brussard, R. Marlow, and T.E. Lee Jr. 1997. Genetic delineation of management units for the desert tortoise, *Gopherus agassizii*, in northeastern Mojave Desert.
- [BLM] Bureau of Land Management. 2024. Approved Record of Decision and Amendments/Record of Decision for Utility-scale Solar Energy Development (Document No. DOI-BLM-HQ-3000-2023-0001-RMPA-ROD). Prepared for the Bureau of Land Management by Argonne National Laboratory, Lemont, Illinois. Volumes 1 – 2. 843 pp.
- [BLM and DOE] Bureau of Land Management and U.S. Department of Energy. 2012. Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States. Volumes 1 – 7. Dated July 2012. Washington, D.C.
- Darst, C. 2014. Impervious surface calculations. Excel spreadsheet. Dated May 6. Fish and Wildlife Biologist, Desert Tortoise Recovery Office. Ventura, California.
- Desert Conservation Plan. 2021. 2019-2021 Biennium Progress Report. December 2021. Accessed August 4, 2022. [https://www.clarkcountynv.gov/government/departments/environment\\_and\\_sustainability/desert\\_conservation\\_program/biennial\\_progress\\_reports.php](https://www.clarkcountynv.gov/government/departments/environment_and_sustainability/desert_conservation_program/biennial_progress_reports.php).
- Fry, J.A., G. Xian, S. Jin, J.A. Dewitz, C.G. Homer, L. Yang, C.A. Barnes, N.D. Herold, and J.D. Wickham. 2011. National Land Cover Database for the Conterminous United States. Analysis of land cover change in the continental United States from 2001 to 2006 using Landsat ETM+ and TM imagery.
- Edwards, T., E. W. Stitt, C. R. Schwalbe, and D. E. Swann. 2004. *Gopherus agassizii* (desert tortoise) movement. *Herpetological Review* 35:381-382.
- Fischer, J., and D. B. Lindenmayer. 2007. Landscape modification and habitat fragmentation: a synthesis. *Global Ecology and Biogeography* 16(3):265-280.
- Germano, D.J., R.B. Bury, T.C. Esque, T.H. Fritts, and P.A. Medica. 1994. Range and habitat of

- the desert tortoise. Pages 57-72, In R.B. Bury and D.J. Germano (eds.), *Biology of the North American Tortoises*. National Biological Survey, Fish and Wildlife Research 13, Washington, D.C.
- Hagerty, B.E. 2008. Ecological genetics of the Mojave Desert tortoise. Ph.D. Dissertation. University of Nevada, Reno.
- Hagerty, B.E. and C.R. Tracy. 2010. Defining population structure for the Mojave desert tortoise. *Conservation Genetics*. 11(5):1795-1807.
- Hagerty, B. E., K. E. Nussear, T. C. Esque, and C. R. Tracy. 2011. Making molehills out of mountains: landscape genetics of the Mojave desert tortoise. *Landscape Ecology* 26:267-280.
- Harless, M.L., A.D. Walde, D.K. Delaney, L.L. Pater, and W.K. Hayes. 2009. Home Range, Spatial Overlap, and Burrow Use of the Desert Tortoise in the West Mojave Desert. *Copeia* 2:378-389.
- Murphy, R.W., K.H. Berry, T. Edwards, and A.M. McLuckie. 2007. A genetic assessment of the recovery units for the Mojave population of the desert tortoise, *Gopherus agassizii*. *Chelonian Conservation and Biology* 6:229-251.
- Nussear, K.E., T.C. Esque, R.D. Inman, L. Gass, K.A. Thomas, C.S.A. Wallace, J.B. Blainey, D.M. Miller, and R.H. Webb. 2009. Modeling habitat of the desert tortoise (*Gopherus agassizii*) in the Mojave and parts of the Sonoran Deserts of California, Nevada, Utah, and Arizona. U.S. Geological Survey Open-File Report 2009-1102.
- Tracy, C.R., R. Averill-Murray, W.I. Boarman, D. Delehanty, J. Heaton, E. McCoy, D. Morafka, K. Nussear, B. Hagerty, and P. Medica. 2004. Desert tortoise recovery plan assessment. Prepared for the U.S. Fish and Wildlife Service. Reno, Nevada.
- Turner, F.B., K.H. Berry, D.C. Randall, and G.C. White. 1987. Population ecology of the desert tortoise at Goffs, California, 1983-1986. Report prepared for the Southern California Edison Company, Rosemead, California.
- [Service] U.S. Fish and Wildlife Service. 1990. Endangered and threatened wildlife and plants; determination of threatened status for the Mojave population of desert tortoise, 50 CFR Part 17, 55 Fed. Reg. 12,178 (April 2, 1990).
- [Service] U.S. Fish and Wildlife Service. 1994. Desert tortoise (Mojave population) recovery plan. Portland, Oregon.
- [Service] U.S. Fish and Wildlife Service. 1997. Programmatic Biological Opinion for Implementation of Multiple Use Activities Within the Las Vegas Field Office. Dated November 25. Memorandum to District Manager, Las Vegas District, Bureau of Land Management, Las Vegas, Nevada. From Field Supervisor, Reno Fish and Wildlife Office, Reno, Nevada.

- [Service] U.S. Fish and Wildlife Service. 1998. Biological Opinion for Implementation of Proposed Actions in the Las Vegas District's Proposed Resource Management Plan/Final Environmental Impact Statement. Dated June 18. Memorandum to District Manager, Las Vegas District, Bureau of Land Management, Las Vegas, Nevada. From Field Supervisor, Reno Fish and Wildlife Office, Reno, Nevada.
- [Service] U.S. Fish and Wildlife Service. 2009. Desert Tortoise (Mojave Population) Field Manual: (*Gopherus agassizii*). Region 8, Sacramento, California.
- [Service] U.S. Fish and Wildlife Service. 2010. Mojave population of the desert tortoise (*Gopherus agassizii*) 5-year review: summary and evaluation. Desert Tortoise Recovery Office. Reno, Nevada.
- [Service] U.S. Fish and Wildlife Service. 2011. Revised recovery plan for the Mojave population of the desert tortoise (*Gopherus agassizii*). Sacramento, California.
- [Service] U.S. Fish and Wildlife Service. 2012a. Endangered species act consultation for Solar Energy Program (File No. 84320-2012-F-0200). Dated July 20. Memorandum to Assistant Director, Minerals and Realty Management, Bureau of Land Management. From Assistant Director for Endangered Species.
- [Service] U.S. Fish and Wildlife Service. 2012b. Biological opinion for the K Road Moapa Solar Project, Moapa River Indian Reservation, Clark County, Nevada (File Nos. 84320-2011-F-0430 and 1-5-05-FW-536, Tier 5). Dated March 7. Memorandum to Superintendent, Southern Paiute Agency, Bureau of Indian Affairs. St. George, Utah. From State Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada.
- [Service] U.S. Fish and Wildlife Service. 2013a. Programmatic biological for implementation of proposed actions in the Las Vegas District's proposed resource management plan/final environmental impact statement opinion (File No. 84320-2010-F-0365). Dated January 2. Memorandum to Assistant Field Manager, Bureau of Land Management, Las Vegas, Nevada. From State Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada.
- [Service] U.S. Fish and Wildlife Service. 2013b. Biological opinion for the Stateline Solar and Silver State Solar South Projects, San Bernardino County, California, and Clark County, Nevada (File No. 08EVEN-2013-F-0105). Dated September 30. Memorandum to Field Manager, Needles Field Office, Bureau of Land Management, Needles California, and Assistant Field Manager, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada. From Acting Field Supervisor, Ventura Fish and Wildlife Office, Ventura, California.
- [Service] U.S. Fish and Wildlife Service. 2022. Mojave desert tortoise (*Gopherus agassizii*) 5-year review: Summary and evaluation. Dated May. Desert Tortoise Recovery Office, Southern Nevada Fish and Wildlife Office. Las Vegas, Nevada.
- [Service] U.S. Fish and Wildlife Service. 2024. Reinitiation of the Bureau of Land Management Southern Nevada District Office Programmatic Biological Opinion (File No. 2022-0027339 S7-001; formally File No. 08ENVS00-2019-F-0153) regarding Pre-project

Geotech Exploration Acreage Thresholds. Dated January 5. Memorandum to Assistant Field Manager, Las Vegas Field Office, Bureau of Land Management, Las Vegas, Nevada. From Field Supervisor, Southern Nevada Fish and Wildlife Office, Las Vegas, Nevada.

Tracy, C.R., R. Averill-Murray, W.I. Boarman, D. Delehanty, J. Heaton, E. McCoy, D. Morafka, K. Nussear, B. Hagerty, and P. Medica. 2004. Desert tortoise recovery plan assessment. Prepared for the U.S. Fish and Wildlife Service. Reno, Nevada.

Turner, F.B., K.H. Berry, D.C. Randall, and G.C. White. 1987. Population Ecology of the Desert Tortoise at Goffs, California, 1983-1986. Annual Report to the Southern California Edison Company, Rosemead, California.

[UES] Universal Engineering Services. 2025. City of Henderson Lake Mead Parkway Utilities and Drainage Channel Biological Assessment. Las Vegas, Nevada.

Zylstra, E.R., L.J. Allison, R.C. Averill-Murray, V. Landau, N.S. Pope, and R.J. Steidl. 2023. A spatially explicit model for density that accounts for availability: a case study with Mojave desert tortoises. *Ecosphere* 14:e4448.