Appendix C

Scoping Comment Letters

Scoping Comment Letters	
Date Received	**Commenter**
Agencies	
9/9/20	California Department of Transportation District 8
9/15/20	Inyo County
9/16/20	Naval Air Weapons Station China Lake
9/18/20	California Department of Transportation District 9
9/24/20	San Bernardino County Department of Public Works #1
9/28/20	Los Angeles Department of Water and Power
9/29/20	California Department of Fish and Wildlife
9/29/20	San Bernardino County Department of Public Works #2
9/29/20	National Park Service Manzanar National Historic Site
Organizations	
9/30/20	Desert Tortoise Council
Tribal Governments and Related Organizations	
9/1/20	Native American Heritage Commission
9/9/20	Rincon Band of Luiseno Indians
9/25/20	Fort Independence Indian Reservation
10/9/20	Colorado River Indian Tribes
Private Parties	
9/10/20	Jeff Borders
9/30/20	Meadowbrook Dairy

Email: Ivanpah-Control Project EIR Team

From: MATHEW, JACOB K@DOT <Jacob.MATHEW@dot.ca.gov>
Sent: Wednesday, September 9, 2020 1:35 PM
Cc: Roberts, Mark B@DOT <mark.roberts@dot.ca.gov>; Clark, Rosa F@DOT <rosa.f.clark@dot.ca.gov>
Subject: SCE project - Ivanpah-Control Project

Hi Susan,

Thank you for including California Department of Transportation (Caltrans – District 8) in the environmental review process by providing us the link for the Notice of Preparation for an EIR along with the revised application information for the Southern California Edison's (SCE) proposed Ivanpah-Control (IC) project within San Bernardino County. The proposed project may encroach into State R/W at locations affecting the I-15 and US-395 highway facilities with installation of new structures, replacing conduit, installation of lightning protection in addition to installation of communication equipment on the lines.

We have reviewed the provided information and no further review by this Office is considered necessary at this time.

However, for the construction or any activity occurring within, under, or over the State Right-of-Way for the new installations or any associated activity at the locations identified in the project description, issuance of a Caltrans Encroachment Permit will be required. For information regarding the Encroachment Permit application and submittal requirements, contact:

Caltrans Office of Encroachment Permits
464 West 4th Street, Basement, MS 619
San Bernardino, CA 92401-1400
(909) 383-4526
http://www.dot.ca.gov/hq/traffops/developserv/permits/

These comments result from a review of the materials provided for our evaluation. If you have any questions regarding this email, please contact me.

Thanks,
Jacob Mathew
D-8, Planning

Email: Ivanpah-Control Project EIR Team

From: Cathreen Richards <crichards@inyocounty.us>
Sent: Tuesday, September 15, 2020 2:26 PM
To: Susan Lee <Slee@aspeneg.com>
Subject: RE: CPUC Ivanpah-Control Project

This email was abridged to show only content related to Ivanpah-Control project comments.

Hi Susan,

Our scoping comments include:

Paint or use other methods to minimize the visual impacts from the power poles especially in areas with iconic views.

The County has limitations on the amount of electrical conveyance through the Owens Valley, if there is any increase in conveyance capacity from the upgrades it needs to meet the requirements set forth in the County's General Plan.

Cathreen

DEPARTMENT OF THE NAVY
NAVAL AIR WEAPONS STATION
1 ADMINISTRATION CIRCLE
CHINA LAKE, CA 93555-6100

5090
ARE2P
September 16, 2020

Mr. John Forsythe
California Public Utilities Commission
c/o Aspen Environmental Group
235 Montgomery Street, Suite 640
San Francisco, CA 94104-2920

Dear Mr. Forsythe

SUBJECT: NOTICE OF PREPARATION FOR AN ENVIRONMENTAL IMPACT REPORT FOR THE IVANPAH-CONTROL PROJECT

Thank you for allowing Naval Air Weapons Station (NAWS) China Lake the opportunity to comment on the Notice of Preparation (NOP) for the Ivanpah-Control Project proposed by Southern California Edison (Application No. 19-07-015). After reviewing the preliminary plans, NAWS China Lake has identified several areas for your consideration during the planning process in an effort to ensure military operations vital to accomplishing our national security mission are not adversely impacted.

First, approximately twenty-two miles of Segment 1 of the proposed project runs parallel to the NAWS China Lake north range and is contiguous to or beneath portions of the R-2505 restricted airspace. The NOP identifies that helicopters will be used to support construction activities that will cause safety concerns if these activities are not properly communicated to NAWS China Lake. To ensure the safety of civilian and military pilots operating near or within the R-2505, prior to any civilian aircraft operating in the restricted airspace, Southern California Edison and their contractors need to coordinate access to the R-2505 with NAWS China Lake.

Additionally, to protect the safety of Navy pilots and aircraft operating in the R-2505 restricted airspace, NAWS China Lakes wants to ensure that the replacement transmission line will not deviate from the current transmission line corridor. Any deviation from the current corridor should be communicated to the Federal Aviation Administration to ensure that aviation maps are properly updated to reflect the location of the towers. For continuity, NAWS China Lake further suggests that towers beneath the restricted airspace do not exceed the height of the existing towers.

Finally, the region surrounding Little Lake is rich in archaeological sites and portions of the project that run parallel to NAWS China Lake in this regions cross lands managed by the Navy. During all phases of the project, any archaeological sites found on Navy managed lands must be immediately reported to the Navy and will be treated in accordance with the National Register of Historic Places (NRHP). Archeological sites found on Navy managed lands will affect all stages of the project and the Navy is willing to help identify mitigation measures should avoidance of archaeological sites not be an option.

5090
ARE2P
September 16, 2020

The Navy has long appreciated and valued the excellent collaborative relationship that exists between the California Public Utilities Commission and the Military. This relationship ensures the energy needs of the State are met while protecting and sustaining the military's mission. To this end, we welcome the opportunity to assist you and your team to collaboratively address and clarify key aspects of the proposed project to ensure compatibility with the military mission.

Once again, thank you for the opportunity to comment on the NOP for the Ivanpah-Control. My point of contact for this project is Mr. John Kersey, the NAWS China Lake Community Planning Liaison Officer. He is available to meet with you or answer any questions you may have and can be reached at (760) 939-9438 or via email at John.Kersey@navy.mil.

Sincerely,

J. T. VAUGHAN
Captain, U.S. Navy
Commanding Officer

DEPARTMENT OF TRANSPORTATION
DISTRICT 9
500 SOUTH MAIN STREET
BISHOP, CA 93514
PHONE (760) 872-0785
FAX (760) 872-0678
TTY 711
www.dot.ca.gov

Making Conservation a California Way of Life.

September 18, 2020

Mr. John Forsythe, Project Manager
CA Public Utilities Commission (CPUC)
c/o Aspen Environmental Group
235 Montgomery Street, Suite 640
San Francisco, California 94104-2920

File: Ker/Iny-395,168
NOP DEIR
SCH#: 2020080553

Ivanphah-Control Project – Southern California Edison (SCE) Application No. 19-07-015 Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR)

Dear Mr. Forsythe:

Thank you for giving the California Department of Transportation (Caltrans) District 9 the opportunity to comment during the NOP phase for the Ivanpah-Control (I-C) Project, which will rebuild transmission lines in eastern Kern and Inyo counties (District 9), and in San Bernardino County (District 8). Over the last few years we have interacted with the CPUC and project proponents. We offer the following:

- In Inyo County, a small portion of the line falls within a designated US 395 Scenic Highway section near Aberdeen.

- As noted in the April 2020 Proponents Environmental Assessment (PEA), Caltrans Encroachment Permit(s) will be required for utility crossings (such as shown in PEA Figure 3.5-3 and Figure Set 3.7-2) within State right-of-way (R/W). Utility standards depend upon the type of highway facility (i.e. access control, conventional, interstate, etc.). Specifications may be found in Section 600 Utility Permits of the **Encroachment Permit Manual** at: https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/encroachment-permits/chapter-6-ada.pdf

  If the I-C Project requests deviations from the Encroachment specifications, the Caltrans Exceptions Procedure could be instigated. However, this process could complicate the permit process; approval of exceptions might not be granted. See: https://dot.ca.gov/-/media/dot-media/programs/traffic-operations/documents/f0017805-chapter-3-a11y.pdf

  The permit application may be found at: https://dot.ca.gov/programs/traffic-operations/ep/applications

For more information, you may contact Stephen Winzenread, D9 Permit Engineer at (760) 872-5222 or stephen.winzenread@dot.ca.gov.

- The PEA already notes use of the CA Manual of Uniform Traffic Control Devices for traffic control, which will also require a Caltrans encroachment permit for State highway facilities. Short term closure of a State highway is required when stringing lines across it. The project should also try to avoid helicopters with loads crossing the highway to also preclude highway closure. We look forward to reviewing the I-C Project Traffic Management Plan.

- Potential Material Yards (i.e. staging areas) are noted in PEA Table 3.7.1 and Figure Set 3.7-1. Any State highway access (PEA section 3.7.1.3) for these need to be further assessed. Access improvements might be required with a Caltrans encroachment permit.

- In Inyo County, the Olancha-Cartago US 395 4-lane project is in the vicinity of the I-C Project. SCE and Caltrans D9 staff have been interacting to ensure that pole relocations/replacements necessary for the US 395 project will be consistent with the I-C Project. Caltrans D9 contacts are:

  - Julie Nellis (760) 872-0721 julie.nellis@dot.ca.gov
  - Cory Freeman (760) 872-0716 cory.freeman@dot.ca.gov

- The I-C Project might need to consider other adjacent utility easements in some areas. Within Caltrans R/W, we can use a consent to common use (CCUA) or joint use agreement (JUA) for those adjacent easements. Julie Nellis is the D9 point of contact.

We value our cooperative working relationship with the CPUC regarding project impacts on the state transportation system. For any questions, feel free to contact me at (760) 872-0785 or at gayle.rosander@dot.ca.gov.

Sincerely,

Gayle J. Rosander

GAYLE J. ROSANDER
External Project Liaison

c: State Clearinghouse
Rosa Clark, Caltrans D8
Mark Reistetter, Julie Nellis, Cory Freeman; Caltrans D9

Email: Ivanpah-Control Project EIR Team

From: Gomez, Sylvia <sgomez@dpw.sbcounty.gov>
Sent: Thursday, September 24, 2020 1:45 PM
Subject: RE: CPUC SCE Project Information

Hi Karen,

I work at Public Works Transportation Permit Section and Brendon sent us your scope of work for your large replacement project for high voltage transmission lines by CPUC-SCE.

I had a chance to quickly go over the information available on the CPUC's website and determined the following:

Segment 1
Non-maintained County Roads no conflicts or permits required with Trans Permits. See attached public easement brochure.

Segment 2
Non-maintained County Roads no conflicts and permits required with Trans Permits. See attached public easement brochure.

Segment 3N
Crossings on County Maintained Road System (CMRS) for the following roads that will require a permit from public works:

1. Harper Lake Road sheet 3
2. Holstead Rd sheet 4
3. Hinkley Rd sheet 4
4. Irwin Rd sheet 6
5. Ft Irwin Rd
6. Daggett-Yermo Road sheet 8
7. Santa Fe St sheet 8
8. National trails Hwy sheet 8

Segment 3S
Crossings on County Maintained Road System (CMRS) for the following roads that will require a permit from public works:

1. Helendale Rd sheet 3
2. Hinkley Rd, Serra Rd, Tamarack Rd & Mtn View Rd sheet 5
3. Lenwood Rd sheet 6
4. Bonanza Rd between L st to H st
5. Old mtn Rd
6. Camp Rock Rd

7. National Trails Hwy
8. Santa Fe St

Segment 4

Crossings on County Maintained Road System (CMRS) for the following roads that will require a permit from public works:

1. Minneola Rd sheet 2
2. Yermo Rd sheet 4
3. Atfon Canyon Rd sheet 6
4. Halloran Springs Rd sheet 14
5. Cima Rd sheet 16

Trans permit can issue one permit for all the road crossing listed above. I know the information online didn't get into detail some places noted they were some modifications being done at the crossing but not clear what was being modified I am assuming there will be more detailed plans that we can see at a later time. For now I am include a link to County CMRS gis map that you can reference.
When you are ready to submit to us you can contact me and I can send you link to where you can apply online through the EZOP website.

Please note you may need permits from Flood Control District because I noted some locations along the Mojave River for Segment 3N, Segment 3S and Segment 4 that may be crossing flood control district easement and/or property.

Thank you,

SAN BERNARDINO COUNTY

Sylvia R. Gomez
Department of Public Works
Permits/Operations Support Division-Transp
Engineer I

Phone: 909.387.7923 | Fax: 909.387.8050
www.SBCounty.gov/dpw

Our job is to create a county in which those who reside and invest can prosper and achieve well-being.

PUBLIC EASEMENTS

A PROPERTY OWNERS GUIDE

A. GENERAL

This brochure provides information for property owners regarding their responsibilities within areas of public easements on their properties. It is the responsibility of the property owner or agency to obtain all required construction, environmental and underground service (dig alert) permits.

B. UNDERSTANDING PUBLIC EASEMENTS

1. Road Easements

The purposes of road easements are to provide for current or future improved public roadways, to avoid land locked parcels, or for general public access. These easements are acquired through a number of ways. The most common are easements dedicated by property owner during the development process, court rulings, eminent domain, subdivision, by Patent Reservation, the exercise of prescriptive rights, and by voluntary action.

1.1 County Maintained Roads Easements

Easements for roads in the San Bernardino County Maintained Road System (CMRS) fall under the jurisdiction of the Department of Public Works (DPW).

RESPONSIBILITY: DPW is responsible for maintaining all roads accepted into the CMRS.

USE BY UNDERLYING PROPERTY OWNERS: It is preferred that no encroachments are constructed within any easement. However, if necessary, the underlying property owner shall apply for an encroachment permit and provide justification as to why the encroachment within the County easement is essential. Property owners can contact the Permits Section of County DPW at (909) 387-7995 or go online at http://www.sbcounty.gov/dpw/operations/permits_road.asp for more details.

1.2 Non County Maintained Road Easements- Road easements which are offered for dedication without County acceptance or are accepted by the County for public use but rejected for maintenance by the County are called non County maintained road easements.

RESPONSIBILITY: Underlying property owners are responsible for keeping these easements in compliance with the intent of the dedication requirement road easements, which are to be used for general public access, or for future public road improvements. These are public rights that are protected by law and any obstructions that cause a denial of such public rights can be removed at the property owner's expense through civil action.

USE BY UNDERLYING PROPERTY OWNERS: It is strongly recommended that no encroachments are constructed within any public easement. Any permitted work activity (e.g. grading) or encroachment that is constructed at the property owner's own risk. Any work inside these easements may be subject to one or more permits including grading permits, building and safety permits, environmental permits and permission from other property owners. Failure to comply may subject the offender to civil actions.

1.3 Obstruction of Public Road Easement

Obstruction of any road easement may constitute a nuisance as defined in the California Civil Code:

"Anything which…unlawfully obstructs the free passage of use… of any Public Park, square, street, or highway, is a nuisance."

Property owners may be responsible for damages under provisions of the Civil Code.
The California Penal Code also defines public nuisances in almost identical language (Section 370). The Penal Code goes on to say "Every person who maintains or commits any public nuisance, the punishment for which is not otherwise prescribed, or who willfully omits to perform any legal duty relating to the removal of a public nuisance, is guilty of a misdemeanor." (Section 372) The punishment for a misdemeanor is given in section 19: "Except in cases where a different punishment is prescribed by any law of this state, every offense declared to be a misdemeanor is punishable by imprisonment in the county jail not exceeding six-months, or by fine, not exceeding one thousand dollars ($1000), or by both.

1.4 Use of Public Road Easement by Utility Agencies

Utilities placed in public right of way (maintained or not maintained) must demonstrate the right to be in public right of way via franchise agreement or previously acquired private utility easements. For non-maintained dedicated roads –no permit from DPW is required. As long as utility is a public utility and the utility doesn't impede the traveling public they are allowed to install facilities in the dedicated right of way.

For private utilities in a public right of way (maintained or not maintained) – a franchise agreement must be obtained, or the utility must be placed outside dedicated right of

way and a private easement must be obtained with adjacent property owners. No DPW permit is required if utility is outside road right of way or on a non-maintained dedicated public road.

For non-maintained roads with no dedication –these roads are considered private. No DPW permit is required. The utility must get private easements.

For maintained roads with no dedicated right of way – Road prescriptive right of way is typically to the edge of a disturbed area. Due to limited width of disturbance: Above ground utilities are to be placed beyond the disturbed area. It is strongly advised to contact DPW for the master plan right of way and place the utilities as close to the outside limit of the master plan right of way as possible to avoid future relocations if road is widened. The location may require a private utility easement from adjacent property owner. If above ground utility must be inside the disturbed limits, DPW will evaluate the location and determine if the obstruction will affect roadway maintenance and will issue a permit if maintenance will not be affected. Underground utilities require a permit from DPW if located within the disturbed limits.

2. DRAINAGE EASEMENTS

The general purpose of drainage easements are to maintain the historical flow and alignment of storm water runoff, or to provide building setbacks. These easements are most commonly acquired through dedication by the property owner during the development process. Drainage easements generally follow natural watercourses and are generally not maintained by the County.

RESPONSIBILITY: The underlying property owners are responsible for maintaining drainage easements. Drainage easements must follow the historic flow path and must not be blocked or their capacities reduced in anyway.

RESTRICTIONS OF USE BY UNDERLYING PROPERTY OWNERS: It is strongly recommended that no encroachments be constructed inside a drainage easement as it may cause drainage/flood damage to neighboring properties. Disputes among neighboring property owners or even civil cases may occur as a result of such encroachments. Property owners who divert or block the historical flows may be liable for any damages caused by their actions to downstream properties.

3. VACATION OF PUBLIC EASEMENTS

Under certain conditions, an existing public easement may no longer be necessary due to a variety of reasons such as changed conditions, topography, etc. The property owner can seek a

vacation of an easement through the County Highway Planning Technical Committee (HPTC) by submitting an application and paying the applicable fees. Contact Design Division/Right –of-Way Section at 909-387-7951 for more details.

4. PAVING NON-COUNTY MAINTAINED ROAD EASEMENT FOR PURPOSE OF COUNTY ASSUMING MAINTENANCE

Any work on a non County maintained road shall follow DPW standards and be constructed according to plans prepared by a registered civil engineer. Prior to any work preformed, the property owner shall obtain an encroachment permit from DPW. If a property owner wishes to pave within a non County maintained road easement and request that the County exercise its discretion to accept that road into the CMRS, the owner can consult the Permits Section of County DPW at (909) 387-7995.

C. GENERAL RESTRICTIONS OF ENCROACHMENTS AND WORK ACTIVITY INSIDE NON COUNTY MAINTAINED PUBLIC EASEMENTS

General restrictions include, but not limited to, the following:

1. Encroachments must not block the public right to pass thru the road easements.
2. Encroachments must not block, or cause restriction of, or divert drainage courses.
3. Structures (walls, drainage facilities, etc) are still subject to building and safety requirements and permit requirements and must be designed by a registered engineer and constructed accordingly.
4. Buildings, accessory structures, and homes are not allowed to be constructed in the easement area.
5. Encroachments must not interfere with utilities.
6. Applicable environmental permitting maybe required.
7. In some cases, easements, acquisitions and/or agreement letters must be signed by neighboring parcels affected by the work activity or encroachment.
8. No septic/leach lines, etc. are allowed in the public easement.
9. The encroachment or work activity must be maintained by the applicant/property owner.
10. Tree removal needs environmental approval and potential public input.

D. ENFORCEMENT (NON MAINTAINED PUBLIC EASEMENT)

1. All work activities or building of structures, inside a non County maintained public easement are subject to San Bernardino County Building Codes. Violations of County Building Codes are subject to the enforcement action by the Land Use Services Department.
2. Any permitted work activity or building of structures inside non County maintained road easement or drainage easement is done so at the property owner's own risk.

3. Non County maintained public easements, by definition, are not maintained by the County. The public and property owners are encouraged to resolve access and maintenance issues among affected parties.
4. If there is a complaint/report brought against a property owner regarding possible illegal encroachments on public easement, DPW staff will research the easement information and refer to the appropriate County department for action. Not all such complaints result in determinations of code violations and property owners are encouraged to seek resolutions acceptable to all involved parties.

5. Cases involving roads with no public dedication are private matters and property owners should be directed to pursue their legal rights as appropriate.

E. ENFORCEMENT (MAINTAINED PUBLIC EASEMENT)

1. Any work activity or building of structures inside a County maintained road easement requires a permit as described in the Section B.1.1 above.

2. If there is a complaint/report brought against a property owner regarding possible illegal encroachments within County maintained road easements, such complaints will be reviewed and evaluated by DPW staff. Notices will be mailed to subject property owners requiring proper remedial actions.

September 28, 2020

Mr. John Forsythe
Project Manager
Aspen Environmental Group
235 Montgomery Street, Suite 640
San Francisco, CA 94104

Dear Mr. Forsythe:

Subject: Comments on the Notice of Preparation for the Ivanpah-Control Project

Thank you for the opportunity to respond to California Utilities Commission's (CPUC) Notice of Preparation (NOP) for the Ivanpah-Control Project (Project). The Project proponent, Southern California Edison (SCE), proposes to rebuild components of its existing 115 kilovolt transmission lines that extend over 358 miles between the existing SCE Control and Haiwee Substations in Inyo County, the Inyokern Substation in Kern County, and the Kramer, Tortilla, Coolwater, and Ivanpah Substations in San Bernardino County. The primary objective is to comply with the CPUC's General Order 95 requirement, and to correct conductor clearance problems along this transmission line.

From preliminary review of the NOP, the Los Angeles Department of Water and Power (LADWP) submits comments pertaining to project areas that cross LADWP right-of-way or activity which affects LADWP's operation (see enclosure). Many of the comments have also been previously provided to the Bureau of Land Management for their consideration as part of their environmental review of the project under the National Environmental Policy Act.

If you have any questions, please contact Ms. Nancy Chung, of my staff at 213-367-0404 or email at Nancy.Chung@ladwp.com. Also, please add Ms. Chung to your direct mailing or emailing list for any future notices regarding this project.

Sincerely,

Nadia Parker
Digitally signed by Nadia Parker
Date: 2020.09.25 12:46:27 -07'00'

Charles C. Holloway
Manager of Environmental Planning and Assessment

NC:aeh
Enclosure
c: Ms. Nancy Chung

LADWP Comments:

- LADWP will need a list of all Material Yards proposed to be located on City of Los Angeles land. Are these proposed Material Yards located within existing rights of way or will temporary construction easements (TCEs) be required? If TCEs are required, a proposal should be submitted to LADWP as soon as possible.

- A new right of way alignment, at least where it crosses LADWP property, should be identified and presented to the LADWP for evaluation and discussion at the earliest possible stage.

- Future iterations of the POD need to identify where the IC Project proposes to cross LADWP transmission and distribution lines and the Los Angeles Aqueduct rights of way on federal land. LADWP has existing rights of way on BLM and federal lands that need to be protected. Consent agreements at such crossings should be a condition and component of any new rights of way granted by BLM or federal agencies.

- Provide a more detailed schedule for the projects when it is developed. (In reference to Segment 1 of the project.)

- Provide 45 days advance notice of project work in a locality and provide general drawings of work to be performed so that we can assess any potential impacts on our facilities and operations. (In reference to Segment 1 of the project)

- For structure that cross our Aqueduct or tributaries, especially those requiring mats, bridges or other proposed protection, please send us drawings of those proposed structures for review. (In reference to Segment 1 of the project.)

- Flag and avoid rare plants along the construction route where possible. Please coordinate with BLM to see shape file provided by LADWP to BLM for the location of these rare plants.

- SCE referenced herein shall pertain to its employees, agents, consultants, contractors, officers, patrons, invitees of SCE, or any other SCE affiliated entities.

- The information provided to date is inadequate for properly reviewing the proposed project. LADWP therefore reserves the right to comment until detailed information is provided regarding the proposed SCE project as it affects LADWP's transmission lines. The more detailed information shall include dimensioned plans of all existing and proposed improvements, property lines, clearances of all improvements from LADWP and Pacific Direct Current Intertie (PDCI) towers, including grading, roadway, and utility plans illustrating impacts to the LADWP/PDCI Transmission Line Right of Way (TLRW). The LADWP TLRW shall be clearly defined with SCE's proposed improvements.

- Provide electronic PLS CADD files for LADWP's Transmission Engineering's review to determine adherence to California Public Utilities Commission (CPUC) General Order No. 95 clearance requirements.

- Please note, this response does not include all responses from LADWP's Transmission Engineering Group's nor Transmission Construction and Maintenance review of SCE's Ivanpah Control Project. (These sections may provide additional input in future rounds of review.)

Conditions:

- SCE shall acknowledge that LADWP and PDCI TLRW are an integral component of the transmission line system which provides electric power to the City of Los Angeles and other local communities. Their use is under the jurisdiction of North American Electric Reliability Corporation (NERC), an organization of the Federal Energy Regulatory Commission (FERC). Safety and protection of critical facilities are primary factors used to evaluate secondary land use proposals. The rights of way serve as platforms for access, construction, maintenance, facility expansion, and emergency operations. Therefore, the proposed use may from time to time be subject to temporary disruption caused by such operations.

- No grading, improvements, or construction activities of any kind whatsoever will be allowed without written approval of LADWP.

- An area of at least 100 feet around the base of each transmission tower must remain open and unobstructed for necessary operation and maintenance activities. Setbacks of 300-feet around specific dead-end transmission tower bases may be required.

- No equipment shall be allowed to set up directly under LADWP and PDCI transmission lines.

- No equipment over 14 feet high shall be used near LADWP and PDCI transmission lines without written permission of LADWP. Equipment higher than 14 feet will require submittal of a Conductor Survey to LADWP's Transmission Engineering Group to ensure clearances meet the CPUC General Order No. 95.

- California Code of Regulations, Title 8, Section 2700 defines "qualified electrical workers" as "a qualified person who by reason of a minimum of two (2) years of training and experience with high-voltage circuits and equipment and who has demonstrated by performance familiarity with the work to be performed and the hazards involved." At all times during installation and/or maintenance of any improvement authorized within the LADWP and PDCI TLRW, SCE shall have at least one (1) qualified electrical worker on site to observe and ensure the said work complies with California Occupational Safety and Health Administration (Cal-OSHA) safety protocols or Occupational Safety and Health Administration (OSHA) equivalent.

- Utilities within the proposed excavation sites shall be notified of impending work. SCE shall be responsible for coordinating the relocation of utilities, if any, within the project boundaries. Before commencing any excavations, contact Underground Service Alert (a.k.a DigAlert).

- All ground elevations are to remain unchanged from existing conditions after construction associated with the SCE proposed improvements is completed. Cut and fill

slopes inside LADWP and PDCI TLRW steeper than 2 horizontal to 1 vertical require retaining structures or geotechnical report approval.

]Note: Grading activity resulting in a vertical clearance between the ground and the transmission line conductor elevation less than 35 feet or as noted in the CPUC General Order 95 within the LADWP and PDCI TLRW is unacceptable.

- Ground cover for all below ground utilities shall not be less than four feet.

- A permanent, unobstructed 20-foot-wide roadway, accessible at all times by LADWP maintenance personnel, shall be provided and maintained. The roadway must remain open and unobstructed, excluded from any watering and kept as dry as possible at all times. See the **Access Road Design Criteria attached**.

- Additional conditions may be required following review of final detailed site plans, grading/draining plans, etc.

- **Standard Conditions for Construction** shall apply. **See attached**.

- This reply shall in no way be construed as an approval of this project.

ACCESS ROAD DESIGN CRITERIA

1. When grading activity affects the Transmission Line access roads, the Contractor shall replace the affected access roads using the following access road design criteria. Typical Road Sections are illustrated in Attachment.

2. The access road right-of-way width shall be 50 feet minimum.

3. The access road drivable width shall be 20 feet minimum, and increased on curves by a distance equal to 400 divided by the radius of curve. Additional 2 feet on either side of the road shall be provided for berms and ditches, as detailed in the attached Typical Road Sections.

4. The minimum centerline radius of curves shall be 50 feet.

5. The vertical alignment grades shall be limited to 10 percent or paved at a maximum of 15 percent.

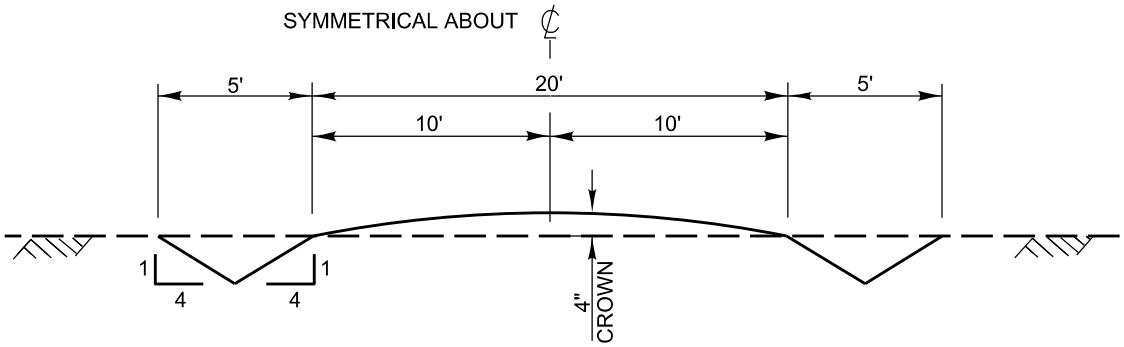
6. Roads entirely located on fills or with cross sections showing more than 30 percent fill along the drivable width of the road require paving.

7. Intersections or driveways shall have a minimum sight distance of 300 feet in either direction along the public street.

8. The Contractor shall provide a commercial driveway at locations where the replaced access roads terminate at, or cross public roads.

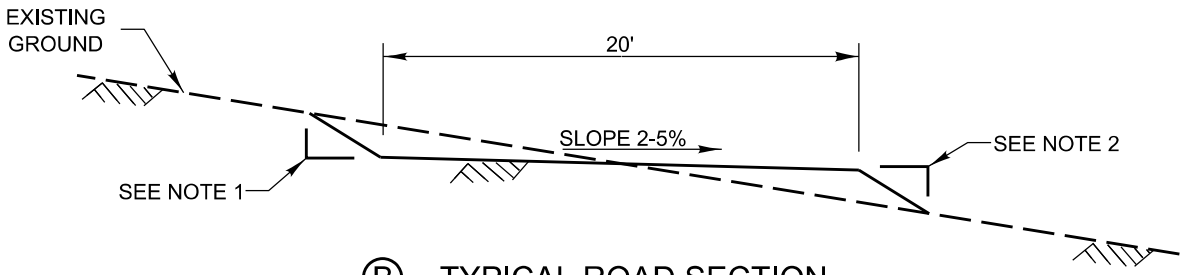
9. The Contractor shall provide lockable gates on LADWP property or easement at locations where access roads terminate or cross public roads.

LOS ANGELES DEPARTMENT OF WATER AND POWER
TRANSMISSION LINE ACCESS ROAD DETAILS



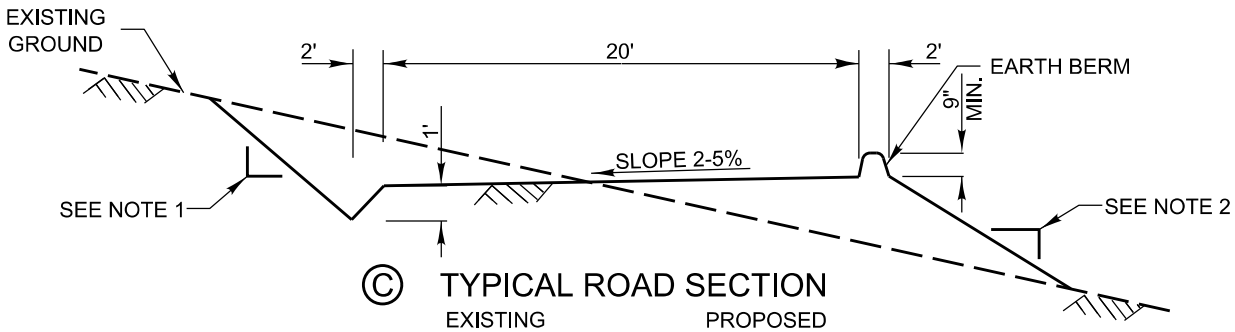
Ⓐ TYPICAL ROAD SECTION

EXISTING CROSS SLOPE	PROPOSED ROAD GRADE
≤ 5%	≤ 10%
	10-15% (PAVEMENT REQUIRED)



Ⓑ TYPICAL ROAD SECTION

EXISTING CROSS SLOPE	PROPOSED ROAD GRADE
5-15%	≤ 10%
	10-15% (PAVEMENT REQUIRED)



Ⓒ TYPICAL ROAD SECTION

EXISTING CROSS SLOPE	PROPOSED ROAD GRADE
15-50%	≤ 10%
	10-15% (PAVEMENT REQUIRED)

NOTES:

1. CUT SLOPE SHALL NOT EXCEED THE FOLLOWING:
   - A. 2 HORIZONTAL TO 1 VERTICAL IN LOOSE OR UNSTABLE MATERIAL.
   - B. 1 HORIZONTAL TO 1 VERTICAL IN COMPACTED MATERIAL.
   - C. 1/2 HORIZONTAL TO 1 VERTICAL IN SOLID ROCK.
2. ALL FILL SLOPES SHALL BE 2 HORIZONTAL TO 1 VERTICAL OR FLATTER.
3. WHERE SOLID ROCK IS ENCOUNTERED THE 4" CROWN AND, OR SIDE DITCHES MAY BE ELIMINATED WHERE DIRECTED BY THE ENGINEER.

STANDARD CONDITIONS FOR CONSTRUCTION

1. Energized transmission lines can produce electrical effects including, but not limited to, induced voltages and currents in persons and objects. Licensee hereby acknowledges a duty to conduct activities in such manner that will not expose persons to injury or property to damage from such effects.

2. The Los Angeles Department of Water and Power (LADWP) personnel shall have access to the right of way at all times.

3. Unauthorized parking of vehicles or equipment shall not be allowed on the right of way at any time.

4. Unauthorized storage of equipment or material shall not be allowed on the right of way at any time.

5. Fueling of vehicles or equipment shall not be allowed on the right of way at any time.

6. Patrol roads and/or the ground surfaces of the right of way shall be restored by the Licensee to original conditions, or better.

7. All trash, debris, waste, and excess earth shall be removed from the right of way upon completion of the project, or the LADWP may do so at the sole risk and expense of the Licensee.

8. All cut and fill slopes within the right of way shall contain adequate berms, benches, and interceptor terraces. Revegetation measures shall also be provided for dust and erosion control protection of the right of way.

9. All paving, driveways, bridges, crossings, and substructures located within the right of way shall be designed to withstand the American Association of State Highway and Transportation Officials' vehicular loading H20-44 or HL-93. The design shall also comply with applicable design standards.

10. The location of underground pipelines and conduits shall be marked at all points where they cross the boundaries of the right of way and at all locations where they change direction within the right of way. The markings shall be visible and identifiable metal post markers for underground pipelines. Utility markers flush with surface may be used on pavement.

11A. General Grounding Condition

All aboveground metal structures including, but not limited to, pipes, drainage devices, fences, and bridge structures located within or adjoining the right of way shall be properly grounded, and shall be insulated from any fencing or other conductive materials located outside of the right of way. For safety of personnel and equipment, all equipment and structures shall be grounded in accordance with State of California Code of Regulations, Title 8, Section 2941, and National Electric Code, Article 250.

11B. Grounding Condition for Cellular Facilities on Towers

All aboveground metal structures including, but not limited to, pipes, drainage devices, fences, and bridge structures located within or adjoining the right of way shall be properly grounded, and shall be insulated from any fencing or other conductive materials located outside of the right of way. For safety of personnel and equipment, all equipment and structures shall be grounded in accordance with American National Standards Institute of Electrical and Electronics Engineers Standard 487-latest edition, IEEE Guide for Safety in AC Substation Grounding.

12. Licensee shall neither hold the LADWP liable for nor seek indemnity from the LADWP for any damage to the Licensee's project due to future construction or reconstruction by the LADWP within the right of way.

13. Fires and burning of materials is not allowed on the right of way.

14. Licensee shall control dust by dust-abatement procedures approved by the LADWP, such as the application of a dust palliative or water.

15. The right of way contains high-voltage electrical conductors; therefore, the Licensee shall utilize only such equipment, material, and construction techniques that are permitted under applicable safety ordinances and statutes, including the following: State of California Code of Regulations, Title 8, Industrial Relations, Chapter 4, Division of Industrial Safety, Subchapter 5, Electrical Safety Orders; and California Public Utilities Commission, General Order No. 95, Rules for Overhead Electric Line Construction.

16. Licensee is hereby notified that grounding wires may be buried in the right of way; therefore, the Licensee shall notify the LADWP's Transmission Construction and Maintenance Business Group at (818) 771-5014, or (818) 771-5076, at least 48 hours prior to the start of any construction activities in the right of way.

17A. Vehicle Parking

An area within 50 feet around the base of each tower must remain open and unobstructed for maintenance and emergencies, including periodic washing of insulators by high-pressure water spray. Clearances of 100 feet may be required under circumstances where access is limited.

17B. Trucking Operations and Storage Operations

An area within 50 feet around the base of each tower must remain open and unobstructed for maintenance and emergencies, including periodic washing of insulators by high-pressure water spray. Clearances of 100 feet may be required under circumstances where access is limited.

17C. Permanent Structures

An area within 100 feet on all sides of each tower shall remain open and unobstructed for maintenance and emergencies, including periodic washing of insulators by high-pressure water spray.

18. Detailed plans for any grading, paving, and construction work within the right of way shall be submitted for approval to the Real Estate Services, 221 N. Figueroa St., Suite 1600, Los Angeles, California 90012, no later than 45 days prior to the start of any grading, paving, or construction work. Notwithstanding any other notices given by Licensee required herein, Licensee shall notify the LADWP's Transmission Construction and Maintenance Business Group at (818) 771-5014, or (818) 771-5076, no earlier than 14 days and no later than two days prior to the start of any grading, paving, or construction work.

19. "As Constructed" drawings showing all plans and profiles of the Licensee's project shall be furnished to the Real Estate Services, 221 N. Figueroa St., Suite 1600, Los Angeles, California 90012, within five days after completion of Licensee's project.

20. In the event that construction within the right of way is determined upon inspection by the LADWP to be unsafe or hazardous to the LADWP facilities, the LADWP may assign a line patrol mechanic at the Licensee's expense.

21. If the LADWP determines at any time during construction that the Licensee's efforts are hazardous or detrimental to the LADWP facilities, the LADWP shall have the right to immediately terminate said construction.

22A. All concentrated surface water which is draining away from the permitted activity shall be directed to an approved storm drain system where accessible, or otherwise restored to sheet flow before being released within or from the right of way.

22B. Drainage from the paved portions of the right of way shall not enter the unpaved area under the towers. Drainage diversions such as curbs shall be used on three sides of each tower. The open side of each tower shall be the lowest elevation side to allow storm water which falls under the tower to drain. The area under the towers shall be manually graded to sheet flow out from under the towers.

22C. Ponding or flooding conditions within the right of way shall not be allowed, especially around the transmission towers. All drainage shall flow off of the right of way.

22D. Licensee shall comply with all Los Angeles County Municipal Storm Water Permit and Standard Urban Storm Water Mitigation Plan requirements.

23A. Fills, including backfills, shall be in horizontal, uniform layers not to exceed six inches in thickness before compaction, then compacted to 90 percent relative compaction in accordance with the American Society for Testing and Materials D1557.

23B. The top two inches to six inches of the concrete footings of the towers shall remain exposed and not covered over by any fill from grading operations.

23C. Licensee shall provide the LADWP with one copy each of the compaction report and a Certificate of Compacted Fill, for clean fill compaction within the LADWP's right of way in accordance with the American Society for Testing and Materials D1557, approved by a geotechnical engineer licensed in the State of California.

24. A surety bond in the amount to be determined by the LADWP shall be supplied by the Licensee to assure restoration of the LADWP's right of way and facilities, and compliance with all conditions herein.

25. The Licensee shall obtain and pay for all permits and licenses required for performance of the work and shall comply with all laws, ordinances, rules, orders, or regulations including, but not limited to, those of any agencies, departments, districts, or commissions of the State, County, or City having jurisdiction thereover.

26. The term "construction", as used herein, refers only to that construction incidental to the maintenance or repair of the existing (requested facility) and shall not be construed to mean permission to construct any additional (requested facility).

27. Signs shall not exceed four feet wide by eight feet long, shall not exceed a height of 12 feet, shall be constructed of noncombustible materials, and shall be installed manually at, and parallel with, the right of way boundary.

28. Remote-controlled gates, or lock boxes containing the device or key for opening the remote-controlled gates, shall be capable of being interlocked with an LADWP padlock to allow access to the right of way by the LADWP. Licensee shall contact LADWP's Transmission Construction and Maintenance Business Group at (818) 771-5014, or (818) 771-5076, to coordinate the installation of an LADWP padlock.

29. Licensee's cathodic protection system, if any, shall have a design that does not cause corrosion to LADWP facilities. A detailed design of the Licensee's cathodic protection system shall be submitted for approval to the Real Estate Services, 221 N. Figueroa St., Suite 1600, Los Angeles, California 90012, no later than 45 days prior to the start of construction or installation of the cathodic protection system.

30A. Licensee shall install K-rails at a distance of ten feet from each side of the tower base for protection of towers. A distance of five feet from the tower base may be acceptable in locations where the patrol roads would be obstructed.

30B. Licensee shall install removable pipe bollards, spaced four feet apart, and at a distance of ten feet from each side of the tower base for protection of towers. A distance of five feet from the tower base may be acceptable in locations where the patrol roads would be obstructed.

31A Licensee shall provide and maintain a minimum 20-foot wide transition ramp for the patrol roads from the pavement to the ground surface. The ramp shall not exceed a slope of ten percent.

31B. Licensee shall provide and maintain a minimum 20-foot wide driveway and gate at all locations where the (road/street) crosses the LADWP's patrol roads. The designed gates must be capable of being interlocked with an LADWP padlock to allow access to the right of way by the LADWP.

32. Licensee shall post a sign on the entrance gate to the right of way, or in a visible location inside the entrance gate, identifying the contact person's name and telephone number for the prompt moving of (vehicles/trucks/trailers/containers) at times of LADWP maintenance or emergency activities, or any other event that (vehicles/trucks/trailers/containers) must be moved. In emergency conditions, the LADWP reserves all rights at any time to move or tow (vehicles/trucks/trailers/containers) out of specific areas for any transmission operation or maintenance purposes.

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Inland Deserts Region
3602 Inland Empire Boulevard, Suite C-220
Ontario, CA 91764
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

September 29, 2020

John Forsythe
Project Manager
California Public Utilities Commission
c/o Aspen Environmental Group
235 Montgomery Street, Suite 640
San Francisco, CA 94104-2920

Subject: Notice of Preparation of a Draft Environmental Impact Report
Ivanpah-Control Project
State Clearinghouse No. 2020080553

Dear Mr. Forsythe:

The California Department of Fish and Wildlife (CDFW) received a Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) from the California Public Utilities Commission (CPUC) for the Ivanpah-Control Project (Project) pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's Trustee Agency for fish and wildlife resources, and holds those resources in trust by statute for all the people of the State. (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (*Id.*, § 1802.) Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW is also submitting comments as a Responsible Agency under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may

1 CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project proponent may seek related take authorization as provided by the Fish and Game Code.

PROJECT DESCRIPTION SUMMARY

Southern California Edison Company (SCE) has filed an application to the CPUC for a Permit to Construct its proposed Project, a 115 kilovolt (kV) transmission line rebuild project. The CPUC, as lead agency under the CEQA, will prepare an EIR to analyze the effects of the Project to comply with CEQA.

SCE is proposing to rebuild components of its existing 115 kilovolt (kV) transmission lines that extend over 358 miles between the existing SCE Control and Haiwee Substations in Inyo County, the Inyokern Substation in Kern County, and the Kramer, Tortilla, Coolwater, and Ivanpah Substations in San Bernardino County. The Project is located on private land, Department of Defense land, and on federal lands administered by the Bureau of Land Management (BLM).

SCE proposes to correct 2,950 conductor clearance problems, where the conductors are now too close to the ground. The solutions include re-tensioning powerline to reduce the sag between towers; installing taller poles to increase the clearance between powerlines and ground, replacing individual poles, and derating a line segment.

SCE proposes to replace the existing conductors and structures on the 115 kV system, installing a new type of conductor, except in Segment 4, with Aluminum Conductor Composite Core (ACCC) called "Dove." Compared with a conventional conductor that is made of steel (and has no composite core), the ACCC conductor type is lighter in weight, has higher tensile strength and can be operated at a much higher temperature. Since the ACCC conductor sags less at its higher operating temperature it can carry more electricity than conventional conductors.

The ACCC Dove conductors that SCE proposes to install would have the capacity to carry more power than the existing transmission lines. For example, in Segment 1, the capacity would increase by three times with the new conductor, and in Segments 2 and 3 the capacity could increase by about 50 percent. In Segment 2, replacement structures would also be designed to carry two circuits, but only a single new circuit of ACCC conductor would be installed, allowing for future installation of an additional circuit, if necessary.

The 5 segments of the Project are described below.

Segment 1: Control Substation (Bishop) to Inyokern. This 126-mile project segment is located primarily in Inyo County. The existing 115 kV line generally parallels U.S. 395. Nearly half of the route would be on land owned by the Los Angeles Department of Water and Power and about 30 percent is on federal land administered by the BLM.

Segment 2: Inyokern–Kramer Junction. This 48-mile project segment closely follows U.S. 395 from the existing Inyokern Substation in northeastern Kern County to the existing Kramer Substation in western San Bernardino County. About 58 percent of the land crossed by the route is federal land administered by the BLM, and 41 percent is private land.

Segment 3N: Kramer Junction–Coolwater Substation (East of Barstow). This segment passes north of the City of Barstow and is 44 miles long. This segment is 49% on federal land administered by the BLM. SCE's proposal for Segment 3N includes removal of approximately 43 existing transmission structures (leaving about 254 structures unchanged), installation of approximately 45 new structures, and installation of a single circuit of ACCC conductor.

Segment 3S: Kramer Junction–Tortilla Substation (Barstow)–Coolwater Substation. This southern segment of the Kramer-Coolwater line passes through the City of Barstow and the existing Tortilla Substation and is 44 miles long. This segment is 44 percent on federal land administered by the BLM. SCE proposes removal of approximately 42 existing transmission structures (leaving about 275 structures unchanged), installation of approximately 42 new structures, and installing replacement ACCC conductor on the entire segment.

Segment 4: Coolwater Substation (East of Barstow) to Ivanpah Substation. This 96-mile project segment begins at the Coolwater Substation (east of Barstow), and ends at the Ivanpah Substation (adjacent to the Ivanpah Solar Electric Generating System). It roughly follows Interstate 15 to the northeast, and two-thirds of it are on federal land administered by the BLM within a designated utility corridor. SCE proposes removing approximately 60 existing structures, installing approximately 62 new structures, and modifying approximately 83 structures (leaving about 480 structures unchanged).

Construction would include removal of many transmission structures and electrical conductors, and installation of new structures and conductors in most segments. In addition, SCE describes the following construction components or details:

- Staging Yards: SCE proposes to use a number of staging yards to support its construction activities; typically, between one and five acres for each staging yard.
- Work Areas: At each pole site, a work area ranging from ¼ acre to ¾ acre would be required.
- Access Roads: SCE would use approximately 426 miles of existing access roads (running along the entire transmission line) and spur roads (short roads to reach

each tower from the access road). Public roads would also be used, and no new permanent access roads would be constructed.
- Vegetation Removal: During road rehabilitation and preparation of staging areas, vegetation would be trimmed or removed, as needed. Tree removal would be minimized.
- Helicopter Use: SCE would use helicopters to support construction activity.
- Construction Personnel: SCE anticipates approximately 200 construction personnel working on a given day.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist the CPUC in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct, and indirect impacts on fish and wildlife (biological) resources.

CDFW recommends that the forthcoming DEIR address the following:

Assessment of Biological Resources

Section 15125(c) of the CEQA Guidelines states that knowledge of the regional setting of a project is critical to the assessment of environmental impacts and that special emphasis should be placed on environmental resources that are rare or unique to the region. To enable CDFW staff to adequately review and comment on the Project, the DEIR should include a complete assessment of the flora and fauna within and adjacent to the Project footprint, with particular emphasis on identifying rare, threatened, endangered, and other sensitive species and their associated habitats.

The CDFW recommends that the DEIR specifically include:

1. An assessment of the various habitat types located within the Project footprint, and a map that identifies the location of each habitat type. CDFW recommends that floristic, alliance- and/or association-based mapping and assessment be completed following *The Manual of California Vegetation*, second edition (Sawyer et al. 2009). Adjoining habitat areas should also be included in this assessment where site activities could lead to direct or indirect impacts offsite. Habitat mapping at the alliance level will help establish baseline vegetation conditions.

2. A general biological inventory of the fish, amphibian, reptile, bird, and mammal species that are present or have the potential to be present within each habitat type onsite and within adjacent areas that could be affected by the Project. CDFW's California Natural Diversity Database (CNDDB) in Sacramento should be contacted at (916) 322-2493 or CNDDB@wildlife.ca.gov to obtain current information on any previously reported sensitive species and habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code, in the vicinity of the proposed Project.

Please note that CDFW's CNDDB is not exhaustive in terms of the data it houses, nor is it an absence database. CDFW recommends that it be used as a starting point in gathering information about the *potential presence* of species within the general area of the Project site.

3. A complete, *recent* inventory of rare, threatened, endangered, and other sensitive species located within the Project footprint and within offsite areas with the potential to be affected, including California Species of Special Concern (CSSC) and California Fully Protected Species (Fish and Game Code § 3511). Species to be addressed should include all those which meet the CEQA definition (CEQA Guidelines § 15380). The inventory should address seasonal variations in use of the Project area and should not be limited to resident species. Focused species-specific surveys, completed by a qualified biologist and conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with CDFW and the U.S. Fish and Wildlife Service, where necessary. Note that CDFW generally considers biological field assessments for wildlife to be valid for a one-year period, and assessments for rare plants may be considered valid for a period of up to three years. Some aspects of the proposed Project may warrant periodic updated surveys for certain sensitive taxa, particularly if the Project is proposed to occur over a protracted time frame, or in phases, or if surveys are completed during periods of drought.

   Western Joshua tree (*Yucca brevifolia*)

   The Project site is known to be occupied by western Joshua Tree. The Fish and Game Commission voted on September 22, 2020 to advance western Joshua tree to a candidate species under CESA. As a candidate species western Joshua tree will have full protection under CESA and take must be authorized through a CESA Incidental Take Permit. CDFW encourages early consultation, as significant modification to the proposed Project and identification of avoidance, minimization, and mitigation measures may be necessary. The California Fish and Game Code requires that CDFW comply with CEQA for issuance of a CESA incidental take permit (ITP).

   CDFW recommends that the CPUC complete surveys over the Project area proposed to be directly or indirectly affected by the Project to determine presence/absence and numbers of western Joshua tree. CDFW recommends the DEIR addresses all Project impacts to western Joshua tree and specifies a mitigation monitoring and reporting program that will address potential impacts.

   Burrowing Owl (*Athene cunicularia*)

   The Project site has the potential to provide suitable foraging and/or nesting habitat for burrowing owl. Take of individual burrowing owls and their nests is defined by Fish and Game Code section 86, and prohibited by sections 3503, 3503.5 and 3513.

Take is defined in Fish and Game Code section 86 as “hunt, pursue, catch, capture or kill, or attempt to hunt, pursue, catch, capture or kill.”

CDFW recommends that the CPUC follow the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation* (Department of Fish and Game, March 2012); available for download from CDFW’s website: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=83843 . The Staff Report on Burrowing Owl Mitigation, specifies three steps for project impact evaluations:

a. A habitat assessment;
b. Surveys; and
c. An impact assessment

As stated in the Staff Report on Burrowing Owl Mitigation, the three progressive steps are effective in evaluating whether a project will result in impacts to burrowing owls, and the information gained from the steps will inform any subsequent avoidance, minimization, and mitigation measures. Habitat assessments are conducted to evaluate the likelihood that a site supports burrowing owl. Burrowing owl surveys provide information needed to determine the potential effects of proposed projects and activities on burrowing owls, and to avoid take in accordance with Fish and Game Code sections 86, 3503, and 3503.5. Impact assessments evaluate the extent to which burrowing owls and their habitat may be impacted, directly or indirectly, on and within a reasonable distance of a proposed CEQA project activity or non-CEQA project.

If burrowing owls are found to occupy the Project site and avoidance is not possible, it is important to note that according to the Staff Report (CDFG 2012), exclusion is not a take avoidance, minimization, or mitigation method and is considered a potentially significant impact under CEQA. However, if necessary, CDFW recommends that burrow exclusion be conducted by qualified biologists and only during the non-breeding season, before breeding behavior is exhibited and after the burrow is confirmed empty through non-invasive methods, such as surveillance. CDFW recommends replacement of occupied burrows with artificial burrows at a ratio of 2 artificial burrow constructed to 1 natural burrow collapsed (2:1) as minimization for the potentially significant impact of evicting burrowing owls. Burrowing owls may attempt to colonize or re-colonize an area that will be impacted; thus, CDFW recommends ongoing surveillance of the Project site during Project activities, at a rate that is sufficient to detect burrowing owls if they return. CDFW also recommends that when temporary or permanent burrow exclusion and/or burrow closure is implemented, burrowing owls should not be excluded from burrows unless or until a Burrowing Owl Exclusion Plan is developed and approved by CDFW; permanent loss of occupied burrow(s) and habitat is mitigated in accordance with the Staff Report; site monitoring is conducted prior to, during, and after exclusion of burrowing owls from their burrows sufficient to ensure take is avoided; and excluded burrowing owls are documented using artificial or natural burrows on an adjoining mitigation site.

If burrowing owls are found to occupy the Project site and avoidance is not possible, CDFW recommends mitigation for permanent impacts to nesting, occupied and satellite burrows and/or burrowing owl habitat such that the habitat acreage, number of burrows and burrowing owls impacted are replaced. The mitigation lands may require habitat enhancements including enhancement or expansion of burrows for breeding, shelter and dispersal opportunity, and removal or control of population stressors. CDFW recommends permanent protection of mitigation land through a conservation easement deeded to a nonprofit conservation organization or public agency with a conservation mission, development and implementation of a mitigation land management plan to address long-term ecological sustainability and maintenance of the site for burrowing owls, and funding for the maintenance and management of mitigation land through the establishment of a long-term funding mechanism such as an endowment.

Desert kit fox (*Vulpes macrotis*)

The Project occurs within the range of desert kit fox, a protected species pursuant to Title 14 of the California Code of Regulations Section 460, which prohibits the take of the species at any time. CDFW recommends surveys, following CDFW-approved protocols, be conducted over all areas proposed to be directly or indirectly affected by the Project to determine presence/absence and numbers of desert kit fox, and that this information be included in the DEIR.

If desert kit fox is found, or have the potential to occupy the Project site, CDFW recommends the CPUC require species-specific mitigation to offset impacts and avoidance, minimization, and monitoring measures aimed at avoiding direct impacts to the desert kit fox be incorporated into the DEIR. Avoidance and minimization measures should include pre-activity surveys following CDFW-approved survey methods, including procedures used to classify identified dens as inactive dens, active and potentially active dens, and active natal dens, and methods utilized to quantify and locate single or paired animals that would need to be avoided or passively relocated, and the burrows or burrow complexes that would need to be collapsed to prevent re-occupancy. The measures should also include detailed monitoring requirements and methods of exclusion/passive relocation to be conducted, and methods and timing of den excavation.

American Badger (Taxidea taxus)

The Project occurs within the range of the American badger, a California species of special concern. CDFW recommends the CPUC complete surveys for American badger over the Project area proposed to be directly or indirectly affected by the Project and that the results of such surveys be included in the DEIR, along with avoidance, minimization, and mitigation measures, if appropriate.

If American badger are found, or have the potential to occupy the Project site, CDFW recommends the CPUC require species specific mitigation to offset impacts

and avoidance, minimization and monitoring measures aimed at avoiding direct impacts to American badger be incorporated into the DEIR. Avoidance and minimization measures should include pre-activity surveys following CDFW-approved survey methods, including procedures used to classify identified dens as inactive dens, active and potentially active dens, and active natal dens, and methods utilized to quantify and locate single or paired animals that would need to be avoided or passively relocated, and the burrows or burrow complexes that would need to be collapsed to prevent re-occupancy. The measures should also include detailed monitoring requirements and methods of exclusion/passive relocation to be conducted, and methods and timing of den excavation.

Ring-tailed cat (*Bassariscus astutus*)

The Project occurs within the range of the ring-tailed cat, a California species of special concern and fully protected species. CDFW recommends the CPUC complete surveys for ring-tailed cat over the Project area proposed to be directly or indirectly affected by the Project and that the results of such survey be included in the DEIR, along with measures to avoid all impacts to the species.

If ring-tailed cat are found, or has the potential to occupy the Project site, CDFW recommends the CPUC require species-specific mitigation to avoiding impacts to the ring-tailed cat be incorporated into the DEIR. Avoidance measures should include pre-activity surveys following CDFW-approved survey methods, including procedures used to classify identified dens as inactive dens, active and potentially active dens, and active natal dens, and methods utilized to quantify and locate single or paired animals that would need to be avoided.

Mohave ground squirrel (*Xerospermophilus mohavensis*)

The proposed Project occurs within the range of Mohave ground squirrel, as state listed threatened species. CDFW recommends that a qualified permitted biologist conduct protocol surveys for Mohave ground squirrel following the methods described in the “Mohave Ground Squirrel Survey Guidelines” (CDFG 2003) during the appropriate survey season prior to Project implementation, including any vegetation- or ground-disturbing activities. Results of the Mohave ground squirrel surveys should be submitted to CDFW and incorporated into the DEIR. Please note Mohave ground squirrel surveys are valid for one year and should be conducted within a year of start of ground-disturbing activities.

If Mohave ground squirrel are found within the Project area during surveys, CDFW recommends the CPUC require species-specific mitigation to offset impacts and avoidance, minimization, and monitoring measures aimed at avoiding direct impacts to the Mohave ground squirrel be incorporated into the DEIR.

If Mohave ground squirrel are found within the Project area during surveys or construction activities, and complete avoidance is not possible CDFW recommends

the Project proponent acquire a CESA ITP prior to any vegetation- or ground-disturbing activities. Any take of Mohave ground squirrel without take authorization would be a violation of Fish and Game Code section 2080. The DEIR should fully describe the impacts and mitigation measures, including compensatory mitigation sufficient to reduce impacts to less than significant.

Agassiz's Desert Tortoise (*Gopherus agassizii*)

The proposed Project occurs within the range of Agassiz's desert tortoise; a state and federally-listed threatened species. CDFW recommends complete protocol level surveys over all areas (i.e., 100 percent coverage) proposed to be directly or indirectly affected by the Project be conducted, using appropriately qualified biologists, following the USFWS Desert Tortoise Field Manual, accessible here: https://www.fws.gov/nevada/desert_tortoise/documents/field_manual/Desert-Tortoise-Field-Manual.pdf. To reduce the likelihood of nonconcurrence with proposed surveys, methodology, and qualifications of biologists, CDFW recommends working with the USFWS and CDFW concurrently to ensure a consistent and adequate approach to planning your work (USFWS, 2018).

CDFW recommends that biologists retained to complete desert tortoise protocol level surveys submit their qualifications to CDFW and the USFWS prior to initiation of surveys. Should the CPUC desire CDFW to pre-approve the qualifications of biologists conducting protocol level desert tortoise surveys, CDFW requests information by provided on the Desert Tortoise Authorized Biologist Qualifications Form (Section 3.2) of the USFWS Desert Tortoise Field Manual for all biologists participating in survey efforts to the following email address: Brandy.Wood@wildlife.ca.gov .

If desert tortoise are found within the Project area during surveys or construction activities, and complete avoidance is not possible CDFW recommends the Project proponent acquire a CESA ITP prior to any vegetation- or ground-disturbing activities. Any take of desert tortoise without take authorization would be a violation of Fish and Game Code section 2080. The DEIR should fully describe the impacts and mitigation measures, including compensatory mitigation sufficient to reduce impacts to less than significant.

4. A thorough, recent, floristic-based assessment of special status plants and natural communities, following CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (see https://www.wildlife.ca.gov/Conservation/Plants).

5. Information on the regional setting that is critical to an assessment of environmental impacts, with special emphasis on resources that are rare or unique to the region (CEQA Guidelines § 15125[c]).

6. A full accounting of all open space and mitigation/conservation lands within and adjacent to the Project.

Analysis of Direct, Indirect, and Cumulative Impacts to Biological Resources

1. The DEIR should provide a thorough discussion of the direct, indirect, and cumulative impacts expected to adversely affect biological resources as a result of the Project. To ensure that Project impacts to biological resources are fully analyzed, the following information should be included in the DEIR:

2. A discussion of potential impacts from lighting, noise, human activity, and wildlife-human interactions created by project activities adjacent to natural areas, exotic and/or invasive species, and drainage. The latter subject should address Project-related changes on drainage patterns and water quality within, upstream, and downstream of the Project site, including: volume, velocity, and frequency of existing and post-Project surface flows; polluted runoff; soil erosion and/or sedimentation in streams and water bodies; and post-Project fate of runoff from the Project site.

3. A discussion of potential indirect Project impacts on biological resources, including resources in areas adjacent to the Project footprint, such as nearby public lands (e.g. National Forests, BLM, etc.), open space, adjacent natural habitats, riparian ecosystems, wildlife corridors, and any designated and/or proposed reserve or mitigation lands (e.g., preserved lands associated with a Natural Community Conservation Plan, or other conserved lands).

Alternatives Analysis

CDFW recommends the DEIR describe and analyze a range of reasonable alternatives to the Project that are potentially feasible, would "feasibly attain most of the basic objectives of the Project," and would avoid or substantially lessen any of the Project's significant effects (CEQA Guidelines § 15126.6[a]). The alternatives analysis should also evaluate a "no project" alternative (CEQA Guidelines § 15126.6[e]).

Mitigation Measures for Project Impacts to Biological Resources

The DEIR should identify mitigation measures and alternatives that are appropriate and adequate to avoid or minimize potential impacts, to the extent feasible. The CPUC should assess all direct, indirect, and cumulative impacts that are expected to occur as a result of the implementation of the Project and its long-term operation and maintenance. When proposing measures to avoid, minimize, or mitigate impacts, CDFW recommends consideration of the following:

1. *Fully Protected Species*: Fully protected species may not be taken or possessed at any time. Project activities described in the DEIR should be designed to completely avoid any fully protected species that have the potential to be present within or adjacent to the Project area. CDFW also recommends that the DEIR fully analyze

potential adverse impacts to fully protected species due to habitat modification, loss of foraging habitat, and/or interruption of migratory and breeding behaviors. CDFW recommends that the Lead Agency include in the analysis how appropriate avoidance, minimization, and mitigation measures will reduce indirect impacts to fully protected species.

2. *Sensitive Plant Communities*: CDFW considers sensitive plant communities to be imperiled habitats having both local and regional significance. Plant communities, alliances, and associations with a statewide ranking of S-1, S-2, S-3, and S-4 should be considered sensitive and declining at the local and regional level. These ranks can be obtained by querying the CNDDB and are included in *The Manual of California Vegetation* (Sawyer et al. 2009). The DEIR should include measures to fully avoid and otherwise protect sensitive plant communities from project-related direct and indirect impacts.

3. *California Species of Special Concern* (CSSC): CSSC status applies to animals generally not listed under the federal Endangered Species Act or the CESA, but which nonetheless are declining at a rate that could result in listing, or historically occurred in low numbers and known threats to their persistence currently exist. CSSCs should be considered during the environmental review process. CSSC that have the potential or have been documented to occur within or adjacent to the Project area, including, but not limited to: snowy plover, burrowing owl, redhead, American white pelican, northern harrier, black tern, black swift, Vaux's swift, olive-sided flycatcher, vermillion flycatcher, loggerhead shrike, yellow warbler, yellow-breasted chat, yellow-headed blackbird. For significant nesting populations, such as the snowy plover, lake wide annual monitoring during the nesting season for the period of construction and for a few years following the end of construction is recommended.

4. *Mitigation*: CDFW considers adverse Project-related impacts to sensitive species and habitats to be significant to both local and regional ecosystems, and the DEIR should include mitigation measures for adverse Project-related impacts to these resources. Mitigation measures should emphasize avoidance and reduction of Project impacts. For unavoidable impacts, onsite habitat restoration and/or enhancement, and preservation should be evaluated and discussed in detail. Where habitat preservation is not available onsite, offsite land acquisition, management, and preservation should be evaluated and discussed in detail.

5. The DEIR should include measures to perpetually protect the targeted habitat values within mitigation areas from direct and indirect adverse impacts in order to meet mitigation objectives to offset Project-induced qualitative and quantitative losses of biological values. Specific issues that should be addressed include restrictions on access, proposed land dedications, long-term monitoring and management programs, control of illegal dumping, water pollution, increased human intrusion, etc.

6. If sensitive species and/or their habitat may be impacted from the Project, CDFW recommends the inclusion of specific mitigation in the DEIR. CEQA Guidelines section 15126.4, subdivision (a)(1)(8) states that formulation of feasible mitigation measures should not be deferred until some future date. The Court of Appeal in *San Joaquin Raptor Rescue Center* v. *County* of *Merced* (2007) 149 Cal.App.4th 645 struck down mitigation measures which required formulating management plans developed in consultation with State and Federal wildlife agencies after Project approval. Courts have also repeatedly not supported conclusions that impacts are mitigable when essential studies, and therefore impact assessments, are incomplete *(Sundstrom* v. *County* of *Mendocino* (1988) 202 Cal. App. 3d. 296; *Gentry* v. *City* of *Murrieta (1995)* 36 Cal. App. 4th 1359; *Endangered Habitat League, Inc.* v. *County* of *Orange* (2005) 131 Cal. App. 4th 777).

7. CDFW recommends that the DEIR specify mitigation that is roughly proportional to the level of impacts, in accordance with the provisions of CEQA (CEQA Guidelines, §§ 15126.4(a)(4)(B), 15064, 15065, and 16355). The mitigation should provide long-term conservation value for the suite of species and habitat being impacted by the Project. Furthermore, in order for mitigation measures to be effective, they need to be specific, enforceable, and feasible actions that will improve environmental conditions.

8. *Habitat Revegetation/Restoration Plans*: Plans for restoration and revegetation should be prepared by persons with expertise in southern California ecosystems and native plant restoration techniques. Plans should identify the assumptions used to develop the proposed restoration strategy. Each plan should include, at a minimum: (a) the location of restoration sites and assessment of appropriate reference sites; (b) the plant species to be used, sources of local propagules, container sizes, and seeding rates; (c) a schematic depicting the mitigation area; (d) a local seed and cuttings and planting schedule; (e) a description of the irrigation methodology; (f) measures to control exotic vegetation on site; (g) specific success criteria; (h) a detailed monitoring program; (i) contingency measures should the success criteria not be met; and (j) identification of the party responsible for meeting the success criteria and providing for conservation of the mitigation site in perpetuity. Monitoring of restoration areas should extend across a sufficient time frame to ensure that the new habitat is established, self-sustaining, and capable of surviving drought.

9. CDFW recommends that local onsite propagules from the Project area and nearby vicinity be collected and used for restoration purposes. Onsite seed collection should be initiated in the near future in order to accumulate sufficient propagule material for subsequent use in future years. Onsite vegetation mapping at the alliance and/or association level should be used to develop appropriate restoration goals and local plant palettes. Reference areas should be identified to help guide restoration efforts. Specific restoration plans should be developed for various project components as appropriate.

10. Restoration objectives should include protecting special habitat elements or re-creating them in areas affected by the Project; examples could include retention of woody material, logs, snags, rocks, and brush piles.

11. *Nesting Birds and Migratory Bird Treaty Act:* Please note that it is the Project proponent's responsibility to comply with all applicable laws related to nesting birds and birds of prey. Fish and Game Code sections 3503, 3503.5, and 3513 afford protective measures as follows: Fish and Game Code section 3503 makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by Fish and Game Code or any regulation made pursuant thereto. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by Fish and Game Code or any regulation adopted pursuant thereto. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by the rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.).

12. CDFW recommends that the DEIR include the results of avian surveys, as well as specific avoidance and minimization measures to ensure that impacts to nesting birds do not occur. Project-specific avoidance and minimization measures may include, but not be limited to: Project phasing and timing, monitoring of Project-related noise (where applicable), sound walls, and buffers, where appropriate. The DEIR should also include specific avoidance and minimization measures that will be implemented should a nest be located within the project site. If pre-construction surveys are proposed in the DEIR, the CDFW recommends that they be required no more than three (3) days prior to vegetation clearing or ground disturbance activities, as instances of nesting could be missed if surveys are conducted sooner.

13. *Moving out of Harm's Way:* To avoid direct mortality, CDFW recommends that the lead agency condition the DEIR to require that a CDFW-approved qualified biologist be retained to be onsite prior to and during all ground- and habitat-disturbing activities to move out of harm's way special status species or other wildlife of low or limited mobility that would otherwise be injured or killed from Project-related activities. Movement of wildlife out of harm's way should be limited to only those individuals that would otherwise by injured or killed, and individuals should be moved only as far a necessary to ensure their safety (i.e., CDFW does not recommend relocation to other areas). Furthermore, it should be noted that the temporary relocation of onsite wildlife does not constitute effective mitigation for the purposes of offsetting Project impacts associated with habitat loss.

    Moving or take of any CESA-listed species is prohibited except as authorized by state law (Fish and Game Code, §§ 2080 & 2085). Consequently, if a project, including project construction or any project-related activity during the life of the project, has the potential to result in take of CESA-listed species, CDFW

recommends that Permittee seek appropriate authorization prior to project implementation. This may include an ITP or a consistency determination (Fish and Game Code, §§ 2080.1 & 2081).

14. *Translocation of Species*: CDFW generally does not support the use of relocation, salvage, and/or transplantation as mitigation for impacts to rare, threatened, or endangered species as studies have shown that these efforts are experimental in nature and largely unsuccessful.

California Endangered Species Act

CDFW is responsible for ensuring appropriate conservation of fish and wildlife resources including threatened, endangered, and/or candidate plant and animal species, pursuant to CESA. CDFW recommends that a CESA ITP be obtained if the Project has the potential to result in "take" (California Fish and Game Code Section 86 defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill") of State-listed CESA species, either through construction or over the life of the Project. CESA ITPs are issued to conserve, protect, enhance, and restore State-listed CESA species and their habitats.

CDFW encourages early consultation, as significant modification to the proposed Project and avoidance, minimization, and mitigation measures may be necessary to obtain a CESA ITP. The California Fish and Game Code requires that CDFW comply with CEQA for issuance of a CESA ITP. CDFW therefore recommends that the DEIR addresses all Project impacts to listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of CESA.

Based on review of CNDDB, and/or knowledge of the Project site/vicinity/general area, CDFW is aware that the following CESA-listed species have the potential to occur onsite/have previously been reported onsite: Desert tortoise (*Gopherus agassizii*), Mojave ground squirrel (*Xerospermophilus mohavensis*) and western Joshua tree (*Yucca brevifolia*).

Lake and Streambed Alteration Program

Based on review of material submitted with the NOP and review of aerial photography many drainage features traverse the site. Depending on how the Project is designed and constructed, it is likely that the Project applicant will need to notify CDFW per Fish and Game Code section 1602. Fish and Game Code section 1602 requires an entity to notify CDFW prior to commencing any activity that may do one or more of the following: Substantially divert or obstruct the natural flow of any river, stream or lake; Substantially change or use any material from the bed, channel or bank of any river, stream, or lake; or Deposit debris, waste or other materials that could pass into any river, stream or lake. Please note that "any river, stream or lake" includes those that are episodic (i.e., those that are dry for periods of time) as well as those that are perennial (i.e., those that flow year-round). This includes ephemeral streams, desert washes, and watercourses with a

subsurface flow. It may also apply to work undertaken within the flood plain of a body of water.

Upon receipt of a complete notification, CDFW determines if the proposed Project activities may substantially adversely affect existing fish and wildlife resources and whether a Lake and Streambed Alteration (LSA) Agreement is required. An LSA Agreement includes measures necessary to protect existing fish and wildlife resources. CDFW may suggest ways to modify your Project that would eliminate or reduce harmful impacts to fish and wildlife resources.

CDFW's issuance of an LSA Agreement is a "project" subject to CEQA (see Pub. Resources Code 21065). To facilitate issuance of an LSA Agreement, if necessary, the DEIR should fully identify the potential impacts to the lake, stream, or riparian resources, and provide adequate avoidance, mitigation, and monitoring and reporting commitments. Early consultation with CDFW is recommended since modification of the proposed Project may be required to avoid or reduce impacts to fish and wildlife resources. To obtain a Lake or Streambed Alteration notification package, please go to https://www.wildlife.ca.gov/Conservation/LSA/Forms.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations. (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). Information can be submitted online or via completion of the CNDDB field survey form at the following link: https://wildlife.ca.gov/Data/CNDDB/Submitting-Data. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

FILING FEES

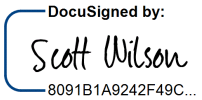
The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.).

CONCLUSION

CDFW appreciates the opportunity to comment on the NOP of a DEIR for the Ivanpah Control Project (SCH No. 2020080553) and recommends that the CPUC

address the CDFW's comments and concerns in the forthcoming DEIR. If you should have any questions pertaining to the comments provided in this letter, please contact Brandy Wood, Senior Environmental Scientist, Specialist, at (909) 483-6319 or at Brandy.Wood@wildlife.ca.gov.

Sincerely,



Scott Wilson
Environmental Program Manager

REFERENCES

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. A manual of California Vegetation, 2nd ed. California Native Plant Society Press, Sacramento, California. http://vegetation.cnps.org/

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SAN BERNARDINO COUNTY

Department of Public Works
- Flood Control
- Operations
- Solid Waste Management
- Special Districts
- Surveyor
- Transportation

Luther Snoke
Interim Director

Brendon Biggs, M.S., P.E.
Assistant Director

September 29, 2020

Transmitted Via Email
File: 10(ENV)-4.01

John Forsythe (CPUC Project Manager)
California Public Utilities Commission
c/o Aspen Environmental Group
235 Montgomery Street, Suite 640
San Francisco, CA 94104-2920
Email: lvanpah-Control@aspeneg.com

RE: CEQA – NOTICE OF PREPARATION FOR AN ENVIRONMENTAL IMPACT REPORT FOR THE IVANPAH-CONTROL PROJECT

Dear Mr. Forsythe:

Thank you for allowing the San Bernardino County Department of Public Works the opportunity to comment on the above-referenced project. **We received this request on September 2, 2020** and pursuant to our review, we have the following comments.

Flood Control Planning/Water Resources Division (Michael Fam, Chief, 909-387-8120):

The Planning Division has the following comment at this time:

1. The proposed Project crosses San Bernardino County Flood Control District (SBCFCD) facilities and right-of-way for Mojave River (4-101) at the following locations based on the maps provided:

   a. Segment 3S; Sheet 6, PM 25-26
   b. Segment 3N; (SBCFCD easement); Sheet 8, MP 43.
   c. Segment 4 (SBCFCD easement); Sheet 1, MP 1.

Also, the project is adjacent to the following facilities:

   d. Sheet Segment 4; Sheet 5-6: MP Baker 5-6: Yermo Channel (4-701-lC).
   e. Sheet 10, MP 55-56, Baker Levee (4-802-5a)

Be advised that any encroachments on the SBCFCD's facilities or right-of-way including but not limited to pole replacements, new conductor installation, and access will require a permit from the SBCFCD prior to the start of the project. The necessity for any permits, and any impacts associated with them, should be addressed in the EIR prior to adoption and certification.

A portion of the Segment 3S extension is part of the Barstow Master Plan of Drainage (MPD).

2. According to the most recent FEMA Flood Insurance Rate Map, Panels 06071C1375H, 1400H, 1800H, 1825H, 1850H, 1875H, 2025H, 2325H, 2350H, 2600H, 2875H, 2900H, 3200H, 3400H, 3425H, 3450H, 3475H, 3825H, 3850H, 3875H, 3895H, 3900H, 3905H, 3910H, 3930H, 3937H, 3941H, 3942H, 3944H, 3975H, 4000H, 4025H, 4527H, 4531 H, 4532H, 4551 H, 4552H, 4556H, 4557H, 4600H, dated August 28, 2008; and 3915J, dated September 2, 2016; the Project lies within Zones A, D, and X-unshaded. The EIR needs to discuss this potential impact and discuss how the project will comply with FEMA regulations. Any impacts and mitigation necessary to comply with FEMA regulations should be discussed within the EIR prior to the document being adopted.

We respectfully request to be included on the circulation list for all project notices, public reviews, or public hearings. In closing, I would like to thank you again for allowing the San Bernardino County Department of Public Works the opportunity to comment on the above-referenced project. Should you have any questions or need additional clarification, please contact the individuals who provided the specific comment, as listed above.

Sincerely,

Michael Perry

MICHAEL R. PERRY
Supervising Planner
Environmental Management

MP:AG:nl

United States Department of the Interior

NATIONAL PARK SERVICE
Manzanar National Historic Site
P.O. Box 426
Independence, CA 93526-0426

IN REPLY REFER TO:

1.B. (MANZ)

September 29, 2020

John Forsythe, Environmental Project Manager
California Public Utilities Commission
c/o Aspen Environmental Group
235 Montgomery Street, Ste 640
San Francisco, CA 94104

Dear Mr. Forsythe:

Manzanar National Historic Site ("Manzanar") appreciates the opportunity to provide scoping comments on the proposed Ivanpah-Control project.

As we discussed in our September 14th meeting, the boundary of Manzanar is located approximately a mile away from the proposed project. The National Park Service manages this property for the long-term preservation of nationally significant cultural resources as well as to provide for the protection of these lands in the remote area of eastern California. Since 2015, annual site visitation has trended upwards with an average of over 103,000 people, generating over $12 million of local economic activity and supporting 129 jobs. Visitors come from around the world to learn about the experiences of the 11,070 individuals incarcerated at Manzanar during World War II (WWII). A visit provides a virtually unchanged landscape with its sparsely populated small rural and remote communities. Once here, individuals are invited to consider not only the living conditions of those incarcerated but most importantly our U.S. Constitution and the protections it promises at a place where (not too long ago) they were largely ignored.

We recognize the important role of upgrading the existing historic electrical transmission line east of the site. These comments are offered as potential mitigation to ensure the continued preservation and stewardship of the site and its associated historic resources, as well as reducing the impacts to visual resources of the surrounding landscape.

Aesthetics

Environmental setting is an important component to the overall experience for

visitors and for individuals that were incarcerated at Manzanar. In 1985, Manzanar was designated a National Historic Landscape. The setting is an extraordinary area that has been spared the impacts of residential and commercial development. The area provides a unique place where the landscape remains mostly unchanged since the early 1900s resulting in the incidental preservation of the wide-open spaces that existed in the 1940s.

Concern: The viewshed at Manzanar is well preserved and a significant theme for the site as identified in Manzanar's Foundation Document (2016): ***"****Landscape and Scenery: Located in the Owens Valley between the towering Sierra Nevada and Inyo Mountains, the dramatic landscape surrounding Manzanar is remarkably unspoiled****. As a result, it powerfully communicates the visual and environmental conditions experienced by Japanese Americans imprisoned at Manzanar during World War II."***

The existing transmission line consists of lattice towers approximately 70 feet tall. These towers blend into the background and are part of the historic viewshed. We understand the poles proposed for SCE's Ivanpah Control TLRR project to be Tubular Steel Poles and Laminated Wood System Mono Poles ranging in height from 88 to 125 feet, and increase of up to 55 feet from the existing towers. The increase in height and the changes in tower structure and materials will combine to increase visual impacts.

Recommendation:
We recommend that the environmental analysis follow the Inyo County Renewable Energy General Plan Amendment which encourages siting, orientation and screening to avoid, minimize or mitigate significant changes to the visual environment. NPS recommends using lattice towers where possible to minimize the changes to the visual environment in the areas within three miles of Manzanar (North and South). In cases where the proposal removes existing lattice towers, if new lattice structures cannot be installed, we recommend no more than five mono pole structures per mile, painted to blend into the landscape and reduce glare. The environmental impacts analysis will need additional visual simulations to determine adequacy of minimal impact to the existing viewshed, including the Manzanar Cemetery and associated historic resources such as the Manzanar Reservoir. We recommend no changes to the lattice towers in the immediate vicinity of the historic sewage treatment plant. Additionally, the historic transmission line and sewage treatment plant could be interpreted on-site with professionally designed panels. Site restoration at the location of the sewage treatment plan could mitigate impacts from the project.

<u>Recreation/Visitation</u>

Concern:
1. Visitor Traffic Conflict - The Site's peak season is from April to October and

monthly visitation ranges from 12,000 – 13,000 during peak months. All visitors traveling to the site use Highway 395. Heavy construction traffic would impact traffic safety on the highway at the site's two entry/exits to Highway 395.

Recommendation: Coordinate with NPS to schedule work in this area during lower traffic use periods, and to ensure that visitors can safely access the site when traffic flow is temporarily diverted or changed.

Concern:

2. Contractor Material Yard - The Manzanar Airfield (an associated historic resource) is located immediately adjacent to Highway 395 east of the site's north entrance. In response to a briefing we provided to Southern California Edison (SCE) and the Bureau of Land Management (BLM) in May, we were told the contractor material yard would be relocated to minimize impacts. Nonetheless, materials recently provided to NPS (September 2020) include the original location for materials storage/laydown. In a May 26, 2020 email from SCE Senior Advisor, Shannon Stewart, confirmed elimination of this use based on the briefing as follows:

> "*SCE appreciates the discussion this week regarding the Manzanar National Historic Site and National Historic Landmark and follow-up providing data layers for the Old Spanish National Historic Trail. We wanted to inform you that Warnetta and her team were able to meet and discuss the laydown yard in proximity to the Manzanar Site that you expressed concerns about. SCE has determined that it is feasible to remove that laydown yard from the project scope entirely. For the purposes of your comments on the Plan of Development, you can assume that the laydown yard will not be carried forward as an element of the project.*"

Recommendation: Eliminate or relocate the material storage area from the Manzanar Airfield to a different area. Update project files to reflect the decision confirmed by Shannon Stewart on May 26, 2020. Suspend use of heavy equipment and/or helicopter during the last week of April to avoid conflicts with the annual Manzanar Pilgrimage.

<u>Cultural Resources:</u>

As stated above, the site was established to preserve the site of incarceration during WWII, but in addition, we also preserve several layers of history including the former Town of Manzanar and Indigenous use associated with the area.

Concern: Many prehistoric and historic resources exist adjacent to SCE's transmission line. There is a high potential for adverse impact to these resources from

construction on the transmission line. Manzanar is one of the most intact examples of the ten US WWII incarceration centers; further disturbance will compromise its historical integrity by impacting important contributing features and associated resources like the sewage treatment plant, historic town resources, and pre-historic sites.

Recommendation: Avoid ground disturbance in areas where cultural resources exist. If avoidance is not possible, we recommend off-site mitigation consisting of amending the National Register Nomination for the Relocation Center to include **all** cultural resources in the original WWII boundary of the camp and completing a National Register Nomination for the Town of Manzanar.

Air Quality

Air quality is an important component of the overall visitor experience at the park.

Concern: Surface soils at the site are highly erodible. During construction of the project, the mitigation measures must control fugitive dust.

Recommendation: The NPS recommends that the project include a clearly defined plan for air quality monitoring at the site boundary throughout construction, including a responsible party and funding source for the monitoring, and also include an adaptive management plan for fugitive dust. A temporary air quality station can be located at Manzanar to ensure that PM10 and PM2.5 are not elevated and unhealthy for visitors and employees.

Thank you for the opportunity to comment. If you have any questions or comments, please contact me at 760-876-2194 or bernadette_johnson@nps.gov.

Sincerely,

Bernadette Johnson

Bernadette Johnson
Superintendent

DESERT TORTOISE COUNCIL
4654 East Avenue S #257B
Palmdale, California 93552
www.deserttortoise.org
eac@deserttortoise.org

Via email only

30 September 2020

John Forsythe (CPUC Project Manager)
California Public Utilities Commission
c/o Aspen Environmental Group
235 Montgomery Street, Suite 640
San Francisco, CA 94104-2920
Ivanpah-Control@aspeneg.com

RE: Notice of Preparation for an Environmental Impact Report (EIR) for the Ivanpah-Control Project Proposed by Southern California Edison Application No. 19-07-015

Dear Mr. Forsythe,

The Desert Tortoise Council (Council) is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of desert tortoise species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council routinely provides information and other forms of assistance to individuals, organizations, and regulatory agencies on matters potentially affecting desert tortoises within their geographic ranges.

We appreciate this opportunity to provide comments on the above-referenced project. Given the location of the proposed project in habitats likely occupied by Mojave desert tortoise (*Gopherus agassizii*) (synonymous with "Agassiz's desert tortoise"), our comments pertain to enhancing protection of this species during activities authorized by the California Public Utilities Commission (CPUC). Please accept, carefully review, and include in the relevant project file the Council's following scoping comments and attachments for the proposed project. Additionally, we ask that you respond in an email that you have received this comment letter so we can be sure our concerns have been registered with the appropriate personnel and office for this project.

On September 1, 2020, the Council received the Notice of Preparation (NOP) directly from the Ivanpah-Control Project EIR Team, which we sincerely appreciate. All references to page numbers in this letter pertain to the NOP, which is dated "September 2020." Page 1 indicates Southern California Edison Company (SCE) has filed an application for a Permit to Construct (PTC) with the CPUC for its proposed Ivanpah-Control Project (Project), which is a 115 kilovolt (kV) transmission line rebuild project. Since SCE's application and the Proponent's Environmental Assessment (PEA) were not deemed complete by CPUC (page 1), there are no formal environmental documents to review; rather, scoping comments are being solicited by the NOP.

As given on page 2, the Bureau of Land Management (BLM) will be the lead agency under the National Environmental Policy Act (NEPA), and will prepare an Environmental Impact Statement (EIS). The BLM will observe the CPUC's scoping meetings and will hold its own public scoping meetings in the future, after issuing a Notice of Intent (NOI) to prepare an EIS in the Federal Register. At the appropriate time, these same scoping comments, with pertinent revisions pending additional project information that may become available, will also be provided to the BLM.

The Council is very interested in this project, as it passes through desert tortoise critical habitat (U.S. Fish and Wildlife Service 1994) in several places. As such, we attended the virtual public scoping meeting held via Zoom on September 10, 2020. As per page 2, "SCE is proposing to rebuild components of its existing 115 kilovolt (kV) transmission lines that extend over 358 miles between the existing SCE Control and Haiwee Substations in Inyo County, the Inyokern Substation in Kern County, and the Kramer, Tortilla, Coolwater, and Ivanpah Substations in San Bernardino County, CA. The Proposed Project is located on private land, Department of Defense land, and on federal lands administered by the BLM. The Project includes re-tensioning powerlines to reduce the sag between towers; [and] installing taller poles to increase the clearance between powerlines and ground, replacing individual poles, and derating a line segment."

With regards to the following statement on page 3, "The CPUC will review SCE's conductor selection as it relates to structure height requirements and *structure spacing (span lengths)* because these factors *may have associated* visual impacts or *construction disturbance*," [*emphasis added*] we interpret this statement to mean that SCE may choose to construct new pad sites if existing spans are determined to be inadequate. We ask that in choosing such sites, insofar as engineering allows, that barren areas and other degraded habitats, as determine with input from knowledgeable biologist(s), be selected to minimize impacts to tortoises and other rare desert plants and animals.

The NOP fails to reveal if replacement, removal, and installation of new and old structures are restricted to aboveground facilities, like conductors, or if they will involve transmission poles and towers that will result in ground disturbance. For example, if the "905 new structures" identified on page 3 and in the next paragraph for Segment 1 pertain to towers, there may be considerable habitat disturbance. We expect that the estimated acreages of both temporary and permanent impacts to desert tortoise habitats, both of which are long-term impacts, will be documented in the EIR, and ask that the results also be reported in terms of their locations inside and outside tortoise critical habitat areas.

We note on page 3 for Segment 1: Control Substation (Bishop) to Inyokern, that "SCE would install approximately 905 new structures and new ACCC conductor[s] in a new right-of-way adjacent to the existing line, then remove all (approximately 1,161) existing subtransmission structures." Be advised that desert tortoises occur between Rose Valley, in the vicinity of Coso Junction south of Olancha, south to Inyokern. Throughout this area, we advise that previously disturbed areas be identified for new structures, particularly if "new structures" include new transmission towers, which is not clear from the description. It is also not clear from the description that "adjacent" will require that the new line would be on the same side of Highway 395 as the old line. In any case, we advocate the completion of U.S. Fish and Wildlife (USFWS 2019) protocol surveys for desert tortoises to help inform SCE of the best places to place new structures that would result in ground disturbance and avoid tortoises and tortoise habitats.

Similarly, all areas south of Olancha including Segments 1, 2, and the western portions of Segments 3S and 3N (west of Barstow) are in habitats that may be occupied by Mohave ground squirrels (*Xerospermophilus mohavensis*; herein "MGS"), which is listed as Threatened by the California Fish and Game Commission. We recommend that protocol trapping surveys for MGS [California Department of Fish and Game (2003; revised 2010)] be performed in all areas where ground disturbance would result in the loss of suitable habitats. Be advised that there are seasonal restrictions for these surveys, which must occur between March and mid-July of a given year; and, that results of these surveys are viable for only one year following completion of trapping surveys (e.g., if the project is not completed by July of the next year after trapping, a new trapping effort will likely be required). Alternatively, SCE may assume presence of MGS and secure a Section 2081 incidental take permit from the California Department of Fish and Wildlife (CDFW) prior to ground disturbance.

We note that work on Segments 1 and 2 would entail installation of new fiber optic cables, but there is no indication if these cables would replace existing lines. If these new cables are not replacing existing cables, we strongly recommend that they either be placed within existing roads or immediately adjacent so that as little new habitat as possible is impacted or lost to this Project. Even if SCE is replacing existing lines, we expect that knowledgeable biologist(s) will perform measurements both before and after the project to determine how many acres of tortoise and MGS habitats are temporarily and permanently lost. These data will allow SCE and the regulatory agencies to determine the levels of habitat compensation that are likely to be required by CDFW and BLM for damage to suitable habitats for these covered species.

Please be sure that acreages associated with Staging Yards and Work Areas identified on page 4 are calculated and reported in the EIR. For an accurate appraisal of these acreages, we feel it is important that each pole site, which will generate a Work Area between ¼ and ¾ acres, must be evaluated in terms of existing disturbances so that new disturbances can be calculated. Unlike pole sites that are fixed locations, there is more flexibility in determining locations of Staging Yards. We expect that all Staging Yards can occur in areas of existing disturbances (preferably barren areas), and ask that SCE commit to locating all yards in disturbed areas, with input from knowledgeable biologist(s) to determine those locations.

We note also that SCE plans to use 426 linear miles of existing roads and spur roads, and that "During road rehabilitation and preparation of staging areas, vegetation would be trimmed or removed, as needed." As given above, we expect that the EIR will identify measures that will require before and after measurements of the widths of roads that are to be improved. The difference between these measurements will allow SCE to determine how many acres of suitable tortoise and MGS habitats are lost, which can then be used by the agencies to determine appropriate habitat compensation. In the same paragraph, we appreciate that, "Tree removal would be minimized," and ask that a similar requirement be identified in the EIR that will be applied to the loss of all intact habitats, which should similarly be minimized.

As stated on page 5, we appreciate that CPUC "…will also include analysis of additional issues identified in the scoping process…" in the EIR. Certainly, one of these additional issues is the potential creation of new nesting substrates for common ravens (*Corvus corax*), which is a known predator of desert tortoises and MGS. As such, we ask that the EIR provide a summary of recent and ongoing efforts by SCE to curtail subsidizing common raven nesting on its structures. Replacing old towers with new and different towers would afford an excellent opportunity to install towers that reduce perching opportunities for ravens. We suggest exploring designs that achieve this goal.

Other questions that should be addressed in the EIR include: Is SCE contributing to the National Fish and Wildlife Foundation's Raven Management Fund for regional and cumulative impacts? Is there an existing raven management plan or a new one to be drafted for this project that meets USFWS (2010) standards as they affect construction, operation, maintenance, and decommissioning (including restoration) with monitoring and adaptive management during each project phase? For those poles that are being replaced, will new poles have design features that minimize raven nesting potential?

In this same paragraph on page 5, CPUC indicates that the EIR "…will evaluate the project's cumulative impacts (project impacts combined with other present and planned projects in the area)." In that regard, we recommend that the cumulative impacts analysis in the EIR also follow the Council on Environmental Quality (CEQ) (1997) guidance on how to analyze cumulative environmental consequences, which contains the eight principles listed below:

1. Cumulative effects are caused by the aggregate of past, present, and reasonable future actions.
The effects of a proposed action on a given resource, ecosystem, and human community, include the present and future effects added to the effects that have taken place in the past. Such cumulative effects must also be added to the effects (past, present, and future) caused by all other actions that affect the same resource.

2. Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem, and human community of all actions taken, no matter who (federal, non-federal, or private) has taken the actions.
Individual effects from disparate activities may add up or interact to cause additional effects not apparent when looking at the individual effect at one time. The additional effects contributed by actions unrelated to the proposed action must be included in the analysis of cumulative effects.

3. Cumulative effects need to be analyzed in terms of the specific resource, ecosystem, and human community being affected.
Environmental effects are often evaluated from the perspective of the proposed action. Analyzing cumulative effects requires focusing on the resources, ecosystem, and human community that may be affected and developing an adequate understanding of how the resources are susceptible to effects.

4. It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.
For cumulative effects analysis to help the decision maker and inform interested parties, it must be limited through scoping to effects that can be evaluated meaningfully. The boundaries for evaluating cumulative effects should be expanded to the point at which the resource is no longer affected significantly or the effects are no longer of interest to the affected parties.

5. Cumulative effects on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries.
Resources are typically demarcated according to agency responsibilities, county lines, grazing allotments, or other administrative boundaries. Because natural and sociocultural resources are not usually so aligned, each political entity actually manages only a piece of the affected resource or ecosystem. Cumulative effects analysis on natural systems must use natural ecological boundaries and analysis of human communities must use actual sociocultural boundaries to ensure including all effects.

6. Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects.
Repeated actions may cause effects to build up through simple addition (more and more of the same type of effect), and the same or different actions may produce effects that interact to produce cumulative effects greater than the sum of the effects.

7. Cumulative effects may last for many years beyond the life of the action that caused the effects.
Some actions cause damage lasting far longer than the life of the action itself (e.g., acid mine damage, radioactive waste contamination, species extinctions). Cumulative effects analysis need to apply the best science and forecasting techniques to assess potential catastrophic consequences in the future.

8. Each affected resource, ecosystem, and human community must be analyzed in terms of its capacity to accommodate additional effects, based on its own time and space parameters.
Analysts tend to think in terms of how the resource, ecosystem, and human community will be modified given the action's development needs. The most effective cumulative effects analysis focuses on what is needed to ensure long-term productivity or sustainability of the resource.

It is unfortunate that the 30 applicant-proposed mitigation measures referenced on page 5 are not included in the NOP. When they are presented in the EIR, we ask that CPUC indicates how, if any, existing measures have been modified for this particular project, and document their effectiveness for similar projects (e.g., how effective has SCE's raven management program been in curtailing raven nesting in its transmission structures?)

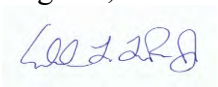
There should also be a review of recent Stipulations for right-of-way grants issued by the BLM and Terms and Conditions in biological opinions issued by the USFWS to ensure that the latest protective measures are being implemented. We expect that CPUC will commit to the latest standards identified in the USFWS' (2009) Desert Tortoise (Mojave Population) Field Manual with regards to surveys, fencing, and other applicable activities. Also, we provide proposed Best Management Practices for tortoise protection during construction projects (Desert Tortoise Council 2017) for your consideration and use to supplement the 30 applicant-proposed mitigation measures, as needed.

Even if conscientiously implemented, there is the likelihood that desert tortoises and/or MGS will be adversely affected by the proposed project. In fact, Section C of the NOP on page 5 states that "The Proposed Project may result in potentially significant impacts," which we assume includes listed species. We therefore ask that the EIR document existing state and federal incidental take permits, likely issued to SCE, that will authorize foreseeable harm or mortality of listed species, including desert tortoise and MGS. Absent such programmatic permits, we expect that CPUC and/or SCE will acquire necessary state and federal take permits from CDFW and USFWS, respectively, prior to ground disturbance, and that the EIR will document the statuses of such permits.

We expect that SCE will need to rehabilitate habitats that are temporarily used resulting in long-term damage by the use of Staging Yards and Work Areas identified on page 4. As such, we submit the attached restoration guidelines (Abella and Berry 2016) for use by SCE and CPUC for this and future projects where habitats would be restored to pre-project conditions.

We appreciate this opportunity to provide input and trust that our comments will help protect tortoises during any authorized project activities. Herein, we ask that the Desert Tortoise Council be identified as an Affected Interest for this and all other CPUC projects that may affect species of desert tortoises, and that any subsequent environmental documentation for this particular project is provided to us at the contact information listed above. We also ask that you acknowledge receipt of this letter as soon as possible so we can be sure our concerns have been received by the appropriate parties.

Regards,



Edward L. LaRue, Jr., M.S.
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Issues and Perspectives

Enhancing and Restoring Habitat for the Desert Tortoise *Gopherus agassizii*

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Abstract

Habitat has changed unfavorably during the past 150 y for the desert tortoise *Gopherus agassizii,* a federally threatened species with declining populations in the Mojave Desert and western Sonoran Desert. To support recovery efforts, we synthesized published information on relationships of desert tortoises with three habitat features (cover sites, forage, and soil) and candidate management practices for improving these features for tortoises. In addition to their role in soil health and facilitating recruitment of annual forage plants, shrubs are used by desert tortoises for cover and as sites for burrows. Outplanting greenhouse-grown seedlings, protected from herbivory, has successfully restored (>50% survival) a variety of shrubs on disturbed desert soils. Additionally, salvaging and reapplying topsoil using effective techniques is among the more ecologically beneficial ways to initiate plant recovery after severe disturbance. Through differences in biochemical composition and digestibility, some plant species provide better-quality forage than others. Desert tortoises selectively forage on particular annual and herbaceous perennial species (e.g., legumes), and forage selection shifts during the year as different plants grow or mature. Nonnative grasses provide low-quality forage and contribute fuel to spreading wildfires, which damage or kill shrubs that tortoises use for cover. Maintaining a diverse "menu" of native annual forbs and decreasing nonnative grasses are priorities for restoring most desert tortoise habitats. Reducing herbivory by nonnative animals, carefully timing herbicide applications, and strategically augmenting annual forage plants via seeding show promise for improving tortoise forage quality. Roads, another disturbance, negatively affect habitat in numerous ways (e.g., compacting soil, altering hydrology). Techniques such as recontouring road berms to reestablish drainage patterns, vertical mulching ("planting" dead plant material), and creating barriers to prevent trespasses can assist natural recovery on decommissioned backcountry roads. Most habitat enhancement efforts to date have focused on only one factor at a time (e.g., providing fencing) and have not included proactive restoration activities (e.g., planting native species on disturbed soils). A research and management priority in recovering desert tortoise habitats is implementing an integrated set of restorative habitat enhancements (e.g., reducing nonnative plants, improving forage quality, augmenting native perennial plants, and ameliorating altered hydrology) and monitoring short- and long-term indicators of habitat condition and the responses of desert tortoises to habitat restoration.

Keywords: annual plants; burrow; disturbance; forage; grazing; restoration; revegetation

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Introduction

Habitat of the desert tortoise *Gopherus agassizii* in the Mojave and bordering western Sonoran Desert in the southwestern United States has changed during the past 150 y. Beginning in earnest during the mid-1800s, thousands of nonnative animals (mainly cattle, sheep, horses, and burros) were moved through or kept in the region to support mining, ranching, and other human activities (Love 1916; Hohman and Ohmart 1978; Lovich and Bainbridge 1999). Numerous trails and roads, such as the Old Spanish Trail and the Mojave Road, originated or expanded from the 1800s through the 1900s (Keith et al. 2008). For example, within 6,000 km^2 of the central Mojave Desert, a road network of 605 km in 1885 expanded to 3,700 km by 1994 (Vogel and Hughson 2009). By the late 1800s, nonnative plant species were introduced that ubiquitously altered the composition of plant communities (Brooks and Esque 2002). In an inventory conducted from 2009 to 2011, at least one nonnative plant species inhabited 82% of 1,662 sites within 25,000 km^2 of national parks in the Mojave Desert (Abella et al. 2015c). In designated critical habitat for the desert tortoise in the western Mojave Desert, nonnative annual plants comprised 6% of the flora and 66% of the biomass in a wet year, and 27% of the flora and 91% of the biomass in a dry year (Brooks and Berry 2006). Large spreading wildfires, not known to have been common historically owing to sparse and discontinuous fuel, are now correlated with proximity to roads and annual plant productivity dominated by nonnative fuels (Brooks and Matchett 2006). Between 1992 and 2011, $>$5% of a 30,000-km^2 portion of the Mojave Desert burned in 1,700 lightning- and human-ignited fires (Hegeman et al. 2014). Many other land-clearing disturbances—such as agricultural fields, historical town sites, contemporary urban developments, energy transmission corridors, solar and wind energy facilities, and military training sites—have removed, altered, and fragmented habitat (Nichols and Bierman 2001; Webb et al. 2009a; Hernandez et al. 2014). Even where sources of disturbance have ceased (such as terminated livestock allotments, abandoned agricultural fields, closed roads), the legacies of altered hydrology, soil, and vegetation can continue for decades to centuries (Carpenter et al. 1986; Abella 2010; Berry et al. 2015, 2016).

The population of the desert tortoise in the Mojave and western Sonoran Desert was federally listed as threatened under the U.S. Endangered Species Act of 1973 (ESA 1973, as amended) in 1990 because of population declines, habitat alteration, and habitat loss (USFWS 1990). Population declines have continued in four of five recovery areas range-wide; the estimated decline was 32% for desert tortoises of breeding size between 2004 and 2014 in all recovery areas (USFWS 2015). Four of the five recovery areas experienced declines ranging from 27% to 67%; only one recovery area showed an increase in desert tortoise numbers.

The declines are serious for several reasons. First, studies at individual sites suggest that the recent 10-y decline continues a longer term trend (Peterson 1994; Berry and Medica 1995; Berry et al. 2006, 2014b; Medica et al. 2012). Populations of 75–140 desert tortoises/km^2 in the 1970s had decreased to $\leq$15/km^2 by 2011–2012 (Berry et al. 2014b; Lovich et al. 2014). Second, the desert tortoise is long-lived ($\geq$50 y), and persistence of adults at low densities may temporarily mask population declines at some sites (Berry et al. 2013). Third, densities of breeding adults in four of the five recovery areas with declining populations are precipitously low, ranging from only 1.5 to 15.3 tortoises/km^2 (USFWS 2015), and recruitment is poor (Berry et al. 2014b). Fourth, factors such as habitat loss and fragmentation, noted at the time of the 1990 listing, have not been curtailed and instead are expanding (Averill-Murray et al. 2013).

The Revised Recovery Plan for the desert tortoise emphasized habitat conservation, enhancement, and restoration as priority recovery actions (USFWS 2011). Habitat restoration was highly ranked, among 25 candidate recovery actions, for potential to enhance desert tortoise populations (Darst et al. 2013). This high ranking was because fundamental desert tortoise needs—food, water, and cover sites—hinge on what the habitat provides (Esque et al. 2014). Moreover, other threats perceived to limit populations, such as disease (Jacobson et al. 2014) and predation by common ravens *Corvus corax,* may also relate to habitat condition (Kristan and Boarman 2007; Averill-Murray et al. 2012). Poor forage quality and contamination of soil and food plants by mercury and arsenic, for example, are thought to increase vulnerability of desert tortoises to disease (Seltzer and Berry 2005; Chaffee and Berry 2006; Jacobson et al. 2014).

Although potential may be high for habitat management to increase the health and size of desert tortoise populations, many habitat improvement techniques are untested for their effectiveness as recovery actions for the desert tortoise. Literature has accumulated on topics such as vegetation restoration in the Mojave Desert, but this research has had diverse goals not necessarily focused on the tortoise (e.g., Wallace et al. 1980; Abella and Newton 2009; Scoles-Sciulla et al. 2014). Meanwhile, some studies have linked desert tortoise biology with habitat features, such as forage composition (Oftedal et al. 2002; Jennings and Berry 2015). The USFWS (2011) recommended integrating these types of habitat features with techniques for restoring and enhancing favorable habitat conditions, which could be followed by monitoring short- and long-term indicators of habitat condition and tortoise responses to habitat restoration.

A broad approach for enhancing habitat is essential for desert tortoise recovery (Averill-Murray et al. 2012). Elements of such an approach include conservation of specific favorable conditions and restoration of desired features designed to improve habitat in the context of contemporary and near-future environments. For example, restoring habitat on decommissioned roads to reestablish hydrological connectivity is feasible where old, previously disrupted stream channels are discernable (Nichols and Bierman 2001). In contrast, 150 y of grazing by nonnative animals and invasion by nonnative plants complicates our understanding of predisturbance forage

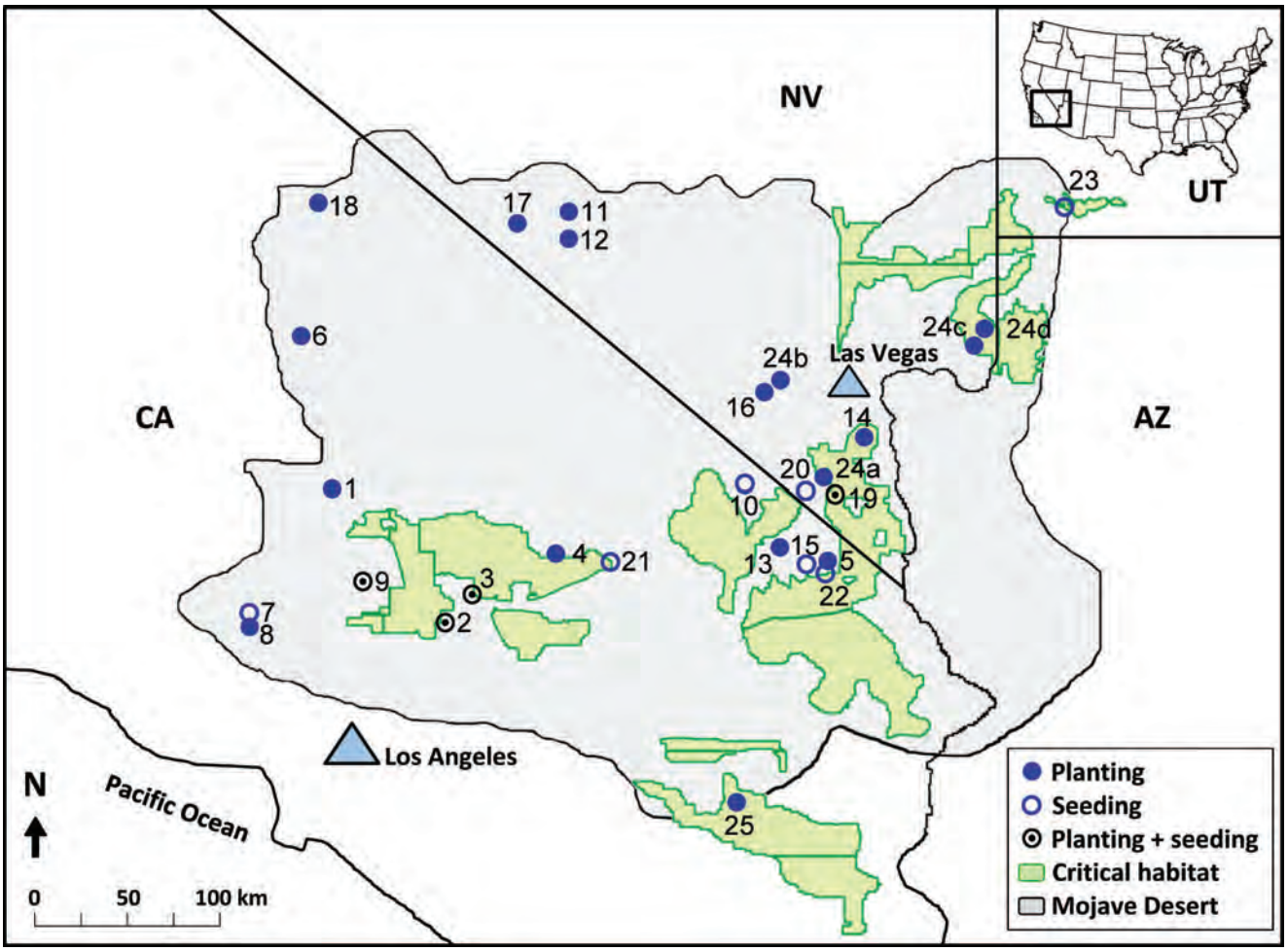

Figure 1. Distribution of critical habitat units for the desert tortoise *Gopherus agassizii* and published revegetation studies in the Mojave Desert of California, Nevada, northwestern Arizona, and Utah. The desert tortoise is distributed across much of the Mojave Desert (shown in green outline and shading). Many different maps of the boundary of the Mojave Desert are in the literature, and this map shows a combined generalization of maps in Rowlands et al. (1982), Rundel and Gibson (1996), and Webb et al. (2009b). Revegetation studies included planting nursery-grown plants and seeding. Studies numbered 1–18 correspond with 18 studies mapped in Abella and Newton (2009). Studies 19–25 are recent: 19, Abella et al. (2012b); 20, Abella et al. (2015a); 21, DeFalco et al. (2012); 22, Jones et al. (2014); 23, Ott et al. (2011); 24a–d, 4 sites in Scoles-Sciulla et al. (2014); and 25, Weigand and Rodgers (2009). Note that few of the revegetation studies are in tortoise critical habitat units. We did not find revegetation studies in the western Sonoran Desert in southeastern California that also contain a desert tortoise population.

composition, creating challenges for restoration efforts (Oldemeyer 1994). In this situation, establishing a plant composition adapted to the site and nutritionally favorable to desert tortoises may be most appropriate (Oftedal 2002; Hazard et al. 2009, 2010).

In support of recovery actions, we synthesize relationships of habitat features (vegetation and soil) with the listed Mojave and western Sonoran Desert population of the desert tortoise, and the status of knowledge for enhancing and restoring the key habitat elements of shrub cover, food, and soils. Our review has two parts: 1) requirements of the desert tortoise for shelter, food, and water; and 2) candidate practices and rationale for improving habitat condition and restoring habitats, including revegetating severe disturbances; enhancing quality of tortoise forage; removing or remediating damaged soil; salvaging topsoil; and decommissioning backcountry roads. Our focus is on habitat management practices aimed at enhancing health and growth of desert tortoise populations and for restoring damaged and deteriorated habitats within the context of past and existing recovery plans for the tortoise (USFWS 1994, 2011).

Methods

Study area

Our study area is the geographic range of the federally listed desert tortoise population, which is hot desert habitat north and west of the Colorado River. This includes most of the 124,000-km^2 Mojave Desert occupying parts of Arizona, Utah, Nevada, and California, as well as the Colorado Desert Subdivision of the western Sonoran Desert, in southeastern California (Figure 1). The

study area receives much of its rainfall from November through April, during winter and spring (Rowlands et al. 1982). Annual precipitation averages 10–20 cm at low and middle elevations below 1,500 m. Topography includes mountain ranges, low hills, washes (ephemeral stream channels), and valleys. Soils include those derived from several rock types (e.g., basalt, limestone) and depositional material from erosion (Rautenstrauch and O'Farrell 1998; Berry et al. 2006; Mack et al. 2015). Geological history and soil age are key factors affecting biota, such as old surfaces of desert pavement compared with young soils in ephemeral stream channels (McDonald et al. 1995).

Dominant vegetation is desert shrubland (Rundel and Gibson 1996). Creosote bush *Larrea tridentata* and white bursage *Ambrosia dumosa* predominate across extensive low elevations, blackbrush *Coleogyne ramosissima* and succulent woodlands containing Joshua trees *Yucca brevifolia* at middle elevations from 1,300 to 1,800 m, and coniferous woodlands and forests at the higher elevations. Desert tortoises are most abundant in the low- and middle elevation creosote bush and mixed shrublands, and are sparse to absent in the higher elevation woodland and forest vegetation associations (Rautenstrauch and O'Farrell 1998; Berry et al. 2006). In years with sufficient rainfall, most annual plants in the desert shrubland germinate in winter, grow through spring, and senesce by May (Beatley 1974; Smith et al. 2014). The eastern Mojave and western Sonoran also have a component of summer annuals, stimulated by summer monsoonal storms (Jennings 2001; Wallace and Thomas 2008). Annual plants are typically most abundant below canopies of shrubs that form "fertile islands" of shaded, nutrient-enriched soil (Brooks 2009). Some annual species, however, are most abundant in interspaces between shrubs (Abella and Smith 2013). The spatial variation in the distribution of different shrub species and interspaces creates heterogeneity in the annual plant community, which may be important for diversifying the forage available to desert tortoises (Jennings and Berry 2015). The amount and timing of rainfall are also variable among years and across the landscape within a year (Hereford et al. 2006). Some years or locations have essentially no annual plants, while others support 50 species of annual plants within a single square kilometer (Brooks and Berry 2006).

Study species

The desert tortoise is distributed at elevations below 1,300 m across much of the Mojave and western Sonoran Desert, except for the Death Valley floor and other low-elevation valleys with minimal rainfall (USFWS 1994). Typical home ranges are up to 20 ha for adult females and 20–50 ha for adult males (Harless et al. 2010). Desert tortoises conduct daily and seasonal activities within these home ranges, including foraging, retreating to burrows, and reproduction. Occasionally they travel longer distances, such as 3–7 km over weeks and months, for reasons that may relate to mating, foraging, or locating new home ranges (Berry 1986). Desert tortoises spend >90% of their lives underground in burrows, thereby escaping temperature extremes, lack of moisture, and predators (Nagy and Medica 1986; Mack et al. 2015). All age classes of tortoises are active in spring during the peak spring growing season for plants. Juveniles can emerge from burrows in February and continue being active through May and June (Berry and Turner 1986), and periodically between November and February (Wilson et al. 1999). A second period of heightened activity of adults occurs during the mating season in summer and early autumn (Rostal et al. 1994). The species is primarily herbivorous (Morafka and Berry 2002; Oftedal 2002; Jennings and Berry 2015). Desert tortoises obtain moisture from succulent, green forage (Nagy et al. 1998) and drink from self-constructed catchments or puddles (Minnich 1977; Medica et al. 1980). Most desert tortoises respond to precipitation at any time of year by emerging to drink, unless they are already hydrated.

Information gathering

We focused on evaluating 1) the vegetation and soil attributes of habitat likely required by desert tortoises to survive and maintain viable populations into the foreseeable future; and 2) how these habitat features can be enhanced or restored for desert tortoises given existing habitat condition. We conducted a systematic review of information published in journal articles, book chapters, conference proceedings, and publicly available U.S. government serials (e.g., U.S. Forest Service General Technical Reports, U.S. Geological Survey Open-File Reports). We first examined review articles of the desert tortoise and disturbance and restoration in the Mojave and western Sonoran Desert (e.g., Webb and Wilshire 1983; Grover and DeFalco 1995; Abella and Newton 2009; Brooks and Lair 2009; Abella 2010). We then systematically searched the following article databases from their period of record through 2015: AGRICOLA, BioOne, GoogleScholar, JSTOR, Scopus, ScienceDirect, SpringerLink, Web of Science, and Wiley Online Library. We searched article titles, abstracts, and key words for articles containing the following terms: Mojave, Sonoran, livestock, grazing, fire, restoration, revegetation, road, right of way, corridor, desert tortoise, *Gopherus agassizii,* habitat, vegetation, forage, food, burrow, cover, perennial plant, and shrub. We also screened the 1976 to 2003 Desert Tortoise Council Proceedings for relevant papers. Nomenclature of plants follows NRCS (2016).

Relationships Between Habitat Features and Desert Tortoises

Perennial plants and protective cover

Desert tortoises predominately construct burrows in soil beneath canopies of native shrubs and under rocks; on certain sites they also use caves in cliffs or banks of

ephemeral stream channels as shelters or dens (Woodbury and Hardy 1948; Burge 1978; Berry and Turner 1986; Baxter 1988; Lovich and Daniels 2000; Rautenstrauch et al. 2002; Mack et al. 2015). In three studies in natural shrubland habitat, desert tortoises constructed 72–97% of burrows beneath perennial plants (Burge 1978; Berry and Turner 1986; Baxter 1988). Furthermore, most burrows were below the largest shrubs. Burge (1978) found that the large catclaw acacia *Acacia greggii* harbored burrows at nine times that expected from its density, Mojave yucca *Yucca schidigera* seven times, and creosote bush four times. In addition to using shrubs as locations for constructing burrows, desert tortoises use shrubs as temporary resting or shelter sites during periods of activity outside burrows. In a 5-y study in the northeastern Mojave Desert, tortoises were observed beneath shrubs twice as often as in interspaces (Drake et al. 2015).

Although these studies show that desert tortoises use shrubs for protection, it is more difficult to determine how much shrub cover they need and if there are requirements for certain species and sizes of shrubs. Andersen et al. (2000), in a model of desert tortoise habitat use in the central Mojave Desert, reported that tortoises avoided areas of minimal plant cover. Berry et al. (2013) found that desert tortoise abundance was lower in areas denuded of vegetation than in adjacent undisturbed habitat. On a burned site, desert tortoises sought shelter below the skeletons of dead shrubs but frequently retreated to unburned areas with higher live perennial plant cover (Drake et al. 2015). If disturbance substantially reduces shrub density, locations for burrows and protective cover from temperature extremes and predation could limit tortoise population sizes (Andersen et al. 2000; Berry et al. 2013; Drake et al. 2015; Mack et al. 2015).

How does availability of perennial plants to desert tortoises fluctuate through time or change after anthropogenic disturbance? Severe, multiyear droughts have corresponded with die-off events in perennial plant communities. For example, some areas may still reflect effects of brief, but severe, droughts in 1989–1991 and 2002 associated with widespread mortality of some species of perennial plants (Hereford et al. 2006). In a 1-ha permanent plot remeasured between 1984 and 2004 in Joshua Tree National Park, density of mature white bursage declined from 1,600 to 523 individuals after the 2002 drought (Miriti et al. 2007). Eastern Mojave buckwheat *Eriogonum fasciculatum* dropped from 256 to 11 individuals, and desert globemallow *Sphaeralcea ambigua* from 59 to 0 individuals. Mature shrublands of creosote bush can generally be stable, but turnover can be substantial in short-lived perennial plants within creosote bush shrubland and in postdisturbance communities dominated by short-lived perennials (Webb et al. 2003). These fluctuations could affect cover as well as forage provided by herbaceous perennials such as desert globemallow (Jennings and Berry 2015).

The amount of alteration to vegetation increases with severity of disturbance and whether root systems of perennial plants remain intact (Prose et al. 1987; Scoles-Sciulla and DeFalco 2009; Webb et al. 2009a). After destruction of aboveground plant parts by off-road vehicles or low-severity wildfires, some perennial species (e.g., creosote bush) can resprout and resemble their former height within 5 y, depending on climatic conditions (Gibson et al. 2004). After wildfires, resprout frequency has varied among species and sites from 0% to near 100% (Abella 2009). Variation in resprouting can be a key influence to cover available for tortoises in postdisturbance environments because regeneration by seed of many shrubs such as creosote bush is infrequent (Esque et al. 2003; Drake et al. 2015).

Based on 30 studies of disturbance in the Mojave Desert, cover of perennial plants can reestablish to levels of nearby undisturbed areas within an average of 80 y (Abella 2010). Estimated time required for reestablishment of perennial cover varied among studies from 24 to 335 y. This variation correlated with plant community type, disturbance type and severity, site factors (e.g., soil parent material, grazing history), and weather following a disturbance (Engel and Abella 2011).

Much of the plant cover reestablishing after disturbance, however, consisted of different species than those before disturbance. Reestablishment of perennial species composition (species present and their relative abundance) was estimated to require decades to centuries after disturbance in the Mojave and Sonoran deserts (Abella 2010). These estimates assume that future conditions (e.g., climate, competition from nonnative plants) are conducive to native plant recovery. Many examples exist of town-sites and pipeline corridors cleared decades ago that remain dominated by species differing from nearby undisturbed areas (Webb et al. 2009a). The functional attributes of fertile islands, annual plant forage, and supply of large shrubs for tortoise burrows of the persistent, postdisturbance communities are poorly understood. Generally, many of the postdisturbance colonizers (e.g., desert globemallow, cheesebush *Hymenoclea salsola,* and desert trumpets *Eriogonum inflatum*) are smaller statured than those of mature shrublands and may therefore provide less protection to tortoises (Shryock et al. 2014).

Forage plants

Diet analyses and observations of foraging indicate that desert tortoises eat dozens of plant species but are selective foragers (Coombs 1979; Henen 2002; Esque et al. 2014; Jennings and Berry 2015). Diets change seasonally with variation in timing of emergence, growth, and senescence of different species of plants in spring and summer (Jennings 2002). Furthermore, juvenile and adult tortoises have access to different-sized plants (Morafka and Berry 2002).

Three sources of evidence suggest that forage quality and quantity have associations with desert tortoise

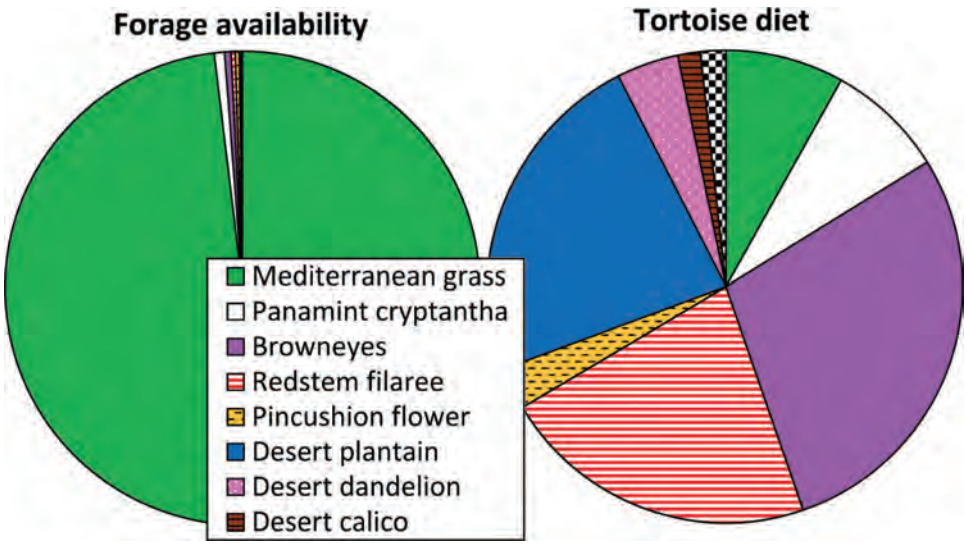

Figure 2. Availability of annual plant forage, relative to what juvenile desert tortoises *Gopherus agassizii* ate, in 1998, in an enclosure at the U.S. Army's Fort Irwin National Training Center, California. The nonnative annual Mediterranean grass dominated plant composition, but desert tortoises avoided eating them. Instead, desert tortoises preferentially ate native annual forbs, with browneyes and desert plantain constituting 52% of tortoise diets. Scientific names for species: Mediterranean grass *Schismus* spp., Panamint cryptantha *Cryptantha angustifolia,* browneyes *Camissonia claviformis,* redstem filaree *Erodium cicutarium,* pincushion flower *Chaenactis fremontii,* desert plantain *Plantago ovata,* desert dandelion *Malacothrix glabrata,* and desert calico *Loeseliastrum matthewsii*. Data from Oftedal et al. (2002).

demography: 1) links between plant productivity and health of individual tortoises, 2) experimental feeding trials, and 3) selective foraging displayed by tortoises. Between 1991 and 2011 in Joshua Tree National Park, desert tortoise survival was correlated with winter rainfall (Lovich et al. 2014). Winter rainfall in turn was correlated with biomass of native annual plants (Rao and Allen 2010) and densities of herbaceous perennial forage species such as desert globemallow (Miriti et al. 2007). At a drought-prone site in the eastern Mojave Desert, desert tortoise survival was only 33% during the 1990s (Longshore et al. 2003). High death rates corresponded with low production of annual plants and limited amounts of drinking water for tortoises in dry years (Nagy et al. 1997). In a long-term study in the northern Mojave Desert, growth of individual desert tortoises was positively correlated with annual plant production over 40 y between 1964 and 2003 (Medica et al. 2012).

Experimental feeding trials indicate that forage quality affects desert tortoise health (Barboza 1995; Nagy et al. 1998; Hazard et al. 2009, 2010). For example, Hazard et al. (2009) reported that captive, juvenile desert tortoises (0.5–1.5 y old) lost weight when fed senesced grasses low in nitrogen. In contrast, tortoises gained weight when fed the native forb desert dandelion *Malacothrix glabrata* or nonnative forb redstem filaree *Erodium cicutarium*. Similarly, in another experiment, adult desert tortoises gained weight when fed a protein- and nutrient-rich native perennial forb (desert globemallow), but lost weight when fed the nonnative grasses *Schismus* spp. (Barboza 1995). Barboza (1995) further noted the importance of a diverse "menu" of preferred food plants for long-term nutrient balances in desert tortoises.

When desert tortoises have a choice, they are selective foragers. Studies that compare what desert tortoises eat to what forage is available are rare, but two examples highlight selectivity. In a fenced enclosure in the central Mojave Desert, juvenile tortoises ate only 42 (0.02%) of the 239,000 individuals of the nonnative grasses *Schismus* spp. they encountered (Oftedal et al. 2002). In contrast, they ate 35% of 346 plants of the native forb desert plantain *Plantago ovata*. Other favored native annual forbs were desert dandelion, desert calico *Loeseliastrum matthewsii,* and browneyes *Camissonia claviformis* (Figure 2). In the particular collection of plant species analyzed, the nonfavored *Schismus* had low water and protein content, whereas the favored species were rich in water and protein (Oftedal et al. 2002).

The biochemical traits of plants thought to contribute to quality of forage for desert tortoises are similar to those for other herbivores and include water, nutrient, and fiber content and digestibility (Nagy et al. 1998; Oftedal et al. 2002; Hazard et al. 2010). Plant biochemistry fluctuates through time and across the landscape, because the chemical composition of plants varies among species, within a species during a year, and across soil types (El-Ghonemy et al. 1978; Chaffee and Berry 2006). Oftedal (2002) noted that desert tortoises are vulnerable to excess potassium, which is abundant in desert plants. Desert tortoises must excrete excess potassium to avoid toxic effects, but this requires that tortoises use water or gain sufficient nitrogen from other forage plants to excrete potassium as urates. If too much

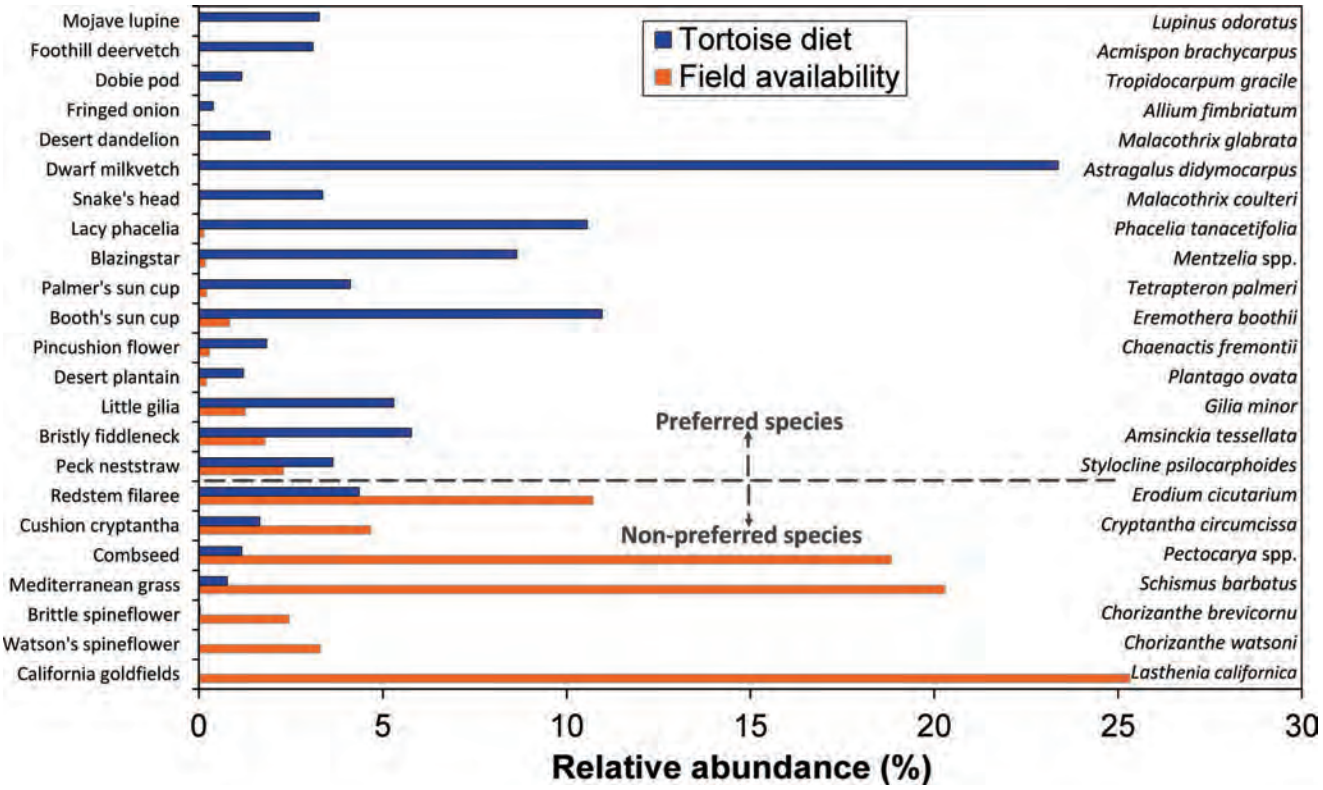

Figure 3. Comparison of availability of annual forage plants to what desert tortoises *Gopherus agassizii* ate, March and April 1992, at the Desert Tortoise Research Natural Area, California. Data from Jennings and Berry (2015).

nitrogen is required to excrete potassium, nitrogen may become limiting to tortoise growth. Oftedal et al. (2002) developed a potassium excretion potential (PEP) index that integrated potassium, water, and protein to indicate favorability of plant forage chemistry for desert tortoises to excrete potassium. Forage with high PEP was likely advantageous to tortoises compared with forage with low PEP. Plants consumed, but not preferred by tortoises (e.g., the nonnative grass *Schismus* spp.), had low PEP, whereas preferred species frequently had high PEP (e.g., plants of the Fabaceae family). Based on these biochemical traits along with field studies comparing food plant consumption to availability (Jennings and Fontenot 1992; Avery and Neibergs 1997; Oftedal et al. 2002; Jennings and Berry 2015) and feeding experiments (e.g., Barboza 1995; Hazard et al. 2009, 2010), desert tortoises favor legumes (family Fabaceae), mallows (family Malvaceae), evening primroses (family Onagraceae), and some species in the Asteraceae and Boraginaceae families. These studies further suggest that, in general, annual and herbaceous perennial forbs supply higher quality forage than nonnative annual grasses.

A study in the western Mojave Desert in southern California, at the Desert Tortoise Research Natural Area, highlighted temporal and spatial variability in tortoise foraging, which could be important to long-term tortoise behavior and nutrition balances (Jennings and Berry 2015). The authors reported seasonal variation in desert tortoise forage preferences from March to June; preferential foraging on certain herbaceous perennial forbs even though annuals were available; and that >75% of bites consumed were on a subset of 10% of the site's 80 annual and perennial species. Three herbaceous perennial forbs—desert wishbone-bush *Mirabilis laevis,* widow's milkvetch *Astragalus layneae,* and whitemargin sandmat *Chamaesyce albomarginata*—were rarely recorded in vegetation surveys but constituted significant components of desert tortoise diets. Some of the more preferred native annual forbs included Mojave lupine *Lupinus odoratus,* foothill deervetch *Acmispon brachycarpus,* dwarf milkvetch *Astragalus didymocarpus,* lacy phacelia *Phacelia tanacetifolia,* and desert dandelion (Figure 3). These favored foods were distributed unevenly within the habitat. Some favored plants were in ephemeral stream channels, and desert tortoises rarely passed by the plants without taking bites. Given how uncommon some preferred forage species are and that they also are eaten by animals other than tortoises, the possibility cannot be dismissed that availability of quality forage is a limiting factor for desert tortoise health.

Disturbance is another factor that can affect variability of annual plant forage. Effects of disturbance on annual plants appear contingent on effects to the perennial plant community and on weather conditions after disturbance, similar to temporal patterns in undisturbed desert (Abella 2010). There may be no response of annual forage plants to disturbance until a year of sufficient rainfall. Given sufficient rainfall, the cover and

species richness of annual plants can attain levels found on undisturbed areas within 1–15 y after disturbance (Callison et al. 1985; Brooks and Matchett 2003; Vamstad and Rotenberry 2010). However, nonnative annual grasses—poor-quality forage for tortoises—often dominate the disturbed communities within a few years and are persistent (Callison et al. 1985; Brooks and Matchett 2003; Brooks and Berry 2006). In a study of annual plant recovery 36 y after construction of the Los Angeles Aqueduct in the western Mojave Desert, certain annual species (e.g., stiff-haired lotus *Acmispon strigosus*) known to be favored by desert tortoises had not colonized the disturbance corridor (Berry et al. 2015). These plants occurred in nearby undisturbed habitat.

Soil and topography, including the special case of roads

In addition to their effect on vegetation, soil and topography interact with desert tortoises in several ways. To create burrows, desert tortoises utilize calcic soils (caliche) in hillsides and banks of ephemeral stream channels by constructing or altering caves (Woodbury and Hardy 1948; Rautenstrauch et al. 2002; Mack et al. 2015). Burrows dug in fine sands easily collapse and do not persist (Wilson and Stager 1992). Compacted soils, including those compacted through human disturbance, are unsuitable as burrow sites because tortoises cannot dig in them. Likewise, soils contaminated with toxic wastes from mining, vehicular traffic, or other sources are unsuitable, because they can contribute to poor health of tortoises (Seltzer and Berry 2005; Jacobson et al. 2014; Kim et al. 2014). Soil type and fine-scale topography are also important for retaining rain water because tortoises drink from puddles or construct their own catchments in soil (Medica et al. 1980). Sites with slow water infiltration or depressions are likely most suitable for supplying drinking water (Henen et al. 1998).

Hazardous chemicals have been intentionally or inadvertently introduced into soils in a variety of desert tortoise habitats. In some cases, the contaminants are along roadsides from decades of vehicle traffic (e.g., leaded gasoline), and in other cases from historical mining (Chaffee and Berry 2006; Kim et al. 2014). Some contaminants are of recent origin, such as illegal dumping or drug operations. Toxic materials, whether airborne or in soil and plants, can accumulate in long-lived desert tortoises. Two examples from the western Mojave Desert illustrate potential effects. Desert tortoises ill and dying of upper respiratory disease at the Desert Tortoise Research Natural Area had 11 times the levels of mercury in their livers as did healthy tortoises from a control site (Jacobson et al. 2014). Near the Rand Mining District, elevated levels of arsenic occurred in tissues (lungs, scutes) of necropsied tortoises (Seltzer and Berry 2005). The probable sources were mining wastes and soils disturbed by mining activities and exacerbated through off-road vehicle activities. Mining wastes with mercury and arsenic from the Rand Mining District have moved tens of kilometers via transport in dust and flowing water (Chaffee and Berry 2006; Kim et al. 2012).

An important consideration in developing restoration plans is the composition of plant species existing in soil seed banks, the effects of past human activities on seed banks, and whether seed banks have been swamped by nonnative annual plants. Do adequate seeds of forage plants preferred by tortoises remain in the soil and can the seed banks support recovery of desert tortoise populations? With the arrival of settlers from the New World in the 1700s to the Southwest, native vegetation has experienced waves of impacts from human uses and the introduction of nonnative annual plants (Minnich 2008). Although we are aware of above-ground changes in cover, composition, and biomass of annual vegetation and how quickly nonnatives have become dominant (e.g., Brooks and Berry 2006; Berry et al. 2014a), we know less about the composition of soil seed banks in different desert regions and whether different types of human activities (e.g., livestock grazing, military maneuvers, off-road vehicle use) have reduced seed banks of forage plants favored by desert tortoises. Although information is limited for desert tortoise habitats, some studies illustrate effects of disturbance on soil seed banks. Brooks (1995), in a study of the benefits of protective fencing at the Desert Tortoise Research Natural Area, reported that biomass of seeds was more than twice as high inside the fence than outside. Habitat inside the fence was protected from sheep grazing and off-road vehicle use for 12–13 y. In a study in the central Mojave Desert on lands degraded by military maneuvers, DeFalco et al. (2009) found that densities of annual plant seeds in compacted soils were 33% less than on control sites. Fire temperatures during desert wildfires can alter survival of seeds (Brooks 2002) and granivores and ants can play a role in seed availability too (Suazo et al. 2013).

Roads are a special case of human alterations to soils, topography, vegetation, and wildlife not only in deserts but elsewhere (Forman et al. 2003; Brooks and Lair 2009; Vogel and Hughson 2009). Roads fragment desert tortoise habitat and can result in the deaths or losses of tortoises from collisions with vehicles, collection by visitors, and predation by predators that feed on road kills or animals crossing roads (von Seckendorff Hoff and Marlow 2002; Boarman and Sazaki 2006; Kristan and Boarman 2007; Hughson and Darby 2013; Nafus et al. 2013). The common raven is an example of a predator subsidized in part by roads and perch sites often found adjacent to roads (e.g., utility corridors; Boarman and Coe 2002). Roads, whether as highways or in the backcountry, also alter the hydrological function of desert ecosystems by changing sheet flow and water movement in drainages (Schlesinger and Jones 1984; Brooks and Lair 2009). Hydrological connectivity is often severed; instead of water flowing across soil surfaces or through multiple channels, water is diverted down the compacted surfaces of roads or through culverts into a

Table 1. Summary of three aims (in bold) for enhancing vegetation and soil habitat conditions for the desert tortoise *Gopherus agassizii* in contemporary environments of the Mojave and western Sonoran Desert. Main management actions and best practices for them are summarized below each aim.

Aims, actions, and best practices
Restore or augment perennial plants as cover or forage
Action 1: Outplanting
Carefully select species
Use good planting stock
Perform effective plant care
Action 2: Seeding
Make controllable factors favorable
Match seed treatments to species
Develop backup plans for seeding failures
Improve forage quality and quantity
Action 1: Reduce nonnative plants
Focus on comprehensively treating damaging, widespread invaders
Detect and remove new invaders early
Implement preventive measures from invasive plant science
Action 2: Manage herbivory by nonnative animals on tortoise forage plants
Monitor changes in habitats after reducing nonnative animals
Strategically deploy exclosures
Action 3: Augment native forage plants
Experimentally test forage augmentation strategies
Compare forage augmentation with other candidate actions
Restore or conserve soil health
Action 1: Salvage topsoil if large soil disturbances are planned
Carefully plan salvage operations
Carefully store soil to maximize biotic retention
Action 2: Evaluate and remediate soil potentially toxic to tortoises
Assess potential for toxic soils
Avoid or remediate toxic soils before conducting other habitat activities
Action 3: Decommission certain backcountry roads
Ameliorate topographic and soil surface alterations
Limit postrestoration vehicle incursions

few channels (Hereford 2009). This can affect the productivity of plants downstream, which is an important consideration for the desert tortoise because plants growing in small washes are important food sources (Jennings and Berry 2015).

Roads have long been implicated in contributing to the invasion and spread of nonnative plants (Frenkel 1977). Brooks and Berry (2006), in a study of nonnative annual plants in desert tortoise critical habitat, reported that density of dirt roads was correlated with abundance of nonnatives. A paved highway appeared to be the source of the invasion of another noxious, nonnative species, Sahara mustard *Brassica tournefortii* in at least one valley within desert tortoise critical habitat in the western Sonoran Desert (Berry et al. 2014a). The highway intersected a major wash, and Sahara mustard likely further spread into the desert from that source. Roads are not always correlated with the distribution of nonnative plants, especially for invasive plants already occupying most of the landscape, but they are probable entry points (Craig et al. 2010).

Habitat Management Aims, Actions, and Practices

Using the systematic literature review and our experiences, we organized actions and best practices aimed at conserving and enhancing three key elements of desert tortoise habitats: cover sites, forage, and soil (Table 1). Elements of a comprehensive, systematic approach to employing these best practices would include conducting site assessments to evaluate probable factors limiting habitat quality to guide the aims of management actions; identifying the most feasible actions with the greatest chance of success for enhancing habitat quality; and monitoring outcomes of actions to inform future projects. In the sections below, we discuss the three broad aims (improving cover, forage quality, and soil health), management actions for accomplishing each aim, and best practices for implementing each action.

Restore or augment perennial plants as cover or forage

Restoring or augmenting abundance and diversity of perennial plants can enhance protective cover and forage (in the case of herbaceous perennials) for desert tortoises. Planting nursery-grown perennials (outplanting) and seeding are the two main methods for revegetating severely disturbed soil (Bainbridge 2007). In the Mojave Desert, outplanting is more reliable than seeding for establishing perennial plants any given year (Abella et al. 2012b). Outplanting has achieved a relatively long-term ($\geq$2 y) survival of $\geq$50% for a variety of perennial species when using good planting stock and proper plant care (Abella and Newton 2009; Weigand and Rodgers 2009; Scoles-Sciulla et al. 2014). For establishing perennial plants, we discuss the actions of

Table 2. Summary of the best-performing perennial species outplanted as nursery-grown plants at revegetation sites in ≥3 studies reported in the literature in the Mojave Desert (Figure 1). Survival was monitored for ≥1 y after outplanting during studies published between 1978 and 2014. The species in the table are medium- to large-sized shrubs that provide cover or burrow sites to desert tortoises *Gopherus agassizii*.

Common name	Scientific name	Total no. of studies	No. of studies with ≥50% survival[a]
White bursage	*Ambrosia dumosa*	10	5
Fourwing saltbush	*Atriplex canescens*	5	4
Nevada jointfir	*Ephedra nevadensis*	3	3
Creosote bush	*Larrea tridentata*	8	5
Anderson thornscrub	*Lycium andersonii*	3	2

[a] In at least one treatment, with treatments including irrigation, fencing to deter herbivory, and others. Data synthesized from Abella and Newton (2009), Abella et al. (2012b), Scoles-Sciulla et al. (2014), and Weigand and Rodgers (2009).

outplanting and seeding, and three best practices for each.

Action 1: Outplanting. Because of cost and logistical challenges, outplanting can be criticized for being unable to cover as much area as seeding. However, no matter how large an area is seeded, the area revegetated is still zero if no seeded species become established, a situation not uncommon (Bainbridge 2007). Furthermore, >50% of surviving outplants have flowered and produced seed within 3 y in some projects, potentially expanding the area revegetated (Abella et al. 2012b). Given that outplanted shrubs can rapidly grow to heights of 40–50 cm within 3 y—reestablishing shaded microsites important to natural plant recruitment—it is possible that outplanting can also stimulate natural plant establishment. Therefore, a management goal using outplanting could be strategically establishing patches of native plants for stimulating recovery within the larger landscape. There are three main best practices well-supported in the literature for increasing success of outplanting: carefully select species, use good planting stock, and perform effective plant care.

1) *Carefully select species*. Species selection is critical to outplanting success because survival and ecological functions of perennial plants differ among species. Also, treatments required for plants to survive vary among species and can affect project costs and logistics. Of 45 native perennial species outplanted in the Mojave Desert, 64% have achieved ≥50% survival in at least one study (Abella and Newton 2009; Abella et al. 2012b; Scoles-Sciulla et al. 2014). Examples of the best-performing species outplanted in three or more studies are in Table 2, including shrubs beneath which desert tortoises construct burrows (Burge 1978; Berry and Turner 1986; Baxter 1988). Generally, large shrubs (e.g., creosote bush) have performed well in outplanting, forbs have performed moderately well, and grasses have struggled. Lowered overall survival in a project may be worth the benefit of diversifying plantings, by including species that do not necessarily survive at high rates but that provide important functions. Even some difficult-to-establish forbs and grasses can still achieve 10–25% survival. In an example of different functions provided by species, some native perennial species (e.g., desert globemallow) exist that can competitively reduce nonnative annuals, or at least become established on sites infested by nonnative annuals (Abella et al. 2011, 2012a). In an example of how species selection affects treatments required, planted cacti have not needed irrigation; whereas, irrigation has doubled survival of white bursage, desert globemallow, and other species (Abella et al. 2015b). The ability of cacti to become established without treatments could be important, because Medica et al. (1982) found that cacti formed >50% of tortoise diets in a dry year. Examining outplanting success and treatments required for little-studied genera, such as *Mirabilis,* that provide important herbaceous perennial forage (Jennings and Berry 2015) could increase the number of tortoise forage species available for outplanting.
2) *Use good planting stock*. Good planting stock can underpin the success of entire projects and requires advance planning. Preparing outplants typically entails ≥6–12 mo of care in nurseries to grow root systems sufficient to provide the best chance of survival in the field (Bainbridge 2007). Plants that are unhealthy leaving the greenhouse often have reduced chance of field survival.
3) *Perform effective plant care*. Treatments to enhance survival after planting at restoration sites are essential for most species. Protection from grazing by small mammals and larger herbivores can be even more important than irrigation (Scoles-Sciulla et al. 2014). It is not uncommon for outplants without protection from grazing to be all or mostly gone from restoration sites within days. An unprotected planting of 100 individuals was killed by animals in <4 h (S.R. Abella, unpublished data). This undesirable herbivory may result from outplants being nutrient-enriched from their nursery propagation (Bainbridge 2007). Enclosing plants in cages or shelters can deter herbivory and increase survival and growth (Figure 4).

Irrigation has enhanced survival in certain studies, potentially making it worth the added cost (Wallace et al. 1980). Species can respond differently to the type of irrigation. For instance, watering by hand improved survival of desert globemallow, whereas a slow-release irrigation gel did not (Abella et al. 2015b). Survival of white bursage increased with both irrigation types. It is also noteworthy that plantings on sites receiving salvaged topsoil had twice the survival of plantings on nontopsoil areas, possibly because organic matter in the salvaged topsoil retained water for gradual extraction by plants (Abella et al. 2015b).

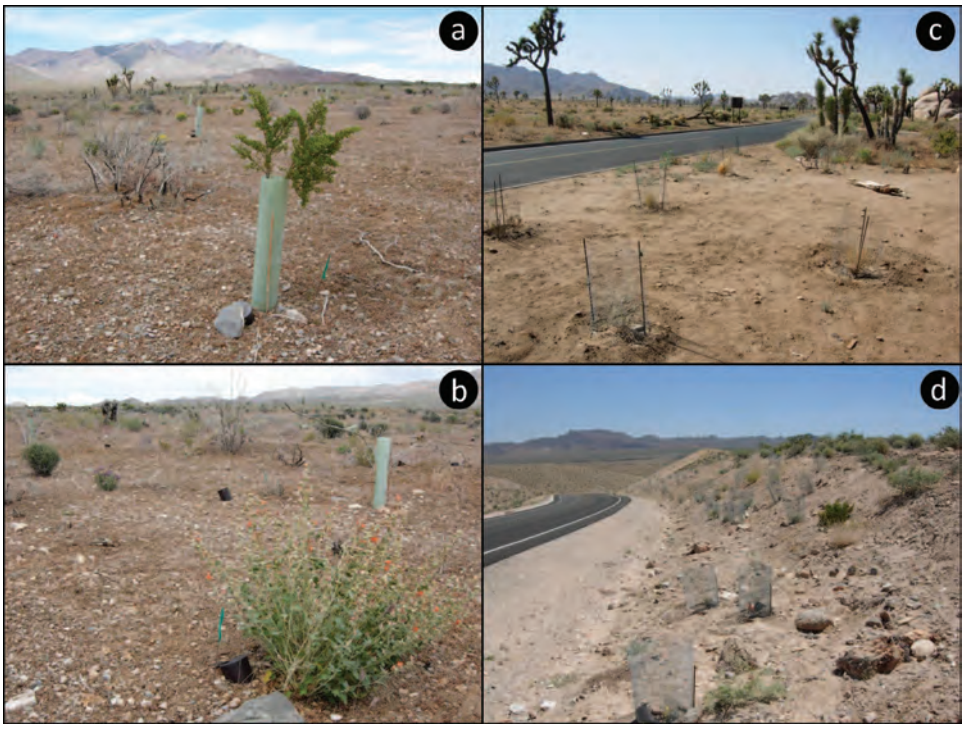

Figure 4. Examples of outplanting and care of perennial plants to revegetate disturbed habitat in the Mojave Desert. The left photos are on the 2005 Goodsprings Fire, southern Nevada, and show **(a)** an outplanted creosote bush *Larrea tridentata* protected by a shelter in the foreground, and **(b)** an outplanted desert globemallow *Sphaeralcea ambigua,* affixed with DriWater as a slow-release irrigation. Wire cages protect outplants from herbivory in roadside revegetation in **(c)** Joshua Tree National Park, California, in 2008, and **(d)** Lake Mead National Recreation Area, Nevada, in 2011. Photos by S.R. Abella.

Other treatments to enhance survival of outplants have not been extensively studied or are not necessarily recommended. Many desert species have relationships with mycorrhizae (Titus et al. 2002), but it is unclear how limiting mycorrhizae are after disturbance. Fertilizing plants in the field has not been recommended because it has not increased survival (Scoles-Sciulla et al. 2014), and augmenting soil fertility raises concerns about nonnative plant growth (Rao et al. 2010). Although nonnative annuals can compete with perennial plants (Rodríguez-Buriticá and Miriti 2009), treating nonnative plants with herbicide did not increase survival of perennial outplants in one study (Scoles-Sciulla et al. 2014).

Action 2: Seeding. Although seeding is risky during any year, it has enhanced establishment of native perennials in some projects. Short-term successes were reported in the 1970s, which was a wet decade, but it was frequently unclear how persistent seedlings were after 1–2-y, short-term studies (Abella and Newton 2009). More recently, some seeded plant establishment occurred during a 14-y monitoring period on a mine restoration site in the northeastern Mojave Desert, but the extent to which seeding improved upon natural plant establishment was uncertain (Ott et al. 2011). Another recent project resulted in no plant establishment over 3 y, despite protecting seeds from mammalian granivory and providing irrigation (Abella et al. 2012b). We emphasize three best practices for seeding in contemporary environments: make controllable factors favorable, match seed treatments to species, and have backup plans for seeding failures.

1) *Make controllable factors favorable*. Managers cannot control the weather and may also have little flexibility for attempting to time seeding with years of favorable weather because of logistical challenges, difficulty of obtaining seed, and deterioration of stored seed. Managers can control, to some extent, the quality and species of seed used, the locations for seeding, and conditions of sites receiving seed. A synthesis published in the 1970s of the phenological timing of perennial species for seed collection, seed storage procedures, and germination requirements is still among the most comprehensive reviews for optimizing seed germination in the Mojave Desert (Kay et al. 1977). Ideally, both viability and germination assays should be performed on seed lots prior to seeding. In some seeding failures, it was unclear whether seeds placed in the field were even viable (Abella and Newton 2009).

   Owing to the usual limitation of availability of native plant seed and to the potential influence of seed source on project outcomes, the question of whether to use locally collected seed (and if so, how local) is commonly raised for desert restoration

projects. This issue is unresolved and the subject of ongoing research, because combined genetics and plant performance analyses are required to determine how successful particular seed sources are in different present and anticipated future environments. Given extensive evidence for local adaptation of plants, the current consensus is that seeds for restoration projects should be collected as locally as possible, unless there are specific reasons to expect that genotypes from elsewhere or other environmental site types will perform better (Johnson et al. 2010). In an example of site-type adaptation in the Mojave Desert, Shryock et al. (2015) identified genetic differentiation in desert globemallow populations along environmental gradients of water stress and temperature seasonality.

Certain sites may be more amenable to seeding than others, and conducting preliminary trials across sites is a good strategy for identifying potentially favorable locations for seeding projects (Grantz et al. 1998). If soils are degraded (e.g., erosion-affected soils), ameliorating site conditions should occur before attempting seeding. For example, roughening soil surfaces or using tackifiers to enhance soil and seed retention has potential for building soil seed banks and promoting plant establishment (DeFalco et al. 2012).

2) *Match seed treatments to species*. An important decision is whether to pretreat seeds, such as applying germination stimulants or protective coatings, because these treatments can increase project costs while sometimes being counterproductive. In a short-term project (4 mo) in the Mojave Desert, seeding bare seed resulted in 22% seedling emergence of blackbrush, whereas only 5% emergence occurred from pelletized seed (Jones et al. 2014). Seeding pelletized seed of three shrubs facilitated short-term seedling establishment (within 1 y) in another study, but the seedlings died by the second year (Abella et al. 2015a). Desert seeding projects should include preliminary assays to identify whether seed treatments are beneficial. Moreover, managers could consider "hedging bets," such as by pretreating or pelletizing a portion of seed and not treating the rest of seed.

Similarly, several options exist for treating seeds after they have been seeded on field sites or timing seeding to coincide with optimal conditions. However, effectiveness of these variations has been mixed. Irrigation has increased short-term seedling establishment in some studies but not in others, regardless of natural rainfall (Winkel et al. 1995; Grantz et al. 1998). Soil surface treatments, such as applying mulches, may only be applicable to localized areas (e.g., compacted soils) and have not consistently improved seeding success (Grantz et al. 1998). Abundant seed can be moved around or off site by mammals and invertebrates within days to weeks after seeding (DeFalco et al. 2012). Seed movement by animals does not preclude seedling establishment if some seeds escape predation and are deposited in microsites favorable for germination. Loss of seed has, however, resulted in suggestions to 1) minimize time that seeds reside on the ground before conditions conducive to germination occur, or 2) time seeding to correspond with nonpeak activity of granivores (Suazo et al. 2013). To minimize the time that dormant seeds are exposed to predation, seeds of some species can be pretreated to speed germination (Ostler et al. 2003). Although still no guarantee of success, if seeding can be timed to correspond with wet years and reduce time to germination, it may facilitate at least short-term plant establishment (Grantz et al. 1998; Ott et al. 2011).

3) *Have backup plans for seeding failures*. Even when best known practices for seeding are implemented, seeding may not be successful because of granivory, lack of germination cues, dry weather, or other factors (Bainbridge 2007). As a result, a precautionary approach would include pairing seeding with other actions for enhancing plant cover. For example, combining seeding with outplanting warrants consideration. This approach was already successful for one postburn restoration project: seeding failed completely, but outplanting successfully produced patches of perennial plants that generated their own seed within 3 y (Abella et al. 2012b).

Improve forage quality and quantity

Composition of the annual plant community across the range of the desert tortoise has changed drastically over the past century, with a major increase in nonnative species (Brooks and Esque 2002; Brooks and Berry 2006; Averill-Murray et al. 2012). Nonnative annual grasses are some of the chief increasers and, unfortunately for tortoises, these grasses provide lower quality forage than many native forbs (Oftedal et al. 2002; Medica and Eckert 2007; Hazard et al. 2009; Jennings and Berry 2015). Returning the annual plant community to primarily natives could improve forage for desert tortoises while also reducing chance of nonnative-grass-fueled fires that kill shrubs used by tortoises for cover. Additionally, protecting shrubs from fires maintains fertile islands as locations for recruitment of a diverse native annual plant community (Abella and Smith 2013) potentially important for balanced nutrition of desert tortoises. We evaluated three main actions for favorably changing forage quality and quantity provided to tortoises by the annual plant community: 1) reduce nonnative plants, 2) manage herbivory by nonnative animals on tortoise forage plants, and 3) augment native forage plants.

Action 1: Reduce nonnative plants. There are two priorities for decreasing potential impacts of nonnative plants: reducing abundance of nonnative plants already dominant across the geographic range of the desert tortoise; and limiting the establishment of new nonna-

tive plants. Three main best practices are suggested for reducing nonnative plants in desert tortoise habitat: focus on comprehensively treating damaging, widespread invaders; detect and remove new invaders early; and implement preventive measures from invasive plant science.

1) *Focus on comprehensively treating damaging, widespread invaders.* Treatment of nonnative annual grasses is strongly supported from our synthesis because of their undesirability as desert tortoise forage and their potential to facilitate fire disturbance across large areas, in turn, creating opportunities for invasion by other nonnative plants (Brooks and Esque 2002). Other widespread invaders in desert tortoise habitat are the nonnative annual forbs redstem filaree and Sahara mustard. Although redstem filaree provides some forage value (Hazard et al. 2010), a concern with this species is that it forms monocultures that may exclude a diversity of native annuals nutritionally important to tortoises (Steers and Allen 2010; Jennings and Berry 2015). Sahara mustard has invaded desert tortoise critical habitats and often forms dense stands (Berry et al. 2014a). Sahara mustard is not a good food plant and contains oxalates, which are likely harmful to tortoise health (Jacobson et al. 2009). Nonnative grasses are the top priority for control at this time, followed by Sahara mustard, redstem filaree, and other invaders that form low-diversity stands or provide poor forage.

   When nonnative annuals are reduced, native annuals have generally responded positively. For example, Brooks (2000) found that thinning *Schismus* via cutting doubled density of native annuals in a wet year. Some of the increasing natives were bristly fiddleneck *Amsinckia tessellata* and other species that Jennings and Berry (2015) identified as forage favored by desert tortoises. Native annuals also remained green 2 wk later in spring on *Schismus*-thinned plots, which could allow tortoises to forage longer (Brooks 2000).

   Carefully timed herbicide applications have reduced nonnative plants while increasing native annuals. On a burned site in the western Mojave Desert, Steers and Allen (2010) found that applying the postemergent herbicide Fusilade early in the growing season reduced nonnative grasses as well as the forb redstem filaree. Species richness and cover of native annuals were up to three times greater in treated compared with untreated areas. Glyphosate and some other herbicides were effective in reducing or eliminating germination of Sahara mustard (Abella et al. 2013). Effects of herbicide on the desert tortoise are unclear, but early timed herbicide applications—to exploit the accelerated phenology of nonnative compared with native species (Marushia et al. 2010)—could generally occur when tortoises are inactive (Esque et al. 2014). For example, Steers and Allen (2010) applied herbicide in January. Adult tortoises remain in underground burrows until at least mid-February in some years (Burge 1977; Rautenstrauch et al. 1998), although juveniles may be active from November through February when local temperatures are warm (Wilson et al. 1999). The California Invasive Plant Council (2015) published best-management practices to reduce nontarget effects of herbicides to animals while controlling nonnative plants damaging to wildlife populations, which may be useful in desert tortoise habitats. Potential negatives of nonnative plant treatments must be balanced against the positives of curtailing deterioration of tortoise habitats by nonnative plants.
2) *Detect and remove new invaders early.* A central tenet of invasive species science is that the early detection and removal of new invaders is cheaper and more effective than managing established infestations (Davis 2009). Surveying for incipient populations of nonnative plants along roadsides is a best practice, because roads can be entry points for nonnative plants (Brooks 2009; Berry et al. 2014a). An early detection program surveyed 3,300 km of roads between 2009 and 2011 in the eastern Mojave Desert, including in desert tortoise habitat, and removed >37,000 nonnative plants (Abella et al. 2009). Prioritizing surveys in wet years may enhance detection of species and maximize benefit from limited resources for surveys and treatments. Roads should be incorporated into broader landscape strategies for nonnative plant management because many firmly established nonnative plants are not, or at least are no longer, distributed only along roadsides (Craig et al. 2010). Thus, restricting surveys only to roadsides may provide a misleading impression of the distribution of nonnative plants, because desert washes, old disturbances, and areas of seemingly undisturbed desert should also be part of detection programs. Washes in particular facilitate the spread of Sahara mustard (Berry et al. 2014a).
3) *Implement preventive measures from invasive plant science.* A concern is that desert tortoise habitats have already been invaded by several species of nonnative plants and the potential exists for transport of new invasive plants by ongoing or proposed human activities, such as renewable energy development near, or adjacent to, critical habitats (Hernandez et al. 2014). It is prudent to view desert tortoise habitats as susceptible to new invaders in the future, in addition to ongoing expansion of incipient populations of species such as Sahara mustard not yet as widespread as nonnative grasses (Berry et al. 2014a). Many best-management practices developed in invasive plant science are applicable to help forestall further invasion of desert tortoise habitats by nonnative plants (Abella 2014). For example, Lake Mead National Recreation Area, including tortoise habitat in the eastern Mojave Desert, recently developed a nonnative plant management plan detailing practices such

as cleaning vehicles to remove seeds (National Park Service 2010). Desert tortoise recovery areas may benefit from the development of similar long-term, nonnative plant management plans.

Action 2: Manage herbivory by nonnative animals on tortoise forage plants. In addition to potential for nonnative animals to affect perennial plant cover and soil in desert tortoise habitats (Webb and Stielstra 1979; Brooks et al. 2006), there may be similarity in forage consumed by nonnative animals and desert tortoises, which is important for understanding contemporary vegetation condition. Early studies comparing food habits of desert tortoises with domestic livestock and feral burros were frequently based on analysis of scats (e.g., Hansen and Martin 1973; Hansen et al. 1976; Coombs 1979; Medica et al. 1982). These studies indicated similarities in diets among tortoises, cattle, and feral burros, with overlap mainly in the grass component. This component is the one most accurately characterized by scat analysis because fibrous material from grasses is less digestible than forbs and passes through the gastrointestinal tract in greater bulk (e.g., Barboza 1995). To more thoroughly characterize diet similarity, scientists began making direct observations of tortoises foraging and counted bites consumed (Jennings and Fontenot 1992; Jennings 2002; Oftedal 2002; Oftedal et al. 2002; Jennings and Berry 2015). Through these studies, it became apparent that forbs were the major and important part of desert tortoise diets. Native forbs were also heavily utilized by nonnative animals. In seven studies across the Mojave Desert, the native annual desert plantain comprised the greatest percentage (11%) of feral burro diets (Abella 2008). Based on bite counts of juvenile desert tortoises, this forb also formed 23% of tortoise diets in the central Mojave Desert (Oftedal et al. 2002). Other forbs preferred by tortoises in at least one study (Jennings and Berry 2015), such as desert wishbone-bush, are also eaten by burros (Abella 2008). Bite counts in the Ivanpah Valley during the 1990s revealed that both cattle and tortoises consumed native annual forbs such as desert dandelion (Avery and Neibergs 1997). Similarly, domestic sheep utilized desert dandelion in a western Mojave Desert allotment (Nicholson and Humphreys 1981).

On landscapes where enhancing forage conditions for desert tortoises is a goal, a conservative approach is ensuring that tortoises do not have to alter their preferred foraging activities because nonnative animals are present (Oldemeyer 1994). This consideration partly led to the first recovery plan for the desert tortoise recommending that grazing of domestic livestock and feral horses and burros be prohibited in Desert Wildlife Management Areas, which generally became designated tortoise critical habitat units (USFWS 1994). By 2009, livestock grazing had been eliminated from 53% of 13,000 km^2 of allotments in tortoise critical habitat (USFWS 2011). Decommissioning livestock allotments remains ongoing in certain areas, though some decommissioned allotments still contain abundant feral horses and burros (Ostermann-Kelm et al. 2009). We suggest two main best practices for nonnative animals in desert tortoise habitat within the context of forage and recovery plan directives for allotment decommissioning: monitor changes in habitats after reducing nonnative animals and strategically deploy exclosures.

1) *Monitor changes in habitats after reducing nonnative animals.* Little monitoring or research has been conducted during the past 20 y to identify transitions within plant communities of desert tortoise habitats following allotment decommissioning or to compare with areas still containing livestock or feral animals. Before/after or grazed/ungrazed comparisons deserve more attention to understand if or when preferred forage plants recover or whether additional actions are needed. It should also be considered that many desert tortoise habitats were grazed by livestock and feral animals for more than a century, which could leave legacies persistent long after the animals are removed (McKnight 1958; Beever 2013; Abella 2015). A possible legacy warranting evaluation is the long-term depletion of soil seed banks of native annual and herbaceous perennial plants preferred by desert tortoises (Minnich 2008). The possibility cannot presently be dismissed that forage plants favored by tortoises remain "missing," or at low abundance, even within areas now protected from herbivory by nonnative animals. Two management implications of this uncertainty are that 1) restoration seed mixtures in priority tortoise habitats could liberally include preferred forage plants, regardless of the prerestoration presence or absence of these plants at contemporary restoration sites (while still ensuring matching species to sites where they are adapted to grow); and 2) monitoring changes in forage composition and foraging activities by tortoises after removing nonnative animals remains an important best practice that should be employed more frequently than it has been.
2) *Strategically deploy exclosures.* When high densities of nonnative animals persist within desert tortoise habitats, strategically excluding the animals from certain areas may benefit vegetation conditions for tortoises. During 3 y in the northwestern Mojave Desert, native perennial grasses were 3–9 times denser inside exclosures compared with areas outside and open to feral burros (Abella 2008). After the Desert Tortoise Research Natural Area had been fenced for 12 y (excluding large herbivores and other disturbances), perennial plant cover was twice as high inside the fence compared with outside (Brooks 1995). Furthermore, the amount and quality of annual plant forage was greater inside the fence (Figure 5).

Action 3: Augment native forage plants. Most efforts aimed at improving forage conditions for the desert tortoise are indirect, such as removing nonnative plants

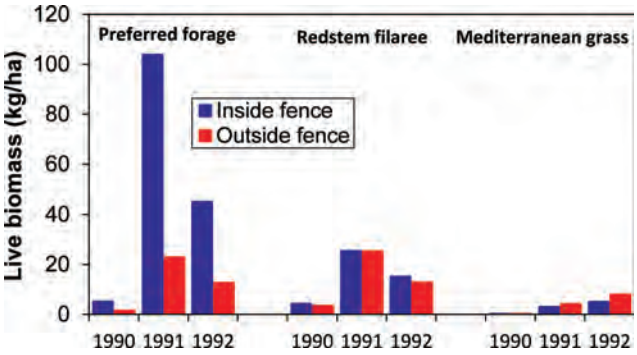

Figure 5. Comparison of the abundance of native annual forage plants with the nonnative redstem filaree *Erodium cicutarium* and Mediterranean grass *Schismus barbatus* inside and outside of fences, among 3 y, in the Desert Tortoise Research Natural Area, California. Data from Brooks (1995).

or livestock, under the assumption that forage plants will then increase naturally. Actively increasing forage plants is another option, but because research is limited to one study that showed potential (Abella et al. 2015a), the best current strategies are implementing further research and adaptive management trials. We suggest two practices: experimentally test forage augmentation strategies, and compare forage augmentation with other candidate actions.

1) *Experimentally test forage augmentation strategies.* A study at the desert tortoise Large-Scale Translocation Site in southern Nevada illustrated that actively augmenting abundance of a native annual forb—desert plantain—preferred by tortoises was feasible when effective treatments were identified (Abella et al. 2015a). Seeding bare seed without protective fencing resulted in minimal plant establishment. However, fencing and using pelletized seed produced six times the density of desert plantain relative to unseeded, unfenced controls. The seeding was followed by 2 y of average rainfall, and the one-time seeding augmented abundance of desert plantain for both years. The study showed that 0.25-ha patches of augmented forage could be established across the landscape, but it also showed that an iterative process was essential for identifying successful treatment combinations.
2) *Compare forage augmentation with other candidate actions.* The costs and benefits of actively augmenting forage remain unclear compared with other candidate actions such as treating nonnative plants or installing exclosures. For example, simply erecting fencing doubled the abundance of desert plantain in the study by Abella et al. (2015a). Yet to be tested is how fencing plus treating nonnative plants compares with the fencing plus seeding treatment. Identifying the cost- and ecological-effectiveness of a range of strategies for enhancing tortoise forage quality should be a priority.

Restore or conserve soil health

Different types of anthropogenic disturbances vary in their immediate and longer term effects on soil and vegetation. On certain soil types, such as desert pavements, even single passes of off-road vehicles leave visible scars of altered soil properties for decades (Adams et al. 1982; Belnap and Warren 2002). On nonpavement soils, several studies involving experimentally driving vehicles over soil have shown increased soil compaction, reduced water infiltration, and increased erosion compared with areas without off-road vehicles (e.g., Eckert et al. 1979; Adams et al. 1982; Webb 1982). Wildfires also can influence soil, with variable effects on different properties such as pH and total and available nutrient contents (Allen et al. 2011). Fires can increase concentrations of soil organic carbon and total nitrogen, likely by partly converting plant material to soil organic matter (Abella and Engel 2013). Elevated soil-nutrient status is not necessarily good for native ecosystems if nonnative plants usurp the additional resources (Allen et al. 2011). Wildfires also can change the structure of fertile islands, by reducing their size and killing the seeds they store (Esque et al. 2010). Severe soil disturbances—those that clear the surface layer of soil through blading or other means—can remove nutrients, biological soil crusts, and soil seed banks (Nishita and Haug 1973; Belnap and Warren 2002; Williams et al. 2013). Guo et al. (1998) reported that 97% of the viable soil seed bank was in the upper 2 cm of soil at a northern Mojave Desert site. By removing upper soil layers, land-clearing disturbances also reduce available rooting depth, which can decrease the size and productivity of perennial plants, affecting cover for desert tortoises (Bedford et al. 2009). In addition to best practices discussed in earlier sections for restoring native plant cover and reducing nonnative plant fuels to protect soils, the literature has emphasized three main actions for conserving or restoring soil health in desert tortoise habitats: 1) salvage topsoil if large soil disturbances are planned, 2) evaluate and remediate soil potentially toxic to tortoises, and 3) decommission certain backcountry roads for habitat enhancement.

Action 1: Salvage topsoil if large soil disturbances are planned. Soil formation is in constant flux, with some desert soils requiring millions of years to develop (McDonald et al. 1995). Topsoil salvage is among the most cost-effective strategies for initiating recovery on severe disturbances (Allen 1995). Salvaging and reapplying topsoil can accelerate plant colonization after disturbance because topsoil contains much of the soil organic matter, biological soil crust organisms (cyanobacteria, algae, lichens, and mosses), soil microbiota, and seed bank (Wallace et al. 1980). For example, survival of perennial plant species doubled when planted on Mojave Desert sites receiving topsoil, which was a benefit nearly equal to irrigating plants (Abella et al. 2015b). We emphasize two critical practices for effective topsoil salvage: carefully plan salvage operations, and carefully store soil to maximize biotic retention.

1) *Carefully plan salvage operations.* Several studies of salvaging desert soils have highlighted the importance of proper salvage procedures to avoid negating the benefits of salvage (e.g., Ghose 2001; Scoles-Sciulla and DeFalco 2009; Abella et al. 2015b). Present knowledge suggests that ideal salvage procedures for Mojave Desert soils include: 1) avoiding areas infested by nonnative plants or soil contaminants; 2) consistently salvaging the upper 5–10 cm; and 3) timing salvage to occur in summer from June through September (and later into autumn if it is a dry year) to capture winter annual seeds dispersed the previous spring, but before seedlings emerge in autumn–winter. Owing to concentration of live material in the upper 5–10 cm of desert soils, salvaging this depth as consistently as possible is important to avoid "diluting" the biota-rich layer with subsoil. For example, Scoles-Sciulla and DeFalco (2009) found that germinable seed density was reduced by 86% for the upper 4 cm of soil (the most important for seedling emergence) when salvaging the upper 30 cm of soil. Further research could examine benefits of strategically salvaging "fertile island" soil below the canopy driplines of shrubs to increase efficiency of nutrient and seed capture, thereby reducing space required to store soil (Abella et al. 2015b). Salvaging some interspace soil would also be wise to ensure capture of seeds of annual plants primarily growing in the open (Guo et al. 1998).
2) *Carefully store soil to maximize biotic retention.* Topsoil should be stored as briefly as possible before reapplication. Ideally, soil should not be stored at all and immediately applied to a recipient site. Practical constraints typically result in some storage being required, and this unavoidably creates some loss of biotic components. If soils must be stored, storage time ideally would not exceed 6–12 mo (Ghose 2001; Scoles-Sciulla and DeFalco 2009). For long storage durations, treatments could be used to potentially extend longevity of biotic components. Some possible treatments may include transplanting vegetation (such as native cactus pads) on top of the piles to potentially enhance longevity of soil microorganisms. These types of treatments have not been tested extensively and should be considered experimental. Also, the height of stockpiles should be as short as possible, preferably not $>$45–60 cm tall, because the deeper the pile, the more likely biotic components will be lost. If storage space limitations require deeper piles, consider periodically turning the soil. Stored soil should be protected, such as via tackifier, from wind erosion or other damage.

Action 2: Evaluate and remediate soil potentially toxic to tortoises. Toxic materials are a potentially insidious threat to desert tortoises because the presence of toxicants may not be superficially obvious and they can accumulate in the bodies of long-lived tortoises (Seltzer and Berry 2005; Jacobson et al. 2014; Kim et al. 2014). We suggest two main practices for reducing potential effects of toxicants to desert tortoises: assess potential for toxic soils, and avoid or remediate toxic soils before conducting other habitat activities.

1) *Assess potential for toxic soils.* A first step is identifying known or suspected areas with contaminants within, or adjacent to, desert tortoise critical habitats and protected areas (Chaffee and Berry 2006). For example, synthesizing records of past mining activities or identifying mine sites through remote sensing or field reconnaissance can help delineate potential locations contaminated by mining. Vectors for transport of mine wastes, such as prevailing winds or desert washes, should be evaluated (Kim et al. 2012, 2014). Other potential sources of contaminants, such as old industrial sites and associated downwind areas, should also be assessed. Ideally, soil sampling and laboratory analysis for typical contaminants, (e.g., arsenic and mercury) would be conducted to characterize areas of known or suspected contamination (Chaffee and Berry 2006).
2) *Avoid or remediate toxic soils before conducting other habitat activities.* If potential problem areas are identified, habitat enhancement actions that could draw desert tortoises to problem areas should be avoided or conducted elsewhere. Furthermore, strategies such as sealing old mines or limiting off-road vehicle use to avoid generating dust and transporting contaminants could be paramount before implementing other habitat improvements (Kim et al. 2014).

Action 3: Decommission certain backcountry roads for habitat enhancement. Strategically decommissioning and revegetating a portion of the extensive backcountry dirt road network can increase soil and plant community health (Brooks and Lair 2009). Best practices previously discussed for establishing perennial plants can also be applicable to revegetating decommissioned roads, along with practices for managing nonnative plants that can be transported along roads. Even in cases where roads have no apparent effect on adjoining vegetation, the area of the road represents a nonvegetated surface that removes an area of potential desert tortoise forage. One road 50 km long and 10 m wide, for example, occupies 50 ha of land, which is equivalent to a large home range of an adult desert tortoise (Harless et al. 2010). Practices for augmenting forage quality and quantity may be appropriate on decommissioned roads because these are already severely disturbed environments that could potentially be converted to special areas of desert tortoise forage. In addition, several studies have highlighted two main best practices for decommissioning backcountry roads: ameliorate topographic and soil surface alterations, and limit postrestoration vehicle incursions.

1) *Ameliorate topographic and soil surface alterations.* After road decommissioning, a key objective is restoring surface water flow by reconnecting severed

drainages (e.g., ephemeral stream channels) and roughening compacted road surfaces to improve water retention (Schlesinger and Jones 1984; Nichols and Bierman 2001). Recontouring road berms can be critical to restore natural water flow, whereas treatments such as ripping and constructing check dams can increase soil roughness and water infiltration (Bainbridge 2007). More work is required to understand effectiveness of mulching because the type of mulch can affect soil water and potentially erosion. For example, Walker and Powell (2001) found that straw mulch reduced soil water, likely via absorption, on a decommissioned road in the central Mojave Desert. Likewise, Caldwell et al. (2006) cautioned that additional research be directed toward developing ripping techniques for reducing soil compaction, to avoid undesirable effects like raising salts from subsoils into the rooting zone.

2) *Limit postrestoration vehicle incursions.* Another priority for road decommissioning is limiting subsequent vehicle trespasses through proper signage, traffic barriers, and camouflage (Bainbridge 2007). Investing in barriers and revegetation at road entry points can efficiently use limited resources by reducing trespasses that undermine other restoration efforts (Weigand and Rodgers 2009). Raking out vehicle tracks, applying stains for color blending, and installing live and dead plant material (vertical mulching) can blend decommissioned roads into the landscape (Bainbridge 2007; Smith et al. 2012). As DeFalco and Scoles-Sciulla (2011) noted, it is good practice to systematically document damage from unauthorized trespasses, because monetary value can be assigned to damaged public resources in court cases.

Conclusion

Changes in desert tortoise habitat during the past 150 y, including grazing by nonnative animals, invasion of nonnative plants, wildfires, proliferation of roads, urban and agricultural development, and other land-clearing disturbances, have affected habitat quantity and quality (USFWS 1994; Lovich and Bainbridge 1999; Brooks and Lair 2009; Berry et al. 2013, 2014b). Degradation of desert tortoise habitat includes lowered availability of large perennial plants as cover sites, reduced forage quality, and greater area harmful to tortoises (e.g., contaminated soil). Habitat management tools—such as actively revegetating disturbed soil and reducing nonnative plants—have potential to partly ameliorate habitat degradation. What has not been evaluated, however, is whether actively restoring habitat increases health or population sizes of desert tortoises. Short-term indicators that could provide insight into responses of desert tortoises to improved habitat may include enhanced growth or fecundity of individual tortoises, reduced evidence of mortality, or construction of new burrows by tortoises.

This review reinforces recommendations in the desert tortoise recovery plans (USFWS 1994, 2011) to implement a comprehensive suite of habitat enhancements. To date, no examples of this approach exist for the desert tortoise. Individual habitat management activities have not been related to the desert tortoise (e.g., vegetation restoration, treating nonnative plants) or have been mainly conducted in isolation as the only habitat management activity (Averill-Murray et al. 2012). To expand on the positives of individual actions such as fencing (e.g., Brooks 1995; Berry et al. 2014b), a next step is identifying priority locations to implement coordinated, integrated actions for recovery of habitat. Such actions could include mitigating roads, revegetating disturbances, enhancing forage quality, and reducing nonnative plants. It is important to ensure that these actions are not undermined by factors such as toxic soils. Sufficient science exists, including that summarized here, to identify candidate actions for implementing comprehensive habitat-enhancement trials. Improving habitat is already known to benefit other components of desert ecosystems (e.g., perennial plant communities), so implementing habitat enhancement measures is a conservative, low-risk strategy with high potential for assisting desert tortoise recovery.

Supplemental Material

Please note: The *Journal of Fish and Wildlife Management* is not responsible for the content or functionality of any supplemental material. Queries should be directed to the corresponding author for the article.

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Attachments

Abella S.R. and K.H. Berry. 2016. Enhancing and restoring habitat for the desert tortoise (*Gopherus agassizii*). Journal of Fish and Wildlife Management 7(1):xx–xx; e1944-687X. doi: 10.3996/052015-JFWM-046.

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Construction Best Management Practices

Desert Tortoise Protection

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Contents

This document was prepared to provide support to the US Fish and Wildlife Service (USFWS) and land management agencies in developing Biological Opinions for projects that could affect desert tortoise (*Gopherus agassizii*). Multiple Biological Opinions were reviewed to compile this suite of consistently employed Best Management Practices (BMPs).

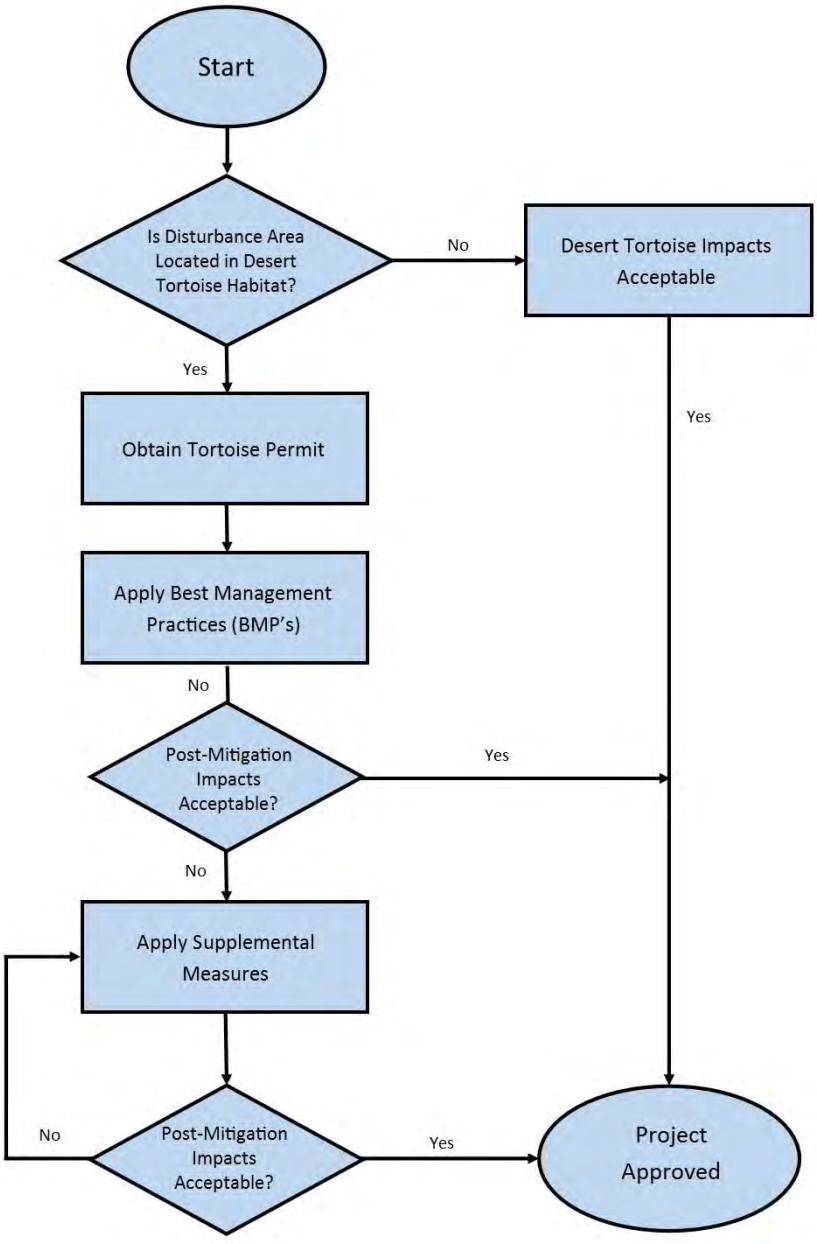
Project-specific BMPs adopted by the USFWS would become Terms and Conditions in a Biological Opinion and be the federal requirements for project construction. This document may also prove useful to project proponents in making their project development decisions because knowing the BMPs could allow them to minimize or avoid potential impacts to desert tortoise and its habitat. The document is organized as follows:

1.0 Best Management Practices Process Flowchart – A flowchart depicting the process for application of mitigation measures and the agency decision process if provided as a summary.

2.0 Best Management Practices – the BMPS are presented in this section.

3.0 References – Literature reviewed for summarizing the BMPs.

1.0 Best Management Practices Process Flowchart



2.0 Best Management Practices

This compilation of BMPs was prepared to aid federal agencies by providing a suite of consistent measures and to aid project proponents in understanding the requirements needed to protect the desert tortoise in accordance with the Federal Endangered Species Act of 1973 (ESA; 16 U.S.C. § 1531 et seq.). The ESA was designed to protect critically imperiled species from extinction as a "consequence of economic growth and development untempered by adequate concern and conservation." The U.S. Supreme Court found that "the plain intent of Congress in enacting" the ESA "was to halt and reverse the trend toward species extinction, whatever the cost."

Under the ESA, USFWS had been charged with evaluation of the potential effects on species that have been federally listed as threatened or endangered with extinction including the desert tortoise. To accomplish this they consult with the federal "Action" or "Lead" agency proposing the action, resulting in a Biological Opinion that either finds the action would not jeopardize the species or that it would result in jeopardy. Examples of federal lead agencies include the Bureau of Land Management, National Park Service, Federal Highway Administration, Army Corps of Engineers, and Department of Defense. Under a jeopardy Opinion the project would be denied federal approval and the USFWS would be required to identify "Reasonable and Prudent Alternatives" that could avoid the jeopardy. A non-jeopardy Opinion typically contains a number of Terms and Conditions designed to reduce potential impacts to a non-jeopardy level. A number of recent Biological Opinions were reviewed during preparation of this document to compile a standard suite of BMPS. BMPs adopted by USFWS in a Biological Opinion become mandatory Terms and Conditions that must be implemented for project construction.

2.1 Field Contact Representative

The Applicant will designate a Field Contact Representative (FCR) who shall be responsible for overseeing compliance with the Biological Opinion. The FCR will be onsite during all active construction activities that could result in the "take" of a desert tortoise. The FCR will have the authority to briefly halt activities that are in violation of the desert tortoise protective measures until the situation is remedied.

2.2 Authorized Desert Tortoise Biologist

Authorized desert tortoise biologists shall be onsite during all construction activities to ensure compliance with this Biological Opinion. Prospective authorized desert tortoise biologists will submit their statement of qualifications to the USFWS and allow a minimum of 30 days for response. Use of authorized desert tortoise biologists will be in accordance with the most up-to-date USFWS guidance and shall required for monitoring of any pre-construction, construction, operation, or maintenance activities that may result in take of the desert tortoise. The current guidance is provided in Chapter 3 of the Desert Tortoise (Mojave Population) Field Manual (herein "USFWS 2009").

The Applicants will employ authorized desert tortoise biologists, approved by the USFWS, to ensure compliance with protective measures for the desert tortoise. As such, all authorized desert tortoise biologists are functionally agents of the USFWS and shall report directly to the USFWS, the federal land management partner, and the proponent concurrently regarding all compliance issues and take of desert tortoises; this includes all draft and final reports of non-compliance or take.

2.3 Biological Monitors

Biological monitors shall employed and responsible for ensuring that all compliance measures in this Biological Opinion are properly implemented, including: reporting all non-compliance issues; reporting all tortoises found in harm's way; ensuring that project vehicles and equipment remain in designated areas; and minimizing the risk to tortoises on project access roads.

Working under the supervision of an authorized desert tortoise biologist, Biological Monitors would be present in all active construction locations. Biological monitors would provide oversight to ensure proper implementation of protective measures, record and report desert tortoise and desert tortoise sign observations in accordance with approved survey protocols, and report incidents of non-compliance in accordance with this Biological Opinion and other relevant project permits.

Authorized biologists will capture and handle desert tortoises in compliance with the most up-to-date guidance from the USFWS (2009). An authorized desert tortoise biologist shall be responsible for recording each observation of desert tortoise handled in the tortoise monitoring reports. This information will be provided directly to the USFWS and the federal lead agency.

2.4 Desert Tortoise Fencing

Installation of tortoise-proof fencing that is designed to protect desert tortoises by excluding them from construction zones may be warranted. Depending on the specifics of the project, USFWS will determine whether fencing is required and if so whether it is permanent, temporary, or of both types. See Chapter 8 in USFWS (2009).

2.4.1 Permanent Fencing

Permanent desert tortoise exclusionary fencing shall be installed around the boundary of the facility. An authorized desert tortoise biologist will monitor construction of exclusionary fencing in order to relocate all tortoises in harm's way to outside the fenced impact area.

Fence specifications shall be consistent with those approved in Chapter 8 of USFWS (2009) or most current version.

2.4.2 Temporary Tortoise Fencing

Should it be necessary to temporarily fence an area to exclude desert tortoises during construction, the temporary fencing would consist of: 1) portable stand-alone chain-link fence modules or plastic snow

fencing supported by standard metal fencepost, and 2) desert tortoise fencing in compliance with Chapter 8 of USFWS (2009).

2.5 Desert Tortoise Site Clearance

Once desert tortoise exclusionary fencing is installed, the fenced area shall be cleared under the direction of authorized desert tortoise biologists who will survey the area to ensure that no tortoises or active burrows are present within the fenced area as per Chapter 6 in USFWS (2009).

2.5.1 Desert Tortoise Clearance Surveys and Translocation Plans

After installation of desert tortoise exclusionary fencing and prior to any surface-disturbing activities, authorized desert tortoise biologists shall conduct a clearance survey to locate and remove all desert tortoises from harm's way, including those areas to be disturbed, using techniques that provide full coverage of construction areas (see Chapter 6 in USFWS 2009).

If more than 5 desert tortoises are to be moved a distance of more than 500 meters then a separate Translocation Plan must be prepared and approved by USFWS.

Desert tortoises found during the clearance survey will either be relocated outside the project impact area or translocated to a recipient site in accordance with the Biological Opinion and Translocation Plan, if applicable. In some cases where the proponent owns contiguous lands or those lands are managed by the BLM (which would require prior approval of the BLM), tortoises may be relocated a short distance onto those lands and monitored by either the Authorized Biologist or monitor until which time the tortoise(s) is judged to be out of harm's way. In some cases, an artificial burrow will need to be constructed by qualified biologists (see Chapter 6, Subsection 7 in USFWS 2009).

Authorized desert tortoise biologists will perform desert tortoise clearance surveys of all unfenced work areas outside the main project site immediately prior to the onset of pre-construction, construction, operation, or maintenance activities for project facilities. Desert tortoise monitoring shall be conducted during all related work activities in accordance with USFWS (2009), Biological Opinion, and Translocation Plan, if applicable.

2.5.2 Worker Environmental Awareness Program

A Worker Environmental Awareness Program (WEAP) shall be presented by an authorized desert tortoise biologist to all project personnel prior to them starting work on the project site. This program will contain information concerning the biology and distribution of the desert tortoise, desert tortoise activity patterns, its legal status, and occurrence in the proposed project area. The program will also discuss the definition of "take" and its associated penalties, measures designed to minimize the effects of construction activities, the means by which employees may limit impacts, and reporting requirements to be implemented when tortoises are encountered. Personnel shall be instructed to check under vehicles before moving them as tortoises often seek shelter under parked vehicles. WEAP training shall

be mandatory, and as such, workers shall be required to sign in and wear a sticker on their hard hat to signify that they have received the training and agree to comply.

2.5.3 Access Roads

Construction access would be limited to the project right-of-way (ROW) and established access roads as defined in pertinent permitting documents or as identified with the construction supervisor. The Applicants will prohibit project personnel from driving off road or performing ground-disturbing activities outside of designated areas during construction, operation, maintenance, or decommissioning.

2.5.4 Speed Limits and Signage

Until the desert tortoise exclusionary fence has been constructed (where applicable), a speed limit of 15 miles per hour shall be maintained during the periods of highest tortoise activity (March 1 through November 1), and a limit of 25 miles per hour maintained during periods of lower tortoise activity. This will reduce dust and allow for observation of tortoises in the road. Speed limit and caution signs would be installed along access roads and USFWS roads.

Where tortoise exclusionary fence is installed and desert tortoise clearance surveys have been completed, speed limits within the fenced and cleared areas shall be established by the construction contractor. Limits should be based on surface conditions and safety considerations. Vehicle travel in unfenced areas will adhere to speed limits established above.

2.5.5 Trash and Litter Control

A trash and litter control program shall be implemented and managed by the construction contractor and monitored by authorized desert tortoise biologists to reduce the attractiveness of the area to opportunistic and subsidized predators such as desert kit foxes, coyotes, badgers, and common ravens. Trash and food items shall be disposed of properly in predator-proof containers with re-sealing lids. Trash containers shall be emptied and construction waste shall be removed daily from the project area and disposed of in an approved landfill, recycling, or compost facility.

2.5.6 Dogs and Firearms

Firearms and domestic dogs shall be prohibited on the project site.

2.5.7 Raptor Control

Authorized biologists are responsible for inspecting structures annually for nesting ravens and other predatory birds and report observations of nests to the USFWS. Transmission line support structures and other facility structures shall be designed to discourage use by raptors for perching or nesting (e.g. by use of anti-perching devices) in accordance with the most current Avian Power Line Interaction Committee guidelines (APLIC 2006). BMPs to discourage the presence of ravens onsite include trash management, elimination of available water sources, designing structures to discourage potential nest sites, use of hazing to discourage raven presence, and active monitoring of the site for raven presence.

2.5.8 Habitat Compensation

Desert tortoise compensation fees will likely be required by the federal lead agency. The total acres of permanent and temporary disturbance shall be adjusted by the federal lead agency based upon final site design and disturbance acreage at the time a Notice to Proceed has been issued for the project (an increase in habitat disturbance may require re-initiation of consultation).

Compensation fees are used to support desert tortoise recovery, which may include the following actions: habitat restoration and recovery; monitoring of habitat, populations, and effectiveness of conservation and recovery actions; applied research to promote conservation/recovery; public outreach; predator management; and other actions recommended by USFWS approved Desert Tortoise Recovery Implementation Teams.

2.5.9 Overnight Hazards

An authorized desert tortoise biologist or Biological Monitor will inspect any excavations that are not within desert tortoise exclusion fencing on a regular basis (several times per day) and immediately prior to filling the excavation. If project personnel discover a desert tortoise in an open trench, an Authorized Biologist or Biological Monitor working under the supervision of an Authorized Biologist will move it to a safe location. To prevent entrapment of desert tortoises during non-work hours, the applicants will cover or temporarily fence excavations that are outside the permanently fenced project areas at the end of each day (e.g. trenches for water pipeline).

2.5.10 Checking for Tortoises Beneath Vehicles

All project personnel shall be instructed to check under vehicles before moving them as tortoises often seek shelter under parked vehicles. Vehicle door magnets or stickers that remind vehicle operators to look beneath tires before driving shall be prepared and distributed by the Authorized Biologist. If project personnel encounter a desert tortoise, they will contact an authorized desert tortoise biologist. The desert tortoise will be allowed to move a safe distance away prior to moving the vehicle. Alternatively, an authorized desert tortoise biologist or Biological Monitor may move the desert tortoise to a safe location to allow for movement of the vehicle.

2.5.11 Construction Area Flagging

Designated areas to protect desert tortoises and their habitat will be identified by an Authorized Biologist. An Authorized Biologist, Biological Monitor, of construction survey personnel, will flag boundaries of these areas for avoidance. Restricted areas may be identified and shall be monitored to ensure desert tortoises are protected during construction. ROW boundaries shall be flagged prior to beginning construction activities, and disturbance shall be confined to the ROW. In some cases, an Authorized Biologist or Biological Monitor shall escort all survey crews on site prior to construction. All survey crew vehicles will remain on existing roads and stay within flagged areas. In cases where construction vehicles are required to go off existing roads, an authorized desert tortoise biologist or Biological Monitor (on foot) would precede the vehicles and clear the area.

2.5.12 Blasting

If blasting is required in desert tortoise habitat, detonation shall only occur after the area has been surveyed and cleared by an authorized desert tortoise biologist no more than 24 hours prior. A 200-foot radius buffer area around the blasting site shall be surveyed, and all desert tortoises above ground within this 200-foot buffer shall be moved at least 500 feet from the blasting site, placed in unoccupied burrows, and temporarily penned to prevent from returning to the site. Tortoises located outside of the immediate blast zone and that are within burrows would be left in their burrows. All burrows, regardless of occupied status, will be stuffed with newspapers, flagged, and the location recorded using a GPS unit. Immediately after blasting, newspaper and flagging will be removed. If a burrow or cover site has collapsed that could be occupied, it shall be excavated to ensure no tortoises have been buried and are in danger of suffocation. Desert tortoises removed from the blast zone would be returned to their burrow if it is intact or placed in a similar unoccupied or constructed burrow.

2.5.13 Penning

Penning of desert tortoises shall be accomplished by installing a circular fence, approximately 20 feet in diameter, to enclose and surround the occupied tortoise burrow (USFWS 2009). The pen should be constructed with 1-inch horizontal by 2- inch vertical, galvanized welded 16-gauge wire. Steel T-posts or rebar should be placed every 5 to 6 feet to support the pen material. Pen material will extend 18 to 24-inches above ground. The bottom of the enclosure will be buried 6 to 12 inches or bent towards the burrow, have soils mounded along the base, and other measures implemented to ensure zero ground clearance. Care shall be taken to minimize visibility of the pen by the public. An authorized desert tortoise biologist or Biological Monitor shall check the pen at least daily to ensure the desert tortoise is secure and not stressed. No desert tortoise shall be penned for more than 48 hours without written approval by the USFWS.

Because this is a relatively new technique, all instances of penning or issues associated with penning shall be reported to the USFWS by phone and email within 24 hours by an authorized desert tortoise biologist. Desert tortoises shall not be penned when conditions are favorable for desert tortoise activity unless approved in advance by the USFWS. Pens for juvenile and hatchling-sized desert tortoises will consist of ½ inch by ¼ inch fencing with a cover to prevent predators, including smaller predators from gaining access to the tortoise (USFWS 2011).

All pens will be approved by USFWS and appropriate agencies, and the authorized desert tortoise biologist shall check pens daily to ensure all desert tortoises within the pens are present and no damage to the pens has occurred. Any impacts to penning or desert tortoises shall be reported to USFWS within one day. USFWS shall be contacted within one day of observation of desert tortoise injury or mortality.

2.5.14 Timing of Construction

The federal lead agency shall ensure that when possible, the project proponent schedules and conducts construction, operation, and maintenance activities within desert tortoise habitat during the less-active

season (generally November 1 to March 1) and during periods of reduced desert tortoise activity (typically when ambient temperatures are less than 60° or greater than 95°F).

2.5.15 Confine Activity to Delineated Area

The applicants will confine all project activities, project vehicles, and equipment within designated areas or delineated boundaries of work areas that authorized desert tortoise biologists or Biological Monitors have identified and cleared of desert tortoises. The applicants will confine all work areas to previously disturbed areas, and if none is available, to the smallest practical area, considering topography, placement of facilities, location of burrows, public health and safety, and other limiting factors. During activities at the completed project site, the applicants will confine all vehicle parking, material stockpiles, and construction-related materials to the permanently fenced project sites and construction logistics areas.

2.5.16 Noise Reduction

Noise reduction devices (e.g. mufflers) will be employed to minimize impacts to tortoises and other protected species. Explosives will be used only within specified times and at specified distances from sensitive wildlife or surface waters as established by the relevant federal and state agencies. Operators will ensure that all equipment is adequately muffled and maintained in order to minimize disturbance to wildlife.

2.5.17 Installing Shade Structures and Shelters

If interior fences are in place during the active season and prior to the removal of desert tortoises from within the area, the applicants will install shade structures along these fences. Shade structures will also be installed outside tortoise exclusionary fence to protect desert tortoises that have been relocated from within the project site, as well as desert tortoises occurring in the wild outside the project perimeter. The shelters will be designed and installed to provide shelter for both small and large tortoises. The shelters will be installed at approximately 1,000-foot intervals (or as approved by the USFWS), with one smaller sized shelter placed in between each larger shelter in order to provide additional locations for subadults and juveniles.

Shelters will be made from either PVC tubes, wood, or similar material with a diameter of 14 inches or greater for the larger shelters and 6-8 inches for the smaller ones. Tubes should be cut into 2-3 foot minimum lengths and then cut horizontally to mimic a naturally occurring burrow. Each shade structure would be partially buried and covered with a minimum 4 inches of soil and rocks to keep them from being blown away and to assist with thermoregulation within the shelter. Alternatively, the PVC tubes may be wired to the exclusionary fence. During all fence monitoring, these structures will be inspected regularly for their effectiveness and adjusted as needed to increase their effectiveness. These inspections will continue until either no tortoises are found consistently walking the fence during an entire active season or until the end of the project's construction period, whichever is earlier.

2.5.18 Moving Construction Pipes

When outside the fenced project areas, project personnel will not move construction pipes greater than 3 inches in diameter if they are stored less than 8 inches above the ground, until they have inspected the pipes to determine whether desert tortoises are present. As an alternative, the project proponent may cap all such structures before storing them outside of fenced areas.

2.5.19 Spill Prevention/Fire Management Plan

A Spill Prevention and Emergency Response Plan will be developed that considers sensitive ecological resources. Spills of any toxic substances will be promptly addressed and cleaned up before they can enter aquatic or other sensitive habitats as a result of runoff or leaching. A Fire Management Plan will be developed to implement measures that minimize the potential for a human-caused fire to affect ecological resources and that respond to natural fire situations.

2.5.20 Water Storage

Water needed for construction should be stored in tanks. If evaporation ponds are used, they will be fenced to prevent use by wildlife and treated in a manner approved by the federal lead agency partner and USFWS to prevent drowning. Wildlife escape ramps will be installed and the liner will be textured sufficiently to ensure that all wildlife can escape if they enter the pond. The ponds and fence shall be inspected at least daily. The Authorized Biologist will be responsible for monitoring for raven use and coordinate with the federal lead agency of appropriate action.

2.5.21 Non-emergency Expansion

Any non-emergency expansion of activities into areas outside of the areas considered in this Biological Opinion will require approval by the federal land management partner and USFWS, as well as necessary desert tortoise clearance surveys. These expanded activities may require re-initiation of consultation with the USFWS.

2.5.22 Geotechnical Testing

An authorized desert tortoise biologist or Biological Monitor will be at each of the geotechnical test sites for all necessary activities. Appropriate desert tortoise clearance will be conducted, and the authorized desert tortoise biologist or Biological Monitor will have the authority to micro-site the geotechnical test locations and stop work, if necessary, to avoid sensitive resources.

2.5.23 Translocation Strategy

Desert tortoises located during protocol clearance surveys of the project site may be relocated to areas outside the project site or transferred to an off-site quarantine facility (ex situ) for translocation, or monitored on the project site (in situ) via telemetry. If ex situ monitoring is selected, the off-site facility would be constructed and operated according to USFWS Translocation Guidance (2011). Transmitters and unique identifiers would be affixed to each desert tortoise following USFWS guidance.

A record of all desert tortoises encountered and translocated during project surveys and monitoring would be maintained. The record would include the following information for each desert tortoise: location (narrative, vegetation type, UTM coordinates, and maps) and dates of observations; burrow data; general conditions and health; appropriate measurements; any apparent injuries and state of healing; if moved, the location at which it was captured and the location at which it was released; voiding of the bladder and rehydration method/duration; and diagnostic markings (i.e. identification numbers).

2.5.24 Reporting

Depending on the scale of the project, agencies may require reports either at project close or quarterly during the duration of construction and annual updates after that. The federal lead agency may delegate this responsibility to the applicants. In addition, a final construction report will be submitted to the USFWS within 60 days of completion of construction of the project. All quarterly reports are due by the 10th of each of the following months (January, April, July, October), and annual reports are due February 1 of each year. If required, annual status updates shall be provided to the USFWS following completion of construction

Specifically, all reports must include information on any instances when desert tortoises were killed, injured, or handled; the circumstances of such incidents; and any actions undertaken to prevent similar incidents from reoccurring. Additionally, the reports should provide detailed information regarding each desert tortoise handled or observed, with the names of all authorized desert tortoise biologists or Biological Monitors (and the authorized desert tortoise who supervised their actions) involved in the project. Information will include the following: location (UTM), date and time of observation, whether desert tortoise was handled, general health, and whether it voided its bladder, re-hydration method and duration if applicable, location 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 authorized desert tortoise biologist or Biological Monitor to be in non-compliance with this Biological Opinion will be documented immediately and reported to the FCR by the authorized desert tortoise biologist.

3.0 References

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

U.S. Fish and Wildlife Service (USFWS). 2015. Biological Opinion. Programmatic EIS for Four Solar Energy Projects in the Dry Lake Solar Energy Zone. Las Vegas, NV.

U.S. Fish and Wildlife Service. 2014. Biological Opinion. Interstate 11, Phase II of the Boulder City Bypass Project. Las Vegas, NV.

U.S. Fish and Wildlife Service. 2013. Biological Opinion. Stateline Solar and Silver State South Projects. Las Vegas, NV.

U.S. Fish and Wildlife Service. 2012. Biological Opinion. KRoad Moapa Solar Project. Las Vegas, NV.

U.S. Fish and Wildlife Service. 2011. Translocation of Mojave Desert Tortoise from Project Sites: Plan Development Guidance (Draft). Reno, NV.

U.S. Fish and Wildlife Service. 2009. Desert Tortoise (Mojave Population) Field Manual: (*Gopherus agassizii*). Region 8, Sacramento, California.

Tennessee Valley Authority v. Hiram G. HILL, Jr., et al. 437 U.S. 153. June 15, 1978. https://law.resource.org/pub/us/case/reporter/US/437/437.US.153.76-1701.html (Accessed 08/17/2016).

NATIVE AMERICAN HERITAGE COMMISSION

September 1, 2020

John Forsythe
California Public Utilities Commission
300 Capitol Mall, Suite 518
Sacramento, CA 95814

Re: 2020080553, Ivanpah-Control Project, Inyo, Kern, and San Bernardino Counties

Dear Mr. Forsythe:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

a. Avoidance and preservation of the resources in place, including, but not limited to:

i. Planning and construction to avoid the resources and protect the cultural and natural context.

ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

i. Protecting the cultural character and integrity of the resource.

ii. Protecting the traditional use of the resource.

iii. Protecting the confidentiality of the resource.

c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).

e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).

2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.

3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).

4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:

- **a.** The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
- **b.** Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:

- **a.** If part or all of the APE has been previously surveyed for cultural resources.
- **b.** If any known cultural resources have already been recorded on or adjacent to the APE.
- **c.** If the probability is low, moderate, or high that cultural resources are located in the APE.
- **d.** If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.

- **a.** The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
- **b.** The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez-Lopez
Cultural Resources Analyst

cc: State Clearinghouse

Rincon Band of Luiseño Indians

CULTURAL RESOURCES DEPARTMENT

One Government Center Lane | Valley Center | CA 92082
(760) 749-1051 | Fax: (760) 749-8901 | rincon-nsn.gov

September 9, 2020

Sent via email only: Ivanpah-Control@aspeneg.com

Re: Preparation of EIR for the Ivanpah-Control Project

Dear Ivanpah-Control Project EIR Team,

This letter is written on behalf of Rincon Band of Luiseño Indians, ("Rincon Band" or "Band"), a federally recognized Indian Tribe and sovereign government.

The Band has received the Notice of Preparation for the California Public Utilities Commission's Environmental Impact Report. The location identified within project documents is not within the Band's specific Area of Historic Interest (AHI).

At this time, we have no additional information to provide. We recommend that you directly contact a Tribe that is closer to the project and may have pertinent information.

Thank you for submitting this project for Tribal review. If you have additional questions or concerns, please do not hesitate to contact our office at your convenience at (760) 297-2635 or via electronic mail at crd@rincon-nsn.gov.

Thank you for the opportunity to protect and preserve our cultural assets.

Sincerely,

Cheryl Madrigal
Tribal Historic Preservation Officer
Cultural Resources Manager

FORT INDEPENDENCE INDIAN RESERVATION

P.O. BOX 67 • INDEPENDENCE, CA 93526 • (760) 878-5160 • FAX (760) 878-2311

September 25, 2020

John Forsythe
CPUC Project Manager
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102-3298

RE: Fort Independence Indian Community of Paiutes Tribal Comment on the Southern California Edison Ivanpah-Control Project – 115kV Electric Transmission Line Replacement

Dear John Forsythe,

The Fort Independence Indian Community of Paiutes has specific concerns with the Southern California Edison 115kV Electric Transmission Line Replacement Proposal. This project will run completely through the Owens Valley and will directly affect known and undisclosed cultural sites.

I understand that a records review is being conducted or has been conducted to determine where cultural sites are located in the valley. Although that effort is appreciated, a proper review and study cannot be conducted without tribal consultation and input.

It is likely that this is the first time that Native American Tribes have been consulted on the construction of this power line. Tribal Historical Preservation Officer positions are new as are many of the regulations that require consultation.

It is extremely important to note that there are many "unrecorded" cultural sites in the Owens Valley and they remain that way for protection of our ancestors. As such, a review or records search will only reveal what has been documented and was likely documented without Tribal Perspective.

Many of the archaeological reports that I receive state "no known cultural resources" as a conclusion when preparing for a project. I might call your attention to the Zumstein Collection (file:///C:/Users/falco/AppData/Local/Microsoft/Windows/INetCache/IE/H135M58U/13-Dauplaise.pdf) and the problem that it presents.

The Zumstein family collected artifacts from the Owens Valley and other areas for over 50 years. These items were not done so professionally and has essentially worked to "erase our footprint" in the valley. When "pot hunters" and "collectors" take artifacts is it makes it harder to prove our existence and makes it easier for archaeologist to state that they didn't observe artifacts. It can also erase markers that indicate graves or other important areas.

The partial mitigation or remedy for this problem is to require Southern California Edison to hire Tribal Monitors who have experience in detecting cultural resources and who serve as the "voice or conscious" for our tribe as it is now, for ancestors as they were and to protect resources for the future.

Tribal consultation is also necessary to gain ethnographic information from elders or others who may have stories or knowledge of areas used for spiritual or other purposes. It is easy for agencies and archaeologist to overlook the vital importance of our culture and the extent that the valley has been occupied and used by our people for thousands of years.

Lastly, it is so easy for people and agencies in general to think of Paiutes or Native Americans in our valley that we have lived only on our reservations. Our elders and ancestors lived in a many different places in the valley, it has a lot of history and consequently much it has been erased.

One of our primary concerns is that although archaeologist, in many cases, do a thorough records search to identify potential concerns - much will be and is missed. Tribes need to be involved in the planning and execution of this project to prevent destruction and unnecessary disturbance of our precious and scared past.

If you have any questions pertaining to this project, please do not hesitate to contact me at (702) 601-3163 or email at falconkeeper22@gmail.com.

Respectfully,

Sean Scruggs
Tribal Historic Preservation Officer
Fort Independence

Enclosure
CC: Business Committee

LITHIC AVOCATIONAL COLLECTION FROM EASTERN CALIFORNIA AND WESTERN NEVADA: AN OVERVIEW

EMMA N. DAUPLAISE
MATURANGO MUSEUM

Over the course of about 50 years a large collection of lithic material from eastern California and western Nevada was collected and eventually deposited by the BLM into Maturango Museum for curation. The collection consists of mostly flaked stone specifically projectile points that has been analyzed, categorized and entered into a database. The collection is still in the process of being cataloged so that there can be a quantitative data analysis on the typologies and materials present in the collection. An overview into this very large collection could allow for research into use patterns of the area.

BACKGROUND

The Zumstein Collection is an incredibly large collection composed of primarily lithic technology which was collected by a family over the course of about 50 years. Once the family realized the ethical problems with this avocational collection, they were kind enough to deposit it to the BLM in Bishop, California. The collection was loaned to the Maturango Museum in Ridgecrest, California for curation in 2017. What the museum currently holds is approximately 10 percent of the total collection and the cataloging process is still in progress. This collection was primarily stored in See's candy boxes (Figure 1), and currently the museum has a count of 4,221 items of the Zumstein Collection with much more left to catalog. The museum began the curation process in the summer of 2017 with the help of Curation Assistants and Archaeology Interns. Due to the nature of this collection, there are only so many types of analysis that can be done so the primary focus of the curation of this collection is to identify as much as possible and to organize the collection into a tailored classification system for a comprehensive analysis of the contents of the collection.

APPROACH FOR CURATION

Knowing that this collection lacked provenience and site information, the priority for cataloguing became identifying the typologies of projectile points and lithic material that was found. Using Microsoft Excel, we used a classification system that focuses on identifying typologies according to the Great Basin stone tools outlined in Justice (2002). The flaked stone categories used include: projectile point, biface, flake tool, drill, core, core tool, crescent, and debitage. Once an item is identified more information such as condition, material, and notes are taken. The notes taken are incredibly important as each box of items has a small number of notes that can be inferred to be the locations to which these items were possibly found. We also took metrics for each projectile point individually: length, width, thickness, and weight. To ensure consistency with the cataloguing process interns are trained in Great Basin typologies and lithic identification and worked in teams of two so that there is teamwork in identifying and discussing the artifacts. The interns were overseen by our Archaeology Curator to assist us in identifying unique objects and answering any questions. The items in the collection are no longer stored in "See's" candy boxes; instead are individually bagged and organized numerically according to their catalog numbers.

ROUGH PROVENIENCES

One of the challenges faced in analyzing this collection is the lack of notes and provenience for the collection. Each one of the See's candy boxes (Figure 1) have a small note or locations written on them. Some of the locations include broad descriptions such as Monitor Valley, Truman Meadows,

Figure 1. Just a Few of the Many Zumstein Collection See's Candy Boxes.

Bridgeport, and Huntoon Valley. These locations allow for some limited inferences on the potential rough provenience of these artifacts based on the typologies that are being identified within the collection.

CONTENTS OF COLLECTION

The contents of this collection consist primarily of projectile points and various other lithic technologies. The most common type in the assemblage are points of the Elko series (Figure 2) with more than 900 identified Elko points. The other most common typologies are Rose Spring, Cottonwood Triangular, and Desert Side-notched (Figure 3). There is a small amount of identifiable Gatecliff series (Figure 4) points within the collection as well.

The presence of Gatecliff gives insight to the potential proveniences of the collection. According to Justice, the Gatecliff were most commonly collected in Monitor Valley, Nevada (2002:145). The Gatecliff points are thought to be possible predecessors to the Elko cluster dating to the Archaic Period approximately 5000–3300 BP (Justice 2002:304). The points within this collection have been predominantly made of obsidian with a smaller concentration of cryptocrystalline silicate (CCS).

The most common typology we found within this collection was the Elko Series (Figure 2) with more than 900 catalogued so far. The Elko series dates to the Late Archaic to Intermediate Period approximately 3500–3300 BP to 1400–1300 BP and is distributed throughout the entire Great Basin (Justice 2002). More than 60 percent of the Elko points are made of Obsidian with the rest composed of CCS.

The rest of the collection of projectile points consists of Rose Spring, Cottonwood Triangular, and Desert Side-notched points. These points date much later than the Elko and Gatecliff typologies and are

Figure 2. Intact Cryptocrystalline Silicate Elko Projectile Point from the Zumstein Collection.

Figure 3. Obsidian Desert Side-notched Projectile Point from the Zumstein Collection.

Figure 4. Obsidian Gatecliff Projectile Point Basal Fragment from the Zumstein Collection.

distributed throughout Eastern California and Western Nevada (Justice 2002). Majority of these types in the Zumstein collection were also composed of Obsidian with smaller amounts of CCS.

FUTURE GOALS

Ultimately, the goal of this collection is to complete cataloguing and transfer the data from Microsoft Excel into FileMaker Pro so that the information can be accessed in a more streamlined manner. There will be a need to revisit the categorization of typologies once cataloging is completed so that there can be a more updated perspective on this collection. This is a massive collection that could possibly benefit from more in-depth geochemical analysis of the materials and locations noted on the original collection boxes to research use patterns and typology distributions.

ACKNOWLEDGEMENTS

I'd like to acknowledge and thank the Zumstein family for donating this collection to the BLM. Thank you to Greg Haverstock and the BLM for their contribution to Maturango Museum by allowing us to work on this collection as well as funding two interns for our Summer Internship Program. I'd also like to thank Daisy Zajicek for helping start this massive project in the summer of 2017 alongside our other interns Levi Bayer, Carol Blair, and Inda Alexander who did a great job tackling this collection. Thank you to Kirsten Carroll, Kara Jones, and Shannon Labelle for your support. Finally, I'd like to thank Alexander Rogers immensely for giving all of us the invaluable experience of working on collections at Maturango Museum, mentoring us and expanding our knowledge in Great Basin archaeology and collections management.

REFERENCES CITED

Justice, Noel D.

2002 *Stone Age Spear and Arrow Points of California and the Great Basin*. Indiana University Press, Bloomington.

COLORADO RIVER INDIAN TRIBES

Colorado River Indian Reservation

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October 8, 2020

Via E-Mail and U.S. Mail

John Forsythe (CPUC Project Manager)
California Public Utilities Commission
c/o Aspen Environmental Group
235 Montgomery Street, Suite 640
San Francisco, CA 94104-2920
Email: Ivanpah-Control@aspeneg.com

Re: Ivanpah-Control NOP Scoping Comments

Dear Mr. Forsythe:

Per the California Public Utility Commission's September 2020 Notice of Preparation ("NOP"), the Colorado River Indian Tribes ("CRIT" or "Tribes") submit these comments[1] to help guide the scoping and content of the Environmental Impact Report ("EIR") for the proposed Ivanpah-Control ("Project") proposed by Southern California Edison Company ("SCE") in San Bernardino County, Kern County, and Inyo County, CA. The Project, a 115 kilovolt (kV) transmission line rebuild project, is proposed on approximately 358 miles. Parts of the Project would be located within the ancestral territory of members of the Tribes.

As a preliminary matter, the Colorado River Indian Tribes are a federally recognized Indian tribe comprised of over 4,440 members belonging to the Mohave, Chemehuevi, Hopi and Navajo Tribes. The almost 300,000-acre Colorado River Indian Reservation sits astride the Colorado River between Blythe, California and Parker, Arizona. The ancestral homelands of the Tribes' members, however, extend far beyond the Reservation boundaries. Significant portions of public and private lands in California, Arizona, and Nevada were occupied by the ancestors of the Tribes' Mohave and Chemehuevi members since time immemorial. These landscapes remain imbued with substantial cultural, spiritual, and religious significance for the Tribes' current members and future generations. For this reason, we have a strong interest in ensuring that

[1] The Tribes appreciate CPUC's extension of the comment deadline to October 9, 2020 to accommodate its Tribal Council meeting schedule.

potential cultural resource and other environmental impacts associated the proposed Project are adequately analyzed and mitigated.

I. The Project is Likely to Significantly Impact Cultural Resources.

Because of the Tribes' past, present, and future connection to the land on which portions of the Project is proposed, CRIT has concerns about the Project's potential for significant cultural resource impacts. Specifically, CRIT is concerned about potential impacts stemming from the 96-mile "Segment 4," located between the Coolwater Substation (East of Barstow) and the Ivanpah Station, adjacent to the Mojave National Preserve. Within this section, SCE proposes to install approximate 62 new transmission line structures and remove approximately 60 existing structures. Such construction would also require the creation of staging yards and work areas.

The Ivanpah-Control Project is one of dozens of energy projects either approved or under consideration by BLM, state, and local agencies in the area. The collective impact of this transformation of the desert has had, and will continue to have, considerable adverse impacts on the Tribes and the cultural, spiritual, and religious practices of CRIT members. CRIT continues to be concerned that federal and state governments intend to approve all energy projects, no matter what the cost to affected tribes, native plants and animals, and the desert ecosystem as a whole. While CRIT appreciates that this project involves the rebuild of existing infrastructure—and thus a reduction in potential impacts—the disturbance of new lands to build new transmission line structures is likely to result in disturbance of additional cultural resources and thus raises concerns.

Specifically, the Tribes are troubled by the Project's potential to remove, damage, or destroy cultural resources and artifacts. These resources are sacred and finite. According to the belief system of CRIT's Mohave members, the disturbance of any cultural resources affiliated with their ancestors is taboo, and thus considered a severe cultural harm.

II. The DEIR Must Broadly Consider Impacts to Cultural Resources

CRIT is concerned about the cultural harm that will result from both the unearthing and destruction of prehistoric archaeological resources and the Project's impacts on other cultural resources. In preparing EISs and EIRs for other solar energy facilities in the region, BLM, state, and local agencies have artificially constrained the definition of "cultural resources," thereby undermining the accuracy and quality of subsequent analysis.

The California Environmental Quality Act ("CEQA") Guidelines, however, explain that a historic resource need not be eligible for the California Register of Historical Resources ("CRHR") to be a "historic resource" under Public Resources Code sections 5020.1(j) or 5024.1; "historic resources" thus require a more expansive analysis than that required under the CRHR criteria. CEQA Guidelines § 15064.5(a)(4). Specifically, the DEIR must take into consideration California Assembly Bill 52's amendments to CEQA by recognizing the proposed project's

effect(s) on "tribal cultural resources," as defined in California Public Resources Code section 21074.

Such resources under either definition necessarily include viewsheds and landscapes, plants and animals used in and/or central to cultural and religious practices and creation stories, and religious and customary practices (e.g., hunting and gathering, religious ceremonies, and trail-walking). By using the correct definition of cultural resources for this Project, the CPUC can ensure that impacts to a host of important tangible and intangible resources are properly considered.

In addition, the DEIR must avoid conflating eligibility for the CRHR and significant impacts under CEQA. Impacts to archaeological resources considered ineligible for listing on the CRHR—perhaps because of their lack of integrity—may nevertheless be significant for CEQA purposes.

III. The DEIR Must Ensure that Potential Impacts to Known and Unknown Cultural Artifacts Are Analyzed and Avoided.

Given CRIT's ongoing experience with utility-scale solar development on land near its Reservation, the Tribes are concerned about the Project's likely impact on both known and unknown archaeological resources. Many of these cultural artifacts are intimately linked to current CRIT members, who consider their disturbance and/or damage to be a significant cultural harm. While cremation sites are of unique importance to the Tribes, other types of artifacts, including groundstones, ceramics, and lithics, are also held sacred.

As a result, all cultural resources should be surveyed, inventoried, and evaluated in a manner that does not harm the resources or remove them from the site prior to preparation of the DEIR so that the environmental analysis fully and adequately takes cultural resource impacts into account. CPUC should also ensure that cultural resource mitigation and treatment plans are in place prior to any ground disturbing activities at the site.

CEQA requires lead agencies to identify significant impacts to "historic resources" and mitigate these impacts. *See, e.g.,* CEQA Guidelines § 15064.5. Moreover, CEQA *requires* lead agencies to use preservation in place for archaeological resources if feasible, unless other mitigation would be more protective. CEQA Guidelines § 15126.4(b); *Madera Oversight Coal. v. County of Madera* (2011) 199 Cal.App.4th 48, 82-87. As a result, proposed mitigation measures must first require avoidance of cultural resources. Only if avoidance is infeasible may the Project impact cultural resources. This feasibility assessment must be defined in the EIR as requiring a written evaluation, supported by substantial evidence, and available for tribal review and comment.

In addition, the CPUC should ensure that all other mitigation measures are developed to ensure maximum protection for cultural resources. For instance, the CPUC should ensure that tribal monitors are used during all activities that have the potential to impact cultural resources,

including but not limited to mowing, grading, and excavation. The presence of tribal monitors will help ensure that all resources of value to the Tribes are recognized and treated with appropriate respect. In addition, the mitigation measures should allow for in-situ or adjacent reburial of prehistoric cultural resources, if such resources are located and cannot be avoided. Such measures help ensure that the footprint of the ancestors of Tribal members are not erased during construction.

IV. The DEIR Must Adequately Consider Cumulative Impacts to Cultural Resources.

The CPUC must take a hard look at cumulative impacts to cultural resources. CEQA requires agencies to consider cumulative impacts, meaning "two of more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." CEQA Guidelines § 15355; *see also id.* § 15130. "Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects. CEQA Guidelines § 15130(a)(3); Pub. Resources Code, § 21083(b).

As CRIT has explained, the collective and continual destruction and removal of cultural resources from the Tribes' ancestral lands due to energy projects has already caused tremendous spiritual harm to CRIT members. In addition to triggering extensive cultural resource removal, these energy projects are often sited in a way that severs the connectivity between cultural resource sites—a connectivity that is vital to the traditional value of these cultural resources. In considering the potential cultural resources impacts of the Ivanpah-Control Project, the CPUC must analyze those impacts in light of other past, present, and reasonably foreseeable future actions impacting cultural resources in this region. The CPUC must also describe the methodology used to assess cumulative impacts and list out the other projects considered in analyzing cumulative impacts.

V. The CPUC Should Consider a Disturbed Lands Alternative.

Within Segment 4, SCE appears to propose building new transmission structures on lands that are not disturbed, while decommissioning structures on already disturbed lands. To avoid the cultural harm caused by disturbance of additional lands, the DEIR should consider whether an alternative that confines disturbance to the already disturbed lands within Segment 4 is feasible.

VI. Conclusion.

Thank you for considering these comments. To best understand how these comments are taken into account in the DEIR, we request that the CPUC provide written responses to our concerns, either in a letter to the Tribe and/or in the DEIR. Please copy the Tribes' Attorney General Rebecca A. Loudbear, at rloudbear@critdoj.com, Deputy Attorney General Antoinette Flora, at aflora@critdoj.com and THPO Director Bryan Etsitty, at betsitty@crit-nsn.gov, on all correspondence to the Tribes.

John Forsythe, CPUC Project Manager
October 8, 2020

Please note that the Tribes have responded separately to the CPUC's request for consultation pursuant to AB 52.

Respectfully,

Dennis Patch
Chairman, Colorado River Indian Tribes

cc: CRIT Tribal Council
Rebecca A. Loudbear, CRIT Attorney General
Bryan Etsitty, Director, Tribal Historic Preservation Office

Email: Ivanpah-Control Project EIR Team

From: Jeff Borders <jeffborders@bordersconsulting.com>
Sent: Thursday, September 10, 2020 6:23 PM
To: Ivanpah-Control Project Team
Subject: SCE Ivanpah Control Project Plan

My name is Jeff Borders. I own 140 acres north of Inyokern adjacent to the high power lines that SCE plans to upgrade. As far as I can tell from the planning documents on the website, SCE is planning to upgrade and replace towers and high voltage wires as needed to maintain the 115 Kv carrying capacity. This does not appear to increase the capacity of the lines, for example, to 138 kv. I don't understand why the plan does not include increasing the carrying capacity of the lines.

In early 2012, the state of California and Inyo county created a planning overlay designating properties adjacent to the power lines as potential solar and wind sites. In 2011, Lincoln Renewable Energy, LLC signed an option agreement with myself and adjacent property owners to purchase our properties for the purpose of building a large scale solar generation facility. After 3 years of studies and applications with the State and SCE, Lincoln opted out of the project.

Their explanation was that the existing high power lines did not have sufficient capacity to ship the power that would be generated by their planned solar facility. So again, I wonder, why would SCE go through all of the effort and expense to simply replace the existing 115 Kv lines? This will not provide additional carrying capacity to add additional solar and wind generation facilities along the route in the near future which was the purpose for the power generation overlay.

Jeff Borders
760-790-8642

Parcel No APN 037-250-03-00

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September 30, 2020

VIA U.S. MAIL AND E-MAIL [Ivanpah-Control@aspeneg.com]

John Forsythe
c/o Aspen Environmental Group
235 Montgomery Street, Suite 640
San Francisco, California 94104

Re: SCE Ivanpah-Control Project – Scoping Comments for Preparation of Environmental Impact Report.

Dear Mr. Forsythe:

This firm represents Meadowbrook Dairy ("Meadowbrook"), one of the largest agricultural producers in the Indian Wells Valley, located north of Ridgecrest in Kern County. Meadowbrook owns land that is adjacent to the existing SCE power transmission lines and the proposed SCE Ivanpah-Control Project ("Project"). A full list of Meadowbrook's property will be sent at a later date ("Property"). On behalf of Meadowbrook we appreciate the opportunity to provide the following comments and issues that the Environmental Impact Report ("EIR") must address as it relates to the potential impacts the Project will have on Meadowbrook's property and agricultural operations.

The Project towers and power lines that will traverse Meadowbrook's property are part of Segment 1 located between the Inyo-Kern Substation and the Coso Substation. SCE has existing easements across the eastern edge of Meadowbrook's property, where several of the existing towers abut Meadowbrook's alfalfa fields. SCE has indicated to Meadowbrook that the Project will require a new 100 foot wide easement ("new easement") centered west of its existing easements. SCE has provided Meadowbrook with its Segment 1 Right-Of-Way exhibits that depict the general location of the new easement through the Property. Based on these

exhibits, the new easement will put the Project, towers and transmission lines, further into and across Meadowbrook's Property. The Placement of the Project towers and transmission lines further into Meadowbrook's Property could result in construction and long-term impacts to agricultural land, health and safety, and air quality that must be analyzed in the EIR.

The EIR needs to identify and discuss the following:

1. Project Description and location: The location of the proposed towers and whether they will be within any of Meadowbrook's fields on the Property. Once the location of the towers is identified, discuss whether there will be any temporary or permanent removal of crops from production as result of the tower placement. In addition, the fields are irrigated with center-pivots, so if a tower is placed within a field the center-pivot irrigation may be impacted. If the towers and transmission lines will be outside of the fields the EIR should state that.

2. If the placement of the Project towers and transmission lines will be within an agricultural field, the EIR must identify, discuss and mitigate for the loss of agricultural land and crop production.

3. Regardless of the placement of the towers, it appears that the Project transmission lines will cross active agricultural fields. The EIR must address the impacts to the farming operations and safety requirements associated with agricultural personnel and equipment working in and under these new transmission lines including any impact to the farming operation that could result in impacts to crop yield.

4. The construction of the towers and transmission lines will impact crop production and impact the operations of the US Navy. Crops and the operations on the Navy Base would be negatively impacted by dust and construction activities in the form of dust, vehicle movement and aerial activities (use of cranes and helicopters). The EIR must identify, discuss and mitigate construction related impacts including air quality, water quality and loss of crop production if the permanent crop has to be removed.

Please add the undersigned to the distribution list for this Project. We are available to discuss these comments.

Respectfully submitted,

Brent R. McManigal, of
GRESHAM SAVAGE
NOLAN & TILDEN,
A Professional Corporation

BRM:jmk
cc: Meadowbrook Dairy