SUNRISE POWERLINK℠

Avian Monitoring and Mitigation Plan: Mitigation Measure Compliance for Hawks, Eagles, and other Birds

Submitted to:

California Public Utilities Commission
California Department of Fish and Game
U.S. Department of Interior Bureau of Land Management
U.S. Fish and Wildlife Service
U.S. Department of Agriculture Forest Service

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ABBREVIATIONS AND ACRONYMS

AGL	Above Ground Level
APLIC	Avian Power Line Interaction Committee
APP	Avian Protection Plan
ARS	Avian Reporting System
BLM	Bureau of Land Management, U.S. Department of Interior
CBP	Customs and Border Patrol
CEC	California Energy Commission
CPUC	California Public Utilities Commission
DOD	Department of Defense
FAA	Federal Aviation Administration
FEIR/EIS	Final Environmental Impact Report & Environmental Impact Statement
Final PMR	Final Project Modification Report
GPS	Global Positioning System
MMCRP	Mitigation Monitoring Compliance, and Reporting Plan
OGWC	Optical Ground Wire Cable
ROD	Record of Decision
ROW	Right-of-Way
SDG&E	San Diego Gas and Electric Company
SRPL	Sunrise Powerlink
TSAP	Tower Staging Access Pad
USFS	United States Forest Service, U.S. Department of Agriculture
USFWS	United States Fish and Wildlife Service

1. INTRODUCTION

1.1 PROJECT DESCRIPTION

The Sunrise Powerlink Project (Project) is a new 500 kilovolt (kV) and 230kV transmission line that SDG&E will build, operate, and maintain in San Diego and Imperial counties, California. The Project was approved by the California Public Utilities Commission (CPUC) in December 2008 and by the U.S. Department of Interior Bureau of Land Management (BLM) in January 2009. The U.S. Department of Agriculture Forest Service (USFS), a cooperating federal agency for the EIR/EIS, issued its own ROD in July 2010. In May 2010, SDG&E submitted the *Sunrise Powerlink Project: Project Modification Report* (PMR) to the CPUC and BLM for review. The PMR for the Project was revised based on review comments and the document was subsequently approved by CPUC and BLM in September 2010.

The line will extend for approximately 117 miles between an existing SDG&E substation south of El Centro in Imperial County to an existing SDG&E substation on the northeast edge of Miramar Marine Corps Air Station in San Diego County (Figure 1). Construction is projected to begin in the Fall of 2010 and continue for approximately 30 months. The construction phase of the Project will entail establishment of 443 towers and poles, a new substation (Suncrest Substation) where the line converts from 500kV to 230kV, permanent access roads, maintenance areas at structure sites, and permanent tower staging access pads (TSAPs) for helicopters. The construction phase also has several temporary components (construction yards, work areas at structure sites, wire stringing areas, guard structures, and some temporary access roads). The permanent components will be operated and maintained by SDG&E. The temporary components will be removed after construction and the sites restored to pre-construction conditions. During the construction phase, SDG&E also will upgrade three existing 69kV lines and their associated substations (Elliot, Pomerado, and Scripps substations). The reconductoring work entails the replacement of insulators, conductors, and some 69kV poles.

1.2 MITIGATION MEASURES

Two mitigation measures are required by the Final Environmental Impact Report/Environmental Impact Statement (FEIR/EIS) for the Sunrise Powerlink Project in reference to potential avian impacts. These measures are detailed in the Mitigation Monitoring, Compliance, and Reporting Program (MMCRP, CPUC and BLM 2009). Mitigation Measure B-10a (Section 2.0) addresses several bird protection measures to reduce the impact of the proposed power line on birds. Mitigation Measure B-7h (Section 3.0) addresses eagle protection measures to successfully avoid indirect impacts to eagle nests.

1.3 CONSULTATIONS

Throughout the development of this plan, SDG&E consulted with the Federal Aviation Administration (FAA), Customs and Border Protection (CBP) and Department of Defense (DOD), BLM, and USFS.

Comments were received from the FAA, CBP, and DOD regarding aerial marker sphere and infrared lighting locations. The USFS and the BLM provided data regarding eagle nests in the vicinity of the Project. In addition, avian experts Philip Unitt and Robert McKernan were consulted regarding migration patterns within the Project area.

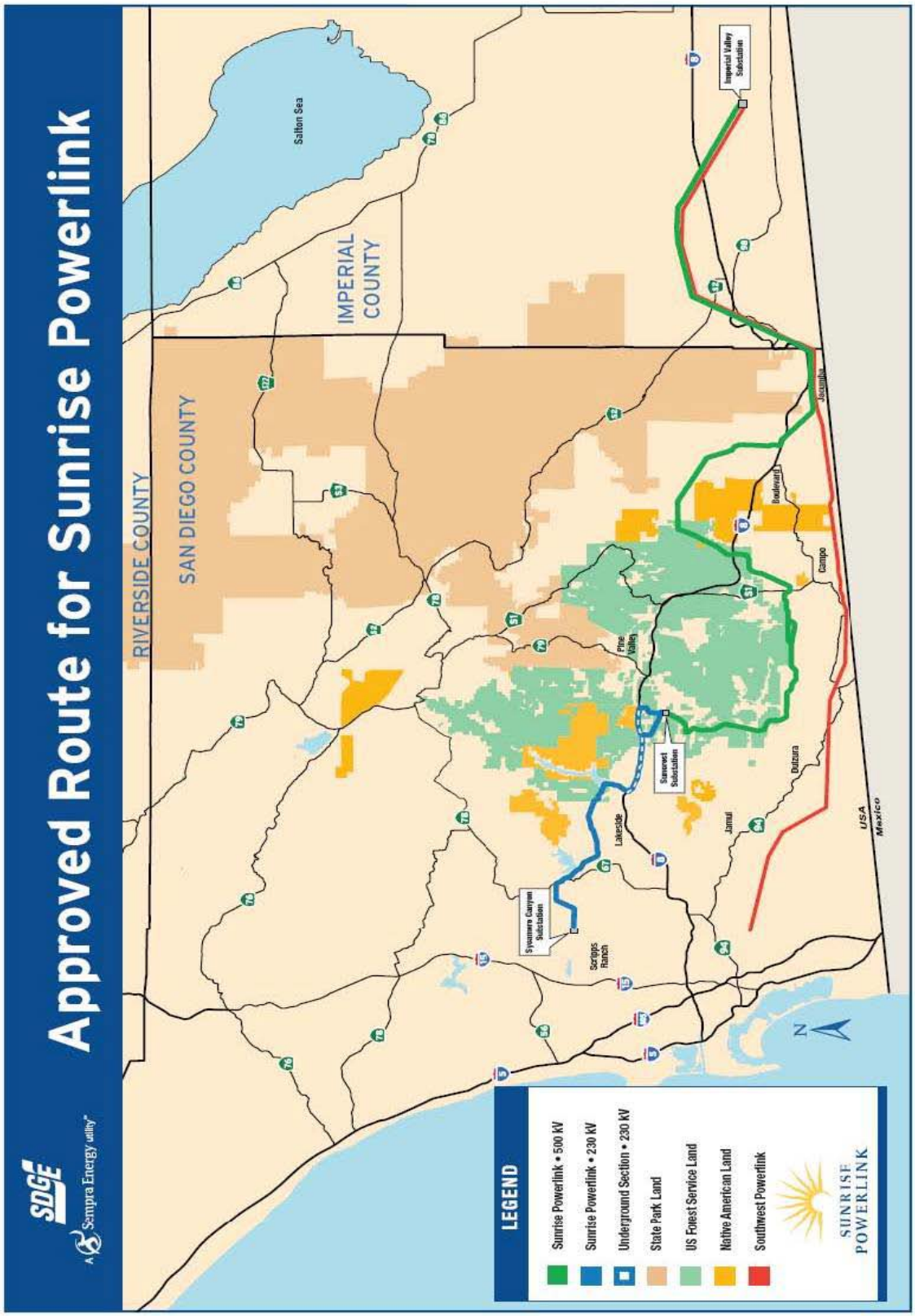


Figure 1. Sunrise Powerlink Transmission Line

2. MITIGATION MEASURE B-10A

This section provides a brief description of Mitigation measure B-10A and compliance actions.

2.1 MITIGATION MEASURE OVERVIEW

Mitigation measure B-10a applies to avian power line standards as described in the MMCRP (CPUC and BLM 2009), and is as follows:

Mitigation Measure B-10a: Utilize Avian Power Line Interaction Committee standards for collision-reducing techniques

Applicant shall install the transmission lines utilizing Avian Power Line Interaction Committee (APLIC) standards for collision-reducing techniques as outlined in "Mitigating Bird Collisions with Power Lines: The State of the Art in 1994" (APLIC, 1994) as follows on B-10a-1a-1:

- Placement of towers and lines shall not be located above existing towers and lines, topographic features, or tree lines to the maximum extent practicable.
- Power lines should be clustered in the vertical and horizontal planes aligned with existing geographic features or tree lines, and located parallel (rather than perpendicular) to prevailing wind patterns to the maximum degree feasible.
- Additionally, overhead lines that are located in highly utilized avian flight paths shall be marked utilizing fixed-mount Firefly Flapper/Diverters, swan flight diverter coils, or other diversion devices, if proven more effective, as to be visible to birds and to reduce avian collision with power lines Where such markers are installed, the Applicant shall fund a study to determine the effectiveness of the markers as a collision prevention measure since there are few, if any, studies that show if such markers work, especially on transmission lines (CEC, 2007).

Submit draft study protocol

The Applicant shall develop a draft study protocol and submit it to the wildlife agencies and California State Parks, as well as to CPUC and BLM, for review. The applicant shall coordinate with the wildlife agencies to develop alternate collision protection measures.

Implement an avian reporting system

The Applicant shall implement an avian reporting system for documenting bird mortalities to help identify problem areas. The reporting system shall follow the format in Appendix C of "Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006" (APLIC, 2006) or a similar format.

Submit a draft reporting protocol and reporting system

The Applicant shall submit a draft reporting protocol and reporting system to the wildlife agencies, as well as to CPUC and BLM, for review and approval. The Applicant shall continue to work with these agencies until approval of a final reporting protocol and reporting system is obtained.

Develop and implement methods to reduce mortalities

The Applicant shall develop and implement methods to reduce mortalities in identified problem areas. The methods shall be approved by the wildlife agencies, CPUC, and BLM prior to implementation.

Document bird mortalities

Bird mortality shall continue to be documented in the problem areas per the avian reporting system to determine the effectiveness of the mortality reduction methods and to determine if new methods need to be developed.

2.2 PLACEMENT AND INSTALLATION OF TOWERS AND POWER LINES

The project adheres to codes that govern power line design and construction developed by CPUC General Order 95. In addition, the primary criteria used to place towers and power lines for the Project are to satisfy engineering and routing constraints and to minimize impacts to sensitive habitats, such as jurisdictional waters of the United States, riparian corridors, and federal- and state-listed species habitat; visual and aesthetic sensitive areas; cultural resources; sensitive land uses such as Riparian Conservation Areas.

The Project is also designed to comply with standards for avian collision-reducing techniques suggested in APLIC (1994, 2006). Line separations exceed the suggested practices recommended by APLIC to avoid electrocution incidents. Where feasible, the towers and lines are located at or below the topographic and natural features adjacent to the Project and aligned with existing geographic features. Birds will ascend high enough to pass over the land features, and therefore also pass over Sunrise Powerlink (SRPL). In addition, birds may not be able to maintain flight control while flying perpendicular to high-velocity winds and get blown into the lines regardless of visibility (APLIC 1994). The SRPL lines have been placed parallel to prevailing winds where feasible to minimize loss of flight control.

2.3 RISK ASSESSMENT OF AVIAN COLLISION POTENTIAL

Avian collision with power lines has been a concern of the utilities, the public, and the regulatory agencies for many years. Generally, the conductors are large enough in diameter to be readily visible to migrating or resident birds in flight. Birds most frequently collide with the Optical Ground Wire Cable (OGWC) located at the peak of each tower (APLIC 1994). These wires have a much smaller diameter than conductors and are much less visible.

Mitigation Measure B-10a requires the use of diversion devices (flight diverters) to increase visibility and reduce avian collisions in highly utilized avian flight paths. In addition, an avian mortality study of the effectiveness of flight diverters is required. The Final PMR relevant to Mitigation Measure B-10a recognizes that no highly utilized avian flight paths are located along the Project. Therefore, the implementation of Mitigation Measure B-10a does not require the installation of collision-reducing devices or an avian mortality study due to highly utilized avian flight paths.

The CBP and DOD maintain navigable air space within the Project, and Mitigation Measure T-11b (CPUC and BLM 2009) requires SDG&E to identify safety concerns the Project may pose to flight operations. As a safety measure for night time flights of aircraft, the CBP and DOD requested that SDG&E install infrared lights on 306 towers (Table 1), as defined in the Final PMR. Night-flying insects may be attracted to infrared lighting in the vicinity of the towers, which may attract a higher density of nocturnal insectivorous birds. Direct impacts to these species could occur if they collide with conductors near the towers.

While the Final PMR determines that infrared lighting will not create a new significant impact to birds, Mitigation Measure B-10a will be implemented at infrared lighting installations. Therefore, flight diverters will be installed on the conductor spans adjacent to the towers with infrared lighting (IR towers), and SDG&E will fund an avian mortality study to determine the effectiveness of the flight diverters. This plan proposes an avian mortality study protocol to confirm the efficacy of the long-term use of avian diverters (Section 2.6). SDG&E will also implement an avian reporting system (ARS) with their existing Avian Protection Plan in order to document and minimize any avian mortalities. The implementation of this mitigation measure in full will ensure that the avian impacts from IR towers will not be substantially more severe than the impacts analyzed in the FEIR/EIS.

In addition to flight diverters, SDG&E is planning to install 1,345 aerial marker spheres. APLIC (1994) recommends using aerial marker spheres to reduce avian collisions with transmission lines. The FEIR/EIS anticipated aerial marker sphere utilization; however, the FEIR/EIS did not recognize the need that aerial marker spheres may be required for aviation safety by the FAA, CBP or the DOD. The Final PMR recognizes that aerial marker spheres are sufficient to comply with Mitigation Measure B-10a, would reduce the risk of avian collisions with transmission lines, and specifies a greater number of marker spheres than anticipated in the FEIR/EIS. The FAA, CBP, and DOD requested the installation of aerial marker spheres at specific locations in order to address concerns regarding aircraft safety. The Final PMR indicates that 1,345 aerial marker spheres will be required on 134 spans of the SRPL, the use of aerial marker spheres presents no new significant impacts, and this practice is within the range of alternatives discussed in the FEIR/EIS.

Based on the utilization of collision-reducing standards recommended by APLIC and employed in the placement and installation of the SRPL, SDG&E believes that the risk of avian collisions with the SRPL will be reduced. Marking lines with aerial marker spheres in accordance with FAA, CBP, and DOD guidance will also provide additional avian protection in those areas. Spans adjacent to IR Towers will be fitted with flight diverters and undergo a study on their efficacy. SDG&E further commits to utilize an adaptive management approach and engage in corrective measures throughout the course of SRPL as needed.

Table 1. Proposed Location of Infrared Lighting on SRPL Towers[1]

Link	Structure	Infrared Lighting	Flight Diverters
1	EP363-1	Yes	4
1	EP362-1	Yes	4
1	EP342	Yes	4
1	EP341	Yes	4
1	EP331	Yes	4
1	EP330-1	Yes	4
1	EP317	Yes	4
1	EP316-2	Yes	4
1	EP304-2	Yes	4
1	EP303-2	Yes	4
1	EP302-1	Yes	4
1	EP301	Yes	4
1	EP300-1	Yes	4
1	EP299	Yes	4
1	EP296	Yes	4
1	EP295	Yes	4
1	EP291-1	Yes	4
1	EP290	Yes	4
1	EP269-1	Yes	4
1	EP267-2	Yes	4
1	EP263B-2	Yes	4
1	EP263A-2	Yes	4
1	EP262-4	Yes	4
1	EP261A	Yes	4
1	EP261-2	Yes	4
1	EP259-3	Yes	4
1	EP258-3	Yes	4
1	EP256	Yes	4
1	EP255-2	Yes	4
1	EP254-3	Yes	4
1	EP252A-1	Yes	4
1	EP252-1	Yes	4
1	EP251	Yes	4
1	EP250	Yes	4
1	EP249	Yes	4
1	EP248	Yes	4
1	EP247	Yes	4
1	EP246	Yes	4
1	EP245-1	Yes	4

Link	Structure	Infrared Lighting	Flight Diverters
1	EP244	Yes	4
1	EP243	Yes	4
1	EP240	Yes	4
1	EP239-1	Yes	4
1	EP238-1	Yes	4
1	EP237-1	Yes	4
1	EP236-1	Yes	4
1	EP234-1	Yes	4
1	EP233-1	Yes	4
1	EP232-1	Yes	4
1	EP230-1	Yes	4
1	EP229-1	Yes	4
1	EP228	Yes	4
1	EP226-1	Yes	4
1	EP225-1	Yes	4
1	EP224-1	Yes	4
1	EP223-1	Yes	4
1	EP221A	Yes	4
1	EP221-2	Yes	4
1	EP220-1	Yes	4
1	EP219-1	Yes	4
1	EP217-1	Yes	4
1	EP215 (Section 9B)	Yes	4
1	EP214	Yes	4
1	EP211	Yes	4
1	EP210	Yes	4
1	EP209-1	Yes	4
1	EP206-1	Yes	4
1	EP205-2	Yes	4
1	EP203-3	Yes	4
1	EP200-3	Yes	4
1	EP198-3	Yes	4
1	EP196-1	Yes	4
1	EP194-2	Yes	4
1	EP190-2	Yes	4
1	EP187-2	Yes	4
1	EP186-1	Yes	4
1	EP183	Yes	4
1	EP181	Yes	4
1	EP177	Yes	4

Link	Structure	Infrared Lighting	Flight Diverters
1	EP175	Yes	4
1	EP174	Yes	4
1	EP172	Yes	4
1	EP170	Yes	4
1	EP152-2	Yes	4
1	EP150	Yes	4
1	EP149-1	Yes	4
1	EP148-1	Yes	4
1	EP147	Yes	4
1	EP146	Yes	4
1	EP145	Yes	4
1	EP144	Yes	4
1	EP143-1	Yes	4
1	EP142-1	Yes	4
1	EP141	Yes	4
1	EP140 (SECTION 9A)	Yes	4
1	EP139-1 (SECTION 9A)	Yes	4
2	EP138-2 (SECTION 9A)	Yes	4
2	EP137	Yes	4
2	EP136	Yes	4
2	EP135	Yes	4
2	EP134-1	Yes	4
2	EP132-2	Yes	4
2	EP131	Yes	4
2	EP130-1	Yes	4
2	EP129	Yes	4
2	EP127	Yes	4
2	EP123-1	Yes	4
2	EP122-1	Yes	4
2	EP121A-1	Yes	4
2	EP121-3	Yes	4
2	EP120A	Yes	4
2	EP120-4	Yes	4
2	EP119-2 (Section 8E)	Yes	4
2	EP118-2	Yes	4
2	EP117-2	Yes	4
2	EP116-1	Yes	4
2	EP115-1	Yes	4
2	EP114-2	Yes	4
2	EP113-4	Yes	4

Link	Structure	Infrared Lighting	Flight Diverters
2	EP112A	Yes	4
2	EP112-3	Yes	4
2	EP111-4	Yes	4
2	EP110-2	Yes	4
2	EP109-1	Yes	4
2	EP108-2	Yes	4
2	EP107-3	Yes	4
2	EP106-3	Yes	4
2	EP105-2	Yes	4
2	EP104-2	Yes	4
2	EP103A	Yes	4
2	EP103-2	Yes	4
2	EP102A-1	Yes	4
2	EP102-3	Yes	4
2	EP101-2	Yes	4
2	EP99-2	Yes	4
2	EP97	Yes	4
2	EP95	Yes	4
2	EP93	Yes	4
2	EP91	Yes	4
2	EP90-1	Yes	4
2	EP89-1 (Section 8D)	Yes	4
2	EP88-2	Yes	4
2	EP87-1	Yes	4
2	EP86-1	Yes	4
2	EP85-2	Yes	4
2	EP84	Yes	4
2	EP83	Yes	4
2	EP82	Yes	4
2	EP81	Yes	4
2	EP80	Yes	4
2	EP79	Yes	4
2	EP78A	Yes	4
2	EP78	Yes	4
2	EP77	Yes	4
2	EP76-2	Yes	4
2	EP75-2	Yes	4
2	EP74-1	Yes	4
2	EP73	Yes	4
2	EP71	Yes	4

Link	Structure	Infrared Lighting	Flight Diverters
2	EP70	Yes	4
2	EP69	Yes	4
2	EP68	Yes	4
2	EP67 (Section 8C)	Yes	4
2	EP66	Yes	4
2	EP65-1	Yes	4
2	EP64	Yes	4
2	EP63	Yes	4
2	EP62A-1	Yes	4
2	EP58-2	Yes	4
2	EP57-1	Yes	4
2	EP56-3	Yes	4
2	EP54	Yes	4
2	EP53-2	Yes	4
2	EP51-1	Yes	4
2	EP50	Yes	4
2	EP49	Yes	4
2	EP48	Yes	4
2	EP47-2 (Section 8B)	Yes	4
2	EP45-1	Yes	4
2	EP44	Yes	4
2	EP43-1	Yes	4
2	EP42	Yes	4
2	EP41	Yes	4
2	EP40-1	Yes	4
2	EP39-1	Yes	4
2	EP37-2	Yes	4
2	EP36-1	Yes	4
2	EP35-1	Yes	4
2	EP34-1	Yes	4
2	EP33-1	Yes	4
2	EP32-1	Yes	4
2	EP31-1	Yes	4
2	EP29-2	Yes	4
2	EP28-3	Yes	4
2	EP25-2	Yes	4
2	EP24-1	Yes	4
2	EP23-2	Yes	4
2	EP22-1	Yes	4
2	EP21-1	Yes	4

Link	Structure	Infrared Lighting	Flight Diverters
2	EP20-2	Yes	4
2	EP19-1	Yes	4
2	EP18	Yes	4
2	EP17	Yes	4
2	EP16-1	Yes	4
2	EP15	Yes	4
2	EP14-1	Yes	4
2	EP13-3	Yes	4
2	EP12-3	Yes	4
2	EP10-2	Yes	4
2	EP9-1	Yes	4
2	EP8-2	Yes	4
2	EP7-1	Yes	4
2	EP6-1	Yes	4
2	EP5-2	Yes	4
2	EP4-3	Yes	4
2	EP3-3	Yes	4
2	EP2-3	Yes	4
5	CP109-1	Yes	4
5	CP108	Yes	4
5	CP107	Yes	4
5	CP106-1	Yes	4
5	CP105-1	Yes	4
5	CP103-2	Yes	4
5	CP101-1	Yes	4
5	CP100-1	Yes	4
5	CP99-2	Yes	4
5	CP96-1	Yes	4
5	CP95-1	Yes	4
5	CP87-1	Yes	4
5	CP86	Yes	4
5	CP85-1	Yes	4
5	CP84	Yes	4
5	CP83	Yes	4
5	CP82-1	Yes	4
5	CP81-1	Yes	4
5	CP80-1	Yes	4
5	CP79-1	Yes	4
5	CP77	Yes	4
5	CP76-1	Yes	4

Link	Structure	Infrared Lighting	Flight Diverters
5	CP75-1	Yes	4
5	CP74-2	Yes	4
5	CP73-2	Yes	4
5	CP72-2	Yes	4
5	CP71	Yes	4
5	CP70-3	Yes	4
5	CP69-2	Yes	4
5	CP68-1	Yes	4
5	CP67-3	Yes	4
5	CP66-2	Yes	4
5	CP64-2	Yes	4
5	CP63-3	Yes	4
5	CP62-2	Yes	4
5	CP62A	Yes	4
5	CP61-1	Yes	4
5	CP60	Yes	4
5	CP59	Yes	4
5	CP58-1	Yes	4
5	CP57	Yes	4
5	CP56-1	Yes	4
5	CP55	Yes	4
5	CP54-1	Yes	4
5	CP53-1	Yes	4
5	CP52	Yes	4
5	CP51-2	Yes	4
5	CP50-1	Yes	4
5	CP49-1	Yes	4
5	CP48-2	Yes	4
5	CP47-2	Yes	4
5	CP46-2	Yes	4
5	CP45-1	Yes	4
5	CP44-1	Yes	4
5	CP43-1	Yes	4
5	CP42-1	Yes	4
5	CP40-2	Yes	4
5	CP39	Yes	4
5	CP37-2	Yes	4
5	CP36-1	Yes	4
5	CP35-2	Yes	4
5	CP34-2	Yes	4

Link	Structure	Infrared Lighting	Flight Diverters
5	CP33A	Yes	4
5	CP33-2	Yes	4
5	CP31-2	Yes	4
5	CP29-1	Yes	4
5	CP28-1	Yes	4
5	CP27	Yes	4
5	CP26	Yes	4
5	CP25-2	Yes	4
5	CP24-1	Yes	4
5	CP23	Yes	4
5	CP22-1	Yes	4
5	CP20	Yes	4
5	CP19-1	Yes	4
5	CP18-1	Yes	4
5	CP17-1	Yes	4
5	CP16-1	Yes	4
5	CP15-1	Yes	4
5	CP14	Yes	4
5	CP13-2	Yes	4
5	CP12-1	Yes	4
5	CP11-1	Yes	4
5	CP10	Yes	4
5	CP9-1	Yes	4
5	CP8-2	Yes	4
5	CP7	Yes	4
5	CP6-1	Yes	4
5	CP3	Yes	4

1 Locations current with this document's publication; minor alterations may occur due to engineering requirements and consultations with the FAA and CBP.

2.4 AERIAL MARKER SPHERES

Aerial marker sphere placement is determined by agency regulations, engineering design, and risk of avian collision. Aerial marker sphere locations were determined by SDG&E in consultation with the FAA, CBP, and DOD. SDG&E proposed aerial marker sphere placement on the OPGW in 134 conductor spans (Table 2). Of these, 93 will be marked as a requirement of FAA Determinations, 28 will be voluntarily marked at the request of CBP, and 13 will be voluntarily marked by SDG&E on its own accord. The number and placement of spheres per span will be dependent upon engineering design constraints, length of the span, local habitat conditions, and additional factors as recommended in APLIC (1994), which will render OPGW lines visible to approaching birds. This practice may also provide additional benefits to birds in the immediate area of the FAA- and CBP- marked lines.

In determining aerial marker sphere placement, SDG&E reviewed all proposed conductor spans along the 230-kV and 500-kV transmission line portions of the project in order to identify catenaries that will be greater than 200 feet above ground level (AGL). The FAA requires that Form 7460-1 "Notice of Proposed Construction or Alteration" (Notice) be filed for any object more than 200 feet AGL. For the purposes of the Project, conductor spans are considered objects. SDG&E filed Notices on 105 conductor spans with catenaries approximately 200 feet AGL or higher. The FAA issued "Determinations of No Hazard to Air Navigation" in response to all Notices; 93 of the “No Hazard” Determinations are conditional upon the placement of aerial marker spheres. The remaining 12 Determinations refer to conductor spans with catenaries less than 200 feet AGL. However, SDG&E will voluntarily mark these spans because the catenaries approach 200 feet AGL.

In addition to consultation with the FAA, SDG&E also solicited input from CBP and the DOD who conduct aviation activities in the vicinity of the Project. Beginning in November of 2009, SDG&E worked with CBP and the DOD to identify any additional spans that warranted marking for aviation safety. The CBP identified 28 spans that are located across improved roads where low-level flight operations are likely to occur. SDG&E is planning to voluntarily mark these 28 spans at the direct request of the CBP.

Table 2. Proposed Aerial Marker Sphere Locations[1]

Link	From Structure	To Structure	Marker Spheres
1	EP342	EP341	11
1	EP331	EP330-1	11
1	EP317	EP316-2	11
1	EP304-2	EP303-2	11
1	EP300-1	EP299	11
1	EP296	EP295	11
1	EP291-1	EP290	13
1	EP290	EP281	13
1	EP280-1	EP279-1	13
1	EP279-1	EP278-1	11
1	EP278-1	EP277-1	9
1	EP277-1	EP276-1	13
1	EP276-1	EP275-1	11
1	EP275-1	EP274-1	9
1	EP272-3	EP271-2	13
1	EP271-2	EP270-2	15
1	EP270-2	EP269-1	11
1	EP269-1	EP267-2	15
1	EP266-2	EP265-2	11
1	EP265-2	EP264-4	9
1	EP263B-2	EP263A-2	13
1	EP263A-2	EP262-4	13
1	EP259-3	EP258-3	11
1	EP252-1	EP251	9
1	EP244	EP243	9
1	EP239-1	EP238-1	10
1	EP226-1	EP225-1	11
1	EP224-1	EP223	13
1	EP220-1	EP219-1	11
1	EP206-1	EP205-2	9
1	EP149-1	EP148-1	9
1	EP148-1	EP147	7
1	EP147	EP146	11
1	EP146	EP145	11
1	EP144	EP143-1	11
1	EP143-1	EP142-1	13

Link	From Structure	To Structure	Marker Spheres
2	EP139-1	EP138-2	9
2	EP137	EP136	9
2	EP136	EP135	7
2	EP135	EP134-1	11
2	EP120-4	EP119-2	11
2	EP117-2	EP116-1	9
2	EP110-2	EP109-1	9
2	EP90-1	EP89-1	7
2	EP85-2	EP84	9
2	EP80	EP79	9
2	EP77	EP76-2	13
2	EP76-2	EP75-2	13
2	EP74-1	EP73	13
2	EP66	EP65-1	9
2	EP64	EP63	15
2	EP57-1	EP56-3	11
2	EP56-3	EP54	13
2	EP54	EP53-2	11
2	EP51-1	EP50	11
2	EP50	EP49	11
2	EP47-2	EP45-1	13
2	EP45-1	EP44	9
2	EP44	EP43-1	17
2	EP43-1	EP42	31
2	EP41	EP40-1	11
2	EP39-1	EP37-2	17
2	EP35-1	EP34-1	9
2	EP33-1	EP32-1	15
2	EP29-2	EP28-3	9
2	EP25-2	EP24-1	11
2	EP23-2	EP22-1	7
2	EP22-1	EP21-1	11
2	EP21-1	EP20-2	5
2	EP20-2	EP19-1	5
2	EP19-1	EP18	11
2	EP17	EP16-1	11
2	EP13-3	EP12-3	17
2	EP10-2	EP9-1	9
2	EP8-2	EP7-1	21

Link	From Structure	To Structure	Marker Spheres
2	EP7-1	EP6-1	9
2	EP6-1	EP5-2	13
2	EP5-2	EP4-3	13
2	EP3-3	EP2-3	17
2	EP2-3	EP1-3	9
5	CP107	CP106-1	10
5	CP103-2	CP101-1	17
5	CP88-1	CP86	3
5	CP87-1	CP86	3
5	CP86	CP85-1	5
5	CP84	CP83	5
5	CP83	CP82-1	7
5	CP82-1	CP81-1	5
5	CP81-1	CP80-1	5
5	CP75-1	CP74-2	9
5	CP74-2	CP73-2	7
5	CP73-2	CP72-2	5
5	CP71	CP70-3	13
5	CP69-2	CP68-1	13
5	CP68-1	CP67-3	11
5	CP67-3	CP66-2	7
5	CP64-2	CP63-3	7
5	CP63-3	CP62-2	9
5	CP62-2	CP62A	7
5	CP62A	CP61-1	9
5	CP60	CP59	5
5	CP59	CP58-1	7
5	CP58-1	CP57	7
5	CP57	CP56-1	7
5	CP56-1	CP55	11
5	CP54-1	CP53-1	11
5	CP52	CP51-2	5
5	CP51-2	CP50-1	9
5	CP50-1	CP49-1	5
5	CP48-2	CP47A-1	3
5	CP47-2	CP46-2	15
5	CP45-1	CP44-1	13
5	CP44-1	CP43	13
5	CP43-1	CP42-1	13

Link	From Structure	To Structure	Marker Spheres
5	CP40-2	CP39	9
5	CP37-2	CP36-1	16
5	CP35-2	CP34-2	7
5	CP29-1	CP28-1	7
5	CP28-1	CP27	7
5	CP27	CP26	5
5	CP25-2	CP24-1	9
5	CP24-1	CP23	5
5	CP23	CP22-1	5
5	CP20	CP19-1	9
5	CP19-1	CP18-1	7
5	CP18-1	CP17-1	9
5	CP17-1	CP16-1	5
5	CP16-1	CP15-1	5
5	CP14	CP13-2	7
5	CP13-2	CP12-1	7
5	CP12-1	CP11-1	11
5	CP9-1	CP8-2	9
5	CP8-2	CP7	5
5	CP6-1	CP3	7

1 Locations current with this document's publication; minor alterations may occur due to engineering requirements and consultations with the FAA and CBP.

2.5 FLIGHT DIVERTERS

Flight diverters will be installed on conductor spans adjacent to IR towers. SDG&E is proposing installing one flight diverter at four feet and one flight diverter at eight feet, on either side of each IR tower. The exact placement of the diverters will be determined by engineering constraints.

2.6 COLLISION PREVENTION STUDY

SDG&E will perform an avian collision study of the effectiveness of flight diverters. Prior to initiating the study, SDG&E will coordinate with the Service to ensure that the study's methods will result in statistically meaningful data collection. Future consultation may adjust the study protocol submitted with this plan.

Dead bird searches consist of traversing the right-of-way (ROW) and documenting all bird carcasses and feather spots, and are the most direct method for determining bird collision with power lines (APLIC 1994). Although time consuming and labor intensive, dead bird searches provide empirical information about the degree of impact the power line is having on birds (APLIC 1994). Comparing dead bird search data from power lines treated with flight diverters with untreated power lines provides a metric for assessing flight diverter effectiveness (APLIC 1994; Bevanger 1999). Underestimation of total bird carcasses can occur due to search bias, removal bias, and habitat bias. Search bias concerns the differences in searcher abilities, removal bias concerns carcasses removed by scavengers prior to detection by searchers, and habitat bias occurs when some portions of an area cannot be searched due to dense vegetation or some other feature (APLIC 1994). Preliminary tests to establish these biases are necessary prior to analysis of any data from the collision plan, and are detailed in APLIC (1994).

SDG&E is proposing a three year study to determine if flight diverters minimize avian collision with power lines near IR towers to determine if the Project poses a significant risk to birds using empirical data from dead bird searches.

2.6.1 STUDY AREAS

Searches for dead birds will be conducted at IR towers fitted with flight diverters (treatment) and towers without infrared lighting or flight diverters (control). While the presence of infrared lighting may confound results on nocturnal bird species that may be more attracted to IR towers than control towers, SDG&E is assuming infrared lighting will have no impact on diurnal birds and that direct comparisons of treatment and control towers are valid. In 2013, 2014, and 2015, dead bird searches will be conducted at treatment and control towers within 50-foot by 200-foot transects. The tower will be centered in the transect (Figure 2). The specific towers will be determined once infrared lighting placement is finalized. In order to gain empirical data for parametric analyses, transects should be placed in an equal number of habitats at IR towers. There should be approximately 30 transects per habitat type where feasible, 15 treatment and 15 control. Treatment and control transects should be spaced apart with a “buffer” span to reduce shadowing effects (Crowder 2000).

Figure 2. Avian Collision Study Transect Design

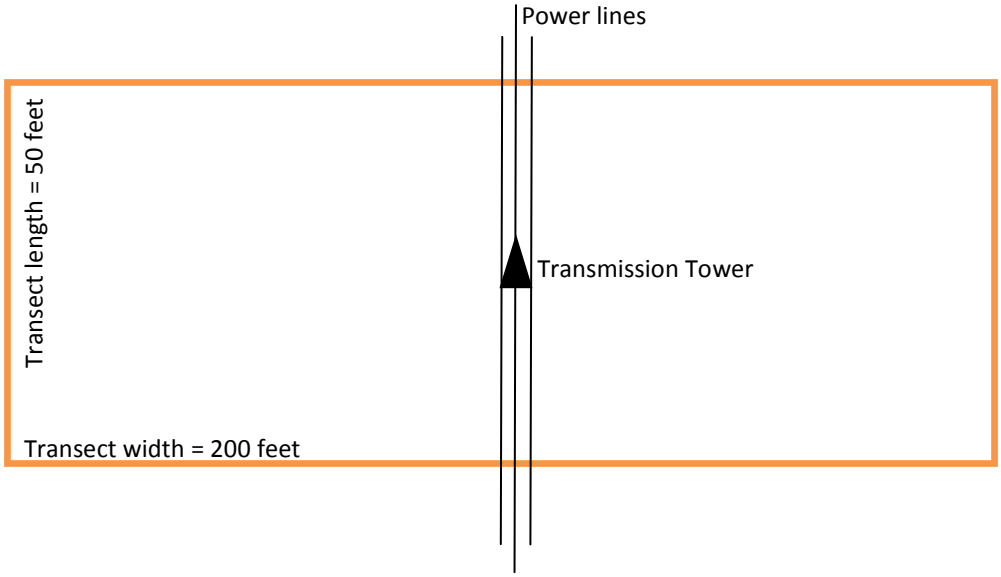
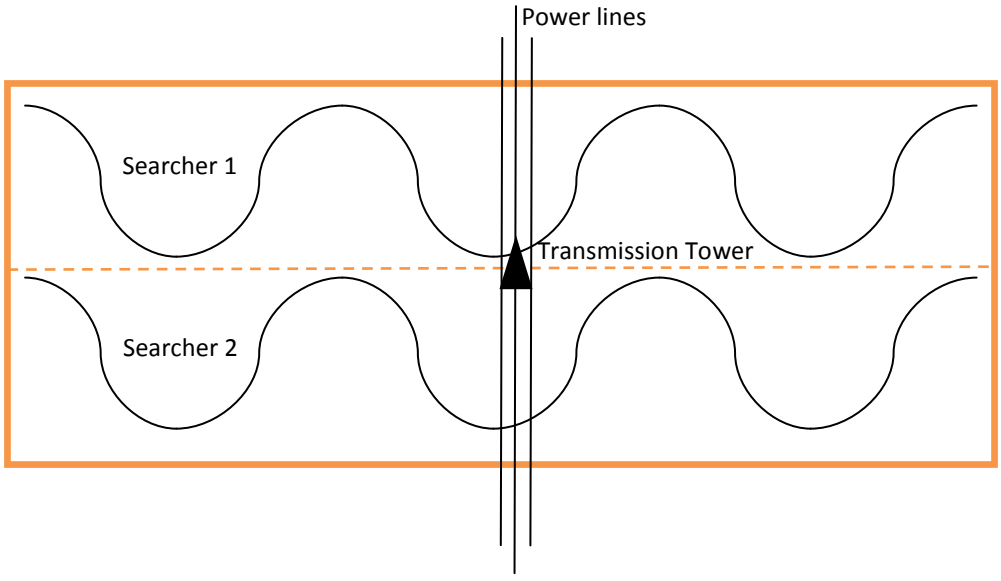


Figure 3. Avian Collision Study Search Method



2.6.2 Sampling Period and Intensity

SDG&E proposes to conduct searches during two consecutive search days per week for dead birds from March 15 through May 15 in 2013, 2014 and 2015 to coincide with the peak migration period (Unitt, pers. comm. and McKernan, pers. comm.). Searching on consecutive days increases the accuracy of the second day's results due to reduced removal bias.

2.6.3 Search Method

Cloud cover, such as fog, increases the risk of bird collisions due to reduced visibility of the lines (Yee 2008); therefore, consecutive search days for the week will be scheduled for days forecasted with cloud cover, where feasible. Transect searches will begin within one hour after sunrise. Searching early in the day reduces removal bias.

Transects will be searched to a distance of 100 feet from each outer conductor on either side of the line, and extend 25 feet from the IR tower for a 50-foot by 200-foot transect. Searches will be conducted in groups of two. One person will walk in a zigzag pattern on either side of the center line of the power line route (Figure 3). Where the terrain permits, searchers will use all-terrain vehicles driven at walking speed to assist with the searches.

When a bird carcass or feather spot (specimen) is found, searchers will record the specimen number; species (when or if determined); transect ID; date; location; condition; time; weather conditions; photo ID; whether or not it was flagged, removed, or suitable for necropsy; plus any additional comments. All specimens will be photographed and either removed or marked to avoid double counting, and the appropriate agency will be notified. Specimens will be identified to species whenever possible. In some cases scavenged carcasses may appear as feather spots. If necessary, ornithologists will be consulted to assist with species identification.

2.6.4 Mortality and Collision Estimates

Estimates of total dead birds will be calculated following the procedure described in APLIC (1994:37-39). These estimates are a function of search bias, removal bias, and habitat bias. APLIC (1994) also described a crippling bias caused when birds collide with the power line but do not end up within the study transect. However, crippling bias estimates are difficult and generally do not yield enough data to be incorporated into studies (APLIC 1994). Therefore, the estimate of total dead birds will not include crippling bias. Estimates for the bias factors may also not yield enough data to be applied accurately. If this occurs, actual avian mortality will be underestimated; however, comparing treated and untreated conductor spans should be valid as these bias factors will likely apply equally along the line (Yee 2008).

2.6.5 Statistical Analysis

Estimated total dead birds (ETDB) will be calculated as described in Section 2.6.4 after determining search bias, removal bias, and habitat bias, if feasible. Marker effectiveness will be examined by comparing treated and untreated spans with ANOVA, controlling for habitat, weather, and year. If necessary, the estimated total dead birds will be normalized using the square root transformation (Ventana Wildlife Society 2009). Non-parametric statistics will be used if normalization is not feasible.

2.6.6 Determination of the Effectiveness of Line Markers

ETDB over the three-year sampling period will be reviewed by the wildlife agencies and SDG&E. For all species impacted, mutual agreement between SDG&E and the USFWS will determine whether the power line markers have demonstrated effectiveness. SDG&E will coordinate with the agencies to analyze the need for additional or alternative collision protection measures.

2.7 Avian Reporting System

In order to provide a dynamic and responsive Avian Protection Plan (APP), an avian reporting system (ARS) will be implemented. SDG&E will comply with all federal and state laws and regulations dealing with the protection of bird species. The ARS will provide data on avian mortalities that might from the Project that SDG&E will use to determine where corrective actions may be necessary. The ARS will integrate with the current SDG&E Avian Protection Plan and Avian Protection Procedures Manual.

An Avian Mortality Report Form from SDG&E's Avian Protection Plan will be used to report dead or injured birds found in the Project. Troublemen regularly patrol the line both via helicopter and ground to assess any problems with the line. Troublemen will receive training on the ARS so they may also report dead or injured birds found in the course of patrolling the SRPL. Upon discovering a dead or injured bird, Troublemen will immediately contact SDG&E's Environmental Services Natural Resources Group, attempt to identify the bird and/or the remains, photograph the bird, complete the Avian Mortality Report Form, and submit the form to SDG&E's Environmental Services Group. The bird will not be removed from the site. The Environmental Services Group will enter the data into a database for tracking purposes, and contact the appropriate agencies for guidance and recommendations. If an eagle or endangered species is found, the Environmental Services Natural Resource Group will make special arrangements to preserve the remains under the direction of the USFWS.

Through the ARS, dead or injured bird records can indicate specific problem areas where more in-depth analysis is necessary. SDG&E will investigate problem areas annually to determine if corrective measures are required.

3. MITIGATION MEASURE B-7H

This section provides a brief description of Mitigation measure B-10A and compliance actions.

3.1 MITIGATION MEASURE OVERVIEW

As Mitigation measure B-7h addresses protection measures to avoid indirect impacts to eagle nests, as described in the MMCRP (CPUC and BLM 2009), and is as follows:

Mitigation Measure B-7h: Implement appropriate avoidance/minimization strategies for eagle nests. No construction or maintenance activities shall occur within 4,000 feet of an eagle nests during the eagle breeding season (December through June).

3.2 RISK ASSESSMENT POTENTIAL FOR INDIRECT IMPACTS TO EAGLE NESTS WITHIN 4,000 FEET OF THE PROPOSED SRPL

SDG&E will comply with the Bald and Golden Eagle Protection Act of 1940 as amended and all associated guidelines to avoid indirect impacts to golden eagle nests. The USFWS recommended compliance with the "Utah Guidelines for Raptor Protection from Human Disturbance and Land Use Disturbance" (2002), which suggests a spatial buffer distance for golden eagle nests of 0.5 mile (2,640 ft) where activity should be restricted. Mitigation Measure B-7h establishes a spatial buffer of 4,000 feet around each nest, exceeding the Utah Guidelines by approximately 52%. Activities within the buffer during the breeding season (December through June) will aid in avoiding direct and indirect impacts to golden eagle breeding activities.

3.3 RISK ASSESSMENT

SDG&E contracted WRI to conduct a preliminary study to identify the golden eagle nests in the vicinity of the Project (WRI 2010). Surveys were conducted by two golden eagle biologists in compliance with all agency guidelines. A preliminary aerial survey using Hughes 500 helicopters was conducted on March 30, 2010, to identify nesting territories and locate nests for final aerial and ground surveys which took place on May 1, 2, 9, 14 and 16 of 2010, totaling approximately 82 person-hours of observations. Final surveys revisited active or possibly active nests. Written documentation and a waypoint were taken at each nest site location with hand-held Global Positioning System (GPS) units (Garmin Map60GSx set to Universal Transverse Mercator grid in the World Geodetic System Datum).

In addition, USFS and the BLM provided known eagle nest locations in the vicinity of the Project, and these sites were included in WRI's assessment. There were no previously unknown eagle nests; however, some duplication of nests was contained in the three datasets.

WRI located a total of nine golden eagle nests in the vicinity of the Project (Figure 4). WRI identified three golden eagle nests within the 4,000 foot spatial buffer of the Project: Thing Valley, Barrett/Echo Mountain and El Cajon Mountain (Figures 5, 6, and 7). The remaining nests will not be indirectly impacted by the Project and include Cane Break, Lake Moreno, Lyons Peak, Rock Mountain, San Vicente, and Iron Mountain. WRI did not report any bald eagle nests in within 4 miles of the Project.

3.4 AVOIDANCE AND MINIMIZATION APPROACHES

SDG&E proposes to avoid and minimize the potential for indirect impacts of the Project on golden eagles in several ways. The Project alignment avoids six of the nine golden eagle nests in the vicinity. All pre-, during and post construction activities including construction yard preparation, use, and restoration will be restricted within the 4,000 foot spatial buffer of a golden eagle nest during the golden eagle breeding season. As a result, these activities would not be expected to disturb golden eagles in the vicinity of the Project. At the request of the FAA and CBP, aerial marker spheres will be installed at certain locations within the golden eagle areas for the safety of aircraft operating in the vicinity. Aerial marker spheres have been shown to be effective in reducing avian collisions with power lines (APLIC 1994).

SDG&E commits to conducting eagle nesting surveys in compliance with all agency guidelines at regular intervals in the future in order to maintain current information on eagle nests in the vicinity of the Project. In the event that new nests are discovered, SDG&E will consult with the appropriate agencies to determine the need, if any, for further avoidance or minimization measures. Based on the time-of-year restrictions on activities in the 4,000 foot spatial buffer areas throughout pre-construction, during, and post-construction; and maintenance and the use of collision-reducing techniques recommended by APLIC, SDG&E believes that these actions in the vicinity of golden eagle nests will result in the successful avoidance and minimization of indirect impacts to golden eagle nests and satisfy the B-7h Mitigation Measure.

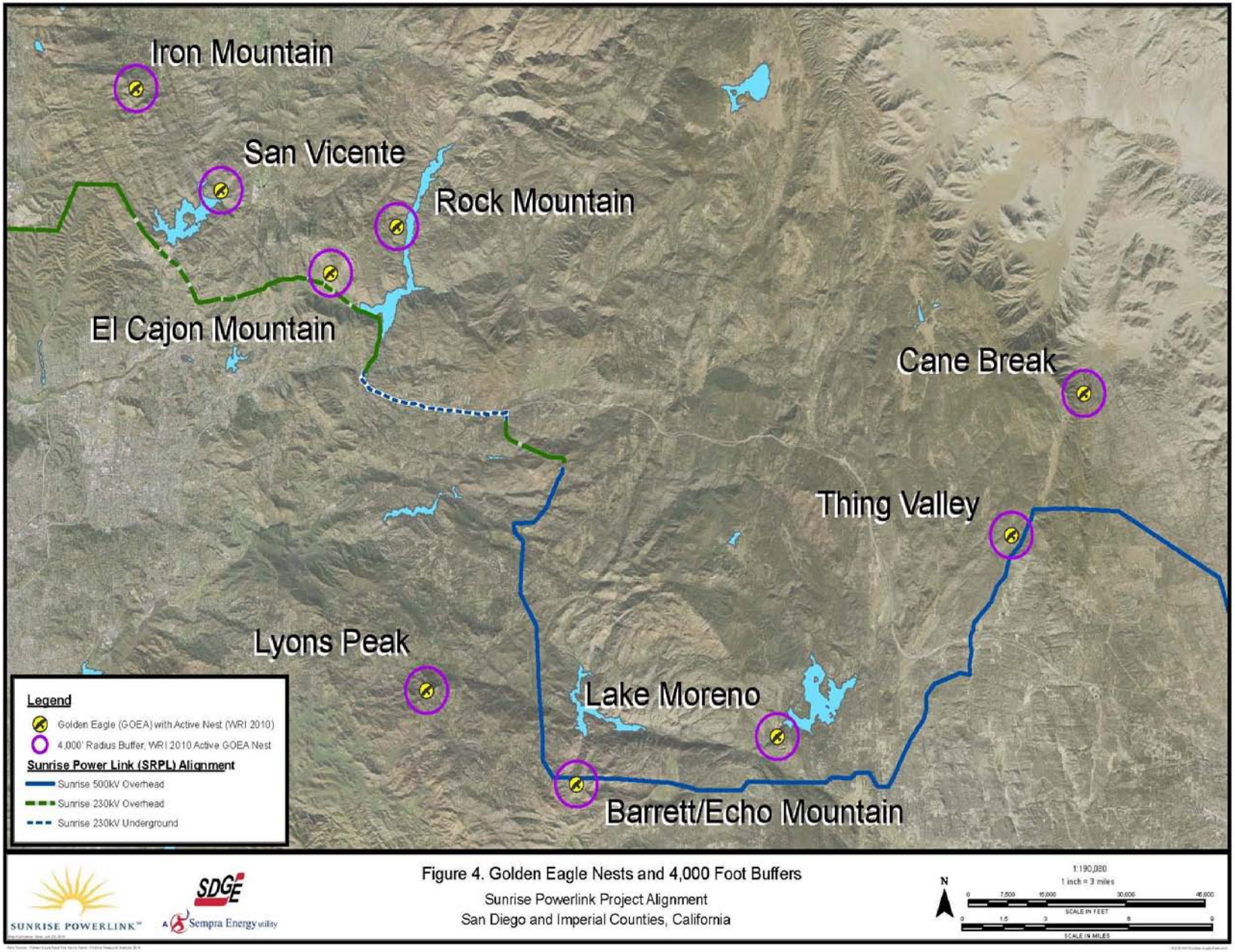
3.5 MONITORING AND ADAPTIVE MANAGEMENT

Adaptive management is a process that allows the Plan's avoidance and minimization measures to be adjusted over time to ensure that the most up-to-date information is being utilized and that the measures are as effective as possible. Through adaptive management, SDG&E will incorporate feedback loops that link implementation and monitoring to a decision-making process focused on improving the avoidance and minimization measures. Incorporating new monitoring information is necessary to assess the need for, and to effect changes in, the avoidance and minimization measures.

The monitoring information obtained as a result of the proposed three-year study on collision marker effectiveness described in section 2.6, as well as information obtained from the long-term Avian Reporting System monitoring described in section 2.7 and eagle nest surveys described in section 3.4, will be evaluated by SDG&E in coordination with the U.S. Fish and Wildlife Service to determine the potential need for additional or alternative minimization measures. The iterative adaptive management process will ensure that the Avian Protection Plan remains dynamic and responsive over time.

3.5.1 ADAPTIVE MANAGEMENT RESPONSES TO EAGLE MORTALITY

In the event that a golden eagle mortality occurs as a result of the Sunrise transmission line, SDG&E would work with the Service to identify appropriate compensatory mitigation to ensure that the no net loss standard is maintained. Potential compensatory mitigation measures available include: (1) placement of additional visual markers on the transmission line; (2) funding transmission line collision and electrocution studies to help inform future mitigation options; (3) based on results of transmission line collision and electrocution studies, work with the Service to determine how many miles of line should be marked/retrofit to offset eagle mortality; (4) funding the protection and long-term management of additional golden eagle nesting and/or foraging habitat. The compensatory mitigation selected by SDG&E to offset golden eagle mortality and ensure continued no net loss of golden eagle populations must receive the concurrence of the Service.


Iron Mountain
San Vicente
Rock Mountain
El Cajon Mountain
Cane Break
Thing Valley
Lyons Peak
Lake Moreno
Barrett/Echo Mountain
Legend
Golden Eagle (GOEA) with Active Nest (WRI 2010)
4,000' Radius Buffer, WRI 2010 Active GOEA Nest
Sunrise Power Link (SRPL) Alignment
Sunrise 500kV Overhead
Sunrise 230kV Overhead
Sunrise 230kV Underground
SUNRISE POWERLINK™
SDGE
A Sempra Energy utility
Figure 4. Golden Eagle Nests and 4,000 Foot Buffers
Sunrise Powerlink Project Alignment
San Diego and Imperial Counties, California
N
1:190,080
1 inch = 3 miles
SCALE IN FEET
SCALE IN MILES

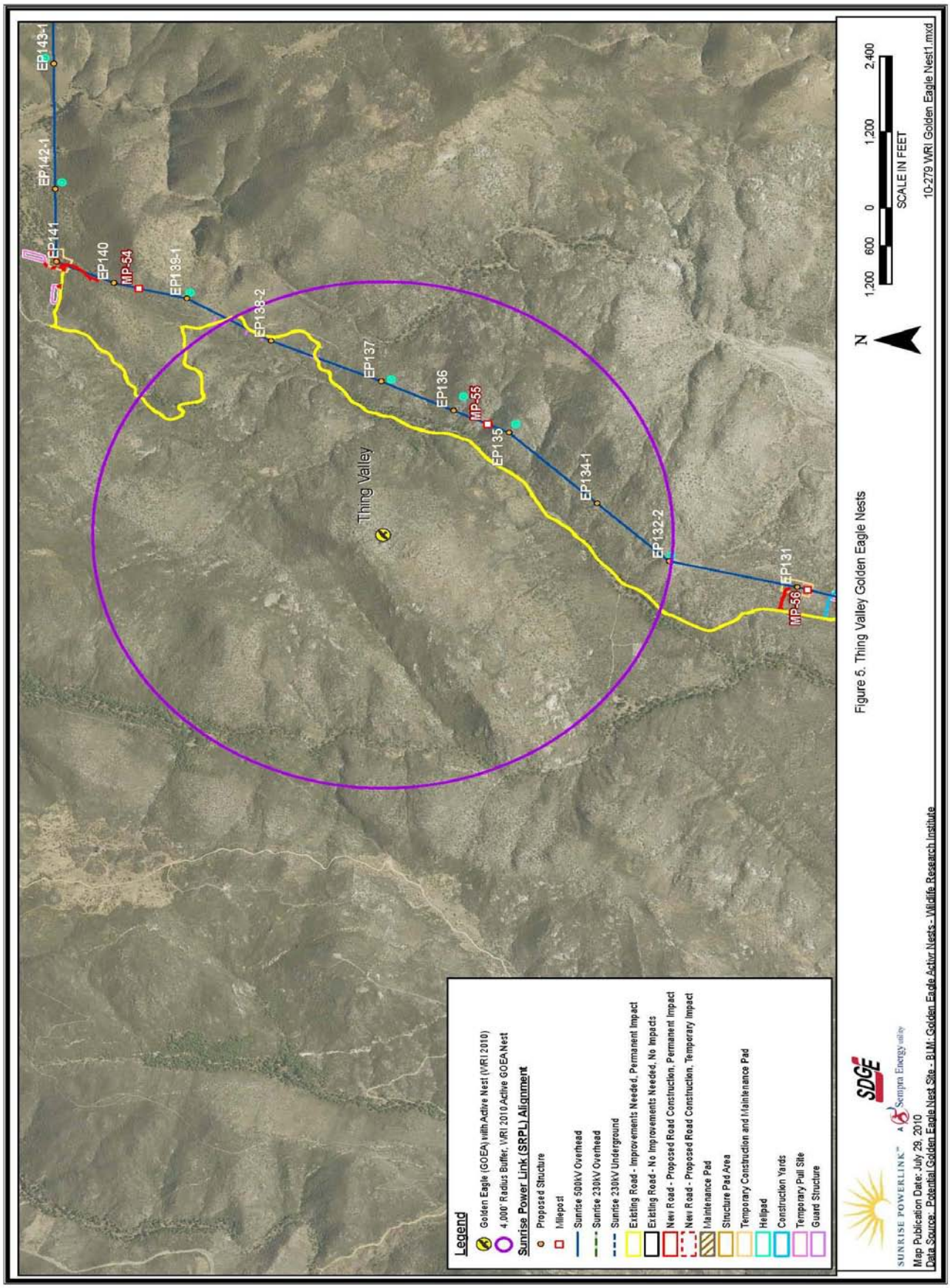


Figure 6. Thing Valley Golden Eagle Nests

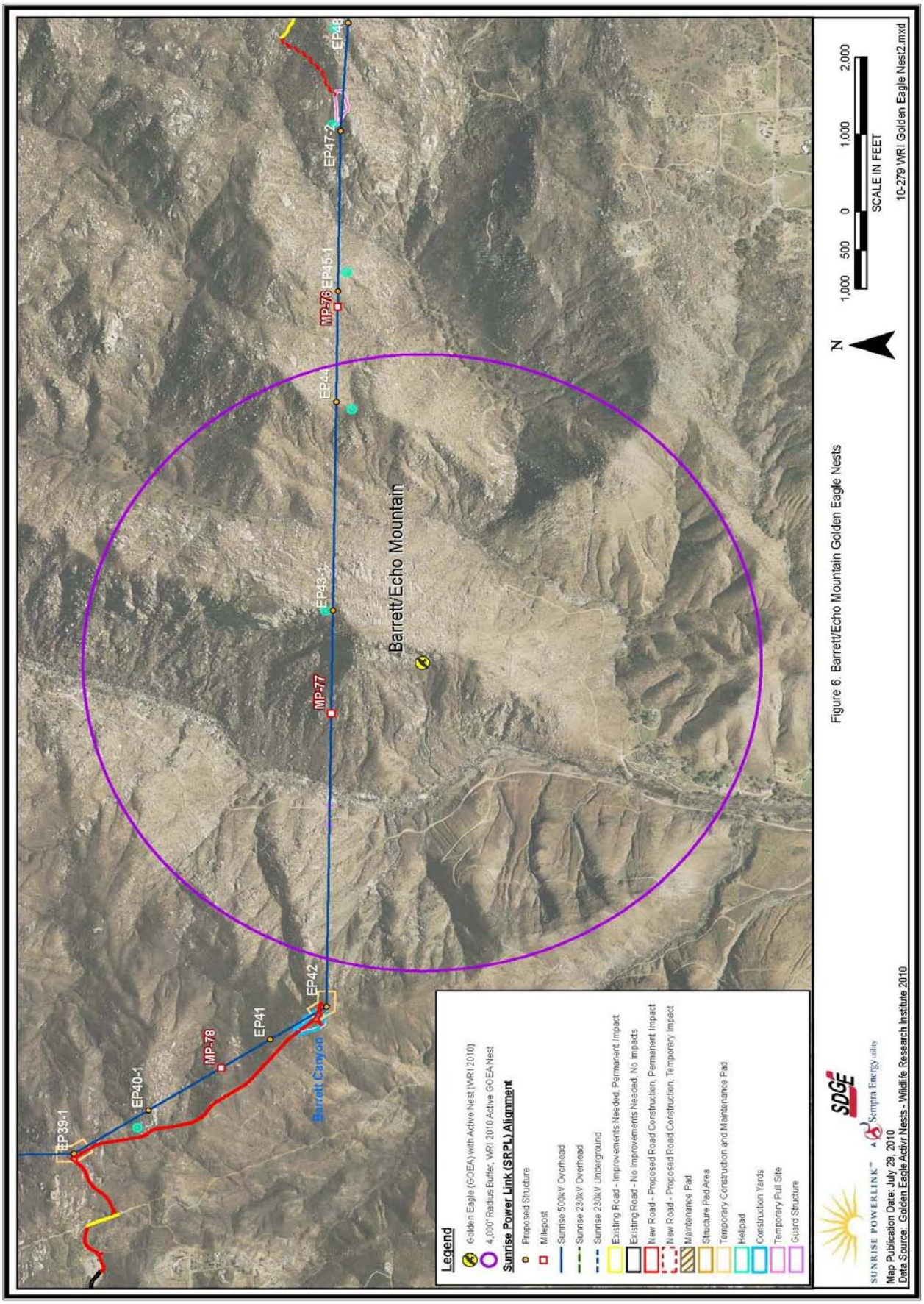


Figure 6. Barrett/Echo Mountain Golden Eagle Nests

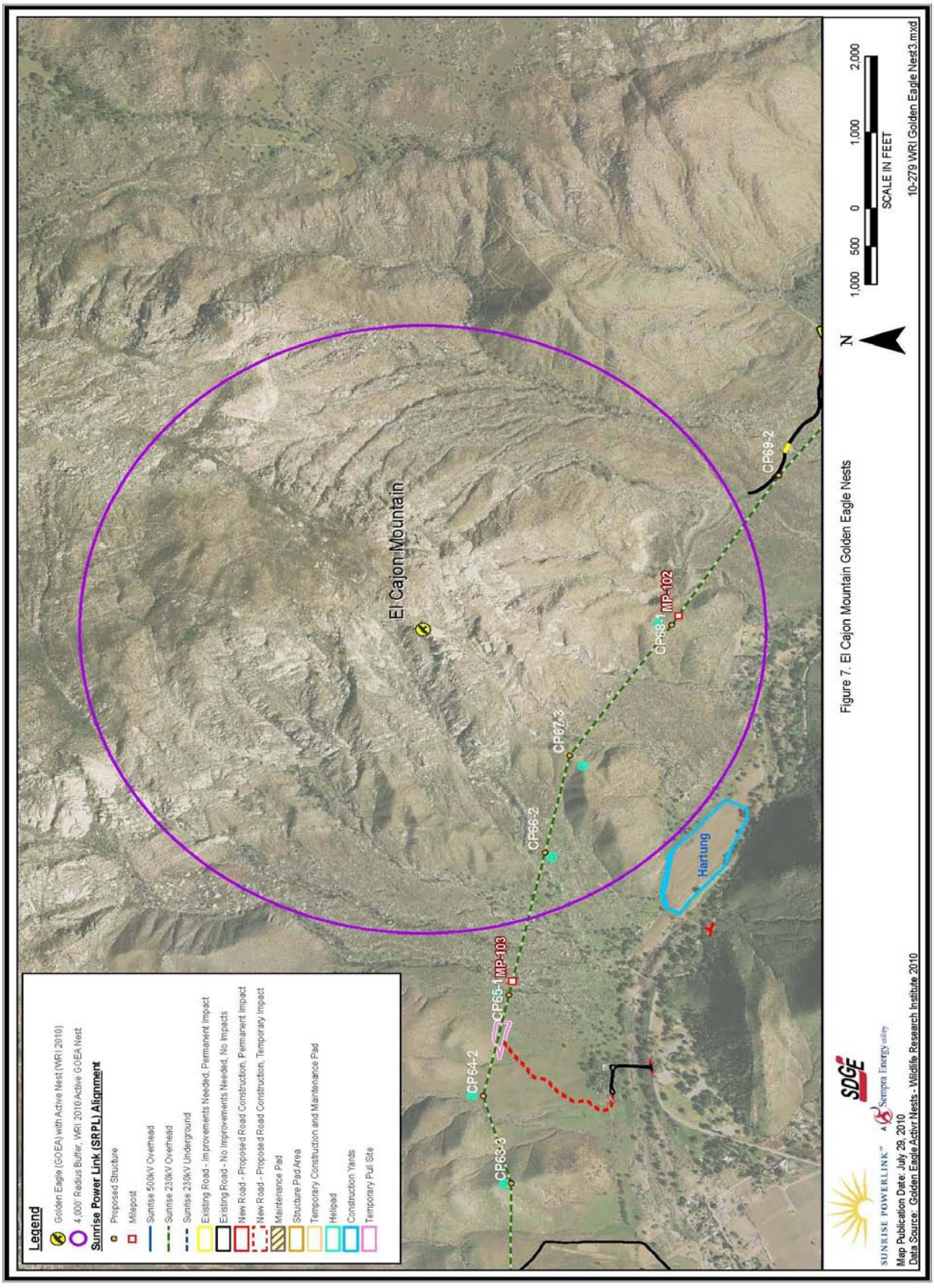


Figure 7. El Cajon Mountain Golden Eagle Nests

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