

Appendix L7

Raptor Migration Report

HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
Suite 200
La Mesa, CA 91942
619.462.1515 tel
619.462.0552 fax
www.helixepi.com



September 7, 2011

PEG-01

Ms. Natalie McCue
Ocotillo Express LLC
1600 Smith Street, Ste. 4025
Houston, TX 77002

Subject: Results of Spring 2011 Raptor Migration Counts for the Ocotillo Wind Energy Project

Dear Ms. McCue:

At your request, HELIX Environmental Planning, Inc. (HELIX) conducted golden eagle (*Aquila chrysaetos*) counts during spring 2011 for the Ocotillo Wind Energy Project; this letter documents the results of the counts.

PROJECT LOCATION AND DESCRIPTION

The approximately 12,436-acre proposed Ocotillo Wind Energy Project site is located almost entirely on Bureau of Land Management (BLM) land near the town of Ocotillo, Imperial County, California (Figure 1). The project site is located in the Carrizo Mountain, Coyote Wells, In-Ko-Pah Gorge, and Painted Gorge U.S. Geological Survey 7.5-minute quadrangle maps (Figure 2). The project site is separated into a northern and a southern area. The northern area generally is situated north of Interstate 8, from the Imperial/San Diego County border on its western edge to approximately 1.5 miles northeast of the town of Ocotillo on its eastern edge. The northern area includes several distinct features, including a portion of the Interstate 8 Island (the undeveloped hilly terrain between the eastbound and westbound lanes of Interstate 8), Sugarloaf Mountain, and a portion of the San Diego and Arizona Eastern railroad tracks (Figure 2). County Highway S2 (Imperial Highway) bisects the northern project area, and Interstate 8 passes through the southern portion of the northern project area. The southern project area is much smaller than the northern project area and occurs south of Interstate 8 and south of State Highway 98.

Elevations on site range from approximately 300 feet above mean sea level (AMSL) in the northeast portion of the site to approximately 1,490 feet AMSL in the southwest portion of the site. The site generally slopes down from west to east, with the Coyote Mountains to the north of the site and the Jacumba Mountains to the west and south of the site. Vegetation on site consists of a variety of desert scrub habitat types that contain numerous dry desert washes.

Pattern Energy, through Ocotillo Express LLC, proposes to construct, operate, maintain, and decommission the Ocotillo Express Wind Energy Project, a wind generation facility that would consist of up to 155 wind turbine generators (WTGs), above ground and below ground electrical transmission/collection system for collecting the power generated by each WTG, an electrical substation, interconnection switchyard, access roads, 4 meteorological towers, a biological monitoring observation tower, and an operations and maintenance (O&M) building. The project would be built in 2 phases; the construction period of each of the 2 phases is anticipated to be completed over a period of 12 to 15 months. The second phase is anticipated to begin approximately one year following the completion of the first phase of construction.

The dimensions of proposed WTGs include a hub height of 80 meters (262 feet) and a rotor diameter ranging from 101-113 meters (328-371 feet). The analysis in this report assumes a rotor swept area (i.e., the zone where the blades of the turbine would occur; RSA) to be between 100 feet to 450 feet above ground level (AGL).

METHODS

HELIX previously conducted raptor migration studies for this project during fall 2009 and spring 2010 (HELIX 2010, 2011). Additional studies in fall 2010 were implemented at the request of Pattern Energy to collect additional observation data on golden eagles and other raptors within the proposed project area and to use the additional information to improve the conservation and protection measures that will be included in the Eagle Conservation Plan for the project. The additional studies were not a requirement of the BLM, United States Fish and Wildlife Service (USFWS), or California Department of Fish and Game (CDFG). The fall 2010 data is presented in a separate report (HELIX 2011). This spring 2011 study is a continuation of the voluntary additional data collection.

The methods of the spring 2011 study were similar to HELIX's methods during previous migration studies for this project and were based on the recommendations provided in the California Energy Commission's (CEC's) Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development (CEC 2007).

HELIX conducted migration counts over a 10 calendar-week period during the 2011 spring migration period (March 21- May 25, 2011). HELIX stationed 3 surveyors generally along a southwest-northeast axis across the site (Locations A, B, and D; Figure 3) to scan the sky and record bird migration data. During the fall 2009 and spring 2010 studies, an additional surveyor was included at Location C; however, this location was not included in the fall 2010 or spring 2011 surveys. Count locations were located to maximize the likelihood of detecting potential north-south and east-west migration through the site.

Location A was on top of a hill at approximately 1,275 feet AMSL in the southwest portion of the site. Location B was located on Sugarloaf Mountain at approximately 1,000 feet AMSL. Location C was located along Highway S2 at approximately 450 feet AMSL, west of the town of Ocotillo and immediately adjacent to the project area, but was not utilized for this fall survey. Location D was in the northeast portion of the site near Shell Canyon Road, at approximately 350 feet AMSL. The observation locations each offered wide fields of view in all directions.

Counts began in mid-morning and concluded in late afternoon. Surveyors methodologically scanned the sky and recorded all bird species, number of individuals, direction of movement, estimated distance from the surveyor, and estimated height above the ground. Surveyors documented activity on standardized datasheets for each date. Weather conditions (e.g., temperature, wind speed, wind direction, cloud cover, etc.) at the start and end of each day were also recorded. Surveyor positions were rotated each day.

HELIX conducted raptor counts for 5.5 hours per day for 30 days during the spring 2011 migration period; total observation time was 489.5 hours (one day consisted of 2 observers). Approximately one hour of each surveyor's time on site each day included drive time to and observation time from other prominent features and ridges in order to look for eagles and other raptors from different locations on site. HELIX biologists Kimberly Davis, Erica Harris, Jason Kurnow, Erik LaCoste, and HELIX's subcontractor Renee Owens (Owens Wildlife Biology) participated in the spring 2011 study.

GOLDEN EAGLE SURVEY RESULTS

Golden eagles were observed on 7 survey dates during spring counts (March 22 and 23; March 30, April 6, May 3; May 4, and May 16; Table 1, Figure 4). Most of the observations were close enough to note plumage and make age determinations. Observations during spring 2011 were primarily of solitary juvenile golden eagles; the few exceptions were one observation of a solitary eagle of undetermined age, an observation of a solitary adult, and one observation of an adult accompanied by a second eagle of undetermined age. Eagle observations were typically mid-day, between the hours of 0930 and 1500, and the average observation duration time ranged from 5 to 19 minutes, with an average time of observation lasting approximately 9 minutes. Total number of observation minutes of golden eagles over the spring 2011 season was 98; total number of minutes within the RSA was 42, resulting in a total exposure rate of 0.43. Golden eagles were observed throughout the majority of the site, with the exception of the portion of the project area that lies south of Highway 98. Flight height ranged from 100 feet to 2000 feet above the ground. On one occasion, an eagle was observed perched upon a large hill in the western portion of the site. Evidence of research markers such as patagial tags, satellite telemetry devices, or leg bands were not noted on any of the observed golden eagles.

Table 1						
SUMMARY OF GOLDEN EAGLE OBSERVATIONS DURING SPRING 2011 SURVEYS						
Date	Time of Observation	# of Individuals	Age	Distance from observer (ft)	Flight Height (ft above ground)	Observation within Rotor Swept Area (100 feet to 450 feet)
22-Mar-11	1130-1135	1	undetermined	1500	200-1000	Yes
22-Mar-11	1326-1334	1	juvenile	200-3000	200-1200	Yes
22-Mar-11	1410-1426	1	juvenile	3000-6000	1000-1500	No
22-Mar-11	1450-1500	1	juvenile	2000	100-1000	Yes
23-Mar-11	0930-0940	1	juvenile	1700	300-1000	Yes
30-Mar-11	1050-1055	1	juvenile	3000	300-1200	Yes
6-Apr-11	1302-1315	1	juvenile	6000	500-1000	No
3-May-11	1055-1114	1	adult	4000	0-500	Yes
4-May-11	1232-1241	2	adult, undetermined	7500	100-2000	Yes
16-May-11	1309-1312	1	juvenile	3500	100-200	Yes

OTHER RAPTOR OBSERVATIONS

A total of 935 raptors/large birds were observed on site during spring 2011 (Table 2). The number of raptors observed ranged from 40-178 each week (Table 2). The peak number of raptors observed occurred in Week 3 (April 4-8; 178 observations). Raptor counts were lowest during the final 2 weeks of the survey (Week 9 [May 16-21] and Week 10 [May 23-27]), when less than 50 observations were made each week.

Table 2											
SPRING 2011 RAPTOR COUNTS											
SPECIES	3/21 - 3/25	3/28 - 4/1	4/4 - 4/8	4/11 - 4/15	4/18 - 4/22	4/25 - 4/28	5/2 - 5/6	5/9 - 5/13	5/16 - 5/21	5/23 - 5/27	TOTAL
	WEEK										
	1	2	3	4	5	6	7	8	9	10	
AMKE	0	0	4	1	4	2	2	1	1	3	18
COHA	1	0	0	0	1	0	0	0	1	0	3
FEHA	0	0	0	0	0	0	0	0	0	0	0
GOEA	4	1	1	0	0	0	4	0	1	0	11
MERL	0	0	0	0	0	0	0	0	0	0	0
NOHA	0	0	0	0	0	0	0	0	0	0	0
OSPR	0	0	0	0	1	1	0	1	0	0	3
PRFA	2	3	11	5	4	1	4	2	3	2	37
RTHA	31	26	49	28	27	31	39	16	13	14	274
SSHA	0	1	0	0	0	0	0	0	0	0	1
SWHA	1	24	14	3	7	0	1	1	0	0	51
TUVU	45	38	77	51	78	26	57	37	17	30	456
Unidentified	4	28	22	3	6	3	7	4	4	0	81
TOTAL	88	121	178	91	128	64	114	62	40	49	935

The species observed most frequently during fall was the turkey vulture (*Cathartes aura*; 456 observations) followed by the red-tailed hawk (*Buteo jamaicensis*; 274 observations). Other species with numerous sightings include the American kestrel (*Falco sparverius*; 18 observations), Swainson’s hawk (*Buteo swainsoni*; 51 observations), and prairie falcon (*Falco mexicanus*; 37 observations). Species observed in small numbers during spring migration counts include 3 Cooper’s hawks (*Accipiter cooperii*), 3 osprey (*Pandion haliaetus*), and one sharp-shinned hawk (*Accipiter striatus*). Species observed during prior migration studies but not observed this spring include merlin (*Falco columbarius*), ferruginous hawk (*Buteo regalis*), and northern harrier (*Circus cyaneus*). Swainson’s hawk observations peaked during week 2, observations of unidentified raptors were highest during weeks 2 and 3, and turkey vulture and American kestrel observations reached peaks during weeks 3 and 5 (Table 2). Prairie falcons and red-tailed hawks are considered to be resident to the area; therefore, peaks in observations are not viewed as potential increases in numbers of individuals.

This spring, a greater number of Swainson’s hawks (51) were observed compared to prior surveys conducted in fall 2009 (one observation), spring 2010 (2 observations), and fall 2010 (17 observations). These hawks were seen between weeks 1 and 8, and were primarily found as solitary individuals. Occasionally, a pair of Swainson’s hawks was seen, and on one occasion, (March 30) a group of 6 was observed flying together from southeast to northwest. Several other solitary Swainson’s were also seen on March 30. The Swainson’s hawks were occasionally seen flying straight through the site, but were more often observed circling while moving through the site, and several were observed hunting. The majority of these hawks were moving in a northwesterly direction.

COMPARISON TO PREVIOUS SEASONS

Overall, more raptors were observed this season compared to previous seasons. A total of 935 raptors/large birds were observed on site during spring 2011 compared to totals of 165, 522, and 451 during fall 2009, spring 2010, and fall 2010, respectively. Raptor use of the site has varied across the seasons with average observations per hour at 0.216, 0.548, 0.781, and 1.910 for the fall 2009, spring 2010, fall 2010, and spring 2011 seasons, respectively.

In terms of raw numbers of observations, no patterns or seasonal differences were noted with the exception of the red-tailed hawk and turkey vulture. Red-tailed hawk observations increased in abundance through the 4 seasons of counts, and were highest during spring 2011. Prior to spring 2011 however, no red-tailed hawk nests were observed within the project site. This season, an active red-railed hawk nest was discovered within the project area in May on a large rocky hill south of Study Location A. A second active red-tailed hawk nest was discovered off-site but near the project area just east of the town of Ocotillo and north of Evan Hewes Highway. The presence of these 2 active nests may account for the increase in observations of this species during the spring 2011 survey. Turkey vultures were more abundant during both spring seasons (spring 2010, 316 observations; spring 2011, 456 observations) compared to the fall seasons (fall 2009, 15 observations; fall 2010, 83 observations).

In terms of raptor use of the site (number of observations per hour), prairie falcon and turkey vulture use of the site was approximately 3 times greater in spring 2011 compared to previous season, and Swainson's hawk use of the site was 5 times greater in spring 2011 compared to previous seasons. Unidentified raptors were 5 times greater in spring 2011 compared to last spring, and 3 times greater than fall 2010.

Table 3
RAPTOR USE AND RELATIVE ABUNDANCE

Species	Fall 2009		Spring 2010		Fall 2010		Spring 2011		Total		Relative Abundance
	No.	No./hr	No.	No./hr	No.	No./hr	No.	No./hr	No.	No./hr	
American kestrel	17	0.022	16	0.017	43	0.074	18	0.037	94	0.034	0.045
Cooper's hawk	2	0.003	1	0.001	3	0.005	3	0.006	9	0.003	0.004
Ferruginous hawk	4	0.005	0	0	0	0	0	0	4	0.001	<0.01
Golden eagle	9	0.012	0	0	11	0.019	11	0.022	31	0.011	0.015
Merlin	1	0.001	0	0	2	0.003	0	0	3	0.001	<0.01
Northern harrier	8	0.010	2	0.002	2	0.003	0	0	12	0.004	<0.01

Table 3 (cont.) RAPTOR USE AND RELATIVE ABUNDANCE											
Species	Fall 2009		Spring 2010		Fall 2010		Spring 2011		Total		Relative Abundance
	No.	No./hr	No.	No./hr	No.	No./hr	No.	No./hr	No.	No./hr	
Osprey	1	0.001	5	0.005	1	0.002	3	0.006	10	0.004	<0.01
Prairie falcon	15	0.020	22	0.023	9	0.016	37	0.076	83	0.030	0.40
Red-tailed hawk	68	0.089	121	0.127	249	0.431	274	0.560	712	0.256	0.344
Sharp-shinned hawk	1	0.001	0	0	3	0.005	1	0.002	5	0.002	<0.01
Swainson's hawk	1	0.001	2	0.002	17	0.029	51	0.104	71	0.026	0.034
Turkey vulture	15	0.020	316	0.332	83	0.144	456	0.932	870	0.313	0.420
Unidentified raptor	23	0.030	37	0.039	28	0.048	81	0.165	169	0.061	0.082
Total Observations	165	0.216	522	0.548	451	0.781	935	1.910	2,073	0.745	
Total Identified Species	12		8		11		9		12		
Observation Hours	763		952		577.5		489.5		2,782		

CONCLUSION

The spring 2011 Raptor Migration Counts Study concludes the fourth season of raptor migration counts conducted by HELIX for the Ocotillo Wind Energy Project. No raptor migration study has previously been conducted in this area prior to HELIX's studies. The Ocotillo Wind Energy Project site is not located in a known raptor migration corridor (Aspen 2008; personal communication, Unitt 2007) and the results of this fourth season continue to support the conclusion that the project site is not a major migratory pathway for diurnally migrating raptor species.

Known migration routes for raptors typically contain topographical features such as appropriately oriented ridgelines that provide orographic lift for migrating birds on long overland flights. The project site lacks a major ridgeline, and also lacks attractive features such as water bodies and large stands of mature trees which might provide more abundant prey and roosting habitat. The closest major water body is the Salton Sea, which is 30 miles to the northeast of the site, and the closest irrigated agriculture fields are approximately 15 miles to the west of Ocotillo near the town of El Centro. The majority of the project site is generally flat and supports a

variety of desert scrub vegetation and dry desert washes. The few higher elevation areas within the project site include Sugarloaf Mountain just north of Interstate 8 and rocky, boulder-covered terrain in the southwest portion of the site. Mountainous terrain exists west and north of the site; the north-south oriented Jacumba Mountains are to the west, the west-east oriented Coyote Mountains are to the north.

Golden eagle use of the site was very low during the spring 2011 study (0.022 observations/hr). The average amount of time golden eagles were observed on site was low (9 minutes) during spring 2011. The results of the extensive observation hours on site (489.5 hours in spring 2011; 577.5 hours in fall 2010; 952 hours in spring 2010; and 763 observation hours in fall 2009) continue to indicate that the site is used occasionally by eagles for foraging at heights including within the RSA, and continues to support the conclusion that the site is not part of a frequently used foraging area. This data indicate that turbine collision risk of the golden eagle is low within the project site. However, it is expected that the potential collision risk will be mitigable through the implementation of measures described in the project's Eagle Conservation Plan (ECP).

Golden eagle observations in spring 2011 (11 observations; 0.022 observations/hr) compared to previous seasons (fall 2010 [11 observations; <0.02 observations/hr]; spring 2009 [0 observations]; and fall 2009 [9 observations; 0.012 observations/hr]). As in previous seasons, in spring 2011 golden eagles were observed over a large portion of the proposed project site, and were primarily seen in the western portion of the site. Both adult and juvenile golden eagles were observed during the studies of fall 2009 and fall 2010; in spring 2011 7 of the 11 golden eagles observed were juveniles. Total number of observation minutes of golden eagles over the 4 seasons was 384; total number of minutes within the RSA was 165, resulting in a total exposure rate of 0.43. Observed flight height ranges and flight behaviors were similar to previous studies; golden eagles were observed soaring and/or thermalling within and adjacent to the project site, as well as traversing the site.

Swainson's hawks were observed during previous migration studies only occasionally, and only as individuals, with the exception of a group of 14 that were seen traversing the site on October 22, 2010. This group was observed moving from north to south at a height of approximately 2000 feet. Season totals from previous surveys ranged from 1 to 17. This spring, a larger number of Swainson's hawks (51) were observed. During spring migration, thousands of Swainson's hawks fly from South America to various destinations in the extreme north of the North American continent. Large groups of these hawks (dozens to many hundreds) are known to stop overnight and roost in the desert town of Borrego Springs, which is approximately 50 miles northwest of the Ocotillo Wind Energy project site. The majority of the Swainson's hawks observed within the project site were moving northwesterly in the general direction of Borrego Springs. The precise route that Swainson's Hawks use when flying from Mexico to Borrego Springs is unknown; however, it is likely that they primarily utilize areas containing ridgelines, which would indicate that their primary travel route would not be through the proposed project site.

As noted during the previous survey reports, there are several raptor species that are resident to the project site vicinity and use the site regularly for foraging, perching, and nesting. These

species occur in low densities within the project site and include the red-tailed hawk, turkey vulture, prairie falcon, and American kestrel. Other raptor species that occur as migrants include osprey, Cooper's hawk, sharp-shinned hawk, merlin, and Swainson's hawk, in addition to migrant turkey vultures and red-tailed hawks. The migratory raptor species listed above (excluding turkey vulture and Swainson's hawk) were observed infrequently during the spring 2011 study period, as well as prior surveys; 3 or fewer observations were made of osprey, Cooper's hawk, sharp-shinned hawk, and merlin. To reduce the collision risk of raptors, non-raptors, and bat species, an Avian and Bat Protection Plan (ABPP) has been prepared for the project in accordance with the guidance provided by USFWS (2010).

Please contact me or Shelby Howard at (619) 462-1515 if you have any questions.

Sincerely,



for Kimberly Davis
Biologist

Enclosures:

- Figure 1 Regional Location Map
- Figure 2 Project Location Map
- Figure 3 2011 Golden Eagle Study Count Locations
- Figure 4 Spring 2011 Golden Eagle Sightings

REFERENCES

Aspen Environmental Group. 2008. Final Environmental Impact Report/Environmental Impact Statement and Proposed Land Use Amendment, San Diego Gas and Electric Company Application for the Sunrise Powerlink Project. SCH #2006091071. DOI Control No. FES-08-54. California Public Utility Commission and U.S. Department of Interior, Bureau of Land Management. October 28.

California Energy Commission (CEC). 2007. California Guidelines for Reducing Impacts to Birds and Bats From Wind Energy Development (Final Report). October.

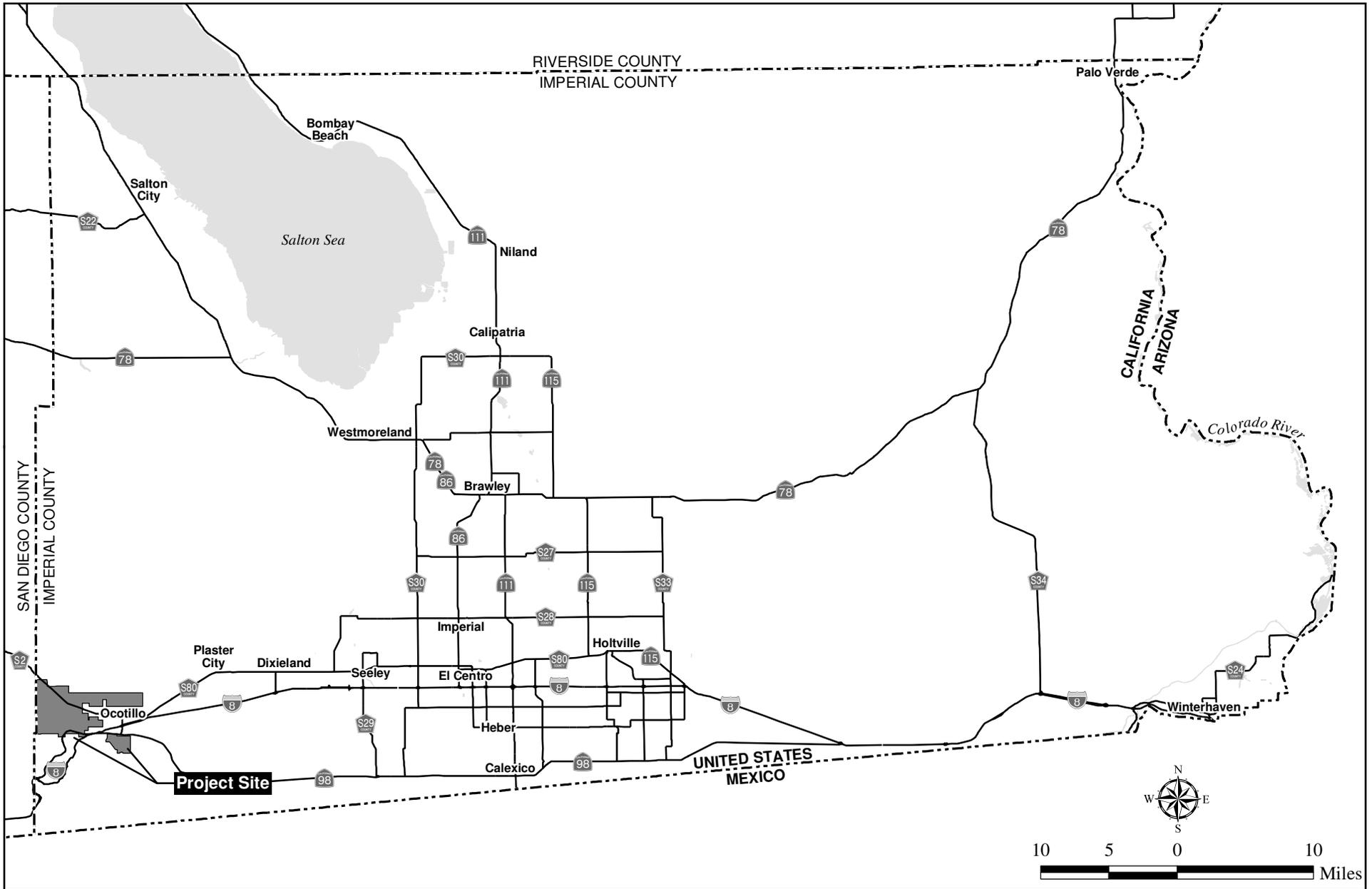
HELIX Environmental Planning, Inc. (HELIX). 2011. Fall 2010 Golden Eagle Count Report. March 4.

2010. Raptor Migration Report. December 7.

U.S. Fish and Wildlife Service (USFWS). 2011. Draft Eagle Conservation Plan Guidance.
January.

2010. Service White Paper Providing Guidance for the Development of Project-Specific
Avian and Bat Protection Plans for Renewable Energy Facilities. August 3.

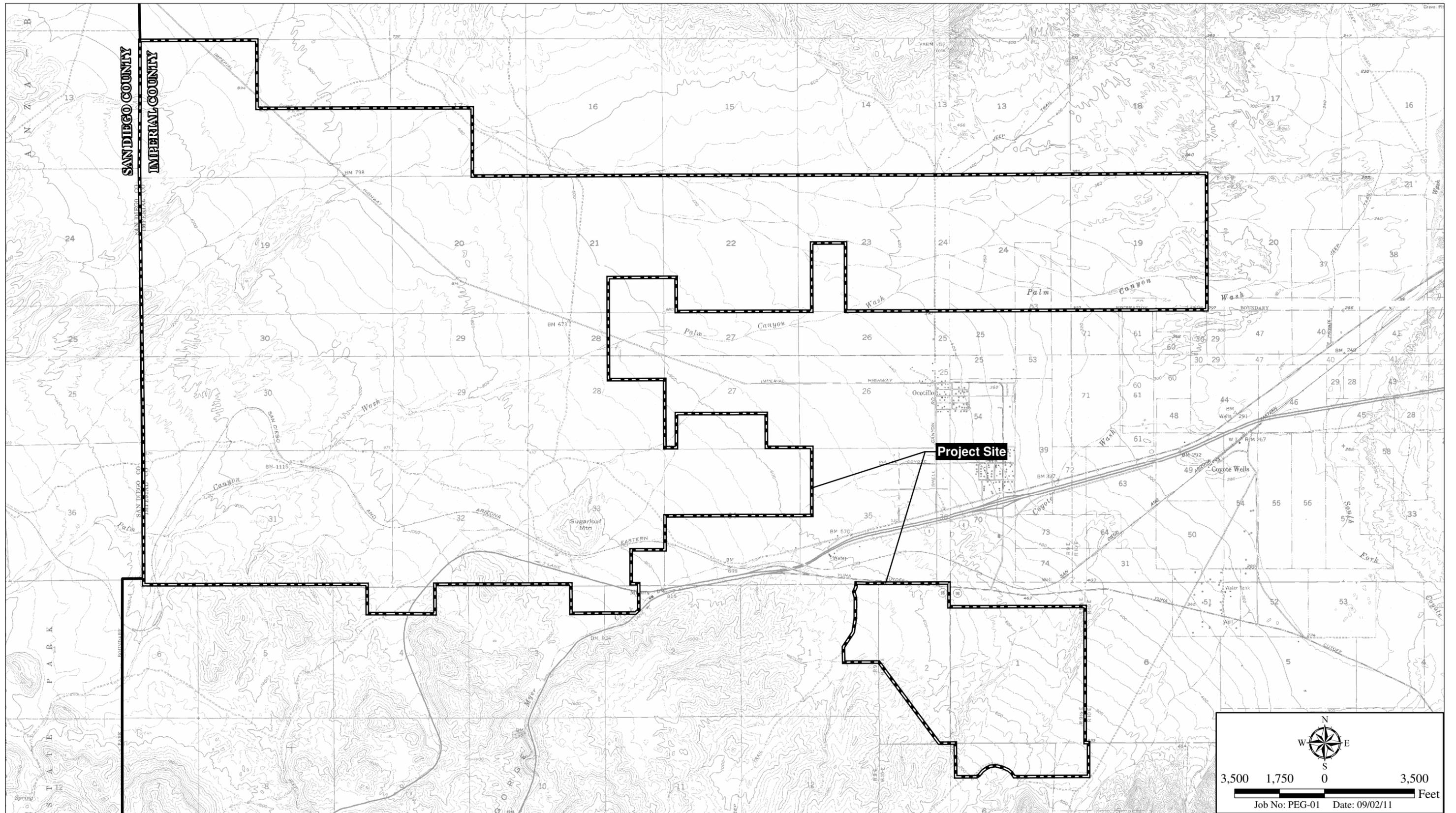
Unitt, P.A. 2007. Collection Manager, Department of Birds and Mammals, San Diego Natural
History Museum. E-mail communication to HELIX for the Sunrise Powerlink Project,
May 29 and June 6.



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Regional Location Map

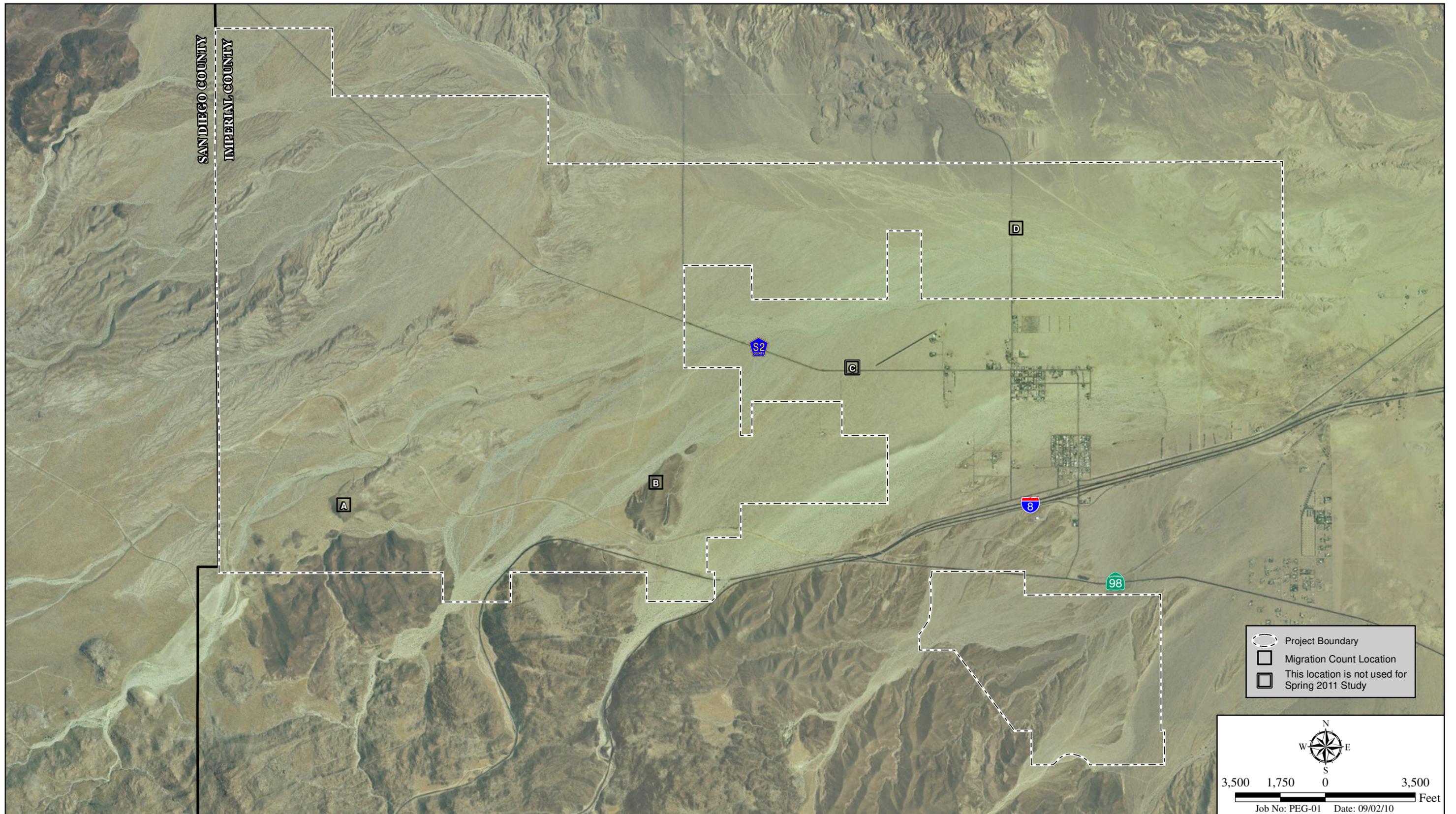
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Project Location Map

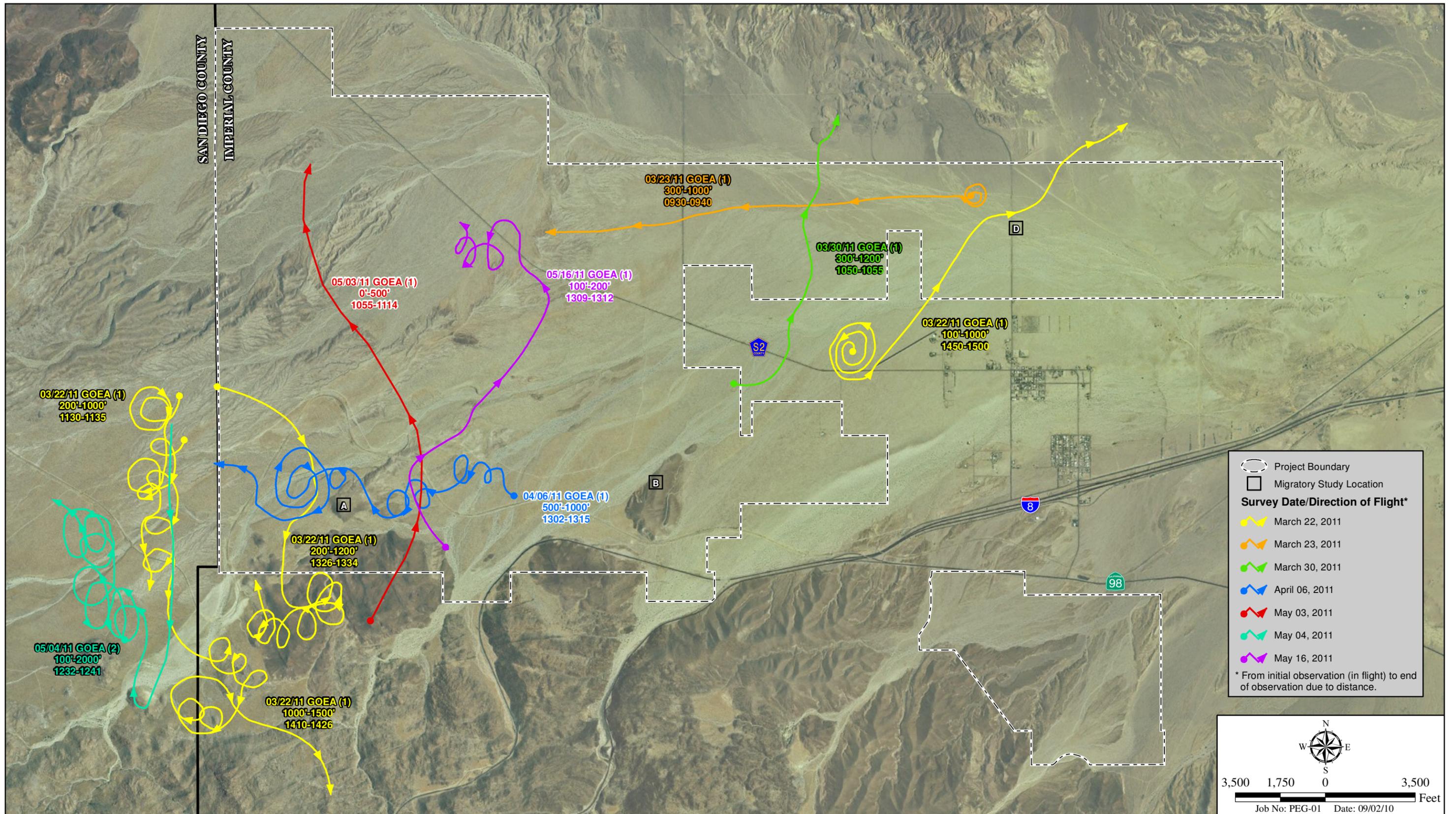
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2011 Golden Eagle Study Count Locations

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Spring 2011 Golden Eagle Sightings

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