

Appendix C – Technical Memoranda

12.15 Golden Eagle Aerial Surveys

Phase 1

**Golden Eagle Aerial Surveys for
Eagle Mountain Pumped Storage
Project in the Mojave Desert Region,
California**

for

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July 15, 2010

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- Appendix B. Golden Eagle and Significant Other Wildlife Species Observations
- Appendix C. Waypoints and Related Data for Golden Eagle and Other Observations

EXECUTIVE SUMMARY

This document reports on findings of the **Phase 1** survey, the first of 2 phases, for Golden Eagles within 10 miles of the Eagle Crest Energy Company's Eagle Mountain Pumped Storage Project boundary in order to comply with the U.S. Fish and Wildlife Service requirements. Thirteen mountain ranges were surveyed by Wildlife Research Institute biologists via helicopter on March 25th, March 26th, April 2nd, and April 3rd, 2010, between and around Blythe and Desert Center, California. Fourteen territories of Golden Eagles were found containing a combined 34 nests. Nine of the 14 territories were considered active in this year but only 1 was found with an incubating female. In addition, 51 Desert Bighorn Sheep were seen in 6 different locations. Besides 5 Golden Eagles, 12 other species were seen (i.e., Barn Owls, Bighorn Sheep, Cooper's Hawks, Common Ravens, Great Horned Owls, a Long-eared Owl, an Osprey, Prairie Falcons, Red-tailed Hawks, Swainson's Hawks, and Turkey Vultures) for a total of 340 wildlife documentations. All sightings have been documented with GPS locations and recorded on the attached maps and tables.

PROJECT SCOPE

The survey work reported here was conducted to record and report occupancy of Golden Eagles (GOEAs, *Aquila chrysaetos*) on and around the Eagle Mountain Pumped Storage Project (EMPSP) area, including a 10-mile spatial buffer from the proposed project boundary to allow for proper data interpretation of occupied territories, a U.S. Fish and Wildlife Service (USFWS) requirement (Pagel et al. 2010).

The EMPSP survey was completed while surveying 3 other nearby solar project sites. In an effort to reduce the financial burden on each client, the costs for the survey were shared among all 4 proponents. A few additional mountains, immediately south and west of the shared survey area, were covered specifically for the EMPSP proposed project area.

PROJECT BACKGROUND

Eagles are large predatory birds with up to 7-foot wingspans and raising young takes a large investment of time and energy. Breeding in Southern California starts in January, nest building and egg laying in February to March, and hatching and raising the young eagles occur from April through June. Once the young eagles are flying on their own, the adult eagles will continue to feed them and teach them to hunt until late November. They then repeat this process. This huge investment of time and energy on the part of the adults, just to raise one or two young, causes some pairs to take a year off from breeding once in awhile even when food is abundant.

WRI has learned, based on 22 years of helicopter and ground studies on GOEAs, that an initial helicopter survey can successfully identify 80 to 90% of the GOEA territories in a given area. Follow-up ground and helicopter surveys have indicated that some nests, and even some pairs, might be missed during the first survey. Second surveys are conducted to determine reproductive success but can identify successful nesting attempts that were missed during initial surveys as well as reveal fledging success.

STUDY AREA

The study area is approximately 1,600 square miles in size and located in the Mojave Desert, near Blythe, California (Figures 2 and 3). It includes the Big Maria, Chuckwalla, Coxcomb, Eagle, Hodges, Little Chuckwalla, Little Maria, McCoy, Orocopia and Palen mountain ranges as well as the Chuckwalla Valley. It is mostly Creosote Scrub and Yucca-Cactus transitional habitat at the lower areas and Rocky Outcrops at the higher elevations. A portion of the northwest corner of the study area lies in Joshua Tree National Park.



Figure 1. Vicinity Map.

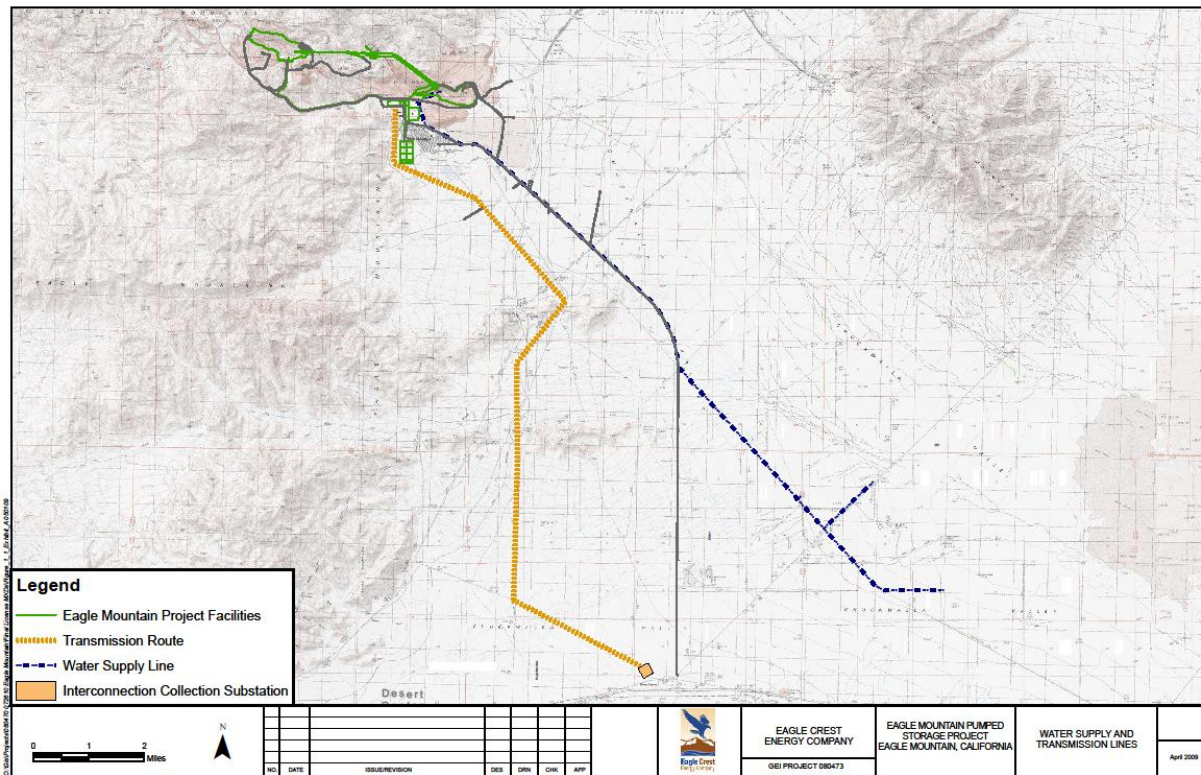


Figure 2. Location Map provided by Eagle Crest Energy Company.

METHODS AND CONSTRAINTS

For this survey, WRI attempted to determine which GOEA territories were active, even in the absence of incubating females, by evidence at the nest sites. Observations such as fresh green branches, material placed in the nest bowl such as yucca, and signs of new nest sticks built into and above old nest material all helped assess activity at the nest site during 2010. We contacted Dr. Larry LaPre, of the BLM, to request available historic records or reports of GOEA nesting activity and/or sightings in the project area. WRI utilized the information provided by Dr. LaPre to improve our survey focus. Surveys conducted over the Joshua Tree National Park required permits from the National Park Service.

It should be noted that all surveying and reporting complies with the current U.S. Fish and Wildlife Service Interim GOEA Inventory and Monitoring Protocols released in 2010 (Pagel et al. 2010).

Survey

On March 25 to 26 and April 2 to 3, 2010, WRI conducted helicopter surveys for the target species, GOEA. We used Hughes-500 helicopters that provided seating for three investigators including 2 GOEA biologists, a Bighorn Sheep biologist, and the pilot. We spent approximately 75 person-hours of actual aerial observations during the helicopter surveys for this phase and

concentrated on any area with suitable GOEA habitat. This included all or part of every mountain range in the study area; areas without suitable GOEA habitat were not surveyed. We also surveyed suitable transmission lines in the project area since GOEAs are known to nest on these types of structures and WRI has documented this activity in other parts of the Mojave Desert (WRI 2002, 2003, 2009).

GPS

Nest site and other location-specific data were determined and documented using hand-held GPS units (Garmin Map60GSx). A sequential number was assigned to each observation that corresponded to the GPS waypoint (see Appendix A for an explanation of acronyms used for waypoints). Waypoints were recorded using the UTM grid in the WGS 84 Datum. GPS was also used to track our survey routes. Handwritten notes were also taken that documented species and corresponded to each GPS waypoint.

Data

We photographed all active GOEA nests, some other raptor nests, representations of numerous inactive GOEA nest sites, and significant other wildlife species observed. The following data were also specifically collected (see Appendices B and C):

- Species
- Number of nests/alternative nests observed
- Condition of each nest and whether or not it was active
- Nest aspect
- Nest elevation
- Nest GPS coordinates
- Nest substrate (cliff, transmission tower, etc.)
- Age class of GOEAs and other species, if determinable
- Behavior of species observed.

An **active nest** is defined by the presence of one or more birds or evidence that new material has been added during the season that the survey is conducted. This often includes the construction of a bowl, used for incubation.

A nest in **good condition** has been worked on within the past 1 to 3 years; a determination made by observing the age of sticks or other materials that make up the nest and the presence of a bowl but no new material.

A nest in **fair condition** has not been used for several years, shows moderate signs of weathering, and could include a rough bowl.

A nest in **poor condition** shows strong signs of weathering, is in the process of deteriorating, and can often even be decomposing.

It should be noted that Red-tailed Hawks (*Buteo jamaicensis*) in particular, as well as other raptors such as Prairie Falcons (*Falco mexicanus*), sometimes utilize GOEA nests for their own nesting, something observed during this survey.

Nest Condition Examples:



Good condition and active



Fair condition



Poor condition

Constraints

In that this was a diurnal survey focused on GOEAs, we were less likely to observe nocturnal and crepuscular raptors (i.e., owls). Aerial surveys also tend to under-represent the smaller species, like the American kestrel (*Falco sparverius*) and burrowing owl (*Athene cunicularia*).

The release of the Interim GOEA Technical Guidance in February and subsequent contracts being finalized in March resulted in survey flights being scheduled late in the GOEA breeding season. Initiating surveys this late in the season may have resulted in missed observations of adult eagles on territory earlier in the year (December-February) that did not attempt to produce young.

High winds encountered during the middle of the first survey required us to abandon surveys for that day and reschedule an additional two days of helicopter flights several days later than originally planned.

RESULTS

Golden Eagles

We observed a total of 34 GOEA nests in the study area that represented an estimated 14 GOEA territories (Figure 4). These nests were in various conditions and some may not have been used for many years. It is important to note that many of the 34 nests are alternative nest sites for the same territory. We indicate “an estimated 14 GOEA territories” because the distinction between adjacent territories is not always clear (see Figure 5) and, often, can only be discerned after multiple seasons of field observations, starting early enough in the spring to document initial activity.

We documented 9 of these territories to be active or possibly active this year; a number of additional territories have apparently been active within the last 2-3 years. One GOEA territory (Northeast Coxcomb) included an incubating female. We will return in May to conduct Phase 2 of the survey and document if the incubating pair is successful and also if any of the other active territories successfully produced young from nests not initially found.

Table 1 lists the waypoint identification number for each GOEA nest identified, the status of the nest (e.g., active, inactive, etc), the territory name (incorporating the US Geological Survey Quad [USGS], the USFWS recommended naming convention), and the geographical area where the nest was located. Additionally, a comprehensive list of all nests identified during the survey and the associated species for each nest is provided in Table 2.

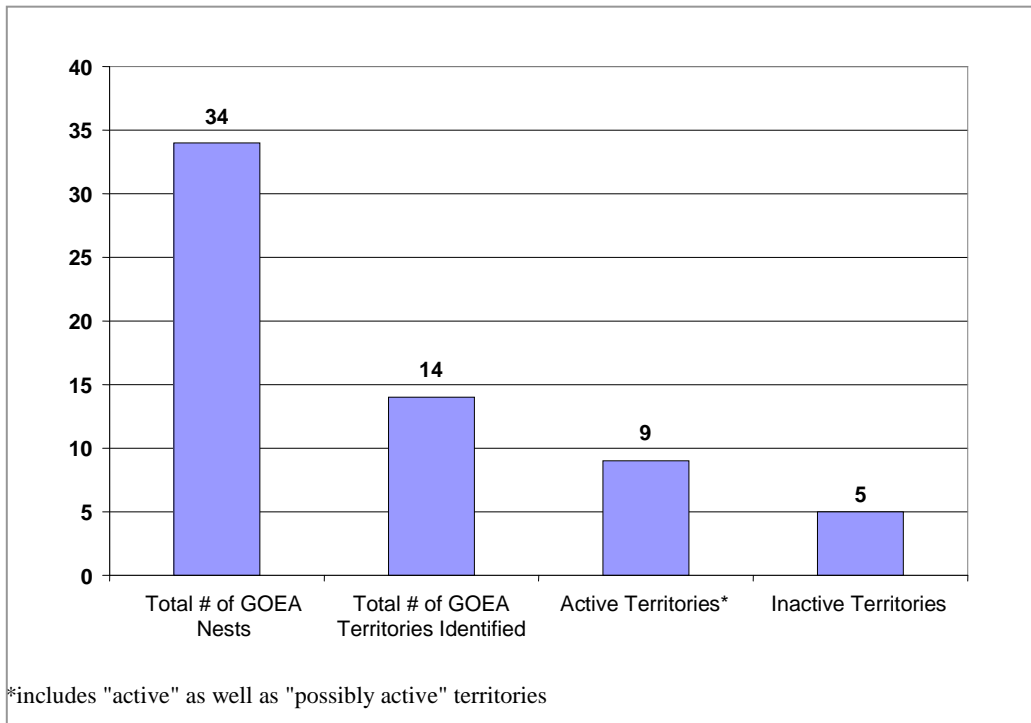


Figure 3. Phase 1 GOEA Territory Data for Eagle Crest Mojave Study Area.

Territory	Trip ID	Waypoint	Active	USGS Quad Territory Name	Geographic Area
1	B	9	N	CA-SD-33115/E3-001-01	Chuckwalla Mtns S
1	B	49	N	CA-SD-33115/E3-002-01	Chuckwalla Mtns S
2	A	26	Y	CA-SD-33114/G6-001-01	Big Maria Mtns
3	A	2	Y	CA-SD-33115/E5-001-01	Chocolate N
4	B	43	N	CA-SD-33115/F3-001-01	Chuckwalla Mtns N
4	B	44	N	CA-SD-33115/F3-001-02	Chuckwalla Mtns N
4	B	77	P	CA-SD-33115/F3-001-03	Chuckwalla Mtns N
4	B	77	P	CA-SD-33115/F3-001-04	Chuckwalla Mtns N
5	D	4	N	CA-SD-33115/H3-001-01	Coxcomb Mtns CW
5	D	5	N	CA-SD-33115/H3-001-02	Coxcomb Mtns CW
5	D	43	N	CA-SD-34115/A4-001-01	Coxcomb Mtns CW
5	D	44	N	CA-SD-34115/A4-001-02	Coxcomb Mtns CW
5	D	45	P	CA-SD-34115/A4-001-03	Coxcomb Mtns CW
5	D	46	N	CA-SD-34115/A4-001-04	Coxcomb Mtns CW
6	C	10	N	CA-SD-34115/A3-001-01	Coxcomb Mtns NE
6	C	17	N	CA-SD-34115/A3-002-02	Coxcomb Mtns NE
6	C	12	Y-Inc	CA-SD-34115/A3-001-03	Coxcomb Mtns NE
6	C	13	N	CA-SD-34115/A3-001-04	Coxcomb Mtns NE
6	C	14	N	CA-SD-34115/A3-001-05	Coxcomb Mtns NE
7	D	50	Y	CA-SD-33115/G3-001-01	Coxcomb Mtns SW
7	D	51	N	CA-SD-33115/G3-001-02	Coxcomb Mtns SW
7	D	53	N	CA-SD-33115/G3-001-03	Coxcomb Mtns SW
8	D	32	N	CA-SD-33115/H5-001-01	Eagle Mtns NW
8	D	34	N	CA-SD-33115/H5-001-02	Eagle Mtns NW
8	D	35	Y	CA-SD-33115/H5-001-03	Eagle Mtns NW
9	B	114	N	CA-SD-33115/F5-001-01	Eagle Mtns S
10	A	4	N	CA-SD-33115/D1-001-01	Little Chuckwalla Mtns
11	A	54	N	CA-SD-33114/G7-001-01	Little Maria Mtns SE
12	A	56	N	CA-SD-33114/F7-001-01	McCoy Mtns SE
13	A	47	P	CA-SD-33115/G1-001-01	Palen Mtns C
13	A	47	P	CA-SD-33115/G1-001-02	Palen Mtns C
13	C	6	N	CA-SD-33115/G1-001-03	Palen Mtns C
14	B	118	N	CA-SD-33115/G5-001-01	Eagle Mtns C
14	B	124	Y	CA-SD-33115/G5-001-02	Eagle Mtns C

Inc=Incubating; N=No; P=Possibly; Y=Yes

Table 1. Golden Eagle territories identified during Phase 1 surveys with USGS Quad territory/site names and geographic locations. Active territories are highlighted in yellow; territories impacted by the Eagle Crest Project are bolded and territories not relevant to the Eagle Crest Project are shaded in light grey.

Species	Big Maria Mtns	Chocolate Mtns	Chuckwalla Mtns	Chuckwalla Valley	Coxcomb Mtns	Eagle Mtns	Hodges Mtns	Little Chuckwalla Mtns	Little Maria Mtns	McCoy Mtns	Mecca Hills	Orocopia Mtns	Palen Mtns	Nest Totals
Common Raven nest			4		2	3								9
Common Raven nest (incubating)			6	7							2	1		16
Golden Eagle nest			4		11	4		1	1	1			1	23
Golden Eagle nest (active)	1	1	2		2	2							2	10
Golden Eagle nest (incubating)					1									1
Great Horned Owl cavity nest			1											1
Long-eared Owl (incubating)					1									1
Prairie Falcon cavity nest					1			1						2
Prairie Falcon cavity nest (incubating)						2								2
Red-tailed Hawk nest	3		2	11	6	8				1		5		36
Red-tailed Hawk nest (incubating)	3		8	16	1	4	1	1					1	35
Unidentified			2		3				1					6
Nest Totals	7	1	29	34	28	23	1	3	2	2	2	6	4	142

Table 2. GOEA and all other nest observations; totals presented by geographic area as well as by species.

AERIAL SURVEY MAPS BY MOUNTAIN RANGE

Overview of GOEA Territories Surrounding the EMPSP Project Area

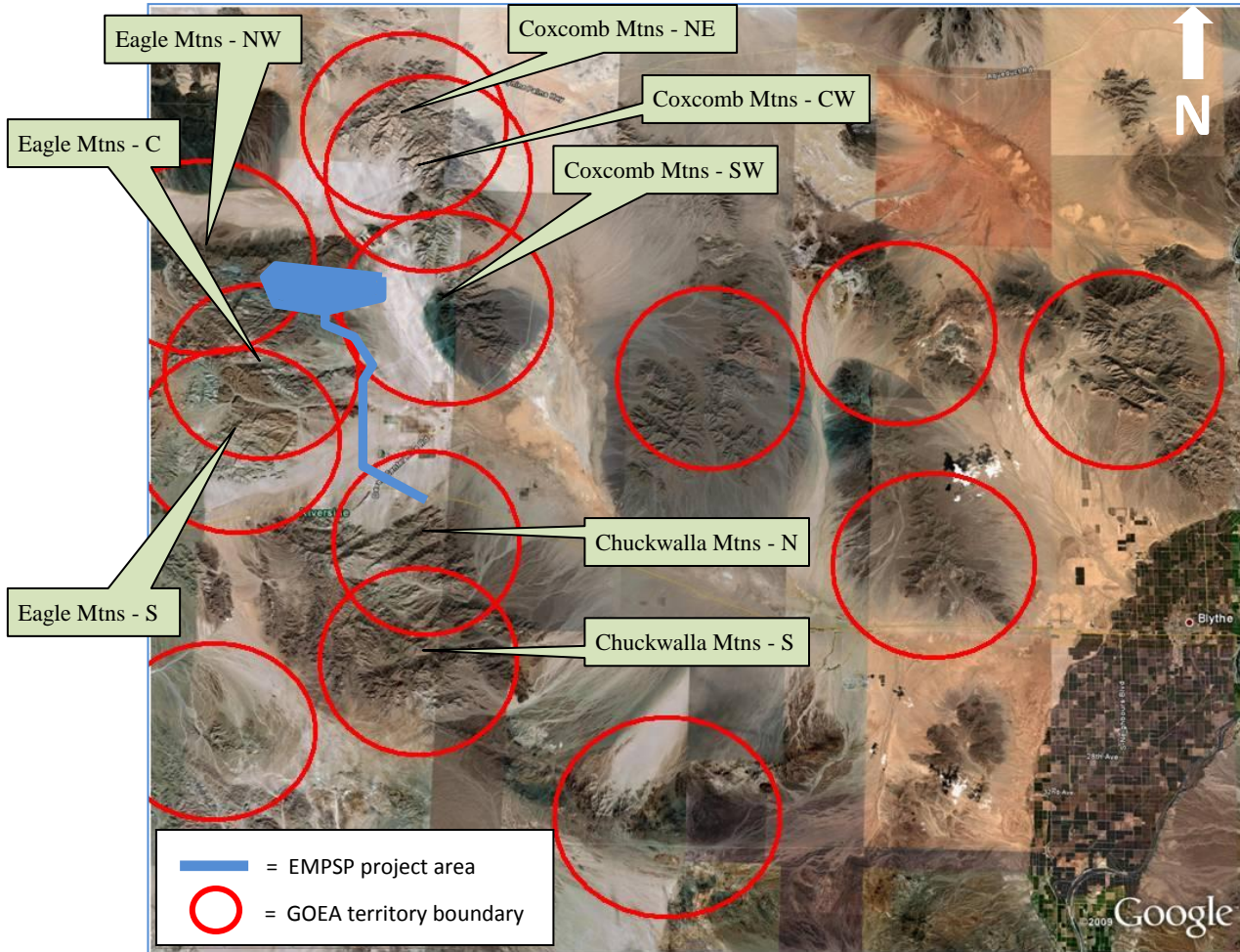


Figure 4. Overview map of all GOEA territories, with an approximate 5-mile GOEA territory radius, surrounding the Eagle Mountain Pumped Storage Project area in the Mojave Desert Region.

Legend for Aerial Surveys Maps

Figure 5 provides a description of the waypoint labels and abbreviations noted on the following survey maps (Figures 6 to 21).

Map Legend	
A50GESN-1	observation ID
A =	trip
50 =	waypoint ID
GE =	Golden Eagle
SN =	stick nest
1 =	one bird/animal present
AK =	American Kestrel
BO =	Barn Owl
BS =	Bighorn Sheep
CN =	cavity nest
CH =	Cooper's Hawk
CR =	Common Raven
GE =	Golden Eagle
GF =	Grey Fox
GO =	Great Horned Owl
LO =	Long-eared Owl
NH =	Northern Harrier
OS =	Osprey
PE =	Peregrine Falcon
PR =	Prairie Falcon
RT =	Red-tailed Hawk
SN =	stick nest
SW =	Swainson's Hawk
TN =	tower nest
TV =	Turkey Vulture
U =	unidentified
XX =	other
Helicopter Flight Paths	
	= March 25, 2010
	= March 26, 2010
	= April 2, 2010
	= April 3, 2010
	= Estimated GOEA territory with 5-mile radius

Figure 5. Survey map legend for the GOEA territory maps (Figures 6-21).

Big Maria Mountains

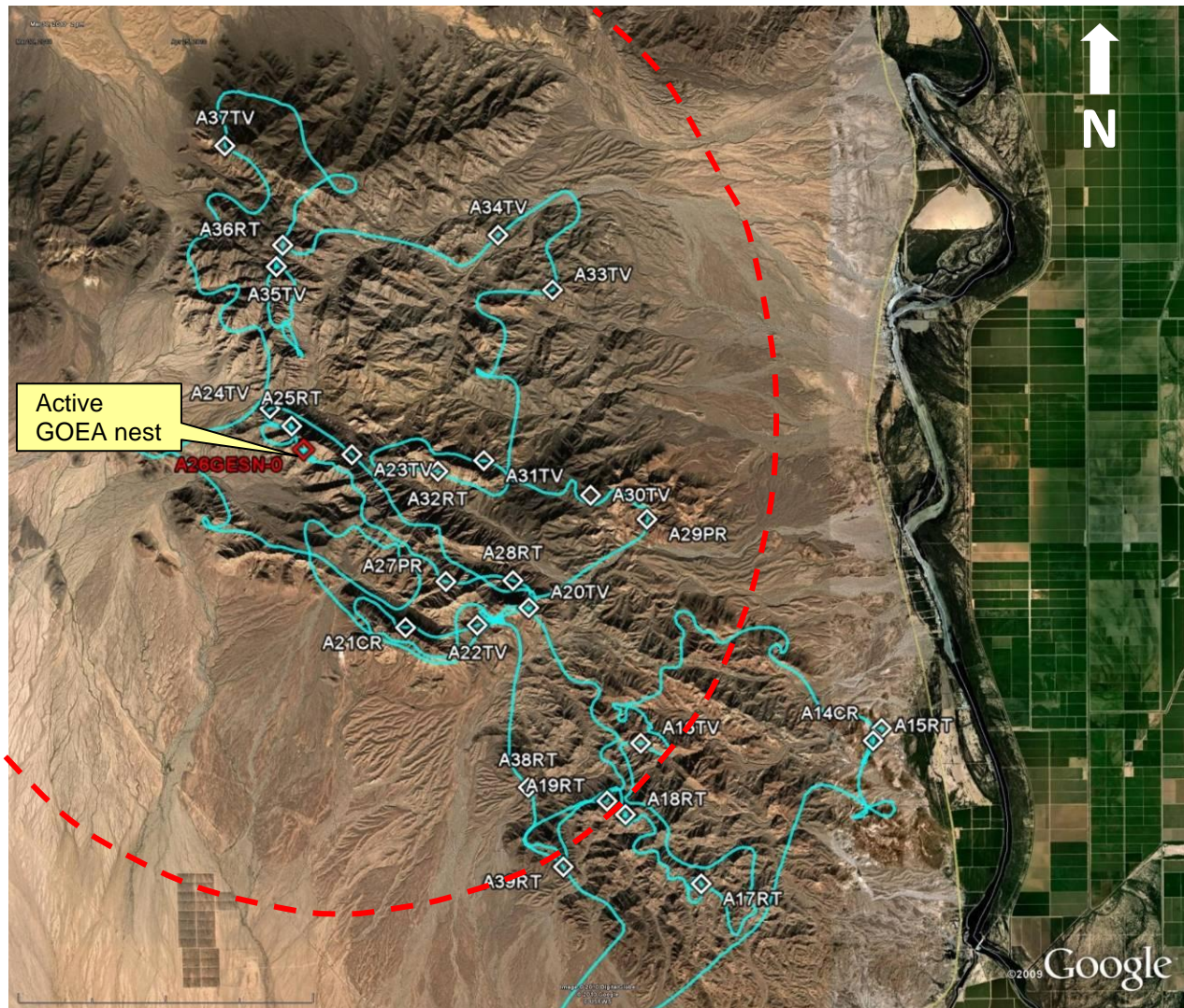


Figure 6. Big Maria Mountains, active territory. All waypoints for species and nests observed, the helicopter flight path, and an approximate 5-mile GOEA territory radius are provided.

Big Maria Mountains



An active GOEA nest (A26GESN-0); good condition, new material this season.



A detailed photograph of the above GOEA nest (A26GESN-0).

Chuckwalla Mountains - North

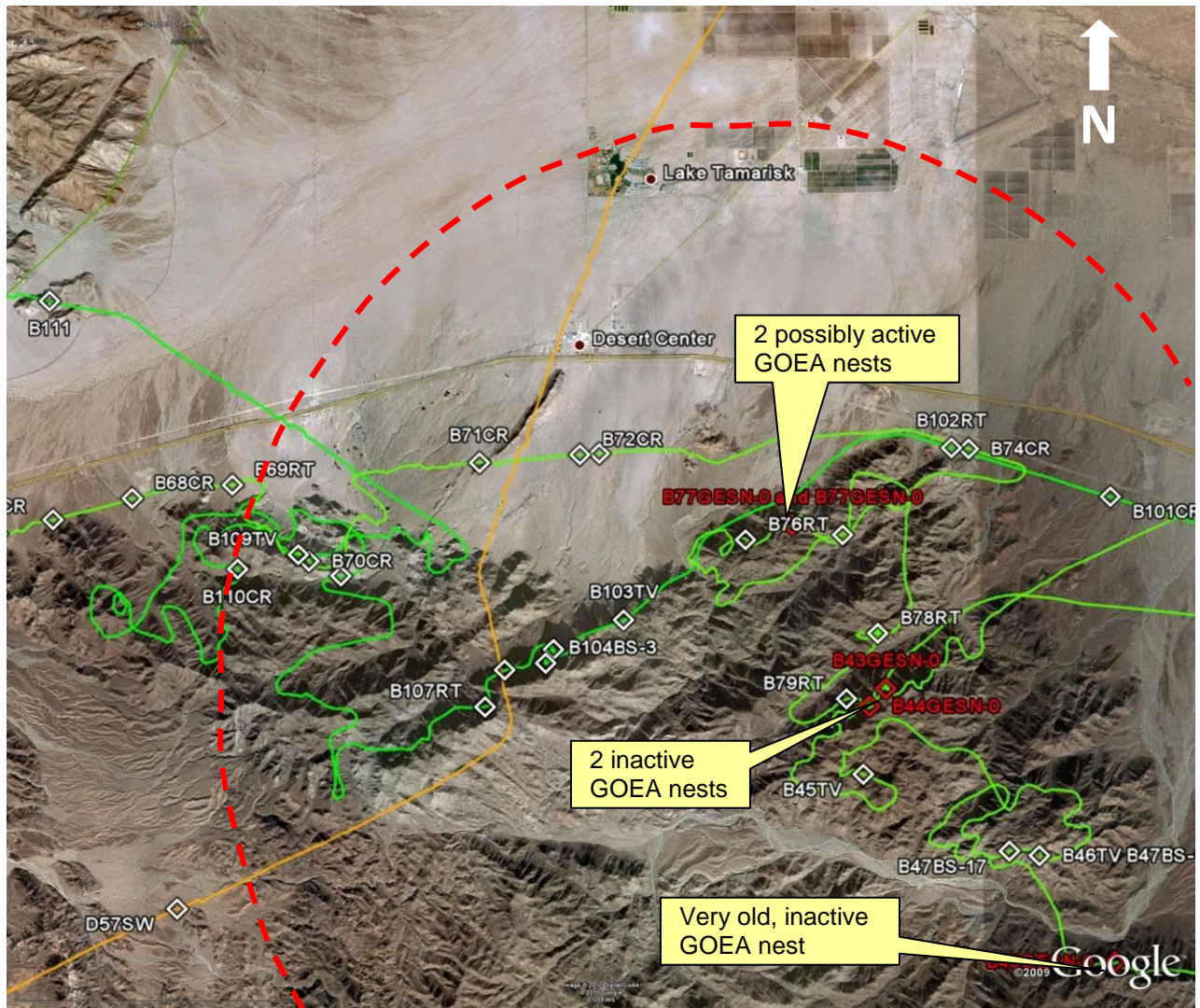


Figure 7. Chuckwalla Mountains - North, possibly active territory. All waypoints for species and nests observed, the helicopter flight path, and an approximate 5-mile GOEA territory radius are provided.

Chuckwalla Mountains - North



An inactive GOEA nest (B44GESN-0); good condition.



A possibly active GOEA nest (B77GESN-0); good condition, 1 of 2 nests at this location.

Chuckwalla Mountains - South

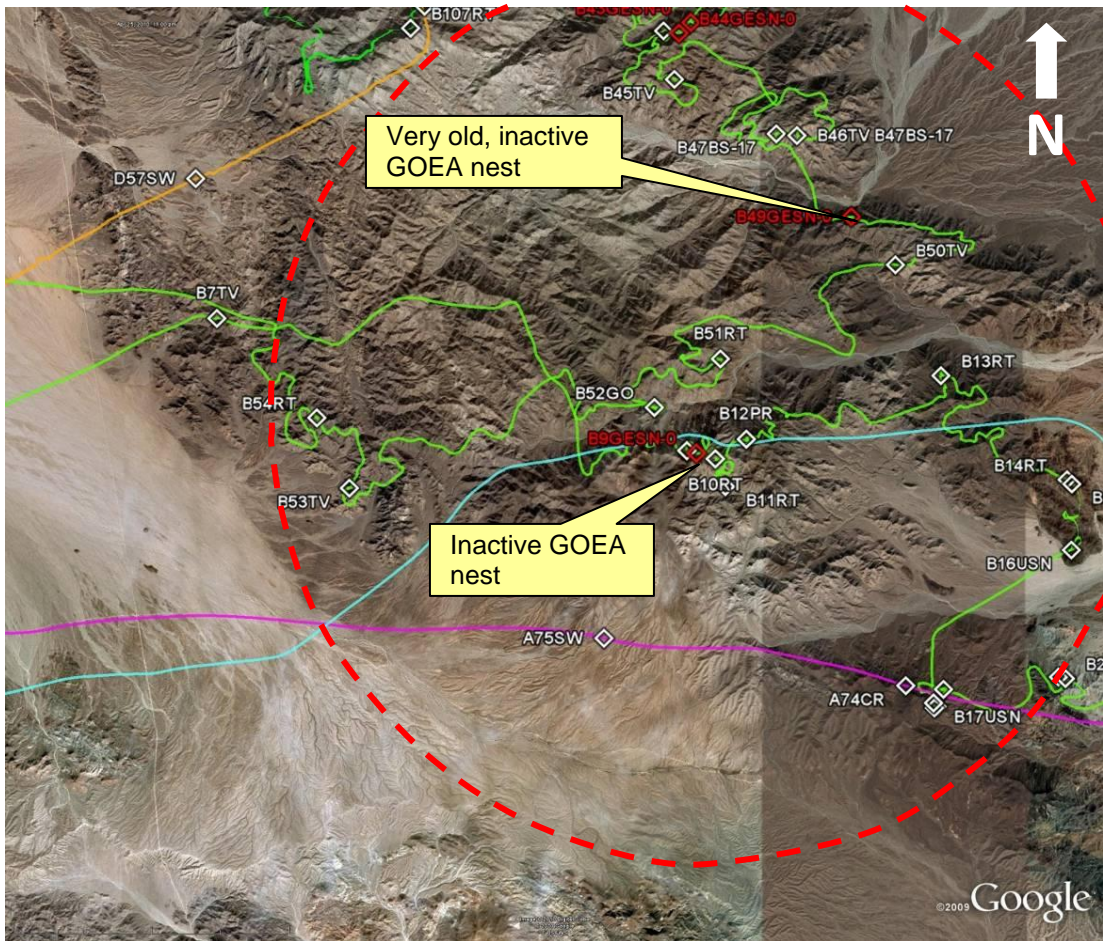


Figure 8. Chuckwalla Mountains - South, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.



An inactive GOEA nest (B49GESN-0). Poor condition, very old nest.

Chocolate Mountains - North
(just south of designated survey area)

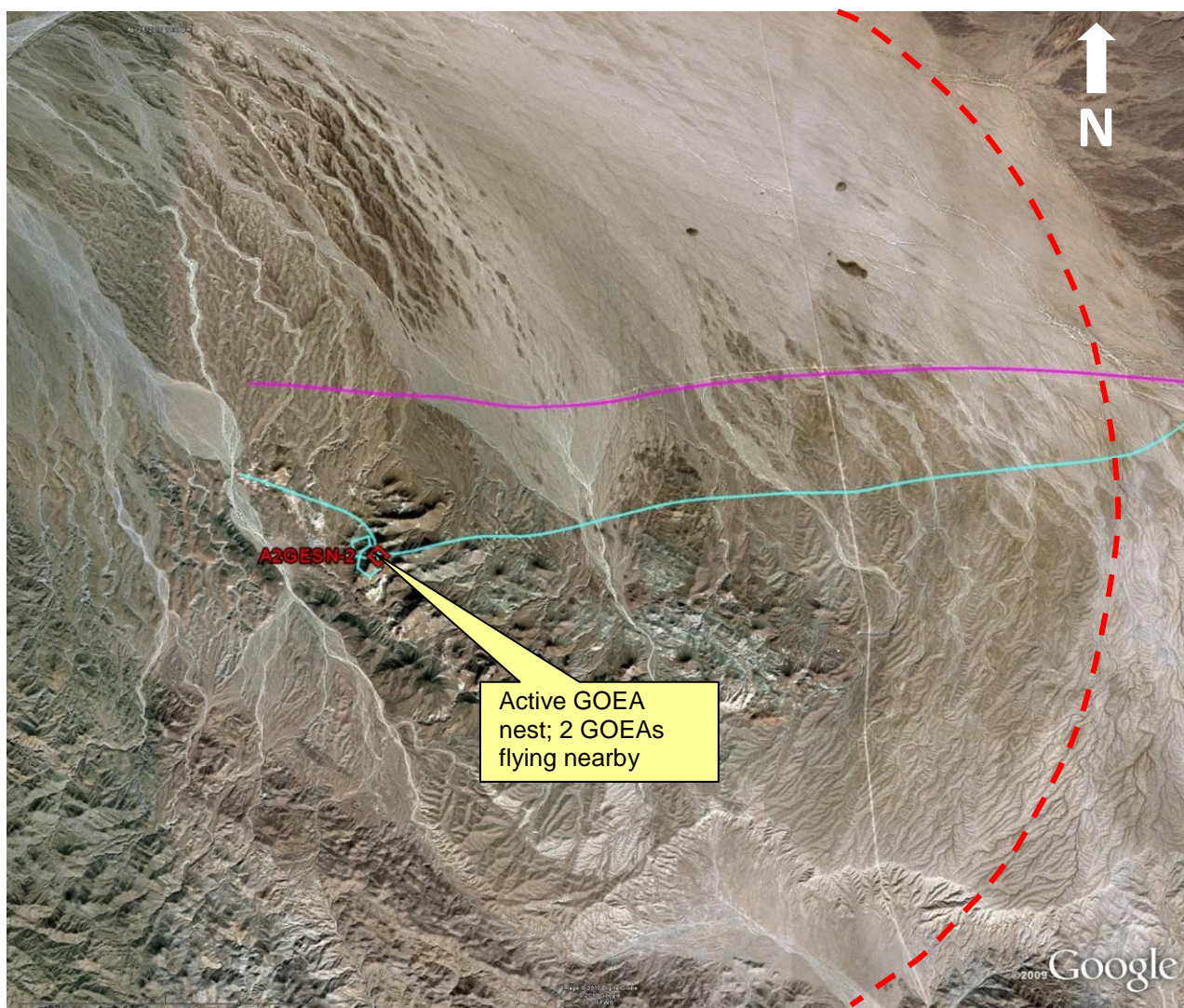


Figure 9. Chocolate Mountains - North, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided. Two GOEAs were observed flying near the nest site; one adult and one 2 to 3 year-old sub-adult. This territory is outside of the required survey boundaries but is included since GOEAs were found during the flights.

Chuckwalla Valley



Figure 10. Chuckwalla Valley. All waypoints for species and nests observed, the helicopter flight path are provided. No GOEA nests were observed in this area.

Coxcomb Mountains - Northeast

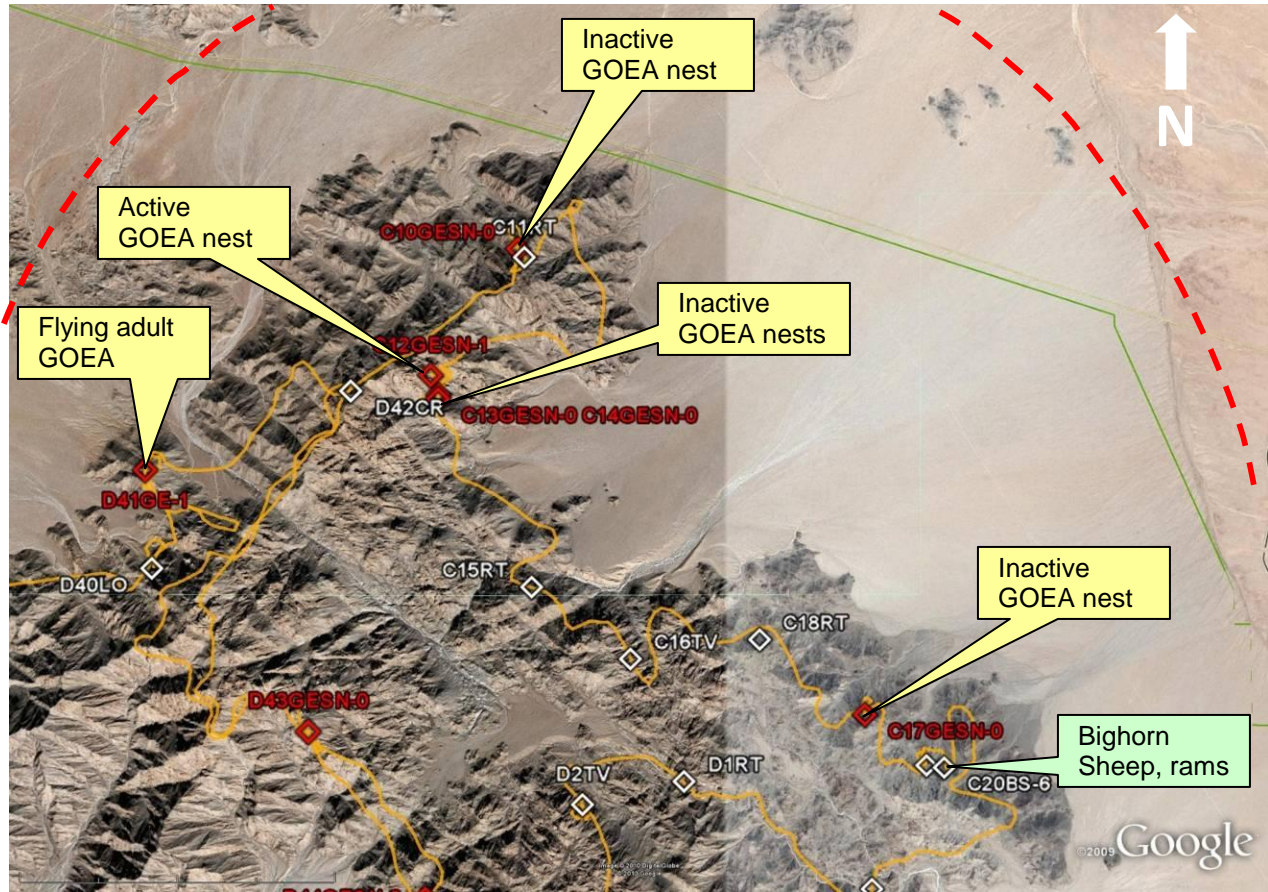


Figure 11. Coxcomb Mountains - Northeast, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

Coxcomb Mountains - Northeast



An incubating Long-eared Owl in old Prairie Falcon cavity nest (D40LOCN-1).



An inactive GOEA nest (C13GESN-0); poor condition, adult GOEA carcass in nest.

Coxcomb Mountains - Northeast



An incubating Golden Eagle (C12GESN-1).



Bighorn Sheep (C20BS-6), 5 of 6 rams observed.

Coxcomb Mountains – Central West

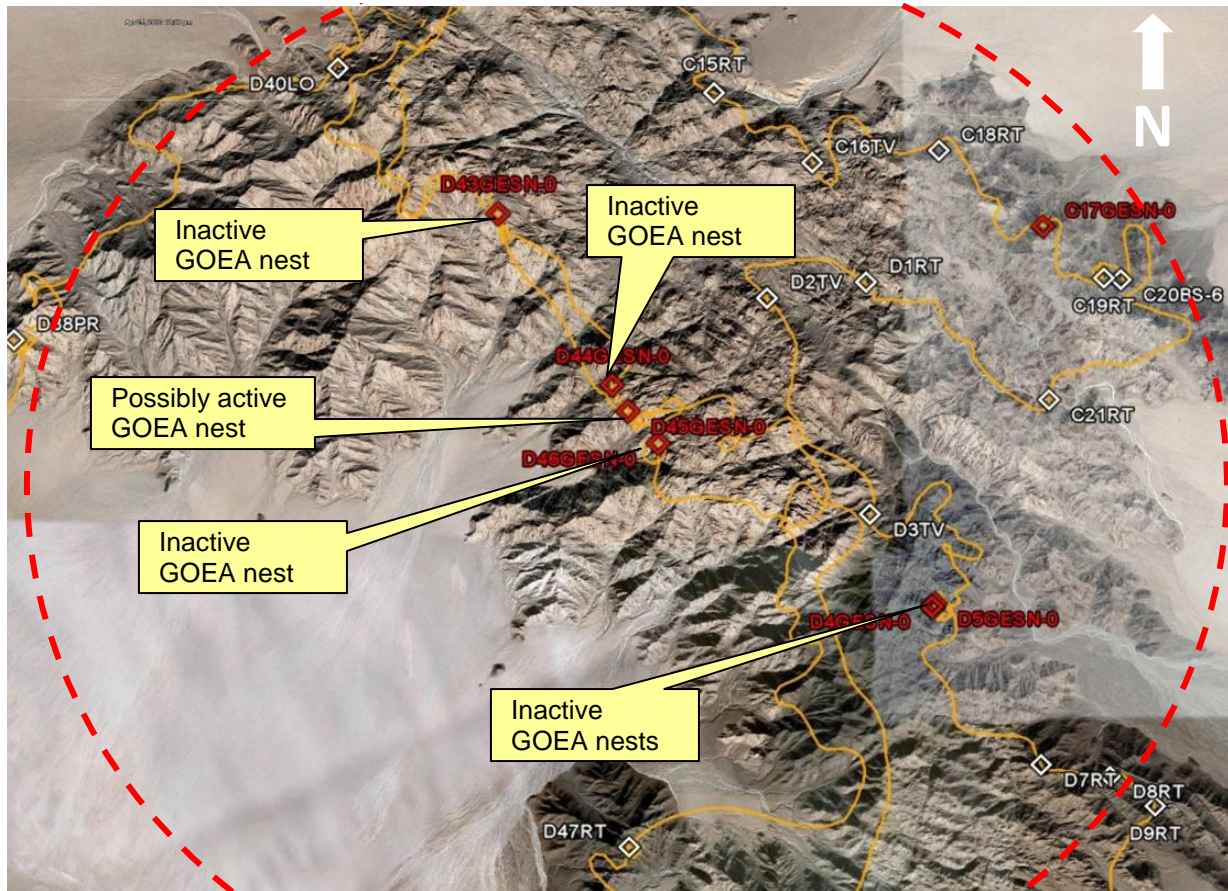


Figure 12. Coxcomb Mountains – Central West, possibly active territory. All waypoints for species and nests observed, the helicopter flight path, and the USFWS recommended 5-mile GOEA territory radius are provided.

Coxcomb Mountains – Central West



An inactive GOEA nest (D46GESN-0); fair condition.



A possibly active GOEA nest (D45GESN-0); good condition.

Coxcomb Mountains - Southwest

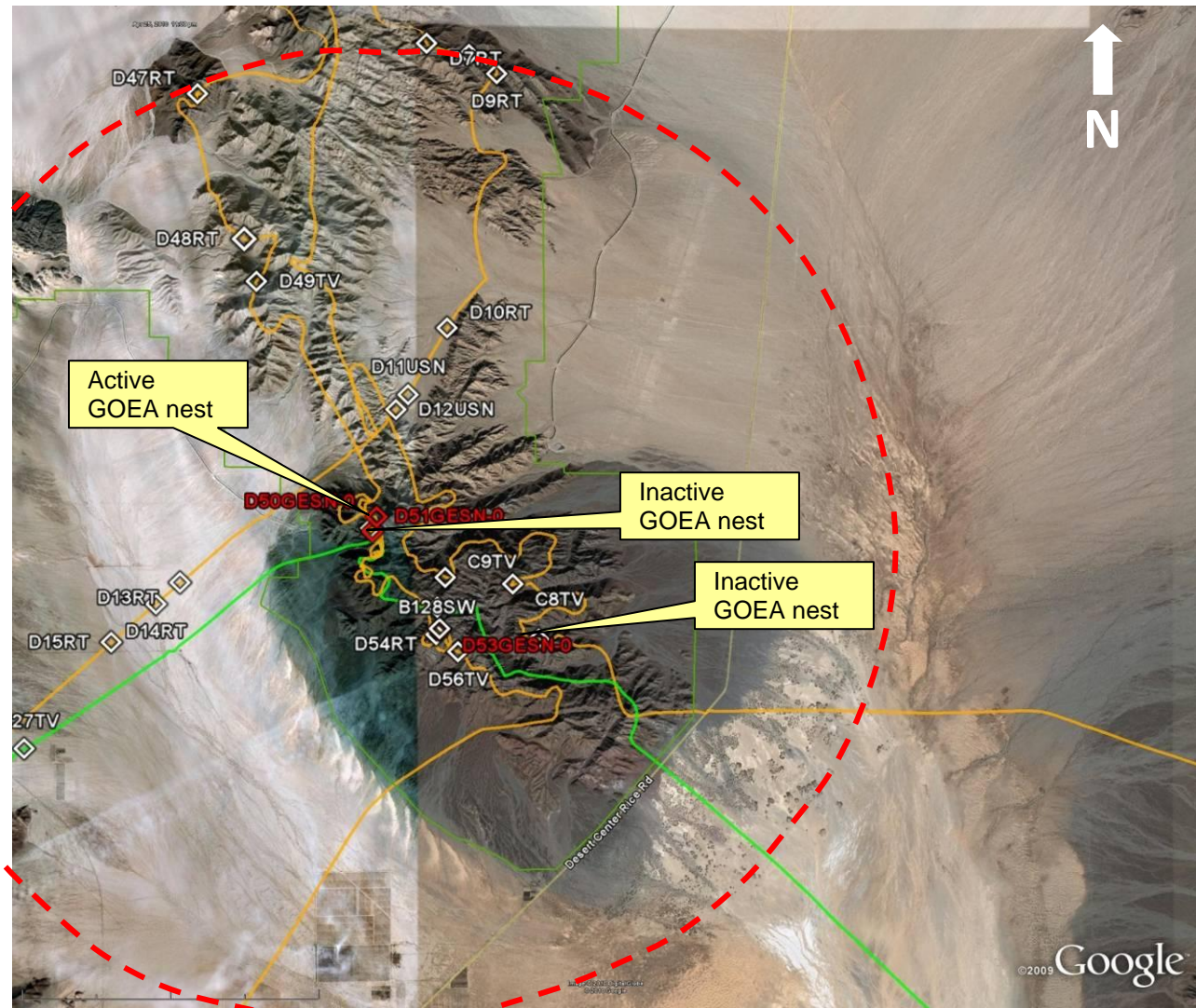


Figure 13. Coxcomb Mountains - Southwest, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided..

Coxcomb Mountains - Southwest



An inactive GOEA nest (D53GESN-0); good condition.



An active GOEA nest (D50GESN-0); good condition.

Eagle Mountain - North



Figure 14. Eagle Mountain - North, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

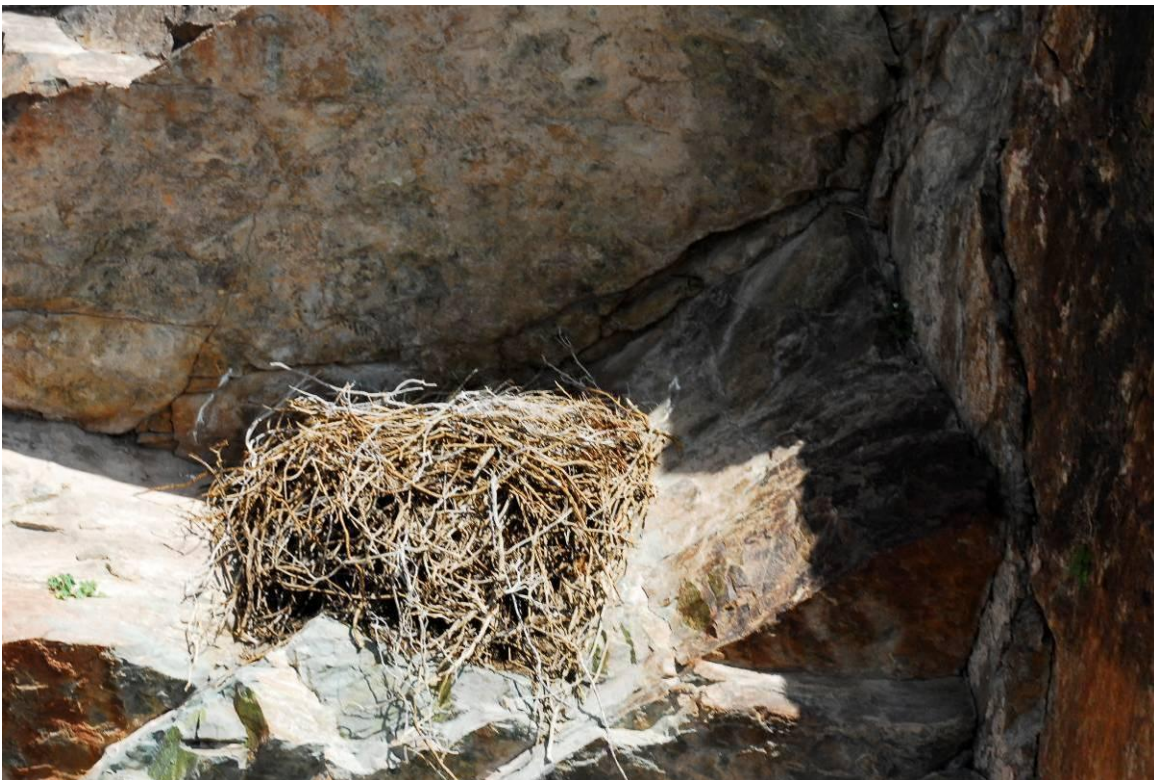


An incubating Prairie Falcon in cavity nest (D36PRCN-1).

Eagle Mountain - North



An active GOEA nest (D35GESN-0); good condition.



An inactive GOEA nest (D32GESN-0); good condition.

Eagle Mountain – Central

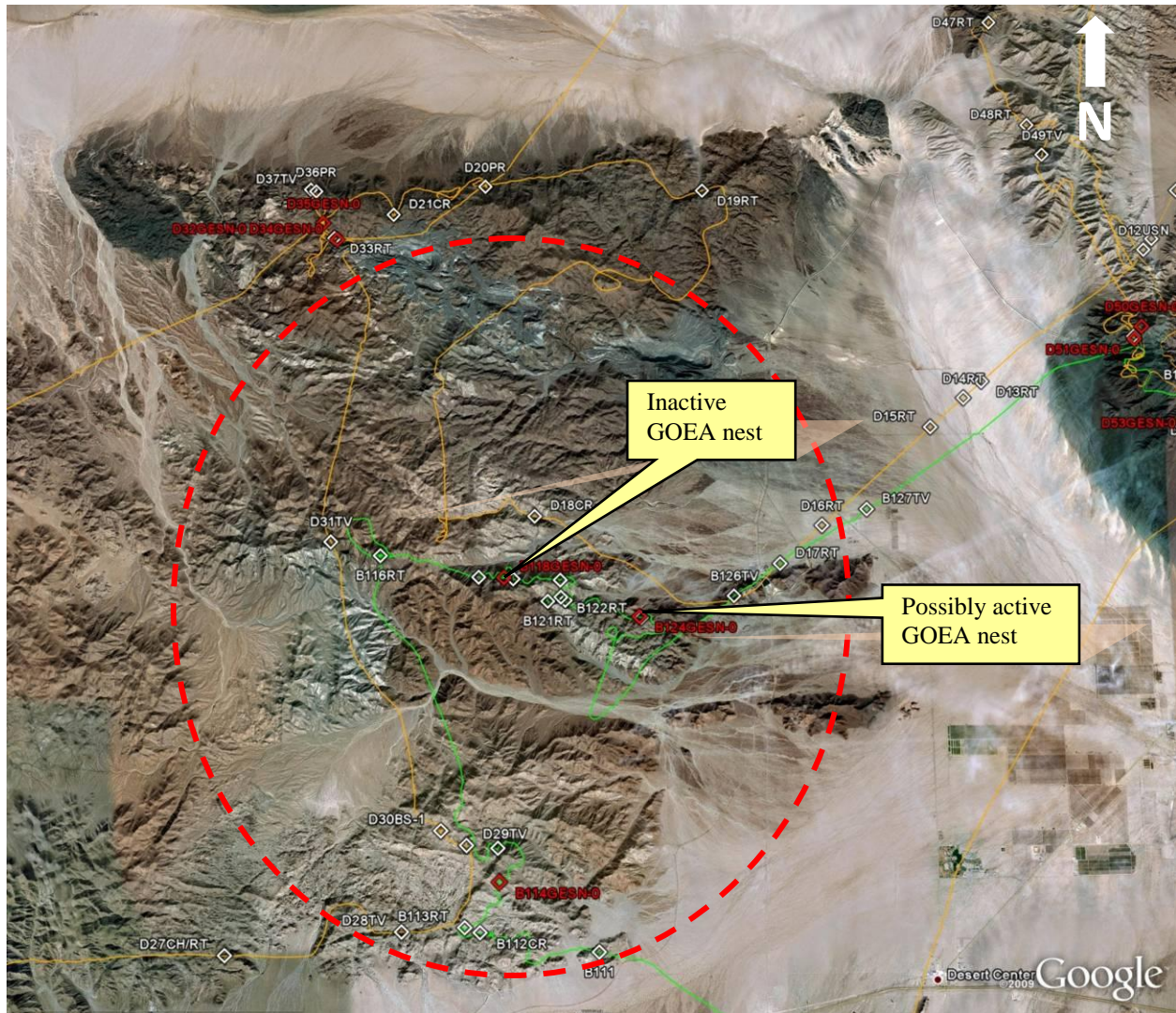


Figure 15. Eagle Mountain - Central, active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

Eagle Mountain – Central



A possibly active GOEA nest (B124GESN-0); good condition, possible new material.



An inactive GOEA nest (B118GESN-0); poor condition, likely abandoned due to rock collapse.

Eagle Mountain – South



Figure 16. Eagle Mountain - South, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.



An inactive GOEA nest (B114GESN-0); fair condition.

Little Chuckwalla Mountains and Hodges Mountains

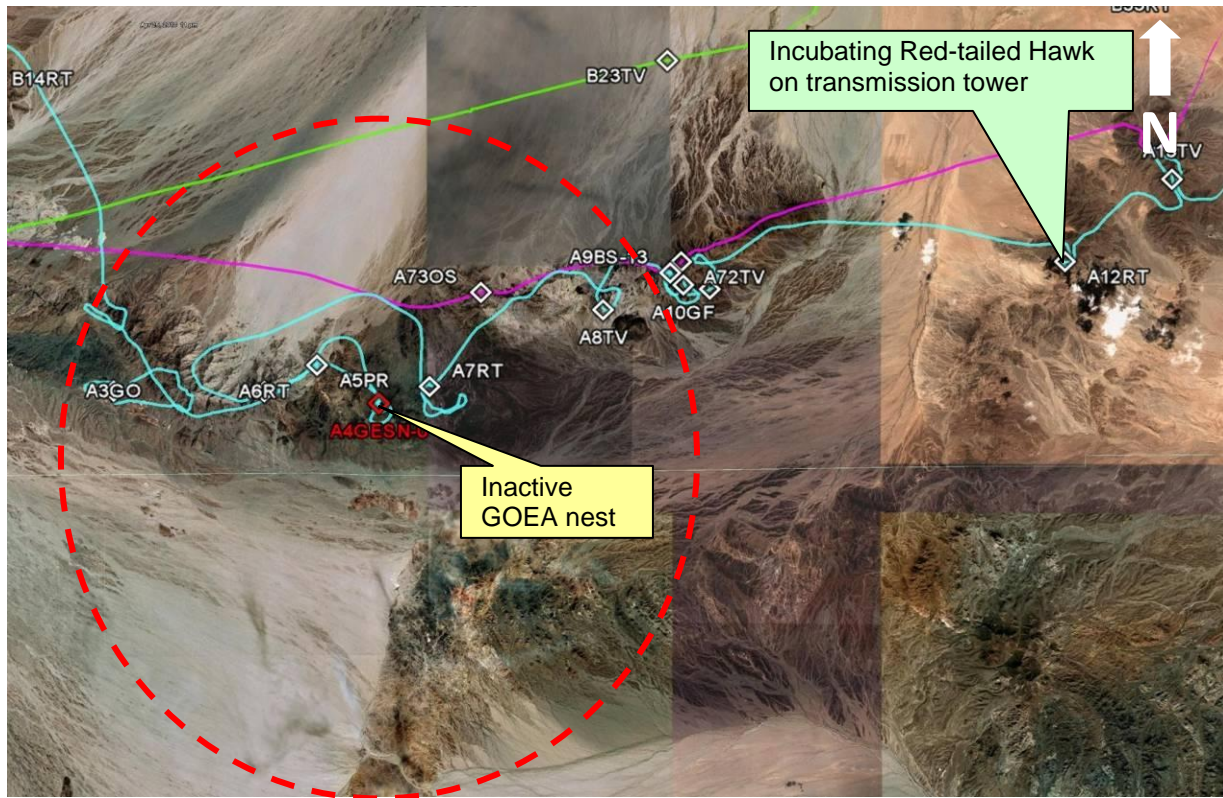


Figure 17. Little Chuckwalla Mountains and Hodges Mountains, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

Little Chuckwalla Mountains and Hodges Mountains



An incubating Red-tailed Hawk on a transmission tower nest (A12RTSN-1).



An inactive GOEA nest (A4GESN-0); good condition and likely active within past 1-2 years.

Little Maria Mountains

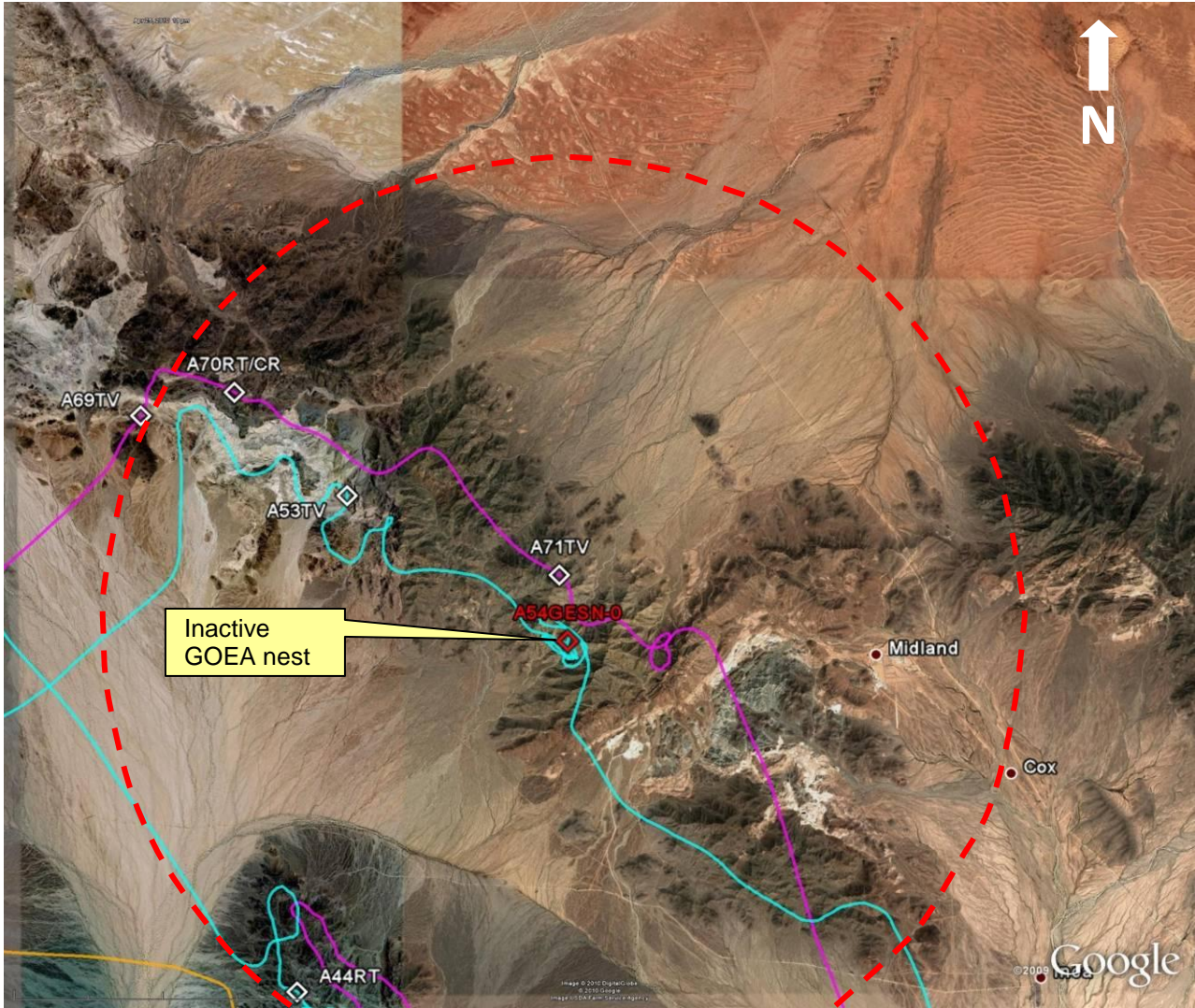


Figure 18. Little Maria Mountains, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

McCoy Mountains

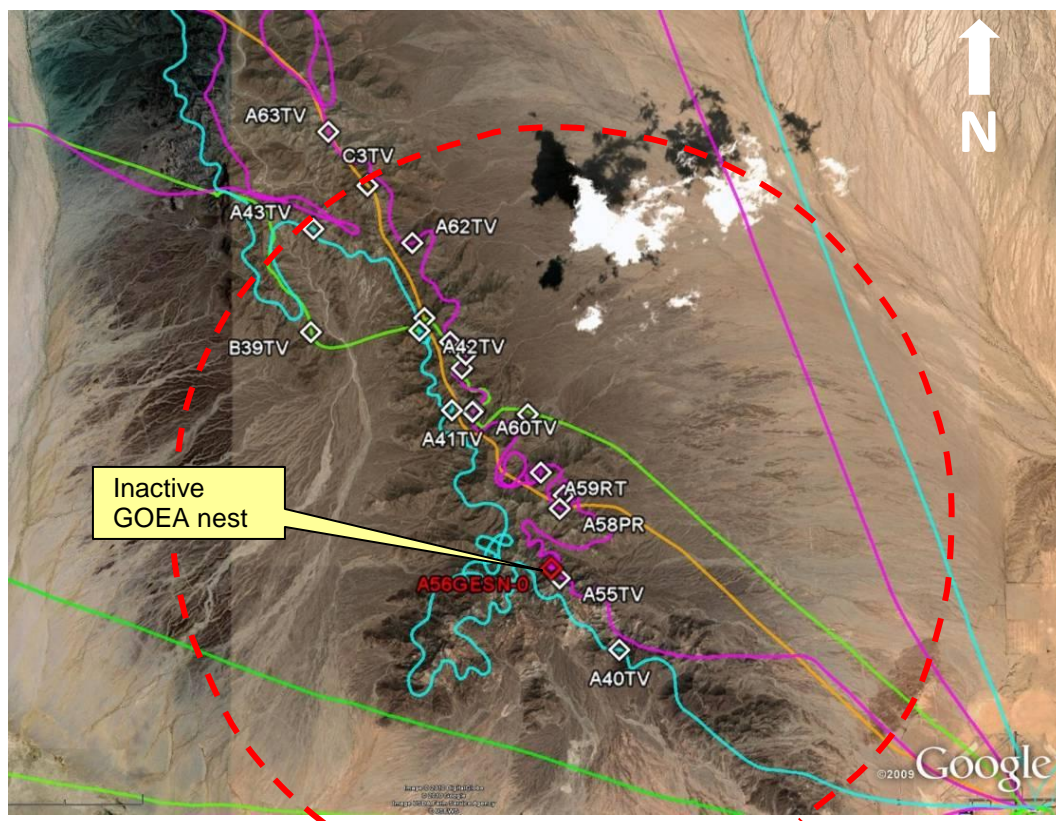


Figure 19. McCoy Mountains, inactive territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.



An inactive GOEA nest (A56GESN-0); poor condition.

Orocopia Mountains

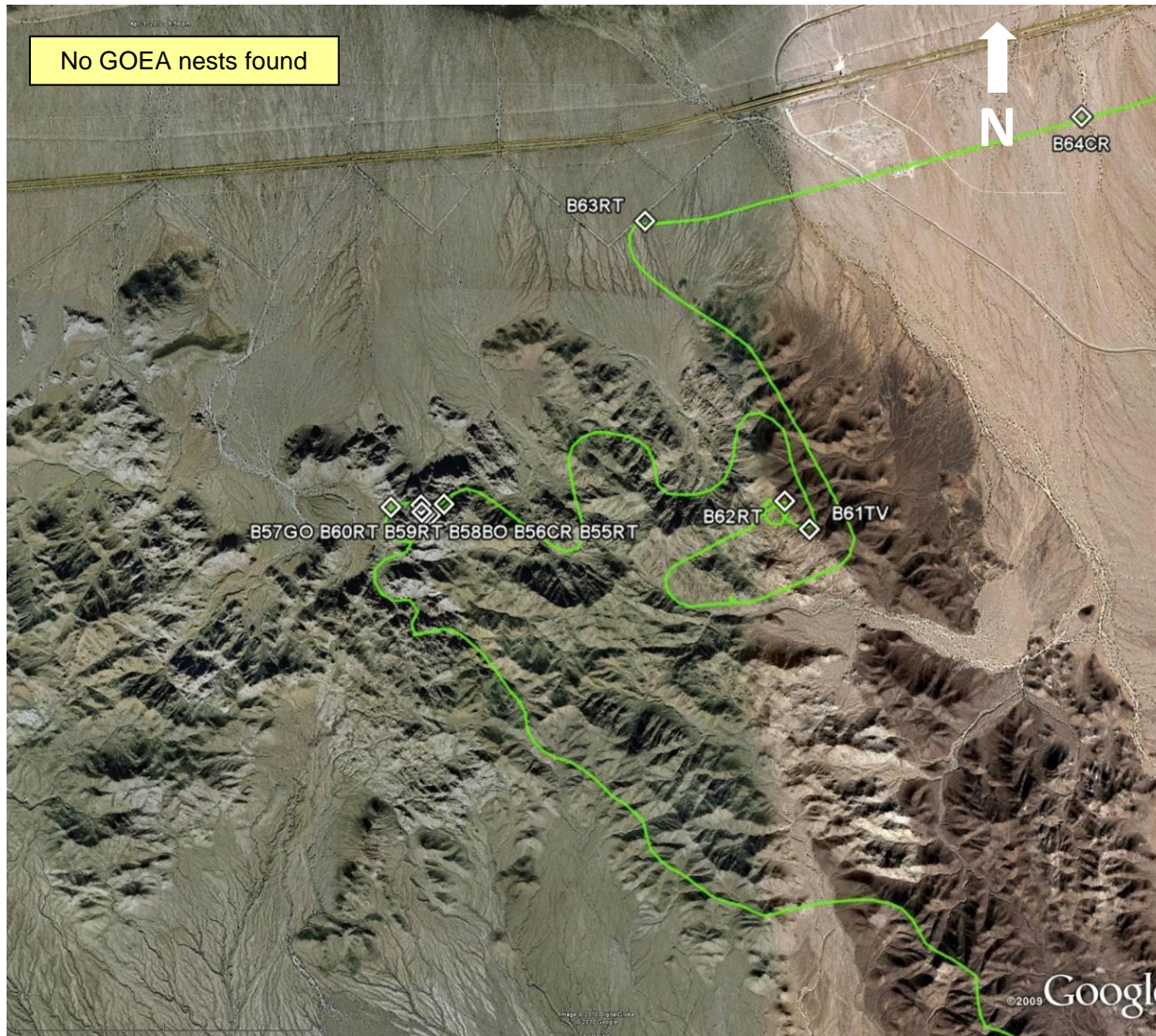


Figure 20. Orocopia Mountains. All waypoints for species and nests observed, and the helicopter flight path. A survey of this entire mountain range was not deemed necessary since the habitat was marginally sufficient to support GOEAs and did not provide adequate GOEA nesting substrate.

Palen Mountains

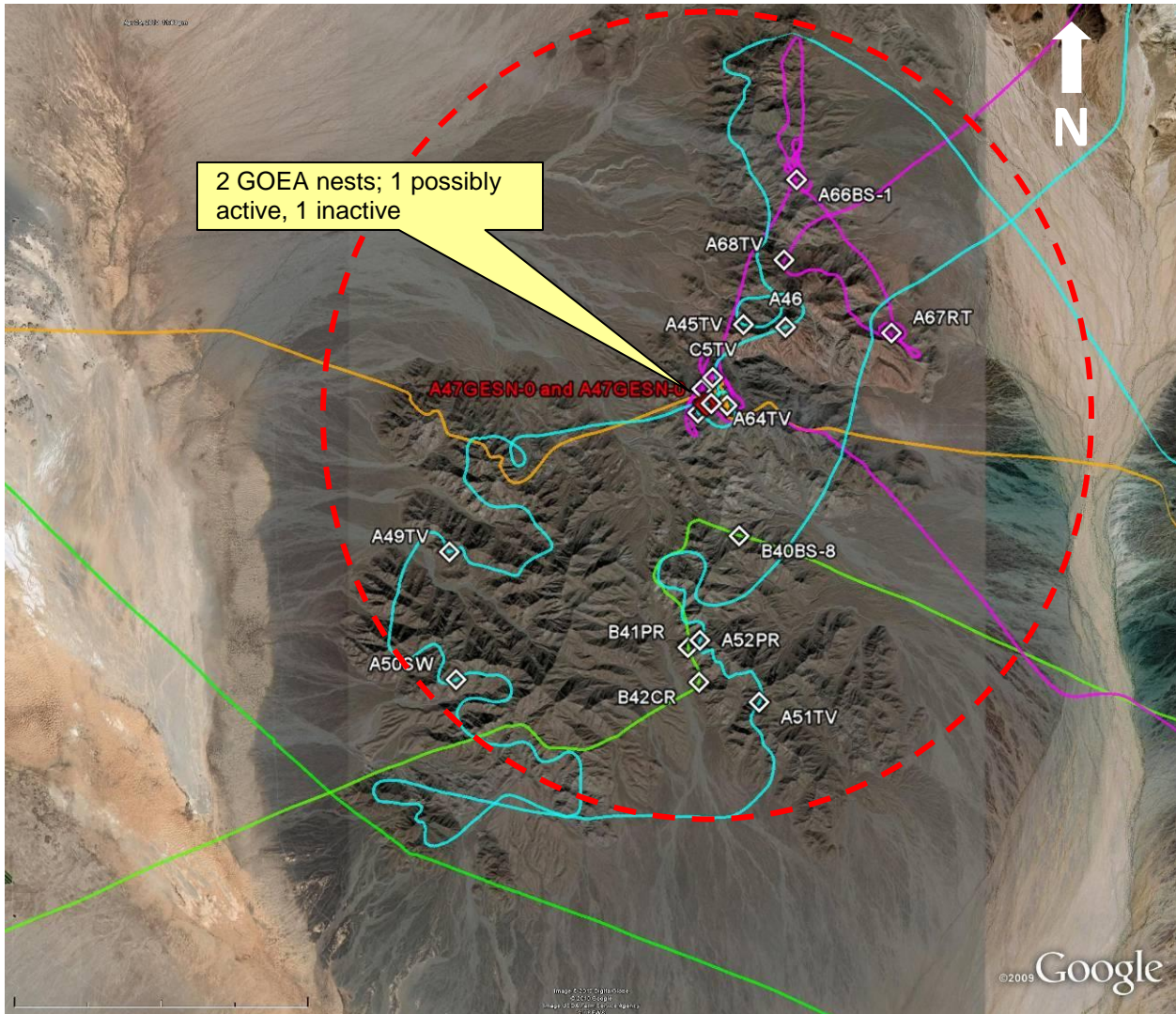


Figure 21. Palen Mountains, possibly active territory. All waypoints for species and nests observed, the helicopter flight paths, and an approximate 5-mile GOEA territory radius are provided.

DISCUSSION OF FINDINGS

While evaluating the data from this 2010 survey, it is important to take the current drought and its effects on GOEA reproduction into account. Without the context of knowing the effects of the drought on GOEA breeding, one might come to a false conclusion about the population of GOEAs in the study area. Since breeding in Southern California starts in January and this study was initiated in late March when only those eagles that were successful would be incubating, no opportunity was afforded to actually get a true number of pairs of GOEAs that attempted to reproduce but failed. Therefore, the number of active territorial pairs of GOEAs in the study area could be higher than those actually identified.

Although a circle with a 5-mile radius (approximately 78 square miles) has been placed around the GOEA core nesting areas on the survey maps, a USFWS requirement in the absence of other data, most desert-nesting GOEAs actually have much larger territories. Research on GOEAs in prime habitat indicates territories are 20 to 25 square miles in size (Hunt and Hunt 2005; Bittner 2010) while most desert-nesting GOEAs have much larger territories encompassing 100 to 120 square miles due to the lack of prime foraging areas (Bittner 2010).

During this Phase 1 survey, we observed 142 total nests, 34 of which were GOEA nests. These nests account for an estimated 14 GOEA territories; 6 active, 3 possibly active, and 5 inactive. Every mountain range in the study area, except for the Orocopia and Hodges Mountains, had nest evidence of GOEA breeding attempts in recent years but not all had evidence of 2010 activity. As previously noted, this is not unusual since healthy populations of GOEAs may average as few as 62% of pairs breeding in any one year (Kochert et al. 2002).

Numerous raptors and mammals were observed (i.e., Barn Owls, Bighorn Sheep, Cooper's Hawks, Common Ravens, Great Horned Owls, a Grey Fox, a Long-eared Owl, an Osprey, Prairie Falcons, Red-tailed Hawks, Swainson's Hawks, and Turkey Vultures) totaling 340 wildlife documentations, including 5 Golden Eagles and 51 Desert Bighorn Sheep.

RECOMMENDATIONS

Further surveys and monitoring of the study area are warranted and recommended since no scientific data are available regarding the effects large solar arrays potentially have on GOEA habitat. The degree of foraging area loss is an unquantified impact at this time and cannot be based simply on the amount within an arbitrary circle. Marking and satellite telemetry of GOEAs in the area is also recommended since this is the best and most economical method of determining the movements and foraging behavior of GOEAs over a large landscape.

Placing satellite transmitters on young GOEAs from nests in the area will allow scientific data to be collected regarding the actual usage of the project area by resident GOEAs. Since this GOEA study was coordinated and cooperatively funded by several proponents, a shared-cost project would be a relatively inexpensive means (per proponent) of satisfying the USFWS requirement for ongoing monitoring of the project area.

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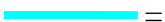
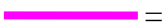



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APPENDIX A: Acronyms and Definitions for Waypoint Data and Maps

Map (reference) Legend	
A50GESN-1	<u>Example</u>
A =	trip
50 =	waypoint id
GE =	Golden Eagle
SN =	stick nest
1 =	one bird present
AK =	American Kestrel
BO =	Barn Owl
BS =	Bighorn Sheep
CN =	cavity nest
CH =	Cooper's Hawk
CR =	Common Raven
GE =	Golden Eagle
GF =	Grey Fox
GO =	Great Horned Owl
LO =	Long-eared Owl
NH =	Northern Harrier
OS =	Osprey
PE =	Peregrine Falcon
PR =	Prairie Falcon
RT =	Red-tailed Hawk
SN =	stick nest
SW =	Swainson's Hawk
TN =	tower nest
TV =	Turkey Vulture
U =	unidentified
XX =	other
Helicopter Flight Paths	
	= March 25, 2010
	= March 26, 2010
	= April 2, 2010
	= April 3, 2010
	= Estimate GOEA territory with 5-mile radius

Waypoint Data Key	
<u>Nest Condition</u>	
F =	Fair shape
G =	Good shape
P =	Poor shape/deteriorating (see Methods in text for definitions)
<u>Substrate</u>	
R =	Rock
TT =	Transmission Tower
<u>Active Nest</u>	
Y =	Yes (new material been added or nest has been worked on this season)
N =	No
P =	Possibly

APPENDIX B: Golden Eagles and Significant Other Wildlife Species Observed

Species	Big Maria Mtns	Chocolate Mtns	Chuckwalla Mtns	Chuckwalla Valley	Coxcomb Mtns	Eagle Mtns	Hodges Mtns	Little Chuckwalla Mtns	Little Maria Mtns	McCoy Mtns	Mecca Hills	Orocopia Mtns	Palen Mtns	Species Totals
Barn Owl										1		1	1	3
Bighorn Sheep			20		6	3		13					9	51
Cooper's Hawk						1								1
Common Raven	3		10	9		2				2	2	2	1	31
Golden Eagle		2		1	2									5
Grey Fox								1						1
Great Horned Owl			2					1		1		1		5
Long-eared Owl					1									1
Osprey								1						1
Prairie Falcon	2		2			2				1			2	9
Red-tailed Hawk	8		15	19	8	7	1	3		1			1	63
Swainson's Hawk			2		14								4	20
Turkey Vulture	20		29	1	15	8	1	31	7	23		3	11	149
Species Totals	33	2	80	30	46	23	2	50	7	29	2	7	29	340

APPENDIX C: Waypoints and Related Data for Golden Eagle and Other Observations

Map coordinates (i.e., UTM, latitude/longitude) of the nests for Golden Eagles, Peregrine Falcons, and Prairie Falcons have been withheld per request of federal agencies in order to protect these sensitive species, but are on file at WRI. If needed, this information is available upon request.

Map Reference					Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)
Trip ID	Waypoint	Species	Nest Type	# of Individuals							
March 25, 2010 - 3 flights - 8 hours total time - sunny, 60-70F, 0% cloud cover, 10-20mph (gusts 30)											
A	2	GE	SN	-0		N	G	R	Y	2590 ft	
A	2	GE		-2						2590 ft	1 adult and 1 juvenile (2-3 yrs old), both flying
A	3	GO		-1	11 S 667250 3703282						
A	4	GE	SN	-0		N	G	R	N	1742 ft	white-wash, active within past 1-2 years
A	5	PR	CN	-0							
A	6	RT	SN	-1	11 S 672615 3703320						
A	7	RT		-2	11 S 678332 3703623						
A	8	TV		-2	11 S 684416 3706512						
A	9	BS		-13	11 S 686764 3707857						
A	10	GF		-1	11 S 687237 3707449						
A	11	TV		-1	11 S 688183 3707327						
A	12	RT	SN	-1	11 S 700787 3708538						
A	13	TV		-1	11 S 704441 3711538						
A	14	CR		-2	11 S 728470 3739803						
A	15	RT	SN	-0	11 S 728245 3739710						
A	16	TV		-1	11 S 723259 3739569						
A	17	RT	SN	-1	11 S 724590 3736613						
A	18	RT	SN	-0	11 S 722963 3738088						
A	19	RT	SN	-0	11 S 722572 3738354						
A	20	TV		-1	11 S 720861 3742407						
A	21	CR		-1	11 S 718301 3741944						
A	22	TV		-7	11 S 719778 3742009						
A	23	TV		-2	11 S 717112 3745551						
A	24	TV		-1	11 S 715330 3746501						
A	25	RT	SN	-1	11 S 715833 3746132						
A	26	GE	SN	-0		S	G	R	Y	2291 ft	new material
A	27	PR		-1							
A	28	RT		-2	11 S 720506 3742963						
A	29	PR		-1	11 S 723191 3744587						
A	30	TV		-2	11 S 722285 3744640						
A	31	TV		-1	11 S 719866 3745480						

Map Reference												
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)	
A 32	RT	SN	-1	11 S 718904 3745239								
A 33	TV		-1	11 S 721221 3749138								
A 34	TV		-1	11 S 720047 3750286								
A 35	TV		-2	11 S 715527 3749421								
A 36	RT		-1	11 S 715668 3749853								
A 37	TV		-1	11 S 714351 3751971								
A 38	RT		-1	11 S 720901 3738545								
A 39	RT		-1	11 S 721677 3736862								
A 40	TV		-1	11 S 702769 3725351								
A 41	TV		-2	11 S 698969 3730661								
A 42	TV		-3	11 S 698227 3732412								
A 43	TV		-1	11 S 695855 3734624								
A 44	RT		-1	11 S 691854 3741999								
A 45	TV		-1	11 S 680296 3745393								
A 46	XX			11 S 681228 3745303						4236 ft	2 people on top of mountain	
A 47	GE	SN	-0			N	G	R	P	2871 ft		
A 47	GE	SN	-0			N	F	R	N	2871 ft		
A 48	BO		-1	11 S 679262 3743327								
A 49	TV		-1	11 S 673524 3740012								
A 50	SW		-4	11 S 673730 3737044								
A 51	TV		-2	11 S 680815 3736643								
A 52	PR		-1	11 S 679400 3738066								
A 53	TV		-2	11 S 692687 3752019								
A 54	GE	SN	-0			W	P	R	N	2304 ft	very old nest	
March 26, 2010 - 2 flights - 3.25 hours total time - sunny, 60-70F, 0% cloud cover, 10-20mph (gusts 25)												
A 55	TV		-2	11 S 701410 3726953								
A 56	GE	SN	-0			N	P	R	N	1995 ft	old nest	
A 57	TV		-1	11 S 701482 3728780								
A 58	PR		-1	11 S 701384 3728507								
A 59	RT	SN	-0	11 S 700953 3729303								
A 60	TV	SN	-4	11 S 699424 3730628								
A 61	BO		-1	11 S 699255 3731890								
A 62	TV		-1	11 S 698035 3734351								
A 63	TV		-1	11 S 696137 3736794								
A 64	TV		-1	11 S 679558 3743536								
A 65	TV		-1	11 S 679359 3743891								
A 66	BS		-1	11 S 681492 3748791								
A 67	RT	SN	-1	11 S 683795 3745287								

Map Reference												
Trip ID	Waypoint	Species	Nest type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)	
A	68	TV		-2	11 S 681201 3746887							
A	69	TV		-1	11 S 688509 3753576							
A	70	U	SN	-0	11 S 690445 3754059						RT or CR	
A	71	TV		-4	11 S 696920 3750480							
A	72	TV		-27	11 S 687150 3708280							
A	73	OS		-1	11 S 680085 3707089							
A	74	CR		-1	11 S 658668 3709520							
A	75	SW		-1	11 S 651441 3710540							

April 2, 2010 - 3 flights - 8 hours total time - sunny, 60-70F, 0% cloud cover, 10-20mph (gusts 30)

B	7	TV		-1	11 S 642020 3718153						
B	8	PR		-1	11 S 653303 3715103						
B	9	GE	SN	-0		N	P	R	N	4251 ft	
B	10	RT		-1	11 S 653970 3714917						
B	11	RT		-1	11 S 654250 3714263						
B	12	PR		-1	11 S 654731 3715403						
B	13	RT	SN	-0	11 S 659445 3717029						
B	14	RT		-1	11 S 662642 3714553						
B	15	GO		-1	11 S 662754 3714446						
B	16	U	SN	-0	11 S 662752 3712831						
B	17	U	SN	-0	11 S 659333 3709116						
B	18	RT	SN	-1	11 S 659600 3709430						
B	19	CR	SN	-1	11 S 659436 3709019						
B	20	CR	SN	-1	11 S 659363 3708994						
B	21	RT		-1	11 S 662415 3709746						
B	22	GO		-1	11 S 662558 3709721						
B	23	TV		-1	11 S 686571 3715735						
B	24	RT	SN	-1	11 S 692408 3718791						
B	25	CR	SN	-1	11 S 693376 3718761						
B	26	CR	SN	-1	11 S 693936 3718749						
B	27	RT	SN	-1	11 S 696156 3718709						
B	28	RT	SN	-1	11 S 697117 3718684						
B	29	CR	SN	-1	11 S 698093 3718663						
B	30	RT	SN	-1	11 S 699799 3718614						
B	31	RT	SN	-1	11 S 700767 3718599						
B	32	RT		-1	11 S 701124 3718589						
B	33	RT	SN	-0	11 S 701534 3718577						
B	34	TV		-1	11 S 706791 3720210						
B	35	CR		-1	11 S 699445 3730661						

Map Reference												
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)	
B	37	GO		-1	11 S 698904 3732172							
B	38	TV		-1	11 S 698331 3732692							
B	39	TV		-1	11 S 695807 3732327							
B	40	BS		-8	11 S 680286 3740495					2392 ft	4 ewes, 4 lambs	
B	41	PR		-1	11 S 679131 3737884							
B	42	CR		-1	11 S 679422 3737056							
B	43	GE	SN	-0		N	P	R	N	2358 ft	very old and deteriorated	
B	44	GE	SN	-0		N	G	R	N	2374 ft		
B	45	TV		-1	11 S 652926 3724110							
B	46	TV		-2	11 S 655879 3722780							
B	47	BS		-17	11 S 655396 3722833							
B	49	GE	SN	-0		NW	P	R	N	2129 ft	very old nest	
B	50	TV		-1	11 S 658348 3719724							
B	51	RT	SN	-1	11 S 654124 3717344							
B	52	GO	SN	-0	11 S 652559 3716143							
B	53	TV		-4	11 S 645279 3714083							
B	54	RT		-1	11 S 644502 3715767							
B	55	RT	SN	-0	11 S 629635 3723912							
B	56	CR		-1	11 S 629879 3723933							
B	57	GO		-1	11 S 630051 3723944							
B	58	BO		-1	11 S 629954 3723857							
B	59	RT	SN	-0	11 S 629910 3723863							
B	60	RT	SN	-0	11 S 629888 3723879							
B	61	TV		-3	11 S 632877 3723811							
B	62	RT	SN	-0	11 S 632686 3724021					2406 ft	old eagle nest	
B	63	RT	SN	-0	11 S 631576 3726195							
B	64	CR	SN	-1	11 S 635034 3727085							
B	65	RT	SN	-1	11 S 636475 3727490							
B	66	CR	SN	-1	11 S 638150 3727981							
B	67	RT	SN	-1	11 S 639102 3728242							
B	68	CR	SN	-1	11 S 640455 3728633							
B	69	RT	SN	-1	11 S 642154 3728890							
B	70	CR		-1	11 S 643552 3727596							
B	71	CR	SN	-0	11 S 646375 3729340							
B	72	CR	SN	-0	11 S 648095 3729504							
B	73	CR	SN	-0	11 S 648427 3729532							
B	73	CR	SN	-0	11 S 648427 3729532							
B	73	CR	SN	-1	11 S 648427 3729532							

Map Reference												
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)	
B 74	CR	SN	-1	11 S 654792 3729707								
B 75	TV		-4	11 S 652606 3728173								
B 76	RT		-1	11 S 650926 3728067								
B 77	GE	SN	-0			N	G	R	P	1730 ft		
B 77	GE	SN	-0			N	G	R	P	1730 ft		
B 78	RT	SN	-0	11 S 653196 3726487								
B 79	RT		-1	11 S 652665 3725361								
B 80	CR		-2	11 S 675633 3724513								
B 81	RT	SN	-0	11 S 689828 3718783								
B 82	RT	SN	-1	11 S 688135 3718820								
B 83	CR		-1	11 S 685885 3718876								
B 84	RT	SN	-0	11 S 685398 3718885								
B 85	RT	SN	-0	11 S 684995 3718891								
B 86	CR	SN	-1	11 S 683926 3718911								
B 87	RT	SN	-0	11 S 682577 3718880								
B 88	RT	SN	-3	11 S 682479 3718975								
B 89	RT	SN	-1	11 S 679313 3719036								
B 90	CR	SN	-1	11 S 678657 3718925								
B 91	RT	SN	-1	11 S 675844 3719714								
B 92	RT	SN	-1	11 S 674828 3720387								
B 93	RT	SN	-1	11 S 672230 3722116								
B 94	RT	SN	-0	11 S 671267 3722754								
B 95	RT	SN	-1	11 S 669654 3723813								
B 96	RT	SN	-1	11 S 666347 3726017								
B 97	RT	SN	-1	11 S 664785 3726648								
B 98	CR	SN	-1	11 S 664343 3726785								
B 99	RT	SN	-1	11 S 661846 3727513								
B 100	RT	SN	-1	11 S 659792 3728145								
B 101	CR	SN	-1	11 S 657255 3728905								
B 102	RT	SN	-1	11 S 654497 3729720								
B 103	TV		-2	11 S 648878 3726664								
B 104	BS		-3	11 S 647584 3725931						3914 ft	ewe with 2 lambs; 1 this year, 1 last year	
B 105	RT	SN	-1	11 S 647708 3726155								
B 106	TV		-9	11 S 646897 3725798								
B 107	RT	SN	-1	11 S 646594 3725193								
B 108	TV		-1	11 S 644082 3727347								
B 109	TV		-4	11 S 643370 3727706								
B 110	CR		-2	11 S 642349 3727442								

Map Reference												
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)	
B 111	XX				11 S 638987 3732043						campers	
B 112	CR	SN	-0		11 S 635816 3732578							
B 113	RT	SN	-0		11 S 635417 3732729							
B 114	GE	SN	-0			SE	F	R	N	3816 ft		
B 115	TV		-2		11 S 636252 3734790							
B 116	RT	SN	-1		11 S 632886 3742473							
B 116	RT	SN	-0		11 S 632886 3742473							
B 117	BS		-2		11 S 635563 3741933					3888 ft	2 rams	
B 118	GE	SN	-0			N	P	R	N	3938 ft	abandoned; rocks collapsed in nest	
B 119	RT	SN	-1		11 S 636495 3741903							
B 120	RT		-1		11 S 637779 3741892							
B 121	RT	SN	-0		11 S 637450 3741313							
B 122	RT	SN	-1		11 S 637801 3741430							
B 123	RT	SN	-0		11 S 637924 3741346							
B 123	RT	SN	-0		11 S 637924 3741346							
B 123	RT	SN	-0		11 S 637924 3741346							
B 124	GE	SN	-0			N	G	R	P	2878 ft	possible new material	
B 125	CR	SN	-0		11 S 640017 3740909							
B 126	TV		-1		11 S 642581 3741544							
B 127	TV		-1		11 S 646316 3744015							
B 128	SW		-14		11 S 655225 3747290							
April 3, 2010 - 2 flights - 7 hours total time - sunny, 57-68F, 0% cloud cover, 0-5mph												
C 1	CR		-1		11 S 700662 3730567							
C 2	TV		-4		11 S 699177 3731581							
C 3	TV		-1		11 S 697036 3735597							
C 4	TV		-2		11 S 679927 3743499							
C 5	TV		-1		11 S 679599 3744151							
C 6	GE	SN	-0			N	G	R	N	2745 ft		
C 7	TV		-2		11 S 657348 3746616							
C 8	TV		-2		11 S 656795 3747805							
C 9	TV		-2		11 S 655377 3747926							
C 10	GE	SN	-0			N	G	R	N	2410 ft		
C 11	RT		-1		11 S 650663 3771176							
C 12	GE	SN	-1			NE	G	R	Y	3013 ft		
C 13	GE	SN	-0			E	P	R	N	2827 ft	dead adult GOEA in nest	
C 14	GE	SN	-0			NE	P	R	N	2697 ft		
C 15	RT		-1		11 S 650811 3767316							
C 16	TV		-1		11 S 651973 3766498							

Map Reference												
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)	
C	17	GE	SN	-0		N	F	R	N	2227 ft		
C	18	RT		-1	11 S 653487 3766710							
C	19	RT	SN	-0	11 S 655494 3765222							
C	20	BS		-6	11 S 655698 3765206							
C	21	RT		-1	11 S 654872 3763739							
D	1	RT	SN	-0	11 S 652617 3765076							
D	2	TV		-2	11 S 651448 3764841							
D	3	TV		-2	11 S 652681 3762313							
D	4	GE	SN	-0		S	F	R	N	2796 ft		
D	5	GE	SN	-0		N	P	R	N	2692 ft		
D	6	RT	SN	-0	11 S 653466 3761205							
D	7	RT		-1	11 S 654807 3759330							
D	8	RT		-1	11 S 655681 3759171							
D	9	RT	SN	-0	11 S 656266 3758798							
D	10	RT	SN	-0	11 S 655288 3753305							
D	11	U	SN	-0	11 S 654489 3751840						on TT, med size, not eagle	
D	12	U	SN	-0	11 S 654240 3751516						on TT, med size, not eagle	
D	13	RT	SN	-0	11 S 649612 3747692							
D	14	RT	SN	-0	11 S 649098 3747212							
D	15	RT	SN	-0	11 S 648147 3746365							
D	16	RT	SN	-0	11 S 645055 3743538							
D	17	RT	SN	-0	11 S 643878 3742455							
D	18	CR		-2	11 S 637036 3743636							
D	19	RT		-1	11 S 641635 3753055							
D	20	PR	CN	-1								
D	21	CR	SN	-0	11 S 632851 3752155							
D	22	CR	SN	-1	11 S 590199 3722945							
D	22	RT	SN	-1	11 S 590199 3722945							
D	25	RT	SN	-0	11 S 618063 3730295							
D	26	RT	SN	-1	11 S 618087 3730327							
D	27	XX		-2	11 S 629062 3731887						CH chasing RT	
D	28	TV		-4	11 S 633746 3732586							
D	29	TV		-1	11 S 635426 3734867							
D	30	BS		-1	11 S 634744 3735247							
D	31	TV		-1	11 S 631536 3742823							
D	32	GE	SN	-0		N	G	R	N	1946 ft		
D	33	RT	SN	-0	11 S 631164 3751489							
D	34	GE	SN	-0		N	F	R	N	1955 ft		

Map Reference												
Trip ID	Waypoint	Species	Nest Type	# of Individuals	Position (UTM)	Aspect	Nest Condition	Substrate	Active Nest	Elevation	Notes (age, sex, behavior, etc.)	
D	35	GE	SN	-0		W	G	R	Y	1953 ft		
D	36	PR	CN	-1								
D	37	TV		-2	11 S 630417 3752931							
D	38	PR	CN	-0								
D	40	LO	CN	-1	11 S 646439 3767489							
D	41	GE		-1	11 S 646360 3768631					3236 ft	flying	
D	42	CR	SN	-0	11 S 648734 3769587							
D	43	GE	SN	-0		W	P	R	N	3941 ft		
D	44	GE	SN	-0		W	P	R	N	3640 ft		
D	45	GE	SN	-0		E	G	R	P	3571 ft	possible new material	
D	46	GE	SN	-0		N	F	R	N	3350 ft		
D	47	RT	SN	-1	11 S 649960 3758231							
D	48	RT		-1	11 S 650982 3755135							
D	49	TV		-3	11 S 651319 3754184							
D	50	GE	SN	-0		NW	G	R	Y	2709 ft		
D	51	GE	SN	-0		SW	G	R	N	2175 ft		
D	52	CR	SN	-0	11 S 653781 3748950							
D	53	GE	SN	-0		E	G	R	N	2346 ft		
D	54	RT	SN	-0	11 S 655272 3746829							
D	55	U	SN	-0	11 S 655197 3746698					2259 ft	medium-sized nest	
D	56	TV		-1	11 S 655659 3746334							
D	57	SW		-1	11 S 641400 3721582							
April 17, 2010 - Subsequent Field Observation												
E	1	GE		-1							flying over Chuckwalla Valley	