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Responses to September 2013 Workshop Requests: Biological Resources

Amended Application for Certification for HYDROGEN ENERGY CALIFORNIA (08-AFC-8A) Kern County, California

Prepared for:
Hydrogen Energy California LLC

hydrogen energy california

Submitted to:

California Energy Commission

U.S Department of Energy

Prepared by:

URS

November 2013

RESPONSES TO SEPTEMBER 2013 WORKSHOP REQUESTS REGARDING BIOLOGICAL RESOURCES

TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS USED IN RESPONSES

BMP	Best Management Practice
BRMIMP	Biological Resources Mitigation Implementation and Monitoring Plan
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CNDDB	California Natural Diversity Database
CPM	compliance project manager
DEIS	Draft Environmental Impact Statement
HECA	Hydrogen Energy California
I-5	Interstate 5
km	kilometer
mph	miles per hour
PG&E	Pacific Gas and Electric Company
PSA	Preliminary Staff Assessment
SJKF	San Joaquin kit fox
SHTAC	Swainson's Hawk Technical Advisory Committee
SR	State Route
USFWS	U.S. Fish and Wildlife Service

RESPONSES TO WORKSHOP REQUESTS

BACKGROUND

During the Preliminary Staff Assessment (PSA)/Draft Environmental Impact Statement (DEIS) Workshop held in September 2013, California Energy Commission (CEC) Staff requested additional information regarding biological resources. Applicant's responses to these workshop requests are provided herein.

WORKSHOP REQUEST

BIO-1. Nitrogen deposition model.

RESPONSE

Applicant is preparing a nitrogen deposition analysis for the Hydrogen Energy California (HECA) Project. The analysis will address the information requested in the PSA/DEIS, and additional information requested by the California Department of Fish and Wildlife (CDFW) during the September PSA/DEIS Workshop. The results will be summarized in a technical memorandum that will be submitted to CEC when completed.

WORKSHOP REQUEST

BIO-2. Survey work plan for botanical surveys.

RESPONSE

HECA will conduct botanical surveys according to the CDFW Protocols for Surveying and Evaluating Impacts to Special-Status Native Plant Populations and Natural Communities (November 24, 2009). Botanical surveys will be timed to coincide with the optimal periods for observation of the plant species with "low," "moderate," or "high" potential to occur in the Project vicinity (Table BIO-2-1). If access is available, reference populations will be visited prior to initiating surveys to confirm that the target species are can be readily observed and identified.

Survey areas would include all natural/ruderal habitats along the natural gas, railroad, process water, and electrical transmission corridors.

Table BIO-2-1
Special-Status Plant Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations and Flowering/Greatest Activity Period for Area
		Federal	State	CNPS		
Plants						
Horn's milk-vetch	*Astragalus hornii* var. *hornii*	—	—	CNPS 1B.1	Low Recorded 5 miles south of the Project Site	Meadows, seeps, alkaline lake margins; **May-October**
Heartscale	*Atriplex cordulata*	—	—	CNPS 1B.2	Low Found approximately 5 miles to south of the Project Site	Chenopod scrub, meadows, seeps, valley and foothill grassland; **April-October**
Subtle orache	*Atriplex subtilis*	—	—	CNPS 1B.2	Moderate Recorded approximately 5 miles north of the Project Site	Valley and foothill grassland; **June-August**
Bakersfield smallscale	*Atriplex tularensis*	—	E	CNPS 1B.1	Very Low Not recorded in area	Chenopod scrub; **June-October**
Lost Hills crownscale	*Atriplex vallicola*	—	—	CNPS 1B.2	Moderate Found in the Project vicinity, approximately 1.5 miles to the south of the Project Site	Chenopod scrub, vernal pools, valley and foothill grassland; **April-August**
Alkali mariposa lily	*Calochortus striata*	—	—	CNPS 1B.2	Very Low Found approximately 10 miles to the south of the Project Site	Chenopod scrub, Mojavean desert scrub, chaparral, meadows and seeps; **April-June**
California jewel-flower	*Caulanthus californicus*	E	E	CNPS 1B.1	Low Recorded approximately 8 miles south of the Project Site	Chenopod scrub, pinyon and juniper woodlands, valley and foothill grasslands; **February-May**

Table BIO-2-1
Special-Status Plant Species with Potential to Occur in the Project Vicinity (Continued)

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations and Flowering/Greatest Activity Period for Area
		Federal	State	CNPS		
Slough thistle	*Cirsium crassicaule*	—	—	CNPS 1B.1	Moderate Recorded within one-half mile of the Project Site	Chenopod scrub, riparian scrub, marshes and swamps; **May-August**
Gypsum-loving larkspur	*Delphinium gypsophilum* ssp. *Gypsophilum*	—	—	CNPS 4.2	High Found within 1 mile southwest of the Project Site	Chenopod scrub, cismontane woodland, valley and foothill grassland; **February-May**
Recurved larkspur	*Delphinium recurvatum*	—	—	CNPS 1B.2	Moderate Recorded near the Project Site and in the vicinity of linear Project components	Chenopod scrub, cismontane woodland, valley and foothill grassland; **March-June**
Kern mallow	*Eremalche kernensis*	E	—	CNPS 1B.2	Low Recorded near the northern portion of the potable water linear	Chenopod scrub, valley and foothill grassland; **March-May**
Hoover's eriastrum	*Eriastrum hooveri*	—	—	CNPS 4.2	Moderate Found approximately 1.5 miles to the southwest of the Project Site	Chenopod scrub, pinyon and juniper woodland, valley and foothill grassland; **February-May**
Cottony buckwheat	*Eriogonum gossypinum*	—	—	CNPS 4.2	Moderate Found approximately 3 miles to the southwest of the Project Site	Chenopod scrub, valley and foothill grassland, **March-September**
Tejon poppy	*Eschscholzia lemmonii* ssp. *Kernensis*	—	—	CNPS 1B.1	Moderate Numerous populations have been recorded just over 1 mile from the Project Site	Chenopod scrub, valley and foothill grassland; **March-May**

Table BIO-2-1
Special-Status Plant Species with Potential to Occur in the Project Vicinity (Continued)

Common Name	Scientific Name	Listing Status			Likelihood of Occurrence in Project Area	Habitat Associations and Flowering/Greatest Activity Period for Area
		Federal	State	CNPS		
Showy madia	*Madia glabrata*	—	—	CNPS 1B.1	Very Low Found more than 10 miles to the northwest of the Project Site	Cismontane woodland, valley and foothill grassland; **March-May**
San Joaquin woollythreads	*Monolopia [Lembertia] congdonii*	E	—	CNPS 1B.2	Moderate Found approximately 2 miles to east of the Project Site	Chenopod scrub, valley and foothill grassland; **February-May**
Bakersfield cactus	*Opuntia basilaris* var. *treleasei*	E	E	CNPS 1B.1	Very Low Not recorded in area	Chenopod scrub, cismontane woodland, valley and foothill grassland; **April-May**
California chalk moss	*Pterygoneurum californicum*	—	—	CNPS 1B.1	Very Low Not recorded in area	Chenopod scrub, valley and foothill grassland
Oil neststraw	*Stylocline citroleum*	—	—	CNPS 1B.1	High Numerous observations within 1 mile of the Project Site	Chenopod scrub, valley and foothill grassland; **March-April**
Mason's neststraw	*Stylocline masonii*	—	—	CNPS 1B.1	Very Low Not recorded in area	Chenopod scrub, pinyon and juniper woodland; **March-May**

Listing Status Designations:
Federal/State
E Federal/State Endangered
CNPS Rank
1B Plants that are rare or endangered in California and elsewhere
X.1 Seriously endangered in California
X.2 Fairly endangered in California
X.3 Not very endangered in California
4 Plants that have limited distribution in California

WORKSHOP REQUEST

BIO-3. Response to the September 11, 2013 CDFW letter regarding the Notification of Lake or Streambed Alteration (File # 1600-2013-0079-R4)

RESPONSE

Applicant has reviewed the CDFW letter and provided the requested information to the CDFW on October 21, 2013, and docketed with the CEC on October 22, 2013.

WORKSHOP REQUEST

BIO-4. Please provide the ratio used to compute the estimated 47-acre credit from Kern Water Bank.

RESPONSE

HECA proposes to provide compensation for permanent habitat loss associated with construction of the Project Site, the railroad spur, the natural gas pipeline, and the Pacific Gas and Electric Company (PG&E) switching station. As presented in the Biological Assessment submitted to the CEC on March 6, 2013, the following permanent impacts to undeveloped lands are anticipated:

- Project Site – 435.3 acres;
- Railroad spur – 26.0 acres;
- Natural gas pipeline – 0.2 acre;
- Process water supply pipeline – 1.2 acre; and
- Transmission line – 3.3 acre.

The permanently affected lands are currently cultivated for row crops, alfalfa, or orchards. The 47-acre credits from the Kern Water Bank would provide a 0.1:1 compensation ratio for the 466 acres that would be permanently developed.

The proposed compensation ratio is based on the very low potential for San Joaquin kit fox (SJKF) to use the Project Site and the other permanently affected lands. Although the permanently developed areas could be used infrequently by SJKF for movement and migration, there are no recent sightings of SJKF in the Project vicinity, and no potential dens or other signs of use were documented during biological surveys for the proposed Project. Intensive cultivation and irrigation of these areas precludes the presence of dens or burrows that would be used by any of the listed mammals or western burrowing owls.

A portion of the permanently developed lands that are cultivated for row crops and alfalfa are likely to be used by foraging Swainson's hawks. Separate compensation is proposed for Swainson's hawks, and is not addressed by the 47-acre credits proposed for purchase from the Kern Water Bank. Additional compensation for SJKF is proposed in the mitigation plan referenced in the response to Workshop Request BIO-6.

WORKSHOP REQUEST

BIO-5. Please provide a copy of the model, including assumptions, used for the San Joaquin Kit Fox vehicular strike analysis. Clarify that the model addresses Tupman Road impacts. Clarify the time periods when truck traffic would occur at night.

RESPONSE

SJKF Road Mortality Model

Project-related SJKF mortality was estimated for Project construction and operations using a model based on a study of road mortality by Bjurlin et al. (2005). The model (included as Attachment BIO-5 and provided separately to CEC as an Excel spreadsheet) estimated mortality based on the Project-related increase in traffic and the type of road affected by the traffic. The background for the model, methods, and assumptions is presented below.

Background

The study by Bjurlin et al. (2005) describes the effects of roads on urban SJFK in Bakersfield, California. Bjurlin et al. collected SJKF carcasses from an area approximately 70 square miles in size. Four road type classifications were used for the roads in the study area:

- **Local** – Roads classified as "local roads" had a primary purpose of providing access to abutting residential property, did not exceed 40 feet in width, had no more than one traffic lane in each direction, and were not longer than 0.5 mile without interruption. The speed limit was 25 miles per hour (mph) on all local roads, but was not always posted.

- **Collector** – Collector roads generally conducted local road traffic to the arterial road network, but sometimes were residential in nature. Speed limits for this road type were generally 30 to 45 mph, based on speed surveys and posted limits.

- **Arterial** – Arterial roads had one to three lanes of traffic in each direction (typically more than one), carried the majority of city traffic, and connected the local and collector road networks to the state highway system. The speed limits on arterial roads were generally 35 to 55 mph, based on speed surveys and posted limits.

- **Highway** – Highways were state numbered roads with the primary purpose of conducting traffic into and away from the urban area. They included State Routes (SRs) 58, 99, 178, and 119, and in some cases passed through residential, commercial, and industrial areas.

Within the study area, there are 203 miles (327.4 kilometers [km]) of local roads, 31 miles (59.9 km) of collector roads, and 32 miles (50.9 km) of arterial roads. There are also

approximately 16 miles (26.4 km) of highways.[1] These data were used to estimate a SJKF mortality factor based on road type, as described below (see also Table 2 in Bjurlin et al., 2005).

Bjurlin et al. recorded the cause of death for foxes discovered in urban Bakersfield between 1985 and 2004. Traffic-related incidents accounted for more than half of the mortality. Of 156 SJKF investigated during this time period, 75 foxes were struck and killed by traffic and eight more foxes were potentially struck and killed by traffic. Of 78 mortalities by transmitting foxes, 21 to 27 foxes were killed by traffic.

Bjurlin et al. radio-tagged a population of 229 SJKF between May 1997 and July 2004, and recorded the cause of death for these foxes. During 1998 to 2004, 48 SJKF were killed by traffic; 18 of these foxes had transmitting radio signals at the time of death.

Among other parameters, this study looks at the correlation between number of deaths and the type of road at the attempted SJKF crossing. During nocturnal activity periods, SJKF commonly crossed local roads, but less frequently crossed arterial or collector roads. Most strikes occurred on arterial roads, which had higher traffic volumes and speed limits. Also, foxes were more frequently struck near intersections between major roads and other linear rights-of-way (e.g., railroads, canals, and other roads), which likely were used as travel corridors by SJKF.

Model Input

Estimates for fox mortality are based on data collected by Bjurlin et al. for all traffic-related mortality from January 1998 to August 2004 (80 months).

- Local roads = 2 traffic kills/327.4 km/80 months = 0.000076 mortality/km/month
- Collector roads = 8 traffic kills/49.9 km/80 months = 0.0020 mortality/km/month
- Arterial roads = 35 traffic kills/50.9 km/80 months = 0.0086 mortality/km/month
- Highways = 1 traffic kill/26.4 km/80 months = 0.00047 mortality/km/month
- Not on road = 2 traffic kills (not used)

These mortality rates were applied to Project roadway segments. The model estimates the SJKF mortality increase due to Project-related traffic based on the estimated traffic volume increase, distance traveled, and duration of Project-related traffic.

Project-related traffic data are based on the most recent estimates developed for HECA as presented in the July 2013 Traffic Study Technical Memorandum (Revision 2) docketed with the CEC on August 1, 2013 (URS, 2013).

Assumptions

The mortality model assumes that the data collected by Bjurlin et al. (2005) are appropriate for the Project study area. This implies that populations of SJKF near Project-impacted roads behave similarly to, and have densities similar to, the urban SJKF studied by Bjurlin et al. in central Bakersfield. It is notable that in other studies of SJKF, vehicle strike rarely exceeded 10 percent of mortalities and was not considered a significant influence on fox demographics or population ecology (Bjurlin and Cypher, 2003, as cited in Bjurlin et al., 2005). This assumption is relatively conservative because the study population of urban SJKF has a relatively high mortality rate due to traffic.

[1] Estimate for highways = 17 km (SR 99) + 3.9 km (SR 58) + 1.5 km (SR 178) + 4 km (SR 119) = 26.4 km of highways.

A second assumption is that mortality rates by road type can be applied to Project-impacted roads at pre-project conditions (i.e., annual average daily traffic levels), and that the relationship between SJKF mortality and increased traffic volume is linear and proportional. This assumption is also conservative because each road type actually represents a range of conditions.

Roads were classified based on the road classification used by Bjurlin et al (2005). This classification is primarily based on vehicle speed and size of the facility. For example, Tupman Road was assigned to the "arterial road" classification because the posted speed limit is 55 mph in some segments and it connects to a state highway (SR 119). The mortality rate of fox for arterial roads is the highest of the four road classifications identified by Bjurlin and other (2005), and therefore is the most conservative assumption.

One-way truck traffic on Interstate 5 (I-5) was estimated, and the model evaluates a 100-km segment of I-5. The length of the I-5 segment was selected to include the extent of likely SJKF movement along I-5 in the Project vicinity from the junction of SR 99, south of the Project area, to the Lost Hills interchange north of the Project area. Due to the proportionately small addition to I-5 traffic volumes and the low mortality rates (1/18th of arterial roads) documented by Bjurlin et al. (2005) for major highways, the precise distance for I-5 truck traffic has little influence on the overall fox mortality.

Lastly, the diurnal/nocturnal activity estimate of SJKF movement was removed to simplify the model. The creation of day and night ratios includes additional assumptions that are not supported by Bjurlin et al. (2005) (e.g., percent mortality for day and night, traffic conditions for day and night, Project-related traffic for day and night), and these assumptions would not provide conservative estimates.

References

Bjurlin, C.D., et al., 2005. Urban Roads and the Endangered San Joaquin Kit Fox. Prepared for California Department of Transportation, Sacramento, California 95819. Report # FHWA/CA/IR-2006/01. July.

URS (URS Corporation), 2013. Hydrogen Energy California Kern County, California, Traffic Study Technical Memorandum (Revision 2). Prepared for Kern County Roads Department and Caltrans District 9. July.

ATTACHMENT BIO-5
SJKF-VEHICULAR STRIKE MODEL

Assumptions:

(1) Populations of kit foxes near project-impacted roads behave similarly to, and have the same density of, urban kit foxes studied in Bakersfield. (Note: In other studies on kit fox, vehicle strike rarely exceeded 10% of mortalities and was not considered a significant influence on fox demographics or population ecology [Bjurlin and Cypher 2003].)

(2) Mortality rates by road type (Bjurlin 2005) can be applied to project-impacted roads at pre-project AADT levels.

(3) The relationship between kit fox mortality and traffic volume is linear and proportional.

(4) Tupman Road is defined as an "arterial" road based on average road speed and how the road is used by most vehicles.

(5) The one-way distance for I-5 north and south was estimated at 100 km. This distance is an estimate of the average truck trip through occupied kit fox territory between Jct with SR 99 and the Lost Hills Interchange.

Data from Bjurlin 2005:

(1) Study duration was May 1997 to July 2004. Kills by road type documented from January 1998 to August 2004 (80 months)

a. All foxes = 156 total mortality (1985-2004), 83 kit foxes potentially killed by traffic (1985-2004), 48 kit foxes killed by traffic (1998-2004).

b. Transmitting foxes = 229 total transmitting foxes, 78 total mortality (1997-2004), 21-27 kit fox mortality by traffic (1997-2004), 18 killed by traffic (1998-2004)

(2) Mortality based on road type using all foxes (January 1998 to August 2004). Study area = 327.4 km of local roads, 49.9 km of collector roads, and 50.9 km of arterial roads. Estimate for highways = 17 km (SR 99) + 3.9 km (SR 58) + 1.5 km (SR 178) + 4 km (SR 119) = 26.4 km of highways. (For mortality by road type, see Table 2.)

a. Local roads = 2 traffic kills/327.4 km/80 months = 0.000076 mortality/km/month

b. Collector roads = 8 traffic kills/49.9 km/80 months = 0.0020 mortality/km/month

c. Arterial roads = 35 traffic kills/50.9 km/80 months = 0.0086 mortality/km/month

d. Highways = 1 traffic kill/26.4 km/80 months = 0.00047 mortality/km/month

e. Not on road = 2 traffic kills

Local road	0.0001
Collector	0.0020
Arterial	0.0086
Highway	0.0005

Construction

	Road segment	Road type	AADT	trucks	cars	added traffic	% change	Distance km (one -way)	duration (months)	fox mortality/ km/month (pre-project)	fox mortality/ km/month (post-project)	Change in mortality/km/month	Total Mortality
	Stockdale Highway	Arterial	4580	6	1354	1360	129.7%	27.0	49	0.0086	0.0111	0.0025523	3.4
	SR 58	Highway	6830	0	616	616	109.0%	32.2	49	0.0005	0.0005	0.0000427	0.1
	119 (Taft)	Highway	11700	0	124	124	101.1%	32.2	49	0.0005	0.0005	0.0000050	0.0
	Buttonwillow	Collector	1850	320	0	320	117.3%	8.0	49	0.0020	0.0024	0.0003466	0.1
	I-5 south	Highway	31000	50	246	296	101.0%	100.0	49	0.0005	0.0005	0.0000045	0.0
	I-5 north	Highway	31000	44	0	44	100.1%	100.0	49	0.0005	0.0005	0.0000007	0.0
	Tupman	Arterial	128	0	124	124	196.9%	6.0	49	0.0086	0.0169	0.0083267	2.4
	TOTAL												**6.1**

Operations

	Road segment		AADT	trucks	cars	added traffic	% change	Distance km	duration (years)	fox mortality/ km/month (pre-project)	fox mortality/ km/month (post-project)	Change in mortality/km/month	Total Mortality
cars only	Stockdale - east	Arterial	4580	0	232	232	105.1%	27.0	25	0.0086	0.0090	0.0004354	3.5
	119 (Taft)	Highway	11700	0	16	16	100.1%	32.2	25	0.0005	0.0005	0.0000006	0.0
	I-5 north	Highway	31000	0	16	16	100.1%	100.0	25	0.0005	0.0005	0.0000002	0.0
	buttonwillow	Collector	1850	0	16	16	100.9%	8.0	25	0.0020	0.0020	0.0000173	0.0
	Tupman	Arterial	128	0	16	16	112.5%	6.0	25	0.0086	0.0097	0.0010744	1.9
	I-5 south	Highway	31000	0	16	16	100.1%	100.0	25	0.0005	0.0005	0.0000002	0.0
	TOTAL												**5.5**

Alt 1													
rail and truck	SR 119	Highway	11700	10	0	10	100.1%	32.2	25	0.0005	0.0005	0.0000004	0.0
	I-5 north	Highway	31000	147	0	147	100.5%	100.0	25	0.0005	0.0005	0.0000022	0.1
	I-5 south	Highway	31000	161	0	161	100.5%	100.0	25	0.0005	0.0005	0.0000025	0.1
	Stockdale Highway	Arterial	4580	11	0	11	100.2%	27.0	25	0.0086	0.0086	0.0000206	0.2
	TOTAL												**0.3**
Alt 2													
truck only	SR 43	Highway	11500	368	0	368	103.2%	43.0	25	0.0005	0.0005	0.0000152	0.2
	SR 119	Highway	11700	30	0	30	100.3%	32.2	25	0.0005	0.0005	0.0000012	0.0
	I-5 north	Highway	31000	316	0	316	101.0%	100.0	25	0.0005	0.0005	0.0000048	0.1
	I-5 south	Highway	31000	330	0	330	101.1%	100.0	25	0.0005	0.0005	0.0000050	0.2
	Stockdale Highway	Arterial	4580	29	0	29	100.6%	27.0	25	0.0086	0.0086	0.0000544	0.4
	TOTAL												**0.9**

Total - Construction and Operations (Alt 1)	**11.9**
Total - Construction and Operations (Alt 2)	**12.5**

INFORMATION REQUEST

BIO-6. Please identify the mitigation for SJKF mortality.

HECA has prepared a mitigation plan that includes compensation for SJKF mortality due to vehicle strikes. See Attachment BIO-6, Mitigation Plan for Biological Resource Impacts.

ATTACHMENT BIO-6
MITIGATION PLAN FOR BIOLOGICAL RESOURCE IMPACTS.

HYDROGEN ENERGY CALIFORNIA
KERN COUNTY, CALIFORNIA

MITIGATION PLAN FOR BIOLOGICAL RESOURCE IMPACTS

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October 2013

Tables

Figures

Acronyms and Abbreviations

AFC	Application for Certification
BNLL	blunt-nosed leopard lizard
BUOW	burrowing owl
CalIPC	California Invasive Plant Council
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife (formerly CDFG)
CEC	California Energy Commission
DOE	U.S. Department of Energy
CO_2	carbon dioxide
EHOF	Elk Hills Oil Field
EOR	enhanced oil recovery
GKR	giant kangaroo rat
HECA	Hydrogen Energy California
KRFCC	Kern River Flood Control Channel
KWBA	Kern Water Bank Authority
OEHI	Occidental of Elk Hills, Incorporated
petcoke	petroleum coke
PG&E	Pacific Gas and Electric Company
Project	HECA Power Generating Facility
ROW	right-of-way
SHTAC	Swainson's Hawk Technical Advisory Committee
SJAS	Nelson's (San Joaquin) antelope squirrel
SJKF	San Joaquin kit fox
SWHA	Swainson's hawk
syngas	synthetic gas
TKR	Tipton's kangaroo rat
URS	URS Corporation
USFWS	U.S. Fish and Wildlife Service

EXECUTIVE SUMMARY

Hydrogen Energy California LLC (HECA LLC) is proposing an Integrated Gasification Combined Cycle polygeneration project (hereafter referred to as HECA or the Project) in Kern County, California. HECA LLC is owned by SCS Energy California LLC. The HECA Project will gasify a 75 percent coal and 25 percent petroleum coke fuel blend to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, which will be used to generate low-carbon baseload electricity in a Combined-Cycle Power Block; low-carbon nitrogen-based fertilizer in an integrated Manufacturing Complex; and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR).

The fertilizer and power produced by the HECA Project have a low-carbon footprint, because more than 90 percent of the CO_2 in the syngas is captured. Approximately 3 million tons per year of the captured CO_2 will be transported via pipeline for use in EOR, which sequesters (stores) the CO_2 in a secure geologic formation. CO_2 will be transported for use in EOR to the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI) (hereafter referred to as the OEHI Project). OEHI will construct and operate the OEHI Project, which includes the processing facilities, wells, and pipelines in the EHOF that are proposed for CO_2 EOR and sequestration.

The U.S. Department of Energy is providing financial assistance to the HECA Project under the Clean Coal Power Initiative Round 3 via a cost-sharing agreement with HECA LLC.

This Mitigation Plan presents the proposed measures that will be implemented to address impacts to the following species listed under the federal Endangered Species Act and the California Endangered Species Act for both the HECA Project and the OEHI Project:

- Blunt-nosed leopard lizard (*Gambelia sila*) – Federally Endangered/State Endangered
- Burrowing Owl (*Athene cunicularia*) – State Species of Concern
- Giant kangaroo rat (*Dipodomys ingens*) – Federally Endangered/State Endangered
- Nelson's (San Joaquin) antelope squirrel (*Ammospermophilus nelsoni*) –State Threatened
- San Joaquin kit fox (*Vulpes macrotis mutica*) – Federally Endangered/State Threatened
- Swainson's hawk (*Buteo swainsoni*) – State Threatened
- Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) – Federally Endangered/State Endangered
- Buena Vista Lake Shrew (*Sorex ornatus relictus*) – Federally Endangered

Conservation measures are proposed in this Plan that will avoid, minimize, or compensate for the potential impacts to these listed species. These measures will include preconstruction surveys; educational training; installation of exclusion fencing, where appropriate; trapping and relocation; construction monitoring; and compensatory mitigation. HECA proposes offsite habitat conservation in perpetuity through purchase of California Department of Fish and Wildlife (CDFW)-approved credits from a mitigation bank. In addition, HECA proposes onsite habitat establishment, preservation, and rehabilitation.

1.0 INTRODUCTION

Hydrogen Energy California LLC (HECA LLC) is proposing to build an Integrated Gasification Combined Cycle polygeneration project (HECA or the Project) in Kern County, California (Figure 1). HECA LLC is owned by SCS Energy California LLC. The Project will gasify a 75 percent coal and 25 percent petroleum coke (petcoke) fuel blend to produce synthesis gas (syngas). Syngas produced via gasification will be purified to hydrogen-rich fuel, which will be used to generate low-carbon baseload electricity in a Combined-Cycle Power Block, low-carbon nitrogen-based fertilizer in an integrated Manufacturing Complex, and carbon dioxide (CO_2) for use in enhanced oil recovery (EOR).[1]

The Project will gasify blends of petcoke and coal to produce hydrogen to fuel a combustion turbine operating in combined-cycle mode. The net electrical generation output from the Project will provide California with approximately 300-megawatt output of low-carbon baseload electrical power to the grid. The Project will also use the hydrogen produced in the gasifier to produce low-carbon nitrogen-based fertilizer in an integrated Manufacturing Complex.

The fertilizers and power produced by the HECA Project will have a low-carbon footprint, because more than 90 percent of the CO_2 in the syngas will be captured. Approximately 3 million tons per year of the capture CO_2 will be transported via pipeline for use in EOR, which sequesters (stores) the CO_2 in a secure geologic formation (HECA, 2012). CO_2 will be transported (via an approximately 3.4-mile-long pipeline) for use in EOR in the adjacent Elk Hills Oil Field (EHOF), which is owned and operated by Occidental of Elk Hills, Inc. (OEHI) (hereafter referred to as the OEHI Project).

The U.S. Department of Energy (DOE) is providing financial assistance to the HECA Project under the Clean Coal Power Initiative Round 3 via a cost-sharing agreement with HECA LLC. OEHI will construct and operate the OEHI Project, which includes the processing facilities, wells, and pipelines in the EHOF that are proposed for CO_2 EOR and sequestration. The DOE has initiated formal consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the federal Endangered Species Act for portions of the HECA Project and the OEHI Project that would be implemented during the demonstration phase of the HECA Project. The USFWS is currently preparing a Biological Opinion for the actions associated with the demonstration phase. Existing regulatory compliance documents for the EHOF include a 1995 Biological Opinion issued by the USFWS, and a related 1997 Memorandum of Understanding between OEHI and the CDFW (formerly the California Department of Fish and Game) that has twice been updated, and remains in effect until 2014.

The California Energy Commission (CEC) has the statutory responsibility for licensing the Project and related facilities, and conducts a certified regulatory program under the California Environmental Quality Act. As part of that process, an Amended Application for Certification

[1] This CO_2 will be compressed and transported via pipeline to the adjacent EHOF, where it will be injected. The CO_2 EOR process involves the injection and reinjection of $CO_2$to reduce the viscosity and enhance other properties of the trapped oil, thus allowing it to flow through the reservoir and improve extraction. During the process, the injected CO_2 becomes sequestered in a secure geologic formation. This process is referred to herein as CO_2 EOR and Sequestration.

(AFC) was submitted to the CEC on May 2, 2012 (CEC Docket Number 08-AFC-8A) (HECA, 2012). On June 28, 2013, the CEC and the DOE issued a joint Environmental Impact Statement and Preliminary Staff Assessment for the proposed Project.

The 453-acre Project Site is approximately 7 miles west of the city of Bakersfield, and approximately 2 miles northwest of the unincorporated community of Tupman in western Kern County, California. The Project Site is near an oil-producing area known as the EHOF (Figure 2). HECA has the option of purchasing the Project Site, as well as an additional 653 acres adjacent to the Project Site, herein referred to as the Controlled Area (Figure 3). The Project Site and Controlled Area are currently used for agriculture, including the cultivation of cotton, alfalfa, and onions. The OEHI Project site comprises a portion of the existing EHOF.

2.0 POTENTIAL BIOLOGICAL RESOURCE IMPACTS

The following section presents the anticipated impacts to species and their habitat as a result of the Project. The Project defined in this Plan consists of the 453-acre Project Site, as well as the construction footprints of the associated linear facilities and the affected areas of the EHOF. The Incidental Take Application submitted to the CDFW (URS, 2013b) and the Biological Assessment that was submitted to the USFWS (URS, 2013a) provide a detailed assessment of the individual species impacts addressed in this conceptual mitigation plan. Table 1 summarizes the potential permanent and temporary impacts of the HECA and OEHI projects to special-status species (URS, 2013a; 2013b).

2.1 DESCRIPTIONS OF THE AFFECTED HABITAT AND CROP TYPES

Several habitat and crop types would be affected by the HECA and OEHI projects, and are discussed in more detail below. Table 2 presents the association between habitat types and special-status species, and also quantifies the potential impacts. Figure 4 presents the locations of the habitat and crop types affected by the HECA and OEHI projects.

2.1.1 Natural/Ruderal Habitat

Areas of natural and ruderal habitats are associated with both the HECA and the OEHI study areas. These habitats are described below.

HECA Natural and Ruderal Habitats

Construction of Project linears will temporarily affect 3.7 acres of natural and ruderal habitats in the HECA Project area (there are no impacts to natural and ruderal habitats in the HECA Project site). Natural and ruderal habitats consist primarily of allscale scrub, which once dominated the southern San Joaquin Valley. Allscale scrub, as classified in *A Manual of California Vegetation* (Sawyer and Keeler-Wolf, 1995; Sawyer, et al., 2009), is characterized by the dominant presence of one or more saltbush (*Atriplex)* species with a 10- to 40-percent shrub cover over a low, herbaceous, annual understory. It occurs on sandy to loamy soils without surface alkalinity within rolling, dissected alluvial fans with low relief. It is distributed within the southern and southwestern San Joaquin Valley and Carrizo Plains of San Luis Obispo County (Holland, 1986). However, farming, urbanization, and oil production have substantially reduced the total area of allscale scrub.

Typical dominant shrub species include alkali saltbush (*Atriplex polycarpa)*, spinescale saltbush (*A. spinifera)*, and boxthorn (*Lycium* spp.). Typical understory species include nonnative invasive grasses and forbs, such as common brome (*Bromus madritensis)*, ripgut brome (*B. diandrus)*, yellow starthistle (*Centaurea solstitialis)*, and redstem filaree (*Erodium cicutarium)*. Soils vary from loose, friable material to compact in more disturbed habitat.

Natural and ruderal habitats are potentially suitable habitats for several special-status and other native species. However, the parcels temporarily affected by the HECA Project linears are small, isolated blocks of habitat, with limited connections to areas with known special-status species occurrences. For instance, blunt-nosed leopard lizards were not detected in any of the natural areas during protocol-level surveys conducted by HECA in 2012 and 2013. There are no other known occurrences of special-status wildlife species in these areas within the past decade.

Table 1
Special-Status Species Impacts

Special-Status Species (Common Name/Scientific Name)	Impact	Temporary	Permanent
San Joaquin kit fox *Vulpes macrotis mutica*	Disturbance	X	
	Movement habitat loss	X	X
	Increased traffic mortality		X
Swainson's hawk *Buteo swainsoni*	Foraging habitat loss		X
	Nest site disturbance	X	
Blunt-nosed leopard lizard *Gambelia sila*	Habitat loss	X	X (OEHI only)
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	Habitat loss	X	
Giant Kangaroo Rat *Dipodomys ingens*	Habitat loss	X	X (OEHI only)
Nelson's (San Joaquin) antelope squirrel *Ammospermophilus nelsoni*	Habitat loss	X	X (OEHI only)
Burrowing owl *Athene cunicularia*	Habitat disturbance	X	

Table 2
Potential Habitat and Land Use Type Impacts of the HECA and OEHI Projects

		HECA Total		OEHI Total[2]		Total	
Habitat/Use Types[1]	**Affected Species and Habitat Use**	**Temp**	**Perm**	**Temp**	**Perm**	**Temp**	**Perm**
Alfalfa	**SJKF** (movement) **SWHA** (foraging) **BUOW** (foraging)	75.60	127.74	0	0	75.6	127.74
Other Row Crop	**SJKF** (movement) **SWHA** (foraging) **BUOW** (foraging)	34.6	333.73	0	0	34.6	333.73
Orchards	**SJKF** (movement)	4.4	4.51	0	0	4.4	4.51
Natural/ Ruderal	**SJKF** (movement) **SWHA** (foraging) **BNLL** (all) **TKR** (all – HECA only) **GKR** (all – OEHI only) **SJAS** (all – OEHI only)	3.7	0	1,447.0	261.6	32.59	63.9
Developed/[1] Disturbed[1]	None	128.8	30.95	0	0	128.8	30.95
Total		247.1	496.93	1,447.0	261.6	275.99	560.83

Notes:

[1] Areas not designated as Cropland (alfalfa, other row crop, orchard) or Natural/Ruderal land have been classified as Developed/Disturbed.

[2] OEHI impacts based on OEHI CO_2 EOR Project Supplemental Environmental Information (Stantec, 2011).

Abbreviations:

BNLL = Blunt-nosed leopard lizard
BUOW = Burrowing owl
CO_2 = carbon dioxide
EOR = enhanced oil recovery
GKR = Giant kangaroo rat
HECA = Hydrogen Energy California
OEHI = Occidental of Elk Hills, Incorporated
SJAS = Nelson's (San Joaquin) antelope squirrel
SJKF = San Joaquin kit fox
SWHA = Swainson's hawk
TKR = Tipton's kangaroo rat

OEHI Natural Areas

The major vegetation types on Elk Hills have been described as Alkali Scrub, Nonnative Grassland, and Valley Sink Scrub (Mayer et al., 1988). Alkali scrub consists of such alliances as Allscale scrub and Spinescale scrub (Sawyer, et al., 2009). These habitats have not been delineated on site because they grade into one another and shift over time (Live Oak Associates, 2006).

Alkali Scrub. Alkali Scrub habitat (also referred to as chenopod scrub, alkali desert scrub, Great Basin saltbush scrub, and shadscale) consists of open stands of very low to moderately high grayish pubescent subshrubs and shrubs. The soils underlying these habitat types are generally very rich in carbonates. Valley saltbush scrub habitat at Elk Hills is dominated by desert saltbush *(Atriplex polycarpa),* although spiny saltbush *(Atriplex spinifera),* cheesebush *(Hymenoclea salsola),* and matchweed *(Gutierrezia bracteata)* are often present. Grasses and forbs common to the nonnative grassland habitat described below are also present where openings in the shrub canopy allow.

Nonnative Grassland. Nonnative grasses and forbs of mostly European origin dominate the nonnative grassland present in Elk Hills. Grasses present during the extensive site surveys conducted at Elk Hills include red brome (*Bromus madritensis* ssp. *rubens*), ripgut (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), rattail fescue (*Vulpia myuros*), and wild oats (*Avenafatua*). The most dominant forb within nonnative grasslands at Elk Hills includes red-stemmed filaree *(Erodium cicutarium).* Other species commonly observed include various species of buckwheat *(Eriogonum* spp.), prickly lettuce *(Lactuca serriola),* rancher's fireweed *(Amsinckia eastwoodiae),* and various species of lupine *(Lupinus* spp.).

Valley Sink Scrub. Valley Sink Scrub habitat is extremely limited in extent at Elk Hills. Where present, this habitat generally consists of low-lying arroyos or sandy washes surrounded by valley saltbush scrub habitat. Although rainwater may flow through these washes during storm events, sink scrub habitats are dry most of the year. Plants within this habitat are generally taller and denser than those of surrounding scrublands, but consist of the same species found in the valley saltbush scrub.

2.1.2 Agricultural Lands

Agricultural lands impacted by the HECA and OEHI projects include alfalfa (*Medicago sativa*), orchards, and other row crops. Except for the 2 to 6 months between harvesting and replanting, vegetation cover is dense, with nearly 100 percent cover. Plowing typically occurs annually after harvesting, but is less often for perennial crops such as alfalfa. This habitat/crop type is frequently disturbed, and characterized by little to no native plant species; it is not likely to be used by most special-status wildlife species except for foraging raptors, and occasionally San Joaquin kit fox (SJKF). Crop rotation results in row crops varying from year to year; although orchards provide a relatively permanent habitat type, they are not anticipated to provide important habitat for special-status species.

Agricultural lands are used primarily by three special-status species: SJKF, Swainson's hawk, and burrowing owls. SJKF potentially use agricultural land for movement between areas with

natural habitat. Swainson's hawk typically use agricultural land for foraging, especially after the fields have been freshly plowed.

The HECA Project will result in the permanent loss of 466 acres of agricultural land, primarily because of the construction of the Project Site and the Pacific Gas and Electric Company (PG&E) switching facility. This could affect movement of SJKF north of the California Aqueduct in the vicinity of the Project Site, but no recent sightings of this species are documented from this area in the California Natural Diversity Database. The core habitat for SJKF, designated in the USFWS Recovery Plan for Upland Species of the San Joaquin Valley, is primarily south of the California Aqueduct, with very limited overlap with the Project Site (Figure 6).

Permanent and temporary losses of agricultural lands could also reduce available foraging habitat for Swainson's hawks and burrowing owls. In addition to the 466 acres at the Project Site and the PG&E switching facility, another 115 acres of agricultural habitat will be temporarily affected during construction of the project linear facilities. This land could be used by either of these species, especially if nests are present in the project vicinity.

2.2 PROPOSED MITIGATION FOR BIOLOGICAL RESOURCE IMPACTS

HECA and OEHI propose to implement a comprehensive mitigation strategy for the biological resource impacts described above (see Table 3). This strategy will emphasize avoidance and minimization, to the extent feasible and as required to avoid take to fully protected species. In addition, HECA and OEHI propose to implement onsite and offsite compensation as appropriate for permanent and temporary impacts that cannot be fully addressed by avoidance or minimization. Section 3 describes the proposed avoidance and minimization measures, and Section 4 describes the proposed compensation measures.

Table 3
Mitigation Proposed for Potential Biological Resource Impacts of the HECA and OEHI Projects

		Proposed Mitigation	
Habitat/Use Types[1]	**Affected Species and Habitat Use**	**HECA**	**OEHI**
Alfalfa	**SJKF** (movement) **SWHA** (foraging) **BUOW** (foraging)	**Temp**: Implement avoidance and minimization measures **Perm**: HECA will implement the following **1)** Acquire 47 acre credits from KWBA mitigation bank for impacts to SJKF movement **2)** Four stands of five trees each (e.g., Fremont cottonwood or other native trees capable of growing to 30 feet tall or higher) will be planted in the Controlled Area to provide future nest sites for SWHA. **3)** Continue cultivation of alfalfa and other row crops within Controlled Area to provide suitable foraging habitat for SWHA and movement of SJKF	None required – no impacts to agricultural habitat types
Other Row Crop	**SJKF** (movement) **SWHA** (foraging) **BUOW** (foraging)		
Orchards	**SJKF** (movement)		
Natural/Ruderal	**SJKF** (movement) **SWHA** (foraging) **BNLL** (all) **TKR** (all - HECA only) **GKR** (all - OEHI only) **SJAS** (all - OEHI only)	**Temp**: Implement avoidance and minimization measures. HECA will acquire 8 acre credits from KWBA mitigation bank for SJKF, SWHA, BNLL, and TKR **Perm**: No permanent impacts	OEHI to provide mitigation details based on consultation with CDFW and USFWS (see response to Information Request BIO-5)
Developed/[1] Disturbed[1]	None	None required – no impacts	None required – no impacts

Notes:

[1] Areas not designated as Cropland (alfalfa, other row crop, or orchard) or Natural/Ruderal land have been classified as Developed/Disturbed.

BNLL = Blunt-nosed leopard lizard
BUOW = burrowing owl
CDFW = California Department of Fish and Wildlife
CO_2 = carbon dioxide
GKR = Giant kangaroo rat
HECA = Hydrogen Energy California
KWBA = Kern Water Bank Authority
OEHI = Occidental of Elk Hills, Incorporated
SJAS = Nelson's (San Joaquin) antelope squirrel
SJKF = San Joaquin kit fox
SWHA = Swainson's hawk
TKR = Tipton's kangaroo rat
USFWS = U.S. Fish and Wildlife Service

3.0 PROPOSED AVOIDANCE AND MINIMIZATION MEASURES

This section summarizes the measures that HECA and OEHI will implement to avoid and minimize potential impacts to federal and state-listed species and their habitats. The measures listed below are the Proposed Conditions of Certification presented in the June 2013 CEC and DOE Preliminary Staff Assessment/Draft Environmental Impact Statement:

- **Compliance Monitoring and Reporting**
  - Designated Biologist Selection and Duties (BIO-1)
  - Biological Monitor Qualifications and Duties (BIO-2)
  - Designated Biologist and Biological Monitor Authority (BIO-3)
  - Worker Environmental Awareness Program (BIO-4)
  - Biological Resources Mitigation Implementation and Monitoring Plan (BIO-5)

- **General Impact Avoidance and Minimization**
  - Impact Avoidance and Minimization Measures (BIO-6)
  - Revegetation Plan (BIO-18)
  - Mitigation for State Waters (BIO-19)

- Species-Specific Avoidance and Minimization Measures
  - San Joaquin Kit Fox and American Badger Surveys and Impact Avoidance Measures (BIO-7)
  - Blunt-Nosed Leopard Lizard Take Avoidance and Minimization Measures (BIO-8)
  - Swainson's Hawk Impact Avoidance Measures (BIO-9)
  - Mitigation for Migratory Bird Treaty Act and California Fish and Game Code Protected Avian Species (BIO-10)
  - Burrowing Owl Impact Avoidance and Minimization Measures (BIO-11)
  - Small Mammal Relocation Plan (BIO-12)
  - Giant Kangaroo Rate Impact Avoidance Measures (BIO-13)
  - Tipton Kangaroo Rat and San Joaquin Antelope Ground Squirrel Impact Avoidance Measures (BIO-14)
  - Giant Garter Snake Impact Avoidance Measures (BIO-15)
  - Mitigation for Western Spadefoot Toad (BIO-16)
  - Special-Status Plant Species Impact Avoidance Measures (BIO-17)

- **Compensatory Habitat Mitigation**
  - Compensatory Habitat Mitigation for Upland Species (BIO-20)

The details of these measures will be presented in the Final Staff Assessment/Final Environmental Impact Statement. Additional conservation measures will be included in the USFWS Biological Opinion as part of the Section 7 Consultation initiated by the DOE.

In addition to the measures summarized above, the HECA Project and OEHI Project designs have been modified to incorporate additional avoidance, minimization, and conservation measures. These measures include relocating the HECA Project Site from the originally proposed location to its current location north of the California Aqueduct to reduce impacts to

the blunt-nosed leopard lizard; and relocating the natural gas pipeline to avoid portions of the Coles Levee Ecosystem Preserve. In addition, the potable water linear and electrical transmission linear were shortened and relocated to the east of the HECA Project Site, which avoided impacts to 1.9 acres of allscale scrub habitat. Proposed CO_2 pipeline crossings of the Outlet Canal, the Kern River Flood Control Channel (KRFCC), and the California Aqueduct will be constructed using horizontal directional drilling to avoid direct and indirect effects to species movement and dispersal at these locations.

4.0 PROPOSED COMPENSATORY MITIGATION

HECA proposes to compensate for Project impacts to special-status wildlife species and their habitat through two methods: the purchase of agency-approved mitigation credits; and the management and establishment of habitats in the controlled areas. These methods are described in Sections 4.1 and 4.2.

In addition, OEHI proposes additional compensation for impacts associated with the CO_2 Pipeline and the associated EOR facilities. The OEHI compensation is described separately in Section 4.3.

4.1 PURCHASE OF MITIGATION CREDITS

HECA will compensate for the permanent and temporary loss of habitats potentially used by the affected special-status species by acquiring credits from the CDFW- and USFWS-approved Kern Water Bank Authority mitigation bank or other agency-approved mitigation bank (Figure 5). The purchase of mitigation credits would occur prior to commencement of construction.

HECA LLC will acquire agency-approved mitigation credits that meet the habitat and/or species requirements of the SJKF, the blunt-nosed leopard lizard, Tipton's kangaroo rat, burrowing owl, and Swainson's hawk. The offsite mitigation bank compensation would consist of the following components:

- Compensation for temporary habitat loss associated with construction of the natural gas pipeline: a total of 8.0 acres (credits) will be acquired to compensate for 3.7 acres of natural vegetation that will be temporarily removed during construction.

- Compensation for permanent habitat loss associated with construction of the Project Site, the railroad spur, the natural gas pipeline, and the PG&E switching station: a total of 47 acres (credits) will be acquired to compensate for the permanent loss of 466 acres of cultivated fields that may be used infrequently by SJKF for movement and migration.

The proposed HECA compensation ratios are based on the low potential for listed species to use the project site, and on the short duration (less than one season) of impacts associated with the natural gas pipeline route. Intensive cultivation of row crops on the Project Site precludes the presence of dens or burrows that would be used by listed mammals, although the Project Site could be used occasionally by SJKF for movement.

4.2 CONTROLLED AREA

In addition to the offsite compensation through credit acquisition, HECA will preserve agricultural uses on most of the 653-acre Controlled Area, and will restore a portion of the Controlled Area to address the permanent loss of Swainson's hawk foraging habitat and SJKF movement and foraging habitat associated with the proposed Project. Mitigation that will be provided in the Controlled Area would also address potential SJKF mortality associated with increased vehicle traffic during construction and operation of the Project.

The Controlled Area consists of multiple parcels adjacent to the Project Site, which are currently used to cultivate alfalfa and other row crops. HECA will restore, preserve, and manage 70 acres of natural habitats in the Controlled Area to provide foraging and nesting habitat to Swainson's hawk, as well as habitats consistent with the movement and migration of SJKF. Proposed onsite compensation for each of these species is presented below.

4.2.1 Swainson's Hawk Mitigation

The proposed Swainson's hawk mitigation will include maintaining agricultural practices in portions of the controlled area that provide foraging habitats for Swainson's hawks and establishing trees that will provide potential future nest sites for Swainson's hawks. The following subsections describe the implementation of the proposed compensation.

Preservation of Existing Foraging Habitats

To compensate for the loss of 466 acres of cultivated fields that are potentially used by foraging Swainson's hawks, HECA will continue to promote cultivation of compatible crops in the 653-acre Controlled Area that will provide foraging habitat for migrating and resident Swainson's hawks. HECA's consultants have previously documented at least two active Swainson's hawk nests within 4 miles of the Controlled Area; in May 2012, URS biologists observed approximately 30 Swainson's hawks foraging in the vicinity of the Project Site and Controlled Area (URS, 2012). Alfalfa fields in the Controlled Area are likely to provide a substantial prey base that is readily available to Swainson's hawks due to the frequency of harvesting activities (Woodbridge, 1998). Maintaining these agricultural fields in active alfalfa rotation or other compatible crops will preserve foraging habitat for nesting and migrating Swainson's hawks. Additional land uses considered foraging habitat for Swainson's hawks include fallow fields, beet, tomato, or low-growing row or field crops, dry-land and irrigated pasture, rice (when not flooded), cereal grain crops, and corn after harvest (CDFG, 1994).

Establishment of Trees for Future Nest Sites

In addition to the preservation and management of foraging habitat, HECA will plant a total of 20 trees in four stands of five trees each within the Controlled Area to provide future Swainson's hawk nest sites (Figure 7). Swainson's hawk breeding habitat in the Central Valley is constrained by the scarcity of large trees suitable for nesting (Woodbridge, 1998). Swainson's hawks typically select nest sites in areas that include suitable foraging habitat. The value of potential foraging habitats within the Controlled Area would be enhanced by providing adjacent, suitable nest trees. These trees will be planted at the margins of the existing fields as hedgerows or groups. This will allow existing farming activities to continue while providing future nesting habitat for hawks. As shown in Figure 7, the proposed planting areas would be located along the southern margin of the Controlled Area to minimize disruption of current agricultural activities. However, the specific planting locations would be developed based on site-specific needs such as access and irrigation. Trees would not be planted within existing easements for canals, or within the easements of the proposed pipeline alignments.

Tree Planting and Monitoring

In the Central Valley, trees most commonly used for nesting include Fremont's cottonwood *(Populus fremontii*), willows (*Salix* spp.), sycamores (*Platanus* spp.), valley oaks (*Quercus lobata*), and walnut (*Juglans* spp.). Other tree species such as eucalyptus (*Eucalyptus* spp.), pines (*Pinus* spp.), and redwoods (*Sequoia sempervirens*) also are used occasionally (Woodbridge, 1998). The mitigation trees would be planted in the Controlled Area in an area deemed suitable by a wildlife expert working in conjunction with a landscape ecologist. Trees would likely be planted along the margins of the property to minimize disruption of existing agricultural activities. This plan presents a conceptual description of the potential tree locations, species, procurement, installation and maintenance, success criteria, and monitoring.

Tree Location

Trees would be planted in four clusters of five trees. Swainson's hawks nest in a variety of tree species, including solitary trees, but may show a slight preference for small clusters, which may allow screening of the nest from a distance (Woodbridge, 1998). Planting in small clusters would allow some screening and also provide redundancy if there is some mortality of the plantings.

Tree Species

Table 4 presents five tree species that are commonly used as nest trees by Swainson's hawk, and represents potential species for planting. One or more of these species is proposed to be planted in the Control Area.

Table 4
Proposed Trees for Swainson's Hawk Mitigation Site

Common Name	Species	Tree and Root Characteristics
Fremont's cottonwood	*Populus fremontii*	Fast-growing riparian trees, often found near rivers. Fremont cottonwoods are susceptible to drought before roots reach the seasonal water tables (Taylor, 2000).
Goodding's willow	*Salix gooddingii*	Shallow-rooted trees found in soils with perennially high water tables (Burns et al., 1990).
California sycamore	*Platanus racemosa*	Sycamores are adaptive trees, which can grow in variable soil textures, and can grow in moist to dry soil conditions (SelecTree, 2013).
California walnut	*Juglans californica*	Trees generally occur on mesic sites such as northern slopes, creekbeds, canyon bottoms, and alluvial terraces. Trees grow best in deep, alluvial soils with high water-holding capacity. The root system is extensive, often with a deep taproot (Esser, 1993).

Plant Procurement

The native tree species will be contract-grown from local stock within western Kern County, or procured from a nursery that carries species procured from western Kern County. The plant

collection zone will be expanded outside of western Kern County if the required tree species cannot be collected in the region; or alternative species, which can be collected locally, will be substituted.

Tree Installation and Maintenance Methods

Trees will be planted in late winter or early spring after the first rains, to maximize soil water availability. Trees will be planted so that their root crowns are at or slightly above the surrounding soil surface following planting and soil settlement. Trees will be irrigated for 3 years with a drip or bubbler irrigation system. Weeds will be controlled with rice straw mulch, which will be placed in a 3-foot-diameter irrigation basin. Trees will be protected with browse protection as needed. Weeds will be removed during maintenance visits. Maintenance visits will be conducted on a bi-monthly basis during the first two growing seasons.

Tree Planting Success Criteria

Each year for the first 5 years after planting, planted trees must meet a survival criterion of 75 percent. If the initial planting is 20 trees, 15 trees must be surviving each year of the 5-year monitoring period. Trees may be overplanted (e.g., planting more than 20 trees) for a final survival of 15 trees.

Irrigation

Trees will be irrigated for 3 years to help establish the root system. Planted trees will be monitored for a minimum of 2 years after irrigation has been removed to ensure that the plants are established and will be self-sustaining after the 5-year monitoring period.

Tree Survival Monitoring

Each year planted trees will be monitored for vigor and to assess whether the survival criterion is being met. Qualitative vigor ratings will range from 0 to 4, as defined:

0: Dead – stem is brittle or missing entirely, with no signs of life

1: Very poor – leaves are dead or dying, but stem is not yet brittle; tree expected to be dead within the next year

2: Fair – leaves wilting or yellowing or signs of insect damage, but otherwise in stable condition

3: Good – leaves green with average growth

4: Thriving – tree is above average in size and condition relative to age and other plantings; expectation that the tree will survive through the monitoring period

Monitoring will occur in May and September each year to observe trees after winter rains (during maximum vigor), and also in the fall after the summer dry season. An annual report will be submitted by December 31 each year. The annual report will assess whether the tree vigor indicates that the survival criterion will be met by the end of 5 years. If in any year, fewer than

15 trees survive, or if vigor is declining such that it is expected that fewer than 15 trees will be alive by the end of the 5 years of monitoring, replacement plantings will be initiated.

Potential Tree Replacement

Should mortality of the tree plantings result such that there are fewer than 15 trees living or 15 trees expected to live by the end of 5 years, trees will be replaced with locally sourced propagules as described above. If one or more species does not appear to be suitable for the site, another species may be substituted, from the list provided in Table 4. For each replacement planting, the 5-year monitoring period would restart the year of planting.

Adaptive Management

Should the need arise, an adaptive management approach toward maintenance and management of the tree plantings will be undertaken. For instance, should a tree species be found to be incompatible with onsite conditions, the species composition may be altered to meet the tree survival goal. The location or spacing of trees, irrigation requirements, weeding, or other maintenance activities may also be altered as needed, and with the necessary approvals, if the survival criterion is not met.

4.2.2 San Joaquin Kit Fox

HECA proposes to increase the area of natural habitat in the southern portion of the Controlled Area to enhance the existing wildlife linkages along the KRFCC; link the isolated areas of natural land currently available for SJKF use north of the California Aqueduct; and provide additional foraging and denning opportunities. This mitigation would compensate for temporary impacts during construction, and the increased potential for vehicle strike mortality associated with construction and operation of the Project. This onsite compensation is consistent with the restoration goals established for SJKF in the Recovery Plan for the San Joaquin Valley Upland Species (USFWS, 1998). Specifically, the expanded habitat would increase the amount of native habitat in the Recovery Plan area, and improve the potential movement corridor for SJKF between sections of the KRFCC to the west and the Tule Elk Reserve. Restoration of allscale scrub habitat would expand islands of connectivity that may be beneficial to SJKF dispersal and/or foraging, and may also provide potentially suitable denning habitat.

The Controlled Area is located in the vicinity of two regional wildlife habitat corridors (linkages) and SJKF occurrences are documented in the vicinity. Figure 6 illustrates the locations of the Kern Refuge – Semitropic Ridge Habitat Linkage and the Kern River Habitat Linkage as documented in Penrod et al. (2001). These linkages are potential migration and movement areas for many species of wildlife, including the SJKF. Discontinuous parcels of natural habitats along these corridors link the larger areas of natural habitat on the western and eastern margins of the Central Valley. As shown on Figure 6, the Project Site is also adjacent to a third wildlife corridor: the Great Central Valley Ecoregion Essential Connectivity Area, which provides ecological connectivity between large, relatively natural habitat blocks that support native biodiversity along the western side of Kern County (Spencer et al., 2010).

The USFWS Recovery Plan (1998) identifies several SJKF recovery areas in the vicinity of the Controlled Area, including:

- Western Kern County Core
- Antelope Plain/Semitropic Kern Satellite
- Urban Bakersfield Satellite

The Controlled Area is located within the northeastern boundary of the Elk Hills portion of the Western Kern County Core recovery area. SJKF movement between the Elk Hills and the Controlled Area is limited by the presence of the California Aqueduct, roads, and other barriers, in addition to human activity associated with cultivated fields. However, SJKF have been observed in structures that cross the Aqueduct (Cypher, 2012). Potential routes for SJKF movement might also include the KRFCC, the Outlet Canal, the Tule Elk Reserve, and local irrigation canals that connect natural areas near the Kern River with the Controlled Area. Although SJKF have been documented in the vicinity of the Controlled Area, there are active den sites documented north of the California Aqueduct.

According to several authors, SJKF may occur adjacent to and forage in fallow fields and row crops, albeit infrequently (Bell, 1994; Warrick and Harris, 2001). These foxes will den within small parcels of native habitat that may be part of a right-of-way (ROW) along a canal or passage that is surrounded by intensively maintained agricultural lands (Knapp, 1978; Warrick and Harris, 2001) and adjacent to dryland farms (Jensen, 1972; Orloff et al., 1986; USFWS, 1998). However, because SJKF prefer natural habitat, the southern boundary of the Control Area would be converted to allscale scrub, in order to expand the narrow gap of natural habitat north of the California Aqueduct.

Habitat Restoration within the Control Area

HECA proposes to convert 70 acres of agricultural lands to alkaline scrub habitat (Figure 7). Efforts will be made to minimize the potential for establishment of invasive nonnative plants. The seed mix for the restoration will use locally adapted genotypes for the San Joaquin Valley. The restoration goals are presented in Table 5.

Table 5
Proposed Strategy to Meet the Controlled Area Restoration Goals

Primary Goal: Establish Vegetation Cover
• Use commercially available, locally adapted genotypes for the San Joaquin Valley. • Establish native plant species. • Invasive species control using manual removal, Integrated Pest Management, or other methods.

The site will be monitored for success criteria. Maintenance will be performed for three growing seasons following planting, or until the vegetation meets success criteria.

Pre-Planting Measures

Prior to planting, the disturbed area will be disc-harrowed to a 2- to 3-inch depth. This will allow nonnative and invasive species to be plowed under before applying the native seed mix. Equipment traffic over the revegetation area will be restricted to avoid further compaction.

Planting

After disc-harrowing it is recommended that a seed imprinter be used to apply the seed mix. Preparing the soil with a seed imprinter improves conditions for plantings in dry environments without access to irrigation. Imprinting creates small V-shaped furrows in the soil that funnel nutrients and water to the seed (St. John, 1998). The seed mix would be simultaneously applied as the soil is being imprinted. Only lightweight track equipment may be used to work on the seeded soil. Lightweight track equipment is defined as equipment with a vehicular ground pressure not exceeding 10 pounds per square inch. It is recommended that a certified weed-free mulch be placed over the entire seeded area as a final cover to reduce erosion, improve water infiltration rate, and protect seed mix. The mulch should be applied loose and not bunched. All seeded areas would be mulched within 24 hours of seeding. Timing of the planting is important due to the dry environment of the San Joaquin Valley. A winter planting is recommended (Kerpez, 1987).

Seeding Mix Rates

The construction contractor will purchase commercially available seed mix of species native to the project vicinity. A single mix will be applied to the restored portion of the Controlled Area (Table 6).

Table 6
Seed Mix for Temporary Disturbance Areas[1]

Common name	Scientific name	Rate (pounds/acre)
big saltbush	*Atriplex lentiformis*	4
allscale saltbush	*Atriplex polycarpa*	3
inland saltgrass	*Distichlis spicata*	4
valley buckwheat	*Eriogonum fasciculatum polifolium*	3
California matchweed	*Gutierrezia californica*	3
alkali barley	*Hordeum depressum*	7
dove lupine	*Lupinus bicolor*	6
valley bluebell	*Phacelia ciliate*	2
Total		**32**

Note:

[1] Available seed and live seed rates from Pacific Coast Seed, Livermore California (Based on availability February 5, 2013).

Maintenance

The primary focus of maintenance activities will be weed control early in the growing season. Due to the size of the site, weed control resources will be focused on removing colonies of invasive weed species rated high or moderate by the California Invasive Plant Council (CalIPC). Weeding will be conducted once each month during the first growing season. During subsequent growing seasons, maintenance will be conducted once annually at the start of each growing season—typically March or April—depending on seasonal weather patterns. Additional maintenance will be conducted as necessary to keep the site on track to meet success criteria. Invasive weed control measures may include both manual and approved chemical methods. Other maintenance activities may include the installation of browse protection, reseeding problem areas, and installation of trespassing deterrents.

Success Criteria

Success criteria will be measured after three growing seasons. Vegetative cover will be compared to a reference site. The allscale scrub habitat south of the Controlled Area adjacent to the KRFCC will serve as the reference site used to determine percent cover success criteria. Success criteria for the revegetated areas will be as follows:

1. After three growing seasons, the absolute vegetation cover in the planted area will be 20 percent of reference site vegetative cover based on visual assessment using point-intercept sampling.

2. After three growing seasons, invasive plant species classified as high or moderate by the CalIPC will not dominate the planting area.

If success criteria are met at the end of the third growing season, the site will be deemed successful and restoration efforts will be complete.

If success criteria are not met at the end of the third growing season, problem areas will be reseeded and monitored an additional 2 years or until success criteria are met. If success criteria are not met by the end of the fifth year, consultation with agencies will be necessary to reassess the viability of success criteria. At this point, either remedial actions will be recommended, or the site will be deemed problematic and success criteria will be adjusted in consultation with regulatory agencies to bring the monitoring to a closure.

Monitoring Methods and Schedule

An annual monitoring report will be completed each year, for 3 years after planting, to evaluate if the site is on track to meet success criteria. For the annual monitoring report, biologists will use the point-intercept sampling method to track vegetative cover within revegetation areas. This method produces a stratified random sample, which is a rigorous method for determining overall cover and composition in the revegetation areas. Transect lines will be randomly field-located and chosen as representative of the overall site for each annual monitoring report. Ten 200-foot transect lines will be used to sample revegetation areas. Sampling will occur at 5-foot intervals along these transects. Data collected for the annual monitoring report will include:

1. Absolute Vegetative Cover

    a. Percent bare ground
    b. Percent total vegetative cover
    c. Percent native cover
    d. Percent nonnative cover
    e. Percent invasive species cover

2. Signs of herbivory or disease, natural regeneration, invasive species establishment, and any other maintenance concerns will be noted.

3. Photo monitoring will document change from permanently established points. Six points will be established to monitor the planting site. The points will be marked with "T" posts and their global positioning system coordinates collected. Photos will be taken facing the same azimuth each time the photo station is monitored. Photos will be taken at standing eye-level, using landscape format, no zoom, and if possible with 20 to 25 percent of the photo comprising sky.

A report compiling and discussing all results will be produced in Years 1, 2, and 3. Should additional remedial and monitoring activities be required, annual reports will be prepared for Years 4 and 5. The report will be submitted by December 31 of each year.

Annual monitoring will begin after the first growing season following plant installation (e.g., February through May); the timing of vegetation monitoring should coincide with plant natural histories such that the maximum number of plant species is identifiable (Table 7). This will occur in mid- to late-spring, depending on weather patterns.

Adaptive Management Measures

The annual monitoring report will help determine whether supplemental management measures are necessary in addition to the regular maintenance activities. Management activities may address nonnative vegetation and/or other disturbance. Possible adaptive management situations include:

1. Invasive nonnative species. If one method of control is inadequate to control an invasion, other weed management options may be applied (mowing, brushcutter).

2. If vegetation cover does not meet the success criteria after the third growing season, remedial measures will be identified by HECA and submitted to the permitting agencies for review.

3. The planting plan is based on past successes, current technology, and species ecology. If the site is failing to meet its success criteria, new research and experts can be consulted to incorporate improved methods and technologies.

Table 7
Control Area Restoration Action Timing

Date	Trigger	Action
Year 1		
Late January	Good soil moisture, timed to avoid morning frost when seedlings sprout.	Apply native seed mix.
February through May	Year 1 growing season.	Maintenance visits once per month during first growing season.
December 31	Annual monitoring report.	Report result of first growing season monitoring and maintenance.
Year 2		
February through May	Year 2 growing season.	.
December 31	Annual monitoring report.	Report result of first growing season monitoring and maintenance.
Year 3		
February through May	Year 3 growing season.	One spring maintenance visit.
December 31 of third growing season	Annual monitoring report.	If success criteria are met, the site is deemed successful and monitoring ends. If success criteria are not met, the site will be monitored for an additional 2 years.
Year 4 and Year 5 (if necessary, same as Year 2 and Year 3)		
End of fifth growing season	If success criteria not met.	Consultation with agencies will be necessary to reassess viability of success criteria.

4.2.3 San Joaquin Kit Fox Dens and Burrows in Controlled Area

SJKF are known to use culverts and artificial dens for refugia from predators such as coyote (Warrick and Harris, 2001). Predation by coyotes, red foxes, and other canids is a substantial source of mortality for SJKF (USFWS, 1998). At the former Elk Hills Naval Petroleum Reserve #1, more than 80 percent of the documented SJKF mortality over a 9-year period was attributed to predators, primarily coyotes (described in USFWS File # 1-1-95-F-102). SJKF are even more vulnerable when they are on agricultural lands where there are no natural burrows for them to use for protection or shelter from predators. HECA will install agency-approved artificial structures to provide SJKF escape dens along the southern edge of the Controlled Area near the KRFCC ROW. These structures would enhance the value of adjacent foraging habitats, and would compensate for the potential loss of SJKF due to vehicle mortality associated with the project, by reducing potential mortality from coyotes and other predators. SJKF have been observed using the ROW of the California Aqueduct to the north of the Project Site (Warrick and Harris, 2001). Linear features such as the Aqueduct and the KRFCC may provide movement corridors for SJKF that would use the artificial dens, and would potentially forage in the Controlled Area.

4.2.4 Fee Title/Conservation Easement

HECA will transfer a conservation easement for the 70-acre portion of the Controlled Area that will be restored to an entity approved by the CDFW. This entity may include a state or local agency, special district, nonprofit organization, for-profit entity, person, or other entity that is eligible to hold the easement under California law.

4.2.5 Funding for Maintenance and Management

HECA will establish an agency-approved long-term management fund (endowment) for future maintenance and management in perpetuity. The endowment will ensure that the 70-acre portion of the Controlled Area is perpetually managed, maintained, and monitored by a long-term land manager in accordance with the conservation easement and the final management plan approved by the CEC, CDFW, and USFWS. The endowment will be in an amount sufficient to fund the perpetual management, maintenance, monitoring, and other activities on the compensation lands consistent with the agency approved management plan.

4.2.6 Agency Acceptance of Controlled Area as Mitigation

Supplementing nest trees would increase breeding opportunities for Swainson's hawks in the Controlled Area. In a February 2012 meeting, CDFW noted that establishing trees in the Controlled Area would be a potentially suitable mitigation option (Vance, 2012). This plan provides additional details for CDFW review of this concept.

The proposed plan to establish nesting trees in the Controlled Area would be suitable mitigation for Swainson's hawk, because nesting trees are rare in the southern San Joaquin Valley and especially so in the HECA project area. In contrast, foraging habitat, in the form of agricultural land, is very common. Therefore, the mitigation would provide a limiting factor (nesting trees) as compensation for impacts to a nonlimiting factor (agricultural fields). The proposed plan to establish a habitat setback in the Controlled Area would be suitable mitigation for SJKF impacts, because it would expand the area available for their movement, foraging, and denning compared to current conditions. CDFW and USFWS have accepted similar mitigation for other projects in the region (solar projects on the Carrizo Plain and the Bakersfield Habitat Conservation Plan) that included fallowing agricultural land combined with restoration (Cypher, 2012). Restoration of these mitigation areas included installation of artificial dens, seeding fallowed areas with native plants, and cessation of rodent poisoning in the area (Althouse and Meade, 2011).

4.3 OEHI PROJECT HABITAT MITIGATION

OEHI will provide compensation for the OEHI Project, including the CO_2 pipeline, in accordance with the 1995 USFWS Biological Opinion concerning oil production at Maximum Efficient Rate on Elk Hills Naval Petroleum Reserve (USFWS File # l 1 95 F 102) and the 1997 Memorandum of Understanding and Take Authorization between OEHI and the California Department of Fish and Wildlife (CDFW Incidental Take Authorization No. 2081-1997-000-04).

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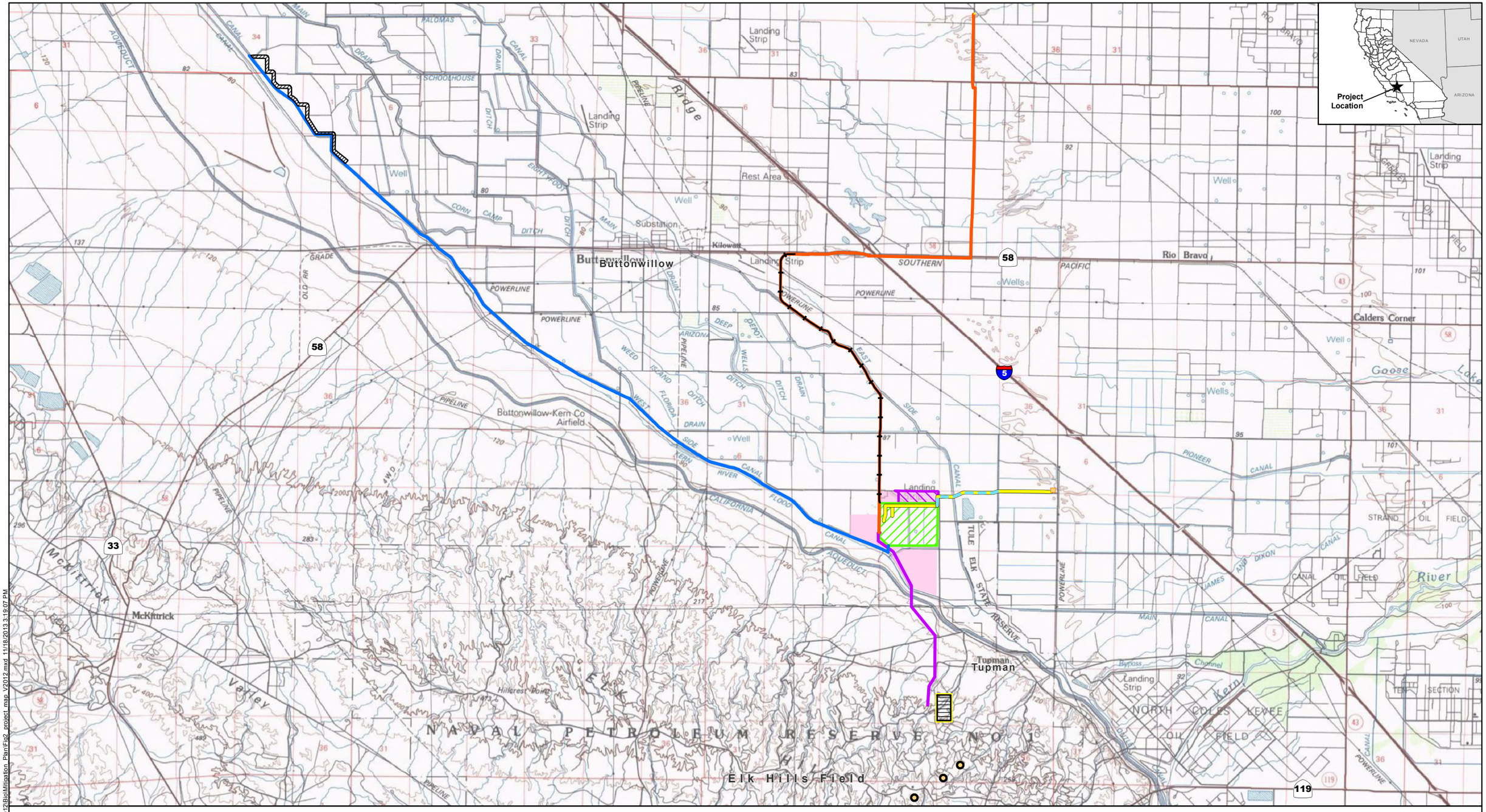
PROJECT LOCATION

Mitigation Plan for
Biological Resource Impacts
Hydrogen Energy California (HECA)
Kern County, California

October 2013
28068052

URS

FIGURE 1



Sources: USGS (30'x60' quads: Taft 1982, Delano 1982). Created using TOPO! ©2006 National Geographic Maps. All Rights Reserved. HECA Project Team (Biological Data, 2009)

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PROJECT VICINITY

Mitigation Plan for
Biological Resource Impacts
Hydrogen Energy California (HECA)
Kern County, California

October 2013
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FIGURE 2

ADOHR RD
DAIRY RD
MORRIS RD
STATION RD
TUPMAN RD
West Side Canal
Kern River Flood Control Channel
California Aqueduct
East Side Canal

Project areas
- Project Site
- Construction Staging Area
- Controled Area

Project Linears
- Carbon Dioxide
- Natural Gas
- Potable Water
- Process Water
- Railroad
- Transmission

N

0 750 1,500 Feet

Source: Aerial Photo, NAIP, USDA, 2012.

PROJECT SITE MAP

Mitigation Plan for
Biological Resource Impacts
October 2013 Hydrogen Energy California (HECA)
28068052 Kern County, California

URS

FIGURE 3

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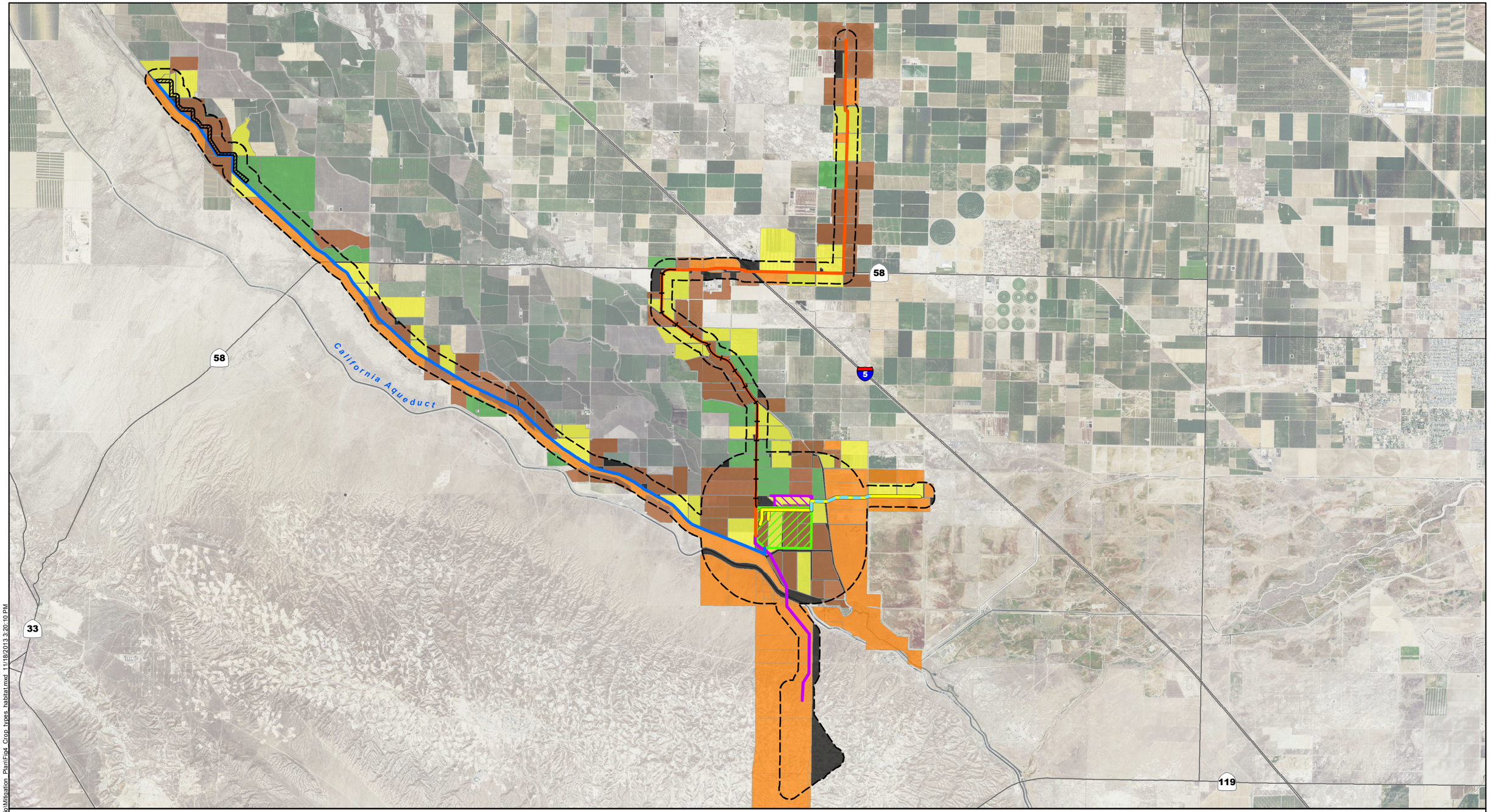

Project Areas
- Project Site
- Construction Staging Area
- BVWSD Well Field
- Biological Resources Study Area

Project Linears
- Carbon Dioxide
- Natural Gas
- Potable Water
- Process Water
- Railroad
- Transmission

Habitat and Crop Types
- Natural/Ruderal Vegetation
- Alfalfa
- Orchard
- Other Row Crops
- Developed

N

0 1 2 Miles

Source: Aerial Photo, NAIP, USDA, 2012.

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HABITAT AND CROP TYPES WITHIN THE BIOLOGICAL RESOURCES STUDY AREA

October 2013
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Mitigation Plan for
Biological Resource Impacts
Hydrogen Energy California (HECA)
Kern County, California

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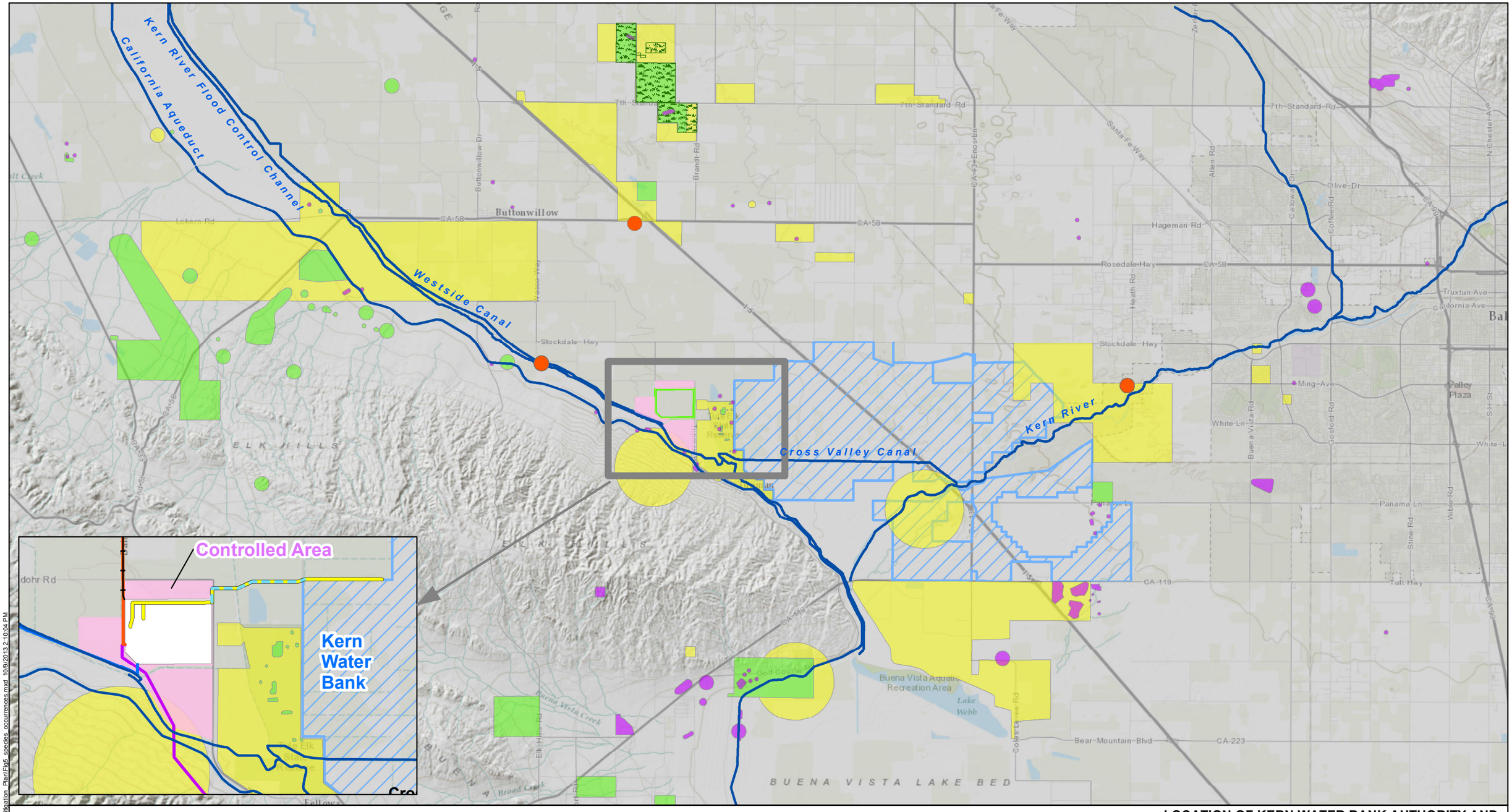
FIGURE 4



Project Areas
- Project Site

Mitigation Locations
- Controlled Area
- Kern Water Bank
- Buttonwillow ER

Project Linears
- Carbon Dioxide
- Natural Gas
- Potable Water
- Process Water
- Railroad
- Transmission

Species Occurences
- Swainson's hawk
- Tipton kangaroo rat
- blunt-nosed leopard lizard
- Burrowing owl

N

0 1 2 Miles

Source: Basemap, Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community.

LOCATION OF KERN WATER BANK AUTHORITY AND PROXIMATE SPECIAL-STATUS SPECIES CNDDB OCCURRENCES

Mitigation Plan for
Biological Resource Impacts
Hydrogen Energy California (HECA)
Kern County, California

October 2013
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FIGURE 5

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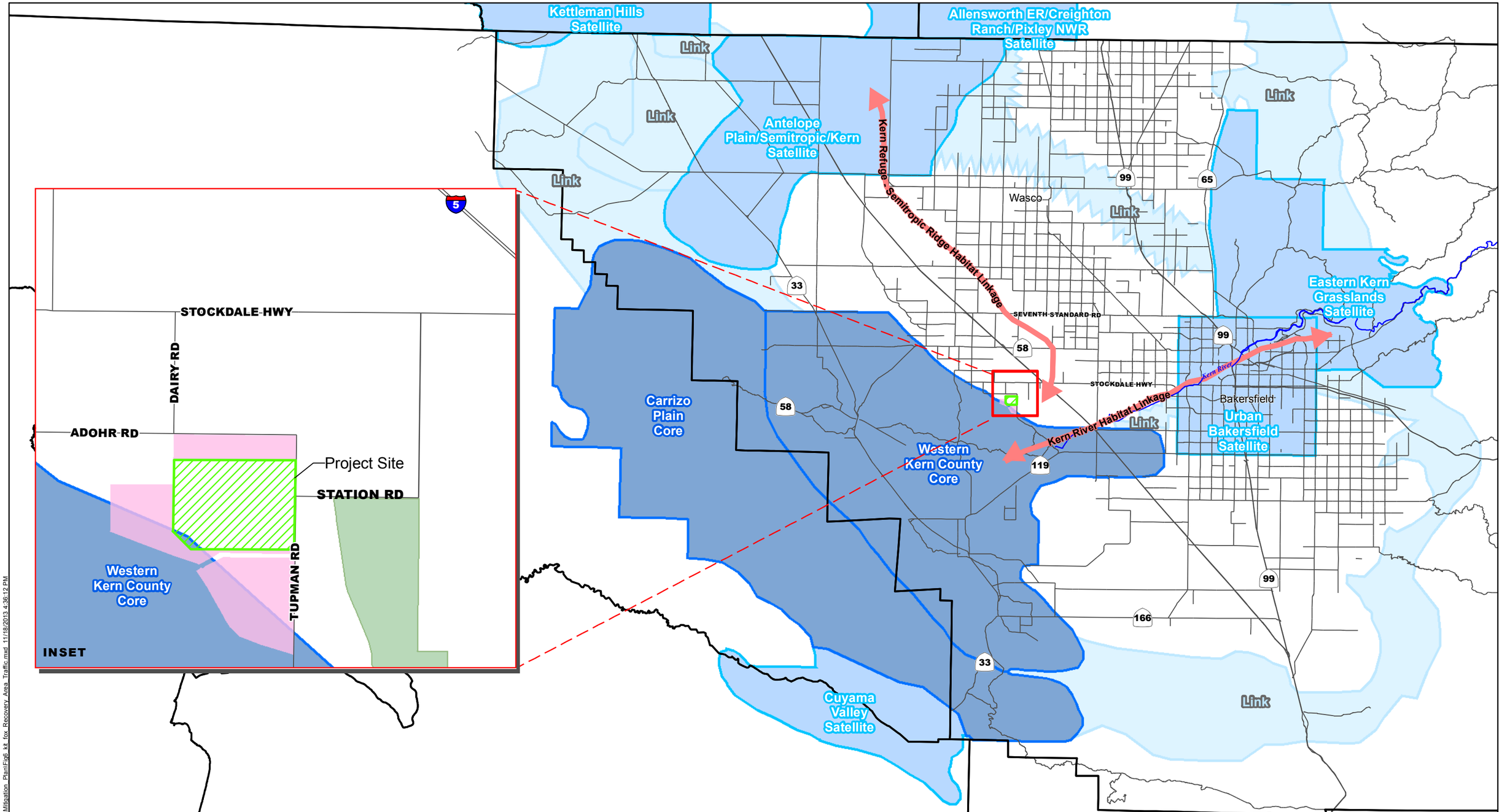

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SAN JOAQUIN KIT FOX RECOVERY AREA

Mitigation Plan for
Biological Resource Impacts
Hydrogen Energy California (HECA)
Kern County, California

October 2013
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FIGURE 6

ADOHR RD
DAIRY RD
MORRIS RD
STATION RD
TUPMAN RD
West Side Canal
Kern River Flood Control Channel
California Aqueduct
East Side Canal
Tule Elk Reserve
Elk Hills Conservation Area
Lokern Ecological Reserve

Project Areas
- Project Site
- Construction Staging Area
- Controlled Area

Onsite Mitigation
- Expanded Movement Corridor for San Joaquin Kit Fox
- Potential Tree Planting Areas for Future Swainson's Hawk Nesting

N
0 750 1,500 Feet

Source: Aerial Photo, NAIP, USDA, 2012.

PROPOSED ONSITE MITIGATION WITHIN THE CONTROLLED AREA

Mitigation Plan for
Biological Resource Impacts
Hydrogen Energy California (HECA)
Kern County, California

October 2013
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FIGURE 7

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WORKSHOP REQUEST

BIO-7. Review potential for avian collisions with towers on project site.

RESPONSE

The new 230-kilovolt electrical transmission line will interconnect the Project to a future PG&E switching station. Approximately 15 steel poles are expected to be required outside of the Project Site for the electrical transmission line interconnection. The transmission poles will be 110 feet tall.

The Project's tallest structure will be the carbon dioxide vent, which will be 355 feet tall. Other structures that will be 200 feet high or taller are: the air separation column can (200 feet); the heat recovery steam generator stack (213 feet); the sulfur recovery unit flare (250 feet); the gasification flare (250 feet), the Rectisol flare (250 feet); the feedstock dryer (305 feet); the gasification structure (305 feet); and the acid gas removal methanol wash column (330 feet). The Project's feedstock storage building will be 160 feet tall.

As discussed in the HECA Project Refinements docketed on October 18, 2013, bird strike hazards associated with the HECA Project would be minimal, because the Project site is not located in a daily flight path, and is not close to wetlands or other important foraging habitats. As noted in the PSA/DEIS (page 4.2-86):

> *Bird collisions with power lines and structures generally occur when a power line or other structure transects a daily flight path used by a concentration of birds and these birds are traveling at reduced altitudes and encounter tall structures in their path. Collision rates generally increase in low light conditions, during inclement weather, during strong winds, and during panic flushes when birds are startled by a disturbance or are fleeing danger.*

BIO-8. Confirm that project avoidance/minimization measures would comply with CDFW 2012 Burrowing Owl protocol.

RESPONSE

The Conditions of Certification in the PSA/DEIS are consistent with the measures identified in the 2012 CDFW Burrowing Owl guidance. The 2012 CDFW guidance on this species outlines a number of impact avoidance and minimization measures that CEC staff have incorporated into Condition of Certification BIO-11 (Burrowing Owl Impact Avoidance and Minimization) in the PSA/DEIS. These measures include avoiding disturbance of occupied burrows during the nesting period from February 1 through August 31; avoiding the direct destruction of burrows; implementing a worker environmental awareness program; making burrows to be avoided visible with flagging; and eliminating small mammal control in the burrowing owl-occupied areas. The proposed Condition of Certification BIO-11 also requires HECA to prepare and implement a Burrowing Owl Monitoring and Mitigation Plan that would incorporate CDFW's most recent mitigation and impact avoidance guidance for this species.

HECA proposes the following clarifications to Condition of Certification BIO-11, which focus on the development of a monitoring and mitigation plan and consistency of avoidance measures for occupied burrows.

BIO-11 Burrowing Owl Impact Avoidance and Minimization Measures

The project owner shall implement the following measures to avoid and minimize impacts to burrowing owls:

1. **Prepare a Burrowing Owl Monitoring and Mitigation Plan.** The project owner shall prepare and implement a Burrowing Owl Monitoring and Mitigation Plan that incorporates the most recent mitigation guidance on this species (CDFG, 2012b); the Plan shall be a stand-alone plan or included as part of the Biological Resources Mitigation Implementation and. Monitoring Plan (BRMIMP). Any modifications to the approved plan shall only take place after approval from the CPM [compliance project manager] based on consultation with CDFW.

   At a minimum, the plan shall include the following: plan purpose and goals; a discussion of take avoidance measures including preconstruction survey methods; burrow monitoring methods; a discussion of all impact avoidance and minimization measures to employ prior to implementing passive relocation and burrow eviction as a last option; a discussion of scenarios in which passive relocation would be necessary; identify and describe suitable relocation sites; potential use of artificial burrows if passive relocation is necessary; monitoring and management of relocation sites and any installed artificial burrows; and long-term monitoring and reporting requirements during operation.

2. **Pre-Construction Surveys**. For each construction year or prior to the start of ground-disturbing activities in a previously undisturbed area, the Designated Biologist or Biological Monitor(s) shall conduct focused surveys for burrowing owls no more than 30 days prior to initiation of construction activities. Surveys shall be focused exclusively on detecting burrowing owls, and shall be conducted from 2 hours before sunset to 1 hour after or from 1 hour before to 2 hours after sunrise. The survey area shall include the proposed construction areas and a surrounding 500-foot survey buffer.

3. **Implement Impact Avoidance Measures.** To the extent feasible, impacts to occupied burrows will be minimized during the nesting season, from February 1 through August 31 of any given year. If an active burrowing owl burrow is detected within the construction work zones or a 500-foot survey buffer, the following avoidance and minimization measures shall be implemented:

    a. **Establish Non-Disturbance Buffer.** If construction commences during the burrowing owl nesting season (February 1 through August 31), either buffer zones, visual screens, or other approved measures shall be implemented and based on site-specific conditions, the results of preconstruction owl surveys, and any follow up monitoring surveys of occupied burrows. Buffer sizes shall be determined based on site-specific conditions that will include the time of year and level of disturbance, as identified in the *Staff Report on Burrowing Owl Mitigation* (CDFG, 2012b). Buffer sizes shall be installed in accordance with the approved Burrowing Owl Monitoring and Mitigation Plan with a minimum buffer size of ~~200 meters~~500 feet, or other CPM-approved buffer size, during the peak nesting season. Materials used to identify nondisturbance buffers shall not preclude access or disturb access of the burrow by owls. The nondisturbance buffer shall be identified as an "Environmentally Sensitive Area" in the construction area. Signs shall be posted in English and Spanish at the fence line indicating no entry or disturbance is permitted within the fenced buffer.

    b. **Monitoring.** If construction activities would occur within 500 feet of any identified occupied burrows during the nesting season (February 1 through August 31), the Designated Biologist or Biological Monitor shall monitor the occupied burrow in accordance with the approved Burrowing Owl Monitoring and Mitigation Plan to determine if these activities are adversely affecting burrowing owl nesting behaviors.

4. **Compensatory Mitigation for Burrowing Owl.** Compensatory habitat shall be acquired for burrowing owl that meets selection criteria as mitigation for this species. Compensation lands shall be acquired as specified in **BIO-20**, including requirements for the acquisition, initial habitat improvement, protection, and funding for long-term maintenance and management.

Verification: At least 60 calendar days prior to the start of any project ground-disturbing activities, the project owner shall submit a draft Burrowing Owl Monitoring and Mitigation Plan to the CPM and CDFW for review and comment. At least 30 calendar days prior to the start of construction, the project owner shall submit a final Burrowing Owl Monitoring and Mitigation Plan that incorporates agency comments and input. The final plan shall be reviewed and approved by the CPM based on consultation with CDFW. Any modifications to the final plan shall be made only after review and approval by the CPM, in consultation with CDFW. All mitigation measures and their implementation methods shall be included in the BRMIMP as required under Condition of Certification **BIO-5**. Implementation of the measures shall be reported in the Monthly Compliance Reports by the Designated Biologist.

These impact avoidance and minimization measures shall be incorporated into the BRMIMP as required under Condition of Certification **BIO-5**. A summary of all ongoing impact avoidance and results of all monitoring activities during construction shall be included in the Monthly Compliance Reports, including a figure showing all burrows and burrow monitoring locations.

All burrowing owl observations shall be reported to the CNDDB [California Natural Diversity Database] within 60 days of the sightings, with copies of the CNNDB submittal forms included in Monthly Compliance Reports.

Within 30 days following the completion of preconstruction nest surveys for burrowing owl in a new construction area, the project owner shall submit a letter report summarizing the results of the preconstruction surveys to the CPM with a copy to CDFW. If an active burrowing owl occupied burrow is found within the approved survey area of the project site, the Designated Biologist shall notify the CPM and CDFW in writing within two business days.

WORKSHOP REQUEST

BIO-9. Clarify the restrictions on rodenticide/herbicide use in the PSA/DEIS, and consistency with other CEC siting documents.

RESPONSE

The PSA/DEIS includes measures to restrict the use of rodenticides and herbicides in the Project area. These measures are presented in draft Condition of Certification BIO-6, 15(d). HECA has reviewed the Draft Condition of Certification, as well as other recent CEC siting documents, to evaluate consistency with past CEC decisions regarding the use of pesticides and rodenticides. The following CEC siting documents were reviewed:

- Pico Energy Commission Decision (CEC-800-2012-003_CMF – September 2012);
- Avenal Energy – AFC – 08-AFC-1, Kings County (CEC-800-2009-006-CMF); and
- Rio Mesa Solar Project – 11-AFC-04, 3031 (P) CACA-053138 CADOOO.06.

CEC recommendations in the PSA/DEIR Condition of Certification BIO-6 are generally consistent with the restrictions included in recent CEC decision documents. HECA proposes the following changes to BIO-6 (15d) to clarify the use and approval of these substances in developed portions of the Project area.

15(d). Implement Pesticide Use Best Management Practices. During construction and operation, the project owner shall conduct pesticide management in accordance with standard Best Management Practices (BMPs). The BMPs shall include nonpoint source pollution control measures. The project owner shall use a licensed herbicide applicator and obtain recommendations for herbicide use from a licensed Pest Control Advisor. Use of rodenticides and herbicides in undeveloped project areas shall be ~~restricted and any herbicide use must be~~ subject to review~~ed~~ and ~~authorized for use~~ approval by the CPM in consultation with the USFWS [U.S. Fish and Wildlife Service] and CDFW prior to application. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation. If rodent control must be conducted, only zinc phosphide shall be used, and application is only allowed in the power plant buildings. Use of rodenticides and herbicides in the project area will not use chemicals and pesticides known to cause harm to nontarget plants and wildlife.

WORKSHOP REQUEST

BIO-10. Provide map of habitats in the project area

RESPONSE

Figure 4 in the HECA Mitigation Plan for Biological Resource Impacts (see Attachment BIO-6 in this submittal) identifies the habitats in the HECA Project Area. The classification of the habitat types is consistent with the previous submittals provided by HECA.

WORKSHOP REQUEST

BIO-11. Review of the PSA/DEIS for consistency with the Swainson's Hawk Technical Advisory Committee recommendations.

RESPONSE

HECA has reviewed the PSA/DEIS for consistency with the 2000 Swainson's Hawk Technical Advisory Committee (SHTAC) recommendations. The PSA/DEIS includes specific references to the SHTAC recommendations, and the proposed Condition of Certification BIO-9 is consistent with the SHTAC's recommended avoidance, minimization, and mitigation measures. No revisions are suggested at this time.