

**Appendix E**  
**Sensitive Plant and**  
**Wildlife Survey Report**

# RECLAMATION

*Managing Water in the West*

## **Sensitive Plant and Wildlife Survey Report**

**Drop 2 Reservoir Project  
Imperial County, California**



**U.S. Department of the Interior  
Bureau of Reclamation  
Yuma Area Office  
Yuma, Arizona**

**August 2005**

## **Mission Statements**

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

# **Sensitive Plant and Wildlife Survey Report**

**Drop 2 Reservoir Project  
Imperial County, California**

Delivery Order No. 04-PE-34-0240

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**U.S. Department of the Interior  
Bureau of Reclamation  
Yuma Area Office  
Yuma, Arizona**

August 2005

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# **Sensitive Plant and Wildlife Survey Report**

## **Drop 2 Reservoir Project Imperial County, California**

### **Introduction**

A team of SAIC biologists surveyed the proposed project area for the Drop 2 Reservoir for sensitive plants and wildlife in September 21 and 22, 2004 and April 13 and 14, 2005. On the initial September, 2004, trip our goal was to survey the area and identify the presence/absence of the flat-tailed horned lizard (FTHL) and sensitive plants in and adjacent to the Project area, including Peirson's milk-vetch, a federally listed threatened plant species. The April survey was supplemental to the survey conducted in September 2004, and focused on identification of spring flowering sensitive plant species that could potentially occur in the proposed Project area, including Peirson's milk vetch.

The site lies within the Lower Colorado River Valley subdivision of the Sonoran Desert (Shreve 1951; Brown, Lowe, and Pase 1979; Turner and Brown 1982). Native vegetation in the vicinity is creosote bush scrub on flat to slightly undulating sandy soils. The Algodones Dunes, an extensive system of well-developed sand dunes, lie immediately to the east of the Project area.

### **Methods**

#### **September 2004 Survey**

The weather was warm and windy with clear skies on both days surveys were conducted and wind became stronger on the second day. Our team of six split into two teams of three, one team focused on general assessment of wildlife habitat and FTHL surveys, and the other focused on rare plant surveys and documentation of vegetation. Both teams started at the eastern boundary of Brock Ranch and worked eastward toward the Coachella Canal. Surveyed areas are depicted in Figures 1-3.

### ***Botanical Survey***

On 21 September 2004, the botanical team, consisting of Lauren Brown, Tom Mulroy, and Charis van der Heide, surveyed an area approximately 400 feet in width for the length of the inlet canal corridor, parallel to the Evans Hewes Highway, excluding areas of private property near Gordon's Well (see Figures 1 and 2). The three botanical team members walked meandering transects spaced about 100 feet apart, denoted on the map with brown hatch marks (Figure 1).

On the second day, the team members surveyed five transects perpendicular to Evan Hewes Highway, shown on Figures 1 and 2, and characterized the vegetation type, cover, and habitat and the substrate type along each transect, while noting reptiles observed and signs of recent animal activity. Each transect ended approximately 1,000 feet from the road and this distance was measured and recorded by handheld Global Positioning System (GPS) units.

Locations of transects and important biological resources observed along the route were documented using a Leica Differential Global Positioning System (DGPS) device capable of sub-meter accuracy, and hand-held GPS units.

### ***Wildlife Survey***

The wildlife team, comprising Marc Blain, Ted Mullen, and Milton Yacelga, surveyed a 5-mile long, 300-foot wide transect parallel to the Evan Hewes Highway between the Coachella Canal and Brock Ranch, excluding areas of private property around Gordon's Well (Figure 3). The wildlife team surveyed for scat, reptile tracks, and presence/absence of FTHL and qualitatively assessed habitat quality for FTHL, taking into consideration vegetative cover, substrate type, presence of ant hills and insect activity, as well as the overall level of disturbance.

A qualitative assessment of the habitat for FTHL was conducted, including characteristics of the vegetation (relative cover and density of plants and dominant species), substrate type (fine sand, coarse sand or gravel), and level of disturbance (including roads or off-highway vehicle (OHV) tracks). An arbitrary 10-point scale of habitat suitability was used to score habitat at ½-mile intervals, with 1 being assigned to the least favorable habitat and 10 to the best habitat for FTHL, based on the experience of the FTHL team leader. The range of 1 to 3 included a habitat heavily disturbed with scarce, small vegetation and wind-scoured soil. The range of 4 to 7 included gravelly substrate, more vegetation, no hills, and disturbance minimal. The range from 8 to 10 included fine sand flats and hills, abundant vegetation, and absence of disturbance. Photographs were used to document habitat characteristics. GPS was used to document locations of transects. GPS coordinates of horned lizard scats found were recorded.

On the second day, the FTHL team also surveyed five transects perpendicular to Evan Hewes Highway, shown on Figure 3, for scat, reptile tracks, and presents/absence of FTHL. Each transect ended approximately 1,000 feet from the road and this distance was measured and recorded by handheld GPS units. They qualitatively assessed habitat quality for FTHL taking into consideration



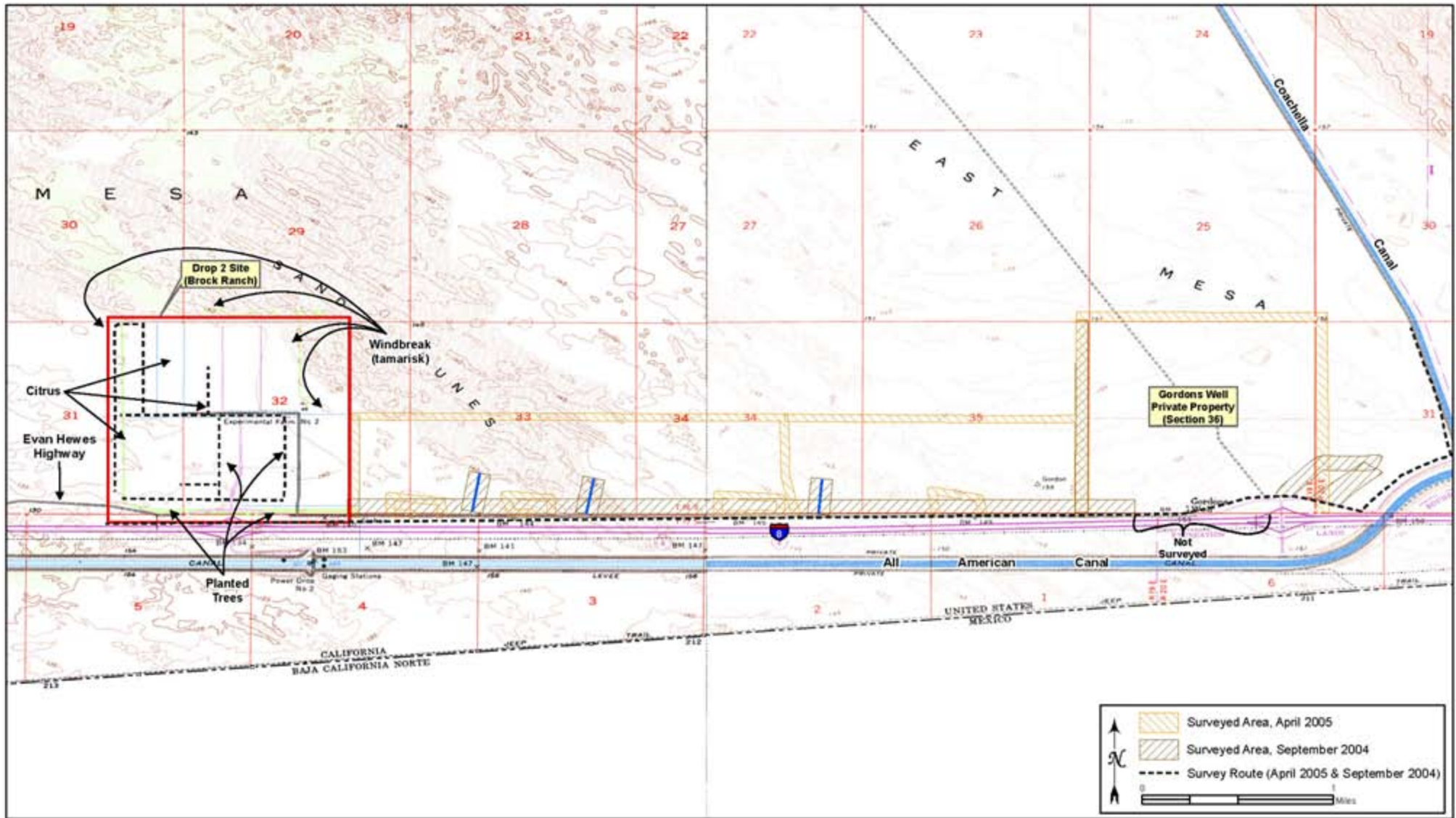


Figure 1. Botanical Survey Area on USGS Topographic Map



Figure 2. Botanical Survey Area



Figure 3. Flat-Tailed Horned Lizard Survey Area

vegetative cover, substrate type, presence of ant hills and insect activity, and the overall level of habitat disturbance.

### ***Brock Ranch Site***

The botanical team conducted a brief reconnaissance of the proposed reservoir site at Brock Ranch on September 22, 2004 and a wildlife biologist, visited the site on July 13, 2005, noting vegetation and wildlife habitat within the previously cultivated area. The route traveled is shown on the map with a black dashed line.

## **April 2005 Survey**

### ***Botanical Survey***

The survey team was on-site at approximately 8 A.M. the mornings of April 13 and 14. On both days, conditions were warm and calm with clear skies. The botanical team, consisting of Lauren Brown, Tom Mulroy, and Charis van der Heide, typically split into two teams of one and two people to cover as much area as possible but remained in the same general vicinity and maintained contact by walkie-talkie or cell phone for safety. Surveys were conducted by walking meandering transects within the areas denoted on the map with hatch marks (see Figures 1 and 3). The walking surveys were supplemented with reconnaissance of general conditions conducted from existing roads with stops to examine features of interest. These routes are indicated in Figures 1 and 3 by dotted lines.

The botanical team visited a known location of Peirson's milk vetch in the Algodones Dunes to verify its condition and appearance at the time of the survey. This reference site is located about 20 air miles north northwest of the Drop 1 site. The reference population of Peirson's milk vetch observed by the survey team was located near the Osborne Overlook, off of State Highway 78 about 3.8 miles west of Glamis. Reference photographs of habitat and plants, flowers, and seed pod are included as Figure 4.

Our botanical surveys encompassed two sample corridors parallel to the Evan Hewes Highway between the Coachella Canal and Brock Ranch (Figures 1 and 2). One sample corridor extended from the Evan Hewes Highway approximately 400 feet to the north. Since this sample corridor had been previously surveyed during the September 2004 site visit, the approach was to revisit portions of this corridor, especially areas that had the greatest potential to support rare plant species (i.e., dune hummocks). The second sample corridor was located 0.5 mile north of and parallel to Evan Hewes Highway and was walked between Brock Ranch and Section 36 using an unpaved half section road as a centerline (see Figure 3). Brief reconnaissance of Section 31, located between Section 36 and the Coachella Canal, was conducted from a vehicle and on foot, criss-crossing the area along the ubiquitous OHV trails. No sensitive resources were noted and GPS positions of these criss-crossing routes were not recorded. Essentially the entire southern half of this section had been heavily disturbed by OHV activity.

The April 2005 surveys did not include land within privately owned Section 36, including Gordon's Well, because permission to access it was not available at the



time of the surveys. However, the surveys included sample corridors parallel to and immediately outside of the western, northern, and eastern boundaries of the property (see Figure 1). The southern boundary of that property was viewed from Evan Hewes Highway which runs along the southern boundary of the Section. The land along the southern boundary is mostly developed and includes a bar, mobile home park, and space for RV parking and staging.

Additional survey routes are shown in black dashed lines on Figure 1. These surveys included a reconnaissance of the proposed reservoir site at Brock Ranch that was conducted from a vehicle on the morning of April 14, noting vegetation and wildlife habitat within the previously cultivated area. Reconnaissance was also conducted near the junction of the Coachella Canal and All-American Canal. The route followed a dirt road extending from Evan Hewes Highway along the north side of All-American Canal and then northward along the west side of the Coachella Canal.

## Results and Discussion

### Inlet Canal Corridor

#### ***Botanical Resources Results***

The Inlet Canal Corridor refers to the area north of the All-American Canal between the eastern boundary of Brock Ranch and the Coachella Canal. The native vegetation in the surveyed area is very homogeneous and simple, dominated by scattered creosote bush (*Larrea tridentata*). This simple community, which is classified as creosotebush scrub (Holland and Kiel 1995) and falls within the Lower Colorado River Valley Subdivision of the Sonoran Desert, Creosotebush-White Bursage series (Turner and Brown 1982), was present throughout the surveyed area except for the developed portions of Section 36 near Gordon's Well and the Brock Ranch property and a small area dominated by Mormon tea (*Ephedra trifurca*) on Section 31, near the Coachella Canal. There were no dry washes or drainageways encountered. A list of plant species observed in native habitats during the September 2004 and April 2005 surveys is included in Table 1.

The Project area slopes very gradually to the west and the terrain is essentially flat, characterized by gravelly flats punctuated by low hummocks of sand at the bases of shrubs. Low sand ridges with a northwest-southeast orientation alternated with gravelly flats in some areas. Sandy ground became more or less continuous and the dunes were best developed about a mile west of Brock Ranch. Even where they were the most developed, the dunes were low with generally less than about 10 feet of local relief. Elevations at the site slope very gradually from east to west, ranging from about 160 feet (49 m) near the east end to about 140 feet (42 m) near the west end at Brock Ranch.



**(a) Habitat and Plants**



**(b) Flowers**

**Figure 4. Peirson's milk vetch at a reference site in the Algodones Dunes, Photographs of (a) Habitat, (b) Flowers, and (c) Seed Pod**



**(c) Seed Pod**

**Figure 4. Peirson's milk vetch at a reference site in the Algodones Dunes, Photographs of Habitat, Flowers, and Seed Pod (cont.)**

**Table 1. Plant Species Observed in Native Habitats During the September 2004 and April 2005 Surveys**

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Habit</i>	<i>Native/ Non- Native</i>
<i>Abronia villosa</i>	Sand verbena	Nyctaginaceae	Annual herb	Native
<i>Aristida adscensionis</i>	Six-weeks three awn	Poaceae	Annual herb	Native
<i>Aristida purpurea</i> var. <i>purpurea</i>	Purple three-awn	Poaceae	Perennial bunchgrass	Native
<i>Asclepias subulata</i>	Rush milkweed; ajamete	Asclepiadaceae	Shrub	Native
<i>Astragalus aridus</i>	Milkvetch	Fabaceae	Annual herb	Native
<i>Atriplex canescens</i>	Fourwing saltbush	Chenopodiaceae	Shrub	Native
<i>Baileya pauciradiata</i>	Desert-marigold	Asteraceae	Annual herb	Native
<i>Brassica tournefortii</i>	Saharan mustard	Brassicaceae	Annual herb	Non-Native
<i>Camissonia claviformis</i>	Brown-eyed primrose	Onagraceae	Annual herb	Native
<i>Cercidium floridum</i>	Blue Palo Verde	Fabaceae	Tree	Native
<i>Chorizanthe rigida</i>	Spiny herb	Polygonaceae	Annual herb	Native
<i>Cryptantha micrantha</i>	Forget-me-not	Boraginaceae	Annual herb	Native
<i>Dalea mollis</i>	Soft dalea	Fabaceae	Annual herb	Native
<i>Dicoria canescens</i>	Desert twinbugs	Asteraceae	Annual herb	Native
<i>Dithyrea californica</i>	Spectacle-pod	Brassicaceae	Annual herb	Native
<i>Ephedra trifurca</i>	Mormon tea	Ephedraceae	Shrub	Native
<i>Eriogonum deserticola</i>	Desert buckwheat	Polygonaceae	Shrub	Native
<i>Eriogonum thomasi</i>	Thomas eriogonum	Polygonaceae	Annual herb	Native
<i>Hesperocallis undulata</i>	Desert lily; Ajo lily	Liliaceae	Perennial herb	Native
<i>Isocoma acradenia</i> var. <i>eremophila</i>	Alkali goldenbush	Asteraceae	Shrub	Native
<i>Loeseliastrum schottii</i>	Schott's gilia	Polemoniaceae	Annual herb	Native
<i>Larrea tridentata</i>	Creosote bush	Zygophyllaceae	Shrub	Native
<i>Mentzelia</i> sp.	Blazing star	Loasaceae	Annual herb	Native



**Table 1. Plant Species Observed in Native Habitats  
During the September 2004 and April 2005 Surveys (cont.)**

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Habit</i>	<i>Native/ Non- Native</i>
<i>Oenothera deltoidea</i>	Dune primrose, bird-cage primrose, Devil's lantern	Onagraceae	Annual herb	Native
<i>Palafoxia arida</i> var. <i>arida</i>	Spanish needle	Asteraceae	Annual herb	Native
<i>Plantago ovata</i>	Desert Plantain	Plantaginaceae	Annual herb	Native
<i>Salsola tragus</i>	Russian thistle	Chenopodiaceae	Annual herb	Non- Native
<i>Schismus arabicus</i> .	Mediterranean grass	Poaceae	Annual herb	Non- Native
<i>Tiquilia plicata</i>	Plicate coldenia	Boraginaceae	Subshrub	Native

The dominant vegetation along the survey route between Brock Ranch and the Coachella Canal is creosote bush scrub with creosote bush frequently being the only perennial species evident. In portions of the route, creosote bush was accompanied by plicate coldenia (*Tiquilia plicata*), a low, rounded subshrub. Desert buckwheat (*Eriogonum deserticola*), a large shrub, was present in among low dunes at a couple of locations. Occasional clumps of rush milkweed (*Asclepias subulata*) were observed and Mexican-tea (*Ephedra trifurca*) was found to be locally dominant in sandy soils near the Coachella Canal and All-American Canal junction. Desert lily (*Hesperocallis undulata*), a showy white flower growing from a deeply-buried bulb (corm), was relatively common in the sandy areas. Spring annuals were present in varying densities between creosote bushes, being especially prevalent and well-developed in the sandy areas, where sand verbena (*Abronia villosa*), dune primrose (*Oenothera deltoidea*), and Spanish needle (*Palafoxia arida* var. *arida*) were prevalent. Most of the annual species were at or just past their peak blooming period and were readily observable and identifiable.

Within the creosote bush scrub vegetation, there were differences in species composition related to soils. The simplest sites were on flats with gravelly surfaces. On these sites sandy hummocks formed at the bases of the creosote bushes. These sites had a generally sparse growth of low-growing annual plants, chiefly desert plantain (*Plantago ovata*) and Mediterranean grass (*Schismus arabicus*), a non-native species. On sites where the entire surface was wind blown sand, the flora was typically richer and included a denser growth of larger annual plant species. On the sandiest sites, areas between shrubs were vegetated with a relatively dense growth of annuals that included dune primrose, sand

verbena, and Spanish needle. The few perennial species other than creosote bush identified in the Project area were mainly on sandy soils. These included plicate coldenia, desert lily, alkali goldenbush, Mormon tea, and desert buckwheat. White bur-sage (*Ambrosia dumosa*), which is co-dominant with creosote bush over large areas of the Mojave and Sonoran Deserts, was very infrequent in the Project area. Four-wing saltbush (*Atriplex canescens*) a widespread desert species was present near Brock Ranch, where it had probably originally established on old fields and dispersed into the native vegetation around the site.

**Invasive Plant Species** Within the native desert scrub community, Russian-thistle (*Salsola tragus*) was most abundant near the Brock Ranch property and probably has dispersed into the native community from there as wind-blown tumbleweeds. It became very infrequent to absent with increasing distance from the property. Mediterranean grass (*Schismus arabicus*) was abundant and nearly ubiquitous in the Project area, especially on flats where it was codominant with desert plantain. Saharan mustard (*Brassica tournefortii*) was widespread but uneven in its abundance, being most abundant near the road.

**Sensitive Plant Species** No individuals of Peirson's milk vetch or other sensitive plant species were observed within the Project area during the September 2004 or April 2005 surveys.

Given the homogeneity of the vegetation, the characteristics of the habitat, the seasonal timing of the surveys, the growth stage of this species at the time of the surveys as viewed at a location in the Algodones Dunes and the excellent conditions for plant growth, we consider it highly unlikely that Peirson's milk vetch is present anywhere within the surveyed area. Based on description of primary constituent elements of critical habitat identified by USFWS (2004), it appears very unlikely that the species could occur on site. Although soils on site are generally sandy, steep, well-developed dunes are lacking from the site as is the specialized psammophytic scrub vegetation typically associated locations supporting Peirson's milk vetch. The only species of milk-vetch identified on the Project site (*Astragalus aridus*) is a small, relatively common annual species that is easily distinguishable at a distance from Peirson's milk vetch.

Spanish needle (*Palafoxia arida* var. *arida*), a widespread species that was abundant on the site, was carefully examined in the field and determined not to be Giant Spanish needle (*Palafoxia arida* var. *gigantea*), a species considered by California Native Plant Society to be Rare and Endangered in California and Elsewhere (CNPS List 1B), and known from the nearby Algodones Dunes, where it occurs in a specialized psammophytic (sand-loving) plant community. The key characters distinguishing Giant Spanish needle from the widespread variety are height, stem diameter, and size of the flowering heads. The plants observed on site were consistently smaller than var. *gigantea* and fell within the range of var. *arida* in all respects.

### **Wildlife**

Most of the wildlife habitat along the Inlet Canal Corridor consisted of a combination of creosote scrub and disturbed habitats. The habitat closest to paved

roads and off-road activities had less vegetation and would therefore provides less resources (i.e., cover, forage, and den sites) for wildlife species. Several portions of the Inlet Canal Corridor had healthy stands of creosote dune scrub vegetation and are contiguous with other large areas of relatively undisturbed habitats. These areas would support several typical desert wildlife species.

Several reptile species that are common to creosote bush scrub habitats were observed during the different site visits. Lizards observed during wildlife surveys of the Project site included desert iguana (*Dipsosaurus dorsalis*), long-tailed brush lizard (*Urosaurus graciosus*), numerous western whiptail (*Cnemidophorus tigris*), numerous zebra-tail lizard (*Callisaurus draconoides*), and a single flat-tailed horned lizard (*Phrynosoma m'callii*). Various tracks from lizards and snakes (including sidewinder tracks) were observed in the area of the Inlet Canal Corridor.

Bird species identified during field surveys of the Project site in September 2004 and April 2005, include greater roadrunner (*Geococcyx californianus*), loggerhead shrike (*Lanius ludovicianus*), black phoebe (*Sayornis nigricans*), common nighthawk (*Chordeiles minor*), red tail hawk (*Buteo jamaicensis*), barn swallows (*Hirundo pyrrhonota*), American robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), white-winged dove (*Zenaida asiatica*), rock dove (*Columba livia*), western kingbird (*Tyrannus verticalis*), killdeer (*Charadrius vociferus*), and Gambel's quail (*Callipepla gambelii*).

Mammals known to occur in or associate with creosote bush scrub in the southern most region of California include desert kangaroo rat (*Dipodomys deserti*), Merriam's kangaroo rat (*Dipodomys merriami*), antelope ground squirrel (*Ammospermophilus leucurus*), round-tail ground squirrel (*Spermophilus tereticaudus*), desert cottontail (*Sylvilagus audubonii*) mule deer (*Odocoileus hemionus*), gray fox (*Urocyon cinereoargenteus*), and coyote (*Canis latrans*). Numerous small mammal burrows, many of which were likely kangaroo-rat burrow complexes, were observed in the least disturbed areas of the Inlet Canal Corridor.

**Sensitive Wildlife Species** The Project area lies near the southern boundary of the East Mesa portion of the Flat-Tailed Horned Lizard Management Area (MA) and the inventoried area east of Brock Ranch is within the MA. We have assumed that the portions of the Project area within the MA would require habitat mitigation and, although the focus of the spring survey was not wildlife, we did observe an individual flat-tailed horned lizard (*Phrynosoma m'callii*) during the survey on April 13, 2005, confirming the presence of this species within the Project vicinity.

During the focused FTHL surveys in September 2004, no FTHLs were recorded, even though the surveys were conducted under the temperature conditions stipulated by the FTHL protocol (e.g., 25–42 °C). Outside of the formerly cultivated Brock Ranch site, habitat conditions were judged to be suitable for FTHL and horned lizard scat was found at 5 locations (Figure 3). Active anthills with harvester ants (*Pogonomyrmex* spp.) were observed in several locations with higher ant activity observed on the second survey day.

Within the generally suitable habitat, degraded habitat conditions were found in three areas as described below. Habitat was relatively disturbed in the first 100 to 130 m north of the Evan Hewes Highway between Gordon's Well and Brock Ranch. The disturbance included vehicular access for powerline maintenance, a variety of refuse of varying ages including camp sites, and random off-highway vehicle tracks. The corridor between Evan Hewes Highway and the I-8 Freeway was even more heavily disturbed by similar activities. On Section 31, at the eastern end of the canal alignment between Gordon's Well and the Coachella Canal, there was very heavy disturbance by OHV traffic, with tracks covering all of the areas between shrubs. West of Gordon's well the habitat quality improved as a result of diminished disturbance as distance from Evan Hewes Highway increased.

### **Drop 2 Reservoir Site**

The Drop 2 Reservoir Site is located on a section of formerly cultivated land known as Brock Ranch. Most of this land is currently fallow, some of it fallow for time periods of many years, judging from the degree to which native shrubs have re-established on the site. Three areas on the site currently support citrus groves (see Figures 1 and 2). In addition, a few planted fruit trees (e.g., pistachio; Brazilian pepper) survive along roads or ditches within the property (Figures 1 and 2). The northern, eastern, and western boundaries of the site are mostly lined with dense windbreak plantings of athel (*Tamarix aphylla*), while on the southerly boundary, a variety of tree species (mostly *Eucalyptus* spp. and palms) are planted in a broad strip along the Evan Hewes Highway. Most of the Brock Ranch property contains a variety of previously cultivated fields in various successional stages. Successional vegetation observed included weedy annual or short-lived perennial plants, areas with scattered well-developed shrubs, and one area near the center of the property with mature creosote bushes that had evidently established subsequent to cessation of cultivation on that part of the site.

In general, dry, disturbed agricultural fields offer fewer resources to most wildlife than native habitats. Although water is a critical feature for most wildlife expected in the area, the Brock Ranch project site no longer regularly provides water in drainage and irrigation ditches. However, the planted trees within the orchards and windbreaks on the property still provide important shade, cover, foraging habitat, roosting sites and nesting habitat for several wildlife species in the area. At least two raptor nests were observed during field surveys in the eucalyptus windrows of Brock Ranch. In addition, several dozen mourning dove nests were observed in various locations in the abandoned citrus groves. In general, the disturbed habitat within the Project site does not present any obstacles to wildlife moving through the general area. Sign of several large mammals (i.e. coyote and black-tailed jackrabbit) were observed throughout the Project site.

### **Conclusions**

From a biological perspective, the survey findings suggest that the optimum location for the inlet canal would be adjacent to Evan Hewes Highway, which

would place the canal in the most heavily disturbed habitat and would minimize habitat fragmentation by consolidating the disturbance with the existing powerline and highway corridors. This location would put the construction corridor outside of or at the edge of the FTHL Management Area, depending on details of the construction alignment. Based on the poor habitat condition observed between Evan Hewes Highway and the I-8 Freeway, it could be argued that it would be unnecessary to put fencing to exclude lizards on the south side of the canal, at least during construction.

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**Appendix A**  
**Sensitive Plant Species in the Project**  
**Region**

# Appendix A

## Federally and State Listed Rare, Threatened and Endangered Plant Species and Other Sensitive Plant Species in the Vicinity of the Drop 2 Site and Inlet Canal Corridors

### Peirson's milk-vetch (*Astragalus magdalenae* var. *peirsonii*) (T/E/1B)

Peirson's milk-vetch was federally-listed as threatened on October 6, 1998 for the entire range, and state-listed as endangered in November 1979. It is included in the CNPS List 1B, rare and endangered in California and elsewhere. It is an annual or short-lived perennial member of the Pea family (Fabaceae). The plant produces erect to spreading stems with a few erect branches. It reaches 20 to 70 centimeters (8 to 27 inches) in height and develops a deep taproot (USFWS 2003). Oblong or oblong-linear leaves are 2 to 6 millimeters (0.08 to 0.24 inches) long and silvery-canescenscent and may fall off in response to drought conditions. Flower petals are pink to purple and often white-tipped and are arranged in 10 to 17 axillary racemes. Inflorescences are present from December through April (USFWS 2003). The fruits are inflated, hollow and contain 11 to 16 seeds in a single chamber (USFWS 2003). Wind dispersal of fruits and seeds is likely to be the primary long-distance dispersal method for this plant. Germination is highly dependent on rainfall. First year plants were found to produce a mean number 5 fruits per plant, while older plants produce 171.5 fruits per plant (Phillips and Kennedy 2002). This shows the importance for the plants to persist two years or more in order to maintain the seed bank.

Peirson's milk-vetch is found in sand dunes within or near a desert psammophytic (sand-loving) scrub community. The psammophytic plant community is typically found in depressions between active and semi stabilized dunes. Typically, Peirson's milk-vetch inhabits slopes and hollows in mobile dunes and on the leeward (downwind) slopes of dunes, sheltered from the prevailing winds, where the fruits and seeds tend to accumulate. Common species of the psammophytic scrub habitat type include Mormon tea (*Ephedra* spp.), desert buckwheat (*Eriogonum deserticola*), desert dicoria (*Dicoria canescens*), common sandpaper plant (*Petalonyx thurberi*), desert panicum (*Panicum urvilleanum*), and plicate coldenia (*Tiquilia plicata*). Additionally, birdcage evening primrose (*Oenothera deltoides*) and desert lily (*Hesperocallis undulata*) may occur in the relatively stable dunes that form a transitional zone with the creosote bush scrub habitat (BLM 2003). Most of the psammophytic plant species listed above were found within the creosote bush scrub community on sandy soils within the project area, as described below. However these did not form a discrete community. Of the species listed above, plicate coldenia, birdcage evening primrose, and desert lily were relatively abundant and widespread on sandy soils within the creosote bush

scrub community. Individuals of desert buckwheat and desert dicoria were found at widely scattered individuals within the creosotebush scrub and Mormon tea was found only in one area where it occurred as a dense, monotypic stand, roughly one acre in extent, between Gordon’s well and the Coachella Canal.

Its historical distribution includes Imperial and San Diego Counties, California. However, it is currently considered extirpated from San Diego County and known only in Imperial County where it occurs as essentially one population of scattered colonies within the Algodones Dunes in the Sonoran Desert. Peirson’s milk-vetch also occurs in Baja California Norte and Sonora, Mexico (CDFG 2004). The distribution and relative abundance of the plant vary over place and time (Phillips and Kennedy 2002). The plants tend to be found in patches, possibly due to the localized dispersal of the seeds and fruits, dune morphology and differences in local rainfall patterns. It is threatened by off road vehicle (ORV) use (CNDDDB 2003).

The USFWS designated critical habitat for *Astragalus magdalenae* var. *peirsonii* on August 4, 2004 which totaled 21,836 acres in Imperial County, California (USFWS 2004a). Habitat consists of intact, active sand dune systems characterized by fine sands of sufficient depth, wind-formed slopes of less than 30 degrees, and an associated psammophytic scrub plant community.

This species was not observed during field surveys, and it is unlikely to occur in the proposed project construction area given the lack of well-developed dune systems in the construction area and lack of developed psammophytic scrub. Individuals of several of the plant species found within psammophytic scrub were found during our field surveys but typically as isolated individuals within creosotebush scrub rather than as a community.

**Table A-1. Sensitive Plant Species Occurring in the Vicinity of the Drop 2 Site and the Inlet Canal Corridor.**

<p><i>Astragalus crotalariae</i>, Salton milk-vetch, CNPS List 2:</p> <p>This is a perennial herb that flowers January to April. It occurs in Sonoran desert scrub with sandy or gravelly soil, elevation range 60 to 250 meters (197 to 820 feet) (CNPS 2001). This species was not observed during fall surveys, but is possible in the proposed project construction area.</p>
<p><i>Astragalus insularis</i> var. <i>harwoodii</i>, Harwood’s milk-vetch, CNPS List 2:</p> <p>This species in an annual herb that blooms from January to May. It occurs in sandy or gravelly soil in desert dunes, elevation 0 to 300 meters (0 to 984 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed project construction area.</p>
<p><i>Astragalus magdalenae</i> var. <i>peirsonii</i>, Peirson’s milk-vetch, FT, CE, CNPS List 1B:</p> <p>This species is a perennial herb that blooms December through April. It occurs in desert dunes, elevation 55 to 250 meters (180 to 820 feet), usually in steep dune terrain, and is known in less than twenty occurrences in California (CNPS 2001). It is threatened by off-road vehicles in the Algodones Dunes. This species was not observed during surveys, and is not expected to occur in the proposed project construction area based on its absence during the surveys and lack of well-developed dune habitat and psammophyte plant community.</p>



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<p><i>Ayenia compacta</i>, ayenia, CNPS List 2:</p> <p>This is a perennial herb that blooms March to April. It occurs in Sonoran and Mojavean desert scrub with rocky soil, elevation 150 to 1095 meters (492 to 3,592 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed project construction area.</p>
<p><i>Calliandra eriophylla</i>, Fairyduster, CNPS List 2:</p> <p>This species is a deciduous shrub that blooms from January to March. It occurs on sandy to rocky soil in Sonoran desert scrub, elevation 120 to 1,500 meters (394 to 4,921 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed project construction area.</p>
<p><i>Croton wigginsii</i>, Wiggin's croton, CR, CNPS List 2, :</p> <p>This is a shrub that flowers March to May. It occurs on desert dunes with Sonoran desert scrub, elevation range 50 to 100 meters (164 to 328 feet) (CNPS 2001). This species, a psammophyte found in the Algodones Dunes, was not observed during surveys, and it is not expected to occur in the proposed project construction area.</p>
<p><i>Ditaxis clariana</i>, Glandular ditaxis, CNPS List 2:</p> <p>This is a perennial herb that blooms in October to March. It occurs on sandy soil in Sonoran desert scrub and Mojavean desert scrub, elevation 0 to 465 meters (0 to 1,525 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed project construction area, based on its absence during the surveys.</p>
<p><i>Helianthus niveus ssp. tephrodes</i>, Algodones Dunes sunflower, CE, CNPS List 1B:</p> <p>This is a perennial herb that flowers from September to May. It occurs in desert dunes, elevation 50 to 100 meters (164 to 328 feet) and is threatened by vehicles (CNPS 2001). CNDDDB records occurrence of this psammophytic species in the South Algodones Dunes approximately 5 miles (8 km) from the junction of the All-American and Coachella canals. This species was not observed during surveys, and is not expected to occur within the proposed project construction area based on its absence during surveys and lack of well-developed dune habitat..</p>
<p><i>Lyrocarpa coulteri</i>, Coulter's lyrepod, CNPS List 4:</p> <p>This is a perennial herb that flowers December to April. It occurs in Sonoran desert scrub with rocky or gravelly soil, elevation range 120 to 795 meters (394 to 2,608 feet) (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed project construction area because of the sandy soils in the area.</p>
<p><i>Nemacaulis denudate var. gracilis</i>, Slender woolly-heads, CNPS List 2:</p> <p>This species in an annual herb that blooms March to May. It occurs in coastal dunes, desert dunes, and Sonoran desert scrub, elevation 50 to 400 meters (164 to 1,312 feet) (CNPS 2001). This species is threatened by urbanization of the Palm Springs area and along the coast (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed project construction area based on its absence during the surveys.</p>

<p><i>Palafoxia arida</i> var. <i>gigantea</i>, giant Spanish-needle, CNPS List 1B, BLMS:</p> <p>This is an annual/perennial herb that blooms February to May. It occurs in desert dunes, elevation 15 to 100 meters (49 to 328 feet) and is threatened by vehicles (CNPS 2001). This species was not observed during surveys, and it is not expected to occur in the proposed project construction area. Its relative <i>Palafoxia arida</i> var. <i>arida</i> was relatively frequent within the survey area in creosotebush scrub habitat.</p>
<p><i>Pholisma sonorae</i>, Sandfood (ammobroma), CNPS List 1B:</p> <p>This is a parasitic, perennial herb that blooms April to June. It occurs in desert dunes, elevation 0 to 200 meters (0 to 656 feet) (CNPS 2001). This species is threatened by vehicles and military activities. It is parasitic on <i>Eriogonum</i>, <i>Tiquilia</i>, <i>Ambrosia</i>, and <i>Pluchea</i> spp. (CNPS 2001). This species was not observed during surveys; however <i>Eriogonum deserticola</i> and <i>Tiquilia plicata</i> are present on the project vicinity so there is potential for this species to occur in the proposed project construction area. We did observe this species about 20 miles NNW of the project area in the Algodones Dunes, near Cahuilla Ranger Station.</p>
<p><i>Pilostyles thurberii</i>, Thurber's pilostyles, CNPS List 4:</p> <p>This is a parasitic, perennial herb that blooms in January. It occurs in Sonoran desert scrub, elevation 0 to 365 meters (0 to 1,197 feet) (CNPS 2001). This species grows inside the stems of <i>Psoralea</i> species, especially <i>P. emoryi</i>, and it flowers on the stems of its host (CNPS 2001). This species was not observed during surveys, and it is not expected to occur on the project property. It is not expected in the proposed project construction area given the absence of its host plant.</p>
<p><i>Sources:</i> CDFG (2004); USFWS (2004b); CNPS (2001); Hickman (1993); CNDDDB, 2003.</p> <p><i>Status:</i></p> <p><u>Federal Status (determined by U. S. Fish and Wildlife Service):</u></p> <p>FE      Federally Listed Endangered          FT      Federally Listed Threatened</p> <p><u>State Status (determined by California Department of Fish and Game):</u></p> <p>CE      California State Listed Endangered          CR      California State Listed Rare</p> <p><u>California Native Plant Society (CNPS) List:</u></p> <p>1B      Plants considered rare or endangered in California and elsewhere.          2      Rare and endangered in California but more common elsewhere          4      Plants of limited distribution – a watch list.</p> <p><u>Bureau of Land Management (BLM):</u></p> <p>BLMS   BLM Sensitive Species</p>

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**Appendix B**  
**Plants Listed Alphabetically by**  
**Common Name**

# Appendix B

## Plants Listed Alphabetically by Common Name

<i>Common Name</i>	<i>Scientific Name</i>
Alkali goldenbush	<i>Isocoma acradenia var. eremophila</i>
Blazing star	<i>Mentzelia sp.</i>
Blue Palo Verde	<i>Cercidium floridum</i>
Brown-eyed primrose	<i>Camissonia claviformis</i>
Creosote bush	<i>Larrea tridentata</i>
Desert buckwheat	<i>Eriogonum deserticola</i>
Desert lily; Ajo lily	<i>Hesperocallis undulata</i>
Desert Plantain	<i>Plantago ovata</i>
Desert twinbugs	<i>Dicoria canescens</i>
Desert-marigold	<i>Baileya pauciradiata</i>
Dune primrose, bird-cage primrose, Devil's lantern	<i>Oenothera deltoides</i>
Forget-me-not	<i>Cryptantha micrantha</i>
Fourwing saltbush	<i>Atriplex canescens</i>
Mediterranean grass	<i>Schismus arabicus.</i>
Milkvetch	<i>Astragalus aridus</i>
Mormon tea	<i>Ephedra trifurca</i>
Plicate coldenia	<i>Tiquilia plicata</i>
Purple three-awn	<i>Aristida purpurea var. purpurea</i>
Rush milkweed; ajamete	<i>Asclepias subulata</i>
Russian thistle	<i>Salsola tragus</i>
Saharan mustard	<i>Brassica tournefortii</i>
Sand verbena	<i>Abronia villosa</i>
Schott's gilia	<i>Loeseliastrum schottii</i>
Six-weeks three awn	<i>Aristida adscensionis</i>
Soft dalea	<i>Dalea mollis</i>
Spanish needle	<i>Palafoxia arida var. arida</i>
Spectacle-pod	<i>Dithyrea californica</i>
Spiny herb	<i>Chorizanthe rigida</i>
Thomas eriogonum	<i>Eriogonum thomasii</i>

