URS

February 29, 2008

Mr. Mark D'Avignon
U.S. Army Corps of Engineers
San Francisco District
1455 Market Street
San Francisco, CA 94103-1398

Subject: Request for Corps Verification of Jurisdiction
URS Project No. 22239472.01300

Dear Mr. D'Avignon:

On behalf of Carrizo Energy, Inc. (Carrizo), this package is provided to request Corps verification of jurisdiction of Carissa Creek (the Creek), which flows through a site that is proposed as a construction laydown area associated with the proposed Carrizo Energy Solar Farm project (referred to herein as either "CESF" or "Project") in San Luis Obispo County, California. Carrizo has applied for authorization under Nationwide Permit 14 to accommodate two Creek crossings necessary for the CESF.

This letter sets forth the evidence establishing that the Creek is a "waters of the United States" under 33 C.F.R. Section 328.3(a)(5). Specifically, this letter establishes that Soda Lake is a "waters of the United States" pursuant to 33 C.F.R. section 328.3(a)(3) (defining "waters of the United States" to include intrastate waters, the degradation or destruction of which could affect interstate or foreign commerce), and that the Creek is a "tributary" to Soda Lake pursuant to 33 C.F.R. Section 328.3(a)(5). This letter incorporates by reference Carrizo's earlier letters of November 7, 2007 and January 15, 2008, which are also attached [Attachments 1 & 2].

I. General Site Conditions.

The Project study boundary is approximately 380 acres and is located in the Carrizo Plain area of the South Coast Ranges, within central eastern San Luis Obispo County, adjacent and to the south and west of California State Route (SR) 58, in an un-incorporated area of San Luis Obispo County near the towns of Simmler and California Valley, California. The study boundary is located entirely within Section 33 of Township 29 South, Range 18 East of the California Valley United States Geological Survey (USGS) 7.5-minute series quadrangle map in APN 072-091-010. The land use within the Project boundary area has historically been agriculture including grazing and cultivation of crops, and it is currently disturbed ranchland that is actively cultivated and grazed with abandoned farm structures present in the center of the site. The topography of the site is generally flat; gently sloping northwest to southwest with elevations ranging from approximately

URS Corporation
1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108
Tel: 619.294.9400
Fax: 619.293.7920

2016 feet to 2065 feet above mean sea level (MSL). There are two areas where culverts will be placed within Carissa Creek to accommodate permanent road crossings associated with the CESF project, which shall be referred to as the review area. The total acreage of the review area is approximately 0.25 acre.

Review Area Location	Longitude	Latitude
Roadway Crossing 1	120.0487331	35.35785993
Roadway Crossing 2	120.0582968	35.36273768

The attachments to this letter include a Locality Map [Attachment 3], Proposed Delineation Maps [Attachment 4], Proposed Jurisdictional Determination Analysis [Attachment 5], a Development Map [Attachment 6], a Soils Map [Attachment 7] with tables describing the San Luis Obispo County soil series, and a Preliminary Off-Site Watershed Hydrology Map with projected runoff rates into the study area boundary [Attachment 8].

II. Soda Lake Is Jurisdictional Under 33 C.F.R. § 328.3(a)(3) Because Its Use, Degradation Or Destruction Could Affect Interstate Or Foreign Commerce.

Soda Lake is a "waters of the United States" pursuant to 33 C.F.R. Section 328.3(a)(3). 33 C.F.R. Section 328.3(a)(3) defines "waters of the United States" as including not only major rivers and lakes, but also all other waters such as intrastate lakes . . . wetlands . . . playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters

> i. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
>
> ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
>
> iii. Which are used or could be used for industrial purpose by industries in interstate commerce.

33 C.F.R. § 328.3(a)(3).

Notably, the regulation specifically calls out waters which "are or could be used by interstate or foreign travelers for recreational or other purposes." 33 C.F.R. § 328.3(a)(3)(i). See Colvin v. United States, 181 F.Supp.2d 1050, 1055 (C.D.Cal. 2001). There, the Court approved application

of the Clean Water Act to the Salton Sea because "the Salton Sea is a popular destination for out-of-state and foreign tourists," including "international and domestic visitors." Id. By contrast and as set forth below, Soda Lake has been, and is, actively used by interstate or foreign travelers for recreational and other purposes, as well as for industrial purposes by industries in interstate commerce.

A. Soda Lake Is Used Extensively For Recreational Purposes By Both Interstate and International Visitors.

Substantial evidence establishes that the Lake is a recreational destination for international and interstate Visitors. Visitor data from the Carrizo Plain National Monument [Attachment 9] demonstrates that a number of interstate and international visitors travel to Soda Lake. Specifically, records from the Goodwin Educational Center, located near Soda Lake, indicate that nearly 600 foreign or out-of-state visitors have filled out the sign in sheet in 2007 [Attachment 10]. The University of California, Riverside has also published a newsletter offering organized educational/recreational tours of Soda Lake [Attachment 11]. Furthermore, Soda Lake was featured on PBS's Huell Howser's California Gold television show [Attachment 12].

Internet sources also reflect the above. For instance, a brief search of on-line resources will reveal bike tours dedicated to Soda Lake [Attachments 13 & 14], which tours of the Monument begin at "Soda Lake Overlook," [Attachment 14] as well as a Boardwalk specifically dedicated to those wanting to enjoy Soda Lake [Attachment 14]. A Google search further reveals photographs of Soda Lake and surrounding areas posted by visitors from other states and countries, including Tennessee and the United Kingdom [Attachment 15]. A Google search will also evidence that the Lake has been studied by scholars at universities in Indiana, Pennsylvania, and Arizona [Attachment 16]. Lastly, pages from websites with photographs and travel logs posted by visitors from other states and countries establish that visitors Soda Lake is a destination for visitors from all over the world [Attachment 17].

Furthermore, in his proclamation designating the Carrizo Plain National Monument, President Clinton referred to Soda Lake as one of the principal reasons for designating the 200,000 acre monument. See Presidential Proclamation 7393, Establishment of the Carrizo Plain National Monument (January 17, 2001) [Attachment 18]. Citing key features of the lake, the President noted that the area is "world famous" and that Soda Lake "teems with thousands of beautiful lesser sandhill cranes, long-billed curlews, and mountain plovers." Id. at ¶ 3. Soda Lake is also "the largest remaining natural alkali lake" in the area, and "the only closed basin within the coastal mountains." Id. It is thus no surprise that it is actually used by travelers for recreation, bird-watching, and sight-seeing, and it is quite obvious that it "could be" so used. See also, Declaration of Dr. Dallas D. Rhodes (stating his understanding that many people go birding at the Lake as it is a

stopover on the Pacific Flyway and reporting evidence of hunters in and around Soda Lake) [Attachment 19].

B. Soda Lake Is Used Extensively For Industrial Purposes By Industries In Interstate Commerce.

Setting aside Soda Lake's significant role in the recreational industry in which interstate and international visitors participate, Soda Lake's unusual geologic characteristics have caused it to be used extensively for industrial purposes. For example, Soda Lake has been mined for its salt.[1] This resource was extracted and sold in the early 1900s by the Carisa Plains Chemical Company. See 1904 Prospectus for stock for Carisa Chemical Company [Attachment 20]; "Sodium and Soda Salts" by Reginald Meeks, Engineering and Mining Journal at 515 (indicating that the company extracted and sold salt from Soda Lake in the early 1900s) [Attachment 21].

In addition to salt, the mineral bloedite is collected from Soda Lake and is currently traded and sold internationally. See February 13, 2008 catalog of minerals that includes Bloedite collected from Soda Lake for sale internationally (see page 4 of 22) [Attachment 22].

Federal agencies have documented the Lake's useful mineral properties. For instance, Soda Lake's minerals are discussed in the USGS Bulletin entitled Contributions to Economic Geology at 369-371 [Attachment 23]. Additionally, page 12 of the BLM's brochure about the Carrizo Plain explains the Lake's commercial uses [Attachment 24].

Soda Lake, and in particular its geologic, recreational and industrial uses, has also been the subject of study by out-of-state academics. For example, Dallas Rhodes, a Geology Professor at Georgia Southern University and Chair of the University's Department of Geology and Geography is part of the "Soda Lake Interdisciplinary Project," which has as its objective the understanding of the paleoenvironmental and tectonic history of the Carrizo Plain. Declaration of Dr. Dallas D. Rhodes at 1 [Attachment 19]. Dr. Rhodes has studied Soda Lake for nearly three decades, and has visited Soda Lake every year since 1984. Id. While the timing of his visits vary, he has been at Soda Lake at least once during each month of the year. Id.

Dr. Rhodes also reports evidence that a mine was present on the shores of the North Basin of Soda Lake in the late-19th and early 20th centuries. Declaration of Dr. Dallas D. Rhodes at 1-2. The mine utilized a causeway constructed across the abandoned lake floor to reach the mine site on the northeastern side of the basin. Id. at 2. With the exception of one gap, the causeway utilized by the

[1] Soda Lake dries up each summer, leaving up to eight inches of salt deposits on the 3,000 acre lakebed. That produces approximately 290 million pounds of salt—a lifetime supply for more than 10,000 Americans.

industrial mine is still intact and is usable. Id. In fact, Dr. Rhodes has provided documents indicating that William C. Hay Ltd., Consolidated Chemical Co., and Pacific Distributing Corp., mined anhydrous sodium sulphate from Soda Lake at least into the mid-1930s, when a plant was moved from one side of Soda Lake to the other. Id. Those documents include excerpts from the California Journal of Mines and Geology (October, 1935), which are attached to Dr. Rhodes' Declaration. The excerpts indicate that anhydrous sodium sulphate—commonly known as Glouber's salt or salt cake—was then used in manufacturing paper, glass, and nickel, and also used in the textiles, tanning, paint, varnish, electro-plating, medical, and chemical industries. Id.. Dr. Rhodes has also witnessed someone collecting evaporate crystals at the Lake. Id. Evaporite minerals can be mined for use in the production of fertilizer and explosives. Id.

In fact, international texts recognize that Soda Lake's mineral deposits are commercially valuable. According to a 1919 report of the Office of the Swedish Chemical Industry, the "saltcake" present on the bed of Soda Lake is useful in the electrical industry. See Declaration of George Bayse [Attachment 25]. The report specifically states that Consolidated Chemical Company was producing saltcake from a "natural strata" at "Soda Lake (28 miles west of McKittrick, California in San Luis Obispo County) . . .."

C. Soda Lake Is Potentially And Actually Navigable.

Finally, there is evidence establishing that Soda lake is potentially and actually navigated. During his visits to Soda Lake, Dr. Rhodes has observed that water levels vary every year, but in March of 1998 he observed the water as much as two to three meters deep near the shore of the "South" basin and estimates that it may have been as much as four to five meters deep near the center of the basin. Id. At this time it was obvious to Dr. Rhodes that an inland fishing boat could have navigated across Soda Lake, and in fact would have been necessary in order to cross the lake. Id. In fact, Robert Lewis, who has lived on the Carrizo Plain for over 50 years, has waterskied on the Lake, an activity that requires a watercraft. Declaration of Robert Lewis [Attachment 26]. Mr. Robert Lewis and his mother, Alberta Lewis, have heard of others using watercraft on Soda Lake. Id; Declaration of Alberta Lewis [Attachment 27].

III. The Creek Is A "Tributary" Pursuant to 33 C.F.R. Section 328.3 (a)(5) And Is Therefore A "Waters Of The United States."

A. The Creek Exhibits A Distinct OHWM.

The Creek is a direct tributary to Soda Lake and is shown on the topographic maps as a blue-line stream and is identified as a 3rd-Order stream in the Carrizo Plain Watershed. As discussed below, a distinct OHWM is present throughout the length of the creek within the study boundary area that

continues 10 miles southeast to Soda Lake.

As recently as site visits during 2007 and 2008, a distinct, well-defined ordinary high water mark (OHWM) was observed along the entire length of Carissa Creek, with an approximate average width of 9 feet (range: 3 feet to 24 feet) and banks with an approximate average width of 20 feet, (range: 5 feet to 28 feet wide) [Attachment 28]. The entire length of Carissa Creek is located within the FEMA 100-year floodplain. Within the study area boundary, there are distinct areas in the creek where there is evidence of scour, pooling, and high flow during large storm events. In addition, several areas of deposition of alluvial soils, animal bones, and debris were observed in the creek. Observations of the soils in a plunge pool within the study boundary area revealed that rapid water flow has caused extensive scour and has broken through the A-Horizon of the soils, which has exposed the D-Horizon of the fragipan material. Below the fragipan, coarser gravel material was observed [Attachment 28, Photographs 19 and 20]. Two sample locations were observed, although no data sheets were completed because only upland vegetation was present; no hydrophytic vegetation was observed within or adjacent the creek within the study area boundary.

B. The Creek Is Directly Hydrologically Connected To Soda Lake And Is An Important Source Of Drainage To Soda Lake.

Not only is the Creek directly hydrologically connected to Soda Lake, but the Creek is an important source of flows to Soda Lake. For example, after the January 22-28, 2008 rain event that deposited 4.5 inches of rain in the Carrizo Plain area, (and during any rainy season in the Carrizo Plain), Carissa Creek was a major feature of the landscape all the way to Soda Lake. Carissa Creek passes through several large culverts on its way to Soda Lake where roads cross over the creek. The depth of the water within the entire length of the creek was approximately 2 feet deep, and was an average of 20 feet wide [see photographs in Attachment 28]. Although no hydrophytic vegetation was present within or near the Creek within the study area boundary, further downstream toward Soda Lake, Carissa Creek flows through and supports habitats that are comprised of hydrophytic and wetland vegetation.

USGS regression equations were used to quantify the runoff generated from the upper watershed of the study boundary area. The National Flood Frequency Program was used to calculate the runoff generated from the upstream watershed of the site, which includes regression equations for 289 flood regions nationwide. The regression equations were developed from peak-discharge records of 10 years or longer, available as of 1975, at more than 700 gauging stations throughout the State. The study boundary area is within the Central Coast Region; therefore, regression values for that region were used in the equation. The table below illustrates the anticipated surface runoff (in cfs) that could impact the CESF project site during several storm levels. In the 2- and 5-year storm events, the flow rates in the study boundary area are between 78.7 cfs and 390 cfs, respectively.

Preliminary Runoff Rates from Off-Site Watershed Basins

Basin	2-Yr Storm	5-Yr Storm	10-Yr Storm	25-Yr Storm	50-Yr Storm	100-Yr Storm	500-Yr Storm
1	61.9	308	669	1420	2340	3480	7680
2	8.29	42.5	94.7	206	340	519	1180
3	9	46.4	104	226	374	571	1300
Overall	78.7	390	846	1790	2950	4380	9630

The magnitude of the Creek's flows were tragically illustrated in the 1970's, when a woman drowned after her Volkswagen van was flipped during a storm event and the heavy water flow in the Creek rolled the van a few times down the creek. See Declaration of Robert Lewis [Attachment 26]; Declaration of Alberta Lewis [Attachment 27].

C. The Creek Is Potentially And Actually Navigable.

The Creek is potentially and actually navigable despite its variable flows. In her declaration, Ms. Alberta Lewis states that her husband, Bob Lewis, canoed along the Creek when he was young. Declaration of Alberta Lewis [Attachment 27]. In fact, Ms. Lewis stated that one time Bob Lewis canoed along the Creek at a spot about a mile and half from the Cavanaugh Ranch, which is located adjacent to the Lake. Id. The attached photographs of recent flow conditions in the Creek demonstrate that the Creek would be navigable by canoe or raft [Attachment 28].

IV. Conclusion

The analysis set forth above establishes that Soda Lake meets the definition of "waters of the United States" set forth in 33 C.F.R. § 328.3(a)(3), that Carissa Creek is a direct tributary to Soda Lake pursuant to 33 C.F.R. § 328.3(a)(5), and therefore the Corps has jurisdiction over at least that portion of Carissa Creek in which the two crossings will be located. Thus, we request that the Corps process the attached verification of jurisdiction of Soda Lake and Carissa Creek.

Thank you for your time and consideration, and please feel free to contact me with any questions or concerns.

Sincerely,

URS CORPORATION

Theresa Miller
Biologist

Patrick J. Mock, PhD
Principal Scientist

TM/PJM:ml

cc: Ausra CESF

Attachments: Schedule of Attachments
Attachments 1 through 28

SCHEDULE OF ATTACHMENTS

1. Letter dated November 7, 2007
2. Letter dated January 15, 2008
3. Figure 1 - Locality Map
4. Figures 2A and 2B - Proposed Delineation Maps
5. Figure 3 - Proposed Jurisdictional Determination Analysis
6. Figure 4 - Development Map
7. Figure 5 – Soil Survey Map and Soil Tables
8. Exhibit A - Preliminary Off-Site Watershed Hydrology Map
9. Visitor data from the Carrizo Plain National Monument
10. Goodwin Educational Center Visitor Origin Reports
11. UCR Newsletter
12. PBS's Huell Howser's California Gold television show
13. Bike tours dedicated to Soda Lake
14. BLM Soda Lake Trail Information
15. Google search of photographs of Soda Lake
16. Google search of academic that study Soda Lake
17. Travel logs website with pictures
18. Presidential Proclamation 7393, Establishment of the Carrizo Plain National Monument (January 17, 2001)
19. Declaration of Dr. Dallas D. Rhodes
20. 1904 Prospectus for stock for Carissa Chemical Company
21. Sodium and Soda Salts" by Reginald Meeks, Engineering and Mining Journal at 515
22. February 13, 2008 catalog of minerals
23. USGS Bulletin entitled Contributions to Economic Geology at 369-371
24. BLM's brochure about the Carrizo Plain
25. Declaration of George Bayse
26. Declaration of Alberta Lewis
27. Site visit photographs from 2007 and 2008

ATTACHMENT 1

LETTER DATED NOVEMBER 7, 2007

DOWNEY | BRAND
ATTORNEYS LLP

555 Capitol Mall, 10th Floor
Sacramento, CA 95814

P: 916/444-1000
F: 916/444-2100
downeybrand.com

Greg Broderick
jbroderick@downeybrand.com

November 7, 2007

Via Electronic Mail & U.S. Mail

Mr. Mark D'Avignon
Mr. Bob Smith
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, CA 94103-1398

Re: Jurisdictional Determination; "Waters of the United States" affected by the Carrizo Energy Solar Farm Project

Dear Messrs. D'Avignon and Smith:

Thank you for taking the time to discuss your opinion on the jurisdiction of a drainage located south of SR58 in the Carrizo Plain with our client's consultants from URS Corporation. As you may recall, this drainage is the subject of a section 404 permit application recently submitted to the Corps for the proposed Carrizo Energy Solar Farm project ("Project"). A full copy of that permit application is enclosed with this letter. The Project's proponents were troubled by your statements during a recent telephone discussion that this drainage does not display an Ordinary High Water Mark ("OHWM") and may not be subject to section 404.

While our clients would normally be pleased to avoid the permit process under section 404, it would be unwise for the Project proponents to accept such a "free pass" given the severe penalties for violating the Clean Water Act, the citizen suit provision, and the facts of this Project. As such, we urge you to review this matter carefully, consider the section 404 application filed with your office, and to begin the permit review process. Alternatively, we request that you send field staff for an on-the-ground review of the drainage in question, which we believe will confirm our conclusion that a section 404 permit is appropriate.

A. Technical Background

The drainage evident on the property flows into Soda Lake, which is part of the Carrizo Plain National Monument and unquestionably a "water of the United States." This drainage, a direct tributary to Soda Lake, is shown on the topographic maps as a blue-line stream and is identified as a major channel in the Carrizo Plain Watershed, with several tributaries draining into it. As our client's consultants have previously indicated, there is a distinct OHWM throughout the length of the drainage channel within the Project site, and the attached photos have been marked

to illustrate the limits and other flow characteristics of the OHWM within this drainage. The presence of a perceptible OHWM places this water squarely within the Corps' regulatory authority. *See* 33 C.F. R. §§ 33 C.F.R. § 328.3(e); 328.4(c); 65 Fed.Reg. 12823 (2000).

The vitality of this major channel to Soda Lake is evident in that the OHWM is still apparent despite the fact that the last two to three years have been extraordinarily dry in central and southern California. In a normal year, the major drainage could be expected to flow from November through February or even into March—nearly 5 months. Further, the deposition of alluvial sands and animal bones within the channel also indicates a recent heavy flow during larger storm events, and there are reports of a Volkswagen van floating down the drainage approximately 20-30 years ago. Anecdotal evidence from that time period suggests that people canoed in the drainage and that another drainage channel flood in 1969 impacted both the home on the property and the town of San Luis.

While we understand that the Corps has declined to assert jurisdiction over other drainages in this area south of SR58, URS has concluded that this drainage is different because it is the largest drainage in the watershed with many smaller tributaries flowing into it. In addition, this is the one of only a few major drainages in the watershed that flows directly into, and provides water for, Soda Lake.

In short, this seasonal drainage is a direct tributary to a water of the United States, displays OHWM features, receives water from smaller tributaries, and is likely to affect sensitive bird and plant species within a National Monument. Against this factual backdrop, we do not understand why the Corps would be uncertain about the applicability of section 404.

B. Legal Analysis

As an initial matter, the drainage waters at issue here are listed as "jurisdictional" waters in the Arid Southwest Supplement to the 1987 Wetland Delineation Manual. They are seasonal, but relatively permanent in that they flow each winter and spring except perhaps in extreme drought conditions. As recent court decisions confirm, seasonal, "relatively permanent" waters at issue here are covered by the Clean Water Act.

The United States Supreme Court recently decided a case delineating the boundaries of the Corps' authority under the Clean Water Act. *See Rapanos v. United States*, 126 S.Ct. 2208 (2006). There, a fractured court rejected the "any hydrologic connection" test pressed by the Corps but also rejected the argument that the CWA was limited to traditional navigable waters and wetlands immediately abutting such waters.

With no single majority opinion winning the day, the rule in any given case is determined by reference to the narrowest grounds on which a majority agreed. *See Marks v. United States*, 430 U.S. 188, 193 (1977). But whatever the controlling test, the drainage in this case meets every test proposed by the Court in *Rapanos*. The four dissenting justices, led by Justice Stevens,

would have approved the Corps' former "any hydrologic connection test and there is obviously a hydrologic connection between the drainage and Soda Lake, which is a traditional navigable water. As such, Justice Stevens' test is satisfied. Thus, the Corps' has authority to regulate the water at issue in this case if it meets *either* the "significant nexus" test set forth in Justice Kennedy's solo concurrence *or* the more restrictive plurality opinion of Justice Scalia for four justices. This drainage — a four-to-five-month direct tributary to a traditional navigable water — meets both tests.

The strictest test — set forth by Justice Scalia's plurality — bars jurisdiction only over "transitory puddles," *id.* at 2221, waters with "merely occasional flows" *id.* at 2219, or run-off "existing only, or no longer than, a day; diurnal ... short-lived." *Id.* at 2221 n.5. Justice Scalia's more restrictive test did "not necessarily exclude seasonal rivers, which contain continuous flow during some months of the year, but no flow during dry months." *Id.* at 2221 n.5. Rather, the narrower test was aimed at excluding features that were not really waters in the commonsense use of the term — " 'ephemeral streams,' 'wet meadows,' storm sewers and culverts, 'directional sheet flow during storm events,' drain tiles, man-made drainage ditches, and dry arroyos in the middle of the desert." *Id.* at 2222. A drainage channel that flows three to four months in a normal year, carries water to a large lake, and is robust enough to carry a Volkswagen van is obviously more than "directional sheet flow" or a "wet meadow." Thus, the major drainage in this case — which flows for four to five months over nearly a dozen miles and discharges directly into Soda Lake — meets even Justice Scalia's test.

With eight justices in agreement, the drainage at issue here falls within the Corps' regulatory jurisdiction. But this drainage also meets Justice Kennedy's "significant nexus" test in that it is a vital pipeline for water to Soda Lake. *See Northern California River Watch v. City of Healdsburg*, 496 F.3d 993, 995 (9th Cir. 2007) (noting import of Kennedy test); *but cf Baykeeper v. Cargill Salt*, 481 F.3d 700, 707-708 (9th Cir. 2007) (suggesting that Kennedy test does not apply to non-wetlands). Under Justice Kennedy's test, the Corps has regulatory authority if the waters "significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable,' " but no authority if the "effects on water quality are speculative or insubstantial." *Id.* at 2248. The effect may be found based on the water "alone or in combination with similarly situated" waters in the area. *Id.*

The major drainage here has direct and significant chemical, physical, and biological effects on both Soda Lake and the Carrizo Plain watershed in general. The Carrizo Plain was recently named as a National Monument, where many special-status and endemic plant and animal species are found. Species such as pronghorn, kit fox, and condor use the habitat within the Carrizo Plain where this drainage flows. The presence of these species, which rely on this water flowing through the Plain, indicates that this major drainage has a significant biological effect.

Further, maintenance of high water quality within the Monument's watershed is of obvious interest to the Corps, EPA, and BLM, and can be assured through the CWA 404 and 401 programs. Given the direct tributary status of this major drainage, it is apparent that whatever

goes into the major drainage will go into the lake. It is thus unthinkable that the Corps and/or EPA would exempt such a watercourse from all provisions of the Clean Water Act. Without the CWA's protection, anyone could dump anything into the major drainage without fear of the CWA's stiff civil and criminal provisions. Finally, the physical impact on Soda Lake and the watershed is obvious: less water in this major drainage means less water in Soda Lake. Soda Lake dries up completely in almost every year, and the water in this major drainage ensures that the lake is wet for a normal period each year. The drainage has a direct relationship with the lake, and its impacts on the lake's ecology and the surrounding watershed are neither "speculative" nor "insubstantial."

The above analysis is also consistent with recent Corps guidance on the reach of the Clean Water Act, issued in response to the *Rapanos* decision. That guidance confirms that a "non-navigable tributary to a traditional navigable water" is within the Corps' authority if it has "a continuous flow at least seasonally (e.g., typically three months)." Joint Memorandum of U.S. EPA and U.S. Army Corps of Engineers, *Clean Water Act Jurisdiction Following U.S. Supreme Court Decision in Rapanos v. United States & Carabell v. United States* at 5-6 (June 5, 2007). In such a case, as here, the Corps asserts regulatory authority without reference to Justice Kennedy's "significant nexus" test. If the water does not meet the above-test, then the Corps determines whether there is a "significant nexus." As demonstrated above, the major drainage to Soda Lake meets both tests, and the Corps should process the permit application.

The Corps' failure to accept and process the permit could have disastrous impacts on the Project, the Company, and its employees. First, the entire project could be delayed or derailed by a citizen suit. Any person claiming the slightest interest in the Monument, Soda Lake, the watershed, or the wildlife dependent upon the watershed could sue the Corps under the CWA's citizen suit provision for failing to require a permit. *See* 33 U.S.C. § 1365(a). Such suits can cost millions to litigate, but could also delay the project for years. Further, the company could find itself in serious trouble for discharging in violation of the Clean Water Act. Civil penalties range as high as $32,500 per day of violation, and can result in administrative orders or a civil suit by the United States. *See* 33 U.S.C. § 1319(a), (b), & (g).

More frighteningly, both the company and its employees could be subject to criminal penalties—including jail time and millions in fines—for violating the Act. See 33 U.S.C. § 1319(c). As the Ninth Circuit held in *United States v. Weitzenhoff*, the Clean Water Act is a strict liability statute. 35 F.3d 1275, 1283-84 (9th Cir. 1994). To go to jail, it is sufficient that people know that they are discharging material, and it is not necessary to know that the discharge is going to a "water of the United States." Such fines are more than a vague possibility—Kinder Morgan Energy Partners recently paid more than $5 million in fines for criminal violations of the CWA, and John Rapanos was originally sentenced to 10-16 months in jail for filling wetlands with a much more tenuous connection to traditional navigable waters. *See United States v. Rapanos*, 339 F.3d 447, 454 (6th Cir. 2003).

The drainage is a major, direct tributary to a large lake that covers several million square feet for a large part of the year. The major drainage presents an evident OHWM, supplies water for Soda Lake, and provides important habitat for endangered and threatened species. Under Corps and EPA guidance, as well as any test posited by the Supreme Court in *Rapanos*, the Clean Water Act extends to the major drainage and the Corps should process the permit.

C. Conclusion

Based on the information listed above, URS and our client request that you process our client's application for a 404 permit. We appreciate your time and consideration, and encourage you to contact Ms. Theresa Miller or Dr. Patrick Mock of URS with any technical questions or concerns. Please also feel free to contact Jane Luckhardt, the attorney assisting with this project, at 916.444.1000.

Very truly yours,

DOWNEY BRAND LLP

Gregory T. Broderick

Gregory T. Broderick
Jane E. Luckhardt

Attorneys for Ausra CA II LLC (dba Carrizo Energy, LLC)

889190.1

ATTACHMENT 2

LETTER DATED JANUARY 15, 2008

DOWNEY | BRAND
ATTORNEYS LLP

555 Capitol Mall, 10th Floor
Sacramento, CA 95814

P: 916/444-1000
F: 916/444-2100
downeybrand.com

Wendy L. Bogdan
wbogdan@downeybrand.com

January 15, 2008

VIA FACSIMILE AND U.S. MAIL

Mr. Mark D'Avignon
Mr. Bob Smith
U.S. Army Corps of Engineers
1455 Market Street
San Francisco, CA 94103-1398

Re: Corps Clean Water Act Jurisdiction Over a Major Soda Lake Drainage Affected by the Carrizo Energy Solar Farm Project

Dear Messrs. D'Avignon and Smith:

On behalf of Ausra, Inc., this letter follows on our letter of November 7, 2007, and the November 28, 2007, telephone conversation between Mr. Smith and Greg Broderick of our office regarding the Corps' authority to regulate the major drainage that is located south of SR 58 in the Carrizo Plain and that drains into Soda Lake. As you may recall, this drainage is the subject of a section 404 permit application recently submitted to the Corps for the proposed Carrizo Energy Solar Farm project ("Project"). A full copy of that permit application is enclosed with this letter for your reference at Exhibit A.

I. *Background*

Our November 7, 2007 letter focused primarily on whether this major drainage is sufficiently permanent, has the characteristics of an Ordinary High Water Mark, and has an adequate nexus to Soda Lake such that the Corps would find the drainage to be jurisdictional under 33 C.F.R. § 328.3 as interpreted by the recent Supreme Court case, *Rapanos v. United States*, 126 S.Ct. 2208 (2006) and other caselaw.

However, in the November 28, 2007 telephone conversation, Mr. Smith clarified that the Corps' initial hesitancy to exercise regulatory authority over this major drainage did not concern the characteristics of the drainage or its connection to Soda Lake. Rather, the Corps' concern focuses on a different issue, unrelated to *Rapanos*, namely whether Soda Lake, into which the drainage flows, is a "waters of the United States." This letter addresses the basis for the Corps' regulatory authority over Soda Lake, which in turn gives rise under 33 C.F.R. 328.3(a)(5) to regulatory authority over the drainage as a tributary to Soda Lake.

II. *Soda Lake Is A "Waters of the United States" Pursuant to 33 C.F.R. § 328.3(a)(3)*

As set forth in our previous letter, the major drainage across which Ausra proposes to build a temporary access road is a direct tributary to Soda Lake, which is part of the Carrizo Plain National Monument. According to the U.S. Geological Survey, Soda Lake is a 3,000 acre playa lake that receives water during wet winters and late-summer monsoon storms. During the several months during which the lake is full, the playa is home to fairy and brine shrimp and supports migratory and nesting birds.

As we now understand, the Corps' concern is whether Soda Lake is a "waters of the United States," as that term is defined in the Clean Water Act and 33 C.F.R. § 328.3. If Soda Lake is a "waters of the United States," then its direct tributaries are also subject to the Corps' jurisdiction and a section 404 permit is required prior to discharge of any fill material into the drainage.

33 C.F.R. § 328.3(a)(3) defines "waters of the United States" as including not only major rivers and lakes, but also all

> other waters such as intrastate lakes . . . wetlands . . . playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters
>
> > i. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
> >
> > ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
> >
> > iii. Which are used or could be used for industrial purpose by industries in interstate commerce.
>
> 33 C.F.R. § 328.3(a)(3).

Based on this definition, it is difficult to understand the Corps' reluctance to exercise its statutory and regulatory authority over Soda Lake. First, it seems reasonably clear that the degradation or destruction of Soda Lake "would affect interstate or foreign commerce." As an initial matter, Soda Lake dries up each summer, leaving up to eight inches of salt deposits on the 3,000 acre lakebed. That produces approximately 290 million pounds of salt—a lifetime supply for more than 10,000 Americans. That reason alone makes it difficult to accept the premise that discharges into Soda Lake lack the potential to affect interstate commerce.

Further, the regulation specifically calls out waters which "*are* or *could be* used by interstate or foreign travelers for recreational or other purposes." 33 C.F.R. § 328.3(a)(3)(i). *See Colvin v. United States*, 181 F.Supp.2d 1050, 1055 (C.D.Cal. 2001). There, the Court approved

application of the Clean Water Act to the Salton Sea because "the Salton Sea is a popular destination for out-of-state and foreign tourists," including "international and domestic visitors." *Id.* Here, there is significant evidence that Soda Lake, as part of the Carrizo Plain National Monument, is actually used by interstate travelers.

In fact, the Park's own record of visitors indicates that nearly 600 foreign or out-of-state visitors have filled out the sign-in sheet at the Goodwin Educational Center, located within the National Monument and just a short distance from Soda Lake. *See* Goodwin Education Center–Carrizo Plain National Monument, Visitor Origins by Season and Region, attached hereto as Exhibit B. As the visitor log points out, the "sign-in" sheets are not mandatory and it is likely that the chart significantly under-represents the number of actual interstate and foreign visitors. As demonstrated by the Monument's traffic log, attached hereto as Exhibit C, more than 35,000 cars entered the Monument in 2007 alone. A Google search further reveals photographs of Soda Lake and surrounding areas posted by visitors from other states and countries, including Tennessee[1] and the United Kingdom,[2] and has been studied by scholars at universities in Indiana, Pennsylvania, and Arizona.[3] It is thus clear that the Monument and the Lake not only *could* affect interstate commerce but actually do so directly and significantly and, as a result, Soda Lake meets the definition of "waters of the United States" set forth in 33 C.F.R. § 328.3(a)(3)(i).

In addition, in his proclamation designating the Carrizo Plain National Monument, President Clinton referred to Soda Lake as one of the principal reasons for designating the 200,000 acre monument. *See* Presidential Proclamation 7393, *Establishment of the Carrizo Plain National Monument* (January 17, 2001). Citing key features of the lake, the President noted that the area is "world famous" and that Soda Lake "teems with thousands of beautiful lesser sandhill cranes, long-billed curlews, and mountain plovers." *Id.* at ¶ 3. Soda Lake is also "the largest remaining natural alkali lake" in the area, and "the only closed basin within the coastal mountains." *Id.* It is thus no surprise that it is actually used by travelers for recreation, bird-watching, and sight-seeing, and it is quite obvious that it "could be" so used.

Even if there were not evidence that the lake is currently visited by interstate and foreign travelers, the Bureau of Land Management has adopted a plan to "provide better visitor services" and "attract the attention of not only the visiting public, but also federal and state agencies, private organizations, and schools and universities interested in environmental education or research opportunities."[4] A brief search of on-line resources reveals bike tours dedicated to Soda Lake,[5] that tours of the Monument begin at "Soda Lake Overlook,"[6] and a Boardwalk

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[1] http://www.easttennesseewildflowers.com/gallery/view_album.php?set_albumName=CA_2007.
[2] http://www.birdtours.co.uk/tripreports/usa/california5/cal-mar2002.htm.
[3] http://personal.georgiasouthern.edu/~drhodes/abstracts/GSA97_2.html
[4] http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/carrizo/FAQ.html.
[5] http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/carrizo/hiking_biking.html.
[6] http://www.blm.gov/ca/st/en/fo/bakersfield/Programs/carrizo/carrizomap.html.

specifically dedicated to those wanting to enjoy Soda Lake.[7] Soda Lake was even featured on PBS's Huell Howser's California Gold television show. As such, activities impacting the Lake certainly "could affect" interstate and foreign commerce.

III. Nothing In The Rapanos Decision Is Determinative As To Whether Soda Lake Is Jurisdictional And The Corps Need Not Confer with Other Agencies Prior to Exercising Its Regulatory Authority

Nothing in the recent *Rapanos* decision changes the analysis regarding the Corps' regulatory authority over Soda Lake. *Rapanos* concerns the sufficiency of the nexus between a drainage and a traditionally navigable water; it does not concern the Corps' authority to regulate waters which "are or could be used" by interstate and foreign travelers under section 328.3(a)(3)(i). *San Francisco Baykeeper v. Cargill Salt Div.*, 481 F.3d 700, 707 (9th Cir. 2007). Here the issue facing the Corps is whether Soda Lake is or could be used by interstate foreign travelers under section 328.3(a)(3)(i). Thus, interpretation of *Rapanos* is not determinative of whether Soda Lake is a "waters of the United States." As such, it is unnecessary for the Corps to go through the recently adopted consultation process for cases implicating *Rapanos* or to wait for a decision from Corps headquarters.

IV. The Corps' Refusal To Exercise Its Regulatory Authority And Process Ausra's Application Makes Both The Corps and Ausra Vulnerable to Legal Challenge

We noted in our prior letter that the Corps' refusal to accept and process the permit (or the Corps' refusal to make a timely decision on its jurisdiction) could have disastrous impacts on the Project, Ausra, and its employees. First, the entire Project could be delayed or derailed by a citizen suit. Any person claiming the slightest interest in the Monument, Soda Lake, the watershed, or the wildlife dependant upon the watershed may be able to sue the Corps under the Clean Water Act's citizen suit provision for failing to require a permit. *See* 33 U.S.C. § 1365(a). Such suits can cost unimaginable sums to litigate but could also cause delay fatal to a project that would otherwise provide an important source of clean, renewable solar-powered electricity. Further, the company could find itself in serious trouble for discharging in violation of the Clean Water Act. Civil penalties range as high as $32,500 per day of violation, and can result in administrative orders or a civil suit by the United States. *See* 33 U.S.C. § 1319(a), (b), & (g). Worse, both the company and its employees could be subject to criminal penalties—including jail time and millions in fines—for violating the Act. *See* 33 U.S.C. § 1319(c). *United States v. Weitzenhoff*, 35 F.3d 1275, 1283-84 (9th Cir. 1994) (Clean Water Act is a strict liability statute). Rather than creating uncertainty and exposing all involved to expensive and timely legal challenges, the Corps should exercise its regulatory authority and process the Ausra's permit application.

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[7] http://3dparks.wr.usgs.gov/carrizo/html/a023.htm.

V. Conclusion

The Corps has regulatory authority over Soda Lake pursuant to 33 C.F.R. § 328.3(a)(3) and therefore has regulatory authority over the major drainage as a tributary to Soda Lake pursuant to 33 C.F.R. § 328.3(a)(5). Thus, we renew our request that the Corps process our client's application for a section 404 permit. We appreciate your time and consideration, and encourage you to contact me or Greg Broderick of Downey Brand with any questions or concerns.

Very truly yours,

DOWNEY BRAND LLP

Wendy L. Bogdan

Wendy L. Bogdan

Enclosures

cc: Perry Fontana, Ausra, Inc. (via e-mail with encls.)
Dr. Patrick Mock, URS Corp. (via e-mail with encls.)

EXHIBIT A

September 24, 2007

Mr. Mark D'Avignon
Army Corps of Engineers
1455 Market Street
San Francisco, CA 94103-1398

Subject: Carrizo Energy Solar Farm
San Luis Obispo County, California
URS Project No. 22239472.01300

Dear Mr. D'Avignon:

On behalf of Ausra CA II, LLC (dba Carrizo Energy, LLC), this letter is to request a Nationwide 14 permit from the United States Army Corps of Engineers (USACE) for modifications to a large drainage located at a site to be developed in support of a solar energy farm in San Luis Obispo County, California. The attachments to this letter include figures showing the location of the site, photographs of the drainage, an application for a Nationwide 14 permit, and a Biological Assessment for Section 7 Consultation with United States Fish and Wildlife Service (USFWS) for potential incidental take of San Joaquin kit fox. Representatives of the USFWS have been briefed on this project.

PROJECT LOCATION

The Carrizo Energy Solar Farm (CESF) Project Area comprises a total of approximately 1,020 acres and is located in the Carrizo Plain area of the South Coast Ranges, within central eastern San Luis Obispo County (Figure 1). More specifically, the Project Area is located entirely within Sections 28 and 33 of Township 29 South, Range 18 East of the La Panza NE and California Valley United States Geological Survey (USGS) 7.5-minute series quadrangle maps. The CESF consists primarily of disturbed ranchland with abandoned farm structures in Sections 28 and 33. The site is generally flat, sloping gently to the southwest with elevations ranging from approximately 629 meters (2065 feet) to 614 meters (2016 feet) above mean seal level (MSL).

PROJECT DESCRIPTION

The proposed CESF and its ancillary systems will consist of approximately one hundred and ninety-five Compact Linear Fresnel reflector (CLFR) solar concentrating lines, associated steam drums, steam turbine generators (STGs), air cooled condensers (ACCs), and infrastructure producing a nominal 163 net megawatts (MWs). The 640-acre Project site is located on one section of land adjacent to California State Route 58 (SR 58)/Carrisa Highway, in an un-incorporated area of San Luis Obispo County near the towns of Simmler and California Valley, California. An access road will be located in the 380-acre construction laydown area south of and adjacent to the proposed Project site on Section 33. The new access road will require crossing the subject channel in two locations (Figure 2).

WATERS OF THE UNITED STATES/STATE JURISDICTIONAL WATERS

There are no known named drainages within the Project. Project surface water is intermittent and drains to local surface depressions and channels tributary to the larger intermittent stream running through the southern portion of the temporary construction laydown area in Section 33 (Figure 2). This drainage has an average width of 20 feet throughout its length and is also located within the 100-year FEMA floodplain. Project surface water that does not percolate into the ground is ultimately tributary to Soda Lake, approximately 10 miles downstream.

The draft Biological Assessment associated with the Application for Certification (AFC) for the Project is provided as a confidential attachment. The draft Biological Assessment also presents a discussion of the waters of the United States and State of California Jurisdictional Waters. Photographs are also included as an attachment.

The access road will be required to allow access to the entire construction laydown area during the construction phase and as a turn-around for large trucks during operations of the CESF. The access road will require two permanent crossings of the drainage that will sufficiently support the large construction and operations vehicles under all weather conditions, including large storm events. The access road will be 30 feet wide, and each crossing will require 48 inch culverts, which will be large enough to support the large vehicles and also allow for wildlife passage.

Crossing 1 of the drainage is at the southern end of the Project boundary, and has a 2-foot wide and 2-foot deep ordinary high water mark (OHWM), and 14-foot wide banks. Approximately 4.4 cubic yards of fill will be discharged into the channel and 0.001 acre of impact to the unvegetated OWUS will occur at this location.

Crossing 2 of the drainage is along the western boundary of the Project construction laydown area. The OHWM is approximately 5 feet wide and 2 feet deep, with 18-foot wide banks. Approximately 11.1 cubic yards of fill will be discharged into the channel, and 0.003 acre of impact to the unvegetated OWUS will occur at this location.

Channel Feature	Crossing No. 1	Crossing No. 2
Length	30 feet	30 feet
Width of OHWM	5 feet	2 feet
Bank-to-bank Width	18 feet	14 feet
Depth	2 feet	2 feet
Cubic Yards of Fill	4.4	11.1
Acreage of Disturbance to Jurisdictional Waters	0.001	0.003

We appreciate your help with this determination and Nationwide 14 permit application. If there is additional information that URS Corporation can provide to assist with this process, please do not hesitate to call.

Sincerely,

URS CORPORATION

Theresa Miller, Wildlife Biologist
URS Corporation Americas

Attachments:

1. Draft Biological Assessment for CESF Project
2. Draft Figures 1 and 2
3. Photographs of the OWUS

cc: Angela Leiba, URS Corporation, San Diego
Patrick J. Mock, URS Corporation, San Diego
Perry Fontana, Carrizo Energy, LLC

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)	OMB APPROVAL NO. 0710-003

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, Searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-003), Washington, DC 20503. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States; the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine uses: Information provided on this form will be used in evaluating the application for a permit. Disclosure: Disclosure of requested information is voluntary. If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME & TITLE (an agent is not required)
Ausra CA II, LLC (dba Carrizo Energy, LLC); P.For	URS Corporation, Attn: Theresa Miller, Biologist
6. APPLICANT'S ADDRESS 2585 East Bayshore Road Palo Alto, CA 94303	9. AGENT'S ADDRESS 1615 Murray Canyon Road, Suite 1000 San Diego, CA 92109
7. APPLICANT'S PHONE NUMBERS WITH AREA CODE a. Residence b. Business 650-353-9785	10. AGENT'S PHONE NUMBERS WITH AREA CODE a. Residence b. Business 619-294-9400

11. STATEMENT OF AUTHORIZATION

I hereby authorize URS Corporation to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE — see scanned file and original — DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

Carrizo Energy Solar Farm (CESF)

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Unnamed Drainage	
15. LOCATION OF PROJECT San Luis Obispo (COUNTY) CA (STATE)	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

The 380-acre CESF construction laydown area is located in one section of land adjacent and to the south and west of California State Route (SR) 58, in an un-incorporated area of San Luis Obispo County near the towns of Simmler and

17. DIRECTIONS TO THE SITE

CA Hwy 101 to SR 58 East. Continue on SR58 East approximately 50 miles east to the CESF site. Or, I-5 to SR 58 West. Continue on SR 58 west for approximately 60 miles to the CESF site.

18. NATURE OF ACTIVITY (Description of project, include all features)

see attached sheet.

19. PROJECT PURPOSE (Describe the reason or purpose of the project, see instructions)

see attached sheet.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. REASON(S) FOR DISCHARGE

Installation of 48" culverts to create two channel crossings for new access road.

21. TYPE(S) OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS

Sand, gravel, road base, culvert pipe.
Crossing 1: 4.4cy of fill
Crossing 2: 11.1cy of fill

22. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED (see instructions)

Crossing 1: 0.001 acre of unvegetated waters of US
Crossing 2: 0.003 acre of unvegetated waters of US

23. IS ANY PORTION OF THE WORK ALREADY COMPLETE? YES ○ NO ◉ IF YES, DESCRIBE THE WORK

24. ADDRESSES OF ADJOINING PROPERTY OWNERS, LESSEES, ETC. WHOSE PROPERTY ADJOINS THE WATERBODY (If more than can be entered here, please attach a supplemental list)

APNs 072-091-009 and 072-091-010: John Lowery (Peter G. Lowery Family Trust); 633 18th St., Santa Monica, CA 90402
APN 072-301-015: Joseph Brolin, Jessie Converse, George and Margorie Paquette; Star Rte 1, Santa Margarita, CA 93453

25. LIST OF OTHER CERTIFICATIONS OR APPROVALS/DENIALS RECEIVED FROM OTHER FEDERAL, STATE, OR LOCAL AGENCIES FOR WORK DESCRIBED IN THIS APPLICATION

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
USFWS	Section 7 Consultation	ACOE to Initiate			
CDFG	Streambed Alteration Agreement	Application to be Submitted			
RWQCB	401 WQ Certification	Application to be Submitted			

* Would include but is not restricted to zoning, building and flood plain permits.

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE
	signed form below		

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.
18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and will fully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, facticious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

USACOE Form 4345 Additional Information

Block 16:

The 380-acre CESF construction laydown area is located in one section of land adjacent and to the south and west of California State Route (SR) 58, in an un-incorporated area of San Luis Obispo County near the towns of Simmler and California Valley, California. The construction laydown area is located entirely within Section 33 of Township 29 South, Range 18 East of the La Panza NE and California Valley United States Geological Survey (USGS) 7.5-minute series quadrangle maps.

Block 18:

Installation of 48 inch culverts in 2 permanent crossing locations in the construction laydown area of the overall CESF project.
Crossing 1 will consist of 4.4cy of fill, 0.001 acre of impact to unvegetated OWUS and Crossing 2 will consist of 11.1cy of fill, 0.003 acre of impact to unvegetated OWUS. Figure 2 shows details of culvert locations, Attachment A shows photographs of the drainage at crossing locations, and Attachment B is the Biological Assessment for the Section 7 Consultation with USFWS.

Block 19:

The access road is part of the larger Carrizo Energy Solar Farm project on the adjacent Section (28), and will provide access to the laydown area during construction and a turn-around for large trucks during operations of the project (see Attached Draft Biological Assessment). The access road is necessary to access the entire construction laydown area and must be sufficient to support large trucks during all weather conditions including large storm events. Work is expected to start in the 2nd Quarter of 2009 and be completed in the 1st Quarter of 2012. The proposed Carrizo Energy Solar Farm (CESF or Project) and its ancillary systems will be adjacent the laydown area.

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)	OMB APPROVAL NO. 0710-003

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing instructions, Searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-003), Washington, DC 20503. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

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Vice President — 9/24/07

APPLICANT'S SIGNATURE — DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

Carrizo Energy Solar Farm (CESF)

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Unnamed Drainage	

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San Luis Obispo (COUNTY) — CA (STATE)

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Instructions For Preparing A
Department of the Army Permit Application

Blocks 1 thru 4 - To be completed by Corps of Engineers.

Block 5 - APPLICANT'S NAME. Enter the name of the responsible party or parties. If the responsible party is an agency, company, corporation, or other organization, indicate the responsible officer and title. If more than one party is associated with the application, please attach a sheet with the necessary information marked "Block 5".

Block 6 - ADDRESS OF APPLICANT. Please provide the full address of the party or parties responsible for the application. If more space is needed, attach an extra sheet of paper marked "Block 6".

Block 7 - APPLICANT PHONE NUMBERS. Please provide the number where you can usually be reached during normal business hours.

Block 8 - AUTHORIZED AGENT'S NAME AND TITLE. Indicate name of individual or agency, designated by you, to represent you in this process. An agent can be an attorney, builder, contractor, engineer or any other person or organization. Note: An agent is not required.

Blocks 9 and 10 - AGENT'S ADDRESS AND TELEPHONE NUMBER. Please provide the complete mailing address of the agent, along with the telephone number where he/she can be reached during normal business hours.

Block 11 - STATEMENT OF AUTHORIZATION. To be completed by applicant if an agent is to be employed.

Block 12 - PROPOSED PROJECT NAME OR TITLE. Please provide name identifying the proposed project (i.e., Landmark Plaza, Burned Hills Subdivision, or Edsall Commercial Center).

Block 13 - NAME OF WATERBODY. Please provide the name of any stream, lake, marsh, or other waterway to be directly impacted by the activity. If it is a minor (no name) stream, identify the waterbody the minor stream enters.

Block 14 - PROPOSED PROJECT STREET ADDRESS. If the proposed project is located at a site having a street address (not a box number), please enter it here.

Block 15 - LOCATION OF PROPOSED PROJECT. Enter the county and state where the proposed project is located. If more space is required, please attach a sheet with the necessary information marked "Block 15".

Block 16 - OTHER LOCATION DESCRIPTIONS. If available, provide the Section, Township, and Range of the site and/or the latitude and longitude. You may also provide a description of the proposed project location, such as lot numbers or tract numbers. You may choose to locate the proposed project site from a known point (such as the right descending bank of Smith Creek, one mile down from the Highway 14 Bridge). If a large river or stream, include the river mile of the proposed project site, if known.

Block 17 - DIRECTIONS TO THE SITE. Provide directions to the site from a known location or landmark. Include highway and street numbers as well as names. Also provide distances from known locations and any other information that would assist in locating the site.

Block 18 - NATURE OF ACTIVITY. Describe the overall activity or project. Give approximate dimensions of structures such as wingwalls, dikes, (identify the materials to be used in construction, as well as the methods by which the work is to be done), or excavations (length, width, and height). Indicate whether discharge of dredged or fill material is involved. Also, identify any structure to be constructed on a fill, piles, or float-supported platforms.

The written descriptions and illustrations are an important part of the application. Please describe, in detail, what you wish to do. If more space is needed, attach an extra sheet of paper marked "Block 18".

Block 19 - PROPOSED PROJECT PURPOSE. Describe the purpose and need for the proposed project. What will it be used for and why? Also include a brief description of any related activities to be developed as the result of the proposed project. Give the approximate dates you plan to both begin and complete all work.

Block 20 - REASONS FOR DISCHARGE. If the activity involves the discharge of dredged and/or fill material into a wetland or other waterbody, including the temporary placement of material, explain the specific purpose of the placement of the material (such as erosion control).

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Block 21 - TYPES OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS. Describe the material to be discharged and amount of each material to be discharged within Corps jurisdiction. Please be sure this description will agree with your illustrations. Discharge material includes: rock, sand, clay, concrete, etc.

Block 22 - SURFACE AREAS OF WETLANDS OR OTHER WATERS FILLED. Describe the area to be filled at each location. Specifically identify the surface areas, or part thereof, to be filled. Also include the means by which the discharge is to be done (backhoe, dragline, etc.). If dredged material is to be discharged on an upland site, identify the site and the steps to be taken (if necessary) to prevent runoff from the dredged material back into a waterbody. If more space is needed, attach an extra sheet of paper marked "Block 22".

Block 23 - IS ANY PORTION OF THE WORK ALREADY COMPLETE? Provide any background on any part of the proposed project already completed. Describe the area already developed, structures completed, any dredged or fill material already discharged, the type of material, volume in cubic yards, acres filled, if a wetland or other waterbody (in acres or square feet). If the work was done under an existing Corps permit, identify the authorization if possible.

Block 24 - NAMES AND ADDRESSES OF ADJOINING PROPERTY OWNERS, LESSEES, etc., WHOSE PROPERTY ADJOINS THE PROJECT SITE. List complete names and full mailing addresses of the adjacent property owners (public and private) lessees, etc., whose property adjoins the waterbody or aquatic site where the work is being proposed so that they may be notified of the proposed activity (usually by public notice). If more space is needed, attach an extra sheet of paper marked "Block 24".

Block 25 - INFORMATION ABOUT APPROVALS OR DENIALS BY OTHER AGENCIES. You may need the approval of other Federal, State, or Local agencies for your project. Identify any applications you have submitted and the status, if any (approved or denied) of each application. You need not have obtained all other permits before applying for a Corps permit.

Block 26 - SIGNATURE OF APPLICANT OR AGENT. The application must be signed by the owner or other authorized party (agent). This signature shall be an affirmation that the party applying for the permit possesses the requisite property rights to undertake the activity applied for (including compliance with special conditions, mitigation, etc.).

DRAWINGS AND ILLUSTRATIONS - GENERAL INFORMATION

Three types of illustrations are needed to properly depict the work to be undertaken. These illustrations or drawings are identified as a Vicinity Map, a Plan View, or a Typical Cross-Section Map. Identify each illustration with a figure or attachment number.

Please submit one original, or good quality copy, of all drawings on an 8.5 X 11 inch plain white paper (tracing paper or film may be substituted). Use the fewest number of sheets necessary for your drawings or illustrations.

Each illustration should identify the project, the applicant, and the type of illustration (vicinity map, plan view, or cross-section). While illustrations need not be professional (many small, private project illustrations are prepared by hand), they should be clear, accurate and contain all necessary information.

DRAFT BIOLOGICAL ASSESSMENT AND WETLAND DELINEATION

CARRIZO ENERGY SOLAR FARM PROJECT

Prepared for

U.S. Fish and Wildlife Service
Sacramento, California

URS Project No. 22239472.01300

Theresa Miller
Project Biologist

Patrick Mock, PhD
Senior Biologist

September 24, 2007

URS

1615 Murray Canyon Road, Suite 1000
San Diego, CA 92108-4314
619.294.9400 Fax: 619.293.7920

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ACC	Air cooled condenser
AFC	Application for Certification
APN	Assessor's Parcel Number
BA	Biological Assessment
BNLL	Blunt-nosed Leopard Lizard
CEC	California Energy Commission
CESF	Carrizo Energy Solar Farm
CLFR	Compact linear Fresnel reflector
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CPUC	California Public Utilities Commission
ESA	Endangered Species Act
I-5	Interstate 5
LORS	Laws, Ordinances, Regulations, Standards
mph	miles per hour
MW	Megawatt
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
OWS	Oil Water Separator
PG&E	Pacific Gas & Electric
sf	Square feet
SJKF	San Joaquin kit fox
STG	Steam Turbine Generator
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

SECTION 1 INTRODUCTION

This Biological Assessment (BA) has been prepared for the Carrizo Energy Solar Farm (CESF or Project) and its ancillary systems pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S. Code 1531 *et seq.*). The BA evaluates the potential direct, indirect, and cumulative effects of the proposed action on the San Joaquin kit fox (SJKF, *Vulpes macrotis mutica*), a federal endangered species. Blunt-nosed leopard lizard (BNLL, *Gambelia sila*), California condor (*Gymnogyps californianus*), giant kangaroo rat (*Dipodomys ingens*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), all federal endangered species that have the potential to occur within the Project vicinity, are absent from the Project. Vernal pool fairy shrimp (*Branchinecta lynchi),* a Federally threatened species with potential to occur within the Project vicinity is also absent from the site due to a lack of suitable habitat. A federal candidate plant species, Parish's checkerbloom (*Sidalcea hickmanii* ssp. *Parishii)* is absent due to a lack of suitable habitat.

Section 7 of the ESA directs all Federal agencies to use their existing authorities to conserve threatened and endangered species and, in consultation with the Secretary (i.e., U.S. Fish and Wildlife Service [USFWS] and/or National Marine Fisheries Service [NMFS]) to ensure that any action authorized, funded, or carried out by such agency does not jeopardize listed species or destroy or adversely modify critical habitat. Section 7 applies to management of Federal lands as well as other Federal actions that may affect listed species such as Federal approval of private activities through the issuance of Federal permits, licenses, or other actions. This document identifies the potential environmental biological effects that may result from implementation of the construction and operation of the proposed Project.

1.1 PROJECT DESCRIPTION

1.1.1 Facility Location

The Project area comprises a total of approximately 1,020 acres and is located in the Carrizo Plain area of the South Coast Ranges, within central eastern San Luis Obispo County. More specifically, the Project area is located entirely within Sections 28 and 33 of Township 29 South, Range 18 East of the California Valley and La Panza NE United States Geological Survey (USGS) 7.5-minute series quadrangle maps. The Project area lies within the San Joaquin Valley Bioregion, near the eastern boundary of the Central Coast Bioregion. The Project area and vicinity is dominated by agricultural land uses including grazing and cultivation of crops. The proposed CESF site and laydown areas consist primarily of chronically disturbed ranchland with abandoned farm structures in Sections 28 and 33 (Figure 1). The topography of the site is generally flat, gently sloping northwest to southwest with elevations ranging from approximately 2065 feet to 2016 feet above mean sea level (MSL).

1.1.2 Facility Description

The proposed solar farm will incorporate Ausra's proprietary Compact Linear Fresnel reflector (CLFR) technology to concentrate solar energy onto water pipes in an elevated receiver. The concentrated solar energy boils water within a row of specially coated stainless steel pipes in an insulated cavity to produce saturated steam. The steam produced in the receivers is collected in a series of pipes, routed to steam

drums, and then to the two steam turbine generators (STGs). Steam used by the steam turbines is condensed in two air cooled condensers (ACCs) and returned to the solar field.

The Project will include the construction of a new 230 kV switchyard located between the two STGs. Untreated raw water for the Project will be obtained from groundwater via an existing on-site well. The design of the Project minimizes use and maximizes the recovery of process water. Blowdown and oil water separator (OWS) clear discharge are routed to the on-site raw water storage tank for reuse. Stormwater will be collected on site and directed to swales and detention areas for percolation into the ground. The sanitary system will consist of a buried septic tank and sanitary leach field.

The STGs will generate electricity at 13.8 kV. To provide transmission level capability, the electricity generated will be stepped up using two (2) 13.8/230 kV Generator Step-Up (GSU) transformers. A new single-circuit 230 kV overhead transmission line will interconnect the facility with PG&E's existing Midway Substation by looping into the existing Morro Bay – Midway 230 kV line located north and adjacent to the CESF site. Total generating capacity for the Project is a nominal 163 net megawatts (MWs).

1.2 PURPOSE AND NEED

The goal and objective of this Project is to generate and sell clean, renewable, solar-powered electricity in accordance with the contractual requirements of the utility purchasing the power and the legal and regulatory requirements of the state of California.

To remain in compliance with renewable portfolio standards (RPS) set forth under California law (SB 1078, Sher, Chapter 516, Statutes of 2002), California utilities must procure 20 percent of the energy they provide customers in 2010 from qualifying renewable energy sources. Currently, the Public Utilities Commission is considering ways to achieve 33 percent renewable energy by 2020. The RPS program requires the California Public Utilities Commission (CPUC) to work collaboratively with the California Energy Commission to implement the RPS and assigns specific roles to each commission. To achieve this challenging target, California utilities have recently undertaken several parallel renewable power procurement processes (e.g., competitive bidding, bilateral negotiations, joint venture development, expansion of existing facilities, etc.) to obtain renewable power at the most advantageous price and terms available. History of Consultation to Date

Consultation with the USFWS has been limited to meetings and discussions between the Project Applicant and Service staff as part of the CEC Application for Certification (AFC) process. The ACOE must consult as part of their Section 404 permitting process.

SECTION 2 PROPOSED ACTION

2.1 FACILITIES DESCRIPTION

2.1.1 Overview

The CESF will consist of CLFR solar concentrators, steam drums and two STGs, and associated air cooling systems. When completed, the CESF will produce 1.14 million kg/h (2.52 million lbm/h) of 49.6 bar (720 psia) dry saturated steam, sufficient to power the two 93 MW (gross) steam turbines.

2.1.1.1 Proposed CESF site on Section 28

The CESF solar farm site will be situated on approximately 640 acres within Section 28 of Township 29 South, Range 18 East of the California Valley and La Panza NE USGS 7.5-minute series quadrangle maps. The CESF includes the construction and operation of a solar power generating facility and its ancillary systems and will consist of approximately one hundred ninety-five Compact Linear Fresnel reflector (CLFR) solar lines, associated steam drums, steam turbine generators (STGs), air cooled condensers, and infrastructure producing a nominal 163 net megawatts (MWs). The entire CESF site will be fenced. The CESF site is located north of California State Route 58 (SR 58)/Carrisa Highway, approximately 26 miles west of Interstate 5, and approximately 39 miles east of Highway 101.

Access Road: The CESF site will utilize Tracy Lane, an existing dirt road, as an access road. Tracy Lane is located south of Section 27 and north of Section 34. Access to the proposed CESF site will be provided by one new gate located at the northeastern corner of Section 28.

Linear Facility Route: The Project site is adjacent to an existing 230 kilovolt (kV) transmission line operated by Pacific Gas & Electric (PG&E). The CESF transmission system will require construction of approximately 850 ft of 230 kV transmission line. The CESF transmission line extends from the Project site switchyard to a point along PG&E's Morro Bay–Midway right-of-way (ROW). The overhead line is approximately 850 ft long, beginning at the dead-end structure in the switchyard. The line continues east along the northern edge of Section 28 for approximately 700 ft, then north for 150 ft to interconnect with the existing PG&E Morro Bay–Midway 230 kV Transmission Line 1. The transmission line is within the Project site boundary except for a 90 ft long segment that connects to the PG&E tower. The existing transmission lines traverse east-west along the northern boundary of Section 28 of Township 29 South, Range 18 East of the La Panza NE USGS 7.5-minute series quadrangle maps.

2.1.1.2 Construction Laydown Area on Section 33

The 380-acre (5,280 ft x 3,000 ft) primary construction laydown and parking areas will be adjacent to the Project site south of SR 58 on the northern half of Section 33. The southeastern portion of the construction laydown area will consist of several temporary construction facilities, including site offices, restrooms, meal rooms, and conference rooms, employee parking, vehicle marshalling area, and an access road that twice crosses a drainage bisecting the laydown area. These facilities are located in proximity to the southeastern entrance to the laydown area from SR 58 to provide ease of access to employees and site visitors from the highway.

Fueling Station: A temporary fueling station will be constructed in the southwestern portion of the laydown area. Vehicles to be refueled will park on a paved surface adjacent to the temporary storage tank. For those few vehicles unable to traverse to the designated refueling location, a refueling truck will be used. The refueling truck will be equipped with spill prevention and cleanup items.

Staging Areas: The northwestern portion of the construction laydown area will contain a staging area, located adjacent to the northwestern entrance to the laydown area from SR 58 and in proximity to the solar farm to the north. Material storage areas, including storage for mirrors, steel, and footings will be constructed around the staging area. Equipment storage areas will be constructed south of the material storage areas. A restroom facility will also be located in the staging area. The northeastern portion of the construction laydown area will contain a large assembly area to accommodate assemblage of the components of the CESF. Each row of reflectors is composed of four segments of six 16 m x 2.25-m (52.5 ft x 7.5 ft) reflectors that are assembled together. The assembly area is located near the staging area to facilitate transportation of the rows to the solar farm as they are completed.

Workers Parking: The CESF site will utilize a workers construction parking area within the construction laydown area. However, the majority of construction workers will be transported to the site via bus.

Access Road: A 9 m (30 ft) wide access road will extend along the western and southern sides of the construction laydown area to provide access to the various areas within the construction laydown area. This access road will also act as a turn-around onto SR 58 for large construction vehicles. Two permanent crossings of an OWUS that bisects the construction laydown area will be required along the access road. The permanent all-weather crossings will consist of 48-inch culverts able to support the large construction machinery associated with the Project. The crossings are discussed further in Section 3.8.2.

Site preparation: The primary construction laydown area is nearly level and thus requires little grading. Pads will be prepared for setting the trailers housing the temporary construction facilities (offices, restrooms, meal rooms, meeting and conference rooms, etc.). The soil in the laydown area will be covered with protective gravel along the access roadways, parking, and vehicle marshalling areas or with construction material on dunnage in the material storage areas so that soil losses will be negligible. In the areas to be restored after their use as temporary construction access and laydown areas, geotech fabric and gravel will be removed and shallow swales and/or depressions will be created for revegetation.

2.2 PROJECT CONSTRUCTION

Construction of the CESF, from site preparation and grading to full commercial operation, is expected to take approximately 35 months. Major milestones are listed in Table 1. Heavy construction will be scheduled to occur between 7:00 am and 7:00 pm, Monday through Friday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities will continue 24 hours per day, 7 days per week. These activities include, but are not limited to, refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning.

Table 1
Project Schedule Major Milestones

Activity	Date
Begin Construction	2nd Quarter 2009
Start Up and Commissioning: Steam Field #1	1st Quarter 2011
Start Up and Commissioning: Power Block #1	3rd Quarter 2011
Start Up and Commissioning: Steam Field #2 & Power Block #2	1st Quarter 2012

SECTION 3 ENVIRONMENTAL BASELINE

3.1 METHODS FOR EVALUATION

Biological field surveys were conducted by URS Corporation Americas (URS) and Live Oak Associates (LOA) biologists between April and September, 2007, according to California Energy Commission (CEC) regulations (CEC, 2000, revised 2007), California Department of Fish and Game (CDFG), and United States Fish and Wildlife Service (USFWS) protocols for surveys of special-status species. The Project area is defined as the area that could potentially be directly or indirectly impacted during Project construction and operation, and includes the solar plant site, construction laydown and parking areas, access road construction, and transmission line connection. The Project survey area includes the Project area and an assessment buffer of a one-mile radius surrounding the CESF and 90-foot long transmission line segment where field surveys were conducted for botanical and wildlife resources.

Prior to conducting field surveys, a review of literature was performed, including a query of the California Native Plant Society (CNPS), Inventory of Rare Plants Database, and the CDFG California Natural Diversity Database (CNDDB) to identify special-status species previously documented within the Project survey area and vicinity. The CNDDB was queried for records of special-status species in the California Valley and La Panza NE USGS 7.5-minute quadrangles (CDFG, 2007), and the species list for the County of San Luis Obispo was obtained from the Ventura USFWS office website (USFWS, 2007). The results of the query and the USFWS List are provided in Appendix A. The federal listed species with potential to occur in the Project study area are discussed below and in Table 2. In addition, the USFWS Recovery Plan for Upland Species of the San Joaquin Valley (USFWS, 1998) was reviewed.

Table 2
Federal Listed Species Potentially Occurring at the CESF Site and Vicinity

Common Name	Scientific Name	Status[1]	Potential for Occurrence on CESF
Wildlife			
Blunt-nosed leopard lizard	*Gambelia sila*	FE, SE, CDFG Fully Protected	Absent. Habitat is marginal; closest record is greater than 9 miles away. Species not detected during adult and juvenile protocol surveys in 2007.
California condor	*Gymnogyps californianus*	FE, SE	Absent. No roosting or foraging habitat in CESF Project survey area and vicinity.
Giant kangaroo rat	*Dipodomys ingens*	FE, SE	Absent. Habitat is marginal; no sign or burrows found during intensive transects surveys of both Sections 28 and 33.
San Joaquin kit fox	*Vulpes macrotis mutica*	FE, ST	Detected in CESF Project study area and vicinity. No den habitat present onsite or vicinity.
Tipton kangaroo rat	*Dipodomys nitratoides nitratoides*	FE, SE	Absent. Habitat is marginal. No sign or burrows found during intensive transect surveys of both Sections 28 and 33.

Table 2
Federal Listed Species Potentially Occurring at the CESF Site and Vicinity
(Continued)

Common Name	Scientific Name	Status[1]	Potential for Occurrence on CESF
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	Absent. No habitat present on CESF site.
Plants			
Parish's checkerbloom	*Sidalcea hickmanii* ssp. *Parishii*	Federal Candidate; State Rare; CNPS - 1B.2	Absent. Site is disturbed with chronic agricultural use including disking.

Notes:

[1] U.S. Fish and Wildlife Service (federal).
FE = Endangered (in danger of becoming extinct throughout all or a significant portion of its range).
FT = Threatened (likely to become endangered in the foreseeable future in the absence of special protection).
FC = Federal Candidate (candidate for FT or FE listing).
FSC = Species of Concern (sufficient information exists which warrants concern over that species' status and warrants study).
CDFG = California Department of Fish and Game (State).
SE = Endangered (in danger of becoming extinct throughout all or a significant portion of its range).
SC = State Candidate (candidate for SE or State threatened [likely to become endangered in the foreseeable future in the absence of special protection).
CSC = Species of Concern (information exists which warrants concern over that species' status and warrants study).

3.2 ENVIRONMENTAL SETTING

The Project area is characterized by ranching activities for cattle (e.g., grazing, rangeland) and the cultivation of agricultural products such as wheat. All of the Project study area and surrounding landscape has been chronically disturbed by extensive dry-land agricultural practices, including seasonal plowing and disking, and the landscape/topography does not generally resemble a natural condition. Both sections within the Project study area have extensive fencing to control movement of cattle and to control public access to the properties.

3.3 VEGETATION COMMUNITIES

No native plant communities are present within the Project. The observed habitats in the Project study area are disturbed in nature and include developed, disturbed and agricultural vegetation communities as defined by Holland. The plant species on the Project are primarily non-native annuals such as low-growing redstem filaree (*Erodium cicutarium*), popcorn flower (*Plagiobothrys* sp.), mustards (*Hirschfeldia* sp., *Brassica* sp.), and chess (*Bromus* sp.) species present throughout the Project study area except where it is bare due to recent plowing activities. Few native individuals such as needlegrass (*Nasella cernua*) and California poppy (*Eschscholzia californica*) are interspersed with the disturbance-adapted non-native species on the CESF.

3.4 FEDERAL PLANT SPECIES

No federal listed plant species were observed during the field survey and there are no records in the CNDDB or USFWS databases within the Project survey area. A federal candidate plant species, Parish's checkerbloom (*Sidalcea hickmanii* ssp. *Parishii),* is absent due to a lack of suitable habitat.

3.5 COMMON WILDLIFE DETECTED

The CESF project study area provides limited habitat to support wildlife species as a result of the chronic disturbance caused by the historical and current extensive dry-land agricultural and grazing activities. Within the 1,020 acres of the CESF site study area, nineteen species of birds, four reptile species and six mammal species were observed or their sign was detected. Typical bird species observed included house finch (*Carpodacus mexicanus*), western kingbird (*Tyrannus verticalis*), western meadowlark (*Stunella neglecta),* red-tailed hawk (*Buteo jamaicensis*), common raven (*Corvus corax*), turkey vulture (*Cathartes aura*), and American kestrel (*Falco sparverius*). Coyote (*Canis latrans*), California groundsquirrel (*Spermophilous beecheyi*), cottontail rabbit (*Sylvilagus audubonii*), and American badger (*Taxidea taxus*) were common mammals observed or detected throughout the CESF site. Cattle (*Bos taurus*) were grazing on Section 33 during the survey period. Pronghorn (*Antilocapra americana*) are common in the vicinity and were observed in the southern portion of Section 33. A red-tailed hawk nest was observed in a cottonwood tree (*Populus fremontii)* along the drainage located in Section 33 near the highway. Common raven nests were observed on the power line towers along the northern boundary of Section 28, and barn owls were observed and most likely nesting in an abandoned structure in Section 28.

3.6 FEDERAL WILDLIFE SPECIES

The CNDDB and USFWS queries listed 6 federally-listed wildlife species as historically present and potentially occurring in the overall Project vicinity. Figure 2 displays the results of the CNDDB database query. Those species are: giant kangaroo rat, Tipton kangaroo rat (Federal), California condor (Federal Endangered), blunt-nosed leopard lizard (Federal Endangered), San Joaquin kit fox (Federal Endangered), and vernal pool fairy shrimp (Federal Threatened). Most of these federal listed species records are located south and north of the CESF Project study area within the undisturbed natural habitat areas of the Carrizo Plain, and are not expected to occur in the Project study area due to lack of suitable habitat. Blunt-nosed leopard lizard have been recorded nearly 10 miles from the CESF project vicinity and thus have a low to moderate potential to occur in the Project study area. Intensive protocol surveys for blunt-nosed leopard lizard that were conducted from April 2007 – September 2007 were negative. A carcass of a San Joaquin kit fox was detected in the construction laydown area of the Project during the BNLL surveys. SJKF is the only federal listed species detected during the Project surveys. Therefore, only SJKF will be discussed further in this document.

3.7 ENDANGERED SPECIES DESCRIPTION

3.7.1 San Joaquin Kit Fox (*Vulpes macrotis mutica*)

Status: SJKF was listed as Federally Endangered on March 11, 1967 (32 CFR 4001) and listed as State Threatened on June 27, 1971. Critical habitat has not been designated. A Recovery Plan was developed in

1983 (UFSWS 1983). This species is also addressed in the Recovery Plan for Upland Species of the San Joaquin Valley, California (USFWS 1998).

The San Joaquin kit fox historically ranged throughout the San Joaquin Valley from Contra Costa County in the north to northern Santa Barbara County in the south. Currently the kit fox still has a wide distribution; however, kit fox numbers are greatly reduced, and populations are isolated from one another. Kit foxes primarily live in grassland and to a lesser extent, shrub, and agricultural habitats. Kit foxes predominantly eat rodents, ground squirrels, rabbits and hares, and ground-nesting birds. Kit fox pups are born in late winter and early spring, and the male provides most of the food for the female while she is nursing. Kit foxes change dens frequently, and often enlarge existing ground squirrel burrows in order to make new dens. Predation or competitive exclusion of kit foxes may occur in the presence of coyotes, introduced red foxes, domestic dogs, bobcats, and large raptors. Human threats to kit fox include destruction of habitat, habitat degradation, predators, pest control programs, and accidents caused by proximity to humans such as electrocution, roadkill, and suffocation from accidental burial in dens. Finally, natural factors such as drought, flooding, and rabies cause a significant percent of kit fox deaths. The San Joaquin kit fox is currently listed as an endangered species by both the federal government and the state of California (USFWS, 1998). The nearest CNDDB record of San Joaquin kit fox to the Project area is less than 1 mile west of the Project area. A road-killed kit fox was observed within Section 33 near the highway in August 2007. Kit fox apparently move through the project vicinity; however, no kit fox dens were detected in the Project study area during the 2007 surveys. California ground squirrel are present on the CESF project site and are most likely important prey for kit fox in the area.

3.8 JURISDICTIONAL WATERS

A formal jurisdictional waters delineation per Army Corps of Engineers (ACOE) protocols was conducted as part of this assessment. Waters of the United States (U.S.), including wetlands, subject to jurisdiction pursuant to Section 404 of the Clean Water Act (CWA) were identified using methods describe by the ACOE (1987). Non-wetland waters of the U.S. were delineated based on the presence of an ordinary high water mark (OHWM) as defined at 33 CFR 328.3(e). The OHWM is defined as:

> "The term 'ordinary high water mark' means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

3.8.1 Methodology

A formal jurisdictional waters delineation for the Project was conducted by URS biologists Dr. Patrick Mock and Ms. Theresa Miller on June 18, 2007, to document the extent of jurisdictional waters on the CESF. Hydrological and vegetation conditions were evaluated along the length of an identified drainage channel (indicated as a "blue-line stream" on the USGS topo map), in Section 33 of the Project study area. Width measurements were taken at periodic points within the channel, drawn onto an aerial map, and recorded using a handheld GPS unit. Channel measurements were also taken at the specific locations of the proposed road-crossings.

3.8.2 Jurisdictional Delineation Results

An OHWM was observed along the entire length of the drainage channel located in the center of Section 33, as depicted on Figure 3. This channel has a well-defined streambed and banks with an approximate average width of 20 feet, (range: 3 feet to 24 feet wide). In addition, the channel is located within the FEMA 100-year floodplain (Figure 3). It is apparent that the entire channel has been disturbed by the agricultural practices of disking, plowing, and seeding over the decades (see site photos); however, the channel path is apparent throughout its length and maintains a distinct OHWM through Section 33 of the Project area. There are distinct areas along the channel that show evidence of scour, pooling, and high flow during large storm events, as well as deposition of alluvial soils and debris from these heavy flows. This channel does not support wetland vegetation as defined by the ACOE or CDFG, nor does it support wetland characteristics (i.e., hydric soils are absent) at any point within or adjacent to the OHWM.

Two channel crossings are proposed.

- The width of the OHWM of Crossing No. 1 at the southern boundary of the Project site in Section 33 is 5 feet wide with banks that are 18 feet across and 2 feet deep. This portion of the channel is more distinct than Crossing No. 2, which is located at the western boundary of Section 33.

- The width of the OHWM Crossing No. 2 is 2 feet, with a bank-to-bank width of 14 feet and 2 feet deep.

Table 3

Details of Jurisdictional Waters to be Disturbed on CESF Construction Laydown Site

Channel Feature	Crossing No. 1	Crossing No. 2
Length	30 feet	30 feet
Width of OHWM	5 feet	2 feet
Bank-to-bank Width	18 feet	14 feet
Depth	2 feet	2 feet
Cubic Yards of Fill	4.4	11.1
Acreage of Disturbance to Jurisdictional Waters	0.001	0.003

SECTION 4 EFFECTS DETERMINATION

4.1 FACTORS CONSIDERED

This section includes the analysis of the direct, indirect, and cumulative effects of the proposed action on SJKF. The analysis identifies the Project features and/or activities that are anticipated to adversely impact the species, and when feasible, quantifies such impacts. Direct effects are defined as actions that may cause an immediate effect on the species or its habitat, including the effects of interrelated actions and interdependent actions. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the proposed project. Permanent impacts were calculated as the physical ground disturbance area covered by new fill or cut sections that result from project implementation and construction.

The permanent loss of 640 acres of disturbed agricultural lands likely utilized by San Joaquin kit fox in the CESF project site is considered significant and would be mitigated per the USFWS and San Luis Obispo County guidelines.

Construction of the temporary facilities in Section 33 will result in temporary impacts to 380 acres of agricultural land utilized by SJKF. Effects of the construction activities include displacement (temporary or permanent) from suitable habitat within the Project area; potential incidental mortality (roadkill), disturbance from noise, vibration, air emissions, and light; and modification of localized movement and foraging opportunities.

4.1.1 Cumulative Impacts

Federal regulations implementing the National Environmental Policy Act (NEPA) (40 CFR 1508.7) define a cumulative impact as "the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." However, unlike NEPA, under Section 7 of the ESA, cumulative effects analyses are limited to future State and private actions that are reasonably certain to occur within the action area prior to the completion of the Federal project. For Section 7 consultations, the cumulative impacts should not include future Federal actions (e.g., undertakings that require federal authorization or federal funding) because they are actions that themselves would be subject to the restraints of Section 7 at some later date. Indicators of "reasonably certain" projects must show more than the possibility that the non-federal project would occur. They must demonstrate with reasonable certainty that it would occur. Accordingly, only those State or private projects that satisfy all major land use requirements and that appear to be economically viable are considered. Cumulative effects involve only future non-Federal actions: past and present impacts of non-Federal actions are part of the environmental baseline. The following subsections identify and describe potential cumulative effects that could result from the CESF project in combination with other reasonably foreseeable future non-Federal actions or natural events in or near the project area.

The CESF and other projects in the vicinity are not expected to result in significant cumulative impacts to environmental resource areas, including, but not limited to, air quality, land use, cultural resources, water

resources, or traffic during the construction or operation phases. All existing and proposed projects can be characterized primarily as residential development (i.e., new single-family dwellings and mobile homes). Of the 41 projects with permit applications submitted since January 2000, only 6 projects proposed new residential construction (i.e., single-family dwellings). The remaining 35 projects include minor construction projects such as individual manufactured and mobile home permits, mobile home foundations, carport additions, roof replacements, deck additions, and residential renovations. Further, some of the listed projects have permits that have since expired since their issuance and thus, can be dismissed from this cumulative impact analysis.

The closest permitted project is located approximately 0.5-mile to the west of the CESF site and includes the addition of a mobile home. In addition, all permitted projects within 2.0-miles of the CESF site include manufactured and mobile home permits and/or mobile home foundations. All other proposed projects are located over 2.0-miles from the Project site. Thus, as mentioned above, no significant cumulative impacts have been identified as a result of the construction, operation, maintenance, or long-term presence of the CESF and other projects in the area. For further discussion of cumulative impacts, see section 5.18, Cumulative Impacts.

Potential cumulative impacts to SJKF caused by the construction of one solar farm in the area will include loss of habitat. Because the surrounding area is either disturbed grassland habitat or existing agricultural land uses, no disruptions to movement corridors of SJKF are expected to occur. In addition, because the CESF is located within a large area of disturbed habitat, cumulative impacts to SJKF would not cause significant adverse effects on SJKF.

4.1.2 Determination of Effect

In summary, construction and long-term operations will cause permanent loss of 640 acres of movement and foraging habitat for SJKF within the Project vicinity. In addition, 380 acres of SJKF habitat would be temporarily lost in the construction laydown area. In consideration of the aforementioned analysis, USFWS has determined the proposed Project will adversely affect the San Joaquin Kit Fox. Potential incidental take would include the harassment of an unknown number of individuals of SJKF and the potential for incidental mortality due to roadkill events.

4.2 MITIGATION/CONSERVATION MEASURES

To compensate for the potential impacts to 640 acres of SJKF-occupied agricultural lands, CESF will either purchase land suitable for kit fox and burrowing owl to be set aside as a conservation easement, or purchase 640 conservation credits, where one credit equals one acre, at a Service-approved mitigation bank that includes the CESF facility in its service area.

Standard Construction Best Management Practices would include:

1. Project-related vehicles should observe a 20-miles per hour (mph) speed limit in all project areas, except on county roads and State and Federal highways; this is particularly important at night when kit foxes are most active. To the extent possible, night-time construction should be minimized. Off-road traffic outside of designated project areas should be prohibited.

2. To prevent inadvertent entrapment of kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2 feet deep should be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured kit fox is discovered, the procedures under number 12 of this section must be followed.

3. Kit foxes are attracted to den-like structures such as pipes and may enter stored pipe becoming trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4-inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe should not be moved until the Service has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the fox has escaped.

4. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in closed containers and removed at least once a week from a construction or project site.

5. No firearms shall be allowed on the project site.

6. To prevent harassment, no pets should be permitted on project site.

7. Use of rodenticides and herbicides in project area should be restricted. This is necessary to prevent primary or secondary poisoning of kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should 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, as well as additional project-related restrictions deemed necessary by the Service. If rodent control must be conducted, zinc phosphide should be used because of proven lower risk to kit fox.

8. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a kit fox or who finds a dead, injured or entrapped individual. The representative will be identified during the employee education program. The representative's name and telephone number shall be provided to the Service.

9. An employee education program should be conducted for any project that has expected impacts to kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and agency personnel involved in the project. The program should include the following: a description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the ESA; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet

conveying this information should be prepared for distribution to the above-mentioned people and anyone else who may enter the project site.

10. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the Service should be contacted for advice.

11. Any contractor, employee, or military or agency personnel who inadvertently kills or injures a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the USFWS immediately in the case of a dead, injured or entrapped kit fox. They will contact the local warden or biologist.

12. The Sacramento Fish and Wildlife Office will be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The Service contact is the Assistant Field Supervisor of the Division of Endangered Species.

SECTION 5 PREPARERS AND REVIEWERS

URS prepared this BA for, and under direction of the USFWS. A list of the professional members on the BA team is provided below.

URS Corporation	
Patrick Mock, PhD	Senior Biologist 28 years of experience
Theresa Miller	Biologist 8 years of experience

SECTION 6 REFERENCES

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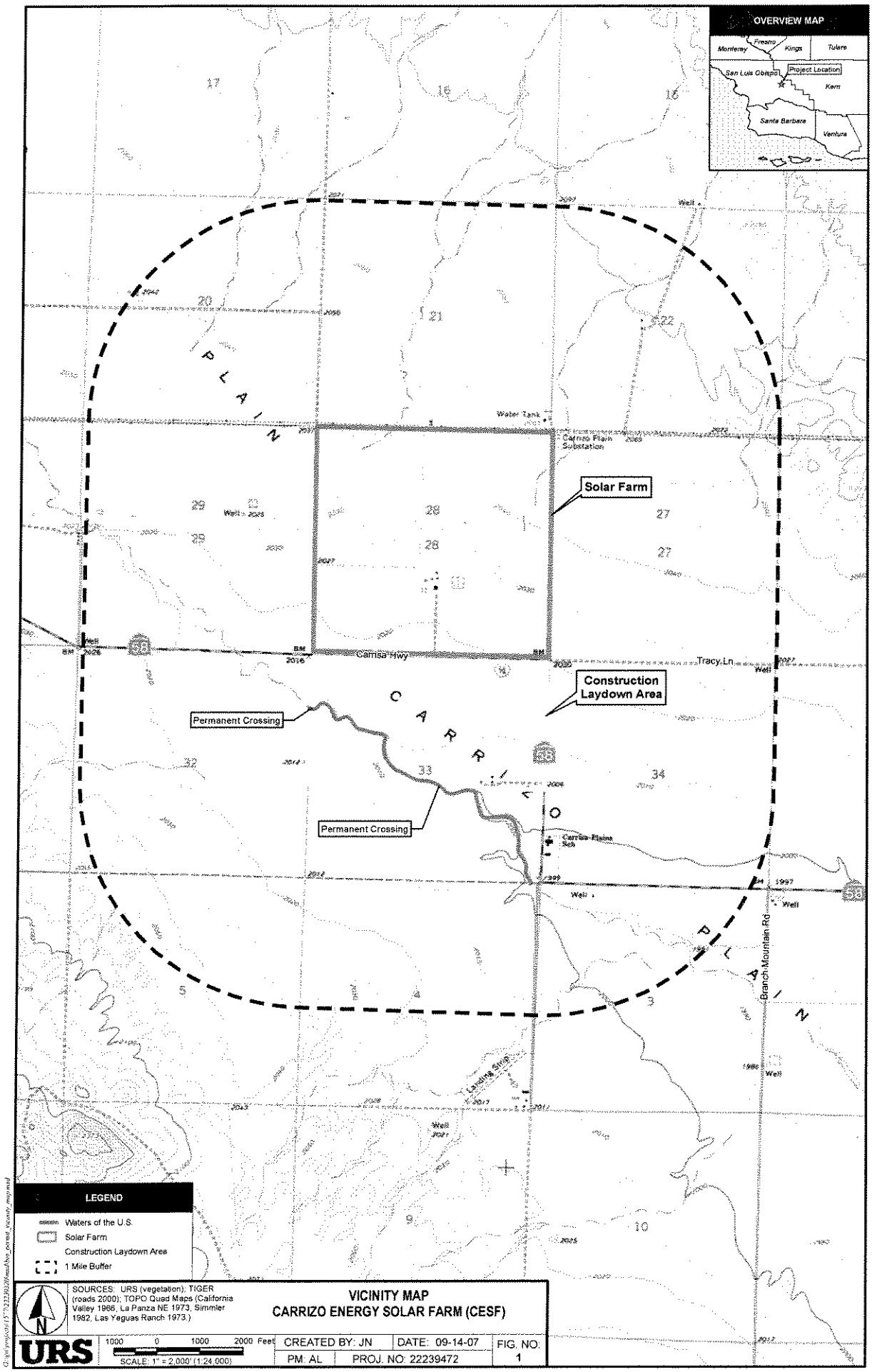
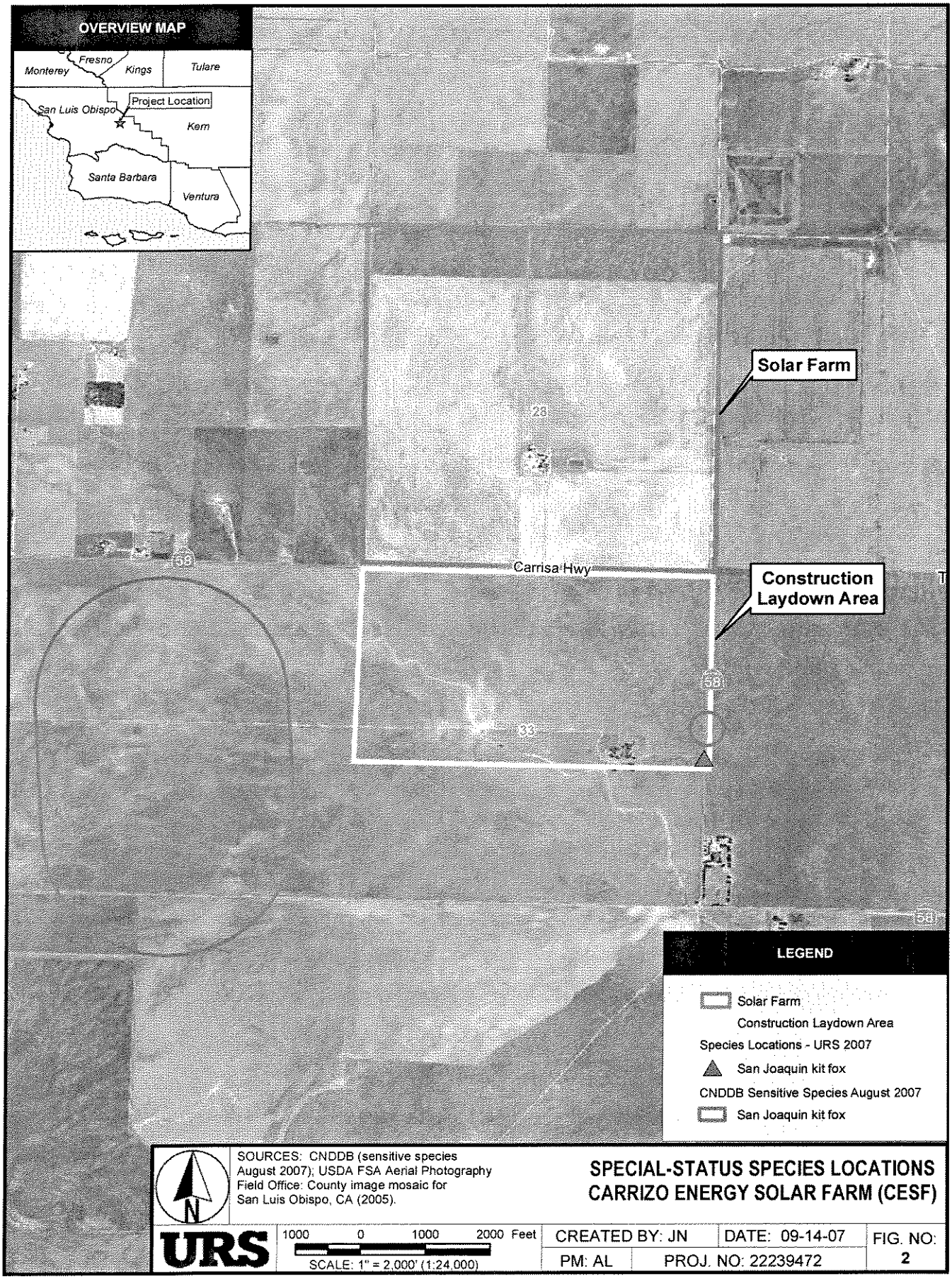

OVERVIEW MAP
Fresno
Kings
Tulare
Monterey
San Luis Obispo
Project Location
Kern
Santa Barbara
Ventura
Solar Farm
Construction Laydown Area
Permanent Crossing
Permanent Crossing
Carrizo Plain Substation
Water Tank
Camatta Hwy
Tracy Ln
Branch Mountain Rd
Landing Strip
CARRIZO PLAIN
LEGEND
Waters of the U.S.
Solar Farm
Construction Laydown Area
1 Mile Buffer
SOURCES: URS (vegetation); TIGER (roads 2000); TOPO Quad Maps (California Valley 1966, La Panza NE 1973, Simmler 1982, Las Yeguas Ranch 1973.)
VICINITY MAP
CARRIZO ENERGY SOLAR FARM (CESF)
URS
1000 0 1000 2000 Feet
SCALE: 1" = 2,000' (1:24,000)
CREATED BY: JN
DATE: 09-14-07
FIG. NO: 1
PM: AL
PROJ. NO: 22239472



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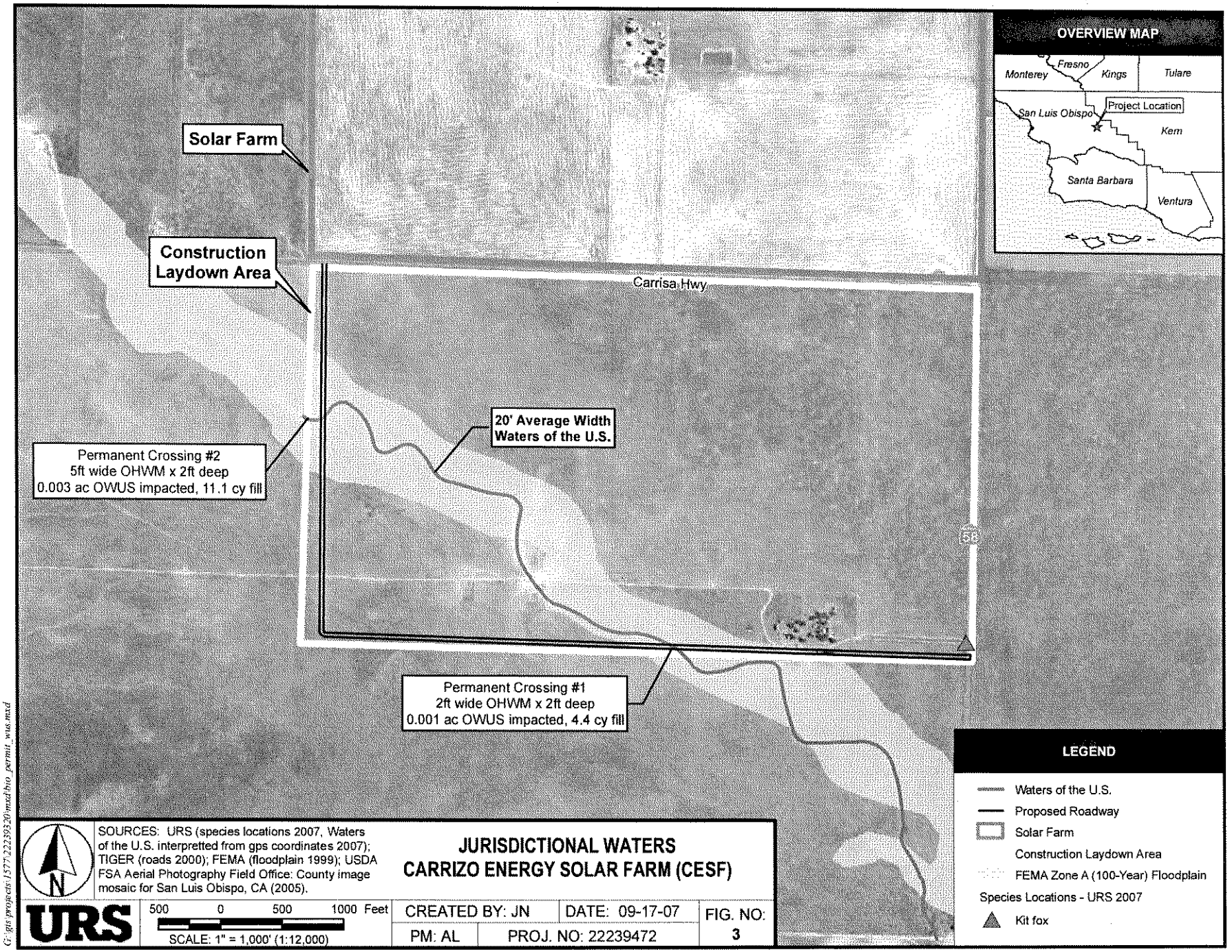

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California Department of Fish and Game
Natural Diversity Database
Selected Elements by Common Name - Portrait
ACSF Project - La Panza NE and California Valley Quads, and GIS Query Results

	Common Name/Scientific Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
1	American badger *Taxidea taxus*	AMAJF04010			G5	S4	SC
2	California condor *Gymnogyps californianus*	ABNKA03010	Endangered	Endangered	G1	S1	
3	Coulter's goldfields *Lasthenia glabrata ssp. coulteri*	PDAST5L0A1			G4T3	S2.1	1B.1
4	Hall's tarplant *Deinandra halliana*	PDAST4R0C0			G1	S1.1	1B.1
5	Indian Valley spineflower *Aristocapsa insignis*	PDPGN0U010			G2	S2.2	1B.2
6	Jared's pepper-grass *Lepidium jaredii ssp. jaredii*	PDBRA1M0G1			G1T1	S1.2	1B.2
7	Lemmon's jewelflower *Caulanthus coulteri var. lemmonii*	PDBRA0M0E0			G4T2	S2.2	1B.2
8	Lost Hills crownscale *Atriplex vallicola*	PDCHE04250			G1	S1.1	1B.2
9	Munz's tidy-tips *Layia munzii*	PDAST5N0B0			G1	S1.1	1B.2
10	Nelson's antelope squirrel *Ammospermophilus nelsoni*	AMAFB04040		Threatened	G2	S2	
11	Parish's checkerbloom *Sidalcea hickmanii ssp. parishii*	PDMAL110A3	Candidate	Rare	G3T1	S1.2	1B.2
12	San Joaquin kit fox *Vulpes macrotis mutica*	AMAJA03041	Endangered	Threatened	G4T2T3	S2S3	
13	San Joaquin pocket mouse *Perognathus inornatus inornatus*	AMAFD01061			G4T2T3	S2S3	
14	San Luis Obispo mariposa lily *Calochortus simulans*	PMLIL0D170			G2	S2.3	1B.3
15	Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	AMAFD03152	Endangered	Endangered	G3T1	S1	
16	Tulare grasshopper mouse *Onychomys torridus tularensis*	AMAFF06021			G5T1T2	S1S2	SC
17	blunt-nosed leopard lizard *Gambelia sila*	ARACF07010	Endangered	Endangered	G1	S1	
18	burrowing owl *Athene cunicularia*	ABNSB10010			G4	S2	SC
19	diamond-petaled California poppy *Eschscholzia rhombipetala*	PDPAP0A0D0			G1	S1.1	1B.1
20	dwarf calycadenia *Calycadenia villosa*	PDAST1P0B0			G2	S2.1	1B.1
21	giant kangaroo rat *Dipodomys ingens*	AMAFD03080	Endangered	Endangered	G2	S2	
22	heartscale *Atriplex cordulata*	PDCHE040B0			G2?	S2.2?	1B.2
23	pale-yellow layia *Layia heterotricha*	PDAST5N070			G1	S1.1	1B.1

	Common Name/Scientific Name	Element Code	Federal Status	State Status	GRank	SRank	CDFG or CNPS
24	pallid bat *Antrozous pallidus*	AMACC10010			G5	S3	SC
25	prairie falcon *Falco mexicanus*	ABNKD06090			G5	S3	SC
26	recurved larkspur *Delphinium recurvatum*	PDRAN0B1J0			G2	S2.2	1B.2
27	round-leaved filaree *Erodium macrophyllum*	PDGER01070			G4	S2.1	2.1
28	showy madia *Madia radiata*	PDAST650E0			G2	S2.1	1B.1
29	vernal pool fairy shrimp *Branchinecta lynchi*	ICBRA03030	Threatened		G3	S2S3	
30	western spadefoot *Spea (=Scaphiopus) hammondii*	AAABF01030			G3	S3	SC

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

Listed, Proposed, And Candidate Species Which May Occur in San Luis Obispo County

(38 Species)

Type	Common Name	Scientific Name	Status	Date Listed	CH	CH Date
Amphibian	ARROYO TOAD	Bufo microscaphus californicus	Endangered	16-Dec-94	Yes	13-Apr-05
Amphibian	CALIFORNIA RED-LEGGED FROG	Rana aurora draytonii	Threatened	23-May-96	Yes	13-Apr-06
Amphibian	CALIFORNIA TIGER SALAMANDER	Ambystoma californiense	Threatened	04-Aug-04	Yes	23-Aug-05
Bird	BALD EAGLE	Haliaeetus leucocephalus	Threatened	11-Mar-67	No	
Bird	BROWN PELICAN	Pelicanus occidentalis	Endangered	02-Jun-70	No	
Bird	CALIFORNIA CLAPPER RAIL	Rallus longirostris obsoletus	Endangered	13-Oct-70	No	
Bird	CALIFORNIA CONDOR	Gymnogyps californianus	Endangered	11-Mar-67	Yes	22-Sep-77
Bird	CALIFORNIA LEAST TERN	Sterna antillarum browni	Endangered	02-Jun-70	No	
Bird	LEAST BELL'S VIREO	Vireo bellii pusillus	Endangered	02-May-86	Yes	02-Feb-94
Bird	WESTERN SNOWY PLOVER	Charadrius alexandrinus nivosus	Threatened	05-Mar-93	Proposed	
Bird	YELLOW-BILLED CUCKOO	Coccyzus americanus	Candidate	25-Jul-01	No	
Fish	SOUTHERN CALIFORNIA STEELHEAD	Oncorhynchus mykiss	Endangered	17-Jun-98	Proposed	
Fish	TIDEWATER GOBY	Eucyclogobius newberryi	Endangered	07-Mar-94	No	
Invertebrate	LONGHORN FAIRY SHRIMP	Branchinecta longiantenna	Endangered	19-Sep-94	Yes	10-Feb-06
Invertebrate	MORRO SHOULDERBAND SNAIL	Helminthoglypta walkeriana	Endangered	15-Dec-94	Yes	07-Feb-01
Invertebrate	SMITH'S BLUE	Euphilotes enoptes	Endangered	01-Jun-	No	

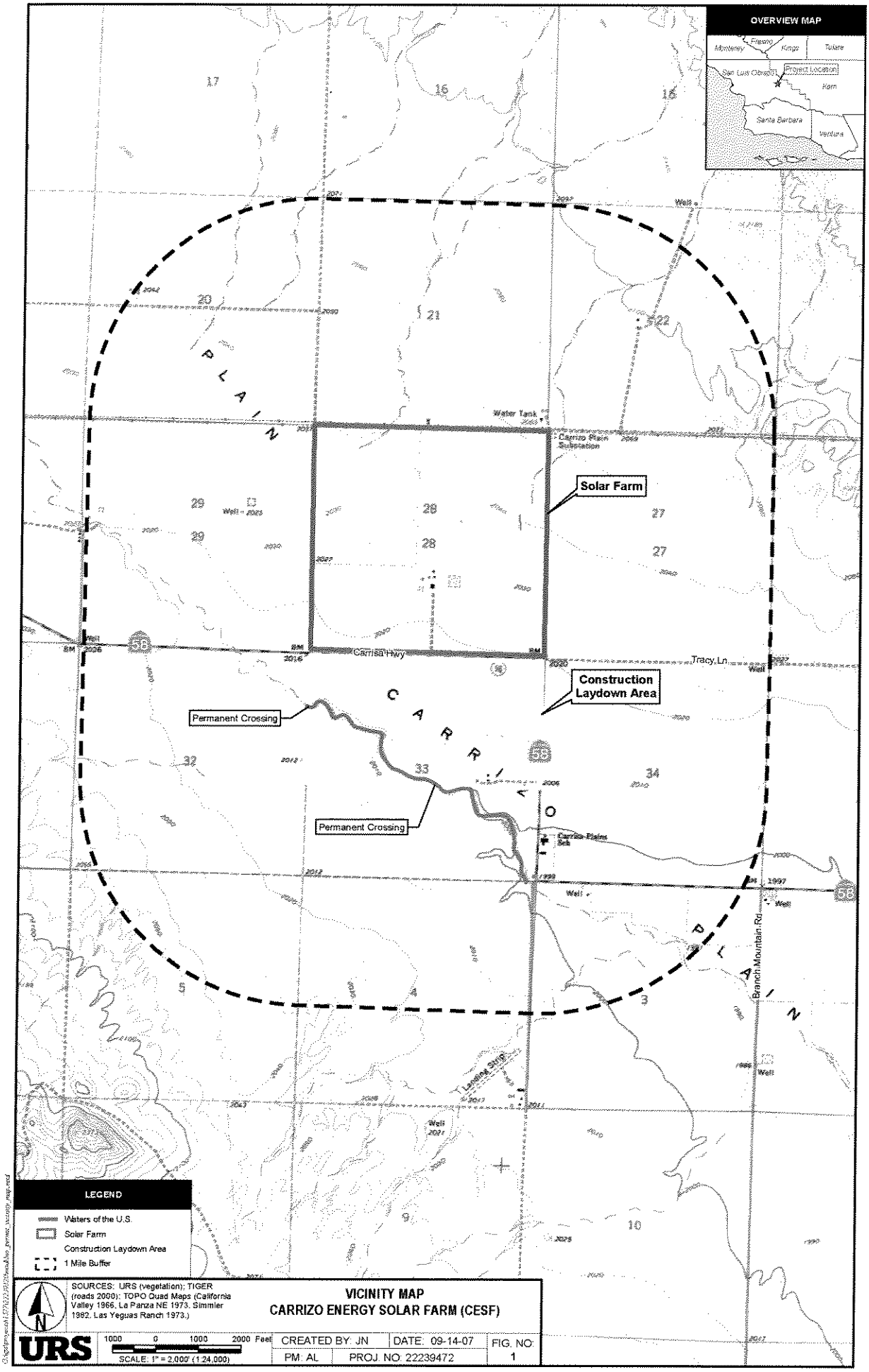
	BUTTERFLY	smithi		76		
Invertebrate	VERNAL POOL FAIRY SHRIMP	Branchinecta lynchi	Threatened	19-Sep-94	Yes	10-Feb-06
Mammal	GIANT KANGAROO RAT	Dipodomys ingens	Endangered	05-Jan-87	No	
Mammal	MORRO BAY KANGAROO RAT	Dipodomys heermanni morroensis	Endangered	13-Oct-70	Yes	11-Aug-77
Mammal	SAN JOAQUIN KIT FOX	Vulpes macrotis mutica	Endangered	11-Mar-67	No	
Mammal	SOUTHERN SEA OTTER	Enhydra lutris nereis	Threatened	14-Jan-77	No	
Plant	CALIFORNIA JEWELFLOWER	Caulanthus californicus	Endangered	19-Jul-90	No	
Plant	CALIFORNIA ORCUTT GRASS	Orcuttia californica	Endangered	03-Aug-93	No	
Plant	CALIFORNIA SEABLITE	Suaeda californica	Endangered	15-Dec-94	No	
Plant	CAMATTA CANYON AMOLE	Chlorogalum purpureum var. reductum	Threatened	20-Mar-00	Yes	24-Aug-02
Plant	CHORRO CREEK BOG THISTLE	Cirsium fontinale var. obispoense	Endangered	15-Dec-94	No	
Plant	GAMBEL'S WATERCRESS	Rorippa gambellii	Endangered	03-Aug-93	No	
Plant	INDIAN KNOB MOUNTAINBALM	Eriodictyon altissimum	Endangered	15-Dec-94	No	
Plant	LA GRACIOSA THISTLE	Cirsium loncholepis	Endangered	20-Mar-00	Yes	17-Mar-04
Plant	MARSH SANDWORT	Arenaria paludicola	Endangered	03-Aug-93	No	
Plant	MORRO MANZANITA	Arctostaphylos morroensis	Threatened	15-Dec-94	No	
Plant	NIPOMO MESA LUPINE	Lupinus nipomensis	Endangered	20-Mar-00	No	
Plant	PARISH'S CHECKERBLOOM	Sidalcea hickmanii ssp. parishii	Candidate	28-Feb-96	No	
Plant	PISMO CLARKIA	Clarkia speciosa var. immaculata	Endangered	15-Dec-94	No	
Plant	PURPLE AMOLE	Chlorogalum purpureum var. purpureum	Threatened	20-Mar-00	Yes	24-Oct-02
Plant	SALT MARSH BIRD'S-BEAK	Cordylanthus maritimus ssp.	Endangered	28-Sep-78	No	

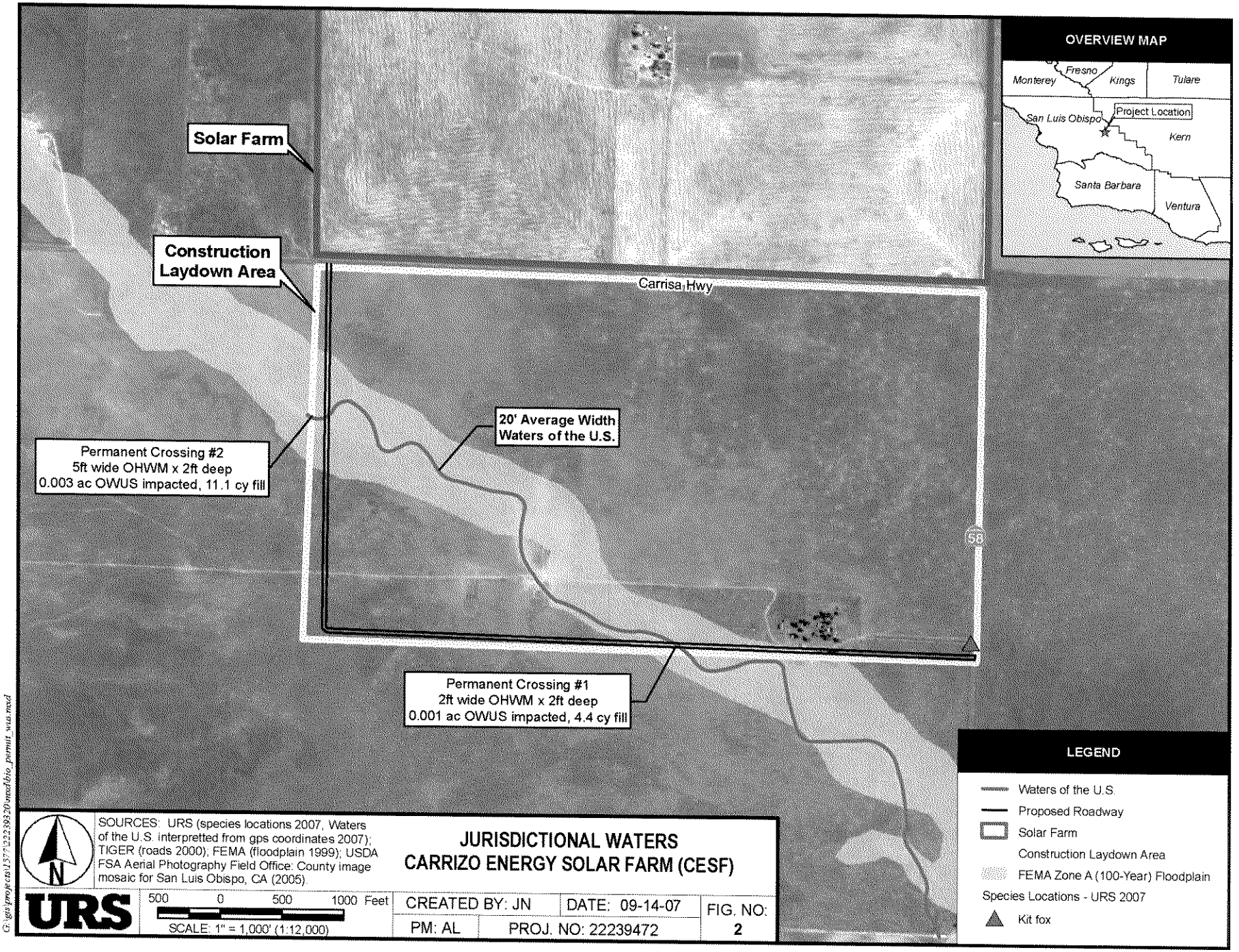
		maritimus			
Plant	SAN JOAQUIN WOOLY-THREADS	Lembertia congdonii	Endangered	19-Jul-90	No
Reptile	BLUNT-NOSED LEOPARD LIZARD	Gambelia silus	Endangered	11-Mar-67	No

DISCLAIMER NOTICE

The information provided on this page should not be considered an OFFICIAL species list. If you have a propsed project and are in need of an official speccies list, please mail a detailed request to the address listed at the top of the page.

<< Back Print


OVERVIEW MAP
Project Location
Solar Farm
Construction Laydown Area
Permanent Crossing
Permanent Crossing
Carrizo Plain
Carrizo Plain Substation
Carrizo Plains Sch
Carrisa Hwy
Tracy Ln
Water Tank
Well
Landing Strip
Branch Mountain Rd
LEGEND
Waters of the U.S.
Solar Farm
Construction Laydown Area
1 Mile Buffer
SOURCES: URS (vegetation); TIGER (roads 2000); TOPO Quad Maps (California Valley 1966, La Panza NE 1973, Simmler 1982, Las Yeguas Ranch 1973.)
1000 0 1000 2000 Feet
SCALE: 1" = 2,000' (1:24,000)
VICINITY MAP
CARRIZO ENERGY SOLAR FARM (CESF)
CREATED BY: JN
DATE: 09-14-07
FIG. NO: 1
PM: AL
PROJ. NO: 22239472


Solar Farm
Construction Laydown Area
Carrisa Hwy
20' Average Width Waters of the U.S.
Permanent Crossing #2
5ft wide OHWM x 2ft deep
0.003 ac OWUS impacted, 11.1 cy fill
Permanent Crossing #1
2ft wide OHWM x 2ft deep
0.001 ac OWUS impacted, 4.4 cy fill
58
OVERVIEW MAP
Monterey
Fresno
Kings
Tulare
San Luis Obispo
Project Location
Kern
Santa Barbara
Ventura
LEGEND
Waters of the U.S.
Proposed Roadway
Solar Farm
Construction Laydown Area
FEMA Zone A (100-Year) Floodplain
Species Locations - URS 2007
Kit fox
N
SOURCES: URS (species locations 2007, Waters of the U.S. interpretted from gps coordinates 2007); TIGER (roads 2000); FEMA (floodplain 1999); USDA FSA Aerial Photography Field Office: County image mosaic for San Luis Obispo, CA (2005).
JURISDICTIONAL WATERS
CARRIZO ENERGY SOLAR FARM (CESF)
URS
500 0 500 1000 Feet
SCALE: 1" = 1,000' (1:12,000)
CREATED BY: JN
DATE: 09-14-07
PM: AL
PROJ. NO: 22239472
FIG. NO: 2
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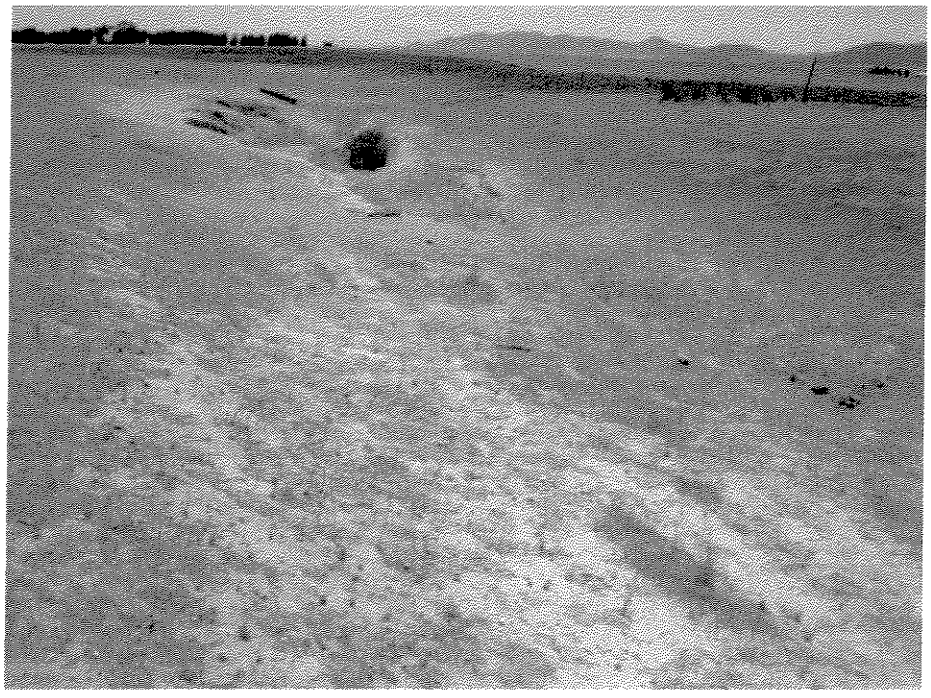
ATTACHMENT A

Photographs of Jurisdictional Waters on the CESF Laydown Site

Photograph #1

Comments:
Carrizo Energy Solar Farm Project.

Crossing #1 road/culvert installation at southern boundary of Project site in Section 3. OHWM is approximately 2 feet wide, 2 feet deep, with 14 foot wide banks.



Photograph #2

Comments:
Carrizo Energy Solar Farm Project.

View toward northwest at Crossing #1 in Laydown Area of CESF Project in Section 33.

Photograph #3

Comments:
Carrizo Energy Solar Farm Project.

View to southeast at Crossing #2 on western boundary of Section 33. OHWM is 5 feet wide, 2 feet deep, with 18 foot wide banks.

Photograph #4

Comments:
Carrizo Energy Solar Farm Project.

View to east/southeast at OWUS feature on project. OHWM at this location is 24 feet wide with 3 foot high banks.

Photograph #5

Comments:
Carrizo Energy Solar Farm Project.

View of channel as it meanders south. OWHM is approximately 2 feet wide at this location.

Photograph #6

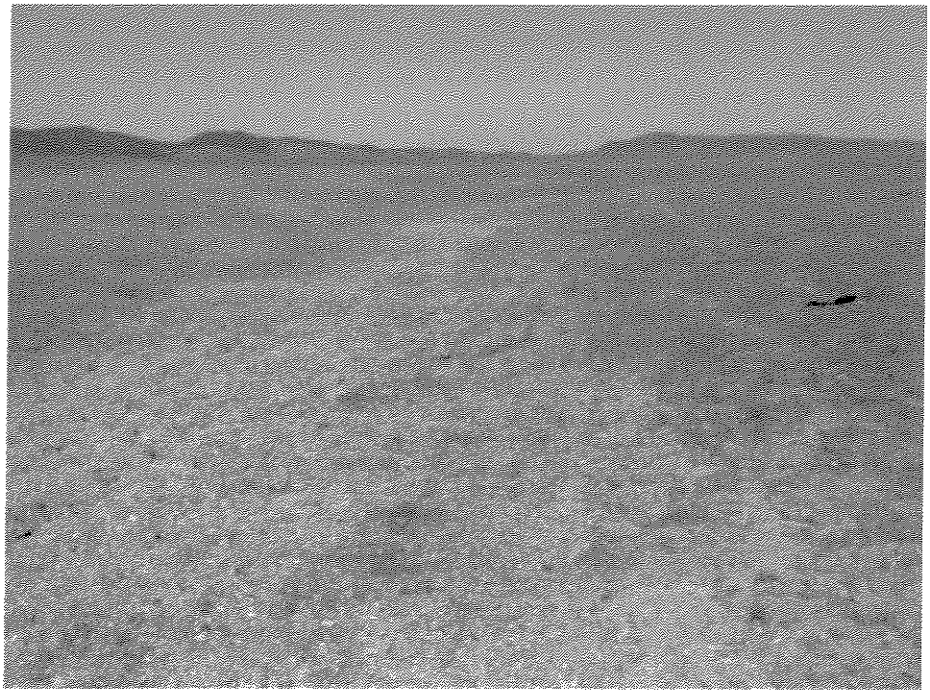
Comments:
Carrizo Energy Solar Farm Project.

Cottonwood tree (*Populus fremontii*) along channel. OHWM is 3 feet wide and bank –to bank width is approximately 18 feet.

Photograph #7

Comments:
Carrizo Energy Solar Farm Project.

Area of deeper cuts within channel. Deposition of bones and other debris apparently caused by high-energy water flows.



Photograph #8

Comments:
Carrizo Energy Solar Farm Project.

View of channel toward northwest. Note disking through channel.

Photograph #9

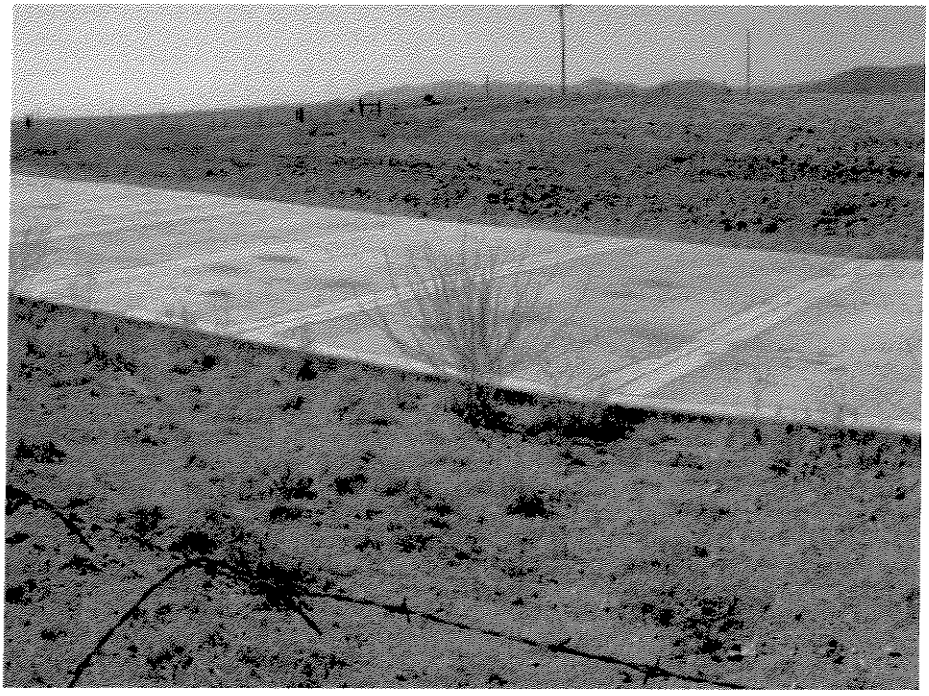
Comments:
Carrizo Energy Solar Farm Project.

Wide portion of channel with alluvial riverwash substrate and evidence of disking through channel, which likely affects the natural flow regime.

Photograph #10

Comments:
Carrizo Energy Solar Farm Project.

18-foot wide OWHM with riverwash alluvial substrate.



Photograph #11

Comments:
Carrizo Energy Solar Farm Project.

Arizona Crossing at southern end of Section 33.

EXHIBIT B

Goodwin Education Center – Carrizo Plain National Monument
VISITOR ORIGINS – by Season and Region

ORIGIN	Season 1994-1996	Season 1996-1997	Season 1997-1998	Season 1998-1999	Season 1999-2000	Season 2000-2001	Season 2001-2002	Season 2002-2003	Season 2003-2004	Season 2004-2005	Season 2005-2006	Season 2006-2007	TOTAL
Central Valley	195	101	57	87	121	41	70	102	95	93	84	96	1142
Central Coast	430	183	198	148	250	78	144	217	161	259	151	126	2345
Los Angeles	33	10	23	17	36	23	50	45	6	51	36	22	352
Southern California	149	68	64	48	101	30	7	75	73	92	81	89	877
Northern California	201	86	117	68	173	49	89	101	116	210	91	73	1374
Out of State	47	30	24	28	64	23	21	32	43	63	69	40	484
Out of Country	9	5	6	6	21	3	6	11	17	11	13	5	113

These numbers are derived from the "sign-in" sheets at the Goodwin Education Center and Painted Rock (sign-ins not required). The numbers do not represent all of the visitors that come to these areas, or to the Carrizo Plain National Monument.

Prepared 12/07 by JC

Goodwin Education Center – VISITOR COUNTS

Daily counts at the Education Center desk

	1998-99	1999-2000	200-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
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JANUARY	388		395	431	623	539	355	357	373
FEBRUARY	249		303	318	503	444	422	342	417
MARCH	367	NOT AVAILABLE	553	399	1184	902	2997	491	653
APRIL	816		1488	1099	972	939	2489	1795	793
MAY	569		344	457	385	416	364	640	
SUMMER						389	189	80	38
TOTAL	2556		3200	2968	3949	3885	7038	3820	

EXHIBIT C

Date	North Entranc	Painted Rock	South Enteranc	Elkhorn	Monthly Total	Cumulative Total
12/20/2006	571	76	894	115	1656	1656
1/31/2007	1215	259	1542	157	3173	4829
2/28/2007	1122	246	861	111	2340	7169
3/31/2007	1568	Closed	1878	169	3615	10784
4/28/2007	1952	Closed	1640	157	3749	14533
5/31/2007	1499	Closed	1528	150	3177	17710
6/29/2007	1224	Closed	1403	145	2772	20482
7/31/2007	952	95	1108	105	2260	22742
8/31/2007	1141	Broken	1659	130	2930	25672
9/29/2007	1198	305	1695	145	3343	29015
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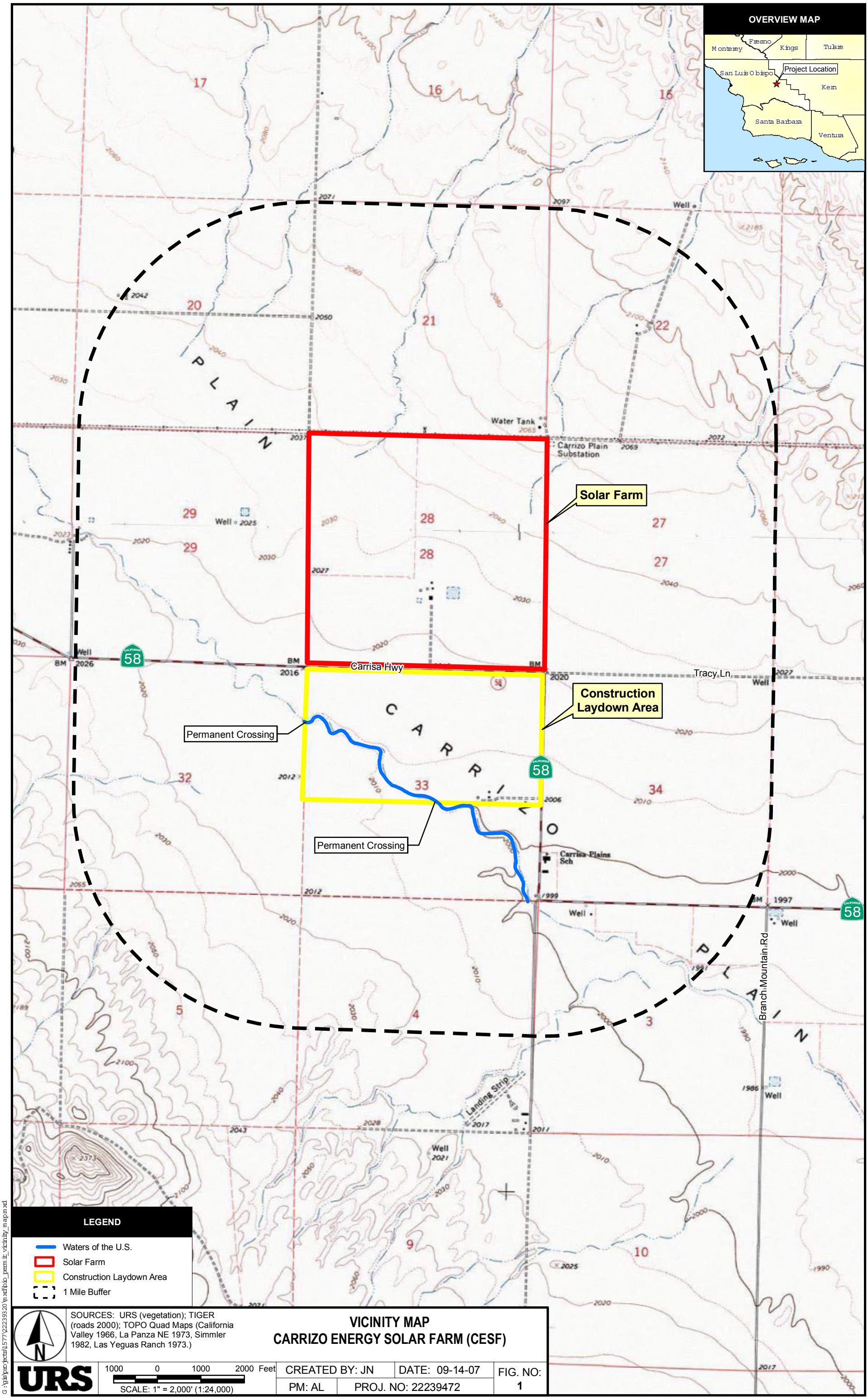
11/30/2007	1246	339	1721	206	3512	35956
12/29/2007	898	257	1059	104	2318	38274

ATTACHMENT 3

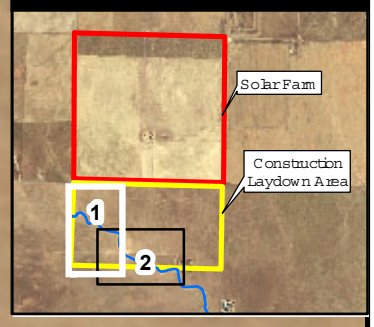
FIGURE 1 - LOCALITY MAP


OVERVIEW MAP
Monterey
Fresno
Kings
Tulare
San Luis Obispo
Project Location
Kern
Santa Barbara
Ventura
Solar Farm
Construction Laydown Area
Permanent Crossing
Permanent Crossing
Carrisa Hwy
Tracy Ln
Carrizo Plain Substation
Water Tank
Well
Carrisa Plains Sch
Landing Strip
Branch Mountain Rd
CARRIZO PLAIN
LEGEND
Waters of the U.S.
Solar Farm
Construction Laydown Area
1 Mile Buffer
SOURCES: URS (vegetation); TIGER (roads 2000); TOPO Quad Maps (California Valley 1966, La Panza NE 1973, Simmler 1982, Las Yeguas Ranch 1973.)
VICINITY MAP
CARRIZO ENERGY SOLAR FARM (CESF)
URS
1000 0 1000 2000 Feet
SCALE: 1" = 2,000' (1:24,000)
CREATED BY: JN
DATE: 09-14-07
PM: AL
PROJ. NO: 22239472
FIG. NO: 1
G:\gis\projects\1577\22239320\mxd\bio_permit_vicinity_map.mxd

ATTACHMENT 4

FIGURES 2A AND 2B - PROPOSED DELINEATION MAPS

INDEX MAP



Permanent Crossing #2
5ft wide OHWM x 2ft deep
(See Figure 4 for detail)

Point 1

Width = 5ft
Length = 2,206ft

Width = 7ft
Length = 711ft

Matchline

LEGEND

- Sample Location
- Waters of the U.S.
- Proposed Roadway
- Construction Laydown Area
- FEMA Zone A (100-Year) Floodplain

SOURCES: URS (culvert locations 2008, Waters of the U.S. interpretted from gps coordinates 2007); TIGER (roads 2000); FEMA (floodplain 1999); USDA FSA Aerial Photography Field Office: County image mosaic for San Luis Obispo, CA (2005).

PROPOSED DELINEATION MAP
MAP 1 OF 2
CARRIZO ENERGY SOLAR FARM (CESF)

URS

100 0 100 200 Feet

SCALE: 1" = 200' (1:2,400)

CREATED BY: JN	DATE: 02-29-08	FIG. NO: 2A
PM: AL	PROJ. NO: 22239472	

G:\gis\projects\t577\22239320\mxd\pio_wus_p.mxd

Width = 7ft
Length = 2,206ft

Width = 5ft
Length = 711ft

Point 2

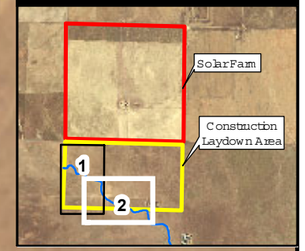
Width = 3ft
Length = 1,314ft

Width = 5ft
Length = 273ft

Permanent Crossing #1
3ft wide OHWM x 2ft deep
(See Figure 4 for detail)

Matchline

INDEX MAP



LEGEND

- Sample Location
- Waters of the U.S.
- Proposed Roadway
- Construction Laydown Area
- FEMA Zone A (100-Year) Floodplain

SOURCES: URS (culvert locations 2008, Waters of the U.S. interpretted from gps coordinates 2007); TIGER (roads 2000); FEMA (floodplain 1999); USDA FSA Aerial Photography Field Office: County image mosaic for San Luis Obispo, CA (2005).

N

URS

100 0 100 200 Feet

SCALE: 1" = 200' (1:2,400)

PROPOSED DELINEATION MAP
MAP 2 OF 2
CARRIZO ENERGY SOLAR FARM (CESF)

CREATED BY: JN	DATE: 02-29-08	FIG. NO: 2B
PM: AL	PROJ. NO: 22239472	

G:\projects\22239320\mxd\fig2_wusm.mxd

ATTACHMENT 5

FIGURE 3 - PROPOSED JURISDICTIONAL DETERMINATION ANALYSIS

LEGEND

- Culvert Location
- Stream Order
- Project Area
- County Boundary

Watershed Hydrologic Unit (HU)

- Carrizo Plain
- Estrella River
- Fellows
- Salinas
- Santa Maria
- South Valley Floor
- Temblor

OVERVIEW MAP

TEMBLOR HU

SOUTH VALLEY FLOOR HU

Kern County

San Luis Obispo County

Carrisa Hwy

ESTRELLA RIVER HU

RPW /TNW

Project Area

Carrisa Hwy

58

Santa Maria Valley Hwy

Carrizo Creek

CARRIZO PLAIN HU

McKittrick

33

SALINAS HU

SANTA MARIA HU

Soda Lake

TNW

FELLOWS HU

SOURCES: California Environmental Resources Evaluation System (hydrography 2001), TIGER (roads 2000); FEMA (watersheds April 2007); USGS Topo Quad Maps (California Valley 1966, La Panza NE 1973, Simmler 1982, Las Yeguas Ranch 1973).

PROPOSED JURISDICTIONAL DETERMINATION ANALYSIS CARRIZO ENERGY SOLAR FARM (CESF)

URS

6500 0 6500 13000 Feet

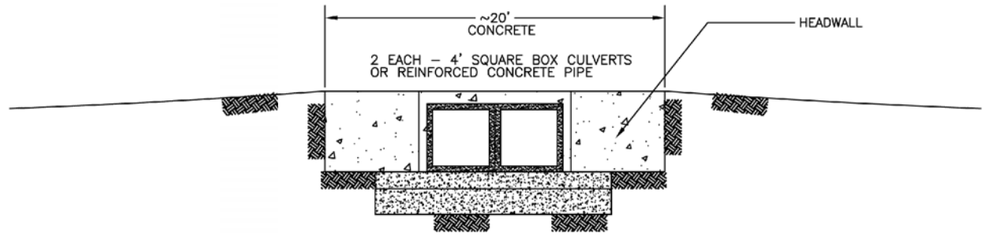
SCALE: 1" = 13,000' (1:156,000)

CREATED BY: JN	DATE: 02-29-08	FIG. NO: 3
PM: AL	PROJ. NO: 22239472	

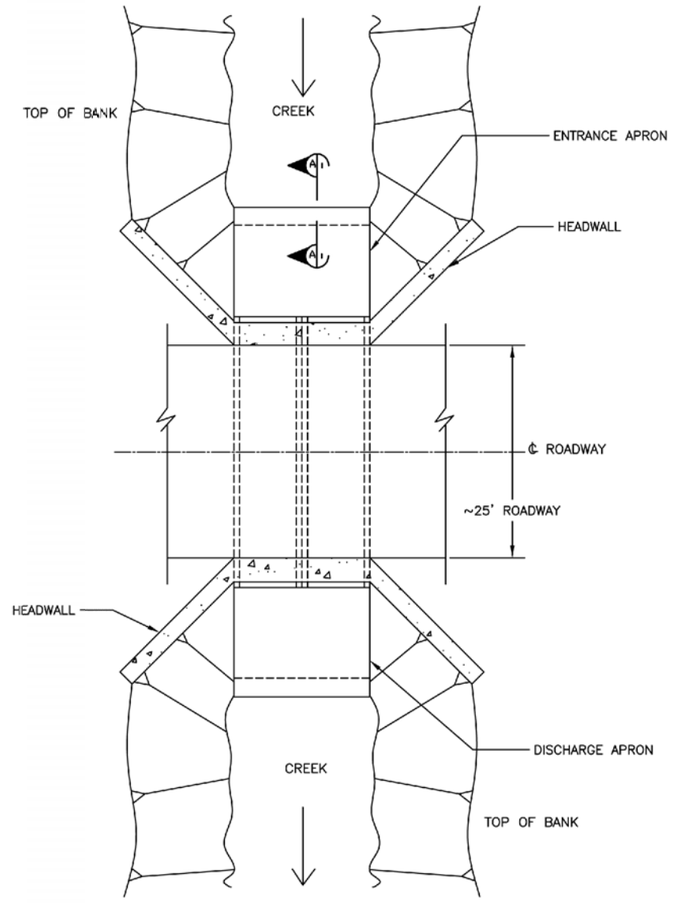
G:\gis\projects\15771\22239320\mxd\hdo_watersheds.mxd

ATTACHMENT 6

FIGURE 4 - DEVELOPMENT MAP



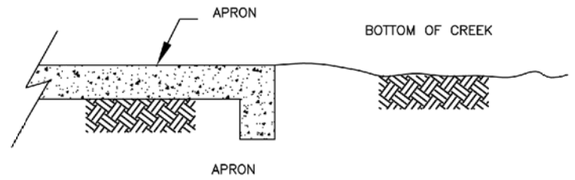
ELEVATION VIEW



PLAN VIEW

NOTE

1. CULVERT SUBGRADE BEDDING SHALL BE COMPACTED TO 90% DRY DENSITY.
2. HEADWALLS SHALL BE BROUGHT BACK AND TIED INTO THE STREAM BANK.
3. REFERENCE CORPS OF ENGINEERS PUBLICATION EM1110–3–136 AND EM1110–2–2902.



SECTION A–A

REV	DATE	DESCRIPTION	DRAWN BY	CHK'D BY	ENG'R	PROJECT ENG'R	APPR'D BY
1	02/08/08	PRELIMINARY	RK				

PATCH SERVICES
CALIFORNIA * ENGINEERING * TEXAS
333 SUNSET AVE.
SUITE: 150
SUISUN CITY, CA 94585
PHONE: 707–425–4949
FAX: 707–425–4553
1701 NORTH GREENVILLE AVE.
SUITE: 800
RICHARDSON, TX 75081
PHONE: 972–231–4060
FAX: 972–231–4059

ROADWAY CREEK CROSSING
CONSTRUCTION LAYDOWN AREA
CARRIZO ENERGY SOLAR FARM (CESF)

URS

CREATED BY: PATCH	DATE: 02-13-08	FIG. NO:
PM: AL	PROJ. NO: 22239472	4

ATTACHMENT 7

FIGURE 5 – SOIL SURVEY MAP AND SOIL TABLES

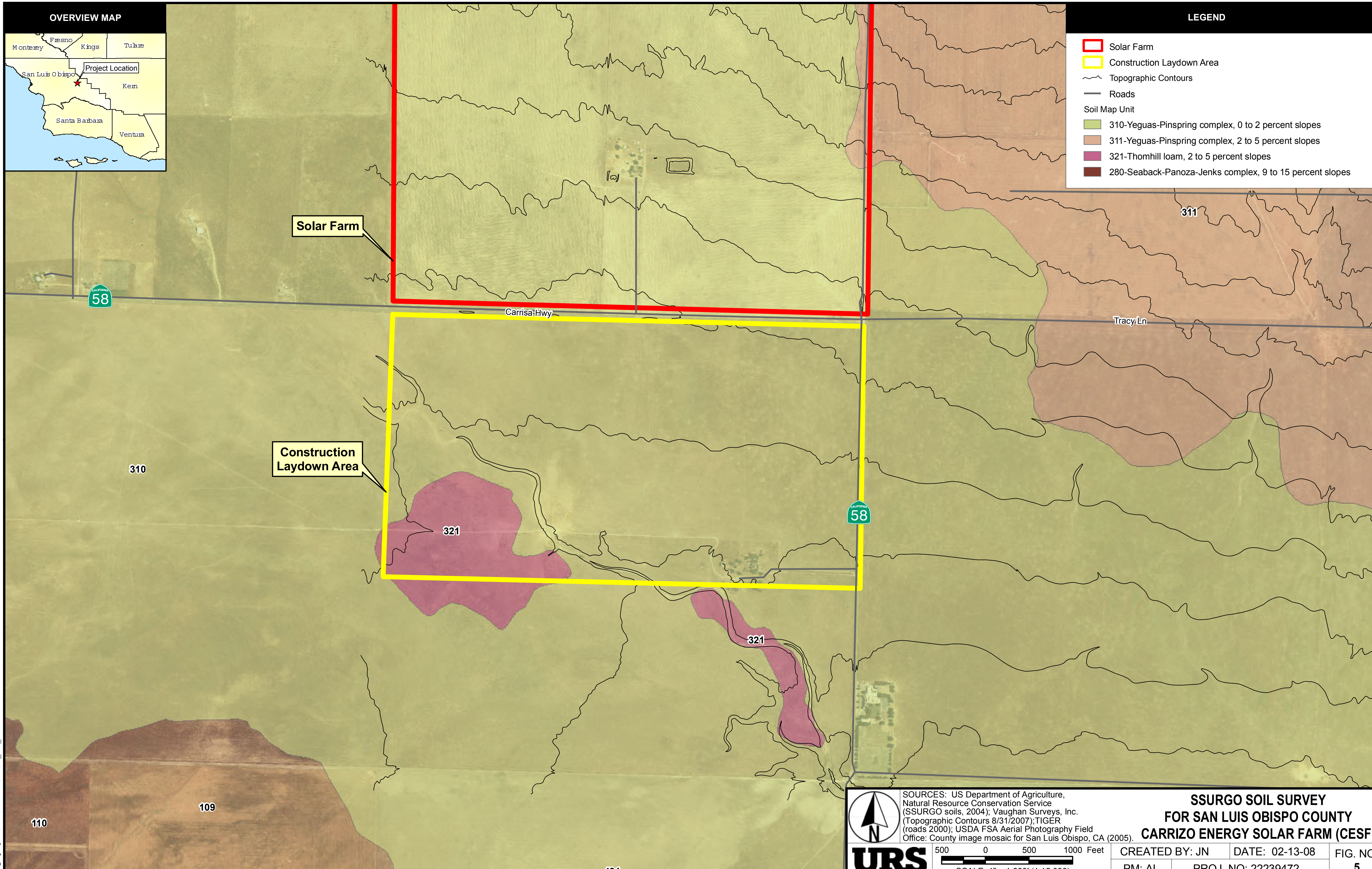

OVERVIEW MAP
Monterey
Fresno
Kings
Tulare
San Luis Obispo
Project Location
Kern
Santa Barbara
Ventura
LEGEND
Solar Farm
Construction Laydown Area
Topographic Contours
Roads
Soil Map Unit
310-Yeguas-Pinspring complex, 0 to 2 percent slopes
311-Yeguas-Pinspring complex, 2 to 5 percent slopes
321-Thornhill loam, 2 to 5 percent slopes
280-Seaback-Panoza-Jenks complex, 9 to 15 percent slopes
Solar Farm
Construction Laydown Area
58
Carrisa Hwy
Tracy Ln
311
310
321
321
58
109
110
491
SOURCES: US Department of Agriculture, Natural Resource Conservation Service (SSURGO soils, 2004); Vaughan Surveys, Inc. (Topographic Contours 8/31/2007);TIGER (roads 2000); USDA FSA Aerial Photography Field Office: County image mosaic for San Luis Obispo, CA (2005).
SSURGO SOIL SURVEY
FOR SAN LUIS OBISPO COUNTY
CARRIZO ENERGY SOLAR FARM (CESF)
URS
500 0 500 1000 Feet
SCALE: 1" = 1,000' (1:12,000)
CREATED BY: JN
DATE: 02-13-08
PM: AL
PROJ. NO: 22239472
FIG. NO:
5

Table 5.4-1
Soil Types in the Carrizo Plain Part of San Luis Obispo County
(In Proximity to CESF)

Map Unit	Detailed Map Unit Name and Description
Solar Farm Area	
310	Yeguas-Pinspring complex, 0 to 2 percent. Very deep, well drained on alluvial flats and fans.
311	Yeguas-Pinspring complex, 2 to 5 percent. Very deep, well drained on alluvial flats and fans.
Construction Laydown Area	
310	Yeguas-Pinspring complex, 0 to 2 percent. Very deep, well drained on alluvial flats and fans.
321	Thornhill loam, 2 to 5 percent. Very deep, well drained, on alluvial flats and fans.
Soils within 2 Miles of Project	
440	Bellyspring-Panoza complex, 9 to 15 percent. Moderately deep, well drained, on hills and mountains.
109	Capay clay, 0 to 2 percent. Very deep, well drained on alluvial flats and fans.
110	Capay clay, 2 to 9 percent. Very deep, well drained on alluvial flats and fans.
350	Jenks clay loam, 2 to 9 percent. Moderately deep, well drained, on hills.
134	Kilmer-Nacimiento-Aido complex, 30 to 60 percent. Moderately deep, well drained, on hills and mountains.
531	Saltos-Millsholm complex, 15 to 30 percent. Very shallow, well drained, on hills and mountains
290	San Timoteo-San Andreas-Bellyspring complex, 15 to 30 percent. Moderately deep, well drained, on hills and mountains.
291	San Timoteo-San Andreas-Bellyspring complex, 30 to 50 percent. Moderately deep, well drained, on hills and mountains.
281	Seaback-Panoza-Jenks complex, 15 to 30 percent. Shallow and moderately deep, well drained, on hills and mountains.
280	Seaback-Panoza-Jenks complex, 9 to 15 percent. Shallow and moderately deep, well drained, on hills and mountains.
490	Wasioja loam, 0 to 2 percent. Very deep, well drained, on alluvial fan remnants.
491	Wasioja-Pinspring-Yeguas complex, 2 to 5 percent. Very deep, well drained, on alluvial flats and fan remnants.

Note: USDA, NRCS, Soil Survey of San Luis Obispo County, California, Carrizo Plain Area, Issued 2003.

Table 5.4-2
Properties of Detailed Soil Map Units
Carrizo Plain Part of San Luis Obispo County
(In Proximity to CESF)

Map Unit Name	Texture[1] (USCS symbol)	Permeability[2]	Water Erosion Susceptibility[3] (Kw factor)	Wind Erodibility Group[4]	Land Capability Class[5] (N/I)
Yeguas-Pinspring complex, 0 to 2 percent (310).	Loam (CL)	Moderately slow and slow	0.37	6	4s/2s
Yeguas-Pinspring complex, 2 to 5 percent (311).	Loam (CL)	Moderately slow and slow	0.37	6	4e/2e
Thornhill loam, 2 to 5 percent (321).	Loam (CL-ML, ML)	Moderately slow	0.28	6	4e/2e
Bellyspring-Panoza complex, 9 to 15 percent (440).	Sandy Loam (SM)	Moderate and moderately slow	0.32	5	4e/---
Capay clay 0 to 2 percent (109).	Clay (CH, CL)	Slow	0.20	7	4s/2s
Ca[ay clay 2 to 9 percent (110).	Clay (CH, CL)	Slow	0.20	7	4e/2e
Jenks clay loam 2 to 9 percent (330).	Clay Loam (SM)	Moderately slow	0.20	4	4e/---
Kilmer-Nacimiento-Aido complex (134).	Loam (CL-ML, ML)	Slow and moderately slow	0.32	4	6e & 7e/ ---
Saltos-Millsholm complex 15 to 30 percent (531).	Loam (CL)	Moderately slow	0.28	5	7e/---
San Timoteo-San Andreas-Bellyspring complex 15 to 30 percent (290).	Sandy Loam (SM)	Moderately rapid	0.28	3	4e/---
San Timoteo-San Andreas-Bellyspring complex 30 to 50 percent (291).	Sandy Loam (SM)	Moderately rapid and moderately slow	0.28	3	6e/---
Seaback-Panoza-Jenks complex 15 to 30 percent (281).	Loam (CL, CL-ML)	Moderate and moderately slow.	0.28	4	7e & 4e/---
Seaback-Panoza-Jenks complex 9 to 15 percent (280).	Loam (CL, CL-ML)	Moderate and moderately slow.	0.28	4	7e & 4e/---
Waioja loam 0 to 2 percent (490).	Loam (CL, CL-ML)	Moderately slow.	0.32	5	4c/1
Wasioja-Pinspring-Yeguas complex 2 to 5 percent (497).	Loam (CL, CL-ML)	Moderately slow	0.32	5	4e/2e

Notes:
[1]Texture = USDA texture of surface layer, Unified Soil Classification System symbol in parentheses.
[2]Permeability refers to saturated hydraulic conductivity (um/sec). Values listed are for the surface horizon.
[3]Soil erodibility factor: low susceptibility range = 0.05 to 0.2; moderate = 0.25 to 0.4; high > 0.4.
[4]Wind erodibility groups range from 1 to 8 with Group 1 being the most susceptible and Group 8 not subject to wind erosion.
[5]N/I = Land Capability Classification listed for non-irrigated/irrigated; indicates no classification (not calculated) for the irrigated

condition.

ATTACHMENT 8

EXHIBIT A - PRELIMINARY OFF-SITE WATERSHED HYDROLOGY MAP

PRELIMINARY RUNOFF RATES FROM OFF-SITE WATERSHED BASINS

Basin	2-Yr Storm	5-Yr Storm	10-Yr Storm	25-Yr Storm	50-Yr Storm	100-Yr Storm	500-Yr Storm
1	61.9	308	669	1420	2340	3480	7680
2	8.29	42.5	94.7	206	340	519	1180
3	9	46.4	104	226	374	571	1300
Overall	78.7	390	846	1790	2950	4380	9630

EL.2417

L=12.9 MILES

EL.2438

EL.2500

1
38.3

L=5.8 MILES

3
5.0

2
4.5

L=6.1 MILES

EL.2040

EL.2055

SITE
1.9

EL.2014

Crossing # 2

Crossing # 1

EL.2006

LEGEND

1 / 38.3	BASIN LABEL / AREA, SQ.MI.
	WATERSHED BOUNDARY
EL.2500	ELEVATION, FT
L=12.9 MILES	FLOW LENGTH
	STREAM FLOW PATH

N

HORIZONTAL GRAPHIC SCALE

6000 3000 0 3000 6000

1 inch = 6000 feet

URS

EXHIBIT A

CESF PROJECT SITE
PRELIMINARY
EXISITING CONDITION
OFF-SITE WATERSHED
HYDROLOGIC MAP

ATTACHMENT 9

VISITOR DATA FROM THE CARRIZO PLAIN NATIONAL MONUMENT

Carrizo Plain National Monument Traffic Counts 2007

Date	North Entranc	Painted Rock	South Enteranc	Elkhorn	Monthly Total	Cumulative Total
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ATTACHMENT 10

GOODWIN EDUCATIONAL CENTER VISITOR ORIGIN REPORTS

Carrizo Plain National Monument Visitor Reports 1998-2007

Goodwin Education Center – Carrizo Plain National Monument

VISITOR ORIGINS – by Season and Region

ORIGIN	Season 1994-1996	Season 1996-1997	Season 1997-1998	Season 1998-1999	Season 1999-2000	Season 2000-2001	Season 2001-2002	Season 2002-2003	Season 2003-2004	Season 2004-2005	Season 2005-2006	Season 2006-2007	TOTAL
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Prepared 12/07 by JC

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APRIL	816		1488	1099	972	939	2489	1795	793
MAY	569		344	457	385	416	364	640	
SUMMER						389	189	80	38
TOTAL	2556		3200	2968	3949	3885	7038	3820	

ATTACHMENT 11

UCR NEWSLETTER

University of California, Riverside

No. 18, Spring 2003

Friends of the Entomology Research Museum

Newsletter

Editor: Rick Vetter Proofing Editors: G. Ballmer, D. Hawks, D. Yanega

More Entomological Quotes

"Don't that beat the bugs a-fightin'?" -
Wilbur W. (Bill) Mayhew,
UCR Professor Emeritus of
Biology

"There is only one thing worse than coming home from the lab to a sink full of dirty dishes, and that is not going to the lab at all."

Chien-Shiung Wu, physicist

The FERM Newsletter is published quarterly and contains articles written by FERM members. If you would like to submit an article, please send it as a Word/Wordperfect file using one of the following two methods: (1) an attachment via email to the editor (see below) or (2) a hard copy version on disk. Submissions will be published in the order they are received in accordance with space availability and relevancy to the FERM general readership. If you have questions please contact the FERM Newsletter editor:
Rick Vetter (vetter@citrus.ucr.edu)

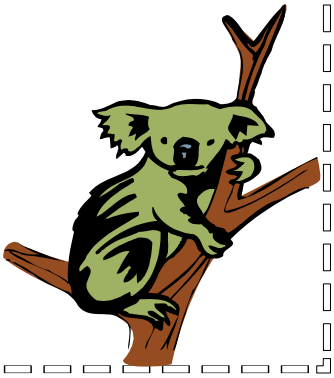
"Emu, 'Roo, and Beetles Too"

by Bryan Carey and Dave Hawks

Seven members of FERM from the UCR Entomology Department traveled in Australia and New Zealand for between three and eight weeks during November and December 2002. We all had fantastic adventures. This article is hopefully just the first of a series of Aussie bug stories for the FERM Newsletter and describes the week that Bryan Carey and Dave Hawks spent with fellow FERM members Rob Weppler and Judith Pedler who moved to Horsham (northwest of Melbourne) almost two years ago. Rob, who received his Masters degree in Entomology at UCR, now works as a plant pathologist and Judith is a soil scientist. Both are avid natural historians, and are having a great time chasing insects (especially beetles) and teaching good manners to Erasmus, their energetic and very friendly border collie. Rob and Judith also are expecting their first baby in June, so times are exciting in Australia!

Bryan, Dave, and Rob converged upon the Melbourne Airport on November 22nd. Dave flew there from Perth in Western Australia where he had been collecting with the Pinto and Heraty lab folks for the previous two weeks (a whole 'nother story!). Bryan (who many of us affectionately call "Jimmy" for reasons clear only to Mike Gates) was just arriving in Australia after his 15-hour flight from LAX. He seemed a bit dopey, but Dave and Rob didn't believe for an instant that it was from the long flight; Jimmy's always that way. After washing his hands a few times, Jimmy set out to learn which way to look for oncoming traffic and which side of Rob's truck is the passenger side (Aussies drive on the left side of the road, so everything's backwards as well as upside-down; and yes, water does swirl counter-clockwise in southern hemisphere toilets). We took off westward along the Great Ocean Highway and had

(story continued on page 5)



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Ecology of Desert Insects [Enroll through The Desert Institute: 760-367-5535]
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[Fri. 8-10 pm, Apr. 25/Sat. 9 am-5 pm, Apr. 26/Sun. 9 am-3 pm, Apr. 27]

Birds of Joshua Tree National Park [Enroll through The Desert Institute: 760-367-5535]
[Fri. 6-8 pm, Apr. 25/Sat. 7 am-4 pm, Apr. 26/Sun. 7 am-noon, Apr. 27]

Reptiles and Amphibians of Joshua Tree National Park [Enroll through The Desert Institute: 760-367-5535]
[Fri. 6-10 pm, May 2/Sat. 8 am-2 pm, 7-11 pm, May 3/Sun. 8 am-2 pm, May 4]

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[Sat. 8 am-5 pm, Apr. 26]

For current listing of courses at any time, bookmark www.unex.ucr.edu/ns/fns1/classes in your web browser.
For further information, contact: Natural Sciences UCR Extension 909.787.5804 909.787.2456 (fax)
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ATTACHMENT 12

PBS'S HUELL HOWSER'S CALIFORNIA GOLD TELEVISION SHOW

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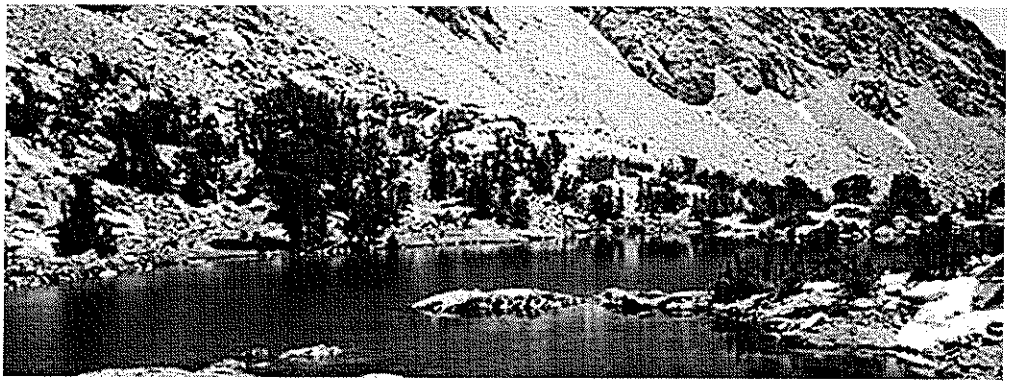
- AUGUSTUS HAWKINS
- FERN CANYON
- ASILOMAR
- FORT HUMBOLDT
- JOAQUIN MILLER
- CUYAMACA RANCHO
- IRVINE RANCH LAND...
- ALUM ROCK
- CHINA CAMP
- BUFANO PEACE STATU...
- PIO PICO
- TARANTULAS
- JOHN MUIR HOME
- YUBA GOLD FIELD
- JOSHUA TREE
- **CARRIZO PLAIN**
- BIDWELL
- COLUMBIA DIGGINS



California's Golden Parks

California's Golden Parks #132 - CARRIZO PLAIN

The Carrizo Plain is a southerly extension of the San Juan Valley, about 20 miles southwest of Bakersfield. Its 250,000 acres allow visitors to imagine what much of California was like 300 years ago. Huell learns about its rare plants and animals, as well as its human history.

Contact:
Bureau of Land Management
Bakersfield Office
661-391-6000
www.ca.blm.gov

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ATTACHMENT 13

BIKE TOURS DEDICATED TO SODA LAKE

Bakersfield
- Programs
- Information
- Resources

Hiking and Bicycling

California

**Birding/Ethics/Hiking & Biking/
Horseback Riding/ Hunting/Tours/ Wildflowers**

Hiking:
There are **four established hiking trails** on the Carrizo Plain National Monument : Soda Lake trail and boardwalk, Wallace Creek, Painted Rock and the Caliente Ridge trail.

The **Soda Lake trail** is a short level trail approximately 1/4 mile long that begins at Soda Lake Road, across from Overlook Hill, and takes visitors to the edge of Soda Lake. Soda Lake is dry much of the year but during the wet season, you may see wildflowers, fairy shrimp, sandhill cranes, avocets, stilts and other shore or aquatic birds. Throughout the remainder of the year, visitors may view one of California´s last remaining alkali wetlands with its unique and rare plant community of very salt tolerant plants. Soda Lake is a massive expanse of alkali and mud with a beauty all its own. The newly constructed boardwalk begins at the edge of Soda Lake and allows visitors to view the Lake up close while protecting sensitive habitat. It is nearly one-half mile in length. Benches are available for sitting. Construction of the boardwalk was completed in the spring of 2001 primarily by a number of the California Youth Authority with help from volunteers and a local Bakersfield boy scout troop. The actual boardwalk is made out of recycled milk cartons. Restroom facilities and parking are available at the Overlook. Please do not drive to the Lake.

The **Wallace Creek trail**, on Elkhorn Road, takes visitors up a slight incline for approximately 2/10 mile to view the famous offset creek bed along the San Andreas Fault. Information and parking are available at the site but there are no facilities. Check back for more information on this trail. We are in the process of creating an interpretive trail explaining the wonders of the San Andreas Fault.

Painted Rock trail is approximately 2/3 mile of gently sloping trail. Parking and facilities are available at the trail head which leads to the sacred site of Chumash rock art. Please note that special restrictions may apply as to the accessibility of this trail.

The fourth trail takes the hiker on a moderate hike through the beautiful **Caliente Ridge** providing incredible views of much of the Carrizo Plain National Monument and parts of the Cuyama Valley. There is a parking area at the trail head; limited facilities are available below at the Selby Camping Area at the bottom of the mountains west of Soda Lake Road.

Biking:
Biking in the Carrizo Plain National Monument is a great way to see many of its hidden beauties while getting in a good workout! Keep in mind that much of the CPNM is sensitive habitat, therefore *bicycles are allowed on existing roads only*. Livestock trails are not considered roads and are closed to bicycle use.

Be aware that winter rains make roads very slick and impassable within the Monument. During these times access to most trails will not be available.

Last updated: 04-27-2007

Carrizo Plain Loop

Preview: The Carrizo Plain is a long narrow valley with Soda Lake Road running the length of it. To the east is the Elkhorn Plain at the base of the Temblor Range, separated from the Carizzo Plain by the low Panorama Hills and farther south by the Elkhorn Hills. The Elkhorn Road runs the length of this very narrow and parallel plain. Elkhorn Plain is higher than the Carrizo Plain and from several places among the road you can see out across the Carrizo Plain, especially on the northern half. These roads are not connected by cross roads except near each end, making for a long ride.

Related information:

- CA: Southern California Mountain Biking
- CA: Southern California Trails
- Mountain Biking Trails
- Ojai CA: Southern California Trails
- Ojai CA: Southern California Mountain Peaks & Summits
- Best Mountain Biking in CA: Southern California
- Best CA: Southern California Trails
- Best Mountain Biking Trails
- Mountain Biking Southern California's Best 100 Trails Guide Book
- San Luis Obispo County Visitors & Conference Bureau 805-541-8000`
- USGS Reward, McKittrick Summit, Simmler, Panorama Hills, Painted Rock, Chimineas Ranch
- Carrizo Plain Loop Topo Map
- Carrizo Plain Loop Trail Reports
- Ojai City Guide
- Ojai CA: Southern California Hotels & Motels
- Ojai CA: Southern California Vacation Rentals
- San Luis Obispo County Mountain Biking
- California Central Coast Mountain Biking

Related Words: mountain biking, mtn, mtb, mt biking, trails for bikes, bike trails, ride, rides, biker
Common Misspellings: moutain bike, trial, trials

Mountain Bike San Luis Obispo County

Where have you gone lately?

Entries Tagged as 'Carrizo Plain'

Caliente Mountain / Soda Lake

(R.T. rolls down a trail surrounded by wild flowers near the Carrizo Plain on the Caliente Ridge Trail).

This ride is terrific in the spring, especially when you can time the wild flowers correctly. Make sure to call the Carrizo Plain National Monument before the long drive out. Please check to see if the trail is open to riders as it has been known to be closed from time to time.

If you don't mind the driving to and from, this is one of the best seasonal rides in the county. It can get extremely hot in the summer, so riding in the spring or late fall is recommended.

Take highway 58 out of Santa Margarita for 45 miles. After passing Soda Lake, turn right onto a dirt

road marked "access to public land." Follow the road for just under 4 miles to the Selby Cow Camp. Hang a left to the Selby parking lot. Definitely refer to the guide book (Fat Tire Fun) before trying this ride as it can be fairly difficult to locate. You can also access this trail from highway 166.

From the parking lot, climb straight up for 4 miles until you reach the upper Caliente Ridge Parking Lot. From here you can ride the fire roads that comb the spine of the ridge. Wild flowers are abundant in the spring from all sides. From the top you can look down to highway 166, and glance the vast valley and the Caliente Mountain Range.

You can make a long drop down from here with a long climb back up, or stay on top for a scenic ride. There is no legal access to highway 166 as the link between the Caliente Ridge Trail and the Caliente Mountain Trail is on private property.

There is also a network of roads that ride around the strange, but scenic, Soda Lake. You'll want to park at the Soda Lake overlook for this one. Don't forget to check out the Chumash Cave Paintings near the visitors center while you're in the area. Antelope are easy to find on the plains, too.

This is a wonderful place to ride, and to spend the day when you're done. Bring a lunch and plenty of water.

Tags: Carrizo Plain by JG
No Comments »

- **Rides**
  - Central County Rides
    - *Cabrillo Peaks
    - *Cerro San Luis
    - *East Cuesta Grade
    - *Irish Hills
    - *Montana De Oro
    - *Morning Glory
    - *Poly Canyon
    - *Prefumo Canyon
    - *Shooters
    - *West Cuesta Ridge
  - North County Rides
    - Blinn Ranch
    - Cerro Alto
    - Cypress Mountain
    - Fernandez Trail
    - Kiler Canyon
    - Pine Mountain Road
    - Rinconada
    - Rocky Canyon
    - Santa Rita Road
  - South County Rides
    - *Lopez Lake
    - Adobe Trail
    - Carrizo Plain

- Hi Mountain
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  - Open Air Cycles
  - So. Cal Trail Site
- **Guide Books**
  - Best 100 Trails Central Coast
  - Fat Tire Fun Guide Book
  - SLO Trail Guide
- **Links**
  - Brainscramble.com
  - Mountain Bike Video Game
  - Neighborhood Produce Exchange
  - NuttyShtuff.com
  - Pozo Saloon
- **Parks**
  - Carrizo National Monument
  - Irish Hills Info
  - Lopez Lake Park
  - Los Padres Ranger Service
  - Montana De Oro State Park
-

ATTACHMENT 14

BLM SODA LAKE TRAIL INFORMATION

This view from Overlook Hill shows Soda Lake and the Temblor Range in the distance. In the foreground is a park boardwalk constructed to protect the sensative saltbush habitat that borders the lakebed.

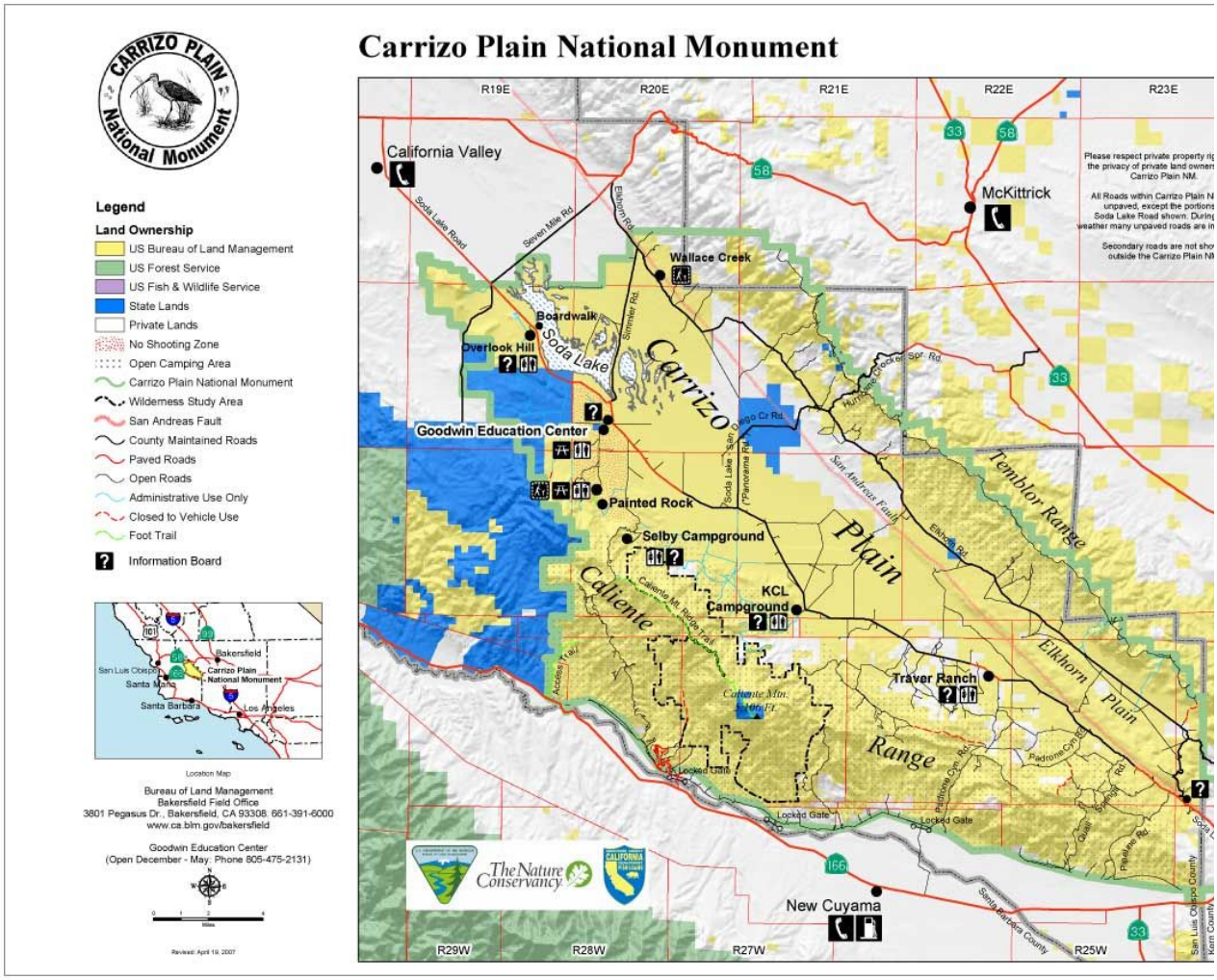
Soda Dry Lake is a playa (an ephemeral lake) at about 1,908 feet in elevation. The lakebed receives water during wet winters and rare late summer monsoon storms. The modern saltpan covers about 3,000 acres and is one of the largest undisturbed alkali wetlands in California.

Rainfall in the Carrizo Plain averages about 8 inches per year (but is significantly greater in the surrounding high country). Rainwater that collects of the playa becomes temporary home to fairy and brine shrimp and supports migratory and nesting birds.

Next Image Return to Main Page

Visitor Resources Map - Carrizo Plain National Monument

"Open camping is defined as areas open to car camping that are outside of the two designated campgrounds (see picnic tables on map). All camping must be self-contained and everything packed in must be packed out. Camp sites may be away from the road but vehicles are not allowed off road. All open campfires are required to have camp fire permits."



PDF map for your printer. 2.1 mb pdf (High Quality 300dpi 11"x17"**)**

Shaded Relief map of the Carrizo Plain National Monument.

Carrizo Home

Last updated:
04-27-2007

ATTACHMENT 15

GOOGLE SEARCH OF PHOTOGRAPHS OF SODA LAKE

Site Map	EastTennesseeWildflowers.com	Photos for Purchase
Index of Wildflowers (Common Names)	Index of Wildflowers (Scientific Names)	Index of Other Organisms
Teacher Resource Page	Videos	Classroom Presentations
Search All Galleries	Recent Search Requests	Site Usage Statistics
My Google Maps Wildflowers At A Glance	Google Search Search EastTennesseeWildflowers.com	Ads by Google Desert Cactus Desert Plants Sonora Desert California

Kris' Email Address: klight10@comcast.net

View Album

(Click thumbnail to enlarge image)

California - Spring 2007 Part I - Desert Week

169 images in this album [slideshow] [login]

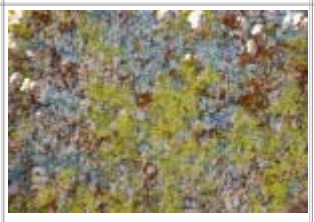
Image Number	Image (Click to Enlarge)	Caption	Image Viewed
1		This is what 2025 miles in 2 weeks looks like! In March 2007 Kenny and I took advantage of my Spring Break from school and went out to southern California in hopes of seeing hundreds of different kinds of wildflowers. Little did we know when we made our airline reservations in December that this winter was the driest since the 1920's! Oh well, I guess you can't win all of them! Despite the wildfires and drought, I found around 140 different wildflowers, 90 or so were new to me. If it had been a year like 2005, I would have at least doubled those numbers! I guess that means we'll have to plan another trip in the future! We flew into Ontario and spent 3 days in the Palm Springs area. While there, we went to Joshua Tree NP 2 days and visited the Salton Sea. On our longest	65 times.

		driving day, we went from Palm Springs over the mountains to see Big Bear Lake (also because we like to avoid the interstate as much as possible) and then on to the oil town of Taft. While in Taft we went into the mountains twice and spent one day in Carrizo Plains. Our next leg of the trip took us over another mountain range to Ventura and the coast. We enjoyed 3 full days of the beautiful beaches, shore birds, tide pools and a wild windstorm. Our last segment was to return to Ontario where we took side trips to San Diego and Los Angeles. This trip finished our goal of visiting all 4 corners of the continental US!	
2		We drove into Palm Springs at night so we didn't know about the Wind Farm until the next morning. We were amazed at the huge turbines that filled the valley and continued up the mountainsides. When I got out of the car to take this picture the wind nearly knocked me down, so these are well-placed! This wind farm can generate about 3.7 million kilowatt-hours of electricity each year, enough power to San Francisco.	**47 times.**
3		Bob Hope's house (the large one on the left) in the Palm Springs area is an interesting looking home.	**58 times.**
4		**Thick Yerba Santa** *Eriodictyon crassifolium* Palm Springs, CA March 18, 2007 I spotted this wildflower when we stopped on the road up to the Palm Springs Tram.	**82 times.**
5		**Sacred Datura** *Datura stramonium*	**50 times.**
6		**Cresotebush** *Larrea tridentata* Palm Springs, CA March 18, 2007 This is a very common shrub in the desert southwest.	**42 times.**
7		I went to the Living Desert Museum in Palm Desert with our friends, Steve and Nancy on the first day of the trip. The museum has animals and plants from desert areas all over the world. This little **Desert Kit Fox** (*Vulpes macrotis arsipus*) was photographed in the southwest US deserts exhibit. These small foxes	**85 times.**

		have very large ears, light-colored fur and they live underground during the day to help them survive the desert heat. The large ears have many blood vessels which help dissipate the body heat to keep the foxes cool. Kenny later saw one of these little foxes during an early morning walk in Taft, it lived in a stormwater drain.	
8		These Cacti were photographed at the shop at the Living Desert Museum. There was a fantastic selection of cacti and succulents of all shapes, colors and sizes available for purchase. Xeriscaping, landscaping with drought-tolerant, desert plants, is an earth-friendly practice. I was amazed at how much water-guzzling green grass we saw in the desert towns, sprinklers are kept quite busy at night! Even more disturbing to me was the number of golf courses in the Palm Springs area; golf courses have to have grass, grass has to have lots of water! To me, golf courses and deserts are not a good combination.	**64 times.**
9		**Claret Cup Cactus** Echinocereus triglochidiatus I cheated on this photo, I took it at the greenhouse at the Living Desert Museum. This is a cactus that I would love to see blooming in the wild!	**91 times.**
10		**Agave** It is interesting how the leaves have the pattern of the other leaves imbedded into them.	**54 times.**
11		The staff of the Living Desert Museum presented a show with desert animals including this threatened native parrot. Many animals are losing their habitats to increasing development of new neighborhoods, roads and shopping areas.	**33 times.**
12		Fortunately, this was the only **Cougar** (Puma concolor) we saw on the trip, it was safely viewed in the Living Desert exhibit. Cougars are part of the southwest desert ecosystem, so it is possible to come across one on a hike.	**41 times.**
13		This large **Desert Tortoise** (Gopherus agassizii) is one of the stars of the show at the Living Desert Museum. The Desert Tortoise is the State Reptile of California. These animals are federally listed as a Threatened Species, thus they are protected from	**59 times.**

		collection and harassment by people. However, their desert habitat is threatened by development for new neighborhoods, shopping areas and roads. The young tortoises are eaten by coyotes, ravens, gila mosters, kit foxes, and roadrunners.	
14		**Mexican Gray Wolf** (El Lobo) *Canis lupus baileyi* Living Desert Museum - Palm Desert, CA The Mexican Gray Wolf is a subspecies of the Gray Wolf and is the only one found in the southwestern deserts. These beautiful animals were once common in the Sonoran and Chihuahuan deserts and were found from central Mexico to western Texas, southern New Mexico and central Arizona. They were eliminated from the wild by the 1950's because they preyed on livestock. A captive breeding program is now being used to try and re-introduce some wolves into the Apache and Gila National Forests of of Arizona and New Mexico. I hope it succeeds, these are beautiful animals!	**52 times.**
15		**Collared Peccary; Javelina** *Peccary angulatus* Living Desert Museum - Palm Desert, CA	**60 times.**
16		**Roadrunner** *Geococcyx californianus* Living Desert Museum March 18, 2007 This Roadrunner was caught in the aviary at the Living Desert Museum. It lived up to its name by running back and forth in an attempt to escape. We saw these birds in the wild too, often crossing a road! And no, they didn't go, "Beep, beep!" :) Roadrunners eat lizards and snakes.	**56 times.**
17		The white patches on this cactus are **Cochineal insects** (*Dactylopius coccus*). I was glad the sign at the Living Desert Museum explained what they were, I probably wouldn't have noticed them otherwise. These insects produce carminic acid to protect themselves from being eaten by other insects. This acid is used to make a bright red dye. Once I was reading the label of a well-known "all natural" juice drink (after I had just finished drinking it!) when I spotted the word "Cochineal" in the ingredient list. After I got over the surprise of having bug-related "food coloring" in my strawberry drink, I decided it was probably better than ingesting an artificial red dye! :)	**48 times.**
18		**Century Plant flowers** *Agave* spp. / Century Plant Family (some botanists put	**45 times.**

		it in the Lily Family) Century plants don't really live for 100 years, they may flower after 10 years or so. However, many of them die after blooming and setting seed. It is common to see the dried stalks of these plants rising like skinny skeletons on desert hillsides.	
19		**Desert Marigold** *Baileya multiradiata* Palm Desert, CA March 18, 2007 These plants were growing at the Living Desert Museum. In a good rain year, I would have seen it in the "real desert"!	**28 times.**
20		**Bladderpod bush** *Isomeris arborea* / Caper Family Palm Springs, CA March 18, 2007 This is a very common plant in the Mojave Desert. It is easy to identify because of the distinct seed pods. The leaves have a very unpleasant odor similar to rancid cheese when crushed. Many desert plants have a bad smell to help them avoid being eaten by hungry animals!	**58 times.**
21		Close-up of **Bladderpod** *Isomeris arborea* / Caper Family Palm Springs, CA March 18, 2007	**72 times.**
22		**Joshua Tree National Park** has an incredibly diverse landscape with its bizarre giant yuccas, cactus, smooth granite boulders and 2 deserts. Unfortunately, the park had received less than 1 inch of rain in the past year, so I didn't see as many wildflowers as I'd hoped. map...	**46 times.**
23		The **49 Palms trail** was an interesting hike to a fascinating oasis in the northern part of Joshua Tree National Park. It was hot and dry, it is important to take lots of water on a hike like this. I always feel like the moisture is being pulled from my body when I'm in the desert!	**28 times.**
24		These large Feldspar crystals are common in the rocks at Joshua Tree NP. The ancient history of the park can be read in these rocks. Large crystals in igneous rock indicates that it cooled slowly underground. The area under the park was a huge	**52 times.**

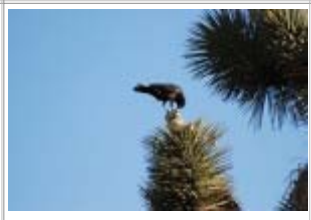
		batholith, a lava dome that cooled beneath the surface. Over the eons the surface rock and soil eroded away leaving the granite behind.	
25		**Desert Mistletoe** Phoradendron californicum Joshua Tree NP March 20, 2007 There are 3 or 4 species of mistletoe in southern California, each type lives on a specific type of tree. Mistletoe is a parasitic plant that grows on living trees, obtaining water and nutrients from the branches.	**65 times.**
26		We saw many Barrel cactus plants like this one as we walked to the 49 Palms Oasis in Joshua Tree NP. The red spines provided some of the only color along that dry trail.	**43 times.**
27		Multi-colored Lichen grows on many of the rocks in the park. Lichens help break down rocks by slowly releasing acids. Lichens are not plants, they are symbiotic organisms made up of fungi and algae. The fungal cells give the lichen its shape holds water; the algae give it color and produce sugars through photosynthesis.	**50 times.**
28		**49 Palms Oasis** is located in the northern section of Joshua Tree National Park. It is a 1-1/2 mile (one-way) hike from the parking lot to the oasis. The water is clear and cold, quite a contrast to the hot, dry, dusty desert that surrounds it. It was interesting to learn that the oasis is an indicator of a geological fault. When groundwater meets the fault it is forced up to the surface. map...	**44 times.**
29		**Washington Palms; Desert Fan Palm** Washingtonia filifera Joshua Tree NP It is amazing to find these huge palm trees growing in the middle of a ravine in a desert mountainside!	**40 times.**
30		**Chuckwalla** Sauromalus obesus obesus There were 2 of these large lizards basking in the sun on the rocks next to the 49 Palms Oasis. Males can grow up to 18" in length. Despite the scary look of	**42 times.**

		these lizards, they are herbivores, or plant eaters. They especially like to eat the flowers of the Brittlebush. (next photo)	
31		**Brittlebush** *Encelia farinosa* Palm Springs, Ca March 18, 2007 This was a familiar "old friend" that I had seen 2 years ago during my spring trip to Arizona.	**51 times.**
32		Brittlebush-leaves are covered in little hairs to protect them from the intense desert sun.	**40 times.**
33		**Cactus Wren** *Campylorhynchus brunneicapillus* This large wren was photographed at the Visitor Center at Joshua Tree National Park. It was collecting nesting material which explains the feather in its mouth.	**44 times.**
34		**Desert cottontail** *Sylvilagus auduboni* We enjoyed watching this little rabbit as it munched on the plants at the Joshua Tree National Park Visitor Center. These animals are quite secretive since they are preyed upon by coyotes, cougars, eagles, owls, snakes and hawks. Rabbits have large ears to help pick up on the sound of predators.	**37 times.**
35		**Chuparosa** *Justicia californica* Joshua Tree National Park March 20, 2007 This bright red flower is a favorite nectar source for hummingbirds.	**40 times.**
36		**Desert Canterbury Bells** *Phacelia campanularia vasiformis* Joshua Tree National Park March 20, 2007 This plant got a little bit of help at the park visitor center, it got some irrigation. I actually missed seeing	**69 times.**

		it the first day, it was hiding behind a larger plant.	
37		**Mojave Yucca plant** Yucca schidigera Joshua Tree National Park March 20, 2007	**61 times.**
38		**Mojave Yucca flowers** Yucca schidigera Joshua Tree NP March 19, 2007 These flowers are pollinated by one insect, the Mojave Yucca moth (Tegeticula yuccasella). The moth and the plant are dependent on one another for survival, a relationship called mutualism.	**42 times.**
39		**Yucca threads** were used by the Native Americans for threads, baskets, and other objects.	**29 times.**
40		Kenny and I enjoyed watching the ants that had made this huge nest in Joshua Tree NP. We were amazed to see a group of small spiders attack and kill the ants. We laughed after watching and photographing them for 20 minutes that it doesn't take much to entertain us! :)	**45 times.**
41		This female Spider is eating an ant that she killed in the nest. We were surprised that there were several spiders, males and females, killing and eating the ants. I used my 4+ diopter adapter on my camera and my small tripod to take this picture. Photos like this make me better appreciate professional nature photographers!	**35 times.**
42		**Nolina** Nolina parryi Joshua Tree NP March 20, 2007 These are the dead flower heads from last year's bloom. Nolina is a type of yucca.	**41 times.**
43		**Mexican Mormon Tea** plant Ephedra trifurca / Joint-Fir Family Joshua Tree National Park	**65 times.**

		March 20, 2007	
44		**Mormon Tea** close-up *Ephedra trifurca* / Joint-Fir Family	**37 times.**
45		**Mexican Mormon Tea** close-up *Ephedra trifurca* Joshua Tree National Park March 20, 2007	**41 times.**
46		**mystery shrub** Joshua Tree National Park March 20, 2007	**46 times.**
47		One of the little cactus that we saw at Joshua Tree NP.	**50 times.**
48		**Mojave Antelope bush** *Purshia tridentata glandulosa* Joshua Tree National Park March 20, 2007 This was the only flower of this plant that I saw, but it counts! :)	**73 times.**
49		**Beavertail cactus** *Opuntia basilaris* / Cactus Family Joshua Tree NP March 20, 2007 Unfortunately, we didn't get to see the hot pink flowers that this cactus would have later in the season. This is an unusual cactus, the pads are very wrinkled looking.	**47 times.**

50		**Jojoba; Goatnut** *Simmondsia chinensis*/ Simmondsiaceae (Jojoba Family) Joshua Tree National Park March 19, 2007 This is a common non-native shrub found in southwestern deserts. The oil from the seeds of this plant has been used in shampoo.	**72 times.**
51		**Split Rock** is a popular side trip at Joshua Tree National Park. It is amazing to see this huge boulder with a crack all the way through it.	**26 times.**
52		This wash would be full of water during a flashflood. That was not much of a threat while we were there though, we had about 15 drops of rain that day before the clouds fizzled.	**48 times.**
53		In some areas of the park the granite has metamorphosed into gneiss shown by the layers in this rock.	**48 times.**
54		**Desert Alyssum** *Lepidium fremontii* Joshua Tree National Park March 20, 2007	**82 times.**
55		Joshua Trees grow quite tall, up to 40 feet!	**37 times.**
56		**Joshua Tree flowers** *Yucca brevifolia* / Agavaceae (Agave Family) Joshua Tree National Park March 19, 2007 These "trees" are not really trees at all, they are large yuccas. The early Mormon settlers thought they looked like the prophet Joshua raising his arms to heaven as they crossed the desert. Joshua Trees grow only in the "high" desert. The park has 2 deserts, the higher Mojave and the lower Colorado. Each	**72 times.**

		desert has its own unique plants.	
57		**Joshua Tree flowers** close-up *Yucca brevifolia* The petals of the Joshua Tree flowers don't completely open. Like other yuccas, the Joshua Tree flowers are pollinated by only one insect, the Yucca moth. The plant and the moth have a *symbiotic relationship (mutualism)*, both are dependent on the other for survival.	**31 times.**
58		A dead Joshua Tree trunk Joshua Trees are a type of Yucca, not an actual tree with wood. This was the trunk of a dead plant.	**47 times.**
59		Parts of Joshua Tree NP burned in the summer of 2006. It was sad to see the blackened plants.	**51 times.**
60		**Smoketree** *Psorothamnus spinosus* Joshua Tree NP March 20, 2007 In a good rain year, this shrub would have been full of bright purple pea-type flowers. It gets its common name from the silvery, smoky appearance of the thorny stems.	**55 times.**
61		**Raven** *Corvus corax* These intelligent birds are fun to watch. They are larger than crows. This raven was pulling the flowerheads of a Joshua tree sending the flowers flying! I assume the raven was hunting for yucca moths or their larvae.	**42 times.**
62		The Cholla forest was an interesting, but formidable area to hike through. This type of cactus is notorious for breaking off and sticking into animals or people unfortunate enough to have a "close encounter" with it!	**39 times.**
63		Ken and Kris on the Cholla forest trail Photo by a bystander	**49 times.**

64		**Brandegea** Brandegea bigelbvii/ Gourd Family Joshua Tree NP March 20, 2007 This plant was a bit of a challenge to identify for a while. I found it growing along the Cholla Forest trail.	**69 times.**
65		**Pencil Cholla** Opuntia ramosissima Joshua Tree NP March 20, 2007 Like the other chollas, the Pencil Cholla has long, wicked spines. It gets its name from the thin stems.	**34 times.**
66		**cholla**	**40 times.**
67		**Silver Cholla** close-up Opuntia echinocarpa / Cactus Family A park visitor got a little too close to one of these cacti on the Cholla Garden, a mistake he regretted! Since cacti store water in their stems, they have to protect themselves from being eaten by thirsty animals. Not many animals can get through this arsenal of spines!	**42 times.**
68		The woody skeleton of a dead Cholla has lots of holes.	**45 times.**
69		**Climbing Milkweed** Sarcostemma cyanchoides / Milkweed Family Joshua Tree NP March 20, 2007 I was excited to find these plants growing in the Cholla Garden. They can grow so thickly that they can smother plants they grow on (sort of like a "desert kudzu").	**66 times.**
70		**Scarlet Globemallow; Desert Mallow** Sphaeralcea ambigua / Mallow Family Joshua Tree NP	**40 times.**

		March 20, 2007 This is a very common desert wildflower, I've seen it in Arizona, Utah and California.	
71		This packrat midden is a formidable fortress for a small rodent. The packrat gathers pieces of broken cholla cactus segments and places them around the entrance of its burrow, discouraging predators such as coyotes and snakes.	**57 times.**
72		A close-up of a packrat midden. Note the colored threads that the rat has used as "decoration"!	**48 times.**
73		**Cheesebush** *Hymenoclea salsola* Palm Springs, CA March 18, 2007 I had read in one of my wildflower books that this plant gets its' name from the odor of the crushed leaves. Sure enough, when I crushed a leaf between my fingers, I smelled an odor similar to a strong Cheddar cheese! These plants are *monoecious*, meaning they have separate male and female flowers. Can you see the two different kinds of flowers?	**72 times.**
74		**Desert Stink Beetle** *Eleodes* sp. This beetle was eating a dead Joshua Tree flower on the side of the road when I found it. A few years ago on a trip to New Mexico my husband found out the hard way what these beetles do if harassed. It sprayed a nasty-smelling liquid on him. That's where the name "stink beetle" comes from! The beetles practically do a headstand to warn off potential predators, squirting the smelling liquid is a last resort.	**54 times.**
75		**Thick-leaved Ground Cherry** *Physalis crassifolia* / Nightshade Family Joshua Tree National Park March 20, 2007 I found this plant growing next to a rock in a wash (dry river bed). Considering the fact that the park had less than an inch of rain in over a year, I felt lucky to find this wildflower.	**64 times.**
76		**Ocotillo** *Fouquieria splendens* / Candlewood Family The red flowers of this interesting desert plant are a	**38 times.**

		favorite of hummingbirds. (see next photo)	
77		**Ocotillo flowers** *Fouquieria splendens*	**50 times.**
78		I was surprised to see this Ocotillo stem with leaves, normally it is leafless in drought conditions.	**36 times.**
79		The light-colored rock in the lower mountains in the center of the photo is an *alluvial fan*. This formation is made up of rock that has eroded and washed down from the mountains. The Ocotillo thrives in the outwash of these fans.	**38 times.**
80		**Granite** is an igneous rock that is common in southern California. This type of rock is made of 3 or 4 different minerals - quartz, feldspar, and horneblende (some kinds of granite contain mica). Granite cooled slowly underground giving the rock large crystals.	**48 times.**
81		"Take only pictures and leave only footprints." I always think of those words when I see a sight like this.	**41 times.**
82		Skull Rock is a bizarre rock formation in Joshua Tree NP. It can be easily reached from the road.	**34 times.**
83		This large Granite boulder contains a vein of feldspar.	**33 times.**

			
84		It is a shame that no place is immune to the idiocy of vandalism! This granite boulder in Joshua Tree NP had been defaced by some spraypaint-wielding moron who selfishly ruined the view for all who followed him (or perhaps her). Taggers remind me of male dogs and cats, they also "spray" to mark their territory!	**45 times.**
85		Rock climbing is a popular sport in Joshua Tree NP. We would have seen a lot more climbers if we had been there on a weekend instead of on Monday and Tuesday. This fellow was practicing traverses on the side of a boulder.	**38 times.**
86		A **Date Palm plantation** near the Salton Sea. There are several species of dates planted in the area. I just had to try a date milk shake after being told about them.	**32 times.**
87		Dates are the fruits of the date palms.	**37 times.**
88		The Salton Sea is beautiful on the surface, but the highly saline (salty) water is the color of coffee and it smells terrible! Amazingly, sea birds overwinter here by the thousands! It is located south of Joshua Tree NP and I-10.	**52 times.**
89		I saw these **American White Pelicans** (Pelecanus erythrorhynchos) on a jetty in the Salton Sea.	**50 times.**
90		The Salton Sea's beach is made up of not sand, but pink barnacle shells! Not exactly the best place to walk barefoot on the beach. This place is really weird! map...	**39 times.**

			
91		Salton Sea "sand" and dead fish on the beach	**45 times.**
92		**Salt Heliotrope** *Heliotropium curassavicum* Salton Sea March 20, 2007 I got a kick out of how these flowers formed the shape of "TN"! :)	**51 times.**
93		**Tamarix; Salt Cedar** *Tamarix** spp. Salton Sea March 20, 2007 This plant is a weedy non-native shrub that grows along riverbanks, creeks and lakes.	**75 times.**
94		**Alkali heath** (*Frankenia salina*) is one of the few plants that can grow near the shores of the Salton Sea.	**39 times.**
95		**Orange flower** There were lots of orange groves near the Salton Sea; their sweet, fragrant aroma was literally a breath of fresh air after enduring the unpleasant smells of the water!	**32 times.**
96		**Palo Verde tree bark** *Cercidium floridum* Living Desert Museum March 18, 2007 *Palo Verde* means "green stick" in Spanish. The twigs and bark of these trees are green. The bark often grows in interesting patterns. Some desert plants are able to photosynthesize through their green bark since they lose their leaves during drought conditions.	**38 times.**

97		**Palo Verde flowers** Cercidum floridum Indio, CA March 20, 2007 We finally found these flowers blooming along an exit of I-10. It is so frustrating to see something blooming in a place that I can't stop! So when these were seen in a safe spot, we pulled off to give me a chance to take this photo.	**71 times.**
98		**Castor Bean flowers** Ricinus communis*/ Euphorbia Family I took this photo from the car window with a telephoto lens at a pull out on the highway going up to Big Bear Lake because it was pouring down rain (the only rain we saw on the 2 week trip). Castor bean plants are quite common in southern California. The fruits are the source of the deadly poison, ricin, so this would not be a good plant to have growing where children would have easy access to it. Castor bean plants are non-native. The flowers are monoecious. It is easy to see the red pistillate flowers at the top of the flower stalk and the opening yellow staminate flowers below.	**82 times.**
99		Sometimes you have to do a doubletake when you see the "trees" in southern California, this isn't a tree at all, it is a well disguised Cell phone tower! I had seen another one near the Salton Sea that was a date palm. What a good idea to make those eyesores look a bit more pleasing! This day was the only day during our 2 week trip that we had a big rain.	**39 times.**
100		On our longest day of driving (10 hours) we drove from Palm Springs to Taft via Big Bear Lake. It was quite a contrast to go from hot, dry desert to torrential rain, near-freezing temperatures, and even sleet and snow at the higher elevations in just a couple of hours!	**41 times.**
101		Big Bear Lake is a welcome respite from the heat, crowds and traffic of the Los Angeles area. There are ski resorts up in the mountains.	**49 times.**
102		My dreams of seeing orange and purple fields of poppies and Owl Clover were immediately dashed when we approached the **Antelope Valley Poppy Preserve**! There was only ONE kind of flower blooming there, a type of cream-colored locoweed. In a good rain year this would have been carpeted in	**54 times.**

		wildflowers!	
103		**Grapevine Hill** in Gorman was one of the redeeming moments of the trip. This was more like what I had hoped to see !	**62 times.**
104		**California Poppy and Hilltop Dasies** This wasn't the masses of poppies that I had hoped to see, but I was happy to see a few like these.	**47 times.**
105		**Hilltop Daisy** close-up *Monolopia lanceolata* Gorman, CA March 22, 2007 These pretty gold flowers carpeted the Grapevine Hill. Along with the orange California Poppies, blue Lupines and Globe Gilia, and other flowers scattered on the hillside, they made for a beautiful sight.	**62 times.**
106		Kris on Grapevine Hill. I was in my element here! :)	**43 times.**
107		**Slender Volcanic Gilia** *Gilia ochroleuca exilis* Gorman, CA March 22, 2007 I had discovered this plant the day before when we stopped along the road in Gorman just before getting onto I-5 to go to Taft. Gilias are pretty little flowers.	**72 times.**
108		**Globe Gilia plant** *Gilia capitata abrontanifolia* Gorman, CA March 22, 2007 I found this pretty flower on the day that we went on a hunt for wildflowers.	**55 times.**
109		**Globe gilia** plant *Gilia capitata abrontanifolia* Gorman, CA March 22, 2007	**45 times.**

		This was growing on Grapevine Hill along with the Hillside Daisies.	
110		**Comet Blazing Star** *Mentzelia pectinata* Gorman, CA March 22, 2007 I found this flower blooming in a small wash below Grapevine Hill, but I couldn't figure out what it was; the other Blazing Stars that I have seen in Colorado and Utah were much larger. I finally identified it when I found it in a wildflower book. I took 2 books with me and bought 4 more. Like I said, you can never have enough wildflower ID books! No wonder I am nearly always within just a couple of pounds below the 50-pound baggage limit!	**85 times.**
111		This sign north of Gorman indicates the steep grade of Interstate 5. A few minutes later we saw a truck that had to use the runaway truck ramp. These ramps go off the highway up a steep incline, if the brakes fail, truck drivers can steer the trucks into the loose gravel to stop safely. See next photo.	**52 times.**
112		Truck on I-5 runaway truck ramp. This photo was taken at 70 mph as we passed, so it is a bit blurry! Fortunately, the driver and the truck were not hurt.	**44 times.**
113		We came across this damaged Tangerine crop on the highway going into Taft. There were thousands of tangerines on the ground. A hard freeze in February caused a tremendous amount of damage.	**41 times.**
114		This was a nice view of the fields in the rolling hillsides south of Taft.	**42 times.**
115		We were surprised to see thousands of oilwells in and around the town of **Taft**. The valley and hillsides in the area are dotted with these pumps. The smell of raw crude oil is strong near the pumps. Much of southern California is located over a large oil field, it even goes out beyond the shore beneath the ocean floor.	**46 times.**

116		The **Taft Oil Museum Derrick** is one of the first landmarks seen when you drive into town. These large derricks once dotted the landscape around the area. The Oil Museum had displays of the history of the town beginning with the Native Americans. The early people used the oil and tar that seeped from the ground as glue and for waterproofing materials.	**44 times.**
117		We finally found out what those large wooden "wheels" were that we saw all over Taft when we saw them in the reconstructed Derrick at the Oil Museum.	**42 times.**
118		An old truck at the Taft Oil Museum.	**36 times.**
119		This canvas tent/cabin at the Taft Oil Museum is a reconstruction of the homes where the workers of the early 1930's lived. The following photo shows the inside of the cabin.	**31 times.**
120		The inside of a tent/cabin at the Taft Oil Museum. This photo shows about half the cabin.	**23 times.**
121		**Bush Lupine** Lupinus spp. / Pea Family March 22, 2007 I found this beautiful lupine blooming in a field on our "escape from the desert" drive in the mountains south of Taft. The following photo is a close-up of the flowers.	**50 times.**
122		Close-up of Bush Lupine Notice how the flowers change color after having been pollinated.	**53 times.**

123		Lupines and distant mountains	**48 times.**
124		**Mystery Flower #1** Carrizo Plain March 23, 2007 I found this flower blooming in the trail to the Soda Lake.	**48 times.**
125		**Fiddleneck** Amsinckia spp. / Borage Family Taft, CA March 22, 2007 There are many different species of Fiddlenecks, I'll have to work on this one. It is a very common plant in southern CA.	**39 times.**
126		**Fiddleneck** Amsinckia spp. March 24, 2007 I found this larger type of Fiddleneck blooming in the Kern River gorge on Highway 178. This one has a red dot in each tube-shaped flower.	**31 times.**
127		**Red-stemmed Filaree** Erodium cicutarium */ Geranium Family Redlands, CA March 21, 2007 This is a very non-native common weed seen just about everywhere in southern California.	**66 times.**
128		**Miniature Lupine** Lupine bicolor Gorman, CA March 22, 2007 This tiny Lupine was blooming on Grapevine Hill. That single hill was a treasure trove of flowers!	**58 times.**
129		**Horehound** Marrubium vulgare*/ Mint Family Highway 58 (going to Carrizo Plain) March 23, 2007 This butterfly was sipping nectar from the little white flowers along the side of the highway. Horehound is a common non-native wildflower in California.	**68 times.**

130		As we drove up Hwy. 33 to Carrizo Plain we made several stops to enjoy the countryside. Much of the land in that area is grazed by cattle. This twisted Barbed wire caught my attention at one stop. Sometimes I enjoy taking photos just for the artistic value!	**52 times.**
131		I found this strange lime-green Lichen growing on the north side of a fence post in the mountains above Taft.	**27 times.**
132		Lomatium	**46 times.**
133		**Baby Blue-eyes** (spotted variety) Nemophila menziesii/ Waterleaf Family Mountains near Taft, CA March 22, 2007 We escaped into the mountains one day, I just couldn't take any more brown, dead grass and sand; I needed a "green fix"! As we drove out of the valley near Taft, we began to see rolling fields of green grass and a few flowers. We stopped to look at some bush lupine and goldenbush. As we were walking back to the car, a small patch of blue on the other side of the road caught my eye. It was this single plant of Baby Blue-eyes, one of my "target plants"! This subspecies has tiny black dots on the white part of the petals, another subspecies does not.	**69 times.**
134		Lupine	**42 times.**
135		**Western Meadow Lark** Sturnella neglecta Carrizo Plain, CA March 23, 2007 We enjoyed seeing and hearing these beautiful birds as we drove the backroads of southern California.	**55 times.**

		Sadly, we rarely see the eastern cousin of this bird in Tennessee anymore.	
136		**Mistletoe flowers**	**39 times.**
137		**Pronghorn "Antelope"** *Antibcapra americana* Carrizo Plain March 23, 2007 We were excited to see this lone male Pronghorn grazing on Carrizo Plain. Later we saw a small herd of females in a field.	**36 times.**
138		**Rattlesnake** I found this young rattlesnake warming itself on the road as I walked back to photograph a wildflower. It had flattened itself on the warm pavement as much as possible. Fortunately, this was not a very busy highway! Rattlesnakes are deaf, they sense their environment by smelling with their forked tongue, sight, feeling vibrations on the ground, and detecting heat through the pits in their face. They eat small rodents. 6.3.spi.2, 6.3.tpi.3	**51 times.**
139		Close-up of rattlesnake	**61 times.**
140		Soda on the surface of Soda Lake in Carrizo Plain.	**38 times.**
141		**Soda Lake** in Carrizo Plain formed around 10,000 years ago when a tectonic shift cut off its outlet. Soda-containing sediments from the nearby mountains have settled in the basin forming the lake (when there is water in it!). map...	**28 times.**

142		A Soda "devil" on Soda Lake. These small swirling cyclones formed over the hot, dry lake bed, pulling white soda high into the air.	**32 times.**
143		Sparrow at Carrizo Plain There was a whole flock of these birds eating flies that were on the flowers of the shrubs.	**44 times.**
144		**Spiny Saltbush** *Atriplex spinifera* Carrizo Plain, CA March 23, 2007 This was one of the few plants that was able to grow on the banks of the Soda lake. It had long spines with small leaves and flowers.	**70 times.**
145		**Tidy Tips** *Layia platyglossa* / Aster Family Carrizo Plain March 23, 2007 These were some of the few flowers that we saw in the park. Tidy Tips are well-named, the ends of the ray flowers (petals) are pure white.	**67 times.**
146		We enjoyed this lovely view in the hills of the **Tremblor Range**. The mountain range gets its name from the earthquakes from the nearby San Andreas Fault.	**46 times.**
147		I finally got a chance to stand on the **San Andreas Fault** when we went to Carrizo Plain, I am pointing to the 2 different tectonic plates. The rise on the left side of the picture is the North American Plate, on the right side is the Pacific Plate. A marker sign in the parking area stated that if a person stood there for 10 million years they would be at the Golden Gate Bridge in San Francisco! The Pacific Plate is moving northward at 1.3 inches per year, about the same rate that a person's fingernails grow.	**32 times.**
148		Here Kenny is standing above **Wallace Creek**, a famous geologic landmark at Carrizo Plain. Over hundreds of thousands of years, the creek bed has been stretched and shifted north. It is not a real easy drive to get to this place, it is on a bumpy, dusty road	**38 times.**

		and not well marked. We had our DeLorme California Atlas and Gazeteer, which was a big help in finding some of our more out-of-the-way destinations.	
149		**Wallace Creek**	**39 times.**
150		These twisted rock layers are located in the Tremblor Range. It is evidence of the power of the San Andreas Fault. Some of the rock in this range is clay which is mined for cat litter!	**37 times.**
151		**Western Burrowing Owl** *Athene cunicularia* Carrizo Plain, CA March 23, 2007 This was one of those, "STOP! Turn around NOW!" situations when I saw this owl sitting in the middle of a field in Carrizo Plain. I'm so lucky to have a patient husband! :) I wish I had an even stronger telephoto lens, my 300mm zoom didn't do this owl justice. It had large yellow eyes and long thin legs that I could see through the binoculars. These birds take advantage of burrows that have been dug by other animals, in this area they are dug by ground squirrels. The owl may take over the burrow after it eats the squirrels! These owls were once very common in southern California, but due to loss of habitat, they are now not as common.	**60 times.**
152		A small **Gilia**	**45 times.**
153		**Baby Blueyes** *Nemophilia menziesiimenziesii* Wafford Heights, CA March 24, 2007 I found these pretty little blue flowers as I was looking for the Cream Cups. I like getting what I call "two-fers", going to see one flower and finding another (or more)!	**74 times.**

154		**Bristly Jewelflower** *Streptanthus glandulosis* Kern River Canyon, CA March 24, 2007 This was one of my "target plants", I really didn't expect to see it due to the drought. I was excited to find a patch of them with several plants! They have an unusual, dark maroon flower.	**78 times.**
155		**Buckbrush** *Ceanothus cuneatus* Highway 33, from Taft to Ventura March 25, 2007 This is a fairly common shrub growing in the chaparral areas of southern California.	**39 times.**
156		**Creamcups** *Platystemon californicus crinitus* / Poppy Family Wofford Heights, CA March 24, 2007 This was another flower I had hoped to see. Some are a creamy white, others like this one, have yellow on the petals.	**71 times.**
157		**Small-flowered Fiddleneck** *Amsinckia menziesii menziesii* Taft, CA March 22, 2007 This is another common wildflower along the roadsides.	**70 times.**
158		**Common Fiddleneck** *Amsinckia menziesii intermedia* / Borage Family Kern River Canyon, CA March 24, 2007 This plant is seen along many of the roadsides in southern California.	**38 times.**
159		**Fiesta Flower** *Pholistoma auritum auritum* / Waterleaf Family Kern River Canyon, CA March 24, 2007 I found this "party flower" ("fiesta" means party in Spanish) blooming by a rock in the lower part of the Kern River Canyon. It was one of the many different flowers we found in the canyon.	**66 times.**
160		**White Fiesta Flower** *Pholistoma membranaceum* Kern River Canyon, CA March 24, 2007	**61 times.**

		The flowers of the White Fiesta Flower are much smaller than those of the Blue variety.	
161		**Angels' Gilia** *Gilia angelensis* Kern River Canyon, CA March 24, 2007	**59 times.**
162		A field of Goldfields	**34 times.**
163		Goldfields along Hwy. 178 going up the Kern River Canyon. map...	**42 times.**
164		**Goldfields** *Lasthenia chrysoma* Hwy. 178 Kern River Canyon, CA March 22, 2007 In a good year, these pretty little flowers paint the roadsides, fields and hillsides of southern California in gold. Unfortunately, we were not there in a good year. :(	**67 times.**
165		I was racing the clock to get this shot of the Popcorn flowers in the field before the sun dropped too far below the horizon. The white flowers almost looked like snow! This was taken along Hwy. 158 coming down from Isabella Lake.	**31 times.**
166		**Rusty-haired Popcorn Flower** *Plagiobothrys nothofulvus* / Borage Family Hwy. 158 March 24, 2007 Some hillsides along the highway were covered with these pretty white flowers.	**63 times.**

167		**California Poppy** *Eschscholzia californica* / Poppy Family Gorman, CA March 22, 2007 We saw California Poppies scattered around the roadsides, but not the huge fields that I had hoped to enjoy.	**35 times.**
168		This was one of the few views we got to see of the Poppy fields. I saw these high on the hillsides of the Kern River Canyon.	**45 times.**
169		**Sacred Datura**	**37 times.**

Webpage: View Album

ATTACHMENT 16

GOOGLE SEARCH OF ACADEMIC THAT STUDY SODA LAKE

Climate Change Recorded by Sedimentary Organic Matter in Soda Lake, Southern California

Jennifer Eigenbrode, Cara Davis, Lisa M. Pratt

Department of Geological Sciences, Indiana University, Bloomington, IN 47405

J Ramon Arrowsmith

Department of Geology, Arizona State University, Tempe, AZ 85287

Dallas D. Rhodes

Department of Geology, Whittier College, Whittier, CA 90608

Lisa A. Rossbacher

Department of Geology, Dickinson College, Carlisle, PA 17013

Aridity, low aquatic productivity, and benthic anoxima make Soda Lake an ideal location to investigate climate signals preserved in organic matter of terrestrial sediments. This permanent saline lake occupies a hydrologically closed basin bounded by the San Andreas Fault and Temblor Range on the east, and by the Caliente Range on the west. Grasses surround Soda Lake on the Carrizo Plain, while juniper-oak woodland dominates at higher elevations. Recent lake expansions and contractions are indicated by broad mud-cracked pavements on the basin floor. The absence of previous shorelines on the adjacent valley walls suggests Soda Lake has never had a pronounced depth. Surface drainage is minimal and groundwater discharge appears to sustain the water level in Soda Lake.

In order to evaluate the climate record of this basin, we hand collected an exploratory sediment core using a 12.5 cm diameter acrylic core barrel. Organic carbon content and stable carbon isotope composition (delta C-13) of organic matter were determined for 17 samples spanning 65 cm of muddy lake sediments. Desalted organic carbon contents drop rapidly in the top 10 cm from just over 2 wt.% at the sediment-water interface to a background value of approximately 0.2 wt.%, which remains relatively constant through the lower 60 cm. Delta C-13 values of total organic matter average -18 to -20 per mil through most of the core. At a 20 cm depth, a pronounced increase in organic carbon content to 1 wt.% is associated with a negative shift in delta C-13 values to -25 per mil in a sediment layer containing woody fragments dated by C-14 at 320 years before present. This age coincides with the widely recognized interval of wetter climate and coastal flooding in the region. Thus, Soda Lake sediments appear to preserve a high-resolution record of climate change in southern California.

ATTACHMENT 17

TRAVEL LOGS WEBSITE WITH PICTURES

A Report from birdtours.co.uk

Southern California: 24th March - 5th April, John Girdley

Introduction.

My trip to Southern California was a family holiday (although I had the firm intention of seeing as many birds as possible.) California's daylight hours meant that I could get about three hours birding done every morning (from about 5.30 - 9.30), before the rest of the family got up.) I also arranged to meet two California based birders, Garry George and Mary Beth Stowe who joined me for a day and two half days respectively.

Garry is a gentleman birder and big world lister, he arrived at our rendezvous with a hamper of food and a flask of tea especially me. Great fun to be with, he was determined to help me to as many lifers as possible and with his help I saw among others, Le Conte's Thrasher, Burrowing Owl and Prairie Falcon, none of which I was to see again. He is a keen conservationist, and at the time of writing is engaged in a battle to save the endangered California Gnatcatcher.

Mary Beth is a skilled field birder, and has a fantastic knowledge of San Diego birds. She met both of my key criteria for a good birder, firstly she could pick up all the birds by ear and secondly she could identify gulls in immature plumages! (I hadn't had sufficient time to revise these prior to my trip and so I was treated to a master class at La Jolla sea front.) Mary Beth cleared up all of the rocky shore birds for me in one morning, found me a pair of California Gnatcatcher and capped it all by finding a singing Gray Vireo. I had my first genuine American "high five" after this.

Between the two, they greatly increased my list and I am deeply grateful to them both. In the end I saw 178 species of which 99 were lifers, a total that I was very pleased with.

The family stayed in two centres; the first week was at Silver Lakes Resort, Helendale in the Western Mojave and the next six days were at Sand Pebbles, Solana Beach, just north of San Diego.

Itinerary

23rd March: We arrived late, were unable to reach our accommodation in time for check in and ended up staying in a Best Western Motel in Victorville.
24th March: Bird the golf course at Victorville, Check in at Silver Lakes, visit Calico Ghost Town
25th March: Bird Silver Lakes at first light, spend rest of day at Disneyland. (Birding lowlight of whole trip!)
26th March: Try to bird Mojave Narrows Regional Park in morning. A burst tyre caused by my attempt to enter via the exit before the gate opened (and failing to notice the spikes in the road) ruled out all birding except what I could see from the broken down car). Afternoon at Great Bear Lake after changing the car in Ontario.
27th March: Bird Rockview Nature Park, Victorville and Mojave Narrows Regional Park in the morning. Visit the San Bernardino Mountains in the afternoon.
28th March: Full day birding with Garry George at Carrizo Plains and The Pinos Mountains.
29th March: San Jacinto State Park (via Aerial Tramway) (Near Palm Springs)
30th March: The Living Desert Zoo and Museum, Desert Springs. (Near Palm Springs) Move to second Centre near San Diego.
31st March: Bird San Elijo Lagoons (Solana Beach) at first light. Spend rest of day at San Diego Zoo.
1st April: Morning with Mary Beth Stowe at Sunset Cliffs, La Jolla and Lake Hodges. Afternoon at the Birch Aquarium at Scripp's Institute.
2nd April: Morning at Tijuana Slough National Wildlife Refuge, Imperial Beach and San Diego River Mouth.
3rd April: Morning with Mary Beth at Mission Trail Regional Park, Cibbets Flat and the Pacific Crest Trial. Afternoon at Sea World.
4th April: Morning at Point Loma, and Fort Rosecrans National Cemetery. Rest of the day in the Palomar Mountains. (Telescope and State Park)
5th April: Early morning at Point Loma / Fort Rosecrans (again) in desperate final attempt to improve list one more time! Fly from LAX in afternoon.

The sites (in chronological order) and commentary.

All directions (unless otherwise given) can be found in the excellent ABA Guide, "Where to watch birds in Southern California" by Brad Shram.

Victorville, Best Western Big Tree Motel, Golf Course:

Woke up at first light wondering what would be my first American bird of the trip. Opened the patio doors to the all too familiar sounds of House Sparrow and Starling. The croak of a Raven was familiar, but unexpected, and was to be the first of many.

Key birds: Housefinch, Lesser Goldfinch, Brewers Blackbird, White-crowned Sparrow, Black Phoebe, Coopers hawk and a couple of California Gull. All were to become familiar sights over the next few days.

Silverlakes, Helendale:

Man made Silverlakes provided some excellent bird watching.

Situated in the Western Mojave Desert, a pair of large man made lakes in the centre of the resort seemed a little incongruous; however they provided me with some good birding. This quantity of water in the middle of a desert must always be attractive to birds and deserves to attract the attention of more birders. Many of the birds that I saw were obvious migrants. During my weeks stay, I saw no other birders.

Key birds:
2 California Quail (L), 400+ American Coot, 50+ Bufflehead, 10+ Northern Shoveler, 10 Pied-billed Grebe, 10+ Horned Lark, 6 California Gull, 1 Ringed-billed Gull, 1 Says Phoebe (L), Raven, 2 Common Yellow-throat, 2 Mourning Dove, 1 Canvasback, 5+ Eared Grebe, 2 Turkey Vulture, 20+ Brewers Blackbird, 6 American Robin (L), 8 Double Crested Cormorant, 1 Black-necked Stilt, 6 Great-tailed Grackle (L), 1 Yellow-headed Blackbird (L), 2 Lesser Scaup, 50+ Ruddy Duck, 2 Yellow-rumped Warbler (L), House Finch (lots), 40+ White Crowned Sparrow, 1 Tree Swallow (L), 1 Hooded Merganser (L), 2 Least Sandpiper, 5 Cinnamon Teal, 2 American Wigeon, 1 Hooded Merganser, 2 Least Sandpiper

Disneyland; the big queue!
Perhaps the less said the better, and I carried binoculars all day!
Birds: House Sparrow, Starling, American Crow, Mallard, American Coot, Rock Dove

Mojave Narrows Regional Park:

Lots of different habitats in a small area, it had a big bird list and I feel sure that there was a lot more to see here given time.

A large area of fishing lakes, wetland, grassland and woodland three miles south of Victorville. On my first visit a burst tyre ruled out all birding except what I could see from broken down car. I shouldn't have tried to drive into the exit. I returned again the next day for some real birding.

Key Birds:
1 Red-tailed Hawk, 2 Western Bluebird (L), 10 Double-crested Cormorant, American Coot (100's), Bufflehead, 2 Nuttall's Woodpecker (L), 2 Northern Flicker, 1 Osprey, 1 Accipiter Sp. (Sharp-shinned?), Great-tailed Grackles, 20 White Pelicans, 1 Common Moorhen, 1 Snowy Egret, 1 Great White Egret, 2 Western Kingbird (L), 4 Bushtit (L), 2 Black-throated Sparrow (L), 6 Savannah Sparrow (L), 1 Common Snipe, 1 Greater Yellowlegs, 3 Cinnamon Teal (L), 1 Black Phoebe, 3 Turkey Vulture, 2 Coopers Hawk, 1 Yellow-rumped Warbler, 10 American Goldfinch (L), 4 Kildeer, 8 California Quail, 150 Red-winged Blackbirds

Rockview Nature Park, Victorville.

Rockview had a lot of birding potential but my stay was short.

Rockview was closed throughout my stay, but was easily accessible by walking round the gate. Situated just north of town on the banks of the Mojave river.

Key birds:
Red-winged Blackbird, 1 Ruby-crowned Kinglet (L), 3 White Throated Swift (L), 10+ White Crowned Sparrow. Plus other birds that "got away"

Great Bear Lake and the San Bernardino Mountains:

The forest walk near the discovery centre gave us stunning views of jays and woodpeckers. We saw several Acorn woodpecker larder trees.

We did a whistle stop tour of the lake in the afternoon (after exchanging my car). The next afternoon we visited the nearby Forest Discovery Centre. The bird table here gave me three lifers.

Key birds:
500+ American Coot, 8 Gadwall, Mallard, 20+ White Pelican, Pied-billed Grebe, 2 Redhead (L), 2 Great-blue Heron, Brewers Blackbird (lots), American Robin, 1 Acorn Woodpecker (L), 2 Common Merganser, Gull Sp. (many distant birds remained unspeciated), 4 Steller's Jay (L), 3 Western Bluebird, 8 Western Scrub Jay (L), 2 Dark-eyed Junco, 6 Pigmy Nuthatch (L), 10 Mountain Chickadee (L), 3 Spotted Towhee(L) 4 Violet Green Swallow (L), 3 Acorn Woodpecker, Northern Flicker, Red-tailed Hawk, House Finch.

Maricopa, Carrizo Plains and the Pinos Mountains:

The picture shows a rare Pronghorn Antelope on the Carrizo plains, the line of the San Andreas Dault can be seen in the background.

On Thursday 25th March I spent full day birding with Garry George at Maricopa, The Carrizo Plains and The Pinos Mountains. We had arranged to meet, via the Internet, two weeks previously. I was to drive out to Gorman for 6am in the morning, (Across miles of unlit desert dirt road - my GPS and laptop guided me with unerring accuracy, fortunately). Garry was to drive up from LA. My attempts to liaise with Garry in California were thwarted by poor telecommunications in the desert and, unbeknown to me, the fact that Garry was stuck in Florida. I left multiple messages on his answering machines and hoped for the best!

Remarkably it all came together, Garry arrived at about 6.15am and we got on the way. First stop was to be Maricopa, a known Le Conte's Thrasher stake out and a bird that Garry was insistent that I should see. (He taught me a lot about prioritising the near endemic species of California, something that I hadn't really considered prior to my visit, reasoning that any tick was a good tick.)

Garry had brought a tape for this one. (Part of his world lister kit!). The first bird to show was Sage sparrow, soon to be followed by a Le Conte's. An excellent start to the day.

We then drove into the Carrizo Plains, our first stop was for a distant soaring raptor that turned out to be a Rough-legged Hawk. After several more featureless miles we came upon an abandoned ranch, with a birder watching it! It turned out that he was on to a sizable flock of Tri-Colored Blackbirds (another near endemic to California.) Driving on, we stumbled across a single Burrowing Owl, a bird that I had been hoping to see. The plains were bone dry and the Great Soda Lake didn't look as though it had seen water for years therefore a single Whimbrel and two American Avocets were both unexpected additions.

We continued on, into the southern approaches to the Central Valley in the hope of seeing Yellow-billed Magpie, but without success. We did chance across a big flock of mixed Cliff and Northern Rough-winged Swallows, both ticks for me.

On our return through the Carrizo we stumbled across an enormous flock of Long-billed Curlew. (about 3000 of them.) We stopped at this point and enjoyed Garry's food hamper whilst gazing awestruck at the wheeling mass of birds.

An attempt to see Mountain Plover failed, I think they had departed, but we did manage to pick out a feeding Prairie Falcon on the ground which later flew off giving good views.

We decided to travel back through the Pinos Mountains and were to be rewarded with several good birds: Golden Eagle, Phainopepla and Band-tailed Pigeon amongst others.

Garry and I parted company, over a flask of tea as the sun set at Gorman. It was a day that I will long remember.

Key birds:
Maricopa area: 2 Sage Sparrow (L), 1 Western Meadowlark (L), 1 Le Conte's Thrasher (L), White Crowned Sparrow

Carrizo Plains: 1 Rough-legged Hawk, 1 Say's Phoebe, Western Meadowlark (Numerous), Western Kingbird (Numerous), Savannah Sparrow, Horned Lark (Numerous), 4 Red-tailed Hawks, White Crowned Sparrow, Brewers Blackbird, 20 Tri-colored Blackbird (L), 1 Lark Sparrow (L), 1 Burrowing Owl (L), 1 Yellow-rumped Warbler, 2 American Avocet, 6 Whimbrel, c.3000 Long-billed Curlew (L), 1 Turkey Vulture, Raven, 1 Prairie Falcon (L)

Road towards Central Valley, NW of Carrizo Plains: Red-winged Blackbird, 15 California Quail, 100+ Cliff Swallow (L), 4 Northern Rough-winged Swallow (L), 1 Oak Titmouse (L), House Finch, Red Tailed Hawk

Pinos Mountain Road. (Numerous stops): Dark-eyed Junco, 1 Phainopepla (L), 2 Golden Eagle, 1 Merlin, House Finch, 1 California Thrasher (L), Mountain Chickadee, Pigmy Nuthatch, Lark Sparrow, Spotted Towhee, California Towhee (L), Band-tailed Pigeon (L), Northern Flicker, Western Scrub Jay, Western Bluebird, American Robin, Steller's Jay

San Jacinto State Park - Palm Springs. (via Aerial Tramway)

The view from near the summit of Mount Jacinto, looking down on Palm Springs

Our visit to Palm Springs was primarily to see the San Jacinto Moutains. I was fascinated by the vast array of wind turbines on the northern approach road (this was the physics teacher in me) and appalled at the extravagant water use (I also teach environmental science) We had intended to see the Living Desert Zoo the same day, but ended up being so captivated by the Mountains that we did an extended summit walk and left the zoo for later.

Key birds:
Top of Tramway: 2700m elevation: 3 Clarke's Nutcracker (L), 1 White-headed Woodpecker (L), 2 Hairy Woodpecker, 4 Crossbill, Western Bluebird, Steller's Jay, Pigmy Nuthatch, Mountain Chickadee, 6 Dark-eyed Junco, Raven, House Finch, 1 Rock Wren (in car park area)

The Living Desert Zoo and Museum, Desert Springs:

The Cactii Gardens at the Living Desert were especially attractive to Cactus Wrens

We decided to stop in at the Living Desert Zoo on the day that we moved from Helendale to San Diego. It was a good decision; The zoo was great and I got four lifers there that I wasn't to see anywhere else!

Key birds:
1 Black-tailed Gnatcatcher (Car Park) (L), 3 Yellow-rumped Warbler, 10+ Cactus Wrens (L), 2 Verdin (L), 3 Costa's Hummingbird (L), 5 Gambel's Quail (L), 4 Northern Mockingbird, 6 White-crowned Sparrow, Mourning Dove, House Sparrow and a tantalising glimpse of what was almost certainly a Roadrunner jumping off the fence at the back of one of the compounds. (I never did see one for certain)

San Elijo Lagoons, Solana Beach:

Situated just a mile north of my apartment, San Elijo Lagoons proved to be an excellent stop for some early morning birding. This is a known site for California Gnatcatcher but I failed to see one here.

Key birds:
Savannah Sparrow, 3 California Towhee, 2 Marsh Wren (L), 10 Anna's Hummingbird (L), 4 Snowy Egret, 6 Blue-winged Teal, 8 Cinnamon Teal, 2 American Wigeon, 6 American Avocet, 4 Kildeer, 3 Semi-palmated Plover (L), c.200 Western Sandpiper, 1 Marbled Godwit (L), 2 Willet, 1 Grey Plover, 3 Dowitcher sp., 4 Lesser Yellowlegs, 3 Double-crested Cormorant, 1 Loggerhead Shrike, 3 Northern Mockingbird, 12 Elegant Tern (L), 2 Caspian Tern, 1 Golden-crowned Sparrow (L), 3 Pacific Coast Flyctcher (L), 100+ American Coot, Northern Shoveller, 1 Black Phoebe, 2 Californian

Thrasher.

San Diego Zoo:
Billed as the worlds best Zoo, this was a must visit destination for the family. A report on the internet suggested that binoculars should be worn here, if only for the aviaries. In the end I spent more time looking at birds in bushes than I did at the animals.

Key birds:
Anna's Hummingbird (lots), 1 Hooded Oriole (L), 1 Townsend's Warbler (L), 3 Californian Towhee, 4 Housefinch, 1 Coopers Hawk, Northern Mockingbird, Mourning Dove, Great Blue Heron, Mallard, House Sparrow, Western Gull (Car park) (L)

Pacific Coast (Sunset Cliffs and La Jolla) and Lake Hodges:

My first real look at the ocean was at Sunset Cliffs. The gulls (This one is Western) behaved very well.

The other of my internet connections was Mary Beth Stowe. I had gathered from her regular postings to CALBIRDS that she spent a great deal of time out in the field and that she knew the birds of the area intimately. Mary Beth had taken a list of my target species and was keen to help me see them.

By the time we met, I had knocked off most of the easy species, but I hadn't yet looked for the shorebirds. Mary Beth knew exactly where to go. She picked me up at 6.00 am (my first lie in of the holiday!), insisted on driving, and took me down to Sunset Cliffs.

New birds came thick and fast. A large flock of Western Grebe had just one Clark's Grebe in it. A flock of Black Turnstone flew by. A nice group of Brandt's Cormorant's sat on a rock promontory. Heerman's Gulls proved to be easy to see. Glaucous-winged was looking difficult until Mary Beth picked one up in a fly by flock. I was most impressed.

Still needing a few targets, we headed up to La Jolla. A search of the many Cormorants eventually gave us Pelagic. In the process, lots of passerines called from the cliff top vegetation and Mary Beth knew every squeak, Wrentits, Orange -crowned Warbler, Bushtit etc….Mary Beth pished most of them out for me. Walking south, I was treated to a master class of Gull identification, including a particularly pale Glaucous-winged Gull. A hoped for flock of Surfbirds put in an appearance and finally a lone Wandering Tattler was seen on the rocks of the small harbour. A couple of spotted Sandpiper lead to an interesting discussion about Common v. Spotted Sandpiper ID.

Mary Beth suddenly stopped. "Stupid Cowbird up there" she muttered. Clearly no love lost here, but I needed Brown-headed Cowbird, and if this was one then I wanted to see it! After some effort Mary Beth picked it up, silhouetted at the top of a large tree.

Time for one more stop, and with most of my coastal species now seen, we headed for Lake Hodges to try for California Gnatcatcher. Cassin's Kingbird was our first new bird and soon we were able to compare them with the similar Western. Mary-Beth also picked out calling Bewick's Wren and Wren Tit both of which I needed. We scoped the parched lake through the heat haze. There were several species of wader, a couple of Osprey's and, better still, a single White-faced Ibis. "The" Gnatcatcher called from a nearby bush and we were able to get good views of both male and female. Mission accomplished!!

Spent the rest of the day at the Scripp's Aquarium with my family.

Key birds:
Sunset Cliffs: c.100 Western Grebe (L), 1 Clarke's Grebe (L), 20 Brown Pelicans, 1 Red-throated Diver, 15 Black Turnstone (L), Ruddy Turnstone, Double-crested Cormorant, 10 Brandt's Cormorants (L), 20+ Heerman's Gull (L), 1 Glaucous-winged Gull (L), Western Gull (lots), 1 Willet, 1 Whimbrel, 1 Least Sandpiper

La Jolla Sea Front: Brown Pelicans, 1 Black Turnstone, Ruddy Turnstone, Double-crested Cormorant, 10 Brandt's Cormorants, 4 Bushtit, 1 Orange-crowned Warbler (L), 1 Pelagic Cormorant(L), 30+ Heerman's Gull, 1 Glaucous-winged Gull, Western Gull (lots), 2 Spotted Sandpiper, 18 Surfbirds (L), 1 Wandering Tattler (L), 2 Willet, 1

Brown-headed (or Stupid) Cowbird (L), 100+ California Sea Lions / Seals

Lake Hodges: 6 California Towhee, 4 White-crowned Sparrow, 4 Northern Rough-winged Swallow, 1 Cliff Swallow, 6 Barn Swallow, Bushtit, 6 Cassin's Kingbird (L), 4 Western Kingbird, 1 Bewick's Wren (L), 2 California Gnatcatcher (L), 2 Osprey, 6 American Avocet, 1 White-faced Ibis (L), Wrentit (L), White Pelican, Snowy Egret, Great-white Egret, American Coot, Western Grebe

Tijuana Slough / Imperial Beach / San Diego River Mouth:

Mary Beth had suggested that Tijuana Slough might be a good bet for Clapper Rail. My book suggested that high tide would be best. On arrival, the tide was clearly out, and the reserve didn't look very exciting. However the sea was another story, I have never seen so many Divers (Loons) in one place. I walked all the way down to the Tijuana River mouth watching the sea all the way. On my way back I called in briefly at Imperial Beach and the San Diego River Mouth (off Sea World Drive). Both were very worthwhile.

Key birds:
Tijuana Slough National Wildlife Refuge: 200+ Brown Pelican, 4 Black-vented Shearwater (L), 100+ Red-throated Diver, 6 Great Northern Diver, 4 Pacific Diver (L), 1000+ Western Grebe, 1-2 Clarke's Grebe, Western Gull (numerous), Heerman's Gull (numerous), 100+ Elegant Tern, 1 Arctic Skua, 1 Common Tern, 4 Forsters Tern, 2 Caspian Tern, Double Crested Cormorant, Brandt's Cormorant, 1 Pelagic Cormorant, 4 Snowy Plover, 2 Grey Plover, 50+ Willet, Snowy Egret, American Wigeon, 2 Lesser Scaup, Wimbrel, 1 Red-breasted Merganser, 20+ American Avocet

Imperial Beach: 8 Surf Scoter, 200+ Willet, 1 Pacific Diver

San Diego River Mouth: 3 Little Blue Heron, 100+ Bonaparte's Gull, 2 Forster's Tern, 50+ Dowitcher Sp (both present), 200+ Western Sandpiper, 2 Dunlin, 2 Northern Pintail, 30 Brant, 4 White Pelican, American Avocet.

Mission Trail regional Park, Cibbets Flat and the Pacific Crest Trial:

This was my second half day out with Mary Beth Stowe. The aim was to see some of the Riparian Woodland species still missing from my list. Mary Beth also secretly intended that I shouldn't leave California without seeing Gray Vireo, a really good bird for California, and one that I hadn't really considered a possibility.

Mission Trails was superb habitat and we saw lots. I amused MB by referring to "Bonnie little Birds". She confused me by saying "there's somebody in that bush" The joys of a common language! Among the highlights were Chipping Sparrow, Black-headed Grosbeak, Red-shouldered Hawk, Rufous-crowned Sparrow, Black-throated Gray warbler and another "stupid" Cowbird. A canyon wren called in the distance but eluded us.

Cibbets Flat was one of several stops in the Laguna Mountains. Two Hutton's Vireos chased off a Western Scrub Jay giving tantalisingly poor views against the light of the sun. Oak Titmouse performed rather better.

The Pacific Crest Tail was MB's last attempt to find the Gray Vireo. Almost as soon as we left the car MB picked one up singing in the far distance. We walked towards the song but it soon became clear that the bird was some way from the trail. Out came the tape. The Vireo went quite, I suggested that we might have scared it away, but MB had confidence. Sure enough the bird crept closer and closer and we had superb views, it even flowed us down the path as we made our return. Mary Beth offered me a "high five." (I've seen these in the films so I knew what to do!!!) Nice one Mary Beth. Another fantastic half days birding.

Key birds:
Mission Trails: 4 Orange-crowned Warbler, Nuttall's Woodpecker, Barn Swallow, Tree Swallow, Northern-rough Winged Swallow, 1 Chipping Sparrow (L), 2 Black-headed Grosbeak(L), 1 Red-shouldered Hawk (L), 1 Rufous-crowned Sparrow (L), 1 Black-throated Gray warbler (L), 6 Lesser Goldfinch, California Towhee, Spotted Towhee, Yellow-rumped Warbler, Bushtit, 1 Hermit Thrush, 1 American Kestrel, Anna's Hummingbird, Wrentit, Western Meadowlark, Western Scrub Jay, 1 Pacific-slope Flycatcher, 1 Black Phoebe, Dark-eyed junco, 1 Brown-headed Cowbird, 1 Bullock's Oriole (L)

Cibbets Flat (Laguna Mountains): 1 Red-tailed Hawk, 4 Oak Titmouse, 2 Hutton's Vireo (L), 1 Steller's Jay, 2 Western Scrub Jay, 2 Nuttall's Woodpecker, 1 Hermit Thrush

Pacific Crest Tail: 1 Gray Vireo (L) (Picked up on song by Mary Beth and then taped out into the open)

Point Loma / Fort Rosecrans National Cemetery

A flowering Agave just outside Point Loma Lighthouse was very attractive to a Bullocks Oriole and several Hummingbirds.

On my second to last morning I decided to visit the migration hotspots of Point Loma and Fort Rosecrans. I was so impressed that I went there the next day too. There were a lot of birds about, so I guess that there had been reasonably sized falls on both days. Surprisingly there were no other birders to be seen. At first I was overwhelmed by the variety and wished that I had Mary Beth to help me out. In the event I quickly got into my stride, some calls were becoming familiar, and I soon picked up four new lifers, Rufous Hummingbird, Western Tanager, Fox Sparrow and Wilson's Warbler.

Fort Rosecrans is a National Cemetery, and I confess to feeling a little uneasy about birding my way around it. I was later informed by a local that the authorities "knew the score" and were quite relaxed about birders.

On my second visit I picked up one of the Empidomax Flycatchers at Fort Rosecrans but really didn't know which it was, I thought Gray, but these are well out of their range in California. Fortunately I was to bump into a local birder, Peter Ginsberg, whom I was later to take back and relocate the Flycatcher. After due consideration he pronounced it to be Hammond's. This was to be my last "tick" of the trip, finishing, frustratingly, on 99 lifer's and a pleasing 178 species for the trip.

Key birds: Totals for two trips.
Pt. Loma/ Cabrillo: 20+ Orange-crowned Warblers, 20+ House Finch, 5 California Thrasher, 3 Spotted Towhee, 20+ California Towhee, 5+ Rufous Hummingbird (L), 1 Western Tanager(L), 1 Bullocks Oriole, 6 Fox Sparrow (L), 1 Wilsons Warbler (L), 20+ Anna's Hummingbird, 15+ Yellow-rumped Warbler, 3 Hermit Thrush, 15+ White-crowned Sparrow, 8 Golden-crowned Sparrow, 30+ Bushtit, 4 Wrentit, 1 Pacific-slope Flycatcher, 10 Cedar Waxwing (Overflying)

Fort Rosecrans: 70+ Yellow-rumped Warbler, 30+ Bushtit, 5 Pacific-slope Flycatcher, 1 Hooded Oriole, 1 Western Tanager, 2 Black-headed Grosbeak, 20+ Dark-eyed Junco, 5 Black Pheobe, 30+ Assorted Hummingbirds, 20 Cassins Kingbird, 1+ Western Kingbird
1 Hammond's Flycatcher (L), 2 Hooded Oriole, 20+ California Towhee, 4 California Thrasher, 40+ White-crowned Sparrow, 40+ Orange-crowned Warbler, 3 Red-shafted Northern Flicker, 2 Coopers Hawk, 4 Chipping Sparrow

Palomar Mountain:

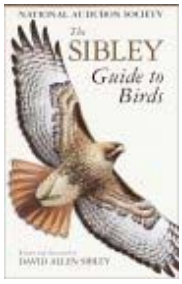
The open fields around the big telescope were alive with Western Scrub Jays and Bluebirds.

My last full day was to be spent at Palomar Mountain. I had wanted to see the giant telescope since I was a kid. After looking at this (one of the few free attractions in California) we went to the State Park and had a last mountain walk. Mary Beth had recommended "Mothers Kitchen" a Mountain Cabin Restaurant situated near the summit. We stopped for lunch, which proved to be really good home cooking and highly recommended.

Key birds: 30+ Steller's Jay, 20+ Mountain Bluebird, 10+ Western Scrub Jay, 20 Band-tailed Pigeon, 5 Mountain Chickadee, Raven, 4 Acorn Woodpecker, 4 Mountain Quail (L), 30+ Violet-green Swallows.

Bibliography:

"**Where to watch birds in Southern California**" **by Brad Shram**. - Absolutely essential.



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ATTACHMENT 18

PRESIDENTIAL PROCLAMATION 7393, *ESTABLISHMENT OF THE CARRIZO PLAIN NATIONAL MONUMENT* (JANUARY 17, 2001)

Proclamation 7393--Establishment of the Carrizo Plain National Monument.(Transcript)

From: Weekly Compilation of Presidential Documents | Date: 1/22/2001

January 17, 2001

By the President of the United States of America

A Proclamation

Full of natural splendor and rich in human history, the majestic grasslands and stark ridges in the Carrizo Plain National Monument contain exceptional objects of scientific and historic interest. Since the mid-1800s, large portions of the grasslands that once spanned the entire four hundred mile expanse of California's nearby San Joaquin Valley and other valleys in the vicinity have been eliminated by extensive land conversion to agricultural, industrial, and urban land uses. The Carrizo Plain National Monument, which is dramatically bisected by the San Andreas Fault zone, is the largest undeveloped remnant of this ecosystem, providing crucial habitat for the long-term conservation of the many endemic plant and animal species that still inhabit the area.

The monument offers a refuge for endangered, threatened, and rare animal species such as the San Joaquin kit fox, the California condor, the blunt-nosed leopard lizard, the giant kangaroo rat, the San Joaquin antelope squirrel, the longhorn fairy shrimp, and the vernal pool fairy shrimp. It supports important populations of pronghorn antelope and tule elk. The area is also home to many rare and sensitive plant species, including the California jewelflower, the Hoover's woolly-star, the San-Joaquin woolly-threads, the pale-yellow layia, the forked fiddleneck, the Carrizo peppergrass, the Lost Hills saltbush, the Temblor buckwheat, the recurved larkspur, and the Munz's tidy-tips. Despite past human use, the size, isolation, and relatively undeveloped nature of the area make it ideal for long-term conservation of the dwindling flora and fauna characteristic of the San Joaquin Valley region.

The Carrizo Plain National Monument also encompasses Soda Lake, the largest remaining natural alkali wetland in southern California and the only closed basin within the coastal mountains. As its name suggests, Soda Lake concentrates salts as water is evaporated away, leaving white deposits of sulfates and carbonates. Despite this harsh environment, small plant and animal species are well adapted to the setting, which is also important to migratory birds. During the winter months the lake fills with water and teems with thousands of beautiful lesser sandhill cranes, long-billed curlews, and mountain plovers.

The Carrizo Plain National Monument owes its existence to the geologic processes that occur along the San Andreas Fault, where two of the Earth's five great tectonic plates slide past one another, parallel to the axis of the Plain. Shifting along the fault created the Plain by rumpling the rocks to the northeast into the Temblor Range and isolating the Plain from the rest of the San Joaquin Valley. The area is world-famous for its spectacular exposures of fault-generated landforms. Stream valleys emerge from the adjacent mountains, only to take dramatic right-angle turns where they intersect the fault. Ponds and sags form where the ground is extended and subsides between branches of the fault. Benches form where the fault offsets valley walls. Many dramatic landscape features are products of the interplay between very rapid fault movement and slower erosion. The dry climate of the area produces low erosion rates, thereby

preserving the spectacular effects of fault slip, folding, and warping. On the Plain, th ese fault-related events happen intermittently, but with great force. In 1857, the strongest earthquake in California's recorded history ripped through the San Andreas Fault, wrenching the western side of the Carrizo Plain National Monument thirty-one feet northward.

The area is also distinguished for its significant fossil assemblages. The Caliente Formation, exposed on the southeast side of the Caliente Range, is host to abundant and diverse terrestrial fossil mammal remains of the Miocene Epoch (from 13 million to 25 million years ago). Fossils of five North American provincial mammalian ages (Arikareean, Hemingfordian, Barstovian, Clarendonian, Hemphillian) are represented in sedimentary rocks in that formation. These terrestrial fossil remains are interlaced with marine sedimentary rocks bearing fossils of mollusks, pectens, turitellas, and oysters.

In addition to its geologic and biological wealth, the area is rich in human history. Archaeologists theorize that humans have occupied the Carrizo Plain National Monument area since the Paleo-Indian Period (circa 11,000 to 9,000 B.C.). Bedrock mortar milling features, village middens, and elaborate pictographs are the primary manifestations of prehistoric occupation. Some of these, such as the Painted Rock and Sulphur Springs rock art sites, are recognized as world class. European expeditions through the area date back to the late 1700s, with settlement beginning in the 1850s. Livestock ranching, farming, and mining activities in the last century and a half are evidenced by numerous artifacts and historic ranch properties within the area.

Section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431), authorizes the President, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and to reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected.

Whereas it appears that it would be in the public interest to reserve such lands as a national monument to be known as the Carrizo Plain National Monument:

Now, Therefore, I, William J. Clinton, President of the United States of America, by the authority vested in me by section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431), do proclaim that there are hereby set apart and reserved as the Carrizo Plain National Monument, for the purpose of protecting the objects identified above, all lands and interests in lands owned or controlled by the United States within the boundaries of the area described on the map entitled "Carrizo Plain National Monument" attached to and forming a part of this proclamation. The Federal land and interests in land reserved consist of approximately 204,107 acres, which is the smallest area compatible with the proper care and management of the objects to be protected.

All Federal lands and interests in lands within the boundaries of this monument are hereby appropriated and withdrawn from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws, including but not limited to withdrawal from location, entry, and patent under the mining laws, and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the monument. For the purpose of protecting the objects identified above, the Secretary shall prohibit all motorized and mechanized vehicle use off road, except for emergency or authorized administrative purposes.

Lands and interests in lands within the proposed monument not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States.

The Secretary of the Interior shall manage the monument through the Bureau of Land Management, pursuant to applicable legal authorities, to implement the purposes of this proclamation.

The Secretary of the Interior shall prepare a management plan that addresses the actions, including road closures or travel restrictions, necessary to protect the objects identified in this proclamation.

The establishment of this monument is subject to valid existing rights.

Nothing in this proclamation shall be deemed to enlarge or diminish the jurisdiction of the State of California with respect to fish and wildlife management.

There is hereby reserved, as of the date of this proclamation and subject to valid existing rights, a quantity of water sufficient to fulfill the purposes for which this monument is established. Nothing in this reservation shall be construed as a relinquishment or reduction of any water use or rights reserved or appropriated by the United States on or before the date of this proclamation.

Laws, regulations, and policies followed by the Bureau of Land Management in issuing and administering grazing permits or leases on all lands under its jurisdiction shall continue to apply with regard to the lands in the monument.

Nothing in this proclamation shall be deemed to revoke any existing withdrawal, reservation, or appropriation; however, the national monument shall be the dominant reservation.

Warning is hereby given to all unauthorized persons not to appropriate, injure, destroy, or remove any feature of this monument and not to locate or settle upon any of the lands thereof.

In Witness Whereof, I have hereunto set my hand this seventeenth day of January, in the year of our Lord two thousand one, and of the Independence of the United States of America the two hundred and twenty-fifth.

[Filed with the Office of the Federal Register, 8:45 a.m., January 19, 2001]

NOTE: This proclamation was published in the Federal Register on January 22.

ATTACHMENT 19

DECLARATION OF DR. DALLAS D. RHODES

DECLARATION OF DR. DALLAS D. RHODES

I, **Dallas D. Rhodes**, declare as follows:

1. I am a Professor of Geology at Georgia Southern University and serve as the Chair of the University's Department of Geology and Geography. I was formerly a Professor in the Department of Geology at Whittier College in Whittier, California.

2. I am part of the "Soda Lake Interdisciplinary Project" (SLIP), which has as its objective, the understanding of the paleoenvironmental and tectonic history of the Carrizo Plain.

3. I have studied Soda Lake for nearly three decades, and have visited Soda Lake every year since 1984. During the period between fall 1995 and summer 1998 I was often there once a month. While the timing of my visits varies, I have been at Soda Lake at least once during each month of the year. My current efforts are directed at the geomorphology of the Soda Lake basins and the clay dunes that border them. In the reports written by myself and my colleagues, we informally refer to the largest basin in the Carrizo Plain as the "North" Basin because it is located on the northwest side of the 10-km long clay dune ridge that helps define it. The second largest basin is referred to as the "South" Basin because of its location relative to the dune ridge.

4. I have observed that the water levels in Soda Lake vary each year. In March of 1998, I observed the water as deep as two to three meters deep near the shore of the "South" basin and estimate that it may have been as much as four to five meters deep near the center of the basin.

5. In March of 1998, it was obvious to me that an inland fishing boat could have navigated across the "South" basin of Soda Lake. In fact, a boat would have been necessary in order to cross the Lake.

6. Attached hereto as Exhibit "A," and incorporated by this reference, is a picture I took in March of 1998.

7. I understand that many people go birding at Soda Lake as it is a stopover on the Pacific Flyway. I have also seen evidence of hunters in and around Soda Lake.

8. I have observed that a mine was present on the shores of the North Basin of Soda Lake in the late-19th and early 20th centuries. This mine utilized a causeway constructed across

the abandoned lake floor to reach the mine site on the northeastern side of the basin. Except for one gap, the causeway is still intact and is usable.

9. Documents in my possession reveal that William C. Hay Ltd., Consolidated Chemical Co., and Pacific Distributing Corp., mined anhydrous sodium sulphate from Soda Lake at least into the mid-1930s, when a plant was moved from one side of Soda Lake to the other. The documents reveal that anhydrous sodium sulphate—commonly known as Glouber's salt or salt cake—was then used in manufacturing paper, glass, and nickel, and also used in the textiles, tanning, paint, varnish, electro-plating, medical, and chemical industries. A copy of the relevant pages from the California Journal of Mines and Geology (October, 1935), is attached hereto as Exhibit "B."

10. I have also seen someone collecting evaporite crystals at the Lake. Evaporite minerals can be mined for use in the production on fertilizer and explosives.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that this declaration was executed on February 28, 2008 at Statesboro, Georgia.

Dallas D. Rhodes

EXHIBIT A

EMPLOYMENT SERVICE

Following the establishment of the Mining Division branch offices in 1919, a free technical employment service was offered as a mutual aid to mine operators and technical men for the general benefit of the mineral industry.

Briefly summarized, men desiring positions are registered, the cards containing an outline of the applicant's qualifications, position wanted, salary desired, etc., and as notices of 'positions open' are received, the names and addresses of all applicants deemed qualified are sent to the prospective employer for direct negotiations.

Telephone and telegraphic communications are also given immediate attention.

Technical men, or those qualified for supervisory positions, and vacancies of like nature only, are registered, as no attempt will be made to supply common mine and mill labor.

Registration cards for the use of both prospective employers and employees may be obtained upon request, and a cordial invitation is extended to the industry to make free use of the facilities afforded. Parties interested should communicate direct with our San Francisco office.

STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
GEORGE D. NORDENHOLT, Director

DIVISION OF MINES
FERRY BUILDING, SAN FRANCISCO

WALTER W. BRADLEY State Mineralogist

Vol. 31 OCTOBER, 1935 No. 4

CALIFORNIA JOURNAL
OF
MINES AND GEOLOGY

QUARTERLY CHAPTER
OF
STATE MINERALOGIST'S REPORT XXXI

STATE DIVISION OF MINES
FERRY BUILDING, SAN FRANCISCO
CALIFORNIA

CALIFORNIA STATE PRINTING OFFICE
GEORGE H. MOORE, STATE PRINTER
SACRAMENTO, 1935

28145

An analysis of the material as given in Canada Department of Mines Bulletin No. 646 shows:

	Per cent
Insoluble in water (clay and sand particles)	0.91
Soluble in water—	
Lime (CaO)	0.34
Magnesia (MgO)	1.00
Soda (Na_2O)	38.72
Sodium Chloride (NaCl)	5.95
Sulphur trioxide (SO_3)	50.83
Moisture	2.05
Total	100.40

A combination possible from the above analysis may be calculated as 88.71 per cent anhydrous sodium sulphate.

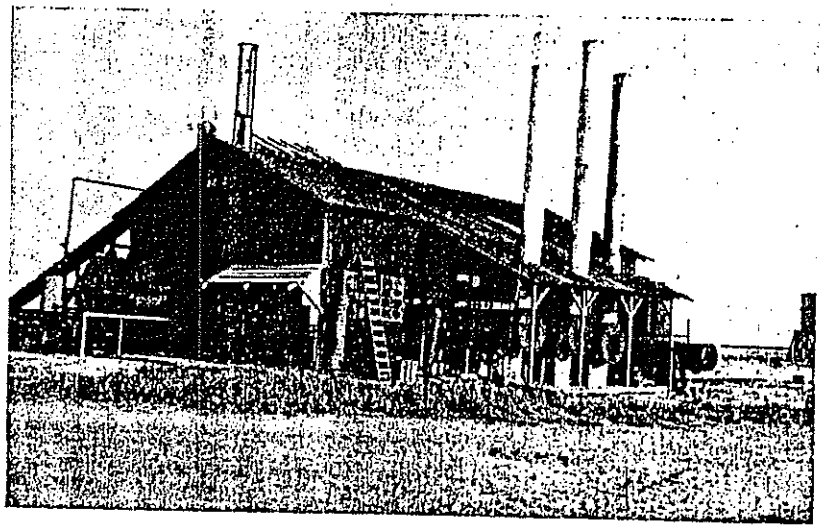


FIG. 8. Plant of William C. Hay, Ltd., for processing sodium sulphate, Soda Lake, San Luis Obispo County.

William C. Hay, Ltd., 8511 West Third St., Los Angeles, are the present owners of this deposit and plant. C. L. Burt, 309 South Holt Ave., Los Angeles, is foreman. The plant was dismantled and moved from the south side of Soda Lake to the opposite side of the lake in 1934. The plant was operated at its new location for a few months when it was closed down. At the present time some experimental work is being carried on. One man is employed to do this work and take care of the property. Water was pumped into a small section of the lake to dissolve the crude salts, and the brine then pumped into two new earthen settling-tanks, about 80 ft. square and 40 inches deep, for solar evaporation. The plant equipment includes three oil-fired boilers, filter, Fairbanks-Morse D. C. Generator, 90-h.p. Whiton turbine, and a number of motors and pumps. The narrow-gauge railroad tra[illegible] previously built on the lake were removed several years ago. The crude salt was crushed, washed, dried in centrifugals, sacked, and hauled to McKittrick by auto trucks in the 1923–1925 operation.

Plans are to commence operating the new plant in the near future. The limited market for 'salt cake' (the trade name for anhydrous sodium sulphate), and the long haul of 28 miles over the Temblor Range to McKittrick, the nearest shipping point, makes exploitation difficult. It has been said that there is a rising trend in the demand for sodium sulphate, which is mainly used in the pulp and paper industry, glass industry, nickel refining, textile dyeing, tanning industry, paint and varnish industry, in electro-chemistry and electro-plating, in medicine, and in the chemical industry.

Bibl: State Mineralogist's Reports VIII, p. 532; X, p. 563; XV, p. 127; XVII, p. 386; XXI, pp. 535–536. State Min. Bur. Bull. 24, p. 136. U. S. Geol. Survey Bull. 380, p. 369; 540, p. 428. U. S. Bur. of Mines, I. C. 6833. Canada Dept. of Mines Bull. 646, p. 20.

STONE INDUSTRY

Crushed Rock, Sand and Gravel.

County Sand and Gravel The county of San Luis Obispo obtains considerable sand and gravel for the construction of roads and county buildings from the beds and mouths of various rivers and creeks. Some of these streams are: Salinas and Nacimiento rivers; Estrella, Huer-

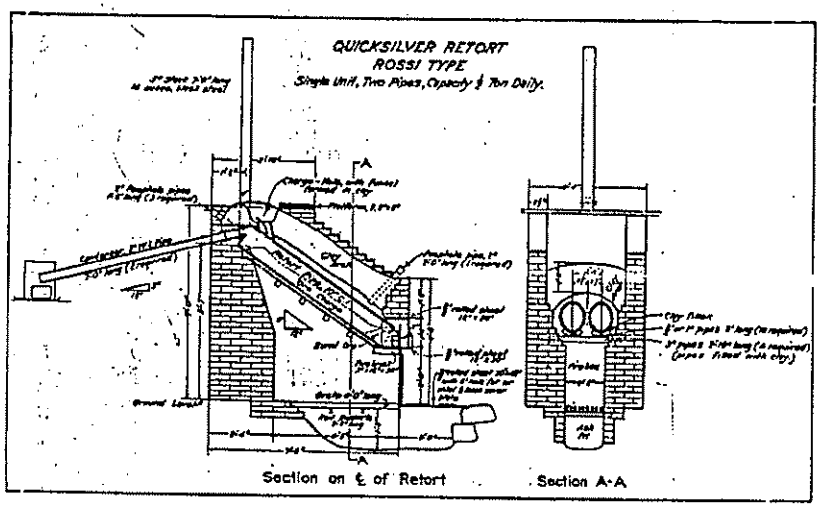
FIG. 9. Portable sand and gravel plant belonging to county of San Luis Obispo on Salinas River.

Huero, Arroyo Grande and Los Berros creeks; and from the mouths of Morro, Toro, Cayucos, Santa Rosa and San Simeon creeks, where they empty into the ocean.

A portable sand and gravel plant was moved from Arroyo Grande Creek to the bed of the Salinas River, about 10 miles southeast of Santa Margarita, in April, 1935. This plant operated from April until June,

erected this type of retort since then, reporting it to work satisfactorily. A drawing of a 2-pipe retort is shown herewith.

The 2-pipe retort is a unit complete with one firebox. The retort pipes are cast from heat-resistant alloy ⅝ inches thick, 6 ft. 2 inches long, with a 10-inch inside diameter. Discarded pipes from a Johnson-McKay retort are said to be often used, opening one end for the



lower-end discharge and the opposite upper side for the hopper, with the aid of an acetylene torch. The pipes are set on an incline, approximately 30°, and ore is charged through a hopper at the upper end. The charge half fills the pipe, which is closed at the lower open end by a plug of burnt ore stacked in such a way as to let a little air draw through it. Two bricks are used to help stack the burnt ore in plugging the lower end of pipe. Damp ashes and clay are used to pack around the charging hole at the upper end of pipe. The pipes are directly exposed to the fire in a box built so as to heat them evenly end to end. Quicksilver vapors are condensed in an 8-ft. pipe with a hood at the lower end and an iron pot to collect the quicksilver. This condenser pipe, 3-inch inside diameter, set on an incline of about 14°, is connected to the retort pipe with a 10-inch nipple.

All of the retorts of this type that were in use at the time of visit were using wood for fuel. The fuel consumption is said to be exceptionally low, using one-third of a cord of wood per ton of ore. Gas, oil, or coal may be used. Banks of more than two pipes can be made. A 6-pipe bank should be made by lining up three units of two pipes each, all in a single frame, but with three fire boxes. A 10-pipe bank can have one large firebox and a set of flues with dampers passing under and over the pipes. The retort frames are made partly of masonry with an inside liner of common brick. The retort could partly be built into the side of a hill to save masonry.

The capacity of a 2-pipe retort is said to be one-half ton of ore daily. The recovery is said to average over 90% when firing is properly done. The pipes are charged and the fires stoked every six hours,

or four times daily. No attention is necessary for the small unit retorts between times.

The advantages claimed for the Rossi retort are: Quicker and more complete reduction of the ore, because of the slope of the pipe and the natural draft from pipe to condenser; less soot, crust or mud and cleaner mercury, because the air inlet provides enough oxygen to combine with sulphur vapors which then pass out as dioxide; and more safety from gases because they can escape only at the condenser end. It is also said to be especially adaptable in treating quicksilver ores containing pyrite.

SODIUM SULPHATE

William C. Hay, Ltd. (formerly Consolidated Chemical Co., Pacific Distributing Corp.) This sodium sulphate deposit, in the form of Glauber's salt, $Na_2SO_4\ 10\ H_2O$, occurs in T. 31 S., R. 20 and 21 E., in what is known as Soda Lake. Soda Lake covers an area of 2800 to 3000 acres. The lake receives the drainage of the Carrizo Plain and has no outlet. The Carrizo Plain is a structural depression which has been faulted down between the Caliente and Temblor ranges. Evaporation exceeds the rainfall of the area, and the lake is dry except after heavy storms, and its surface is covered with a broad layer of white crystalline salts, ranging from a thin sheet about the margins to a deposit a few inches thick in the deeper parts. There are also

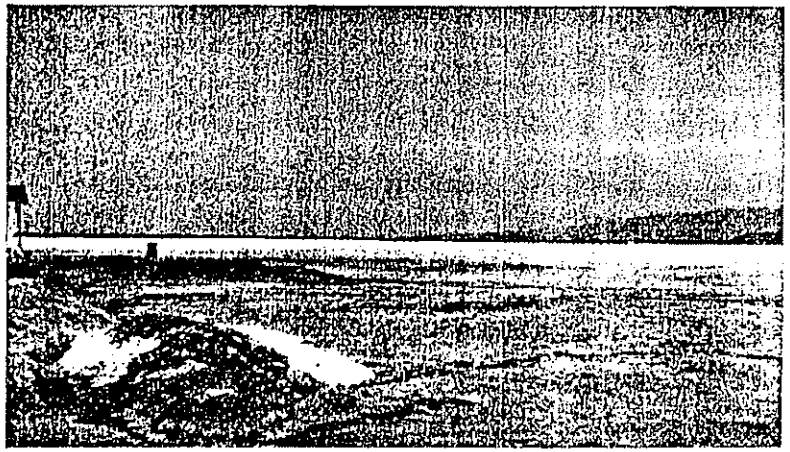


FIG. 7. A portion of Soda Lake, Carrizo Plain, San Luis Obispo County.

some deep channels that have been filled. Beneath the surface crust of mirabilite crystals (Glauber's salt) there is a greenish-gray mud, containing some crystal salts and saline matter in solution. Some bloedite crystals, a hydrated double sulphate of sodium and magnesium, are also found in this mud. Gale[1] estimated that over a million short tons of sodium sulphate (crude salts) were available in this deposit.

[1] Gale, Hoyt S., U. S. Geol. Survey Bull. 540, p. 428.

ATTACHMENT 20

1904 PROSPECTUS FOR STOCK FOR CARISSA CHEMICAL COMPANY

Carisa Chemical Company

Prospectus

Incorporated Under the Laws of the State of California

CAPITALIZED FOR $1,000,000
PAR VALUE SHARES, $1.00 EACH

Depository: Bank of California

President
E. C. DUDLEY

Vice-President
F. M. MEIGS

Treasurer
H. W. COPP

Secretary
A. HUGHES

BOARD OF DIRECTORS

E. C. DUDLEY
F. M. MEIGS
C. L. MORGAN
A. HUGHES
H. W. COPP

F. M. MEIGS, General Manager
218 California St. San Francisco

BRIEF DESCRIPTION OF THE CARISA CHEMICAL COMPANY AND THE MANUFACTURE OF SULPHATE OF SODA AND ITS BY-PRODUCTS

¶ In the eastern part of San Luis Obispo County, California, surrounded by high mountains and hills, lies a large tract of land about fifty miles long by fifteen miles wide, known as the Carisa Plains. A portion of these plains has at one time been a vast lake, the surface of which, through centuries of sunshine, has become crystallized and has the appearance of a lake of ice and snow, to the plains-

man, the prospector and the cattle herder, this lake has been considered a deposit of low grade salt, filled with alkali, and therefore worthless, no one ever taking the trouble to have an analysis made of it.

¶ A party of men were visiting the painted rock, a large rock in the shape of a horse-shoe, which rises up out of the plains, the interior of which contains a number of paintings and hieroglyphics of some extinct tribe of Indians. As they were passing this lake, which is but a short distance from the rock, samples of crystals were gathered and submitted to Thomas Price & Son, chemists of San Francisco,

CARISA CHEMICAL COMPANY

for analysis, and they were astonished to find that it was sulphate of soda, one of the most important chemical substances known. Other samples were immediately obtained and careful tests were made to see if they contained other substances besides sulphate of soda. Samples were submitted to a number of chemists, and each one reported, after a most thorough analysis, that it was sulphate of soda, over 99 per cent pure. Realizing that an important discovery had been made, steps were at once taken to ascertain the size and depth of this deposit. It was found to cover an area of 2,960 acres. A deposit six and one half miles long, with an

average width of one mile crystallized on the surface from one to six feet in depth, beneath which is a vast body of water in a super-saturated state and containing sulphate of soda in pure form. A company was at once organized, adopting the name of the Carisa Chemical Company, and this area secured. All the papers in connection with it were thoroughly examined and pronounced by the very best authorities to be perfect in every respect, so there could be no question as to the title of the land.

¶ To give an idea as to the importance of this discovery, the uses of sulphate of soda and its by-products, a short explanation of its manufacture will convince you

CARISA CHEMICAL COMPANY

of its value. Sulphate of soda is manufactured from sulphuric acid and chloride of sodium (common salt), there is also sulphate of soda produced from the ashes of plants, but in such small quantities that it entirely prohibits the use of that sulphate of soda for commercial manufacturing purposes. In a number of places in the United States, principally Wyandotte, Mich.; Detroit, Mich.; Cleveland, Ohio; Barbarton, Ohio; Cincinnati, Ohio; Saltville, Virginia; Boston, Mass.; Syracuse, N. Y., and Buffalo, N. Y., are extensive plants for the manufacture of sulphate of soda and its by-products. These various plants manufacture their sulphate of soda

from sulphuric acid and chloride of sodium (common salt), they are compelled to get their sulphuric acid in its purity and to have an extensive plant for the manufacture of the same. They dig deep wells to obtain their salt water, from which they get their salt, and this salt has to be refined, which necessitates another expensive factory. From the action of the acid and salt combined, with other ingredients, they obtain what is known commercially as salt cake or black ash. This salt cake or black ash is dissolved and the liquor is drawn off, subjected to a solar heat, and re-crystallized. It is then sulphate of soda, the base and foundation of all sodas, **the same**

CARISA CHEMICAL COMPANY

as we have in all its purity given to us by nature without the expense of manufacture. At this point it becomes necessary to manufacture the by-products of the sulphate of soda. The first reaction is carbonate of soda, or the soda ash of commerce, which is used in the manufacture of various articles of everyday use, among which is GLASS, of which over 55 per cent is soda ash; from the carbonate of soda is obtained bi-carbonate, which is used by druggists, chemists and EVERY HOUSEKEEPER in the land. Caustic soda, used in the manufacture of cleansing compounds, mercerizing of cotton, in the manufacture of soap, etc. Hypo sulphate

of soda is used in all photograph eatablishments in the world for fixing negatives and prints, also used by paper makers. These are only a few of the principal by-products. There are numerous others for which there is a large demand.

¶ There is one ingredient that is used in the manufacture of these by-products and which is used in large quantities. This is limestone, and that stone must be free from magnesia. We have a mountain of this article. We have had it analyzed and know exactly what it will do, and what we can do with it. As a matter of fuel we have the cheapest in the world, that is oil, which comes from the Kern fields. You

CARISA CHEMICAL COMPANY

can readily see that nature furnishes us everything. It gives us pure sulphate of soda, without the expense of manufacture; it gives us a mountain of pure limestone at the very door of our factory; furnishes us with oil, the cheapest fuel known, to use in our furnaces; gives us a climate in which greater results can be accomplished in one day than any other portion of the United States, and with the Santa Fe and Southern Pacific Railroads but a short distance from us, we are in a position to compete with the world.

¶ As to the consumption, the Pacific Coast has not for several years past had an ample supply of soda ash at any one time.

There are glass works that are continually being closed for want of soda ash; there are also large glass works in counties adjacent to San Francisco in the same condition, in fact, glass works all over the country find it difficult to obtain a sufficient supply of pure soda ash.

¶ The consumption in San Francisco alone is in excess of forty-five tons per day. There are on the Pacific Coast Eastern capitalists who are considering the advisability of erecting glass works, and have gone so far as to purchase their sites, and they have interviewed us regarding the amount of ash we could furnish them per day, and stand ready to contract for a

CARISA CHEMICAL COMPANY

term of years for soda ash in large quantities. The average price in San Francisco is $28.00 per ton, and we can manufacture and deliver soda ash at a cost to us of almost one-third the above price, to say nothing of the by-products we will have through the manufacture of this ash. As to the dividends paid by manufacturers of sulphate af soda and its by-products, the Brune Monde Factory is paying regularly quarterly dividends of 30 per cent, and others are doing as well, if not better. What can we not do when nature furnishes us with everything we need, making the cost of manufacture so small that it prohibits competition?

CARISA CHEMICAL COMPANY

¶ As to the Carisa Chemical Company, it was incorporated on the 10th day of August, 1904, with a capitalization of $1,000,000, divided into 1,000,000 shares, par value of $1 each. The entire amount of the capitalization was placed in the treasury of the company. No man was given stock for his name or his influence, and every share of stock issued represents so much cash received. The Company owes no debts whatever, and has expended over $60,000 in machinery, etc. A complete traction equipment for conveying its product to the railroad, an extensive evaporating plant, warehouses, buildings for housing and boarding the employees of

CARISA CHEMICAL COMPANY

the company at the lake, and are now preparing to build the reduction works, and to complete the same. The Directors have authorized the sale of a limited amount of treasury stock, a portion of which is offered at 50 cents per share. This company needs only a small additional amount of money to place them in position to manufacture the by-products of sulphate of soda, for which there is a large and growing demand.

¶ Have this Company, and the use of its products, explained to you, for it will be one of the money makers of the West, and opportunities like this are seldom offered to the general public.

CARISA CHEMICAL COMPANY

ANALYSIS MADE BY THOMAS PRICE & SON.

October 18, 1904.

We have carefully analyzed the samples submitted to us and desire to report as follows:

The samples of crystals we find to have the following composition:

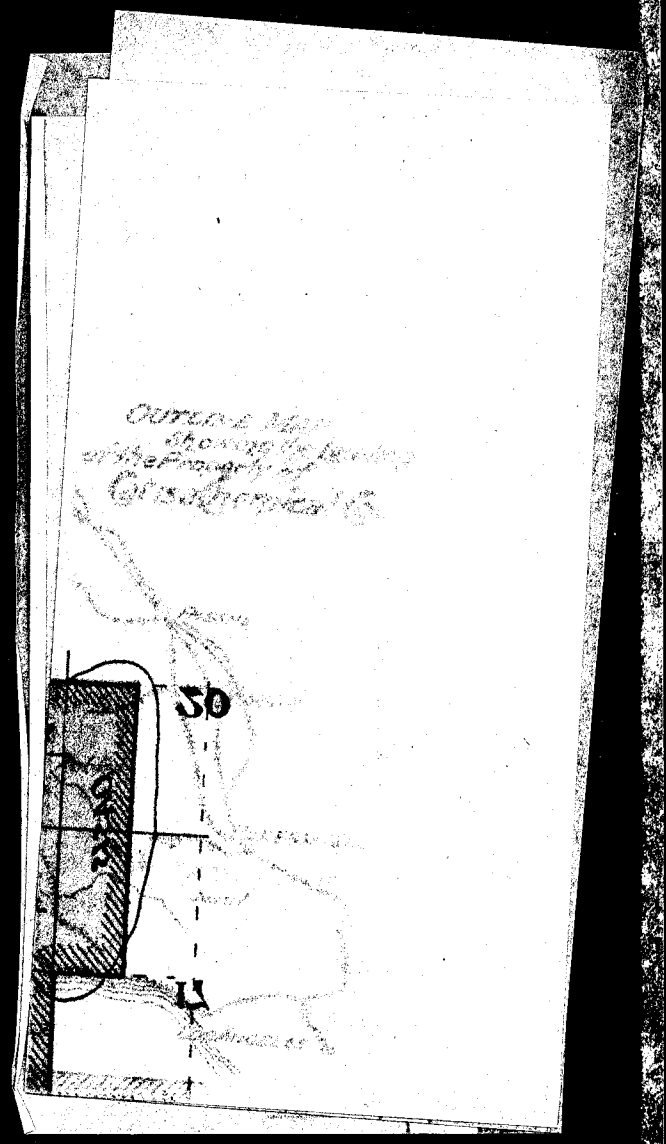
	Per cent.
Anhydrous sodium sulphate.....	42.78
Sodium chloride.....	0.32
Water.....	56.90
	100.00

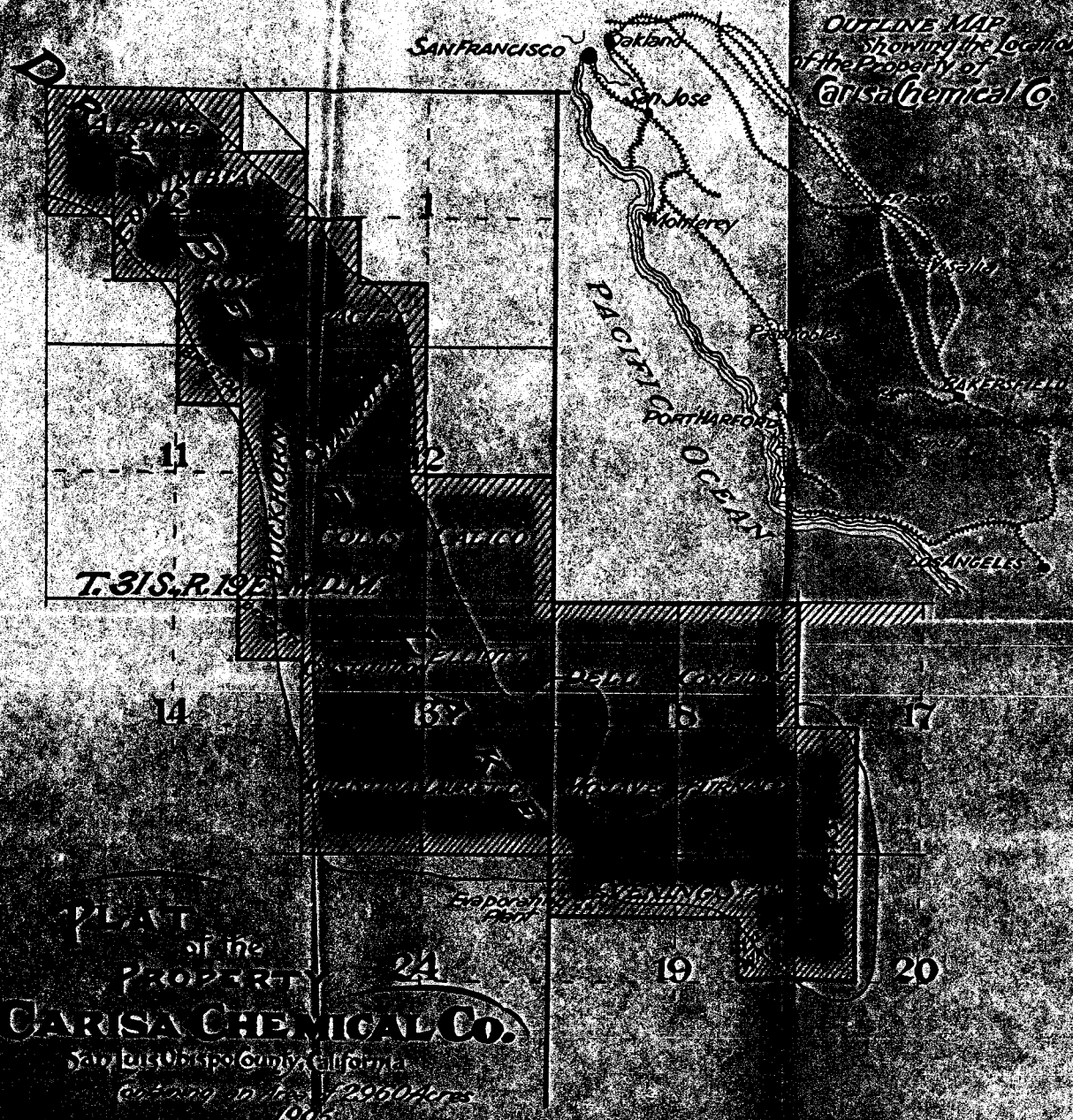
November 29, 1905.

Sample of top of lake after drying:

	Per cent.
Insoluble matter.....	00.16
Sodium sulphate.....	98.65
Sodium chloride.....	00.47
Magnesium sulphate.....	00.43
Loss and undetermined.....	00.29
	100.00

THOMAS PRICE & SON.
Chemists.





PLAT
of the
PROPERTY
OF
CARISA CHEMICAL Co.
San Luis Obispo County, California
Containing in the aggregate 2230 Acres
more or less

Request Date: 04-FEB-2008
Expires at 07:00 AM on: 18-FEB-2008

ILL Number: 

YBP or OCLC #: 

YBP or OCLC #: 2166659

ID: USD0

ISBN/ISSN:

YBP Number: 2167709

Call Number: N/A

Material Type: Other

Author: Carina Chemical Company.

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ATTACHMENT 21

SODIUM AND SODA SALTS" BY REGINALD MEEKS, ENGINEERING AND MINING JOURNAL AT 515

THE MINERAL INDUSTRY

ITS

STATISTICS, TECHNOLOGY AND TRADE

DURING

1905

FOUNDED BY RICHARD P. ROTHWELL

EDITED BY

WALTER RENTON INGALLS

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NEW YORK and LONDON

ENGINEERING AND MINING JOURNAL (Incorporated)

1906

SODIUM AND SODA SALTS.

By Reginald Meeks.

There is a considerable production of metallic sodium, which is not, however, marketed largely in metallic form, but is used as the basis of manufacture of certain soda salts, especially the cyanide. The Niagara Electro-Chemical Company (a branch of the Roessler & Hasslacher Chemical Company) at Niagara Falls, is a large producer of sodium for this purpose. The production of metallic sodium in the United States in 1905 has been estimated by a good authority at 1200 tons, the nominal value being 60c. per lb. or $1200 per ton. The same authority estimates the production of sodium in Great Britain at 1200 tons, and in Germany at 1000 tons; giving a total production of 3400 tons for the world. Further details as to this industry are not available.

During 1905 there were no new developments of unusual character in the soda industry. As in former years the trade in nitrate of soda held a prominent position, though production continues to advance only to a limited extent, owing to the agreement among the Chilean *oficinas*.

The world's production in 1905 amounted to 1,733,000 long tons, of which 321,231 tons were imported into the United States, the remainder being absorbed by European and other countries. This compares with a consumption of 1,447,000 tons in the previous year and 1,412,000 tons in 1903.

The Chilean nitrate industry is of the greatest importance to that Government, because an annual revenue of something like $20,000,000 in gold is derived from an export duty of $12.32 per ton on the salts.

There are four producing districts in the nitrate area of Chile; these contribute in the following proportion: Tarapacá, 81 per cent.; Tocopilla, 9 per cent.; Taltal, 8 per cent. and Antofagasta 2 per cent. There are 80 *oficinas* in the field, of which 68 are in Tarapacá. The industry furnishes employment for about 25,000 men. It is worthy of notice that in all the enormous output of nitrate of soda in northern Chile there is no American capital interested, although shipments to the United States are increasing. The companies are mostly English, with a few Chilean and German.

The cost to consumers has increased in the last two years owing to higher rates for freight and wages, and curtailed production. That the industry has been and is profitable may be seen by the following annual report of the London Nitrate Company, Ltd., Oct. 31, 1905. The company was organized in 1887 with a capital of $800,000. In 18 years

it paid in dividends $1,170,000 and returned to its stockholders $400,000 of its original capital, making a total of $1,570,000 cash. Besides this the company established new plants at a cost of $400,000 and began a sinking fund invested in English securities of $100,000 more. This shows that the total cash earnings in the 18 years had reached the sum of $2,070,000. It still has on hand a capital stock of $400,000 and assets worth, at low valuation, $355,000.

It has been claimed that valuable deposits of sodium nitrate exist in San Bernardino county, California. Some of these reports are of a very sanguine nature and even claim that the supply may be sufficient for the United States.

From reliable sources it is learned that the alleged deposits of California contain practically no nitrate of any commercial value. A few samples showed traces of the salt, but the majority were entirely devoid of even traces. It is significant that three of the largest nitrate concerns in this country have investigated the field and have decided that there is no commercial value attached to the discovery.

The United States is a large consumer of Chile saltpeter and imports close to one-quarter of the world's supply. The annual imports and values for the last ten years are shown in the subjoined table:

IMPORTS OF SODIUM NITRATE INTO THE UNITED STATES. (a).
(In tons of 2240 lb.)

Year.	Quantity.	Value.	Value, per ton.	Year.	Quantity.	Value.	Value per ton.
1896	115,504	$3,566,744	$30.88	1901	208,079	$5,999,098	$28.75
1897	94,965	2,810,187	29.59	1902	205,245	5,996,205	29.21
1898	147,495	2,298,240	15.58	1903	272,947	8,700,806	31.88
1899	146,492	3,486,313	23.80	1904	228,012	9,333,613	40.93
1900	182,108	4,935,520	27.10	1905	321,231	11,206,548	34.89

(a) From *Summary of Commerce and Finance of the United States*.

Natural Soda.—A deposit of soda is located at the Carisa Plains dry salt lake, 13 miles from Olig, in the eastern part of San Luis Obispo county, California. The deposit is in a dry lake six miles long by one mile wide, and varies in depth from a few inches to several feet. The underlying water is said to be highly charged with soda; in the winter it flows into the basin and in the summer evaporates, leaving crystals of soda behind. The Carisa Chemical Company of Bakersfield, California, is utilizing the deposit and has installed the necessary apparatus.

The Markets in 1905.

January opened with prices for nitrate between $2.35 and $2.40. These shaded off in the two following months only to stiffen considerably in April, the price advancing to $2.45 @ 2.52½, and again in May, when $2.77½ was the high price for the month and year. June saw a drop of 30c., followed by an advance of 5c., then prices receded and remained

at $2.22½ @ 2.20 for the remainder of the year. The high and low prices for 1905 were $2.77½ @ 2.20, as against $2.37½ @ 2.10 for the preceding year.

Prices for bicarbonate remained practically stationary, opening at $1.30 for bulk and $1.50 in kegs f.o.b. works. The demand for caustic soda was very active during the first quarter of the year, and large sales of domestic were made, deliveries to take place in 1905, 1906 and 1907. Quotations were on the basis of $1.85 for 60 per cent. The demand remained strong throughout the year and prices did not vary. Salt cake was held firm at 65c., with the demand limited. The deliveries were principally confined to contracts. Sharp competition existed among the domestic manufacturers of sal soda, and prices fluctuated. In April prices advanced sharply, and imported was sold freely at the advanced price of 85c. The domestic article was quoted at 60c. f.o.b. works or 70c. New York. Bleaching powder underwent a wide variation in price. January quotations were at $1.75, and for the first quarter this price varied only 10c. The high prices for each month remained almost constant, but low prices were variable, touching $1.25 and $1.00 during the last quarter.

ATTACHMENT 22

FEBRUARY 13, 2008 CATALOG OF MINERALS

Foreign and Interstate Commerce on Soda Lake - Bloedite sales

To order, simply email me, tjokela@execulink.com, but please read this first.

HOME	ORDER	WHAT'S NEW	THE BEST
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Thumbnails

These are all mounted in the standard 33mm (1.25") Perky boxes
Prices in US $ -- Prepayment required -- Minimum order $20 -- Domestic S&H $7
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Click any mineral names that are blue and underlined like this to see a photo.

Hit the Refresh button to be sure you're seeing the most up to date list!

ALBITE, Linopolis, Minas Gerais, Brazil - Odd and unusually appealing matrixless white crystal clusters. Hard to describe, sort of frosted and stacked, nice pieces with more charm than usually exhibited by this mineral. $3

ALBITE, Linopolis, Minas Gerais, Brazil - Typical sparkling 25mm matrixless cluster of small white to colorless xls, $2

AMETHYST, Lake Balkash, Karaganda Oblast, Kazakhstan - Utterly darling squat doubly terminated deep purple crystals on shards of matrix, nine lovely thumbnails for you to choose from!

AMETHYST, Blue Point Mine, Thunder Bay, Ontario - typical druses of points, nice purple TN's $5

AMETHYST, Mursinka, Middle Urals, Russia - Scepter crystals with pale purple heads and colorless shafts, slightly frosted, around 2cm long, TN's $5

ANALCIME, Five Islands, Cumberland County, Nova Scotia - A particularly nifty thumbnail with colorless to brownish-red xls, the largest 6mm across and reasonably clear. Nice locality piece, $8

ANALCIME, Amethyst Cove, King's County, Nova Scotia - A superlative thumbnail with a chain of six pristine colorless crystals to 10mm on buff-colored quartz matrix. About as good a thumbnail of the mineral as you'll ever see! $19

ANALCIME, Lambert Quarry, near Kings Valley, Benton County, Oregon - A white 15mm xl, a bit etched or contacted on one side, on nicely contrasting black matrix. TN, $9

ANALCIME, Mont Saint-Hilaire, Que - A 2cm pair of white xls with natrolite and aegirine, $5

ANALCIME, Mont Saint-Hilaire, Que - nice equant white xls in the 2cm range, some with natrolite, $5

ANATASE, Diamantina, Minas Gerais, Brazil - Matrixless elongated bipyramids in shades of brown. Decent but not fabulously aesthetic crystals averaging about 14mm long (half an inch!) are only $8 each - very reasonable for such large xls!

RUTILE pseudo ANATASE, Diamantina, Minas Gerais, Brazil - Dark brown chatoyant rutile has completely replaced anatase bipyramids in the 12mm range. Relatively sharp pseudos are $15 each; bizarre skeletal sort of pseudos are $12 each. Really neat stuff.

ANATASE with **RUTILE**, Diamantina, Minas Gerais, Brazil - Same as above, but with varying quantities of oddly chatoyant darker brown rutile partially replacing the anatase xl. Singles and clusters 12mm +, $10 each

ANATASE, Viveli, Hardangervidda, Norway - Large sharp loose black crystals, all TN size. 13-25mm, $18-$50. The only locality in the world from which monstrously large crystals can be had for reasonable prices. Please order by letter.

ANATASE, Matskorhae, Ullensvang Statsallmenning, Horland Fylke, Norway - A black 11mm bipyramid with some small contacts. TN, $9

ANDRADITE, San Benito County, California - A number of sparkling black xls to a large 6mm, their size unfortunately causing contact damage from the tight veins they formed in. $4

ANTIMONY, Arechuybo, Mexico - Nice bright chunks, TN's 10-15mm across, $5

ANTIMONY, Velez-Malaga, Costa del Sol, Spain - Brilliant silvery cleavages, around 2cm across, TN's $25 & $35, priced by size and richness - this is good stuff!

ANTIMONY, Lac Nicolet Antimony Mine, Quebec - Superb grey fine-grained solid chunks of native antimony (Element 51). Fine specimens collected in 1987. Some have associated Sb microminerals, including stibnite, valentinite, kermesite. TN's $8, miniatures, 40-50mm, $12 ea; cabinet specimens, 70-80mm, $35 each.

ANTIMONY, Kern County, California - Solid alluvial nodule sections, with one or more bright silvery cleavage faces, TN's 15-25mm across, $15-30

APOPHYLLITE, NATROLITE, ANALCIME, Lincoln Creek Quarry, near Doty, Lewis County, Washington - a cool colorless 15mm prismatic xl perched atop black matrix with natrolites to ~10mm on the back and 1mm analcimes, very nice TN, from a state not exactly known for its apophyllite production, $10

ARSENOPYRITE, Santa Eulalia, Chihuahua, Mexico - A nice lustrous pair of xls, incomplete on side and bottom. TN, $6

ARAGONITE, Berkeley Hill Tunnel, Oakland, California - A small cluster of clear colorless tabular xls to ~10mm. TN, $5

ARAGONITE, Oamaru Quarry, Otago, New Zealand - An unusual specimen with a nice fan of twinned prismatic aragonite xls. Sawn matrix. TN, $8

ARAGONITE, Morocco - Typical somewhat brownish floater ball of twinned xls. TN, $3

ARDENNITE, Salmchateau, Belgium- One left, yellowy/orange massive in quartz, $20

ARSENOPYRITE, Romaho Mine, New Mexico - A nice complete floater 1cm xl with subdued silvery luster. $4

ATACAMITE, Tanunda, South Africa - Botryoidal green, some micro xlization, $4

AZURITE, Tsumeb, Namibia - A very nice little group of small black-blue xls with a bit of matrix, 15mm across, especially nice with a bit of magnification. $10

AZURITE, Bisbee, Arizona - A highly aesthetic grouping of xln spheres, electric blue on the front and altered to greenish/brown malachite on the back. Nice! $22

AZURITE, MALACHITE, Bisbee, Arizona - An attractive druse of zillions of tiny dark blue sparkling xls, with just a bit of acicular malachite on matrix. $8

AZURITE, Tsumeb, Namibia - Sparkling 25mm cluster of numerous blue/black prisms to about 7mm, with wee malachite balls and calcite rhombs, great under the scope, $20

AZURITE, Toussit, Morocco - A classy and unusual blue/black crystal, 20x12x7mm, with odd, somewhat ragged multiple terminations on each end, $30

BARITE, Palos Verdes Peninsula, Los Angeles County, California - An aggregate of platy tan xls, TN, $6

BARITE, STIBNITE, Carlin Trend, Nevada - A small but exquisite water-clear palest yellow 6mm barite xl, sitting up nicely, with a few smaller barites and some brilliant stibnite xls. TN, $8

BARITE, Rowley Mine, near Theba, Maricopa County, Arizona - A pair of thin tabular clear colorless xls, no matrix. Unusual locality. TN, $9

BARITE, White Pine Mine, Ontonagon County, Michigan - A nice pair of long thin xls to 20mm, colorless, with clear tips. One seldom sees a nice barite from Michigan! TN, $12

BARITE, Clara Mine, Bavaria, Germany - Tightly-packed clear colorless blades in

a druse 20mm across on matrix, not bad under the scope. TN, $6

BARITE, Stoneham, Colorado - Nice pale blue parallel growth of three xls with decent clarity and luster, $4

BARITE, Norman, Oklahoma - Typical 15mm red 'desert rose', $2

BERTRANDITE, Governour Valadares, Brazil - Glistening white massive/xln TN, $12, unusual for the mineral.

BERYLLONITE, Telirio Mine, near Corrego Frio, Minas Gerais, Brazil - Colorless crystals, mostly fairly crude, some facet-grade, HIGHLY UNUSUAL FOR THE MINERAL! 10-25 mm, priced by size and quality, $8 to $50 each

BISMUTH, Rio Quilace, Bolivia - Rounded alluvial nuggets, around 1cm across, very unusual and interesting specimens, TN's $10

BISMUTHINITE, BISMUTH, Keys Mine, Deepwater, New South Wales, Australia - A chunk of dull to silvery massive bismuthinite with minor micro native bismuth. TN, $8

BIXBYITE, Thomas Range, Utah - A super-lustrous flat-faced cube, 7mm across, with modified edges, on a small ryolite matrix. TN, $18

BLOEDITE, Soda Lake, Carrizo Plain, San Luis Obispo County, California - A superb perfect floater crystal, blackish, 20mm across. TN, $29

BOLEITE, Amelia Mine, Santa Rosalia, Baja California, Mexico - A nice sharp deep blue cube 5mm on edge, which isn't a bad size for the mineral. No matrix. TN, $15

BORACITE, Luneberg, 40 km S-SE of Hamburg, Lower Saxony, Germany - Unusually large and well-formed modified cubes, but not great on color, being mostly a dull brown. The sharpest 5mm xls are $12 each, just as big but not as well formed are $10 each; decent 4mm xls are $8 each, and smaller xls, running 2-3mm in size, great for mm's, are $4 each.

BRAZILIANITE, Linopolis, Brazil - An etched yellow-green spearpoint-shaped crystal 25mm long, $15

BROOKITE, Magnet Cove, Arkansas - A fairly rough, dull black 7mm crystal perched on brown quartz, $5

BROOKITE on QUARTZ, Magnet Cove, Hot Spring County, Arkansas - A pair of sharp metallic black brookites, 6 & 2 mm across, perched in the middle of a 27mm long doubly-terminated opaque smoky quartz xl. Very seldom are these brookites so interesting and aesthetic, a most unusual TN. $25

BUERGERITE, near Mexquitic, San Luis Potosi, Mexico - Excellent, highly lustrous black/dark brown xls to 7mm on matrix. TN, $15

CALCITE, Nova Scotia, Canada- A nice clear colorless 1cm equant xl on matrix, light on locality information, $3

CALCITE, Grant Quarry, near Greely, Ontario - A dozen available, mostly stout, large, sharp prisms sans matrix, shades of yellow, some smaller with matrix, some with phantoms, all a bit dinged. $8 each.

CALCITE, Tsumeb, Namibia - Typical plate of glassy rhombs with an olive greenish color supplied by duftite or something similar. $3

CALCITE pseudo after IKAITE, Olenitsa River, Russia - Cool dark brown spiky floater balls of xls, also a few single or triple xls to a few cm, -specify which habit you'd like- neat and unusual pseudomorph, no damage. New batch, chunky TN $6 (The photo looks a bit better than the specimens; the real thing is a bit browner.)

CALCITE, Levant Mine, Cornwall, England - Papery white blades covering matrix, $5

CALCITE, Magma Mine, AZ - A neat glistening rounded sheaf of xls, colorless, on black matrix, $8

CALCITE, Dundas, Ontario - A pair of rough yellow dogsteeth, $2

CALCITE pseudo after IKAITE, Olenitsa River mouth, Kola Peninsula, Russia - Spiky brown crystal balls, TN's $8

CATAPLEIITE, Mont Saint-Hilaire, Quebec - A colorless glassy hexagonal crystal about 4mm across embedded in matrix, $4

CAVANSITE, Wagholi Quarry, India - Superb matrix specimens with fine blue balls about 8-10mm across perched on druses of heulandite on matrix. Great display pieces, with lovely color. These are the cream of the crop, chosen from 1,500 pieces. TN's $25

CELESTINE, Pugh Quarry, Custer, Ohio - Nice translucent blue prisms on matrix, $3

CELESTINE, Maybee, Michigan - A pale blue lustrous translucent xl group that sure looks like a faden, $8

CELESTINE, Maybee, Michigan - A decent chunky colorless to blue xl, with the back showing contact damage, $6

CERUSSITE, Tsumeb, Namibia - a selection of superb TN's, all different, from $22 - $25. Miniatures and cabinet size available **here**.

CERUSSITE, Tsumeb, Namibia - Nice glassy loose little grey/white twinned group, 25x10x3mm, TN $15; loose 3cm incomplete xls, colorless, fairly clear, showing classic twinning, TN's, $20 ea.

CERUSSITE, Flux Mine, Santa Cruz County, Arizona - Typical jackstraw cluster of nice bright silky white prisms to 15mm long, $6

CERUSSITE, Broken Hill, Zambia - Typically weird cerussite; a couple of clear xls, one incomplete, on top of a black-included mass of the same, $6

CHABAZITE, STILBITE, Jaquish Road, south of Goble, Columbia County, Oregon - A) a 15mm mound of glistening, snow-like sharp white rhombohedra to 3mm on edge on a druse of white stilbites to 5mm, no matrix. 35x25x15mm, $10; B) A complete-all-around 20mm mound of sparkling white rhombs, mostly 2mm but one at 6mm, with some acicular mesolite, on a base of bladed stilbite and a bit of matrix. Cool TN, $15

CHALCOCITE with BORNITE, Flambeau Mine, Wisconsin - Typically weird, rounded little xl cluster, 15mm across, with a thin coat of bornite providing an iridescent sheen, TN $5

CHILDRENITE, Mendes Pimental pegmatite, Minas Gerais, Brazil - Really weird dull brown opaque xl, incomplete on the backside. You'd never guess this thing was a childrenite, it looks more like betafite. TN, 20mm xl, $22

CHRYSOBERYL, Espirito Santo, Brazil - Lovely yellow-brown 25x12mm loose prismatic apparently twinned xl, looks almost sceptered. Perfect and well-terminated with some gemmy sections. Modest color change depending on light source.TN, $45

CHRYSOBERYL, Ambatondrazaka, Lac Alaotra, Madagascar - These are really cool yellow partial sixling twins with good to complete transparency. Nice affordable examples. 7-12mm across, 1mm thick at the most, (supermodel-thin!) are $12 each. Xls in the 11mm range, but a more normal 3mm thick, are $15 each, only two available.

CHRYSOCOLLA, 79 Mine, AZ - Bumpy blue botryoidal, $5

CLINOZOISITE, Vesper Peak, Snohomish County, Washington - Neat dark brown lustrous fan of xls, complete all around except on one side. TN, 20mm tall, $15

COLEMANITE, Death Valley, Inyo County, California - Sparkling mounds of colorless xls to about 4mm, $6

COPPER, CUPRITE, MALACHITE, Estrella mine, Bolsico District, Chile - Dendritic xln copper embedded in cuprite with a bit of malachite. Magnification reveals that the copper is in fact crystallized. Neat TN, quite unusual.

20x15x15mm, $12

COPPER, Ray Mine, Pinal County, Arizona - Typical nice coppery branching xlizations, one 4cm across with a bit of matrix at $8, another 15mm across at $4

COPPER, Keweenaw Peninsula, Michigan - An exellent 3cm branching xl aggregate, crudely xlized, with a nice patina, $12

COPPER-SILVER 'halfbreed', near Houghton, Houghton County, Keweenaw Peninsula, Michigan - Neat loose nuggets of the two metals, tarnished. Flattened a bit from the mill rollers, 20x12mm, $4

COPPER, Onganja Mining District, ~30 km N of Seeis, Namibia - A neat crudely xln dark brown dendrite, 20x10mm. See MR V27 #2. TN, $8

CORUNDUM, Iredell Co., North Carolina - Unusual alluvial pebble, light green on the outside with a pink nodule in the core, all opaque. $10

CREEDITE, Contessa Mine, Aquiles Serdan, Santa Eulalia District, Chihuahua, Mexico - A nice spray of small sharp colorless xls with a bit of matrix. TN, $6

CROCOITE, Dundas, Tasmania, Australia - A thick, unterminated 23x10mm xl of stunning fire-red color. TN, $30

CUBANITE, Henderson #2 Mine, Chibougamou, Quebec - Superb loose crystals, bright brassy pseudohexagonal cyclic twins with no matrix from the classic locality. Nice for the price! 14mm across, $45. Nice smaller twinned xls, 8-10mm, $25 each

CUPRITE, Tsumeb, Namibia - Druses of intergrown xls on massive cuprite, $7

CYLINDRITE, Poopo, Oruro Prov., Bolivia - Small loose steely cylinders of this most unusual sulfide, a few mm thick and 10-15mm long. One of about two minerals known to crystallize like this. $8 each.

DANBURITE, San Luis Potosi, Mexico - A nice 35mm long white prism with a clear tip, damaged on the back side, with a smaller xl at the base, lustrous and very attractive, $8

DIADOCHITE, Richelle, Liege, Belgium - An off-white rounded lump 25mm across. TN, $10

DIAMOND, Vaal River, Cape Province, South Africa - Highly rounded blackish dodecahedra, just under 3mm across, size and price make up for lack of form. $10

DIAMOND, Argyle Mine, Western Australia - rounded blackish octahedra, ~3mm, $15

DIAMOND, Tshikapa, Zaire - yellowish cubes, ~3mm, $15

DIAMOND, Sewa River, Sierra Leone - rounded greenish cube, ~3mm, $15

DIAMOND, Tortia, Ivory Coast - rounded octahedra, ~2mm, $15

DIAMOND, Kasai Province, Congo - rounded yellow/greenish cube, other forms, ~2mm, $15

DIAMOND, Aikhal Mine, Yakutia, Siberia, Russia - Slightly smoky sharp 2mm octahedra, $15

DIAMOND, Argyle Mine, 200km S of Kununurra, Western Australia - Blackish/whitish 3mm rounded octahedron, $18

DIAMOND, Tshikapa, Zaire - A somewhat rough-faced 3mm cube, opaque, $15

DIASPORE, around Bafa Lake, Etibank Mines, Milas, Mugea, Turkey - A highly transparent striated palest yellow-brown prismatic xl; termination sharp but slightly contacted on the right side, back side cleaved. Quite nce for the species! 19mm tall xl, TN, $75

DIOPTASE, Tsumeb, Namibia - about 10 xls, to 5mm, on a 15mm matrix, $5; a mound of sparkling green xls to a couple of mm on a 20mm colorless calcite crystal, $15; about a dozen xls, one 10mm, on a sparkling brown matrix, choice display TN, $50

DIOPTASE, Kaokoveld, Namibia - Nice green xls, more elongated than the Tsumeb xls, with or without matrix; singles, groups or crusts, smallish TN's $7

DIOPTASE, Tsumeb, Namibia - Nice green xls, with or without matrix, TN's $10, $20

DOLOMITE on QUARTZ, Spruce Claim, WA - nice ring of tan xls around the termination of a clear colorless 15mm quartz xl, $4

DONNAYITE-(Y), Mont Saint-Hilaire, Quebec - Stout hexagonal barrels in shades of olive greenish on calcite matrix. Good xls, about 3-6 mm, on matrix, $8, $10, $16

DRAVITE, Jajarkot, Nepal - A very cute, highly transparent yellow-brown doubly-terminated crystal, 17mm long. TN, $15

DRESSERITE, DAWSONITE, Francon Quarry, Quebec - A group of off-white xl balls, each about 3mm across, altogether about 10mm across, with minor micro dawsonite, on sawn matrix. Magnification reveals the dresserite xls making up the spheres are nicely terminated. A couple of other balls are split open, revealing the bright white radiating xlization. The most aesthetic dresserite specimen I have

ever seen. This is a mineral that hardly ever gets big, from the type locality, which is now essentially defunct. If you need to add some rarity to your competition thumbnail display, this is the piece for you. 25mm across, TN, $90

DYSCASITE, Kuber Schacht, Pribram, Bohemia, Czech Republic - A small sparse xl group; interesting specimen of one of the rarer silver minerals, very seldom found in xls. TN, 22mm tall, $40

ELBAITE, Lavra do Pederneira, Santa Maria do Suasui, Minas Gerais, Brazil - Fine color-zoned prisms 25-30 mm long, nicely terminated, with red tips and almost purplish bases; the color is hard to describe. Good luster, mostly translucent to opaque--> NICE! $18 each

ELBAITE, Arqueana Mine, Itinga, Minas Gerais, Brazil - Exquisite transparent green prisms, most with slightly darker terminations. Facet-grade material, saved from the cutters. Crystals about 1cm long are $8; crystals in the 15-25mm range, some with opaque lower halves, are $12 each.

ELBAITE, Newry, Maine - Small polished slab of watermelon tourmaline from an ever so classic location, showing the succession from red centres to colorless to olive to dark green/black skins, quite neat. 3mm thick, 11mm across, $20

ELBAITE, Minas Gerais, Brazil - An unterminated bluish crystal section in mica matrix, the entire crystal is hollow, the walls are 1mm thick - talk about unusual! $20

ELBAITE, Minas Gerais, Brazil - A slender 20x4mm black prism, dark green when backlit, with a nice termination, $4

ELBAITE, Minas Gerais, Brazil - A small 14mm cluster of dark green unterminated prisms and needles, $4

ELPIDITE, Mont Saint-Hilaire, Quebec - dull grey prismatic xln, TN's $3

ELPIDITE, Mont Saint-Hilaire, Quebec - a rather good 30x15mm jackstraw cluster, $10

ENARGITE, PYRITE, Butte, Silver Bow County, Montana - A superb pair of xls, the main one 10x10mm, with a little pyrite. Unusually aesthetic, classic locality. TN, $45

EOSPHORITE, Rio Jequitinhonha, Minas Gerais, Brazil - A pile of tabular brown blades to about 4mm with some other micro species. TN, $9

EPIDOTE, Green Monster Mine, Prince of Wales Island, Alaska - A nice thick dark green doubly terminated twinned loose xl. Nice luster but some contact damage. 20x17x9mm, TN, $15

EPIDOTE, Knappenwand, Austria - A small green/black xl, lustrous, with a stepped multiple-termination, 9x8x4mm, $10.

EPIDOTE, QUARTZ, Mineral County, Nevada - 5 dark green epidote prisms to 2cm with a jumble of milky quartz xls of the same size, nice combo, $14

EPIDOTE, Mineral County, Nevada - cute little specimen with a 10mm epidote and a 5mm quartz, $5

EUDIALYTE, Kangerdluarssuk, Ilimaussaq, Greenland - A well-formed partial single xl, dark red/brown, with good flat faces. Nice size. 15x13x10mm, $20

FEITKNECHTITE, Noda-Tamagawa Mine, Iwate Prefecture, Japan - Massive brown chunks in the 2cm range, $6

FLUORAPATITE, Sceptre Claims, Emerald Lake, Yukon Territory, Canada - Delightful mint-green crystals, totally gemmy, with cool terminations. TNs, 11-15mm long, $6 each

FLUORAPATITE, Nuristan, Afghanistan - A dull, rounded, incomplete, doubly terminated, opaque, purple 10mm xl on a bit of quartz matrix, $6

FLUORAPATITE, Cerro Mercado Mine, Mexico - Exquisitely transparent yellow-green prism, sharply terminated, 17mm long, TN, $5

FLUORAPOPHYLLITE, PREHNITE, Loudoun County, Virginia - A very aesthetic colorless xl 12mm across perched atop a plate of green prehnite. TN, $15

FLUORAPOPHYLLITE, PREHNITE, Bull Run, Loudoun County, Virginia - A nice pearly 9mm xl on a druse of prehnite on matrix. Nice TN, $6

FLUORAPOPHYLLITE, Poona, India - A very clear, pale mint-green xl rising up from matrix, TN, $15

FLUORAPOPHYLLITE, Bombay, India - Four fairly nice colorless xls to 10mm, topped with a bit of prehnite and a couple of dozen tan gyrolite balls, $8

FLUORITE, Wallworth, New York - A sharp and utterly transparent, colorless, parallel-growth cube cluster, 9mm, $12

FLUORITE, Dundas Quarry, Ontario - yellow/brown generally imperfect cubes, 10-15mm, little or no matrix, TN's $3

FLUORITE, Florence Mine, Beckermet, England - A small druse of clear cubes on a thin skin of hematite, pale blue on the edges and dark in the centre. $6

FLUORITE, Heights Mine, Weardale, England - 20mm dinged green cube with a couple of others, not pretty but only $5

FLUORITE, Mt.White, CO - Rounded opaque pale green octahedra to 15mm, $14

FLUORITE, Elmwood, Tennessee - A nice purple 15mm cube with a smaller one on sphalerite, slightly dinged corners, $7

FLUORITE, Cookes Peak, Luna Co., AZ - Small plate of tiny purple cubes, $3

FLUORITE, Pays Plat occurrence, 12 km west of Rossport, Ontario - A crust of opaque dark purple/black cubes to 6mm, $4

FLUORORICHTERITE, Earle Property, Wilberforce, Ontario - Good black tabular terminated xls in the 15-30mm range, $3

GALENA, SIEGENITE, Buick Mine, Viburnum Trend, Iron County, Missouri - A cool tabular 15mm spinel twin, with minute sparkling siegenite xls (also twinned, great with magnification) on the front and some dolomite on the back. Unusual and interesting. TN, $20

GALENA, Buick Mine, Viburnum Trend, Iron County, Missouri - A very cool steely pseudo-hexagonal spinel twin crystal, 17x12x3mm. $15

GALENA, Reynolds County, Missouri - A nice steely cube 16mm on edge, sitting very prettily on a bit of matrix. A couple of corners are incomplete but it's still highly aesthetic. $12

GALKHAITE, Getchell Mine, Nevada - very small dark red cubes of this rare sulfosalt, 1mm or less, on matrix, most with excellent micro potential, TN's $20,30,40

GEARKSUTITE, Boulder County, Colorado - A chalk-white mass 20mm across. TN, $5

GILLESPITE, **SANBORNITE**, La Madrelena Mine, Mexico - Bright red cleavages in white sanbornite, TN's $6

GOETHITE ps. PYRITE, Hiddenite, NC - Nice sharp 16mm brown cube with a smaller one at it's base, $4

GOLD, Olinghouse Mine, Washoe County, Nevada - A band of bright, tiny, needle-like xln gold on matrix. Appreciable with the naked eye and lovely under the scope. $75

GOLD, Mirage Claim, near Bissett, Manitoba - Bright, small but visible gold masses to a few mm max in quartz. Small quartz matrices. On the pricy side because this is a rather unusual locality - whooda thunk there's gold in Manitoba of all places? TN's $10

GOLD, Columbia Basin, Helmville, Powell County, Montana - A 5x3x0.5mm loose

nugget from an unusual locality. TN, $10

GORMANITE, Big Fish River, Yukon -A thin plate of small dark green needles, none too aesthetic, $4

GOYAZITE, Linopolis, Brazil - 15-20mm solid clusters of 1mm rhombohedrons with augelite/brazilianite crystals associated, best appreciated with magnification, TN's $20

GRATONITE, Excelsior Mine, Cerro de Pasco, Peru - A small steely xl cluster of one of Peru's rarest sulfides. A number of the xls are incomplete, but at least a dozen are terminated. Smallish TN, 12mm, $20

GROSSULAR, York River Skarn Zone, near Bancroft, Ontario - Nice orange xls, clusters and singles, 5-30mm, generally imperfect, TN's $5

GROSSULAR, Coahuila, Mexico - A single sharp opaque yellowish 12mm dodecahedron with somewhat rough faces, $2

GYPSUM, Folkstone, Kent, England - Pair of crude floater sand-included platy xls, $3

GYPSUM, Baja California, Mexico - fair platy rosette, $2

GYROLITE, OKENITE, PREHNITE - Bombay, India - Nine or more cute 3mm greenish-brown spheres on a colorless prehnite druse with a bunch of acicular white okenite, $3

HEMATITE, Gotthard, Tessin, Switzerland - A small black iron rose perched on matrix, 10mm across and almost as thick. Classic stuff. A smallish TN, the photo makes it look bigger than it is. $25

HEMATITE pseudo MAGNETITE, Digby, Nova Scotia, Canada - A nice group of sharp brown octahedra, no matrix. TN, $4

HEMIMORPHITE, Ojuela Mine, Mexico - A neat, almost solid spray of xls that spanned the vein; the sides are contacted but the terminations are nicely exposed, 25x20mm, $8

HEMIMORPHITE, Ojuela Mine, Mexico - Nice little cluster of clear colorless tabular xls, $4

HEMIMORPHITE, 79 Mine, AZ - Four glistening connected 6mm botryoids on matrix, quite nice, 20x12mm, $15

HERDERITE, Linopolis, Minas Gerais, Brazil - matrixless clusters of opaque brown bladed xls, good inexpensive specimens, only $8 each

Green HEULANDITE, Aurangabad district, Maharashtra State, India - Very cool TNs, with weird green color caused by microscopic inclusions of a chlorite group mineral. Nice xl clusters, some singles, running 15-20mm across, only $5 each. A few extra-nice larger clusters, 30-40mm across, at $10 each. **INESITE**, Wessels Mine, South Africa - Orangey/brown druses, sprays, TN's, $10, one at $20

HUBNERITE, FLUORITE, Silverton, Colorado - Countless thin red/black tabular hubnerite blades, with tiny fluorite cubes, on a bed of solid quartz xls. Really, really nice under the scope! Biggest xl is about 5mm long. 30mm TN, $12

JEREMEJEVITE, Ameib Farm, Erongo Mountains, Namibia - Small blue crystal sections from this recent find, 7-12mm long, $8 each. Nice long prismatic terminated crystals, colorless, yellowish, to pale blue, 9-14mm long, $15 each.

KALIPYROCHLORE, Lueshe Deposit, Kivu Province, Congo - A loose 3mm octahedron, tan, somewhat rough. $20

KERMESITE, Lac Nicolet Antimony Mine, Quebec - Rich deep maroon solid silky sprays, with minor stibnite and perhaps others, small TN's $10

LAVENDULAN, Mazarron area, Murcia Province, Spain - Electric-blue lustrous xln film on a 20x15mm surface, attractive, unusual locality. TN, $30

LAZULITE, Rapid Creek, Yukon - A very large, 14mm! xl with a couple of others, plus siderite and quartz, $35

LEIFITE, Mont Saint-Hilaire, Quebec - superb matrixless solid acicular sprays of silky white leifite, really nice, inexpensive specimens of this beryllium silicate, TN's $10 each

LEIGHTONITE +? Chuquicamata, Chile - Sparse sky-blue powdery leightonite with veinlets and a micro xl or two of an unknown green mineral. TN, $20

LEUCITE, Caserta, Italy - Nice opaque white pair of xls, the main one 20mm across. Faces are dull and edges a bit rounded, looks much like an analcime xl that's been weathered for a few hundred years. TN, $8

LIBETHENITE, Mindola Open Pit, Rokana Mine, near Kitwe, Zambia - See Min Rec V9#6 - KILLER THUMBNAILS from the locality that has produced the world's best libethenite. Dark green lustrous crystals; loose and on matrix, $25 to $90.

LINARITE, BROCHANTITE, QUARTZ, Los Azules Mine, 345 km E of Copiapo, Copiapo Province, Chile - Colorful but not very well xlized deep blue linarite coating quartz xls - most unusual!, with minor brochantite. TN, $10

MAGNETITE, (CUBIC XLS!) 2500' Level, Fowler Orebody, ZCA #4 Mine, Balmat, New York - Excellent examples of this unusually rare form; cubic magnetite is

known from perhaps five or six localities at the most, and from what I can recall, all but the Balmat xls are very micro indeed. These are really nice sharp black cubes averaging about 8mm on edge, just dandy TN's, a mere $10 each.

MALACHITE, Globe, AZ - Nice solid velvety acicular with mssv azurite, $5

MANGANITE, Caland Mine, Atikokan, Ontario - Solid druses of lustrous black tabular xls to a few mm long, crystal crusts of essentially pure manganite, most without matrix, $4 each.

MELLITE, Csordakut Mine, Tatabanya, Hungary - A pair of connected brown xls, well formed and with decent luster, the largest 22mm across. That's just under an inch, and that is a good sized mellite xl. One corner of the main xl is missing, and there is one other contact, otherwise nicely formed. Nice blue FL under SW. An unusual mineral found in coal mines, perhaps a half dozen localities known. TN, $75

META-AUTUNITE, Streuberg Quarry, near Bergen, Vogtland District, Saxony, Germany - Fine thumbnails and small miniatures, bright yellow-green and beautifully crystallized, little or no matrix. Radioactive, with intense dayglo fluorescence under SW UV. Spectacular specimens, $35-75

MICROCLINE, Teller County, CO - A terminated 3cm milky green xl, backside incomplete, $5

MILLERITE, Halls Gap, Lincoln County, Kentucky - Geode fragments with varying quantities of wispy acicular brassy millerite, from a locality that is now closed to collecting, $3 and $8, plus one nice little 15mm geode half with lots of millerite at $10

MIMETITE, Hat Yai Province, Thailand - Strange and cool lemon-yellow lustrous crystals, 14-20mm across, showing hopper growth. Neat TN's from this new locality, only $15 each.

MIMETITE, Tsumeb, Namibia - A wee 15mm cluster of spiky yellow xls, no matrix, $10

MOLYBDENITE, Moly Hill Mine, near Malarctic, Preissac Township, Abitibi County, Quebec - Excellent sharp thin hexagonal bluish silvery xls on quartz matrix. Excellent examples, TN-min, $9-$19

MOLYBDENITE, Malarctic, Que - A pair of lustrous rounded hexagonal xls to 6mm in quartz matrix, $4

MOLYBDENITE, Val d'Or District, Quebec - A large silvery blue matrixless crystal, 23mm across, edges somewhat rough but with obvious hexagonal form, $8

MONOHYDROCALCITE, South Maricopa Mountains, Maricopa County, Arizona - Porous light brown masses, about 10-15mm, $6

NEPTUNITE, Benitoite Gem Mine, San Benito Co., Calif. - A lustrous black well terminated 6mm prism on white massive natrolite on matrix, $6

MUSCOVITE, Linopolis, Minas Gerais, Brazil - Excellent platy yellow/green xls in clusters, some twinning but unfortunately none repeated enough to form the cool stars. Attractive TN's, mostly floaters, averaging 25mm across, $5 each. One nice larger cluster, 40x25x25mm, at $8

NATROLITE, Ice River Complex, ~25 km south of Field, British Columbia, Canada - Excellent colorless to white crystals, some gemmy, some doubly terminated. Unusual location; most of the interesting mineral areas are in a National Park, but not all, these were collected outside the park boundaries and are hence legal. About a three day hike through the Rocky Mountains I'm told, so don't expect to see much coming out. $14-20

NATROLITE, APOPHYLLITE, ANALCIME, Lincoln Creek Quarry, near Doty, Lewis County, Washington - B) a wild jumble of natrolite needles to 15mm among countless clear colorless apops to ~8mm with some 1mm analcimes, superb with magnification! TN, $12

NEPHELINE, Kertzenbuckel, Erbach, Germany - Really neat loose xls, opaque buff-colored, 7mm across. Two available, pretty much identical, $15 each.

NEPTUNITE on NATROLITE, Benitoite Gem Mine, San Benito County, California - Lovely lustrous sharp black prismatic multiple crystal on pure white natrolite matrix. Neptunite is 16mm long. Superb, aesthetic specimen for the TN lover! $45

NORMANDITE, Mont Saint-Hilaire, Quebec - Quite rich silky orange blotches on matrix, all appreciable without magnification, smallish specimens, $12 and $15

ORTHOCLASE, West Maroon Creek, Colorado - A nice sharp loose blocky greyish ~30mm simple xl. TN, $5

ORTHOCLASE twin, West Maroon Creek, Colorado - A textbook-quality Carlsbad twin, very sharp, opaque, sort of tan colored. Really neat example of one of the coolest of all twins. 25mm tabular floater xl. TN, $10

PARAVAUXITE, Llallagua, Potosi, Bolivia - A superb xl bowtie, palest green, lustrous, 15mm across, no matrix. Beautifully mounted on a glass rod. Great TN, lousy photo! $75

PETALITE, Genipapo Mine, near Taquaral, Minas Gerais, Brazil - Highly gemmy colorless prismatic crystal fragments, a small degree of xlization present, far more than the usual formless masses available. A rare gem rough saved from the

cutters. TNs, 15-25mm long, $10 each; chunkier pieces, 25-35mm long, $15 each

POTASSIUM ALUM, near Silver Peak, Nevada - yeah, it's a real mineral, ice-like 2cm chunks TN $6

PREHNITE, Jeffrey Mine, Asbestos, Quebec - A white 20mm long xl, habit similar to that of a highly elongated anatase xl. Common mineral, rare in large single crystals. This locality is pretty much kaput. TN, $30

PREHNITE, Bombay, India - Cute little light green cross, prehnite replacing laumontite, $4

PREHNITE cast after LAUMONTITE, Bombay, India - A cute very slightly divergent pair of long pale green xln casts 4cm long. $6

PROBERTITE, Borax Pit #3, near Ryan, Inyo County, California - Whitish/tan colored sort of fibrous/xln fragment. TN, $10 Not worth photographing, you'll have to use your imagination.

PYRITE, Road cuts near Sherbrooke, Quebec - Typical cubes in grey matrix; almost perfect 6mm $4, a 7mm cube with a few nicks for $3

PYRITE, Quiruvilca, Peru - Nice cluster of complex xls to 10mm with cool striae, $4

PYRITE, Trabzon, Turkey - Nice floater 7mm octahedron, $5

PYROLUSITE, Taylor Mine, Minnesota - black blades in a quartz-lined cavity, two sawn faces on the back can't be seen easily, $4

PYROMORPHITE, 14 level, 18 stope, Brown vein, Bunker Hill Mine, Kellogg, Idaho - A neat little doubly terminated brown xl 10mm long on a small bit of matrix. TN, $4

PYROMORPHITE, Phoenixville, PA - Small dark green xls from this ancient classic locality, just over 10mm long. $5

PYROMORPHITE, Les Farges Mine, Ussel, Correze Department, France - Typical small brown xls with yellow caps, about 2mm long, on matrix, $8

QUARTZ, Herkimer, New York - A fine 15mm colorless xl, clear but with internal flaws, with a smaller xl on matrix. The smaller xl is incomplete and the back of the main xl is slightly flawed, but the view from the front is great. $15

QUARTZ, Mt. Ida, Arkansas - Nice floater pair of doubly terminated clear colorless parallel xls, $5

QUARTZ, Middleville, NY - A 20mm cluster of fine clear xls, varying from

colorless to yellow to black due to inclusions and probably iron staining, odd, $14

QUARTZ, variety ROSE, Minas Gerais, Brazil - Palest to nicely pink rose quartz in varying degrees of crystallization, $5, $10, $12

QUARTZ, Lincoln County, NM - A couple of nice clear smoky prisms to 10mm on a little bit of matrix, $5

QUARTZ, CHLORITE, Jessieville, Arkansas - Doubly terminated 27mm long prism, clear, showing green chlorite inclusions in the bottom half. A couple of contacts on side and back. $5

QUARTZ, HEMATITE, Quartzite, Arizona - Clear colorless prisms to 10mm with a couple of good black lustrous hematite xls, $15

QUARTZ scepter, King County, Washington - A fine clear colorless 25mm long scepter with a normal xl crossing it at an angle at the base. $25

QUARTZ, variety AMETHYST, Hickory, North Carolina - An odd little pair of crystals looking a bit like pale purple herkimers, ever so glassy, partially double-terminated, 15mm across, $5

QUARTZ, ANKERITE, Pedro Pipe, King County, Washington - A slightly flattened clear colorless 20mm xl with small brown ankerites to ~3mm on its back and top. $5

QUARTZ Bahia, Brazil - A 2cm prism, contacted on a couple of sides, rendered mostly opaque and red by a phantom inclusion, clear and colorless on the tip. Kinda neat. $5

QUARTZ, SPHALERITE, Casapalca, Peru - Numerous small clear colorless prisms to about 10mm long on a plate of black xln/cleaved sphalerite, $8

QUARTZ, Musclow Road Cut, Bancroft, Ontario - A druse of small amethystine xls to about 5mm, some with micro hematite/goethite inclusions. $2

QUARTZ, Birds Creek, Bancroft, Ontario - A sparkling druse of small 5mm smoky xls, $2

RHODIZITE, Tsilaisina, 50 km S of Antsirabe, Madagascar - Small but fairly nice sharp yellow dodecahedra, 3mm across, known from perhaps a half dozen localities, $5 each

RHODOCHROSITE, La Capillita Mine, Catamarca Province, Argentina - A polished slice the size of a quarter, ~2mm thick. Quite pretty. TN, $22

RHODOCHROSITE, Mont Saint-Hilaire, Que - Nice little translucent dark red 5mm rhombohedral xl, $5

RHODOCHROSITE pseudomorphs after EUDIALYTE - Mont Saint-Hilaire, Quebec - Small brown, somewhat crude crystals, replaced by solid rhodochrosite, the exteriors a druse of tiny rhodo xls, the original eudialyte xl form still appreciable. Pretty darn unusual. 10-25mm singles or clusters, $15 each

SCAPOLITE, Brazil - Loose gem xls, clear yellow striated prisms, with lovely terminations, around 1cm long, thin to thick. I saved these from being turned into cut stones. $8

SCHORL, Little 3 Mine, Ramona, San Diego County, California - A sharp and lustrous black 15mm prism in a clump of xln white feldspar, classy! $25

SENARMONTITE, Djebel Hamimat Antimony Mine, near Constantine, Algeria - I was very surprised to acquire a nice lot of these, they're from Germany's Senckenberg Nature Museum, and the label was dated 1910! Senarmontite is not very rare, but it hardly ever comes in crystals over a few millimeters. These are loose octahedra, grey to sort of off-white, with a bit of bruising around the edges, having been stored together for the last ninety years or so; not exactly lookers but great for the mineral. The best is 9mm on its longest edge, with a couple of much smaller xls attached on the backside, at $20. 8mm+ xls are $15 each; 6mm+ xls are $10 each; and 4mm+ xls are $6 each. Classic old stuff!

SERANDITE, Mont Saint-Hilaire, Quebec - The thin tabular pink habit: 25-30mm crystals, mostly multiple xls or sheaves of xls, all terminated but none absolutely perfect, $12 each.

SERANDITE: The thick pinkish-orange habit: A good sized xl with cleaved right side prism face, bumpy pink exterior from secondary xlization, 26x18x12mm, $40

SHORTITE, Mont Saint-Hilaire, Quebec - Nice chunks of bright yellow massive shortite, $10 each

SIDERITE, Brookfield, NS - Fair brown rhombs to 8mm, sawn back, $3

SIDERITE, ANKERITE, Mont Saint-Hilaire, Quebec - typical sharp brown rhombs, loose,12-25mm across, with a thin skin of epitaxial lighter brown ankerite, $5-8. A 25mm xl, shades of brown, sans ankerite coating, the main face, triangular, being either a modification of the basic rhombohedron which I can't figure out or a product of twinning, as in the Min Rec MSH issue photo on p.338. Not pretty but interesting, $6. A nice sharp brown 10mm xl with others in a vug in matrix, TN $6

SILVER, Silverfields Mine, Cobalt, Ontario - An aggregate of fine, thread-like silver wire, 15mm across, the biggest wire is about 6mm long. Very old specimen! TN, $25

SILVER, Batopilas, Chihuahua, Mexico - An utterly superb xlized herringbone sort of wire, no matrix. 15mm across, 30mm long if straightened out. Incredibly

aesthetic! TN, $75

SILVER, Batopilas district, Chihuahua, Mexico - Exceedingly cute micros or small thumbnails, matrixless arborescent xl groups, rounded to very sharp, 8-13mm across. Your choice, $8 each.

SILVER, Batopilas, Mexico - Sparse spiky xln to 3mm in etched calcite on matrix, best with magnification, $8

SILVER, Sarbay Deposit, North Kazakhstan - Neat sinuous little single wires, no matrix, about 10mm long, small TN's $6

SILVER, Zacatecas, Mexico - Cute little curly wires to a few mm on a smallish matrix, $6

SILVER, Gowganda, Ontario - A bright paper-thin leaf of native silver about 1cm square on a small matrix, $5

SPESSARTINE, Garnet Hill, White Pine Co., Nevada - A flat-faced, lustrous, sharp black 1cm xl, with a bit of contact damage, on matrix. Classy. $10

SPHALERITE, Dundas Quarry, near Hamilton, Ontario - complex black xls under 10mm on limestone, TN's $4; 2cm xl groups, TN's $5

SPINEL, Mogok, Burma - Intense red octahedra, most well-formed and gemmy, 2-4 mm across, $5 each

STIBNITE, Baia Sprie, Romania - A wild busy cluster of zillions of silvery needles to 25x1mm, $12

STIBNITE, Herja, Romania - Very classy group of bright black interlocking sprays, $15

STIBNITE, Oaxaca, Mexico - A decent 20mm solid silvery spray, $4

STILBITE, Poona, India - 25mm pearly pinkish "Roman sword" xl on apophyllite, incomplete near the base, $6

STILBITE, Centreville, VA - Cool little 7mm yellow/orange ball on matrix, $5

THENARDITE, Searles Lake, San Bernardino County, California - A 30mm xl cluster, sort of greyish-white, composed of one large and several small xls. A good example of the species. TN, $15

TOPAZ, Tanagama, Yama, Japan - An excellent loose clear colorless xl, almost as wide as it is tall, and beautifully terminated, 15x14x9mm, $20. Also smaller xls, running about 8mm long and 2-4mm across, decent TN's or large micros, $6 each.

TOPAZ, Thomas Range, UT - A beautiful lustrous brown xl 25mm long, both ends unfortunately cleaved, with a few other topaz xls and superb micro bixbyite xls, $8

TURQUOISE, Gunneath China Clay Pit, Cornwall, England - A pale blue to robins egg blue chunk of chalky turquoise with a bit of quartz. Tiny vugs are lined with extremely tiny xls, with 45x you just pick up the glinting xl faces, might be very cool if you have access to a SEM. An unusual old locality, one of the two dozen or so that have produced **turquoise xls**. TN, $20

TURQUOISE, Bishop Mine, Lynch Station, Campbell County, Virginia - A 12mm specimen composed mostly of blue-green turquoise with a bit of xlization visible under the scope. $5

UVITE, Brumado, Bahia, Brazil - Nice green xls in small, medium, and large, at $3, $7, and $14 ea

UVITE, Pierrepont, NY - Lustrous loose black xls, most with imperfections, TN's $5

VANADINITE (ARSENIAN) Ahumada Mine, Los Lamentos, Mexico - A small (10mm) matrixless pair of lustrous brown xls looking much like bunny ears, $2

VANADINITE, Mibladen, Morocco -#2- A similar piece with a chain of xls along the edge of the matrix, $25

VANADINITE, Mibladen, Morocco - Nice red xls to 5mm on a chip of matrix, $8

VANADINITE, San Carlos, Mexico - A half dozen unusual tan hexagonal barrels to 5mm with xln calcite, $4

VANADINITE (ARSENIAN), Los Lamentos, Mexico - An attractive, rich brown, super-lustrous group of mostly hollow, incomplete xls to about 20mm, $8

VARISCITE, Avant, Garland County, Arkansas - A sparkling green druse of minute xls, about 20x15mm across on matrix, $5

VILLIAUMITE, Mont Saint-Hilaire, Quebec - good very dark red to black chunks and patches with other stuff, around 15mm TN's, good examples, $10

VIVIANITE, LUDLAMITE, Big Fish River, Yukon Territory, Canada - A couple of these, C) and D), are thumbnails.

VIVIANITE, Huanuni, Bolivia - Nice sprays of slim blue xls, $6

WULFENITE, MIMETITE, Santa Ana Mine, Siera Gorda, Antofagasta, Chile - Small but beautiful crystals from an unusual locality. The best are a fabulous red-orange and exquisite with 20x or so, mostly thick tabular but some pseudo-octahedral xls. Varying quantities of mimetite are present, in minute

orange needles, sprays: **WULF3** - The nicest thumbnail, with a fiery orange 2mm xl, very cute. $22

WULFENITE, Tsumeb, Namibia - Two nice loose xls, one thick at $15 and one thin, unfortunately scratched up but transparent and a good size, at only $6.

WULFENITE, Mezica Mine, Slovenia, Yugoslavia - A 2cm cluster of small brown thick tabular xls to 4mm; the main faces dull but the xl edges lustrous. Classic locality, $15

WULFENITE, Los Lamentos, Chihuahua, Mexico - Typical brownish orange blocky xls, xl groups, $2, $4, and $10

WULFENITE, near Lone Mtn., Broadwater Co., Montana - Lustrous orange tablets a few mm across, on 15-30mm matrices, all TN's, $8 each

WULFENITE, Harrington-Hickory Mine, Beaver Co., Utah - Very nice rich specimens, 20-50mm across, with orange blades to about 5mm, TN's to min's, $8 each

WULFENITE, Rowley Mine, AZ - The thinnest bright orange tablets to 7mm on matrix, $6

WULFENITE, Los Lamentos, Mexico - glistening brown masses of xls to 3mm, $6 - $8

XENOTIME-(Y), Nova Horizonte, Bahia State, Brazil - Good lustrous loose brown xls or parallel xl groups, mm-TN. 8mm xls $5; 10-14mm xls $8; 17mm xls $15, and a few jumbo xls, 20-23mm at $20 each.

ZIRCON, Mont Saint-Hilaire, Quebec - A nice lustrous sharp brown bipyramid, 7mm across, contacted in a few spots, sitting up nicely on matrix, $5

ZIRCON, Mont Saint-Hilaire, Quebec - A nicely formed brown bipyramid, 3 corners imperfect. Good size for the locality, 11x10x10mm, $9

ZIRCON, Saranac Mine, Bancroft, Ontario - A dark brown xl 15 mm long, good for the locality, $8

ZIRCON, Saranac Mine, Bancroft, Ontario - A couple of decent 8mm xls in matrix, $5

ZIRCON, Natividade, Goias, Brazil - Good large bipyramids in shades of brown, nice pure matrixless xls, big enough to demonstrate why zircon is considered a heavy mineral. Xls running 12-15mm across, only $6 each! A few larger xls, at 22mm+ are $10 each, and one big honker, not very well formed but 35x20x20mm at $14.

ATTACHMENT 23

USGS BULLETIN ENTITLED CONTRIBUTIONS TO ECONOMIC GEOLOGY AT 369-371

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
GEORGE OTIS SMITH, DIRECTOR

BULLETIN 380

CONTRIBUTIONS

TO

ECONOMIC GEOLOGY

1908

PART I.—METALS AND NONMETALS, EXCEPT FUELS

C. W. HAYES AND WALDEMAR LINDGREN
GEOLOGISTS IN CHARGE

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CONTRIBUTIONS TO ECONOMIC GEOLOGY, 1908, PART I.

C. W. HAYES and WALDEMAR LINDGREN, *Geologists in charge.*

INTRODUCTION.

By C. W. HAYES, *Chief geologist.*

This bulletin is the seventh of a series, including Bulletins 213, 225, 260, 285, 315, and 340, Contributions to Economic Geology for 1902, 1903, 1904, 1905, 1906 (Part I), and 1907 (Part I), respectively. These bulletins are prepared primarily with a view to securing prompt publication of the economic results of investigations made by the United States Geological Survey. By means of the bibliographies accompanying the several groups of papers they also serve as a guide to the economic publications and afford a better idea of the work which the Survey as an organization is carrying on for the direct advancement of mining interests throughout the country than can readily be obtained from the more voluminous final reports.

The first two bulletins of this series included numerous papers relating to the economic geology of Alaska. In view of the rapid increase of economic work, both in Alaska and in the States, and the organization of a division of Alaskan mineral resources distinct from the division of geology, it was in 1905 considered advisable to exclude all papers relating to Alaska. These were brought together in a separate volume entitled "Report of progress of investigations of mineral resources of Alaska in 1904," Bulletin 259. A similar segregation of papers relating to Alaska has since been made and published annually.

During 1906 a further change in the arrangement of the economic bulletin seemed desirable. The former section of iron ores and non-metallic minerals was divided and M. R. Campbell was placed in charge of a new section devoted to the investigation of fuels. This change in Survey organization was used as a basis for a separation of the economic bulletin, based on subjects. The present bulletin

is therefore restricted to the work of the Survey in 1908 in the metals, structural materials, and other nonmetals except fuels. A separate bulletin will be issued later (Bulletin 381) relating to Survey work on coal, lignite, peat, oil, and gas.

The papers included in the present volume are such only as have a direct economic bearing, all questions of purely scientific interest being excluded.

The papers are of two classes—(1) preliminary discussions of the results of extended economic investigations, which will later be published by the Survey in more detailed form; (2) comparatively detailed descriptions of occurrences of economic interest, noted by geologists of the Survey in the course of their field work, but not of sufficient importance to necessitate a later and more extended description.

The papers have been grouped according to the subjects treated and each group has been issued as soon as ready, in advance of the complete bulletin. At the end of each section is given a list of previous publications on that subject by this Survey. These lists will be serviceable to those who wish to ascertain what has been accomplished by the Survey in the investigation of any particular group of mineral products. They are generally confined to Survey publications, though a few titles of important papers published elsewhere by members of the Survey are included.

Material assistance in the preparation of this volume has been rendered by W. C. Phalen, and to him is largely due the promptness of its publication.

The results of the Survey work in economic geology have been published in a number of different forms, which are here briefly described:

1. *Papers and reports accompanying the Annual Report of the Director.*—Prior to 1902 many economic reports were published in the royal octavo cloth-bound volumes which accompanied the Annual Report of the Director. This form of publication for scientific papers has been discontinued and a new series, termed Professional Papers, has been substituted.

2. *Bulletins.*—The bulletins of the Survey comprise a series of paper-covered octavo volumes, each containing usually a single report or paper. These bulletins, formerly sold at nominal prices, are now distributed free of charge to those interested in the special subject discussed in any particular bulletin. This form of publication facilitates promptness of issue for economic results, and most economic reports are therefore published as bulletins. Their small size, however, precludes the use of large maps or plates, and reports containing large illustrations are issued in the series of professional papers.

3. *Professional Papers.*—This series, paper covered but quarto in size, is intended to include such papers as contain maps or other illustrations requiring the use of a large page. The publication of the series was commenced in 1902, and the papers are distributed in the same manner as are the bulletins.

4. *Monographs.*—This series consists of cloth-bound quarto volumes, and is designed to include exhaustive treatises on economic or other geologic subjects. Volumes of this series are sold at cost of publication.

5. *Geologic folios.*—Under the plan adopted for the preparation of a geologic map of the United States the entire area is divided into small quadrangles, bounded by certain meridians and parallels, and these quadrangles, which number several thousand, are separately surveyed and mapped. The unit of survey is also the unit of publication, and the maps and descriptions of each quadrangle are issued in the form of a folio. When all the folios are completed, they will constitute a Geologic Atlas of the United States.

A folio is designated by the name of the principal town or of a prominent natural feature within the quadrangle. It contains topographic, geologic, economic, and structural maps of the quadrangle, and in some cases other illustrations, together with a general description.

Under the law copies of each folio are sent to certain public libraries and educational institutions. The remainder are sold at 25 cents each, except such as contain an unusual amount of matter, which are priced accordingly.

Circulars containing complete lists of these folios, showing the location of the quadrangle areas they describe, their prices, etc., are issued from time to time and may be obtained on application to the Director of the United States Geological Survey. The following list shows the folios issued since January 1, 1908, and in an advanced state of preparation, also the economic products discussed in the text of each, the products of greatest importance being printed in italic:

SALINES.

)DIUM SULPHATE IN SODA LAKE, CARRISO PLAIN, SAN LUIS OBISPO COUNTY, CALIFORNIA.

By RALPH ARNOLD and H. R. JOHNSON.

INTRODUCTION.

The deposits of sodium sulphate described in this paper are found ı the lowest portion of the Carriso Plain, which extends along and ·ithin the northeast boundary of San Luis Obispo County, Cal. 'he lake known locally as Soda Lake, or Salt Lake, in the bed of /hich this salt occurs, lies wholly within T. 31 S., R. 19 E., and ·. 31 S., R. 20 E., and is about 12 to 15 miles west-southwest of /cKittrick, Kern County, the nearest railroad station. Soda Lake ·eceives the drainage from the Carriso Plain and the adjoining lanks of the bounding ranges, the total catchment basin being ;omewhat over 525 square miles in extent. The lake has a length)f about 5 miles and a maximum width of a little over a mile, and includes an area of nearly 3,000 acres. It remains practically dry except in extraordinarily wet seasons. The region in which the deposits occur is of the arid type characteristic of the intermontane valleys of California away from the coast. The Carriso Plain has a length of about 40 miles and an average width of 12 or 15 miles and extends parallel to the inclosing mountains—the Caliente Range on the southwest and the Temblor Range on the northeast. The lowest point in the plain lies at an elevation of about 1,925 feet above sea level.

Rainfall records for this region are not available, but the precipitation is probably about the same as that of the west side of the San Joaquin Valley—between 5 and 10 inches annually. No axial stream flows through the Carriso Plain, although numerous small gulches and canyons, whose mouths debouch upon the gravelly slopes of its margin, enter from both sides. The nearest running stream in the region is San Juan River, which flows northwestward in a deep gorge parallel to the Carriso Plain but lying outside of its drainage area, in the Caliente Range to the southwest.

OCCURRENCE.

Geologic statement.—The Carriso Plain is a structural depression which has been faulted down between the Caliente and Temblor ranges and has been sufficiently covered by Pleistocene and possibly earlier débris to mask its real character. Faults, some of them very recent geologically, bound the plain along its northeast and southwest margins. The amount of folding and faulting which has taken place in this region is very great. This intense deformation has, in conjunction with denudation, exposed large areas of soft conglomerate, sandstone, and shale, particularly in the adjacent ranges, to the solvent action of rain, and thus through the agency of running water the soluble salts of these rocks have been transferred, in part, to the lowest portion of the plain. There they have been deposited, through evaporation of the solvent, in a series of saline beds, the chief constituent of which is sodium sulphate.

Chemical nature.—A sample of this salt collected at the surface of the lake, just west of the present evaporation plant, which is in sec. 19, T. 31 S., R. 20 E., varies from dull to lustrous pure white in color and, though more or less grainy, may be easily crushed between the fingers. An analysis of the salt, made by George Steiger in the laboratory of the United States Geological Survey, is as follows:

Analysis of salt crust from Soda Lake.

Insoluble	0.40
Al_2O_3	.04
MgO	1.66
CaO	.45
Na_2O	40.50
K_2O	.28
H_2O- / H_2O+	3.65
CO_2	None.
SO_3	46.12
Cl	9.27
	102.37
Less oxygen	2.09
	100.28

The two analyses below were made by Thomas Price & Son, of San Francisco, the first in October, 1904, and the second in November, 1905.

Analysis of sodium sulphate crystals from Soda Lake.

Anhydrous sodium sulphate	42.78
Sodium chloride	.32
Water	56.90
	100.00

Analysis of dried sample crust from top of Soda Lake.

Insoluble matter	0.16
Sodium sulphate	98.65
Sodium chloride	.47
Magnesium sulphate	.43
Loss and undetermined	.29
	100.00

It is stated that tests indicate that the surficial deposit of this salt is from 1 to 6 feet in depth and is underlain by a supersaturated solution of the sulphate and water.

COMMERCIAL DEVELOPMENT.

The deposit offers an almost unlimited supply of the mixed salts and its profitable exploitation is dependent almost entirely on transportation facilities, which at present are inadequate. The developing company owns traction engines with which it expects to haul the product to the most available railroad point, presumably Hazelton, near the terminus of the Sunset branch of the Southern Pacific Railroad, 32 miles to the southeast and 1,200 feet lower than the lake. The McKittrick branch of the same railroad lies only about 15 miles distant, but the Temblor Range, which must be crossed in making the trip, presents a considerable obstacle. With the construction of a contemplated railroad to San Luis Obispo by way of the Carriso Plain the commercial development of this deposit will be greatly assisted.

The exploitation of this deposit has been undertaken by the Carisa Chemical Company, which is incorporated under the laws of California with a capital of $1,000,000. It is stated that about $60,000 has been expended for machinery and other equipment for the extraction of the sodium sulphate, but at the time the plant was visited in September, 1908, operations had been temporarily suspended.

SURVEY PUBLICATIONS ON SALINES, INCLUDING SALT, BORAX, AND SODA.

The more important publications of the United States Geological Survey on the natural lime, sodium, and potassium salts included in this group are those listed below.

These publications, except those to which a price is affixed, may be obtained free by applying to the Director, United States Geological Survey, Washington, D. C. The priced publications may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C.

CAMPBELL, M. R. Reconnaissance of the borax deposits of Death Valley and Mohave Desert. Bulletin No. 200. 23 pp. 1902. 5c.

——— Borax deposits of eastern California. In Bulletin No. 213, pp. 401–405. 1903. 25c.

CHATARD, T. M. Salt-making processes in the United States. In Seventh Ann. Rept., pp. 491–535. 1888.

DARTON, N. H. Zuñi salt deposits, New Mexico. In Bulletin No. 260, pp. 565–566. 1905. 40c.

DAY, W. C. Potassium salts. In Mineral Resources U. S. for 1887, pp. 628–650. 1888.

——— Sodium salts. In Mineral Resources U. S. for 1887, pp. 651–658. 1888.

ECKEL, E. C. Salt and gypsum deposits of southwestern Virginia. In Bulletin No. 213, pp. 406–416. 1903. 25c.

——— Salt industry of Utah and California. In Bulletin No. 225, pp. 488–495. 1904. 35c.

HILGARD, E. W. The salines of Louisiana. In Mineral Resources U. S. for 1882, pp. 554–565. 1883.

KINDLE, E. M. Salt resources of the Watkins Glen district, New York. In Bulletin No. 260, pp. 567–572. 1905. 40c.

PACKARD, R. L. Natural sodium salts. In Mineral Resources U. S. for 1893, pp. 728–738. 1894.

PHALEN, W. C. Salt and bromine. In Mineral Resources U. S. for 1907, pt. 2, pp. 659–672. 1908.

RICHARDSON, G. B. Salt, gypsum, and petroleum in trans-Pecos Texas. In Bulletin No. 260, pp. 573–585. 1905. 40c.

YALE, C. G. Borax. In Mineral Resources U. S. for 1889–1890, pp. 494–506. 1902.

——— Borax. In Mineral Resources U. S. for 1906, pp. 1059–1062. 1907.

——— Borax. In Mineral Resources U. S. for 1907, pt. 2, pp. 631–635. 1908.

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O

ATTACHMENT 24

BLM'S BROCHURE ABOUT THE CARRIZO PLAIN

OUR

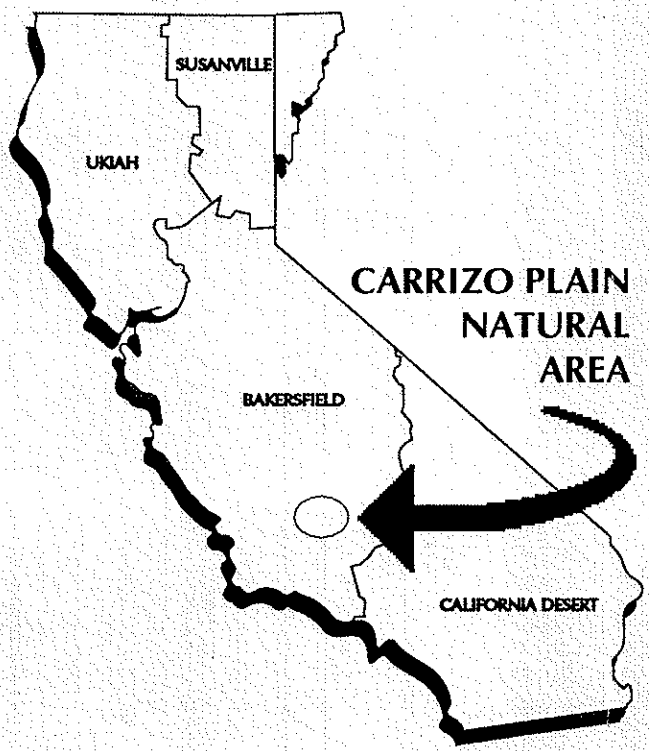
OF THE

Carrizo Plain Natural Area

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

BUREAU OF LAND MANAGEMENT

DISTRICTS



WELCOME

To the Public Lands in California

It is a pleasure to welcome you to the public lands in California under the jurisdiction of the Bureau of Land Management (BLM), and particularly to the Carrizo Plain.

Statewide, BLM is responsible for more than 17 million acres of lands as well as 47 million acres of subsurface minerals. BLM-California also has jurisdiction over another 1.5 million acres in northwestern Nevada.

Most people don't realize it, but almost half of California is Federally owned. National Forests account for 20.4 million acres; BLM public lands 17.2 million; National Parks 4.6 million acres; military lands 4 million; and another 1 million acres managed by other Federal agencies.

This large percentage, combined with a rapidly growing population now reaching 30 million people, makes public land management a complex, highly visible operation. The challenge is to balance the tremendous need for resources with the State's strong public environmental ethic.

Today, you will be visiting an area where these conflicts are being positively resolved: the Carrizo Plain Natural Area. It clearly illustrates what can be done when all interests cooperate toward a balanced outcome.

I hope you enjoy the day and find the trip informative. I'm sure your visit will help you better understand the public land challenges facing BLM in California.

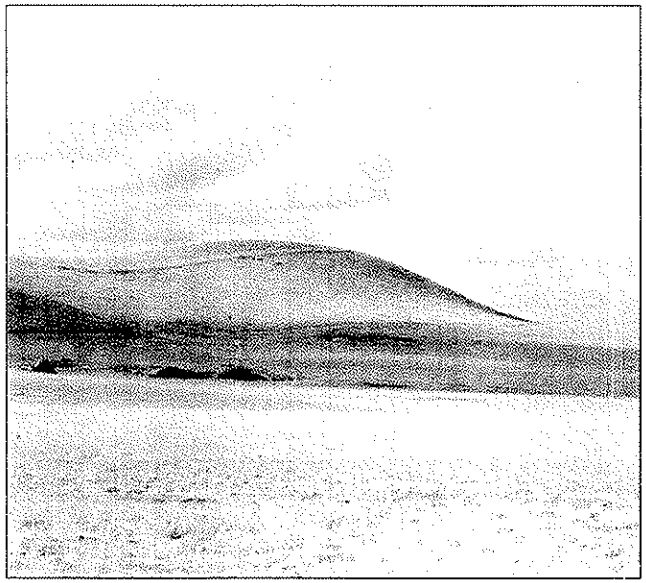
Sincerely,

Ed Hastey

THE CARRIZO PLAIN

The Carrizo Plain Natural Area is a perfect example of the kind of cooperative approach that holds great promise for resolutions of land use conflicts throughout The West.

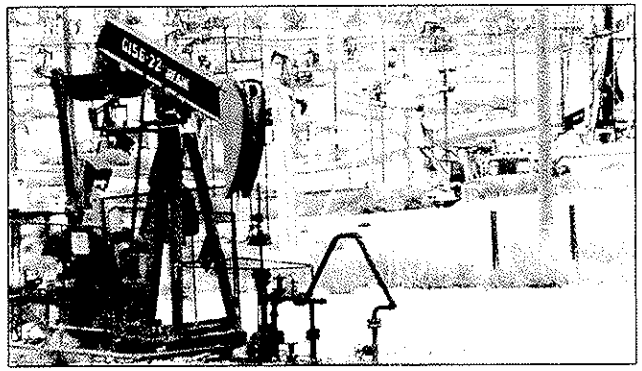
The Plain, a 200,000-acre expanse of private and public lands in eastern San Luis Obispo County, halfway between Bakersfield and San Luis Obispo, contains the last remnants of the once vast San Joaquin grasslands that covered a large expanse of Central California. These, combined with the area's critical wetlands and shrublands, are home to the largest concentration of Federally listed plant and wildlife species anywhere in the continental U.S. (A Fedeal listing reflects concern for the species' survival.) Other significant wildlife and sensitive plant species are also found in this special ecosystem.



A cloudy day on the Plain

Just to the west lies one the country's most productive oilfields near Taft, as well as some of the State's most promising potential oil exploration areas in the San Joaquin Valley.

These two factors — sensitive resource values and high potential energy reserves — can often lead to the kind of "either/or" situation guaranteed to cause problems, and sometimes, legal standoffs, for land management agencies.



Drilling for oil in Kern County

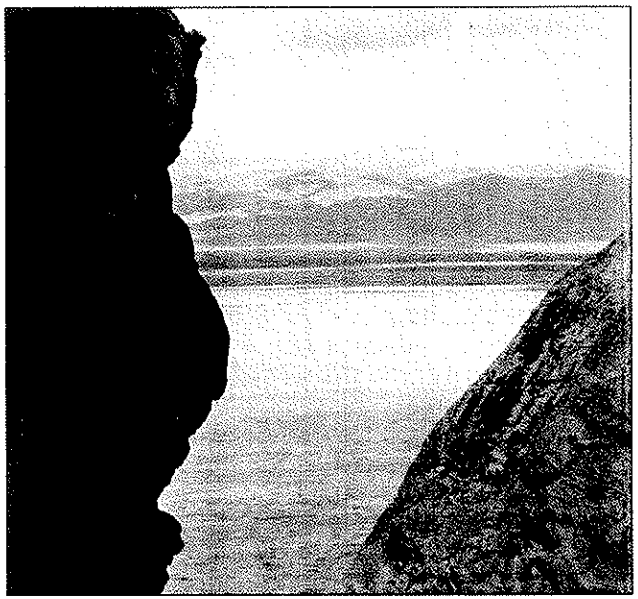
But the BLM, along with The Nature Conservancy and 14 other cooperators, including oil companies, wildlife groups, and State and local agencies, have come together to solve the problem in the Carrizo Plain.

The goal is to complete land exchanges and purchases so that almost all 200,000 acres will be publicly owned. The area is managed by BLM, in cooperation with the California Department of Fish and Game and The Nature Conservancy, for the benefit of wildlife and plant species under the principles of multiple use management. The primary goal is to enhance the habitats to the point that the populations are stable and thriving enough to delist the species as endangered. Meanwhile, nearby oil reserves can be developed by offsetting impacts to endangered species habitat.

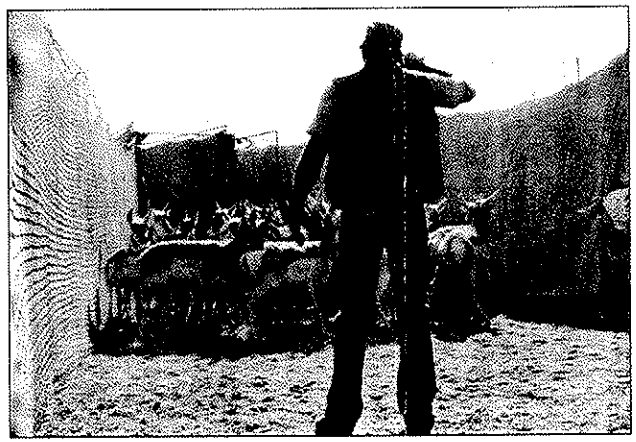
The Cooperators

Some 16 different entities are participating in the Carrizo Plain effort, led by Chairman Jerry Diefenderfer, a former San Luis Obispo County Supervisor:

- BLM
- The Nature Conservancy
- California Fish and Game
- Oppenheimer Industries
- Fish and Wildlife Service
- National Audubon Society
- University of California at Riverside
- Kern County
- San Luis Obispo County
- California Energy Commission
- Santa Fe Energy Co.
- Tenneco Oil
- Shell California
- Chevron USA
- Texaco Inc.
- Edward Lowe Industries, Inc.



A view of Carrizo Plain through Painted Rock



Pronghorn being reintroduced to Carrizo Plain

The Residents

Nine animal species and three plant species, all listed as threatened or endangered, are benefitting from the plan:

- San Joaquin kit fox
- San Joaquin antelope squirrel
- Giant kangaroo rat
- Short-nosed kangaroo rat
- Blunt-nosed leopard lizard
- Greater sandhill crane
- California condor
  (historically ranged here and there are long-term hopes for reintroduction)
- American peregrine falcon
  (has been sighted here)
- Bald eagle (has been sighted here)
- California jewelflower
- Hoover's woolly star
- San Joaquin woolly threads

In addition, 300 pronghorn antelope, which disappeared from the Plain in the early 1900's, have been reintroduced to the Plain, along with tule elk. Other wildlife species, including numerous raptors and lesser sandhill cranes, along with rare plants, will also benefit.

Oil and Gas Production

California ranks fourth among oil producing states in the nation, accounting for more than 11 percent of the nation's total. In 1988, 71 percent of California's oil production came from counties within the BLM's Bakersfield District.

More than 19 million barrels of oil were produced from BLM-administered leases last year, generating $51 million in revenues. Half, or about $25 million, was paid directly to the State.

Elk Hills Naval Petroleum Reserve

Two of the four national petroleum reserves (NPRs) are located in this area between McKittrick and Taft: Elk Hills and Buena Vista.

The Elk Hills NPR #1 covers 48,000 acres. It was withdrawn in 1912 to stockpile Federal oil reserves for the U.S. Navy. Because of private lands, equity in the area was split between the Navy with an 80 percent share and Standard (Chevron) Oil with 20 percent. The Federal equity was later transferred to the Department of Energy. Oil production from the area was intermittently increased during the Arab embargo and has now leveled out to about 60,000 barrels a day. The Bechtel Corporation, under contract, operates the oil drilling operation and the oil produced is sold through competitive bidding.

The Buena Vista NPR #2, covering 15,000 acres of Federal and private lands, is a misnomer. It was never operated as a reserve and the Federal acreage has been actively leased to many separate companies over the years. Half of the Federal revenues go to the State. The field currently produces up to 10,000 barrels a day.

"Postage Stamp" Habitat Management

It is not unusual to find sensitive species coexisting in the midst of human activities. Kit fox dens can be found in old sumps or beside pipelines and well sites. Some kit fox have been known to use abandoned pipe as artificial dens. Other species such as blunt-nosed leopard lizards can occasionally be seen running across roads in developed oilfields. Such small pieces of undisturbed habitats known as "postage stamp" habitats and even habitat that has been slightly altered can still provide a home for an occasional sensitive species.

Giant Kangaroo Rat

This endangered species is found in the annual grasslands of southern San Joaquin Valley. Their burrow systems, called precincts, are scattered throughout the Carrizo Plain. Research efforts are currently geared toward determining the effects of grazing on this species. Giant kangaroo rats feed primarily on seeds during their night-time forays from their burrows. Habitat alterations by man have greatly reduced the amount of habitat available to the giant kangaroo rats.

Blunt-nosed leopard lizard

A large, day-time hunting lizard, this endangered species frequents dry, desert washes in the Carrizo area which are sparsely vegetated with annual grass and saltbush. These lizards often hide beneath shrubs and ambush insects as they pass by. The lizard is generally active above ground when temperatures are between 75 and 95 degrees Fahrenheit. Otherwise, they seek the shelter of burrows under the ground. Their habit of hunting during the day is dangerous to them where many roads cross through their habitat, exposing them to possible accidents with vehicles.

California Condor

The largest bird in the United States, this endangered species no longer exists in the wild. The Carrizo Plain Natural Area is an important part of long-term plans toward successful reintroduction of the species. Currently, tule elk and pronghorn antelope are being relocated into this area. The addition of big game into the condor's traditional range will be an important factor in providing adequate food reserves for these large carrion eaters.

Raptors

With the winter rains, which carpet the Carrizo Plain with green grass and flowers, come an impressive number of hawks, falcons, eagles, and owls. These predators are escaping the rigors of winter farther north. Their arrival is timed to take advantage of the increase in prey available in the winter. Ducks and shorebirds are attracted to Soda Lake. Mammals, such as rabbits, mice, and kangaroo rats, time their breeding activities with this winter "green-up" and their numbers swell during winter and early spring. Agricultural and urban development have removed more than 90 percent of the habitat once available to migrating and wintering raptors. Natural areas like the Carrizo Plain are essential to conserving these birds.

Antelope Squirrel

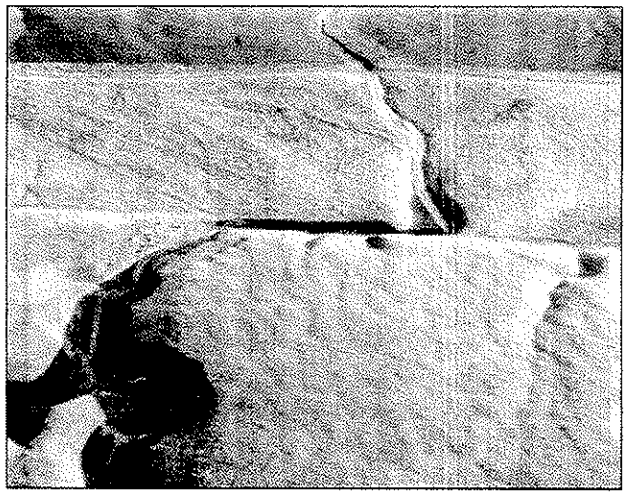
This small squirrel is omnivorous, with a diet consisting primarily of grass and forb seeds and insects. Insects, especially grasshoppers, are eaten regularly when available. Antelope squirrels are active during the day when temperatures are between 68 and 86 degrees Fahrenheit. Burrows used by this animal are either dug by them or by giant kangaroo rats. The San Joaquin antelope squirrel is considered threatened by the State of California and is a candidate for listing as a threatened or endangered species by the Federal government.

The San Andreas Fault

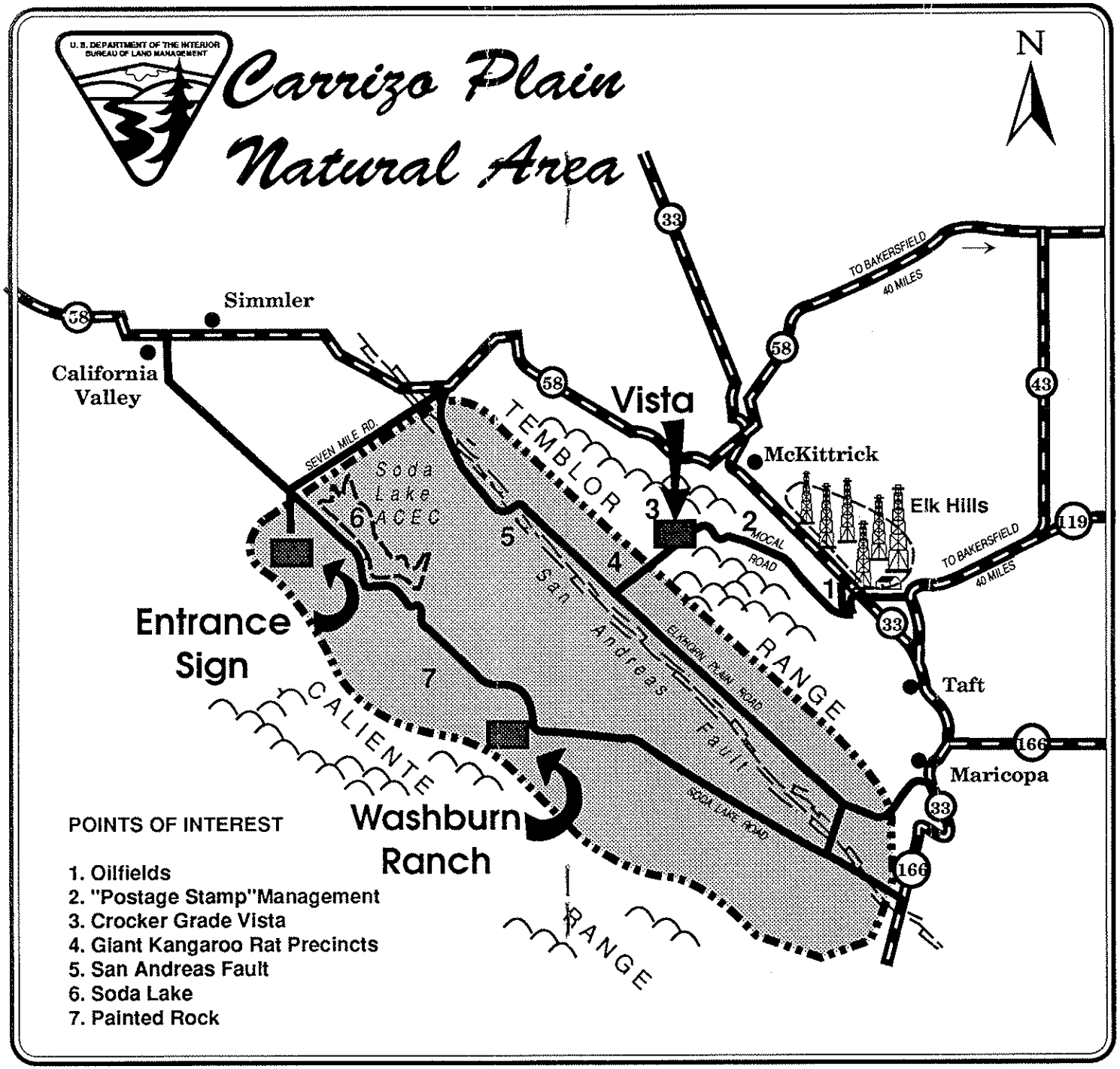
The recent tragedy in the Bay Area earthquake has again focused national and worldwide attention on the San Andreas Fault. The quake, registering 7.1 on the Richter scale with its epicenter northwest of here near Watsonville, is now on record as one of the State's worst. The Carrizo Plain is also the result of movement on the San Andreas Fault, which came into being 15 to 20 million years ago.

The San Andreas Fault represents the boundary between the Pacific Plate (on the west) which moves northwestward relative to the North American Plate on the east. The San Andreas Fault is more than 800 miles long, and consists of a complex zone of crushed and broken rock from a few hundred feet to more than a mile wide.

Within the Carrizo Plain, geological features characteristic of the fault are exceptionally well displayed. The fault here is often depicted in textbooks and studied by geology students and professionals. The U.S. Geological Survey continues to study the fault to obtain data relating to seismic activity.



The San Andreas Fault


U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Carrizo Plain
Natural Area
N
Simmler
California Valley
Vista
McKittrick
Elk Hills
TO BAKERSFIELD
40 MILES
SEVEN MILE RD.
Soda Lake ACEC
TEMBLOR RANGE
San Andreas Fault
ELKHORN PLAIN ROAD
SODA LAKE ROAD
MOCAL ROAD
Entrance Sign
Washburn Ranch
CALIENTE RANGE
Taft
Maricopa
POINTS OF INTEREST
1. Oilfields
2. "Postage Stamp"Management
3. Crocker Grade Vista
4. Giant Kangaroo Rat Precincts
5. San Andreas Fault
6. Soda Lake
7. Painted Rock

Wildflowers

Spring wildflower displays can include Phacelia, goldfields, purple owls, clover, popcorn flower, wild parsnip, filaree, lupine and fiddleneck. Several rare plants, such as the California jewelflower, also contribute to a lavish wildflower display.

Sandhill Cranes

Thousands of sandhill cranes winter in the Carrizo Plain Natural Area. From October until late February these birds, which stand three to four feet tall, can be seen around Soda Lake. All their requirements are met here: safe nighttime roosting at Soda Lake; ample food in the grainfields and annual grasslands; and fresh drinking water at several springs. The continued conversion of wetlands into agricultural lands or housing developments in the San Joaquin Valley makes the Carrizo Plain Natural Area important for this species' future survival. The nutrients and energy gained during the winter on the Carrizo Plain allow the cranes to migrate north in spring to breed on their nesting grounds.

Soda Lake

Soda Lake is a dominant feature of the Carrizo Plain Natural Area. Soda Lake is dry most of the year. Just beneath the dry surface is a considerable reserve of water which sustains the rare alkali sink scrub habitat. Many rare plants are found around the lake. When the rains come in the fall, the lake is transformed from a shimmering mirage into a wetland teeming with wintering cranes, ducks, and shorebirds.

Soda Lake Sodium Sulphate Deposits

The Carrizo Plain is a structural depression, an area of interior drainage, which has resulted in the formation of Soda Lake. Soda Lake covers an area of about 3,000 acres. In the 1880's the saline deposits at Soda Lake were mined for use at nearby cattle ranches.

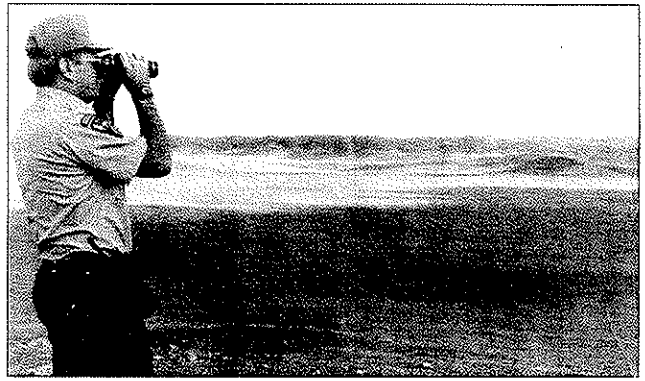
Prior to 1908, the Carisa Chemical Company invested $60,000 for a plant and a narrow-gauged railroad on the lakebed for the extraction of sodium sulphate. Between 1923 and 1925 an operation was active, and the product was hauled to McKittrick by truck. In 1934 the plant was moved from the south side of the lake to the north and a small amount of mineral produced.

In 1912, Hoyt Gale, with the U.S. Geological Survey, estimated that Soda Lake contained reserves of more than a million tons of sodium sulphate. The BLM has classified Soda Lake as prospectively valuable for sodium. However, sodium is already produced in large quantities at other locations, including Searles Lake in San Bernardino County. If any leasing at Soda Lake were to be considered in the future, it would be subject to the overall management objectives, primarily wildlife protection, for the Carrizo Plain.

Soda Lake

KCL Ranch

A public campground is planned for the Kern County Land (KCL) Ranch, part of 28,000 acres of Carrizo Plain acquired by BLM in 1989. The barn and corral will stay in order to serve equestrian campers, and the ranch water supply and septic system will be part of the campground public services. The trees provide some of the only shade to be found in the Carrizo.



A BLM ranger monitors wildlife

Caliente Mountain

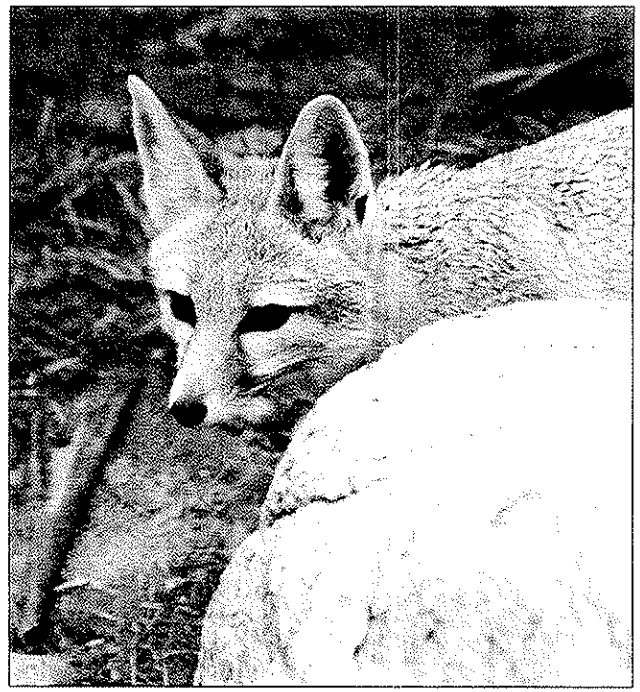
Caliente Mountain is the highest point in San Luis Obispo County and is a Wilderness Study Area. This large tract of public land for years had no public access, but that has changed with all the land BLM has acquired on the Carrizo Plain. The Selby parking area is available for primitive camping, and provides access to Caliente Mountain. From Selby, it is a two-mile uphill hike to the ridge parking area.

The road to the ridge parking area is open seasonally from April through November, and from there it is an easy seven-mile hike along the ridge to Caliente Mountain. The mountain is also accessible on foot from KCL Ranch, and from Highway 166 on the west side of the Caliente Range.

San Joaquin Kit Fox

This endangered species is the smallest fox in the United States but can manage to take prey as large as jackrabbits, which can equal their weight. The kit fox is found in annual grasslands and salt scrub throughout the Carrizo Plain Natural Area.

Like most desert animals, the kit fox is most active at night. Current research is being conducted on the basic requirements of this animal and the types and importance of its natural enemies. This species' inquisitive nature often brings it close to towns and other human developments. Unfortunately, this curiosity and the accidents caused by this contact is the leading cause of death for this animal.



A kit fox

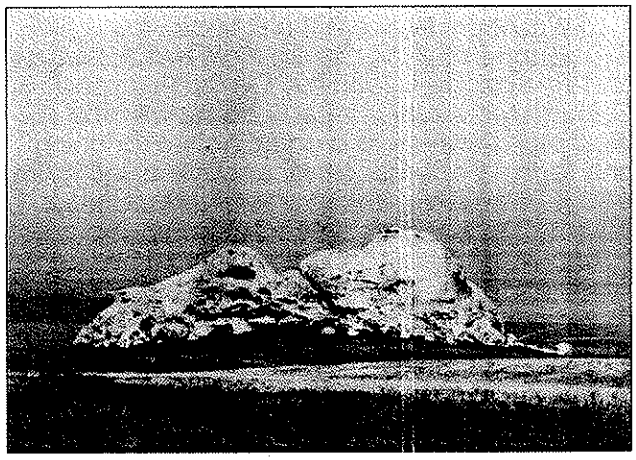
Revegetation and Grazing Management

The Carrizo Plain Natural Area is predominantly covered by annual Mediterranean grassland and valley scrub vegetation communities. Much of the total acreage has been manipulated extensively in the past for dryland farming and requires revegetation back to its native state. Revegetation efforts include research into native communities, species selection, experimental designs and planting practices, as well as seedling establishment monitoring.

The lands remaining in their native vegetative state within the natural area have been subjected to intense grazing pressures under past management. The new grazing management plan employs a short season of use in the spring from December 1 through April 15 and also a pasture rest rotation system. These management actions will help reduce the aggressive establishment of non-native annual grasses and promote the succession of shrub species and native bunch grasses by protecting them from grazing pressures when the annual grasses dry out and become less favorable to livestock.

The vegetative landscape at Carrizo

Painted Rock



Painted Rock

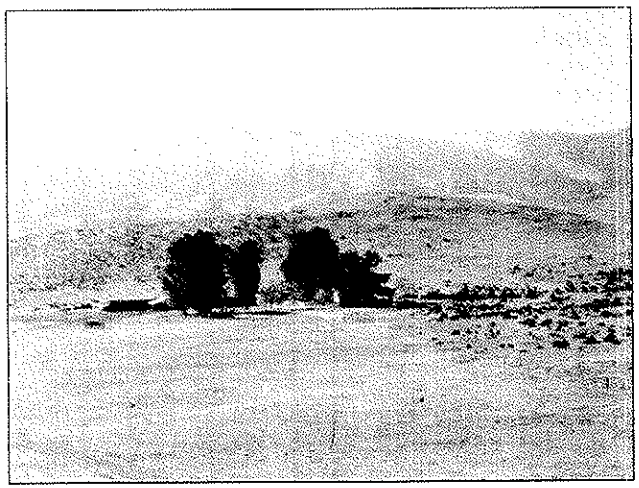
Painted Rock stands out in bold contrast to the Carrizo Plain as a natural landmark that rises 120 feet above the ground and contains some of the most impressive prehistoric rock art in all of North America. Geologically, the rock is a marine sandstone formed 20 to 25 million years ago during the Miocene Epoch. It is 250 feet long and 120 feet wide. Archeologists describe the rock art as polychrome pictographs because they are painted rather than being etched. These pictographs are done in a variety of colors, mostly red, black, white, and yellow.

Painted Rock appears to have been visited by several Indian tribes including the Chumash from the Pacific Coast and the Yokuts from the San Joaquin Valley. The rock art is estimated to be from 200 to 1,000 years old and used primarily by large gatherings for religious and spiritual purposes. Diverse styles and intricate detail were painted on these sandstone surfaces, making Painted Rock one of the most significant rock art sites in California, if not the world.

Washburn Ranch

Washburn Ranch is the BLM administrative headquarters for the Carrizo Plain Natural Area and is nestled between the Carrizo Plain and Caliente Mountain Range. Traditionally, the Washburn Ranch was a combination ranching and farming operation that encompassed more than 80,000 acres. The main settlement in the early 1900's was a cabin centered around a natural stone fireplace. Today, this same fireplace forms the core of a much larger 5,000 square foot home with four bedrooms and three bathrooms built around the 1930's.

Some of the features that give the Washburn Ranch a rustic ambience include the extensive woodwork, cast iron stove, and various historic ranching memorabilia. Associated buildings are the old cook house, bunkhouse, barns, and a recently relocated double-wide mobile home. The property was most recently owned by General Oppenheimer, a World War II hero, who founded Oppenheimer Industries, a multinational conglomerate. Many notables, ranging from movie stars to political figures, often accompanied the General on his visits to the ranch.



Washburn Ranch

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Notes

- The Bureau of Land Management (BLM) administers 17.2 million acres of public land in California (17% of the State) and 1.5 million acres of Nevada land.

- It also has responsibility for about 47 million acres of subsurface mineral resources representing 47% of the State.

- The BLM balances the management of public lands and resources so that they are considered in a combination that will best serve the American people.

- By Congressional direction, BLM manages the public lands under the multiple use concept that includes environmental protection, resource development and recreation.

BLM CA GI 90 002 8200

ATTACHMENT 25

DECLARATION OF GEORGE BAYSE

DECLARATION OF GEORGE D. BASYE

I, **George D. Basye**, declare as follows:

1. Until I retired from the State Bar of California in February of 2008, I was an attorney in good standing and admitted to practice law in California for more than 50 years. I am Of Counsel at Downey Brand LLP and have worked at this firm since 1955.

2. I received my undergraduate degree from the University of the Pacific in 1948, my Bachelor of Laws from the University of California at Berkeley School of Law (Boalt Hall) in 1954, and my Masters in Law from Boalt Hall in 1956.

3. I speak fluent Swedish and attended the University of Stockholm, Sweden, from 1948-49 and the University of Uppsala, Sweden, in 1955. I maintain my Swedish language skills by, among other things, regularly conversing with friends and associates in Sweden, and frequently reading history and novels in Swedish. Since 1955 I have visited friends and relatives in Sweden seven times, spending several weeks on each trip.

4. At the request of my colleagues, I reviewed the document Attached as Exhibit A. It is a Swedish report from 1919, titled "Meddelanden Fran Sveriges Kemiska Industrikontor Under REdaktion Af Ingenior Otto Cyren Kemiska Industrikontorets Ombudsman," which, when translated from Swedish to English, means "Report from the Office of the Swedish Chemical Industry Under Chairman Otto Cyren, Chairman of the Chemical Industry Office."

5. Page 76 of that report, which is part of Exhibit A to this declaration, states, in relevant part:

> Kaustik soda har under kriget tagits i bruk i stor utsträckning för pikrinsyreframställning. Tillverkningen bedrefs elektrolytiskt vid flera större och mindre fabriker. Redan före kriget exporterade Amerika årligen 75,000 tons och sedan England blef oförmöget att leverera har världsbehofvet täckts af Förenta Staterna med små tillskott från Japan. Af soda exporterade England förr 200,000 tons årligen, men har denna export under senaste åren till största delen upphört och Förenta Staterna i stället erhållit en betydande utförsel.
>
> Natriumsulfat är i form af s. k. »saltcake» en betydande biprodukt från den elektrokemiska industrin. Särskildt från fabrikerna vid Niagara Falls levereras betydande kvantiteter. Naturliga lager afverkas vid Soda Lake (28 miles vester om McKittrick, Cal., San Louis Obsipo County), från en areal af 3,280 acres (1;327 har) af Consolidated Chemical Co. — Världsproduktion af klorkalk uppskattades år 1914 till 500,000 tons och fylldes hufvudsakligen af England och Tyskland, som exporterade stora

kvantiteter till Amerika och Japan. Nu försörja dessa länder ej blott sig själfva utan utföra betydliga mängder.

6. Translated into English from Swedish, the above-paragraph reads:

Caustic soda has, during the war, taken a large expansion. The production is accomplished by an electrical process of several larger or smaller producers. Before the war America exported 75,000 tons per year and since England became unable to deliver it, the United States, with a small contribution from Japan, has satisfied the world's need. England was previously providing 200,000 tons but since this export in recent years has been largely discontinued, the United States has instead provided the most meaningful supply.

Sodium sulfate is a form of so-called "saltcake" which is a byproduct of the electrical industry. Factories in Niagara have provided the most significant quantity. A natural strata is being worked at Soda Lake (28 miles west of McKittrick, California in San Luis Obispo County) from an area of 3,280 acres of Consolidated Chemical Company. World production of chlorinated lime was estimated in 1914 at 500,000 tons and was supplied primarily by England and Germany who exported a large quantity to America and Japan. Now these latter countries no longer have a shortage but are exporting a significant amount.

7. I declare under penalty of perjury under the laws of the State of California that, to the best of my knowledge, the foregoing is true and correct, and that this declaration was executed on February 28, 2008 at Sacramento, California.

George D. Basye

EXHIBIT A

MEDDELANDEN

FRÅN

SVERIGES

KEMISKA INDUSTRIKONTOR

UNDER REDAKTION AF

INGENIÖR OTTO CYRÉN

KEMISKA INDUSTRIKONTORETS OMBUDSMAN

ANDRA ÅRGÅNGEN, 1919

CENTRALTRYCKERIET, STOCKHOLM 1919.

kalisalterna med dessa. Färgfabriker, tillverkande »Prussian blue» (berlinerblått), som i Amerika är en stor artikel, ha härför begagnat sig af ferrocyannatrium.

Alkalier.

Kaustik soda har under kriget tagits i bruk i stor utsträckning för pikrinsyreframställning. Tillverkningen bedrefs elektrolytiskt vid flera större och mindre fabriker. Redan före kriget exporterade Amerika årligen 75,000 tons och sedan England blef oförmöget att leverera har världsbehofvet täckts af Förenta Staterna med små tillskott från Japan. Af *soda* exporterade England förr 200,000 tons årligen, men har denna export under senaste åren till största delen upphört och Förenta Staterna i stället erhållit en betydande utförsel.

Natriumsulfat är i form af s. k. »saltcake» en betydande biprodukt från den elektrokemiska industrin. Särskildt från fabrikerna vid Niagara Falls levereras betydande kvantiteter. Naturliga lager afverkas vid Soda Lake (28 miles vester om Mc Kittrick, Cal., San Louis Obsipo County), från en areal af 3,280 acres (1,327 har) af Consolidated Chemical Co. — Världsproduktion af *klorkalk* uppskattades år 1914 till 500,000 tons och fylldes hufvudsakligen af England och Tyskland, som exporterade stora kvantiteter till Amerika och Japan. Nu försörja dessa länder ej blott sig själfva utan utföra betydliga mängder. En fabrik, som tillverkade klorkalk på ett rätt primitivt sätt, var jag i tillfälle bese i Pittsburg, Cal. Kloren framställdes elektrolytiskt ur en mättad koksaltlösning. Cellerna voro upprättstående, af cement, med kol- och järnelektroder, diafragma af asbest och järnnät. För saltlösningen användes enkla träränner och för bortledande af klorgasen asfalterade gjutjärnsrör. I stora lådliknande rum utbreddes å golfven nysläckt, finfördelad kalk. Rummen täcktes med täta trälock, hvarefter de sattes under vakuum och klor samtidigt inleddes till mättning. Kloren användes äfven här för tillverkning af koltetraklorid, enligt uppgift använd till kloroformframställning. Vidare komprimerades öfverskottet af klor på cylindrar, medelst en enkel hemmakonstruerad pump af glaserat lergods med svafvelsyrefyllda kolfvar, hvilken funktionerade utmärkt. Verkets hufvudprodukt var kaustikt natron. Den vid elektrolysen uppstående vätgasen användes till härdning af sojabönolja. Armén har kunnat använda den som biprodukt vid alkalifabrikerna uppstående kloren i stor utsträckning under kriget. Nu söka dessa fabriker, som installerat komprimeringsanordningar, göra propaganda för klors direkta användning som blekningsmedel inom textilindustrien för att fortfarande blifva af med denna sin biprodukt.

Bariumsalter hafva förr importerats i stor utsträckning. Från Tyskland var införseln af baryt före kriget c:a 40,000 tons, som hufvudsakligen användes till beredning af *litophone*, en ersättning för blyhvitt i målarefärger. Nu framställa ett flertal amerikanska fabriker detta preparat ur baryt, bruten i Tenesse, Kentucky, Virginia och Missouri. Fem fabriker tillverka dessutom förr importerade barium-

ATTACHMENT 26

DECLARATION OF ALBERTA LEWIS

DECLARATION

I **Alberta Lewis** , declare as follows:

1. I am familiar with Carrizo Creek ("Creek"), Soda Lake ("Lake"), and the surrounding property, all of which are located within the Carrizo Plain ("Plain").

2. I have lived on the Plain, and I have owned property there for over 50 years. I now live close by on Pozo Road.

3. The Creek runs through the old Lewis Ranch, under Hwy 58, and through the old Cavanaugh Ranch (also known as the Lowery property), and all the way down continuously to the Lake.

4. My husband, Bob Lewis, canoed along the Creek when he was young.

5. Almost 32 years ago, a woman driving a Volkswagen Beetle drowned while trying to cross the Creek at a spot near California Valley. The Car was flipped and rolled down the Creek by the strength of the current.

6. I have seen or heard of other people, such as my son Robert Lewis, using watercraft, including waterskiing on the Lake.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that this declaration was executed on 3/2, 2008 at 4906 E Pozo Rd Santa Margarita Ca 93453, California.

Alberta A Lewis

Alberta Lewis

ATTACHMENT 27

SITE VISIT PHOTOGRAPHS FROM 2007 AND 2008

Photograph #1

Comments:
CESF Solar project. View to southeast at channel of Carissa Creek as it passes through project area during the second day of a major rain event on January 23, 2008.

OHWM is 24 feet wide.

Photograph #2

Comments:
CESF Solar project. View to southeast at channel of Carissa Creek in project area on January 23, 2008.

Note bones that have been deposited during heavy flow through OHWM.

Photograph #3

Comments:
CESF Solar project. View to northwest at channel of Carissa Creek in project area on January 23, 2008, the second day of a major rain event. OHWM is 5 feet wide.

Photograph #4

Comments:
CESF Solar project. Additional channel with apparent OHWM that flows into main channel of Carissa Creek from southwest. OHWM is 3 feet wide. Taken January 23, 2008.

Photograph #5

Comments:
CESF Solar project.

View to west/northwest at Carissa Creek as it crosses the Arizona Crossing at southern end of Section 33. Photograph taken at end of major rain event of approximately 4.5 inches on January 29, 2008. Channel is 20 feet wide.

Photograph #6

Comments:
CESF Solar project.

View to south/southeast at Carissa Creek as it flows across the Arizona Crossing at southern end of Section 33 and continues southeast to Soda Lake.

Photograph #7

Comments:
CESF Solar project.

View to northwest of Carissa Creek as it approaches Soda Lake Road southeast of the CESF Project site. Channel is approximately 15 feet wide. Taken on January 29, 2008.

Photograph #8

Comments:
CESF Solar project.

View of Carissa Creek at the culvert crossing on Soda Lake Road.

Photograph #9

Comments:
CESF Solar Project.

View of double culvert of Carissa Creek at Soda Lake Road. January 29, 2008. Water is 2.5 feet deep at this location.

Photograph #10

Comments:
CESF Solar project.

View of watermarks on culvert of Carissa Creek at Soda Lake Road.

Photograph #11

Comments:
CESF Solar project.

View of upstream side of Carissa Creek culvert at 7 Mile Road as creek flows to Soda Lake. This side of the culvert has 3 pipes, approximately 10 feet high. Channel is 20 feet wide on this side.

Photograph #12

Comments:
CESF Solar project.

View of downstream side of culvert of Carissa Creek at 7 Mile Road.

Note overflow pipe (with sediment deposits) that directs excess flow over the road.

Photograph #13

Comments:
CESF Solar project.

View of entire culvert at downstream side of Carissa Creek at 7 Mile Road near Soda Lake Road as creek flows to Soda Lake. Creek is 40 feet wide at this location.

Photograph #14

Comments:
CESF Solar project.

View of upstream side of large culvert at Belmont Road along Carissa Creek.

Photograph #15

Comments:
CESF Solar project.

Downstream view of large culvert along Carissa Creek at Belmont Road near Soda Lake Road.

Photograph #16

Comments:
CESF Solar project.

View of Carissa Creek as it flows adjacent to Soda Lake Road toward Soda Lake.

Photograph #17

Comments:
CESF Solar project.

View of Carissa Creek where it meets Soda Lake.

Photograph #18

Comments:
CESF Solar project.

View of Carissa Creek as it meets Soda Lake.

Photograph #19

Comments:
Carrizo Energy Solar Farm Project.

View to east/southeast at OWUS feature on project. OHWM at this location is 24 feet wide with 3 foot high banks. Soil horizons are visible and it is apparent where scour has broken through A-Horizon to D-Horizon and exposed the fragipan layer.

Photograph #20

Comments:
Carrizo Energy Solar Farm Project.

Area of deeper cuts within channel where scour has broken through A-Horizon to D-Horizon and exposed the fragipan layer. Deposition of bones and other debris apparently caused by high-energy water flows.

Photograph #21

Comments:
Carrizo Energy Solar Farm Project.

18-foot wide OWHM with riverwash alluvial substrate.