# WALKING TOUR
# CARPINTERIA OIL SEEPS
# SANTA BARBARA COUNTY, CALIFORNIA

Gregg Wilkerson

2018

# Carpinteria Oil Seeps, Santa Barbara County, California

Gregg Wilkerson*, 2018
*yosoygeologo@gmail.com

**Acknowledgement and Disclaimer**

The information in this paper is taken largely from published sources. I have reproduced this material and present it pretty much as I found it, not trying to harmonize discrepancies in mine or geologic descriptions. I have changed verb tenses for readability and have used some paraphrase. Italics indicate quotations. Authors of the original information are indicated at the end of each paragraph. Paragraphs without a citation are my own material. The maps in this report have been compiled and rectified from digital and paper copies of original sources that were made at different scales and in different geographic projections. Therefore, the maps are accurate, in most situations, to within 250 feet. PLSS means Public Land Survey System. That survey data was obtained from the U.S. Bureau of Land Management website. Seep location data from California Division of Oil and Gas and Geothermal Resources ("CDOOGR").

## Contents

## LOCATION

The Carpinteria oil seeps are within the city limits of the town of Carpinteria, California. All of the seeps are along the coast on the old El Rincon-Arellanes Land Grant in Carpinteria State Park. They are in projected portions of T.4N, R.25W, Section 33 and 34, SBM.

| CA Seep Number | LONGITUDE WEST | LATITUDE NORTH | Township | Range | Section | Base Meridian |
|---|---|---|---|---|---|---|
| 2-61 | -119.5120 | 34.3880 | 4N | 25W | 33 | SB |
| 2-62 | -119.5080 | 34.3860 | 4N | 25W | 33 | SB |
| 2-63 | -119.5070 | 34.3860 | 4N | 25W | 33 | SB |
| 2-64 | -119.5040 | 34.3850 | 4N | 25W | 33 | SB |
| 2-88 | -119.4990 | 34.3850 | 4N | 25W | 33 | SB |
| 2-89 | -119.4950 | 34.3850 | 4N | 25W | 34 | SB |

TABLE 1. LIST OF OIL SEEPS AT CARPENTERIA STATE BEACH. From CDOGGR website. Data from Hodges (1980).

## HISTORICAL OVERVIEW

Wagner and Yenne (1969) gave this summary of the asphalt use at Carpinteria:

*The asphalt deposit at Carpinteria was located near the sea cliff, about half a mile southeast of town. The archeologic record reveals that aborigines used asphalt for holding points on weapons (Abbott, 1879); and Spanish explorers, dating back to at least 1775, observed that Indians near the present site of Carpinteria used tar from those deposits to calk their boats and to seal their water pitchers (Heizer, 1943). As early as 1857 the Carpinteria deposit supplied material from which illuminating oil was distilled; the quarry pits were as deep as 25 feet and covered several acres (Eldridge, 1901)*(Wagner and Yenne, 1969, p. 13-14).

## GEOLOGY

All of the seeps listed in the table, above are in Miocene Monterey Shale, except for seep 2-61 which is in Pleistocene Older Alluvium  (Dibblee, 1986).

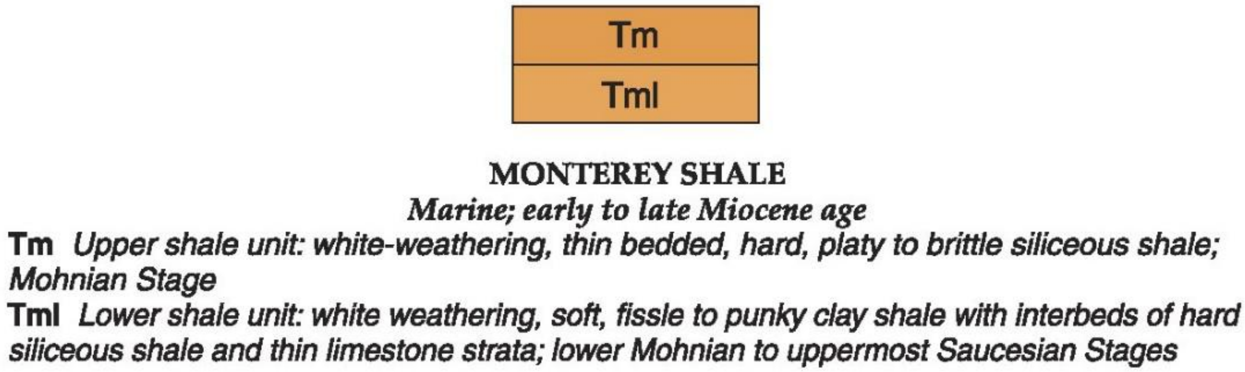



*Figure 1. Lithologic description of the Monterey Shale. From Dibblee, 1986.*

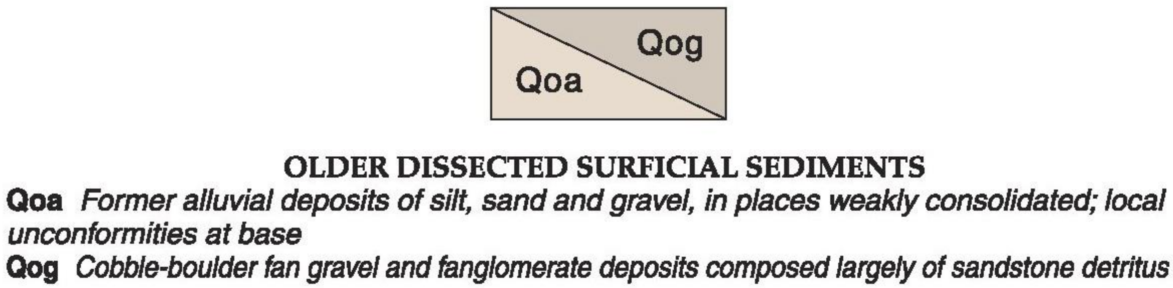



*Figure 2. Lithologic description of Older Alluvium and Older Gravel. From Dibblee, 1986.*

In 1969, Wagner and Yenne observed:

*The asphalt impregnates the basal 12-15 feet of flat-lying older alluvium where it rests on steeply dipping Monterey Shale that forms the sea cliff. Eldridge also reported several active tar seeps, and one of these, a "tar volcano," is illustrated by Arnold (1907, pi. lllB)*Wagner and Yenne, 1969, p. 14).

Priestaf (1979, p. 168) said this of geology at the Carpinteria oil seeps:

*The other major asphalt deposit along the southern California coast occurs immediately east of Carpinteria Beach State Park. Here the beach is wide and backed by vegetated dunes on its western end, with low bluffs increasing in height to the east. The cliffs are composed of Monterey Shale, here dipping nearly vertically and striking parallel to the coast. Here, too, the bituminous material contained in the · shale seems to have migrated upward to escape at the surface, appearing as seeps along the cliff face (figure 10)(*Priestaf, 1979, p. 168).

*Oil has migrated upward through the Monterey Shale at Carpinteria to extensively impregnate the overlying alluvial material, including coarse gravels and cross-bedded sands. This alluvial material persists as hardened, bituminous sand, which crops out along the landward margin of the beach* (Priestaf, 1979, p. 168).

Edwards provided a cross section for the geology of the Carpinteria oil seep area:

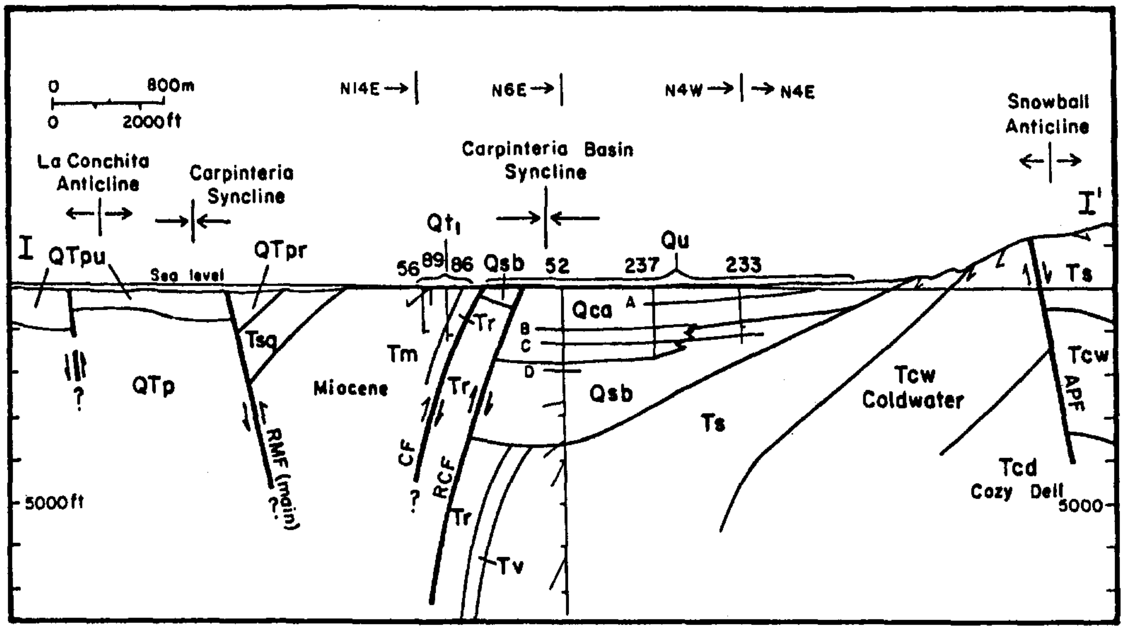



**Figure 2: Geologic cross-section through Carpinteria State Beach, field trip stop 9. RMF, Red Mountain fault; CF, Carpinteria fault; RCF, Rincon Creek fault. From Jackson and Yeats, 1982.**

*Figure 3. Geologic cross section from Jackson and Yeats, 1982 in Edwards, 2087.*

The following is Edwards (1987, p. 77) description of the structure and stratigraphy at Carpinteria State Beach:

*Underlying Carpinteria State Beach Park and the beach east of the park boundary is a south-dipping, essentially homoclinal sequence of middle to upper Miocene sediments of the Monterey formation. These rocks are upthrust between the north-dipping Red Mountain fault, located approximately one mile offshore to the south, and the south-dipping Carpinteria fault located less than one-quarter mile to the north (Jackson and Yeats, 1982, fig. 11). North of the Carpinteria fault, a south-dipping wedge of lower Miocene Rincon shale is found in the subsurface below a thin cover of Pleistocene marine sediments of the Santa Barbara formation. Another quarter-mile to the north, beneath Carpinteria Avenue, the Rincon is terminated by the south-dipping Rincon Creek fault which, at this location, exhibits approximately 3600 feet of vertical offset and separates the Miocene coastal exposures from the thick Pleistocene marine and non-marine sediments which fill the Carpinteria Basin. Offshore, to the south, beyond the Red Mountain fault, seafloor outcrops consist of the Pliocene Pico formation and the underlying rocks of the Monterey formation dip south into a deep syncline before being thrust and folded into the anticlines of the offshore Rincon Trend (Ogle, et.al., 1987)*(Edwards, 1987, p. 77).

*The Red Mountain fault and the Rincon Creek fault form the boundaries of an upthrust wedge of Miocene rocks which parallel the coastline. This wedge is complexly cut by a series of north-and south-dipping reverse faults, including the Carpinteria fault, but also including many others which are of relatively small displacement and are un-named. To the west, the faults bounding the wedge separate and a drag fold is developed in the hanging wall of the Rincon Creek fault (Jackson and Yeats, 1982),* *providing a trapping mechanism for the Summerland oilfield. To the east, near Rincon Point, the wedge narrows and the dips steepen, ultimately becoming overturned* (Edwards, 1987, p. 77).

*The area covered by this field trip segment extends from the mouth of Carpinteria Creek to the prominent headland approximately one-quarter mile east of the park boundary, which blocks further travel eastward at beach level (See fig. 4). In this area, the Monterey formation is fairly well exposed at the base of the sea cliff, and in the intertidal zone; however, because the strike of the exposures is essentially parallel to the coastline, only a thin stratigraphic interval is available for inspection. Some intertidal features mentioned in this report may not be apparent in summer when a thick cover of beach sand is deposited by longshore drift and not removed by storm surf. No detailed geologic mapping of this small area has been published* (Edwards, 1987, p. 77).

*The most recent published mapping of this small section of beach is that of Dibblee (1986) which shows a thin band of upper Monterey shale, of Mohnian age, dipping 81 to 48 degrees to the south within the park boundary, but overturned 80 degrees to the north in the eastern part. It is the author's opinion from field observation that these north dips represent the north limb of a small scale, faulted chevron-type fold which may be traced along the base of the sea cliff throughout most of the exposure, rather than an overturn. Numerous small-scale internal Montery folds may be seen in the intertidal zone at the eastern park boundary, and in the cliffs of the eastern headland. These internal folds are common within the Monterey, occurring at scales ranging from hand specimen to outcrop and are believed to be a response to flexural slip deformation in a sequence characterized by zones of widely varying ductility (Snyder, 1987)* (Edwards, 1987, p. 77-78).

## PROXIMITY TO OIL FIELDS

The Carpinteria Oil Seeps are in an area surrounded by four oil fields:

| OIL FIELD | DISTANCE FROM CARPINTARIA OIL SEEPS |
|---|---|
| Summerland Offshore | 11,000 ft |
| Carpinteria Offshore | 12,000 ft |
| Rincon Creek (Abandoned) | 10,000 ft` |
| Rincon | 11,500 ft |

## NEARBY OIL WELLS

There are 63 abandoned oil wells in the vicinity of the Carpinteria oil seeps. These are listed in Table 2 and illustrated in Figure 77. Wells near the route of the walking tour of the Carpinteria oil are described below.

### Geo A. McDonald 120-1-A

Along the beach, near stop E09-W23 is the Geo A. McDonald 120-1-A well, API No. 28304306. According to CDOGGR on-line records the well is at Latitude 34.388196, Longitude -119.51509. It is plugged and abandoned. It is in T.04N, R.25W. Section 32. The week was drilled April 23, 1931 to a depth of 1024 feet. It is considered an off-shore well. The casing landed at 474 feet and bailed dry (479 feet) with 2-foot rise in 15.5 hours. Water Shut Off was OK. The well had “Brown shale” from 604 to 860 feet (a thickness of 246 feet) showing heavy oil. At 926 to 966 feet (a thickness of 58 feet) there was more "Brown Shale" showing oil (https://secure.conservation.ca.gov/WellRecord/283/28304306/28304306_DATA_10-01-2007.pdf; accessed Oct. 4. 2018)

## R. W. Casper 130-1A

Along the beach, forty two feet northwest of Stop E03-W04 is the R.W. Casper 130-1A well, API No. 28304325. According to CDOGGR on-line data, the well is in T.04N, R.25W, Section 32 at Latitude 34.389282, Longitude -119.518455. It is considered an off-shore well. The well was plugged on November 22, 2002. It was drilled April 1, 1931 to a depth of 1029 feet. The casing landed at 55 feet. No oil was noted in the well log. The log noted sand, sandy shale, sticky shale, brown shale and tough shale https://secure.conservation.ca.gov/WellRecord/283/28304325/28304325_DATA_02-15-2008.pdf, accessed Oct. 4, 2018).

## Walter W. Gregg No. 1

Along the beach, near Stop E09-W24, is the Walter W. Gregg No. 1 well, API No. 08304298. According to CDOGGR on-line records the well is at Latitude 34.38799, Longitude -119.514283. It is plugged and abandoned. It is in T.04N, R.25W. Section 32. The week was drilled December 24, 1924 to a depth of 360 feet. It is considered an off-shore well. Soft asphalt and gas were encountered between 20 and 29 feet. There was a "hard cap rock" at 241 to 270 feet underlain by "brown shale showing a little oil" from 270 to 285 feet. There was a "showing of oil" between 302 and 360 feet. At 360 feet there was "oil and gas". No water was encountered in the well. (https://secure.conservation.ca.gov/WellRecord/083/08304298/08304298_DATA_11-21-07.pdf, accessed Oct. 2, 2018)

## Searoad Asphaltum & Refining Well No. 4

Above the beach, on the marine terrace, near Stop W30, is the Searoad Asphaltum and Refining Company Well No. 4, API No. 08304330. According to CDOGGR on-line records the well is at Latitude 34.387856, Longitude -119.512815. It is plugged and abandoned. It is in T.04N, R.25W. Section 33. The well was abandoned July 8, 1942. The well proposed to drill to 340 feet on April 19, 1926, but landed casing at 1,200 feet. It "never produced more than ½ barrel of asphalt per day" (https://secure.conservation.ca.gov/WellRecord/083/08304330/08304330_DATA_10-01-2007.pdf, accessed Oct. 3, 2018). This well may be located incorrectly. It may be at the seep at Stop E10-28.

## Conoco Kittie C. Bailard Well No. 1

Above the beach, on the marine terrace, north of the railroad tracks near Stop W46, is the Conoco Kittie C. Bailard Well No. 1, API No. 08304290. According to CDOGGR on-line records the well is at Latitude 34.386133, Longitude -119.502432 . It is plugged and abandoned. It is in T.04N, R.25W. Section 33. The well was proposed for drilling to 4,000 feet on April 17, 1929 by the Continental Oil Company of Arizona. It was drilled to a depth of 4,535 feet. The well was sidetracked, and no oil sands were encountered. The Water Shut of test of May 15, 1929 reported that the test was 1,480 feet deep. From 1 to 500 feet there was "surface wash and shale. Heavy asphalt in fractures". From 500 to 1,480 feet there was "Brown shale and shells . Heavy asphalt in fractures with slight gas showings." The well was abandoned December 2, 1929 after a series of mishaps including twisting off of 2 strands of drill pipe, fishing, side tracking, and having pipe stuck in the hole. The lithologic log of April 26, 1929 noted the following:

1224-1231 feet: Shells and gas
1458-1470 feet: Blue clay and gas
2357-2372 feet: Core recovery, bottom foot had fractured and slickensided clay with oil
2574-2563 feet: Core recovery, brown clay shale – fractured dip 70 deg. – oil
2618-2620 feet: Core recovery hard compact thinly striated brown shale – dip 70 deg. Oil stains.
3016-3020 feet: Brown shale – gas
3070-2079 feet: Hard light brown shale – oil and gas
3228-3245: Core recovery,  brown clay shale – fractured – do[ 55 deg. – oil stains
3433-3439 feet: Hard shell - gas

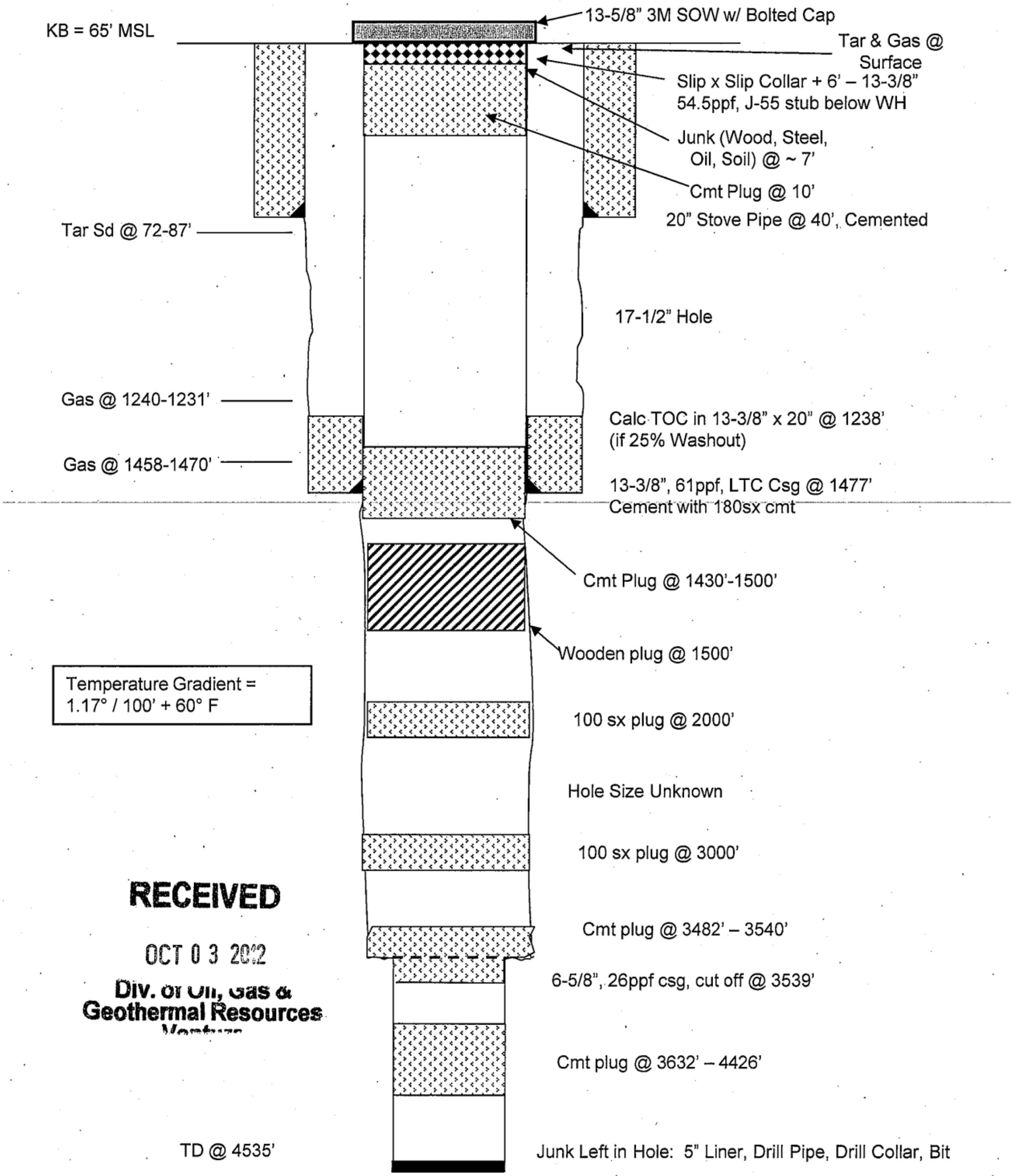
The well was transferred to Conoco, Inc on July 1, 1979. On December 20, 2011 the CDOGGR notified Conoco that they suspected oil seeps near the Kittie Bailard No. 1 well were due to leakage of that well. On January 6, 2012 Conoco proposed a work plan to dig an excavation 20 feet x 20 feet wide and 6 to 10 feet deep to expose the wellhead for the Kittie Bailard No. 1 Well. The wellbore diagram of September 27, 2012 is reproduced, below:

# Kittie Bailard 1 – Current Wellbore

T4N, R25W, Sec 33, Santa Barbara County, CA

API# 04-083-04290

09/27/12



An notice of intention to re-abandon the well was received by CDOGGER on October 3, 2012. The well was re-abandoned on December 12 to 17, 2012. The area around the Kittie Bailard No. 1 Well began to seep oil again in 2017. In an "Approval of Concurrence" for this situation dated May 17, 1917 it states: *An initial site visit was conducted by Ewan Beenham, from the Division on April 4, 2017, after the initial excavation of the well to view the oil seep that was emanating from beside "Kittie Bailard" 1. From initial observations, it was clear that the oil seep was not connected to the now abandoned well. The seep was penetrating the earth in a 9-foot-long by ¼ inch wide stretch from the east side of the well cellar and was not evident inside the well cellar or around the abandoned casing* (Beenham, 2017).

*Mr. Ernest Blevins from the Division, visited the site the following day on April 5, 2017 to once again inspect the seep to allow for any migration or expression of the seep inside the well cellar. There was still no oil inside the well cellar or around the casing* (Beenham, 2017).

*After reading the Wellhead Assessment Report for "Kittie Bailard" 1 and from the Divisions multiple inspections, the Division has come to the conclusion that the Oil Seepage near this well is of a natural nature and not connected to the presence of the Abandoned well* (Beenham, 2017).

(The Beenham article can be downloaded from this site: https://secure.conservation.ca.gov/WellRecord/083/08304290/08304290_DATA_03-04-2008.pdf, accessed Oct. 4, 2018).

Bill Harz contributed the following about post-mining reclamation at Kittie Bailard No. 1:

*For years, people who frequent the Carpinteria Bluffs have been wondering what the bubbling oily patch in the grass was near the train tracks along the path toward the seal rookery overlook. So in September 2011, the City of Carpinteria's parks director, Matt Roberts, contacted the state Department of Conservation, which investigated the site and, according to the department's Donald Drysdale, "made the determination that the oil seepage was likely from a well."(*Harz, 2018; citing Carpinteria News).

That well, it turns out, was named after Catherine "Kittie" Bailard, who was born into one of the city's pioneering families in 1893 but never saw her namesake well give way to any gusher. Drilled by Continental Oil in 1929, the Kittie Bailard Well was shut down that same year, with no black gold in sight. But back then, shutting down a well was sometimes as primitive as jamming wooden electric poles down the hole, explained Drysdale, so it's no big mystery as to why Kittie's oil eventually started bubbling up. (Harz, 2018, citing Carpinteria News).

By the time the seepage showed up, though, Continental was no longer. Once part of John D. Rockefeller's Standard Oil, it was split off as part of an antitrust ruling and later was swallowed up — along with the Kittie Bailard Well, among thousands of other old sites — by ConocoPhillips. After determining ownership, Drysdale contacted the Houston-based corporation about the seepage, and the company then made the necessary cleanup arrangements with the city, including getting archaeological clearance due to the well-known Chumash history of the area. (Harz, 2018, citing Carpinteria News).

Today, there is fencing around the area, and a sealing-up project is underway, with crews from ATC Associates and MMI Service on-site last week and the state's Division of Oil, Gas, and Geothermal Resources overseeing the project to seal off the well. Drysdale estimated that the work is costing ConocoPhillips about a million dollars but that most abatement projects of this type usually cost "several hundred thousand." (Harz, 2018, citing Carpinteria News).

Workers will be at the site between the hours of 7 a.m. and 5 p.m. ConocoPhillips is planning to use air-monitoring devices, but as an apparent precaution, MMI Services has also closed off the immediate area and put up signs warning potential trespassers that, if they go into the space, they risk hydrogen sulfide gas exposure. (Harz, 2018, citing Carpinteria News).

## ASPHALT MINING

Priestaf (1979, p. 168) described mining activities at Carpinteria:

*Mining has extensively altered the Carpinteria deposits. In 1857, Charles Morrel, a San Francisco druggist, began a quarrying operation to provide material for distilling illuminants, but the mining venture did not prove to be very successful (Dibblee, 1966). Later quarrying operations, which lasted well into the 1920s, were far more successful. At one time more than 600 men were employed in the production of paving materials (Clark, 1962)(*Priestaf, 1979, p. 168).

*The mining operations resulted in a series of pits lying just inland from the beach. These pits are approximately 25 feet deep and extend over several acres. Deposits of massive asphalt were largely removed in one of these pits. Miners left intact some of this asphalt which is now preserved as a "dike" or seawall between the beach and the low-lying pit. Timbers used to brace the sagging asphalt during mining operations are still visible, though now covered in part by the slumping, sagging asphalt they were meant to support (figure 12)* (Priestaf, 1979, p. 168).

*The eastern quarry pits are still recognizable above the bluffs. Though most of the pit floors are now covered with iceplant, they are still obviously petroliferous. The bituminous sand is sticky and slightly yielding where softened in the sun, and thin pools of oil make walking hazardous. Seepage is still relatively active in the floor of the pits as indicated by miniature "tar volcanoes", similar but smaller than those described and photographed by Arnold in 1907 (figure 13)* (Priestaf, 1979, p. 168).

Edwards (1987, p. 76) expanded on Priestaf's summery of Carpinteria's asphalt mining history:

*With the coming of the Americans, the second phase of commercial asphalt development began. The first geologist known to have described these deposits was J. D. Whitney who, in the Geological Survey of California, noted the "black and highly bituminous" shales, later to be named the Monterey formation, and the asphaltum that "saturates the beach sand and flows down to the sea" (Caldwell, 1979). The first* *development was attempted in 1857 by Charles Morrell, a San Francisco druggist, who, with little success, attempted to produce illuminating oils from the asphalt (Priestaf, 1979*) (Edwards, 1987, p. 76).

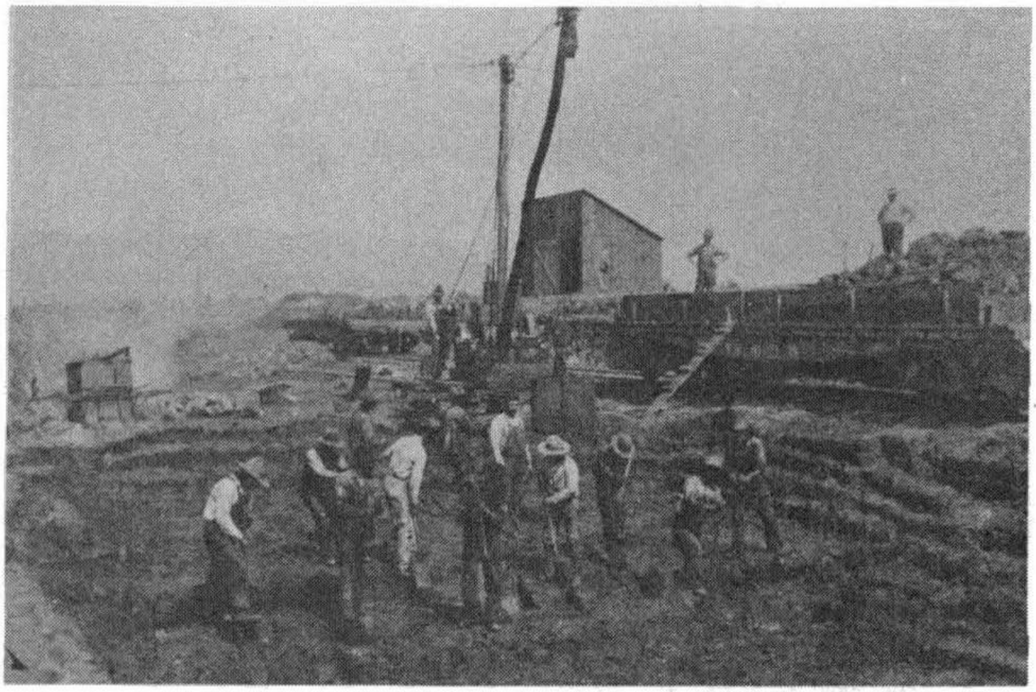


Figure 1: Early asphalt mining operations at Carpinteria. Location and date unknown. Photo courtesy of Carpinteria Valley Historical Society.

*Figure 4. Asphalt mining at Carpinteria. From Edwards, 1987.*

*The first large-scale mining operation was undertaken, in 1875, by the Crushed Rock and Asphaltum Company of San Francisco which, by 1880, employed forty men. A succession of operators, notably Andrew Sattler, continued this effort throughout the late 1800's, at one time employing 200 men who were housed in barracks on the property, ate in the company dining room, and drank in the six saloons which had sprung up along Linden Avenue (Caldwell 1979). The miners worked in pits along the beach, using shovels heated in ovens to quarry blocks of bituminous sand which were loaded on rail cars and carried to a refinery near the mouth of Carpinteria Creek. The quarry pits were as much as 25 feet deep and covered several acres (Priestaf, 1979). At the refinery, the asphalt was heated in vats, washed with saltwater to remove the sand, loaded in barrels made on the property and shipped from a nearby wharf. Not all the uses to which this material was put are recorded, however, much of it was used to pave streets in Carpinteria and in Santa Barbara and to coat roofs. In 1887, a second asphalt mine, the Alcatraz, was opened on the bluffs to the east, near the present-day Chevron Oil Company property using the same mining methods as those used by Sattler. The first subsurface exploitation occurred in 1900 when a 350 foot "shaft" was sunk which filled with pure asphalt, selling in those days for thirty-six dollars a ton. Two years later this well was steamed through a two-inch line, allowing the asphalt to be recovered in liquid form. Operations such as these continued, off and on, until 1915, when both the*

*Alcatraz mine and the Sattler operation were closed down and the equipment sold* (Edwards, 1987, p. 76).

*Interest was renewed in 1924, when cable tool drilling for liquid asphalt was begun. This asphalt was refined, not for traditional petroleum products, but for a substance called Icthyol which was a medicinal ingredient used in a skin remedy (Caldwell, 1979). The California Division of Oil and Gas wildcat map W3-1 shows eight wells drilled between 1924 and 1927 in this area, which were probably in response to this unusual play. Shortly these operations ceased, and the old asphalt pits ended their existence by becoming the town dump* (Edwards, 1987, p. 76).

*In 1930-31, sixteen wells were drilled along the beach, from just west of the mouth of Carpinteria Creek to within a half mile of Rincon Point, all in the intertidal zone and all undoubtedly by wildcatters following the trend of higher gravity Vaqueros (early Miocene) discoveries at Summerland oilfield the year before (see Kennett, this volume). The casings of two of these wells, the R. W. Casper 130-1A, total depth 1025 feet, and the G. A. McDonald 120-1A, total depth 1024 feet, are visible on the beach within the park boundaries during low sand conditions* (Edwards, 1987, p. 76).

*Little evidence of Carpinteria's asphalt mining industry remains today. The refinery and mining equipment have been removed, the pits filled with trash and covered over with asphalt of a newer vintage, and the remainder eroded by the sea. Along the beach east of the mouth of Carpinteria Creek, at the first exposure of asphalt, careful examination will reveal old timbers supporting a sea wall of asphalt, behind the protection of which asphalt and bituminous sand have been mined away. Viewing this sea wall from the top of the low sea cliff, the red bricks of one of the ovens which were used to heat the miners shovels may be seen. Walking farther east at' beach level, the visitor may see blocks of coarse concrete, which were probably once equipment footings, among the rip-rap boulders which have been placed to protect the sea cliff from erosion. Trending southeastward in the intertidal zone, a long concrete trough is visible at low tide which was probably used to provide seawater to the refinery (*Edwards, 1987, p. 76).

## PALEONTOLOGICAL STUDIES

Many different kinds of fossils have been found in the Carpinteria oil seeps.

Edwards (1987, p. 76) relates that

*In the late twenties, the asphalt deposits were once again mined, by the Santa Barbara Museum of Natural History and the Carnegie Institute, this time for their fossil content. The asphalts have yielded a rich plant and bird assemblage and a mammalian fauna including mastadon, ground sloth and bison* (Edwards, 1987, p. 76)

*Figure 5. Tar with fossils, Carpinteria oil seeps. Photo by Bob Gray.*

*Figure 6. Bird bones in tar matrix. Photo by Bob Gray.*

## SEEPS (CDOGGR, 1980)

The California Division of Oil and Gas has compiled location data on seeps from Technical Report 26 (Hodgeson, 1980). These locations are shown in green on my maps.

Here is a listing of Carpinteria seep descriptions by Hodgeson (1980). The latitude and longitude designations are from the CDOGGR website.

### 2-61

*326,400 N; 543,9001E; At foot of see cliff*
*Tar sand and fractured shale, Monterey Shale.*
*CDOG, March 1971, USGS Prof. Paper 679 (1969)*
*Trickle, Single tar seep from bluff* (Hodgeson, 1980, p. 81).
-119.5120 34.3880

This is the western-most of the Carpinteria Oil Seeps in the CDOGGR database. It is mapped as being in Older Alluvium (Dibblee, 1986).

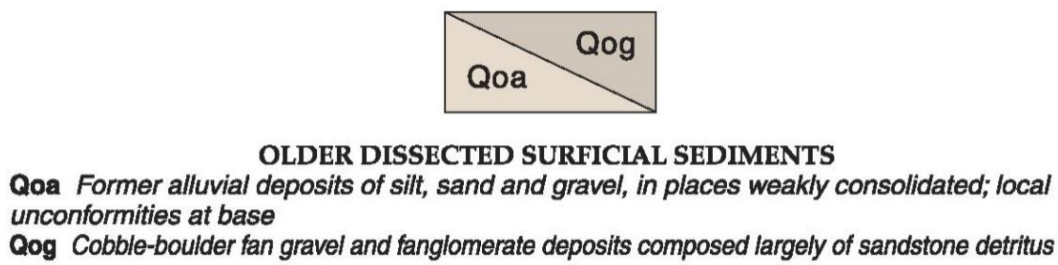



*Figure 7. Lithologic description of the Older Alluvium. From Dibblee, 1986.*

### 2-62

*325,800N; 1,545,000E; On beach, 550 feet northwest of pier.*
*Tar Sand and fractured shale; Monterey Formation;*
*CDOG, March 1971, USGS Prof. Paper 679 (1969)*
*Trickle. 500 ft. each way (along beach) from coordinate intersection* (Hodgeson, 1980, p. 81).
-119.5080 34.3860

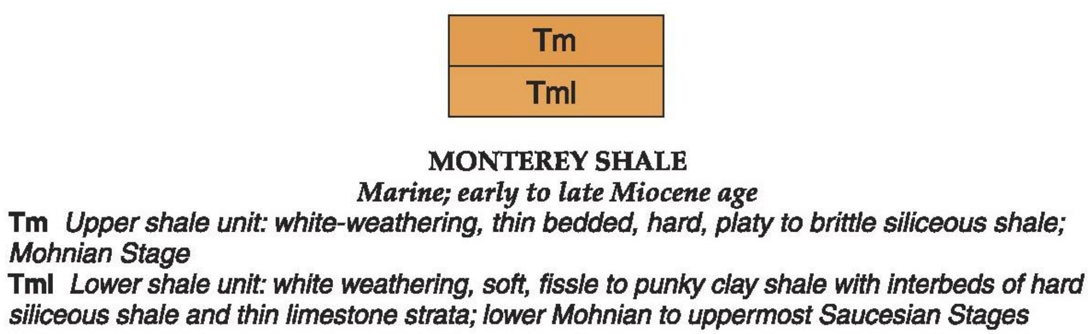



*Figure 8. Lithologic description of the Monterey Formation. From Dibblee, 1986.*

## 2-63

*325,700N; 1,545, 200E; On beach, 400 feet northwest of pier.*
*Tar Sand and fractured shale; Monterey Formation;*
*CDOG, March 1971, USGS Prof. Paper 679 (1969)*
*Trickle from outcrop on beach. Extends 200 feet southwest from coordinate intersection* (Hodgeson, 1981, p. 81).
-119.5070 34.3860

## 2-64

*325,400N; 1,546, 200E; On beach, 600 feet northwest of pier.*
*Tar Sand and fractured shale; Monterey Formation;*
*CDOG, March 1971, USGS Prof. Paper 679 (1969)*
*Trickle from several locations in bluff, 300 ft. each way (along beach) from coordinate intersection* (Hodgeson, 1981, p. 81).
-119.5040 34.3850

## 2-88

*325,500N; 1,547, 800E; At foot of sea cliff.*
*Tar Sand and fractured shale; Monterey Formation;*
*CDOG, March 1971, USGS Prof. Paper 679 (1969)*
*Trickle. Single tar seep from base of bluff* (Hodgeson, 1981, p. 81).
-119.4990 34.3850

## 2-89

*325,300N; 1,688,100E; At foot of sea cliff.*
*Tar Sand and fractured shale; Monterey Formation;*
*CDOG, March 1971, USGS Prof. Paper 679 (1969)*
*Inactive. Tar has seeped from a few locations at base of bluff* (Hodgeson, 1981, p. 81).
-119.4950 34.3850

## EDWARDS FIELD GUIDE TO THE CARPINTERIA OIL SEEPS

In 1987, Edwin Edwards wrote a field guide and description of the Carpinteria oil seeps and associated geologic and historic-archaeologic features.

The field guide portion of his article is reproduced, below, with amendments by me.

### INTRODUCTION

*The following field guide begins at the east end of the Carpinteria Creek bridge in Carpinteria State Beach Park and continues as a walking tour along the beach and bluff top for a distance of approximately 0.7 miles eastward. None of the stops discussed below are marked. Location along the route may be made by reference to the oblique air photo and accompanying sketch map (fig. 4) or by counting paces between stops. A geographic description of each stop is given for additional reference. The "pace" used here is about five feet and is counted each time the right (or left, if you prefer) foot falls (i.e., a double step). Pace varies with each individual and with terrain but will be close enough for location along this route if geographic descriptions are observed* (Edwards, 1987, p. 80-81).

I have added several stops to Edward's walking tour. His stops are labeled E01, E02…… My stops are lables W01, W02…

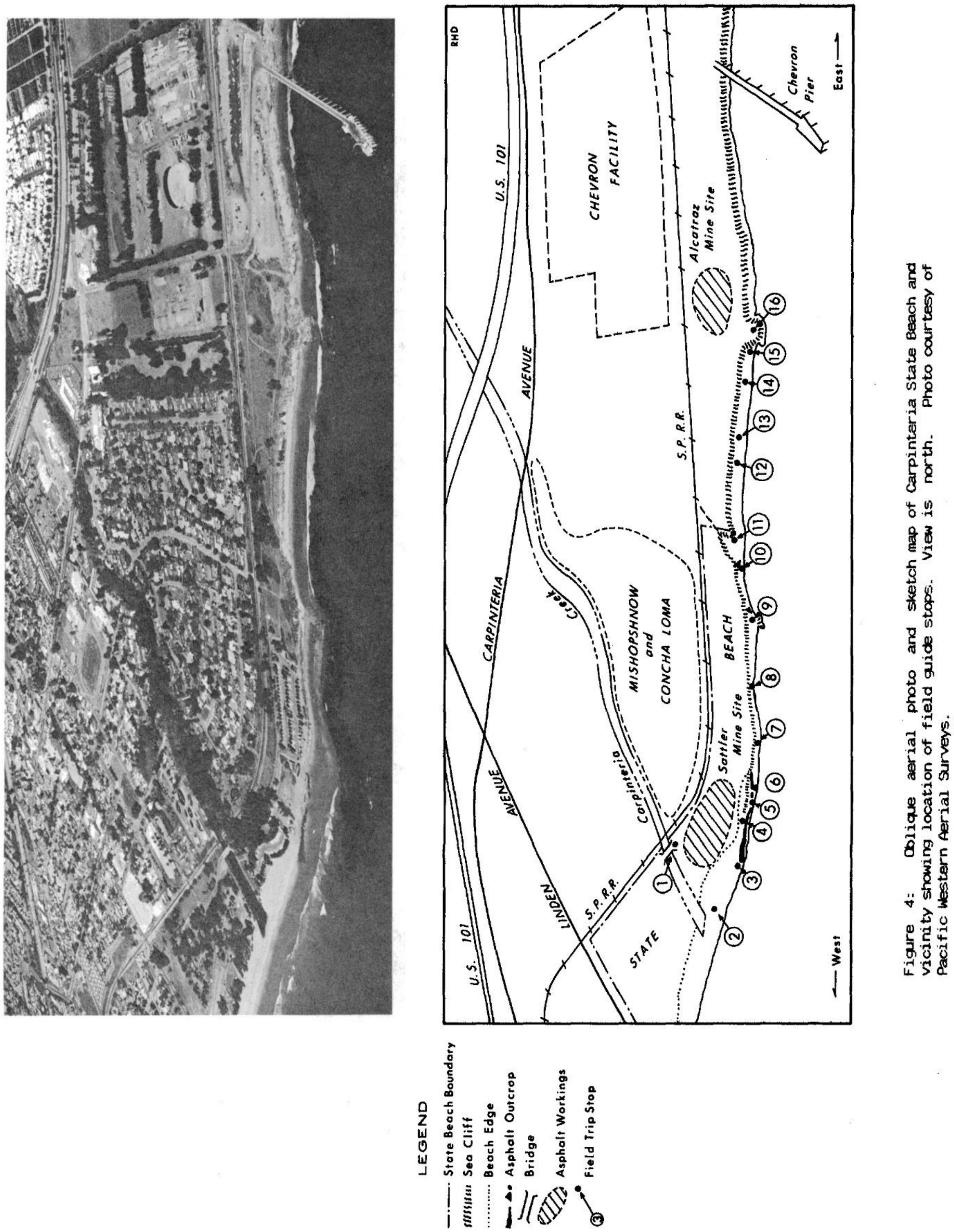



*Figure 9. Oblique aerial photo and sketch map of Carpinteria oil seeps. From Edwards, 1987, Figure 4.*

## STOP E01, W01: Carpinteria Creek Bridge

*(0 paces, 0 feet) East end of Carpinteria Creek bridge facing east. Ahead is Santa Rosa RV drive-in campground which approximately overlies the original location of the Sattler asphalt workings active during the late 1800's and early 1900's. At one time, 200 men were employed here and were housed in barracks located on this property. A little to the right, perhaps near where the restroom now stands, was the refinery which processed the asphalt-saturated sands produced here* (Edwards, 1987, p. 81).
*Turn right and proceed toward beach on path along bank of Carpinteria Creek. The small squirrels frequently seen along here are the California Ground Squirrel (Citellus beecheyi), which are common throughout the park. At the end of the path are some low dunes partially stabilized by growths of fleshy-leaved Sea-Fig (purple flowers) and Hottentot-Fig (yellow flowers). Continue onto beach* (Edwards, 1987, p. 81).


*Figure 10. Carpinteria Creek Bridge. View to north. Stop E01/W01 is on the left (east) side of the bridge)*

## STOP E02, W02: Carpinteria Beach

*(80 paces, 400 feet) Beach immediately east of mouth of Carpinteria Creek. In winter the beach here is covered with rounded cobbles consisting mostly of reddish and greenish Sespe formation (Oligocene) and tan to brown Eocene sandstones, and laminated siliceous Shales and massive dolomitic shales and porcelanites of the Monterey formation (middle to upper Miocene) (Edwards, 1987, p. 81).*
*Turn left and proceed eastward along beach* (Edwards, 1987, p. 81).

## STOP E03-W03: First Asphalt Outcrop

*(107 paces, 535 feet) First outcrop of asphalt. Note pahoehoe-like texture of this relatively pure (sand-free) asphalt, caused by downslope flowage of the viscous liquid on warm days. On the seaward side of the outcrop, goose barnacles (Polliclpes polymerus) may be seen growing in protected crevices attached to the asphalt. The old timbers embedded in the asphalt are the remains of a sea wall built by early miners to keep sea water out of the diggings at high tide. Note numerous cans and brick and wood fragments which over the years have become embedded in the soft surface of the outcrop* (Edwards, 1987, p. 81). On my maps, I label this first tar area TA-01. This area is west of the Sattler Mine Site shown on Edward's map between his stops E03 and E05.


*Figure 11. Stop E03-W03. West end of Tar Deposit 01.*

*Climb to top of low bluff and note red brick structure built into the back of the sea wall. This is the remains of one of the ovens in which the miners heated their shovels to facilitate quarrying the asphalt and bituminous sand into blocks for loading onto rail cars and delivery to the refinery* (see fig. 1).

## STOP E03-W04: Western Oven

There are 3 oven complexes in Tar Area-01. This is the western oven


*Figure 12. Stop E01-W04, western oven.*

*Walk east along edge of bluff behind sea wall* (Edwards, 1987, p. 81).

## STOP E03-W05: Beach cobbles in tar.

Here we see large beach clasts in the tar.


*Figure 13. Stop E03-W05 Tar conglomerate.*

## STOP E03-W06: Concrete Foundation

Cement foundation 5 feet x 3 feet with iron fasteners.


*Figure 14. Stop E03-W06. Cement foundation.*

## STOP E03-W07: Central Furnace

This central oven has five brick foundations.


*Figure 15. Stop E03-W07. Central oven with five foundations.*

STOP E03-W08: Remnant of timbers for sea wall.


*Figure 16. Stop E03-W08 Wood Planks in tar (TA-1)*

## STOP E03-W09. Eastern Oven

Here is a third oven, covered with ice plant.


*Figure 17. Stop E03-W09. Eastern Oven.*

## STOP W10. Fossil Hash

A few feet east of the Eastern Oven is an exposure of oil sand with fossil "hash."


*Figure 18. Stop W10, fossil hash in oil sand above terrace deposits.*

Here is a view of Tar Area 01 looking west from it's eastern end (Stop E03/W03-W10).

## STOP E03-11: East End Tar Area 01


*Figure 19. Stop E03-W11, east end of Tar area TA-01*

## STOP E04-W12

*(40 paces, 200 feet) Base of east-trending asphalt "finger" which extends out onto beach (just past lifeguard station. Good view ahead of the sea wall behind which the relatively pure, sand-free asphalt of this outcrop has been mined away. To the right, (seaward) the dark outcrops in the intertidal zone are not rock but asphalt. Diagonally ahead, on the beach, the casing of the R. W. Casper 130-1A well, drilled in 1930 to a depth of 1025 feet, may be seen if thick summer sand deposits have not covered it. This is one of sixteen wells drilled along the beach from Carpinteria Creek to Rincon point following the discovery of relatively high-quality Vaqueros (lower Miocene) oil at Summerland field in 1929* (Edwards, 1987, p. 81). This is my Tar Area TA-03.


*Figure 20. Stop E04-W12. East trending finger of tar.*

*Walk out along the asphalt "finger" and drop onto the beach* (Edwards, 1987, p. 81).

## STOP 04-W13 Tar Graffiti

People are creative.


*Figure 21. Stop E04-W13, area with tar graffiti.*


*Figure 22. More tar graffiti at Stop E04-W13.*

## STOP E05-W14 : Casing of Caspar 130-1A Well

*(26 paces, 130 feet) Casing of the Casper 130-1A well on beach just past the tip of the east-trending asphalt "finger of stop 4. Note erosion of the casing by surf-washed sand. This well appears to be adequately abandoned as no evidence of seepage has been observed by the author over the last fifteen years. The outcrops in the intertidal zone seaward of here are dolomitic siliceous shales of the organic shale member of the Monterey formation* (Edwards, 1987, p. 81).

This well casing is covered with sand in the summer.

*Continue eastward along beach* (Edwards, 1987, p. 81).

## STOP E06-W15: Asphalt "Finger"

*(23 paces, 115 feet) Tip of west-trending asphalt "finger". The concrete trough trending diagonally offshore from this point was the bed for an iron pipe which may have supplied sea water to the asphalt refinery for use in de-sanding the asphalt or, alternatively, may have carried effluent away. Walk behind asphalt outcrops for close inspection of sea wall construction. Look among rip-rap boulders for active seep of heavy oil* (Edwards, 1987, p. 81).


*Figure 23. E06-W15. West end of Tar Area TA-4 with clasts of brick, rip rap and beach cobbles.*

*Continue eastward along beach* (Edwards, 1987, p. 81).

## STOP W16: Railroad Tracks

Archaeologists have exposed a buried railroad track that used to service the Alcatraz open pit asphalt mining operation.


*Figure 24. Stop W16. Excavated narrow gauge railroad track.*

Near the railroad track exposure, there is arcuate excavations of oil sand.


*Figure 25. Man-made arcuate excavations into oil sand, near railroad track exposure.*

## STOP E07-W17: Punta Gorda Terrace Deposits

*(49 paces, 245 feet) Lifeguard tower. First appearance of Punta Gorda terrace deposits. This terrace surface has been dated at 45,000 years further east at Rincon Mountain. Note asphalt impregnated sands rather than pure asphalt. Seeps of heavy oil are becoming more common along the base of the terrace. Outcrops offshore are Monterey fm. As you continue east, watch for asphalt impregnated pebble to cobble conglomerate at base of terrace and for asphalt-saturated cross-bedding in overlying sands* (Edwards, 1987, p. 81).


*Figure 26. Stop E07-W17 Conglomerate with tar at base of Punta Gorda terrace deposits.*

*Continue eastward along beach* (Edwards, 1987, p. 81).

STOP W18. Active seep with shells and cross bedding in oil sand.


*Figure 27. Stop W18 Cross bedding in oil sand.*

## STOP W19: Painted Cement "Oil Sand"

To control erosion, gunnite cement has been applied to the oil sand. The lower part is painted black to resemble the oil sand, and the upper part is buff to resemble the terrace deposits.


*Figure 28. Painted cement covering oil sand for erosion control.*

## STOP E08-W20: Monterey Formation

*(42 paces, 210 feet) Low outcrops of Monterey formation on both left and right. The ridges of Monterey outcrop seaward from here are erosion resistant dolomitic siliceous shale beds of the organic shale member. A few steps back the way you came, these intertidal outcrops have been heavily bored by pholad clams, the shells of which are still in evidence. The shell cavities have been filled with asphalt. Note mounds of asphalt intermixed with these intertidal outcrops. Shoreward, along the base of the cliff, is a good exposure of Monterey intraformational breccia. Note two generations of fracturing; one calcite-filled, the other filled with asphalt. Breccias such as these are most common in brittle rocks in the hinges of tight folds and may be in part due to transient over-pressuring (Snyder, 1987). The attitude of this outcrop approximates the average dip within this fault block and measures 77 degrees, north 81 west* (Edwards, 1987, p. 81-82).


*Figure 29. Stop E08-W20. Oil sand cliff overlying Casitas of Santa Barbara formations.*

*A park restroom is accessible from this point and is reached by climbing the low bluff and walking to the east end of the campground. Continue eastward along beach* (Edwards, 1987, p. 82).

## STOPS W21, W22 Tar deposits overlying Monterey Formation


*Figure 30. Stop W21. Monterey Formation underlying tar.*


*Figure 31. Stop W22. Monterey Formation underlying tar.*

## STOP E09-W23: Stairway

*(75 paces, 375 feet) Foot of beach access stairway. On the beach, about half-way between the foot of the stairs and the prominent outcrop to the right, is the casing of the G. A. McDonald 120-1A well, drilled in 1931 to a depth of 1024 feet. This casing may not be visible under high sand conditions. The author was unable to find any geologic records of this or the Casper well in the files of the California Division of Oil & Gas. This well, too, appears to be properly abandoned, as no seepage has been observed* (Edwards, 1987, p. 82).


*Figure 32. Stop E09-W23. Wooden staircase with tar flow.*

*This is a good location to observe the lithology of the organic shale member of the Monterey formation which is best exposed in the intertldal outcrops just to the east. Note the alternation of dark laminated shales up to several feet thick with hard, erosion-resistant beds of dolomltic siliceous shale ranging from several inches to one foot thick. The light-colored shale laminations are made up of blebs, lenses and laminae of phosphate (carbonate fluorapatite) while the dark material is organic-rich marlstone. Both the marlstone and the phosphate show microscopic evidence of bacterial structures suggesting that bacteria may have been important in apatite formation by releasing phosphate from the organic matter under low oxygen sea-bottom conditions (Garrison, Kastner and Kolodny, 1987). The distinctive appearance of the phosphate laminae aids in field recognition of the organic shale member, and it is repeated at smaller scale under the hand lens, frequently permitting recognition of this unit in drill cuttings. These intertldal outcrops also show significant intraformational folding which is common in* *relatively incompetent units of the Monterey. Here the numerous sharp folds appear to plunge steeply eastward* (Edwards, 1987, p. 82).

*Figure 33. Stop E09-W24. Monterey Formation in intertidal zone.*


*Figure 34. Stop E09-W24. Phosphatic member of Monterey Formation.*

*Further evidence of the complexity of internal Monterey structure may be seen by closely examining the large outcrop at the low tide line. Here, individual blocks of phosphatic marlstone, dolomitic siliceous shale and dolomite are seen to be complexly intermixed, to the point of forming a breccia. Note that there is little evidence of soft sediment deformation; the laminae of marlstone blocks terminating sharply against other lithologies without contact distortion, suggesting that the individual blocks were at least partially lithified before being disturbed. Also, there is no evidence of significant, through-going fracturing as would be expected if this were a tectonic breccia. Probably the best interpretation is that this is a sea-floor slump deposit composed of partially lithified blocks of organic shale member lithologies with the interstices between blocks being filled in by continuing deposition of phosphatic marl. Other interpretations are welcome* (Edwards, 1987, p. 82).

*Examination of the sea cliff at this locality reveals a lobate seep of asphalt spilling out onto the beach just east of the foot of the stairs* (see Fig. 29 Wilkerson). *This seep appears to issue from the base of the Punta Gorda terrace deposits. Both left and right of the stairs, Monterey lithologies are exposed at the base of the cliff which are not typical of the organic shale member. These rocks consist of light tan, low density, diatomaceous, largely noncalcareous, somewhat punky shales lacking dolomitic interbeds. Such lithologies are more typical of the upper units of the Monterey, including the upper calcareous and upper siliceous members. If this is correct, a fairly significant fault is indicated between the rocks exposed on the beach and those in the sea cliff. Perhaps a fortuitous future storm will improve the exposure enough* *to make a definitive interpretation; otherwise some paleontologic work would seem to be indicated* (Edwards, 1987, p. 82).

*Finally, observe the terrace deposits in the cliff to the left of the stairs. Note the white sand layer separating asphalt-impregnated sands at the base and top of the bluff. This may reflect episodic activity of these seeps over the last 45,000 years* (Edwards, 1987, p. 82).

*Continue eastward along the base of the cliff watching for tar-filled Monterey fractures and small seeps* (Edwards, 1987, p. 82).

## STOP W24 Salt grass in oil sand


*Figure 35. Stop W24, salt grass growing in tar overlying fractured, brecciated Monterey Formation.*

STOP W25 Cross bedding in oil sand.


*Figure 36. Stop W25. Cross Bedding in oil sand above fractured Monterey Formation.*

## STOP W26 Oil seep “falls”

Tar seeps down the Monterey Formation like a slow-moving waterfall.


*Figure 37. Stop W26, oil seep "falls" over Monterey Formation.*

## STOP E10-W-27: Lobate Asphalt Seep at abandoned oil well.

*(38 paces, 190 feet) Lobate asphalt seep. This is one of the most active seeps along this beach, but as will be discussed shortly, it may not be entirely natural. Note the iron, brick, concrete and cobbles embedded in the surface of the semi-solid asphalt and observe the numerous seeps of heavy oil which are spilling onto the beach sand, slowly extending this outcrop toward the sea. Use caution in exploring here because small pools of fresh, wet oil are frequently found lurking under a quarter-inch of apparently dry beach sand in this area. In the cliffs here, and into the mouth of the small gully just ahead, are further exposures of Monterey lithologies which appear to be younger than the organic shale member* (Edwards, 1987, p. 82).

This seep is 200 fees southwest of the CDOGGR location for the Searoad Asphaltum and Refining Well No. 4.


*Figure 38. Stop E10-W27, lobate oil flow and seep at oil well site.*


*Figure 39. Stop E10-W28, pipe from oil well?*

From the beach, you can walk up to the top of the terrace and view the oil seep coming out of a pipe. On the way you pass an area of Salt Grass, and a fresh water spring area with willows.

## STOP W29 Salt Grass


*Figure 40. Stop W29, salt grass and ice plant.*

## STOP W30: Spring with willows

*Continue along the cliff into the mouth of the small gully and climb left onto the bluff at the first opportunity. Atop the bluff, turn left and walk out to the point. You are now directly above the lobate seep of stop 10. At the time of writing this was the site of a "tar-volcano", the result of gas bubbling up through liquid asphalt. On warm days when the seep was most active, these bubbles would burst and throw droplets of oil into the air where they would drift with the wind to coat the wooden barricade and sign which marked the site. This section is written in the past tense because the California Division of Oil & Gas believes this may be an old oil well (potentially the W. W. Gregg well, 1924, depth 360 feet) rather than a natural seep. If so, they will be obliged to attempt to abandon it properly and these features may not be visible at field trip time. About 20 feet to the north (toward the mountains) is a concrete circle which the D.O.G. believes may be an old tank footing* (Edwards, 1987, p. 82).

*Looking east from this vantage point, observe the Punta Gorda terrace deposits atop the headland at the east end of the beach and note that they dip approximately four degrees inland rather than seaward as would be expected. This is evidence of continued recent uplift of coastal rocks relative to those farther north under the terrace. Also note the asphalt impregnated sand outcrop just across the gully to the east. Return down the trail and proceed to that point* (Edwards, 1987, p. 82-83).


*Figure 41. Stop W30, willows at fresh water spring.*

## STOP W31: Names carved in oil sand

Here we see names carved in the oil sand.

*Figure 42. Stop W31. Names carved in oil sand.*

## STOP W32: Sulfate

Yellow sulfate from hydrothermal alteration is seen along bedding plains with tar.

*Figure 43. Stop W32 Sulfate in Monterey Formation.*

## STOP W33: Fossil Oil Seep

Here is a (relatively) inactive tar seep. The oil sand has flowed down slope, like a debris flow


*Figure 44. Stop W33. Fossil oil seep (now inactive).*

## STOP E11-W34: Asphalt impregnated terrace deposits

*(19 paces, 95 feet from point 10) Asphalt impregnated terrace deposits. This is a good exposure of the unconformity between the Monterey formation and the overlying Punta Gorda terrace. The unconformity here is at an elevation of about 5 feet whereas, looking east down the beach, the same unconformity can be seen to reach an elevation of about 30 feet. This tilting of the terrace surface has occurred since its formation, about 45,000 years ago. This same surface is at an elevation of 655 feet on Rincon Mountain, about 4 miles east. In this outcrop, notice the presence of a basal pebble conglomerate and well exposed cross-bedding in the asphalt-impregnated sands. Pebble lithologies consist primarily of two types; these are well-rounded greenish and tan sandstones, probably of Sespe (Oligocene) and Coldwater (Eocene) origin, and sub-rounded fragments of various Monterey lithologies. These units are well exposed in the mountains to the east and north. Also included are occasional well-rounded clasts of exotic lithologies such as quartzlte which are probably re-worked from the highly conglomeratic Sespe. At the base of the cliff the Monterey lithology appears to be typical of the organic shale member. Although not a very clear exposure, these rocks appear to be tightly folded. Observe asphalt fracture filling and small active seeps* (Edwards, 1987, p. 83).

*Enroute to the next stop watch for sulfur staining on outcrops and notice the prevailing south dip of the Monterey. Also observe that asphalt- impregnation is restricted to the basal part of the terrace deposits and that it thins to a thickness of only two feet* (Edwards, 1987, p. 83).

*Figure 45. STOP E11-W34: Asphalt impregnated terrace deposits*

*Continue eastward along cliff* base (Edwards, 1987, p. 83).

## STOP W35: Sulfate

Here sulfate is at the contact between Monterey and Punta Gorda terrace deposits


*Figure 46. STOP W35: Sulfate in Monterey Shale below Terrace deposit oil sand.*

## STOP E12-W36: Fresh water springs

*(71 paces, 355 feet). At steep, narrow gully below somewhat sickly-looking tree on bluff edge. Notice the numerous small springs of water issuing from the Monterey at the base of the cliff. The shales here are both foraminiferal and diatomaceous under the hand lens and do not have the visual aspect of the organic shale member* (Edwards, 1987, p. 83).

*Figure 47. STOP E12-W36: Fresh water springs.*

*Continue eastward along cliff base* (Edwards, 1987, p. 83).

## STOP E13-W37: Overturned beds

*(16 paces, 80 feet) Below the next tree on the cliff edge. Notice that these rocks, which again do not look like the organic shale member, dip north. Are they overturned or are they in the down-faulted north limb of a sharp anticline trending parallel to the coastline? While close inspection shows some of these shales to be laminated, it is a very even, fine-grained type rather than the blebby, grainy phosphate lamination of the organic shale member* (Edwards, 1987, p. 83).


*Figure 48. STOP E13-W37: Overturned beds.*

*Continue eastward watching for the re-appearance of typical organic shale member lithology* (Edwards, 1987, p. 83).

## STOP W38: Oil sands reappear.

From this point eastward, we see more oil sands and seeps.


*Figure 49. STOP W38: Oil sands reappear.*

Continue eastward along the base of the cliffs.

## STOP E14-W39: Folded Monterey

*(62 paces, 310 feet) Just past the next big tree on the bluff. Here, typical organic shale member is folded into a sharp, faulted anticline with a smooth syncline adjoining to the south. Close looking shows additional small, active seeps in this area* (Edwards, 1987, p. 83).


*Figure 50. STOP E14-W39: Folded Monterey.*

*Continue eastward* (Edwards, 1987, p. 83).

## STOP W40: Dolostone

Here is a 2 foot long concretion of dolostone.


*Figure 51. STOP W40: Dolostone.*

## STOP E15-W41: End of Beach

*(25 paces, 125 feet) End of beach. This large, west-facing outcrop shows very complex folding and faulting within the organic shale member. Examine the outcrop for step-shearing in the laminated shales and for numerous asphalt-filled fractures and heavy oil seeps. The rocks offshore of the point are dolomites and dolomitic siliceous shales of the organic shale member* (Edwards, 1987, p. 83).

*The next objective is the top of this bluff. This can be achieved in three ways. At low tide and in calm sea conditions, the nimble of foot can scramble quickly around the point into the next cove where, however, they will be faced with a twenty-foot climb up a pile of very large angular rip-rap boulders. In the alternative, retrace your steps until you find a negotiable section of bluff to climb. This field trip takes the conservative approach and returns along the beach to stop 10 from which a good trail is available along the top of the bluff* (Edwards, 1987, p. 83).


*Figure 52. STOP E15-W41: End of Beach*

*Return to stop 10 at the mouth of the large gully 300 yards west where a path leads up onto the bluff and thence eastward* (Edwards, 1987, p. 83).

## STOP E16-W42: High Point of Bluffs

*(270 paces, 450 yards from stop 10) Concrete survey markers on high point at bluff edge. Looking east additional exposures of the Monterey formation are seen in the cliffs and coves between here and the Chevron pier. In the first cove, the rocks are typical organic shale member and dip generally south; however, entering the next cove dips steepen to vertical and ultimately overturn to steep north dip and the transitional contact with the underlying lower calcareous member is exposed. The lower calcareous shale member is composed of thick-bedded dolomites and dolomitic siliceous shales with only thin interbeds of phosphatic marlstone. If there is a significant, down-to-the-north fault paralleling the outcrops we have just visited, it must trend a little to the north under the terrace deposits at this point. If so, it might help explain the presence of another major asphalt deposit which once existed here* (Edwards, 1987, p. 83).


*Figure 53. STOP E16-W42: High Point of Bluffs. View is to the west.*

Walk north to the Alcatraz abandoned mine area.

## STOP W43: Alcatraz Mine

The hummocky, grassy swale just north of this point was the location of the Alcatraz (spanish for pelican) asphalt mine at the turn of the century. Very little evidence of it is left today, except for the subtle topographic disturbance. Along the near edge of the depression old timber fragments and metal parts may be found embedded in asphalt and around other edges small, active heavyoil seeps may be located In the grass. When the mine closed, the pit was used as the town dump (Edwards, 1987, p. 83, 84).


*Figure 54. STOP W43: Alcatraz Mine. View to the north from Stop E16-W42.*

*Figure 55. Alcatraz tar mine, 1902. Photo from Bob Gray. Note railway. Compare with Figure 21, Stop W16.*

*Figure 56. Alcatraz tar mine with drag line, 1902. Photo from Bob Gray.*

*Figure 57. Alcatraz tar mine, 1902. Photo from Bob Gray.*

*Figure 58. Alcatraz tar mine. Digging with hot shovels. Photo from Bob Gray.*

*Figure 59. Fossil collecting at Alcatraz tar mine, 1927. Photo from Bob Gray.*

*Figure 60. Carpinteria tar mine.1927. Photo from Bob Gray.*

*On a clear day this is a good place to observe the string of production platforms which marks the crest of the Rincon offshore trend, the marine extension of the same structural feature which forms the trap for the Rincon, San Miguelito and Ventura Avenue fields. Looking back west, the two platforms which produce the Summerland offshore field should be visible* (Edwards, 1987, p. 84).

Walk north to see active seeps in the old mine area.

## STOP W44: Alcatraz Mine Seeps

Tar is still oozing up from the area of the old mine.

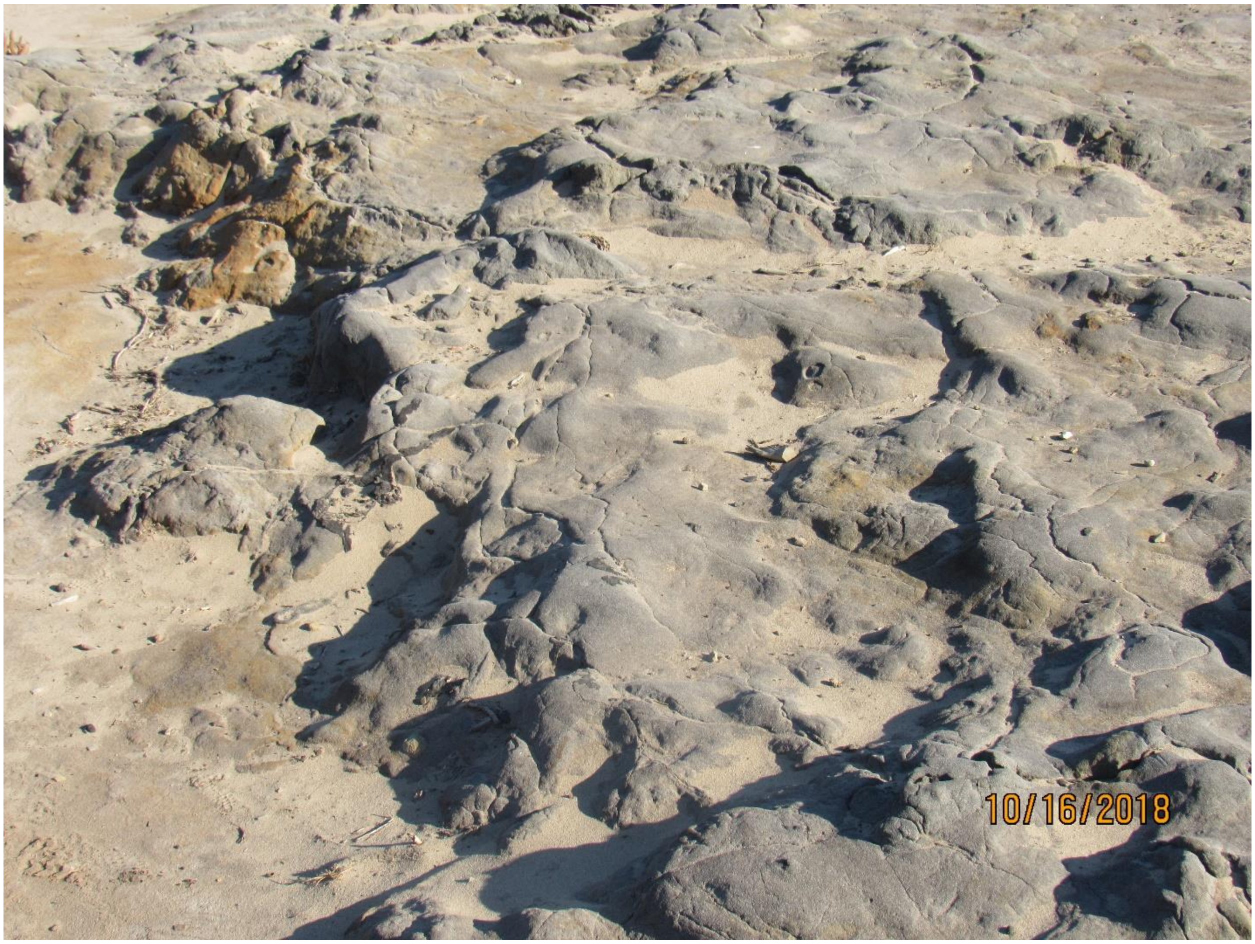



*Figure 61. STOP W44: Alcatraz Mine Seeps.*

Take trails north to the bike path. Go east to the paved road. Cross the railroad tracks and walk along the north side of them past oil processing facility and farm to a wind break.

## STOP W45: Kitty Bailard No. 1 Re-abandonment site

This abandoned well started to leak in 2015. Excavations showed that the abandoned well was not leaking, but natural seepage around it was discharging from the well area. A discussion of this re-abandonment project is found on pages 6 to 9 of this report.


*Figure 62. W45: Kitty Bailard No. 1 Re-abandonment site.*

Go south, cross the railroad tracks, and head toward the bluffs.

## STOP W45: Paved Road

Is this an old oil seep, or melted asphalt roadway? Walk down this old road to see the cliffs.


*Figure 63. STOP W45: Paved Road.*

Continue west along the bluff.

From the paved road, looking north you see outcrops illustrating the stratigraphy in this area: Terrace deposits are on top. These are underlain by gravels. The gravels rest on an unconformity above the Monterey Formation


*Figure 64. Stratigraphic section with Punta Gorda terrace deposits lying above gravels. These rest unconformanbly on the Monterey Formation.*


*Figure 65. Stratigraphic section with Punta Gorda terrace deposits lying above gravels. These rest unconformanbly on the Monterey Formation.*

## STOP W46: Monterey Formation: No oil sands

At this point, we see no oil sands in the cliff face.  We can see the stratigraphy with Monterey at the base, the gravels, and then terrace deposits.

## STOP W47: Oil Sands in Fractured Shale

From this vantage, to the east, we see some oil sand development, and tar in brecciated Monterey Formation.


*Figure 66. STOP W47: Oil Sands in Fractured Shale.*

The Carpinteria Cliffs are dangerous


*Figure 67. A reminder to be careful when hiking the Carpinteria bluffs.*

### STOP W48: Seal Sanctuary

There is a bench here. You can enjoy watching the seals.


*Figure 68. STOP W48: Seal Sanctuary.*

Continue west to return to Carpinteria State Beach campgrounds.

END OF WALKING TOUR

## REFERENCES

Beenham, Ewan, 1917, Approval of Concurrence, CDOGGR, May 17, 2017

Caldwell, Jayne C , 1979, Carpinteria as it was: Papillon Press, 228 p.

Chaney, R.W.,and Mason, H., 1934,A Pleistocene flora from the asphalt deposits at Carpinteria, California: Carnegie Institute, Contributions to Paleontology, Publication Number 415, p. 45-79.

Clark, Arthur M., 1962, From grove to cove to grove, a brief history of Carpinteria Valley.

ESRI, 2018, Digital aerial photography for the United States. https://www.esri.com/en-us/home

Dibblee, T.W. Jr., 1966, Geology of the central Santa Ynez Mountains, Santa Barbara County, California: California Division of Mines and Geology Bulletin 186, 99 p.

Dibblee, Thomas, W., Jr., 1986, Geologic Map of the Carpinteria Quadrangle, Santa Barbara County, California, Santa Barbara Museum of Natural History, Dibblee Geology Center Map #DF-04, Scale 1:24,000.

Dibblee, Thomas, W., Jr., 1987, Geologic Map of the White Ledge Peak Quadrangle, Santa Barbara County, California, Santa Barbara Museum of Natural History, Dibblee Geology Center Map #DF-11, Scale 1:24,000.

Edwards, Edwin B. 1987, Field guide to the geology and asphalt deposits of Carpinteria State Beach and vicinity: in Tom Wright and Ron Heck, editors, Petroleum Geology of Coastal Southern California, Pacific Section American Association of Petroleum Geologists, Guidebook No. 60, p. 75-86.

Grant, Campbell, 1962, The Carpinteria tar pits: "Noticias", Quart, bull. Santa Barbara Historical Society, v. 8, no. 4, p. 11-20 .

Hartz, Bill, 2018, Personal communication, citing article from Carpinteria News.

Hodgson, Susan F., 1980, Onshore oil & gas seeps in California: California Department of Conservation, Division of Oil & Gas, TR26, 97p.

Hoffman, R., 1927, The finding of Pleistocene material in an asphalt pit at Carpinteria, California: Science, v. 66, no. 1702, p. 155- 157

Issacs, C. M., 1981a, Lithostratigraphy of the Monterey formation, Goleta to Point Conception,! Santa Barbara coast, California, _in Isaacs, C. M., ed., Guide to the Monterey formation in the California coastal area, Ventura to San Luis Obispo: Pacific Sec. Amer. Assoc. Petroleum Geologists, Vol. 52, p. 9-24.

Isaacs, C. M. 1981b, Outline of diagenesis in the Monterey formation examined laterally along the Santa Barbara coast, California, in Isaacs, C. M., ed., Guide to the Monterey formation in the California coastal area, Ventura to San Luis Obispo: Pacific Sec, Amer. Assoc. Petroleum Geologists, Vol. 52, p. 25-38.

Isaacs, C. M., 1981c, Field characterization of rocks in the Monterey formation along the coast near Santa Barbara, California, ±n_ Isaacs, C. M., ed., Guide to the Monterey formation in the California coastal area, Ventura to San Luis Obispo: Pacific Sec. Amer. Assoc. Petroleum Geologists, Vol. 52, p. 39-54.

Jackson, P. A. and Yeats, R. S., 1982, Structural evolution of the Carpinteria Basin, western Transverse Ranges, California: Amer. Assoc. Petroleum Geologists Bull., v. 66, no. 7, p. 805-829.

Isaacs, C. M., 1981d, Field trip guide for the Monterey formation, Santa Barbara coast, California, _in Isaacs, C. M., ed., Guide to the Monterey formation in the California coastal area, Ventura to San Luis Obispo: Pacific Section, Amer. Assoc. Petroleum Geologists, Vol. 52, p. 55-72.

Ogle, B. A. and Wallis, W. S., Heck, R. G. and Edwards, E. B., 1987, Petroleum geology of the Monterey formation in the offshore Santa Maria/Santa Barbara areas, _iri Ingersoll, R. V. and Ernst, W. G., eds., Cenozoic basin development of coastal California, Rubey Vol., VI: Prentice-Hall, Inc., Englewood Cliffs, New Jersey, p. 382-406

Priestaf, Iris, 1979, Natural tar seeps and asphalt deposits of Santa Barbara County, California, California Geology, August, 1979, p. 163-169.

Priestaf, Iris, 1979, Natural Tar Seeps and Asphalt Deposits of Santa Barbara County: California Geology, v 32, no. 8, p. 163-169.

Snyder, W. S., 1987, Structure of the Monterey formation: stratigraphic, diagenetic, and tectonic influences on style and timing, in Ingersoll, R. V. and Ernst, W. G., eds., Cenozoic basin development of coastal California, Rubey Vol. VI: Prentice-Hall, Inc., Englewood Cliffs, New Jersey,

Yerkes, R. F., Wagner, H. C., and Yenne, K. A., 1969, Petroleum Development in the Santa Barbara Channel Region: Geology, Petroleum Development, and Seismicity of the Santa Barbara Channel Region, California, U. S. Geological Survey Professional Paper 679-B p. 13-27.

# PHOTOS

*Figure 69. Carpinteria Oil Seeps in 1907. Photo by Ralph Arnold. Courtesy of CDOOG.*

*Figure 70. Carpinteria Oil Seeps. Photo by Steve Mulqueen. Courtesy of CDOORG.*

*Figure 71. Carpinteria Oil Seeps. Photo by Steve Mulqueen. Courtesy of CDOOGR.*

*Figure 72. Carpinteria Oil Seeps. Photo by Steve Mulqueen. Courtesy of CDOOGR.*

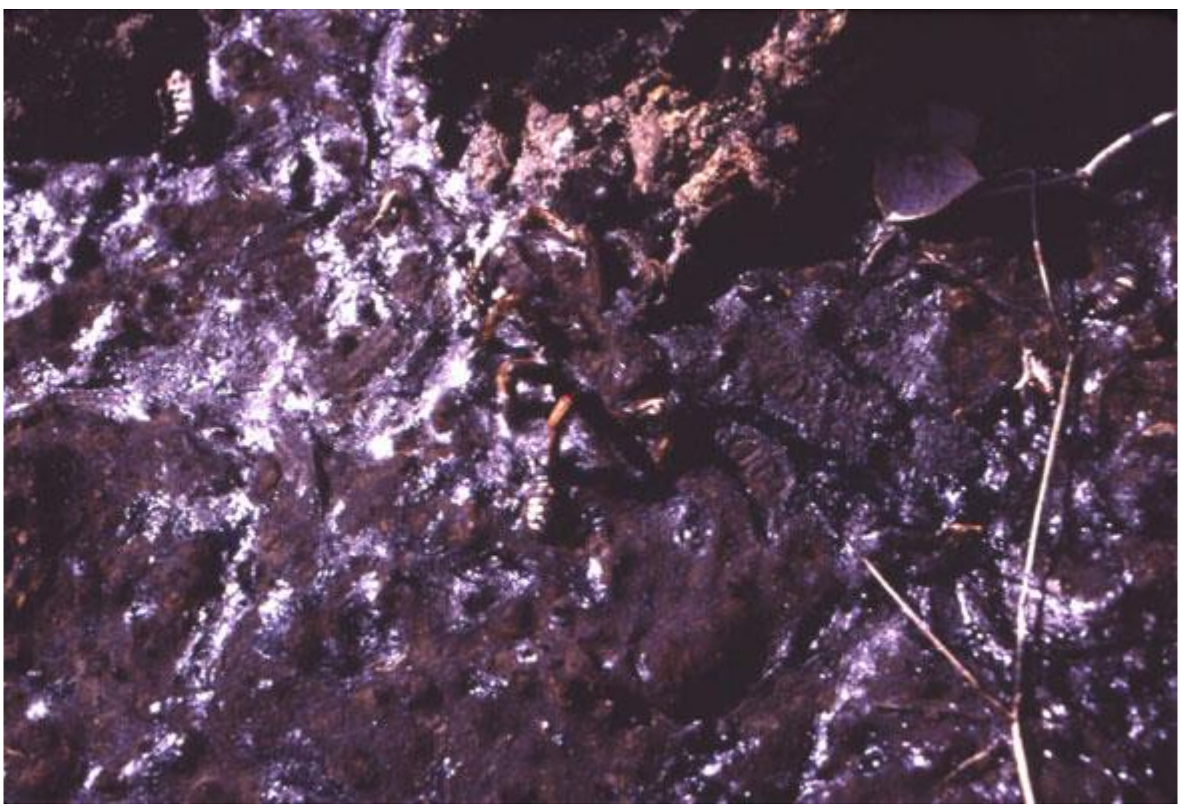
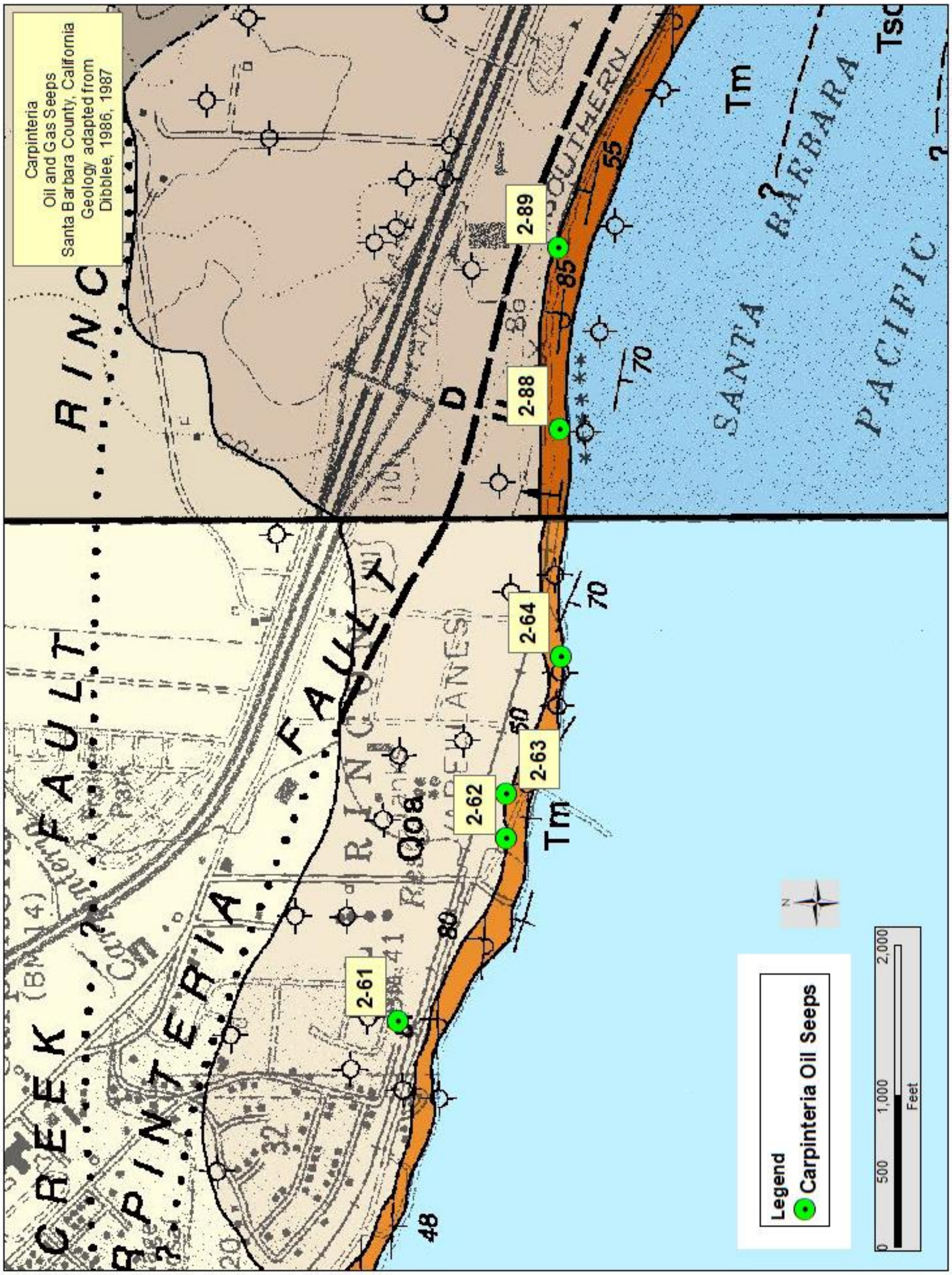


*Figure 73. Carpinteria Oil Seeps. Photo by Steve Mulqueen. Courtesy of CDOOGR.*

# MAPS


T4N

*Figure 74. Topographic map of the Carpinteria Oil Seeps. Seep locations from Hodgeson, 1980.*

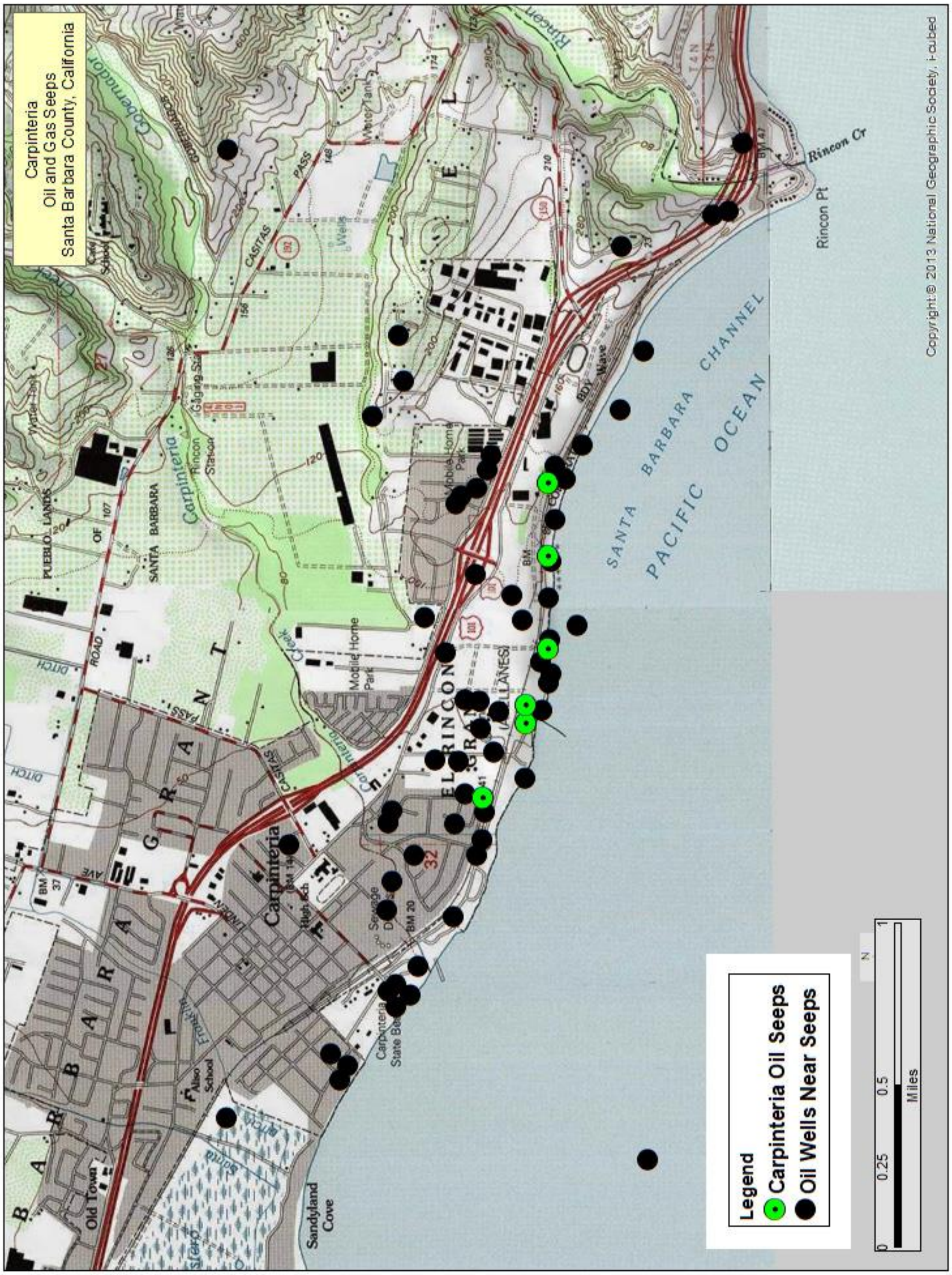



T4N

*Figure 75. Geologic map of the Carpinteria Oil Seeps. Adapted from Dibblee, 1987 and Dibblee, 1986. Seep locations from Hodgeson, 1980.*


T4N

*Figure 76. Aerial photograph of the Carpinteria Oil Seeps. Photo adapted from ESIR, 2018. Seep locations from Hodgeson, 1980.*



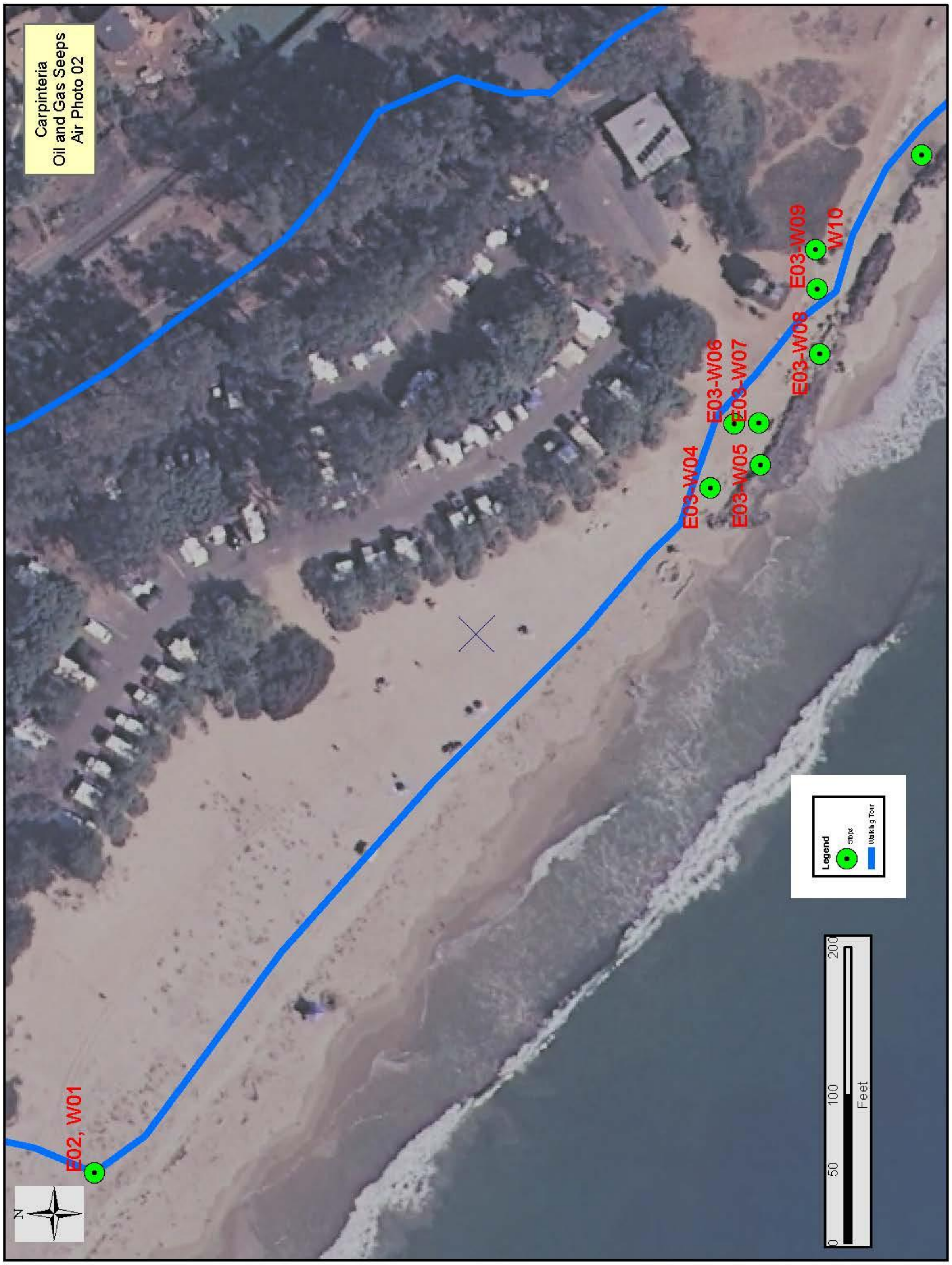

T4N

*Figure 77. Abandoned oil wells near the Carpinteria Oil Seeps. Seep locations from Hodgeson, 1980. Well data from CDOOGR. For list of wells see Table 2.*

## AERIAL PHOTOGRAPHS FOR THE WALKING TOUR

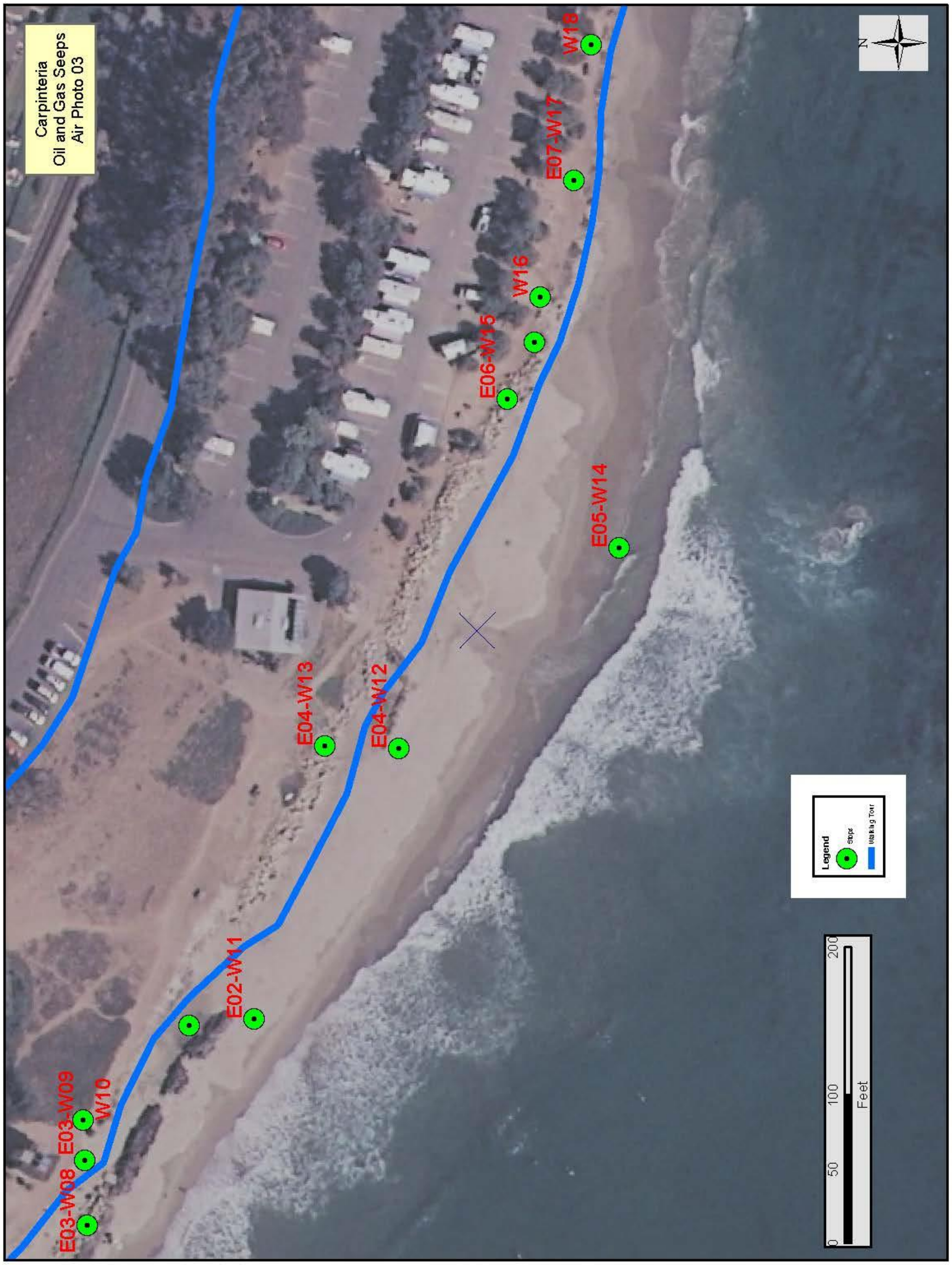
Aerial Photographs 01 to 07


T4N

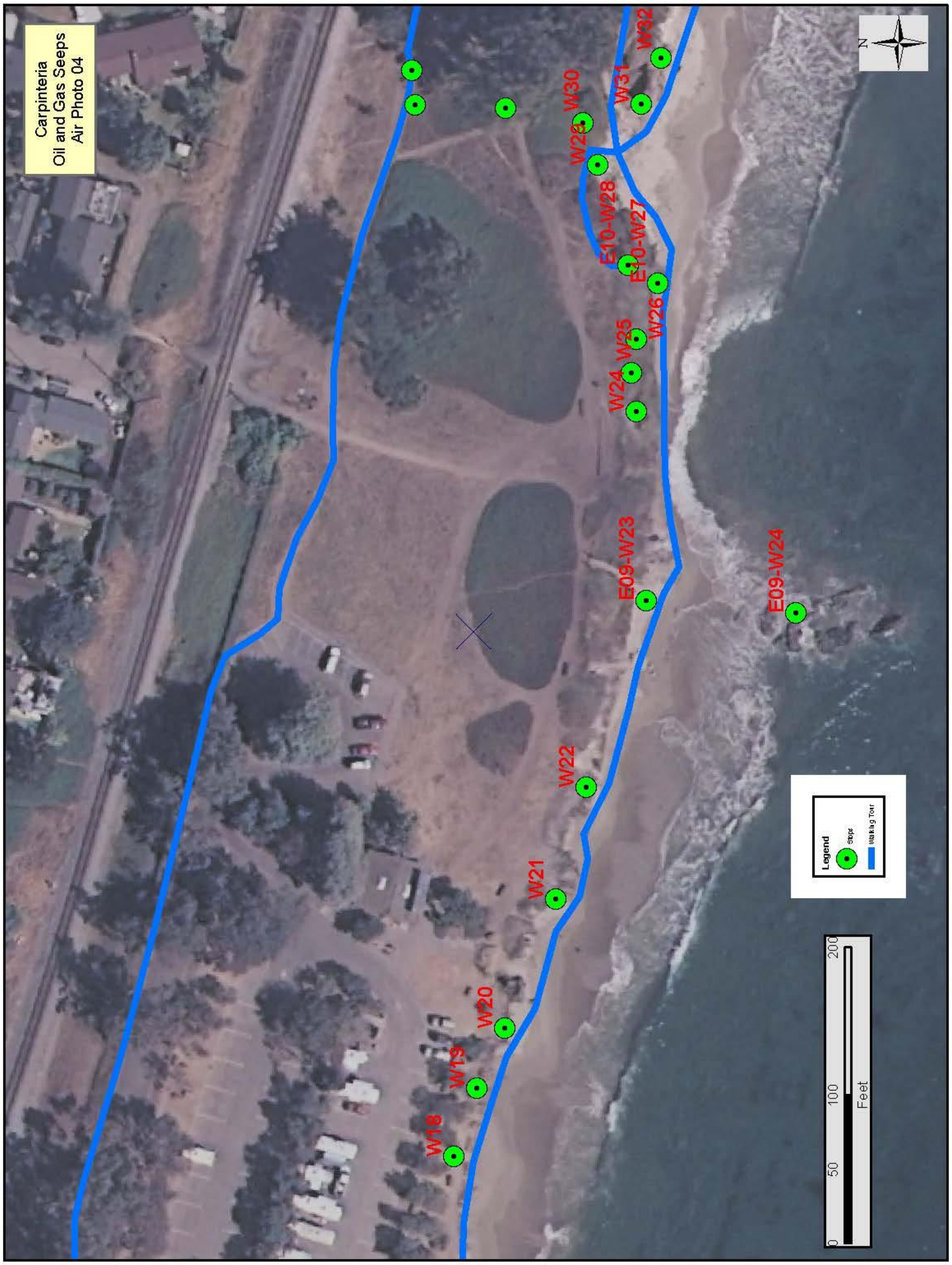


Carpinteria
Oil and Gas Seeps
Air Photo 02
E02, W01
E03-W04
E03-W05
E03-W06
E03-W07
E03-W08
E03-W09
W10
Legend
0
50
100
200
Feet
N


T4N


Carpinteria
Oil and Gas Seeps
Air Photo 03
E03-W08
E03-W09
W10
E02-W11
E04-W13
E04-W12
E05-W14
E06-W15
W16
E07-W17
W18
Legend
Seeps
Walking Tour
0
50
100
200
Feet
N

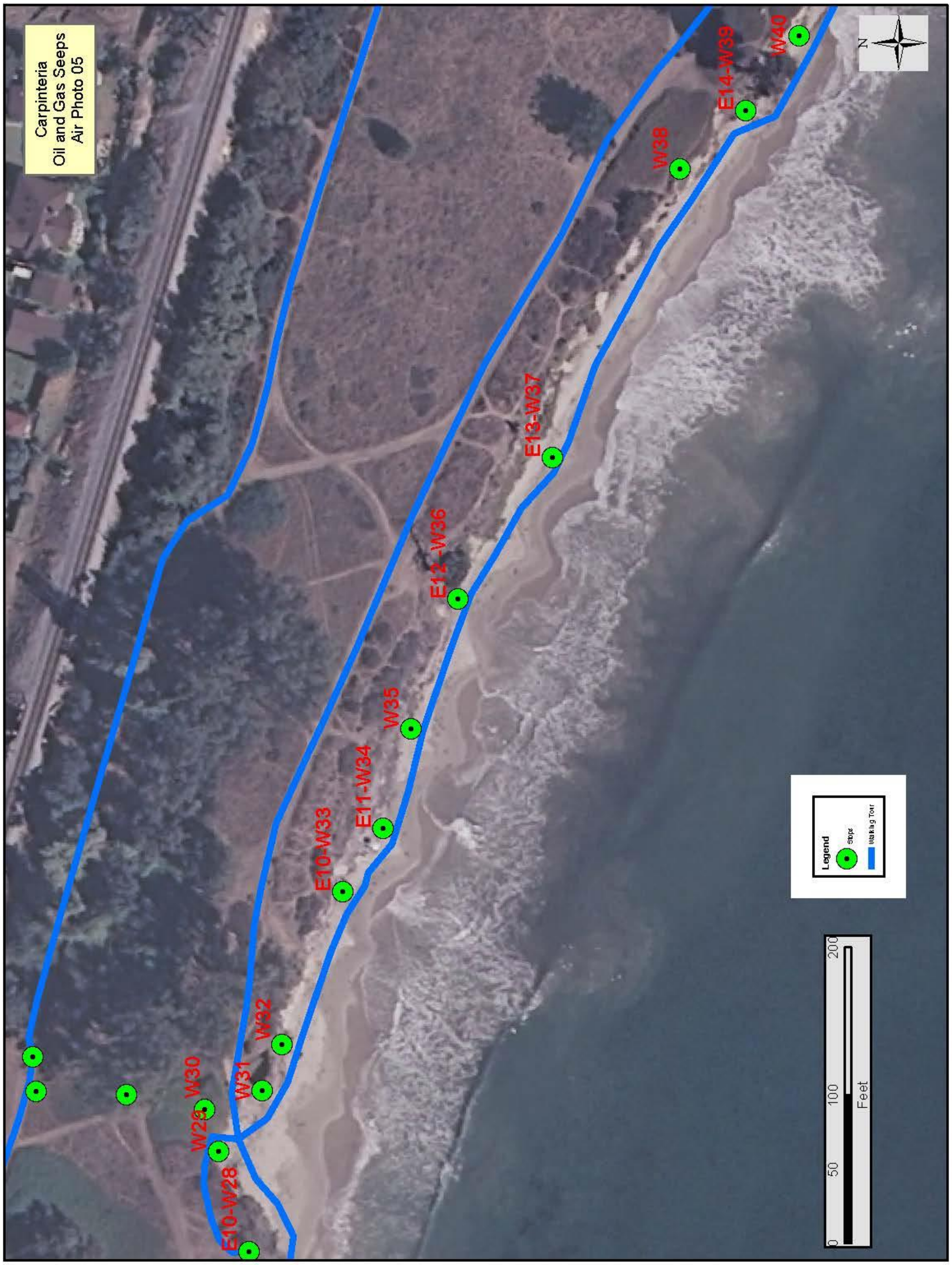
T4N



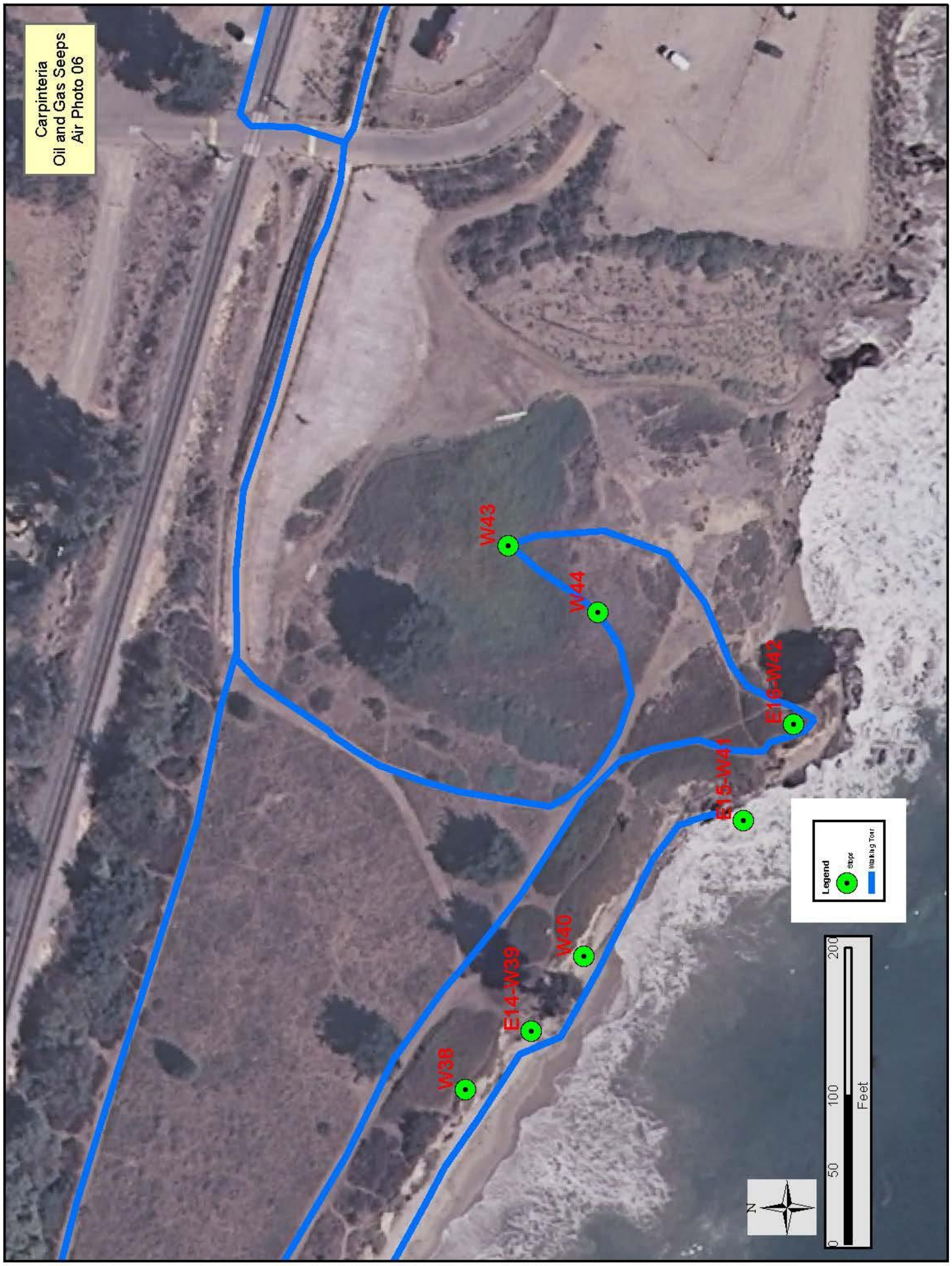
Carpinteria
Oil and Gas Seeps
Air Photo 04
W18
W19
W20
W21
W22
E09-W23
E09-W24
W24
W25
W26
E10-W27
E10-W28
W29
W30
W31
W32
Legend
Seeps
Walking Tour
0
50
100
200
Feet
N


T4N

R25W


Carpinteria
Oil and Gas Seeps
Air Photo 05
E10-W28
W29
W30
W31
W32
E10-W33
E11-W34
W35
E12 -W36
E13-W37
W38
E14-W39
W40
Legend
0
50
100
200
Feet
N

T4N



Carpinteria
Oil and Gas Seeps
Air Photo 06
W43
W44
E16-W42
E15-W41
W40
E14-W39
W38
Legend
Stops
Walking Tour
0
50
100
200
Feet
N


T4N


Carpinteria
Oil and Gas Seeps
Air Photo 07
W43
W44
W45
W46
W47
W48
Legend
Stops
Walking Tour
0
145
290
580
Feet
N

T4N

## TABLOID SIZE MAPS

11” X 17”

Topographic Map

Geologic Map

Aerial Photograph

Index map for aerial photographs


Carpinteria Oil Seeps
Santa Barbara County, California
Columbian Oil Asphalt & Refinery Well No. 2
Lester L. Pedersen Core Hole 2
Lester L. Pedersen Core Hole 1
Nixon & Bosig Well No. 1
Nixon & Bosig Well No. 2
Nixon & Bosig Well No. 1
Carpinteria Oil Co. Carpinteria 1
McDonald Drilling Co. 165-1
Justin S. Snow Well No. 190-1
E01, W01
Lester L. Pedersen Core Hole 3
Chevron U.S.A. Inc. Carpinteria Community Lease #3 1
E02, W01
James F. Nugent Oil Co. Well No. 1
C. M. S. Oil and Drilling Co. 1
R. W. Caspers Well No. 130-1A
Searoad Asphaltum & Refining 1
James F. Nugent Oil Co. Well No. 2
Searoad Asphaltum & Refining Well No. 2
Thornbury Drilling Co. Carpinteria Community 1
Geo. A. McDonald Well No. 120-1-A
Walter W. Gregg Well No. 1
D. S. Fletcher Catlin-Fletcher 1
Thornbury Drilling Co. Community 3
Searoad Asphaltum & Refining Well No. 4
P. C. Higgins P.C. Higgins 1
Thornbury Drilling Co. Carpinteria Community 1
Columbian Oil Asphalt & Refinery Well No. 1
Conoco Inc. Kittie C. Bailard 1
W44
Lucien M. Higgnis Well No. 121-1
Callie M. Higgins Well No. 122-1
Conoco Inc. Franklin 1
Thornbury Drilling Co. Carpinteria Community 2
Theresa Franklin State Permit 123 1
Kittie C. Bailard State Permit 124 1-A
Conoco Inc. State Permit 124 1
W08
W10
E03-W06
W05
E04-W13
E04-W12
E02-W11
E06-W15
W16
E05-W14
W19
W21
W22
E07-W17
W18
W24
W26
W32
W30
W35
E09-W23
W25
E10-W33
E13-W37
E09-W24
W34
W38
W43
E14-W39
W40
W44
E15-W41
E16-W42
W48
W47
W45
W46
EL RINCON
GRANT
(ARELLANES)
Sewage
Disposal
BM 20
BM 41
32
Tanks
101
Legend
STOPS
Oil Wells Near Seeps
Feet
0
500
1,000
2,000
Copyright:© 2013 National Geographic Society, i-cubed

Carpinteria Oil Seeps
Santa Barbara County, California
Geology adapted from Dibblee 1986
Legend
STOPS
Oil Wells Near Seeps
Feet
0
500
1,000
2,000

Carpinteria Oil Seeps
Santa Barbara County, California
Columbian Oil Asphalt & Refinery Well No. 2
Lester L. Pedersen Core Hole 2
Lester L. Pedersen Core Hole 1
Nixon & Bosig Well No. 1
Nixon & Bosig Well No. 2
Nixon & Bosig Well No. 1
Carpinteria Oil Co. Carpinteria 1
McDonald Drilling Co. 165-1
Justin S. Snow Well No. 190-1
E01, W01
Lester L. Pedersen Core Hole 3
Chevron U.S.A. Inc. Carpinteria Community Lease #3 1
E02, W01
James F. Nugent Oil Co. Well No. 1
C. M. S. Oil and Drilling Co. 1
R. W. Caspers Well No. 130-1A
Searoad Asphaltum & Refining 1
James F. Nugent Oil Co. Well No. 2
Searoad Asphaltum & Refining Well No. 2
Thornbury Drilling Co. Carpinteria Community 1
W08
W10
E03-W06
W05
E04-W13
E04-W12
E02-W11
E06-W15
W16
E05-W14
Geo. A. McDonald Well No. 120-1-A
Walter W. Gregg Well No. 1
Searoad Asphaltum & Refining Well No. 4
D. S. Fletcher Catlin-Fletcher 1
Thornbury Drilling Co. Community 3
W19
W21
W22
E07-W17
W18
W24
W26
W32
W29
W30
P. C. Higgins P.C. Higgins 1
Thornbury Drilling Co. Carpinteria Community 1
E09-W23
W25
W35
E10-W33
E11-W34
E13-W37
E09-W24
W38
W43
E14-W39
W40
W44
E15-W41
E16-W42
Columbian Oil Asphalt & Refinery Well No. 1
Conoco Inc. Kittie C. Bailard 1
W44
Lucien M. Higgnis Well No. 121-1
W48
W47
W46
W45
Callie M. Higgins Well No. 122-1
Conoco Inc. Franklin 1
Thornbury Drilling Co. Carpinteria Community 2
Theresa Franklin State Permit 123 1
Kittie C. Bailard State Permit 124 1-A
Conoco Inc. State Permit 124 1
Legend
STOPS
Oil Wells Near Seeps
0
500
1,000
2,000
Feet
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


Carpinteria Oil Seeps
Santa Barbara County, California
Aerial Photo Index Map
Photo 1
Photo 2
Photo 3
Photo 4
Photo 5
Photo 6
Photo 7
Columbian Oil Asphalt & Refinery Well No. 2
Henry Berrie Fish Fish 164 1
Carpinteria Oil Co. Carpinteria 1
McDonald Drilling Co. 165-1
Justin S. Snow Well No. 190-1
Lester L. Pedersen Core Hole 2
Lester L. Pedersen Core Hole 1
Nixon & Bosig Well No. 1
Nixon & Bosig Well No. 2
Nixon & Bosig Well No. 1
Lester L. Pedersen Core Hole 3
Chevron U.S.A. Inc. Carpinteria Community Lease #3 1
James F. Nugent Oil Co. Well No. 1
C. M. S. Oil and Drilling Co. 1
R. W. Caspers Well No. 130-1A
Searoad Asphaltum & Refining 1
James F. Nugent Oil Co. Well No. 2
Searoad Asphaltum & Refining Well No. 2
Thornbury Drilling Co. Carpinteria Community 1
Northern Consolidated Oil Co. Well No. 1
D. S. Fletcher Catlin-Fletcher 1
Thornbury Drilling Co. Community 3
P. C. Higgins P.C. Higgins 1
Thornbury Drilling Co. Carpinteria Community 1
Columbian Oil Asphalt & Refinery Well No. 1
Lucien M. Higgins Well No. 121-1
Conoco Inc. Kittie C. Bailard 1
Callie M. Higgins Well No. 122-1
Conoco Inc. Franklin 1
Thornbury Drilling Co. Carpinteria Community 2
Theresa Franklin State Permit 123 1
Kittie C. Bailard State Permit 124 1-A
Conoco Inc. State Permit 124 1
E01, W01
E02, W01
E03-W06
W08
W10
W05
E02-W11
E04-W12
E04-W13
E05-W14
W20
W22
E09-W23
W26
W31
W32
W35
E09-W24
W36
W40
W44
E16-W42
E15-W41
W44
W48
W47
W45
W46
Legend
STOPS
Oil Wells Near Seeps
Aerial Photos
Feet
0
500
1,000
2,000
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## ARCH E SIZE MAP

36” X 42”

This map is posted on line at

https://www.academia.edu/37644723/Map_of_the_Carpinteria_Oil_Seeps_Santa_Barbara_County_California


Carpinteria Oil Seeps
Santa Barbara County, California
Gregg Wilkerson, 2018
Legend
STOPS
CDOGGR Oil Seeps
Oil Wells Near Seeps
Walking Tour Route
N
0
250
500
1,000
Feet

# TABLES

TABLE 1: CDOGGR OIL SEEPS CARPINTERIA
(Hodges, 1980) STATE BEACH

| CA Seep Number | LONGITUDE WEST | LATITUDE NORTH | Township | Range | Section | Base Meridian |
|---|---|---|---|---|---|---|
| 2-61 | -119.5120 | 34.3880 | 4N | 25W | 33 | SB |
| 2-62 | -119.5080 | 34.3860 | 4N | 25W | 33 | SB |
| 2-63 | -119.5070 | 34.3860 | 4N | 25W | 33 | SB |
| 2-64 | -119.5040 | 34.3850 | 4N | 25W | 33 | SB |
| 2-88 | -119.4990 | 34.3850 | 4N | 25W | 33 | SB |
| 2-89 | -119.4950 | 34.3850 | 4N | 25W | 34 | SB |

| APINumber | Operator | Section | Township | Range | B&M | Latitude | Longitude | Lease | Well Number | Definition |
|---|---|---|---|---|---|---|---|---|---|---|
| 08304845 | Artic Oil Co. | 34 | 04N | 25W | SB | 34.38459506600 | -119.49408179200 | | 1 | Plugged Dry Hole |
| 28304285 | Benjamin F. Bailard | 33 | 04N | 25W | SB | 34.38462304000 | -119.49697891500 | State Permit 127 | 1 | Plugged Oil & Gas |
| 28304286 | Benjamin F. Bailard | 34 | 04N | 25W | SB | 34.38337810400 | -119.49301072400 | State Permit 129 | 1 | Plugged Oil & Gas |
| 08304647 | C. M. S. Oil and Drilling Co. | 33 | 04N | 25W | SB | 34.38957293800 | -119.50418737200 | | 1 | Plugged Oil & Gas |
| 28304302 | Callie M. Higgins | 33 | 04N | 25W | SB | 34.38528507900 | -119.50733148100 | Well No. | 122-1 | Plugged Dry Hole |
| 08304324 | Carpinteria Oil & Gas Co. | 34 | 04N | 25W | SB | 34.38161224300 | -119.48228023900 | Well No. | 1 | Plugged Dry Hole |
| 08304177 | Carpinteria Oil Co. | 32 | 04N | 25W | SB | 34.39188513700 | -119.52205149800 | Carpinteria | 1 | Plugged Dry Hole |
| 28304291 | Casitas Oil Co. | 34 | 04N | 25W | SB | 34.38063921600 | -119.48792945900 | Well No. | 202-1 | Plugged Oil & Gas |
| 28304292 | Casitas Oil Co. | 34 | 04N | 25W | SB | 34.38170316100 | -119.49110261300 | Well No. | 202-2 | Plugged Oil & Gas |
| 08304293 | Century Oil Co. | 34 | 04N | 25W | SB | 34.38767199100 | -119.49432485900 | Core Hole Hall | 1 | Plugged Dry Hole |
| 08304309 | Chevron U.S.A. Inc. | 33 | 04N | 25W | SB | 34.39052989000 | -119.50226627400 | Carpinteria Community Lease #3 | 1 | Plugged Dry Hole |
| 08304310 | Chevron U.S.A. Inc. | 27 | 04N | 25W | SB | 34.39276489400 | -119.49136082700 | Core Hole | 1 | Plugged Dry Hole |
| 08304311 | Chevron U.S.A. Inc. | 34 | 04N | 25W | SB | 34.38747000300 | -119.49353082200 | Core Hole | 2 | Plugged Dry Hole |
| 08300769 | Chevron U.S.A. Inc. | 34 | 04N | 25W | SB | 34.39161795600 | -119.48698061900 | Core Hole | 3 | Plugged Dry Hole |
| 28304441 | Chevron U.S.A. Inc. | 33 | 04N | 25W | SB | 34.38482901600 | -119.49923301400 | Well No. | 126-1 | Plugged Dry Hole |
| 28301047 | Chevron U.S.A. Inc. | 32 | 04N | 25W | SB | 34.38063351300 | -119.53157184900 | Texaco-Monterey Core Hole | 8-D-55 | Plugged Dry Hole |
| 08304573 | Columbian Oil Asphalt & Refinery | 33 | 04N | 25W | SB | 34.38656396400 | -119.50109412800 | Well No. | 1 | Plugged Dry Hole |
| 08304574 | Columbian Oil Asphalt & Refinery | 32 | 04N | 25W | SB | 34.39222013500 | -119.52243952800 | Well No. | 2 | Plugged Dry Hole |
| 08304290 | Conoco Inc. | 33 | 04N | 25W | SB | 34.38613255400 | -119.50243170000 | Kittie C. Bailard | 1 | Plugged Dry Hole |
| 08304294 | Conoco Inc. | 32 | 04N | 25W | SB | 34.38530504200 | -119.50469732200 | Franklin | 1 | Plugged Dry Hole |
| 28304289 | Conoco Inc. | 33 | 04N | 25W | SB | 34.38367005200 | -119.50274217300 | State Permit 124 | 1 | Plugged Dry Hole |
| 08304297 | D. S. Fletcher | 33 | 04N | 25W | SB | 34.38802903000 | -119.50826258900 | Catlin-Fletcher | 1 | Plugged Dry Hole |
| 08304847 | Dr. R. W. Hill | 3 | 03N | 25W | SB | 34.37746636200 | -119.48063209500 | | 1 | Plugged Dry Hole |
| 28304306 | Geo. A. McDonald | 32 | 04N | 25W | SB | 34.38819612100 | -119.51509000500 | Well No. | 120-1-A | Plugged Dry Hole |
| 08304299 | Guiberson-Cudahy | 29 | 04N | 25W | SB | 34.39661792600 | -119.51453513500 | Shepard | 1 | Plugged Dry Hole |
| 28304295 | Henry Berrie Fish | 32 | 04N | 25W | SB | 34.39190015400 | -119.52327557300 | Fish 164 | 1 | Plugged Dry Hole |
| 08304303 | Imperial Gypsum & Oil Corp. | 34 | 04N | 25W | SB | 34.38811197300 | -119.49532091000 | Bailard | 1 | Plugged Dry Hole |
| 08304327 | James F. Nugent Oil Co. | 33 | 04N | 25W | SB | 34.39009000800 | -119.50998173300 | Well No. | 1 | Plugged Dry Hole |
| 08304328 | James F. Nugent Oil Co. | 33 | 04N | 25W | SB | 34.38901803200 | -119.51001171400 | Well No. | 2 | Plugged Dry Hole |
| 28304331 | Justin S. Snow | 32 | 04N | 25W | SB | 34.39090314500 | -119.52110142200 | Well No. | 190-1 | Plugged Dry Hole |
| 28304287 | Kittie C. Bailard | 33 | 04N | 25W | SB | 34.38488403500 | -119.50349624200 | State Permit 124 | 1-A | Plugged Oil & Gas |
| 28304288 | Kyrtle Bailard | 33 | 04N | 25W | SB | 34.38493600300 | -119.50126010800 | State Permit 125 | 1-A | Plugged Oil & Gas |
| 08304537 | Lester L. Pedersen | 32 | 04N | 25W | SB | 34.39202105700 | -119.51653816700 | Core Hole | 1 | Plugged Dry Hole |
| 08304538 | Lester L. Pedersen | 32 | 04N | 25W | SB | 34.39227507200 | -119.51806026400 | Core Hole | 2 | Plugged Dry Hole |
| 08304539 | Lester L. Pedersen | 32 | 04N | 25W | SB | 34.39101805900 | -119.51509806000 | Core Hole | 3 | Plugged Dry Hole |
| 08304305 | Linc-Con Oil Operating Co. | 34 | 04N | 25W | SB | 34.38908794300 | -119.49612396200 | Linc-Con | 1 | Plugged Dry Hole |
| 28304301 | Lucien M. Higgnis | 33 | 04N | 25W | SB | 34.38603311200 | -119.51096671400 | Well No. | 121-1 | Plugged Dry Hole |
| 28304326 | Mary B. Hall | 34 | 04N | 25W | SB | 34.38415807000 | -119.49479881400 | | 1 | Plugged Dry Hole |
| 28304814 | McDonald Drilling Co. | 32 | 04N | 25W | SB | 34.39123616000 | -119.52263452100 | | 165-1 | Plugged Dry Hole |

| APINumber | Operator | Section | Township | Range | B&M | Latitude | Longitude | Lease | Well Number | Definition |
|---|---|---|---|---|---|---|---|---|---|---|
| 08304645 | Nixon & Bosig | 33 | 04N | 25W | SB | 34.39200700300 | -119.51267493300 | Well No. | 1 | Active Oil & Gas |
| 08304653 | Nixon & Bosig | 33 | 04N | 25W | SB | 34.39215800800 | -119.51329697300 | Well No. | 1 | Plugged Dry Hole |
| 08304654 | Nixon & Bosig | 33 | 04N | 25W | SB | 34.39215900800 | -119.51329597300 | Well No. | 2 | Plugged Dry Hole |
| 08304655 | Northern Consolidated Oil Co. | 33 | 04N | 25W | SB | 34.38820793200 | -119.49994810800 | Well No. | 1 | Plugged Oil & Gas |
| 08304644 | P. C. Higgins | 33 | 04N | 25W | SB | 34.38745707000 | -119.50957153000 | P.C. Higgins | 1 | Plugged Oil & Gas |
| 21106002 | Phillips Oil Company | 2 | 03N | 25W | SB | 34.37612093500 | -119.47676384500 | Signal State C.H. | 1 | Plugged Dry Hole |
| 28304325 | R. W. Caspers | 32 | 04N | 25W | SB | 34.38928214400 | -119.51845523000 | Well No. | 130-1A | Plugged Oil & Gas |
| 08304308 | Santa Barbara Oil and Gas Co. | 29 | 04N | 25W | SB | 34.39947907400 | -119.52926408700 | S.B. | 1 | Plugged Dry Hole |
| 08304650 | Searoad Asphaltum & Refining | 33 | 04N | 25W | SB | 34.38920907500 | -119.51342892400 | | 1 | Plugged Dry Hole |
| 08304329 | Searoad Asphaltum & Refining | 33 | 04N | 25W | SB | 34.38874606300 | -119.51178381600 | Well No. | 2 | Plugged Dry Hole |
| 08304330 | Searoad Asphaltum & Refining | 33 | 04N | 25W | SB | 34.38785609700 | -119.51281486100 | Well No. | 4 | Plugged Dry Hole |
| 08304304 | Tesoro Petroleum Corporation | 26 | 04N | 25W | SB | 34.39920884000 | -119.47694832500 | Gobernador | 1 | Plugged Dry Hole |
| 28304479 | Theresa Franklin | 33 | 04N | 25W | SB | 34.38483106200 | -119.50534435200 | State Permit 123 | 1 | Plugged Dry Hole |
| 28304296 | Thomas N. Fish | 29 | 04N | 25W | SB | 34.39440415500 | -119.52721086100 | State Permit 163 | 1 | Plugged Dry Hole |
| 08304312 | Thornbury Drilling Co. | 34 | 04N | 25W | SB | 34.39140794200 | -119.48946972100 | Canfield | 1 | Plugged Dry Hole |
| 08304313 | Thornbury Drilling Co. | 33 | 04N | 25W | SB | 34.38720103600 | -119.50734251800 | Carpinteria Community | 1 | Plugged Oil & Gas |
| 28304313 | Thornbury Drilling Co. | 33 | 04N | 25W | SB | 34.38870999400 | -119.50675151100 | Carpinteria Community | 1 | Plugged Dry Hole |
| 28304314 | Thornbury Drilling Co. | 33 | 04N | 25W | SB | 34.38498206500 | -119.50584338500 | Carpinteria Community | 2 | Plugged Dry Hole |
| 08304315 | Thornbury Drilling Co. | 33 | 04N | 25W | SB | 34.38806300900 | -119.50680250200 | Community | 3 | Plugged Dry Hole |
| 08304643 | Unknown Operator | 3 | 03N | 25W | SB | 34.37679538100 | -119.48043507500 | Unknown | | Plugged Oil & Gas |
| 08304300 | W. C. Hamilton | 34 | 04N | 25W | SB | 34.38884795200 | -119.49571794000 | Tyler-Hamilton | 1 | Plugged Dry Hole |
| 8304298 | Walter W. Gregg | 33 | 04N | 25W | SB | 34.38799011400 | -119.51428295200 | Well No. | 1 | Plugged Dry Hole |
| 08303804 | Western Oil Royalties, Ltd. | 29 | 04N | 25W | SB | 34.39482412600 | -119.52578978300 | Bryce | 1 | Plugged Dry Hole |
| 08304316 | Western Oil Royalties, Ltd. | 32 | 04N | 25W | SB | 34.39403115200 | -119.52641780600 | Well No. | 1 | Plugged Dry Hole |

| STOP | Description | Longitude | Latitude |
|---|---|---|---|
| E03-W04 | Western oven | -119.51819501800 | 34.38899720190 |
| E03-W07 | Cement foundation | -119.51805046200 | 34.38890703530 |
| E03-W06 | Central oven with 5 brick foundations | -119.51805246200 | 34.38895170190 |
| E03-W09 | Eastern oven | -119.51775151800 | 34.38879670190 |
| W10 | Fossil hash oil sand | -119.51766218400 | 34.38879997970 |
| E02-W11 | East end of TA-01 | -119.51743668800 | 34.38848142800 |
| | Tar area 02 | -119.51745101800 | 34.38860164640 |
| E04-W13 | Tar graffiti | -119.51682507300 | 34.38834736860 |
| E05-W14 | Intertidal blocks of tar | -119.51638485100 | 34.38779947970 |
| E06-W15 | West end of TA-04 | -119.51605040700 | 34.38800581300 |
| | tar cliff | -119.51592368500 | 34.38795420190 |
| W16 | Railroad track | -119.51582101800 | 34.38794253520 |
| E07-W17 | Conglomerate in tar | -119.51556085100 | 34.38787897970 |
| W18 | active seep with shells and cross beds in oil sand | -119.51525718500 | 34.38784686850 |
| W20 | Sand below tar in Casitas or Santa Barbara Fm. | -119.51497079600 | 34.38775064630 |
| W19 | Painted cement made to look like tar sand | -119.51510450400 | 34.38780346100 |
| W21 | Monterey fm under tar | -119.51468129600 | 34.38765492410 |
| W22 | Monterey fm under tar | -119.51443157400 | 34.38759692410 |
| E09-W24 | Monterey in intertidal zone | -119.51404429200 | 34.38720590570 |
| E09-W23 | Wood staircase with cement foundation | -119.51401362900 | 34.38748431300 |
| W24 | Salt grass in oil sand | -119.51359029600 | 34.38750081290 |
| W25 | Crossbeds in oil sand | -119.51350279600 | 34.38750886850 |
| W26 | Oil seep "falls" | -119.51342724100 | 34.38749931290 |
| E10-W27 | Active lobate seep area | -119.51330218500 | 34.38745986850 |
| W29 | Salt grass | -119.51303590700 | 34.38756992400 |
| W30 | Fresh water spring with vegitation | -119.51294213000 | 34.38759631290 |
| | TRACE of fault | -119.51290840700 | 34.38774036840 |
| E10-W28 | Oil well pipe seep | -119.51326218500 | 34.38751514620 |
| | salt bush | -119.51282307400 | 34.38791403510 |
| | yellow buck brush | -119.51290079600 | 34.38790842400 |
| E01, W01 | East end Carpinteria Creek Bridge | -119.51869538400 | 34.39101488850 |
| E02, W01 | Beach east of Carpinteria Creek | -119.51972392500 | 34.39014686330 |
| E03-W05 | Conglomerate in Tar | -119.51814445400 | 34.38890448950 |
| E03-W08 | Wood planks in Tar | -119.51789752700 | 34.38879283710 |
| E04-W12 | East trending finger of tar | -119.51683239300 | 34.38821041150 |
| W31 | Carvings in oil snd | -119.51290018500 | 34.38748875730 |
| W32 | Sulfate on bedding planes | -119.51279863000 | 34.38745109070 |
| | | -119.51245535200 | 34.38733664620 |
| E10-W33 | Fossil oil seep | -119.51245535200 | 34.38733664620 |
| E11-W34 | Conglomerate with tar | -119.51231402100 | 34.38726239850 |
| W35 | Sulfate at contact | -119.51209213000 | 34.38720864620 |

| **STOP** | **Description** | **Longitude** | **Latitude** |
|---|---|---|---|
| E12 -W36 | Sickly Tree, springs | -119.51180140800 | 34.38712120170 |
| E13-W37 | Tree in arroyo | -119.51148468500 | 34.38694442400 |
| W38 | Oil sand reappear | -119.51083987000 | 34.38670418330 |
| E14-W39 | Organic shale | -119.51070901900 | 34.38658097950 |
| W40 | Dolostone concretion | -119.51054268600 | 34.38648242400 |
| E15-W41 | End of beach | -119.51024090800 | 34.38618525730 |
| E16-W42 | High Point of Bluffs | -119.51002618600 | 34.38609147960 |
| W43 | Alcatraz Mine (Site) | -119.50962263000 | 34.38662042390 |
| W44 | Alcatraz Mine Seep | -119.50977200400 | 34.38645455320 |
| W44 | Kitty Balard No. 1 re-abandonment project | -119.50237429800 | 34.38612920130 |
| W45 | Paved Road | -119.50397718700 | 34.38540375710 |
| W46 | No oil sands | -119.50314251700 | 34.38535277520 |
| W47 | Oil sands in fractured shale | -119.50443396500 | 34.38534331270 |
| W48 | Seal Sancturay | -119.50569713100 | 34.38551264600 |