2023
PROGRESS REPORT

Coastal Hazards and Legacy Oil & Gas Well Removal and Remediation Program

Commissioners:
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Introduction

Established in 1938, the California State Lands Commission (Commission) manages roughly 4 million acres of tide and submerged lands and the beds of natural and navigable rivers, streams, lakes, bays, estuaries, inlets, and straits. These lands, often referred to as sovereign or public trust lands, stretch from the Klamath River and Goose Lake in the north to the Tijuana Estuary in the south, and the Colorado River in the southeast. They encompass the Pacific Coast from 3 miles offshore in the west to world-famous Lake Tahoe in the east, and include California's two longest rivers, the Sacramento and San Joaquin. The Commission protects and enhances these lands and natural resources by issuing leases for use or development, providing and preserving public access, resolving boundaries between public and private lands, and implementing regulatory programs to protect state waters from oil spills and invasive species introductions. Through its actions, the Commission secures and safeguards the public's access rights to waterways and the coastline and preserves irreplaceable natural habitats for wildlife, vegetation, and biological communities.

The Commission also oversees sovereign land granted by the Legislature in trust by the Legislature to approximately 70 local jurisdictions. These lands generally consist of prime waterfront lands and coastal waters and include the land underlying California's five major ports.

Development of the Summerland Oil Field in Santa Barbara County began in the late 1890s in an area of naturally occurring oil and gas seeps. Wells were first drilled on the beach and then from piers that extended into the Pacific Ocean. The operators drilled, produced, and plugged and abandoned wells without regulation. Production ceased in the early 1900s. Virtually no records exist about the drilling or abandonment of the hundreds of wells in the Summerland Oil Field. Oil leaks and sheens are regularly observed on the beach and in the water near Summerland. Some oil is from natural seeps, but some originates from improperly plugged and abandoned legacy wells.

Legacy oil and gas wells are wells that were drilled before current abandonment standards, where there is scant information on the well's abandonment procedure, and there is no viable company with the responsibility to re-abandon the well should it start leaking or threaten the environment or public health and safety. Based on the Commission's research, there are 200 high-priority legacy oil and gas wells that could, depending on

their condition, leak oil into the marine environment, negatively affecting swimmers, surfers, recreational users, marine and coastal wildlife, as well as causing environmental degradation and public health and safety hazards.

SB 44 (Jackson) Chapter 645, Statutes of 2017, provides the Commission up to $2 million each year until fiscal year 2027-2028 to administer a Coastal Hazards and Legacy Oil and Gas Well Removal and Remediation Program. Chapter 645 requires the Commission to provide an annual report to the Legislature on the activities and accomplishments of the Program from the prior year and requires the Commission, by January 2027, to submit a report to certain legislative committees that covers the life of the Program and includes information necessary to aid the Legislature in determining the effectiveness of the Program and whether funding should be reauthorized. Chapter 645 becomes inoperative on July 1, 2028. The purpose of this annual report is to provide information on the Commission's activities from December 2022 through December 2023.

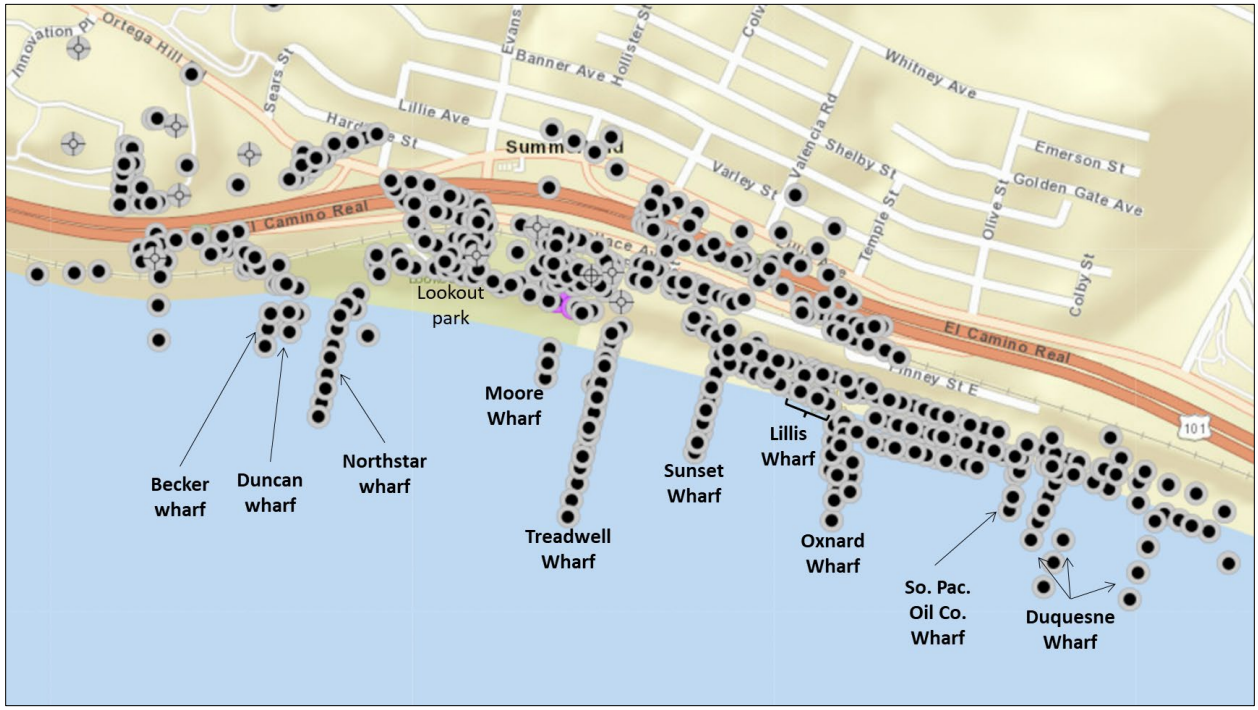

Figure 1. Summerland Legacy Wells in Santa Barbara County.

Figure 2. Exposed railroad irons near Goleta Beach (photo by Padre Associates).

Summerland Oil Sheen Incident

On January 6, 2023, amid a series of atmospheric rivers that battered the state in late December and early January, a large oil sheen was seen offshore Summerland Beach in Santa Barbara County. The following day, a Unified Command was formed that consisted of the U.S. Coast Guard, California Department of Fish and Wildlife's Office of Spill Prevention and Response (CDFW-OSPR) and the Santa Barbara County Fire Department. Lab analysis conducted by CDFW-OSPR indicated that the sheen oil was consistent with local natural seep oil. The Pacific Ocean offshore Summerland Beach is an area with active natural seeps. There are also an estimated 200 legacy wells near the beach, and while lab results indicated that the sheen oil was consistent with seep activity, it is possible that one or more of the legacy wells could also have been a factor in producing the sheen. The legacy wells, which were drilled in the late 1800s and early 1900s and abandoned prior to the introduction of modern safety standards, are believed to be relatively shallow compared to modern wells, which makes it nearly impossible to distinguish the legacy well oil from natural seepage in the area. The Commission, through its Coastal Hazard and Legacy Well Remediation Program, investigated whether any of the legacy wells were discharging petroleum. The investigation included crews surveying the area looking for affected wildlife and any other signs of risk for the public before reopening the beach.

To ensure public safety, the Santa Barbara County Air Pollution Control District conducted air monitoring and determined that contamination levels did not reach the threshold of being a risk to the public. With confirmed lab results from CDFW-OSPR of natural seep oil and the Commission's ongoing investigations under its legacy well program set to continue, the Unified Command decided to demobilize about a week after the sheen was observed.

The Commission continues its work as the agency responsible for ongoing monitoring and investigation at Summerland Beach.

Accomplishments

Following the successful re-abandonment in the Summerland Beach area of two legacy wells (Treadwell-10 and NorthStar-815) in 2020, and two more Legacy Wells (Olsson-805 and Duquesne-910) in 2021, staff continued to monitor the area for additional seeps, prepared engineering plans, and obtained permits to re-abandon two additional offshore legacy wells along the Treadwell Pier, known as Treadwell-1 and Treadwell-5 during the summer of 2023.

Summerland Survey

The exceptionally wet 2022-2023 winter storms created an unusual drop in the level of sand on Southern California beaches, revealing several well casings and coastal hazards at Summerland beach, Haskell's Beach, Mussel Shoals Beach, and other locations. The Commission's environmental consultant conducted a survey to record the geographic coordinates of the features that were exposed after the storms.

Staff and the state's contractor, 2H (previously known as InterAct PMTI), along with their team performed a field site survey for legacy wells that became exposed at Summerland and Loon Point beaches after evidence of leaking hydrocarbons appeared from recent storm events.

The area that was surveyed was divided in two areas:

- Area 1: western region, which includes previously capped wells Becker-1 and Olsson-805.
- Area 2: eastern region, which includes previously capped well Duquesne-910.

The areas that were surveyed for coastal hazards can be seen on Figure 3:

Figure 3. Overview map of Summerland Beach & Loon Point (photo by 2H).

Area 1

Area 1 includes 16 surveyed locations of remnants (well casings, capped wells, and pipelines) of legacy oil field activities. Survey data was collected in 2017 and 2023 and is indicated on the map below (Figure 4).

Figure 4. Area 1 location map (photo by 2H).

Multiple well casings were exposed at the time of the field site survey. Labels were given to the surveyed locations and assigned to associated field photos as indicated in Figure 5, Figure 6, and Figure 7 below. The wells were exposed and able to be photographed and surveyed due to local low tidal depths.

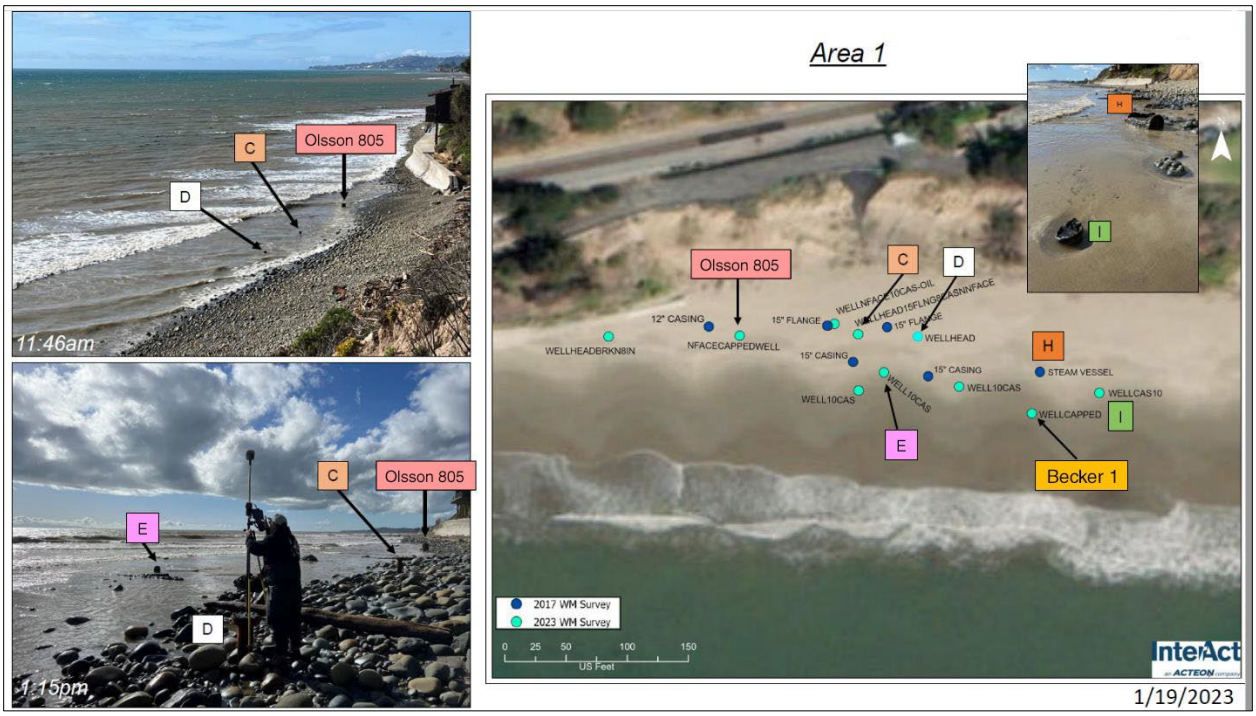

Figure 5. Area 1 photos and survey locations at low tide looking west (photo by 2H).

Figure 6. Area 1 photos and survey locations at low tide looking east (photo by 2H).

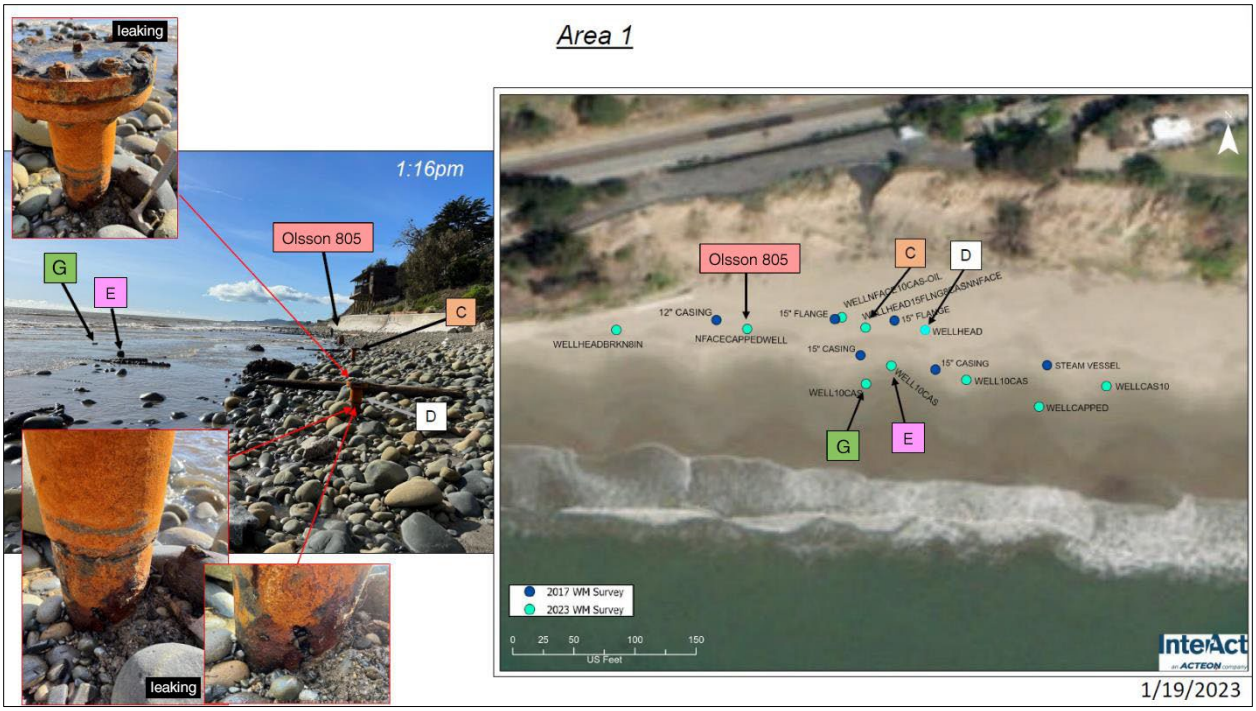

Figure 7. Area 1 photos and survey locations at low tide looking west (photo by 2H).

Area 2

Area 2 includes 19 surveyed locations of remnants (well casings, capped wells, and pipelines) of legacy oil field activities. Survey data was collected in 2017 and 2023 and is indicated on the map (Figure 8). The Duquesne 910 capped well is in this area and included in Figure 9.

Figure 8. Area 2 photos and survey locations at low tide (photo by 2H).

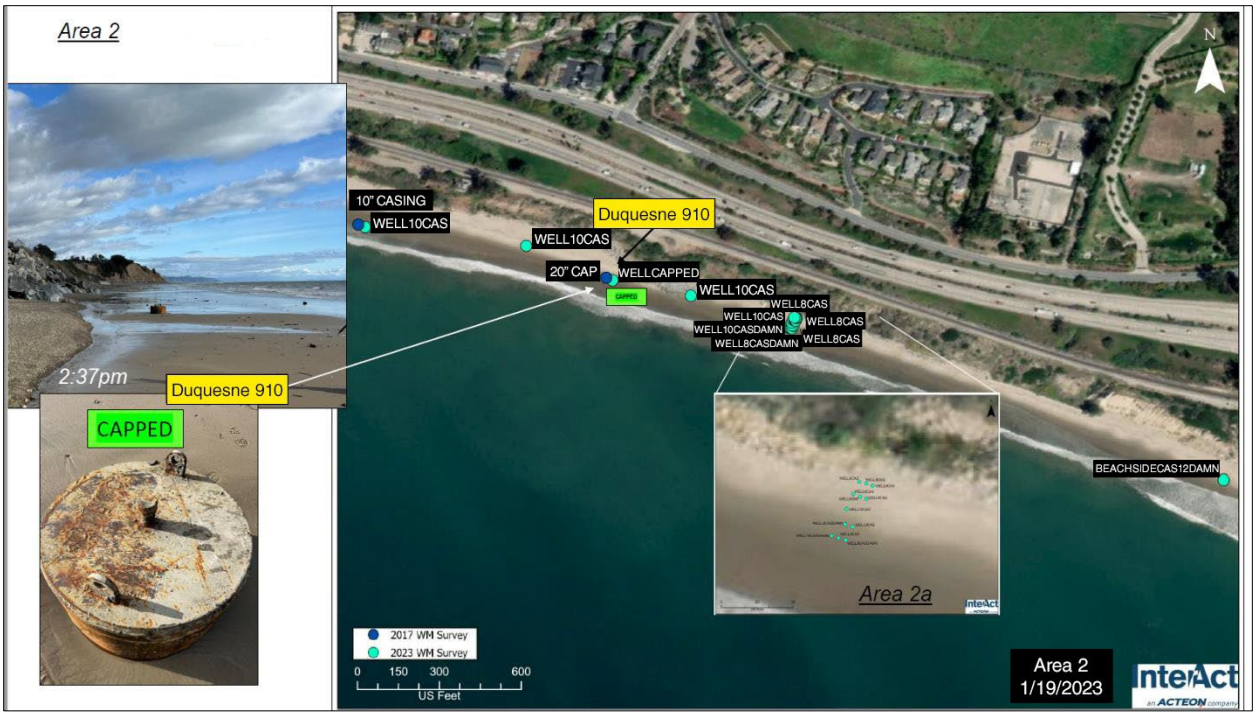

Figure 9. Area 2 photos of Duquesne 910 capped well at low tide looking east (photo by 2H).

Area 2a

Area 2a consists of a concentration of 12 survey sites that were measured and then matched up with the photos. The remnants were a combination of metal, wood objects and concrete blocks that appear to be old piers, pilons, or oil facilities.

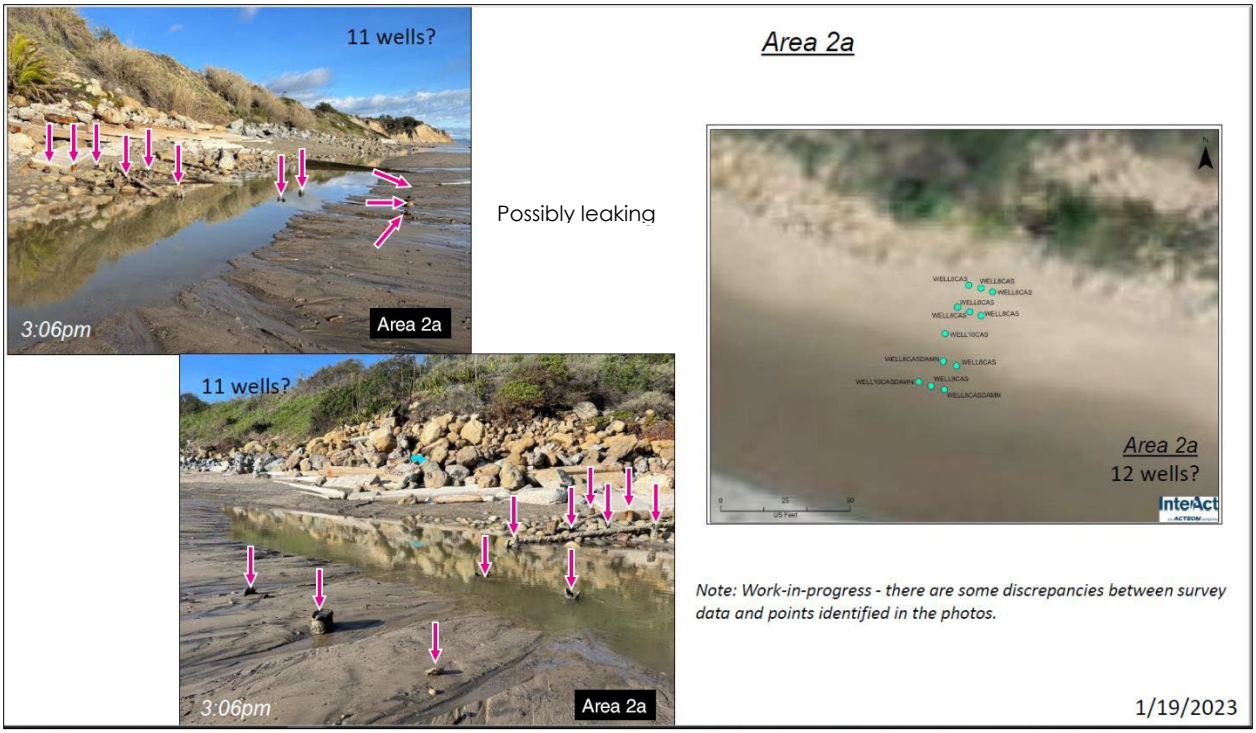

Figure 10. Area 2a photos and survey locations at low tide (photo by 2H).

Loon Point

Loon Point Beach is the eastern most surveyed site and includes one legacy well casing along with three metal objects that were protruding above the beach surface. There is one object that appeared to be a legacy well casing. Three other metal objects were above the surface, and it was difficult to know whether they were legacy wells or part of the former infrastructure (Figure 11).

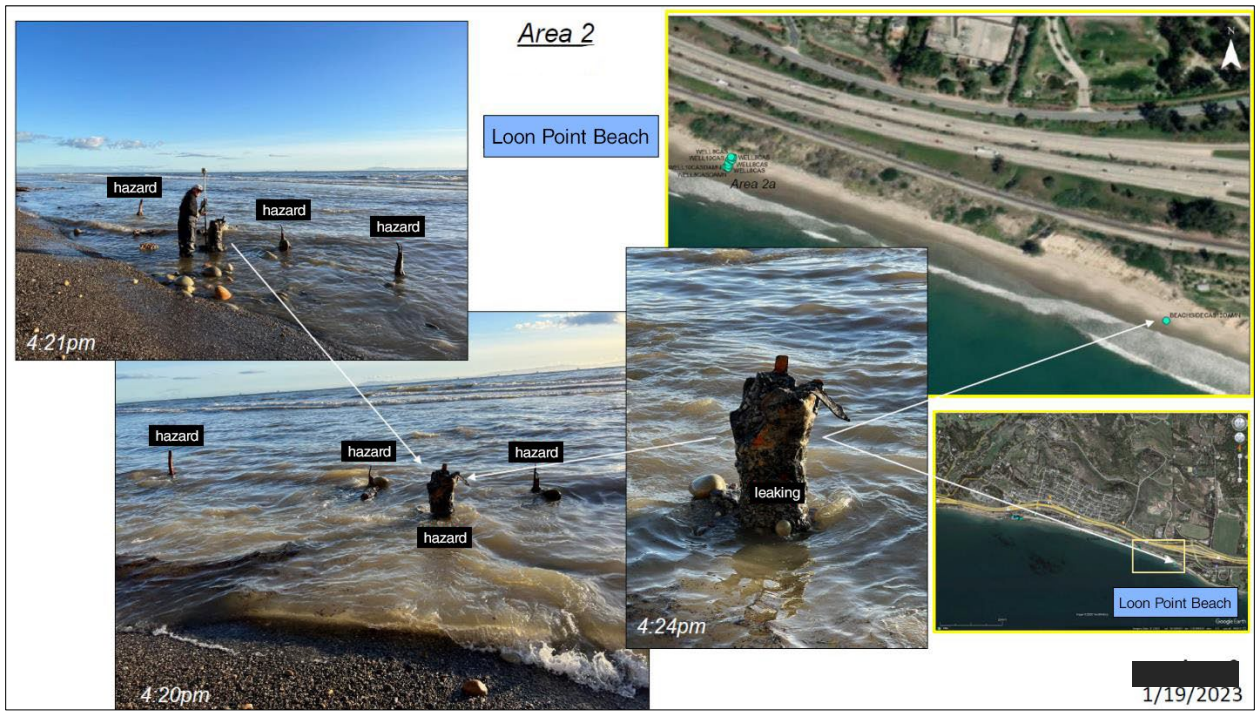

Figure 11. Loon Point Beach photos and survey locations just after low tide (photo by 2H).

Survey observations

Substantial well production infrastructure was exposed due to erosion from the extraordinary 2022-2023 winter storm season, allowing for an extensive survey of well location and conditions on Summerland Beach. The wells within Area 1 are near each other, which yields operational savings when designing and executing a multiple well abandonment program. There is also clear and documented evidence of minor hydrocarbon discharge directly from casings into the surrounding environment, which was likely not present before due to the weight of the sand that covered these wells, providing enough overburden pressure to shut them off and preventing oil seepage.

Area 2 & 2A had no visible oil leaking from any well casings.

At Loon Point Beach we observed a single well casing and associated infrastructure that was severely damaged and protruding approximately three feet above the mudline. This poses a potential environmental and safety risk to the public.

An additional legacy well survey will be performed in 2024 as funds become available, and any legacy wells leaking hydrocarbons will be added to the list of wells that require re-abandonment using SB 44 funding. The next step in terms of legacy well remediation is to continue monitoring the area and perform additional surveys to determine if more wells need remediation at a future date.

The Commission continues to conduct land-based monitoring, which consists of weekly site visits by Commission inspectors to look for tar balls and record any seep activity.

Mobilization and Plugging of Two Legacy Wells: August 2023

On September 1, 2023, the Commission and 2H completed the re-abandonments of the Treadwell-1 and Treadwell-5 wells using a barge, divers, and heavy equipment.

This re-abandonment work was an essential part of the Commission's efforts to permanently stop hydrocarbon leaks at their source and prevent further discharge from leaking into surrounding waters and onto the beach. The work was conducted from a derrick barge and a dive vessel anchored nearby.

The Commission coordinated with numerous agencies and either consulted or obtained necessary permits for the two well abandonments. Consulting and permitting agencies included:

- California Geologic Energy Management Division (CalGEM): permit to conduct well operations.
- Santa Barbara County Air Pollution Control District: written determination of permit exemption.
- California Coastal Commission: Coastal Development Permit.
- U.S. Army Corps of Engineers: nationwide permit verification.
- Central Coast Regional Water Quality Control Board: water quality certification.
- Santa Barbara County Planning and Development: Lookout Park permit.
- U.S. Coast Guard: pre-work notification.
- California Department of Fish and Wildlife Office of Spill Prevention and Response: pre-work notification.
- Santa Barbara County Parks: pre-work notification.
- Joint Oil Fisheries Liaison Office: pre-work notification.

The project started on August 14, 2023, when the barge arrived at Summerland in the morning. The project duration was 19 days, which included several weather-related standby days because of the historic arrival of Hurricane Hilary and turbulent swells.

This work was performed within the confines of an environmental containment unit, allowing divers to access the well location at the seafloor and serving as a containment device for any ongoing oil seepage. Onshore support consisted of oil spill response equipment staged in Lookout Park.

Figure 12. Spill control equipment at Lookout Park (photo by the Commission).

Treadwell-1

The project started by setting up and anchoring the barge over well Treadwell-1 (T1). An environmental containment unit was lifted, centralized, landed over the well, then secured to the seabed by driving four pin piles on each corner. Excavation was initiated at the seafloor to expose the outer casing of the well at approximately four feet below the seafloor. The next step was to cut the casing closer to the mudline. During the cutting process, the dive team discovered additional casings that were not observed during previous dive surveys and confirmed that well T1 had multiple casings: 12-inch,10-inch, 8-inch, and 6.5-inch. A 24-inch pile was centralized and guided over the exposed T1 well and was driven with a vibratory hammer. A second 24-inch pile was welded to the top of the first pile and together driven deeper. At the end of the day, Hurricane (eventually, tropical storm) Hilary was approaching. The team developed a contingency plan to temporarily cap the well before the barge left the project site to seek safer shore. The team carried out the contingency plan, which included driving the rest of the 24-inch pile to a workable height where a temporary cap could be welded on. The barge was demobilized, and crews were on standby until conditions improved for the barge to remobilize and continue working on T1.

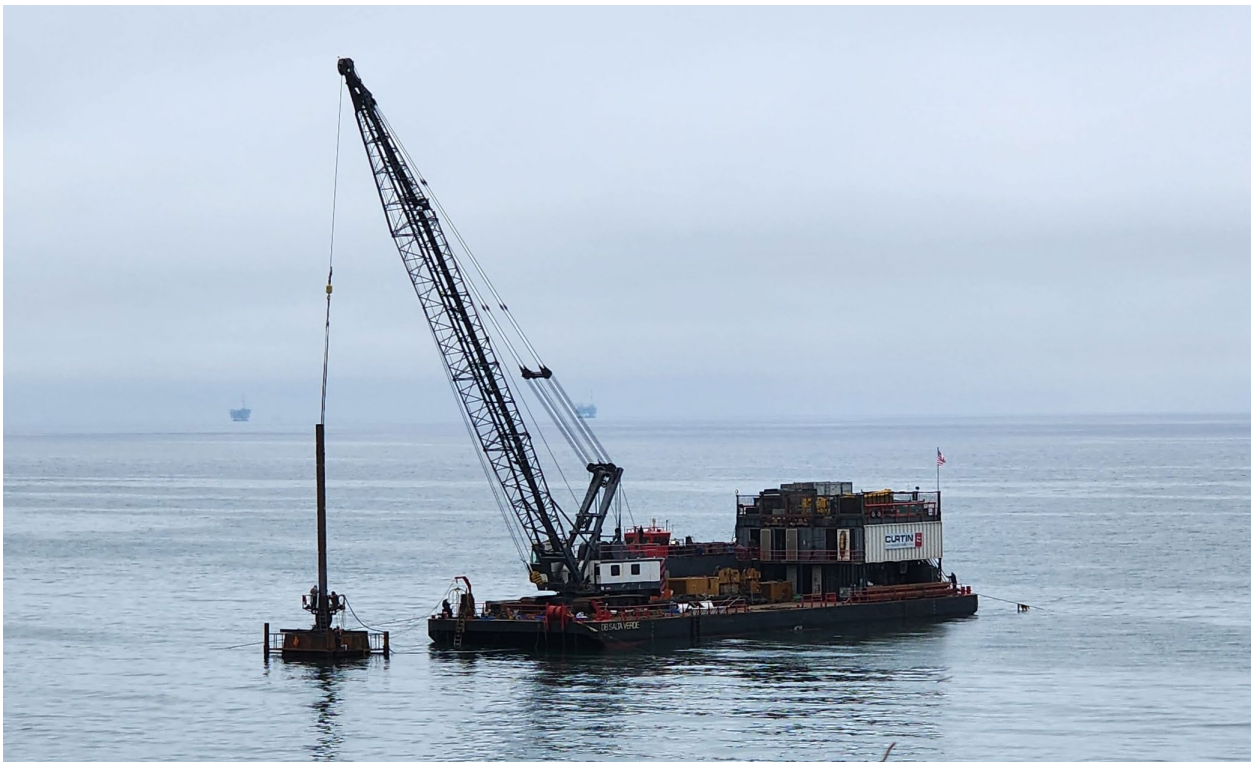

Figure 13. Placing pipe pile on top of Treadwell-1 (photo by the Commission).

After the storm passed and it was deemed safe to continue the T1 operations, the barge set its anchors again near the well. The temporary cap was removed from the pile and the team pumped out seep oil from inside the pile into containment totes. The following step was to pick up and stab the third pile into the second pile and splice around the two piles. The subcontractor investigated the swell forecast and informed 2H that the crew should not continue any driving operations on T1 until swells improved due to unsafe conditions. During the standby period, the diving team started excavation around T5. Two days later, after swell conditions allowed continued operations, the third pile was driven until meeting ultimate refusal at 68 feet below natural bottom. The team pumped cement into the well casing and inside the pipe pile. After the cement was cured, the 24-inch pile was cut 2-feet above natural bottom, and the final cap was welded on top. There were six weather related standby days because of Hurricane Hilary and turbulent swells.

Treadwell-5

The execution process for Treadwell-5 (T5) was similar to T1. The barge moved into T5, and the crew placed the containment centralized over T5 and set the pin piles. This time the team did not find any extra casings and were able to cut

the 9-inch and 6-inch casings. The first 24-inch pile was placed and centered over the casing stub. The second pile was placed on top and spliced. After using the vibrohammer and diesel hammer shortly after, the team reached ultimate refusal at 38 feet. The excess pile was cut and prepped for the remedial cementing processes to begin. After the cement finished curing, the cut was made 2-feet above natural bottom, and the well stub was prepped for welding of the final cap. Once the cap was welded on, we removed the pin piles and recovered the containment unit. The barge anchors were removed the following day during high tide and departed for Long Beach.

Figure 14. Barge working on Treadwell-5 (photo by the Commission).

These re-abandonment operations are an essential part of the Commission's efforts to permanently stop hydrocarbons from leaking into surrounding waters and onto the beach. 2H remains under contract with the Commission for purposes of securing the permitting for the next re-abandonments and developing engineering plans for additional wells, as needed, until June 2025.

Coastal Hazards (legacy infrastructure, not including wells)

Coastal hazards are remnants of artificial coastal structures that have been abandoned and orphaned (i.e., there is no known responsible party). These hazards, typically buried in the coastal surf zone, include wood or steel pilings, H piles and H beams, railroad irons, cables, angle bars, ties, pipes, pipelines, seep tent related structural remnants of rip rap structures, wood structures, groins, jetties, piers, and oil and gas-related infrastructure located along the California coastline. Hazard exposure depends on tide and beach erosion. Many hazards are only exposed during the high tidal erosion that occurs in winter. The Commission responds to and removes hazards subject to permit conditions.

The Commission had retained the Cushman Contracting Corporation to remove coastal hazards as they are identified. The contract with Cushman Contracting Corporation expired on June 30, 2023. The Commission is now in the final stages of awarding a new contract for an on-call coastal hazards removal contractor and will formalize a contract in early 2024. Work to remove coastal hazards (non-well hazards) will start when funding is available to do so.

Hazards are usually removed with small excavators or loaders. No coastal hazard removal work was conducted during the 2022 winter exposure season because no coastal hazards had been exposed at suspected hazard sites.

Figure 15. H Beam being extracted near Bacara Resort in 2018 (photo by the Commission).

Figure 16. H Beam being extracted near the Bacara Resort in 2018 (photo by the Commission).

Padre Associates, another contract the Commission retains as part of its SB 44 implementation, conducts, and manages an ongoing hazards inventory. Padre Associates surveys are conducted using handheld GIS data collection units as beach exposure occurs. Roughly 70 percent of the documented hazard sites have been inventoried and recorded.

In February 2023, the Commission, through its contractors, removed multiple hazards around Ellwood and Haskell's beach in Santa Barbara County exposed during storm events. Two crews worked in tandem to remove the hazards. One started west of Bell Creek. Another started east of Bell Creek, which is near the area where the now-decommissioned 421 piers were located, and Sand Piper Golf Club.

A crew operated by Cushman Contracting Corporation accessed the beach from the Bacara Resort emergency access staging area and used beach sand to construct a usable access ramp from the staging area, no manipulation of the bluff was necessary for access. Crews worked during low tide to remove both previously identified and newly discovered hazards (H beams and wooden pilings). Crews worked on partially or fully removing a total of 17 hazards (Figures 17 and 18) and approximately 8-10 I-beam hazards that were modified to be more flush with the substrate and eliminate them from hazardous obstructions.

Figure 17. Crews removing wood pile hazard near Tecolote Creek (photo by Padre Associates).

Figure 18. Crews removing wood piles near Bell Canyon Creek (photo by Padre Associates).

Crews operated by Beacon West Energy Group accessed the beach from an existing access ramp east of Bell Creek. Crews worked near the former 421-2 pier, removing existing and newly documented hazards (primarily H beams). Crews partially or fully removed a total of 44 hazards (Figures 19 and 20). Approximately 51 metal objects including H-Beams and railroad ties were removed or broken significantly below the cobble line. The removed or partially removed hazards were updated in the hazards inventory database.

Figure 19. BW crews removing H-beam hazards near the former location of the 421-2 pier (photo by Padre Associates).

Figure 20. H-piles removed by BW crews, temporally stockpiled near the former location of the 421-1 pier. All material was removed from the beach at the end of the day. (photo by Padre Associates).

Figure 21. H-Beam Flush with Surrounding Substrate (photo by Padre Associates).

Staff will now monitor these sites as well as other sites, including Summerland and Mussel Shoals beaches, for hazards exposure during future storms.

2024 Plans

Plug and abandon additional Summerland Beach legacy wells

The Commission anticipates plugging and abandoning additional offshore wells on the beach as funds become available. The plug and abandonment approach will likely be similar to the approach used in the Olsson-805 and Duquesne-910 abandonments performed in 2021, with some improvements or modifications based on lessons learned from previous operations. The work will involve driving a pipe-pile around the well, like a sleeve, and filling the pipe with cement, entombing the legacy well. This work will occur, depending on funding availability, in the second half of 2024.

Develop an inventory and study of offshore seep activity

The Commission authorized its Executive Officer to retain a consultant to conduct seep studies. The studies will likely require historical research and an inventory of offshore natural tar, oil, and gas seeps. The survey, study, and monitoring of tar, oil, and gas seepage (seep studies) in state waters will determine locations, rates, and fingerprinting techniques to characterize tar, oil, and gas samples originating from natural seeps, geologic framework and other conditions controlling seeps, as well as their environmental impacts. The Commission expects to seek a consultant to perform this work in 2024, depending on funding availability.

Additional surveys and debris removal

The Commission plans to continue remediating leaking wells along the Treadwell Pier. This work will include:

1. Finish documenting the well casings inshore of Treadwell-11.
2. The area around Treadwell-9 was found to have moderate seepage and warrants further investigation to determine if it is associated with the well or attributable to a natural seep in the vicinity.
3. Remove vertical timber piles and other debris around future well casing targets for capping.
4. Recover and dispose of underwater stockpiles of oiled debris.

A plan for Duncan Pier and Moore Pier locations is listed below:

1. A follow-up dive for Duncan Pier and Moore Pier to locate and determine if there are leaking well(s) or natural seeps.
2. Extensive documentation and modeling of seepage area(s).
3. Map and tag Moore and Duncan Piers.

The Commission also intends to continue performing investigatory work on seep sites for association with legacy wells, re-abandon additional wells as funding allows, and continue the coastal hazard removal program.

Rincon Well #102

The orphan offshore well Rincon Well #102 is located off Rincon Island in Ventura county downcoast from Summerland Beach. The next steps proposed for the continued well capping engineering design of Rincon Well #102 are listed below:

1. Document and verify via video the structure of the tree and casing.
2. Extensive documentation and modeling of seepage area(s).
3. Locate tools for a one-of-a-kind tree for testing valves during a follow-up dive.

Remove larger debris around future well casing targets for capping.

Fund Allocation

Contract No.	Contractor	Start	End	Contract Value
C2017041	Cushman Contracting Corporation	9/1/2018	6/30/2023	$1,000,000
C2017043	Padre Associates	2/1/2018	01/31/2024	$1,500,000
C2019060 (Plug and Abandonment work)	InterAct	06/30/2020	06/29/2025	$10,500,000

Looking Ahead

The following table shows ongoing and expected projects:

#	Description	Timeframe
1	Plug and abandon up to two legacy wells at Summerland Beach	2nd half of 2024
2	Retain a consultant or firm to perform a seep inventory and study.	2nd half of 2024
3	Continue researching leaks that may be associated with legacy wells or around seeps.	Ongoing
4	Continue coastal hazard inventory and removal as coastal hazards become exposed.	Ongoing

Supplemental Background:

In the late 1800s, the area offshore of Summerland Beach in Santa Barbara County had hundreds of oil wells and related drilling infrastructure. Today, the coastline area retains the vestiges of that extensive and largely unregulated offshore oil production. These are the unfortunate legacy of the rapid and intensive offshore oil development along the coastline that began just before the turn of the twentieth century and primarily at Summerland Beach.

Most legacy oil and gas wells were abandoned in the early 1900s when regulatory oversight was nonexistent. Virtually no records exist about the drilling and abandonment of these wells. Removal, if any, varied from well to well and involved rudimentary procedures that fell far short of current health, safety, and environmental protection requirements. Based on the Commission's research, there are approximately 200 high priority legacy oil and gas wells (identified as Category 1 wells), that could, depending on their condition, leak oil into the marine environment, negatively affecting swimmers, surfers, recreational users, and marine and coastal wildlife and fish and their habitats, as well as causing environmental degradation and public health and safety hazards. Legacy oil and gas wells are wells drilled before current abandonment standards. There is little or no information on the well's abandonment procedureand no viable company with the responsibility to re-abandon the well should it start leaking or pose a threat to the environment or to public health and safety. Other wells are categorized as medium (Category 2) to low (Category 3) priority wells because more information is available about the integrity and abandonment of these wells or because a responsible party is or may beavailable to address any leak that may occur.

The Legislature, when it passed SB 44, found that there is a critical need for funding to remove coastal hazards, to identify exact locations of legacy oil and gas wells that may be leaking, and to prioritize remediating wells with the highest risk. The funding enables the Commission to gather data to address the presence of oil along the coastline, determine where legacy wells are located and whether they are leaking oil, and prioritize remediation to address the highest risk wells first. The funding also enables the Commission to survey and monitor offshore oil seeps in state waters, to contract for studies to determine oil seepage locations, rates, and environmental impacts, and pursue innovative solutions to address natural seeps.

SB 44 added section 6212 to the Public Resources Code, which requires the Commission to administer a coastal hazard and legacy oil and gas well removal and remediation program that does the following:

1. Complete an assessment of legacy oil and gas wells and other coastal hazards along theCalifornia coastline, including conducting aerial surveys and dives, and determine high- priority hazards and legacy oil and gas wells to remediate.
2. Survey, study, and monitor oil seepage in state waters and tidelands under the Commission's jurisdiction to determine oil seepage locations,

rates, and environmental impacts; and partner with experts to facilitate innovative solutions.

3. In cooperation with the Division of Oil, Gas, and Geothermal Resources (now the California Geologic Energy Management Division), begin the process of remediating improperly abandoned legacy oil and gas wells that have a high risk of leaking oil and are hazardous to public health and safety and the environment.

SB 44 authorizes up to $2 million annually from the state's General Fund to the Commission's Kapiloff Land Bank Fund (https://www.slc.ca.gov/kapiloff) beginning in 2018-19 and through 2027-28, to administer the program. In July 2018, the Commission received the first $2 million appropriation. SB 44 authorizes the transfer of an amount sufficient to bring the unencumbered balance of the program funds back up to $2 million annually through 2027-28.