



# 2022

## PROGRESS REPORT

Coastal Hazard and Legacy  
Oil and Gas Well Removal  
and Remediation Program



Commissioners:

Eleni Kounalakis, Lieutenant Governor

Betty T. Yee, California State Controller

Joe Stephenshaw, Governor's Director of Finance

Jennifer Lucchesi, Executive Officer

PHOTO BY KAL VISUALS  
ON UNSPLASH

# Contents

---

Introduction .....	1
Accomplishments .....	4
Aerial drone surveys .....	4
Treadwell Pier diver survey .....	8
Rincon Well # 102 diver survey.....	17
Moore and Duncan area surveys.....	20
Coastal Hazards (legacy infrastructure, not including wells).....	22
2023 Plans .....	24
Plug and abandon two more Summerland Beach legacy wells (Treadwell-1 & Treadwell-5).....	24
Develop an inventory and study of offshore seep activity .....	24
Additional surveys and debris removal .....	24
Fund Allocation .....	26
Looking Ahead.....	26
Supplemental Background:.....	27

## Introduction

---

Established in 1938, the California State Lands Commission (Commission) manages 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 also encompass the Pacific Coast 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 in trust by the California 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.

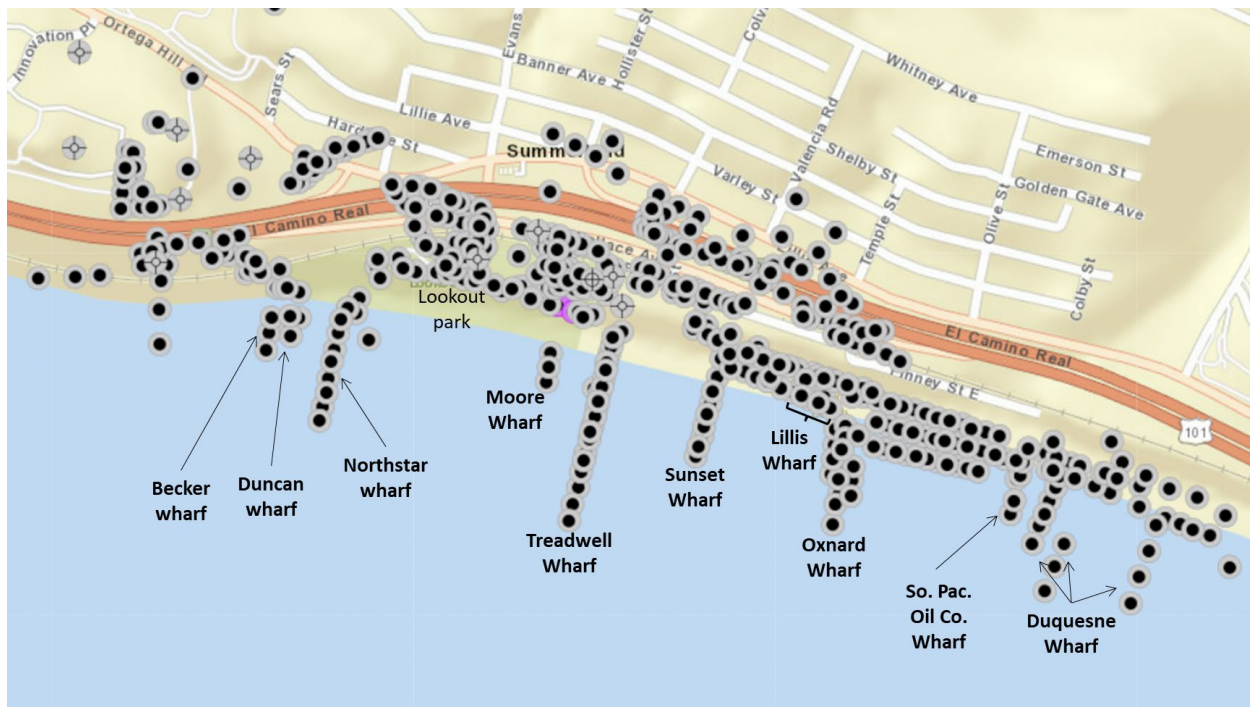
Development of the Summerland Oil Field in Santa Barbara County began in the late 1890s in an area of naturally occurring oil and gas seeps. Wells were first drilled on the beach and then from piers that extended into the Pacific Ocean. The operators drilled, produced, and plugged and abandoned wells 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 is 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, and marine and coastal wildlife and fish, 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 from fiscal years 2018-2019 to 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 report is to provide information on the Commission's activities from December 2021 through December 2022.





**Figure 1. Summerland Legacy Wells in Santa Barbara County.**



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

# Accomplishments

## Aerial drone surveys

Staff conducted several aerial drone surveys to monitor the areas of the Becker-1, Treadwell-10, Northstar-815, Olsson-805, and Duquesne-910 wells and assess the success of the re-abandonment activities performed in prior years. The purpose of these surveys was to monitor the wells and ensure that, post re-abandonment, hydrocarbons were no longer seeping from them. 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.



**Figure 3. Flightpath of drone for aerial monitoring of wellheads in the Summerland Beach area (photo by On the Wave Productions).**



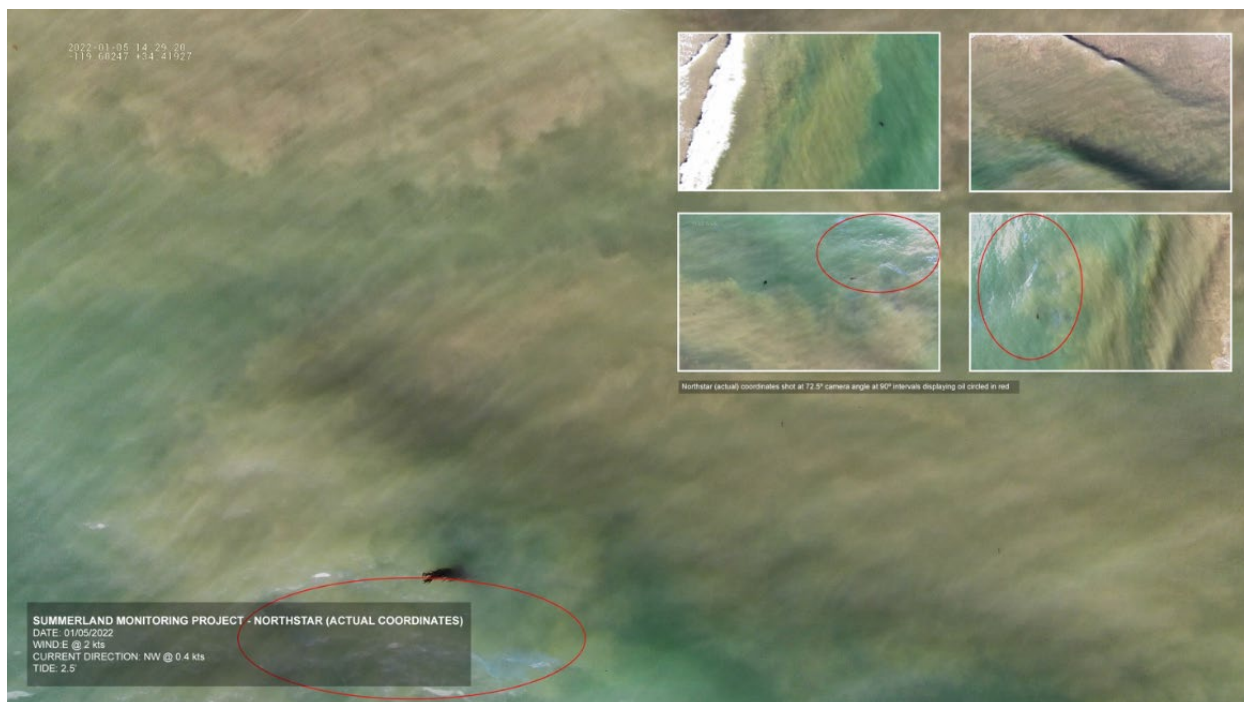


Figure 4. Duquesne-910 area shows no sheen (photos by On the Wave Productions).

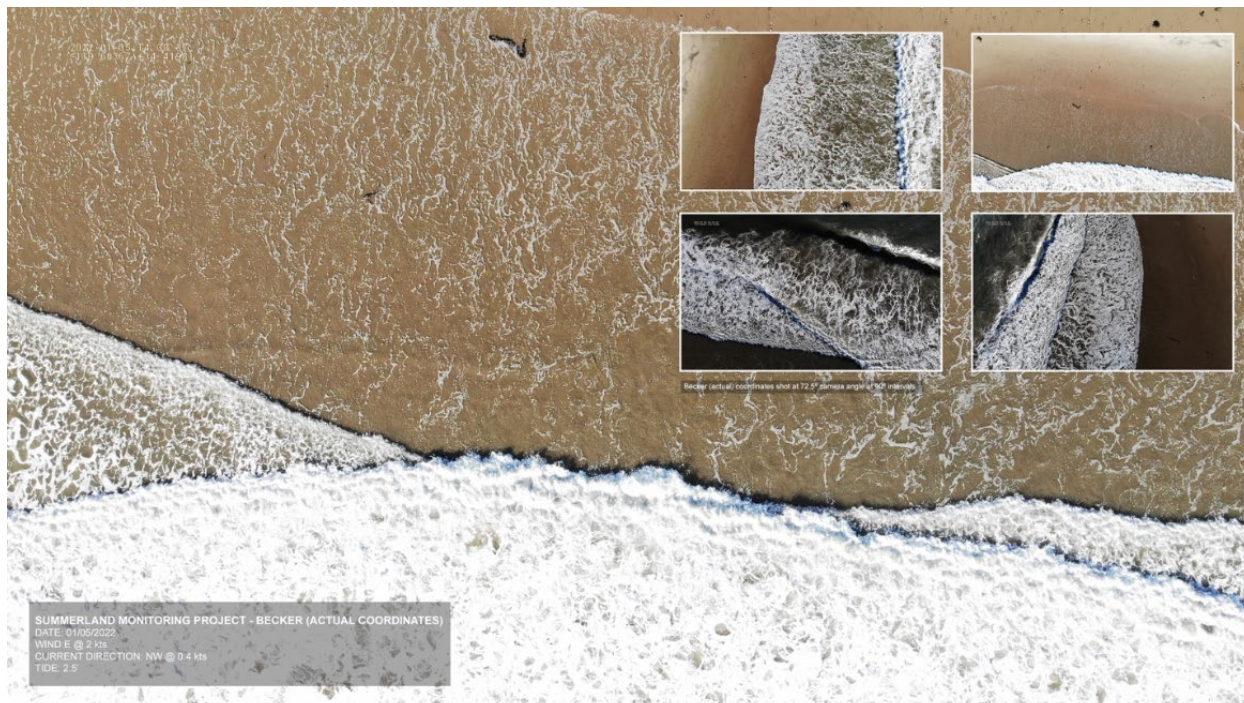


Figure 5. Treadwell-10 area shows no sheen (photos by On the Wave Productions).





**Figure 6. NorthStar-815 area shows no sheen associated with the well (photos by On the Wave Productions).**



**Figure 7. Becker-1 area shows no sheen (photos by On the Wave Productions).**





Figure 8. Olsson-805 area shows no sheen (photos by On the Wave Productions).

## Treadwell Pier diver survey

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 continues to monitor the area for additional seeps and are preparing engineering plans and obtaining permits to re-abandon two additional legacy wells in Summerland in the second half of 2023.

Following surveys performed in 2021, there was a need to perform an additional diver survey in the continued effort to map a section of the Treadwell Pier, locate debris, and obtain GPS coordinates of all wells waterward of Treadwell-10. InterAct PMTI, the State's contractor, arranged a specialty diving and salvage firm, Global Diving & Salvage, to assist in identifying and mapping the wells at the former Treadwell Pier. The objectives were to identify (label), document, and video all wells at the location. The survey took place in February 2022.

Global Diving & Salvage mobilized surface supplied diving equipment and underwater excavation equipment to support a 24-hour-a-day operation for the Treadwell Pier well mapping effort. After mobilizing diving and dredging equipment, the crew secured equipment on the deck of the dive support vessel called the *Danny-C*. The *Danny-C* was anchored into position and after a brief weather delay, three days of 24-hour diving operations started. The divers discovered 13 well casings. Starting from the known point at Treadwell-10, divers established a travel line extending offshore to Treadwell-1. The well casings were 45 to 50 feet apart. Mapping areas were delineated by establishing crossover lines from the travel line to the known wells, as well as debris piles that the divers accumulated for future removal. Substantial excavation was required to eliminate debris and investigate the actual well casings. Divers successfully located the 10 known wells (not including Treadwell-10, which was previously re-abandoned) along the Treadwell Pier (Treadwell-1 through Treadwell-11), as well as three unknown well casings (A, B and C). The divers recorded accurate GPS coordinates and dimensions, leaking status remarks, and notes on substantial debris from the previous structures. The divers also placed fastened identification tags to the wells with large, visible numbers and letters.

After locating and labeling 13 wells, surface buoys were installed at each well location. Divers documented existing timber pile stubs in proximity to several wells, which will need to be removed for shoring ring installation and well plug



and abandonment. Divers recorded several videos documenting debris piles, along with a drawing depicting the distance between wells and the heights of wells above natural bottom.



**Figure 9. Mobilizing diving and dredging equipment on the Danny-C Vessel (photo by Global Diving).**





**Figure 10. Debris removal (photo by Global Diving).**





**Figure 11. Treadwell-11 tagged (right); buoy marker line for well location (left)**



**Figure 12. Diver securing travel line along the wells on the Treadwell Pier (photo by Global Diving)**



**Figure 13. Travel line from well Treadwell-10 (photo by Global Diving).**



**Figure 14. Treadwell-1 labeled (photo by Global Diving).**



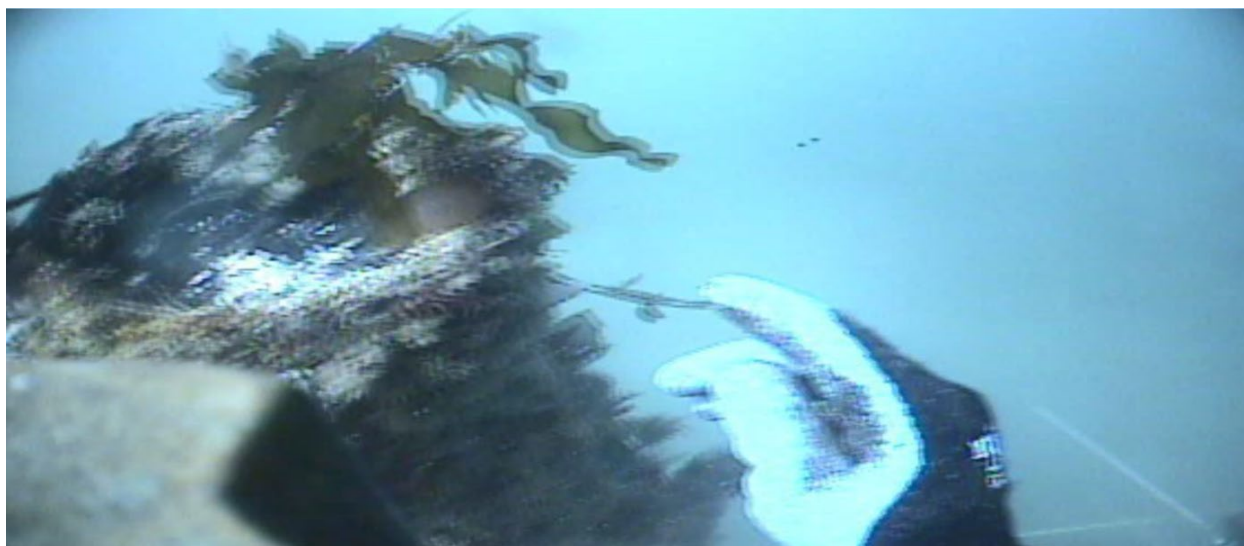


Figure 15. Intermittent leaking coming from Treadwell-1 (photo by Global Diving).

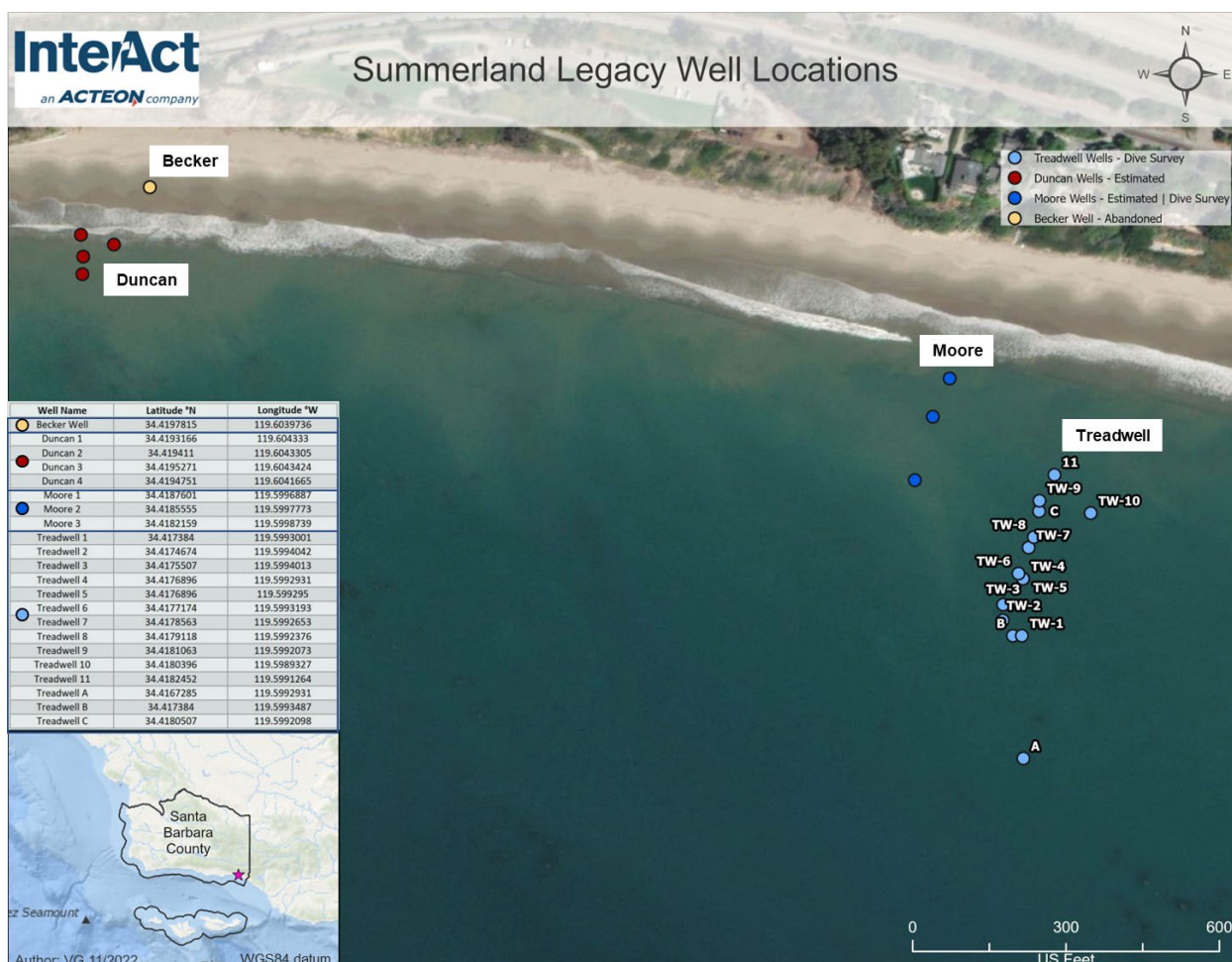


Figure 16. Map of wells surveyed along the Treadwell, Moore, and Duncan piers (photo by InterAct).

Treadwell Pier well casing data:

<b>Well #</b>	<b>Casing dimension</b>	<b>Leak or Seepage</b>	<b>Debris notes</b>	<b>Distance above natural bottom</b>
A	9-inch	No	Sandy bottom	18 inches
1	12-inch with inner 9-inch string	Yes	Large boulders, timber, steel pipe	96 inches
B	9-inch	No	Steel pipe, large diameter rocks, asphaltenes, timber	60 inches
2	8-inch. Bent over to 90° angle.	No	Timber piles, asphalt, large rocks	60 inches
3	9-inch	No	Timber pile, steel pipe, asphalt, large boulders.	20 inches
4	9-inch. Bent over at a 30° angle	No	Sandy bottom, river rock	48 inches
5	9-inch	Yes	Timber pile, railroad tie, steel scrap	60 inches
6	10-inch with timber pile inside	No	River rock	84 inches
7	9-inch with timber pile inside	No	Steel pipe, river rock	36 inches
8	9-inch. Bent over at 90° angle	No	River rock, asphaltenes	12 inches
C	9-inch. Bent over, timber pile inside.	No	Two scrap pipes, river rock, timber pile, asphaltenes.	7 inches
9	9-inch with timber pile inside	No. But seepage seen nearby	River rock	12 inches



<b>Well #</b>	<b>Casing dimension</b>	<b>Leak or Seepage</b>	<b>Debris notes</b>	<b>Distance above natural bottom</b>
11	9-inch with timber pile inside, bent over	No	Asphaltenes, river rock, timber pile, steel pipe	33 inches

This survey helped to properly document well casings on the Treadwell Pier from Treadwell-11 (the well closest to shore) to the offshore terminus of Treadwell Pier (where Treadwell-1 is located). As noted above, in addition to Treadwell-1 through Treadwell-11, three extra casings were discovered (A, B, and C), which could mean more casings are present in the vicinity that have still not been recorded or found. A future survey is suggested to locate, document, and tag all casings inshore of Treadwell-10. The work of securing numbered tags around each casing will help in future work to identify possible sources of surface sheen on the water.

The two confirmed leaking wells, Treadwell-1, and Treadwell-5, still have vertical timber piles that need to be removed. This work, along with the re-abandonment, will occur in the second half of 2023 when SB 44 funds are available in that fiscal year. This work is somewhat delicate because the timber piles and other debris are encased in asphaltenes that are stuck to the outside of the well casings. Precautions are being developed to remove the debris and asphaltenes without tearing away any section of the casing where steel is thin; proper measures will avoid causing more oil leakage than what occurs presently. Dive crews piled debris in a few central locations underwater for easier recovery at a later point, either during re-abandonment or on a future dive campaign, for landfill disposal.

The re-abandonments of Treadwell-1 and Treadwell-5 are estimated to take 4-5 days for each well. The projected cost is around \$3 million. The proposed work will be similar to the Treadwell-10 and NorthStar-815 operations except that Treadwell-1 and Treadwell-5 protrude 8 and 5 feet above the mudline, respectively. The well casings will need to be cut off at the mudline before driving the pipe pile over the top. This work will be done within the confines of a temporary wet cofferdam, allowing divers to access the well location at the seafloor and serving as a containment device for any ongoing oil seepage. Onshore support will consist of oil spill response equipment staged in Lookout Park.

These re-abandonment operations are an essential part of the Commission's efforts to permanently stop the hydrocarbon source from leaking into surrounding waters and onto the beach. InterAct 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.



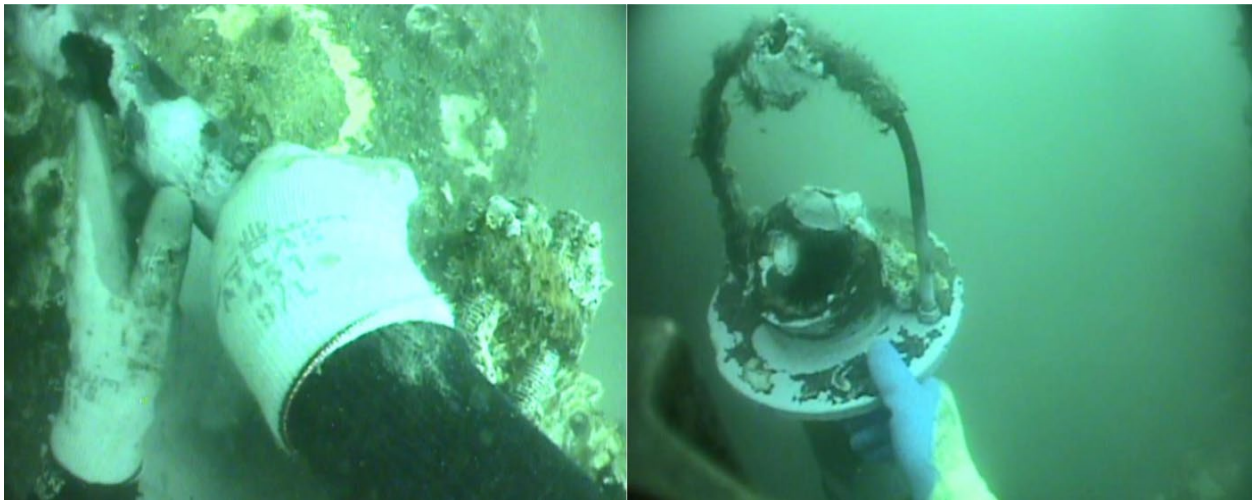
## Rincon Well # 102 diver survey

The Rincon Island Limited Partnership PRC 1466 Well #102 is a sub-sea completed oil well situated in 55 feet of water approximately three quarters of a mile off the coast at Punta Gorda in Western Ventura County. The well is adjacent to, and previously produced into, the Rincon Island production facility. In 2017, all the Rincon leases were relinquished. The Commission is now, as it has been, working to ensure public and environmental safety and to protect the State's public lands and resources. In 2021, the Commission completed plugging and abandoning all the wells on Rincon Island and the associated onshore wells.

In 1961, Atlantic Richfield Co., drilled and completed Well # 102 as a producing oil and gas well. The well originally produced roughly 65-75 barrels of oil and 25-30 thousand cubic feet of gas per day from the Miley AL and AO sands through a gravel packed slotted liner set at about 2,000 feet below the ocean floor. The well was completed with a concentric tubing completion string to allow gas lifting, as required, through a 1 ¼-inch tubing string situated inside the 2 7/8-inch production tubing string. The well originally flowed, with gas lift assistance, at about 275 pounds flowing tubing pressure through the 2-inch flowlines connecting the well to the Island facilities. An 8 5/8-inch by 2 ½-inch Shaffer wellhead was installed to facilitate remote control of the wellhead valves. The wellhead was designed for 3,000 pounds per square inch (psi) working pressure; however, the well could develop slightly less than 1,000 psi shut-in pressure. In 1971, the well was converted to a produced water injection well and, in 1979, was shut in. The well is currently idle, with all surface valves closed at the wellhead. The original cathodic protection system was disconnected sometime after 1979 and before the Rincon leases were quitclaimed in 2017. The two 2-inch flowlines and one 2-inch hydraulic control line connecting the well to the Island have degraded to the point that they are unserviceable. The wellhead, or production tree, as described above, was designed by Shaffer Corporation as an underwater, remotely operated tree for Atlantic Richfield Co. The concentric tubing design was unique to local sub-sea, remote well producing methods during the 1960's. The tree sits directly on an 8 5/8-inch casing string that is landed in a 13 3/8-inch surface casing. Original drilling records indicate that the casings were adequately cemented to eliminate the potential for fluid or gas migration outside or between the casing strings. This design could support a through tubing abandonment plan.

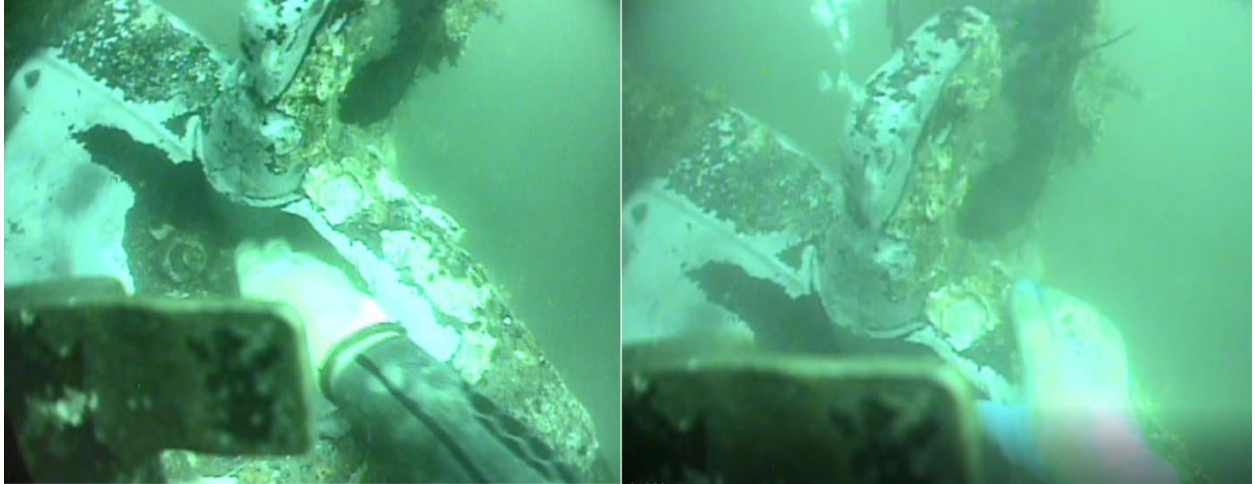
The 2 7/8-inch by 8 5/8-inch casing annulus was isolated from the producing formation by a wireline set, Baker Model "D", production packer set immediately above the zone. The integrity of the packer, the 2 7/8-inch production tubing, and the 1-1/4-inch tubing is unknown.

The dive crew arrived at the Navy Pier in Santa Barbara Harbor in February 2022, to offload the Godwin trash pump and load the 10k water blaster to assess Well # 102. The support vessel "Way Out" set buoy markers on the GPS coordinates. The *Danny-C* anchored into position at the well and the diving operation began. The purpose of this assessment was to identify any visible leaking from the well and net guard attachment points for removal if future plug and abandonment work is necessary. After thoroughly cleaning the well head and net guard, no visible oil leaks were immediately discovered. Divers did observe extensive corrosion on various sections along the subsea tree and observed gas bubbles coming out of a hole. All data collected was recorded and videoed. The Commission will determine the abandonment needs of this well at a future date.



**Figure 17. 2-inch line (left) and top of wellhead tree 2-inch pipe (right) (photos by Global Diving).**





**Figure 18. Landing base pad eye (left) and gas bubbles (right) (photos by Global Diving).**

## Moore and Duncan area surveys

Interact notified the diving services firm (Global) of a surface sheen in the vicinity of the Moore-1 and Duncan-1 well locations off Summerland Beach. The dive team surveyed the area in March 2022. The dive team observed oil and gas bubbles on the surface of the water on coordinates provided by a drone operator. The support vessel Way Out dropped buoy markers for the *Danny-C* and divers to navigate from. The *Danny-C* anchored into position at the Moore-1 well location, which was in proximity to the shore, making for poor visibility and surging conditions. The divers used a metal detector to try and locate the well casings but were unable to pinpoint well locations. A hand jet was deployed to excavate at the buoy marker location. After extensive dredging of a grid area of 30 by 30 feet, divers located asphaltenes and oily sands, but did not find any debris or well casings.



**Figure 19. Diver on vessel after excavating in oiled sea floor (photo by Global Diving).**



Divers continued to survey the area around the Moore Pier outside of the initial 30 by 30 feet grid area and focused on an area where they found wooden timbers. The survey team located a 20-inch by 15 feet long casing resting on the seafloor. The area was surrounded by heavy asphaltenes, but no leak was detected. After further jetting and tracking wooden debris, the survey team found a 12-inch casing with a pinched smaller casing inside sticking up 1 foot above the seafloor, approximately 30 yards from the shoreline in roughly 6 feet of water, with no sign of leaking. The hydrocarbons in the area could be associated with a natural seep.

The survey team tried to survey the Duncan well, which is approximately 5 feet from the shore, but was unsuccessful because of low tides. The survey team will re-evaluate whether to attempt a re-survey at a later date—perhaps using different methodology.

## 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 has retained the Cushman Contracting Corporation to remove coastal hazards as they are identified. This contractor is on call and retained through June 30, 2023. Hazards are usually removed with small excavators or loaders. No coastal hazard removal work was conducted during the 2022 winter exposure season owing to lower-than-expected coastal erosion at suspected hazard sites.



**Figure 20. H Beam being extracted near Bacara Resort in 2018 (photo by SLC).**



**Figure 21. H Beam being extracted near the Bacara Resort in 2018 (photo by State Lands Commission).**

Padre Associates is conducting an ongoing hazards inventory. Padre Associates conducts surveys annually using handheld GIS data collection units as beach exposure occurs. Once the sand moves away from the beaches, typically starting in November, the Commission will resume documenting remaining features. Roughly 70 percent of the inventory of documented hazard sites has been completed.



## 2023 Plans

---

### Plug and abandon two more Summerland Beach legacy wells (Treadwell-1 & Treadwell-5)

The Commission anticipates plugging and abandoning two additional offshore wells along the Treadwell Pier – Treadwell-1 and Treadwell-5. Staff will try to re-abandon both wells concurrently if funding allows. The plug and abandonment approach will be similar to the approach used in the Treadwell-10 and NorthStar-815 abandonments performed in 2020, 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 2023.

### Develop an inventory and study of offshore seep activity

In December 2022, 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 2023, 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 is 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.

The next steps proposed for the continued resolution 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.
4. Remove larger debris around future well casing targets for capping.

A forward 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, plans to re-abandon additional wells as funding allows, and to continue its coastal hazard removal program.

## 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	12/31/2024	\$1,500,000
C2018031 (Engineering Plans, EIR Addendum & Permitting)	InterAct	1/15/2019	1/15/2023	\$3,000,000
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 abandonment up to two legacy wells at Summerland Beach	2 <sup>nd</sup> half of 2023
2	Retain a consultant or firm to perform a seep inventory and study.	2 <sup>nd</sup> quarter of 2023
3	Continue researching leaks that may be associated with legacy wells or natural seeps.	Ongoing
4	Continue coastal hazard inventory and removal as 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 procedure and 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 be available 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 the California 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.