Shipwrecks Along California's Coast

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This Presentation Will Cover:

- The M/V Jacob Luckenbach, a Long Term Mystery Solved
- The Montebello Project, a Pro-Active Investigation of a WWII Era Shipwreck
- A Summary Review of NOAA's Recent West Coast Shipwreck Survey, Including:
  - Shipwreck's Considered Most Threatening to California's Marine Environment

MV *Jacob Luckenbach*

Summary

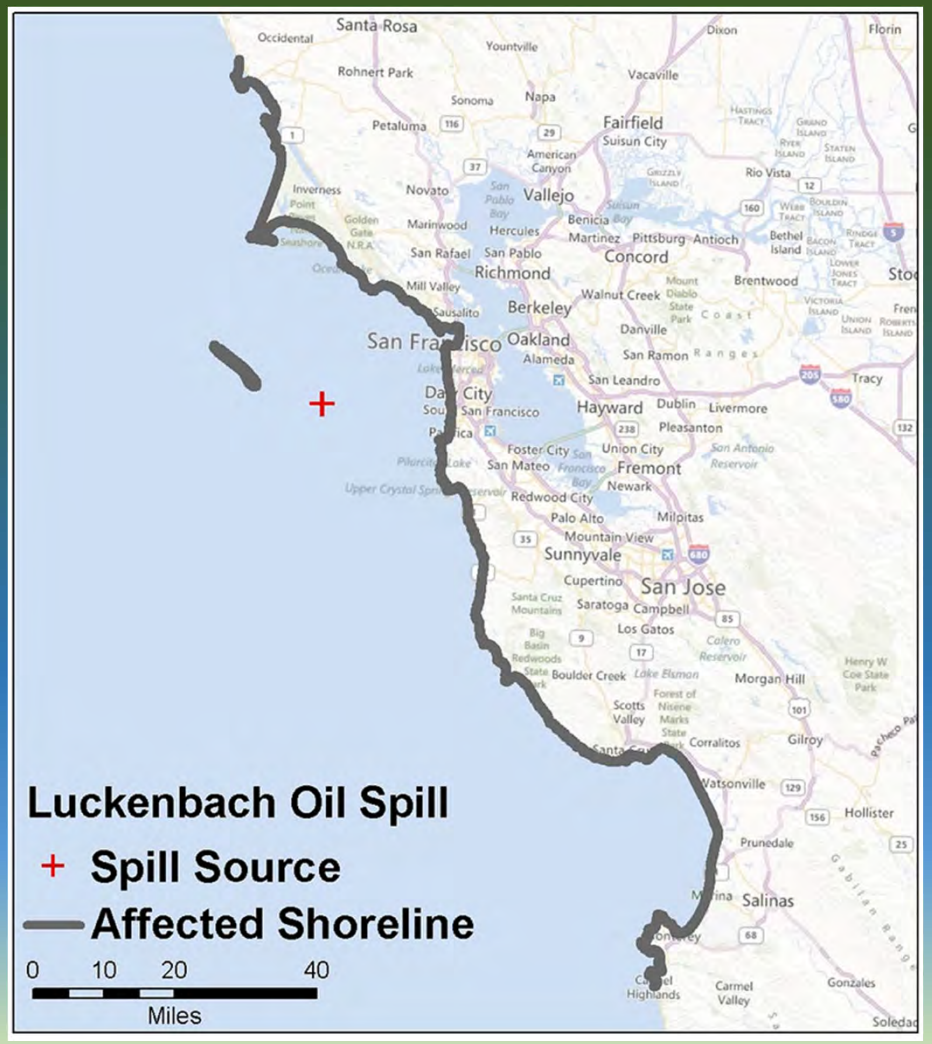
- July 14, 1953, the S.S. Jacob Luckenbach collided with its sister ship and sank in 180 feet of water approximately 17 miles west-southwest of San Francisco
- Carrying automotive parts to Korea loaded with 457,000 gallons of bunker fuel
- As it decayed on the ocean floor, it leaked oil sporadically and became the source of many oil spills, primarily during large winter storms
- In 2002, oil associated with these "mystery spills" was linked to this shipwreck
- In summer 2002, the U.S. Coast guard and OSPR removed approximately 85,000 gallons from the *Jacob luckenbach* and sealed the remaining oil inside the vessel
- The ten-month recovery operation cost nearly $19,000,000

MV *Jacob Luckenbach*

Summary

- From 1992 until 2002, oiled birds were found along the central California coastline during the winter months.
- In 2001, the response to oiled wildlife was the most significant to date. Extending over 220 miles of coastline, more than 2000 birds were recovered.
- An extensive Oil Spill Source Identification Task Force was formed consisting of 20 federal and state agents working together to get to the source of the problem.
- The state and federal investigators utilized the historical data collected in previous cases, oil fingerprinting, Remote Sensing, and GIS data analysis to solve the mystery.
- The Task Force was able to eliminate alternative possibilities and focus the investigation on the last potential source, a sunken shipwreck.

MV *Jacob Luckenbach*



MV *Jacob Luckenbach*
Investigation

- The investigation focused on three possible causes: natural oil seeps, commercial or recreational ships that dumped oil purposely or accidentally, and sunken vessels.
- Oil fingerprint analysis showed that the oil on the 2001 birds matched oil samples from a mystery spill that killed up to 10,000 birds off Point Reyes between November 1997 and February 1998.
- Further tests linked the oil to mystery spills in the winter of 1992-93, 1999 and to the 2002 incident
- the SS Puerto Rican was thought to be the culprit. The 20-ton chemical tanker exploded and partially sank 22 miles off the coast of Half Moon Bay on Halloween 1984.
- Oil fingerprinting ruled out the Puerto Rican's fuel

MV *Jacob Luckenbach*
Investigation

- Commercial divers familiar with the ongoing investigation saw globs of oil floating up from the Jacob Luckenbach and notified the Coast Guard
- The Luckenbach was located directly underneath oil sheens spotted on the ocean via satellite in December.
- The Coast Guard sent an ROV down to look at the Luckenbach
- The ROV images showed an ocean current cutting through a broken section of the deteriorated ship, stirring up the oil.
- A sample of the oil was collected
- Fingerprint analysis confirmed the source of the mystery oil

MV *Jacob Luckenbach*
Wildlife Impact Summary

Major Mystery Oil Spills off Central California or and Relationship to the *Luckenbach*

Date	Impacts (regardless of oil source) Link to *Luckenbach**
Winter 1973-74	100+ live oiled birds found by public, *Strongly Suspected*
Winter 1981-82	218 oiled birds observed on Southeast Farallon Island (SEFI), *Strongly Suspected*
August 1983	500+ live oiled birds found by public, *Possible*
Winter 1989-90	243 oiled birds observed on SEFI, *Strongly suspected*
Winter 1990-91	195 live oiled birds found by public; 127 oiled birds observed on SEFI, *Strongly Suspected*
Winter 1992-93	163 live oiled birds found by public; 117 oiled birds observed on SEFI *Confirmed*
Winter 1997-98	2,964 birds collected by agency response, *Confirmed*
Winter 2001-02	1,921 birds collected by agency response, *Confirmed*
Summer 2002	257 birds collected by agency response, *Confirmed*
Winter 2002-03	546 birds collected by agency response, *Confirmed*
Winter 2015-16	9 oiled birds treated by IBR, *Confirmed*

TABLE 2 – Hampton el al, Marine Ornithology 31: 35-41 (2003)

*** Confirmation implies that oiled birds were matched to the Luckenbach through oil fingerprinting.**

MV *Jacob Luckenbach*

Investigation

Historical Data

Shipwrecks

- US Coast Guard
- NOAA
- State Land Commission

MV *Jacob Luckenbach* Investigation

Historical Data

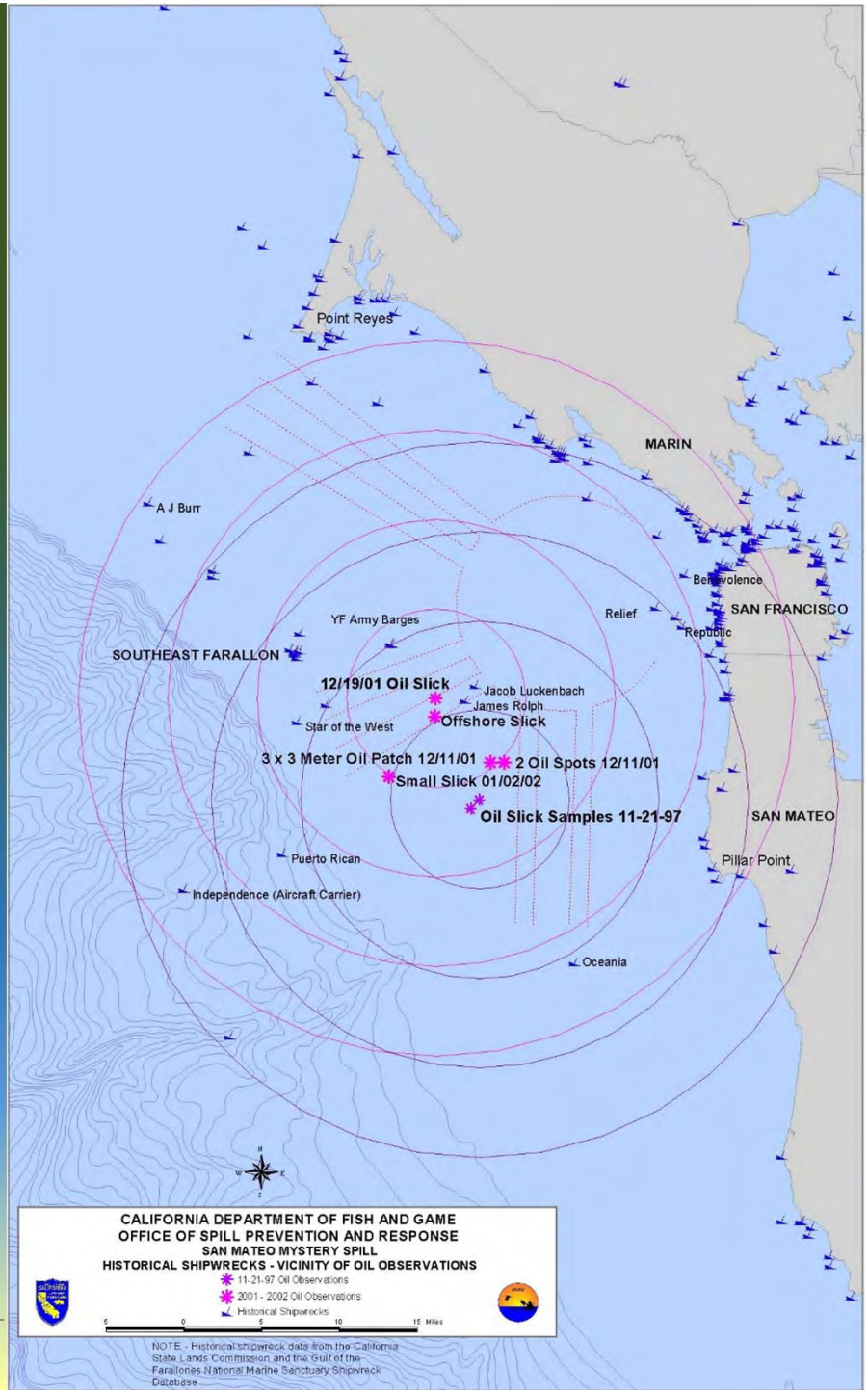
Extent of oiled wildlife is captured using GIS from data collected by Wildlife Recovery Teams

MV *Jacob Luckenbach*

Investigation

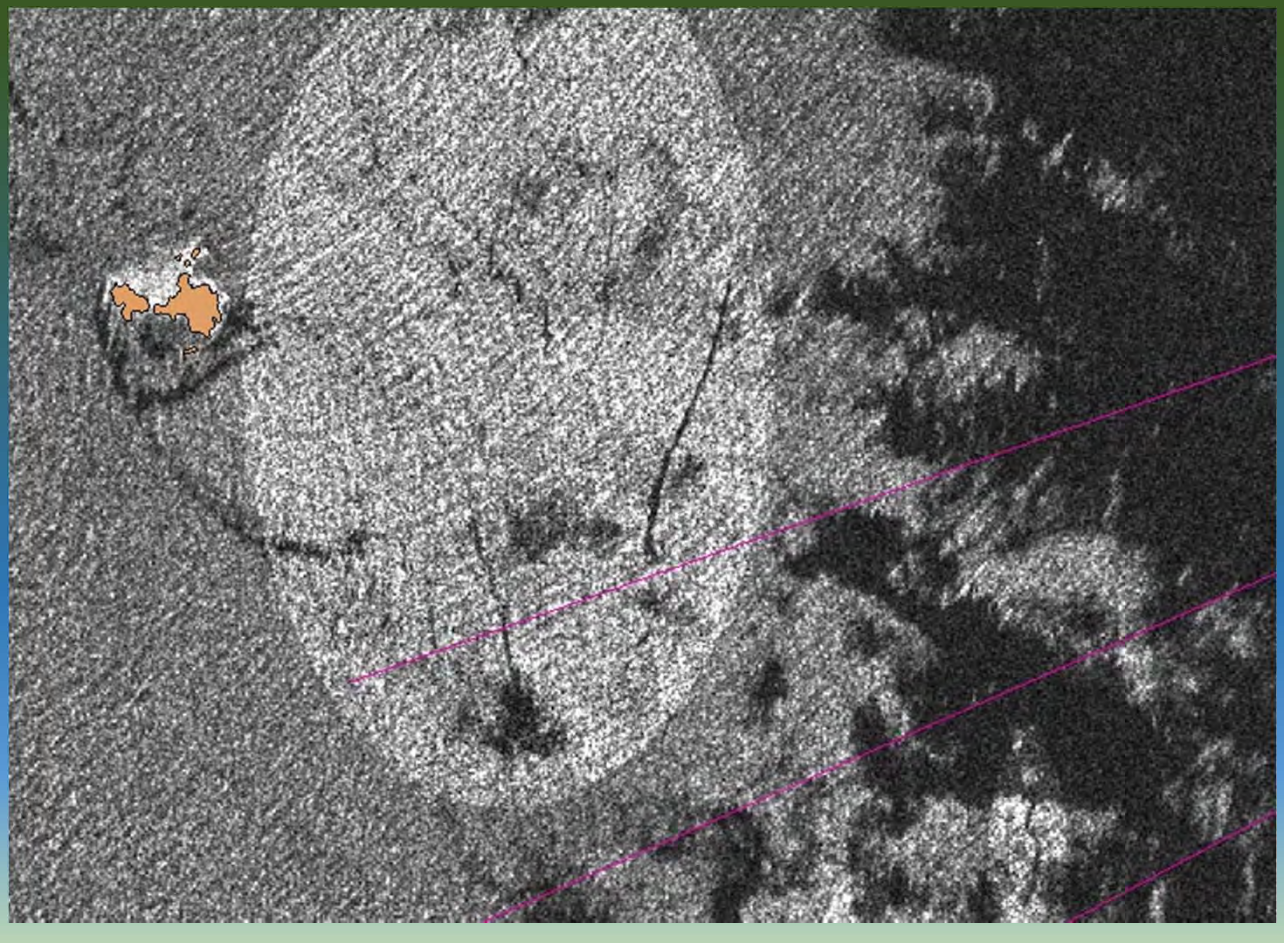
Identify Possible Sources of Oil

Plot oil observation in relation to possible targets



MV *Jacob Luckenbach*

Investigation



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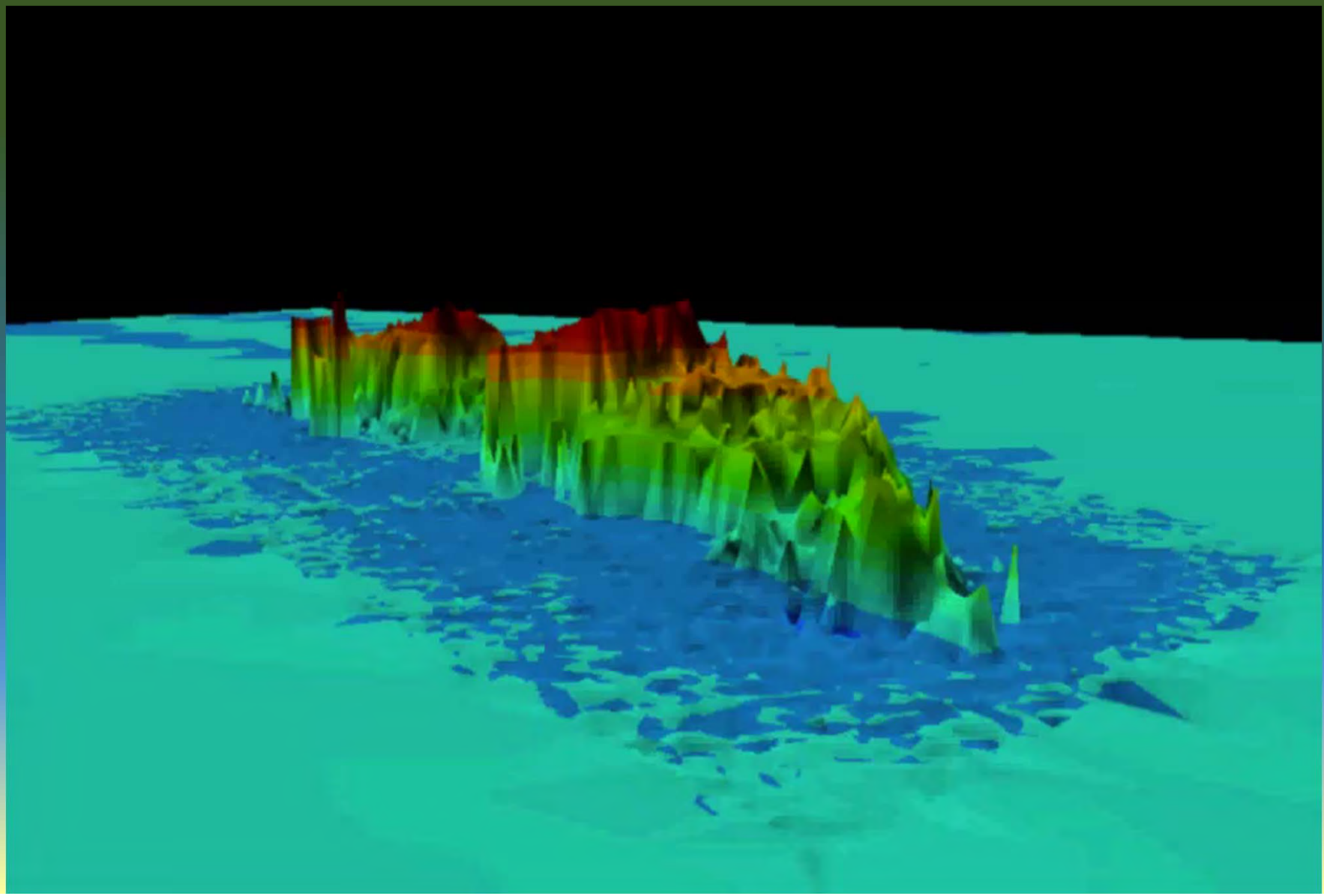
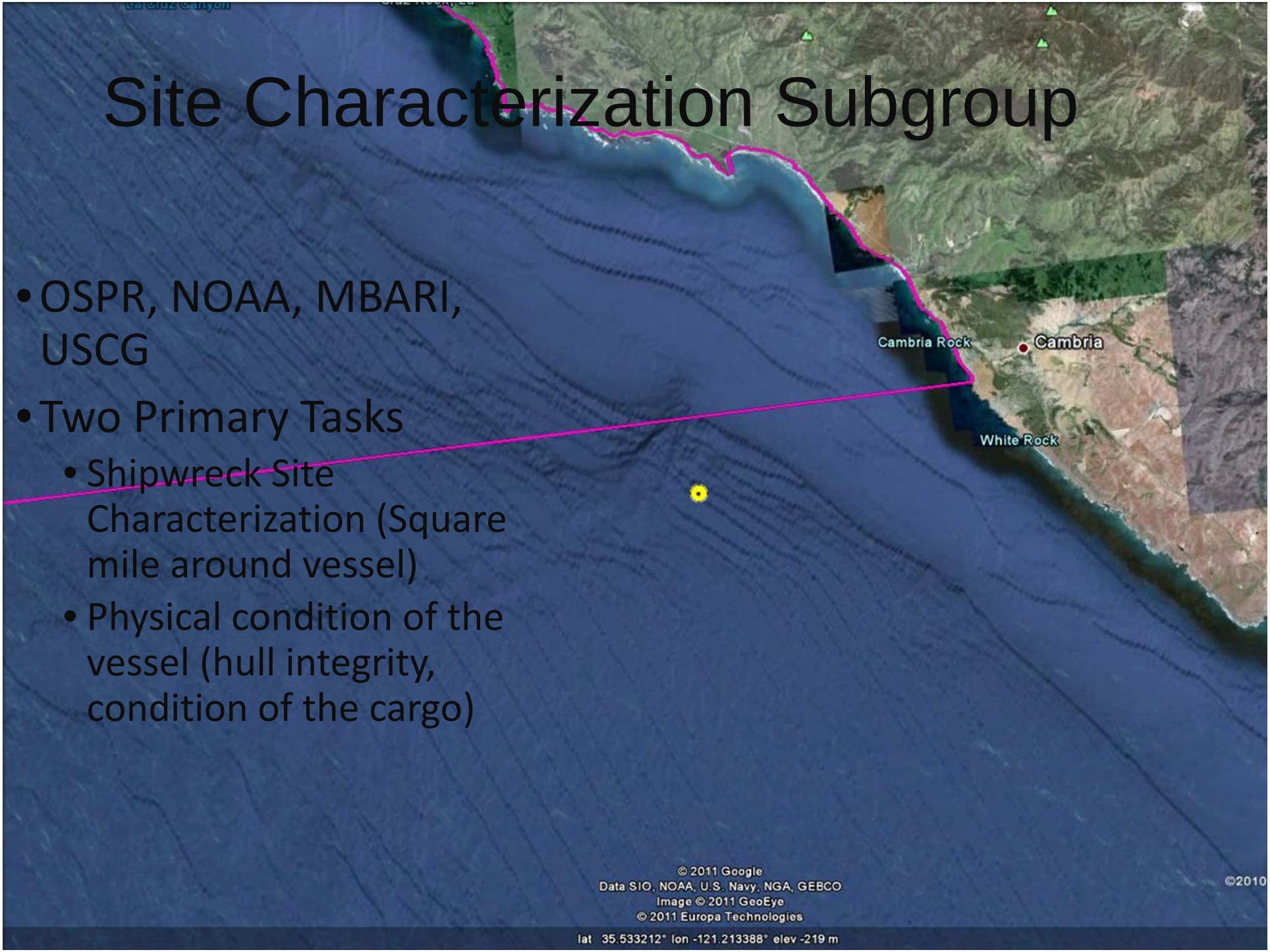


SS Montebello

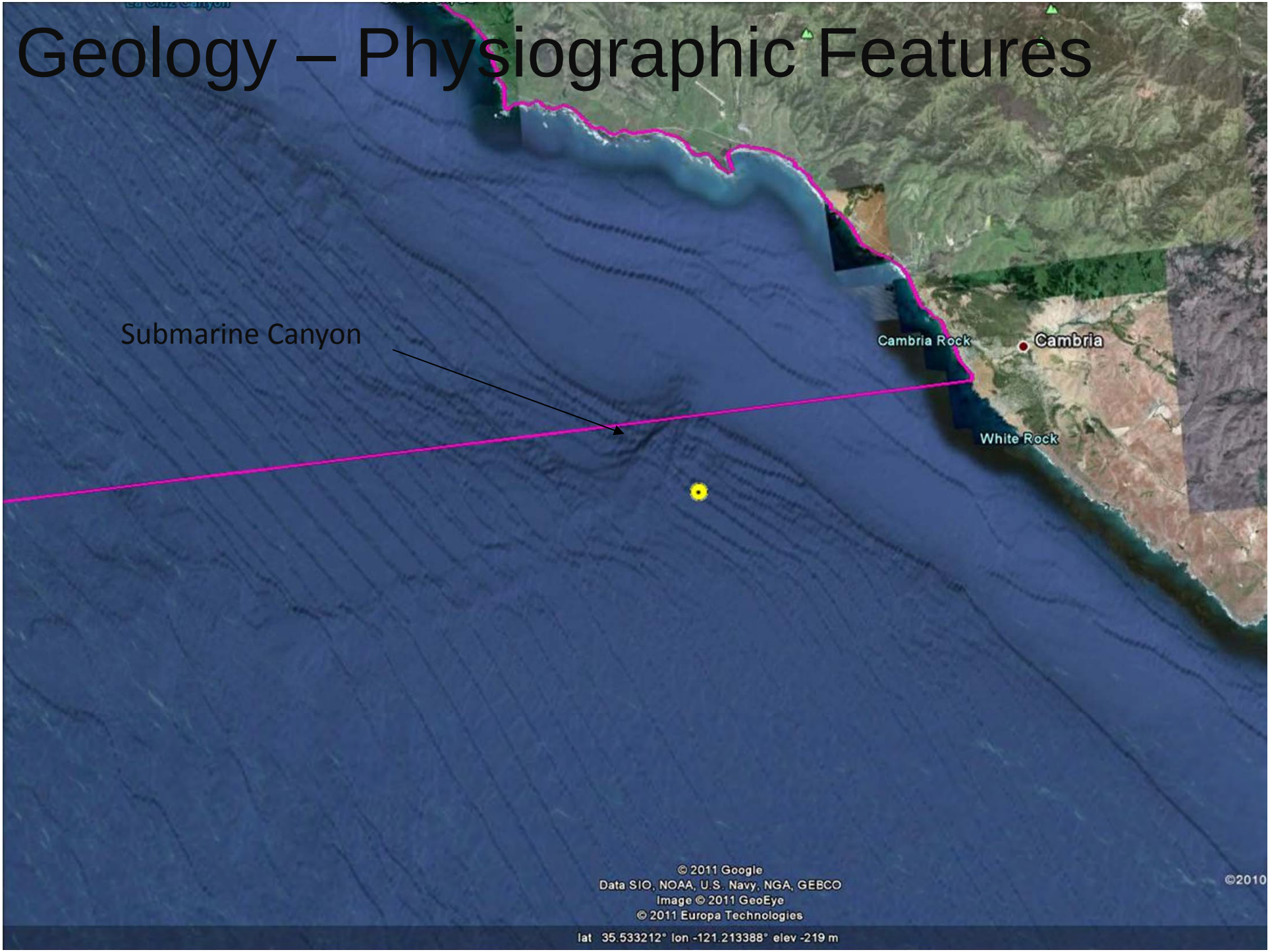
- On December 23, 1941, a Japanese submarine sank the SS *Montebello* off the central California coast, just south of the Monterey Bay National Marine Sanctuary.
- The vessel sits in federal waters, approximately six miles off the coast of Moonstone Beach in Cambria, 900 feet below the water's surface.
- Just prior to its sinking, the *Montebello* had loaded 73,571 bbl of Santa Maria crude oil and 2,477 bbl of bunker fuel at Port San Luis, California.
- No significant releases were observed when it sank.
- A series of submersible dives showed the ship remarkably intact and found that the torpedo missed the cargo tanks where the 71,000 bbl of crude oil were held.
- In 2009, a multi-agency Task Force was formed to investigate the vessel and funding was secured to conduct an underwater survey and collect samples from the tanks.
- After an extensive underwater survey in October 2011, the Task Force concluded that the wreck had no recoverable oil and had lost its cargo sometime over the past 70 years.

Site Characterization Subgroup

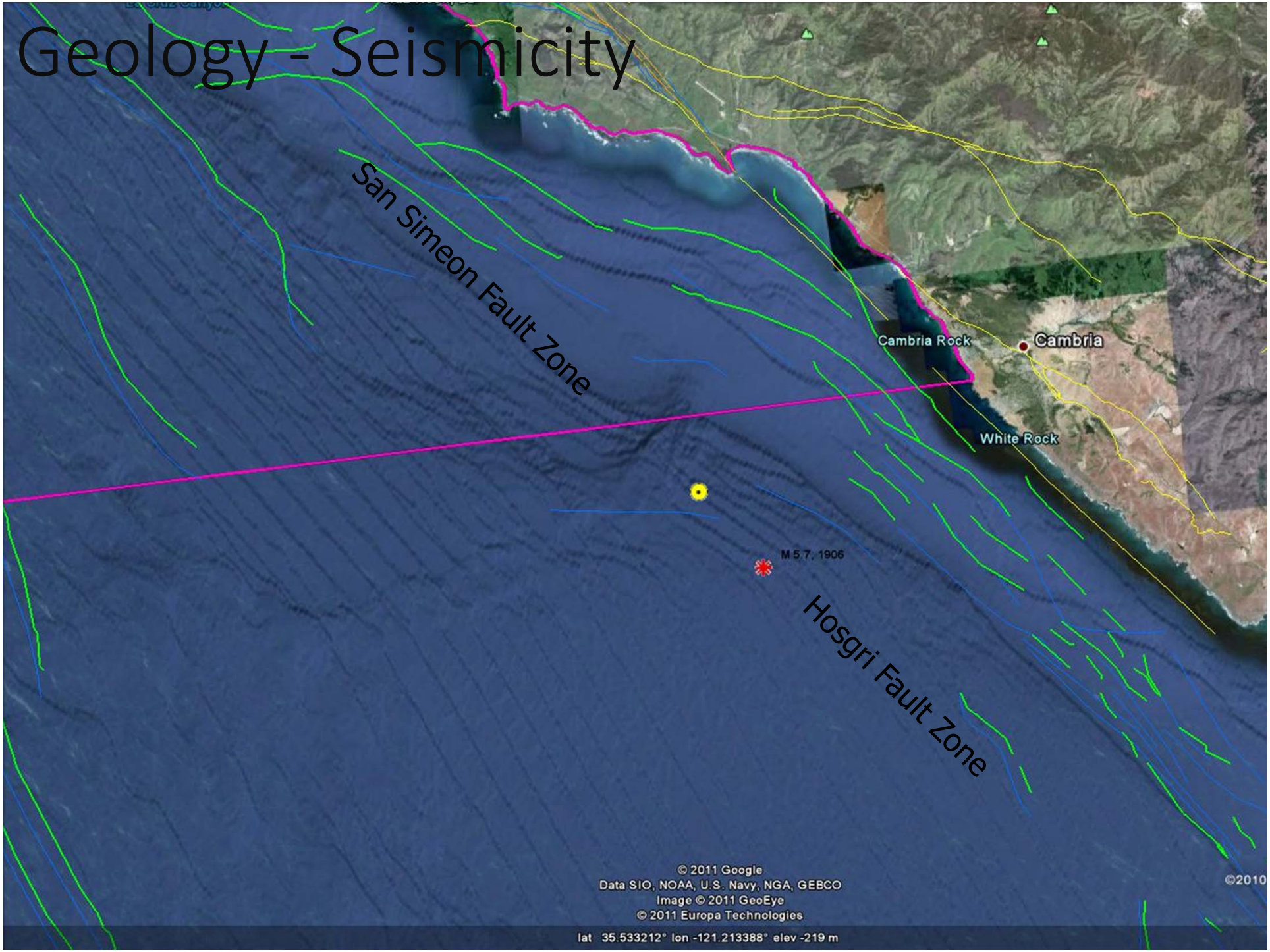
- OSPR, NOAA, MBARI, USCG
- Two Primary Tasks
  - Shipwreck Site Characterization (Square mile around vessel)
  - Physical condition of the vessel (hull integrity, condition of the cargo)



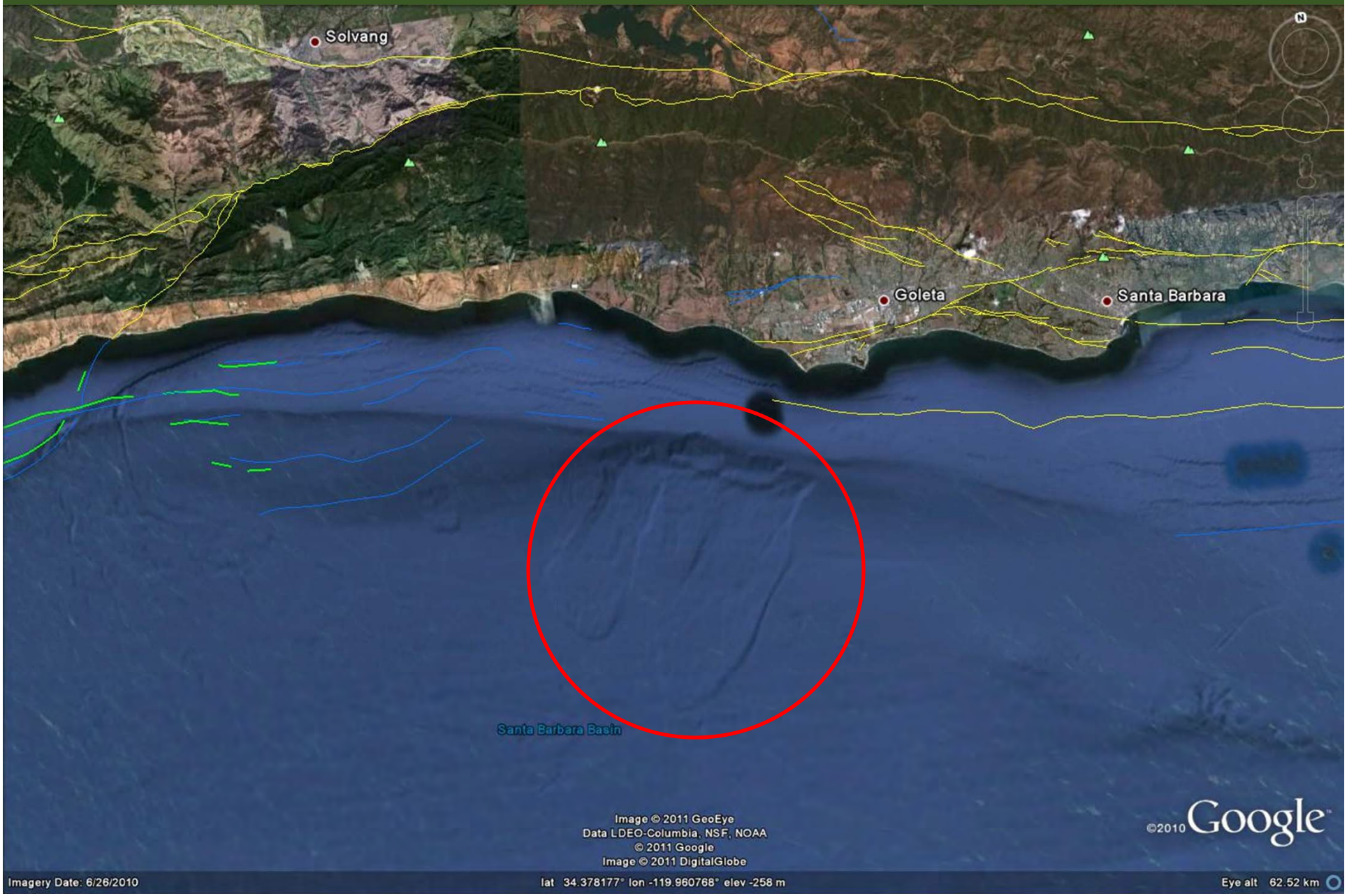
Geology – Physiographic Features



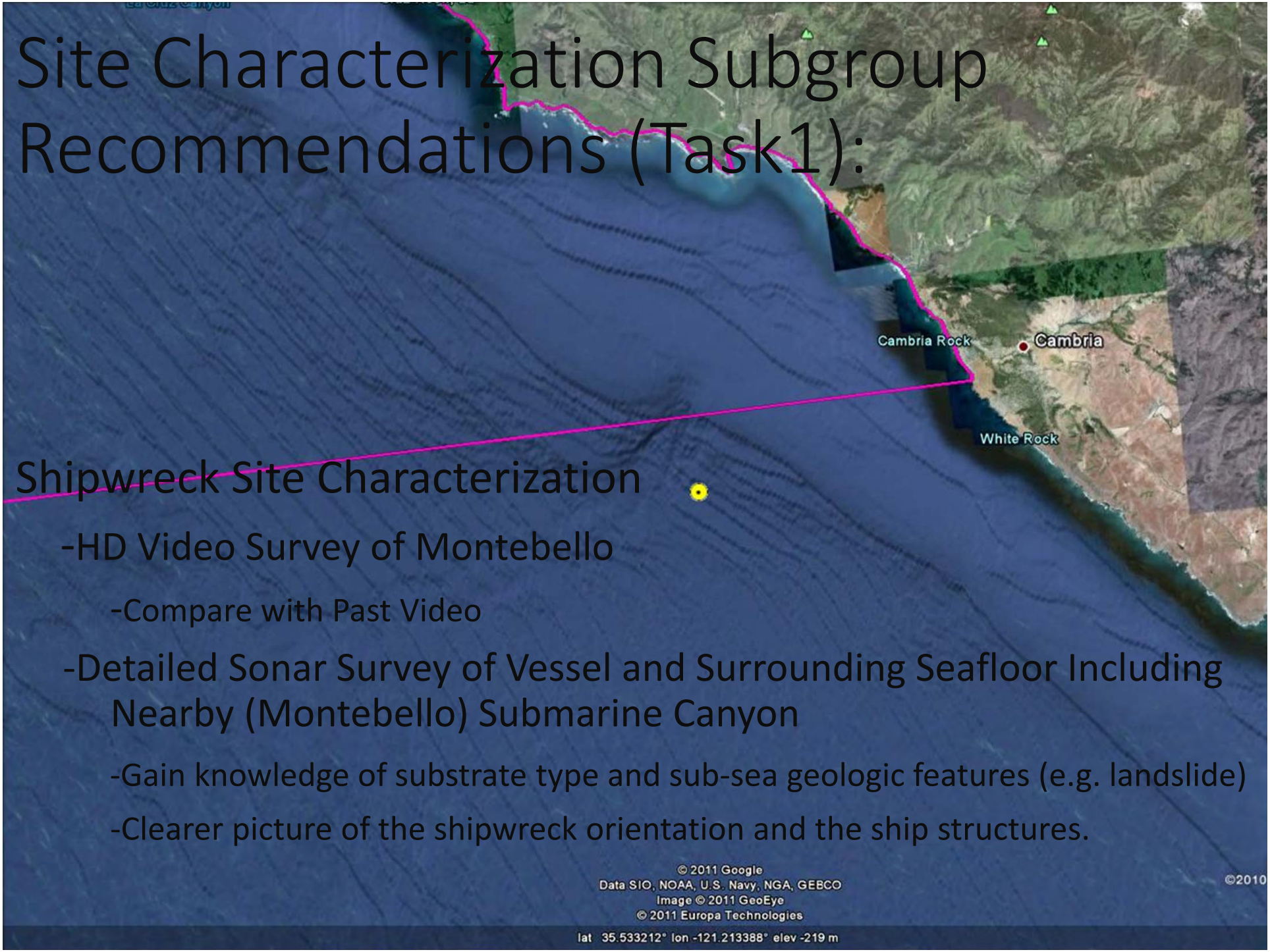
Geology - Seismicity



Geology – Submarine Landslide



Site Characterization Subgroup Recommendations (Task1):

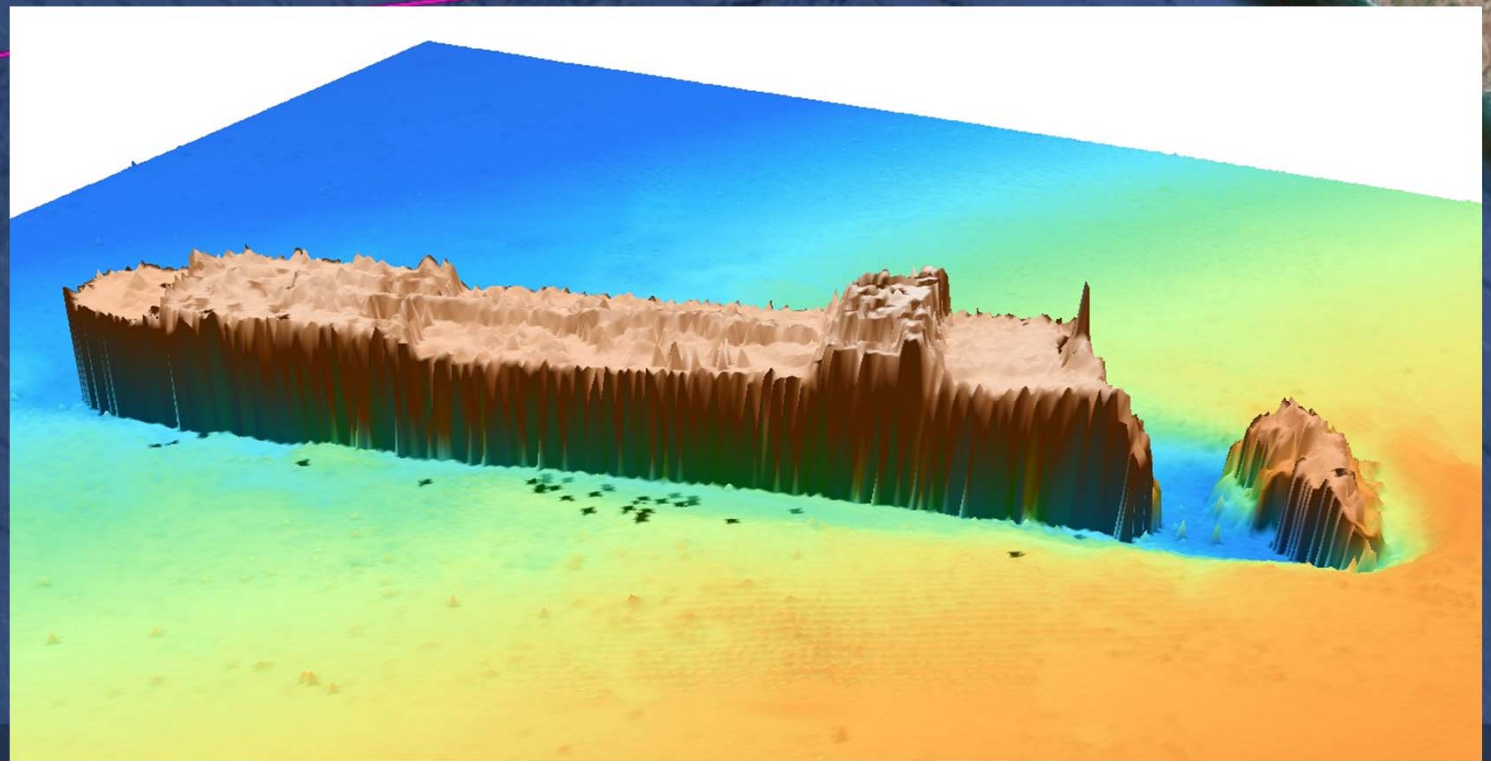


Shipwreck Site Characterization

- -HD Video Survey of Montebello
  - -Compare with Past Video
- -Detailed Sonar Survey of Vessel and Surrounding Seafloor Including Nearby (Montebello) Submarine Canyon
  - -Gain knowledge of substrate type and sub-sea geologic features (e.g. landslide)
  - -Clearer picture of the shipwreck orientation and the ship structures.

Task 2
Physical Condition of The Vessel

- Monterey Bay Aquarium Research Institute (MBARI)
- Multibeam sonar survey of the SS *Montebello*



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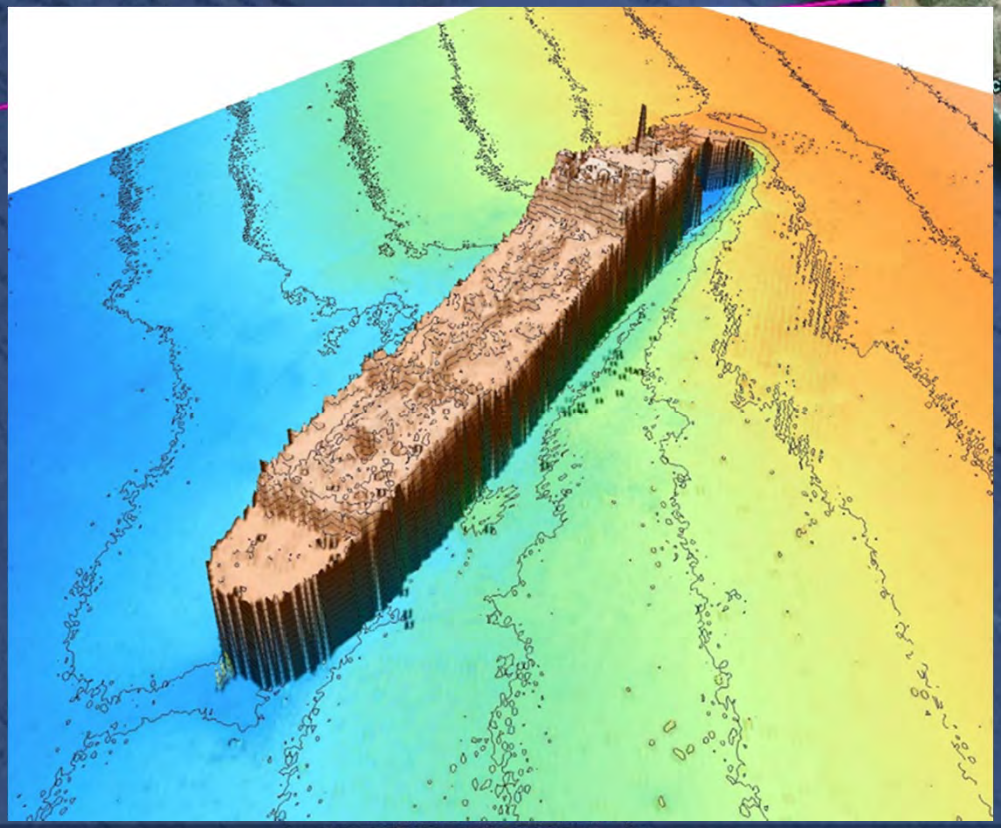
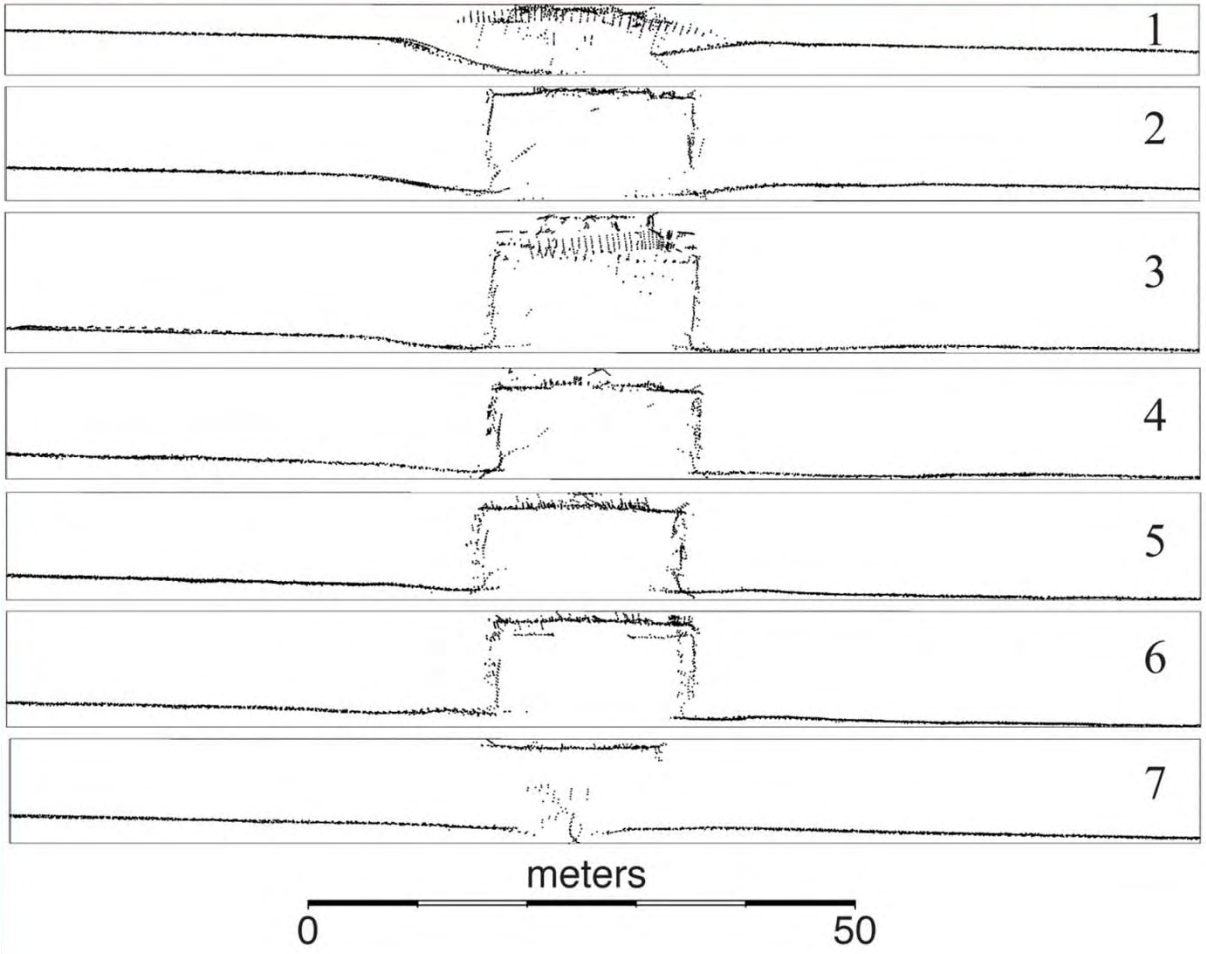
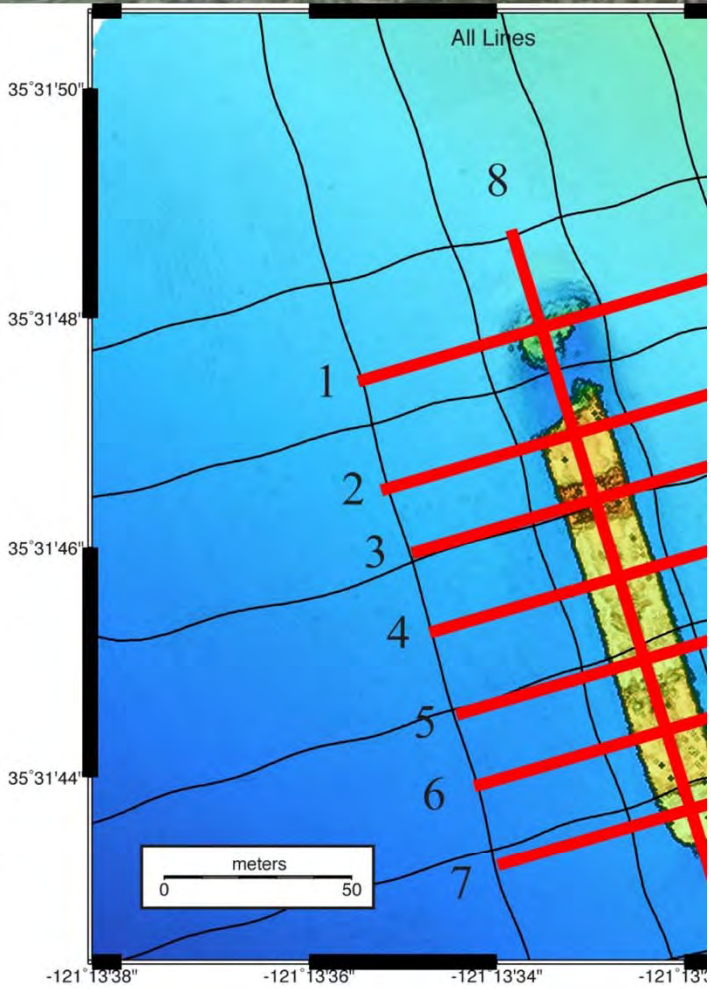
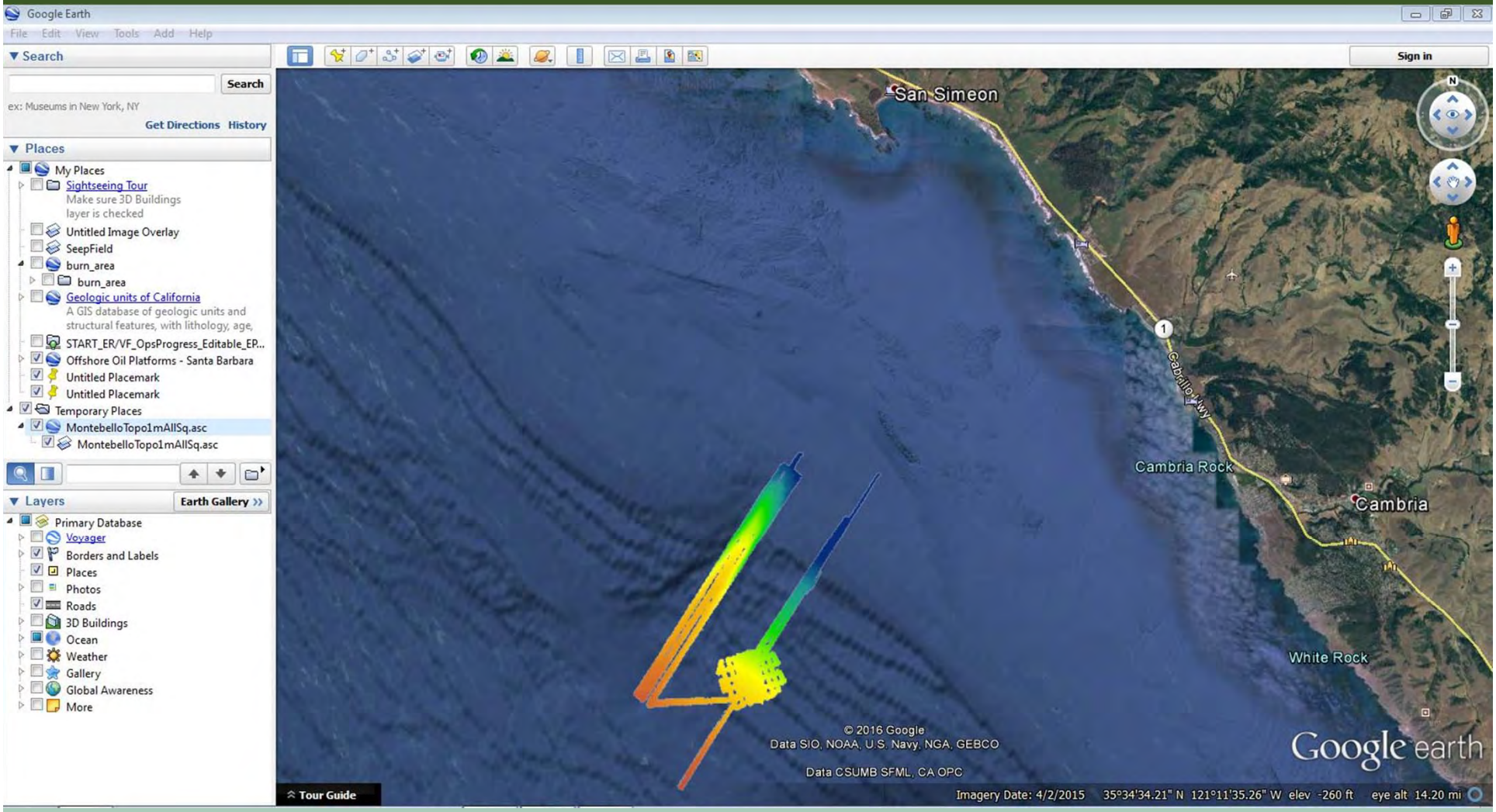




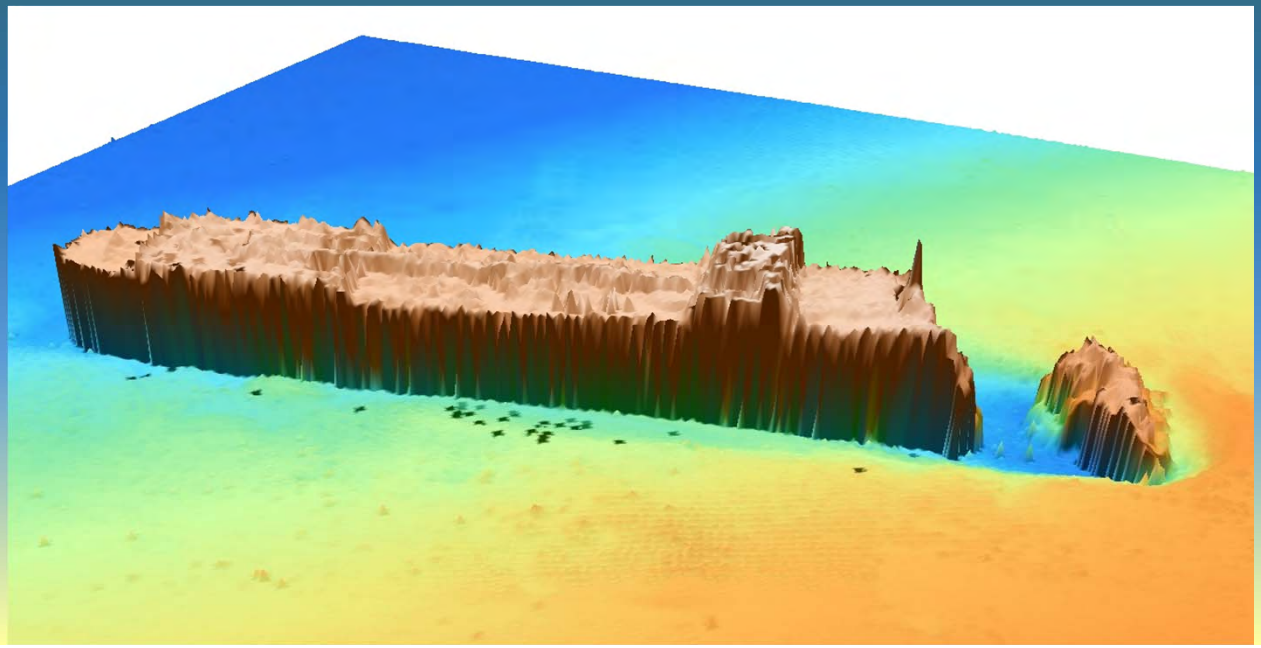


SS Montebello



Interpretation

- The multibeam sonar data indicate that the *Montebello* was pitched forward down when it impacted the bottom, crushing and breaking off the bow section
- Except for the bow and the stack, the wreck is largely intact
- The wreck's setting on the seafloor is stable and not likely to be subjected to either rapid erosion or mass wasting

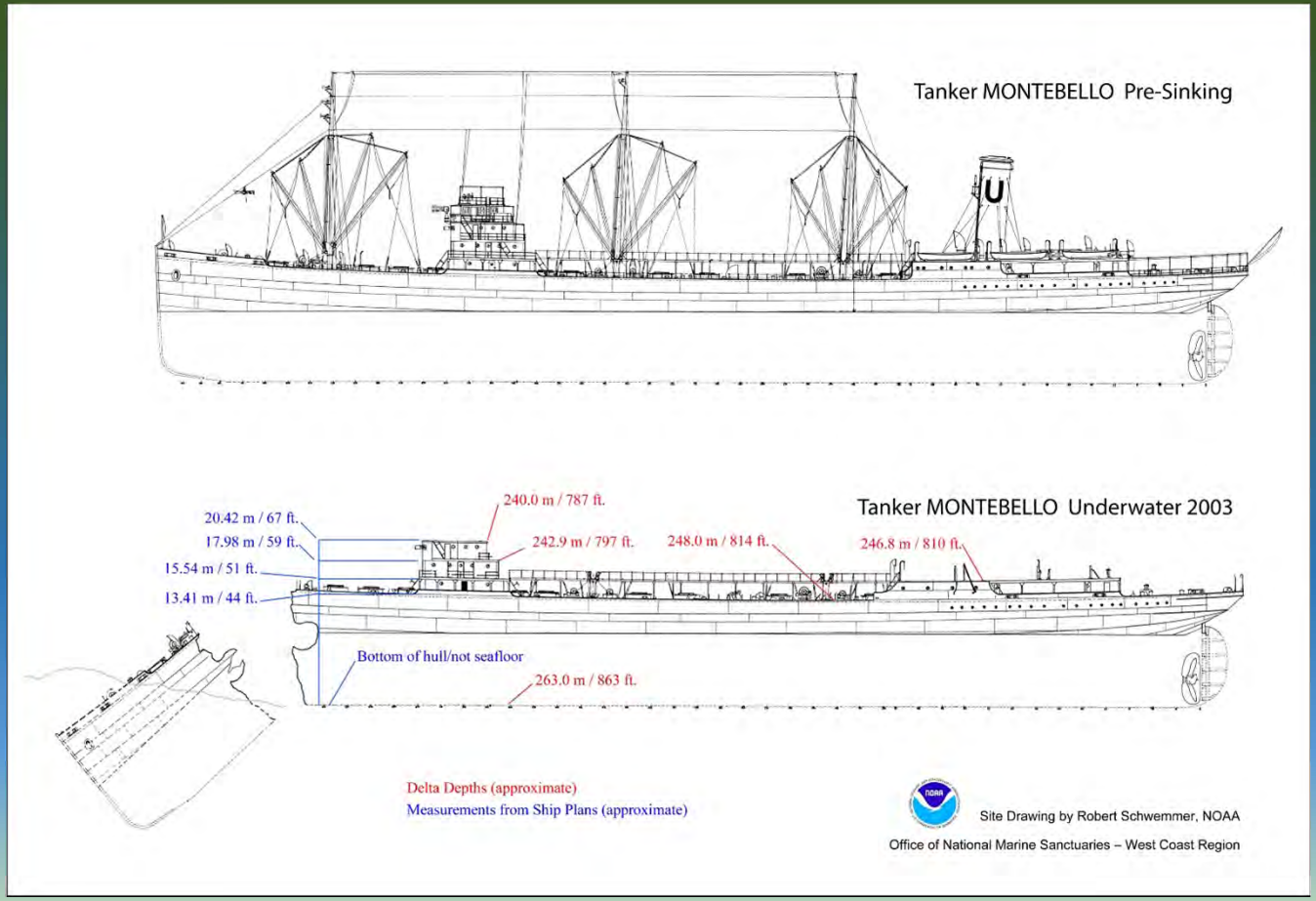


Observations

- The bow is separated from the rest of the hull, tilted forward, and partially buried
- The bow is located in a 4.5 meter deep basin, and the seafloor in front of it bulges up about 1 meter
- Aside from the bow, the vessel is largely intact and upright
- Both the bridge and the aft deckhouses are intact, as is the pipe bridge running along the main deck and the shelter deck on the stern
- The foremast is at least partly intact, but the aft two masts are missing
- The rudder is intact but leaning to port
- The bathymetry and subbottom profiles indicate that the vicinity of the wreck has not recently been subject to significant sediment deposition, erosion, or mass wasting
- The multibeam sonar imaged large schools of fish in the vicinity of the wreck

Montebello – Conclusion

A rigorous assessment determined that there was no recoverable oil remaining onboard



Risk Assessment for Potentially Polluting Wrecks in U.S. Waters

Department of Commerce
National Oceanic and Atmospheric Administration
Office of National Marine Sanctuaries
Office of Response and Restoration

Risk Assessment for Potentially Polluting Wrecks in U.S. Waters

- The National Oceanic and Atmospheric Administration (NOAA) maintains a large database of shipwrecks, dumpsites, navigational obstructions, underwater archaeological sites, and other underwater cultural resources.
- This internal database, Resources and Undersea Threats (RUST), includes approximately 20,000 shipwrecks in U.S. waters
- The Remediation of Underwater Legacy Environmental Threats (RULET) was created for the subset of wrecks in RUST with the highest potential to cause pollution
- Initial screening criteria, based on available data for each wreck, included vessels sunk after 1891 (when U.S. vessels began conversion to fuel oil), vessels built of steel or other durable material, cargo vessels over 1,000 gross tons, and any tank vessel

Risk Assessment for Potentially Polluting Wrecks in U.S. Waters - RUST

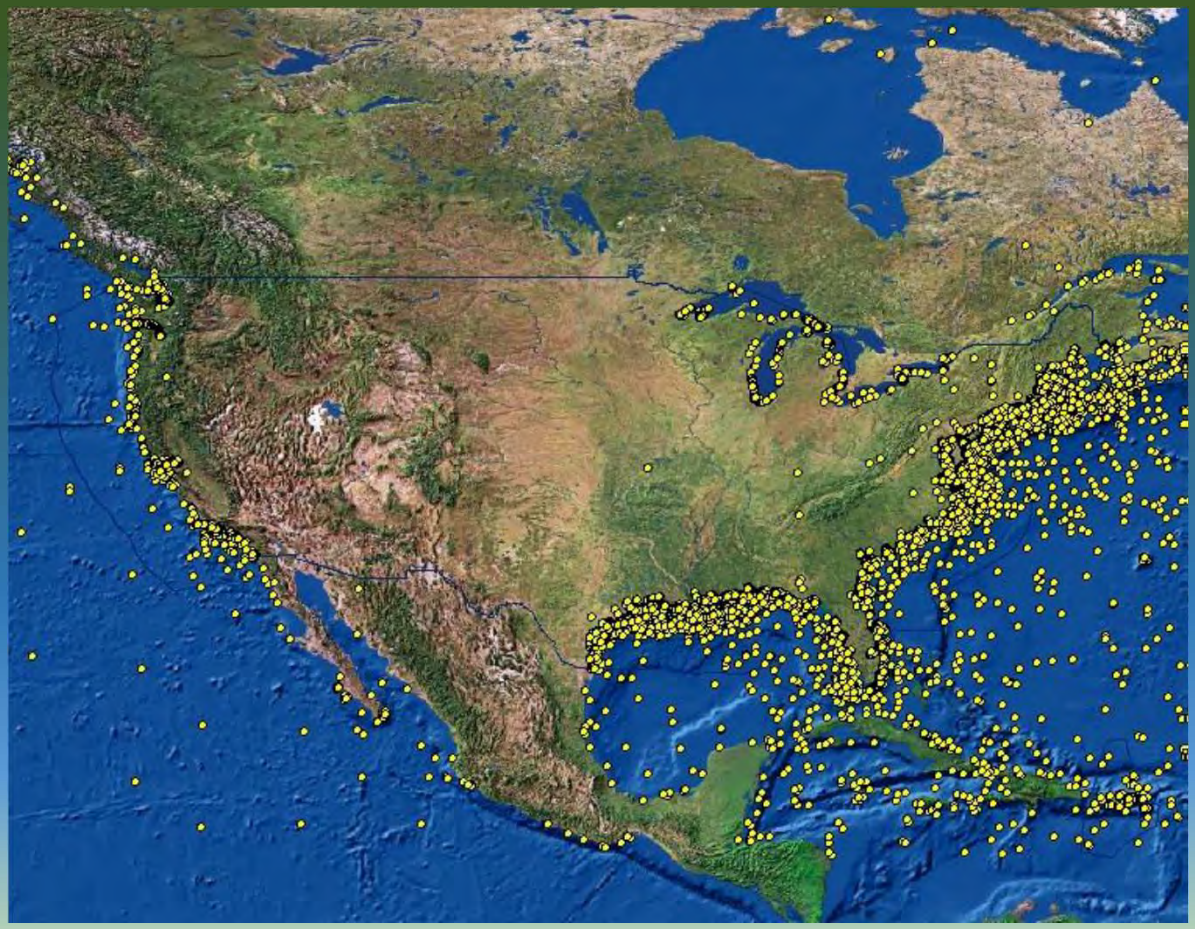


Figure ES-1: The NOAA Resources and UnderSea Threats (RUST) database has over 30,000 targets, including 20,000 vessels

Risk Assessment for Potentially Polluting Wrecks in U.S. Waters - RULET

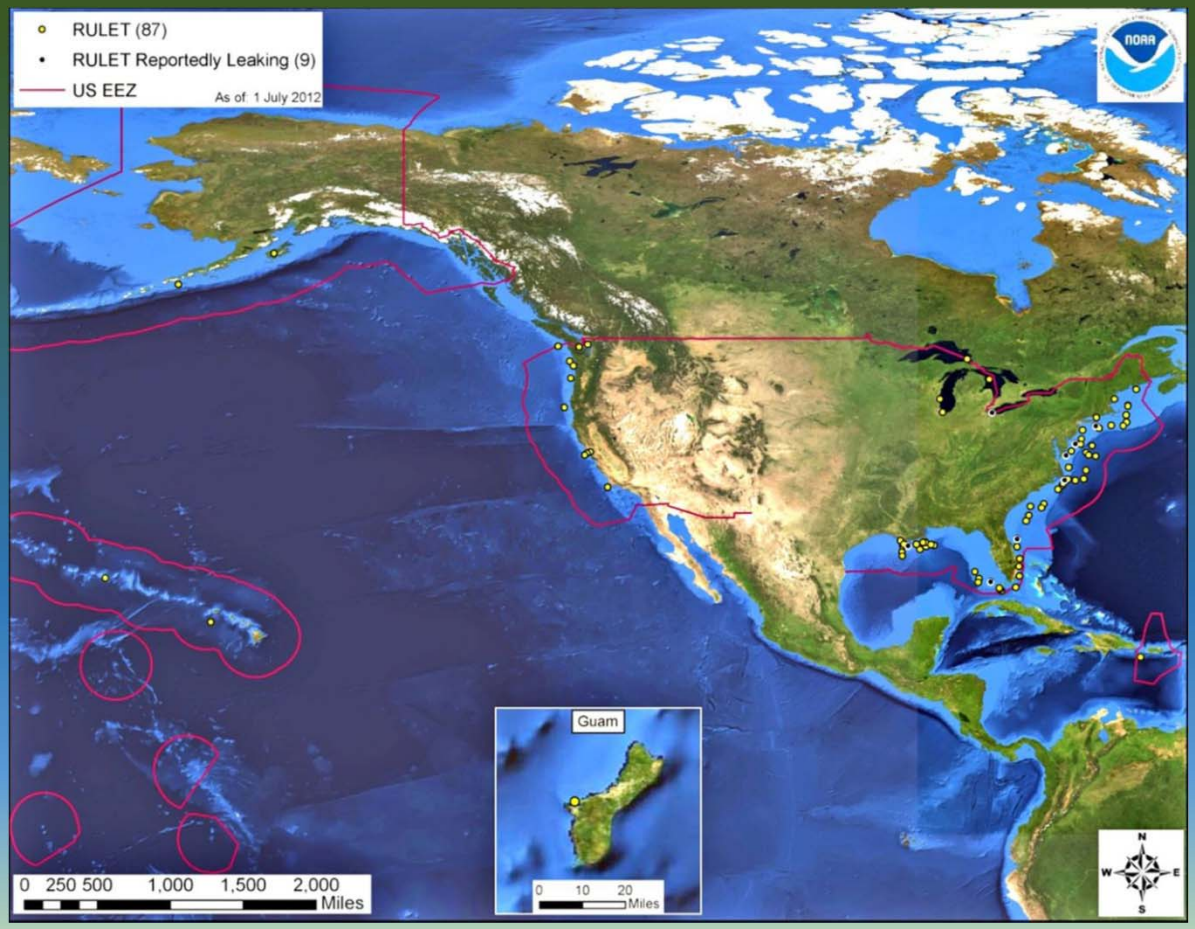


Figure ES-2: The locations of the 87 priority wrecks

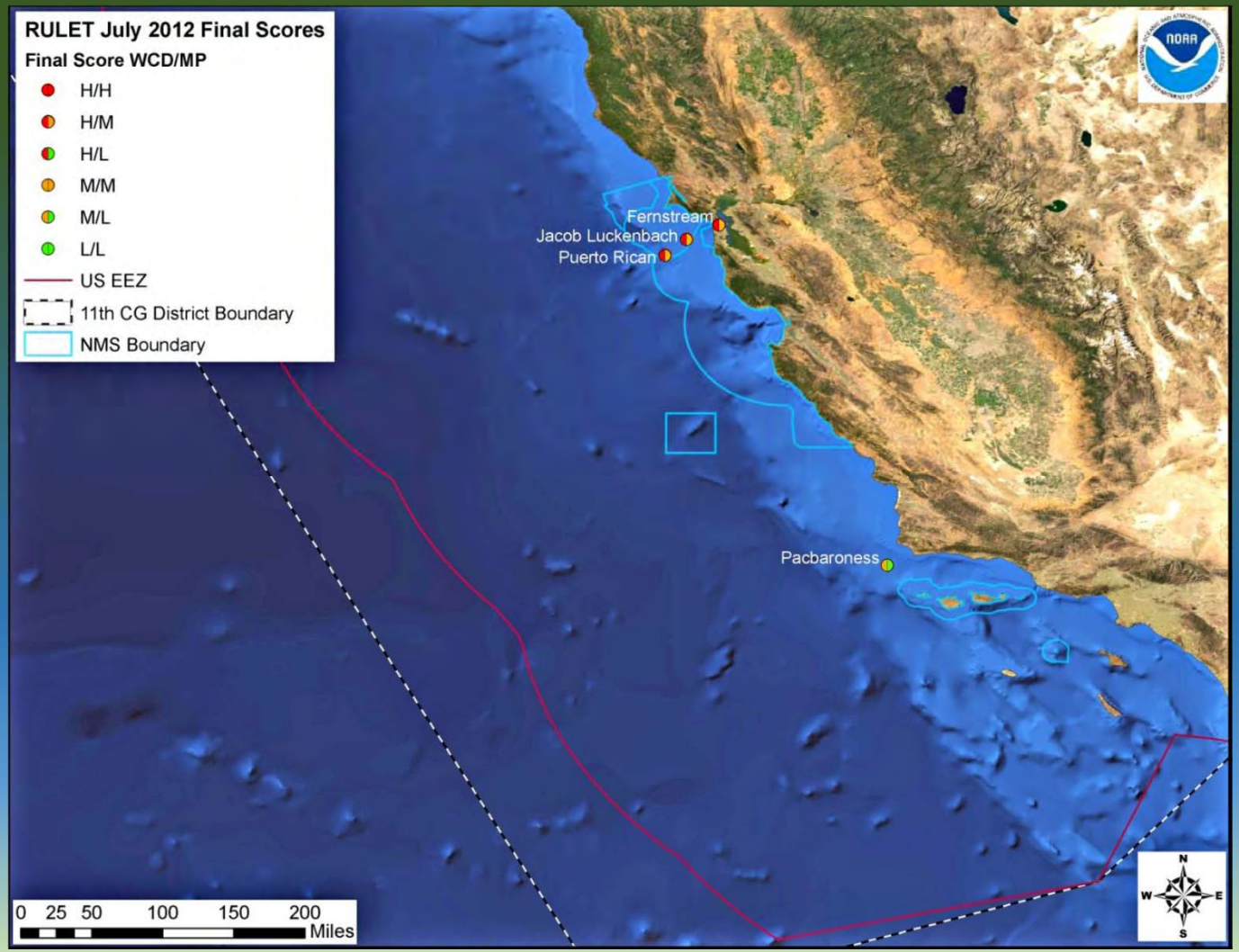
Risk Assessment for Potentially Polluting Wrecks in U.S. Waters - RULET

- Of the 87 priority vessels, 47 (54%) have unknown or unconfirmed locations; “unconfirmed” locations
- Top four threatening shipwrecks for California:
  - Fernstream – Frieghter, sunk on December 11, 1952, in San Francisco Bay (soy beans)
  - Jacob Luckenbach – Freighter, sunk on July 14, 1953, outside the Golden Gate (automotive parts)
  - Puerto Rican – Tank Vessel, exploded, broke in half, sunk outside the Golden Gate
  - Pacbaroness - Freighter, sunk September 21, 1987, off Point Conception, (21,000 metric tons of finely powdered copper concentrate)

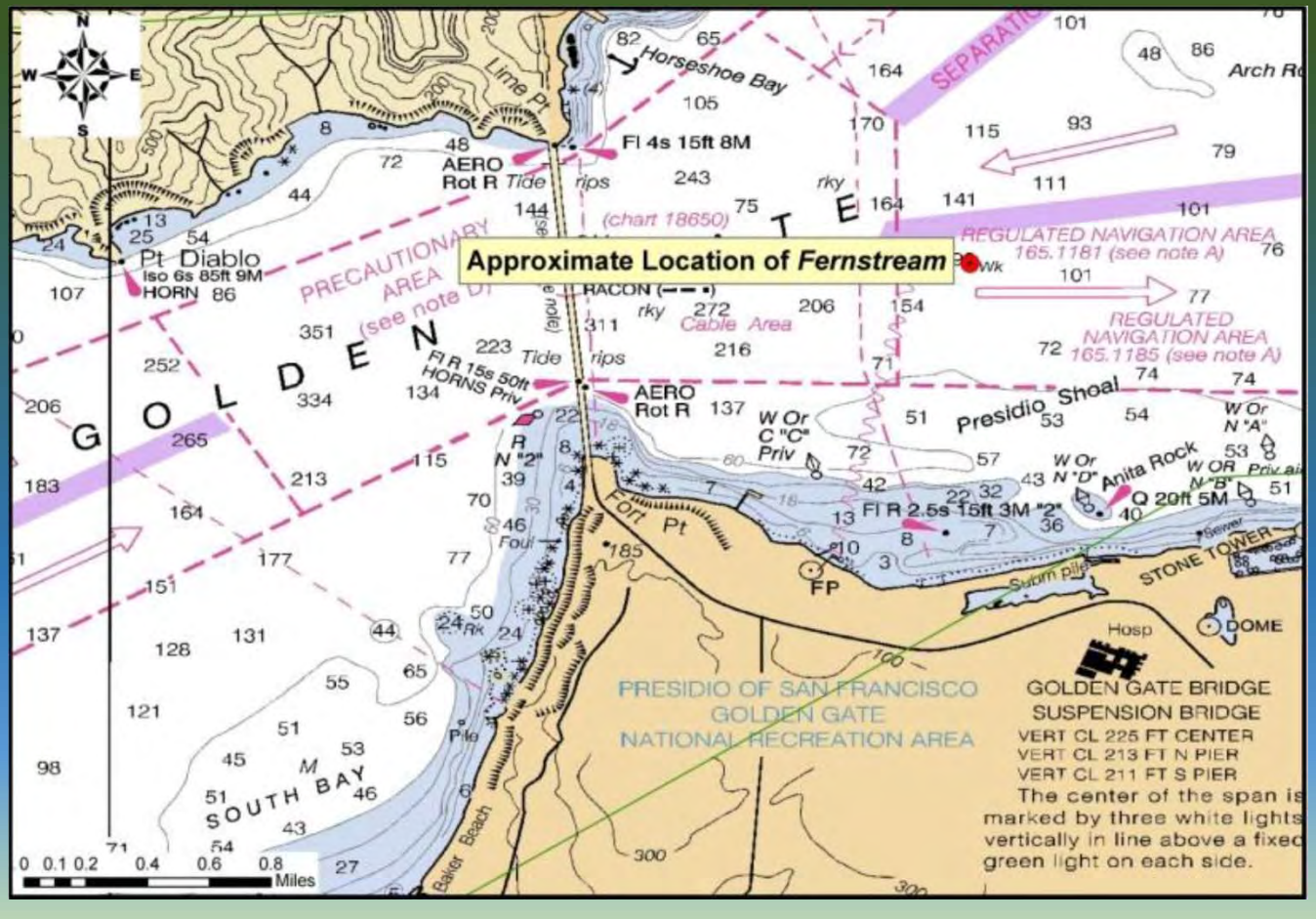
Name	WCD Final Score	MP Final Score	USCG District
*Fernstream***	15	13	11
Jacob Luckenbach	15	12	11
Puerto Rican	15	12	11
*Pacbaroness***	13	11	11

Note: Blue denotes WWII casualties; tan denotes confirmed location; * denotes unconfirmed location; ** denotes foreign flagged.

Risk Assessment for Potentially Polluting Wrecks in U.S. Waters – California Top Four



Risk Assessment for Potentially Polluting Wrecks in U.S. Waters - MV *Fernstream*



Risk Assessment for Potentially Polluting Wrecks in U.S. Waters - MV *Fernstream*

- On 11 December 1952, the SS *Hawaiian Rancher*, a cargo vessel of 8,353 gross tons, was inbound in San Francisco Bay and proceeding to an anchorage, and the MV *Fernstream* (Norwegian) was outbound proceeding to sea.
- While proceeding on various courses and speeds, errors in judgment of course and speed were made and both vessels collided at 0730, 11 December 1952, in position 121 degrees True, 0.8 miles from Lime Point Lighthouse.
- The *Fernstream* sank with no loss of life and the *Hawaiian Rancher* suffered bow damage
- It carried 42 crew, 11 persons in addition to the crew and was fully loaded with 6,378 tons of cargo, consisting of 3,000 tons of soybeans in bulk, the balance general cargo and mail

MV *Fernstream*
2013 NOAA Investigation

- Is she upright or inverted?
- Is she stable?
- How extensive is the damage to the ship and her fuel tanks?
- Does an extensive pollution threat remain?
- If so, what (if anything) can be done about it safely?

Risk Assessment for Potentially Polluting Wrecks in U.S. Waters - MV *Fernstream*

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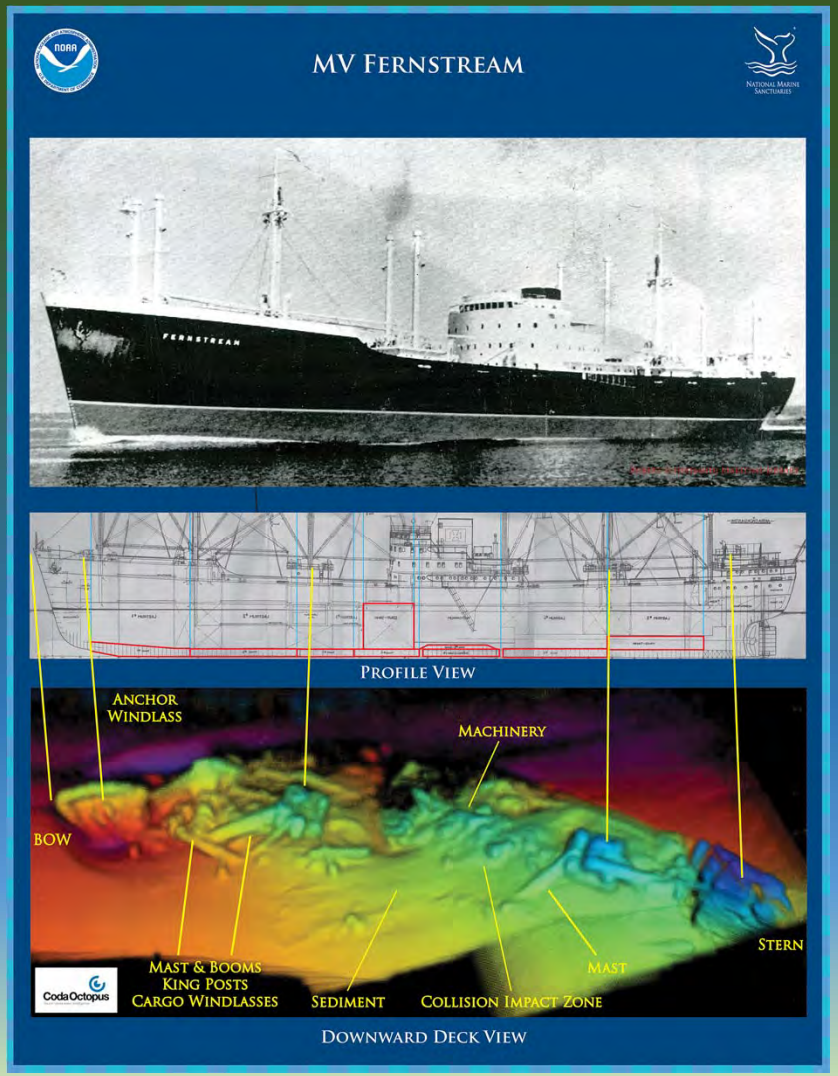

2013 NOAA Investigation
MV *Fernstream*
Recommendations to the USCG

- *FOSC determined the M/V FERNSTREAM* no longer poses a substantial oil threat; though small, inaccessible amounts of residual oils may remain
- Monitor RULET vessels in San Francisco AOR as part of regular Maritime Domain Awareness Patrols
  - USCG vessel & aircraft
  - NOAA NRT-6 triennial survey
  - Port Partner Marine Patrol Units


Thank You