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PROJECT PROFILE

Lingering Oil: Oil Weathering and Tracking

WHY ARE WE SAMPLING?

In March 1989, the *Exxon Valdez* tanker ran aground on Bligh Reef in eastern Prince William Sound (PWS), spilling an estimated 11 million gallons of crude oil. In the days following, spilled oil moved south and west through PWS and then into the Gulf of Alaska. Roughly 40% of the spilled oil landed on beaches within PWS, affecting at least 487 miles of shoreline. The extent and degree of oiling on shorelines decreased rapidly over the first few years after the spill, and it was assumed that remaining oil would be reduced to negligible amounts soon thereafter. However, observations eight years after the spill showed that oil remained in some beaches leading to concerns that lingering oil could continue to harm wildlife populations and their prey. Lingering oil surveys during the 2000s continued to verify that oil was persisting longer than experts expected and remained relatively un-weathered chemically. The oil weathering project of Gulf Watch Alaska is designed to continue monitoring the persistence and chemical state of lingering *Exxon Valdez* oil on impacted beaches.

WHERE ARE WE SAMPLING?

Lingering oil surveys - we will re-survey approximately ten of the worst case sites with lingering oil in PWS selected from historic sampling results. These sites have become the long term monitoring sites for lingering oil and will be sampled every 5 years over the next 20 years.

Chemical state of the oil – Analyses will be from archived *Exxon Valdez* oil samples housed at Auke Bay Laboratories in Juneau, Alaska and samples from future lingering oil monitoring sites in PWS.
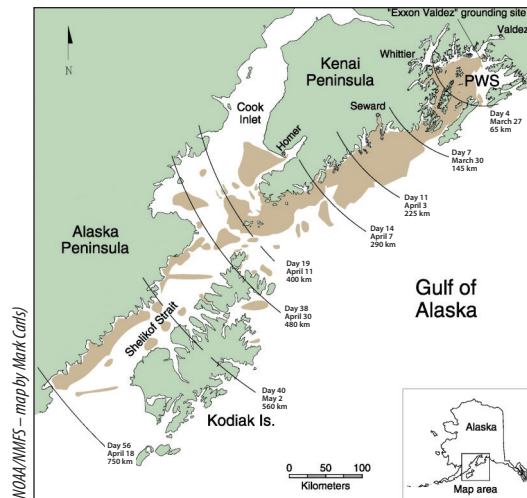
Known extent of the Exxon Valdez *oil spill in PWS and Gulf of Alaska.*

Photo of Exxon Valdez *oil tanker grounded on Bligh Reef and leaking oil, March 1989.*

HOW ARE WE SAMPLING?

Lingering oil surveys – Surveys are conducted as they have in the past by sampling random pit locations. Pits will be dug 20 inches deep and evaluated for lingering oil. If oil is found, samples are taken for chemical analyses.

Chemical state of the oil – over the decades, oil degrades in the environment so it is critical we are able to identify *Exxon Valdez* oil (chemical fingerprint) and understand how it is changing or weathering over time. From oil samples taken over the last several decades, studies have been focusing on determining levels of geochemical biomarkers. These biomarkers are compounds found in oil most resistant to weathering, therefore yielding a better picture of weathering.

WHAT ARE WE FINDING?

Lingering oil surveys – The amount of lingering oil is small relative to the amount that originally stranded and presumably has diminished since the last quantitative estimate was conducted (in the early 2000s). A lingering oil monitoring survey will be conducted in PWS during the summer of 2015 at ten sites known to have persistent subsurface *Exxon Valdez* oil. Continued monitoring at these sites will allow us to quantify how much oil remains at these locations and the rate at which the oil is diminishing and also assess the oil's chemical state through time.

Chemical state of the oil – Chemical composition (fingerprint) of oil samples from 2012 continues to be consistent with *Exxon Valdez* oil. In addition, new forensic modeling approaches with geochemical biomarkers are providing a definitive identification of oil decades after the spill. Oil remains biologically available at some PWS and Gulf of Alaska locations, so it could affect the marine ecosystem.

Examples of lingering oil found in PWS.

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Remnant oil from the *Exxon Valdez* oil spill is just below the surface in many areas of PWS, especially those areas protected from strong weather and wave action.

Example of survey equipment and digging pits on beaches in PWS, 2001.

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