

Exxon Valdez Oil Spill

In March 1989, the *Exxon Valdez* went aground on Bligh Reef, Alaska. It's punctured hull emptied between 40 and 136 million L¹ of crude oil into Prince William Sound. The spill's severity was compounded by the heavy, persistent properties of North Slope crude, heavy storm conditions and a three-day lag in Exxon's response.

Prior to the Exxon Valdez spill, it was assumed that impacts to species from oil spills were almost exclusively from acute mortality.² The Exxon spill demonstrated that unexpected persistence of toxic, subsurface oil could hinder species recovery for decades. Because of vast amount of research completed after the spill, there has been a shift in oil toxicity paradigms in relation to impacts on fish and other aquatic animals.

The immediate impacts included 2000 km of oiled shoreline³, deaths of 250,000 seabirds, up to 2800 sea otters, unknown numbers of porpoises and dolphins, countless intertidal shellfish and smothered kelp and eel grass habitats over a 3400 sq. km area. In time, other impacts surfaced; 22 killer whales died (devastating two pods), the herring population has not recovered (though possibly confounded by other factors); subsistence gathering of intertidal resources has only partially returned; and more than 80,000 L of oil still remains buried just beneath the surface, much of it nearly as toxic as the first few weeks after the spill.⁴ As many as 3,000 clean-up workers have now suffered from spill related illnesses.⁵ Estimates of economic, social, and ecological damages are \$9.5 billion, of which Exxon paid \$3.4 billion with US taxpayers covering the shortfall.⁶

Two and a half years after the Exxon Valdez spill (1991) an estimated 13 percent of the oil remained in sub-tidal sediments, and two percent remained in intertidal (shorezone) areas, mostly as highly weathered residuals.⁷ By 2007, roughly 80,000 L of oil still remained in subsurface sediments and was degrading at 0-4 percent per year.⁸ Some oil pockets were still relatively unchanged since the spill.⁹ At this rate, the remaining oil will take decades and possibly centuries to disappear entirely.

¹ Exxon's estimate is 40 million litres. Others are higher i.e., AK Department of Law. 1991. Files on 'ACE' investigation, 1989-1991. ARLIS, Anchorage, AK

² Peterson et al. 2003.

³ 2000 km estimate from Peterson et al. 2003

⁴ Exxon Valdez Oil Spill Trustees Council. 2009. 2009 Status Report.

⁵ Based on the findings from a Yale graduate study in 2003 that Dr. Riki Ott relayed to US Congress according to Anchorage Daily News June 29, 2010. According to ProPublica (Marian Wang, June 4 2010) Exxon's internal medical reports revealed that an unspecified number of the 11,000 Exxon Valdez workers made 5,600 clinic visits for upper respiratory illnesses in the summer of 1989.

<http://www.propublica.org/blog/item/former-valdez-cleanup-worker-warns-of-toxic-dangers-in-the-gulf>

⁶ Vanem et al. 2007

⁷ Wolfe et al. 2008.

⁸ Short et al. 2007.

⁹ Short et al. 2007.

Although researchers initially thought that the weathered oil was inert, they now believe otherwise.¹⁰ Weathered oil (which concentrates PAHs) is more toxic on a weight per weight basis than non-weathered oil.¹¹ There are concerns that weathered oil will remain toxic to some species for decades.¹²

¹⁰Biologically inert; meaning it wouldn't affect the health of biological organisms.

¹¹ Carls and Meador 2009.

¹² Esler et al. 2010.