



Prince William's Oily Mess: A Tale of Recovery

Student Guide

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Web Resources

Exxon Valdez Oil Spill Trustee Council

<http://www.evostc.state.ak.us>

This Web site contains information from the *Exxon Valdez* Oil Spill Trustee Council about the spill, its impacts, and [restoration](#) and research efforts. Check the Council's Oil Spill Facts page for answers to common questions about the spill, and links to more information for students and researchers.

Exxon Valdez Oil Spill: 10 Years Later

<http://www.loe.org/series/exxon/exxon.htm>

This Web site has transcripts and sound files from National Public Radio shows that relate to the *Exxon Valdez* oil spill, and links to sites representing a variety of perspectives on the spill.

What Happens When an Oil Spill Occurs?

http://www.classzone.com/books/earth_science/terc/content/investigations/es0703/es0703page01.cfm?chapter_no=investigation

This Web site is an interactive Web presentation on the *Exploring Earth* Web site. It includes information about oil spill response, as well as activities that use NOAA's [GNOME](#) (General NOAA Oil Modeling Environment) oil [trajectory](#) software to [model](#) and simulate oil spills.

Hard Aground - 10 Years of Stories, Photos and Reference Material

<http://www.adn.com/evos/index.html>

Hard Aground is a collection of news reports from the Anchorage Daily News that chronicle the *Exxon Valdez* oil spill and its repercussions. This Web site is a rich source of information that only a local newspaper can provide, including a 1999 special feature called, "Legacy of the *Exxon Valdez* oil spill."

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Workers clean a shoreline in Prince William Sound, Alaska after the *Exxon Valdez* oil spill. (Photo credit: OR&R, NOAA)

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Prince William Sound: Paradise Lost?

<http://library.thinkquest.org/10867/>

This is a comprehensive Web site from ThinkQuest about the damage caused by the *Exxon Valdez* oil spill and its clean up. It also provides a history of oil in Alaska. ThinkQuest is an international Web site building competition, where teams of students and teachers are challenged to build Web sites on educational topics.

Exxon Valdez Oil Spill Research: Environmental Recovery in Prince William Sound

<http://www.valdezresearch.com/>

This Web site depicts the results of key scientific studies of Prince William Sound and the Gulf of Alaska following the *Exxon Valdez* oil spill. It is a reference guide for anyone interested in understanding scientific assessments of environmental recovery in the spill-affected area.

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Oil Pollution and Birds

http://www.hww.ca/index_e.asp

This Web site from the Canadian Wildlife Service/Canadian Wildlife Federation explains how spilled oil hurts birds.

Historical Incidents Database

<http://www.incidentnews.gov/incidents/history.htm>

This database contains reports and images from about 1,000 incidents such as oil spills and chemical accidents that happened from 1977 to 2001. It is searchable by name or keyword. The database includes mainly U.S. incidents, but also significant incidents that occurred elsewhere. Generally, it includes only those incidents that occurred either in navigable waters (including large freshwater bodies such as the U.S. Great Lakes) or in coastal waters.

Questions and Answers About the *Exxon Valdez*

<http://www.evostc.state.ak.us/facts/qanda.html>

This Web page is full of facts about the *Exxon Valdez* oil spill from the *Exxon Valdez* Oil Spill Trustee Council, which was formed to oversee restoration of the injured ecosystem using the \$900 million civil settlement.

Images from the Exxon Valdez Spill

<http://response.restoration.noaa.gov/photos/exxon/exxon.html>

This is a collection of NOAA's *Exxon Valdez* photos.

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Glossary of Terms

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A

Abundance—the total number of individuals of a species present in an area. Also see, [Relative Abundance](#).

Amphipods—a group of small, laterally compressed crustaceans that includes beach hoppers and others.

Aquatic—growing or living in, or frequenting water. The term “aquatic” is sometimes used to refer specifically to freshwater, as opposed to salt or marine water. See [Marine](#).

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B

Ballast Tanks—special tanks on large ships that are used to provide stability needed when carrying less than a full load of cargo and to keep the ship at the proper depth in the water. When the ship is loaded with cargo, the ballast tanks are emptied and its contents (usually water) are released to surrounding waters; when the ship is empty, the ballast tanks are filled with water (or other substance like soil or sand) to keep it upright.

Barnacles—[marine](#) crustaceans with feathery appendages for gathering food that are free-swimming as larvae but permanently fixed (to rocks, boat hulls or whales) as adults.



In many locations in Prince William Sound, the action of tides and currents distributed oil throughout the entire intertidal zone. Here, a member of NOAA's Office of Response and Restoration oil spill response team stands on Knight Island in Northwest Bay, Alaska. (Photo credit: OR&R, NOAA)

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Berm—a terrace formed by wave action along the backshore of a beach; a mound or wall of earth, sand or rocks used as a barrier or as insulation.

Biodegradation (or Biodegrade)—the breaking down of substances by [microorganisms](#), like bacteria, which use the substances for food and generally release harmless by-products such as carbon dioxide and water.

Bivalve Mollusk—mollusks with two shells, such as oysters, mussels, and clams. Snails and limpets are gastropod mollusks.

Boom—a temporary floating barrier used to contain an oil spill.

Boulder—a mass of rock greater than 256 millimeters in diameter.

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C

Cobble—a mass of rock greater than 64 millimeters in diameter, but less than 256 millimeters in diameter. Cobblestones are larger than a pebble and smaller than a [boulder](#).

Colonize—to populate or establish a population in an area.

Community—an association of living organisms that have mutual relationships among themselves and with their [environment](#), and thus function, to some degree, as an ecological unit.

Control (or Control Group)—in an experiment, it is the group or subject not exposed to the variable or condition (for example, not exposed to oiling or not exposed to cleanup techniques).

Controlled Experiment—uses an [experimental group](#) and a [control group](#) to test a hypothesis.

Cover—referring to the amount of plants or other organisms that are occupying the ground, a rock or other surface.

Crude Oil—gooey liquid that contains hundreds of different types of hydrocarbons; raw, unprocessed [petroleum](#) (i.e. oil in its natural unprocessed state). It is refined or separated into petroleum gas, kerosene, diesel, fuel oil, bunker oil, etc.

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D

Dispersant—chemical that causes oil to break into small droplets by reducing the surface tension between the water and oil. It is used to cleanup low [viscosity](#) oils, yet it impacts the plankton in the upper water layers, because the oil is dispersed within the water.

Diversity (or Biological Diversity)—the variety of species, their genetic makeup, and the natural communities that they compose. All the different kinds of organisms living in an area.

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E

Ecology—the study of the relationship among organisms and between organisms (the biological environment) and their [physical environment](#).

Ecologist—scientist who studies the interactions between species of organisms and their [environment](#) (studies the [ecosystem](#)).

Ecosystem—a [community](#) of living organisms and their interrelated [physical](#) and chemical [environment](#).

Environment—the [physical](#) and biological conditions that surround an organism or a group of organisms.

Evaporation (or “to evaporate”)—the physical change by which any substance is converted from a liquid to a vapor or gas.

Experimental Group—in an experiment, the group exposed to the variable or condition.

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G

GPS (or Global Positioning System)—satellite-based navigation system that permits a user to pinpoint his or her exact location on Earth.

Grazers—organisms that eat grasses or other herbs or, in the case of fish and [aquatic invertebrates](#), scrape or suck plant material from some surface (for example, rocks).

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H

Hydrocarbons—a large class of molecules containing only carbon and hydrogen; common in [petroleum](#) products and other oils.

Hypothermia—excessive loss of body heat caused by exposure to very cold water or other conditions.

Hypothesis—an idea or explanation that is based on observations and that can be tested; a suggested explanation for an observation often stated in the form of a question that can be answered by the results of an experiment.

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I

Indicator Species (or Indicator)— a species whose status (i.e., its presence, absence, or [abundance](#)) provides information on the overall condition of an [ecosystem](#) and of other species in that ecosystem. They reflect the quality and changes in environmental conditions, as well as aspects of [community](#) composition.

Insectivore—a heterotrophic organism that eats insects.

Intertidal Zone—on a beach, the area between high [tide](#) and low tide.

Invertebrate—an animal lacking a backbone.

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L

Leach—to draw out or remove the oil from the soil or sediments, often a result of the action or percolation of water.

Limpet—marine gastropod mollusk that has a low conical shell broadly open beneath and grazes over rocks or timbers in the littoral area and clings very tightly when disturbed.

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M

Marine—relating to the seas and oceans.

Microorganism—a very small plant, animal or bacterium; some microorganisms, like larger organisms, can be hurt by oil spills; some microorganisms actually break oil down into less harmful substances.

Model—an abstraction or simplification of a natural phenomenon developed to [predict](#) a new phenomenon or to provide insight into existing ones.

Mortality—the proportion of deaths in a population.

Mussels—a [bivalve mollusk](#) usually having a dark elongated shell.

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N

NOAA—the National Oceanic and Atmospheric Administration (NOAA), an agency of the U.S. government that conducts research and gathers data about the global oceans, atmosphere, space, and sun, and applies this knowledge to science and service that touch the lives of all Americans. NOAA provides these services through five major organizations: the National Weather Service, the National Ocean Service, the National Marine Fisheries Service, the National Environmental Satellite, Data and Information Service, and the Office of Oceanic and Atmospheric Research; and numerous special program units. In addition, NOAA research and operational activities are supported by the nation's seventh uniformed service, the NOAA Corps, a commissioned officer corps of men and women who operate NOAA ships and aircraft, and serve in scientific and administrative posts.

Non-petroleum Oils—oils that are not derived from [petroleum](#); this group of oils includes vegetable oils and animal fats.

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O

Oil—[crude oil](#) and refined [petroleum](#) products (motor oils, fuels, lubricants, etc.), as well as vegetable oils, animal fats, and other [non-petroleum oils](#).

Oil Slick—a layer of oil floating on the surface of water.

Oleophilic—having a strong affinity for lipids, including [petroleum](#) oils and fats. Oleophilic materials absorb or stick to petroleum oils.

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P

Percent Cover—the proportion (in percent) of a certain species or group of species that is occupying a surface such as the ground, a rock, etc.

Petroleum—a mixture of liquid, gaseous, and solid [hydrocarbon](#) compounds found naturally underground. The liquid form of petroleum is called [crude oil](#). Crude oil is occasionally found in springs or pools but usually is drilled from wells beneath the Earth's surface. Petroleum can be processed (refined) into a number of useful products including asphalt, diesel fuel, fuel oil, gasoline, jet fuel, lubricating oil, and plastics.

Photolysis (or Photolysed)—chemical decomposition by the action of radiant energy (as light).

Physical Environment (or Abiotic Environment)—nonliving things in the environment, e.g., water and minerals. Also refers to physical processes in the environment such as evaporation, currents, wind, etc.

Polychaetes (class Polychaeta)—segmented worms that have parapodia (i.e. flattened extensions that have stiff and sometimes sharp bristles).

Prediction (or “to predict”)—a scientific [model](#) to explain what happens, and why it happens; an indication in advance based on observation, experience, or scientific reason.

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Q

Quadrat—a small plot or sample of land that is representative of the particular habitat that is being studied. Often the plot of land is demarcated using a frame made of PVC pipe or other material.

R

Rationale—an underlying reason.

Recolonization—to reestablish a colony or population after being removed from a particular location by a disturbance.

Recovery—the act, process or instance of bringing a habitat or [ecosystem](#) back to a normal condition; or to save it from loss and restore it to usefulness.

Reef—a chain of rocks or coral or a ridge of sand at or near the surface of the water, forming a hazardous obstruction.

Relative Abundance—the proportion or numbers of a species compared to the total number of individuals of all the species in the [community](#) or sample.

Remedial—intended as a treatment or correction.

Replicate—one of several identical experiments, procedures or samples.

Replication—performance of an experiment or procedure more than once.

Resilience (or Resilient)—the capacity to recover structure and function after disturbance. A highly resilient [community](#) or [ecosystem](#) may be completely disrupted by disturbance but quickly returns to its former state.

Restoration—bringing back or restoring species and [ecosystems](#) after human disturbance.

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S

Sediments—the matter, such as soils, sand and rocks, that settles or is deposited on the bottom of a water body by the action of water, wind or glaciers.

Seine—a large net with sinkers on one edge and floats on the other that hangs vertically in the water and is used to enclose and catch fish when its ends are drawn together or drawn ashore.

Skimmers—devices used to remove oil from the water's surface.

Sorbents—substances that take up and hold water or oil; sorbents used in oil spill cleanup are made of [oleophilic](#) materials.

Stressor—the five external forces (i.e. stressors) identified as affecting coastal and marine ecosystems are pollution, invasive species, climate change, extreme events, and land or resource use.

Subtidal—the coastal life zone that remains underwater (below low tide), but above the continental shelf.

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T

Tide Pools—small habitats formed when spaces between rocks retain water at low [tide](#).

Tides—very long-period waves that move through the oceans in response to the forces exerted by the moon and sun. Tides originate in the oceans and progress toward the coastlines where they appear as the regular rise and fall of the sea surface. When the highest part, or crest, of the wave reaches a particular location, high tide occurs; low tide corresponds to the lowest part of the wave, or its trough.

Trajectory—the path taken by something.

Trajectory Model—a [prediction](#) about the path of something—like an [oil slick](#).

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V

Viscosity (or Viscous)—amount of resistance to flow by a liquid. Corn syrup is much more *viscous* than water. High molecular weight oils have high viscosity (i.e. do not flow easily).

Volatile—referring to “volatile organic compounds” (VOCs)—a family of chemical compounds found in oils; VOCs [evaporate](#) quickly and can cause nerve damage and behavioral abnormalities in mammals when inhaled.

W

Weathering—action of the wind, waves, and water on a substance, such as oil, that leads to disintegration or deterioration of the substance.

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<http://oceanservice.noaa.gov/education/stories/oilymess/glossary.html>

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