



Designation: F2464 – 22

Standard Guide for Cleaning of Various Oiled Shorelines and Habitats¹

This standard is issued under the fixed designation F2464; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide provides information on shoreline types and sensitive habitats that can be used as guidance for selecting appropriate cleaning techniques following an oil spill. This guide does not address protected archaeological, historical, or cultural sites.

1.2 This guide's emphasis is on typical physical and biological attributes of coastal and inland habitats that could be at risk from oil spills. It reviews and encompasses the entire spectrum of shoreline types representing a wide range of sensitivities. It is largely based on NOAA's and API's publications listed in Section 2.

1.3 This guide provides only very broad guidance on cleaning strategies for the various habitats. For more in-depth guidance, the reader is referred to Section 2, Referenced Documents.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

¹ This guide is under the jurisdiction of ASTM Committee F20 on Hazardous Substances and Oil Spill Response and is the direct responsibility of Subcommittee F20.17 on Shoreline and Inland Countermeasures.

Current edition approved Sept. 1, 2022. Published October 2022. Originally approved in 2005. Last previous edition approved in 2018 as F2464 – 12(2018). DOI: 10.1520/F2464-22.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[F2205 Guide for Ecological Considerations for the Use of Chemical Dispersants in Oil Spill Response: Tropical Environments](#)

2.2 Other Publications:

[API Publication 4706 Environmental Considerations for Marine Oil Spill Response, 2001³](#)

[API and NOAA 4558 Options for Minimizing Environmental Impacts of Freshwater Spill Response, 1995³](#)

[NOAA Characteristic Coastal Habitats, Choosing Spill Response Alternatives, June 2010⁴](#)

3. Significance and Use

3.1 One of the key considerations in making sound cleanup decisions for oiled shorelines is the relative sensitivity of the impacted area. Some areas are very sensitive and certain cleaning methods could cause more harm than benefit. In such cases, natural recovery will be the preferred approach. In other cases, depending on the type of oil, the amount of oil present may be so extensive that recovery will be significantly delayed or not occur at all unless active intervention is carried out.

3.2 This guide presents summary information taken from publications listed in Section 2 on the relative physical and biological sensitivities of shorelines for coastal and inland habitats. Use this guide together with the referenced publications and ASTM guides to make informed decisions prior to undertaking cleaning operations. Consult appropriate government agencies according to law.

3.3 The relative sensitivities of shorelines and resources relate to a number of factors:

3.3.1 Shoreline type (substrate, grain size, tidal elevation, etc.),

3.3.2 Biological productivity, diversity and vulnerability,

3.3.3 Exposure to wave and tidal energy, and

3.3.4 Ability to conduct cleanup without further damage.

³ Available from American Petroleum Institute (API), 1220 L. St., NW, Washington, DC 20005-4070, <http://www.api.org>.

⁴ Available from the National Oceanic and Atmospheric Administration (NOAA), 14th St. and Constitution Ave., NW, Room 6217, Washington, DC 20230.

4. Description and Relative Sensitivity of Shorelines

4.1 This section summarizes the types of shorelines and habitats that may be impacted by an oil spill. The Environmental Sensitivity Index (ESI) is frequently used to characterize relative sensitivity of shorelines to oil spills. Areas exposed to high levels of physical energy and containing low biological activity would rank low (ESI=1, example: exposed rocky shores). Sheltered areas with associated high biological activity have the highest ranking (ESI=10, example: mangroves). Broad guidelines are provided on preferred strategies for cleaning these shorelines following an oil spill incident.

4.2 *Exposed Rocky Shores*—Also known as exposed wave-cut cliffs. The intertidal zone is steep (more than 30° to 45° slope) and narrow with little width. Access can be difficult and dangerous. Sediment accumulation is uncommon and usually transitory because waves remove the debris from the eroding cliffs. There is strong vertical zonation of intertidal biological communities. Species density and diversity vary greatly but can be abundant. Oil would generally be held offshore by reflection of the waves. However, pockets of stranded oil can occur. Any oil that is deposited would be rapidly removed naturally. Cleanup is usually not required.

4.3 *Exposed Man-made Structures*—These are solid structures such as seawalls, piers, and port facilities. They are common in developed areas, providing protection to residential and industrial zones. Many structures are constructed of concrete, wood, stone, or metal. They are built to protect from erosion by waves, boat wakes, and currents. They are exposed to rapid natural removal processes. Attached animals and plants are sparse to moderate. Oil would be held offshore by waves reflecting off the steep, hard surfaces in exposed settings. Cleanup may not be required. All cleanup techniques may be appropriate including surface-washing agents.

4.4 *Exposed Wave-Cut Platforms and Sheltered Bedrock Habitats*—These habitats are characterized by gently sloping bedrock shelves, called platforms, of highly variable width. A steep scarp or low bluff may back the shoreline. They often co-occur with gravel beaches. The platform surface is irregular and cracks, crevices, and tidal pools are common. Small accumulations of gravel can be found in the tidal pools and crevices in the platform. Areas of sandy veneer can occur on the platform in less exposed settings. These habitats can support large populations of encrusting animals and plants, including barnacles, snails, mussels, and macroalgae. Birds and seals use platforms for feeding and resting during low tide. Oil does not adhere to the wet surface, but could penetrate crevices or sediment veneers. Cleanup may not be necessary. Pockets of stranded oil may occur. If the area is accessible, it may be feasible to manually remove heavy oil accumulations and oiled debris.

4.5 *Sand Habitats*—Sand habitats are generally flat to moderately sloping and relatively hard-packed. Sand habitats include sand bars and banks along rivers. In developed areas, sand habitats can be man-made for the purpose of recreation. In exposed coastal areas, they are commonly backed by dunes or seawalls. There can be heavy accumulations of stranded marine vegetation or other debris. Sand habitats can undergo

rapid erosion/deposition cycles as currents and storms relocate the sand. Sand habitats have low to medium sensitivity. In developed areas, sand habitats used as recreational beaches are considered sensitive for economic reasons. Biological populations are typically of low density except if the habitat is in a protected area and contains muddy sediments. Birds use sand habitats for resting, feeding, and nesting. Turtles use these habitats to lay their eggs. Oil penetration can be as much as 15 cm in fine- to medium-grain sand and up to 30 cm in coarse-grain sand. Cleanup should concentrate on manually removing persistent oil and oily debris. On recreational beaches, extensive cleanup is required. Replacement with clean sand having the appropriate composition, grain-size, and color may be necessary if large amounts of sand are removed during cleanup.

4.6 *Tundra Cliffs*—These shorelines are found in extremely cold regions near permafrost areas. They are generally comprised of vegetation overlying peat and permafrost. The cliff height ranges from less than 1 metre to as much as 10 metres. The vegetation on the tundra is a living plant community that is sensitive to disturbance. The main users of this shoreline are migratory birds during the summer season and they are most at risk by oiling. Oil can be removed from beach deposits by sorbents or by manual and mechanical methods as long as there is no damage to the peat substrate. Access may be limited due to fragility of tundra vegetation.

4.7 *Mixed Sand and Gravel Habitats*—These moderately sloping habitats contain significant (over 25 % each) amounts of both sand and gravel. The high-tide berm area is usually composed of sand and fine gravel and the lower part is coarser with cobbles to boulders. In glaciated areas, large boulders may occur. Mixed sand and gravel habitats occur along lakes and as bars along rivers and streams. There can be large-scale changes in the sediment distribution patterns depending upon season, because of the transport of sand offshore during storms. Desiccation and sediment mobility on exposed areas result in low densities of attached animals and plants. The presence of algae, mussels, and barnacles indicate coastal habitats that are relatively sheltered. In freshwater areas, worms and insects such as mayflies, caddisflies, and midges may burrow in mixed sand and gravel habitats. This habitat may include fish spawning areas, birds, and mammals. Oil penetration and sediment deposition can result in subsurface oil layers at depths of over a metre. If the sand fraction exceeds 40 %, oil behavior will be much as it is for a sand habitat. Heavy accumulations of oil should be removed using low-pressure flushing. All oiled debris should be removed; sediment removal should be limited as much as possible as erosion is a concern. In coastal areas, relocation of oiled sediment from high-tide zones to upper intertidal zones can be effective in areas regularly exposed to wave activity.

4.8 *Gravel Habitats*—These habitats are composed of substrate ranging in size from pebbles to boulders. They can be very steep, with multiple wave-built berms forming the upper beach. Density of animals and plants in the upper intertidal zone is low on exposed habitats, but can be high on sheltered gravel habitats and on the lower intertidal zone. Gravel habitats occur along lakes and as bars along rivers and streams. In