

COMPARATIVE PHOTOGRAPHS OF THE *METULA* SPILL SITE, 21 YEARS LATER

Erich R. Gundlach
E-Tech, Inc.
15 Milldam Road
Acton, Massachusetts 01720

ABSTRACT: The area subjected to heavy oiling from the 1974 *Metula* spill of 53,500 tons along the south side of the First Narrows in the eastern Strait of Magellan (Chile) was revisited in December 1995. The marsh/tidal flat at Espora marsh shows some regrowth of vegetation, but oiled areas remain common with 5 to 15 cm of liquid oil present below a thin layer of fine sediment. The asphalt pavement in the sheltered area behind Espora spit shows only a minor (≈ 2 m) reduction in extent. The previous band of asphalt pavement on the exposed, gravel-dominated low-tide terrace along the First Narrows of the strait has mostly been eroded, but disconnected remnants still remain. The *Metula* spill site continues to provide a field laboratory to study the long-term persistence of spilled oil.

Background

The 206,000 deadweight-ton (dwt) supertanker *Metula* ran aground in the eastern Strait of Magellan in southern Chile on August 9, 1974 (Figure 1), releasing an estimated total of 51,500 tons of light Arabian crude and 2000 tons of Bunker C fuel. Only a few tens of meters (at ferry landing areas) of the 65 to 80 km of oiled shoreline were cleaned up. A recent review of all major oil spills prior to 1989 by Gundlach *et al.* (1994) indicated that the *Metula* site offers the potential for obtaining updated information concerning spill persistence in various coastal habitats. This study focused on previously heavily oiled areas near Punta Espora on the south side of the First Narrows (see Figure 1) and offers a reconnaissance toward determining if the site remains a viable candidate for follow-up work. Additionally, because these habitats are similar to those in Alaska, they offer a no-cleanup comparison to the *Exxon Valdez* spill where extensive cleanup operations were performed.

The author last reported on the *Metula* site following a 1981 survey (Gundlach *et al.*, 1982). Pre-1981 studies at the site included several surveys describing spill distribution varying by sediment type and exposure, effects on biological communities, and short-term microbiological changes. More recent site surveys were undertaken in 1987 (Owens *et al.*, 1987; Owens and Robson, 1987), reporting that substantial and relatively fresh oil quantities remained. Baker *et al.* (1993) also reported on the site, focusing on the role of oil thickness as it affects marsh recovery.

Survey results

This survey reviewed the condition of the shoreline in five principal locations in the Punta Espora area (see Figure 1): (1) the sheltered tidal flat area behind Espora spit; (2) the outer exposed shoreline of Espora spit along the First Narrows; (3) the outer exposed low-tide terrace west of the entrance to Espora marsh; (4) the tidal flat at the entrance to Espora marsh; and (5) the Espora marsh. Each is described here.

- **Location 1:** The sheltered tidal flat behind the Espora spit had a wide continuous band of asphalt pavement caused by the spill. Minor erosion (< 1 m) was evident along its upper edge from 1975 to 1981. Erosion has continued to 1995 such that the band was approximately 1.5 to 2 m back from its initial position. Comparative photographs are shown in Figures 2A and B.

- **Location 2:** The outer shore of the Espora spit along the First Narrows had previously been very broad: 15 cm-thick concentrations of asphalt pavement in 1976. It was eroded to an area 40 m by 5 m by 1981. In 1995, only a few isolated remnants remained, approximately 7 m by 1 m, but very discontinuous (see Figure 2C).
- **Location 3:** In the exposed low-tide terrace west of the entrance to Espora marsh, several small remnants remained, the largest being 6 m by 8 m by 2 cm thick. Other remnants showed thicknesses up to 12 cm (see Figure 2D).
- **Location 4:** The tidal flat at the entrance to Espora marsh was very heavily oiled at the initial stages of the spill and has changed little since. Beneath a very thin surface layer of tidally deposited fine-grained sediments, 10 to 15 cm of oil was still fresh in appearance and in smell. Areas of thin, discontinuous asphalt pavement also remained, particularly adjacent to the entry channel. The remnants of an unsuccessful fertilization/tilling experiment were evident (conducted several years ago in conjunction with the Universidad de Magallanes).
- **Location 5:** The Espora marsh still retained extensive and thick oil deposits, principally remaining along the upper banks of the main channel. Oil, again located below a thin layer of silt, was still 10 to 15 cm deep and fresh in both appearance and smell (see Figures 2E and F). Some vegetation has grown over the thinner, dried oiled deposits (crusts), and has reappeared in areas previously oiled. Baker *et al.* (1993) reported that areas having a mean oil depth of less than 2.4 cm potentially recovered; those with thicker deposits did not.

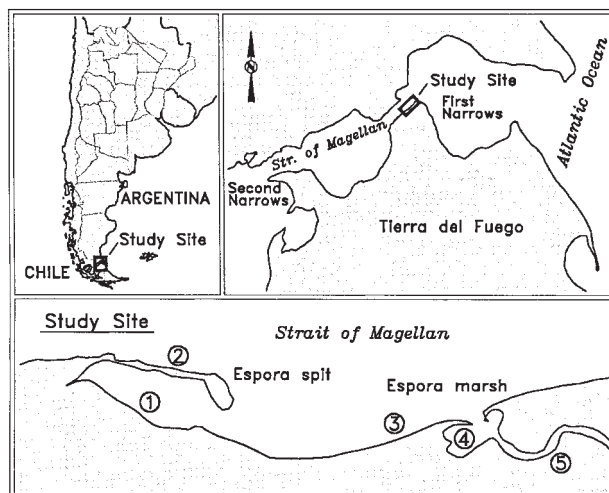


Figure 1. Locator map for the *Metula* spill site. The study site is located along the Tierra del Fuego side of the First Narrows, Strait of Magellan, Chile.

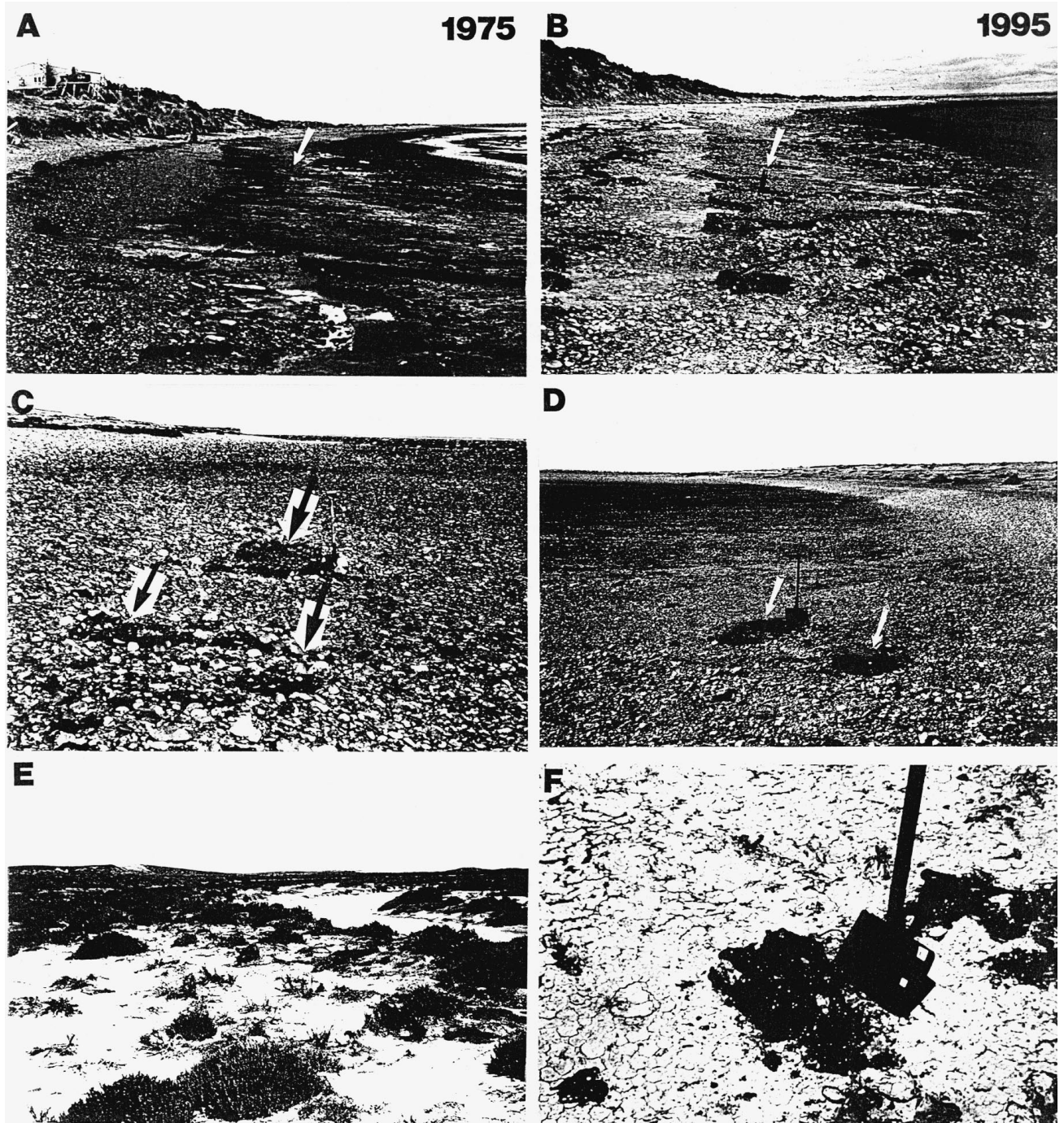


Figure 2. (A) Asphalt pavement located behind Espora spit in 1975 (note arrow marking stake); (B) the same site in 1995; (C) arrows mark 1995 remnants of previously continuous asphalt pavement along the outer edge of Espora spit; (D) arrows mark 1995 remnants along low-tide terrace west of Espora marsh entrance; (E) Espora marsh in 1995 with white areas indicating oiled areas covered by fine silt [most vegetation in thick oil (white) area has not recovered]; and (F) closeup of fresh oil residing just under the thin silt covering.

Conclusions

The *Metula* spill site still serves as a field laboratory for monitoring the persistence of spilled oil within high-latitude climates and continues to provide value for additional studies as described in Gundlach *et al.* (1994). Whereas only few asphalt pavements along the exposed shoreline of the strait remain after 21 years of exposure, asphalted and thickly

oiled areas in sheltered localities remain similar to those at the time of the spill. The implication for the *Exxon Valdez* spill in Alaska is that without cleanup, long-term oil persistence would have remained common in sheltered marshes, tidal flats, and heavily oiled areas where wave energy is low to moderately low and the beach is composed of gravel or mixed sand and gravel, as was a large percentage of the shoreline affected by the *Exxon Valdez*.

Biography

Erich Gundlach has been actively involved in oil spill studies and oil spill response since the initial study of the *Metula* spill in 1975. Most recently, he has completed contingency plans and impact analyses for the oil and gas industries in Chile, Argentina, Kazakhstan, and Nigeria, in addition to information-management planning for the U.S. Coast Guard and several U.S.-based oil companies.

References

1. Baker, J. M., L. M. Guzman, P. D. Bartlett, D. I. Little, and C. M. Wilson, 1993. Long-term fate and effects of untreated thick oil deposits on salt marshes. *Proceedings of the 1993 International Oil Spill Conference*, American Petroleum Institute, Washington, D.C., pp395-399
 2. Gundlach, E. R., D. D. Domeracki, and L. C. Thebeau, 1982. Persistence of *Metula* oil in the Strait of Magellan six and one-half years after the incident. *Oil and Petrochemical Pollution*, v1, n1, pp37-48
 3. Gundlach, E. R., J. N. Neff, and D. I. Little, 1994. Evaluation of marine post-oil spill sites for long-term ecological recovery studies. *Marine Spill Response Corporation*, approx. 200pp (summarized in Gundlach, E. R., D. I. Little, J. M. Neff, and D. V. Aurand. Evaluation of historic spill sites for long-term recovery studies. *Proceedings of the 1995 Oil Spill Conference*, American Petroleum Institute, Washington, D. C., pp974-975)
 4. Owens, E. H. and W. Robson, 1987. Field observations of stranded oil in the Strait of Magellan, Chile, 12.5 years after the *Metula* spill. Report EE-89, Environment Canada, Environmental Protection Directorate, Ottawa, 40pp
 5. Owens, E. H., W. Robson, and B. Humphrey, 1987. Observations from a site visit to the *Metula* spill 12 years after the incident. *Spill Technology Newsletter*, Environment Canada, v12, n3, pp83-96
-