PRELIMINARY RESULTS FROM A YEAR'S STUDY OF THE IMPACT ON AND THE RECOVERY OF MICROPLANKTON AND MICROBENTHON FOLLOWING THE BURMAH AGATE OIL SPILL

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ABSTRACT

A major oil tanker (BURMAH AGATE) spill occurred near a metropolitan area (Galveston) and an estuarine system (Galveston Bay) on November 1, 1979, and continued burning and spilling oil for 69 days. The burning and leaking BURMAH AGATE is shown in cartoon fashion, on the bottom, about 10 kilometers outside the Galveston breakwater (Fig. 1). The conditions on day, one week, one month, six months, and one year after the initiation of the spill are generalized. The avenues of oil to the bottom are: tar balls and dead plankton by the ship (1, 2), copepod fecal pellets from mousse and perhaps sheen (3), aerosol aggregates that adhere silt-sized particles in the near-shore turbid zone (4), and mousse droppings, probably formed when mousse or sheen comes in contact with suspended sediments exiting in a plume from Galveston Bay (5), aerosol aggregates also get out to mid transect probably by traction seaward via bottom currents (6), Biological influences and effects include feeding on the oil by copepods and the death of other plankton, both increase the organic content of the underlying sediments close to the ship (2 and 7) doubling the standing crops of nematodes and foraminiferans one month after the spill (8), nearshore the suspected use of mousse droppings by suctorial nematodes as a food source is suggested by the "production" of "deflated mousse droppings" (9), a high standing crop of nematodes in the sediments under the turbid zone nearshore one day after the spill may be due to a migration of nematodes towards the oil concentrated at the sediment water interface by aerosol aggregates (10), also the death of solitary centric diatoms (probably due to the toxic effects of the oil from aerosol aggregates in the mixed turbid zone) increases the organic content of the bottom (11), one month after the spill started the opportunistic and meroplanktonic foraminiferan *Brizalina lowmani* (12) occurred at all regions sampled; six months after the initiation of the spill nearshore and mid-transect regions appeared to be "normal" or returning to "normality" with a few aerosol aggregates still present in interstitial (probably "deep" interstitial) sands nearshore (13) and representing the only oil observed after six months; however, the region near the site where the ship sank still appears to show effects of the spill with a doubling (over one month) of the nematode and a slight increase in benthonic foraminiferan standing crops (14), the presence of recently dead plankton (15) suggests that although no oil was visible, oil "bleeding" from the bottom produced a toxic effect on the organisms in the water above (probably very near the sediment water interface), and the presence of benthonic foraminiferans undergoing "dissolution" (16) supports the presence of oil being broken down resulting in foraminiferan "dissolution". Higher than normal standing crops of nematodes and benthonic foraminiferans still existed one year after the spill near the ship (the only effect noted after a year) (17).

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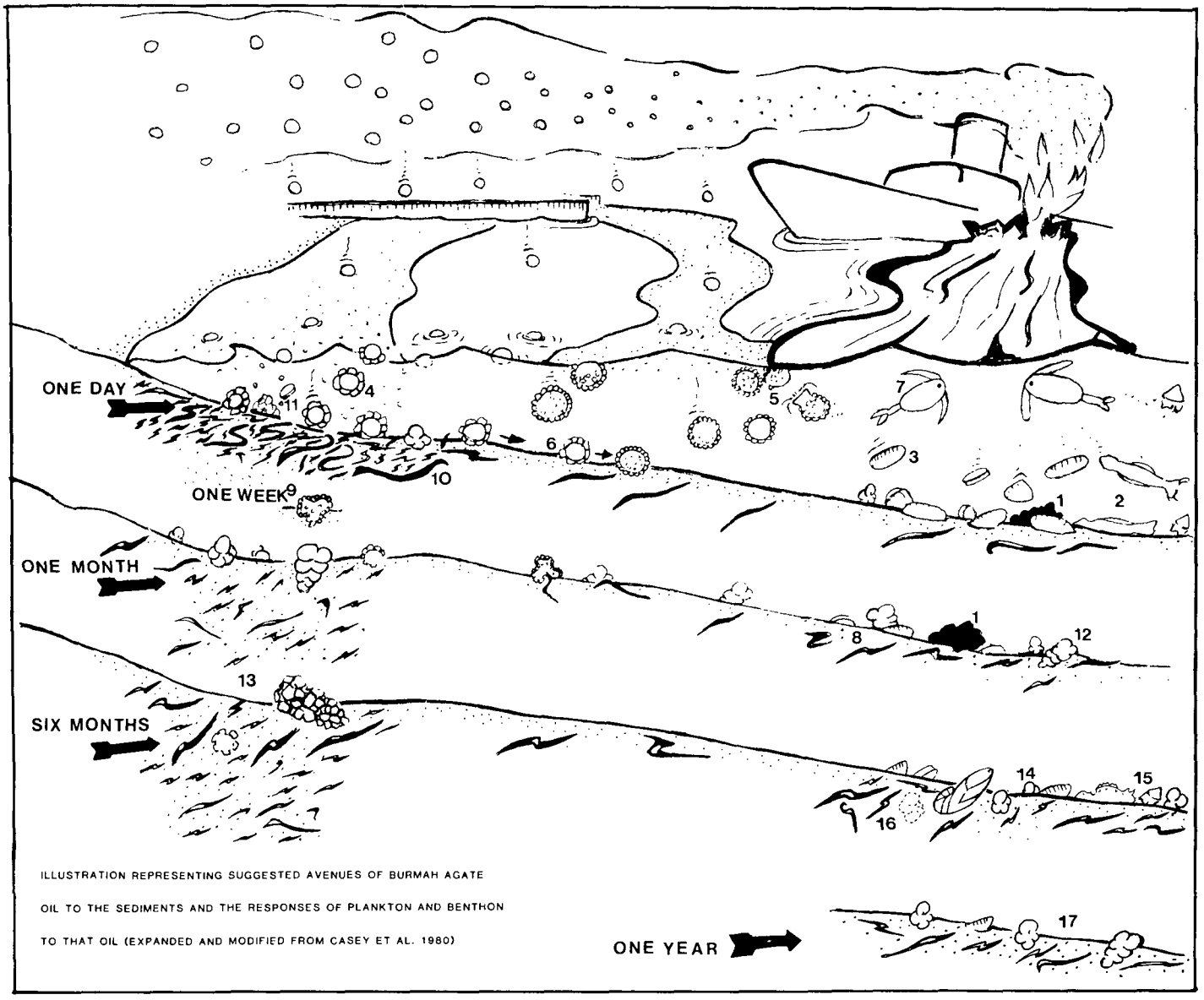

ILLUSTRATION REPRESENTING SUGGESTED AVENUES OF BURMAH AGATE OIL TO THE SEDIMENTS AND THE RESPONSES OF PLANKTON AND BENTHON TO THAT OIL (EXPANDED AND MODIFIED FROM CASEY ET AL. 1980)

REFERENCES CITED

Casey, R., Amos, A., Anderson, J. Koehler, R., Schwarzer, R., and Sloan, J., 1980, A preliminary report on the microplankton and microbenthon responses to the 1979 Gulf of Mexico oil spills (IX-TOC 1 and BURMAH AGATE), with comments on avenues of oil to the sediments and the fate of oil in the column and on the bottom: Gulf Coast Assoc. Geol. Socs. Trans., v. 30, p. 273-281.