

# Tests show spills drift to Pt. Barrow

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Where would the oil go in the event of an offshore spill at Prudhoe Bay? This question is being addressed by Professor Brian Matthews of the Geophysical Institute in a program which was begun in 1977 and continued through 1981.

Matthews and co-workers released 6,800 "drifters" into lagoons and along the coastline of the Beaufort Sea near Prudhoe Bay during the springs and summers of the past five years. The object was to retrieve them when they came ashore in order to ascertain where the winds and tides might carry crude oil in case of a spill, because drifters respond to motion of the water in much the same manner that a crude oil slick would.

The drifter is a small concave plastic disk that resembles a yellow "beanie" hat with a two-foot long flexible stem extending downward from its center. There are two types: the surface drifter and the bottom drifter, which has a small brass weight attached to the stem that brings it to just below neutral buoyancy.

Each drifter was identified by a serial number and carried a message requesting that anyone who found it report its number, date and location of find to the Geophysical Institute.

To date, 887 of the original 6,800 have been recovered by residents of the Beaufort Sea Coastal communities and by helicopter searches assisted by the U.S. Coast Guard.

Winds are predominantly from the east along the Beaufort Sea coast. After a release in August 1977, a storm lasting about 7 days swept the area with easterly winds up to 35 miles per hour (54 km/hr). After the storm, drifters were found on beaches as far west as Pt. Barrow, some 170 miles (280 km) distant.

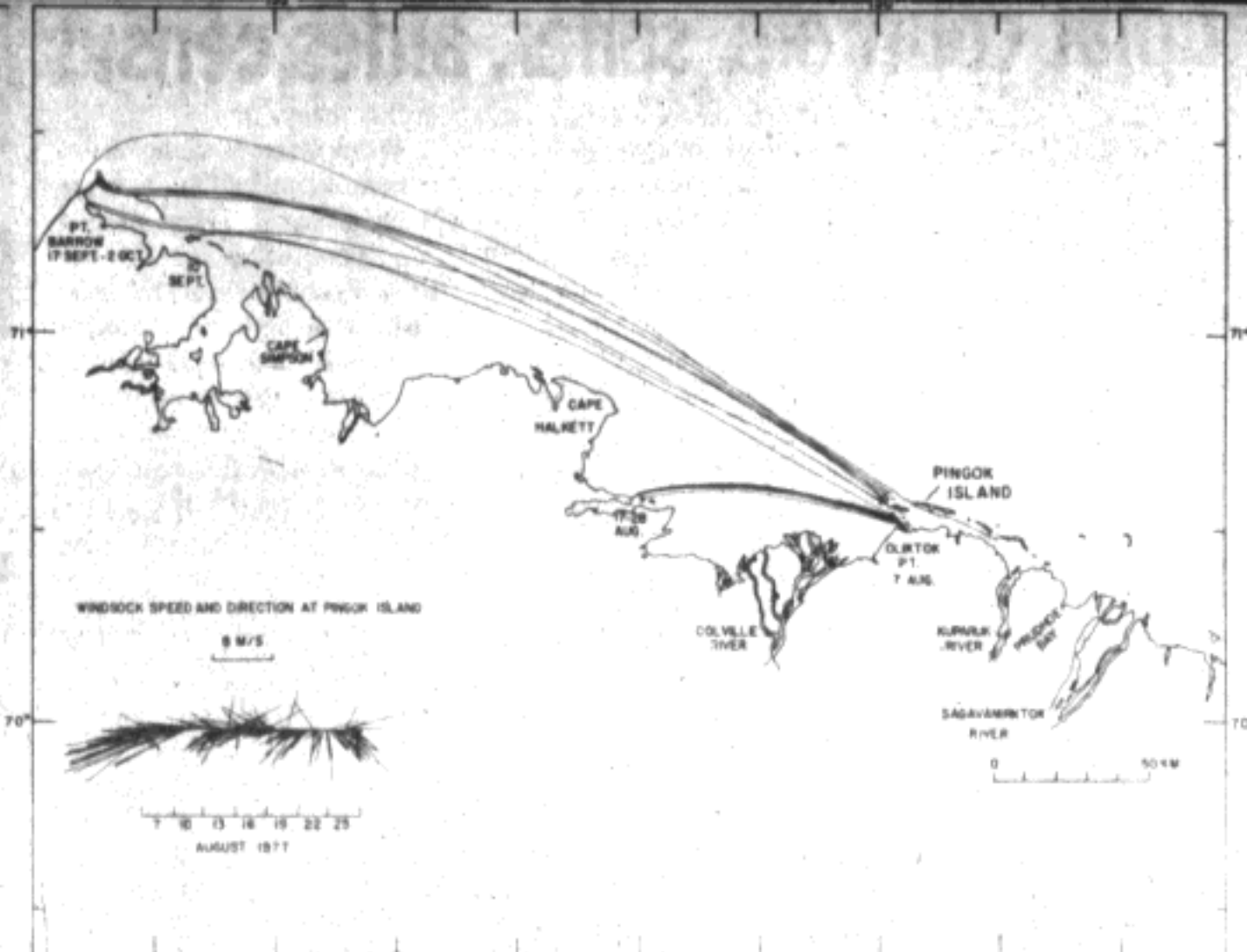
Matthews concluded that wind-driven ocean currents travelled at about 3 percent of the average rate of the prevailing winds, as measured by the surface drifters. During the 1977 experiment, this amounted to an overall westward drift on the surface of about 4 inches per second (10 cm/sec).

Bottom drifters travel at a rate about 20 percent that of surface drifters.

The direction of drift can change quickly and dramatically over short periods due to local weather and storm conditions. Overall motion for drifters in some years was found to be to the east.

In the later years of the study, surface drifters were planted directly below the ice in the springtime before breakup. There was a net shoreward movement in all cases, demonstrating that there are small currents under the ice where the wind could have little influence.

This is probably due to a circulation pattern in which denser brine created by leaching of the ice near shore flows



seaward on the sea bed, and is replaced at higher levels by less dense ocean water flowing toward the shore directly under the ice.

Because the nearshore areas of the Beaufort Sea are ice-free only about three months

out of a year, an oil spill under the ice is statistically more likely than one during a period of open water. Potentially, what this means is that underwater oil spills during the winter would be carried toward shore underneath

the ice, and after breakup would then be subject to wind-driven transport along the coast for many miles.

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