

## HANNA SHOAL

### Description of Area

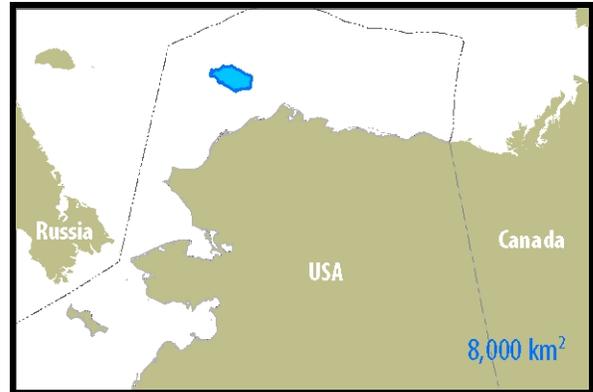
Hanna Shoal is located approximately 125 kilometers northwest of Barrow. The shoal sits between 15 to 40 meters below the surface. (Map 2).

This shallow topographic feature diverts large, warm water masses flowing northward from the Bering Sea, thereby holding onto colder water long into the summer season. As a result, sea ice persists there longer into the season as well (Maps 2, 4–5). A pack ice feature near Hanna Shoal called Post Office Point was historically known for its reliable ice all summer long. Recent decades of warming have changed this persistent lobe of ice, and the minimum September sea ice extent has come this far south only once in the last decade (Map 5). Although no longer known for reliable, summer-long pack ice, today Hanna Shoal is an area of broken ice and persistent ice floes, which are relied on by ice-associated wildlife through late summer.

Water temperatures over the shoal are generally 0–2° C during ice-free months (Map 7). Climate change has affected the shoal greatly; the minimum sea ice extent historically was just south of, and included, the shoal. Today the minimum extent is far north and east over the 4000 meter deep Canada Basin (Map 8).

### Outstanding Biological Features

Hanna Shoal has low primary productivity (Maps 9–10) but concentrated zooplankton (Map 11). The area is thought to have only moderate benthic productivity (Map 12); however, likely because of the persistent ice, this area has almost no direct sampling of benthic fauna—a significant data gap for an area so intensively used by ice-dependent wildlife. Likewise, there is no comprehensive data mapped for fish in this area.



Some bird species such as Steller’s and King eiders are known to migrate through the area when passing from Alaska to Chukotka, but similar migration pathway information for many other Arctic bird species is not known. The area appears to be significant for Ivory Gulls—one of the only documented concentration areas for this species in U.S. waters. These birds were observed in groups of up to 30 individuals in surveys completed 30 years ago (Map 26). Northern Fulmars and Short-tailed Shearwaters forage in the area in summer and fall months in unknown numbers (Maps 28–29).

The shoal is part of the core use area of polar bears, as well as a documented denning area (Map 32). Satellite-collared Arctic foxes have been tracked wandering as far offshore as Hanna Shoal to forage atop the winter pack ice (Map 33).

This is a very important area for pinnipeds. Ice-dependent Pacific walrus rely on the late-summer persistent ice at Hanna Shoal as the last ice haulout after all other Chukchi Sea waters are ice-free (Map 34). When Hanna Shoal ice melts in August the walrus are forced to haul out on land and forage from shore. Ringed and bearded seals concentrate at Hanna Shoal in late summer, from July to September (Maps 37–38). Ribbon seals are also present (Map 35).

The shoal is an important, regularly-used migration area for bowhead and beluga whales

in the fall (September to November) when moving from Alaskan to Russian waters (Maps 39–40). This is also the northern extent of gray whales which migrate to the Chukchi Sea from Mexico each year (Map 41).

### Current Resource Use

The area is leased for oil exploration and development.

### Conservation Status

- Currently closed to commercial fishing by the U.S. North Pacific Fishery Management Council.

### Current and Future Threats

- Oil and gas seismic exploration, exploratory drilling, production well development, and/or oil spills (Map 42).
- Future increased vessel traffic due to shipping, tourism, or fishing as the ice-free season continues to lengthen.
- High air temperature increases (up to 2.0° C) projected by the end of the century (Map 44).
- Expected, but not well understood, changes in marine productivity due to changes in timing and extent of sea ice.