

Key Site 13: Nushagak and Kvichak Bays, Alaska

Location: 58°34'56"N, 158°5'4"W

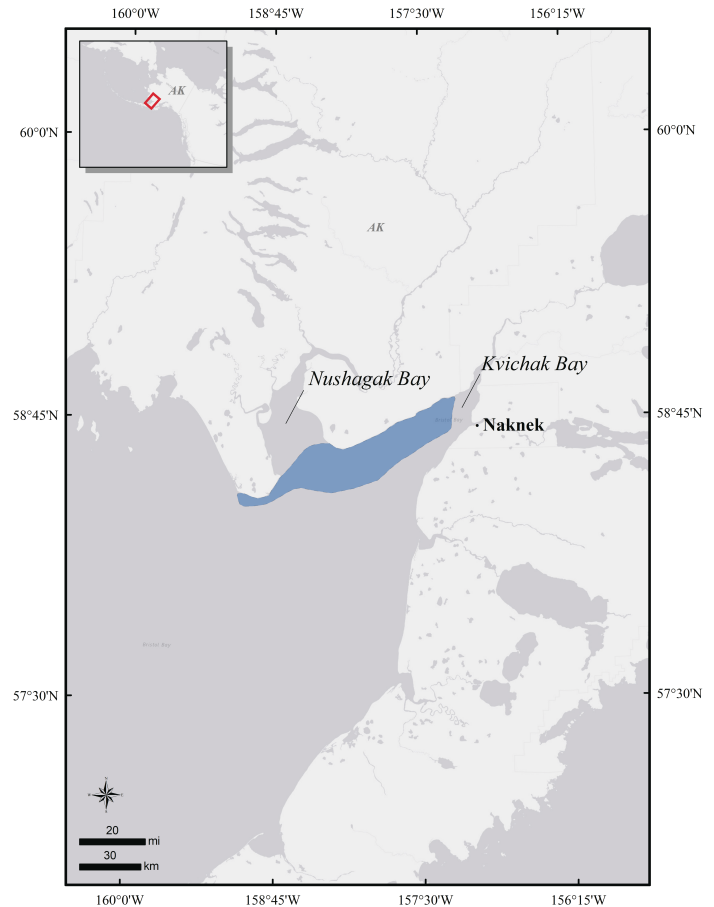
Size: 1732 km²

Description: Nushagak and Kvichak bays represent the northern and northeast arms, respectively, of Bristol Bay adjacent to the north side of the base of the Alaska Peninsula in southwestern Alaska. These major estuary areas encompass waters from the tip of Cape Constantine at the southwest corner of Nushagak Bay eastward to nearshore and offshore areas of Half Moon Bay in Kvichak Bay. Kvichak Bay receives two major rivers: the Kvichak River, which runs southwest from Lake Iliamna, and the Naknek River, which empties Naknek Lake, as well as several smaller drainages. Both of these rivers, and the Nushagak River, are major salmon-producing rivers. The bay is shallow, with unvegetated intertidal mud flats and sand flats exposed at low tide. Tides range 4.6 to 8 m. Benthic invertebrates, particularly bivalves (e.g., *Macoma* and *Mytilus* spp.), are numerous (Coyle et al. 2007). During winter and early spring, this area is sometimes covered with ice, concentrating sea ducks in small patches of open water or forcing them to move to other ice-free areas.

Precision and Correction of Abundance

Estimates Presented: Abundance estimates presented for this key habitat site have been adjusted to reflect actual abundance (not indices), using periodic high observed counts for the area and species or based on expert and local knowledge.

Biological Value: This is a highly productive estuarine system with abundant mollusks and other invertebrates that are utilized heavily by sea ducks seasonally, particularly during migration and staging, and also during winter as ice conditions allow. Up to 125,000 King Eiders, 100,000 Black Scoters, 12,000 Long-tailed Ducks, and 50,000 Steller's Eiders stage there during spring migration (Larned 2012, J. Schamber, Alaska Department of Fish and Game unpublished data); however, these are likely minimum estimates of the number of sea ducks that the area, because spring surveys upon which most of these estimates are based provide only a snapshot of abundance, not total use over the migration period. For example, >75% of 70 Black Scoters marked with satellite transmitters during winter from



British Columbia to the Aleutian Islands used this area in May and >60% during October (Schamber et al. 2010), spending one to three weeks there. Extrapolating this to the entire western Black Scoter population, this equates to a total use by 90,000 to 120,000 individual Black Scoters during spring. Sea ducks likely use this food-rich area to acquire reserves during migration. The area is also a significant molting area for Black Scoters and some King Eiders during late summer and fall (August through September; Schamber et al. 2010). During winter, tens of thousands of King Eiders may be present, depending in large part on ice coverage (Larned 2012). King Eiders breeding in northern Alaska, the western Canadian Arctic, and Russia use this area (Oppel et al. 2008, Dickson 2012a, 2012b), suggesting the international importance of northeastern Bristol Bay. Black Scoters use relatively shallow areas whereas King Eiders and Long-tailed Ducks use deeper waters. The Nushagak and Kvichak Bay area is part of an Important Bird Area (Audubon Alaska 2014) because of its importance to waterfowl and shorebirds.

Sensitivities: This area is used by large numbers of King Eiders and Black Scoters, particularly during the spring and fall seasons when physiologic condition may have strong fitness-related consequences (Anteau and Afton 2009). Northeastern Bristol Bay is an important area for a large segment of the Pacific populations of King Eiders and Black Scoters (Bowman et al. 2021) during the annual cycle. Thus, future impacts from resource development or environmental change could have significant effects on population levels of both species. Shifts in benthic community structure or reductions in benthic biomass could have adverse consequences for birds that rely heavily on those resources; such changes have been linked to warmer sea temperatures in the Bering Sea (Grebmeier et al. 2006, Coyle et al. 2007). Steller's Eiders, which are listed as a threatened species under the Endangered Species Act (USFWS 1997), also use this area during migration.

Potential Conflicts: Major threats include the risk of oil contamination from spills in the Bering Sea and Bristol Bay and potential habitat degradation or ecosystem-level changes associated with climate change. The area of the Outer Continental Shelf currently designated by BOEM as the North Aleutian Basin Planning Area, including Bristol Bay, was withdrawn from federal offshore oil and gas leasing and development in 2014 for an indefinite period of time due to the area's importance to Alaska Native subsistence users, fish and wildlife species, and commercial and recreational fisheries. The withdrawn area includes Nushagak and Kvichak Bays.

Significant mining activities have been proposed within the bay's watershed that could impact Bristol Bay chemistry and biology. The largest proposed mine is the open pit Pebble Mine, which is currently stalled in planning and permitting processes and has met with significant opposition due to environmental concerns.

Tourism within the estuary is minimal; at low tide, navigation is difficult and there is little recreational boat traffic or human use. Commercial salmon fishing is a huge industry, with boat traffic mostly confined to deep water channels. Most shore-based fish processing plants are located in the village of Naknek and city of King Salmon.

Status: King Eiders breeding in northern Alaska, the western Canadian Arctic, and Russia use this

area (Oppel et al. 2008, Dickson 2012a, 2012b), suggesting the international importance of northeastern Bristol Bay. Kvichak Bay was recently designated as one of only 49 sites within the Western Hemispheric Shorebird Reserve Network, which was established to protect critical shorebird habitat across the Americas. Nushagak and Kvichak Bays are designated as a coastal Important Bird Area (Audubon Alaska 2016).

Nushagak and Kvichak Bays are part of two boroughs, Bristol Bay and Lake and Peninsula, to the south and east, and the Dillingham Census Area to the north and west. Surrounding lands are under the jurisdiction of various entities, including the Bristol Bay Borough, Bristol Bay Native Association, Bristol Bay Native Corporation, Bureau of Land Management, Alaska Department of Natural Resources, Alaska Department of Fish and Game, and several Native villages. Intertidal and subtidal lands are administratively regulated by the State of Alaska. There is currently little commercial development surrounding Nushagak and Kvichak Bays, although the waters support one of the largest wild salmon fisheries in the world with commercial fishing and processing and subsistence fishing. Much of the estuary is managed as a fisheries conservation zone.

The Nushagak and Kvichak Bay area is part of an Important Bird Area (Audubon Alaska 2014) because of its importance to waterfowl and shorebirds.

Literature Cited

- Alaska Department of Fish and Game. 2011. Bristol Bay Critical Habitat Areas Management Plan. Draft report.
- Anteau, M. J., and A. D. Afton. 2009. Lipid reserves of lesser scaup (*Aythya affinis*) migrating across a large landscape are consistent with the "spring condition" hypothesis. *Auk* 126:873–883.
- Audubon Alaska. 2016. Alaska's Important Bird Areas. <http://ak.audubon.org/important-bird-areas-4>.
- Bowman, T. D., S. G. Gilliland, J. L. Schamber, P. L. Flint, D. Esler, W. S. Boyd, D. H. Rosenberg, J.-P. L. Savard, M. C. Perry, and J. E. Osenkowski. 2021. Strong evidence for two disjunct populations of Black Scoters (*Melanitta americana*) in North America. *Wildfowl* 71:179–192.

- Coyle, K. O., B. Konar, A. Blanchard, R. C. Highsmith, J. Carroll, M. Carroll, S. G. Denisenko, and B. I. Sirenko. 2007. Potential effects of temperature on the benthic infaunal community on the southeastern Bering Sea shelf: Possible impacts of climate change. *Deep-Sea Res pt II* 54:2885–2905.
- Dickson, D. L. 2012a. Movement of King Eiders from breeding grounds on Banks Island, NWT, to moulting and wintering areas. Canadian Wildlife Service Technical Report Series No. 516.
- Dickson, D. L. 2012b. Seasonal movement of King Eiders breeding in western Arctic Canada and northern Alaska. Canadian Wildlife Service Technical Report Series No. 520.
- Grebmeier, J. M., J. E. Overland, S. E. Moore, E. V. Farley, E. C. Carmack, L. W. Cooper, K. E. Frey, J. H. Helle, F. A. McLaughlin, and S. L. McNutt. 2006. A major ecosystem shift in the Northern Bering Sea. *Science* 311:1461–1464.
- Larned, W. W. 2012. Steller's Eider spring migration surveys Southwest Alaska 2012. Unpublished Report. U.S. Fish and Wildlife Service, Migratory Bird Management, Anchorage, Alaska.
- Oppel, S., A. N. Powell, and D. L. Dickson. 2008. Timing and distance of King Eider migration and winter movements. *Condor* 110:296–305.
- Schamber, J. L., P. L. Flint, and A. N. Powell. 2010. Patterns of use and distribution of King Eiders and Black Scoters during the annual cycle in northeastern Bristol Bay, Alaska. *Marine Biology* 157:2169–2176.
- U.S. Fish and Wildlife Service. 1997. Endangered and Threatened Wildlife and Plants: Threatened Status for the Alaska Breeding Population of the Steller's Eider. Final Rule. *Federal Register* 62:31748.