

## Key Site 6: Lynn Canal–Frederick Sound, Alaska

**Location:** 57°52'59"N, 133°53'45"W

**Size:** 8933 km<sup>2</sup>

**Description:** This site extends nearly 400 km from north to south, encompassing much of the coastline of Southeast Alaska. It includes most of the Alexander Archipelago (Admiralty, Kuiu, Kupreanof, Mitkof, and many smaller islands) and the mainland coast from the head of Lynn Canal to the Stikine River Delta. This region is characterized by fjords, high mountains, numerous glaciers, productive estuaries, and complex rocky shorelines. Chichagof and Baranof islands provide protection from the open waters of the Gulf of Alaska, but the proximity of the Pacific Ocean contributes to a moderate maritime climate, with sea and air temperatures relatively cool in summer and warm in winter. The complex topography results in variable precipitation levels, with annual rainfall ranging from <100 cm to >500 cm, depending on location (Carstensen et al. 2007). The low-elevation coastal temperate rainforest is dominated by Sitka Spruce and Western Hemlock. Coastal waters generally remain ice-free, but areas with significant freshwater input (e.g., heads of bays and inlets) occasionally freeze, and some mainland fjords contain large quantities of ice calved from tidewater glaciers.

Lynn Canal, with depths of >600 m, is one of the deepest and longest fjords in the world. In addition to its steep rocky coasts, the area includes estuaries and a variety of soft-bottom shorelines. The mainland coast of Stephens Passage is mountainous, with narrow inlets and glacial rivers in Port Snettisham and Tracy and Endicott arms. Southern Frederick Sound separates Kupreanof and Mitkof islands from the mainland coast and borders the northern portion of the Stikine River Delta. Duncan Canal is a narrow waterway that almost bisects Kupreanof Island, and Keku Strait is a convoluted channel separating Kupreanof and Kuiu islands.

Communities within the region include the state capital of Juneau (population >30,000), Haines, Skagway, Kake, Petersburg, and Angoon.

### **Precision and Correction of Abundance**

**Estimates Presented:** Abundance estimates from Hodges et al. (2008) have been adjusted to account



for incomplete detection by applying species-specific visibility correction factors estimated for surveys specific to this area. Scoters (*Melanitta* spp.), goldeneyes (*Bucephala* spp.) and mergansers (*Mergus* spp.) were not identified to species during aerial surveys; species composition ratios were based on boat surveys in the same areas.

**Biological Value:** The Lynn Canal–Frederick Sound region is important wintering habitat for several species of sea ducks, while during spring and summer more localized concentrations of sea ducks occur. Of particular importance during spring staging, the Lynn Canal area extends from Chilkat, Chilkoot, and Taiya inlets down the eastern side of Lynn Canal, including Berners Bay, Gastineau Channel, northern Stephens Passage, and Seymour Canal. Within this large region, areas vary in importance depending on season and species ([Appendix 1](#), [Appendix 2](#), [Appendix 3](#)).

**Winter: Lynn Canal to Frederick Sound.** Based on surveys during February–March, this region supports almost 170,000 sea ducks at a density of >20

ducks per km<sup>2</sup> (Hodges et al. 2008). Estimated counts are 44,000 Barrow's Goldeneyes (*Bucephala islandica*) (~18% of the western population), 30,000 Harlequin Ducks (*Histrionicus histrionicus*) (~12% of the western population), 26,000 Surf Scoters (*M. perspicillata*), 23,000 Buffleheads (*Bucephala albeola*), 20,000 White-winged Scoters (*M. deglandi*) (~5% of the continental population), 11,000 Long-tailed Ducks (*Clangula hyemalis*), 6800 Red-breasted Mergansers (*M. serrator*), and 4800 Common Mergansers (*M. merganser*) (Hodges et al. 2008, D. Groves, USFWS unpublished data). Mergansers, Bufflehead, goldeneyes, and scoters tend to be found in less exposed areas (Gunn 2008). Mergansers, Bufflehead, and goldeneyes are usually closer to large streams whereas scoters, Bufflehead, and Harlequin Duck are found in areas with more small islets (Gunn 2008).

**Spring staging: Lynn Canal.** During the spring staging period, Lynn Canal is used by about 25% of the continental population of Surf Scoters (Appendix 1 and Appendix 3). Aerial surveys in May 2006 counted >170,000 Surf Scoters (no visibility correction factors applied) along about 850 km of shoreline near Juneau and Haines, at densities of about 300 per km<sup>2</sup> (Lok et al. 2012). Many of the Surf Scoters using Southeast Alaska in spring congregate at herring spawn sites, which provide an important seasonal food resource (Lok et al. 2011, 2012). Herring runs were formerly widespread throughout Lynn Canal but now mainly occur in Berners Bay (Lok et al. 2011). Berners Bay is one of the most productive watersheds in Lynn Canal, partially due to spawning aggregations of herring and eulachon (Carstensen et al. 2007). The Lynn Canal area, and Taiya Inlet in particular, serve as a final coastal staging area for Surf Scoters before they migrate to inland breeding areas in the boreal forest (Appendix 3; De La Cruz et al. 2009, Lok et al. 2012). Abundance of Surf Scoters likely peaks in early to mid-May, with most individuals departing to inland breeding areas by the end of May (De La Cruz et al. 2009, Lok et al. 2012). This area is likely used by other sea duck species as well, but spring survey data are not available.

**Summer/molt: Lynn Canal to Frederick Sound.** During the summer/molting period, Surf and White-winged scoters and Harlequin Ducks are particularly abundant in Southeast Alaska, with Common and Red-breasted mergansers present as well. Scoters and Harlequin Ducks generally migrate from

inland breeding areas to the coast before undergoing annual feather molt and may remain in this area throughout the winter or move to more southern coastal wintering areas. While the flightless period of wing molt lasts around one month for individuals, intraspecific timing is quite variable, and molting Surf and White-winged scoters can be found in Southeast Alaska from late June to late October (Dickson et al. 2012). Early in the summer, subadults of both sexes and adult males outnumber adult females; the frequency of adult females increases in the late summer/fall (Dickson et al. 2012). Numbers of White-winged Scoters also increase during the molt period (R. Dickson unpublished data).

Surveys during late July and early August indicated there were >70,000 Surf Scoters, >9000 White-winged Scoters, almost 9000 Harlequin Ducks, 2000 Red-breasted Mergansers, and 1500 Common Mergansers in the Lynn Canal/Stephens Passage/Admiralty Island area (Appendix 2; Hodges et al. 2008, D. Groves, USFWS unpublished data). Particularly high densities of sea ducks have been recorded along the north shore of Admiralty Island, the east side of the Glass Peninsula, Seymour Canal, Holkham Bay, and Tracy and Endicott arms (Gunn et al. 2008). In Keku Strait/Duncan Canal there were >14,000 Surf Scoters, almost 2000 White-winged Scoters, 4000 Harlequin Ducks, and several hundred Red-breasted and Common mergansers during summer (Hodges et al. 2008, D. Groves, USFWS unpublished data). The head of Duncan Canal and northern Keku Strait had the highest densities, with Harlequin Ducks especially abundant in northern Keku Strait (Gunn et al. 2008, Hodges et al. 2008). The mainland coast of Frederick Sound, from Port Houghton to the Stikine River Delta, provides summer/molting habitat for >14,000 Surf Scoters, 1800 White-winged Scoters, >3000 Harlequin Ducks, and several hundred Red-breasted and Common mergansers (Hodges et al. 2008, D. Groves, USFWS unpublished data). Hotspots within this area include Point Vandeput at the mouth of Thomas Bay, the northern side of the Stikine Delta, and around Petersburg, with mergansers more abundant near the Stikine Delta and Harlequin Ducks more concentrated in the northern half of this area (Gunn et al. 2008, Hodges et al. 2008).

**Sensitivities:** Sea ducks wintering at the northern periphery of their range may experience lower

over-winter survival; Uher-Koch et al. (2016) found that female and immature Surf Scoters had lower survival rates in Southeast Alaska than in the southern part of their range and suggested poor body condition and/or increased predation rates as contributing factors. During spring staging, sea ducks may be concentrated in very large flocks (tens of thousands), thus significant numbers could be negatively affected by localized threats. During the summer molting period, sea ducks are incapable of flight and particularly sensitive to disturbance but cannot easily relocate in response to negative pressures.

**Potential conflicts:** Frederick Sound, Stephens Passage, and Lynn Canal are major elements of the Alaska portion of the Inside Passage waterway and consequently have frequent marine traffic, including ferries, freighters, cruise ships, tugs, fishing boats, and recreational craft, which could disturb sea ducks. The communities of Juneau, Haines, Skagway, Kake, Petersburg, and Angoon are located in this area. Cruise ship itineraries often include travel to Juneau, Skagway, and Tracy and Endicott arms. Mining activity in the area has diminished and less freight is now being shipped through Lynn Canal. There are concerns about the re-opening of a gold mine on the north side of Berners Bay and possibly other areas. The Greens Creek Mine near Hawk Inlet on Admiralty Island is the largest silver mine in the U.S.; recent approval of expanded tailings storage has raised concerns regarding discharge of contaminants such as cadmium, copper, mercury, and lead (Audubon Alaska 2016). Throughout the Lynn Canal–Frederick Sound area there is the potential for oil spills or chronic contamination.

Status: Extent of protected areas varies widely throughout this region. In the Lynn Canal area, only 2% of land is legislatively protected and 10% is administratively protected in the Chilkat River Complex biogeographic province, whereas 90% of Admiralty Island is legislatively protected within the Admiralty Island National Monument and Kootznoowoo Wilderness with only 4% in development status (Audubon Alaska 2016). Protected areas within or partially overlapping this region include the Alaska Chilkat Bald Eagle Preserve, Klondike Gold Rush National Park (at head of Taiya Inlet), Tracy Arm–Fords Terror Wilderness, Chuck River Wilderness, Stikine–LeConte Wilderness, Petersburg Creek–Duncan Salt Chuck Wilderness,

Tebenkof Bay Wilderness, and Kuiu Island Wilderness (Audubon Alaska 2016).

Several Important Bird Areas including Berners Bay, Mendenhall Wetlands, Stephens Passage, Frederick Sound to Duncan Canal, Stikine River Delta, Sumner Strait, Outside Islands Marine, and Tebenkof Bay are within or overlap Lynn Canal–Frederick Sound (Audubon Alaska 2016). Designation as an Important Bird Area does not imply any protected status but does emphasize the importance of this area to waterfowl and other marine birds.

The State of Alaska has jurisdiction over tidelands (between mean high water and mean low water) and submerged lands (from mean low water to the three-nautical-mile line), with the authority to manage, develop, and lease resources. However, the federal government regulates commerce, navigation, power generation, national defense, and international affairs throughout state waters.

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Surf Scoters. Photo: Tim Bowman.