
Chapter Four: Habitats, Fish, and Wildlife

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Chapter Four: Habitats, Fish, and Wildlife

This chapter considers and discusses the habitats and fish and wildlife populations of the sale area, as required by AS 38.05.035(g)(iii). This chapter is not intended to be an exhaustive examination of all habitats and fish and wildlife species of the area, but rather, the director has established and limited the scope of the administrative review and finding to considering and discussing those that have important subsistence, recreational, or commercial value and that are material to the determination of whether the lease sales will best serve the interests of the state (AS 38.05.035(e)(1)(A)(B)).

A. Habitats

The Alaska Peninsula sale area includes a wide variety of terrestrial, freshwater, and marine habitats, and a broad diversity of fish and wildlife species that support many subsistence, economic, and recreational activities in the area.

The U.S. Geological Survey divides Southwest Alaska into seven ecoregions. The sale area exists in two of the ecoregions. The majority of the sale area is in the Bristol Bay-Nushagak Lowlands, and some portions are in the Alaska Peninsula Mountains (Map 4.1). The sale area includes habitats such as: estuaries and lagoons; wetlands and tideflats; rocky islands and seacliffs; exposed high-energy coasts; rivers, streams, and lakes; boreal forests/taiga; alpine and low arctic tundra; and glaciers and barren alpine tundra. Each ecoregion has distinctive topography, vegetation patterns, climatic zones, and fauna (SWAMC 2012).

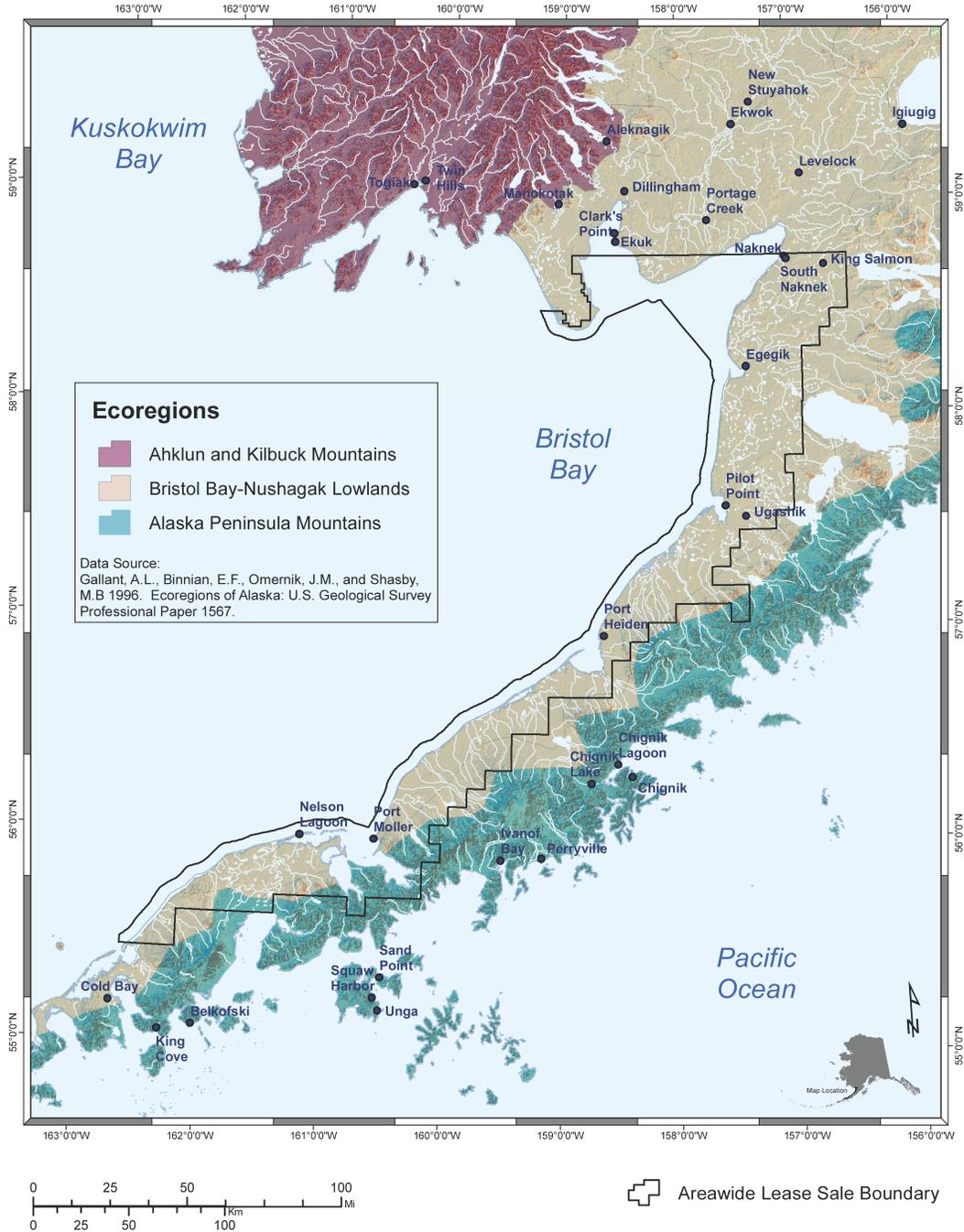
The Bristol Bay Nushagak Lowlands on the north side of the peninsula are characterized by flat to gently-rolling terrain with lakes, ponds, rivers and wetlands. Rivers and streams meander among small lakes and ponds into estuaries at the mouths of major rivers (LaRoche and Associates 2011). Lowlands range in elevation from sea level to about 500 ft. The shoreline is composed of sand and gravel beaches and tidal mudflats. Sand dunes are found on bluffs of the rivers and coastlines (ADF&G 2006). This area is a staging and migration area for waterfowl, and the marine and freshwater habitats experience one of the largest sockeye salmon runs in the world. The lowlands are underlain by glacial till and outwash deposits as a result of glaciations from the Aleutian and Ahklun mountains (SWAMC 2012). The dwarf shrub vegetation consists of willow, birch, alder, and tussock sedges in wet organic soils. Groundcover is a combination of mosses and lichens (ADF&G 2006).

The lakes and wetlands in this ecoregion are key components of the water habitat system associated with the large runs of sockeye salmon in Bristol Bay. Especially productive lakes include Naknek, Becharof, Black, Chignik, and the Upper and Lower Ugashik lakes. The larger lakes (Naknek, Becharof, Upper and Lower Ugashik) are drained by the Naknek, Egegik, and Ugashik rivers, respectively (LaRoche and Associates 2011).

Under AS 16.05.871(a), ADF&G is required to specify and inventory known anadromous bodies of water. These are published in the Anadromous Waters Catalog and Atlas and updated annually (ADF&G 2012f). If water bodies are not 'specified' in the catalog, they are protected under AS 16.05.841.

Many systems such as flood channels, intermittent streams, beaver ponds, and small tributaries to known anadromous fish-bearing water bodies are not surveyed so are not included in the catalog or atlas. This may be due to remote location, small size or their ephemeral nature (Johnson and Blanche 2012). Major river systems located in the sale area are the Naknek, Egegik, Ugashik, Inik, Bear and Nelson rivers. Additional salmon-bearing waterbodies are Black Hills Creek, Franks Lagoon, Milky River and Muddy River (ADF&G 2013g).

The Alaska Peninsula Mountains are characterized by mountain and volcanic slopes covered with dwarf shrub on upper slopes and low scrub in lower areas (Gallant et al. 1995). The streams and rivers on the south side of the peninsula are commonly short, steep and fast, and drain into the steep terrain of the Pacific coastline (LaRoche and Associates 2011). The coastline and fjords along the Gulf of Alaska on the south side of the peninsula serve as habitats for wildlife, fish and bird populations (ADF&G 2006).



Map 4.1 Ecoregions In or Near the Alaska Peninsula Sale Area

The Alaska Peninsula mountains include the Aleutian Range which divides Bristol Bay from the North Pacific Ocean. The Aleutian Range forms the watershed drainage divide between Bristol Bay to the north, and the Gulf of Alaska to the south (LaRoche and Associates 2011). It reaches heights up to 8,580 feet above sea level (ADF&G 2006). The glacier carved valleys and high peak glaciers provide large variations in surface relief. The peaks slope down to lowlands on the north side, with estuaries, lakes and large river basins. Wetlands are common in these low-lying areas (CEC 1997). These aquatic systems support wet moist tundra communities with water flowing into broad estuarine habitats of Bristol Bay and the Bering Sea (ADF&G 2006).

1. Marine and Coastal Habitats

For the purpose of the Alaska Peninsula Areawide Lease Sale, the offshore marine environment includes those waters extending seaward from the mean lower-low water to the three-mile limit of state jurisdiction. These waters are essential habitat to a wide variety of fish, shellfish, seabirds, waterfowl, and marine mammals. In addition, the offshore marine environment is an important interface between marine and upland habitats (LaRoche and Associates 2011). The marine environment is influenced by the major river systems of the area including the Nushagak, Kvichak and Naknek rivers within inner Bristol Bay, and the Egegik, Ugashik and Meshik rivers within the northern portion of the Alaska Peninsula (Johnson and Blanche 2012). The freshwater discharges from rivers and the upwelling marine currents provide nutrients for offshore coastal areas. The composition of the substrate factors significantly in the productivity of the nearshore environment in terms of plant production, use as a nursery area by fish and shellfish, and feeding areas for waterfowl and shorebirds (LaRoche and Associates 2011).

The shoreline of the Alaska Peninsula supports a diversity of habitats, including the intertidal zone, mudflats and beaches, and marine eelgrass beds. In the intertidal zone, wave energy, substrate, tidal action, temperature and salinity influence the biota abundance. The three main types of rocky intertidal habitats include:

- exposed rocky shores with steeply dipping, vertical bedrock, high to moderate wave energy;
- exposed wave cut platforms with wave-cut or low-lying bedrock, high to moderate wave energy; and
- sheltered rocky shores with vertical rock walls, bedrock outcrops, wide rock platforms, boulder strewn ledges, usually found along sheltered bays or along inside of bays and coves.

Seasonal changes affect the distribution and composition of the biota. Spring and summer climates encourage productivity, with detritus (decomposed organic matter) becoming food sources that in turn support filter feeders, which then also become food sources for other birds and fish in the intertidal community (ADF&G 2006).

Eelgrass beds are found in nearshore shallow water, and support a diverse biota of invertebrates and fish. The grasses generate food and nutrients for a variety of migrating birds and sea otters, and vary seasonally. The algae and invertebrates on the grass are important food sources. The perennial grasses stabilize the substrate against tidal wave action and seasonal storms. Small fish use eelgrass as refuge from predators, and herring spawn on eelgrass beds (LaRoche and Associates 2011; ADF&G 2006). Besides supporting fish and waterfowl the eelgrass beds of the bays and lagoons, along with the assortment of wildlife, all support the Bristol Bay and the Alaska Peninsula economies (ADF&G 2012b).

Intertidal areas alternately exposed by rising and falling tides are often referred to as tideflats. Tideflats, also called mudflats, and beaches are habitats formed by unconsolidated deposits. Mudflat substrates can vary from mud to sand and gravel. Kvichak Bay is an example of a broad, exposed

mudflat. Mudflats support a low to moderate level of plant and animal life, while sheltered mudflats are usually more productive and support a wide array of plant and animal communities (LaRoche and Associates 2011). Biological communities include numerous species of filter feeders and invertebrates. Mudflats are important for migrating birds as stopover locations. Clams, a type of filter feeder, are an important food source for waterfowl.

Cobble beaches foster species that can survive pounding waves and grinding substrate. Beach communities can be composed of substrates ranging from fine sediments to gravels, coarse sands and shell fragments (ADF&G 2006). Harbor seals haul-out on beaches and mudflats. Fish species that are important for commercial and recreational fisheries use these areas for spawning and nursery habitats as well.

2. Estuaries

Estuarine habitats are common in the sale area. An estuary is a partly enclosed coastal body of water where river water mixes with seawater. Estuarine environments are defined by their salinity boundaries instead of geographic boundaries (Britannica 2012). In the sale area, estuaries occur as bays at the mouths of rivers, marine waters behind barrier islands, and upstream in rivers and waterways to the limit of salt water intrusions. During the summer, most of inner Bristol Bay could be considered an estuary due to the amount of freshwater flowing into the bay from major rivers. The largest estuaries in the sale area include river mouths and associated bays of the Nushagak, Kvichak, Naknek, King Salmon, Egegik, Cinder, and Meshik rivers (LaRoche and Associates 2011; SWASHP 2011).

The mixture of fresh and salt water in the estuarine environment provides a unique yet important habitat for feeding and rearing fish, shellfish, waterfowl, marine mammals and benthic invertebrates. Estuaries are important habitat for juvenile salmon as they initially enter the marine environment, serving as nurseries for fish and invertebrates and later as staging points for large salmon runs (SWASHP 2011). Larger estuaries attract feeding seals and beluga whales when salmon are abundant

3. Barrier Islands and Lagoons

Barrier islands and lagoons form low-lying peninsulas or spits of accumulating sand or gravel across the mouths of bays, inlets, or other coastal embayments. This may be due to the transport of materials by ocean currents or wave action, or deposition from the outflow of streams and rivers. These unique and important habitats shelter the water in the protected lagoons while maintaining continuous or periodic exchanges of water with the sea. Barrier island lagoons contain a mixture of fresh and salt water, which often results in much more productive habitats than adjacent marine waters (LaRoche and Associates 2011).

Barrier islands protect a considerable lagoon system along the north shore of Bristol Bay. These lagoons provide a unique set of conditions that attract millions of migrating birds (DMLW 2005). In addition, barrier islands and lagoons accommodate vital molting and staging areas for waterfowl and shorebirds, and feeding areas for birds, seals and fish. Besides protecting coastal areas from scouring and wave erosion, barrier islands serve as nest habitats for birds, seal haul-outs and pupping areas, and as beach spawning habitat for some marine fish species such as capelin and sand lance. Barrier island and lagoon systems in the area include the Seal Islands, southwest entrance to Port Heiden, Cinder River Lagoon, Goose Point and various unnamed islands off the mouth of Egegik Bay (LaRoche and Associates 2011).

4. Wetlands

Wetlands are transitional zones between aquatic and terrestrial habitats characterized by poor soil drainage. There are primarily four types of wetlands identified in Alaska: bogs, grass wetlands, sedge wetlands, and salt marshes. Wetlands can be hydrologically connected to rivers, streams and lakes

(ADF&G 2006). Hydrological connections are “water-mediated transfers of matter, energy, and/or organisms within or between elements of the hydrologic cycle” (Pringle 2003). Wetlands may also be isolated or ephemeral in nature.

Significant wetlands exist along the coastline and next to river deltas. Wetlands are used by migratory birds along the flyways, are highly productive habitats, and important in preserving biological diversity (ADF&G 2006). The USFWS has developed a wetlands inventory for its Region 7, which includes the sale area. At this time, the only area completed in the Alaska Peninsula inventory is King Salmon and some of the surrounding area (USFWS 2009; USFWS 2012g).

a. Bogs

Most of Alaska’s wetlands are bogs. Bogs form when several vegetative layers have accumulated over time. Most bogs receive their water from rainfall and are acidic. This leaves a system low in the nutrients needed for plant growth. Flora and fauna that do live in bogs have adapted to cope with low nutrient levels. Tree species include dwarf black spruce, dwarf tamarack, and birch. Common shrubs are sweet gale, willow, leatherleaf, resin birch and thinleaf alder. Other shrubs include crowberry, blueberry, and mountain cranberry. Mosses may comprise 50 to 100% of the ground cover. Common wildlife species found in bog environments are flycatchers, blackbirds, solitary sandpipers, lesser yellowlegs, dragonflies, damselflies and wood frogs (ADF&G 2006).

b. Grass Wetlands

Grass wetlands are composed of water-tolerant grass species that grow in clumps and tussocks. Wetter locations are generally hummocky. The soil substrate is generally organic or rich in minerals. Grass wetlands provide important wildlife habitat, perform as ground water recharge areas, and store storm and floodwaters which helps maintain minimum base flows critical for aquatic resources downstream. Common species found in grass wetlands are the northern harrier, short-eared owl, dragonflies, damselflies, Columbia spotted frog, wood frog, and the western toad (ADF&G 2006).

c. Sedge Wetlands

Sedge wetlands are typically inundated by water. Tall sedges, cottongrasses, rushes, bulrushes, and aquatic mosses may be present. Sedge wetlands may be found in very wet areas of floodplains, slow-flowing margins of ponds, lakes, streams, sloughs, and depressions of upland areas. Species in these wetland habitats are the red-necked grebe, horned grebe, dragonflies, damselflies, and some species of blackfish and sticklebacks (ADF&G 2006).

d. Salt Marshes

Salt marshes are typically located at the mouths of rivers, behind barrier islands, coves, and spits of land. Tide flats may harbor salt marshes because low energy wave action and fine sediment deposits create elevated land where marsh vegetation establishes itself. Salt marshes comprise a large portion of the Lake and Peninsula Borough’s Bristol Bay shoreline. The salt tolerant vegetation grows between the mean high water and lower intertidal zone. Plant species include hairgrass, alkali grass, beach sandwort, sea arrowgrass, sea plantain, saltbrush, sand spurry and scurvey grass. Salt marshes provide spawning and nursery habitat for marine invertebrates and fishes such as stickleback, Dungeness crab, and Pacific herring. Copepods and fish species such as broad whitefish, Bering cisco, Pacific sand lance, and capelin are also found there. Birds associated with salt marshes include merlin falcon, short-eared owl, Tule white-fronted goose, lesser yellowlegs, solitary sandpiper, migrating geese, ducks, and shorebirds (ADF&G 2006).

In summary, wetlands are vital habitats serving many needs (LaRoche and Associates 2011). They:

- replenish and regulate stream flow;

- contribute to maintenance of water quality in lakes and streams;
- provide important source of organic nutrients to estuaries and coastal waters;
- nesting, rearing , molting, and staging areas for migratory birds;
- rearing areas for resident fish and freshwater rearing stages of anadromous fish;
- early spring feeding areas for bears;
- feeding areas for caribou; and
- sustain small mammal and furbearer populations.

Many species use more than one type of habitat over the course of their lifetime because resource limitations in one area may be offered in another. Wetlands are one of the most productive and important habitats in preserving the state’s biological diversity (ADF&G 2006).

5. Rivers, Streams, and Lakes

Freshwater habitats range from alpine glacier environments to marine waters at sea level. Erosion of river banks create sediments that deposit elsewhere along the water system. These deposits become sand and gravel bars where colonies of herbaceous plants, grasses, sedges, willows and deciduous trees develop (ADF&G 2006; ADF&G 2012c).

Rivers are important to the boreal forest ecosystem. Rivers and their tributaries provide protective plant cover, and support terrestrial wildlife along the riparian areas and serve as travel corridors (ADF&G 2012c). These edge environments between aquatic and terrestrial habitats host a diversity of wildlife. They filter sediment, reduce the effects of the wind, regulate water temperature, and stabilize stream banks. Beavers, river otters, muskrat, moose, bear and other mammals also use these waterbodies and their riparian zones. Waterfowl and resident birds use the lakes and ponds for feeding, staging, and resting areas (LaRoche and Associates 2011). Birds and wildlife forage, breed, and nest here. Some common species living in riparian corridors are songbirds, the rusty blackbird, blackpoll warbler, Tule white-fronted goose, swallows (barn, bank, and cliff), snowshoe hare, and moose (ADF&G 2006, 2012c). The Alaska Peninsula rivers, streams, lakes, and ponds support world-class runs of salmon and resident rainbow trout, Arctic char, Arctic grayling and other fish (LaRoche and Associates 2011).

Riparian vegetation along small streams and rivers benefit fish by providing shade, temperature control, organic debris, low velocity refuges during high runoff, and bank stabilization. Riparian habitat also provides food for fish directly through insects falling into the water and indirectly through detrital food web. (Levings and Jamieson 2001). In Alaska, the most common detritus comes from dead plant material, which makes up to 90% of the organic matter supporting headwater stream communities. Rivers also provide migratory routes, spawning and rearing habitats, overwintering habitat, and refugia (unique areas allowing species to survive when elsewhere is impossible) (ADF&G 2006).

Water comes from numerous sources in Alaska, from glaciers, to ground water, to rain and snowfall. The glaciers from high mountain areas provide flow into tributaries and rivers. Glacially influenced rivers experience high volume and variable rates of flow that may cause large fluctuations in volume discharges. These rivers can carry heavy sediment loads of clay and silt. Variable, yearly fluctuations are common, with peak glacial river flows observed in May through August (ADF&G 2006).

Clearwater rivers and streams have high clarity and low turbidity unlike glacial water systems. Clearwater flow comes mainly from ground water, rain, and snowfall. Compared to glacier fed rivers, these waterways have narrower channels, low sediment loads, stable, well-defined banks and beds, and increased habitat complexity. These waterways often freeze to the bottom (ADF&G 2006). Becharof Lake, the second largest lake in Alaska, is located in the sale area. It is river and stream fed, 35 mi long, 15 mi wide, and up to 600 ft. deep. Becharof Lake serves as a nursery for the world's second largest run of sockeye salmon, which attract and feed one of the largest concentrations of brown bear in Alaska. Other wildlife using this habitat includes caribou, wolverine, fox, river otter, and beaver (USFWS 2012c).

6. Uplands

Upland forest ecosystems support high levels of biodiversity. This forest region contains a large diverse patchwork of distinctive ecosystems and flora. Complex interrelationships exist among climate, solar radiation, surface water, slope, soil, permafrost, disturbance effects, wildlife, and plant cover creating patterns of vegetation over the landscape (ADFG&G 2006).

The higher elevations are steep, rugged volcanic peaks with slopes vegetated by dwarf scrub, such as Arctic willow and mountain-avens. These uplands consist of vegetated and unvegetated areas, forested lands, and riparian areas along streams and rivers (Gallant et al. 1995). Drier upland soils support spruce, birch, dwarf dogwood, highbush cranberry, and lingonberry (ADF&G 2006).

Some upland spruce-hardwood forests are found in the Bristol Bay Borough, Dillingham Census Area, and the Lake & Peninsula Borough. These are generally dense areas containing white spruce, birch, aspen, and poplar. Black spruce can be found in stands on north facing slopes and poorly drained flats (SWAMC 2012).

The Alaska Peninsula's high altitude tundra (alpine tundra) is a semiarid habitat, found above the tree line, supporting low shrubs, lichens, mosses, and grasses. These plant communities are low lying mat and cushion forming species intermittently spaced with shrubby species (ADF&G 2006). Tundra can also contain many wetlands, especially when frozen soils trap surface moisture close to the surface, forming a complex mosaic of moist and dry sites (ADF&G 2012d).

Some of the wildlife species found here are the golden eagle, rough-legged hawk, gyrfalcon, ptarmigan, squirrel, marmot, and curlew.

7. Designated Habitat Areas

This region includes state and federal land refuges, critical habitat areas, parks and preserves, and other designated areas (DMLW 2011) (Map 4.2). Specific legislation provides additional protection of habitat that is important to fish and wildlife populations and recreational opportunities (ADF&G 2013j). Special Areas are legislatively designated state game refuges, critical habitat areas, and wildlife sanctuaries. Special Areas can include uplands, tidelands, and submerged lands, and state waters. Most recreational activities do not require a permit, but any land or water use activity, or activities that may impact fish, wildlife, habitats, or existing public uses may require one.

a. State-managed Areas

Five state critical habitat areas, one fisheries reserve, and one state game refuge fall within or are adjacent to the boundaries of the sale area.

i. State Critical Habitat Areas

Waterfowl and shorebirds rely heavily on both state-designated and other conservation units for their specialized habitat needs (ADF&G 2006). The importance of staging and feeding areas led the following estuaries to be designated as State of Alaska Critical Habitat Areas: Egegik Bay, Ugashik

Bay (Pilot Point), Cinder River, Port Heiden and Port Moller (LaRoche and Associates 2011; ADF&G 2012a). Birds are not the only species using these critical areas. Harbor seals, sea otters, brown bears and caribou may be seen here along with smaller mammals. Likewise rivers flowing into these habitats are productive salmon streams.

ii. Fisheries Reserve

A portion of the sale area, from approximately Ugashik Bay northward, is located within the Bristol Bay Fisheries Reserve. This reserve was established by the State Legislature under AS 38.05.140(f). The Reserve is dedicated to the protection of fish and wildlife as well as recreational resources (DMLW 2005). The Reserve is identified as the submerged and shore land lying north of 57 degrees, 30 minutes North latitude, and east of 159 degrees, 49 minutes West longitude within the Bristol Bay drainage. Within the Bristol Bay Fisheries Reserve, surface entry to develop an oil or gas lease is not permitted on state owned or controlled land unless the legislature specifically finds that surface entry will not constitute danger to the fishery (Alaska Att’y Gen. Op. 2012; AS 38.05.140(f)) (Map 4.3).

iii. State Game Refuge

Izembek State Game Refuge includes state lands and waters within the Izembek National Wildlife Refuge. It also includes tide and submerged land within Izembeck Lagoon and extends beyond the barrier reefs into the Bering Sea. It was established by the Alaska Legislature in 1972 to protect natural habitat and game populations, especially the millions of waterfowl and shorebirds that visit each year on their way to and from nesting grounds to the north. In 1986 the Convention on Wetlands of International Importance designated both refuges as the United States’ first Wetland of International Importance. It is co-managed by ADF&G and ADNR (ADF&G 2006; 2013n).

b. Federally-managed Areas

The sale area abuts or is near several federal conservation system units (DMLW 2005):

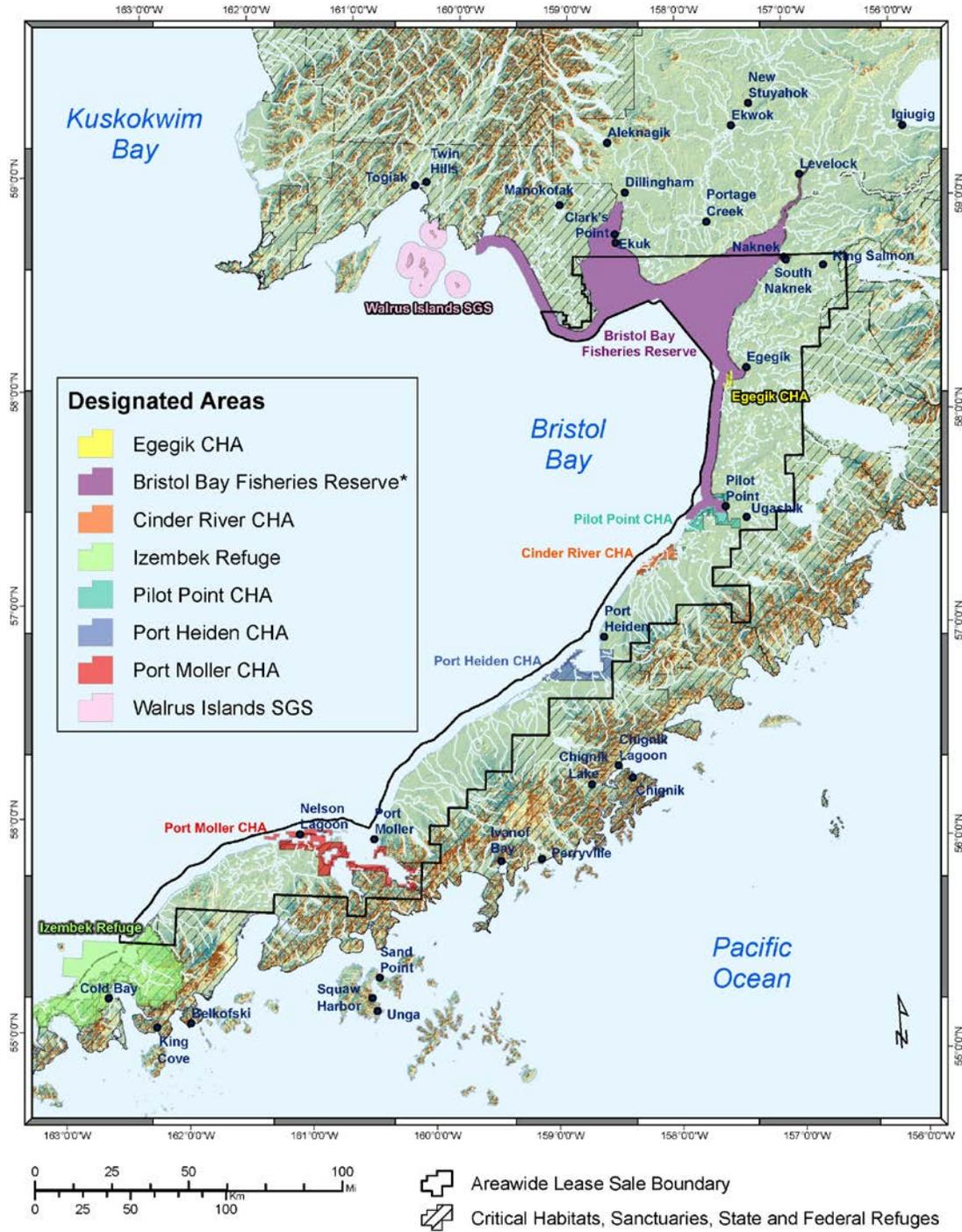
- Alaska Peninsula National Wildlife Refuge;
- Izembek National Wildlife Refuge;
- Becharof National Wildlife Refuge;
- Aniakchak National Monument and Preserve; and,
- Katmai National Park and Preserve.

The Izembek National Wildlife Refuge was designated a Wetland of International Importance in recognition of the millions of migrating waterfowl and shorebirds that use it. It also protects the watershed of the Izembek Lagoon (ADF&G 2006).

The Alaska Peninsula, Izembek, and Becharof National Wildlife Refuges are managed by the U.S. Fish and Wildlife Service (USFWS). These lands are set aside to conserve, manage, and where appropriate, restore America’s fish, wildlife, plants, and their habitats for the benefit of present and future generations (USFWS 2013c).

The National Park Service oversees the management of Katmai National Park and Preserve and Aniakchak National Monument and Preserve. National preserves are established mainly to protect certain resources. Hunting and fishing or the extraction of minerals and fuels may be permitted if they do not jeopardize the natural values (NPS 2003).

Katmai National Park and Preserve was created in 1918 to preserve the Valley of Ten Thousand Smokes for further study. Today it is also known for brown bears (NOS 2013a). Over the years, boundaries were extended to protect the bears. Aniakchak National Monument and Preserve was originally established to recognize the unique geological significance of the Aniakchak caldera (NPS 2013b).



Map 4.2 Legislatively Designated Areas In or Near the Alaska Peninsula Sale Area

*Includes all waterbodies within the Bristol Bay drainage subject to the conditions of AS 38.05.140(f).

B. Fish and Wildlife Populations

1. Fish and Shellfish

a. Pacific Salmon

The numerous freshwater habitats of the sale area provide expansive, nearly continuous fisheries habitat, especially for anadromous fish species such as Pacific salmon. These habitats range from the low lying floodplains and meandering waterways on the north side of the sale area, to short steep-gradient rivers on the south side of Alaska Peninsula. All five species of Pacific salmon are found in the sale area: Chinook, sockeye, coho, pink, and chum. Streams on the southern side support mainly chum and pink salmon habitat, but coho and sockeye salmon are present if suitable overwintering and rearing habitat is available (LaRoche and Associates 2011).

All Pacific salmon species spawn only once and then die. In Bristol Bay, salmon migrate in runs returning to spawn from May to mid-October, with species-specific timing for each run (ADF&G 2012i). The 2012 Bristol Bay sockeye salmon run was about 29 million fish with about 21 million harvested. The total sockeye salmon harvest was 6% below the preseason forecast. Chinook salmon harvests were below average in every district while coho salmon was 26% above the recent 20-year average. Pink salmon runs appear strong and the 2012 preliminary chum salmon harvests were up and down depending upon the district (Eggers et al. 2013).

Depending on the species, the young salmon emerge from the gravel in the spring and generally rear in freshwater for a few months to a few years, and then migrate to the ocean. Juvenile salmon undergo significant physiological changes in preparation for migrating to the ocean. Young salmon spend varying time in nearshore waters and then most move further offshore.

During their ocean residence, salmon grow quickly as they feed on abundant marine food supplies. After feeding for one to several years in the ocean, mature adults migrate back to their natal fresh water stream or lake to spawn (ADF&G 2012e; DCCED 2013). Some salmon species make long migrations on the high seas that span thousands of miles and up to seven years. As they near freshwater, salmon use olfactory cues to find their home stream with great precision. Eggs are laid in the gravel where they remain through the winter. Growth and development of eggs and alevins in the gravel depends on water temperature, and requires good flow of clean water through the subsurface gravel (ADF&G 2012i). Salmon die after spawning, but their decomposed bodies provide essential nutrients that contribute to the productivity of the entire stream ecosystem (Walker and Davis 2004).

In 2000, the Alaska Board of Fisheries adopted the Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) which strengthened long-time principles of salmon management by ADF&G and provided a systematic approach for evaluating the health of salmon populations. Criteria were included to identify three levels of concern for salmon populations. As of 2013, no salmon population in the Bristol Bay or North Alaska Peninsula areas was listed in a level of concern (Eggers et al. 2013).

A recommendation of no change was made for salmon escapement goals for the North Alaska Peninsula area (Sagalkin and Erickson 2013). In Bristol Bay, 18 salmon escapement goals were evaluated. The review committee recommended eight goals change in range, four changes in type, from sustainable escapement goal (SEG) to biological escapement goal (BEG), and three were eliminated. The committee also recommended no change to five goals and two new goals were established (Fair et al. 2012).

i. Chinook (king) Salmon

Chinook salmon are the largest of the Pacific salmon species at maturity, frequently exceeding 50 lbs. (ADF&G 2012i). Females lay 3,000 – 14,000 eggs (ADF&G Chinook Salmon Research Team 2013).

After hatching and emerging from the gravel, juvenile Chinook feed on plankton and insects while in freshwater (ADF&G 2012i). Most Chinook salmon remain in freshwater for one or two years before their seaward migration and they spend three to five years in the ocean (ADF&G Chinook Salmon Research Team 2013). In the ocean, Chinook feed on herring, pilchard, sandlance, squid and crustaceans as well as other available fish and shellfish (ADF&G 2012i).

ii. Sockeye (red) Salmon

Sockeye salmon females lay 2,000 – 5,000 eggs (ADF&G 2012i). Sockeye are unique in that after emerging from the gravel, they usually spend one to two years in lakes as juveniles (Armstrong 1996). Important food sources in lakes include plankton and insects. They are one of the smaller species of Pacific salmon, reaching 18 – 31 in long and weighing 4 – 15 lbs. In the ocean, sockeye feed on plankton, insects, small crustaceans, and sometimes squid and small fish (ADF&G 2012i).

iii. Coho (silver) Salmon

Coho salmon females deposit from 2,400-4,500 eggs in stream gravel. Most coho remain in freshwater until the following spring. During fall and winter, juvenile coho seek out deep pools and side channels in which to overwinter. While in freshwater, coho feed on a wide range of aquatic insects and plankton. They may also feed on eggs deposited by adult spawning salmon. While in the ocean, they feed mainly on fish and squid (ADF&G 2012i).

iv. Pink Salmon

Pink salmon are the smallest of the five species of Pacific salmon and weigh between three and five lbs. Pink salmon females lay between 1,200 – 1,900 eggs. They generally spawn in the lower reaches of streams within a few miles of the ocean, and may even spawn in intertidal areas. Most pink salmon do not travel more than 40 miles up a river to spawn. However, in Alaska they do sometimes travel greater distances in larger river systems such as the Nushagak. Because pink salmon migrate to the ocean shortly after emerging from the gravel and spend only one year in the ocean, they have a distinct two-year life cycle from egg to spawning; therefore, populations are characterized as either odd- or even-year. During their migration to the ocean, pink salmon generally do not eat as they leave freshwater. For the few that spawn further inland, they may feed on aquatic insects. Once in the ocean, pink salmon feed on plankton, small fish, squid, and tiny marine crustaceans (ADF&G 2012i).

v. Chum (dog) Salmon

Chum salmon females lay between 2,000 – 4,000 eggs. After hatching in the spring, young chum immediately migrate to the ocean. They form large schools and remain in estuaries and near-shore waters feeding on plankton until fall, when they migrate to the open ocean. While in the ocean, chum feed on copepods, tunicates, mollusks, and a variety of fishes. After three to six years at sea, chum return to their home streams to spawn (ADF&G 2012i).

b. Other Freshwater Species

Rivers, streams, and lakes of the sale area support populations of other freshwater fish. These include rainbow trout, Dolly Varden, lake trout, Arctic grayling, northern pike, burbot, and humpback whitefish (LaRoche and Associates 2011). These species overwinter mainly by occupying lakes, deep slow waters, or large rivers. Some, like the Arctic grayling and Dolly Varden that normally live in rivers or streams, may also migrate to deeper waters. Rainbow trout have been known to migrate to lakes with sockeye salmon runs, but some live year round in streams. Most northern pike overwinter in deep slow waters of large rivers (ADF&G 2012i). Humpback whitefish prefer deep pools but have been found in rivers and brackish water of Bristol Bay (ADF&G 2011).

i. Rainbow and Steelhead Trout

Rainbow and steelhead trout are actually the same species, and they are in the same genus as Pacific salmon. Steelhead trout migrate to the ocean; rainbow trout remain in freshwater for their entire life, either in streams or lakes. Both rainbow and steelhead trout may spawn multiple times in their life. Females lay between 200 and 8,000 eggs in stream gravel. Rainbow trout may spawn when they reach two to three years of age. Generally steelhead are older before they spawn. Steelhead usually spend about three years in freshwater before migrating to the ocean. There they may spend about two years before returning to their home streams to spawn. The clearwater lakes and streams draining into Bristol Bay provide an important habitat for rainbow trout. Rainbow trout freshwater populations appear stable throughout their native range, including the sale area (ADF&G 2012i).

ii. Dolly Varden

Dolly Varden are closely related to Arctic char and distinguishing between the two requires a close examination of several body structures. The northern form of Dolly Varden may be found in or near the lease sale area. Both freshwater-resident and sea-run Dolly Varden populations occur in this area. Among freshwater residents, there are lake, stream, and dwarf forms (ADF&G 2012i).

After their first migration to the ocean, Dolly Varden may spend the remainder of their lives overwintering in lakes and migrating between the ocean and freshwater. Dolly Varden that are hatched and reared in a lake system migrate to the ocean to feed and return annually to a lake or river to overwinter. Dolly Varden that hatch in non-lake systems seek out a lake for overwintering. They search for a lake randomly, migrating from system to system until they find a system with a lake. After overwintering in the lake, Dolly Varden may also migrate annually to sea in the spring, and may search for food in other stream systems. When Dolly Varden reach sexual maturity, usually between ages 5-9, they migrate directly from their overwintering areas to their home stream to spawn (ADF&G 2012i).

Dolly Varden are capable of spawning multiple times during their lives, usually in the fall. The female, depending on her size, lays between 600 – 6,000 eggs in streambed gravel. Dolly Varden are more of a scavenger than a predator feeding on a variety of prey. In freshwater they may eat winged insects and larvae. They also may eat drifting salmon eggs, small crustaceans, and small fish. In the ocean they may feed on amphipods and small fish (ADF&G 2012i).

c. Other Marine Species

Marine fish found in or near the sale area include Pacific cod, walleye pollock, Pacific halibut, Pacific herring, capelin, and eulachon (hooligan). The largest concentrations of Pacific herring in Alaska are found in Bristol Bay. This area also provides important rearing areas for a variety of marine species, particularly halibut. Pacific herring and capelin spawn along the Alaska Peninsula coastline (ADF&G 2012i; LaRoche and Associates 2011).

Shellfish in the region include cockles, soft-shell, butter, surf and razor clams, king, tanner, Dungeness, and hair crabs, and shrimp. Extensive clam beds can be found in shallow coastal waters adjacent to the north side of the Alaska Peninsula (northeast of Bristol Bay) while smaller concentrations of clam beds occur in bays on the south side of the peninsula (LaRoche and Associates 2011). The Alaska Peninsula also supports scallops (ADF&G 2006).

2. Birds

a. Waterfowl

Habitats of the sale area support millions of waterfowl, some of which inhabit the area seasonally and some year round. Species include tundra swans, snow geese, emperor geese, white-fronted geese, lesser Canada geese, black brant, eiders, and 27 species of ducks (ADF&G 2006; LaRoche and Associates 2011).

The largest concentrations of ducks, geese, swans, and cranes occur during the spring and fall migrations. Port Heiden, Ugashik, and Egegik, provide plentiful food (especially eelgrass) and protected areas that allow waterfowl to rest and feed undisturbed. The Bristol Bay wetlands support about 18% of diving ducks breeding in Alaska. More than 100,000 dabbling ducks nest in ponds throughout these wetlands. An estimated 600,000 ducks are hatched and an additional million ducks migrate through the Bristol Bay wetlands each year (LaRoche and Associates 2011).

b. Seabirds and Shorebirds

One of the largest and most diverse gatherings of marine birds in the world can be found on the isolated islands and productive seas near the Alaska Peninsula. Various species of marine birds use different portions of the marine ecosystem (ADF&G 2006).

Although the Alaska Peninsula's steep cliffs and rugged offshore islands along the Pacific side provide excellent nesting habitat for seabirds, colonies are relatively sparse and small along the Peninsula and in Kvichak and Nushagak bays. However, during the summer, an additional 8-13 million nonbreeding seabirds arrive to feed before leaving to breed in New Zealand, Australia, and South America. Some of the seabirds that do remain include common murre, black-legged kittiwakes, tufted and horned puffins, glaucous-winged gulls, pelagic, red-faced, and double crested cormorants, and Aleutian terns (LaRoche and Associates 2011).

Alaska Peninsula estuaries are important staging and stopover sites for shorebirds migrating in the fall. In fact, each spring, Izembek and Moffet lagoons have experienced concentrations of more than 500,000 shorebirds, including marbled godwits and rock sandpipers. Each fall the Alaska Peninsula also has the majority of the eastern Pacific population of black brant (ADF&G 2006). Due to harsh climatic conditions, few species of shorebirds overwinter along the coast. Those that do, include rock sandpipers, some dunlins, sanderlings, and surfbirds (ADF&G 2012h).

Bristol Bay, particularly along the lagoon systems and estuaries on the northern side of the Alaska Peninsula, accommodates vast flocks of molting, feeding, and staging shorebirds every fall. The intertidal flats of Nushagak, Kvichak, Cinder rivers, Egegik and Ugashik bays, Port Heiden and the Seal islands are the most heavily used estuaries (LaRoche and Associates 2011). Of all the birds found in the state Critical Habitat Areas, shorebirds use them in the largest numbers (ADF&G 2012a).

About 30 species migrate or nest in the region, but only eight species can be found in significant numbers. These are greater yellowlegs, northern phalarope, common snipe, short-billed dowitcher, western, least, and rock sandpipers, and dunlin (LaRoche and Associates 2011).

c. Raptors

Raptors may be found throughout the sale area. Raptors are considered an indicator species of ecological changes and human-induced influences or impact because they are high trophic-level (top of the food chain) predatory birds (ADF&G 2006). Some raptors that may be found in the sale area are bald eagles, peregrine falcons, various hawks and owls (eBird 2012).

Bald eagles are commonly found throughout the Alaska Peninsula (USFWS 2010). Most bald eagles winter in southern Alaska, but some do leave the state (ADF&G 2012h). In fact, more than 1,000 bald eagles nest along its rivers, lakes, and coastline, primarily on the south side of the peninsula (LaRoche and Associates 2011).

On August 9, 2007, bald eagles were removed from the federal threatened and endangered species lists under the Endangered Species Act. However, they do remain protected under the Bald and Gold Eagle Protection Act and the Migratory Bird Act. This act prohibits anyone from taking or disturbing bald eagles (ADF&G 2012h). According to the Protection Act, "disturb" means:

“...to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior” (USFWS 2007).

d. Landbirds

The following landbirds are representative of some of the summer or yearlong residents found in or near the sale area: song and savannah sparrows, blackpoll warbler, rusty blackbird, rosy finch, spruce grouse, ptarmigan, common ravens, magpies, woodpeckers, and chickadees (ADF&G 2006, 2012g; LaRoche and Associates 2011; USGS 2012). Due to inaccessibility in some areas, information is lacking about landbirds specific to the sale area.

3. Mammals

a. Terrestrial Mammals

The Alaska Peninsula is inhabited by several species of large terrestrial mammals, including caribou, moose, brown bear, and wolf (USFWS 2012b). Other, smaller mammals living in or near the sale area are the bat, shrew, beaver, river otter, mink, short-tailed and least weasel, red and Arctic fox, wolverine, lynx, and marten (LaRoche and Associates 2011). Mice, voles, hoary marmots, red squirrels, lemmings, tundra hares, and the smaller mammals already listed tend to be grouped together as furbearers (ADF&G 2006; ADF&G 2012k).

i. Caribou

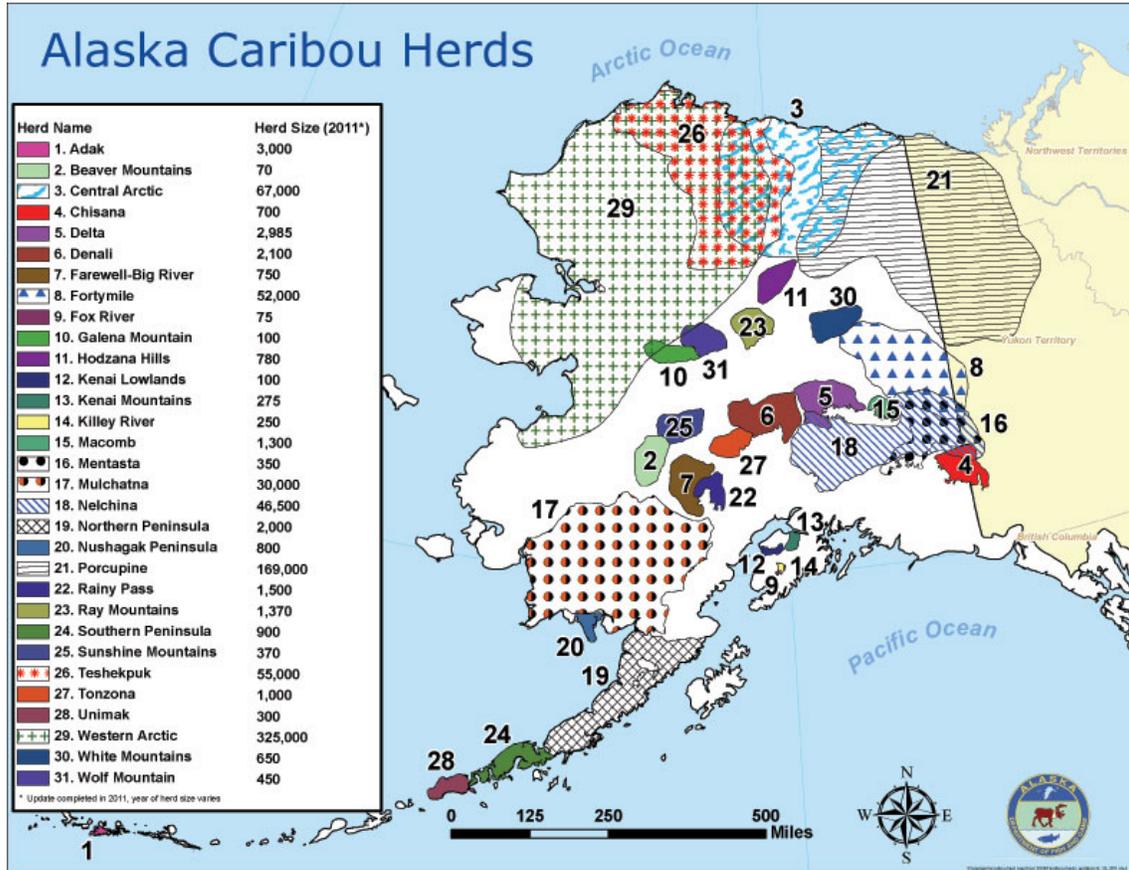
Three caribou herds reside in the sale area. The Northern Alaska Peninsula herd (NAPH) has the largest range of the area. Next is the Southern Alaska Peninsula herd (SAPH), then the Mulchatna herd (MCH). As a herd animal, caribou must keep moving to find adequate food sources. Larger herds may migrate up to 400 miles between summer and winter ranges while smaller herds may not migrate at all (Map 4.3). During the summer, caribou eat willow leaves, sedges, flowering tundra plants and mushrooms. During the winter, they switch to a diet of lichens (reindeer moss), dried sedges, and small shrubs (ADF&G 2012k).

Calving occurs in early June for the herds of the Alaska Peninsula. Most females do not breed until they are 28 months old but some females in very good condition may breed as early as 16 months of age. Most adult cows are pregnant every year and give birth to one calf. After calving, caribou gather into large post calving aggregations to avoid predators and insects such as mosquitoes and warble flies. After insect numbers decline, usually around August, caribou scatter and focus on feeding heavily to regain body weight (ADF&G 2012k).

In Alaska, caribou prefer treeless tundra and mountains during all seasons but may winter in boreal forests. Calving areas are usually located in mountains or open, coastal tundra. Caribou tend to calve and migrate in the same general areas for years, but may suddenly abandon those routes in favor of movements to new areas with more food. Changing weather conditions such as the onset of cold weather or snowstorms probably also trigger caribou movements. Once they undertake migration, they can travel up to 50 miles a day (ADF&G 2012k).

The NAPH ranges roughly from north of King Salmon south to Port Moller. Historically, the NAPH population has fluctuated widely but herd numbers continue to decline and survival and recruitment remain low. In 1986, a significant number of NAPH animals began to winter between the Naknek River and Lake Iliamna and it was hoped the excellent forage conditions there would sustain the herd. However, about the same time, up to 50,000 MCH caribou also began using this area. Herds intermingled and due to the increasing competition for winter forage, the NAPH did not increase as

much as originally hoped. Hunting restrictions and closures were implemented to minimize any negative human influence, but they were not expected to reverse the population trend. Currently, there is no intention of reopening hunts until the herd recovers. As of 2009, herd population appears to be between 2,000 – 2,500 animals (Riley 2011a).



Source: ADF&G 2012k

Map 3.3 Alaska Caribou Herds

The range of the SAPH extends from Port Moller to False Pass. After a peak of more than 10,000 caribou in 1983, the SAPH began declining sharply and continued until the herd stabilized in the mid-1990s. The population grew to 4,100 by 2002, but the population again began declining. Counts completed during 2007 and 2008 estimated the minimum population to be 600 – 700 caribou during each year. Recent studies suggest wolves significantly reduced calf survival and led to population decline. At the same time, other herds on the Alaska Peninsula experienced low calf recruitment. Calf recruitment increased in 2008, 2009, and 2010 following selective wolf removal on the calving grounds. Timing may be coincidental or it may indicate a common regional factor may be affecting caribou populations in this part of the state. As of 2010, the causes for this population decline were unclear (Riley 2011b).

During the 1980s and late 1990s, the MCH appeared to intermingle with the NAPH. During the winter of 2008 – 2009, a large part of the herd wintered south of the Kuskokwim River while the remainder wintered in the lower Nushagak and in the Kvichak drainage. Generally, the MCH does not move as a

distinctive herd but in recent years the herd basically splits. Part of the herd moves to the eastern side of its range and the rest to the western side in the summer. Then they assemble for the fall rut and then move back to winter in these areas. Come late winter/spring, the caribou travel back to the middle and northern part of their range for calving, repeating this process come summer. Over the past 25 years, there have been dramatic changes in the MCH's range, sometimes seasonally occupying ranges used by smaller resident caribou herds. As of summer 2008, the MCH population had declined to 30,000, a decrease from 200,000 in 1996 (Woolington 2011a).

ii. Moose

Moose can be found predominately along riparian areas. Although little is known about specific movement patterns, it is known moose are influenced mainly by the rutting season in late September and snow conditions in winter (Woolington 2010b). Most moose migrate seasonally to calving, rutting, and wintering areas. They may travel only a few miles or up to 60 miles during these transitions. Sexual maturity is closely linked to range conditions. Most females breed at about 28 months though breeding has been known to occur as early as 16 months of age. Rutting season usually occurs in late September and early October (ADF&G 2012k).

Moose are herbivores and during the fall and winter they consume large quantities of willow, birch, and aspen leaves and twigs. In the spring they browse and graze. During the summer they eat sedges, pond weeds, grasses and willow, birch and aspen leaves. In the wild they rarely live beyond 16 years (ADF&G 2012k).

Moose were scarce in the Alaska Peninsula and Northern Bristol Bay area before the 1950s and 1960s, when the population increased dramatically and spread southwest. An ADF&G 1983 census taken in the central part of Unit 9E estimated 1,148 moose. This number was extrapolated to the rest of Unit 9E resulting in a rough estimate of 2,500 moose. As of 2010, it appeared moose populations in most of Unit 9 have been relatively stable while moose densities remained very low in Units 9A, 9B, and 9D (Butler 2010b). ADF&G began collecting data on moose in Units 17A and 17C in 1971. Over the last 30 years, moose populations have increased substantially in number and in range, especially in unit 17A. Population in this area is estimated to be 4,000 – 4,700 and increasing (ADF&G 2012k).

iii. Brown Bears

Brown bears (classified as the same species as grizzlies) are abundant on the Alaska Peninsula and the sale area. The Alaska Peninsula contains an abundance of good denning habitat commonly found in alder, willow, or grass areas (LaRoche and Associates 2011). Access to an abundance of spawning salmon, coupled with a milder climate and wide variety of vegetation, leads to larger bears living in higher densities than in northern and interior parts of the state.

Brown bears are very adaptable and eat a large variety of foods. Common foods include salmon, berries, sedges, cow parsnip, ground squirrels, carrion, and roots. Brown bears may also hunt caribou and moose, especially newborns (ADF&G 2012k). In the early spring, after emerging from winter dens, coastal grass flats play an important role as the first food source available to bears. The newly emerging sedges here provide a reliable high quality food source year after year when the bears need it most and are generally in the poorest condition. Also, because relatively few large coastal flats exist in the area, they are considered a highly important habitat. Other important spring food sources include carcasses of marine mammals that have washed ashore (LaRoche and Associates 2011).

Most brown bears reach sexual maturity at 5 years of age, but females do not usually produce a litter until later. Brown bears mate from May to July. In the fall, pregnant females usually enter dens first, and leave them, with their newborn cubs, last in the spring. Cubs are born in the den during January and February and twins are common. Adult males do the opposite, entering dens later in the fall and emerging sooner in the spring (ADF&G 2012k). Most denning sites are found on hillsides or mountain slopes, usually below 1,800 ft. elevation. In areas with mild winters, some male bears may stay active

all winter. The oldest recorded brown bears in Alaska were a 39 year old female and 38 year old male (ADF&G 2012k).

Based on data gathered from 1999 - 2005, density estimates suggest a population size of 6,000-6,800 bears occupying lands open to hunting in Game Management Units 9A, 9B, 9C, and 9D (Riley and Butler 2011). No data are available on bear populations specific to Unit 17. The bear population is probably stable to increasing in this unit (Woolington 2011b).

iv. Furbearers

Numerous furbearers can be found throughout the Alaska Peninsula and the sale area. The rocky shores and beaches are inhabited by river otter, mink, short-tailed and least weasel, and red and arctic fox. They feed on carrion, clams, and crabs. The Bristol Bay Lowlands are an important habitat for wolves, lynx, and martens. Most streams and large lakes here are home to beaver. They are particularly abundant in the Nushagak and Mutchatna drainages. Smaller mammals include Arctic ground squirrels, tundra hares, hoary marmots, and tundra voles. In fact, tundra voles exist in all Alaskan habitats except on bare rocks and glaciers. They are a food staple for weasel, marten, foxes, coyotes, all owls, most hawks, inland breeding gulls, jaegers, and on occasion, great blue herons, domestic cats, northern pike, and other voles. Other furbearers found in the lease sale area are wolverine, shrews, mice, lemmings, and pikas (ADF&G 2006, 2012i; LaRoche and Associates 2011).

Wolves are found throughout the sale area. Their primary food source is moose and caribou though squirrels, snowshoe hares, beaver, and occasionally birds and fish supplement their diets. Wolves are social animals and usually live in smaller packs averaging six or seven animals. Sometimes packs of 20 to 30 animals occur and two or three litters of pups. Wolves have never been threatened or endangered in Alaska. However, wolf populations may be negatively affected by events such as severe winters, a decline in their prey, or even harvesting by humans. Major sources of wolf mortality are other wolves (defense of territory), hunting, and trapping. Disease, malnutrition and accidents also affect wolf numbers (ADF&G 2012k).

b. Marine Mammals

i. Beluga and Other Whales

During the summer several whale species feed in the waters of Bristol Bay. Beluga whales follow returning salmon and smelt to the northeast bays of Bristol Bay (ADF&G 2006). Beluga whales are present in Bristol Bay throughout the year and are seen mainly in Kvichak and Nushagak bays (Lowry et al. 2008). In the spring they migrate to warmer waters such as estuaries, bays and rivers where they may molt, give birth and care for their calves (Allen and Angliss 2012). They are sometimes found at the mouths of major streams and rivers, even occasionally upstream in large rivers beyond tidal influence areas in their pursuit of salmon (LaRoche and Associates 2011).

Besides salmon, beluga whales also feed on smelt during late spring and summer. From mid-June through mid-August, salmon is their main diet. After mid-August, this changes to flatfish, sculpin, lamprey, and shrimp. Little is known about their diet during the fall and winter months (Lowry et al. 2008). It is estimated that the Bristol Bay beluga population increased about 5% annually and 65% over the twelve-year period 1993-2005. There is no clear or single explanation for this increase so it is not possible to make any definitive conclusions as to why this is happening (Lowry et al. 2008).

Minke whales feed in bays and shallow coastal waters in summer while killer whales feed on several marine mammal species in the coastal waters and bays. Gray whales are known to travel in nearshore waters during their spring migration north. Fin, humpback, and mink whales are found in the nearshore and offshore waters of the Alaska Peninsula during the summer (ADF&G 2006). Of the whales found near the sale area, three are on the federal endangered species list. These are the humpback, fin, and

bowhead (USFWS 2012f). Beluga, minke, killer, and gray whale populations are considered healthy and stable (ADF&G 2012k; USFWS 2012f).

ii. Walruses, Seals, Sea Lions, and Sea Otter

The waters of northeast Bristol Bay support a wide variety of benthic marine life and extensive clam beds. Because of this, Bristol Bay supports several large marine mammal predator species such as Pacific walrus. All marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA gives Pacific walrus management authority to USFWS. Part of this management includes preparing Pacific walrus stock assessments which are updated every three years (USFWS 2011).

Adult male walruses use haulouts around the bay (ADF&G 2006). Pacific walrus congregate in Bristol Bay and rest on haulouts between feeding bouts. Haulouts located near the sale area are Cape Constantine, Round Island, Cape Newenham, and Cape Seniavin located on the Alaska Peninsula (USFWS 2012e). Walrus have been hauling out here regularly since the 1970s. Large year to year fluctuations in haulout numbers suggest walrus may not return to the same haulout each year. Factors including the status of food stocks near haulouts, population size, disturbance levels, and winter/spring distributions may influence walrus abundance and are poorly understood.

Harbor seals haul out on beaches along both coastlines of the Alaska Peninsula (ADF&G 2006). They are seen congregating on shoals and sandbars and feeding on schools of herring and capelin. Some have been seen pursuing salmon upstream beyond tidal area. Haulout areas are critical to maintaining harbor seal populations because there are a limited number of suitable sites and these experience high intensity use (LaRoche and Associates 2011). Haulouts are used to rest, give birth, and nurse their pups which are born between May and mid-July. An actual census is difficult to obtain because harbor seals can only be accurately counted when they are hauled out, and they haulout at different times of the day at thousands of locations in Alaska. Harbor seals were listed as an Alaska Species of Special Concern, which is no longer maintained by ADF&G; however, harbor seals are on the nominee species list in Alaska's Wildlife Action Plan (ADF&G 2012k; 2014).

Spotted seals may be found in the vicinity of the sale area, although their preferred habitat is the edge of pack ice in loose floe areas. They may be found in Bristol Bay during the winter along the southern edge of the broken pack ice. Spotted seal pups are born on sea ice rather than land. Spotted seals in Alaska are not listed as threatened or endangered under the Endangered Species Act. Spotted seals are prey to many marine and land mammals (ADF&G 2012k).

Haulouts and rookeries for Steller sea lions can be found primarily along the gulf coast where they land to rest and suckle their young. Sea lions do not migrate, but do move their central haulout to follow their many types of prey (ADF&G 2006, 2012i). Since 2000, there has been a substantial effort to identify causes and possible remedies to the western stock population decline. These are the subject of considerable debate but causes may be from both "top-down" (predation, disturbance, intentional killing, and entanglements) to "bottom-up" (reduced prey quality and abundance and long-term shifts in environment) processes (ADF&G 2012k).

Commercial harvesting of sea otters had reduced their population to a few hundred animals in the early 1900s (USFWS 2012d). Since then, sea otters have recolonized the southern half of the Alaska Peninsula, but the population decreased dramatically in recent years. This decline may be due to increased predation by killer whales (ADF&G 2006). Because of this decline, the Southwestern stock of Northern sea otter is listed as threatened under the Endangered Species Act (USFWS 2012f). As of 2008, the abundance of sea otters in Alaska is estimated to be about 70,000 (ADF&G 2012k).

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