APPENDIX 3

Karluk Timeline

18,000 BC: Glaciers reached a maximum on Kodiak Island during the final Wisconsin phase of Pleistocene glaciation. On Kodiak Island this period was known as the Akalura glaciation, which followed at least two other periods of glaciation, the Sturgeon River (maximum 110,000 years ago) and Karluk (maximum 65,000 years ago) phases. During the Akalura glaciation, all of Kodiak Island was covered by glaciers, except for an ice-free area lying west of Karluk Lake. This ice-free area is known as the Kodiak Island Refugium since it provided habitat for the fauna and flora throughout the Akalura glaciation.

12,000–5000 BC: Climatic warming caused glaciers to retreat on Kodiak Island.

5500 BC: Probable first arrival of humans on Kodiak Island occurred.

4200 BC: Human habitation on Kodiak Island has been documented (first dated site) to this year.

3000 BC: Humans have continuously inhabited Karluk from at least 3000 BC to the present time. Prehistoric sites of human habitation in the Karluk vicinity include those at Karluk Village, numerous sites along the Karluk River, and at Karluk Lake. Many prehistoric sites contain evidence of occasional volcanic ash falls and tsunami waves.

1800 BC: Series of volcanic ash falls on Kodiak Island occurred.

20 BC: Ash fall at Karluk Lake occurred.

370 AD: Major ash fall at Karluk occurred.

1100–1850: Little Ice Age in the Northern Hemisphere caused glaciers in SW Alaska to advance somewhat during 1440–1710. On Kodiak Island, human population densities increased on the southwest end of the island and at Karluk. This climatic cooling caused humans to shift away from hunting sea mammals to greater reliance on salmon resources for subsistence.

1250: Tsunami wave at Karluk Village occurred.

1710: Ash fall at Karluk Lake occurred.

1741: Explorer Vitus Jonassen Bering (1681–1741), sailing from Russia, discovered Alaska and on his return voyage viewed Kodiak Island from a distance at sea. The German naturalist, Georg Wilhelm Steller (1709–1746), accompanied the Bering voyage of discovery to Alaska.

1761: Possible, but undocumented, landfall on Kodiak Island occurred by the Russian Dmitrii Pan'kov, skipper of the vessel *Sv. Vladimir.*

1762: First Russian map showing the presence of Kodiak Island produced.

1763–64: The Russian Stephen Glotov, skipper of the vessel *Sv. Andrean I Nataliia,* over-wintered at Russian Harbor on southwest Kodiak Island, but his presence was resisted by the Alutiiq inhabitants, forcing him to depart.

1763–75: Possible landfall on Kodiak Island occurred by an unknown Russian ship and crew, from which a map of southwest Kodiak Island was published in 1775.

1776: The Russian Dmitrii Polutov, skipper of the vessel *Sv. Arkangel Mikhail,* sailed along the south coast of Kodiak Island to Ugak Bay.

1779–80: The Russian Afanasii Ocheredin, skipper of the vessel *Sv. Kliment,* over-wintered on the southwest coast of Kodiak Island.

1784: The Russian merchant Grigorii I. Shelikhov established the first Russian colony at Three Saints Bay on the south coast of Kodiak Island.

1785–86: An exploration party of Russians, Aleuts, and Alutiiq dispatched by Shelikhov over-wintered at Karluk and established a small post. The Karluk River outlet to Shelikof Strait was then located at the northeast end of Karluk Spit. The Russians began harvesting and drying salmon from the Karluk River for their Native fur-hunting crews. They also prepared barrels of salted salmon for local use and, in later years, for export.

1786: First detailed Russian map showed the Kodiak Island coastline and location of the Karluk River and Cape Karluk.

1788: Large earthquake (magnitude 8) west of Kodiak Island caused coastal land subsidence and tsunami waves around Kodiak Island (July 1788).

1790: The Russian Aleksandr Andreyevich Baranov (1747–1819) became manager of Shelikhov's company in Alaska. He served in this position from 1790 to 1818, Shelikhov's venture becoming the Russian–American Company.

1792: Large earthquake hit Kodiak Island.

1792–93: Baranov moved the Russian colony at Three Saints Bay to Kodiak (then called Pavlovsk Gavan, or Paul's Harbor).

1794: The Russian Orthodox Church first came to Kodiak Island.

1795: Baranov conducted the first census of Kodiak Island, recording a population of 6206.

1804–05: Urey Lisiansky arrived on the Russian naval ship *Neva* and over-wintered at Kodiak. Based on this visit, he published a map of Kodiak Island in 1812 that showed the Karluk River and Lake.

1821: Russian–American Company obtained exclusive trading rights in Alaska.

1837–39: Smallpox epidemic decimated Alutiiq population on Kodiak Island.

before 1850: Karluk River entrance into Shelikof Strait shifted from the northeast to west end of Karluk Spit.

1866: First known photograph from Alaska was taken.

1867: United States purchased Alaska from Russia for $7,200,000. U.S. Army was given jurisdiction of Alaska in 1868.

1867: Three salt-salmon ventures began at the Karluk River, in addition to the salmon-drying operations.

1870: Alaska Fur Trading Company and Alaska Commercial Company began salt-salmon operations at the Karluk River.

1871: U.S. President Ulysses S. Grant signed bill creating the Commission of Fish and Fisheries (9 February).

1878: First salmon canneries in Alaska were established at Klawock and at old Sitka.

1880: Tarleton H. Bean, Ichthyologist, visited Kodiak (9–14 July) under the direction of the U.S. Commissioner of Fish and Fisheries to investigate the fish and fisheries of Alaska. Though he did not visit Karluk, he interviewed Charles Hirsch and others about the Karluk River fisheries. Sockeye salmon were then being harvested for salting and drying by Western Fur and Trading Company of San Francisco, CA, and by Oliver Smith and Charles Hirsch.

1882: First salmon cannery in central Alaska was operated on Karluk Spit by Oliver Smith and Charles Hirsch; their partnership became the Karluk Packing Company in 1884.

1888: Two additional salmon canneries were built and operated on Karluk Spit—Kodiak Packing Company and Aleutian Islands Fishing and Mining Company. A third cannery, Alaska Improvement Company, was built just to the west of the Karluk River mouth in 1888, but heavy seas wrecked their supply vessel, the bark *Julia Foard,* near the Karluk River mouth and delayed the start of their operations until 1889.

1888: Arctic Packing Company built a cannery near the mouth of Larsen Bay; the sockeye salmon for this cannery came from the Karluk River.

1888: Russian Orthodox Church was built at Karluk Village.

1888: U.S. Fish Commission was established as an independent agency and terminated its relationship with the Smithsonian Institution (20 January). Marshall McDonald was appointed U.S. Fish Commissioner.

1888–89: The large number of salmon canneries in Alaska caused over production of canned salmon, reducing market prices below production costs.

1889: Hume Packing Company built a cannery on Karluk Spit; Royal Packing Company and Russian–American Packing Company built canneries on Afognak Island and took sockeye salmon from the Karluk River.

1889: Dams, river barriers, or obstructions to salmon migrations were outlawed by the U.S. government (2 March 1889).

1889: Tarleton H. Bean visited the canneries and inspected fishery methods at Karluk Spit (2 August–7 September). He surveyed the spawning grounds at Karluk Lake (15–21 August) with Livingston Stone, Franklin Booth, and assistant Robert Lewis. Bean collected fish, birds, and plants at Karluk for the U.S. National Museum.

1889: Fishermen started beach seining in ocean waters outside Karluk Lagoon and river mouth. The 1882–1888 salmon harvests came from Karluk Lagoon and River.

1891: Karluk River Fisheries agreement between existing canneries apportioned the sockeye salmon pack. This agreement reduced the number of operating canneries and decreased packing expenses.

1891: Alaska Packers Association was formed in September to dispose of the salmon pack from Karluk.

1891: First salmon hatchery was operated by a private coalition of competing canneries (Karluk River Fisheries) for one year on Karluk Lagoon to enhance the sockeye salmon runs. They took 2,500,000 sockeye salmon eggs and released 500,000 fry into the brackish waters of Karluk Lagoon.

1892: Alaska Packing Association was formed to control production of canned salmon. This group included all canneries in the Kodiak area, except for the Alaska Improvement Company.

1892: Based on Livingston Stone's recommendation, Afognak Island was set aside as a Forest and Fish Cultural Reserve by the U.S. government (24 December 1892).

1893: Alaska Packers Association, with its headquarters in San Francisco, CA, incorporated to control the salmon pack (9 February). The number of operating canneries on Karluk Spit was reduced.

1893: Hume Canning and Trading Company built a salmon cannery at Tanglefoot Bay 2 km west of Karluk Spit; the cannery operated in 1893–94 and then was sold to the Alaska Packers Association in 1895.

1895: Alaska Packers Association's chartered ship *Raphael* wrecked in a severe storm near Tanglefoot Bay, losing the cargo of canned salmon.

1896: Steam power was first used to haul beach seines on Karluk Spit.

1896: Alaska Improvement Company used an experimental floating trap to capture salmon at Uganik Bay.

1896–1916: Second Karluk hatchery was operated by Alaska Packers Association on Karluk Lagoon to enhance sockeye salmon runs. From 1896 to 1916, they took 628,107,360 sockeye eggs and released 488,753,807 fry into the brackish waters of Karluk Lagoon. In 1903 the Karluk hatchery was enlarged.

1896–97: Fishery biologist, Cloudsley Louis Rutter, worked as a fish culturist at the new Karluk hatchery. He visited the upper Karluk River and Lake, and collected fishes, birds, and plants.

1897: U.S. Fish Commission biologist, Alvin B. Alexander, briefly studied Karluk's salmon fishery (18 July–6 August); Captain Jefferson F. Moser, Commander, U.S. Fish Commission steamer *Albatross,* made two stops at Karluk, one in July, another in August.

1897: Pacific Steam Whaling Company and Hume Brothers and Hume built salmon canneries at Uyak Anchorage and harvested sockeye salmon from Karluk.

1897: For the first time, salmon harvests at Karluk were recorded separately by species.

1898: Karluk River and Lagoon were closed to commercial salmon fishing, except for hatchery procurement of brood stock and for subsistence use by Karluk's residents (7 May).

1900: U.S. Treasury Department mandated that canneries build sockeye salmon hatcheries and release four fry for every adult caught (2 May).

1900: Alaska Packers Association's bark *Merom* wrecked on the rocks near Karluk Spit with 12,572 cases of canned salmon.

1901: Alaska Packers Association purchased the first of its *Star* fleet, which soon grew to nearly 20 iron and steel, square-rigged, sailing ships. The ships were used to haul workers and equipment north to the salmon fishing grounds and canneries and to return workers and a cargo of canned salmon south to San Francisco, CA.

1902: U.S. Treasury Department increased its hatchery mandate to 10 fry released for every sockeye salmon adult caught (24 January).

1903: U.S. Bureau of Fisheries was created in the Department of Commerce and Labor (1 July). Supervision of Alaska's salmon and fur seals transferred from Treasury Department to U.S. Bureau of Fisheries.

1903: U.S. President Theodore Roosevelt ordered the formation of the Alaska Salmon Commission to determine the conditions of Alaska's salmon fisheries. Field studies were conducted in 1903 using the U.S. Fish Commission steamer *Albatross,* with David Starr Jordan, Barton Warren Evermann, Franklin Swift, Alvin B. Alexander, J. Nelson Wisner, and Cloudsley L. Rutter. Special assistants were Frederic M. Chamberlain, E. L. Goldsborough, Harold Heath, Charles H. Gilbert, Milo H. Spaulding, Harold Bowen Jordan, Harry C. Fassett, and A. H. Baldwin.

1903: U.S. Fish Commission fishery biologist, Cloudsley Louis Rutter, studied sockeye salmon at Karluk River and Lake (May–August), assisted by Milo H. Spaulding. Rutter died in November 1903, shortly after completing his field work at Karluk; his 1903 studies were later published by Frederic M. Chamberlain (1907).

1903: Alaska Packers Association doubled the original size of the Karluk hatchery.

1906: U.S. Secretary of Commerce and Labor approved the Karluk hatchery (29 June). James A. Richardson, Fish Culturist and builder of the Karluk hatchery (1896), was replaced as Superintendent by Ingwald Loe. Federal government began to grant rebates of case pack taxes to canneries that operated hatcheries (40 cent rebate for every 1,000 sockeye salmon fry released from the hatchery).

1907: Alaska Packers Association's bark *Servia* was driven ashore in a gale at Karluk with a full cargo of canned salmon.

1907–08: U.S. Bureau of Fisheries salmon hatchery was constructed on Afognak Lake (Litnik Lake) near the site originally selected by Livingston Stone in 1889.

1909: Alaska Packers Association began to build a new salmon cannery at Larsen Bay to replace its facilities at Karluk Spit.

1909–12: Charles H. Gilbert of Stanford University used scales to age salmon from the Columbia and Fraser Rivers.

1911: Alaska Packers Association ceased cannery operations at Karluk Spit, but continued to harvest sockeye salmon at Karluk for its new Larsen Bay cannery. Besides the traditional beach seining at Karluk Spit, there was greater use of purse seines and gill nets to

capture sockeye salmon. Only subsistence harvests were allowed in Karluk Lagoon.

1911: U.S. Bureau of Fisheries made a brief reconnaissance of the Karluk River and Lake.

1912: Novarupta volcano erupted at Katmai on the Alaska Peninsula opposite Kodiak Island, spreading ash over the island, but only small accumulations occured in the Karluk area.

1912: Alaska was given formal territorial status.

1913: U.S. Department of Commerce and Labor was divided into two departments; the Bureau of Fisheries was placed in the Department of Commerce (4 March).

1916: U.S. Bureau of Fisheries employee, Edward M. Ball, briefly investigated the sockeye salmon spawning grounds of the Karluk River and Lake.

1916: Alaska Packers Association permanently closed the Karluk hatchery, the remaining eggs being transferred to Afognak Hatchery (30 June).

1916: Alaska Packers Association merged with California Packing Corporation, which adopted the name Del Monte Corporation in the 1960s.

1918: Karluk River and Lagoon was closed to commercial salmon fishing, except for Native subsistence. Commercial fishing was allowed in the ocean 91 m beyond the Karluk River mouth.

1919: Charles H. Gilbert and U.S. Bureau of Fisheries employee Henry O'Malley briefly visited Karluk Lake to view the spawning habitats of sockeye salmon.

1919: Edward M. Ball recommended that the Karluk River watershed be placed in a National Fisheries Reservation.

1921: The first salmon counting weir in Alaska was installed on the Karluk River under the general direction of Charles H. Gilbert and Henry O'Malley. The weir was located on the lower Karluk River at the eastern end of Karluk Lagoon. Gilbert and O'Malley inspected the weir operations and visited Karluk Lake.

1922: Willis H. Rich became Chief of the U.S. Bureau of Fisheries, Division of Scientific Inquiry. Henry O'Malley became U.S. Commissioner of Fisheries.

1922–33: The only legal commercial salmon fishing gear during this time were beach seines, gill nets, and stationary traps.

1924: The U.S. Government passed the White Act that required 50% escapement of the total sockeye salmon run. Purse seines and floating traps for catching salmon were prohibited in the Kodiak area. First stationary traps were used to capture sockeye salmon during their ocean migration along the northwest coast of Kodiak Island (Rich and Ball, 1931), although a few traps may have operated in Uganik Bay in 1919–22 (Roppel, 1986).

1926–31: Chauncey Juday, Willis H. Rich, George I. Kemmerer, and Albert Mann conducted limnological studies of Karluk Lake; they published their results in 1932.

1927: Gilbert and Rich published the results of their sockeye salmon studies at Karluk.

1927: At the request of Willis Rich, a small cabin was built on Camp Island, Karluk Lake, for use by U.S. Bureau of Fisheries research biologists.

1927–32: Steelhead eggs were taken annually from the Karluk River at the Portage by the U.S. Bureau of Fisheries for incubation at Afognak hatchery and at Seward. A temporary weir was installed each spring across the Karluk River to capture mature steelhead moving downstream and to take the eggs, which were incubated for a few weeks onsite in a small tributary of the Karluk River.

1929: Stock market crashed and the Great Depression started.

1929: This was the final year that any of the *Star* fleet of the Alaska Packers Association carried workers and supplies north and returned south with a cargo of canned salmon.

1929: U.S. Bureau of Fisheries used 24 vessels and one airplane to regulate the Pacific salmon fisheries.

1930: Karluk research biologist, Willis Rich, resigned as U.S. Bureau of Fisheries Director of Pacific Fisheries Investigations, to become Professor of Zoology at Stanford University.

1930–37: Joseph Thomas Barnaby of Stanford University and U.S. Bureau of Fisheries conducted studies at Karluk Lake and River, including smolt-to-adult survival of sockeye salmon, water chemistry of Karluk Lake, and Dolly Varden migration and food habits.

1931: U.S. Bureau of Fisheries, Fisheries Biological Laboratory (Montlake Laboratory) opened in Seattle, WA (22 May). U.S. Bureau of Fisheries personnel at the Stanford University field station transferred to the Montlake Laboratory.

1933: Depth of the Great Depression. These economic hard times continued through the 1930s. Tight budgets at U.S. Bureau of Fisheries affected management and research of Karluk's sockeye salmon.

1933: Purse seines were ruled legal for commercial salmon fishing in Alaska.

1933: Afognak hatchery was permanently closed by U.S. Commissioner of Fisheries, Frank T. Bell (30 June).

1935–37: U.S. Bureau of Fisheries biologist Joseph Thomas Barnaby studied Dolly Varden migration and food habits at Karluk; these charr studies continued until 1941 by biologists Allan C. DeLacy and William M. Morton.

1939: U.S. Bureau of Fisheries was transferred from Department of Commerce to Department of the Interior (1 July).

1939–1945: World War II. U.S. military controlled the airspace and waters around Kodiak Island.

1940: U.S. Bureau of Fisheries and Bureau of Biological Survey consolidated as the Fish and Wildlife Service in the Department of the Interior (30 June).

1940: Suspension bridge was built across Karluk River between Karluk Village and Karluk Spit.

1941: Dolly Varden bounty was discontinued in Alaska.

1941: Kodiak National Wildlife Refuge was established by President Franklin D. Roosevelt to protect the habitat of the Kodiak brown bear (Executive Order 8857, dated 19 August 1941). Karluk Lake and River were included within the refuge boundaries.

1942: Attu and Kiska Islands in the Aleutians were captured by Japanese armed forces (6–7 June); U.S. military began buildup on Kodiak Island.

1942: Salmon counting weir was moved from lower Karluk River to the Portage, where it operated for three years (1942–44).

1943: Secretary of the Interior Ickes created the Karluk Reservation for the Alutiiq people (Public Land Order 128). The reservation included about 35,000 acres of land and water near Karluk Spit, including prime ocean beach seining locations.

1944: U.S. Fish and Wildlife Service biologist, Joseph Thomas Barnaby, published his research on Karluk's sockeye salmon.

1945: Salmon counting weir was moved from the Portage to near the outlet of Karluk Lake, where it operated for the next 30 years.

1946: Purse seines were prohibited within 457 m of the Karluk River mouth.

1947: The Fisheries Research Institute, University of Washington, Seattle, was formed; first Director was William F. Thompson.

1947: U.S. Fish and Wildlife Service biologist, Richard F. Shuman, studied bear predation on sockeye salmon adults at Karluk Lake.

1948–49: Fisheries Research Institute biologist, Donald E. Bevan, studied ocean migration of sockeye salmon along the west coast of Kodiak Island and found that many home to the Karluk River.

1948–55: Fisheries Research Institute biologists studied Karluk's sockeye salmon. Topics included ocean migrations, ages, sizes, and spawning habitats of the adults, and sizes and ages of the juveniles.

1949: U.S. Supreme Court ruled on *Hynes v. Grimes Packing Co. et al (*337 U.S. 86) that 1) the Secretary of the Interior Ickes had the authority to establish the Karluk Reservation in 1943, and 2) Karluk residents could not bar the access of others to the waters and fish within the reservation.

1949: U.S. Fish and Wildlife Service biologists, Richard Shuman and Philip R. Nelson, searched for a suitable lake on Kodiak Island to study the effects of artificial fertilization on lake productivity. Bare Lake, located 25 km SW of Karluk Lake, was selected for the fertilization experiment.

1949: Alaska Department of Fisheries was created by the Alaska Territorial Legislature; Clarence L. Anderson became its first Director.

1950: William F. Thompson, Director of the Fisheries Research Institute, proposed that the productive midseason runs of Karluk's sockeye salmon have been depleted by commercial fishing.

1950–56: U.S. Fish and Wildlife Service fishery biologist, Philip Nelson, fertilized Bare Lake with inorganic phosphate and nitrates and studied the response in the plankton and young sockeye.

1953: Bounty was repealed on bald eagles in Alaska. The first eagle bounty was implemented in 1917; 114,291 bald eagles were killed in 1917–40. An eagle bounty existed during some, but not all, years in the 1940s.

1953–59: Steelhead eggs were taken at the Karluk River Portage by the Kodiak Conservation Club, Alaska Department of Fish and Game, and U.S. Fish and Wildlife Service, in cooperation with the U.S. Navy. A temporary V-shaped weir was installed each spring to capture mature steelhead moving downstream and the eggs were flown to Devils Creek Hatchery on the Kodiak Naval Base.

1955: U.S. Fish and Wildlife Service was split into Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife (1 July).

1956: All federal biological research on Alaska's finfish moved from Montlake Biological Laboratory, Seattle, WA, to Juneau, AK.

1957: Alaska Department of Fish and Game was created by the Alaska Territorial Legislature, with Clarence L. Anderson as the first Director (1 April). ADFG replaced the Alaska Department of Fisheries.

1958: U.S. Fish and Wildlife Service biologist, George A. Rounsefell, published a paper on the reasons for the decline in Karluk's sockeye salmon runs.

1958: Fish traps were prohibited in the Kodiak Island region for commercial salmon fishing.

1959: Alaska officially became 49th state of the United States (3 January).

1960: State of Alaska assumed responsibility for managing its fisheries from the U.S. Government (1 January).

1960: U.S. Bureau of Commercial Fisheries built a field research laboratory and living facilities on Camp Island, Karluk Lake.

1960: U.S. Fish and Wildlife Service, Auke Bay Biological Laboratory, opened near Juneau, AK.

1960–70: U.S. Bureau of Commercial Fisheries conducted research on Karluk's sockeye salmon, including its genetics, migratory behavior and timing, abundance of smolt outmigration, fecundity, bear predation, and subpopulations.

1962: U.S. Bureau of Commercial Fisheries biologists John B. Owen, Charles Y. Conkle, and Robert F. Raleigh reviewed past research and published a report on sockeye salmon production at Karluk.

1964: Large earthquake hit southern Alaska (magnitude 9.2) and created a tsunami that damaged Kodiak; little damage occurred at Karluk Village (March 27). Karluk Lagoon subsided about 46 cm.

1967: Alaska Department of Fish and Game assumed fully responsibility for operating the Karluk River weir. Alaska Department of Fish and Game began rehabilitation research on Karluk's sockeye salmon.

1969: U.S. Bureau of Commercial Fisheries ended its long-term sockeye salmon research program at Karluk Lake.

1969: Alaska Department of Fish and Game investigated ways to rehabilitate Karluk's sockeye runs.

1970: U.S. Bureau of Commercial Fisheries was renamed the National Marine Fisheries Service (3 October) and became part of the National Oceanic and Atmospheric Administration within the Department of Commerce.

1971: Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement and Development (FRED) was created by the Alaska State Legislature.

1971: Alaska Native Land Claims Settlement Act allowed Native corporations to select lands for ownership.

1972: Commercial Fisheries Limited Entry Commission was created by the Alaska State Legislature.

1972: Alaska Packers Association closed its salmon cannery at Larsen Bay.

1973: Limited entry permit system went into effect for commercial salmon fishing in Alaska.

1973: University of Washington biologists Richard Van Cleve and Donald E. Bevan published a paper on the reasons for the decline in Karluk's sockeye salmon runs.

1976: Salmon counting weir was moved from Karluk Lake's outlet to the lower river; the weir has continued to operate at this site to the present time (2010).

1976: Alaska State Legislature directed the Commissioner of the Department of Fish and Game to develop comprehensive regional salmon plans.

1978: The Karluk Native Corporation (later merged with the Koniag Corporation) assumed ownership of the entire Karluk River and northern half of Karluk Lake and pursued several income producing ventures in the Karluk basin, including 1) bear watching platforms, 2) sport fishing for steelhead, king salmon, sockeye salmon, coho salmon, and Dolly Varden, and 3) Karluk River float trips.

1978: A violent storm with strong NE winds (>160 km per hour) breached Karluk Spit and changed the course of the lower Karluk River (January). The suspension bridge between Karluk Spit and New Karluk Village was destroyed, as were many of the remaining cannery buildings. Karluk residents moved the village 1.5 km inland, aided by the U.S. Army Corps of Engineers. The new location included 23 new homes, a land based airstrip (820 m), and a new school (1982).

1978: The National Marine Fisheries Service transferred their research field station on Camp Island, Karluk Lake, to the U.S. Fish and Wildlife Service, Kodiak National Wildlife Refuge.

1978–86: Alaska Department of Fish and Game rehabilitated the Upper Thumb River sockeye run by culturing eggs to the eyed stage and implanting them into the river. Eggs were first incubated at Devil's Creek Hatchery in Kodiak and then at Kitoi Hatchery, Afognak Island (1978–79). A streamside hatchery was operated on the East Fork of Upper Thumb River in 1980–86. During 1978–86, they took 101,217,000 sockeye eggs and planted 82,546,000 upstream of natural fish barriers in the Upper Thumb River drainage. This rehabilitation project was led by Fishery Biologist Lorne E. White, Division of Fisheries Rehabilitation, Enhancement, and Development.

1979: Alaska Department of Fish and Game launched the statewide limnology program in the Division of Fisheries Rehabilitation, Enhancement and Development (FRED) to enhance sockeye salmon nursery lakes through nutrient enrichment and fry stocking. Regular limnological sampling of many physical,

chemical, and biological factors has occurred at Karluk Lake from 1979 to the present time.

1980: The Karluk Native Corporation merged with the regional corporation, Koniag, Inc. (December).

1982: U.S. Fish and Wildlife Service established the position of Fishery Biologist for the Kodiak National Wildlife Refuge.

1982–88: U.S. Fish and Wildlife Service (Anchorage and Seattle offices) studied Karluk Lake, including stickleback competition with young sockeye, predation on juvenile sockeye by charr and young coho salmon, and past lake fertility revealed by lake sediments. Other projects included measurement of smolt outmigration and movements of adult steelhead and coho salmon in the Karluk River.

1983: Kodiak Regional Aquaculture Association (KRAA) was approved by the Alaska Department of Fish and Game (17 June).

1984: Kodiak Regional Comprehensive Salmon Plan Phase I, 1982–2002, was approved by the Alaska Department of Fish and Game (April 13). Phase II was approved in 1987 (15 September) and a revision to Phase II was approved in 1992 (27 April).

1986–90: Alaska Department of Fish and Game added artificial fertilizers to the north basin of Karluk Lake to enhance its productivity. The amount of fertilizer added was 87,272 kg (1986), 87,272 kg (1987), 87,272 kg (1988), 77,272 kg (1989), and 86,363 (1990).

1986–91: University of Alaska biologist Thomas C. Kline, Jr. measured the proportion of marine-derived nitrogen present in the juveniles and adults of Karluk's sockeye salmon.

1987: Alaska Department of Fish and Game limnologists Jeffery P. Koenings and Robert D. Burkett published their Aquatic Rubic's Cube paper concerning Karluk's sockeye salmon and the importance of the lake rearing environment. They recommended artificial fertilization of Karluk Lake.

1989: *Exxon Valdez* oil spill (24 March) halted all commercial salmon fishing on Kodiak Island for the entire year.

1997–98: Alaska Department of Fish and Game biologist Dana Schmidt and colleagues published papers on Karluk's sockeye salmon that show the importance of salmon-carcass nutrients to Karluk Lake's fertility and salmon production.

1994–2004: University of Alaska biologist Bruce Finney and his graduate students and colleagues studied marine-derived nitrogen and plankton microfossils in Karluk Lake's sediments and related those to the past 2200 years of sockeye escapements. Salmon-carcass nutrients affect the lake's trophic status. Ocean climate affects the long-term variations in escapements and lake fertility.

2008–09: U.S. National Marine Fisheries Service biologists Ellen C. Martinson and John H. Helle and their colleagues studied the scales of age 2.2 early-run Karluk sockeye salmon to determine salmon growth and survival in relation to climatic and oceanic regimes.