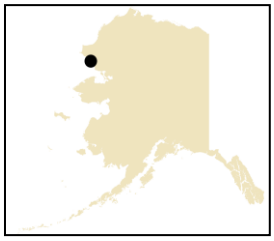
Kivalina (*kiv-uh-LEE-nuh*)



People and Place

Location [1]

Kivalina is at the tip of an 8-mile barrier reef located between the Chukchi Sea and Kivalina River. It lies 80 miles northwest of Kotzebue, and 620 miles northwest of Anchorage. The area encompasses 1.9 square miles of land and 2.0 square miles of water. Kivalina was incorporated as a Second-class city in 1969 and is under the jurisdiction of the Northwest Arctic Borough.

Demographic Profile [2]

In 2010, there were 374 residents in Kivalina, ranking it 144th largest of 352 total Alaskan communities with recorded populations that year. Overall between 1990 and 2010, the population increased by 18.0%. Between 2000 and 2009, the population increased by 8.8% with an average annual growth rate of 0.77%, which was very similar to the statewide average of 0.75% and indicative of slow growth. Information regarding population trends can be found in Table 1.

Kivalina is a traditional Inupiat Eskimo village. In 2010, 96.3% of residents identified themselves as American Indian or Alaska Native, compared to 96.6% in 2000; 2.1% identified themselves as White, compared to 3.4% in 2000; and 1.6% identified themselves as two or more races, compared to 0.0% in 2000. Information regarding racial and ethnic trends can be found in Figure 1.

The average household size in 2010 was 4.40 individuals, compared to 4.70 in 1990 and 4.83 in 2000. In that year, there were 99 housing units, compared to 71 in 1990 and 80 in 2000. Of the households surveyed in 2010, 65% were owner-occupied, compared to 78% in 2000; 21% were renter-occupied, compared to 20% in 2000; 10% were vacant, compared to 3% in 2000; and 4% were occupied seasonally, compared to 0% in 2000. No residents lived in group quarters between 1990 and 2010.

The gender distribution in 2010 was somewhat biased towards females with 52.4% females and 47.6% male. This was in contrast to both the statewide distribution that year (52.0% male, 48.0% female), and distribution in 2000 (51.5% male, 48.5% female). The median age in 2010 was 21.3 years, which was significantly younger than the statewide median of 33.8 years, and similar to the 2000 median of 20.8 years.

The population structure was expansive in both 2000 and 2010. In 2010, 46.6% of residents were under the age of 20, compared to 48.0% in 2000; 8.8% were over the age of 59,

[1] Alaska Dept. of Comm. and Rural Affairs. (n.d.). *Community Database Online*. Retrieved October 17, 2011 from http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.htm.

[2] U.S. Census Bureau (n.d.). *Profile of selected social, economic and housing characteristics of all places within Alaska*. Datasets utilized include the 2000 (SF1 100% and SF3 sample data) and 2010 (Demographic Profile SF) Decennial Census and the 2010 American Community Survey 5-year estimates. Retrieved November 1, 2011 from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

compared to 8.5% in 2000; 27.2% were between the ages of 30 and 59, compared to 28.4% in 2000; and 17.4% were between the ages of 20 and 29, compared to 15.1% in 2000.

Gender distribution by age cohort was more equal in 2010 than in 2000. In that year, the greatest absolute gender difference occurred within the 50 to 59 rage (5.1% female, 2.4% male), followed by the 10 to 19 (10.7% female, 9.1% male) and 30 to 39 (5.1% female, 3.7% male) rages. Of those three, the greatest relative gender difference occurred within the 50 to 59 range. Information regarding trends in Kivalina's population structure can be found in Figure 2.

Table 1. Population in Kivalina from 1990 to 2010 by Source.

Year	U.S. Decennial Census[1]	Alaska Dept. of Labor Estimate of Permanent Residents[2]
1990	317	-
2000	377	-
2001	-	385
2002	-	383
2003	-	388
2004	-	390
2005	-	385
2006	-	392
2007	-	397
2008	-	406
2009	-	410
2010	374	-

[1] (1) U.S. Census Bureau (1990). *CP-1: General Population Characteristics of all places within Alaska*. Retrieved November 1, 2011 from http://www.census.gov/prod/www/abs/decennial/1990.html. (2) U.S. Census Bureau (n.d.). *Profile of selected social, economic and housing characteristics of all places within Alaska*. Datasets utilized include the 2000 (SF1 100% and SF3 sample data) and 2010 (Demographic Profile SF) Decennial Census and the 2010 American Community Survey 5-year estimates. Retrieved November 1, 2011 from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

[2] Alaska Department of Labor. 2011. Current population estimates for Alaskan Communities. Retrieved April 15, 2011, from http://labor.alaska.gov/research/pop/popest.htm.

Figure 1. Racial and Ethnic Composition, Kivalina: 2000-2010 (U.S. Census).

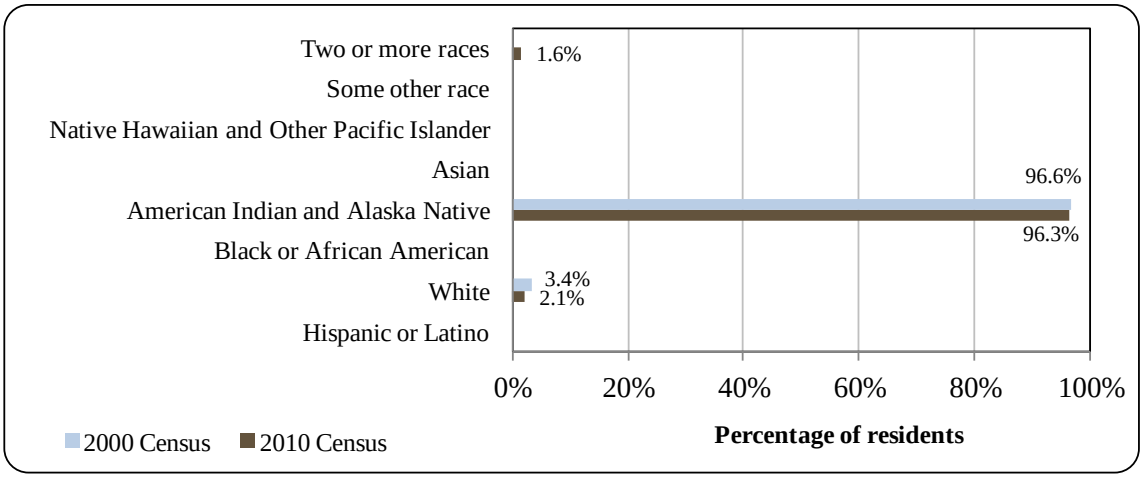
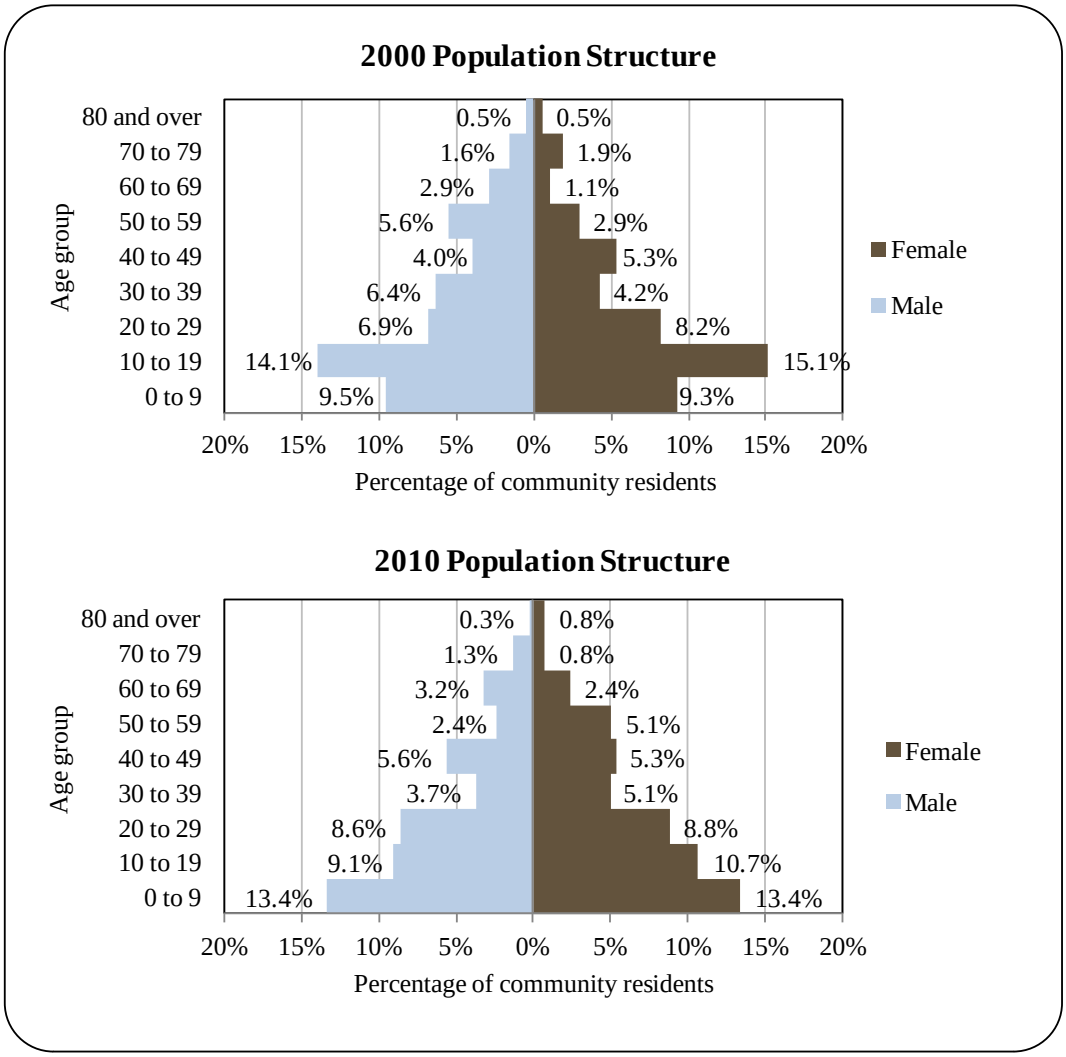


Figure 2. Population Age Structure in Kivalina Based on the 2000 and 2010 U.S. Decennial Census.



In terms of educational attainment, the U.S. Census' 2006-2010 American Community Survey (ACS)[3] estimated that 64.1% of residents aged 25 and over held a high school diploma or higher degree in 2010, compared to an estimated 90.7% of Alaskan residents overall. Also in that year, an estimated 14.9% of residents had less than a 9th grade education, compared to an estimated 3.5% of Alaskan residents overall; an estimated 21% had a 9th to 12th grade education but no diploma, compared to an estimated 5.8% of Alaskan residents overall; an estimated 15.5% had some college but no degree, compared to an estimated 28.3% of Alaskan residents overall; 2.8% of resident held a Bachelor's degree, compared to an estimated 17.4% of Alaskan residents

[3] While ACS estimates can provide a good snap shot estimate for larger populations, smaller populations can be misrepresented by ACS estimates if demographic information is not collected from a representative sample of the population. This is especially problematic for Alaskan communities with small populations that have a low probability of being adequately sampled.

overall; and an estimated 1.1% held a graduate or professional degree, compared to an estimated 9.6% of Alaskan residents overall.

History, Traditional Knowledge, and Culture

Human occupation of the barrier island where Kivalina is located extends back 1,500 years, when the area was first populated as a stopping-off place for people travelling between Arctic coastal areas and the Kotzebue Sound region. According to oral history, the original permanent settlement known as Kivalina was located on the coast of the mainland, somewhat north of the Kivalliik Channel. Originally, the people of Kivalina utilized the barrier island only as a seasonal hunting ground, making camp during summer months. Kivalina's existence was recorded in 1847 by a Russian Naval officer who mistook a seasonal subsistence camp north of the present day village as a permanent settlement. This settlement was logged as "Kivualinagmut."[4] A severe famine hit the area in the early 1880s, which killed or drove out most inhabitants of the Kivalina area.

From 1896 to 1902, reindeer were transported to the Kivalina area by the federal government, and locals were actively trained as herders. In 1905, Kivalina was relocated to its current location when the U.S. Bureau of Indian Affairs (BIA) repeated the error of the Russian naval officer by mistaking a seasonal camp on the barrier reef for a permanent village. Soon, the BIA established a school on the southern tip of the island and threatened any residents who did not enroll their children with imprisonment. This led to the vacating of the original Kivalina as well as surrounding communities.[5]

A post office was established in 1940, and an airstrip in 1960. During the 1970s, a new school, power system, and new houses were built. The sale and importation of alcohol is prohibited within the community.[6]

Natural Resources and Environment

Kivalina lies in the transitional climate zone, which is characterized by long, cold winters and cool summers. The average low temperature during January is -15 °F; the average high during July is 57 °F. Temperature extremes have been measured from -54 to 85 °F. Annual snowfall averages 57 inches, with 8.6 inches of precipitation per year. The Chukchi Sea is ice-free and open to boat traffic from mid-June to the first of November.

The village lies on a 5-mile long, 700-foot wide barrier reef island. Local soils are characterized by sand and gravel, which are largely unconsolidated and subject to erosion. The mainland to the east of Kivalina consists of a large coastal plain dotted with lakes, meandering streams, sloughs, and gently rolling limestone hills. In most areas, continuous permafrost underlies a tundra-covered bed of glacier till and alluvium. Lowland topography is characterized by thermokarst features which include thaw lakes, ice wedge polygons, frost mounds, and solifluction lobes. Moist and wet tundra are primary vegetation communities in lowland areas. The landscape is dominated by sedge-grasses and dwarf shrubs. Tall shrubs are present around

[4] NANA Corporation. (n.d.). *Kivalina.* Retrieved September 18, 2012 from: http://www.nana.com/regional/about-us/overview-of-region/kivalina/.
[5] Ibid.
[6] Alaska Dept. of Comm. and Rural Affairs. (n.d.). *Community Database Online*. Retrieved October 17, 2011 from http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.htm.

many drainages. Freshwater species found in drainages include four species of whitefish, northern pike, Arctic char, Dolly Varden, and Arctic grayling. Terrestrial mammals include brown bear, snowshoe hare, moose, muskoxen, fox, wolves, weasels, and wolverine. There is also habitat for a wide range of seabirds.[7] Marine species within the Chukchi and East Bering seas include urchins, sea cucumbers, Snow crab, Arctic cod, sculpins, Saffron cod, shrimp, flounder, eelpouts, herring, walleye pollock, smelt, Pacific cod, king crab, sole, capelin, turbot, greenling, and a range of bivalves. All five species of Pacific salmon are found in the Kotzebue Sound region.[8] Marine mammals found within the Chukchi Sea include spotted seal, bearded seal, ringed seal, ribbon seal, beluga whale, killer whale, harbor porpoise, gray whale, minke whale, bowhead whale, polar bear, and Pacific walrus.[9]

Mineral resources in the region include a major zinc-leader development operated by NANA Corporation and Tech Alaska Incorporated. The Red Dog mine has been in operation since 1989 and one of the world's largest producers of zinc concentrate.[10]

Environmental hazards manifest almost exclusively in the form of flood and erosion events caused by storm surges. Storm flooding historically occurred in early fall, before the formation of sea ice along the shore. However, Kivalina can experience storm events at any time of the year. Southwesterly storms bring 70 knot winds in the summer and early fall, while winter storms typically come from the northeast. Local observations have found that shorefast ice has formed later in recent years, increasing the effects of fall storm flooding. For two decades, steady erosion of the Kivalina shoreline has led to increased sea encroachment, and the City has decided that relocation to an inland site is necessary. Relocation inland would alleviate shoreline flooding concerns; however, the U.S. Army Corps of Engineers (USACE) estimates relocation to be 15 to 20 years away, putting the community in a difficult situation if current erosion trends continue. In addition to sediment removal, bank failure, and habitat destruction; flood and erosion hazards can damage infrastructure, leading to the potential release of toxic contaminates into the local environment. Outhouses, the school sewer, septic bunkers, and dog yards are all potential sources of contaminants which could impact community health. A significant concern of flood victims would be the lack of a reliable, clean water source. Mitigation measures in place include a large rock revetment, proposed evacuation route, public awareness programs, and structure elevation and relocation plans.[11]

In 2003, the Government Accountability Office reported that Kivalina faced an imminent threat from flooding and erosion, and the USACE was utilized in assessing threats and possible mitigative actions, including relocation. Storms in 2004 and 2005 caused significant damage to Kivalina's shore, and it was estimated that 70 to 80 feet of coastline was lost. The city was subsequently declared a federal disaster area by the Federal Emergency Management

[7] National Park Service. (n.d.). *Final Environmental Impact Statement: Cape Krusenstern National Monument, Alaska.* Retrieved September 19, 2012 from: http://wilderness.nps.gov/document/III-3.pdf.
[8] North Pacific Fishery Management Council. (2009). *Fishery Management Plan for Fish Resources of the Arctic Management Area.* Retrieved September 19, 2012 from: http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/Arctic/ArcticFMP.pdf.
[9] Angliss, R. P. and K. L. Lodge. 2004. Alaska marine mammal stock assessments, 2003. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-144. Retrieved September 20, 2012 from http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2003.pdf.
[10] See footnote 4.
[11] City of Kivalina; ASCG Inc. of Alaska; and Bechtol Planning and Development. (2007). *City of Kivalina, Alaska Local Hazards Mitigation Plan.* Retrieved September 20, 2012 from: http://www.commerce.state.ak.us/dca/planning/nfip/Hazard_Mitigation_Plans/Kivalina_HMP.pdf.

Administration (FEMA), qualifying it for relief funding. A seawall was soon constructed; however, it failed a day before its inauguration. A storm in 2007 forced an evacuation of the community, and a large rock revetment project was planned soon after. Kivalina had selected the relocation site of *Kiniktuuraq*, which was located a mile southeast on a portion of the Chukchi Sea coast that had been used by residents as a subsistence camp. However, the site was determined as vulnerable to erosion by federal contractors, and would require riprap and armor rock to stabilize the shoreline. This determination frustrated Kivalina residents, as it conflicted with local and traditional ecological knowledge of area characteristics. However, the USACE requires that floodplain delineation and long-term shoreline stabilization plans are submitted before relocation efforts can be funded by FEMA and to qualify for federal disaster insurance. These requirements raised the cost of relocation significantly.[12]

In 2008, costs associated with relocation prompted the City of Kivalina and the Native Village of Kivalina to file a public nuisance suit against Exxon-Mobil Corporation and 23 other fossil fuel companies for contributing to the effects of global warming though excessive emissions of greenhouse gases. The claim stated that harm to the community was caused by anthropogenic climate changes, which was caused in part by carbon dioxide emitted by the defendants. However, a California District Court dismissed the case on grounds that the plaintiffs' claim lacked standing. It was the court's opinion that under the political question doctrine, it was inappropriate for the court system to weigh in on an issue that had not been given clear legislative or political definitions. In addition, the plaintiffs' claim that harm was linked to the defendants' emissions lacked sufficient evidence. The case was later filed in appellate court in 2010, and oral argument was held in November 2011.[13] Ultimately, the original ruling was upheld.

According to the Alaska Department of Environmental Conservation, there are no significant environmental remediation sites active within Kivalina as of 2010. However, the nearby Red Dog Mine site consistently monitored for potential impacts to populated and subsistence use areas from fugitive dust and lead sulfide and zinc sulfide contaminates. Potential risks include respiratory problems associated with dust, and impacts to subsistence food sources from dissolved or bioaccumulated contaminates. Dust deposition from the mine site poses risks to the local environment surrounding open pits. A study conducted in 2001 found that it was safe to continue eating subsistence foods, and mitigation techniques have been put in place to control fugitive dust particles.[14]

Current Economy[15]

Kivalina's economy is heavily dependent upon subsistence hunting and fishing. Wage employment opportunities are limited, and many jobs are either part-time or seasonal. Major employers include the City, Village Council, school, Maniilaq Association, NANA Regional

[12] Shearer, C. 2012. The political ecology of climate adaptation assistance: Alaska Natives, displacement, and relocation. J. Political Ecol. 19, 174-183.
[13] Abate, R. S. (2010). Public Nuisance Suits for the Climate Justice Movement: the Right Thing and the Right Time. (2010). *Washington Law Review, 85*, 197-252.
[14] Alaska Dept. of Environmental Conservation. (n.d.). *Contaminated Sites Program: Red Dog Mine.* Retrieved September 20, 2012 from: http://dec.alaska.gov/spar/csp/sites/reddog.htm.
[15] Unless otherwise noted, all monetary data are reported in nominal values.

Corp., local stores, and the Red Dog Mine. Commercial fishing is another source of seasonal employment. The Native art industry is also expanding, and locals specialize in ivory carving.[16]

In 2010,[17] the estimated per capita income was $13,425 and the estimated median household income was $59,375, compared to $8,360 and $30,833 in 2000, respectively. After adjusting for inflation by converting 2000 values into 2010 dollars,[18] the real per capita income ($10,993) and real median household income ($40,545) indicate that both individual and household earnings declined. In 2010, Kivalina ranked 220th of 305 communities from which per capita income was estimated, and 79th of 299 communities from which median household income was estimated.

However, Kivalina's small population size may have prevented the ACS from accurately portraying economic conditions.[19] Another understanding of per capita income is obtained through economic data compiled by the Alaska Local and Regional Information (ALARI) database maintained by the Alaska Department of Labor and Workforce Development (DOLWD). According to the ALARI database, residents earned $2.96 million in total wages in 2010.[20] When matched with the 2010 Decennial Census population, the per capita income equals $7,919, which is significantly less than the 2010 ACS estimate and suggests that cautions should be used when comparing 2010 ACS and 2000 Census figures.[21] This is supported by the fact that Kivalina was recognized as "distressed" by the Denali Commission, indicating that over 70% of residents aged 16 and older earned less than $16,120 in 2010.[22] It should be noted that ACS and DOLWD data are based on wage earnings and do not take into account the value of subsistence within the local economy.

According to 2006-2010 ACS estimates,[23] 66.8% of residents aged 16 and older were part of the civilian labor force in 2010. In that year, unemployment was estimated at 17.1%, compared to an estimated 5.9% statewide; and an estimated 22.0% of residents lived below the poverty line, compared to an estimated 9.5% of Alaskan residents overall. Again, it should be noted that the ACS may not have accurately captured economic conditions in Kivalina due to its small population size. According to 2010 ALARI estimates, the unemployment rate was 25.8% based on unemployment insurance claimants.[24] Of those employed in 2010, the ACS estimated that 40.3% worked in the private sector and 59.7% worked in the public sector.

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[16] NANA Regional Corporation. (n.d.). *Kivalina.* Retrieved September 20, 2012 from: http://www.nana.com/regional/about-us/overview-of-region/kivalina/.

[17] U.S. Census Bureau (n.d.). *Profile of selected social, economic and housing characteristics of all places within Alaska*. Datasets utilized include the 2010 American Community Survey 5-year estimates. Retrieved November 1, 2011 from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.

[18] Inflation was calculated using the Anchorage Consumer Price Index for 2010 (retrieved January 5, 2012) from the Alaska Department of Labor, http://labor.alaska.gove/research/cpi/inflationcalc.htm).

[19] While American Community Survey (ACS) estimates can provide a good snapshot estimate for larger populations, smaller populations can be misrepresented by ACS estimates if demographic information is not collected from a representative sample of the population. This is especially problematic for Alaskan communities with small populations that have a low probability of being adequately sampled.

[20] ALARI estimates based on wages reported for unemployment insurance purposes. Estimates do not include self-employed or federally employed residents.

[21] Alaska Department of Labor and Workforce Development (n.d.). *Alaska Local and Regional Information Database.* Retrieved April 23, 2012 from http://live.laborstats.alaska.gov/alari/.

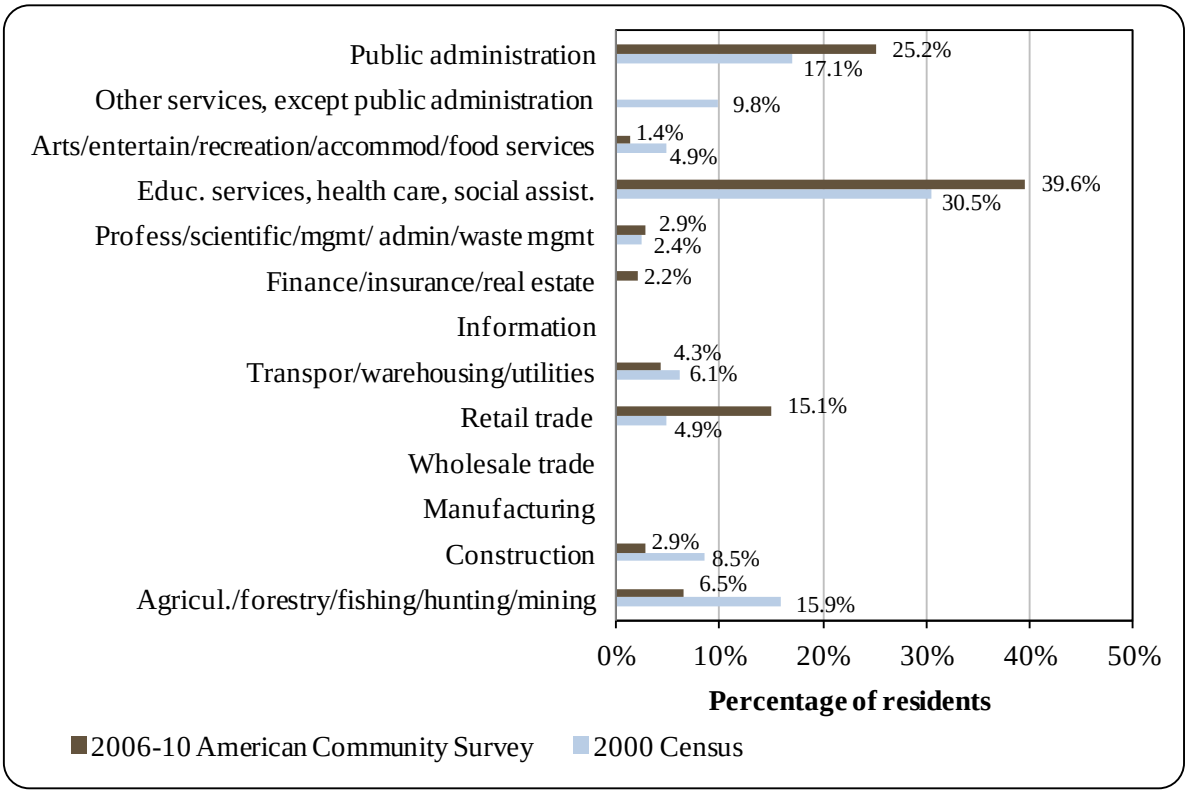
[22] Denali Commission. 2011. *Distressed Community Criteria 2011 Update*. Retrieved April 16, 2012 from: www.denali.gov.

[23] See footnote 19.

[24] See footnote 21.

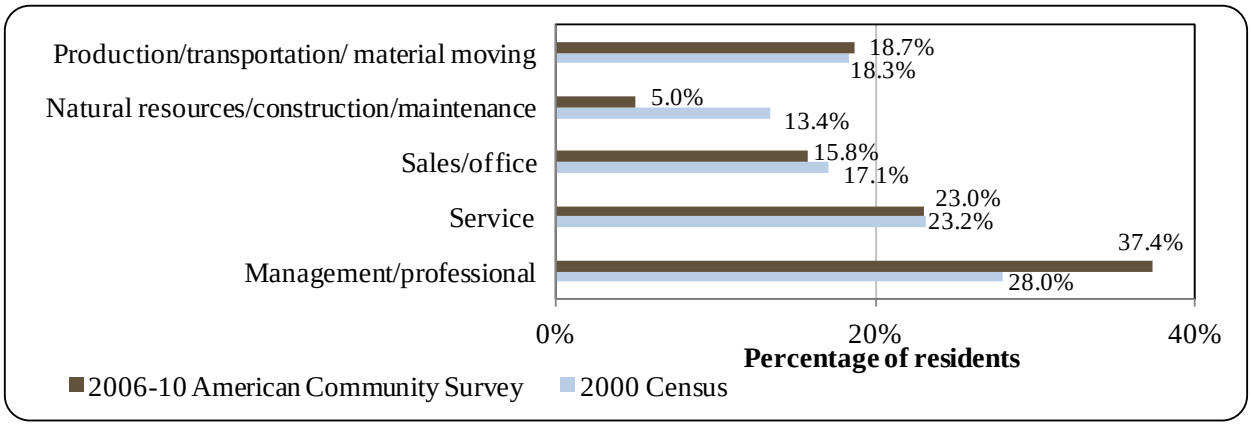
By industry, most (39.6%) employed residents were estimated to work in education services, health care, and social assistance sectors; followed by public administration (25.2%); retail trade (15.1%); and agriculture, forestry, fishing, hunting, and mining (6.5%) sectors.[25] According to 2010 ALARI estimates, most (66.5%) employed residents worked in local government sectors; followed by educational and health service (11.2%) and natural resources and mining (7.1%) sectors.[26] Between 2000 and 2010, there was significant variation in employment by industry sector. Significant proportional increases occurred in public administration sectors; education services, health care, and social assistance sectors; and retail trade sectors. Conversely, significant proportional declines occurred in other service sectors; construction sectors; and agriculture, forestry, fishing, hunting, and mining sectors (Figure 3).

Figure 3. Local Employment by Industry in 2000-2010, Kivalina (U.S. Census).



[25] U.S. Census Bureau (n.d.). *Profile of selected social, economic and housing characteristics of all places within Alaska*. Datasets utilized include the 2010 American Community Survey 5-year estimates. Retrieved November 1, 2011 from http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml.
[26] Ibid.

Figure 4. Local Employment by Occupation in 2000-2010, Kivalina (U.S. Census).



By occupation type, most (37.4%) employed residents were estimated to hold management or professional positions; followed by service (23.0%); production, transportation, or material moving (18.7%); sales or office (15.8%); and natural resources, construction, or maintenance (5.0%) positions (Figure 4).[27] According to 2010 ALARI estimates, most employed residents held construction laborer occupations; followed by stock clerks or other fillers; office or administrative support workers; and gaming service workers. ALARI listed 11 occupational categories in 2010.[28] Between 2000 and 2010, there were significant variations in employment by occupation type. Significant proportional increases occurred in management or professional occupations. Conversely, significant proportional declines occurred in natural resources, construction, and maintenance positions.

Governance

Kivalina is a Second-class city with a mayoral form of government. There is a six-member city council, eleven-member school board, and five municipal employees. In addition, there is a U.S. Bureau of Indian recognized tribal government.

The Alaska Native Claims Settlement Act (ANCSA) chartered regional corporation representing Kivalina is the NANA Regional Corporation, which also serves as the ANCSA-chartered village corporation. The local ANCSA chartered non-profit is the Maniilaq Association.

The closest National Marine Fisheries Service (NMFS) office is located in Anchorage, 620 miles southeast. The closest Alaska Department of Fish and Game (ADF&G) office is located in Kotzebue, 80 miles southeast. The closest U.S. Bureau of Citizenship and Immigration Services office is located in Nome, 490 miles south.

Municipal revenues were taken from Certified Financial Statements. When adjusted for inflation,[29] total municipal revenues declined by 2.4% between 2000 and 2010 from $836,087, to $1.06 million. Total municipal revenues peaked in 2009 at $1.68 million, and were at their lowest in 2005 at $241,479. In 2010, most (79.5%) municipal revenues were collected locally. In

[27] Ibid.
[28] Ibid.
[29] Inflation calculated using Anchorage CPI from Alaska DOL: http://labor.alaska.gov/research/cpi/cpi.htm.

that year most locally generated revenues were collected from gaming revenues, followed by donations, utility rents, and debt interests. Outside revenues were collected from state allocated Community Revenue Sharing and other outside grants. Sales tax revenues accounted for 2.5% of total municipal revenues in 2010, compared to less than one-percent in 2000. In addition, Community Revenue Sharing accounted for 11.1% of total municipal revenues that year, compared to 3.8% in 2000 from State Revenue Sharing. Information regarding municipal revenue can be found in Table 2.

Table 2. Selected Municipal, State, or Federal Revenue Streams for the Community of Kivalina from 2000 to 2010.

Year	Total Municipal Revenue[1]	Sales Tax Revenue[2]	State/Community Revenue Sharing[3,4]	Fisheries-Related Grants (State and Federal)[5]
2000	$836,087	$6,017	$31,947	n/a
2001	$1,257,173	$29,411	$32,017	n/a
2002	$949,436	$2,200	$30,054	n/a
2003	$769,776	$3,002	$30,054	n/a
2004	$510,492	$7,466	-	n/a
2005	$241,479	$4,066	-	n/a
2006	$667,988	$14,444	-	n/a
2007	$956,968	$21,121	-	n/a
2008	$1,232,015	$24,088	-	n/a
2009	$1,683,112	$30,731	$116,510	n/a
2010	$1,055,540	$26,037	$116,711	n/a

[1] Alaska Dept. of Comm. and Rural Affairs. (n.d.). *Financial Documents Delivery System*. Retrieved April 15, 2011from http://www.commerce.state.ak.us/dcra/commfin/CF_FinRec.cfm.
[2] Alaska Dept. of Comm. and Econ. Dev. (n.d.). *Alaska Taxable (2000-2010)*. Retrieved April 15, 2011 from http://www.commerce.state.ak.us/dca/osa/osa_summary.cfm.
[3] Alaska Dept. of Rev. (n.d.). *(2000-2009) Taxes and Fees Annual Report*. Retrieved April 15, 2011from https://www.tax.state.ak.us.
[4] The State Revenue Sharing program ceased in 2003 and was replaced by the Community Revenue Sharing program starting in 2009.
[5] Alaska Dept. of Comm. and Rural Affairs. (n.d.). *Community Funding Database*. Retrieved April 15, 2011from http://www.commerce.state.ak.us/dca/commdb/CF_Grants.htm.

Infrastructure

Connectivity and Transportation[30,31]

Kivalina is not connected to any road systems, and basic modes of transportation to and from Kivalina are plane, small boat, and snowmobile. The state owns a 3,000-foot long by 60-foot wide gravel airstrip. There is daily service from Kotzebue and twice weekly service from Point Hope provided by Bering Air and Era Aviation. In total, roundtrip airfare between Anchorage and Kivalina in June 2012 was $718.[32] Air freight services between Kivalina and Kotzebue are provided by Ryan Air, Bering Air, and Era Aviation. Two main hunting trails follow the Kivalina and Wulik Rivers. Northland Services barges fuel, automobiles, groceries, household goods, and general supplies to Kivalina in July and August. Cargo is shipped in from either Anchorage or Seattle.

Facilities[33,34]

Water is sourced from the Wulik River and pumped via a 3-mile surface line to a pair of storage tanks holding 1.17 million gallons. Water is chlorinated and fluoridated as it is pumped. Kivalina operates on a "fill-and-draw" system meaning that water is pumped and stored during July and August for use during the winter. During warm-weather months, residents haul and treat their own water individually, while during the winter water is hauled from the central tanks. A few residents have plumbing, and the school and health clinic are fully plumbed with individual water and sewer lines. Residential sewage is hauled in honeybuckets to four disposal bunkers located throughout the community. A washeteria is operated by the city within the community and offers three showers. When the water tank is down to 12 feet, the washeteria is closed to the public.

The Alaska Village Electric Co-op provides electricity via diesel generators with a peak capacity of 1,040 kilowatts. Telephone service is provided by Kotzebue-based OTZ Telephone Cooperative. Landline and cellular phone service capabilities are available. OTZ also provides DSL high speed internet services. Cable television service is provided by the City.

A community hall and Boys & Girls Club are available in the community. There is no Village Public Safety Office, and services are provided by state troopers based in Kotzebue. The City also maintains its own volunteer fire department and search and rescue group. Visitor accommodations are not available in Kivalina. Other public facilities include the City Office, Tribal Office, Kivalina Native Store, two churches, bingo hall, and three small privately owned dry goods shops.

[30] NANA Regional Corporation. (n.d.). *Kivalina.* Retrieved September 24,2012 from: http://www.nana.com/regional/about-us/overview-of-region/kivalina/.
[31] Alaska Dept. of Comm. and Rural Affairs. (n.d.). *Community Database Online*. Retrieved October 17, 2011 from http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.htm.
[32] Airfare was calculated using lowest fare from www.travelocity.com (Retrieved November 22, 2011).
[33] See footnote 31.
[34] See footnote 30.

Medical Services[35]

The Kivalina Clinic operated by the Maniilaq Association provides residents with basic medical services. Two health aides provide services 6 days per week and are on call 24 hours. The small clinic has a waiting room, two exam rooms, an office, a communications room, and a bathroom. Acute, long-term, specialized, and emergency medical services are provided in Kotzebue.

Educational Opportunities

McQueen School provides preschool through 12th grade instruction. As of 2011, there were 139 students enrolled and 13 teachers employed.[36] Opportunities for post-secondary education are available through online classes provided by Chukchi Campus, a rural division of the University of Alaska.[37] Bachelor's degrees are offered in child development and family studies, rural development, social work, and education. Master's degrees are offered in education and rural development.[38]

Involvement in North Pacific Fisheries

History and Evolution of Fisheries

Historically, the area's inhabitants used Kivalina as a seasonal subsistence camp. Important subsistence fish include Arctic char, chum salmon, sheefish, whitefish, tomcod, and smelt. Important subsistence marine mammals include bearded seals, ringed seals, spotted seals, beluga whale, and bowhead whale, and walrus. Subsistence harvests are conducted throughout the year, depending on species. Bowhead and beluga whale hunting is primarily conducted in the spring, from April through June. Walrus hunting peaks during May and June. Seal hunting peaks from April through June, and again from late January through the end of February. Fishing is done throughout the year, along coastal areas and within the Kivalina and Wulik River drainages. Arctic char and chum salmon are especially important species.[39]

With the exception of Pacific halibut, commercial fishing within the federally managed Arctic Management Area (AMA) is prohibited under the current Arctic Fishery Management Plan (FMP). Pacific salmon fisheries are managed by the State of Alaska and directed fishing is allowed in State waters within the Kotzebue Sound region. Halibut is management under the International Pacific Halibut Commission (IPHC). Halibut harvests may occur within federal waters under the management of the IPHC; however, no commercial harvests have been attempted. Experimental fishing for halibut has occurred within the AMA in the past. Directed

[35] Ibid.
[36] Alaska Department of Education and Early Development. (2012). *Statistics and Reports*. Retrieved April 24, 2012 from http://eed.alaska.gov/stats/.
[37] Ibid.
[38] University of Alaska Fairbanks. (n.d.). *Chukchi Campus.* Retrieved September 24, 2012 from: http://www.uaf.edu/chukchi/.
[39] U.S. Environmental Protection Agency, U.S. Dept. of the Interior, U.S. Dept. of the Army Corps of Engineers, and Ott Water Engineers, Inc. (1984). *Final Environmental Impact Statement Red Dog Mine Project.* Retrieved September 24, 2012 from: http://nepis.epa.gov/EPA/.

fishing for crab in the Chukchi Sea is limited to small subsistence or personal use fisheries. The commercial harvest of crab within the AMA is prohibited under the current Arctic FMP.[40]

In terms of state water fisheries, a small crab fishery occurs in the Norton Sound area; adjacent to the AMA. While authorized under the federal crab FMP, management is largely deferred to the State. Some crab subsistence and personal use occurs within the southeastern Chukchi Sea. A commercial salmon fishery is managed by the state within the Kotzebue Sound region. Again, commercial salmon harvests are prohibited within the AMA. While prohibited within the AMA, herring harvests occur in some adjacent State waters. Dolly Varden are at times caught incidentally during salmon harvests within the Kotzebue Sound region.[41]

Processing Plants

According to ADF&G's 2010 Intent to Operate list, Kivalina does not have a registered processing plant. The closest seafood processor is located in Kotzebue.

Fisheries-Related Revenue

Between 2000 and 2010, there was no known fisheries-related revenue reported by the community of Kivalina (Table 3).

Commercial Fishing

Overall, commercial fishing in Kivalina is somewhat limited. In both 2000 and 2010, five residents, or 1.3% of the population, held five commercial fishing permits issued by the Commercial Fisheries Entry Commission (CFEC). Between those years, no more than five residents held CFEC permits. Salmon was the only species harvested by residents of Kivalina between 2000 and 2010. No residents held Federal Fisheries Permits (FFP) or License Limitation Program (LLP) permits in those years, nor did any residents hold halibut, sablefish, or crab quota share. In 2010, 20% of permits held were actively fished, compared to 40% in 2000; which was also the year that local permit activity peaked.

Residents held three commercial crew licenses in 2010, compared to two in 2000. In addition, residents held majority ownership of only one commercial fishing vessel that year, compared to none in 2000. Kotzebue gillnet salmon was the only fishery prosecuted by residents of Kivalina in 2010.

No landings were reported in Kivalina between 2000 and 2010. Landings reported by residents of Kivalina during that time are considered confidential. Information regarding commercial fishing trends can be found in Tables 4 through 10.

[40] North Pacific Fishery Management Council. (2009). *Fishery Management Plan for Fish Resources of the Arctic Management Area.* Retrieved September 25, 2012 from: http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/Arctic/ArcticFMP.pdf.
[41] Ibid.

Table 3. Known Fisheries-Related Revenue (in U.S. Dollars) Received by the Community of Kivalina: 2000-2010.

Revenue source	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Raw fish tax[1]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Shared Fisheries Business Tax[1]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Fisheries Resource Landing Tax[1]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Fuel transfer tax[2]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Extraterritorial fish tax[2]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bulk fuel transfers[1]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Boat hauls[2]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Harbor usage[2]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Port/dock usage[2]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Fishing gear storage on public land[3]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Marine fuel sales tax[3]	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Total fisheries-related revenue[4]	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Total municipal revenue[5]	*$836,087*	*$1.56 M*	*$949,436*	*$769,776*	*$510,492*	*$241,479*	*$667,988*	*$956,968*	*$1.23 M*	*$1.68 M*	*$1.06 M*

Note: n/a indicates that no data were reported for that year.

[1] Alaska Dept. of Comm. and Econ. Dev. (n.d.) *Alaska Taxable (2000-2010)*. Retrieved April 15, 2011 from http://www.commerce.state.ak.us/dca/osa/osa_summary.cfm.

[2] Alaska Dept. of Comm. and Rural Affairs. (n.d.) *Financial Documents Delivery System*. Retrieved April 15, 2011 at http://www.commerce.state.ak.us/dcra/commfin/CF_FinRec.cfm.

[3] Reported by community leaders in a survey conducted by the AFSC in 2011.

[4] Total fisheries related revenue represents a sum of all known revenue sources in the previous rows.

[5] Total municipal revenue represents the total revenue that the City reports each year in its municipal budget. Alaska Dept. of Comm. and Rural Affairs. (n.d.) *Financial Documents Delivery System*. Retrieved April 15, 2011 at http://www.commerce.state.ak.us/dcra/commfin/CF_FinRec.cfm.

Table 4. Permits and Permit Holders by Species, Kivalina: 2000-2010.

Species		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Groundfish (LLP) [1]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Active permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0
Crab (LLP) [1]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Active permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0
Federal Fisheries Permits [1]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Fished permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0
Crab (CFEC) [2]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Fished permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0
Other shellfish (CFEC) [2]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Fished permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0
Halibut (CFEC) [2]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Fished permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0
Herring (CFEC) [2]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Fished permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0

Table 4 cont'd. Permits and Permit Holders by Species, Kivalina: 2000-2010.

Species		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sablefish (CFEC) [2]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Fished permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0
Groundfish (CFEC) [2]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Fished permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0
Other Finfish (CFEC) [2]	Total permits	0	0	0	0	0	0	0	0	0	0	0
	Fished permits	0	0	0	0	0	0	0	0	0	0	0
	% of permits fished	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Total permit holders	0	0	0	0	0	0	0	0	0	0	0
Salmon (CFEC) [2]	Total permits	5	4	4	4	5	5	5	5	5	5	5
	Fished permits	2	1	0	0	1	1	1	1	1	1	1
	% of permits fished	40%	25%	0%	0%	20%	20%	20%	20%	20%	20%	20%
	Total permit holders	5	4	4	4	5	5	5	5	5	5	5
Total CFEC Permits[2]	*Permits*	*5*	*4*	*4*	*4*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
	Fished permits	*2*	*1*	*0*	*0*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
	% of permits fished	*40%*	*25%*	*0%*	*0%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
	Permit holders	*5*	*4*	*4*	*4*	*5*	*5*	*5*	*5*	*5*	*5*	*5*

[1] National Marine Fisheries Service. 2011. Data on License Limitation Program, Alaska Federal Processor Permits (FPP), Federal Fisheries Permits (FFP), and Permit holders. NMFS Alaska Regional Office. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[2] Alaska Commercial Fisheries Entry Commission. 2011. Alaska commercial fishing permits, permit holders, and vessel licenses, 2000 – 2010. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

Table 5. Characteristics of the Commercial Fishing Sector in Kivalina: 2000-2010.

Year	Crew License Holders[1]	Count Of All Fish Buyers[2]	Count Of Shore-Side Processing Facilities[3]	Vessels Primarily Owned by Residents[4]	Vessels Homeported[4]	Vessels Landing Catch in Kivalina[2]	Total Net Pounds Landed in Kivalina[2,5]	Total Ex-Vessel Value of Landings in Kivalina[2,5]
2000	2	0	0	0	0	0	0	$0
2001	2	0	0	1	1	0	0	$0
2002	0	0	0	0	0	0	0	$0
2003	0	0	0	1	1	0	0	$0
2004	3	0	0	1	1	0	0	$0
2005	4	0	0	0	0	0	0	$0
2006	2	0	0	0	0	0	0	$0
2007	3	0	0	1	1	0	0	$0
2008	2	0	0	1	1	0	0	$0
2009	2	0	0	1	1	0	0	$0
2010	3	0	0	1	1	0	0	$0

Note: Cells showing – indicate that the data are considered confidential.

[1] Alaska Department of Fish and Game. 2011. Alaska sport fish and crew license holders, 2000 – 2010. ADF&G Division of Administrative Services. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[2] Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. 2011. Alaska fish ticket data. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[3] Alaska Department of Fish and Game. (2011). Data on Alaska fish processors. ADF&G Division of Commercial Fisheries. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[4] Alaska Commercial Fisheries Entry Commission. 2011. Alaska commercial fishing permits, permit holders, and vessel licenses, 2000 – 2010. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[5] Totals only represent non-confidential data.

Table 6. Halibut Catch Share Program Participation by Residents of Kivalina: 2000-2010.

Year	Number of Halibut Quota Share Account Holders	Halibut Quota Shares Held	Halibut IFQ Allotment (Pounds)
2000	0	0	0
2001	0	0	0
2002	0	0	0
2003	0	0	0
2004	0	0	0
2005	0	0	0
2006	0	0	0
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0

Source: National Marine Fisheries Service. 2011. Alaska Individual Fishing Quota (IFQ) permit data. NMFS Alaska Regional Office. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

Table 7. Sablefish Catch Share Program Participation by Residents of Kivalina: 2000-2010.

Year	Number of Sablefish Quota Share Account Holders	Sablefish Quota Shares Held	Sablefish IFQ Allotment (Pounds)
2000	0	0	0
2001	0	0	0
2002	0	0	0
2003	0	0	0
2004	0	0	0
2005	0	0	0
2006	0	0	0
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0

Source: National Marine Fisheries Service. 2011. Alaska Individual Fishing Quota (IFQ) permit data. NMFS Alaska Regional Office. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

Table 8. Bering Sea and Aleutian Island Crab Catch Share Program Participation by Residents of Kivalina: 2000-2010.

Year	Number of Crab Quota Share Account Holders	Crab Quota Shares Held	Crab IFQ Allotment (Pounds)
2005	0	0	0
2006	0	0	0
2007	0	0	0
2008	0	0	0
2009	0	0	0
2010	0	0	0

Source: National Marine Fisheries Service. 2011. Alaska Individual Fishing Quota (IFQ) permit data. NMFS Alaska Regional Office. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

Table 9. Landed Pounds and Ex-vessel Revenue, by Species, in Kivalina: 2000-2010.

	Total Net Pounds[1]										
	2000	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	***2009***	***2010***
Crab	0	0	0	0	0	0	0	0	0	0	0
Finfish	0	0	0	0	0	0	0	0	0	0	0
Halibut	0	0	0	0	0	0	0	0	0	0	0
Herring	0	0	0	0	0	0	0	0	0	0	0
Other Groundfish	0	0	0	0	0	0	0	0	0	0	0
Other Shellfish	0	0	0	0	0	0	0	0	0	0	0
Pacific Cod	0	0	0	0	0	0	0	0	0	0	0
Pollock	0	0	0	0	0	0	0	0	0	0	0
Sablefish	0	0	0	0	0	0	0	0	0	0	0
Salmon	0	0	0	0	0	0	0	0	0	0	0
Total[2]	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
	Ex-vessel Value (nominal U.S. dollars)										
	2000	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	***2009***	***2010***
Crab	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Finfish	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Halibut	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Herring	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other Groundfish	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Other Shellfish	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Pacific Cod	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Pollock	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Sablefish	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Salmon	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total[2]	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*	*$0*

Note: Cells showing – indicate that the data are considered confidential.

Source: Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. 2011. Alaska fish ticket data. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[1] Net pounds refers to the landed weight recorded in fish tickets.

[2] Totals only represent non-confidential data.

Table 10. Landed Pounds and Ex-vessel Revenue, by Species, by Kivalina Residents: 2000-2010.

	Total Net Pounds[1]										
	2000	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	***2009***	***2010***
Crab	0	--	0	--	--	0	0	--	--	--	--
Finfish	0	--	0	--	--	0	0	--	--	--	--
Halibut	0	--	0	--	--	0	0	--	--	--	--
Herring	0	--	0	--	--	0	0	--	--	--	--
Other Groundfish	0	--	0	--	--	0	0	--	--	--	--
Other Shellfish	0	--	0	--	--	0	0	--	--	--	--
Pacific Cod	0	--	0	--	--	0	0	--	--	--	--
Pollock	0	--	0	--	--	0	0	--	--	--	--
Sablefish	0	--	0	--	--	0	0	--	--	--	--
Salmon	0	--	0	--	--	0	0	--	--	--	--
Total[2]	*0*	--	*0*	--	--	*0*	*0*	--	--	--	--
	Ex-vessel Value (nominal U.S. dollars)										
	2000	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	***2009***	***2010***
Crab	$0	--	$0	--	--	$0	$0	--	--	--	--
Finfish	$0	--	$0	--	--	$0	$0	--	--	--	--
Halibut	$0	--	$0	--	--	$0	$0	--	--	--	--
Herring	$0	--	$0	--	--	$0	$0	--	--	--	--
Other Groundfish	$0	--	$0	--	--	$0	$0	--	--	--	--
Other Shellfish	$0	--	$0	--	--	$0	$0	--	--	--	--
Pacific Cod	$0	--	$0	--	--	$0	$0	--	--	--	--
Pollock	$0	--	$0	--	--	$0	$0	--	--	--	--
Sablefish	$0	--	$0	--	--	$0	$0	--	--	--	--
Salmon	$0	--	$0	--	--	$0	$0	--	--	--	--
Total[2]	*$0*	--	*$0*	--	--	*$0*	*$0*	--	--	--	--

Note: Cells showing – indicate that the data are considered confidential.

Source: Alaska Department of Fish and Game, and Alaska Commercial Fisheries Entry Commission. 2011. Alaska fish ticket data. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[1] Net pounds refers to the landed weight recorded in fish tickets.

[2] Totals only represent non-confidential data.

Recreational Fishing

Sportfishing in remote areas of Northwest Alaska is extremely limited due to travel costs and a lack of visitor infrastructure. There are few recreational fisheries in the AMA and no catch and release fishery management programs. Personal use fisheries exist, although they are more closely related to subsistence fisheries. Most recreational fishing occurs near Kotzebue and within state waters.[42]

Between 2000 and 2010, there were no sport fish guide businesses registered within the community, no sport fish guide licenses issued to residents, and no sportfishing licenses sold within the community. In 2010, residents held 25 sportfishing licenses, compared to 5 in 2000. No information on species targeted by resident private anglers is available (Table 11).

Kivalina is located within the Northwest Alaska ADF&G Harvest Survey Area which includes the Selawik, Kobuk, Noatak, Wulik, and Kivalina river drainages; and all saltwater in the northern half of Kotzebue Sound. There are no saltwater angler days fished data available for 2010. In 2009, there was a total of 251 angler days fished, compared to 215 in 2000. In that year, non-Alaskan residents accounted for 100% of total angler days fished, compared to 6.5% in 2000. In 2010, there was a total of 1,088 freshwater angler days fished, compared to 1,404 in 2000. In that year, non-Alaskan residents accounted for 32.7% of total angler days fished, compared to 31.2% in 2000. Further information regarding recreational fishing trends can be found in Table 11.

Table 11. Sport Fishing Trends, Kivalina: 2000-2010.

Year	Active Sport Fish Guide Businesses[1]	Sport Fish Guide Licenses[1]	Sport Fishing Licenses Sold to Residents[2]	Sport Fishing Licenses Sold in Kivalina[2]
2000	0	0	5	0
2001	0	0	5	0
2002	0	0	4	0
2003	0	0	5	0
2004	0	0	6	0
2005	0	0	6	0
2006	0	0	27	0
2007	0	0	22	0
2008	0	0	19	0
2009	0	0	6	0
2010	0	0	25	0

[42] North Pacific Fishery Management Council. (2009). *Fishery Management Plan for Fish Resources of the Arctic Management Area.* Retrieved September 25, 2012 from: http://www.fakr.noaa.gov/npfmc/PDFdocuments/fmp/Arctic/ArcticFMP.pdf.

Table 11 cont'd. Sport Fishing Trends, Kivalina: 2000-2010.

Year	Saltwater		Freshwater	
	Angler Days Fished – Non-Residents[3]	Angler Days Fished – Alaska Residents[3]	Angler Days Fished – Non-Residents[3]	Angler Days Fished – Alaska Residents[3]
2000	14	201	438	966
2001	44	86	509	801
2002	27	15	275	973
2003	298	17	934	939
2004	115	19	450	709
2005	35	308	408	510
2006	36	35	394	875
2007	79	27	237	763
2008	352	68	512	639
2009	251	n/a	347	913
2010	n/a	n/a	356	732

[1] Alaska Department of Fish and Game. 2011. Alaska sport fish guide licenses and businesses, 2000 – 2010. ADF&G Division of Administrative Services. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[2] Alaska Department of Fish and Game. 2011. Alaska sport fish and crew license holders, 2000 – 2010. ADF&G Division of Administrative Services. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. [URL not publicly available as some information is confidential.]

[3] Alaska Department of Fish and Game. 2011. Alaska Sport Fishing Survey results, 2000 – 2010. ADF&G Division of Sport Fish, Alaska Statewide Harvest Survey project. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. http://www.adfg.alaska.gov/sf/sportfishingsurvey/ (Accessed September 2011).

Subsistence Fishing

Subsistence is essential to Kivalina's residents, sustaining them economically, nutritionally, and culturally. Popular subsistence fishing areas include the Kivalina River and Wulik River watersheds, as well as coastal areas of the Chukchi Sea. According to ADF&G household surveys conducted in 2008, 34% of households reported participating in salmon subsistence activities in 2007, 67% reported participating in marine mammal subsistence activities, 7% reported participating in marine invertebrate subsistence activities, and 79% reported participating in non-salmon fish subsistence activities (Table 12). In terms of subsistence resource use, 98% of households reported using fish and 93% reported using marine mammals in 2007.[43]

Broken down by species, most (45%) households surveyed in 2008 reported using chum salmon in 2007, followed by pink (19%), coho (10%), and Chinook (7%) salmon. Also in that year, an estimated 2,406 pounds of chum salmon were harvested, followed by an estimated 502 pounds of Chinook, 251 pounds of pink, and 33 pounds of coho salmon. Data regarding

[43] Magdanz, J.S., N. S. Braem,, B. C. Robbins,, and D. S. Koster. 2010. Subsistence Harvests in Northwest Alaska, Kivalina and Noatak, 2007. Alaska Dept. of Fish and Game Technical Paper No. 354. Retrieved September 25, 2012 from: http://www.subsistence.adfg.state.ak.us/techpap/TP354.pdf.

subsistence salmon permits issued by ADF&G are largely unavailable, with only limited data reported in 2008. In terms of non-salmon fish, 93% of households surveyed in 2008 reported using Dolly Varden in 2007, followed by saffron cod (81%), whitefish (40%), sheefish (36%), Arctic grayling (33%), Arctic cod (31%), northern pike (17%), and burbot (14%). Overall, an estimated 75,332 to 78,780 lbs of non-salmon fish were harvested in 2007.[44,45] Between 2003 and 2010, no residents were issued Subsistence Halibut Registration Certificates (SHARC) by NMFS (Table 14).

Marine mammals accounted for the largest part of Kivalina's subsistence harvest in 2007. In that year, 126,002 lbs of marine mammals were harvested, accounting for 49% of the total community subsistence harvest reported for that year. In that year, most (88%) households reported using beluga whale, followed by bearded seal (83%), bowhead whale (64%), ringed seal (48%), walrus (45%), spotted seal (5%), and ribbon seal (2%).[46] For species listed in Table 15, an estimated total of 78 beluga whales, 6 walrus, and 2 polar bears were harvested between 2000 and 2010. Most beluga whale harvests occurred in 2000 (44) and 2007 (22).

Overall, 10 species accounted for 95% of the edible weight harvested by subsistence resources (most of which were aquatic species). This included an estimated 229 bearded seals, 20,527 Dolly Varden, 268 caribou, 22 beluga whale, 25,824 saffron cod, 71 ringed seals, 490 gallons of cloudberries (salmonberries), 401 chum salmon, 357 gallons of crowberries, and 4 moose.[47]

In terms of availability of aquatic resources, 26% of households reported not "getting enough" marine mammals, specifically bearded seals, walruses, bowhead whales, and beluga whales. According to ADF&G subsistence harvest records (Tables 15), an estimated 50 beluga whales and 6 walruses were harvested between 2000 and 2010; however, these estimates were not consistent with the 2008 ADF&G household survey.

[44] Ibid.
[45] Alaska Department of Fish and Game. 2011. *Community Subsistence Information System (CSIS).* ADF&G Division of Subsistence. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. http://www.adfg.alaska.gov/sb/CSIS/ (Accessed February 2011).
[46] Ibid.
[47] Ibid.

Table 12. Subsistence Participation by Household and Species, Kivalina: 2000-2010.

Year	% Households Participating in Salmon Subsistence	% Households Participating in Halibut Subsistence	% Households Participating in Marine Mammal Subsistence	% Households Participating in Marine Invertebrate Subsistence	% Households Participating in Non-Salmon Fish Subsistence	Per Capita Subsistence Harvest (pounds)
2000	n/a	n/a	n/a	n/a	n/a	n/a
2001	n/a	n/a	n/a	n/a	n/a	n/a
2002	n/a	n/a	n/a	n/a	n/a	n/a
2003	n/a	n/a	n/a	n/a	n/a	n/a
2004	n/a	n/a	n/a	n/a	n/a	n/a
2005	n/a	n/a	n/a	n/a	n/a	n/a
2006	n/a	n/a	n/a	n/a	n/a	n/a
2007	34%	n/a	67%	7%	79%	n/a
2008	n/a	n/a	n/a	n/a	n/a	n/a
2009	n/a	n/a	n/a	n/a	n/a	n/a
2010	n/a	n/a	n/a	n/a	n/a	n/a

Note: n/a indicates that no data were reported for that year.
Source: Alaska Department of Fish and Game. 2011. Community Subsistence Information System (CSIS). ADF&G Division of Subsistence. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. http://www.adfg.alaska.gov/sb/CSIS/ (Accessed February 2011).

Table 13. Subsistence Fishing Participation for Salmon, Marine Invertebrates, and Non-Salmon Fish, Kivalina: 2000-2010.

Year	Subsistence Salmon Permits Issued[1]	Salmon Permits Returned[1]	Chinook Salmon Harvested[1]	Chum Salmon Harvested[1]	Coho Salmon Harvested[1]	Pink Salmon Harvested[1]	Sockeye Salmon Harvested[1]	Lbs of Marine Inverts[2]	Lbs of Non-Salmon Fish[2]
2000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2001	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2002	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2003	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2004	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2005	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2006	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2007	n/a	n/a	n/a	n/a	n/a	n/a	n/a	87	75,332
2008	1	1	1	n/a	n/a	n/a	22	n/a	n/a
2009	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2010	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note: n/a indicates that no data were reported for that year.
[1] Fall, J.A., C. Brown, N. Braem, J.J. Simon, W.E. Simeone, D.L. Holen, L. Naves, L. Hutchinson-Scarborough, T. Lemons, and T.M. Krieg. 2011, revised. Alaska subsistence salmon fisheries 2008 annual report. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 359, Anchorage. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.
[2] Alaska Department of Fish and Game. 2011. Community Subsistence Information System (CSIS). ADF&G Division of Subsistence. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle. http://www.adfg.alaska.gov/sb/CSIS/ (Accessed February 2011).

Table 14. Subsistence Halibut Fishing Participation, Kivalina: 2003-2010.

Year	SHARC Issued	SHARC Cards Fished	SHARC Halibut Lbs Harvested
2003	n/a	n/a	n/a
2004	n/a	n/a	n/a
2005	n/a	n/a	n/a
2006	n/a	n/a	n/a
2007	n/a	n/a	n/a
2008	n/a	n/a	n/a
2009	n/a	n/a	n/a
2010	n/a	n/a	n/a

Note: n/a indicates that no data were reported for that year.
Source: Fall, J.A. and D. Koster. 2011. Subsistence harvests of Pacific halibut in Alaska, 2009. Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 357, Anchorage. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.

Table 15. Subsistence Harvests of Marine Mammal Resources, Kivalina: 2000-2010.

Year	# of Beluga Whales[1]	# of Sea Otters[2]	# of Walrus[2]	# of Polar Bears[2]	# of Steller Sea Lions[3]	# of Harbor Seals[3]	# of Spotted Seals[3]
2000	44	n/a	1	n/a	n/a	n/a	n/a
2001	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2002	3	n/a	n/a	n/a	n/a	n/a	n/a
2003	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2004	1	n/a	n/a	n/a	n/a	n/a	n/a
2005	2	n/a	2	n/a	n/a	n/a	n/a
2006	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2007	22	n/a	n/a	2	n/a	n/a	n/a
2008	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2009	1	n/a	2	n/a	n/a	n/a	n/a
2010	5	n/a	1	n/a	n/a	n/a	n/a

Note: n/a indicates that no data were reported for that year.
[1] Frost, K.J., and R.S. Suydam. 2010. Subsistence harvest of beluga or white whales (*Delphinapterus leucas*) in northern and western Alaska, 1987–2006. J. Cetacean Res. Manage. 11(3): 293–299. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.
[2] U.S. Fish and Wildlife Service. 2011. Marking, Tagging and Reporting Program data bases for northern sea otter, Pacific walrus and polar bear. Office of Marine Mammals Management. Anchorage, Alaska. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Seattle.
[3] Wolfe, R.J., Fall, J.A. and M. Riedel. 2009. The subsistence harvest of harbor seals and sea lions by Alaska Natives in 2008. Alaska Native Harbor Seal Commission and Alaska Department of Fish and Game Division of Subsistence, Technical Paper No. 347, Anchorage.