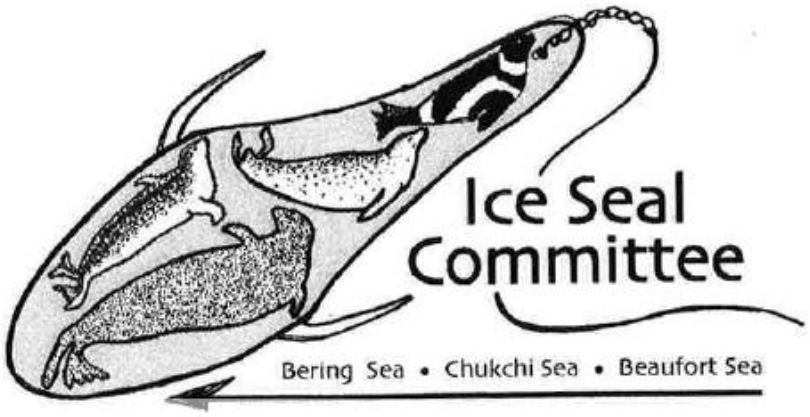
The Subsistence Harvest of Ice Seals in Alaska— a Compilation of Existing Information, 1960–2022

Approved by ISC on September 30, 2024



A Report of the Ice Seal Committee

Use of harvest data:
Due to high variability in seal harvest numbers (among years, within communities, among communities, and within regions), harvest data presented here should not be extrapolated to other communities or regions at this time. For example, during the ten-year span of 2014–2024, only 1 (Hooper Bay) of the 60 coastal communities that harvest ice seals has been surveyed in two consecutive years or more. In addition, hunter concerns regarding the misuse of harvest data make extrapolation of harvest numbers inappropriate at this time. Please contact the Ice Seal Committee for guidance prior to using these harvest data.

Citation:
Ice Seal Committee. 2024. The subsistence harvest of ice seals in Alaska – a compilation of existing information, 1960-2022. http://www.iceseals.org. Pages 1-87.

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Introduction

Bearded (*Erignathus barbatus*), ringed (*Pusa hispida*), spotted (*Phoca largha*), and ribbon seals (*Histriophoca fasciata*) are called ice seals because of their association with sea ice and their dependence on it for feeding, resting, molting, and pupping. All four species occur in the Bering, Chukchi and Beaufort seas surrounding Alaska and are harvested by coastal Alaska Natives. Hunting, processing, using, and sharing ice seals are important parts of Alaska Native culture and heritage. Seals are a source of food and skins are used for clothes, boats, and crafts. The number of seals used by a community should be determined and reported annually because this information shows how important seals are to communities and how many are needed. Documenting the subsistence harvest is especially important now because climate change and associated factors may change the number of seals in a population or change their availability to hunters.

The Ice Seal Committee (ISC), originally called the Ice Seal Working Group, was formed in 2004 and consists of five delegates and five hunter representatives, one of each from the five regions where ice seals occur in Alaska (Fig. 1). The purpose of the Ice Seal Committee as stated in the bylaws is "to preserve and enhance the marine resources of ice seals including the habitat; to protect and enhance Alaska Native culture, traditions, and especially activities associated with subsistence uses of ice seals; [and] to undertake education and research related to ice seals." **The ISC has identified the collection of harvest information as a priority.** Collecting and reporting harvest information demonstrates concern for the resource and is an important management requirement. This report serves to compile existing ice seal harvest information for the years 1960–2022 to serve as a valuable reference, determine where and how often harvest information is being collected, and highlight where efforts need to be focused in the future.

Background

Statewide seal harvest data has never been collected on a regular basis. Most recent information comes from household surveys done intermittently, often when money is available due to development projects (e.g., mining or oil and gas). Interestingly, the most comprehensive harvest data was acquired for a different objective. From 1927 to 1972, hunters were paid a $2–$6 bounty to turn in noses of seals they harvested. The original purpose of the bounty was to encourage the harvest of seals to decrease predation on commercial fish species. In northern Alaska where commercial fishing did not occur, the bounty program became important for monitoring seal harvest rather than for curbing fish depredation. The seal bounty for ice seals was used to document the harvest for several communities from 1962–1972 (Burns et al. 1964, Burns 1965–1970, 1972, 1973). Today, approximately 60 coastal communities harvest ice seals in western and northern Alaska, making statewide harvest monitoring a substantial project.

Urgency of collecting harvest information

All four seal species have been considered for listing under the Endangered Species Act (ESA), prompting the National Oceanic and Atmospheric Administration's Fisheries (NOAA Fisheries) to conduct status reviews. In 2012, NOAA Fisheries listed ringed and bearded seals as threatened based on 100-year projections of decreasing sea ice and snow (U.S. Federal Register 2012a, b). Both listings were challenged in court, however, the threatened status was upheld for bearded

seals in 2016 (Alaska Oil and Gas Association 2016) and for ringed seals in 2018 (Alaska Oil and Gas Association 2018). Climate-related changes to ice seal habitat may decrease seal populations in the future or change their availability to hunters. Documenting the harvest for all four species will help determine if such changes are occurring. Subsistence harvest data has also been used to affirm that current estimates of state-wide take are sustainable (Nelson et al. 2019). Harvest data documents the sustainability of the harvest, helps identify important patterns or trends in seal populations, and is needed for defending harvest levels in the future.

Concerns of subsistence users

Subsistence users have concerns about the collection of harvest information. Seal hunters fear that if they report the number of seals they catch each year federal managers will use it to establish regulations, such as seasons and bag limits, and will require them to buy a license to hunt seals. Currently, marine mammals are the only animals that can be harvested without a license and there is no season or bag limit, however, marine mammals can only be harvested by Alaska Natives and only in a non-wasteful manner. This system fits best with subsistence hunting practices and needs because seal hunting is often opportunistic, can occur at any time of year, and a seal hunter may provide seals for multiple families within the community, making the restriction of a bag limit problematic.

Even though it is not the intention of NOAA Fisheries to impose limits on the harvest, subsistence users have experienced limits on many other subsistence resources they rely on. Law enforcement actions over licenses, duck stamps, and hunting and fishing regulations in rural communities have resulted in arrests that upset many people and created a situation that makes conducting surveys difficult. Alaska Natives fear that reporting their subsistence harvests could get them in trouble and thus are reluctant to volunteer such information.

Use of harvest data

Due to high variability in seal harvest numbers (among years, within communities, among communities, and within regions), harvest data presented here should not be extrapolated to other communities or regions at this time. For example, during the ten-year span of 2014-2024, only 1 (Hooper Bay) of the 60 coastal communities that harvest ice seals has been surveyed in two consecutive years or more. In addition, hunter concerns regarding the misuse of harvest data make extrapolation of harvest numbers inappropriate at this time. Please contact the Ice Seal Committee for guidance prior to using these harvest data.

Methods

Household survey

Currently, the most used harvest collection method is a household survey. A household survey consists of a survey technician, preferably locally hired, surveying a predetermined number of households in a community. Survey questions focus on the number of seals harvested by the household. The level of detail varies; some surveys record only the number of each species per year, while others record the number of individuals by sex, month of harvest, struck but lost, and

age. More detail is useful but it makes the surveys take longer and cost more. Ice seals are used for subsistence in five different regions of Alaska, and each region has unique needs, concerns, and desires of the people in that region that should be considered when planning a survey. Sometimes a harvest calendar is provided prior to the survey for people to keep track of their harvest before being surveyed. A household list is used by the surveyor to keep track of which households have been surveyed, but is kept confidential so there is no way to associate the harvest reported to an individual hunter or household.

The information reported on a household survey must be analyzed in a manner that allows for expansion to the entire community. Therefore, some terminology must be understood to clarify what the numbers presented here mean. The information recorded on the survey forms is the *reported* harvest and *reported* struck but lost. This information is used to calculate *estimated* harvest and *estimated* struck but lost for the entire community. Because surveys do not cover every household in the community, we must estimate the number of seals used by the households not surveyed. The formula for estimating the annual harvest for a given community is:

$$e = \frac{R}{\%S}$$

Where "e" is the estimated total number of seals harvested in the community, "*R*" is the reported number of seals harvested, and "*%S*" is the percentage of households surveyed. For example, during 2016 we surveyed 78% of the households in Hooper Bay (%S = 0.78) and they reported harvesting 421 ringed seals (*R*). The estimated total number harvested would be:

$$e = \frac{R}{\%S} = \frac{421}{0.78} = 540 \text{ harvested ringed seals}$$

The estimated struck but lost is calculated using the same formula. The total number of seals by species used for subsistence during a particular year is the estimated harvest plus the estimated struck but lost and together is called the "take". **So "take" as presented in this report refers to the estimated harvest plus the estimated struck but lost.**

Occasionally, (e.g., Shiedt 2012) a survey will report the number harvested by species, but report the number struck but lost as a total for all species. In this situation the number of struck but lost is allocated to each species weighted by the number of each species harvested.

To compare community harvests through time, changes in the population of the community need to be accounted for. The number of seals taken per person (called *per capita*) shows how many seals were taken per person living in the community during that year. *Per capita* seal take is calculated by dividing the estimated seal take by the number of people living in the community. For example, the number of bearded seals taken *per capita* in Tununak during 2016 would be

$$\frac{18 \text{ (bearded seals taken)}}{315 \text{ (number of people living in Tununak during 2016)}} = 0.06 \text{ bearded seals per person.}$$

This means that Tununak took 0.06 bearded seals for every person living in Tununak during 2016, or Tununak took 3 bearded seals for every 50 persons.

Bounty records

Prior to 1973, the State of Alaska implemented a bounty on seals in some areas of the state. The purpose of the bounty was to reduce harbor seal numbers to protect commercial fish stocks in the Gulf of Alaska from predation; although there was no commercial fishing farther north, the bounty was paid on ice seals anyway, providing the first ice seal harvest data. The information collected during the bounty was rarely reported by species and more often reported as the total number of seals turned in for bounty per year by community. Comparing current levels of take to data collected during the bounty years provides some information on the overall change in numbers of seals taken over the last 40 or 50 years (Olnes et al. 2022). Comparing bounty data to household survey data comes with some problems, however, because the information was collected in different ways with different objectives (Olnes et al. 2022).

Ratings

In order to evaluate the quality of the harvest information, we developed a rating system. Take information for each year and community is assigned a rating for general comparison. For example, the bounty estimates are rated "good" or "poor", based on the reports from the years in which they were collected. Poor ratings occurred during years when the people in the communities did not know the bounty was available, thought it had ended, chose not to participate, or if the bounty was collected for only part of the year. Bounty data with a poor rating should be viewed as a minimum estimate of take for that year. A "good" rating occurred when the majority of the community participated in the take or where take was estimated based on bounty records, local observer estimates, and hunters in the community.

Community surveys have three quality categories; poor, good, and census. A "poor" community survey sampled a small percentage of the households in the community (<30%) or only covered part of the year. A "good" survey sampled >30% of the households in the community, properly estimated the results for the whole community, and reported harvest for an entire 12-month period. A "census" sampled every household in the community and recorded every seal caught during the 12-month period. A census is the most accurate count of the seals taken because every household is surveyed, and every seal taken is accounted for.

Results

Take by region

More than 60 communities harvest ice seals in Alaska (Fig. 1.) and take (harvest and struck but lost) information for these communities is presented in this report. The communities belong to five regions that are represented on the Ice Seal Committee. There are other communities in Alaska that benefit from ice seal harvests through trading and sharing, and some hunters travel to the coast to hunt ice seals, but the communities in Figure 1 are the main ice seal hunting communities.

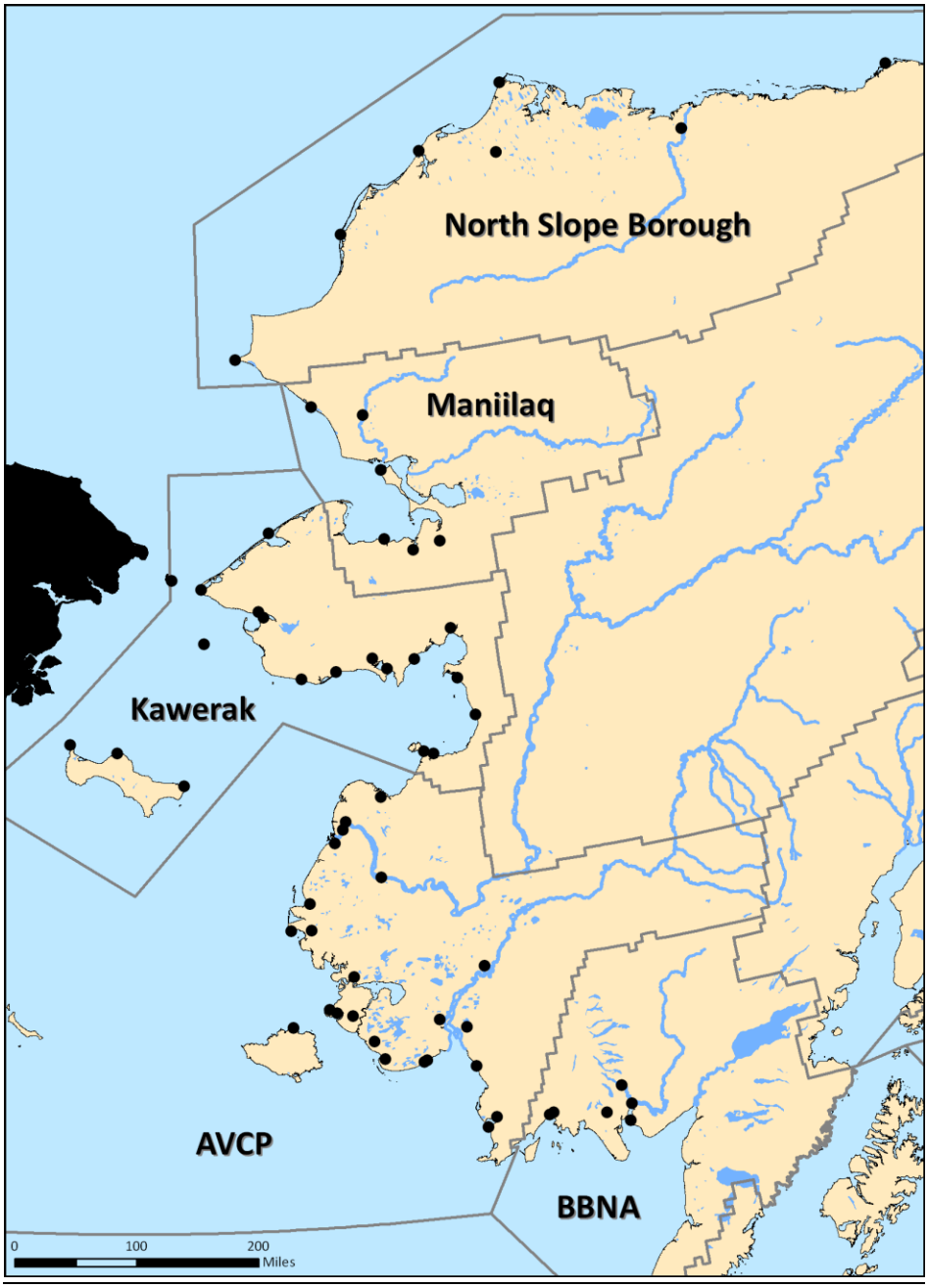

Figure 1. Alaska regions and communities that regularly harvest ice seals.

North Slope

The North Slope region represented by the North Slope Borough includes northwestern and northern Alaska from Point Hope to the Canadian border. There are seven communities in this region that harvest ice seals (Fig. 2). Bearded seals are the preferred species for food and umiak (skin boat) coverings. Ringed seals are also common for food and blubber that is usually rendered into seal oil.

The North Slope Borough, Department of Wildlife Management (DWM) has collected subsistence take information annually since 1994 on all animals that are taken for subsistence use (e.g., marine mammals, moose, caribou, fish, and birds) by conducting household surveys. The surveys are conducted by local surveyors hired by the DWM. The local surveyor records the data from each household in a manner that keeps household identities confidential and results are reported as community totals. Although the North Slope Borough has been successful in collecting ice seal take information from select communities in recent years, only limited information is currently available due to budget and staffing constraints.

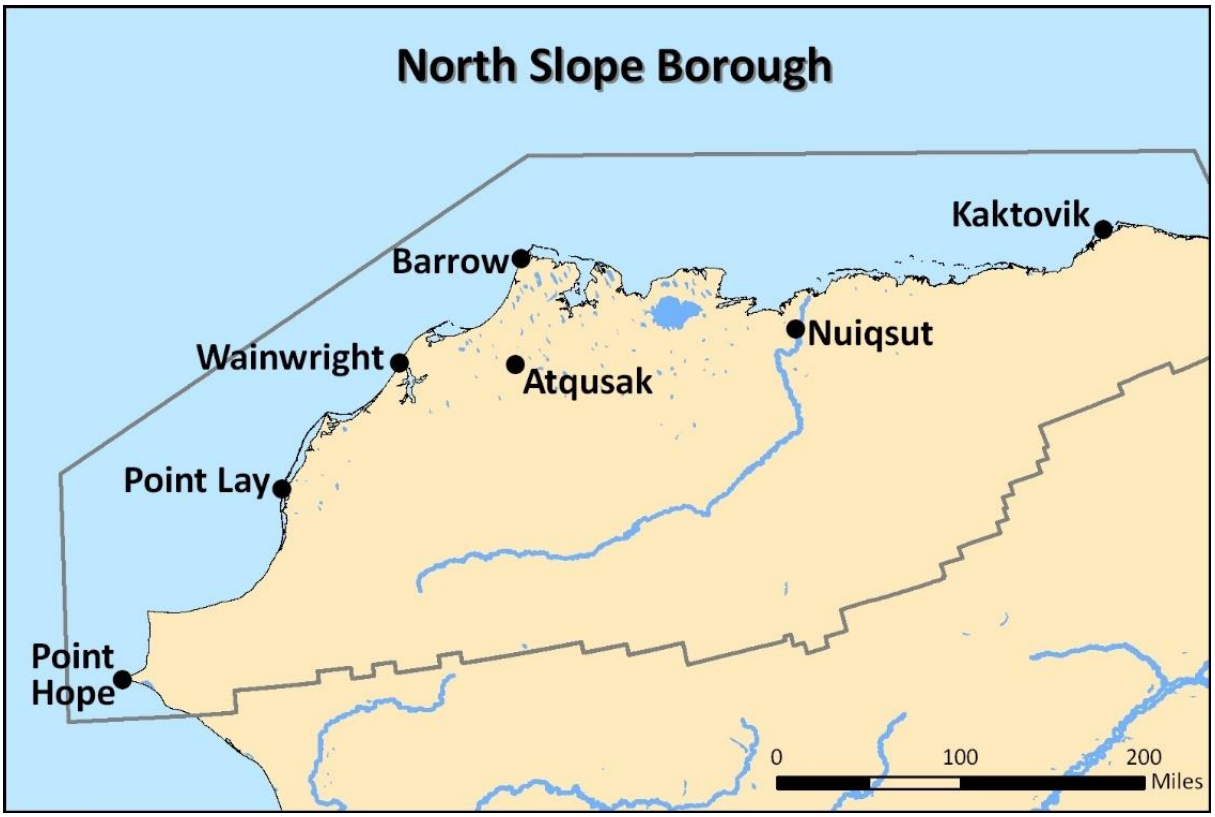

Figure 2. North Slope Borough communities that regularly harvest ice seals.

Kaktovik – Primarily a coastal bowhead whaling community that also has access to land mammals, residents of Kaktovik will take seals when available. Take data comes from four bounty estimates and eleven household surveys. The most recent surveys were conducted by the North Slope Borough (Bacon et al. 2009, Harcharek et al. 2018). Kaktovik's current population is approximately 211 people (U.S. Census Bureau).

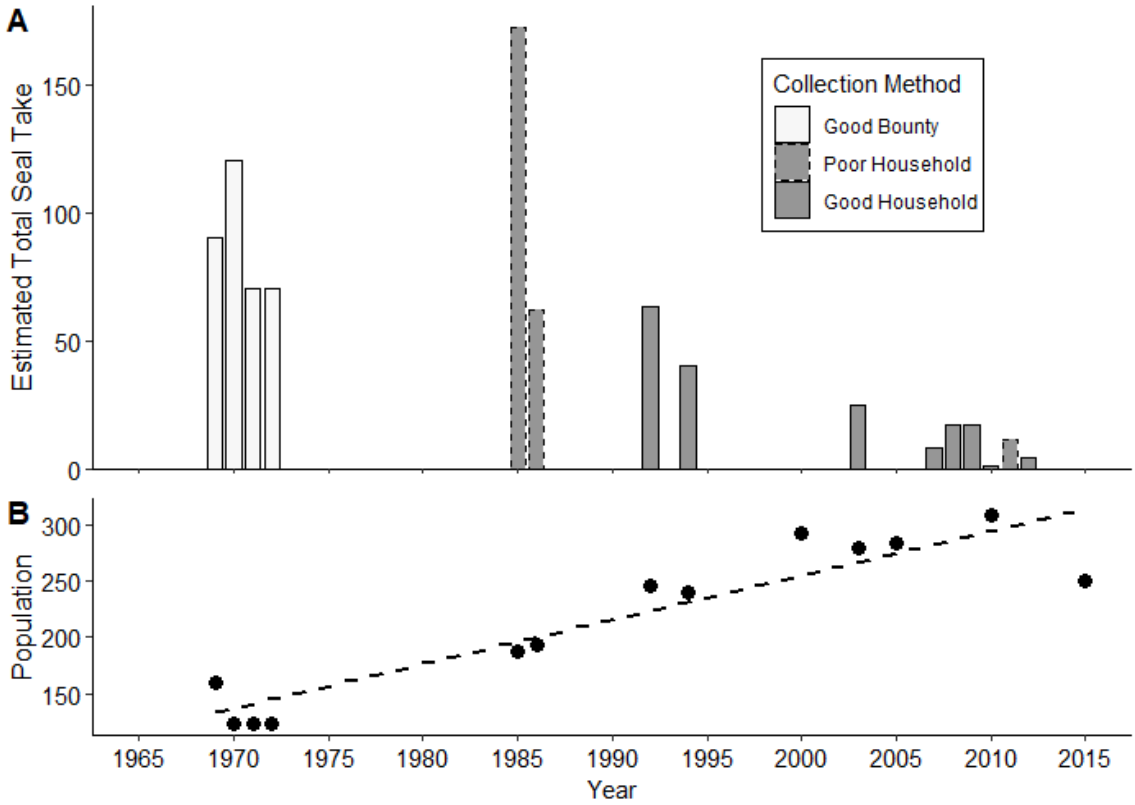

Figure 3. Estimated seal take (A) and human population (B) for Kaktovik, Alaska. Numbers are from Burns (1970, 1972, 1973), Fuller and George (1997), Bacon et al. (2009), Harcharek et al. (2018), ADF&G (2024) and the U.S. Census Bureau.

Kaktovik continued

Table 1. Number of people, total take (estimated take + estimated struck but lost) for each seal species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Kaktovik, Alaska. Numbers are from Burns (1970, 1972, 1973), Fuller and George (1997), Bacon et al. (2009), Harcharek et al. (2018), ADF&G (2024) and the U.S. Census Bureau.

		Method		Number of Seals					*Per*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*capita* Take
1969	160	bounty	good	-	-	-	-	90	0.56
1970	123	bounty	good	-	-	-	-	120	0.98
1971	123	bounty	good	-	-	-	-	70	0.57
1972	123	bounty	good	-	-	-	-	70	0.57
1985	188	household	poor	21	151	0	0	172	0.91
1986	194	household	poor	17	44	1	0	62	0.32
1992	246	household	good	17	39	7	0	63	0.26
1994	240	household	good	21	16	3	0	40	0.17
2003	280	household	good	8	17	0	0	25	0.09
2007	308	household	good	2	6	0	0	8	0.03
2008	308	household	good	6	11	0	0	17	0.06
2009	308	household	good	15	2	0	0	17	0.06
2010	308	household	good	1	0	0	0	1	0.00
2011	308	household	poor	5	6	0	0	11	0.04
2012	308	household	good	3	1	0	0	4	0.01

Nuiqsut – Residents of Nuiqsut moved from Utqiaġvik (Barrow) in 1974 and 1975 when the community was incorporated. Previously it had been a seasonal hunting location. Located 35 miles inland, seal hunting in Nuiqsut is likely more opportunistic and more dependent on ice and weather conditions than other communities along the coast. The bounty ended before Nuiqsut was established, but seven household surveys have taken place intermittently between 1985 and 2014.

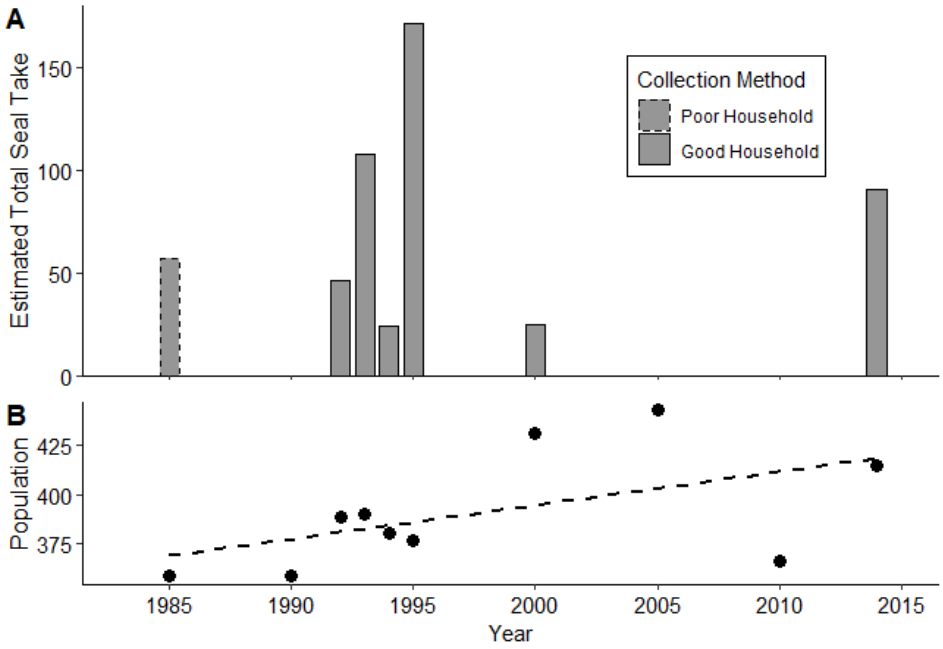

Figure 4. Estimated seal take (A) and human population (B) for Nuiqsut, Alaska. Numbers are from Fall and Utermohle (1995), Fuller and George (1997), Bacon et al. (2009), ADF&G (2024), and the U.S. Census Bureau.

Table 2. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Nuiqsut, Alaska. Numbers are from Fall and Utermohle (1995), Fuller and George (1997), Bacon et al. (2009), ADF&G (2024), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1985	358	household	poor	15	40	2	0	57	0.16
1992	388	household	good	16	24	6	0	46	0.12
1993	390	household	good	6	98	4	0	108	0.28
1994	380	household	good	0	24	0	0	24	0.06
1995	376	household	good	17	155	0	0	172	0.46
2000	431	household	good	0	25	0	0	25	0.06
2014	415	household	good	26	58	7	0	91	0.22

Utqiaġvik (Barrow) – Located on the coast near Point Barrow, Utqiaġvik (formerly Barrow) has excellent access to seals. As the regional hub for the North Slope Borough, Utqiaġvik has many residents that are not Alaska Natives and cannot hunt seals, therefore it is harder to identify and contact subsistence seal hunters, making estimates of seal take more difficult. Despite this, nine bounty estimates and ten household survey estimates are available, the most recent is from 2014. The 1962 bounty is labeled as "Good" because it includes an estimate based on the number of bounties plus what else was thought to have been taken outside of the bounty. The actual take, however, was probably much higher than indicated based on the report.

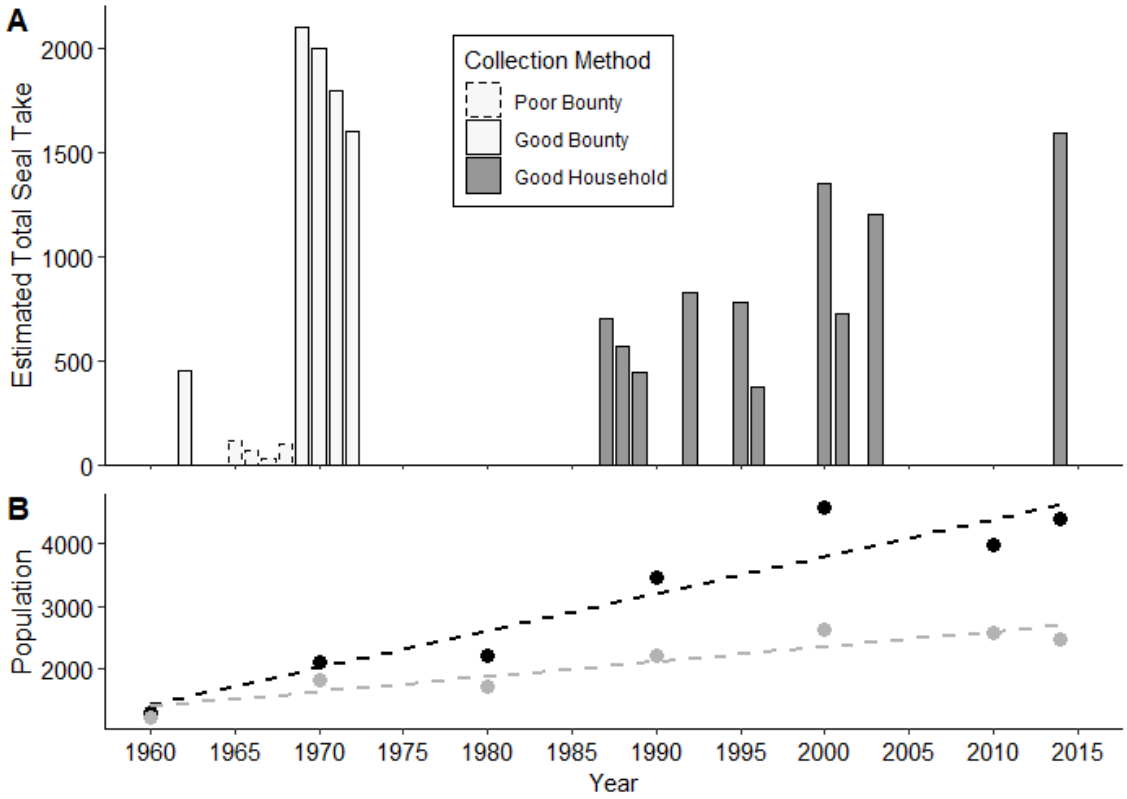

Figure 5. Estimated seal take (A), total human population (B, black dots), and Alaska Native population (B, grey dots) for Utqiaġvik (Barrow), Alaska. Numbers are from Burns et al. (1964), Burns (1966, 1967-1970, 1972, 1973), Braund (1993a), Fuller and George (1997), Bacon et al. (2009), ADF&G (2024), and the U.S. Census Bureau.

Utqiagvik continued

Table 3. Number of Alaska Native people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Utqiaġvik (Barrow), Alaska. Numbers are from Burns et al. (1964), Burns (1966, 1967-1970, 1972, 1973), Braund (1993a), Fuller and George (1997), Bacon et al. (2009), ADF&G (2024), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	Alaska Native Population	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	1215	bounty	good	-	-	-	-	450	0.37
1965	1215	bounty	poor	40	54	20	0	114	0.09
1966	1215	bounty	poor	-	-	-	-	63	0.05
1967	1215	bounty	poor	-	-	-	-	31	0.03
1968	1215	bounty	poor	-	-	-	-	102	0.08
1969	1215	bounty	good	-	-	-	-	2100	1.73
1970	1830	bounty	good	-	-	-	-	2000	1.09
1971	1830	bounty	good	-	-	-	-	1800	0.98
1972	1830	bounty	good	-	-	-	-	1600	0.87
1987	2117	household	good	236	466	2	0	704	0.33
1988	2117	household	good	179	388	4	0	571	0.27
1989	2117	household	good	109	328	4	0	441	0.21
1992	2117	household	good	463	300	65	0	828	0.39
1995	2117	household	good	431	345	0	0	776	0.37
1996	2117	household	good	192	180	0	0	372	0.18
2000	2620	household	good	729	586	32	0	1347	0.51
2001	2620	household	good	327	387	7	0	721	0.28
2003	2620	household	good	776	413	12	0	1201	0.46
2014	2461	household	good	1070	428	98	0	1596	0.65

Atqasuk – Located about 60 miles inland, Atqasuk hunters occasionaly travel to Utqiaġvik to hunt seals. Even though only a few seals were reported caught by Atqasuk hunters, sharing and bartering with other coastal communities is likely important to fulfill community subsistence needs. No bounty records and only two household survey estimates are available from 1994 (population 234) and 1998 (population 207, U.S. Census Bureau). Atqasuk took 6 ringed and 6 bearded seals in 1994. Three bearded seals were taken in June of 1998 (Bacon et al. 2009). Atqasuk's population is currently estimated at 75 people (U.S. Census Bureau).

Wainwright - Located 70 miles southwest of Utqiaġvik (Barrow), Wainwright subsistence revolves around bowhead whaling and caribou hunting. Seal hunting occurs when whales and caribou are not available. Nine bounty and five household survey estimates are available; the most recent is from 2009. Wainwright's population is currently estimated to be 584 people (U.S. Census Bureau).

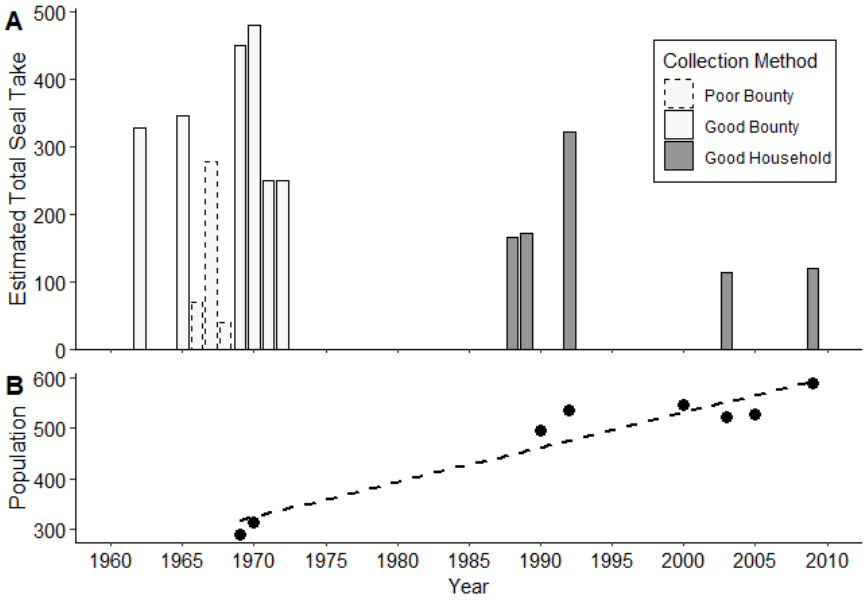

Figure 6. Estimated seal take (A) and human population (B) for Wainwright, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Braund (1993b), Fuller and George (1997), Bacon et al. (2009), ADF&G (2024), and the U.S. Census Bureau.

Table 4. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Wainwright, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Braund (1993b), Fuller and George (1997), Bacon et al. (2009), ADF&G (2024), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	290	bounty	good	-	-	-	-	328	1.13
1965	290	bounty	good	100	205	40	0	345	1.19
1966	290	bounty	poor	-	-	-	-	69	0.24
1967	290	bounty	poor	-	-	-	-	277	0.96
1968	290	bounty	poor	-	-	-	-	40	0.14
1969	290	bounty	good	-	-	-	-	450	1.55
1970	315	bounty	good	-	-	-	-	480	1.52
1971	315	bounty	good	-	-	-	-	250	0.79
1972	315	bounty	good	-	-	-	-	250	0.79
1988	497	household	good	97	63	5	0	165	0.33
1989	497	household	good	74	86	12	0	172	0.35
1992	536	household	good	159	153	10	0	322	0.60
2003	522	household	good	79	27	3	0	109	0.21
2009	590	household	good	74	27	19	0	120	0.20

Point Lay – Point Lay is located 150 miles southwest of Utqiaġvik and is protected from the Chukchi Sea by barrier islands that form Kasegaluk Lagoon. The community has a strong tradition of beluga whale hunting, but has recently begun bowhead whaling. One bounty estimate and four household survey estimates are available, collected between 1987 and 2012. The most recent survey was conducted by the Alaska Department of Fish and Game (ADF&G), Division of Subsistence for the year 2012.

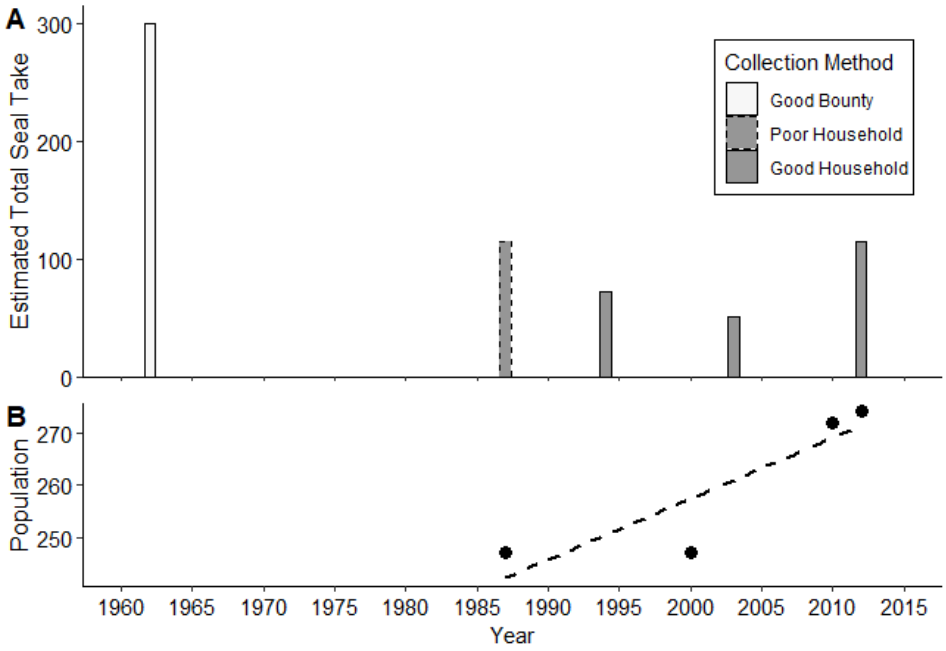

Figure 7. Estimated seal take (A) and human population (B) for Point Lay, Alaska. Numbers are from Burns et al. (1964), Bacon et al. (2009), Braem et al. (2017), ADF&G (2024) and the U.S. Census Bureau.

Table 5. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Point Lay, Alaska. Numbers are from Burns et al. (1964), Bacon et al. (2009), Braem et al. (2017), ADF&G (2024) and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	?	bounty	good	-	-	-	-	300	-
1987	247	household	poor	13	49	53	0	115	0.47
1994	247	household	good	32	17	23	0	72	0.29
2003	247	household	good	32	17	2	0	51	0.21
2012	274	household	good	55	51	8	0	114	0.42

Point Hope – Point Hope is located on the northwestern coast of Alaska and was the center of the first environmental impact study required because of a federal project proposing to use atomic energy to excavate a harbor near Cape Thompson (Wilimovsky and Wolfe 1966). This work resulted in a census survey in 1961, which is the only time a full census survey has been collected in any community in Alaska. A census survey means that the researchers believe they counted every seal that was taken that year so no estimate was needed. Nine bounty estimates, one census estimate, and five household survey estimates are available. In 2014, ADF&G's Division of Subsistence collected harvest data in Point Hope via household surveys.

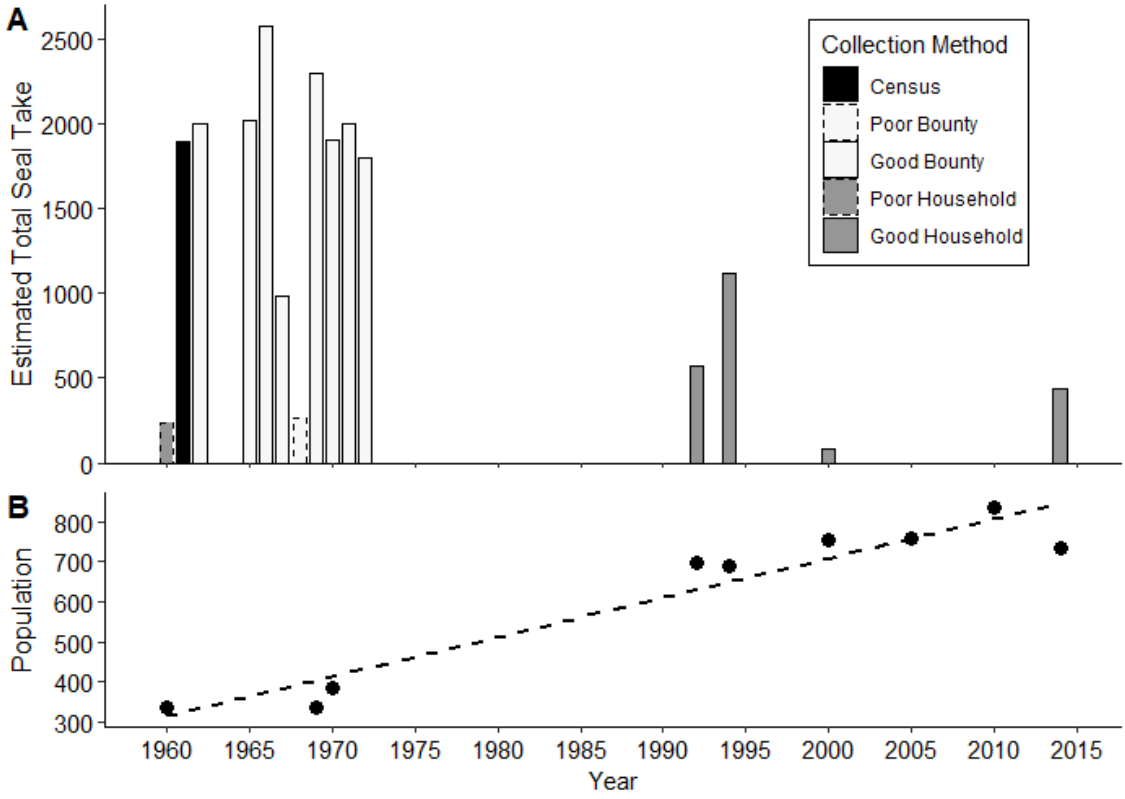

Figure 8. Reported and estimated seals taken (A) and human population (B) for Pt. Hope, Alaska. Numbers are from Wilimovsky and Wolfe (1966), Burns et al. (1964), Burns (1966-1970, 1972, 1973), Fuller and George (1997), Bacon et al. (2009), Braem et al. (2017) and the U.S. Census Bureau.

Point Hope continued

Table 6. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Point Hope, Alaska. Numbers are from Wilimovsky and Wolfe (1966), Burns et al. (1964), Burns (1966-1970, 1972, 1973), Fuller and George (1997), Bacon et al. (2009), Braem et al. (2017), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1960	337	household	poor	28	210	1	0	239	0.71
1961	337	census	good	177	1708	2	4	1891	5.61
1962	337	bounty	good	-	-	-	-	2000	5.93
1965	337	bounty	good	250	1616	150	0	2016	5.98
1966	337	bounty	good	-	-	-	-	2571	7.63
1967	337	bounty	good	-	-	-	-	980	2.91
1968	337	bounty	poor	-	-	-	-	264	0.78
1969	337	bounty	good	-	-	-	-	2300	6.82
1970	386	bounty	good	-	-	-	-	1900	4.92
1971	386	bounty	good	-	-	-	-	2000	5.18
1972	386	bounty	good	-	-	-	-	1800	4.66
1992	697	household	good	160	365	50	0	575	0.82
1994	689	household	good	21	1100	0	0	1121	1.63
2000	755	household	good	57	28	0	0	85	0.11
2014	735	household	good	183	246	5	0	434	0.59

Northwest Arctic

The Northwest Arctic Region is represented by Maniilaq, which is the nonprofit arm of the NANA Corporation within the Northwest Arctic Borough. Maniilaq supports natural resource and subsistence programs, and coordinates representation on the Ice Seal Committee. Three coastal and three inland communities regularly hunt seals in this region (Fig. 9).

Figure 9. Northwest Arctic communities that regularly take ice seals.

Kivalina – Kivalina has a strong bowhead whaling history, however, they have taken no bowheads recently. Ten bounty estimates and eight household survey estimates are available, the most recent is from 2011.

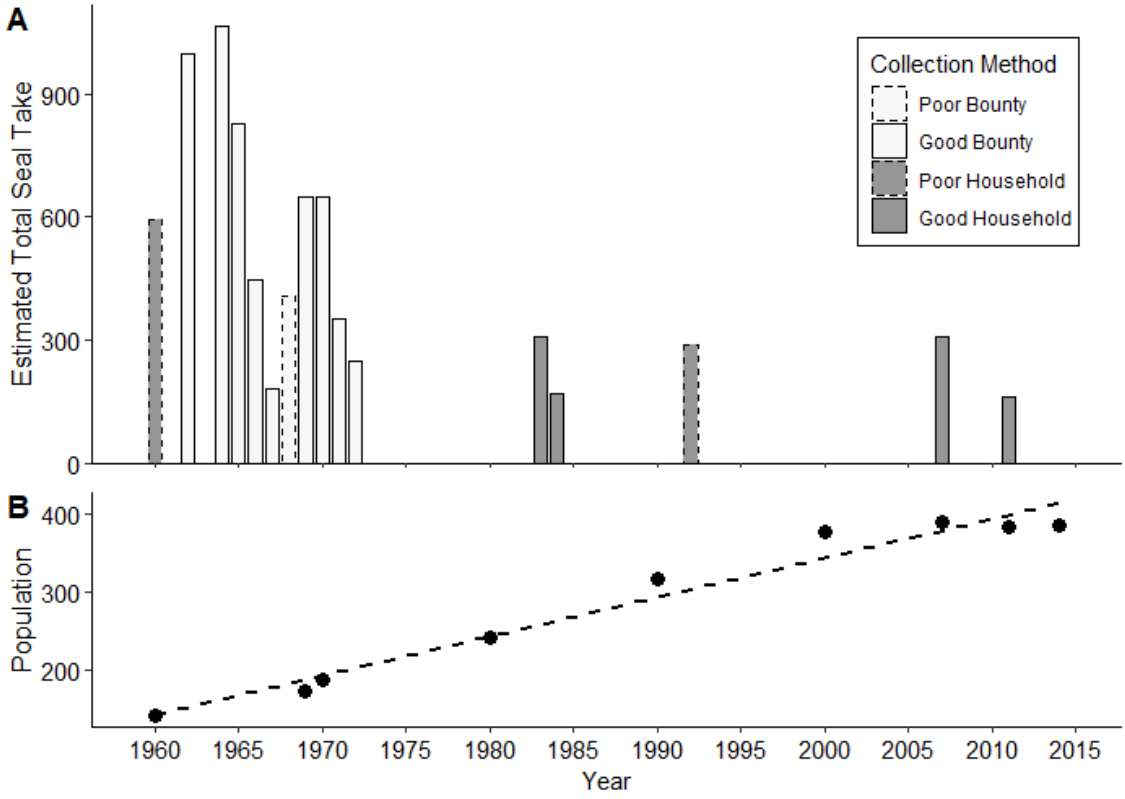

Figure 10. Estimated seal take (A) and human population (B) from Kivalina, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Saario (1962), Burch (1985), Fall and Utermohle (1995), Shiedt (2012), and the U.S. Census Bureau.

Kivalina continued

Table 7. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Kivalina, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Saario (1962), Burch (1985), Fall and Utermohle (1995), Shiedt (2012), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1960	142	household	poor	117	478	0	0	595	4.19
1962	142	bounty	good	-	-	-	-	1000	7.04
1964	173	bounty	good	153	908	4	0	1065	6.16
1965	173	bounty	good	100	652	75	0	827	4.78
1965	173	household	good	119	467	1	0	587	3.39
1966	173	bounty	good	-	-	-	-	445	2.57
1967	173	bounty	good	-	-	-	-	182	1.05
1968	173	bounty	poor	-	-	-	-	407	2.35
1969	173	bounty	good	-	-	-	-	650	3.76
1970	188	bounty	good	-	-	-	-	650	3.46
1971	188	household	poor	125	500	1	0	626	3.33
1971	188	bounty	good	-	-	-	-	350	1.86
1972	188	bounty	good	-	-	-	-	250	1.33
1983	241	household	good	134	172	1	1	308	1.28
1984	241	household	good	60	109	1	0	170	0.71
1992	317	household	poor	139	110	30	8	287	0.91
2007	388	household	good	229	71	4	2	306	0.79
2011	383	household	good	123	16	21	0	160	0.42

Noatak – Noatak is located on the Noatak River about 55 air miles north of Kotzebue. Seal hunters must travel downriver, usually during spring, to hunt seals in Kotzebue Sound. Eight bounty estimates and three household survey estimates are available, the most recent is from 2011.

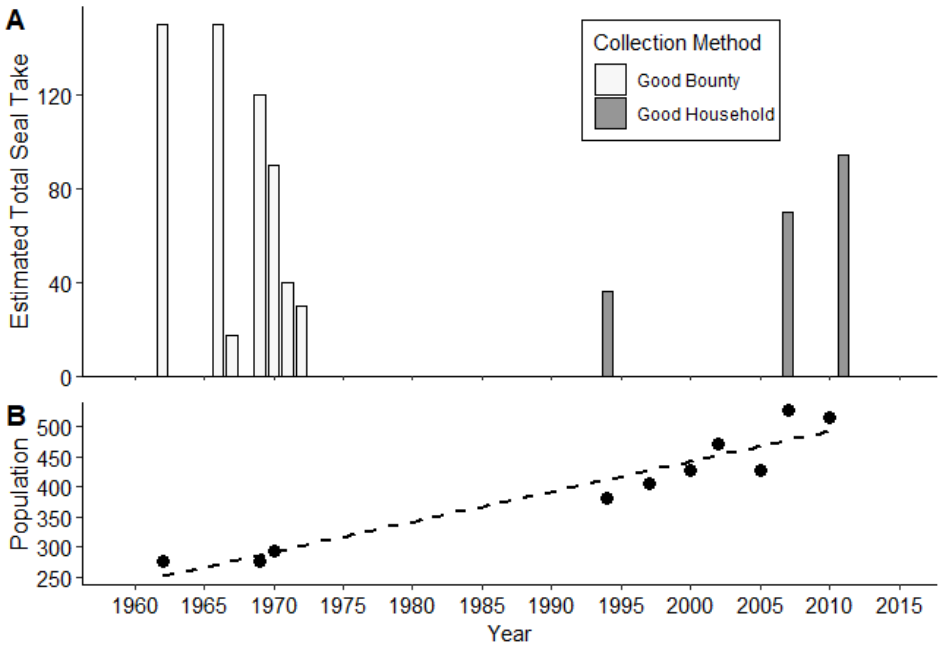

Figure 11. Estimated seal take (A) and human population (B) for Noatak, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Magdanz (1995), Magdanz et al. (2010), Shiedt (2012), and the U.S. Census Bureau.

Table 8. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Noatak, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Magdanz (1995), Magdanz et al. (2010), Shiedt (2012), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	Take
1962	275	bounty	good	-	-	-	-	150	0.55
1966	275	bounty	good	-	-	-	-	150	0.55
1967	275	bounty	good	-	-	-	-	17	0.06
1968	275	bounty	poor	-	-	-	-	0	0.00
1969	275	bounty	good	-	-	-	-	120	0.44
1970	293	bounty	good	-	-	-	-	90	0.31
1971	293	bounty	good	-	-	-	-	40	0.14
1972	293	bounty	good	-	-	-	-	30	0.10
1994	380	household	good	36	0	0	0	36	0.09
2007	526	household	good	60	6	4	0	70	0.13
2011	514	household	good	65	3	25	1	94	0.18

Kotzebue – As the regional hub, estimating take information for Kotzebue is more difficult because it is harder to identify and contact subsistence seal hunters due to the larger population of people and the higher percentage of non-Natives living there. The Alaska Native population for 1986 to present was calculated as 71.5% of the total population as reported by the U.S. Census. Nine bounty estimates and six household survey estimates are available, the most recent was a household survey conducted by ADF&G's Division of Subsistence in 2014.

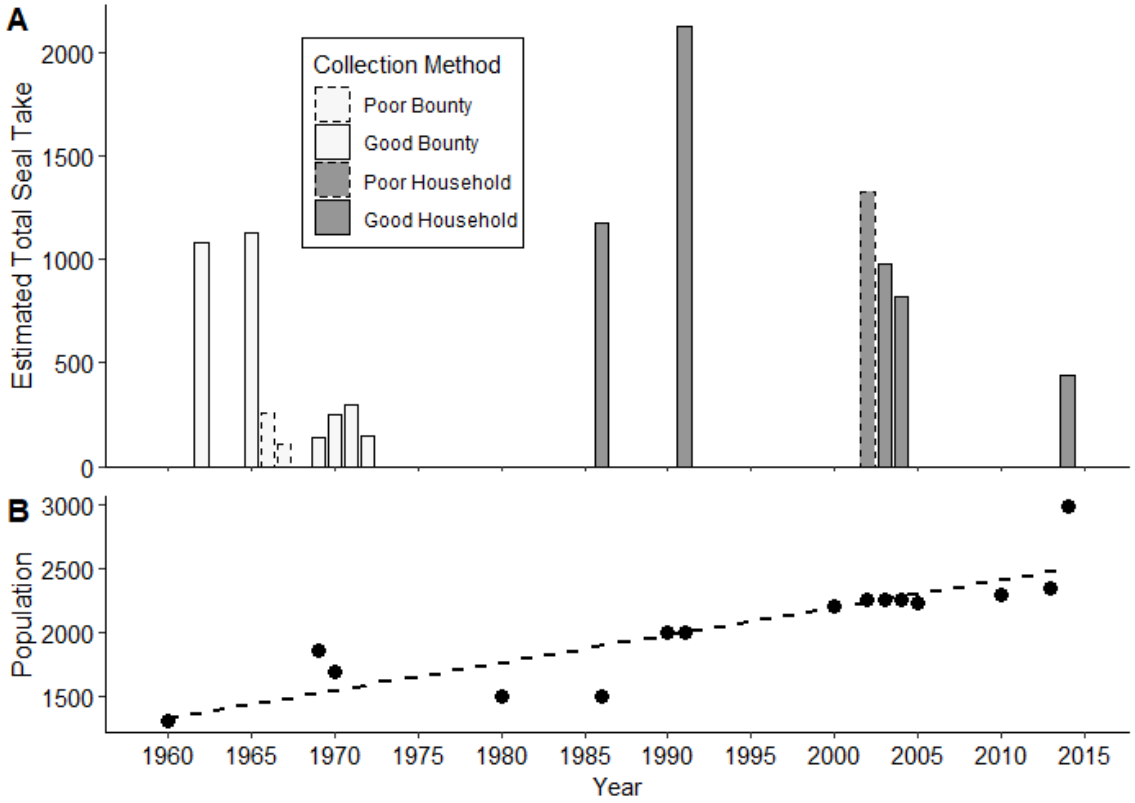

Figure 12. Estimated seal take (A) and Alaska Native population (B) for Kotzebue, Alaska. Numbers are from Burns et al. (1964), Burns (1966, 1967-1970, 1972, 1973), Fall and Utermohle (1995), Georgette and Loon (1993), Whiting (2006), Braem et al. (2017), and the U.S. Census Bureau.

Kotzebue continued

Table 9. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Kotzebue, Alaska. Numbers are from Burns et al. (1964), Burns (1966, 1967-1970, 1972, 1973), Fall and Utermohle (1995), Georgette and Loon (1993), Whiting (2006), Braem et al. (2017), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	1300	bounty	good	-	-	-	-	1085	0.83
1965	1855	bounty	good	100	731	300	0	1131	0.61
1966	1855	bounty	poor	-	-	-	-	255	0.14
1967	1855	bounty	poor	-	-	-	-	105	0.06
1968	1855	bounty	poor	-	-	-	-	0	0.00
1969	1855	bounty	good	-	-	-	-	140	0.08
1970	1696	bounty	good	-	-	-	-	250	0.15
1971	1696	bounty	good	-	-	-	-	300	0.18
1972	1696	bounty	good	-	-	-	-	150	0.09
1986	1502	household	good	537	440	201	0	1178	0.78
1991	2002	household	good	963	914	251	0	2128	1.06
2002	2256	household	poor	533	265	532	1	1331	0.59
2003	2256	household	good	508	121	351	3	983	0.44
2004	2256	household	good	486	67	267	2	822	0.36
2014	2983	household	good	228	69	143	0	440	0.15

Buckland – Buckland is somewhat inland of southern Kotzebue Sound and had a strong beluga whaling tradition until the mid 1980s when few belugas returned. They now manage a reindeer herd, and rely on seals for part of the year. Five bounty estimates are available; only three household estimates are available since 1972.

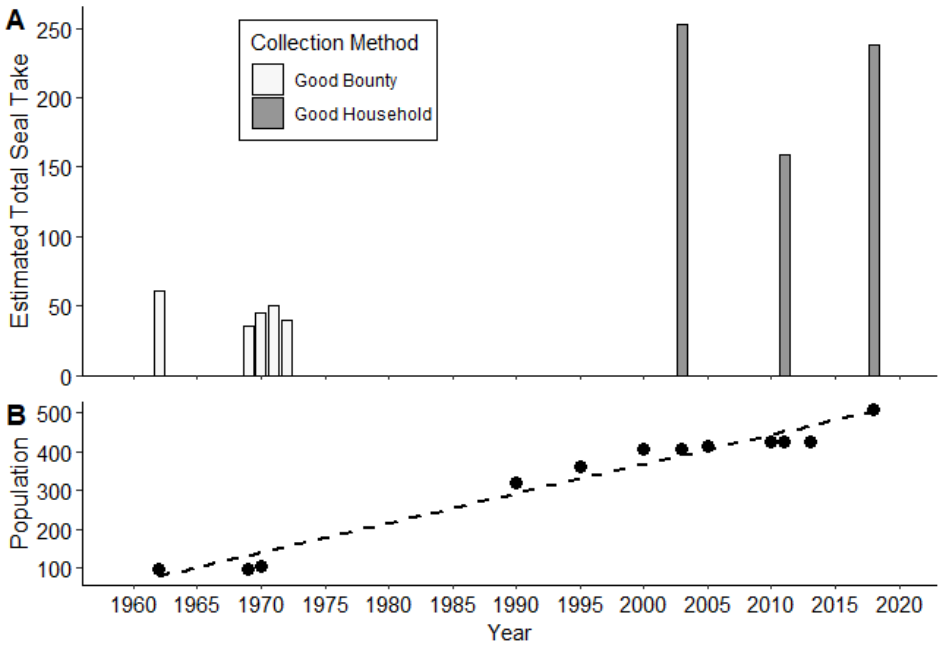

Figure 13. Estimated seal take (A) and human population (B) from Buckland, Alaska. Numbers are from Burns et al. (1964), Burns (1970, 1972, 1973), Magdanz et al. (2011), Shiedt (2012), Mikow and Cunningham (2020), and the U.S. Census Bureau.

Table 10. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Buckland, Alaska. Numbers are from Burns et al. (1964), Burns (1970, 1972, 1973), Magdanz et al. (2011), Shiedt (2012), Mikow and Cunningham (2020), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	98	bounty	good	-	-	-	-	61	0.62
1969	98	bounty	good	-	-	-	-	35	0.36
1970	104	bounty	good	-	-	-	-	45	0.43
1971	104	bounty	good	-	-	-	-	50	0.48
1972	104	bounty	good	-	-	-	-	40	0.38
2003	408	household	good	111	50	88	4	253	0.62
2011	426	household	good	48	26	85	0	159	0.37
2018	507	household	good	119	14	105	0	238	0.47

Deering – Deering is located on the southern coast of Kotzebue Sound. Eight bounty estimates and three household surveys are available for Deering.

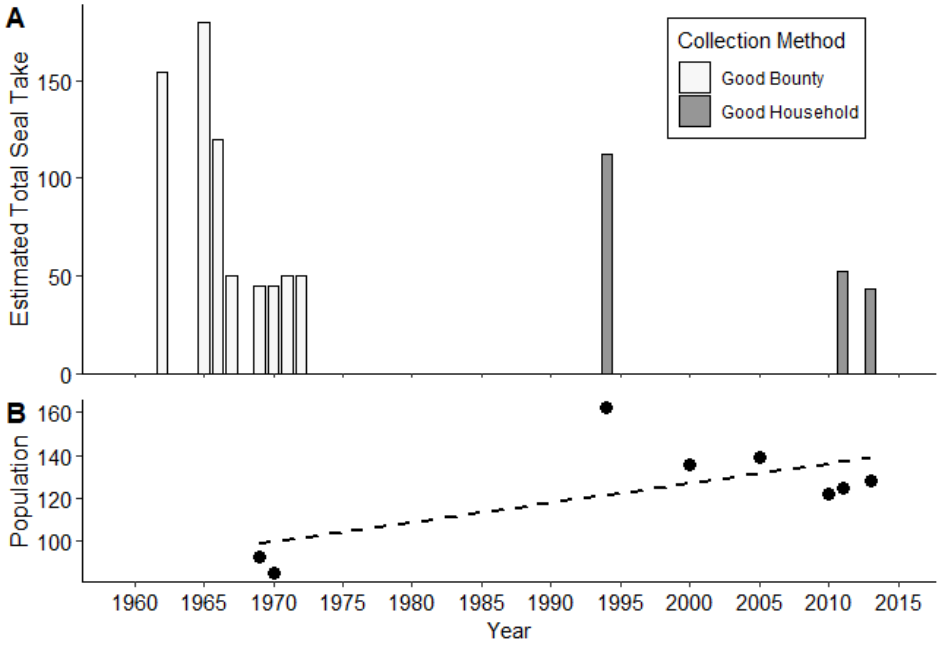

Figure 14. Estimated seal take (A) and human population (B) for Deering, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1968, 1970, 1972, 1973), Magdanz (1995), Shiedt (2012), Braem et al. (2017), and the U.S. Census Bureau.

Table 11. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Deering, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1968, 1970, 1972, 1973), Magdanz (1995), Shiedt (2012), Braem et al. (2017), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	93	bounty	good	-	-	-	-	154	1.66
1965	93	bounty	good	40	100	40	0	180	1.94
1966	93	bounty	good	-	-	-	-	120	1.29
1967	93	bounty	good	-	-	-	-	50	0.54
1969	93	bounty	good	-	-	-	-	45	0.48
1970	85	bounty	good	-	-	-	-	45	0.53
1971	85	bounty	good	-	-	-	-	50	0.59
1972	85	bounty	good	-	-	-	-	50	0.59
1994	162	household	good	75	8	29	0	112	0.69
2011	125	household	good	49	0	3	0	52	0.42
2013	128	household	good	29	7	7	0	43	0.34

Candle – Candle is located approximately 10 miles inland of Kotzebue Sound. Bounty records are only available for 1968 when 28 seals were bountied (Burns 1969). No current seal take or human population information is available.

Bering Strait

Kawerak is the nonprofit arm of the Bering Straits Native Corporation, and they manage natural resource and subsistence issues for the region. At least 17 communities hunt seals in this region, including three communities that live on islands in the Bering Sea (Fig. 15).

Figure 15. Bering Strait communities that regularly take ice seals.

Shishmaref – Located on a barrier island just north of the Bering Strait, Shishmaref has historically taken many seals for subsistence. Nine bounty estimates and five household survey estimates are available, the most recent is from 2014.

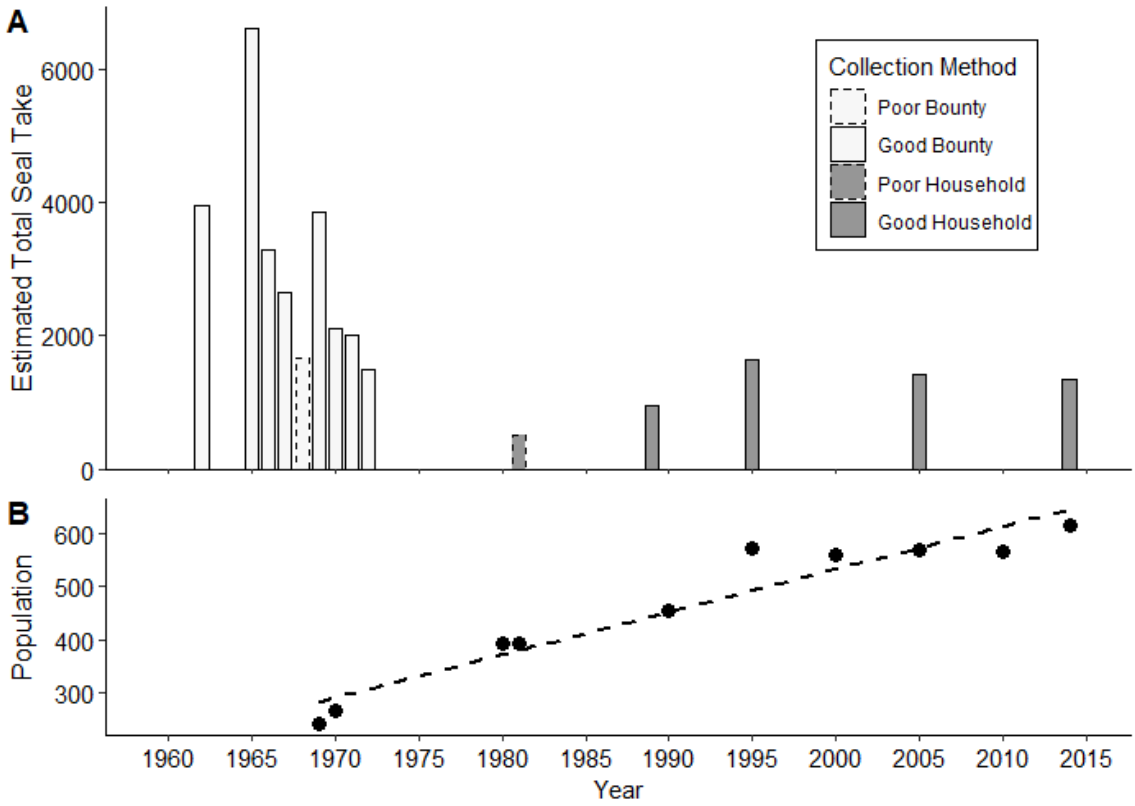

Figure 16. Estimated seal take (A) and human population (B) for Shishmaref, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Conger and Magdanz (1990), Magdanz (1995), Ahmasuk et al. (2007), Braem et al. (2017) and the U.S. Census Bureau.

Shishmaref continued

Table 12. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Shishmaref, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Conger and Magdanz (1990), Magdanz (1995), Ahmasuk et al. (2007), Braem et al. (2017) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	240	bounty	good	-	-	-	-	3956	16.48
1965	240	bounty	good	1000	4404	1200	-	6604	27.52
1966	240	bounty	good	-	-	-	-	3291	13.71
1967	240	bounty	good	-	-	-	-	2651	11.05
1968	240	bounty	poor	-	-	-	-	1658	6.91
1969	240	bounty	good	-	-	-	-	3850	16.04
1970	267	bounty	good	-	-	-	-	2100	7.87
1971	267	bounty	good	-	-	-	-	2000	7.49
1972	267	bounty	good	-	-	-	-	1500	5.62
1981	393	household	poor	131	230	136	0	497	1.26
1989	456	household	good	191	360	360	39	950	2.08
1995	572	household	good	588	520	513	19	1640	2.87
2005	571	household	good	581	292	518	14	1415	2.48
2014	617	household	good	319	296	727	0	1342	2.18

Little Diomede – As an island community, Little Diomede relies almost exclusively on marine mammals and seabirds. Seals are likely extremely important; however, the most recent current take data indicates a decline in harvests *per capita*. Data presented are from nine bounty estimates and three household survey estimates.

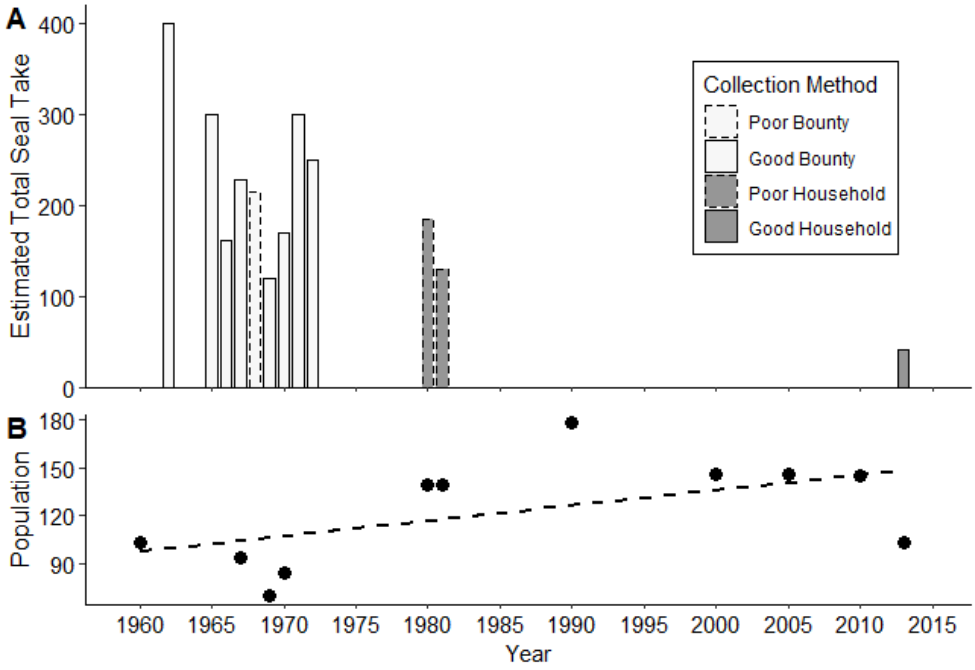

Figure 17. Estimated seal take (A) and human population (B) for Little Diomede, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Kawerak (1980), Sherrod (1982), Braem et al. (2017), and the U.S. Census Bureau.

Table 13. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Little Diomede, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Kawerak (1980), Sherrod (1982), Braem et al. (2017), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	103	bounty	good	-	-	-	-	400	3.88
1965	94	bounty	good	70	130	100	0	300	3.19
1966	94	bounty	good	-	-	-	-	161	1.71
1967	94	bounty	good	-	-	-	-	227	2.41
1968	94	bounty	poor	-	-	-	-	214	2.28
1969	70	bounty	good	-	-	-	-	120	1.71
1970	84	bounty	good	-	-	-	-	170	2.02
1971	84	bounty	good	-	-	-	-	300	3.57
1972	84	bounty	good	-	-	-	-	250	2.98
1980	139	household	poor	-	-	-	-	185	1.33
1981	139	household	poor	48	65	17	0	130	0.94
2013	103	household	good	15	13	13	0	41	0.39

Wales – Wales is located on the Cape of Wales of the Seward Peninsula, which is a prime location for hunting marine mammals. Nine bounty estimates and four household survey estimates are available, the most recent is from 2005.

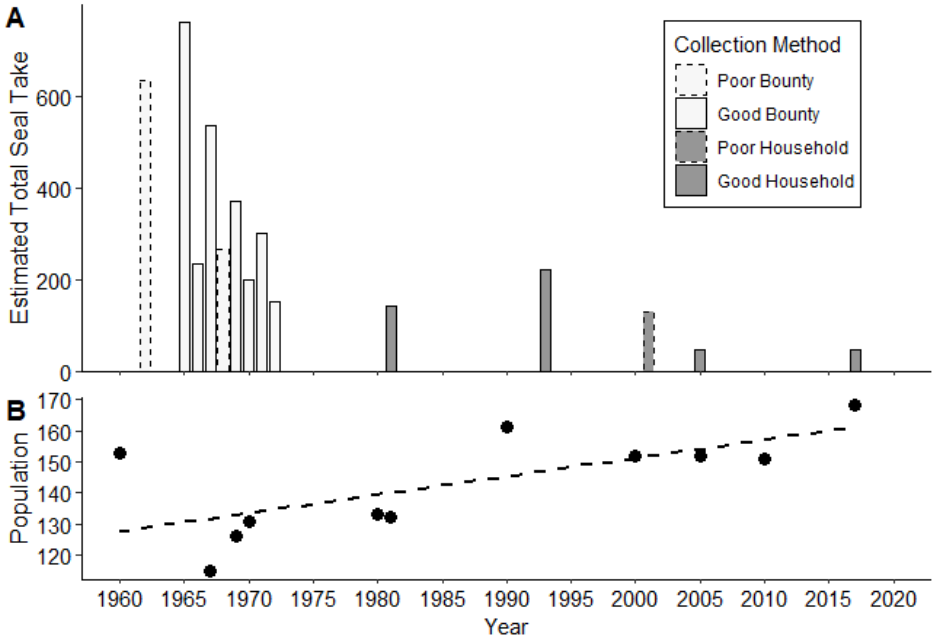

Figure 18. Estimated seal take (A) and human population (B) for Wales, Alaska. Numbers are from Burns et al. (1964), Burns (1966, 1967-1970, 1972, 1973), Sherrod (1982), Magdanz (1995), Ahmasuk et al. (2007), Kawerak (2002), Mikow et al. (2020), and the U.S. Census Bureau.

Table 14. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Wales, Alaska. Numbers are from Burns et al. (1964), Burns (1966, 1967-1970, 1972, 1973), Sherrod (1982), Magdanz (1995), Ahmasuk et al. (2007), Kawerak (2002), Mikow et al. (2020), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	115	bounty	poor	-	-	-	-	632	5.50
1965	115	bounty	good	75	636	50	0	761	6.62
1966	115	bounty	good	-	-	-	-	234	2.03
1967	115	bounty	good	-	-	-	-	534	4.64
1968	115	bounty	poor	-	-	-	-	266	2.31
1969	126	bounty	good	-	-	-	-	370	2.94
1970	131	bounty	good	-	-	-	-	200	1.53
1971	131	bounty	good	-	-	-	-	300	2.29
1972	131	bounty	good	-	-	-	-	150	1.15
1981	132	household	poor	33	69	39	0	141	1.07
1995	161	household	good	106	77	39	0	222	1.38
2001	152	household	poor	50	39	21	18	128	0.84
2005	155	household	good	42	3	1	0	46	0.30
2017	168	household	good	29	10	3	0	42	0.25

Brevig Mission - Brevig Mission was historically a reindeer herding community, but also relies on seals for subsistence given its coastal location. There are eight bounty estimates and six household survey estimates available, the most recent is from 2005.

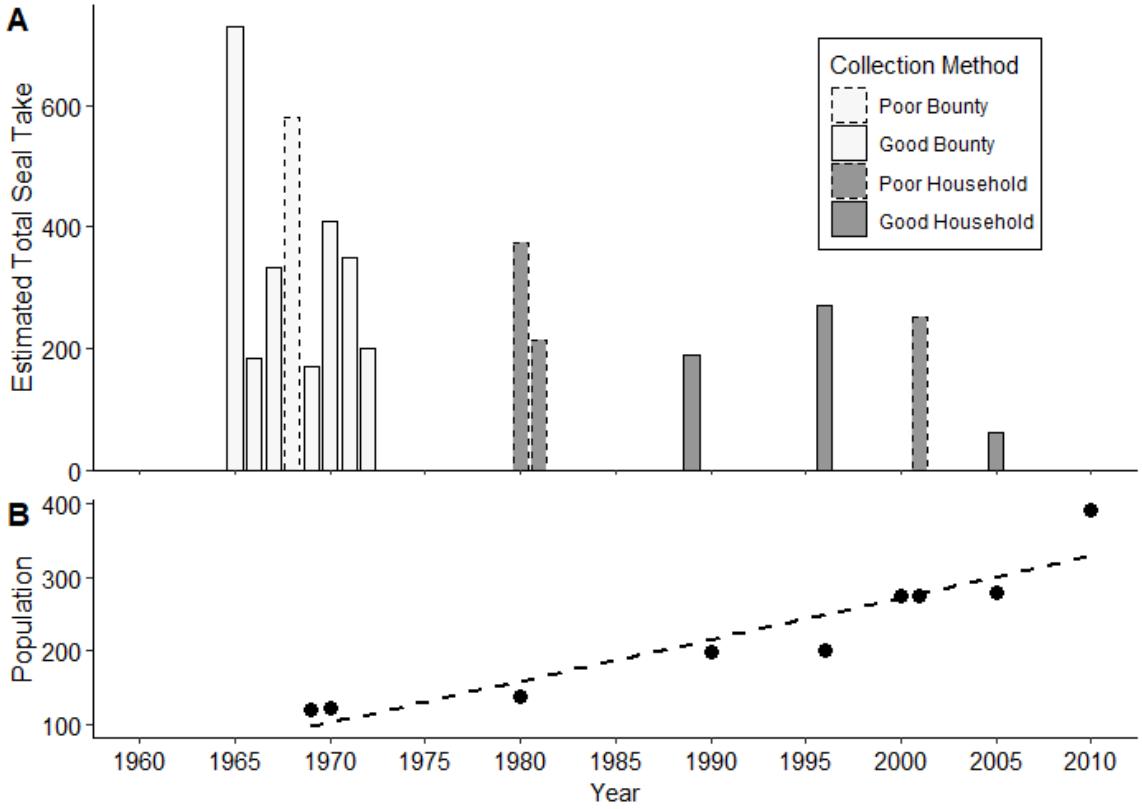

Figure 19. Estimated seal take (A) and human population (B) for Brevig Mission, Alaska. Numbers are from Burns (1966-1970, 1972, 1973), Sherrod (1982), Conger and Magdanz (1990), Georgette et al. (1998), Ahmasuk et al. (2007), Kawerak (2002), and the U.S. Census Bureau.

Brevig Mission continued

Table 15. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Brevig Mission, Alaska. Numbers are from Burns (1966-1970, 1972, 1973), Sherrod (1982), Conger and Magdanz (1990), Georgette et al. (1998), Ahmasuk et al. (2007), Kawerak (2002), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1965	120	bounty	good	70	559	100	0	729	6.08
1966	120	bounty	good	-	-	-	-	183	1.53
1967	120	bounty	good	-	-	-	-	332	2.77
1968	120	bounty	poor	-	-	-	-	581	4.84
1969	120	bounty	good	-	-	-	-	170	1.42
1970	123	bounty	good	-	-	-	-	410	3.33
1971	123	bounty	good	-	-	-	-	350	2.85
1972	123	bounty	good	-	-	-	-	200	1.63
1980	138	household	poor	-	-	-	-	373	2.70
1981	138	household	poor	15	121	77	1	214	1.55
1989	198	household	good	26	100	63	0	189	0.95
1996	202	household	good	63	98	93	16	270	1.34
2001	275	household	poor	81	67	102	1	251	0.91
2005	280	household	good	9	11	40	1	61	0.22

Teller – Teller is located on a sandy spit near Port Clarence. Nine bounty estimates and two household survey estimates are available, the most recent is from 2005. Teller's current population estimate is 249 people (U.S. Census Bureau).

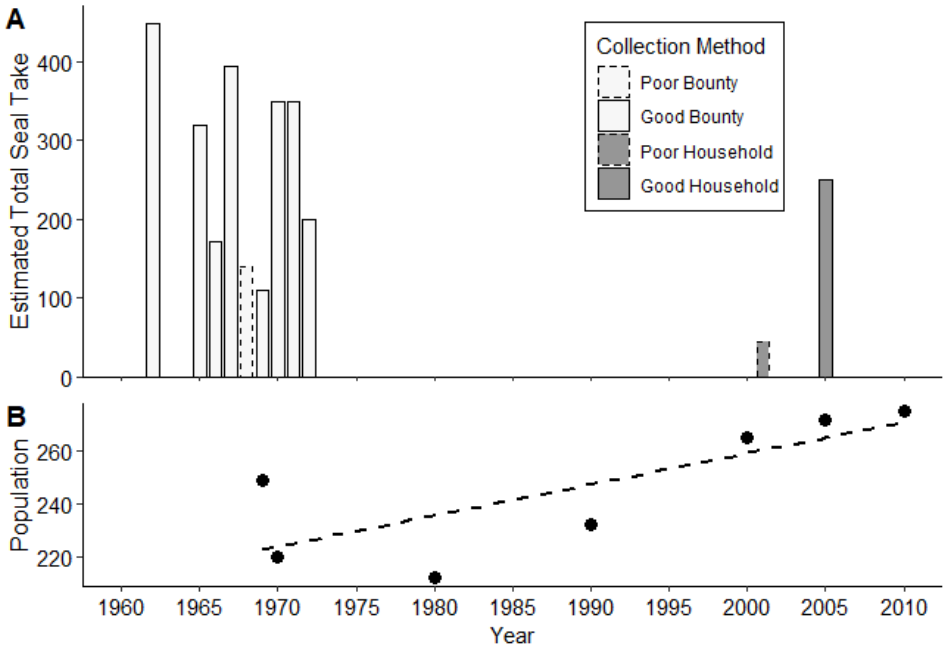

Figure 20. Estimated seal take (A) and human population (B) for Teller, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Kawerak (2002), Ahmasuk et al. (2007), and the U.S. Census Bureau.

Table 16. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Teller, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Kawerak (2002), Ahmasuk et al. (2007), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	Take
1962	249	bounty	good	-	-	-	-	449	1.80
1965	249	bounty	good	35	135	150	0	320	1.29
1966	249	bounty	good	-	-	-	-	172	0.69
1967	249	bounty	good	-	-	-	-	395	1.59
1968	249	bounty	poor	-	-	-	-	140	0.56
1969	249	bounty	good	-	-	-	-	110	0.44
1970	220	bounty	good	-	-	-	-	350	1.59
1971	220	bounty	good	-	-	-	-	350	1.59
1972	220	bounty	good	-	-	-	-	200	0.91
2001	265	household	poor	11	0	33	0	44	0.17
2005	272	household	good	77	52	119	3	251	0.92

Nome – As the regional hub for the Kawerak region, estimating take information for Nome is more difficult because it is harder to identify and contact subsistence seal hunters due to the larger human population and the higher percentage of non-Natives living there. Nevertheless, Nome likely takes a large number of seals and should be part of a harvest monitoring program. Nine bounty estimates are available, and only one household survey has been collected in Nome since 1972. Nome's current population estimate is 3,699 people, of which 51% are Alaska Native (U.S. Census Bureau).

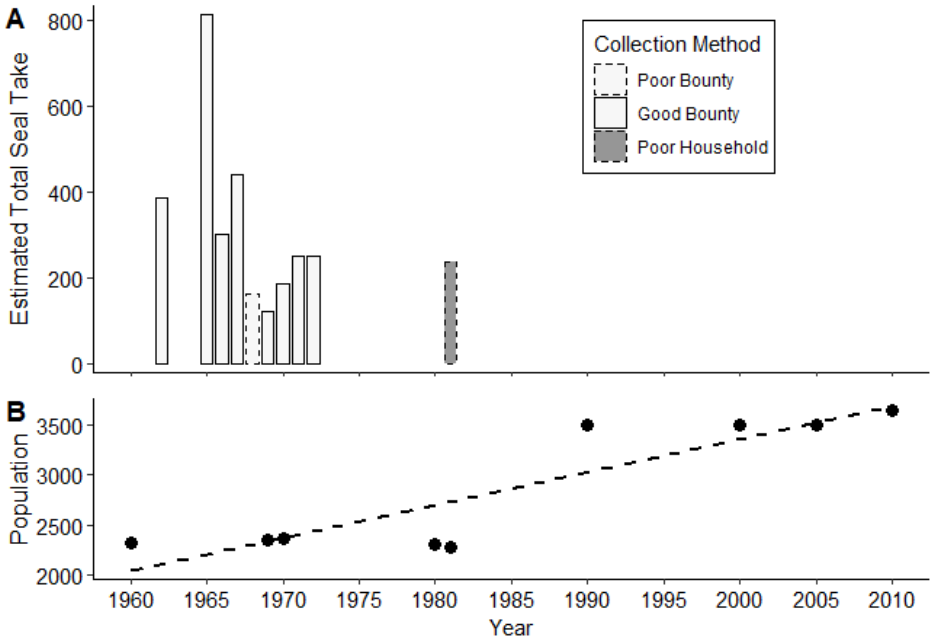

Figure 21. Estimated seal take (A) and human population (B) for Nome, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), and the U.S. Census Bureau.

Table 17. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Nome, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	Take
1962	2136	bounty	good	-	-	-	-	386	0.18
1965	2350	bounty	good	70	130	100	0	815	0.35
1966	2350	bounty	good	-	-	-	-	300	0.13
1967	2350	bounty	good	-	-	-	-	441	0.19
1968	2350	bounty	poor	-	-	-	-	163	0.07
1969	2350	bounty	good	-	-	-	-	120	0.05
1970	2357	bounty	good	-	-	-	-	185	0.08
1971	2357	bounty	good	-	-	-	-	250	0.11
1972	2357	bounty	good	-	-	-	-	250	0.11
1981	2273	household	poor	67	83	87	1	238	0.10

White Mountain - Although White Mountain is located slightly inland, seals are available in the nearby coastal areas. Seven bounty estimates and one household survey estimate from 2005 are available.

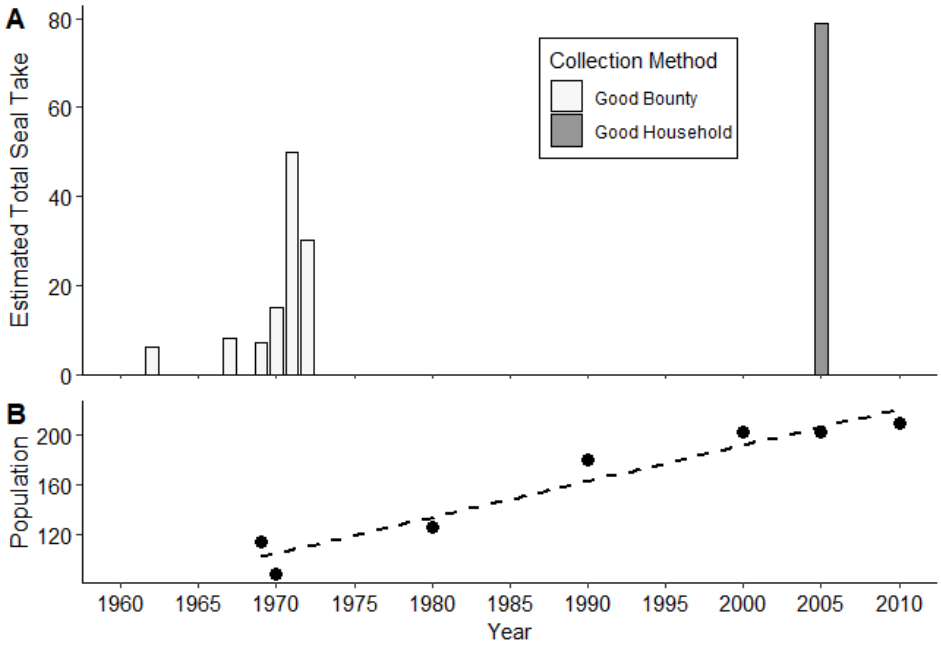

Figure 22. Estimated seal take (A) and human population (B) for White Mountain, Alaska. Numbers are from Burns et al. (1964), Burns (1968-1970, 1972, 1973), Ahmasuk et al. (2007), and the U.S. Census Bureau.

Table 18. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in White Mountain, Alaska. Numbers are from Burns et al. (1964), Burns (1968-1970, 1972, 1973), Ahmasuk et al. (2007), and the U.S. Census Bureau.

		Method		Number of Seals					*Per*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*capita* Take
1962	113	bounty	good	-	-	-	-	6	0.05
1967	113	bounty	good	-	-	-	-	8	0.07
1968	113	bounty	poor	-	-	-	-	0	0.00
1969	113	bounty	good	-	-	-	-	7	0.06
1970	87	bounty	good	-	-	-	-	15	0.17
1971	87	bounty	good	-	-	-	-	50	0.57
1972	87	bounty	good	-	-	-	-	30	0.34
2005	203	household	good	58	1	20	0	79	0.39

Golovin - Golovin is located 70 miles east of Nome on the northern coast of Norton Sound. Nine bounty estimates and five household survey estimates are available, the most recent is from 2012.

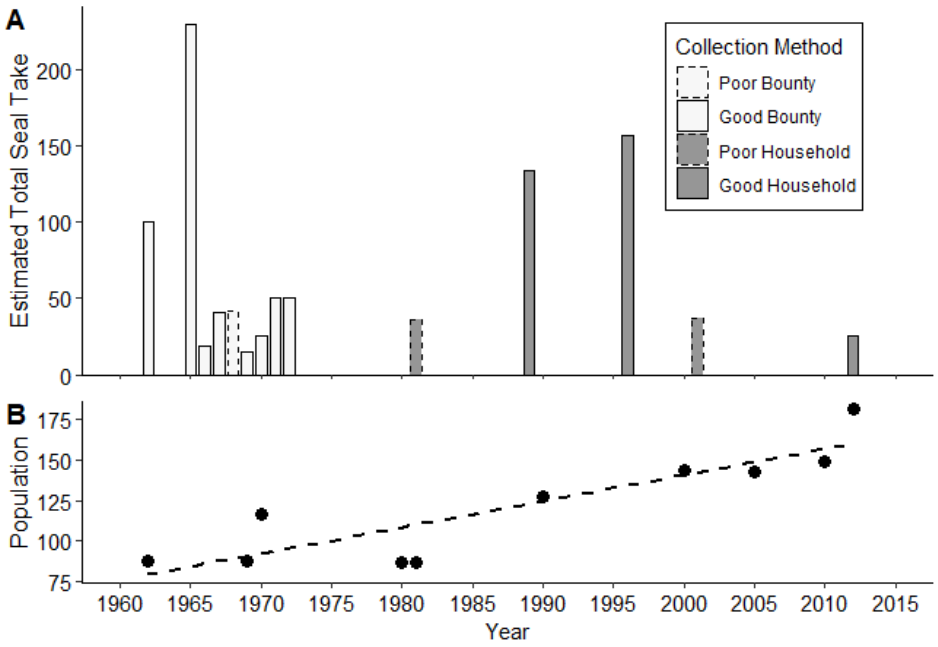

Figure 23. Estimated seal take (A) and human population (B) for Golovin, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Conger and Magdanz (1990), Georgette et al. (1998), Kawerak (2002), Braem et al. (2017), and the U.S. Census Bureau.

Table 19. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Golovin, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Conger and Magdanz (1990), Georgette et al. (1998), Kawerak (2002), Braem et al. (2017), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	88	bounty	good	-	-	-	-	100	1.14
1965	88	bounty	good	60	120	50	0	230	2.61
1966	88	bounty	good	-	-	-	-	19	0.22
1967	88	bounty	good	-	-	-	-	41	0.47
1968	88	bounty	poor	-	-	-	-	42	0.48
1969	88	bounty	good	-	-	-	-	15	0.17
1970	117	bounty	good	-	-	-	-	25	0.21
1971	117	bounty	good	-	-	-	-	50	0.43
1972	117	bounty	good	-	-	-	-	50	0.43
1981	87	household	poor	9	11	16	0	36	0.41
1989	127	household	good	19	17	98	0	134	1.06
1996	144	household	good	31	77	47	2	157	1.09
2001	143	household	poor	10	7	16	4	37	0.26
2012	181	household	good	11	0	14	0	25	0.14

Elim – Elim is located on the northern coast of Norton Bay and residents have good access to seals. Eight bounty estimates and three household survey estimates are available, but only the most recent household survey conducted in 2006 was conducted in a way to allow extrapolation to the community.

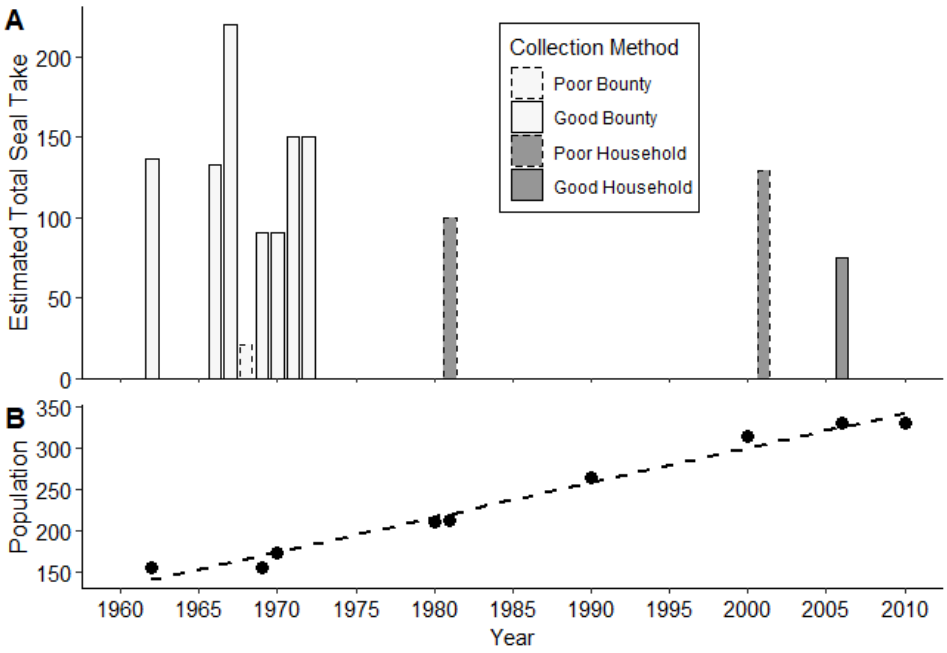

Figure 24. Estimated seal take (A) and human population (B) for Elim, Alaska. Numbers are from Burns et al. (1964), Burns (1967-1970, 1972, 1973), Sherrod (1982), Kawerak (2002), Ahmasuk et al. (2007), and the U.S. Census Bureau.

Table 20. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Elim, Alaska. Numbers are from Burns et al. (1964), Burns (1967-1970, 1972, 1973), Sherrod (1982), Kawerak (2002), Ahmasuk et al. (2007), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	Take
1962	156	bounty	good	-	-	-	-	136	0.87
1966	156	bounty	good	-	-	-	-	133	0.85
1967	156	bounty	good	-	-	-	-	220	1.41
1968	156	bounty	poor	-	-	-	-	21	0.13
1969	156	bounty	good	-	-	-	-	90	0.58
1970	174	bounty	good	-	-	-	-	90	0.52
1971	171	bounty	good	-	-	-	-	150	0.88
1972	174	bounty	good	-	-	-	-	150	0.86
1981	212	household	poor	40	35	25	0	100	0.47
2001	313	household	poor	68	45	15	1	129	0.41
2006	330	household	good	42	13	20	0	75	0.23

Koyuk – Koyuk is located at the mouth of the Koyuk River in Norton Bay and has good access to seals. Eight bounty estimates and two household survey estimates are available. The most recent survey is from 2005. The current population of Koyuk is estimated as 312 residents (U.S. Census Bureau).

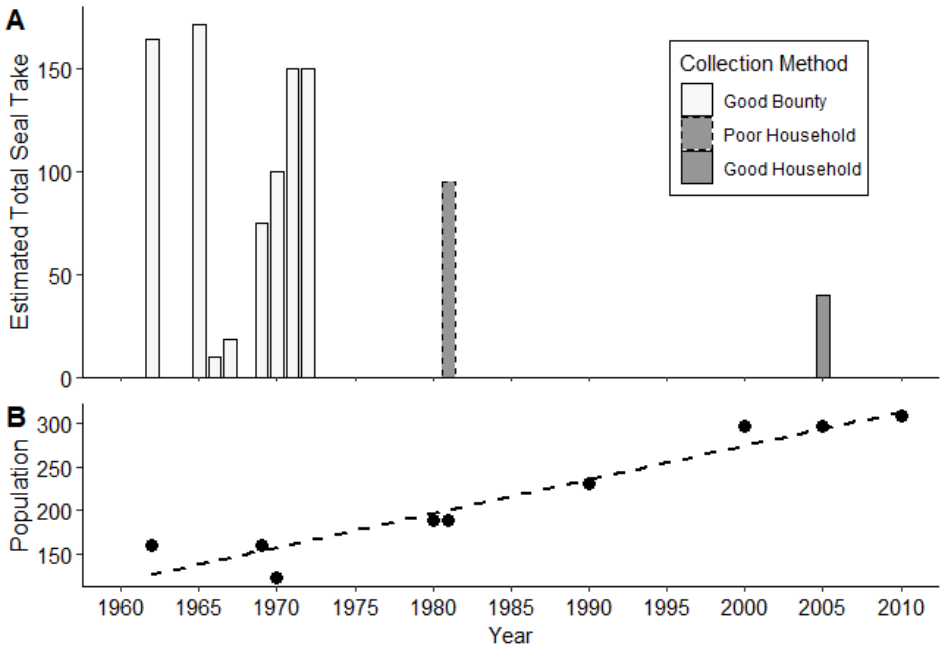

Figure 25. Estimated seal take (A) and human population (B) for Koyuk, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Ahmasuk et al. (2007), and the U.S. Census Bureau.

Table 21. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Koyuk, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Ahmasuk et al. (2007), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	160	bounty	good	-	-	-	-	165	1.03
1965	160	bounty	good	40	82	50	0	172	1.08
1966	160	bounty	good	-	-	-	-	10	0.06
1967	160	bounty	good	-	-	-	-	18	0.11
1969	160	bounty	good	-	-	-	-	75	0.47
1970	122	bounty	good	-	-	-	-	100	0.82
1971	122	bounty	good	-	-	-	-	150	1.23
1972	122	bounty	good	-	-	-	-	150	1.23
1981	188	household	poor	34	45	16	0	95	0.51
2005	297	household	good	10	7	23	0	40	0.13

Shaktoolik - Shaktoolik was moved to its current town site in 1967. The new town site is on the coast of Norton Sound between Unalakleet and Koyuk. Nine bounty estimates and three household survey estimates are available, the most recent is from 2001. Currently, 212 people are estimated to live in Shaktoolik (U.S. Census Bureau).

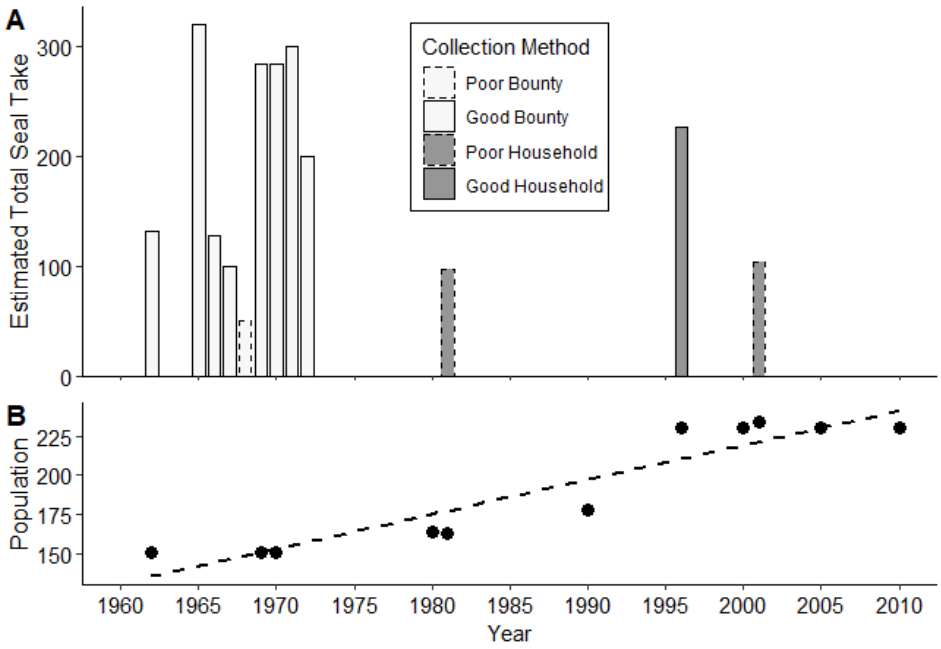

Figure 26. Estimated seal take (A) and human population (B) for Shaktoolik, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Georgette et al. (1998), Kawerak (2002), and the U.S. Census Bureau.

Table 22. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Shaktoolik, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Georgette et al. (1998), Kawerak (2002), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	151	bounty	good	-	-	-	-	132	0.87
1965	151	bounty	good	70	171	80	0	321	2.13
1966	151	bounty	good	-	-	-	-	128	0.85
1967	151	bounty	good	-	-	-	-	100	0.66
1968	151	bounty	poor	-	-	-	-	50	0.33
1969	151	bounty	good	-	-	-	-	285	1.89
1970	151	bounty	good	-	-	-	-	285	1.89
1971	151	bounty	good	-	-	-	-	300	1.99
1972	151	bounty	good	-	-	-	-	200	1.32
1981	163	household	poor	42	27	28	0	97	0.60
1996	230	household	good	76	109	41	1	227	0.99
2001	234	household	poor	44	13	47	0	104	0.44

Unalakleet – Unalakleet is located on the eastern coast of Norton Sound. Eight bounty estimates and two household survey estimates are available, the most recent is from 2005. The current population estimate for Unalakleet is 765 people (U.S. Census Bureau).

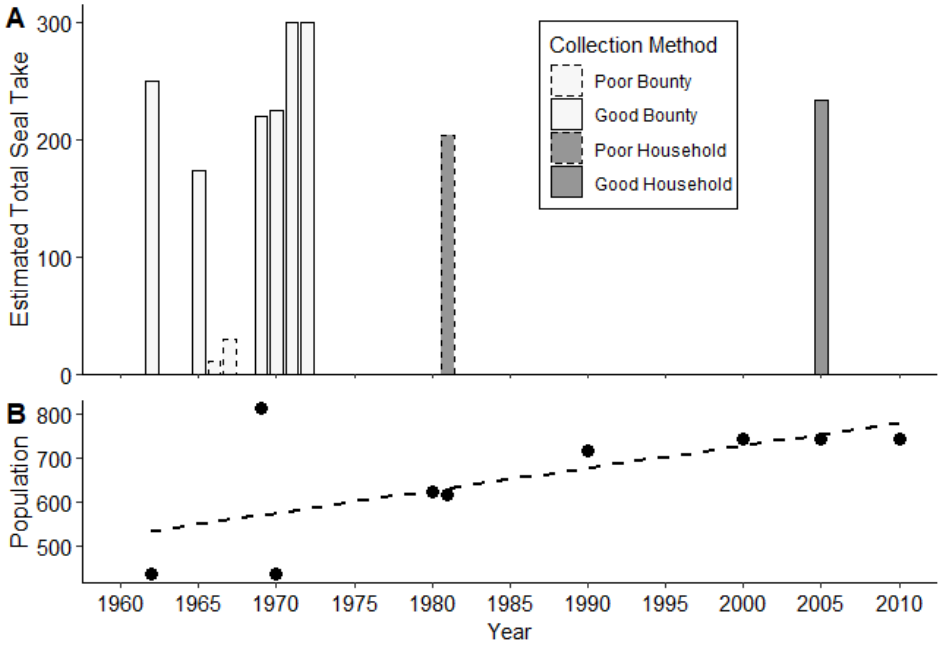

Figure 27. Estimated seal take (A) and human population (B) for Unalakleet, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Ahmasuk et al. (2007), and the U.S. Census Bureau.

Table 23. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Unalakleet, Alaska. Numbers are from Burns et al. (1964), Burns (1966- 1970, 1972, 1973), Sherrod (1982), Ahmasuk et al. (2007), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	434	bounty	good	-	-	-	-	250	0.58
1965	434	bounty	good	40	93	40	0	173	0.40
1966	434	bounty	poor	-	-	-	-	11	0.03
1967	434	bounty	poor	-	-	-	-	29	0.07
1969	811	bounty	good	-	-	-	-	220	0.27
1970	434	bounty	good	-	-	-	-	225	0.52
1971	434	bounty	good	-	-	-	-	300	0.69
1972	434	bounty	good	-	-	-	-	300	0.69
1981	615	household	poor	58	69	77	0	204	0.33
2005	744	household	good	95	11	125	3	234	0.31

Saint Michael – Saint Michael is located on the southern coast of Norton Sound. Seven bounty estimates and three household survey estimates are available, the most recent is from 2005. The current population of St. Michael is estimated at 456 people (U.S. Census Bureau).

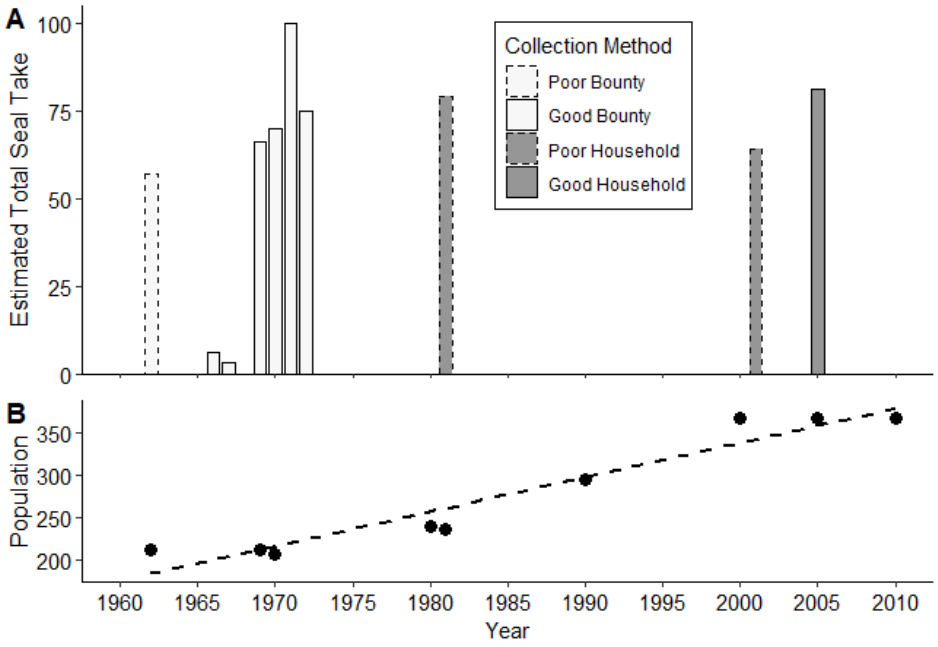

Figure 28. Estimated seal take (A) and human population (B) for St. Michael, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Kawerak (2002), Ahmasuk et al. (2007), and the U.S. Census Bureau.

Table 24. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in St. Michael, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Kawerak (2002), Ahmasuk et al. (2007), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	212	bounty	poor	-	-	-	-	57	0.27
1966	212	bounty	good	-	-	-	-	6	0.03
1967	212	bounty	good	-	-	-	-	3	0.01
1969	212	bounty	good	-	-	-	-	66	0.31
1970	207	bounty	good	-	-	-	-	70	0.34
1971	207	bounty	good	-	-	-	-	100	0.48
1972	207	bounty	good	-	-	-	-	75	0.36
1981	334	household	poor	49	19	11	0	79	0.24
2001	368	household	poor	16	3	45	0	64	0.17
2005	368	household	good	44	0	36	0	80	0.22

Stebbins – Stebbins is located near Saint Michael on the southern coast of Norton Sound. Eight bounty estimates and six household survey estimates are available. The most recent household survey is from 2013. Stebbins' current population estimate is 634 people (U.S. Census Bureau).

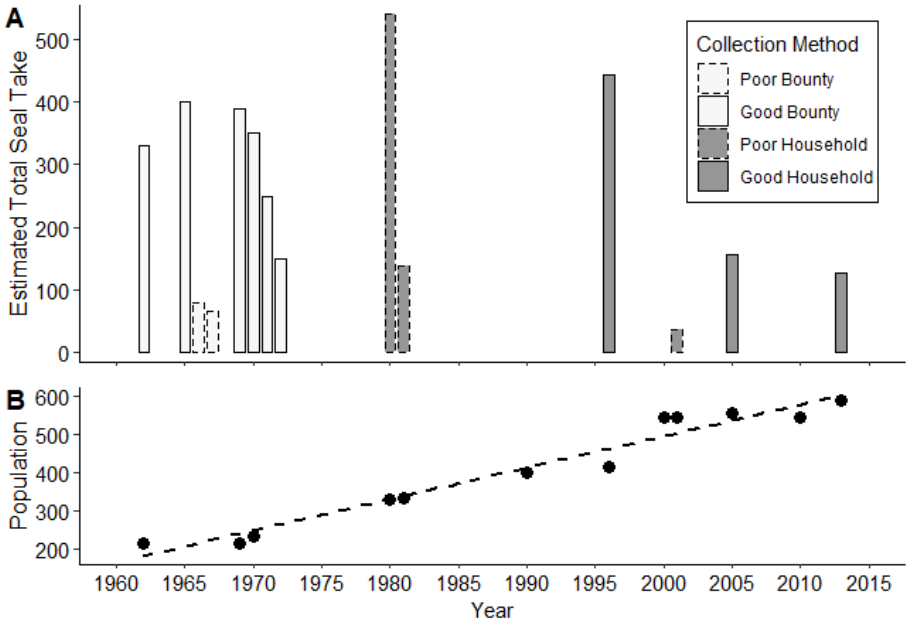

Figure 29. Estimated seal take (A) and human population (B) for Stebbins, Alaska. Numbers are from Burns et al. (1964), Burns (1966- 1970, 1972, 1973), Wolfe (1981), Sherrod (1982), Georgette et al. (1998), Kawerak (2002), Ahmasuk et al. (2007), Braem et al. (2017), and the U.S. Census Bureau.

Table 25. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Stebbins, Alaska. Numbers are from Burns et al. (1964), Burns (1966- 1970, 1972, 1973), Wolfe (1981), Sherrod (1982), Georgette et al. (1998), Kawerak (2002), Ahmasuk et al. (2007), Braem et al. (2017), and the U.S. Census Bureau.

		Method		Number of Seals					*Per*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*capita* Take
1962	215	bounty	good	-	-	-	-	331	1.54
1965	215	bounty	good	100	181	120	0	401	1.87
1966	215	bounty	poor	-	-	-	-	79	0.37
1967	215	bounty	poor	-	-	-	-	66	0.31
1969	215	bounty	good	-	-	-	-	390	1.81
1970	231	bounty	good	-	-	-	-	350	1.52
1971	231	bounty	good	-	-	-	-	250	1.08
1972	231	bounty	good	-	-	-	-	150	0.65
1980	331	household	poor	180	300	60	0	540	1.63
1981	334	household	poor	63	43	32	0	138	0.41
1996	416	household	good	145	231	63	4	443	1.06
2001	546	household	poor	22	9	6	0	37	0.07
2005	557	household	good	74	16	66	0	156	0.28
2013	591	Household	Good	61	23	42	0	126	0.21

Gambell - Gambell is located on the northwestern tip of St. Lawrence Island and the community relies heavily on marine mammals for subsistence. Nine bounty estimates and five household survey estimates are available, the most recent from 2005. Currently, 640 people are estimated to reside in Gambell (U.S. Census Bureau).

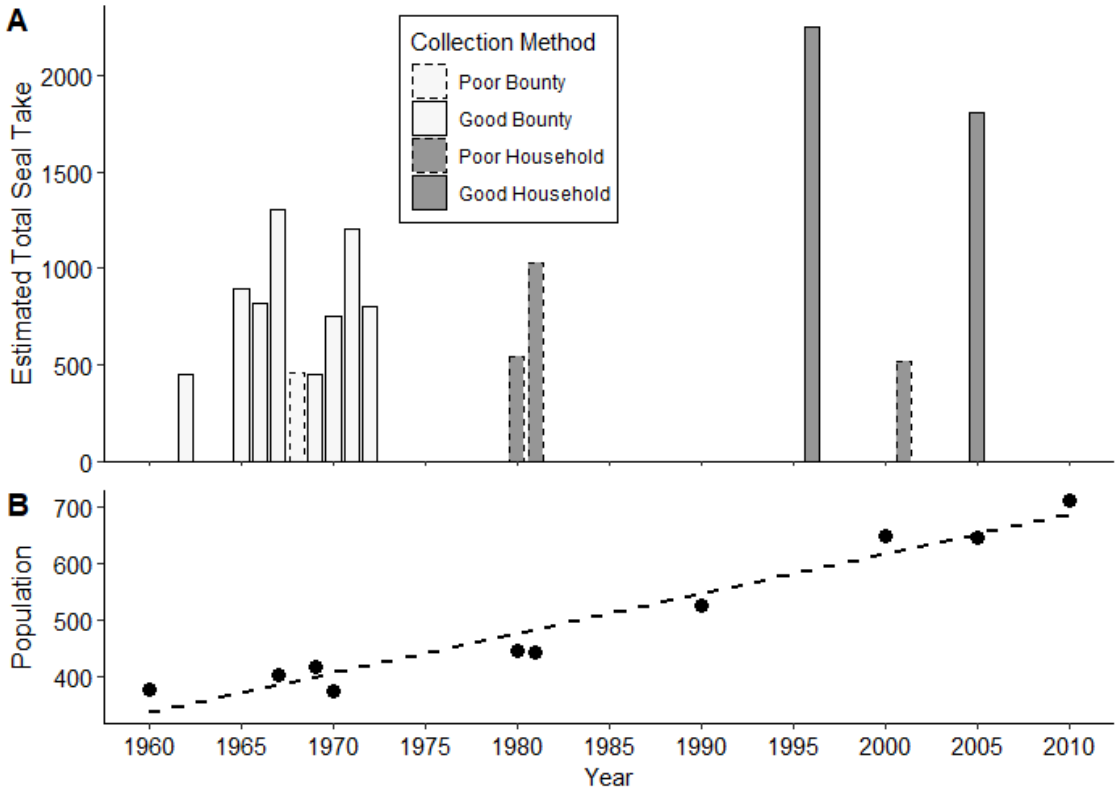

Figure 30. Estimated seal take (A) and human population (B) for Gambell, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Kawerak (1982, 2002), Sherrod (1982), Georgette et al. (1998), Ahmasuk et al. (2007), and the U.S. Census Bureau.

Gambell continued

Table 26. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Gambell, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Kawerak (1982, 2002), Sherrod (1982), Georgette et al. (1998), Ahmasuk et al. (2007), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	377	bounty	good	-	-	-	-	450	1.19
1965	402	bounty	good	200	543	150	0	893	2.22
1966	402	bounty	good	-	-	-	-	820	2.04
1967	402	bounty	good	-	-	-	-	1306	3.25
1968	402	bounty	poor	-	-	-	-	458	1.14
1969	415	bounty	good	-	-	-	-	450	1.08
1970	372	bounty	good	-	-	-	-	750	2.02
1971	372	bounty	good	-	-	-	-	1200	3.23
1972	372	bounty	good	-	-	-	-	800	2.15
1980	445	household	poor	-	-	-	-	540	1.21
1981	441	household	poor	361	327	343	0	1031	2.34
1996	525	household	good	908	598	714	30	2250	4.29
2001	649	household	poor	177	141	195	3	516	0.80
2005	646	household	good	752	346	676	36	1810	2.80

Savoonga - Savoonga is located on the north side of St. Lawrence Island and the community relies heavily on marine mammals for subsistence. Nine bounty estimates and four household survey estimates are available, the most recent is from 2005. Savoonga's current population estimate is 835 people (U.S. Census Bureau).

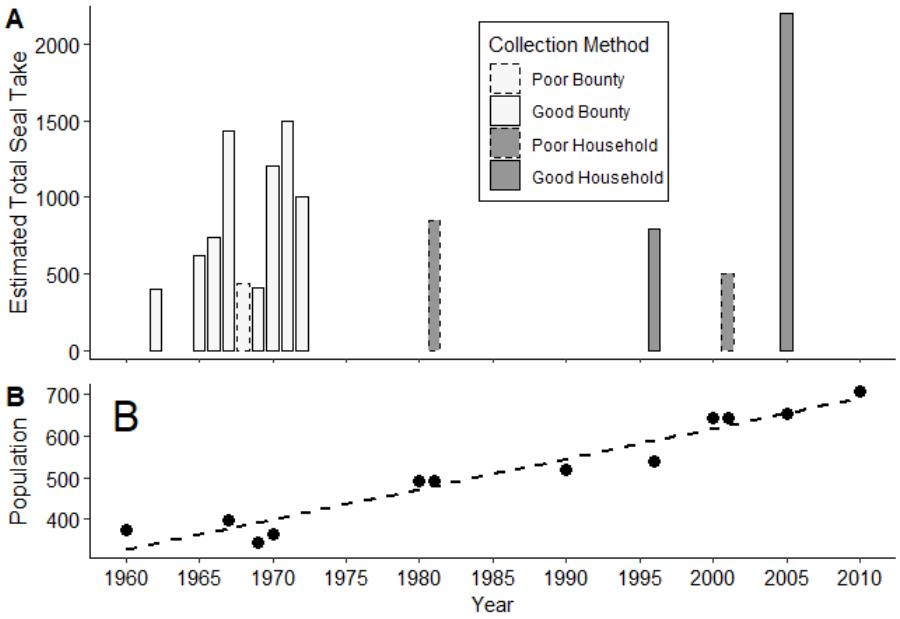

Figure 31. Estimated seal take (A) and human population (B) for Savoonga, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Georgette et al. (1998), Kawerak (2002), Ahmasuk et al. (2007), and the U.S. Census Bureau.

Table 27. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Savoonga, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Sherrod (1982), Georgette et al. (1998), Kawerak (2002), Ahmasuk et al. (2007), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	374	bounty	good	-	-	-	-	400	1.07
1965	397	bounty	good	150	321	150	0	621	1.56
1966	397	bounty	good	-	-	-	-	736	1.85
1967	397	bounty	good	-	-	-	-	1436	3.62
1968	397	bounty	poor	-	-	-	-	439	1.11
1969	343	bounty	good	-	-	-	-	410	1.20
1970	364	bounty	good	-	-	-	-	1200	3.30
1971	364	bounty	good	-	-	-	-	1500	4.12
1972	364	bounty	good	-	-	-	-	1000	2.75
1981	491	household	poor	137	371	293	52	853	1.74
1996	539	household	good	286	252	243	17	798	1.48
2001	642	household	poor	151	199	144	4	498	0.78
2005	654	household	good	700	631	832	33	2196	3.36

King Island - Located in the Bering Sea 85 miles due northwest of Nome, King Island took an estimated 400 seals in 1962 (Burns et al. 1964). Residents of King Island moved to Nome in the 1960s due to social and economic pressures and opportunities. King Islanders maintain a distinct community identity within Nome and continue to hunt near King Island, their take is reported as part of Nome's.

Northeast Cape – Northeast Cape was a third community on St. Lawrence Island that was abandoned in the early 1970s. Three bounty estimates were made before the residents left Northeast Cape for Savoonga, Gambell, and Nome. Bounty records show Northeast Cape took 20 seals in 1967, 11 in 1969, and 20 in 1971 (Burns 1968, 1970, 1972).

Solomon - Solomon was a gold rush mining town with a large seasonal population, but today there are few resident families. Four bounty records are available, but no information has been collected since 1972. From 1969 to 1972, seven residents lived in Solomon (U.S. Census Bureau), harvesting 35, 20, 25 and 15 seals in 1969, 1970, 1971 and 1972, respectively (Burns 1970, 1972, 1973).

Yukon-Kuskokwim Delta

The Association of Village Council Presidents (AVCP) is the nonprofit organization that represents more than 60 communities in the Yukon-Kuskokwim Delta region, of which 30 are located along the coast and hunt marine mammals (Fig. 32).

Figure 32. Yukon-Kuskokwim Delta communities that regularly take ice seals.

Kotlik – Kotlik is located within the Yukon River delta near the southern coast of Norton Sound. No bounty estimates and only one household survey estimate is available. An estimated 655 people currently live in Kotlik (U.S. Census Bureau).

Table 28. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Kotlik, Alaska. Numbers are from Wolfe (1981) and the U.S. Census Bureau.

		Method		Number of Seals					*Per*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*capita* Take
1980	293	household	poor	128	140	80	-	348	1.19

Kwiguk (Emmonak) – Kwiguk residents moved to Emmonak in 1964 after a flood damaged the village. Located near the mouth of the Yukon River, Emmonak hunters travel downriver to hunt seals in the ocean, but sometimes take them in the river near the community. Four bounty estimates and five household survey estimates are available, the most recent was from a 2011 household survey.

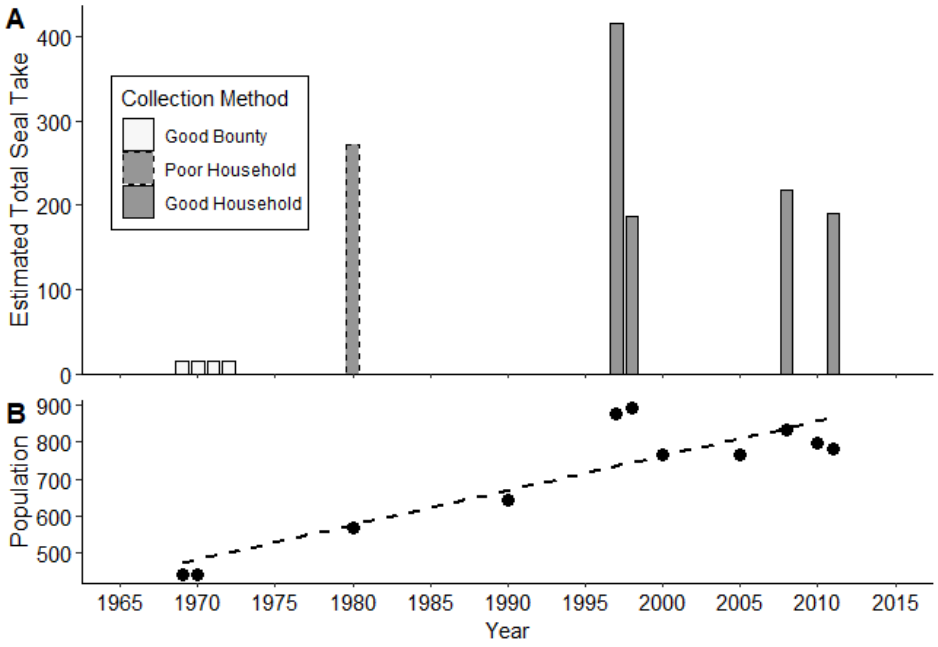

Figure 33. Estimated seal take (A) and human population (B) for Emmonak, Alaska. Numbers are from Burns (1970, 1972, 1973), Wolfe (1981), Coffing et al. (1998, 1999), Fall et al. (2013), Nelson (2013), and the U.S. Census Bureau.

Table 29. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Emmonak, Alaska. Numbers are from Burns (1970, 1972, 1973), Wolfe (1981), and Coffing et al. (1998, 1999), Fall et al. (2013), Nelson (2013), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1969	440	bounty	good	-	-	-	-	15	0.03
1970	439	bounty	good	-	-	-	-	15	0.03
1971	439	bounty	good	-	-	-	-	15	0.03
1972	439	bounty	good	-	-	-	-	15	0.03
1980	567	household	poor	39	139	94	0	272	0.48
1997	879	household	good	198	151	60	7	416	0.47
1998	892	household	good	72	66	45	4	187	0.21
2008	834	household	good	136	28	46	7	217	0.26
2011	782	household	good	106	56	28	0	190	0.24

Alakanuk - Alakanuk is located near the mouth of the Yukon River. Four bounty estimates and one household survey estimate are available, the most recent from 1980. The current population estimate for Alakanuk is 756 residents (U.S. Census Bureau).

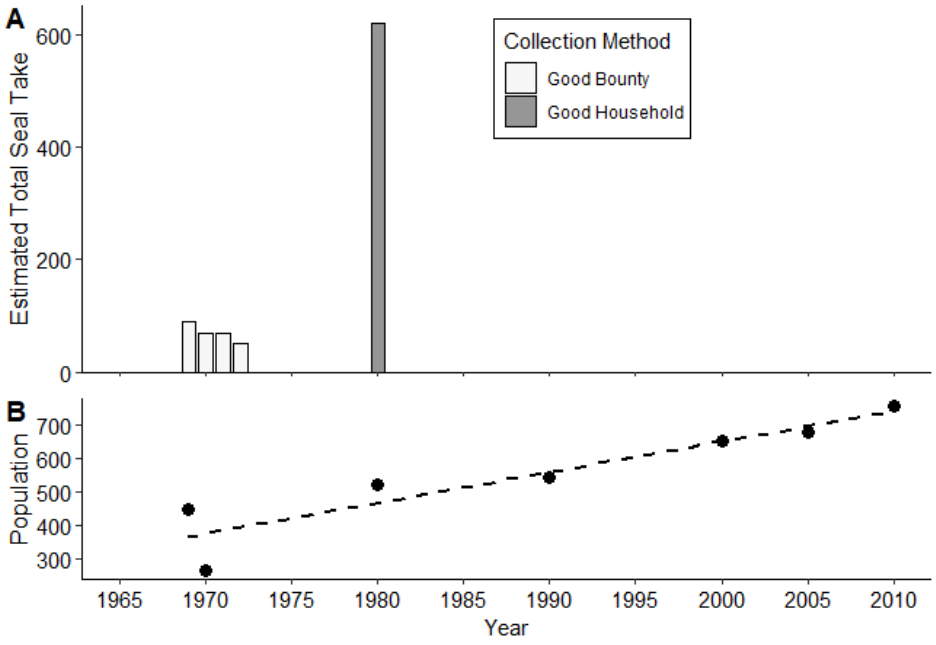

Figure 34. Estimated seal take (A) and human population (B) for Alakanuk, Alaska. Numbers are from Burns (1970, 1972, 1973), Wolfe (1981), and the U.S. Census Bureau.

Table 30. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Alakanuk, Alaska. Numbers are from Burns (1970, 1972, 1973), Wolfe (1981), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1969	447	bounty	good	-	-	-	-	90	0.20
1970	265	bounty	good	-	-	-	-	70	0.26
1971	265	bounty	good	-	-	-	-	70	0.26
1972	265	bounty	good	-	-	-	-	50	0.19
1980	522	household	good	176	274	171	-	621	1.19

Scammon Bay – Scammon Bay is a bay on the eastern coast of the Bering Sea and residents often travel to hunt seals nearby including spotted seals hauled out on islands west of the community. Nine bounty estimates, and three household survey estimates from 2011 to 2013 are available for Scammon Bay, Alaska. 600 people are currently estimated to reside in Scammon Bay (U.S. Census Bureau).

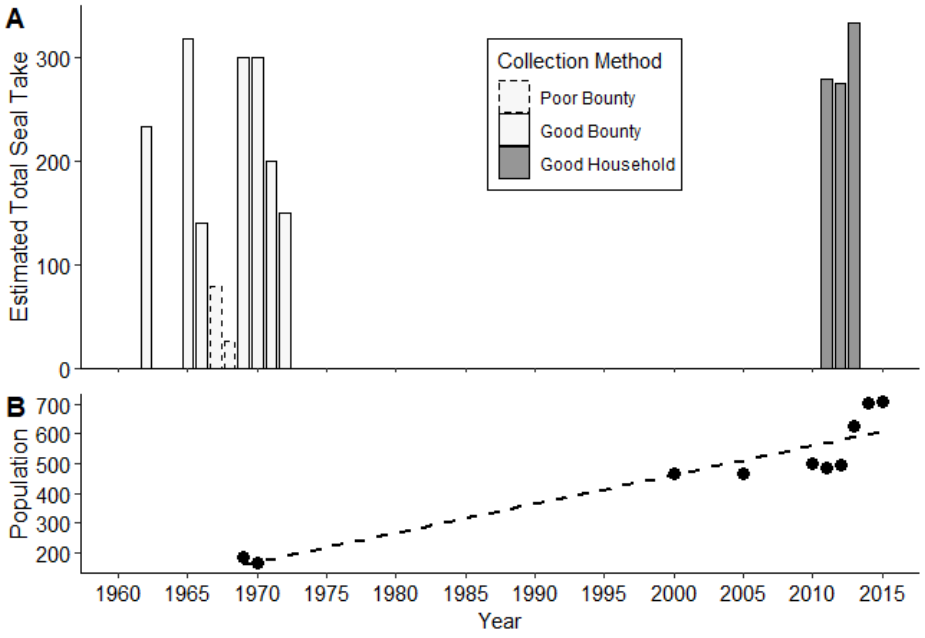

Figure 35. Estimated seal take (A) and human population (B) for Scammon Bay, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Nelson (2013, 2014), Ikuta et al. (2013), and the U.S. Census Bureau.

Table 31. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Scammon Bay, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), Nelson (2013, 2014), Ikuta et al. (2013), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	185	bounty	good	-	-	-	-	234	1.26
1965	185	bounty	good	90	129	100	0	319	1.72
1966	185	bounty	good	-	-	-	-	140	0.76
1967	185	bounty	poor	-	-	-	-	79	0.43
1968	185	bounty	poor	-	-	-	-	26	0.14
1969	185	bounty	good	-	-	-	-	300	1.62
1970	166	bounty	good	-	-	-	-	300	1.81
1971	166	bounty	good	-	-	-	-	200	1.20
1972	166	bounty	good	-	-	-	-	150	0.90
2011	486	household	good	82	137	56	4	279	0.57
2012	498	household	good	51	169	53	2	275	0.55
2013	628	household	good	82	189	56	7	334	0.53

Hooper Bay – Hooper Bay is located on the coast of the eastern Bering Sea. Nine bounty estimates and thirteen household survey estimates are available, the most recent is a series of surveys from 2008 to 2018. Household surveys are currently being conducted in Hooper Bay by ADF&G in cooperation with the AVCP and the ISC.

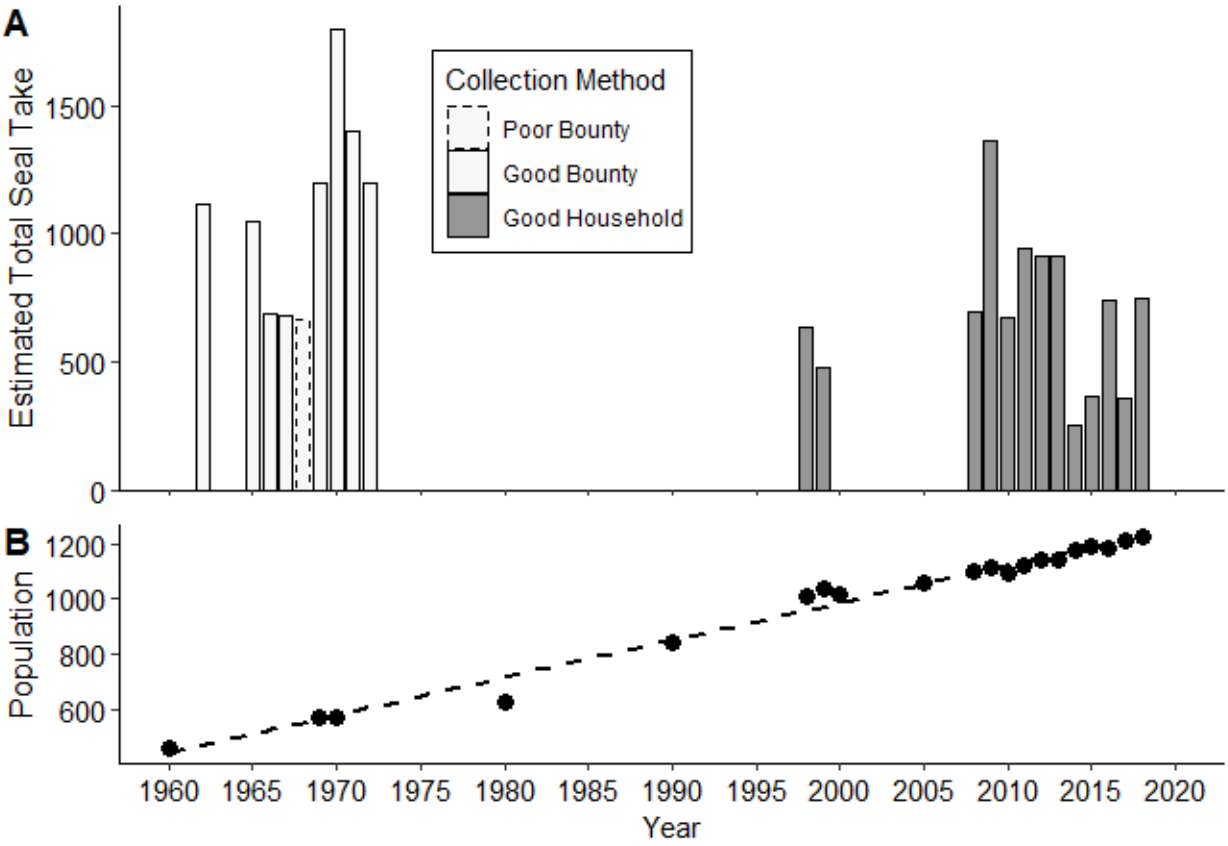

Figure 36. Estimated seal take (A) and human population (B) for Hooper Bay, Alaska. Numbers are from Burns et al. (1964), Burns (1966- 1970, 1972, 1973), Coffing et al. (1998, 1999), Olnes et al. (2020a) and the U.S. Census Bureau.

Hooper Bay continued

Table 32. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Hooper Bay, Alaska. Numbers are from Burns et al. (1964), Burns (1966- 1970, 1972, 1973), Coffing et al. (1998, 1999), Olnes et al. (2020a) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	460	bounty	good	-	-	-	-	1114	2.42
1965	460	bounty	good	200	646	200	0	1046	2.27
1966	460	bounty	good	-	-	-	-	686	1.49
1967	490	bounty	good	-	-	-	-	683	1.39
1968	490	bounty	poor	-	-	-	-	662	1.35
1969	575	bounty	good	-	-	-	-	1200	2.09
1970	575	bounty	good	-	-	-	-	1800	3.13
1971	575	bounty	good	-	-	-	-	1400	2.43
1972	575	bounty	good	-	-	-	-	1200	2.09
1998	1012	household	good	146	409	78	4	637	0.63
1999	1039	household	good	59	370	48	2	479	0.46
2008	1101	household	good	193	396	104	0	693	0.63
2009	1112	household	good	332	889	144	0	1365	1.23
2010	1094	household	good	148	458	71	0	677	0.62
2011	1121	household	good	210	674	57	0	941	0.84
2012	1144	household	good	212	651	46	4	913	0.80
2013	1144	household	good	171	667	61	0	899	0.79
2014	1173	household	good	64	158	27	0	249	0.21
2015	1193	household	good	148	185	32	0	365	0.31
2016	1180	household	good	118	546	72	5	741	0.63
2017	1208	household	good	114	193	50	0	357	0.29
2018	1225	household	good	159	560	29	0	748	0.61

Chevak – Chevak is located approximately 16 miles inland from Hooper Bay. Nine bounty estimates are available. Chevak's current population is estimated to be 951 residents (U.S. Census Bureau).

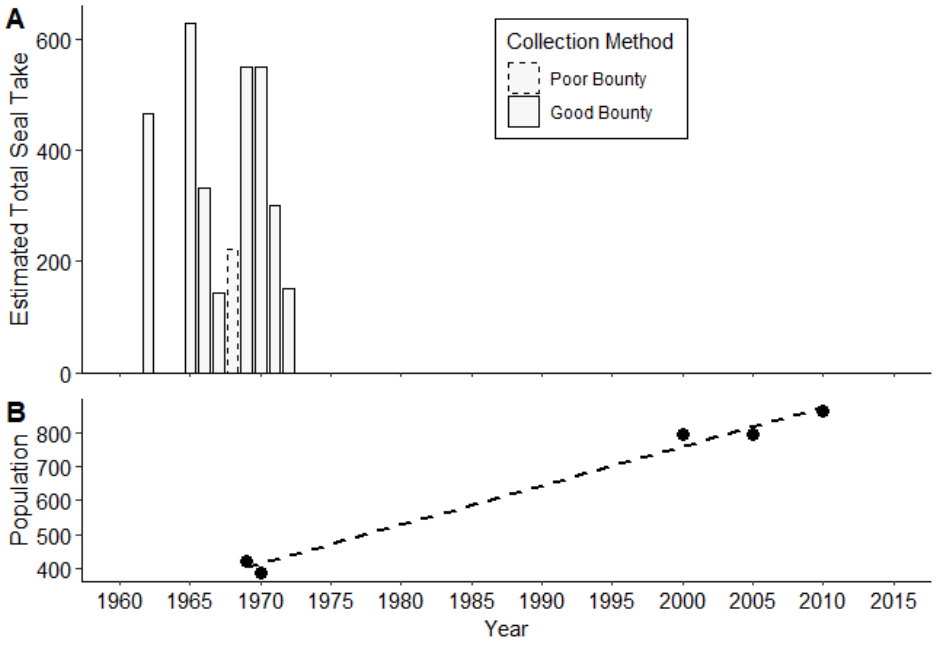

Figure 37. Estimated seal take (A) and human population (B) for Chevak, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), and the U.S. Census Bureau.

Table 33. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Chevak, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	420	bounty	good	-	-	-	-	465	1.11
1965	420	bounty	good	100	329	200	-	629	1.50
1966	420	bounty	good	-	-	-	-	332	0.79
1967	420	bounty	good	-	-	-	-	142	0.34
1968	420	bounty	poor	-	-	-	-	221	0.53
1969	420	bounty	good	-	-	-	-	550	1.31
1970	378	bounty	good	-	-	-	-	550	1.46
1971	387	bounty	good	-	-	-	-	300	0.78
1972	387	bounty	good	-	-	-	-	150	0.39

Tununak – Tununak is located within Tununak Bay of the Bering Sea. Five bounty estimates and eight household survey estimates are available for Tununak, the most recent are from a cooperative harvest monitoring project by ADF&G with AVCP and the ISC.

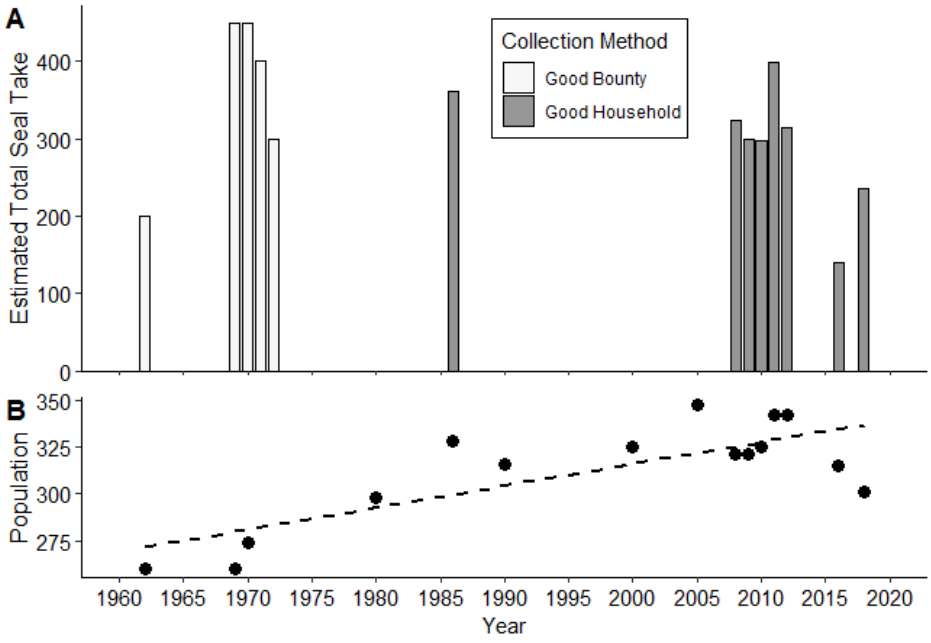

Figure 38. Estimated seal take (A) and human population (B) for Tununak, Alaska. Numbers are from Burns et al. (1964), Burns (1970, 1972, 1973), Olnes et al. (2020b), ADF&G (2024), and the U.S. Census Bureau.

Table 34. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Tununak, Alaska. Numbers are from Burns et al. (1964), Burns (1970, 1972, 1973), Olnes et al. (2020b), ADF&G (2024), and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	260	bounty	good	-	-	-	-	200	0.77
1969	260	bounty	good	-	-	-	-	450	1.73
1970	274	bounty	good	-	-	-	-	450	1.64
1971	274	bounty	good	-	-	-	-	400	1.46
1972	274	bounty	good	-	-	-	-	300	1.09
1986	328	household	good	60	196	78	27	361	1.10
2008	321	household	good	31	193	97	2	323	1.01
2009	321	household	good	21	232	47	0	300	0.93
2010	325	household	good	40	162	96	0	298	0.92
2011	342	household	good	42	257	100	0	399	1.17
2012	342	household	good	44	219	52	0	314	0.92
2016	315	household	good	19	117	26	0	162	0.51
2018	301	household	good	13	187	31	4	235	0.78

Mekoryuk - Mekoryuk is an island community that relies heavily on seals for subsistence. Nine bounty estimates show high reliance on seals in Mekoyruk, but no surveys are available since the 1972 bounty. Approximately 206 people currently reside in Mekoryuk (U.S. Census Bureau).

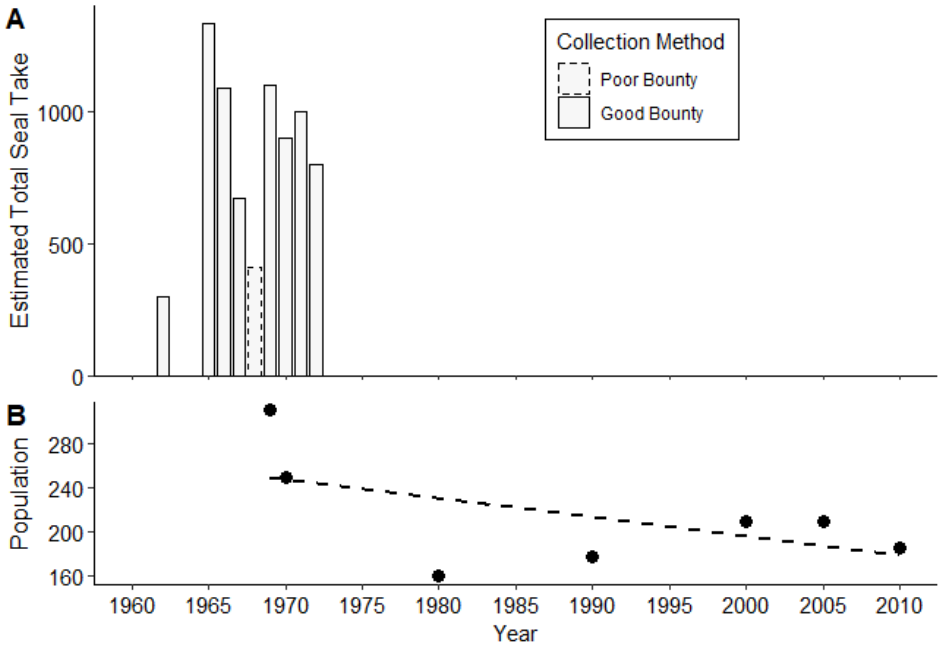

Figure 39. Estimated seal take (A) and human population (B) for Mekoryuk, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973) and the U.S. Census Bureau.

Table 35. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data from Mekoryuk, Alaska. Numbers are from Burns et al. (1964), Burns (1966-1970, 1972, 1973) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	310	bounty	good	-	-	-	-	300	0.97
1965	310	bounty	good	300	532	500	-	1332	4.30
1966	310	bounty	good	-	-	-	-	1087	3.51
1967	310	bounty	good	-	-	-	-	668	2.15
1968	310	bounty	poor	-	-	-	-	407	1.31
1969	310	bounty	good	-	-	-	-	1100	3.55
1970	249	bounty	good	-	-	-	-	900	3.61
1971	249	bounty	good	-	-	-	-	1000	4.02
1972	249	bounty	good	-	-	-	-	800	3.21

Tuntutuliak – Tuntutuliak is located roughly 25 miles up the Kuskokwim River from its outlet. Only six bounty estimates are available for Tuntutuliak. In 2013, a household survey was conducted by ADF&G's Division of Subsistence.

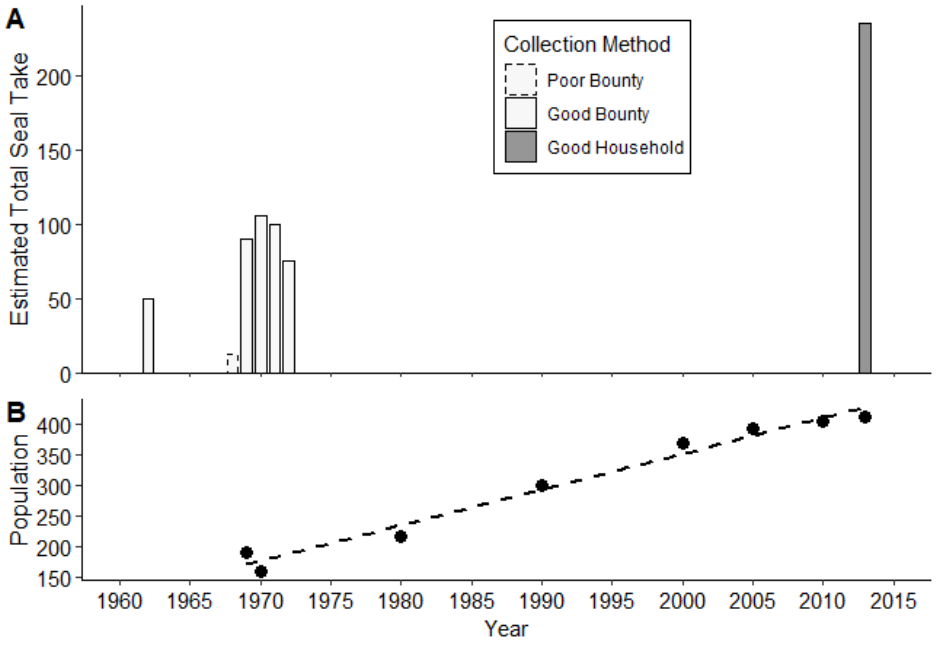

Figure 40. Estimated seal take (A) and human population (B) for Tuntutuliak, Alaska. Numbers are from Burns et al. (1964), Burns (1969, 1970, 1972, 1973), Ikuta et al. (2013), and the U.S. Census Bureau.

Table 36. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Tuntutuliak, Alaska. Numbers are from Burns et al. (1964), Burns (1969, 1970, 1972, 1973), Ikuta et al. (2013) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	190	bounty	good	-	-	-	-	50	0.26
1968	190	bounty	poor	-	-	-	-	12	0.06
1969	190	bounty	good	-	-	-	-	90	0.47
1970	158	bounty	good	-	-	-	-	105	0.66
1971	158	bounty	good	-	-	-	-	100	0.63
1972	158	bounty	good	-	-	-	-	75	0.47
2013	413	household	good	53	75	107	0	235	0.57

Eek – Eek is located on a tributary of the Kuskokwim River (the Eek River) approximately 20 miles from the coast. Seven bounty estimates are available, and data from only one household survey is available, conducted in 2013 by ADF&G's Division of Subsistence.

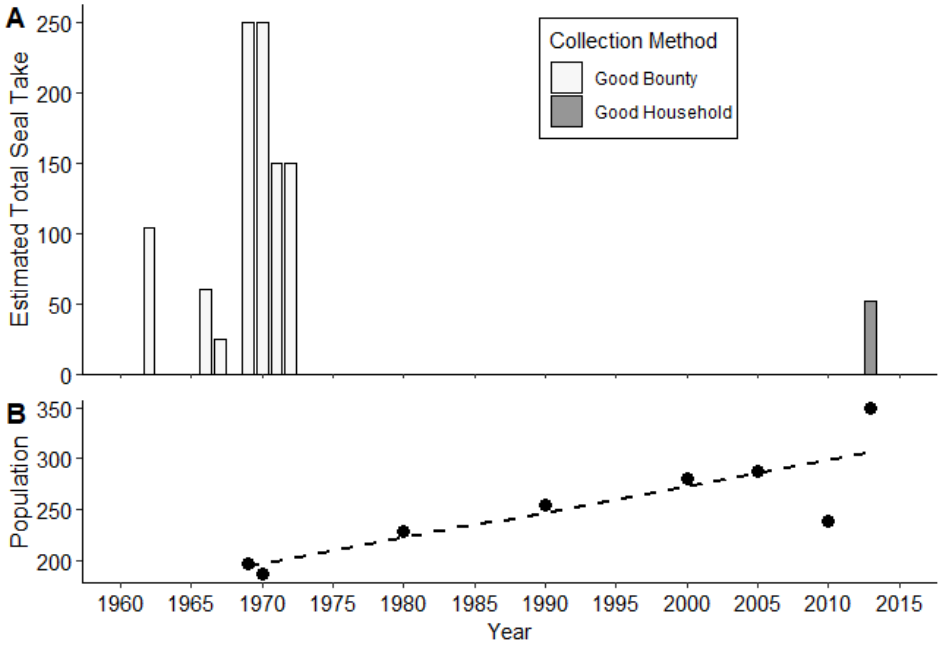

Figure 41. Estimated seal take (A) and human population (B) for Eek, Alaska. Numbers are from Burns et al. (1964), Burns (1967-1970, 1972, 1973), Ikuta et al. (2013), and the U.S. Census Bureau.

Table 37. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Eek, Alaska. Numbers are from Burns et al. (1964), Burns (1967-1970, 1972, 1973), Ikuta et al. (2013), and the U.S. Census Bureau.

		Method		Number of Seals					
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*Per capita* Take
1962	197	bounty	good	-	-	-	-	104	0.53
1966	197	bounty	good	-	-	-	-	60	0.30
1967	197	bounty	good	-	-	-	-	25	0.13
1969	197	bounty	good	-	-	-	-	250	1.27
1970	186	bounty	good	-	-	-	-	250	1.34
1971	186	bounty	good	-	-	-	-	150	0.81
1972	186	bounty	good	-	-	-	-	150	0.81
2013	349	household	good	17	13	22	0	52	0.15

Quinhagak – Quinhagak is located at the mouth of Kanektok River, where it flows into Kuskokwim Bay. Eight bounty estimates and ten household survey estimates are available, the most recent seven surveys were conducted by ADF&G in cooperation with the AVCP and the ISC.

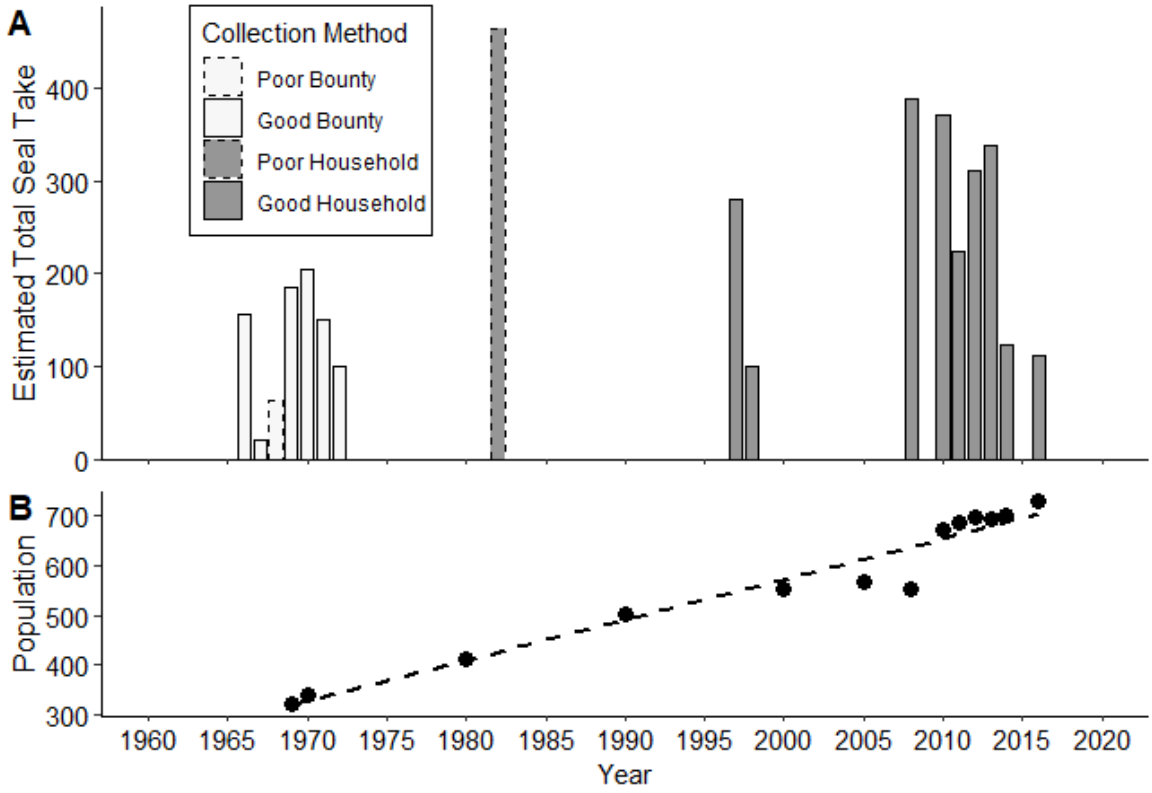

Figure 42. Estimated seal take (A) and human population (B) for Quinhagak, Alaska. Numbers are from Burns et al. (1964), Burns (1967- 1970, 1972, 1973), Wolfe et al. (1984), Coffing et al. (1998, 1999), Nelson et al. (2018b), and the U.S. Census Bureau.

Quinhagek continued

Table 38. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Quinhagak, Alaska. Numbers are from Burns et al. (1964), Burns (1967- 1970, 1972, 1973), Wolfe et al. (1984), Coffing et al. (1998, 1999), Nelson et al. (2018b), and the U.S. Census Bureau.

		Method		Number of seals					*Per capita* take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total take	
1962	320	bounty	good	-	-	-	-	0	0.00
1966	320	bounty	good	-	-	-	-	157	0.49
1967	320	bounty	good	-	-	-	-	21	0.07
1968	320	bounty	poor	-	-	-	-	64	0.20
1969	320	bounty	good	-	-	-	-	185	0.57
1970	340	bounty	good	-	-	-	-	205	0.60
1971	340	bounty	good	-	-	-	-	150	0.44
1972	340	bounty	good	-	-	-	-	100	0.29
1982	412	household	poor	65	114	286	0	465	1.13
1997	567	household	good	34	120	125	2	281	0.50
1998	612	household	good	19	13	66	1	99	0.16
2008	553	household	good	63	115	210	0	388	0.70
2010	672	household	good	29	163	179	2	373	0.56
2011	686	household	good	26	117	78	3	224	0.33
2012	697	household	good	44	140	128	0	312	0.45
2013	694	household	good	49	160	195	0	404	0.58
2014	702	household	good	16	51	56	0	123	0.18
2016	729	household	good	38	26	48	0	112	0.15

Mountain Village - Located about 70 miles inland, Mountain Village was not part of the bounty program. Although no bounty estimates are available, two household surveys from 1980 and 2010 are available for Mountain Village. In 1980 (human population: 125), Mountain Village took an estimated 138 seals, and in 2010 (human population: 813), an estimated 51 seals were taken (Wolfe 1981, Braem 2012, U.S. Census Bureau).

Toksook Bay – Toksook Bay is located near Tununak. Only two bounty estimates are available for Toksook Bay, from 1971 and 1972. Toksook Bay's current population is estimated at 658 residents (U.S. Census Bureau).

Table 39. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Toksook Bay, Alaska. Numbers are from Burns (1973) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1971	257	bounty	good	-	-	-	-	100	0.39
1972	257	bounty	good	-	-	-	-	100	0.39

Nightmute – Nightmute is located roughly 12 miles from the Bering Sea coast, just south of Toksook Bay. Only four bounty estimates (1969-1972) are available. The current population estimate for Nightmute is 306 residents (U.S. Census Bureau).

Table 40. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Toksook Bay, Alaska. Numbers are from Burns (1970, 1972, 1973) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1969	120	bounty	good	-	-	-	-	54	0.45
1970	120	bounty	good	-	-	-	-	80	0.67
1971	127	bounty	good	-	-	-	-	80	0.63
1972	127	bounty	good	-	-	-	-	50	0.39

Chefornak – Chefornak is near the coast and likely relies on seals for subsistence. Only five bounty estimates are available for Chefornak and no take estimates are available since the 1972 bounty. Chefornak's current population estimate is 506 residents (U.S. Census Bureau).

Table 41. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data from Chefornak, Alaska. Numbers are from Burns (1969, 1970, 1972, 1973) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1968	155	bounty	poor	-	-	-	-	8	0.05
1969	155	bounty	good	-	-	-	-	125	0.81
1970	146	bounty	good	-	-	-	-	125	0.86
1971	146	bounty	good	-	-	-	-	125	0.86
1972	146	bounty	good	-	-	-	-	100	0.68

Kipnuk – Kipnuk is located near the coast approximately 15 miles south of Chefornak. Only five bounty estimates are available for Kipnuk and no estimates are available since the 1972 bounty. The population around Kipnuk is estimated at 704 people (U.S. Census Bureau).

Table 42. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data from Kipnuk, Alaska. Numbers are from Burns et al. (1964), Burns (1970, 1972, 1973) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	310	bounty	good	-	-	-	-	4	0.01
1969	310	bounty	good	-	-	-	-	185	0.60
1970	325	bounty	good	-	-	-	-	185	0.57
1971	325	bounty	good	-	-	-	-	185	0.57
1972	325	bounty	good	-	-	-	-	100	0.31

Kwigillingok – Kwigillingok is near the northern coast of Kuskokwim Bay. Only five bounty estimates are available for Kwigillingok, and no estimates are available since the 1972 bounty. An estimated 380 people currently reside near Kwigillingok (U.S. Census Bureau).

Table 43. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Kwigillingok, Alaska. Numbers are from Burns et al. (1964), Burns (1970, 1972, 1973) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1962	185	bounty	good	-	-	-	-	50	0.27
1969	185	bounty	good	-	-	-	-	200	1.08
1970	148	bounty	good	-	-	-	-	200	1.35
1971	148	bounty	good	-	-	-	-	100	0.68
1972	148	bounty	good	-	-	-	-	75	0.51

Nunam Iqua - Formerly called Sheldon Point, Nunam Iqua is located on the south side of the Yukon River near its mouth and has good access to seals. No bounty estimates and only one household survey estimate from 1980 is available. Currently, an estimated 217 people reside in Nunam Iqua (U.S. Census Bureau).

Table 44. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data in Nunam Iqua, Alaska. Numbers are from Wolfe (1981) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita* Take
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	
1980	103	household	good	69	108	102	-	279	2.71

Akiachak - Akiachak is located about 70 miles up the Kuskokwim River and residents must travel to the coast to hunt seals. This happens occasionally and, during 1998, Akiachak took 69 seals (Coffing 2001). Currently, 677 people live in Akiachak (U.S. Census Bureau).

Table 45. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Akiachak, Alaska. Numbers are from Coffing et al. (2001) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	Take
1998	585	household	good	15	28	26	0	69	0.12

Goodnews Bay – The community of Goodnews Bay is located on the inland side of Goodnews Bay. Only five bounty estimates and no household survey estimates are available. The population of Goodnews Bay is currently 258 people (U.S. Census Bureau).

Table 46. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Goodnews Bay, Alaska. Numbers are from Burns et al. (1964), Burns (1970, 1972, 1973) and the U.S. Census Bureau.

		Method		Number of Seals					*Per capita*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	Take
1962	220	bounty	good	-	-	-	-	213	0.97
1969	220	bounty	good	-	-	-	-	180	0.82
1970	218	bounty	good	-	-	-	-	180	0.83
1971	218	bounty	good	-	-	-	-	200	0.92
1972	218	bounty	good	-	-	-	-	100	0.46

Platinum – Platinum is located on a spit near the outlet of Goodnews Bay. Only five bounty estimates and no household survey estimates are available. The current population estimate for Platinum is 55 residents (U.S. Census Bureau).

Table 47. Number of people, survey method and rating, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Platinum, Alaska. Numbers are from Burns et al. (1964), Burns (1970, 1972, 1973) and the U.S. Census Bureau.

		Method		Number of Seals					*Per*
Year	People	Type	Rating	Bearded	Ringed	Spotted	Ribbon	Total Take	*capita* Take
1962	80	bounty	good	-	-	-	-	43	0.54
1969	80	bounty	good	-	-	-	-	22	0.28
1970	55	bounty	good	-	-	-	-	35	0.64
1971	55	bounty	good	-	-	-	-	20	0.36
1972	55	bounty	good	-	-	-	-	0	0.00

Newtok – Newtok is approximately 15 miles from the coast, north of Tununak. No take information exists for Newtok and its current population estimate is 209 people (U.S. Census Bureau).

Bristol Bay

Bristol Bay is represented by the nonprofit arm of the Bristol Bay Native Corporation (BBNA) (Fig. 43). Six villages harvest ice seals, and all are located in northern Bristol Bay. Bristol Bay is the only region where spotted seals overlap in distribution with harbor seals (*Phoca vitulina*). These seals cannot visually be identified to species and so get reported together. ADF&G's Division of Subsistence collaborated with the Alaska Native Harbor Seal Commission to collect take information for harbor seals (including some proportion of spotted seals) and sea lions in Bristol Bay. The proportion of spotted seal take was estimated depending on month of harvest. Seals harvested during the months when sea ice was present (October-May) were recorded as spotted seals and seals harvested during the months of open water (June-September) were recorded as harbor seals. However, there are now fewer sea ice months and more open water months complicating this separation, therefore spotted and harbor seals are combined for this report. We recognize that this is likely an overestimate of the number of spotted seals harvested in Bristol Bay.

Figure 43. Northern Bristol Bay communities that take ice seals.

Togiak – Togiak is located at the mouth of the Togiak River in Togiak Bay. No bounty records, but twenty household survey estimates are available. ADF&G worked with BBNA and the ISC to collect the most recent estimates.

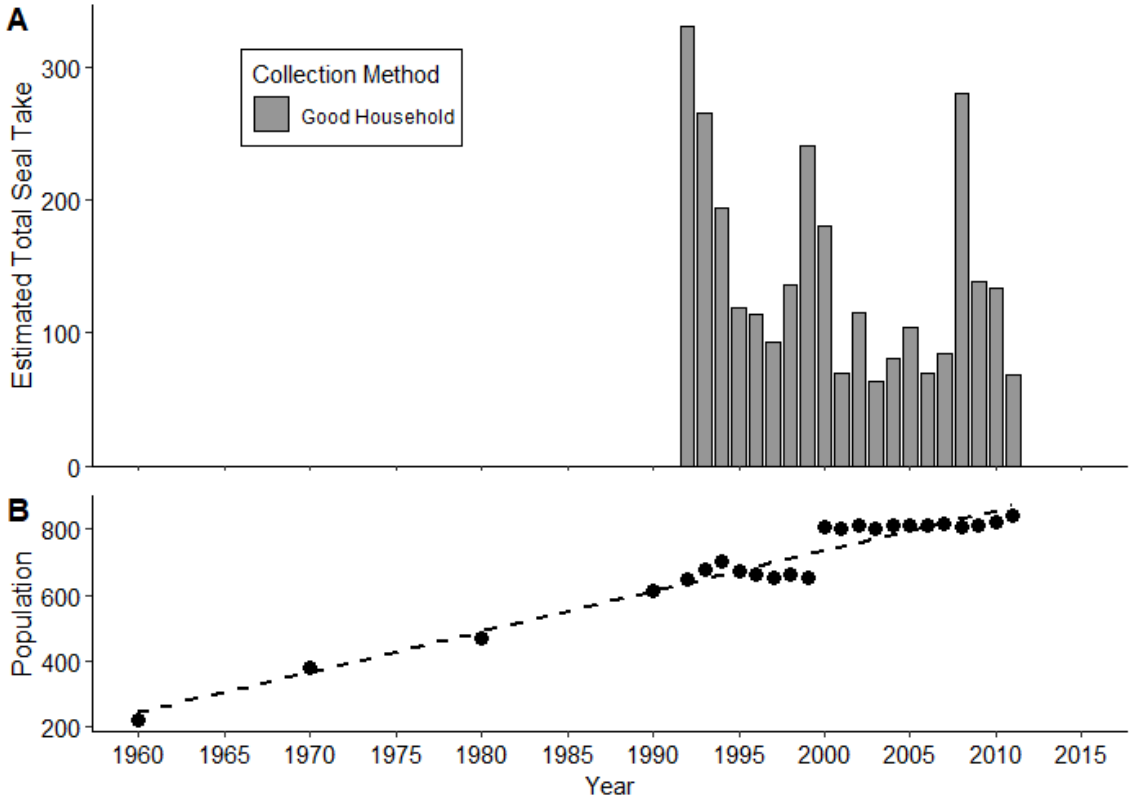

Figure 44. Estimated seals taken (A) and human population (B) for Togiak, Alaska. Numbers are from Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b), Coiley-Kenner et al. (2003), Nelson (2011, 2013), and the U.S. Census Bureau.

Togiak continued

Table 48. Number of people, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Togiak, Alaska. All data is from good household surveys. Numbers are from Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b), Coiley-Kenner et al. (2003), Nelson (2011, 2013), and the U.S. Census Bureau.

		Number of Seals					*Per capita* Take (all seals)	*Per capita* Take (spotted/ harbor)
Year	People	Bearded	Ringed	Spotted/Harbor	Ribbon	Total Take		
1992	648	-	-	330	-	-	-	0.51
1993	678	-	-	265	-	-	-	0.39
1994	704	-	-	194	-	-	-	0.28
1995	671	-	-	119	-	-	-	0.18
1996	664	-	-	114	-	-	-	0.17
1997	655	-	-	93	-	-	-	0.14
1998	663	-	-	136	-	-	-	0.21
1999	809	23	0	194	0	217	0.27	0.24
2000	809	-	-	180	-	-	-	0.22
2001	800	-	-	70	-	-	-	0.09
2002	813	-	-	115	-	-	-	0.14
2003	803	-	-	63	-	-	-	0.08
2004	810	-	-	81	-	-	-	0.10
2005	811	-	-	104	-	-	-	0.13
2006	812	-	-	70	-	-	-	0.09
2007	816	1	2	71	0	74	0.09	0.09
2008	809	4	6	210	0	220	0.27	0.26
2009	814	0	1	138	0	139	0.17	0.17
2010	821	0	1	132	0	133	0.16	0.16
2011	842	2	0	66	0	68	0.08	0.08

Twin Hills – Twin Hills is located approximately four miles east of Togiak and is slightly inland from Togiak Bay. No bounty records, but fifteen household survey estimates are available for Twin Hills. ADF&G worked with BBNA and the ISC to collect the most recent estimates.

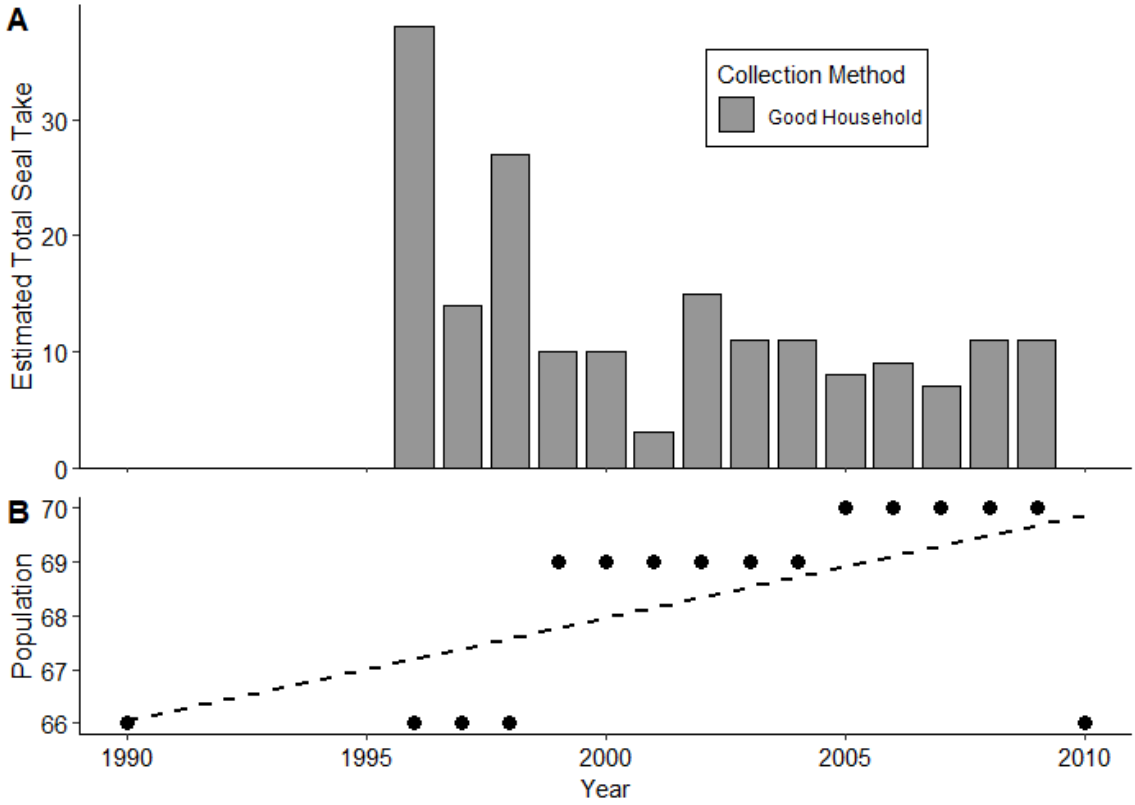

Figure 45. Estimated seals taken (A) and human population (B) for Twin Hills, Alaska. Numbers are from Wolfe (1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b), Coiley-Kenner et al. (2003), Nelson (2011), and the U.S. Census Bureau.

Twin Hills continued

Table 49. Number of people, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Twin Hills, Alaska. All data is from good household surveys. Numbers are from Wolfe (1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b), Coiley-Kenner et al. (2003), Nelson (2011), and the U.S. Census Bureau.

		Number of Seals					*Per capita* Take (all seals)	*Per capita* Take (spotted/ harbor)
Year	People	Bearded	Ringed	Spotted/ Harbor	Ribbon	Total Take		
1996	66	-	-	38	-	-	-	0.58
1997	66	-	-	14	-	-	-	0.21
1998	66	-	-	27	-	-	-	0.41
1999	69	0	2	8	0	10	0.14	0.12
2000	69	-	-	10	-	-	-	0.14
2001	69	-	-	3	-	-	-	0.04
2002	69	-	-	15	-	-	-	0.22
2003	69	-	-	11	-	-	-	0.16
2004	69	-	-	11	-	-	-	0.16
2005	70	-	-	8	-	-	-	0.11
2006	70	-	-	9	-	-	-	0.13
2007	70	0	0	7	0	7	0.10	0.10
2008	70	0	0	11	0	11	0.16	0.16
2009	70	0	0	11	0	11	0.16	0.16
2010	66	0	0	18	0	18	0.27	0.27

Manokotak – Manokotak is located roughly 20 miles from Nushagak Bay up the Igushik River. One bounty estimate and seventeen household surveys are available, the most recent from 2008.

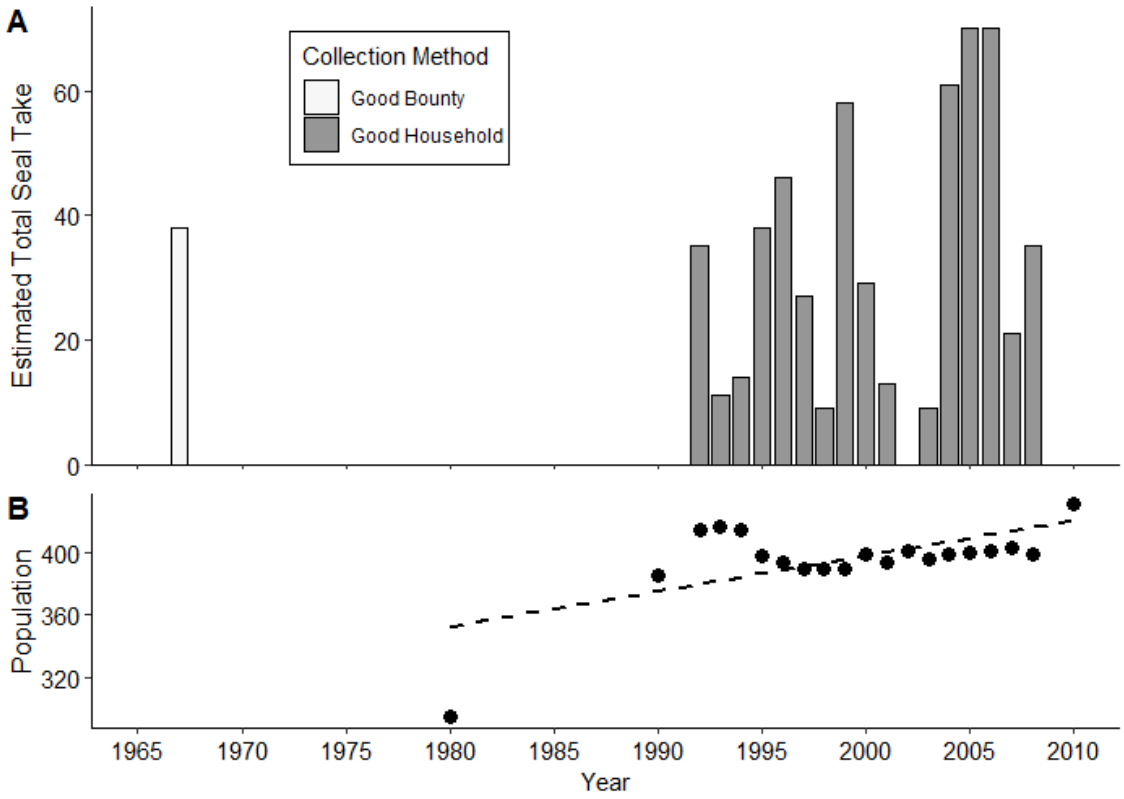

Figure 46. Estimated seals taken (A) and human population (B) for Manokotak, Alaska. Numbers are from Burns (1968), Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a), Coiley-Kenner et al. (2003), Holen et al. (2012), and the U.S. Census Bureau.

Manokotak continued

Table 50. Number of people, data collection method, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Manokotak, Alaska. Numbers are from Burns (1968), Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a), Coiley-Kenner et al. (2003), Holen et al. (2012), and the U.S. Census Bureau.

			Number of Seals					*Per capita* Take (all seals)	*Per capita* Take (spotted/ harbor)
Year	People	Method	Bearded	Ringed	Spotted/Harbor	Ribbon	Total Take		
1967	290	bounty	-	-	-	-	38	0.13	-
1992	415	household	-	-	35	-	-	-	0.08
1993	417	household	-	-	11	-	-	-	0.03
1994	415	household	-	-	14	-	-	-	0.03
1995	398	household	-	-	38	-	-	-	0.10
1996	394	household	-	-	46	-	-	-	0.12
1997	390	household	-	-	27	-	-	-	0.07
1998	390	household	-	-	9	-	-	-	0.02
1999	399	household	13	21	24	0	58	0.15	0.06
2000	399	household	-	-	29	-	-	-	0.07
2001	394	household	-	-	13	-	-	-	0.03
2002	401	household	-	-	0	-	-	-	0.00
2003	396	household	-	-	9	-	-	-	0.02
2004	399	household	-	-	61	-	-	-	0.15
2005	400	household	-	-	70	-	-	-	0.18
2006	401	household	-	-	70	-	-	-	0.17
2007	403	household	-	-	21	-	-	-	0.05
2008	399	household	9	3	22	0	34	0.09	0.06

Aleknagik – Aleknagik is located where Lake Aleknagik flows into the Wood River, roughly 18 miles from Dillingham. No bounty estimates and sixteen household surveys are available, the most recent from 2008. The surveys indicate that Aleknagik takes almost exclusively harbor, not spotted, seals so there is no current ice seal take monitoring.

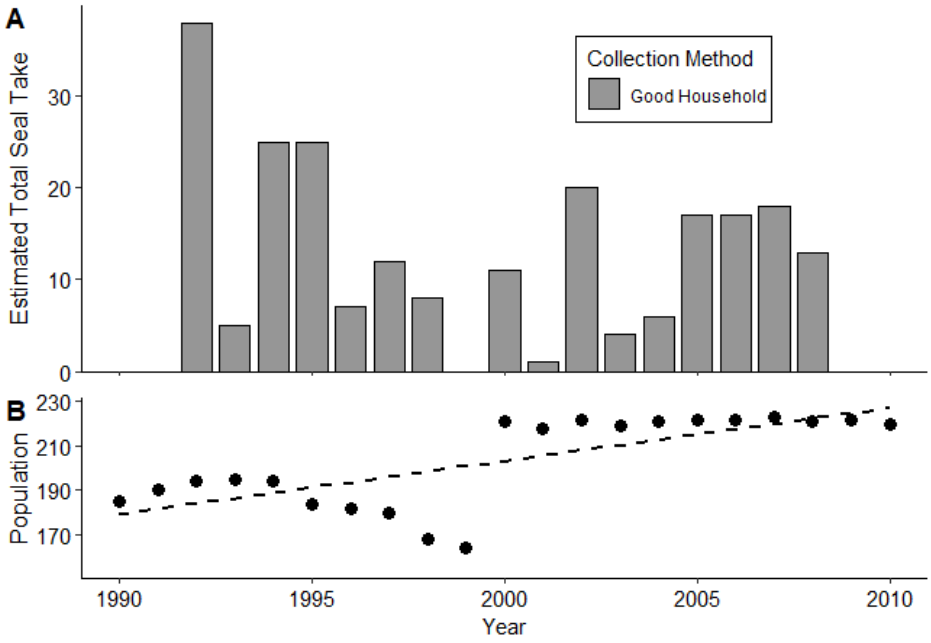

Figure 47. Estimated spotted/harbor seals taken (A) and human population (B) for Aleknagik, Alaska. Numbers are from Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b) and the U.S. Census Bureau.

Table 51. Number of people, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Aleknagik, Alaska. All data is from good household surveys. Numbers are from Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b) and the U.S. Census Bureau.

Year	People	Spotted/ Harbor Seal Take*	*Per capita* Take
1992	194	38	0.20
1993	195	5	0.03
1994	194	25	0.13
1995	184	25	0.14
1996	182	7	0.04
1997	180	12	0.07
1998	168	8	0.05
2000	221	11	0.05
2001	218	1	0.00
2002	222	20	0.09
2003	219	4	0.02
2004	221	6	0.03
2005	222	17	0.08
2006	222	17	0.08
2007	223	18	0.08
2008	221	13	0.06

*Most seals taken are likely harbor seals.

Dillingham – Dillingham is located roughly 15 miles upriver from where the Nushagak River flows into Bristol Bay. No bounty estimates and sixteen household surveys are available, the most recent from 2012. Dillingham takes almost exclusively harbor or spotted seals, however, only one survey asked about bearded and ringed seals, and very few were taken (Evans et al. 2013). As the regional hub for the Bristol Bay region, estimating take information for Dillingham is more difficult because it is harder to identify and contact subsistence seal hunters due to the larger population of people and the higher percentage of non-Natives living there.

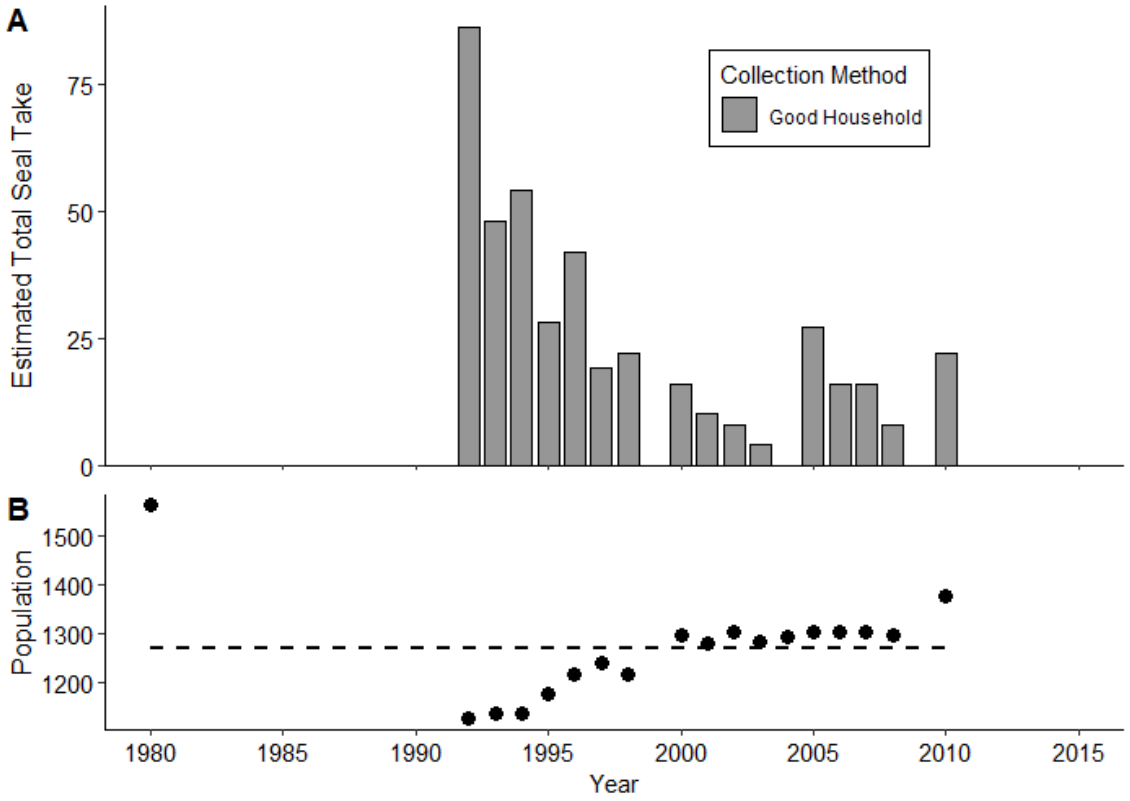

Figure 48. Estimated spotted/harbor seals taken (A) and the Alaska Native population (B) for Dillingham, Alaska. Numbers are from Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b), Evans et al. (2013), and the U.S. Census Bureau.

Dillingham continued

Table 52. Number of Alaska Native people, total take (estimated take + estimated struck but lost) for each species, and the *per capita* total take (total take / number of people) for all years with available data for Dillingham, Alaska. All data is from good household surveys. Numbers are from Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b), Evans et al. (2013), and the U.S. Census Bureau.

		Number of Seals			
Year	People (Alaskan Native)	Bearded	Ringed	Spotted/Harbor	*Per capita* Take*
1992	1125	-	-	86	0.08
1993	1135	-	-	48	0.04
1994	1137	-	-	54	0.05
1995	1175	-	-	28	0.02
1996	1215	-	-	42	0.03
1997	1239	-	-	19	0.02
1998	1215	-	-	22	0.02
2000	1296	-	-	16	0.01
2001	1281	-	-	10	0.01
2002	1305	-	-	8	0.01
2003	1282	-	-	4	0.00
2004	1294	-	-	0	0.00
2005	1302	-	-	27	0.02
2006	1302	-	-	16	0.01
2007	1305	-	-	16	0.01
2008	1296	-	-	8	0.01
2010	1376	7	3	12	0.01 (0.02)

*Here '*Per capita* Take' refers to spotted and harbor seals only, except for 2010, where number in parentheses is total take for all species combined.

Clarks Point – Clarks Point is located on the east side of the Nushagak River, where it enters Bristol Bay. No bounty estimates and seventeen household surveys are available, the most recent from 2008. The surveys indicate that Clarks Point takes almost exclusively harbor seals so there is no current ice seal monitoring.

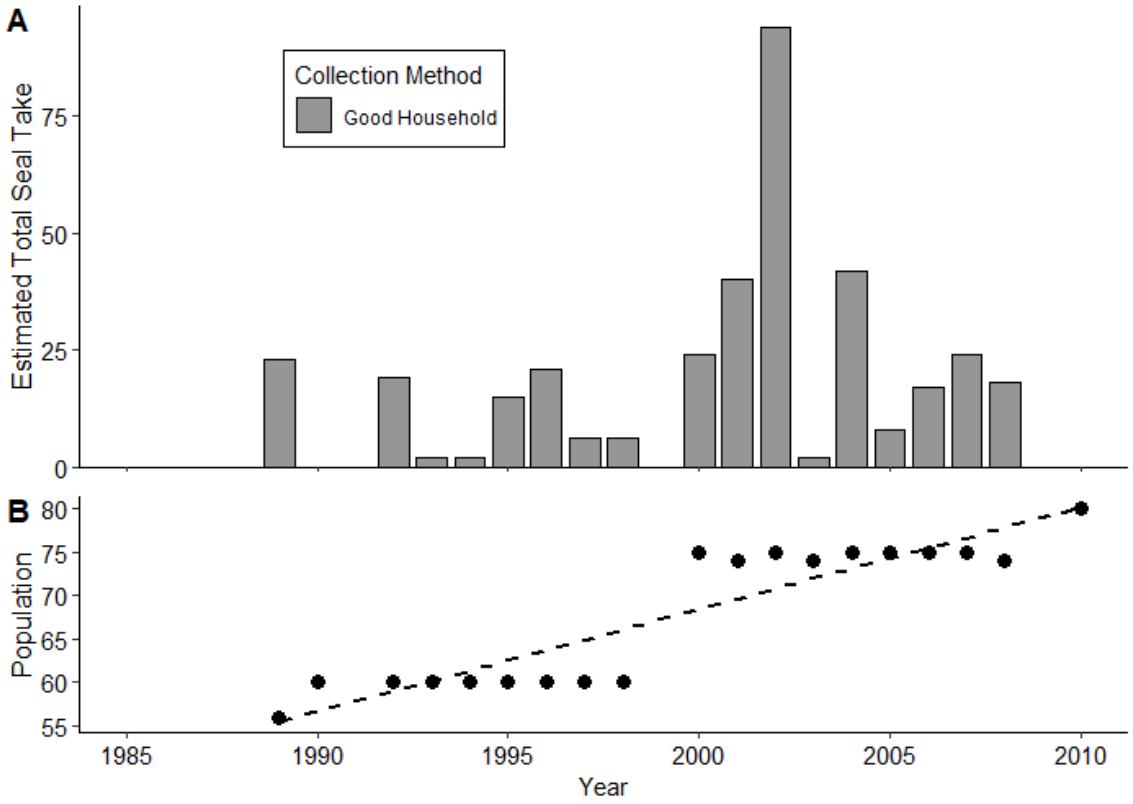

Figure 49. Estimated seals taken (A) and human population (B) for Clarks Point, Alaska. Numbers are from Seitz (1996) and Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b) and the U.S. Census Bureau.

Clarks Point continued

Table 53. Number of people, total take (estimated take + estimated struck but lost) for each species, total take for all species combined, and the *per capita* total take (total take / number of people) for all years with available data for Clarks Point, Alaska. All data is from good household surveys. Numbers are from Seitz (1996) and Wolfe (1993, 1994, 1995, 1996, 1997, 1998, 1999, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2009a, b) and the U.S. Census Bureau.

		Number of Seals			
Year	People	Ringed	Spotted/Harbor*	Total Take	*Per capita* Take†
1989	56	10	13	23	0.23 (0.41)
1992	60	-	19	-	0.32
1993	60	-	2	-	0.03
1994	60	-	2	-	0.03
1995	60	-	15	-	0.25
1996	60	-	21	-	0.35
1997	60	-	6	-	0.10
1998	60	-	6	-	0.10
2000	75	-	24	-	0.32
2001	74	-	40	-	0.54
2002	75	-	94	-	1.25
2003	74	-	2	-	0.03
2004	75	-	42	-	0.56
2005	75	-	8	-	0.11
2006	75	-	17	-	0.23
2007	75	-	24	-	0.32
2008	74	-	18	-	0.24

* Most seals taken are likely harbor seals.
† Here '*Per capita* Take' refers to spotted and harbor seals only, except for 1989, where number in parentheses is total take for all species combined.

Discussion

Quality of the data

The best survey results are those that estimate seal harvest and struck but lost (i.e., take) for the entire community for a 12-month period. Surveys that include other information such as species, month of take, and conditions that affect hunter effort (e.g., bad weather, ice conditions, lots of jobs, no jobs) are also useful. The surveys rated as "good" collected this information and presented it clearly. The "good" estimates should be considered the best estimates available. The surveys in which the data were presented with no way to know how or if the rest of the community was included in the estimate were rated "poor." The "poor" estimates should be used with caution and considered as minimum take estimates. Overall, 86% of surveys in this report have a "good" rating.

Although the bounty program was designed to protect or enhance commercial fishing, no commercial fishing occurred north of Bristol Bay. For ice seals in the north, the bounty program provided a cash reward for seals that were being harvested for subsistence and allowed a mechanism for estimating the harvest (Burns et al. 1964). The payment for a dead seal ($3 most years) was likely not enough to encourage take much above a normal subsistence level, given the importance of seal meat for subsistence and the higher value of seal skins. In 1962, ringed seal skins were worth $8 and spotted seal skins were worth $10–$20 (Burns et al. 1964). There may have been times or years when more people hunted because of the bounty, but most of the variability in bounty years probably had more to do with weather, jobs, and ice conditions (Olnes et al. 2022). The bounty year estimates rated as "good" accounted for seals that were taken in addition to those bountied and are the best estimates available for seal take during that timeframe. The bounty estimates rated as "poor" represent a minimum take for that year, however some may be well below the true take. Only 13% of estimates from bounty records were considered "poor" and most of those occurred in 1968 when there was uncertainty over the continuation of the bounty program (Burns 1969).

In Bristol Bay, the harbor seal/sea lion survey by the Alaska Native Harbor Seal Commission and ADF&G's Division of Subsistence estimated the proportion of the take of spotted versus harbor seals based on the month of harvest. Spotted seals are more likely to be present during the ice-covered season and harbor seals during the open water season. This may have led to an underestimation of the take of harbor seals and an overestimation of spotted seals, especially in later years when there was less ice in the region and probably fewer spotted seals. Genetic testing of the take should be conducted to better understand what species is present when seals are hunted.

Confidentiality

Harvest monitoring programs strive to maintain complete confidentiality for subsistence users. The raw data sheets with the individual's harvest information are kept confidential and a household number is used instead of the family's name. The information on the data sheets is compiled and only community totals are presented. This protects the identities of individual hunters and households. Once the data have been compiled and formulated into a usable product

the information is brought back to the communities in the form of a report for review, comment, and approval. This level of confidentiality and review is important to retain the trust of the communities and subsistence participants. Past surveys may have handled confidentiality differently, but the concepts and intent have remained the same.

Struck but Lost

The number of seals that were struck but lost is important to assess the total number of seals removed from the population and the total number of seals killed by each community to get what the community needs for subsistence. Reporting the number of struck but lost seals also shows responsibility and concern by hunters, and eliminates the need for federal managers to estimate the number lost, which could be higher than the actual number. Other Alaska Native co-management groups recognize the benefit of reporting take, including struck but lost, and put great effort into their take reporting (e.g., Alaska Beluga Whale Committee, Alaska Eskimo Whaling Commission, and Alaska Native Harbor Seal Commission).

Recommendations

North Slope (North Slope Borough)
Data collection for the North Slope Region has been the most consistent as household surveys for seal take have been conducted annually since 1994, however due to funding, personnel time, and higher priorities the data have not been compiled and are not available. Funding and or other assistance (i.e., personnel, data analysis) should be provided to the NSB to encourage processing and reporting of these data.

Northwest Arctic (Maniilaq)
Kotzebue only has five years of take data since the end of the bounty; Kivalina has four years and take data for other Northwest Arctic villages has rarely been collected, although ADF&G's Division of Subsistence has surveyed communities in the region more recently, such as Deering and Buckland. Kotzebue was last surveyed in 2014 and should be the focus of another survey soon.

Bering Strait (Kawerak)
The Kawerak survey for the 2001 harvest year was never finalized, however data from that survey is presented here. Many of the surveys conducted in 2001 are likely "good" surveys, however, without more details on how the data was collected they are currently rated as "poor". Nome, the largest community in the Bering Strait region, has never been surveyed and no information exists except for the bounty. Collecting take information from Nome is a high priority for this region.

Yukon Kuskokwim Delta (AVCP)
Toksook Bay, Mekoryuk, Chefornak, Kipnuk, Chevak, and Goodnews Bay all took more than 100 seals/year during the bounty years but have not been surveyed since. All these communities would be good candidates for conducting surveys in the near future. Mekoruyuk likely harvests many ice seals, however, the community declined a request for a survey of the 2022 harvest. Efforts to survey Chevak in 2019, 2022, and 2023 were unsuccessful.

Bristol Bay (BBNA)

According to elders in Togiak, taking bearded and ringed seals was a common occurrence in the past, however survey numbers indicate only one or two bearded and ringed seals are taken each year now. Spotted seals are still taken but telling them apart from harbor seals requires a genetic test, therefore their take estimates are likely inaccurate. The top priority for the northern Bristol Bay region is genetic testing of harvested harbor/spotted seals to monitor the species composition of the harvest.

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