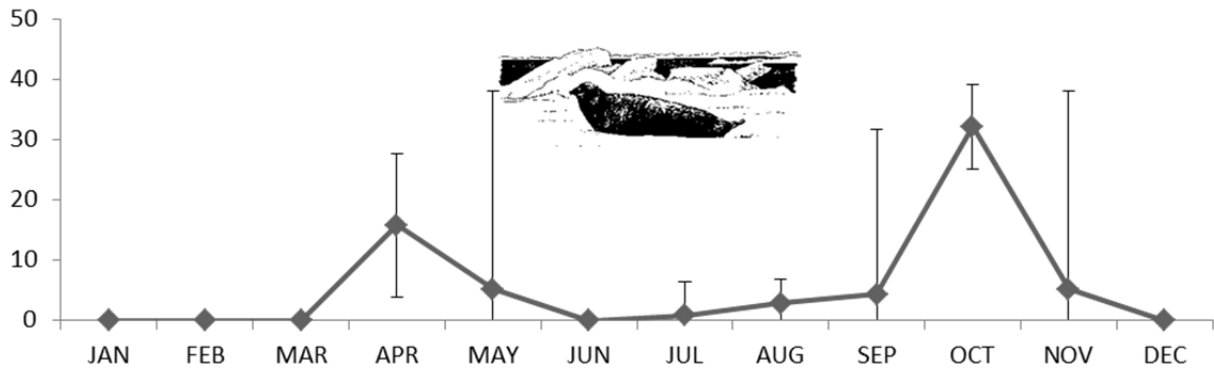


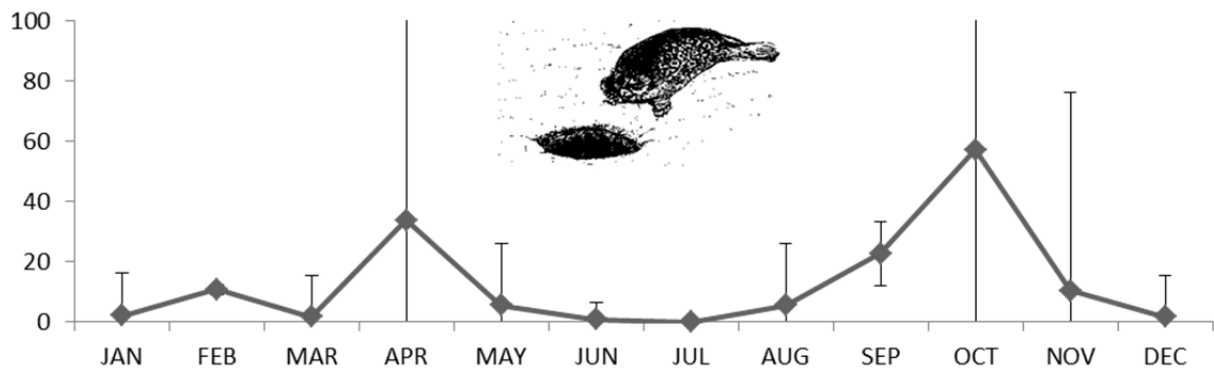
Scammon Bay Ice Seal Harvest Report

2011 and 2012 Summary

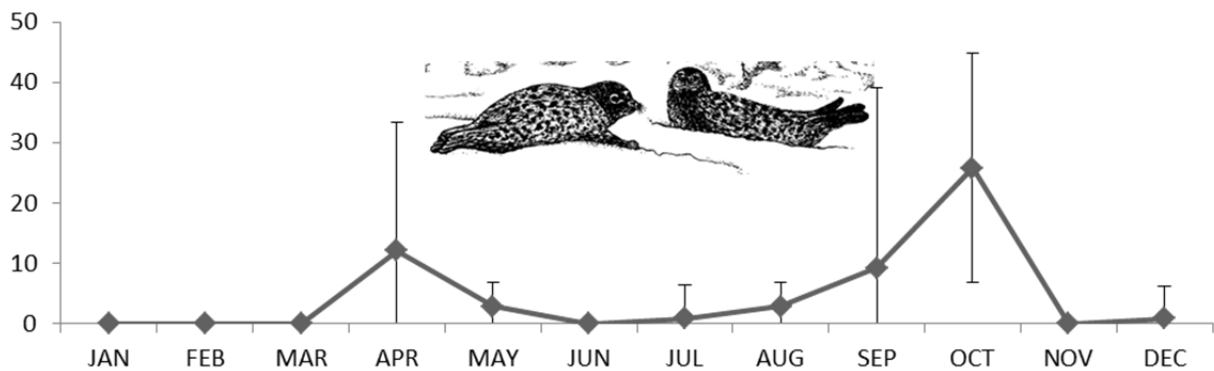
Bearded Seal Take (95% CI)



Ringed Seal Take (95% CI)



Spotted Seal Take (95% CI)



Scammon Bay Ice Seal Harvest Report 2011 and 2012 Summary

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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 past five years (2008-2012), only 6 of the 64 (9%) coastal communities have 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. We are working toward a better understanding of harvest variability and community needs by conducting more and consecutive surveys with the goal of being able to report a statewide ice seal harvest in the future. Until then, please contact the Ice Seal Committee for guidance prior to using these harvest data.

Nelson, Mark A., Kaganak Hazel. 2013. Scammon Bay ice seal harvest report 2011 and 2012 Summary. Report to Scammon Bay and the Ice Seal Committee. 11 pp.

Introduction

Bearded (*Erignathus barbatus*), ringed (*Pusa hispida*), spotted (*Phoca largha*), and ribbon seals (*Histiophoca fasciata*) are the species of Alaska's seals collectively called ice seals because of their association with sea ice and their dependence on it for feeding, resting, and pupping. Ice seals are an important component in maintaining Alaska Native subsistence culture because seals are a source of food; skins are used for clothes, boats, and crafts. Hunting, processing, using, and sharing seals is an important part of Alaska Native culture and heritage. To document subsistence needs and to show that harvests are sustainable, the number of seals used by a community should be determined and reported annually. Reporting subsistence seal harvest information by community shows how important seals are to communities and how many are needed. This information is very important now because climate change or other factors may change the number of seals in a population or change when they are available to hunters. Bearded and ringed seals are now listed as "Threatened" under the Endangered Species Act and although the NMFS has said limiting harvest is not a management action they are pursuing there is still great concern among subsistence users that harvest will be restricted. Often in situations where no harvest data are available decisions that are more restrictive are made to protect the resource than would be necessary if good harvest data were available. The numbers of seals in each population are not known because it is difficult to count them. Aerial surveys are the best tool but they are expensive and dangerous and although some seals are counted, the number in the water and not counted is unknown. Learning more about the current level of subsistence harvest of ice seals, which is thought to be sustainable, could also provide valuable information about the size of seal populations where little information is available.

Methods

Project Approval

The Ice Seal Committee, AVCP, and the Scammon Bay Tribal Council were presented with the project goals and all agreed that the project was necessary to show the importance of seals for subsistence needs. The Scammon Bay Tribal Council approved the project before any surveys were conducted in the community.

Survey Instrument

Based on pilot studies, the most preferred 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 are related to 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 loss, and age. The more detailed information is more 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. 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 track the

harvest of an individual household.

Survey timing

In Scammon Bay, most hunters start hunting when the ice breaks up in the spring and are busy hunting or fishing until after the ocean freezes back up in the late fall. Therefore, the best time to conduct surveys is during the winter before the spring breakup. The goal was to begin the surveys after the first of January, to record harvest for the previous calendar year, and have them completed by mid-April. For example, a survey conducted in February 2012 collected information about seals harvested during the calendar year (Jan-Dec) 2010.

Data Analysis

The completed survey forms were sent to Mark Nelson at Alaska Department of Fish and Game in Fairbanks. The surveys are counted and checked for completeness then the surveyor was paid based on how many surveys were completed. The information from the surveys was then entered into a Microsoft Access database and checked for accuracy and duplication. The number of completed household surveys was tallied and compared against the total number of households in the community to determine the percentage of households surveyed. The percent surveyed is used to extrapolate the information collected to the entire community. The information is always presented as community estimates and never by household to protect the privacy of individual households.

The information recorded on the survey forms is considered reported harvest or reported struck but lost. This information is used to calculate estimated of harvest and estimated struck but lost for the entire community. We must estimate for the entire community because the surveys do not cover every household in the community and this is how we account for the number of seals used by the households not surveyed. The estimated harvest or struck but lost are the numbers that are presented in reports because they represent the subsistence needs for the entire community. The total number of a certain species of seals used for subsistence during a particular year is the estimated harvest plus the estimated struck but lost and is called the “take”. When the number of seals taken is presented this refers to the estimated harvest plus the estimated struck but lost. The formula for estimating the number of seals harvested in the entire community:

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

Where “e” is the estimated number of seals harvested, “R” is the reported number of seals harvested, and “%S” is the percentage of households surveyed. For example during 2012 we surveyed 57 % of the households in Scammon Bay, %S=.45, and they reported harvesting 23 bearded seals (R) then the estimated number harvested would be:

$$e = \frac{R}{\%S} = \frac{23}{.45} = 51 \text{ bearded seals.}$$

The estimated number of seals harvested is then added to the estimated number of seals struck but lost to determine a total “take” for the community. A 95% confidence interval is an estimate on how confident we are with the estimation. This means that when we

repeat the study, 95% of the time the confidence interval will contain the true number of seals taken. This is calculated by using the formula:

$$CI (\pm) = \frac{t_{a/2} \times S_e}{e} \times FPC$$

where CI stands for confidence interval, “ $t_{a/2}$ ” is the measure of precision you want to use (we will use 95%), “ S_e ” is the standard error of our estimated take, and “FPC” is the Finite Population Correction. The “ S_e ” is calculated by the formula

$$S_e = \sqrt{\frac{\sum(e_i - \bar{e})^2}{n}}$$

where “ e_i ” is each years estimated seal take and “ \bar{e} ” is the average seal take for the four years. The “FPC” is calculated by the formula

$$FPC = \sqrt{\frac{N-n}{N-1}}$$

where “N” is the number of households in the community pooled over the four years and “n” is the number of pooled households surveyed during the four years. The FPC is a way to account for the number of households that were surveyed where the more you survey the lower your confidence interval is meaning the better your estimate is. If the survey contacted every household in the community the FPC would go to zero and the confidence interval would go to zero meaning that you are 100% positive the number is correct because you are not estimating for households not surveyed.

The number of seals percapita show how many seals were taken per person living in the community during that year. This is calculated by dividing the number of seals by the number of people living in the community. For example, the number of ringed seals taken per capita during 2012 is: 169 (ringed seals taken)/496 (number of people living in Scammon Bay during 2012) = .34. This means that Scammon Bay took .34 ringed seals for every person living in Scammon Bay during 2012, or Scammon Bay took 1 ringed seal for every 3 people.

The information is presented to the communities by reports, posters, and oral presentations at tribal and community meetings. The numbers must be approved by the community in which they were collected before they can be shared. Once approved, the numbers are included in the annual ice seal harvest report (Nelson 2009, 2010b, a, 2011, 2013a) that is presented to the Ice Seal Committee.

Results

Participation

The number of households that participated during 2011 and 2012 was used to calculate the percent surveyed for each year (Table 1).

Table 1. Population of Scammon Bay from 2011 to 2012, number of households contacted, number of households that participated, the total number of households, and the percent of households surveyed (participated/total).

| year | population | number of households | | | percent surveyed |
|------|------------|----------------------|--------------|-------|------------------|
| | | contacted | participated | total | |
| 2011 | 486 | 68 | 55 | 96 | 57% |
| 2012 | 496 | 74 | 43 | 96 | 45% |

It is important to understand how the hunting pressure is changing in the community from year to year to understand more about the changing number of seals needed for subsistence. A supplemental question asks if the household hunted more or less than during the previous year and most of the households reported hunting the same or less (Table 2).

Table 2. Results from the supplemental question “Did you hunt more or less this year than last year?” reported by the percent of households.

| year | Did you hunt more or less | | |
|------|---------------------------|------|------|
| | more | same | less |
| 2011 | 20% | 61% | 19% |
| 2012 | 3% | 34% | 63% |

Harvest by species

The total take (estimated harvest + estimated struck but lost) of bearded seals during 2011 was 82 and during 2012 was 51 which averaged 67 bearded seals per year (Table 3). The total take of ringed seals during 2011 was 137 and during 2012 was 169 which averaged 153 ringed seals per year (Table 3). The total take of spotted seals during 2011 was 56 and during 2012 was 53 averaging 55 ringed seals per year (Table 3). Four ribbon seals were taken during 2011 and 2 during 2012 (Table 3).

Table 3. The estimated harvest, estimated struck but lost, total take, and the seal take percapita for each species of ice seal taken during 2011 and 2012. The average of each of those numbers is presented for bearded, ringed, and spotted seals along with the 95% confidence interval for the total take. The extremely low number of ribbon seals prevents further calculations.

| Bearded Seals | | | | | | Ringed Seals | | | | | |
|---------------|-----------|-----------------|----|------------|----------------------|--------------|-----------|-----------------|----|------------|----------------------|
| | Harvested | Struck but Lost | | Total Take | Percapita Total Take | | Harvested | Struck but Lost | | Total Take | Percapita Total Take |
| 2011 | 79 | 3 | 4% | 82 | 0.17 | 2011 | 132 | 5 | 4% | 137 | 0.28 |
| 2012 | 51 | 0 | 0% | 51 | 0.10 | 2012 | 169 | 0 | 0% | 169 | 0.34 |
| Average | 65 | 2 | 2% | 67 (±98) | 0.14 | Average | 151 | 3 | 2% | 153 (±100) | 0.31 |
| Spotted Seals | | | | | | Ribbon Seals | | | | | |
| | Harvested | Struck but Lost | | Total Take | Percapita Total Take | | Harvested | Struck but Lost | | Total Take | Percapita Total Take |
| 2011 | 56 | 0 | 0% | 56 | 0.12 | 2011 | 2 | 2 | | 4 | 0.01 |
| 2012 | 49 | 4 | 8% | 53 | 0.11 | 2012 | 0 | 2 | | 2 | 0.00 |
| Average | 53 | 2 | 4% | 55 (±9) | 0.11 | Average | 1 | 2 | | 3 | 0.01 |

Seasonality of harvest

Most hunting of bearded, ringed, and spotted seals occurs during the fall (September-November) in Scammon Bay. A smaller harvest occurs during the spring (April and May) as the sea ice breaks up (Tables 4-6 and Figures 1-3). The tables below, presented by species, show the total take each month, total for the year, the average take each month from 2011 and 2012 and the associated 95% confidence interval.

Table 4. The number of bearded seals taken (estimated harvest + estimated struck but lost) by month and the total for each year including a 95% confidence interval.

| Bearded Seal Take | | | | | | | | | | | | | |
|-------------------|------|------|------|-------|-------|------|------|------|-------|------|-------|------|-------|
| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Total |
| 2011 | 0 | 0 | 0 | 14 | 11 | 0 | 2 | 4 | 9 | 33 | 11 | 0 | 82 |
| 2012 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 2 | 0 | 31 | 0 | 0 | 51 |
| Average | 0 | 0 | 0 | 16 | 5 | 0 | 1 | 3 | 4 | 32 | 5 | 0 | 67 |
| 95% CI | (±0) | (±0) | (±0) | (±12) | (±33) | (±0) | (±5) | (±4) | (±27) | (±7) | (±33) | (±0) | (±98) |

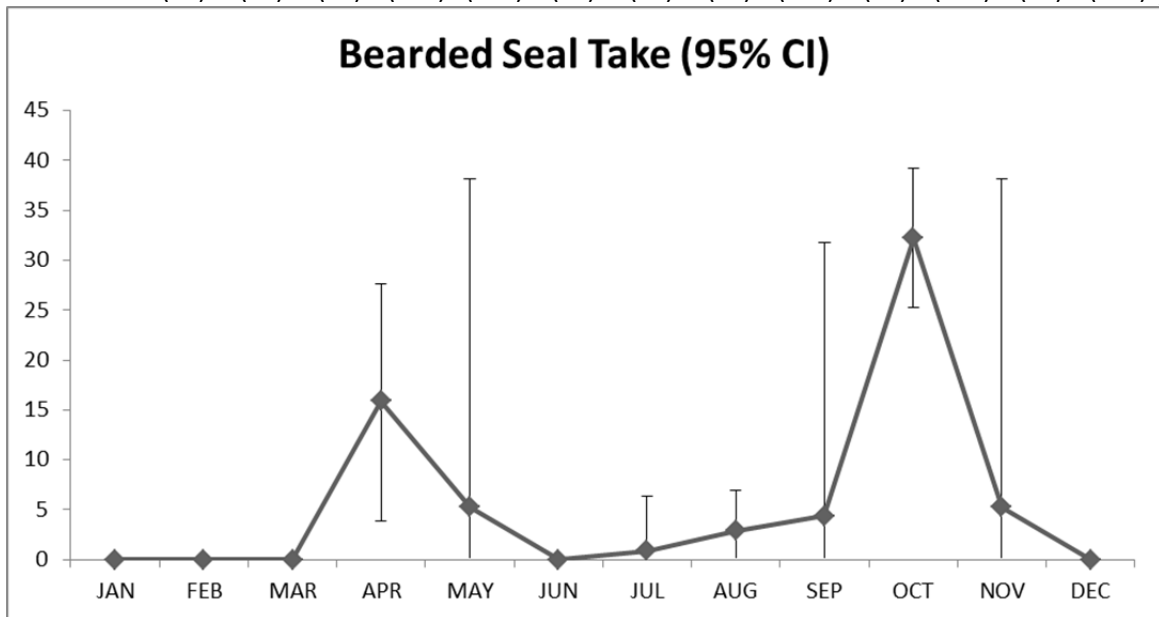


Figure 1. Average bearded seal take for each month during 2011 and 2012 with a 95% confidence interval.

Table 5. The number of spotted seals taken (estimated harvest + estimated struck but lost) by month and the total for each year including a 95% confidence interval.

| Spotted Seal Take | | | | | | | | | | | | | |
|-------------------|------|------|------|-------|------|------|------|------|-------|-------|------|------|-------|
| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Total |
| 2011 | 0 | 0 | 0 | 9 | 4 | 0 | 2 | 4 | 14 | 23 | 0 | 2 | 56 |
| 2012 | 0 | 0 | 0 | 16 | 2 | 0 | 0 | 2 | 4 | 29 | 0 | 0 | 53 |
| Average | 0 | 0 | 0 | 12 | 3 | 0 | 1 | 3 | 9 | 26 | 0 | 1 | 55 |
| 95% CI | (±0) | (±0) | (±0) | (±21) | (±4) | (±0) | (±5) | (±4) | (±30) | (±19) | (±0) | (±5) | (±9) |

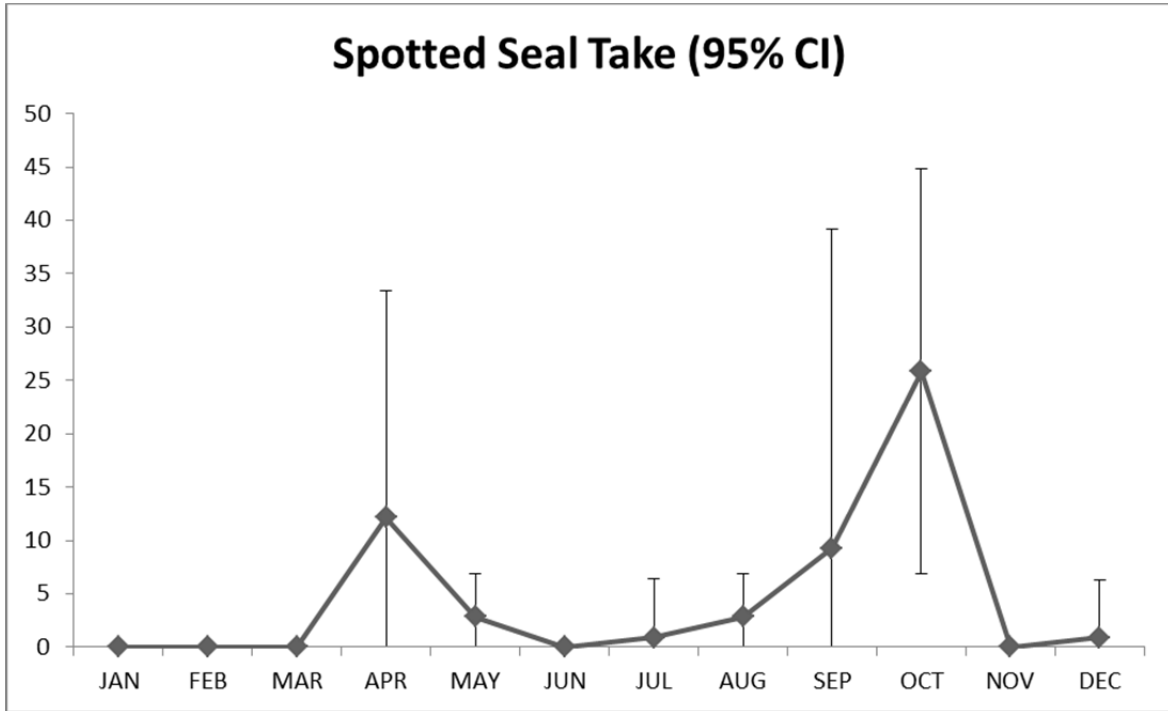


Figure 2. Average spotted seal take for each month during 2011 and 2012 with a 95% confidence interval.

Table 6. The number of ringed seals taken (estimated harvest + estimated struck but lost) by month and the total for each year including a 95% confidence interval.

| Ringed Seal Take | | | | | | | | | | | | | |
|------------------|-------|------|-------|-------|-------|------|------|-------|-------|--------|-------|-------|--------|
| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | Total |
| 2011 | 0 | 11 | 4 | 21 | 9 | 2 | 0 | 9 | 21 | 37 | 21 | 4 | 137 |
| 2012 | 4 | 11 | 0 | 47 | 2 | 0 | 0 | 2 | 24 | 78 | 0 | 0 | 169 |
| Average | 2 | 11 | 2 | 34 | 5 | 1 | 0 | 5 | 23 | 57 | 11 | 2 | 153 |
| 95% CI | (±14) | (±2) | (±14) | (±80) | (±20) | (±5) | (±0) | (±20) | (±11) | (±128) | (±66) | (±14) | (±100) |

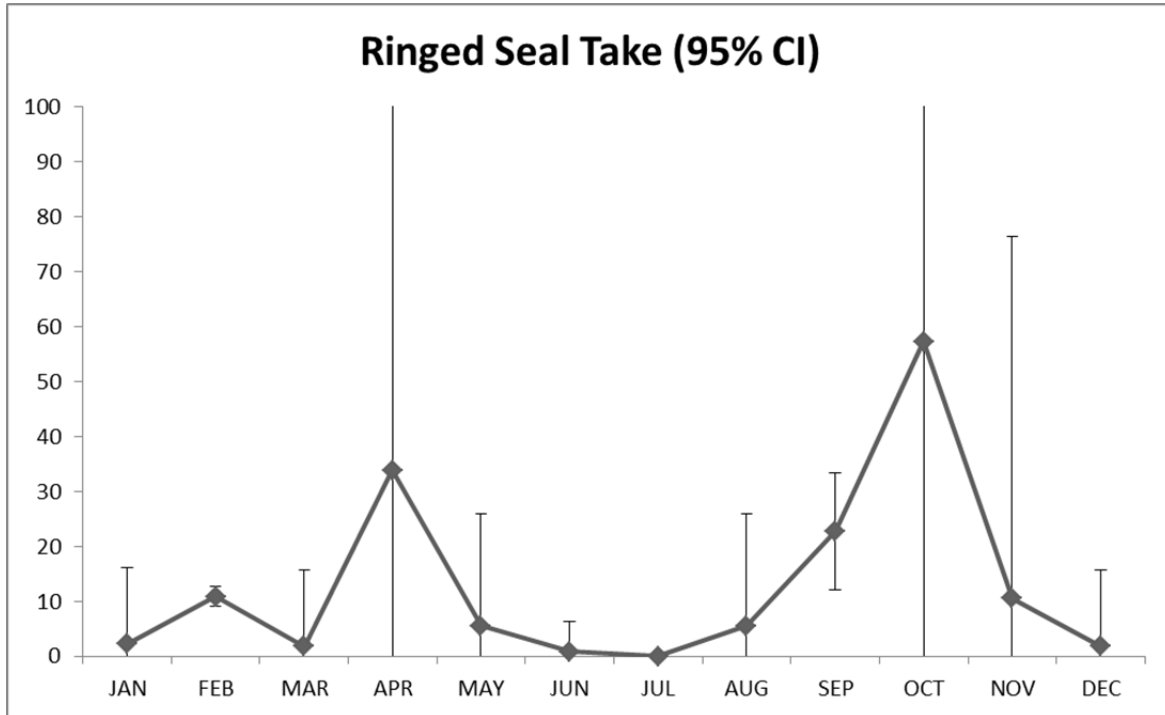


Figure 3. Average ringed seal take for each month during 2011 and 2012 with a 95% confidence interval.

Seal health

Subsistence hunters and processors have extensive experience handling seals and know when an animal looks sick or unhealthy. A supplemental question was added to collect information on the number of unhealthy seals a household encountered. During 2011, all households reported that ringed and bearded seals were healthy but 2 households reported seeing some spotted seals that appeared unhealthy and 1 household reported a ribbon seal that was not healthy. During 2012 all households reported all spotted, bearded, and ribbon seals were healthy but 1 household reported a sick ringed seal. Very few seals that are harvested are considered unhealthy by the subsistence households. It is worth noting that during 2011 and 2012 there was an Unusual Mortality Event (UME) where numerous ringed seals were found to be sick with symptoms including hair loss and sores around the eyes, nose and flippers. Many of these seals were found on the beach and unafraid of people. More information about this can be found at the NOAA website <http://www.nmfs.noaa.gov/pr/health/mmume/>.

Discussion and Conclusion

Ringed, bearded, and spotted seals are all used extensively in Scammon Bay. Ribbon seals are not harvested very often, but are still taken each year. This survey has only collected information from two years in Scammon Bay and this explains the large confidence intervals seen bearded (± 98) and ringed (± 100) seals. By conducting the survey again in the future we can decrease the confidence intervals or increase the quality of the information we collect.

The information gained from this survey is extremely important for showing how many ice seals are needed for your subsistence needs. If you have any questions or comments please contact Mark Nelson with the provided contact information.

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