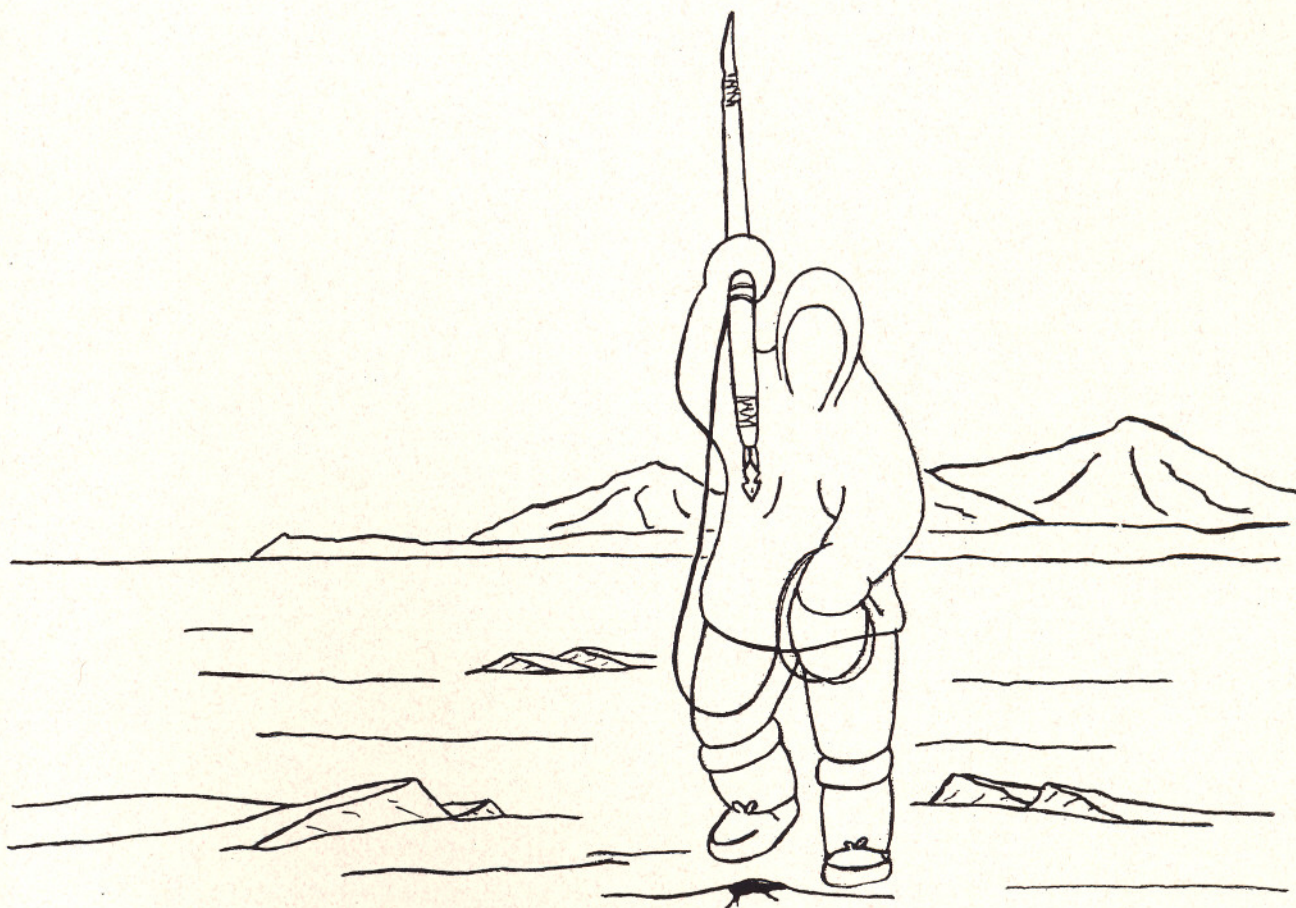
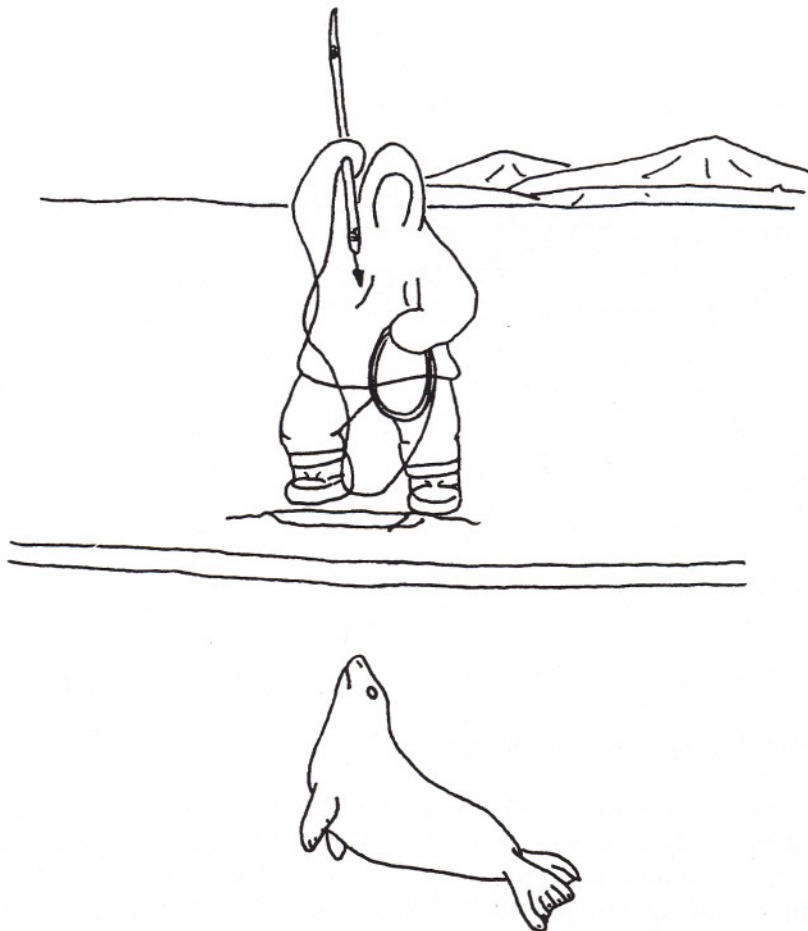


DOCUMENTING QIKIKTAGRUGMIUT KNOWLEDGE OF ENVIRONMENTAL CHANGE



**Conversations About the Environment of Northern Kotzebue Sound
During the Last Half of the Twentieth-Century**

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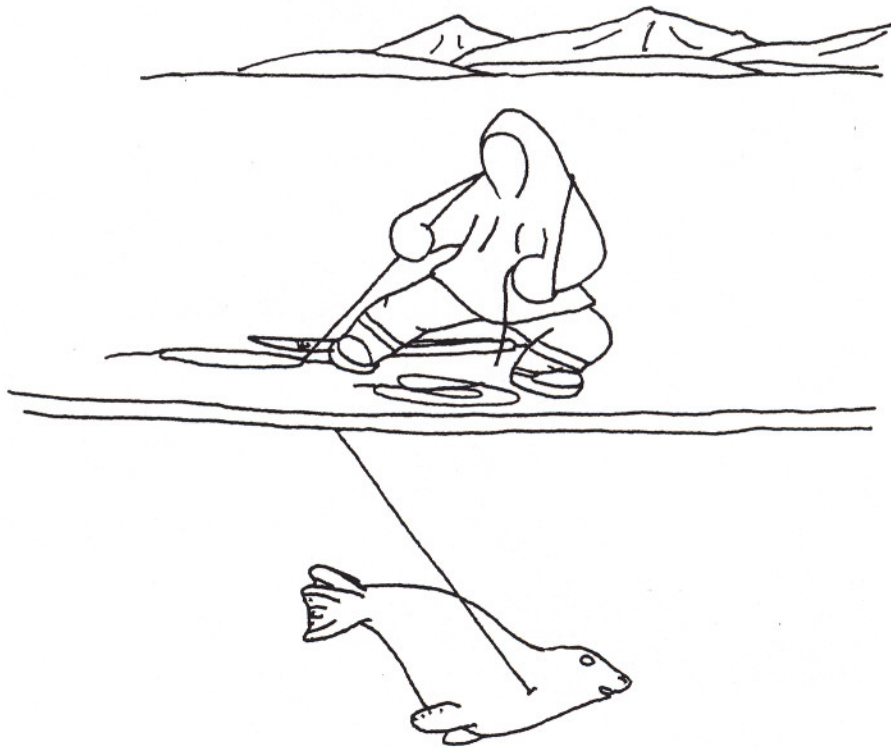


**Conversations About the Environment of Northern Kotzebue Sound
During the Last Half of the Twentieth-Century**

Illustrations

All Provider (seal hunter) series drawn in pencil by Nauluq (Jim Jones), redrawn in ink with permission by Alex Whiting

The design of the Drum/Stick by: Nauluq, drawing including map insert by: Alex Whiting



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This collection is an attempt to document a selection of knowledge of the environment by the current members of the Tribe for the benefit of future Tribal members.

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Copies of the report might be obtained by contacting the Tribe.

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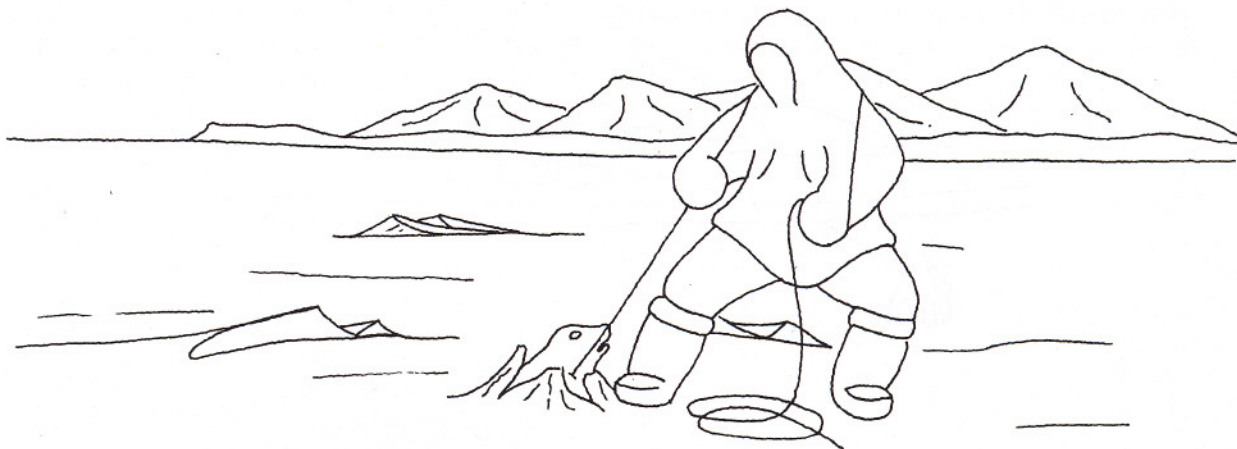
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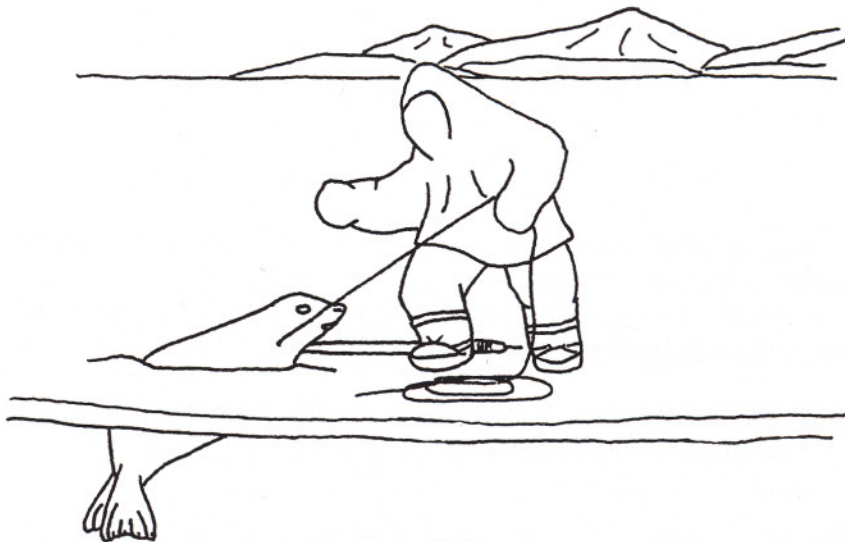


ACKNOWLEDGMENTS

This project was funded under the National Park Service Historic Preservation grant program and was developed and administered by Alex Whiting, the Tribal Environmental Protection Specialist, with assistance from Henry P. Huntington, PhD, of Huntington Consulting, whose counsel, experience, and moral support were especially appreciated and valuable. Individual Tribal members were hired by the Tribe to interview participants who were selected through word-of-mouth. All interviews were recorded on audiotapes. Alex Whiting transcribed the tapes and compiled the final report. The Tribe appreciates the participation of both the interviewers and the interviewees; those members participating are listed below.

Interviewers: Teresa Foster, Virginia Kennedy, Sue Norton, Aakatchaq Schaeffer, Roswell Schaeffer Jr., Della Schaeffer, Michael Schaeffer, and Myles Wilson.

Interviewees: Theodore Booth Sr., Edna Coffin, Sara Evak, Amos Foster Sr. Herbert Foster, Mabel Henry, Ruth Nelson, Albert Porter, John Schaeffer Sr., Siku Sours, Bob Uhl, and Claude Wilson Sr.

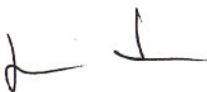


PREFACE FROM THE EXECUTIVE DIRECTOR OF THE TRIBE

The phenomena of global warming that we believe is happening is another test of our ability to survive. In this time of technological wonders, we must still rely on our traditional skills, albeit some of those have eroded in their use, but their function and need have not diminished. We must keep them alive if we are to survive.

As we see political events and undesirable environmental consequences of pollution take place, mostly out of any singular control, we feel the helplessness in how we should respond. Yet we make adjustments in our daily lives almost as a matter of course, and in this way are able to mitigate some of the more minor changes, but many are too large to handle or cope with successfully.

Of major concern is the issue of pollution and global warming and their impact on our natural foods, as we have a traditional and spiritual responsibility to pass on not only the knowledge of the use these foods to our descendents, but also to pass them on in abundance and uncontaminated. Thus as change of all kinds continues to occur the responsibility is of greater weight to bear as time passes, and we must do our part in the whole scheme of existence, individually, collectively, and otherwise, to effectively meet the challenge. We are, despite the western notion of individual rights, a collective species that will have to work together if the whole is going to survive (or not). Communities within the world should have rights too. Perhaps someday those collective rights will prevail over those of self. Like it or not, we are all in this together. Period.



Tarruq

FOREWORD

The people comprising the membership of the Native Village of Kotzebue, the Qikiktagrugmiut, are descended from the original inhabitants of the area surrounding northern Kotzebue Sound and have managed to not only survive in this hard, yet productive environment, but also to thrive. The culture is based on an intimate relationship to the land and the many living and non-living elements, which make up the complex web of the northwestern Alaska Arctic environment. While recognizing that change on small local scales (e.g., animal populations), and large scales (e.g., ice age – glacial advance), make up the Earth's regular oscillations over time, recently, since about the mid 1970's, the people are noting changes that are more unpredictable and drastic than what members living today remember during their time growing up. Living on low lying coastal areas and being dependent upon those elements which together produce the climate that directly affect's the ability of the Qikiktagrugmiut to travel, live and harvest natural resources in the region, makes the people especially vulnerable and sensitive to environmental change of all magnitudes. One way to better understand these changes, is to begin to document the knowledge of the environment, as people currently understand it, and knew it in the past, specifically over the last 50 years, from 1950 to 2001. The Tribe has undertaken this effort to begin to document personal experiences and collective knowledge about the environment and the changes people have noticed. As such, this report is not the end of an effort, but only the beginning. By revisiting and updating this information as time goes by, the Tribe should be able to build a strong record of changes in the region. This information will be useful in trying to recognize patterns that may help people predict and plan for future changes and to overall add to our ability to understand our environment.

Interviews were conducted one on one with individual tribal members that expressed interest in contributing. A list of various environmental elements was provided both to the interviewer and the interviewee to facilitate the interview. Some of the members were interviewed at their homes, some at the tribal office, and a few at their camps located around northern Kotzebue Sound.

The format of the report is by topic and individual responses are presented anonymously, in recognition of the fact that individual Tribal member's knowledge of the environment is a collective effort, with each member's understanding of the environment linked with that of all the other member's, past and present.

The final report, audiotapes, and all other material produced through this effort will be archived at the Native Village of Kotzebue and permission to access this material would need to be obtained by contacting the Tribe.

INTRODUCTION

Kotzebue, an Iñupiaq community of 3,000 inhabitants, is located on the Baldwin Peninsula 30 miles above the Arctic Circle in northwest Alaska. Its Iñupiaq name is Qikiktagruk, which means "almost an island." The people indigenous to this locality are the Qikiktagrugmiut, "people of Qikiktagruk" and the tribal government representing them is the Native Village of Kotzebue. The subject of climate change, and environmental change in general, is of personal interest to a people that continue to interact directly with the natural world for their spiritual, cultural and nutritional sustenance. The tribal members, while giving some thought to the broader definition and future implications of environmental change, mostly focus on present and near-future effects. They are specifically concerned with change as it relates to climate and day-to-day weather and how these compare to what is considered "normal" based on many years experience.

This collection of information is the result of the project carried out by the Tribe to document environmental change in the Kotzebue area during the time from about the 1950's to present. While the actual documentation of this knowledge will be valuable to future tribal members for historic preservation purposes and comparative analysis, for today's members the continuing oral tradition of collecting and disseminating information continues. This is the main reason why most of the impetus to formally document climate change comes from outside researchers, rather than from the tribal members themselves.

Local hunter discussion focuses on the elements of the climate and "country" (the environment outside of the settlements) on a daily basis. Their interest is not primarily comfort, although that is usually referred to in conversation, but on whether conditions are conducive to travel and how they will affect the movement of animals. Hunter mobility is critical to the ability to access a migratory and widespread animal resource. During summer, high winds and fog, along with the breakup of ice during the end of May and beginning of June, heavily influence the ability to travel. High winds in the wintertime, like heavy rain in the summer, are not as big an impediment as an inconvenience, unless the winds are associated with blizzards, blowing snow, and whiteout conditions. While these conditions will stop travel at times, it is still possible to travel under the most adverse winter conditions, unlike in summer. More commonly, extremely cold temperatures restrict winter travel. In recent years, however, the length of time the weather stays extremely cold has been shortening. The timing of freeze-up, the thickness of the newly forming ice, and the timing and amount of snow are also key factors for travel.

In other words, the weather is immediately important for daily activity. There is no doubt that the weather and the entire environment that tribal members depend on to support their way of life is changing. All environmental change is not necessarily bad. For instance, in the beginning of the twentieth century caribou were rare in the locality of Kotzebue. If not for the region's reindeer herds, many people would have had a hard time finding enough meat to make it through the winter. Many did, after whalers and other outside commercial hunters overexploited marine resources at the end of the nineteenth century and before the reindeer were introduced. Now the western Arctic caribou herd that travels through the area numbers about half a million, and local reindeer herds are absent. In addition, moose also began to appear in the region from about the 1950s onward. These types of changes are very beneficial to the health, cultural integrity, and quality of life of the region's residents.

Weather also has changed over the last half century. Seasons are less consistent now. For example, warmer temperatures have become more common during fall and winter, sometimes creating mid-winter fog (a new phenomena), as have colder temperatures in the summers. Daily changes are now more extreme. It seems relatively common now for the temperature to change from -30°F one day to 30°F the next or vice versa. Not just during the winter do unusual swings in weather occur. An exceptional example is the snowstorm during July 2000, which left snow

covering the tundra for a day and reduced the berry crop dramatically that year. Another example includes having the least amount of precipitation recorded for the month of November during 1999 and again in 2001, .01 inches, or 100 times less than the average amount of precipitation recorded for that month over the last fifty years. According to tribal members, the increased variability and unpredictability in weather appears to have started during the 1970s and has continued through the 1990s and into the new century.

The relationship between weather and the Qikiktagrugmiut is more intimate than that between most people in the United States. While they share a similar outlook on weather as, say, farmers who depend on weather for a good yield and commercial fisherman who depend on weather for safety, the Qikiktagrugmiut depend on weather for all facets of life and their daily traditional activities are entirely dictated by the weather and other environmental conditions. For most Americans the concern with weather has more to do with comfort level and recreation. For the tribe, the weather determines if daily activities can be carried out safely and productively. The weather is also tied to the ability of the land to produce natural crops, of fur, meat, and berries.

This disparity in how weather is perceived by the tribal community versus the American mainstream is apparent from watching weather forecasters across the country, including urban centers in Alaska, such as Anchorage. The premise of these forecasters is based on the urban view that "good" weather should be sunny and warm. For the tribe, however, weather is "good" if it is favorable to the country's productivity and the ability of people to access the land's resources. Thus, "good" weather may include rain in July to produce a good berry crop and extremely cold temperatures during early fall so that Kotzebue Sound and the surrounding rivers and lakes freeze quickly and reliably for safe travel. These two conditions, rain and extreme cold, are almost universally portrayed as "bad" weather in urban settings. In addition, the tribe's ability to cope with extreme weather events differs from that of most communities across the nation. For instance, blizzards usually shut down entire cities and are portrayed as mini-disasters by the urban media, while around Kotzebue, blizzards are looked on favorably by the tribal community as a means by which travel is improved, allowing greater access to the country for harvesting animals. Even in the town of Kotzebue, extreme weather events have relatively little direct impacts. Schools and businesses, for example, are rarely closed by weather.

While these characteristics appear to show an ability to successfully adapt and live in an inherently variable local environment, the real challenge with assessing the impacts of climate change is the interconnectedness and the wide-ranging impacts that collectively work to change the shape of the web of activities and life in this part of the world.

Some tribal members live out in the country. Their ability to travel and obtain the necessary requirements of life is dependent on the length and quality of the freeze-ups and the length of breakups, which of course are determined by the weather conditions during fall and spring. In addition, many of our people who are at the fringes of production, the young and the elderly, depend on favorable weather to be able to participate in the limited harvesting activities available to them. Ice fishing directly in front of Kotzebue, for instance, supplies people with traditional fall food (tomcod and smelt), and is also an important social activity that binds the community and gives the elderly and young people one of their few chances during the year to harvest traditional foods. During falls with a late freeze-up or poor ice, ice fishing is limited or less productive. Thus, a single climate variable in one season disproportionately affects this segment of the population by substantially reducing their annual harvesting opportunities.

Taking a closer look at one event and its impacts, such as a late freeze-up, can show how the consequences are widespread and varied yet still intertwined, so that it is impossible to look at any one thing in a vacuum or as a single topic. As an example the consequences of a late freeze-up on people, spotted seals, caribou, red foxes, and salmon will be used. This will illustrate how

trying to determine whether changes are positive or negative is complex depending on context and perception. It also shows how the timing, quality of ice, speed of complete freezing, associated weather, and ecological effects all combine to produce the many and varied impacts of a late freeze-up.

Impacts on humans

- Better whitefish harvesting. People at camps have an extended period for harvesting. Late season storm surges can reach the beach, piling porous sand across the mouth of a major harvesting river, trapping the fish behind the sand dam where they can be easily captured.
- Better clamming. Late season storm surges wash clams up on the beach at Sisaulik (a peninsula across the Sound from Kotzebue where some of the tribes members camp during the summer and fall), where they can be easily collected and stored in cool saltwater for many days of clam-bakes.
- Better spotted seal hunting. Hunters have more opportunity for using boats to hunt spotted seals, which are present in prolific numbers feeding on large schools of fish of many varieties (see below). In addition, thin ice for a long period provides the opportunity for seals to feed far into the sound where they can become trapped when the ice thickens, and thus easily accessed by hunters once ice travel is possible.
- Better access to caribou. Caribou hunters have a longer period in which they can use boats to reach caribou. There is, however, an increased risk during extended freeze-ups that boats will get caught in young ice and have to be abandoned for the winter. This happened during the late freeze-up of 2000.
- Better Arctic fox harvests. Arctic foxes are concentrated along the coast during the long season of open water, unable to get out onto the sea ice.
- Better access to driftwood. More logs are washed up on the mud flats by late-season high water, and are then easily accessed by campers for their early fall fuel supply.
- Shorter ice-fishing season. As noted earlier, ice for fall fishing is missing, so the season is shorter in front of Kotzebue. In many cases, the ice fishers will then miss the largest runs of smelt and saffron cod, which tend to come past town in large concentrations earlier, rather than later, in the fall.
- Poor access to and from camps. Campers must wait for a longer period before they can reach town for expendable supplies such as gas, propane, and other necessities.
- Rough ice conditions. By repeated incomplete freezing and thawing of the northern sound the ice that does appear can be piled up by the wind, creating really rough conditions and many obstacles to be avoided once the ice permanently freezes and travel by snowmachine and dogs begins.
- More danger from thin ice. Snow can pile up on thin ice and make these areas less likely to freeze completely and thus more dangerous once travel begins. Many times there is much snow on the ground during falls with late freeze-up's because the low pressure conditions that contribute to slow ice growth also are associated with snow and storm fronts.
- More erosion and flood problems. Late season storm surges, unimpeded by ice, can create erosion and flood problems along the beach and road front of Kotzebue.

Impacts on spotted seal

- Better access to inshore waters and fishes that congregate there. Due to the absence or patchiness of ice, the seals have increased access to the extreme inshore waters where smelt and saffron cod, along with other food fishes, congregate in large numbers during the early fall. The seals can force the fish into concentrated balls next to shore during the

open water period, which is probably the most efficient way for them to catch the fish easily and in large numbers. Also, a late freeze-up would allow seals increased access to the Noatak River, which stills holds large char and salmon during this time.

- Better haul outs for resting. Thin or patchy ice is conducive to seals hauling out on, allowing them to rest close to their major food source at this time of year, thus increasing the net amount of energy gained from this seasonal activity.
- Greater risk of being trapped. Because the seals are able to haul out and breathe through the thin ice, they have a higher risk of becoming trapped too far from open water when the ice begins to thicken. Once it gets cold, which can happen rapidly at this time of year, the ice can become too solid and extensive for the seals to reach open water.

Impacts on caribou

- Slower movements. The warm weather associated with a late freeze-up makes caribou less likely to travel long distances thus slowing down the fall migration. In addition to being slowed by the warm weather and their own lack of initiative to move, extended thin ice conditions hamper movement, because the ice does not support the animals when they try to cross water bodies in their path. Although the consequences of this are unclear, they are probably many and varied, such as being forced to stay extended periods of time on less productive ranges and increased vulnerability to predators such as wolves that are lighter and able to take advantage of the obstacles created for the caribou.

Impact on red foxes

- Better feeding. A longer period of late season open water allows more storm surges to reach the shore, closing off coastal rivers with porous sand that allows large amounts of whitefish to become trapped and frozen into the ice at coastal river outlets. These fish provide a substantial food resource for many of the foxes along the coast. In addition late season storms wash up on the beach more sources of fox food in the form of enormous schools of nearshore baitfish and marine mammal carcasses. Also, a longer hunting season for spotted seals and caribou by boat hunters means more gut piles and lost seals become available prior to the long period of beach foraging (almost all foxes within the vicinity of the coast rely heavily on beach scavenging) during the time around freeze-up (which also coincides with low human traffic along the coast) and into December. A particularly good year for late season beach foraging is significant in the yearly life cycle of the foxes and can allow them to accumulate critical amounts of fat to survive the long winter months ahead.
- Increased competition with Arctic foxes. An extended period of open water along the coast can impede the movement of Arctic foxes out onto the ice pack, which would allow these animals to compete with the red foxes that rely on coastal food sources to start the winter off with. If this occurs during a high in the four-year Arctic fox population cycle, the effect is multiplied by the large numbers of Arctic foxes migrating south and becoming stopped by the open water along the coast.

Impact on salmon

- Reduced egg survival. The high water associated with a late freeze-up can allow the salmon to spawn in areas that, while having sufficient water at the time of egg deposition, dry up once the really cold temperatures lock up the water as ice.
- More predation. A long period of open water in the fall would also allow increased access to the salmon for their largest predators, such as the bears and spotted seals.

While this list is not exhaustive, these examples give some idea of the interconnectedness that complicates an effort to try to understand the changes that occur from year to year as well as the long- and short-term effects of changes to the various combinations of environmental elements. This brief analysis of the potential impacts of change leads to the central questions facing the Qikiktagrugmiut and other indigenous peoples of the Arctic.

Since the entire history of Arctic peoples is replete with change, is continued change a threat to the Tribe and their culture? Even if processes are in motion that will in fact change the entire ecosystem, will the result be a vacuum or circumstances not conducive to human existence, or will a new ecosystem come into being, producing resources available for human consumption, transforming both the environment and the culture over time? Archaeologists have found this pattern in the past as Arctic societies changed from inland cultures to maritime cultures and back again. Whether a specific activity continues or ceases, will this substantially change the people or their ability to provide sustenance? Or is change just a threat to current understanding of the environment, which in any case is continually changing, slowly and on a daily basis? For example, seal hunting in leads during winter has decreased in importance and participation each year, due in part to the cultural economy's changing dependency on the seal for food and domestic utilitarian purposes, and also to the unpredictable, and thus more dangerous, ice conditions of late. In addition, it is an activity that relies on the most extreme form of specialized knowledge of the environment that needs to be taught and learned over many years. More rapid environmental change may be harder to adapt to. Recently, two experienced seal hunters were lost on the ice while hunting. Local interpretation of the event concluded that the phenomenon of climate change has resulted in unusual and unpredictable ice conditions and that this must have been the cause, as these two men would not have had trouble traveling over ice in normal circumstances. The idea of unusual conditions is consistent with the observations of environmental change made by tribal members.

If the change occurring is in fact mostly from natural causes, then cannot the culture adapt and continue to survive as they have done for thousands of years? If the changes are caused mostly by humans and their emissions into the atmosphere and oceans, then does the question become what is the world's responsibility to the Tribe? And how would this finding change the fact that people will still have to adapt to the change no matter what the cause, if they are to continue to survive as a people in their current geographical location? Is cultural identity of a people dependent on current environmental conditions, or can a people redefine themselves and their relationship with the environment while still holding onto their distinct identity? These are the more important questions to the Qikiktagrugmiut.

The challenge posed by climate change to the Arctic people is their ability to respond and adapt to changes to the local environment, while continuing to prosper. While there is cause for concern at the prospect of rapid and major change, the Qikiktagrugmiut, like Inuit across the Arctic, have successfully overcome adverse conditions and continue to thrive in one of the most hostile places on the planet through the use of their specialized knowledge and talents while displaying the determination of a people to stay true to their way of life and the spirit that is Inupiaq.

Alex Whiting
Kotzebue, Alaska
June 2002

The following statements are taken from the audiotapes produced during the interviews. Each separate paragraph is taken from a single informant, the information is transcribed verbatim from the recorded interviews and the material presented was selected because it spoke to one of the topics or was related to the subject. The order they are presented in, is for formatting purposes only.



OBSERVATIONS OF THE QIKIKTAGRUGMIUT

CLIMATE CHANGE

My whole life here has been spent living off of the land as it were, what called a subsistence lifestyle now, so we indeed have been pretty close to the weather, the weather in that kind of a lifestyle determines pretty much what you do everyday and how you manage to make a living. The weather and temperatures and storms and what not, are a big part of your existence.

Its kind of our feeling with respect to global warming and what elders may contribute to long time knowledge of weather change. It would be our hope that the scientific world with their ability to measure with instruments and modern technology would be in a better position to measure those things that happen in the air around us, temperatures and what not. We know that they can do that and we also feel a lack in ourselves to be able to give any real solid information in that line because our memories, all of our memories, are not perfect and when you think back twenty years, or thirty years, forty years sometimes, you don't even agree with someone that was there with you then, your spouse for instance.

TEMPERATURE

It's getting warmer now.

I notice this year we didn't get too cold, it was nice and warm and unusual weather, I mean too good to be true. I remember long ago it used to be nice and cold and we look forward to wind chills.

In the early 1920's the weather used to be different, it used to be real cold in wintertime, because the hunters always say even the coal oil always freeze when its real cold, but today its different, its like its never be real cold now, than when we were growing up.

Just like this ground the earth is going upwards and the south area going down, warmer, that's why the Barrow peoples have warmer area, warm air, just like they go up. That's what that old man tell me in Barrow, not like long ago its getting warmer, warmer than Kotzebue.

Generally we come up with the remembrances of some summers that were very cold, some winters that were very cold, other ones that were very warm. I mean each one a little bit different than another, but it is pretty hard to separate out each one well enough to say you could see in the past a definite warming trend.

Actually there is something here of interest that these questions bring out, what we have observed as a trend is a lot of extremes, a real warm sun on some days and then not too far off a real cold sun, some of that seems different than 40, 50 years ago, there does seem to be more dramatic swings back and forth between extremes, like the hot is hotter and the cold is colder. There has always been that back and forth change, but it does seem to be more dynamic changes in the atmosphere.

Long ago when its real cloudy outside it used to be above zero, and nice and warm and when its clear and when we have clear skies it will be real cold, very cold, and its kind of the same today but then to me it seems like its real warm now. When its cloudy outside seems like there's a little moist, like its going to rain or something, so the temperature gets to 30 below, last month we had it almost all thirties and that's the longest I can remember that we had it since then. At then we

used to have that just once in a while long ago, we had thirty, I mean maybe forty below, and not all the time, it used to just come once and while in two or three months so. But today its kind of different again, it seems like it will run all the way

like 30-30 [from 30 below zero F. to 30 above 0] same day, I mean two times in a week or whatever, and we don't usually kind of know about the temperature in those days, because we travel by dog team and walk and it wasn't that cold. Today it's real different, because now that we travel by snowmachines and were talking about 70-80 below wind-chill and before now if we are frostbitten in the face and before we know it we kind of learn of that too.

Alaska was different, it used to stay colder for a long time until the end of April, right now it changed. Even the days are changing. That sun it's changing, my wife's dad Harold Downey, he said even the sun start coming up way past up where it used to in Noatak, those hills that are marked and its way up and that sun is so fast springtime mostly you will notice it will go down and swing right up. The sun is going round and round faster than it used to and it's way warmer than it used to be before. Long time ago when we were growing up, it used to go up to 30, 40 below zero early November. September is the hardest part long time ago, cause as soon as September come around it would start icing up early in the morning, that's why they always try to get their dog feed and fish put away in September. Like salmon and whitefish and trout for their winter use, they always start getting this time year [fall time – September], but now look it's middle of September already and still warm, once in a while we see little frost, but not like it used to be, it changed, everything changing, everything is fast and warm, as soon as the sun start coming up everything just melt.

Long ago it used to be colder during the winter and summer, springtime mostly it used to be colder, but now it start getting warmer. Short days it starts getting warmer and longer days it starts getting colder. Right now like springtime, its almost cold weather the whole summer. The temperature is going down, getting colder. The weather, the Barrow weather it used to be even but right now it start getting warmer than Kotzebue, the Kotzebue weather getting colder than Barrow. That's why when they start whaling this spring they wait for cold weather, its too warm up there, they never have open water, the tide is to warm. The weather is changing up there, they say the sun is getting warmer in Barrow. It used to freeze up early around here, like in September, middle part it used to be colder 'til all the way 'til December, January, February, March it used to be cold weather all the time. It used to freeze up early and when it freeze up early, we always have good ice in the ocean, cause we can hunt and try look for open water way out, but right now open lead is little ways too much warm water, right close to the beach right now, how many years, three years straight we have been having closer lead almost to the beach, from Sealing Point to Sisaulik. Open water from the beach to long ways out, cause the weather is too warm. Too warm temperature going up.

SKY COLOR

Today the sky color its different than it used to be then, what I am trying to say long ago and now today.

The arctic haze discussion we have been aware of for a long time, it hasn't attracted my attention or my wife's attention to the degree that we would say it's changed.

AURORA BOREALIS (NORTHERN LIGHTS)

The northern lights we are seeing more and more now, even during the winter, especially in January and it's really pretty, its good to see northern lights and we see more often lately.

Long time ago it used to have northern lights all the time almost, not now, it used to get real bright too northern lights long time ago when we were hunting, we always get scared even when there's too much light, when were hunting long time ago in the winter time.

SUN/MOON

Then when we were growing up just like the moon is getting higher, I thought when we were small it used to be lower, I always see it just like it get higher.

We were out this weekend and you know usually we feel that hot feeling beginning in April but this time we were out this weekend and we felt the warm, I could really feel the heat like its closer and its different.

The days are like one month earlier this spring, the way the weather is, the weather is getting faster, long ago the weather and the sun used to be almost even. The cold beat the sun that's why, the cold beat the sun, if you want to find out December, the month of December before new years you can go out and check which one comes out first the moon or sun, in the early morning before the sun come up. But if you see the moon up there, or sun, either one, that sun will come up early it will be shorter days early break, the moon come up early it will be longer days springtime. The sun and the moon in December, which one will come up first, the sun come up first there will be shorter days and the moon come up first there will be longer days, just like opposite, huh. I never see the moon come up first.

CLOUDS

Seems like there's more clouds than before.

Them old people before my time when we were growing up, when I follow them try to go seal hunt, my old uncles used to wake up early and look out just watching the clouds, them old people would say, "Well it looks like it going to be good hunting, lets go", and they go. When they go they had good weather all day long out there and then pretty soon one or two old people would start talking, start pointing, they say towards Deering sometime, and sometimes towards Sealing Point those little clouds when they start forming, they would say "let's go home," those clouds they used to use them for weather map those old peoples. A lot of things are changing now. Before, those clouds used to be high, now they're up to your baldhead sometimes, clouds after clouds. [The respondent is referring to the fact that the clouds are a lot lower in the sky more now than in the past]

SNOW

This winter its different. We don't have much snow than other winters. I don't know if it will snow more in February or March.

Big snow banks too, even the stores always covered up like little holes to go inside, even Kivilina too, used to have big snow banks.

When I was growing up the snow used to be real clean white and a lot of snow, right now it seems like there is hardly any snow, long ago there used to be a lot of snow drifts in town, right now you hardly see any snow drifts anymore.

Long ago we used to have a lot of snow early like in October, and they used to tell us when there is a lot of snow all over the villages or down the coast there used to be lots of berries, the snow insulates them, the snow is really going down not much snow.

I remember when I was growing up we used to have lots of snow banks going to school, nowadays its just clear, I mean, its not like long ago and its hard to say we got these good tractors to help us, but even back then we had tractors too, but we used to have more snow than now.

Today it seems like there is not many snow this time of the year. When we were growing up I remember there used to be real big snow banks, about like Chukchi college, that high [the building the respondent is using for reference is about 20 feet high], and I can remember that there were about four or five of those starting about from Crowley Marine to post office. Today I don't see any of that anymore and that's where I think we doesn't have very much snow now and it looks like that way this year too. It is starting to snow towards spring [more snow is falling in the spring than in the fall] and I don't know if that is going to stop, so that's the difference of the snow now and then.

In the early days we used to have a lot of snow in the early fall. Nowadays it seems like it's pretty late towards spring and the end of the year. We hardly had any snow this winter, in the past there used to be big snow banks. It seems like about twenty years ago it started doing that. The snow is dry, fairly dry this winter and towards springtime it seems like its kind of wet mixed with rain. The weather has been changing real frequently. It seems like one week you have 20, 30, 40 below and the next week same thing its 20, 30 above, or whatever, so there is a lot of change on that.

We used to have warm houses too, they always be real warm those sod houses when we live across from here sometimes around middle part of 1920's. When mama was living we even used to winter across there [referring to Sisaulik]. Later on just like the winters are getting milder, even when we move down here after 1940's, in 1948 I start living around here. Two different winters we got lot of snow, it cover up our houses, even the dogs used to run around on top, even the kids used to run around on top. That's two winters I remember we got a lot of snow, even without those snow removals too, but now it's just like the winters are mild.

We remember years when there was a lot of early snow in the fall time and other years when it hardly snowed at all. Oddly enough in that line was one thing that we do remember in fifty years, the snow held off in the fall time for so long that we couldn't make our annual move, there was no snow in our area on the ground until very nearly Christmas, we were not able to move to our winter quarters here [referring to a forested creek behind Sisaulik] 'til a couple days after Christmas, that is very unusual. We would count last year I think as snow being late in the season as being a record for us. At the same time we had extremely cold weather, which was another difficulty of last year for us. A few years ago we had so much snow during one particular storm a little after Christmas that even with the good sno-go's and technology we have nowadays, we couldn't get out from our camp up there in order to get to Kotzebue without calling some help from Kotzebue to break trail first. What that adds up to in our memories, is that we have had years with very lots of snow and years with no snow at all. But again it's hard to put that in the context of recent global warming.

Before, as soon as October get around at that time, snow used to start coming and ice on the lakes be thick enough you could start driving dog team, and snow would be right on top of it then. Now it will snow, but few sprinkles like, not like it used to before. Long time ago, even those houses around Kotzebue, when we come down from Noatak, in front of those stores, those snow drifts used to be almost even from those stores like Hanson's and Tom Berryman's, and those houses that were in between, and you can notice those snowdrifts used to be way out in Kotzebue Sound and real hard to walk and the only thing you got to do if you are going to go to that store is walk right through the tunnel where they been digging in and out. Right now its not like that, its that snow is pretty late and as soon as sun start coming out in early March that snow start melting and less and less you can notice it, unless we have like we used to have heavy snow in March and

April, but its not like that anymore. You know between here and Noatak and over towards Kivilina those willows they used to have little trail and long ago they used to make one trail to ago back and forth with dog team. That time those things used to be covered even and you used to have hard time. I don't know how many times from Noatak, about ten miles after that first creek below the hills, that's where we used to camp, in that last brush of trees that's how far we could go with dog team when snow was deep, every time that wind blow it would cover your trail and you would have to break new trail when you try to go out hunting same way in the river. You think Kelly River is long ways, but right now you can travel to that thing with snowmachine up and back. One time I notice while I was helping my dad reindeer herding when my brother and George Nelson take me and my partner Clarence Allen to reindeer camp, it take us two days when we had to stop not far from Noatak, old man and two of us would lead the dogs with snowshoes, even when the dogs were fresh they had hard time breaking trail 'cause that snow is so deep from one foot to up to your knees and you would have to break trail all day long just to make it all the way to Qamanik [a place upriver from the village of Noatak]. That's only about fifteen miles and from there next day we start real early and by the time it start getting dark you would make it up to Kelly. That's how much snow we used to get at that time. But right now you travel most of the time on sand bar, gravel bar, on top of nigger-heads, you can travel on top of nigger-heads sometimes not much snow and before those things used to be covered with snow and used to be easy traveling, but right now its less snow and not hard like it used to be long ago, its soft. Like me right now trying to go to camp, we have hard time, me and Morris and somebody else, we had hard time going over the hill on bare ground some of it and some of it we have to go through valley and we have hard time trying to climb because there is no snow.

RAIN

Long ago when it's getting fall time it used to rain lots, not much now.

In summertime after we go down to the coast for spring hunting for ugruk's and seals, they never used to be lot of rain in springtime, but when it started raining it used to really pour, but not for long, maybe today there is more rain than when we were growing up.

I learn that growing up, black clouds or low clouds, it's rain, we know that rain is coming our way and that there is a little lightning somewhere, we can hear it, we can't see it and we had a lot of rain for a while, that what we used to expect in those days and it hasn't changed very much today.

We remember times when the ground has gotten so dry that the berry crop didn't turn out and there have been times when the ground has gotten so wet that berry crop spoils, so you know its just back and forth and again for the individual for ourselves there is no clear cut point in our memory that you can fasten on and say its changing, it is always changing in our region. It's kind of the way this country seems to be.

There is lots of changes in rain. One time in the early 50's when I first get out of service I get off at 1948 and we went caribou hunting towards Wulik, and we went caribou hunting and there is lot of people from Noatak and some from Kivilina, and while we were hunting up there were pretty lucky that we see caribou before it start raining and it rain for a couple of days. Not just little bit, it was raining so hard that we had to dry everything, our dog harnesses we had to dry them outside, hang them in willows and build a fire in the bottom and at that time we didn't have not much rope, we had ugruk rope for dogs towlines and we had to watch them not to burn them, and that was the first time that I notice that, and its strange when you have rain in the wintertime and you have no rain gear and you're about 30, 40, 50 miles away from home. Right now, last year I think it rain twice, once around first part of December, or end of November, and it rain little bit and after January it get so warm it snowed and it slushed and it rained a little too, at that time and

get pretty hard for caribous and everything. Summertime it's different, now you think it's going to rain but it never rain hard it rain light. I notice that around here we have real cold summer, that's how come we never have salmonberries and blueberries its cold. First time I seen snow around here, light rain and snow in June, that's what killed them because hardly any (berries) around here and later on it got cold and it sprinkle lots of rain but it never get no where. Before when it rain used to have mud puddles all over and we used to get high water, but this time that Noatak river never go down much because way up headwaters someplace, some of that snow didn't melt, because on account of its cold and that moist and rain keep moisting the land in the flats and when sunshine it will go down and softer a while it start raining up again because that dry ground is moisted with rain and just a few little drops will bring it up. It never rain so hard in my life earlier, but now it never rain like it used to. When it rain it's different just like it's real light sprinkling, and that's all I notice it is different than before, long time ago, it used to rain 3 or 4 days and water get plenty high and stop and turn around and get warm, but now when it get cloudy it hang around for a long time.

FOG

It always do that long time ago it always turn warm after it stay cold (in mid-winter) but no fog, clear all the time, no fog long time ago.

WIND

When its blowing from North it always be real cold and stormy, but when I was young I never pay attention because I wasn't traveling in wintertime, but long ago when we was living in Noatak there never used to be wind in winter time like right now. In Noatak there never used to be wind, the snow always start piling up, soft snow, but today it always be real windy too.

You can notice that from what I learned from old people talking and hunting with old people, I am getting old to myself by the way and maybe somebody will listen to me, if you are out hunting in the ocean or wherever, the currents shift and start going south or north you can notice the currents start shifting all together and after that in about an hour or so we will have a big wind from the east or west and that is where the wind start blowing. That's how we learn the weather patterns then and at that time we will be heading back towards land inland and we know that the currents start getting stronger.

Seems like long ago wind use to come around at times at not just coming out of nowhere today, today it seem like today when you're out hunting it will start blowing all together, the next hour it seems like its calm again. I can notice that, like if I am getting ready to go out hunting and it start blowing all of a sudden then pretty soon it will stop. So in those days it used to start blowing real slow, afterwards later on start getting stronger and we can notice that and we have time to run, or go inland, when I follow my grandparents or whoever my dad hunting out there, they used to tell me that is going to start blowing pretty quick so we had better head back. So that is the change that the wind it will start blowing altogether and it's kind of different from the old days.

That wind change, you know long ago it used to wind January, February, March, April, the whole month August. More windy springtime or before it freeze up and that wind used to come early before it freeze up, that wind used to always come earlier, big waves, high water from the southwest or southeast wind it used to be a real flooded high water fall time, but right now its going down look like no more high water. Later on like October, November, when it freeze up, when that big storm come up, it always flooded, real flooded, break the thin ice and high water used to come up lots of flooding water, but right now its like we are really going down, for about 3 or 4 years now its been going down. It used to be early, but this summer is kind of slow the high water come up but not that much, we used to have real high water long ago.

Since 1964 me and my family move down here from Noatak to find a job, and wintertime we have east wind and when it blow it get stormy and when it get stormy it used to last one week before right here in Kotzebue. When we come down with dog team we used to start hustling for dog feed, sometimes we always give up and take off trusting our dogs to take us home and when it start blowing it never used to stop from the east at that time, now it'll blow from east one good day and get evening start slowing down. Same thing with west wind, springtime early when it start blowing from west it used to last a few days, now it change from east to west and it will blow hard for a day or so and next thing you know it will stop, but you will have a good breeze from the west. At that time long ago we used to be stuck between here and Rabbit Creek, when I was helping my dad reindeer herding we used to go from Rabbit Creek and stop just before we hit Sealing Point. Sometimes we would have to wait, get a little calm go to Sealing Point and portage to that lake and again we would have to wait 'til it calm down at Anigaaq, calm down enough to go to Sisaulik, and on to Kotzebue. Now I don't think it blow so hard no more like it used to, because boats been going back and forth to Kivilina all summer again, never get stuck no where.

STORMS

For the first time anyone can remember, the blizzard last Wednesday [April 17, 2002] was the first one to start from the East [at 30 miles an hour] and continue to the South, then the West [at 35 miles an hour] in one blow. [The storm lasted all day and dropped about .5 inches of precipitation and the switch that occurred from West to East only took about 10 minutes].

The blizzards last longer, they always be about 3 or 4 days and the wind never stop, now maybe 3 days, sometimes 2 days, going down. Long ago it used to storm for 3 or 4 days, maybe one week, sometimes some hunters at Noatak they would be stuck for whole week, but right now it's going real down.

Storms we used to have a lot long ago and seems like last two years, or three years, we hardly had any storms like we used to every October and March, almost the whole month of March and November and we hardly had any storms and you know me and my husband and relatives we would talk about it, you know we would look forward to storms and we don't even see it any more. I mean its good, but it's a change this year.

In the springtime that in the past, that used to be stronger then what it is today, because I remember we used to have big floods and we used to have to go away to higher ground in camp every summer seems like. These last two summers we haven't had to do that. Probably the strength of the wind has been earlier or late, that's why we probably lucked out on that part during the last two summers and the length doesn't last that long, probably two days or three days.

The storms were real intense and we only had one big storm in the summer then. Now its kind of holding back a little, I remember growing up long ago how the storms used to be real, real strong and there used to be big waves and it used to last for about a week. Growing up in camp myself about 12 miles out of town, there was big storms and it hasn't changed that much, but it used to be stronger than what it is today, kind of scary. I just remember at Sisaulik that's about 50 years back growing up little boy, I didn't see no land except those houses that were built over there towards Doc Harris's area, that was the only strip of land that I see at that time. That how far back I can remember the storms used to be kind of strong, very strong, we don't know and can't tell how many miles an hour winds we had at the time, because growing up at that time they didn't tell us anything by radio or CB or VHF we didn't have those, so we had to live day by day on our own instinct and what to do on the weather. That's how my dad and grandpa and

everyone else learn how to be out in the country and that's how we learn, but today it's on the radio on the hour every hour and they warn you.

We don't have winter storms like we used to. Before, it used to blow storm. In the 1960's we went down here to build that high school and sometimes we never have airplane for weeks. Back and forth from work, back towards airport we had house me and my friend when we were building that place, we used to walk, get people, and we used to walk down that way out on the ice and go up by where we work, because when we try to go through the road back here the snowdrifts were so high it would take us twice as long to try and go to work. That's how it used to storm by the weeks long ago, now it just storm by the morning 'til about afternoon and it will stop. Same thing in summer time, we have rough waters for quite a while when we have west wind and south wind, but hardly see any south wind now like I used to, cause we used to have hard time when its south wind right in the mouth of the Noatak, those waves used to plenty high right there where its deep and we used to have hard time trying to go there, because the only way we could go there is right through where it is deep. Now I have been boating back and forth from my camp, and as long as its east wind I don't have any trouble no more, before we used to have trouble with south wind, pretty hard crossing the mouth of the Noatak with south wind, now you can just wait 'til it start getting evening and the wind will die down

NOATAK RIVER

If the water come early it's going to break up early. If we get a lot of snow it always break up early too, the Noatak.

Even in winter time some places always be open in the rivers waters, but that time they mostly use dog team and they always use staff and they always know where the thin ice is, but no more they always go too fast and that's why there always be accidents, just like nobody cares and they always count their trips in minutes.

I think that high water change that river every year, no more bending, they are talking about short cut river right now, they used to be staggered just like zig-zag river, right now going to Noatak they make real shortcut. That's why they say I am going to Noatak 2 hours, now no more 6 hours, no more all day, no more 2-day travel.

Noatak river, it's more shallow, cause you know when we used to go with our boat we can go up the little Noatak river, we used to go way inside. Now we have to be real careful because its getting more and more shallow up there, even out here this way and there will be days it's high water and lot of times not really more shallow, but the water level getting real low.

You know I have been staying up at camp most of the time and before it used to get pretty thick all the way up to October/November you could drive your dogs down river and go to Kotzebue in November, before Thanksgiving, and I have been noticing it every year right by Aggie it never freeze 'til about middle part of November, it always stay open now right where that little current is, even though it freeze. Once me and Morris went down and check it, we hit it with an axe, couple of hits and the axe go right through, and we go further down, and we didn't go more than 8 inches, maybe less, that's how thick it was right there where sandbar is. That's pretty dangerous for November last part. When we used to let our reindeers go across long time ago, dad used to check the ice, it used to be more than 12 inches, and that way we always let the reindeer cross, now we can't even do that.

Now the river level, again I am going to talk about the river level growing up. I grew up, up in Noatak inside and my parents moved down there about when I was about ten years old and I am still here. I grew up my other ten years at Noatak and we used to live at camp and the river levels in those days used to be normal seems like, but then today it tends to erode the ground and start

eating all the ground. The high bank it is so different now today strong, its stronger then what it used to be. It used to be just calm like in those days and the current not that strong and but today when I go up Noatak it is a lot different than it used to be. It's eroding all the weak areas at Noatak. Even the village itself it's being kind of worked on by the village people and they are kind of concerned and worried about it and they start moving up towards where its higher in the, we used to call it the tundra, in the back its all just water and it's not real, it's not real solid ground, it's muddy, muddy like and stuff when I was growing up I remember that and that's where they move all the houses, new housings and things.

Well in my time the Noatak used to be narrow all the way up 'til it start eroding. I notice up in Noatak they move that schoolhouse twice when I was growing up, first I was about fourteen or fifteen I worked as a labor helper when they working trying to move that school house. Next time they were going to move that place I worked for about a month and it eroded maybe about a 100 feet or more, I think it's more 'cause it go out in the bank where that log cabin school house used to be and it go down. We used to have flat ground down there and we used to have lake right close to the beach, now that thing is all gone and where they have housing on the north side those things used to be about a 200 feet, but they are real close to the river now. I think what really happen is like what those old people say, our big Earth is turn a little bit. You can notice it when you go up the Noatak, that main channel used to be on the other side that island in front of Noatak, and that one back right where the village is used to be a slough just deep enough for the boats to go back and forth, and the main channel used to be on the other side of that island it move over. The last 15 years I think, from about 5 miles up, seems like it is just going straight towards Noatak every spring, more and more water going on this way. I think the whole earth is twisting itself because the old people notice that sun start coming up further up too, not like it used to. We had our own inboard/outboard that my dad bought when I was in service with what little money I send him, and I help him with little money when I was in service, and that's how we got that boat. Later a few more people got boats and they never had trouble going in and out hauling freight. They draw about 4 feet of water and they just take a little bit out of that boat they were dragging, now if we had them kind of boats we would have real hard time freighting now, cause all them inboard/outboard motors always have hard time when that river go down, props all over.

KOTZEBUE SOUND

Long ago it seems like the ice during breakup used to go really fast, now it seems like it always go back in and then go back until it melts.

The waves today are larger then they used to be long ago and they will last longer and even if it's calm we will have big breakers out there.

It hasn't changed much too since the time I was growing up and hunting out there with my grandfather, or my dad, or my brothers, only thing is we travel out there now with snow machines and we don't know what the road conditions are.

Right now the sea level is pretty low, when the high water come up it seem like it always used to be higher, right now the sea level is way down. You can see the wave on the beach when you go to Sisaulik, you can see the high wave driftwood, you can see the driftwood are that high [located in the grass at the top of the beach] then lower and lower.

You can tell real easy when you're getting high water. At times it will do that early in the fall after freeze up and you can tell when you move to camp there has been high water. I can remember that about ten years ago it reached my little house towards the wintertime, we had high water some time ago and I can tell it reached my house.

The ocean ice is getting thinner, right now 'til January that late it still always be thin ice, long ago it used to freeze early. By December or January it would be thick and you could go all over, right now it's thin. East wind, when there is too much east wind it never freeze up you got to have southwest, northwest wind fall time, then it's going to freeze up real quick cold weather. That what I kind of understand, now today the ocean it's warmer then it was before today because, a lot of birds, a lot of these pink ones, or whatever they call them, are dying summertime. Even small seal last summer 3, 4, 5 months old they are dying I run into 4 or 5 of them on the beach. I don't know why, maybe too much warm water, no food or too much disease out there.

This particular year, this summer that the interview is being made, we have a contradiction already in that we may have had ice in sight from where we are having the interview done here, ice on the ocean in sight to the very latest date we remember, to have ice in sight at the end of July from Sisaulik is kind of unusual and of course it would indicate not a trend of global warming but just the opposite.

That breakup is earlier now in front out there in the ocean from Sealing Point on, it used to be from Sealing Point over towards Shishmaref that's how far it used to be for long time 'til about May, but now from my camp when I climb up the hill, it start going from about 10 miles out other side those sandbars it open up already first part of May. Out there its already open, it used to be sometime around the first of June when it start opening up around here, but now it's way different than it used to be before.

However looking back in time two or three years before I got around here they had the storm as far as wave size and flood and that kind of thing still seems to be of greater magnitude than anything we have seen since then. Although 6 or 7 years ago we had the highest waves and storms since I have been here, that threw gravel over the strip where the tents and camps are and this was a kind of remarkable one, because some of the holes and house pits that are along this spit that archaeologists have told us are 300 or 400 years old were filled in with gravel.

When we were young, I think I was 17, just before I went in the service, I follow some seal hunters I think it was January or February and that ice was more then 5 feet, just a little bit below me I could see what that west wind blow up on top that's how thick it was. Now if you go out in the ocean, it seems like 4 feet is the thickest now, maybe less, and it always be late real late, you can see it, Kotzebue Sound will be frozen and it will stay open out there in December, November/December. There is lots of open water now than there used to be long time ago, those people, those old people, would go out looking for open lead, go way out in the ocean, now you can go just off the beach and it will be open in December that's how late it is now. Before it used to be plenty safe first part of December, you can travel in the ocean ice, now you have to watch because there is lots of young ice out there

The ocean level change a lot too, by Hanson's with that inboard/outboard we got there used to be a little channel someplace across there and we used to follow that little channel and go across there and we used to follow that little channel and go right over when that water was a little high even like it is right now, but even the outboard motors start having a hard time going over that channel and there is more mudflats out there when its low, low, it seems like you can walk all the way to Sisaulik. The only mudflats I used to notice were those two way out in the mouth of the channel, where all that ice pile up that sand, now there is a sandbar out there. When you see it when its low, low, its about 2 or 3 miles going from the main channel down way out there and seems like you can walk all the way to Sisaulik pretty soon.

Again, growing up long time ago over in that area, we used to stay at camp until it freeze up and sea level falltime used to be real low way out, we could walk about mile when it gets real low

over there, right today there's ocean now, its all just ocean. Come to think of it even myself nobody would believe it we would be beachcombing walking out there where the ocean is now, used to go out about one mile out and we didn't have any four wheelers or anything to cover all the areas and we used to find bones and old stuff and we don't know what to use them on and what they are and we are not worried about them. Today you find a bone out there that's kind of big and you'll sell it and its kind of expensive too. That's how it was when I was growing up about the sea level

EROSION

This coastline is washing off. The water is washing it off making it small.

The beach is getting longer partly because of the erosion, because we have lost 50 or 100 feet of that sod that does make our beach longer.

The sandbars you can tell they're out there because it's different than long ago. Long ago you used to never see no sandbars at all and we never had that much problem with traveling by boat or outboard, but today it seems like its different now, its real shallow in some place and you just have to know where you are going and where you are at.

Before they used to have not much driftwood on the beaches, and the beaches were further out like in Sisaulik even. Right there by Nuvugurak it cuts right between Snyder's camp and the other place, it's almost right to the lake now, that's where those tents used to be long ago. Snyder's camp, and that other camp where we used to stay, that beach used to be quite a ways out, there used to be lots of tents out there, that's where those Noorvik people used to have their tents, now it's hardly any.

I went towards Blossom this summer with 4 wheeler and that place is going down, you know those 2 lighthouses, they move that first lighthouse towards that second one, and that second one drop somewhere, and that place is much shallower way down than it used to be, those big rocks, when its low water on the north end, those big rocks are sticking out more than they used to be. It's much better going around there with snow machine than it used to be, before it used to be right up to the beach, that water.

We're living here where the interview is taking place on the edge of the north shore of Kotzebue sound and we're living where Carrie's folks lived a generation back and some of the fish racks the poles and stuff that are down here, are giving us a very good indication that erosion has eaten away at the edge of the beach down here at a fairly rapid rate, I mean it seems a much more rapid rate than we would have an understanding from her father's generation. We have lost 50 or 100 feet of beach sod on the edge of the beach here during the last thirty or twenty years. The reason that's outstanding is because that the pole that the old man put in the ground is still standing out there and of course it was a regular fish rack with two poles. The lower poles have been gone for some years, but the upper ones are still there standing, but a good deal of the sod is gone from the edge of the beach during our time compared to the last generation.

Again, I learn about those sandbars and the islands. The islands today they are more bigger then they used to be inland, where we used to go out egg hunting. That's long ago, that's then and now today there is more land, or it growing, or just more bigger then what I used to remember that they were small. Today they are big now and that's where we go egg hunting even out here in the bay, about five miles out, it doesn't go away that much anymore, it is always there, no matter even if it's normal now. In those days long ago we used to never have sandbars, nothing, now they're out there so it must be getting more lower. However when we travel by boat it doesn't change the conditions that much, only those sand bars out there, beginning it seems like

to me that they are going out and more higher and you see more land, just seems like, out there every summer.

FIRES/LIGHTNING

They never used to be that much fires.

We hardly had any lightning, once every year or so.

We seem to have more fires in unusual places and I don't know what causes it, probably from the lightning.

Long ago hardly any fires, once in a while you see fire long ago when we were growing up. Up in the headwaters of the Kobuk/Noatak River there's more fires than there used to be long ago.

They never used to be that much fires, but in summertime when there used to be lightning's across the village from Noatak there used to be fires from lightning, but not as much now I guess, it's different.

And again we don't have much lightning in the summer, it will be going by about two or three times in the summer and long ago, long time ago, lightning were kind of rare and different and we didn't have the kind of lightning we have nowadays, they are much bigger and closer and louder and that's what it seems like to me anyway.

Long ago when there was big rain thunder falling down, when there was thunder they make spark and they make fire all over in the village, when the thunder come in you could hear it, that thunder always make noise and then pretty soon it would start raining. Sometimes one month of thunder. That thunder is going down from long ago, slow.

Fires nowadays they don't turn off by themselves, as I remember way back, fires used to start and when they don't start gathering up, or hiring firefighters in those days, just unless it start getting real big and I can't remember anybody hiring firefighters. Today upriver the Kobuk area they will start hiring firefighters, and its all dried up and probably getting on fire.

Today it is more intense than it used to be long ago. The last two or three summers we had lightning and it was very intense and close and I had my grandchildren with me. My wife and I had to find little shelter for them and cover up on the tarp and stay there for about 15-20 minutes and the lightning was real strong and shake the boat a little bit seems like and kind of scary, that's how it is now today real strong than what it used to be before.

Long ago it used to start from lightning to the fires and inland after lightning two or three days later there will be a lot of smoke and we don't know where it's at and you can't tell. Today now there is a lot of traffic in the air and boats and they will know where it's at and they will hire a lot of firefighters. That was then, like what I am trying to say is now they can handle it and seems like there is always more fires.

Long ago hardly any fires. Once in a while you see fire long ago when we were growing up. Up in the headwaters of the Kobuk/Noatak River there's more fires than there used to be long ago. Never be too much lightning now, before we used to have all kinds of lightning as soon as it start raining, but now I think this summer I notice lightning once or twice, at night when it start raining towards the east when we were coming down river that's the only time I notice it this summer. Sometimes you could see those lightning clouds long ago they used to come pretty low, before the rain hit there used to be sparks all over, lucky that time they never get much forest fires around here, one or two little ones here or there, but now as soon you see lightning before that rain you will start hearing about fires someplace inland.

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Today it's more intense than it used to be, we will here and then we will see big lightning coming our way, or passing by through in another direction and hour later or so and we will have real heavy rain, that's how it is today now. We remember how in those days it used to be kind of real interesting to me in the past three summers I have been out hunting or somewhere and I have to go inland somewhere to stay where I think I am more safe. I learn that too from the past, because after the lightning passed it will be real clear and no wind and all that and after it passed it will get real windy all of sudden together and there's no place to be out in the ocean or the water, so its better to be inland after the lightning and that's when the rain really start pouring.

LAND MAMMALS

Long time ago used to have lots of rabbits.

Long time ago there used to be lots of muskrats.

Lynx, even wintertime we used to go hunt across there [behind Sisaulik].

No marten around, once and a while they migrate and you get one.

There used to be lots of rabbits Noorvik way, Noatak way. I think they decline.

In my time they used to go hunt bears in little rivers in little creeks, in fall time, in Noatak they always go down and people used to hunt in nighttime.

There used to be jackrabbits [Alaska hares] long time ago, that mountain over there used to be full of jackrabbits. Jackrabbits running around all over.

There used to be lynx, every ten years or so they migrate and come around. Some places lots of lynx too. Kobuk River mostly is where there used to be lots of lynx.

We never see no caribou's when we were growing up, cause they have to go way out somewhere to get caribou's, we don't have caribou's around here when we were growing up [around Kotzebue].

We never used to have martens way back, like when I was a kid there was no martens they start getting them again. That fire like in Yukon, or close to Fairbanks anyway, they run out of room, I mean food, so they start moving this way.

There was a lot of mice compared to now, it was probably good I guess, they gather their stuff and people take them from them. They dig a hole underneath the ground and put crackers or something in there for the masu they took.

Even wolves they are coming back again, way back you know when I was kid, they used to talk about wolves eating reindeers, killing reindeers, now we got wolves again. Lots of caribou yeah, and we will have not much moose too, pretty soon, if there is so much wolves, wolves are eating them.

Long time ago there was hardly any caribou around, just reindeer, they start losing their reindeer that's what I hear, they start losing their reindeer and that's how these caribou's, half-breed anyway they come this way. Reindeers take them up this way, but caribou's take those to north in spring, like way back same thing like today.

We have, in the time I have been here, a number of things happen on land, moose have come to be a common part of the animals here, in wondering about that and talking to archaeologists that have done a great deal of work around here it does seem that moose are entirely new to this area since about the time that I came on the scene here [during the 1940's].

Marten is another land animal that has moved into our region and more or less common and was not a part here for as long as we can trace back in oral history. Beaver we were surprised to find a beaver lodge on our trail 2 or 3 years ago and as far as we have been able to trace they were not present in this particular section since Pleistocene times.

No caribou nothing, nothing in the country except foxes and mink and stuff like that I guess. There was no caribou in those days [during the 1930's and 40's], even around here [Kotzebue]. The old people used to say that when they get big bull they used to take all the fat off and put it in a pile and they couldn't even lift the pile. Very few around in those days. No caribou until the reindeer, Kivilina, Noatak and Kotzebue get reindeer and lose their reindeer.

Now it's different. You have to look real hard to spot a moose from the hills behind my camp and before you spot a moose you see 3 or 4 bears moving around looking for something to eat, that's how much those bears are now, because there is no more old people. Those old people used to hunt them for food and the fat for their oil for their grubstake in the winter time, mix it with meat, put it in coffee cans, or lard cans, and put it away for when they are going to hunt, they just eat a little bit of that bear feed and walk like a bear all day.

Long ago we never had very much land mammals down here when I was growing up. Now today there is more again and it's like muskrats and beavers and all those that all my grandfather and my dad used to hunt those inland not out here. They started coming down here now I don't know maybe population growing now like sea otters or land otters now they are more out towards ocean side at times there more than what they used to be before like if I go out boating towards Krusenstern now find big, big bones of long ago I don't know how long ago how far back they always be in the hills too up there seems like a whole a whole whale that washed up or whatever some places that near Krusenstern area that's where I always find big bones whale bones

We have gone over a period of more then twenty years with rabbits being absent and we expected them back after a ten year disappearance but it extended almost twice that long. They are beginning to come back to the area, but we were beginning to worry about that as far as environmental contamination is concerned, because rabbits of course depend on willows and if there were something in willow bark was poisonous to them or something, like radioactivity in lichens that kind of thing they would act as a kind of canary an indicator that something was wrong in the environment. We have no proof of anything like that but everybody agrees that it is pretty unusual for rabbits to be not present. These are varying hares snowshoe hares that are supposed to be present in white spruce/willow habitat around the state but they have been absent in our area for twenty years.

Long ago, those trappers they used to go way up almost headwaters of Noatak and they say that there is moose up there but they never used to come this far. Around the 50's they have fire over on the Yukon I think that's what scare them over. There never used to be moose over by the hatchery and Kilikmak, nothing. There used to be quite a bit even this spring we see them over by our camp eating willows. During spring I used to see them having one or two calves, and this

spring I see only one cow moose with calf that was by the mouth of Noatak that is the only one, further up all those females have no young ones, because of bears and wolves. They used to hunt bears every fall for food, because those caribou were scarce and they had to go back beyond the hills to get caribou. On top of that poor old caribou only have one calf and that bear have two or three right behind it every spring, and there is more bears, and they are more dangerous this fall all over up the Noatak, every bend they are watching you.

Every spring when we go camping in April, our dad used to take us to muskrat camp, and he always take off to reindeer camp, and we used to hunt muskrat at that time food pretty scarce, hardly any caribou's maybe he give us one piece of reindeer meat and few little pieces of caribou meat, and we got lots of fish, but ptarmigan were lots at that time on the flats. We used to hunt ptarmigans early morning and get all we want, plus along the river you see lots of rabbits and hardly any foxes, now there is lots of foxes so many foxes, poor rabbit last fall they got few tracks around my camp and then they disappear because them foxes I think they got them before they had chance to grow. Before, them old people, and people all over the NANA region, foxes is what they depend on and hardly any lynx used to be, but later I find that those lynx follow their food, them rabbits, and when they go, they (lynx) go. Never used to be any foxes running around, because the first fox that make track around here, somebody start 2 or 3 o'clock in the morning somebody start chasing them, walking after them, tough, tough peoples. Mink and otter are the worst animals of muskrat and now there are so many otters in the river even up in Noatak they (the people) have to look for trout in the wintertime, those fish they hide where there is more ice. Long ago those people used to put traps for those otters, that's how they used to get them, now nobody hardly hurt them, and this spring when we move to camp, me and my grandson we were in the flats looking for a good place to hunt geese if they come, the only thing we see is otter tracks looking for muskrats, and when they find them they just tear up their holes, every one we come to they just tear them up, and go down probably eat, because there is little blood stain around them. My grandson see one muskrat I never see any when even we go around when it get wet, we start going around and see muskrat homes on the lake all torn up by otter.

There used to not enough moose long ago in Noatak you know where we were raised, but in a great while when we saw a big track we would say what are these big tracks, they said they are tiniikaq, moose, they never show up all the time the Indians they always tell them that there are a lot of them in the Indian area and then right now there are a lot of moose coming from when the fire start burns they come this way and the moose start coming over. They start showing up after the ground burn up. Caribou used to be long ways long ago, right now they are all mixed up Caribou and reindeers together even though they are long ways caribou always go back and bring those reindeers, caribous coming back. Yeah they really changed the way those caribous are, half-breed reindeers and caribous. They used to hunt those caribous up by Wainwright where it is flat and cold, that's where they used to hunt long ago. Dick Norton tell us one time they go caribou hunting and trapline hunting they said it was too cold they had five gallons of blazo it can't even go down real slow, cold, they said even when its windy they always have storm for three or four days sometimes one week its windy, but right now it can't be storm. They said long ago they used to hunt caribou and traplining up there, but right now they hunt little ways. Just like they go Hanson's store or Rotman store, when they're hunting they come right away. Long ago they used to have a lot of wolves and wolverines around. They would trap them trapline and some of them when they hunt caribou they would shoot them, 'cause they never be scared long ago it was just dog teams and shot them when they were going, they can't run away. Right now there is lot of snowmachine and airplane and they chase them around, running around, and run away. They said they used to have a lot of lynx in Noatak flats up there up the Noatak river, they said there used to be a lot of lynx up there, rabbits up there, but now they all disappear, just depends on the rabbits. Long ago they used to try to hunt grizzly bear, but right now they quit hunting, they start going to their beach and eating seal and right now the meat start tasting funny

and they don't care for the fat anymore. Long ago they used to hunt bears grizzly bears for bacon or good meat. In the fall they used to have bacon right now the meat is changing, they eating seals on the beach.

Several of those animals, moose and possibly marten because of their prey and stuff will extend their range if there were a steady trend of warming, a few degrees warming in temperature because of the way that would promote willow growth. When we noticed that some time back we got a hold of some people that were active here hunting foxes in the twenty or thirties, and in the process of hunting foxes by snowshoes, that's not trapping, but hunting, its needful for the hunter to know every little willow patch that there is, because there is a connection between willow patch and tracking foxes that's necessary for the hunter to be successful. In talking to, interviewing some of those old timers, they agree, wholeheartedly agree that there is a lot more willows now then there were in the thirties a lot. Of course moose live on willows and its necessary for them to have willows for food, which would be an indication of why they moved in and became common where they were not here ever before. It could probably be traced the same reason for marten and beaver, this increased willow growth that probably could be traced to temperature would be to me real proof of global warming of any we could come up with. The same would be true for the sea, we live by fishing and hunting marine mammals and stuff in the sea, but there seems to be an increase here in king salmon that were never here at least in the numbers that they are now, at least there has been a building trend in their population here in the last twenty years, and king crabs, both of those species were really scarce in the past, but it seems to follow in a logical manner that a few degree temperature in ocean temperatures here would allow those species that are common just south of the Bering Straits here to extend their range up into this area. This is my personal testimony that pretty much assures me that global warming and probably caused by human effect pollution or whatever in the atmosphere, but its fairly good proof to me as an individual that that situation is indeed true and there is that trend, simply on the basis of these several living creatures that would benefit and move into an area because a few degrees warming in temperature.

MARINE MAMMALS

Killer whales, I don't know I've never seen one, some people say they always see them around Sisaulik sometimes, way out, along time ago.

There's not much belugas nowadays, I don't know why maybe in other place they start killing them or they start making new trails for coming south.

It used to be a lot of seals too, in fall time. Yeah lot of belugas too long time ago, we used to go hunt belugas across there, used to stay in Nuvurak all the time, we had a lot of beluga.

There used to be lots of beluga long ago. When I was staying at little Noatak when I was 6 or 7 years old lots of beluga always come in right along the ice, when the ice was going out right along the shallow water. Every summer they used to come in little ways, right when they get to Arctic Lighterage that deep place right there they go right along the beach, nobody bother them. That was before they had boats inboards, lots of beluga coming in. I think those nets spoil them (when they stop coming). Lots of beluga over there [Elephant Point]. I guess they quit coming in when they got so many belugas that one summer. They just let them float out there, they just take the maktak off, they quit going to Elephant Point. First thing everybody from Kobuk, Selawik, Buckland and all the Noatak and Kivilina they used to hunt Beluga every spring and put away quite a bit, I notice one summer when I was growing up they got ten, ten belugas and that's plenty. Some of them used to get more, them people that have more dog feed, and they save everything bone and all. They always before, when they had dog teams, they usually save everything, dry them up and the guts dry them up for the wintertime. Now pretty scarce to see

Beluga even, I don't think I see one this summer, but they see quite a few over in Sisaulik but they never give them a chance to go in. They try to start right away and they just turn just like caribou. They go along different route those old people used to say just let the first ones go in, but they never no more.

I think the belugas go same places, but this spring first time they tell me about no belugas first time they get no belugas too much high water up there and to much high water, the belugas never even show up they disappear somewhere. They travel somewhere. Long ago they tell us not to argue about belugas they said we got to many belugas, we sure pile up belugas. They tell us not to talk about it, belugas always hear from long ways and they always disappear. Same thing like Buckland, when Kotzebue people start going to Buckland, they start arguing about Kotzebue they tell them not go in or hunting, after that after two or three years later, beluga's can't go in Buckland, inside Buckland area no more. If they never argue about beluga's there, we still go in I guess inside Buckland Bay. Same thing when Buckland people come around here long ago, we never argue each other, we hunt together. Even though when we chase belugas on the sand bar over here in the front and they hear shoot and they go out and hunt, there be belugas and we never argue about it. When the jet plane start coming out they start going smaller, and smaller, and smaller, and boat people want to get first beluga, they disappear and go someplace now, to a quiet place.

Marine mammals today there used to be lots out here like beluga and seals we used to get beluga, we used to herd beluga. I used to follow my cousins out there and hunt belugas or wait for belugas to come in, we would be waiting for them to come in. That's long ago you are talking about, 50 or 60 years ago, someplace in that area, 45 or 50 years ago, we would wait out there just like where our boats where it's deep, deep about a mile or so, then the beluga start coming and we see them spouting out to the west. Finally they would reach you and everybody's quiet not doing nothing, just sitting down in the boat and looking at each other's and not moving. That's what the old people used tell us: don't talk, do not move, do not do nothing, just see and watch. Now today you do not see that. You see a big jet flying over you 3-4 jets landing in town. There's traffic that never stop going back and forth and they are gone today, all those beluga. There's just once in a while very few that comes in and in those days we used to herd them in where its real shallow to about a foot to two feet of water then we will slaughter them if the guy says go ahead and start killing or start shooting that's when we open up and start shooting at them. If I remember right me and my cousin, I was a teenager maybe both of us were teenagers, one time we got nine, can you imagine that nine belugas, all big white ones. We start our 16 horsepower boat we couldn't move, so somebody with a bigger motor and the biggest motor at that time was a 22 horse and they dragged us inland that was the biggest haul that I seen at that time and we wait for belugas and we slaughter them. That's the marine mammals. In fall time there used to be, even spring time I remember my dog sled moving to camp again long ago growing up they used to be out here right on the sand bar and further out seals out on the ice spring time. Today that's about I don't know how far back again there's nothing not even one 'til breakup time that's what changes probably all jet craft, a lot of traffic today.

WATERFOWL

They say there used to be lot of brants long ago going by in the springtime.

There used to be a lot of ducks and geese springtime early, I don't know right now it must too much cold weather springtime now, they hardly come around early. When the weather is kind of warm they come early, but right now they start coming late.

We have gotten certain species of waterfowl that are common here now that don't have an Eskimo name. I mean that's an indication, all the old time Eskimos named different species and

when you begin to see a species every year that doesn't have an Eskimo name why it means its new on the scene. Canvasbacks fall in that category, possibly some lesser scaup, that's a couple of examples in the bird line.

Springtime and fall time there used to be a lot of ducks lot of ducks today to now fall time. It seems like long ago about 30-40 years ago there used to be all kinds of ducks and some today I don't see anymore those disappeared too. We probably don't even know what they are what the names are I can't see any more of those what I used to see growing up. They have more the government or the game warden they have more of those out there in the Park Service and all that it never work though, it didn't slow down things. That what it looks like to me anyway. They try to control and handle the animals in our country here where we grew up and we know where they are, what they are doing, how much they are. We don't count them, we don't keep track of them. We don't waste either, we wait for a time when we need caribou, ducks or fish, we will go out there and get it, we will hang it up, we don't throw it away. To me that was our farm long ago seems like and I used to think that long ago things were free for us and how we used to have no problems with the Park Service, the fed's, but today they will say no you can't do that you have to go buy a card and today that's different now we have to count and say how much we get, how much ducks we get and how much fish we get and all that at times they will send me a questionnaire to fill out I think to myself, because I am from long ago I am from way long ago before the snow machines are here. We never ask the feds or the white people how much chicken or pigs or whatever you have in your barn did you kill we never ask them. Because we didn't know about them, they come here to ask for a job they didn't know too and they start asking us so I refuse to fill some of them out but I never break no laws we get what we want just like hunting ugruks and all that everything. There's a lot of different now today there is Park Service all over the country in the summer time, seems like you feel to me anyway you are hunting but you are hiding the same time. No it shouldn't be that way. So that's what I learn about the difference between subsistence and hunting now and then.

LAND BIRDS

Long ago there was lots of everything, birds all kinds of birds.

Lots of ptarmigans, not many now, it used to have lots of ptarmigans even.

We're missing some land birds right here in Sisaulik and that's the current mystery and its been growing for the past ten years, with each year and this summer we did just again when your folks were over here last night we checked to see if they had any Lapland longspurs down in their camp over here and they said they had a few males. But this is a very common bird, I mean a very well liked bird because it lives right around camps and everybody likes to see it in the spring time in their display flights and that and I don't think anybody has seen one on Sisaulik spit this year and maybe last year. And the trends they just seem to be getting fewer and fewer and we don't know why.

FISH

Used to be a lot of tomcod out in front here, seems like there is less now.

Its pretty well known in Sisaulik that in the past there were very few sheefish taken along here in the springtime in the ocean proper, now they have gotten thicker and thicker and we don't know the reason for that either. They're medium size to small sheefish, but everybody has noticed that change, which of course might have to do with silting up of the delta up here. In earlier years they were always known to be in back of the lagoon all summer, but down in the main saltwater they were not near as plentiful in that locality as they are now. There is some threat involved

with that, because now those sheefish that were firm and fat while the water was muddy here when it was fresh, now a lot of them are working there way back this way and some of them are just backbones they can hardly swim, they have lost all their weight, even their muscle and we noticed that in the last five years, it's all pretty new, that's a fact.

TUNDRA

The berries depend on the weather.

It seems like there is hardly any masu now.

Probably less stinkweed now than long ago.

Very few (sourdock), you have to, just like for the salmonberries you got to go different places to look for them.

Only few houses in Kotzebue long time ago. We used to pick black berries around here and a lot of ptarmigan around.

When we go to Noatak we used to get a lot of masu. In fall time they always try to get masu. My sister always boil them up with sugar.

Every summer we're getting more and more of these what you call them, cotton and it's getting real thick and I don't know why. Everything is just about the same except more cotton and every other year we will get good berries lots of berries and years later we will get less berries and we are really losing a lot. Were really losing a lot of those salmon berries and you have to go more and more further to go look for salmon berries.

BEACH FLOTSAM

Driftwood, sometimes there is lots, and sometimes there will be hardly any.

I see a lot more trash that are washed up, even more seals and ugruks and whales. We are seeing more trash out there.

Long ago up in Noorvik where I grew up, springtime ice used to come up from Kobuk all the way up from Kobuk River and there used to be lots of trees. Seems like the last few years wood don't come down the river this way they start going down through the other side, Riley Channel.

We went several years without any blue mussels here and we noticed that particularly here because when Carrie was a girl and adult to farther on down the line, in the fall time you run along the beach after a storm picking them up and go home and put them on the stove and for about four or five years in a row, there just weren't any available after a storm. That observation could just be an observation between clam and mussel predators, you know one population increases and another decreases and that quite possibly is a naturally occurring cycle.

INSECTS

Long ago we used have lots of flies, but not much no more around here. Lot of mosquitoes long ago up the river.

When I used to go up to camp there was hardly any of those, what they call them, horseflies, there was hardly any when I first used to go up there. Nowadays there are more and more.

ANIMAL DISEASE

Long ago we used to never have any problems with, I don't know how would you say it, like if you open up a fish nowadays we're finding things like a different color, even with a seal and my husband went hunting not too long ago last year at the other spring and that urgruk he got was a different color and even in the fish and I met a friend of mine last week and she was talking about they were ice fishing outside of Art Field's and she noticed that the flounders and tomcods had some types of lumps in them and they were afraid to eat it and you could really see the difference in the animals and the fish, some are good and a lot of it you can't hardly see if they have, I don't know how to say just deformed, like just different.

In December I was working for the Department of Fish and Game, I was traveling and I noticed in the office that somebody wrote a letter to the Department of Fish and Game that when they were fishing last summer for salmon, they opened them up and they were starting to cut them and they made a real good explanation that there were worms in there, in the salmon. That was really odd so they decided to call the Fish and Game and I don't know what, seems like every time we interview somebody about fish they will always say that the fish was different than before and there was some kind of lumps in there more like worms.

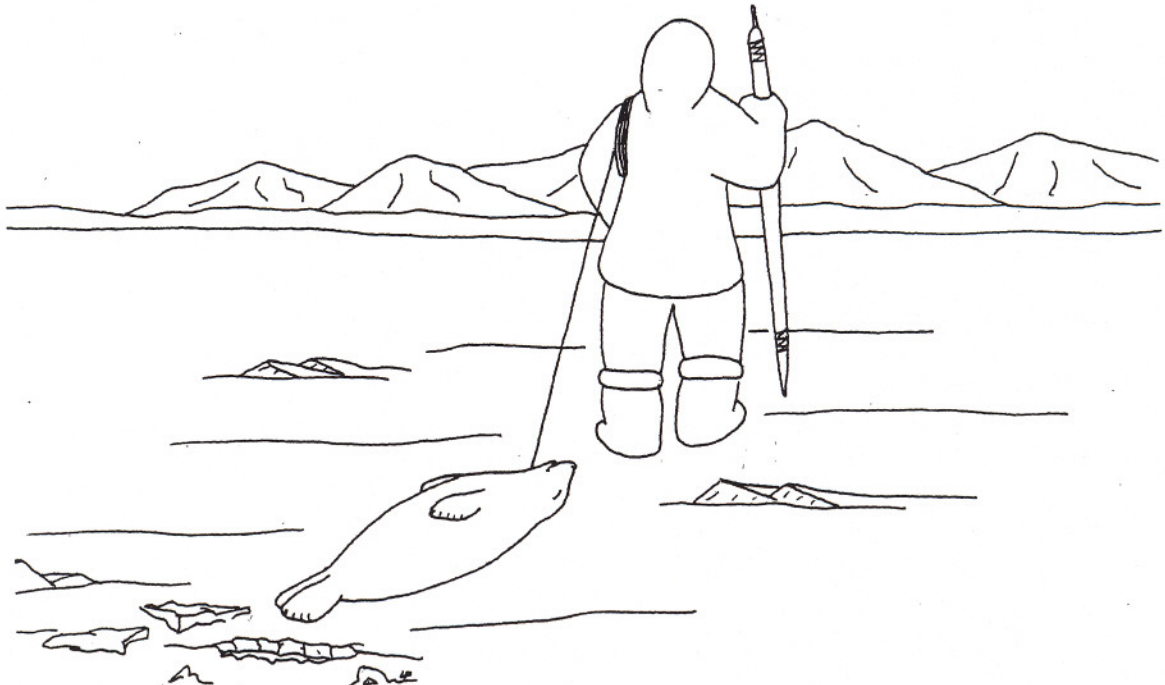
A couple years ago a friend of mine gave me a caribou what he caught across there from Sisaulik, it was really fat and skinned. I was so proud of it he gave me hindquarter. I start cutting it up for fry meat, when I start cutting it up there was a lot of bug's inside that caribou, arri I sure hate to throw it away. I wouldn't even give it to my dogs, I had a lot of dogs, I just throw it out in the ocean. Inside you know there's those little bug's they're just like water and inside there is little black ones, the whole hindquarters was like that, inside the meat. Inside the meat there's little bugs just like water and inside the water there's those little black things all over inside the meat, the whole hindquarter was like that. Even the fish nowadays seems like they got sores on them when you fish, especially up Kobuk River and around here mostly, sometimes salmon just like they got sores on them, even up in Noorvik, might be too much chemical in the water, you never know.

GRAPHS

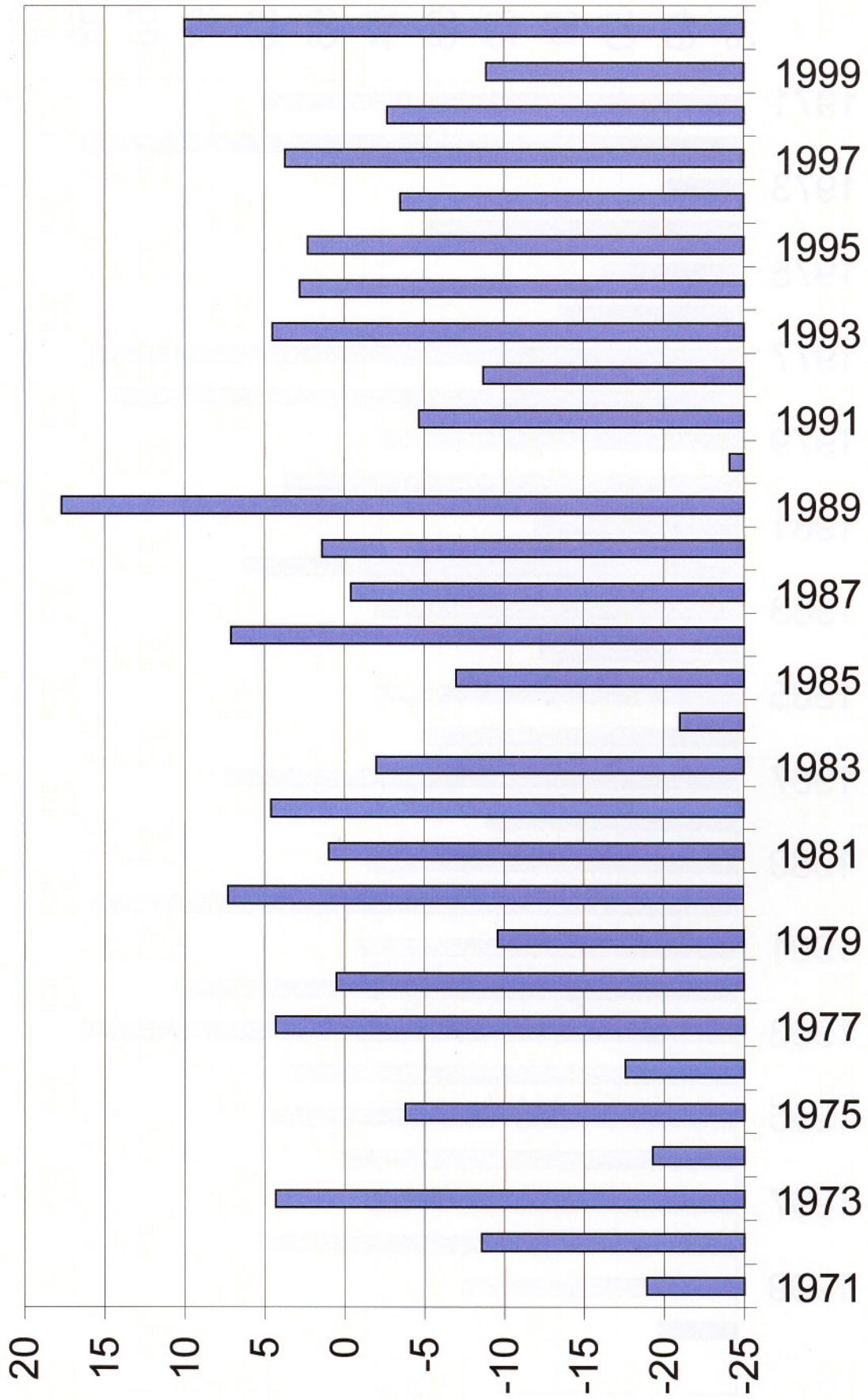
Since this document is intended to record present knowledge of the environment, not only for historic purposes, but so that it may provide a valuable base for future comparisons of climate change and related phenomena, these graphs are included as they complement this effort and should also provide a data base that can easily be revised and updated from time to time well in to the future.

The weather related graphs are based on information taken from the document titled 2000 Local Climatological Data – Annual Summary with Comparative Data – Kotzebue, Alaska (OTZ), an official publication of the National Oceanic and Atmospheric Administration, compiled from records on file at the National Climatic Data Center. All weather data is for Kotzebue and the vicinity as defined by the National Weather Service.

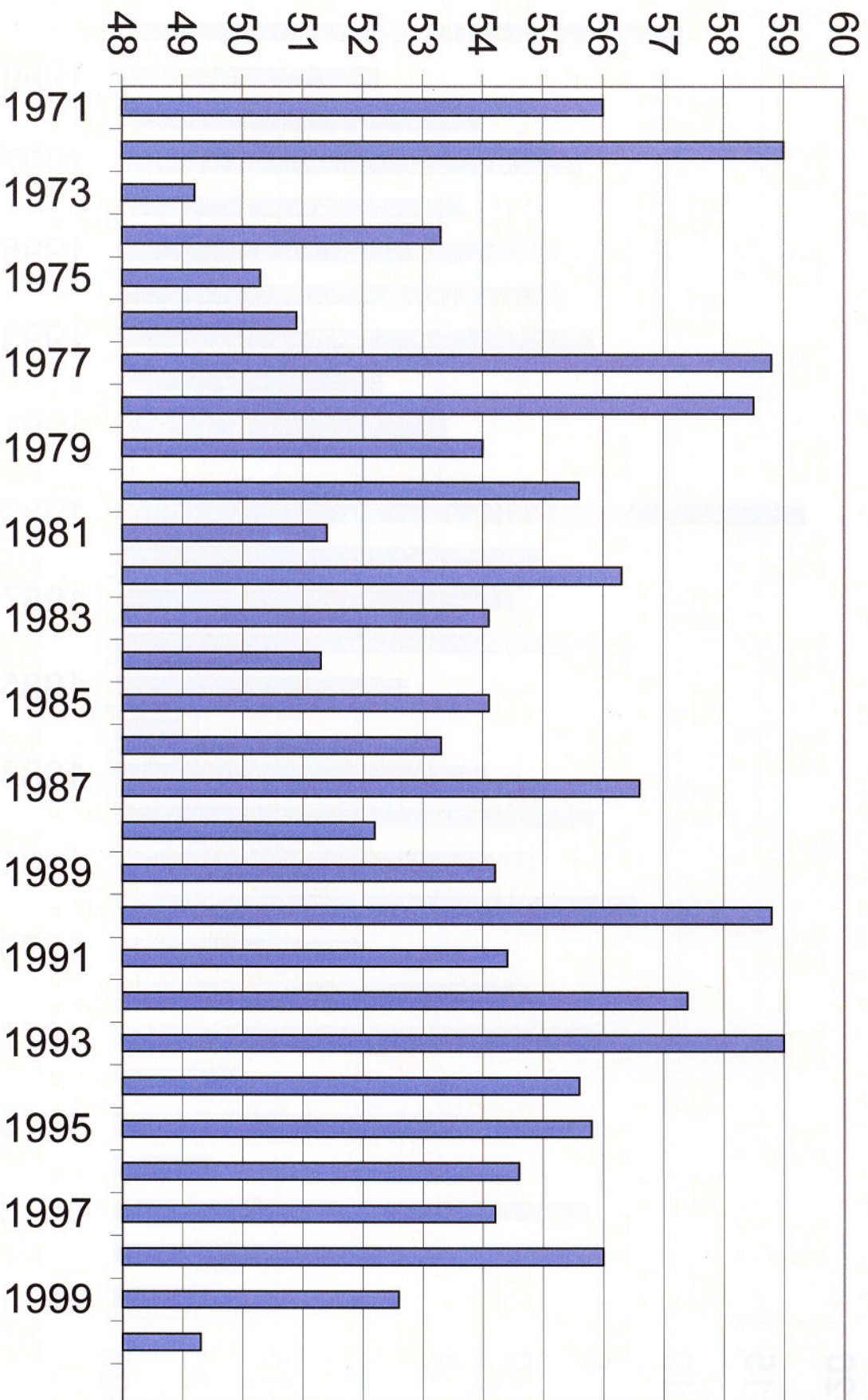
The wildlife population graphs are produced from information provided by the Kotzebue office of the Alaska Department of Fish and Game (ADF&G). The sheep numbers come from annually flying most sheep habitat in the Baird Mountains with a fixed wing aircraft and making visual counts of all sheep present. The caribou counts are done every 3 years by the ADF&G using large format photographs to census the Western Arctic Herd. While these may not provide exact population numbers they do represent as accurately as possible major trends in the populations of both species.



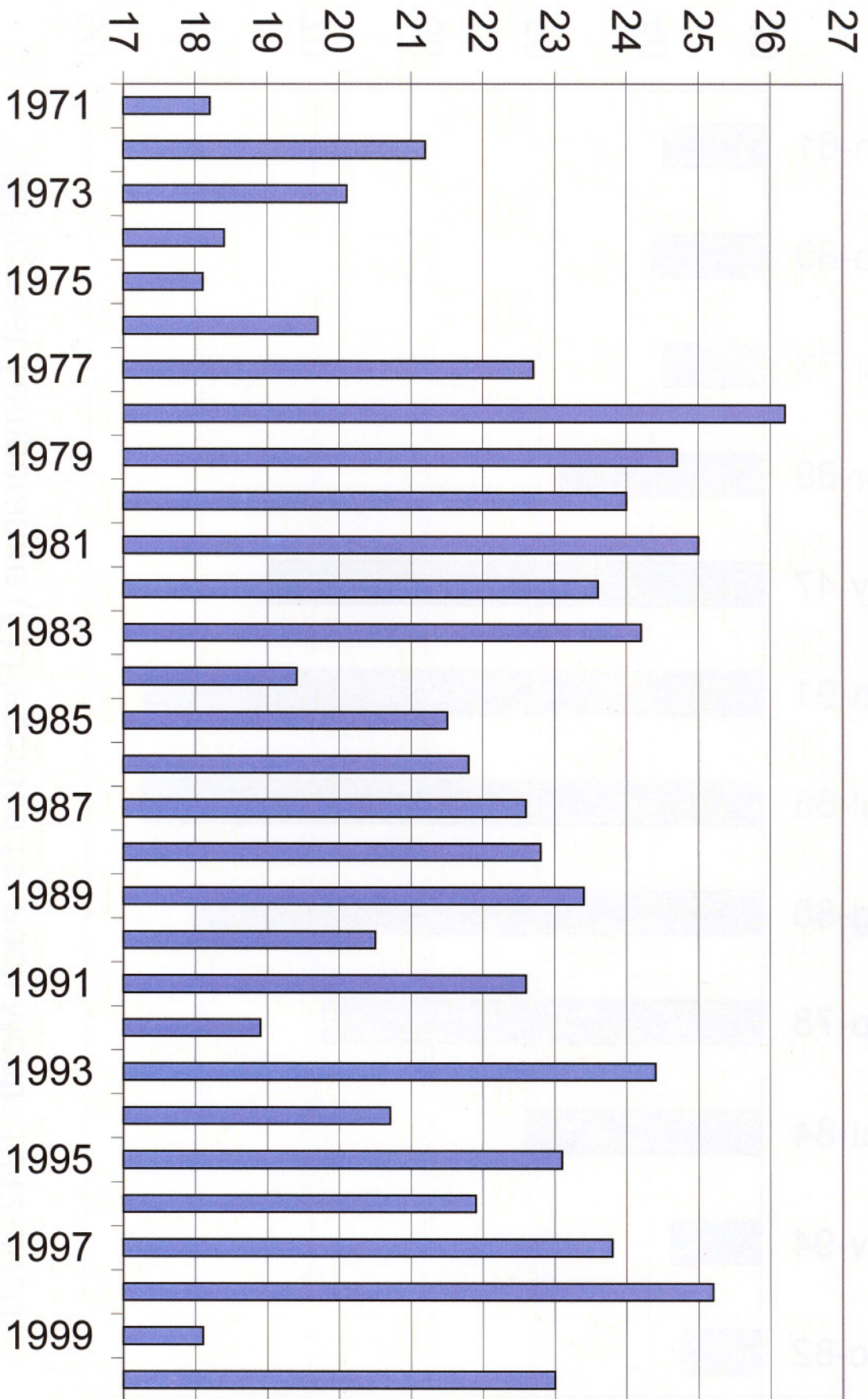
■ Average Temperature (F) for the Month of February 1971-2000

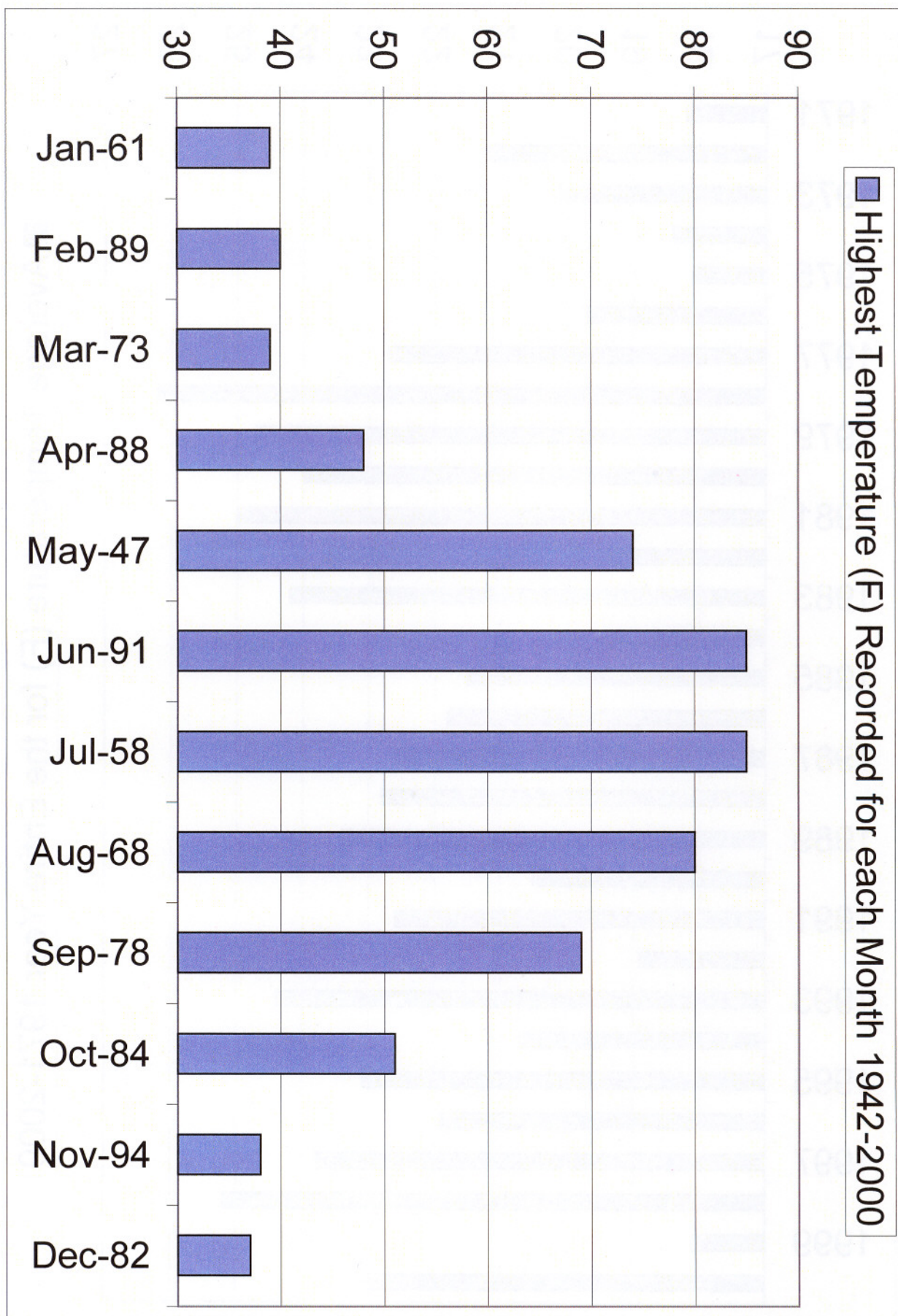


■ Average Temperature (F) for the Month of August 1971-2000

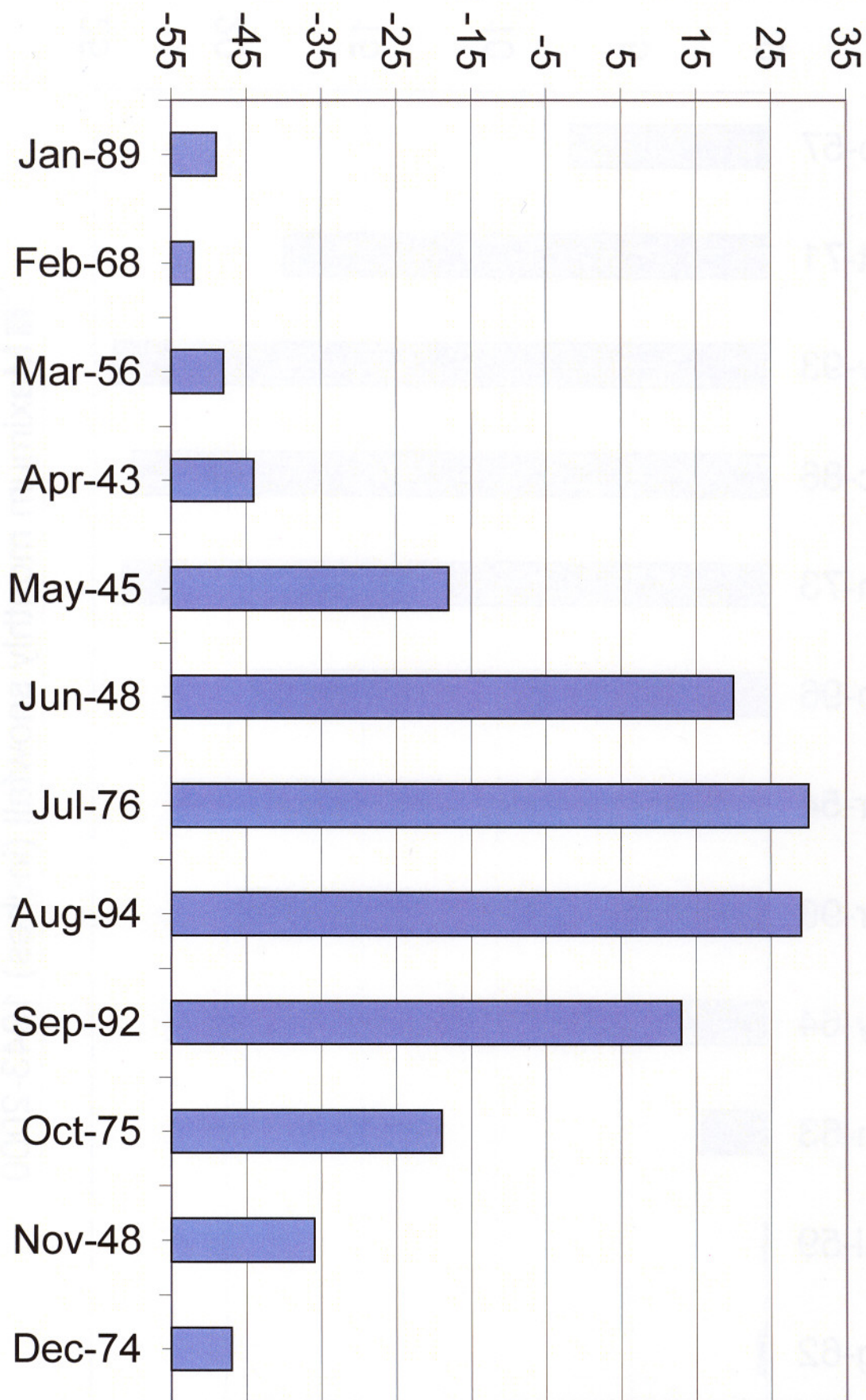


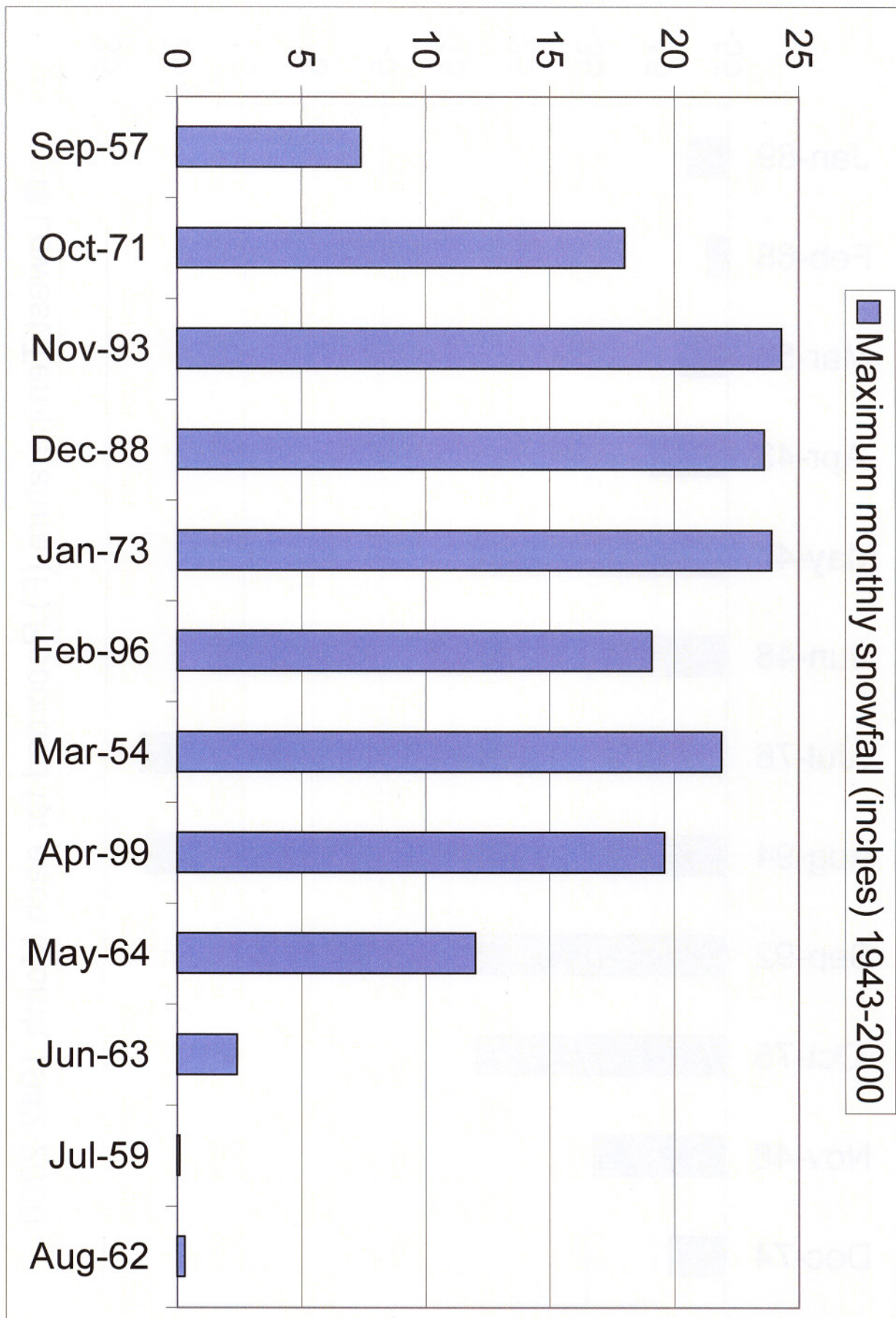
■ Average Temperature (F) for the Entire Year 1971-2000



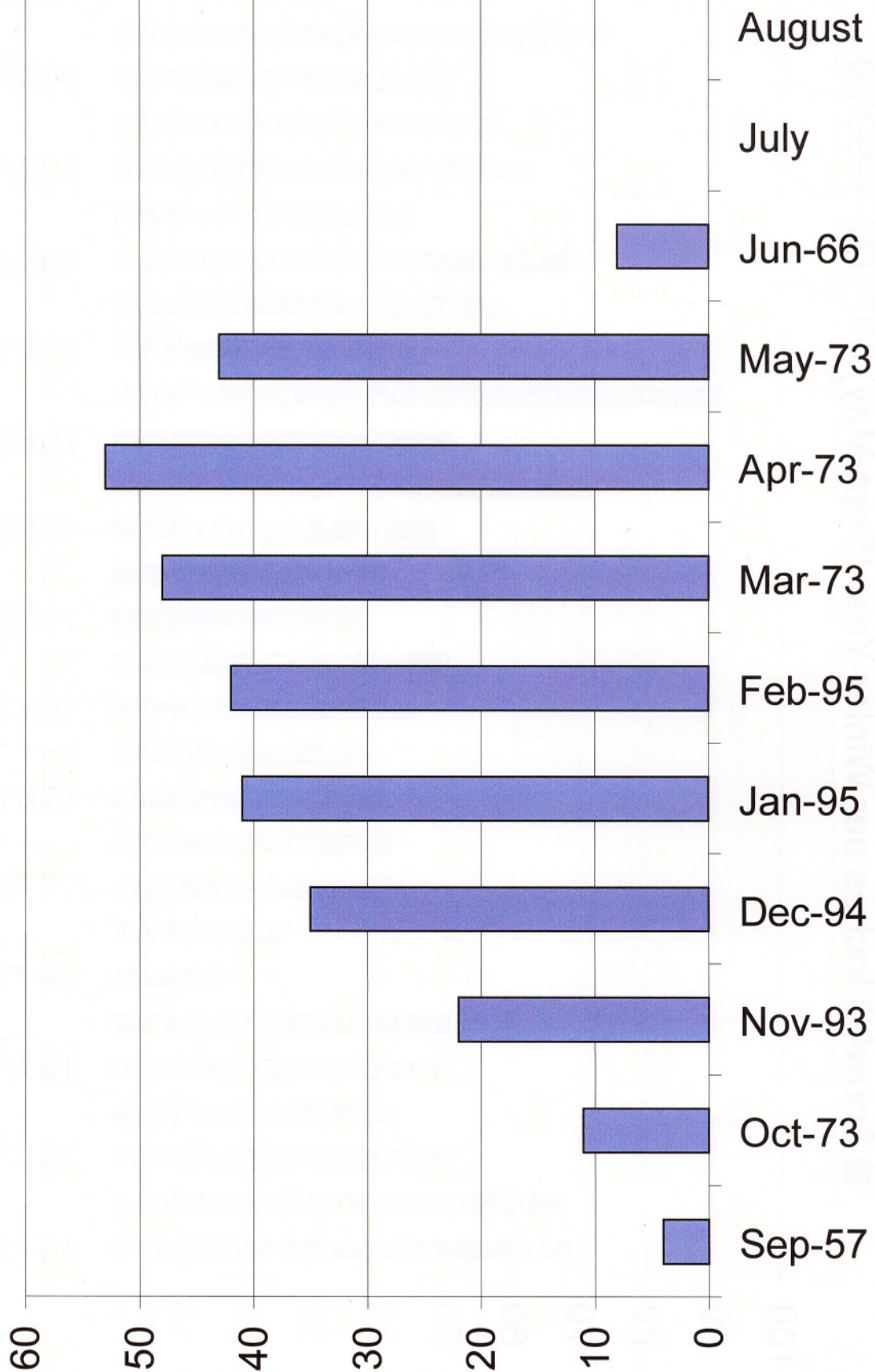


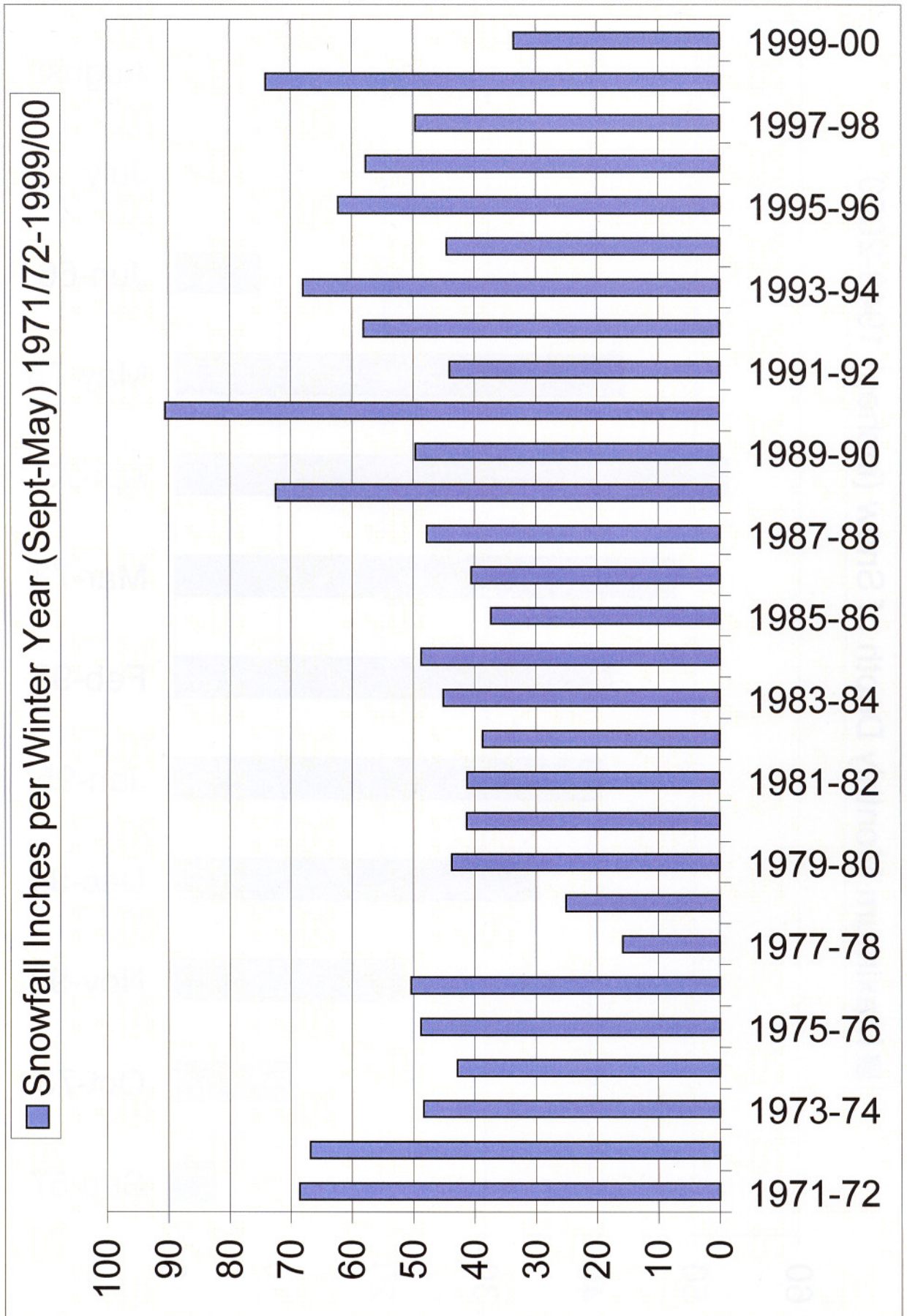
■ Lowest Temperature (F) Recorded for each Month 1942-2000



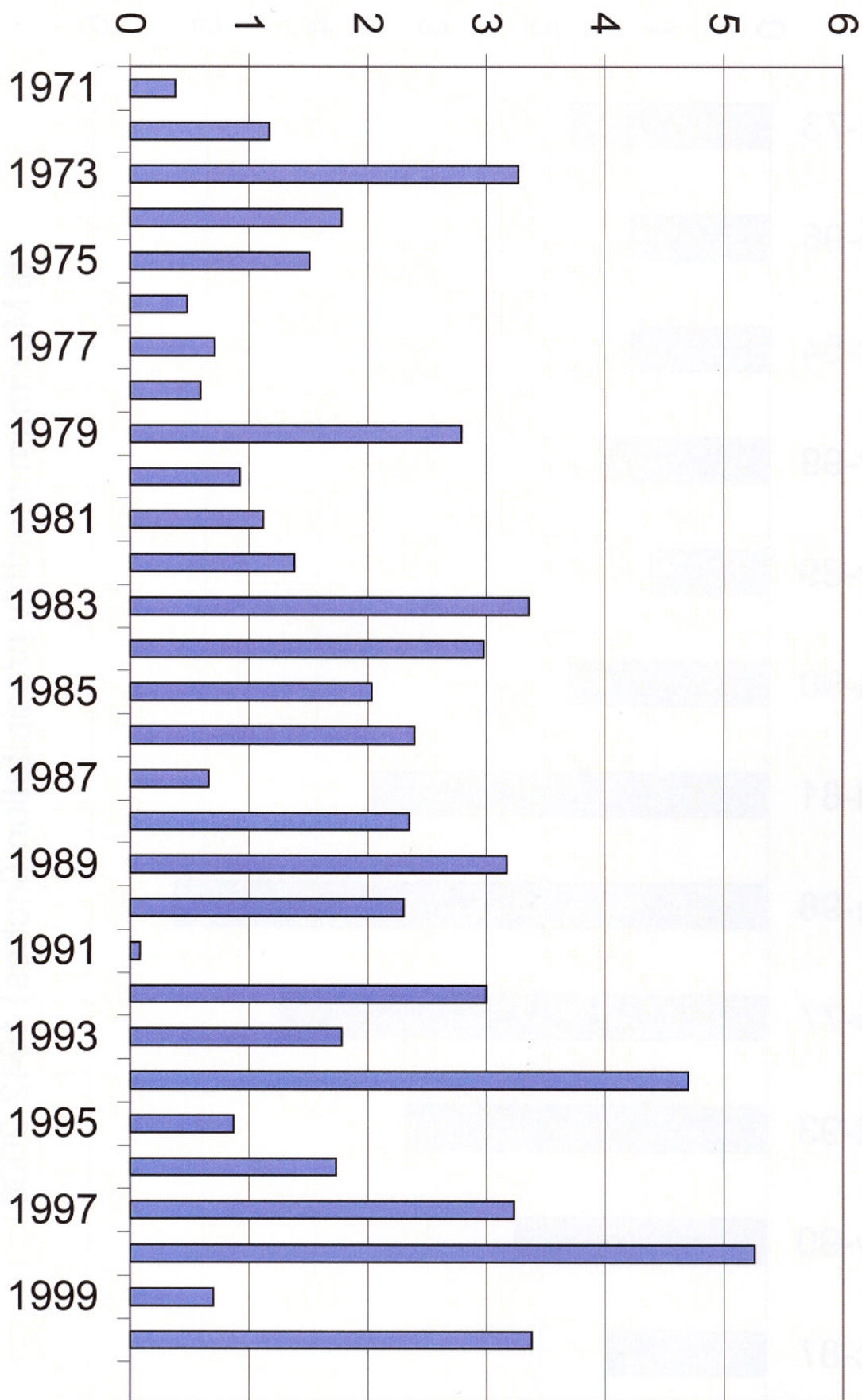


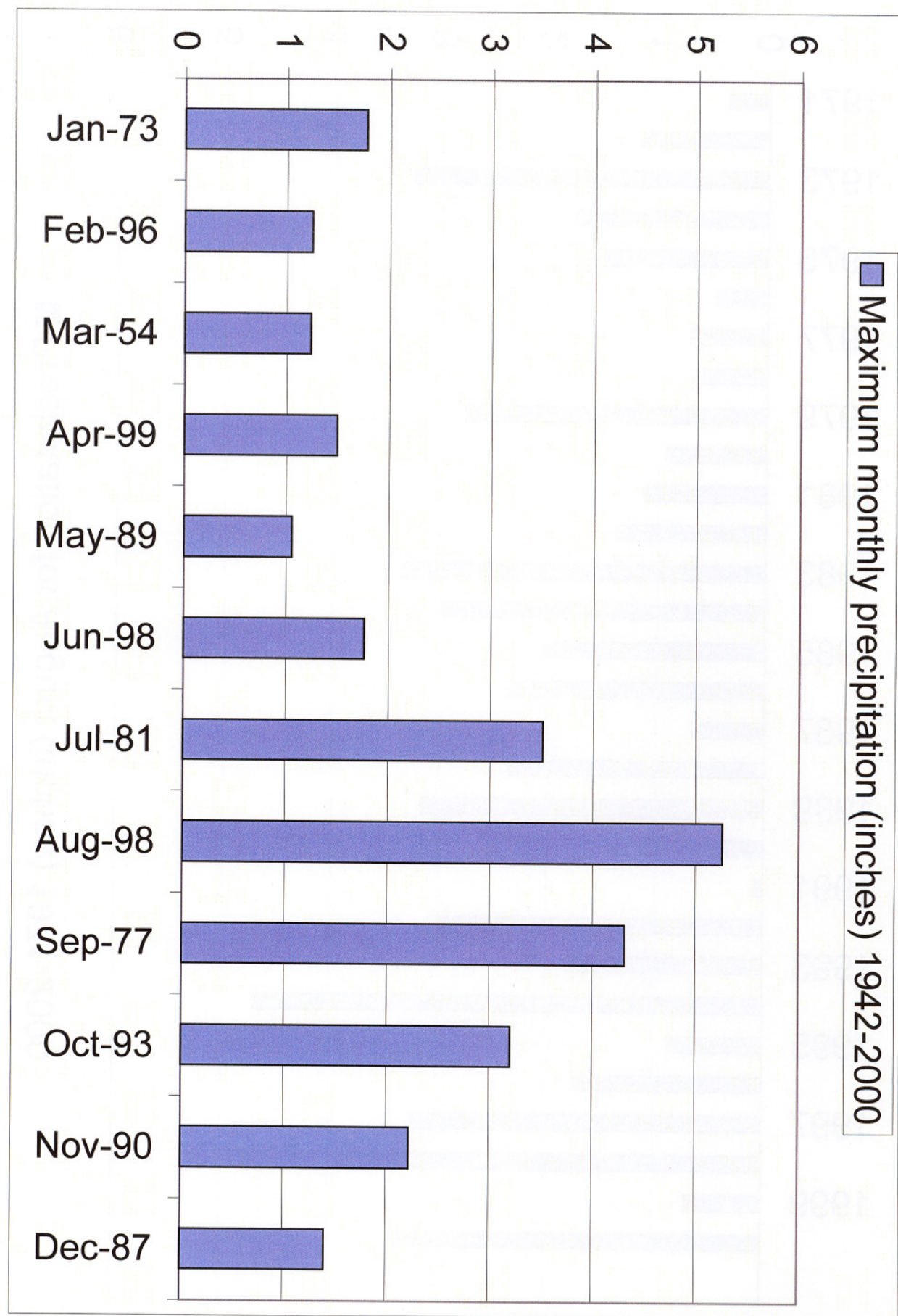
■ Maximum Monthly Depth of Snow (inches) 1949-2000



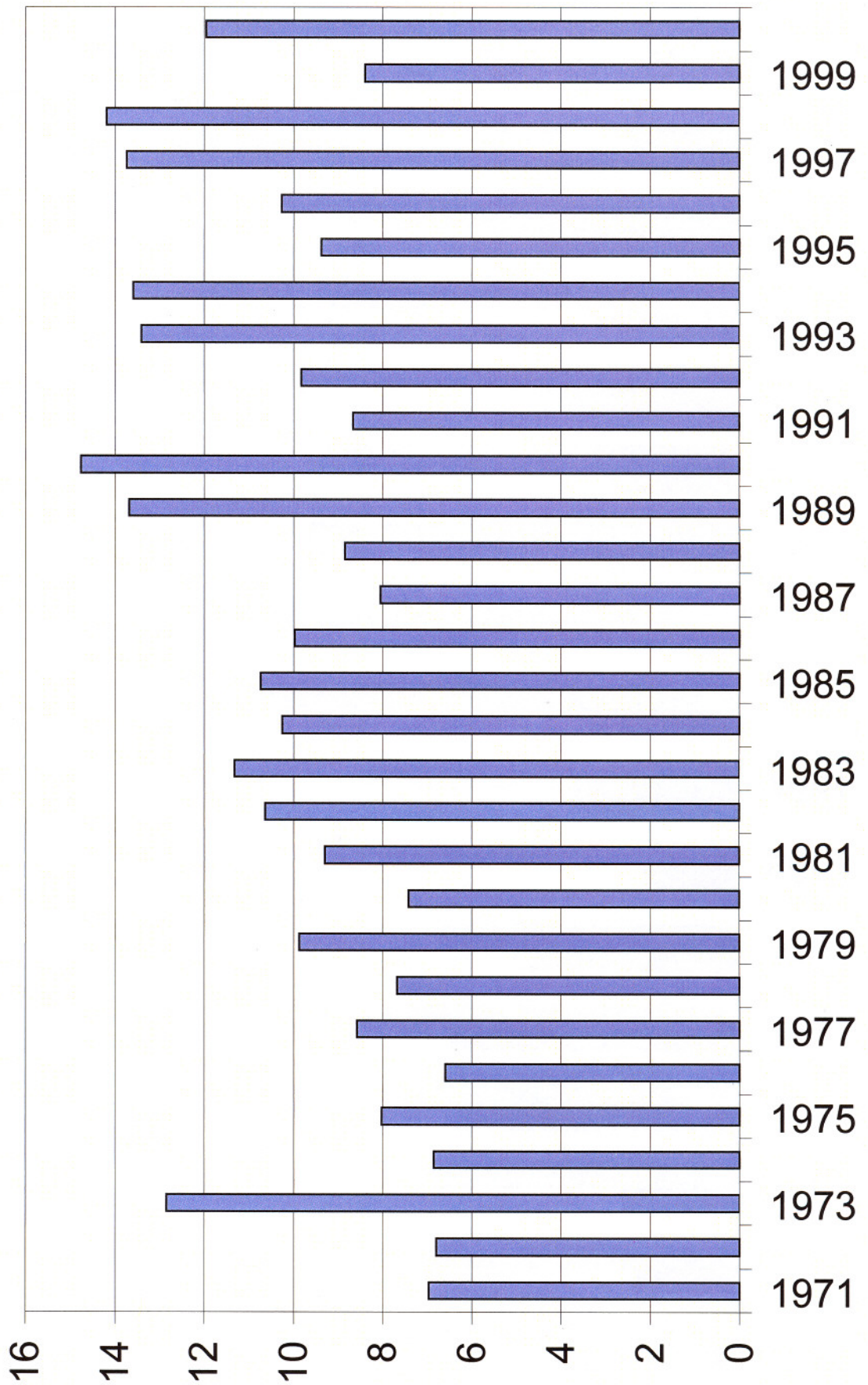


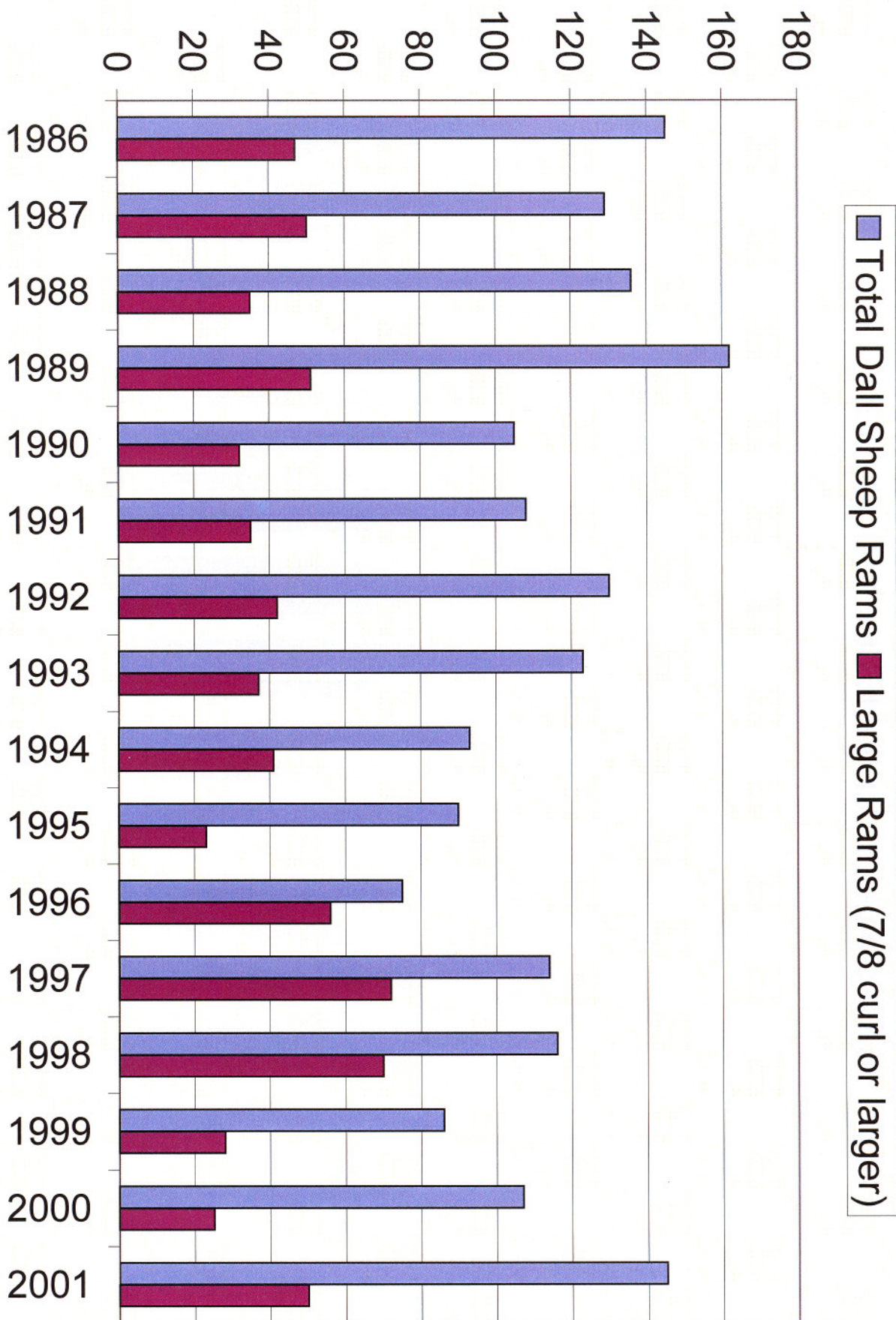
■ Precipitation for August (Inches) 1971-2000

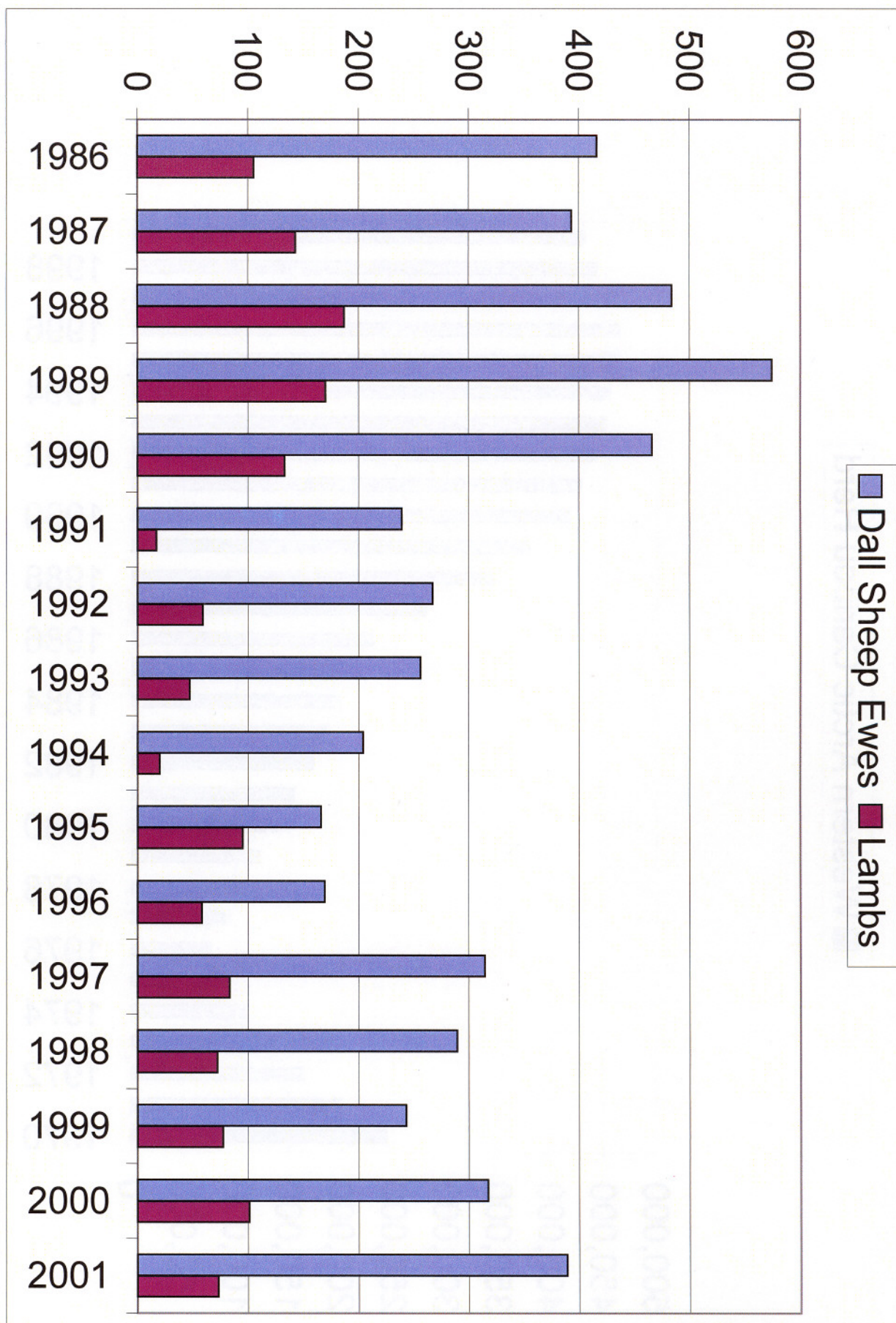




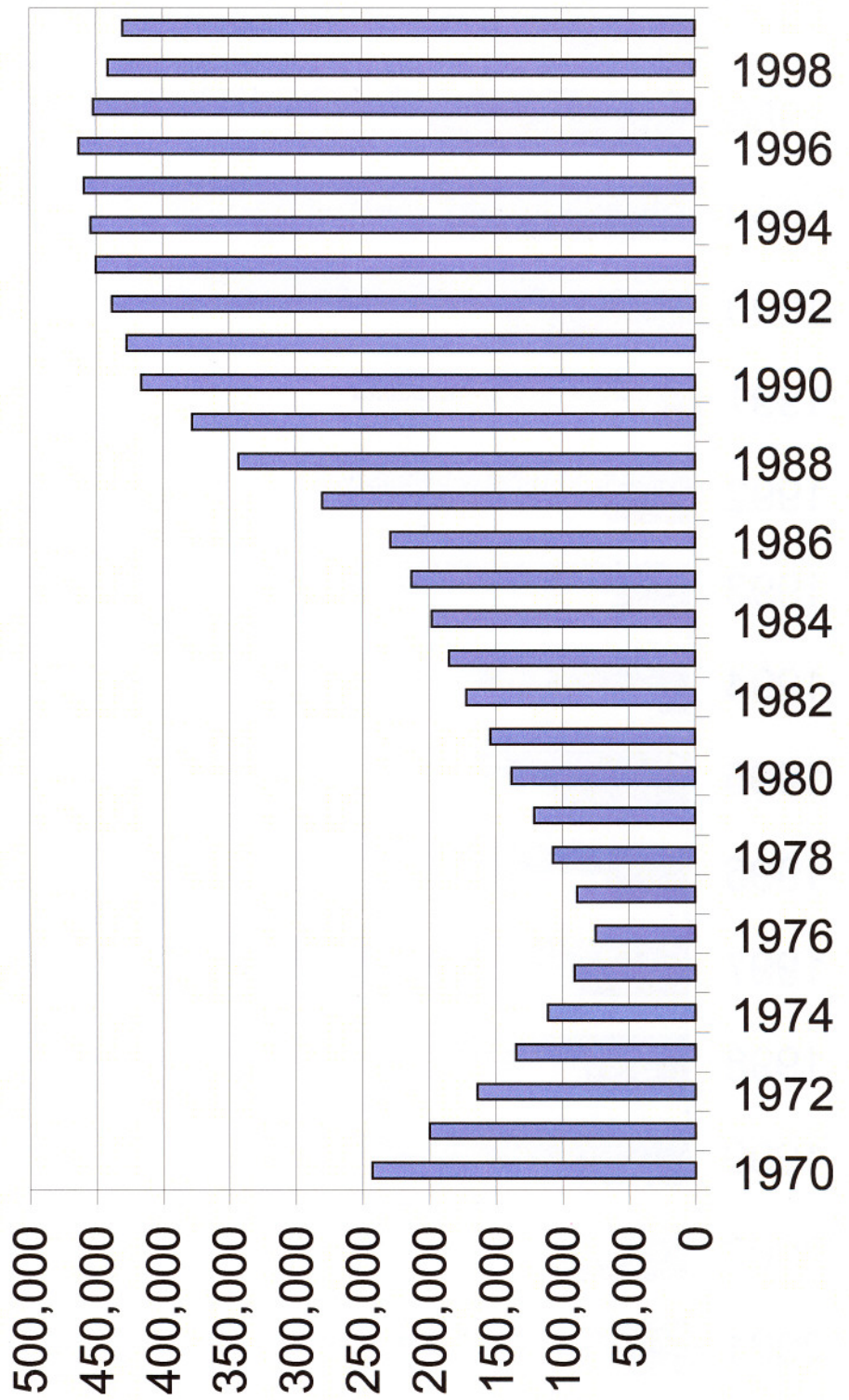
■ Precipitation for the Entire Year (Inches) 1971-2000





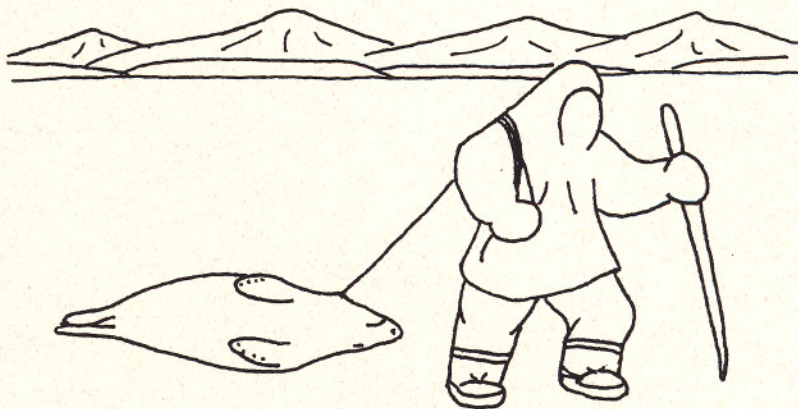


Western Arctic Caribou Herd



Quyanna, to all our members who participated in this record of change. To inquire about this report please contact:

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Kotzebue, Alaska 99752
(907) 442-3467**



The Qikitagrugmiut, forever sovereign, will live our Inupiaq way of life for all generations

