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**Community knowledge on Ivory Gulls near the Brodeur Peninsula,
Baffin Island**

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1.0 INTRODUCTION

The Ivory Gull (*Pagophila eburnea*) is a small gull with pure white plumage, black eyes and feet. It inhabits the High Arctic during the breeding season (Haney and MacDonald 1995), and it is regularly observed by Inuit hunters at the floe edge or near multiyear ice. In fact, this gull is often found in ice-rich areas when feeding or resting offshore (Renaud and McLaren 1982), and its migration in the eastern Arctic sees individuals from the High Arctic move east and south through Baffin Bay and Davis Strait to winter off the edge of pack ice through to Labrador. Known breeding locations for this gull include Seymour Island, nunataks in Ellesmere Island and Devon Island (mountaintops surrounded by glaciers, resembling islands of land in a sea of ice), and 10 small colonies on the Brodeur Peninsula of northern Baffin Island, west of the community of Arctic Bay (Tununirusiq) (Reed and Dupuis 1983, Thomas and MacDonald 1987, Alexander et al. 1991, Haney and MacDonald 1995).

The Ivory Gull is listed as a species of "Special Concern" by COSEWIC (COSEWIC 2001) because of its limited population size, and its susceptibility to disturbance. However, there have been no meaningful assessments of Canadian Ivory Gull populations in more than 15 years. In fact, despite the information noted above, our knowledge of the abundance, distribution and breeding habitat of this species is very limited and outdated, because breeding and wintering locations for this gull are remote and inaccessible. Our ability to gather necessary data is hampered by the logistical constraints and corresponding high costs of broad-based surveys associated with working in arctic regions. Hence, standard, "western" scientific approaches to gathering information for assessment and management of this species can be difficult to apply.

Since 1999, the Ivory Gull colonies on the Brodeur Peninsula merit special concern. Anecdotal reports from Arctic Bay, particularly the Nunavut Wildlife Service Enforcement Officer, suggest that fewer gulls have been observed compared to what has been seen in the past (J. Coutu, *pers. commun.*; note that these concerns have also been expressed by residents of Grise Fiord, Resolute Bay and Nanisivik; CAFF 2001). Perceived declines in Ivory Gull numbers relate not only to areas near the community, but also from passengers on ships in Lancaster Sound (J. Coutu, *pers. commun.*). As well, mining exploration for kimberlite pipes and diamonds has been increasing on the Brodeur Peninsula since 1999, with several companies using helicopters in this broad region.

Given the challenges associated with conducting extensive aerial survey work in the eastern Arctic, alternate approaches to gathering data on Ivory Gulls have to be considered. Much attention has been given recently to the role that traditional or community indigenous peoples' knowledge (also known in the Arctic as *Inuit Qaujimanituaqangit*) can and should play in the management of northern wildlife (Matveyeva 2000, Pierotti and Wildcat 2000, Usher 2000, Wallace 2000). Traditional ecological knowledge (TEK) has been used to help define and manage local populations of harvested marine and terrestrial species in Nunavut (e.g. Stewart et al. 1995, Ferguson and Messier 1997, Ferguson et al. 1998, 2001, Hay 2000), and was recently used to

gather distributional information on endangered species in southern Baffin Island (Mallory et al. 2001). While TEK can provide useful information not readily obtainable through western scientific approaches, there are also limitations that the researcher must consider. Of particular importance is the fact that the quality of TEK will vary depending on the species in question; for example, much knowledge is available on caribou (*Rangifer tarandrus*), a harvested and critical species for Inuit (Ferguson et al. 1998, 2001), but considerably less is available on infrequently harvested species such as gulls (Mallory et al. 2001). This means that the researcher must be cognizant of the relationship between the focal species and Inuit culture when interpreting results.

To address some of the concerns expressed by Arctic Bay about declining Ivory Gulls, we flew to the community to interview Inuit hunters and elders and record aspects of their knowledge of this species. Our interest focused on information regarding population status and trend, and the timing and locations where Inuit had observed Ivory Gulls near Arctic Bay. At the same time, we also asked questions about Long-tailed Ducks (*Clangula hyemalis*) and changes in sea ice, for other projects (see Appendix A).

2.0 METHODS

We gathered TEK through direct interviews with hunters and elders in the community of Arctic Bay between August 2-8, 2001 (Figure 1). We contacted the Ikajutiit Hunters' and Trappers' Organization approximately one month prior to the interviews, and had them review the interview questions in advance. We also asked the HTO to select appropriate hunters and elders (i.e. that might have experience with this species) to be interviewed.

Interviews were conducted in Inuktitut and English. For each interview, the interviewer (J. Akearok) took a list of questions, a notebook, a tape recorder, four - 1:250,000 topographic maps covering the Arctic Bay region, and pictures of the species. Prior to each interview, a consent form in Inuktitut and English was shown to each interviewee, and they were asked to sign the form to indicate if they wished to be identified in publications resulting from this work. Interviewees were paid a \$30 honorarium, and interviews were generally kept to about one hour. Questions were kept simple and brief, and were based in part on the questions used in recent TEK studies (Hay 2000, Mallory et al. 2001). To assess each interviewee's current and past knowledge and observations of the Ivory Gull, they were asked whether they actively went out on the land and seas to hunt and camp presently and in the past. Aside from specific questions like whether they had seen the species in question, we also asked if they could or wanted to elaborate on the subject in any way that they felt comfortable. Before the end of each interview on each species, the interviewer would state that if they did not have anything else to say on the species that they were finished on the specific topic. During the questions, interviewees were encouraged to indicate on maps where they had observed the species, and these notations were kept on maps and in a notebook.

All but one interview was recorded, and were later transcribed and translated (Appendix A).

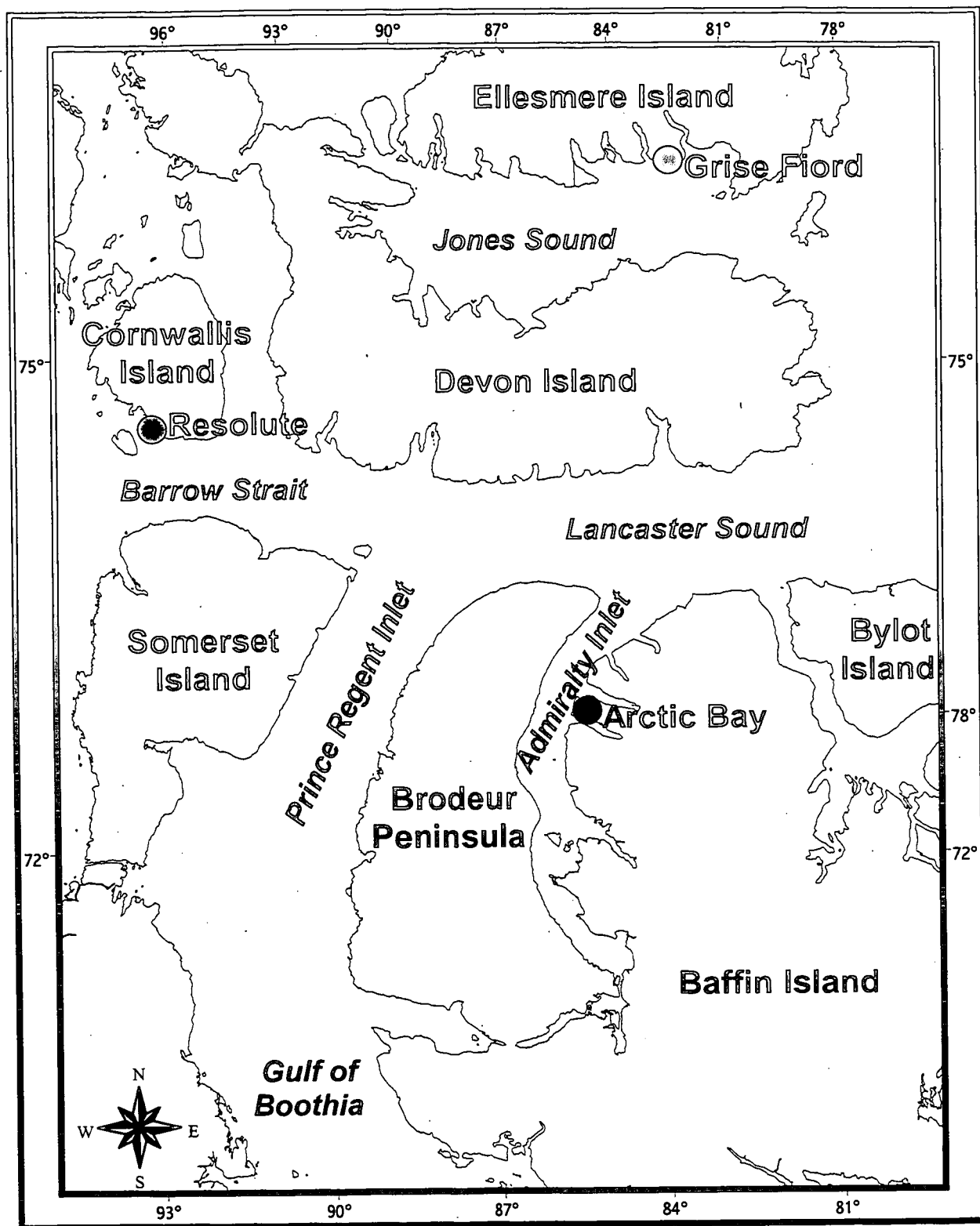


Figure 1. Location of Arctic Bay and other geographic features described in the study.

3.0 RESULTS

We interviewed 12 Inuit: three women and nine men. All were middle-aged or elders. Eleven interviewees stated that they actively went out on the land to hunt and camp in the past as well as the present, however, one informant mentioned that she did not go out on the land during the fall season. All interviewees were familiar with the Ivory Gull and were able to provide information on the timing of their observations of this species as well as its habits.

The complete transcript of each interview is in Appendix A. Below, we summarize the key points provided by interviewees on various aspects of Ivory Gull biology near Arctic Bay.

Timing of observations

Eleven interviewees stated that most Ivory Gulls were observed in the spring at the floe edge (in two cases this was the only time that people observed this species). Nine individuals indicated that this bird was observed rarely in the summer. During fall (September onwards), two individuals observed the species during migration, and one indicated that this is when most Ivory Gulls were observed (although two other people stated that they were rare at this time). One person said that they used to see more near town, and two people said that they observed young Ivory Gulls in the fall. Specific comments on the dates when Ivory Gulls arrive and depart the Arctic Bay area are in Table 1 (note that some responses were provided by several interviewees).

Table 1. Timing of Ivory Gull observations near Arctic Bay

Arrival	Departure	Comments
When the ice begins to thaw and form puddles of water	August and September	Leaves before Glaucous Gulls
May	September	Leaves when it gets cold and ice starts forming
May, mostly June	End of September	
June	October	
April, May but mostly June		
Spring		

Locations

The locations at which Ivory Gulls were seen differed through the year. In spring, birds were observed at the floe edge, the location of which varied annually. Gulls were rarely observed in the summer, and when they were it was often near multiyear ice. During fall migration, birds were observed scavenging food (seal or whale carcasses), or near forming ice (Table 2).

Table 2. Locations of Ivory Gull observations identified on maps

Spring Sites	Summer Sites	Fall Sites
Admiralty Inlet floe edge	Brodeur Peninsula east coast	Navy Board Inlet to Milne Inlet coast
Admiralty Inlet west coast	Lancaster Sound multiyear ice	
Iglorsuit Island	Ebenezer Harbour	
Ebenezer Harbour	Peter Richards Island	
Cape Strathcona floe edge parallel with Brodeur Peninsula		

Diet

Eleven of the 12 interviewees indicated that Ivory Gulls were often observed scavenging seal or narwhal fat or meat. Two people added that Ivory Gulls scavenge both from people and polar bears. Six individuals suggested that these gulls feed on fish, while four interviewees said that Ivory Gulls eat zooplankton or shrimp.

Inuit Use of Ivory Gulls

Five of the interviewees stated that their immediate ancestors harvested Ivory Gulls and eggs when their ancestors were stranded on the Brodeur Peninsula. One of these five people also stated that they would occasionally harvest and eat Ivory Gulls during times of food scarcity.

Local Population Status

There were differing opinions on the status of Ivory Gulls near Arctic Bay. Four people thought that the numbers of gulls near the community were declining, while another four thought numbers were unchanged. Only one person thought that he saw more gulls recently, and three people indicated that they didn't know whether numbers had changed or not, although two of these people thought they saw fewer gulls now.

Two of the interviewees thought that the birds had moved to a different breeding area, and another two indicated that the population probably goes through cycles of abundance.

Sea Ice

All interviewees indicated that the sea ice had changed in this area, with 11 of the 12 people noting that the ice was thinner in recent years near Arctic Bay. Several respondents indicated that the ice is darker, that it forms later and breaks up earlier, and that seabirds arrive earlier in the spring.

4.0 DISCUSSION

Our interviews with hunters and elders in Arctic Bay yielded interesting and important information on the Ivory Gull. Typically, the natural history descriptions of the species habits (arrival and departure observations, diet) matched what is known in the scientific literature (Haney and MacDonald 1995), suggesting that the reports are quite accurate. Moreover, the independent corroboration of locations or behaviours from reports of different hunters enhances our confidence in the reliability of the observations.

It was clear through the information we derived that there were some inconsistencies among community members in their knowledge or perceptions of Ivory Gull habits. Some of this is probably related to the nature of the IQ available for this species. For example, although some of the interviewees indicated that Ivory Gulls or their eggs have been eaten by Inuit in the past, it is not a common practice. Thus, it is safe to say that Nunavummiut do not currently nor have they historically relied on harvest of Ivory Gulls for food or other resources. In fact, none of the 12 interviewees had ever observed an Ivory Gull nest (although some of their ancestors had). As such, we should expect more detailed, precise, thorough and consistent IQ information for species on which Inuit survival has relied, such as caribou (Ferguson et al. 1998). For the Ivory Gull, much of the IQ would have been gathered or developed as hunters were after other prey. It is not surprising, therefore, that greater consistency in the reports came from questions related to where and when birds were observed (e.g. at the floe edge, when Inuit were hunting whales or seals), but less consistency was achieved on questions relating to population status or breeding locations.

Given that most of the observations of gulls were on the water or ice, it was also interesting to note the differences in the timing and location of observations between Inuit hunters. We found both seasonal differences, consistent with the biology of this species (Renaud and MacLaren 1982), and differences among years. The latter were attributable in part to annual changes in the location of the floe edge and pack ice in Admiralty Inlet and Lancaster Sound, and interannual changes in the extent, location and movement of sea ice that affect Ivory Gull migration (Haney and MacDonald 1995). For example, spring sightings of the arrival of gulls were recorded as early as April but as late as June. Some of the interviewees described the timing of Ivory Gull arrival not in terms of calendar dates, but instead in terms of specific sea ice conditions, notably when sea ice began to melt and form leads or surface puddles. All respondents indicated that sea ice was changing, particularly that it was thinner, more dangerous to drive on, and that it breaks up earlier, with the latter resulting in earlier arrival dates of seabirds. This suggests that Ivory Gull migration and reproductive biology will likely be influenced by changing ice conditions attributable to climate change.

Clearly most information on Ivory Gulls came from observations when gulls were in migration, or away from the colony feeding near pack ice or the floe edge. Two interviewees speculated on the location of colonies near Ebenezer Harbour and inland on the northeast Brodeur Peninsula, both locations not known to support colonies (Alexander et al. 1991). None of the people interviewed had been to an Ivory Gull

colony, but six people recounted an incident experienced by their ancestors. Apparently Inuit in the previous generation had been stranded by an unusual break-up of sea ice, and were forced to cross the Brodeur Peninsula on foot. The Inuit came across an Ivory Gull colony far inland, where the area appeared white due to a large number of gulls (birds, eggs or faeces, depending on the account). The exact location is not known, but it was probably one of the colonies found later in various surveys (Reed and Dupuis 1983, Thomas and MacDonald 1987). Undoubtedly this is the same report first published by Bray (1943) and recounted by MacDonald and Macpherson (1962). Bray heard the story from "Iktukshakdjuk" who was one of the Inuit who saw the colony. At the time of Bray's publication (1943), the sighting was "from many years ago". This means that it has likely been more than 60 years since anyone in the community has physically encountered an Ivory Gull colony on the Brodeur Peninsula.

For some Arctic species, IQ information can be used to address population status. This has been used successfully for Bowhead Whales (*Balaena mysticetus*) and caribou, two species traditionally harvested in Nunavut. For other uncommon and infrequently harvested species, IQ information on distributions can be very informative, but data concerning abundance is qualitative rather than quantitative, and often not as suited towards population monitoring (Mallory et al. 2001). For Ivory Gulls near Arctic Bay, the most common sightings occurred in the spring near the floe edge, although the location and timing of the floe edge varied each year. No members of the Arctic Bay community have observed or recorded numbers of Ivory Gulls returning to the colonies on the Brodeur Peninsula, the one location best suited to population monitoring. With this in mind, we interpret the comments on the numbers of Ivory Gulls near Arctic Bay as strongly suggestive of population declines. One third of the interviewees said that numbers of this species were declining, and another third said they were unchanged. A further two people reported seeing fewer Ivory Gulls now than they did in the past (detailed in Appendix A), although they weren't sure of the overall local population status. Hence 50% of respondents indicated perceived declines in Ivory Gull numbers at some level. Three interviewees didn't know whether populations were changing, in part because they saw so few birds, which is also suggestive of declines given that other residents said that the bird was quite common near the community many years ago. Only one person thought he was seeing more gulls. Certainly many people in Arctic Bay have reported seeing fewer Ivory Gulls near the community itself (exclusive of these interviews). In the mid 1990s, the Arctic community of Sanikiluaq expressed concerns to the CWS over suspected declines in local eider numbers in the Belcher Islands. Subsequent CWS surveys found that eider populations had declined by 75% (Robertson and Gilchrist 1998). In Arctic Bay, several interviewees suggested that the birds had moved to a new breeding area, or that the population underwent cycles of abundance. This interpretation is consistent with the population dynamics of many migratory populations in the Arctic (Ferguson et al. 1998, CAFF 2001). The extent to which Ivory Gull populations may be cyclical, or that these small colonies can relocate is unknown.

It is clear that Ivory Gulls are currently uncommon and are only observed at certain times or locations near Arctic Bay. During interviews with Inuit in Arctic Bay, several people stated that they were unsure of the (population) status of Ivory Gulls because they didn't

hunt them. Nonetheless, a substantial portion of the people interviewed thought that they saw fewer Ivory Gulls now than they have in the past. Collectively, this information, in addition to other anecdotal accounts from individuals working or touring near the community (J. Coutu, *pers. commun.*) and other communities near Lancaster Sound (CAFF 2001) suggests that Ivory Gulls nesting on the Brodeur Peninsula, Baffin Island, may be in decline. Given that the population of Ivory Gulls nesting in Canada is thought to be small (~ 2000 pairs; Haney and MacDonald 1995) and susceptible to a variety of threats, declines in colonies on the southern edge of the breeding range could be problematic for this population. We recommend that Ivory Gull colonies in the eastern Arctic be resurveyed as quickly as possible to assess their current status. Moreover, our current information suggests that COSEWIC should consider updating the classification of Ivory Gulls from "Special Concern" to "Threatened".

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- J:** *You've only seen ivory gulls in the spring?*
M: Yes, I've only seen ivory gulls in the spring around Arctic Bay.
J: *Do you know when ivory gulls start leaving, or do you only see them during the spring?*
M: I only see ivory gulls in the spring.
J: *How about during the fall?*
M: I don't see ivory gulls in the fall.
J: *Do you know if ivory gull numbers have increased or decreased?*
M: There have always been many ivory gulls and they are easily seen high above steep places when they start arriving.
J: *Do you see ivory gulls in the spring near town or when you're out on the land?*
M: Ivory gulls aren't seen near town but they are typically close to where they nest on steep hills.
J: *The number of ivory gulls hasn't decreased or has their numbers remained unchanged?*
M: I didn't notice ivory gulls this spring because it was unusually cold. Because of the cold spring the ice didn't thaw and form puddles of water during the season it normally would. The ice didn't thaw to form puddles during the spring because it was cold in which there were frequent blizzards.
J: *If you don't have anything further to add on ivory gulls than we're finished.*

Long-tailed Duck

- J:** *Have you seen this bird?*
M: Yes I have seen long-tailed ducks. Long-tailed ducks are around Arctic Bay but there aren't many of them.
J: *They are here on the land?*
M: Yes, long-tailed ducks are around Arctic Bay but there aren't that many lakes here. They are more abundant west from Arctic Bay at places like "qinnuqpasiani". Right now though there aren't many near town because there aren't that many lakes near here.
J: *I've asked you this already but have you seen long-tailed ducks near Arctic Bay?*
M: Yes, I've seen long-tailed ducks near Arctic Bay during the spring. Now at "kitiqpasungaaaju" there are long-tailed ducks.
J: *Have you consistently seen long-tailed ducks near Arctic Bay?*
M: Yes, I consistently see long-tailed ducks every spring. I see them each spring at waters where the river drains into the sea.
J: *Have you seen long-tailed duck nests?*
M: Yes, I've seen long-tailed duck nests when I lived in Igloolik when I was younger.
J: *In Igloolik?*
M: Yes, I used to live in Igloolik and I've seen long-tailed ducks nests there.
J: *Do you know when long-tailed ducks start arriving around the Arctic Bay area?*
M: During the spring when the ice in the sea, lakes and ponds starts thawing and forming puddles of water.
J: *Do you know what long-tailed ducks eat during the spring?*
M: Long-tailed ducks eat shrimp-like zooplankton near the ice as well as zooplankton along the shoreline ice.
J: *Do you know where they go to find food?*
M: At lakes where there are small animals they can feed on. These birds like to frequent lakes.
J: *Do long-tailed ducks associate with other animals?*
M: Yes, they associate with eider ducks. They arrive around the same time as eider ducks. Long-tailed ducks typically start arriving soon after eiders ducks first arrive.
J: *Do you know when long-tailed ducks start leaving?*
M: Long-tailed ducks start leaving in the fall around September when their young start learning to fly.
J: *Do you know if long-tailed duck numbers have increased or decreased?*
M: Long-tailed duck numbers haven't changed. At least their numbers haven't changed around Arctic Bay.
J: *Their numbers haven't changed?*
M: Yes, they haven't changed.
J: *If you have nothing further to add than we are finished?*
M: We're finished.

Arctic Bay Sea-Ice

- J:** *Do you think that ivory gulls and long-tailed ducks rely on ice?*
- M:** In some ways. When long-tailed ducks and ivory gulls arrive, I know that that means warmer weather is coming.
- J:** *The long-tailed duck and ivory gull arrive here at the same time?*
- M:** Ivory gulls leave earlier, they are mostly spring-time birds because I don't usually see them in the summer but long-tailed ducks only leave when it starts getting cold again here. Ivory gulls leave a little earlier.
- J:** *When these birds arrive it indicates that the ice will begin to thaw?*
- M:** No, they arrive when the ice is beginning to thaw. Although you're not asking me questions on Arctic terns, they are already here and they are also indicators of spring.
- J:** *Have you noticed changes in the ice near and around Arctic Bay?*
- M:** There have been changes in the ice conditions this spring. The spring this year has been very cold.
- J:** *Has the ice gotten thinner or thicker?*
- M:** The ice was thinner this spring.
- J:** *Are there any changes around seal holes?*
- M:** There have been some changes in that there aren't as many seals.
- J:** *Do the seal holes break up sooner?*
- M:** The seal holes don't break-up any sooner.
- J:** *What changes have you observed around seal holes?*
- M:** There aren't as many seal holes today. There used to be lots of seal holes in the past when I first moved here when I was younger and there were more seals back then.
- J:** *Do you know why that is?*
- M:** We didn't have motors back then when I was younger around 1947. The sound of the motors is scaring off seals and other animals. Furthermore, myself and other hunters are now able to hunt seals farther and faster from here more often so the seals have moved off to other places than Arctic Bay. Including animals like whales.
- J:** *Do you know why there aren't as many seal holes?*
- M:** Hunters today can travel farther and faster by ski-doo. In the past it used to take us longer to travel to hunt seals but now people can travel to a lot of places, and I think the seals are aware of the motor sound and have moved off to other places so now there aren't as many seals.
- J:** *You've mentioned that the ice is thinner now, why do you think that the ice is thinner now?*
- M:** The salt content of the sea has changed from the past and if the salt content had remained the same then the thickness of the ice would have remained the same. The ice used to be around 6 feet thick, now it is around 2 to 3 feet thick. The ice has gotten thinner for over the past 2 years. When the climate is really cold one can typically see mist coming off the land. During the winter, however, the mist off the land was brief because the climate was warmer. I think that the ice is thinner because the salt content has changed and because the climate isn't as cold. This is only what I think.
- J:** *You've mentioned that you've observed changes in the thinness of the ice as well as the lack of seal holes these days, as a result of these changes have you noticed any changes in any of the birds here?*
- M:** No, there haven't really been any changes there. In the past we only used dog teams and it was a lot of work hunting whales and working on it and then transporting it back to the land from the sea-ice. We didn't travel as far back in the past but it has changed today because of ski-doods.
- J:** *If you have nothing further to add on the ice and seal holes then we're finished?*
- M:** I have nothing further to add.

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4. Δ^2 : $D_a \cap^2 \Gamma \Delta^{sb} \subset D_c \Delta^{sb} \cap L \Delta \Delta?$

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[illegible]

- Jo:** Yes. I rarely see ivory gulls during the summer but I do see more in the community during the fall.
- J:** *Do you know what time of the year ivory gulls start migrating back south?*
- Jo:** Probably around late-fall. In the high Arctic late-fall is about the end of September. That is when the weather starts getting cold.
- J:** *Have you seen ivory gull numbers go up or down or have they remained the same?*
- Jo:** I think they have gone down because I don't see them as often as we did before.
- J:** *Have their numbers consistently gone down or has the numbers varied?*
- Jo:** I think they've been declining at a slow pace. I don't know if they're actually declining but we don't see ivory gulls as often as we did before.
- J:** *Any speculation as to why that is?*
- Jo:** Maybe ivory gulls have been moving elsewhere. That's the only speculation I have.
- J:** *Have you seen ivory gull eggs before or their nesting areas?*
- Jo:** No.
- J:** *Do you have any further comments?*
- Jo:** I'm 40 years old now and I remember that when I was around 12 years old that there used to be a lot of ivory gulls in this community. Ivory gulls used to be like right on the beach near Arctic Bay, but now I don't see them unless I go out to the floe edge. I never really thought about the ivory gull before, but since someone is doing this study it has kind of made me think. There used to be lots in this community and we used to try and hunt them down at the beach but now there aren't any near the community. One doesn't see them at all, but I think they are nice creatures because their color is so white and when you're out on the land or out on the floe edge they are special because they contrast with the ice and everything.

Long-tailed Duck

Joanasie Akumalik had no comments on long-tailed ducks.

Arctic Bay Sea-Ice

- J:** *Do you think that the ivory gull relies on the ice?*
- Jo:** I think they do.
- J:** *In what way?*
- Jo:** Maybe because of their diet. There appears to be more ivory gulls around when the ice is thick.
- J:** *When is it thick?*
- Jo:** Yes. There seems to be more ivory gulls around when the ice is thick. I don't know how it affects their diet but I think they have some sense of knowing where their food is around the ice. This year the ice was so thin and we were very surprised by it because the ice moved out very fast and I think that that affects ivory gull movement. I think that they have a sense of when the ice is going to go out fast.
- J:** *Have you noticed changes in the ice in Arctic Bay and Lancaster Sound?*
- Jo:** Yes.
- J:** *Has it gotten thinner?*
- Jo:** It's definitely thinner this year. Back in June we went out to Brodeur Peninsula and there was no water out on the ice – normally there is water at that time. The ice was flat. It was very nice to travel on but out towards Arctic Bay there was some water on the ice. A lot of hunters were saying that the ice was thin this year and that's why the ice moved out fast.
- J:** *Is this the first year that the thinness of the ice has been noticed or has it been noticed before?*
- Jo:** Well I think the thinness of the ice has been noticed in the past before and it may be just a cycle. If not than maybe the cause of the thinner ice is due to global warming.
- J:** *Have there been any changes in the polynyas in Arctic Bay?*
- Jo:** There's one polynya around Moffet Inlet that I know of but there are other polynyas further down Admiralty Inlet, however, I've never been to those areas as much as I have to the one in Moffet Inlet. There have been no real changes around polynyas there. The polynya at Moffet Inlet is always there and we've always been warned not to go near it.
- J:** *Has the moving off of the ice occurred within the last few years or sooner?*
- Jo:** I think the last one was around 15 to 20 maybe 30 years ago but all the hunters were quite surprised this year. They already knew back in January or February that the ice would move off

- K: Yes. I see them around the fall before it starts getting cold and when it starts snowing again. It's like that here in Arctic Bay and in Pond Inlet.
- J: *Have you seen ivory gull nests?*
- K: No but I've heard that ivory gulls nest southwest from here on a high land perhaps somewhere at its center.
- J: *Do you know when ivory gulls start arriving?*
- K: I start seeing ivory gulls around May near the floe edge.
- J: *Do you know what they eat during the spring?*
- K: They eat Arctic cod and whatever food or meat is available like seal fat.
- J: *Do you know where ivory gulls go to find food?*
- K: A lot of places but mostly to the floe edge. They also eat shrimp when it's available.
- J: *Do ivory gulls associate with other animals?*
- K: They associate with glaucous gulls and fulmars. They typically associate when they are feeding.
- J: *Do you see them in the summer and fall?*
- K: I see them the least during the heart of summer.
- J: *Do you know when ivory gulls start leaving?*
- K: Ivory gulls start leaving around October. They are only here for a brief time when it starts getting cold. Ivory gulls typically start leaving when we can just begin traveling on the ice again. I think they are one of the last birds to leave.
- J: *Do you know if ivory gull numbers have increased or decreased?*
- K: Ivory gull numbers are not decreasing. There are more of them during the fall. There did not seem to be as many when I was younger. I observed birds when I was younger and their numbers were less before.
- J: *Maybe you see more of them in the fall because you also see ivory gull young as well?*
- K: Yes, I can tell because the young have faint black spots on them.
- J: *You don't think that ivory gull numbers have changed?*
- K: No, I know that their numbers have increased.
- J: *Ivory gull numbers have increased?*
- K: Yes.
- J: *Do you know why ivory gull numbers have increased?*
- K: I don't know exactly how many eggs ivory gulls lay, however, birds that feed on meat or seal fat seem to lay less eggs than birds that lay eggs on the land. Still I think the ivory gull numbers have increased because their young are able to survive well.
- J: *If you have nothing further to add than we are finished.*
- K: Yes that is what I know. They are not decreasing.

Long-tailed Duck

- J: *Have you seen this bird here in Arctic Bay?*
- K: I see them everywhere.
- J: *You've seen them near and around Arctic Bay?*
- K: Yes, here and in Igloolik and Pond Inlet. I've seen long-tailed ducks consistently at these places.
- J: *Have you consistently seen long-tailed ducks near and around Arctic Bay?*
- K: Yes. They are most active here in the spring along the shoreline.
- J: *Have you seen long-tailed duck nests?*
- K: Yes although there aren't a lot of birds in Arctic Bay but there are a lot of long-tailed ducks and their nests around Igloolik and Hall Beach.
- J: *Do you know when long-tailed ducks arrive in Arctic Bay?*
- K: Around June when water starts forming along the shoreline.
- J: *Do you know what long-tailed ducks eat in the spring?*
- K: They eat shrimps. They also eat these fish that have these large eyes.
- J: *Do you know where long-tailed ducks go to find food in the spring?*
- K: They feed along the shoreline ice.
- J: *Do you know where long-tailed ducks go to find food in the summer?*
- K: I'm only aware of them feeding in the sea.
- J: *Do you see long-tailed ducks in the fall?*
- K: I think long-tailed ducks leave fairly early in the fall before the ice forms.

- A: I always see ivory gulls every spring when we're out seal hunting. When we catch seals, ivory gulls always try and take some of the seal meat and fat.
- J: *Do you see ivory gulls near and around Arctic Bay consistently?*
- A: Certainly. I've heard this story one time that I'll tell to you. This took place on a steep hill southwest from here. Do you know Elaiga Iq&uq from Pond Inlet? He and many other Inuit one time had walked overland over steep hills when they were stranded because the ice had broken up and melted. They walked near a point over these steep hills. He said that near this point the land was covered with ivory gulls. Now they know that at this area there are a lot of ivory gulls.
- J: *Have you seen ivory gull nests?*
- A: No I haven't seen ivory gull nests. Now near Pond Inlet there is a thick-billed murre colony and ivory gulls probably have colonies near that area.
- J: *Do you know when ivory gulls start arriving here?*
- A: Certainly. They start arriving here around May. In June one can typically see a number of ivory gulls trying to feed on seal meat and seal fat. Ivory gulls definitely arrive by June. One can definitely notice ivory gulls when we're cutting up seals because the ivory gulls try and scavenge the seal fat. More than one ivory gull starts landing nearby when we're cutting up seals.
- J: *Do you know what ivory gulls eat during the spring?*
- A: Ivory gulls are more endearing than glaucous gulls because they are smaller than glaucous gulls. Now when we toss seal fat towards ivory gulls, glaucous gulls usually try and steal the seal fat. Ivory gulls really crave seal fat when we're out on the sea ice during the spring.
- J: *Do you know where ivory gulls fly to find their food?*
- A: On the sea ice as well as along the shorelines. Down at the sea ice one begins to notice two and then pretty soon three ivory gulls when there is seal fat around. They could also be down where there are multi-year ice and polar bears. I think they look for Inuit and polar bears that are hunting seals.
- J: *Do you know where ivory gulls go to find food during the summer?*
- A: Ivory gulls leave earlier than glaucous gulls. I'm not sure where they go. They leave around early fall. Sometimes though in early fall there are young ivory gulls. In the summer one rarely sees ivory gulls. Although the ivory gull young are sometimes here briefly when it starts getting cold.
- J: *Do ivory gulls associate with other birds?*
- A: There is a glaucous gull colony near a lake and river that contains fish west from Arctic Bay. Before the glaucous gulls lay eggs the gulls chase fish in that area. Ivory gulls also spend time at this area with the glaucous gulls catching fish. I don't think ivory gulls stay as long as glaucous gulls in that area though.
- J: *Do you know when ivory gulls start leaving Arctic Bay?*
- A: It seems like they start leaving around August. They leave earlier than glaucous gulls.
- J: *Have you noticed if the numbers of ivory gulls has increased or decreased or have their numbers remained the same?*
- A: There are always ivory gulls on the ice during the spring here. When Inuit are hunting seals and narwhals in the spring on the ice they typically see ivory gulls around. When someone catches a yearling seal and toss's seal fat a number of ivory gulls can be spotted trying to scavenge the seal fat. When seal fat is tossed on the ice more than one ivory gull arrives, sometimes 4 or 5 ivory gulls. Although ivory gulls can be spotted when seals are caught there aren't as many of them as glaucous gulls.
- J: *Thank you. If you have nothing further to add then we're finished.*
- A: Ivory gulls are typically seen here in the spring and they are rarely seen in the summer. Maybe they leave fairly early.

Long-tailed Duck

- J: *Have you seen long-tailed ducks in and around Arctic Bay?*
- A: Yes.
- J: *Have you seen long-tailed duck nests?*
- A: Long-tailed ducks lay eggs on the land here as opposed to on high steep cliffs like the ivory gulls. They typically lay eggs near lakes.
- J: *Do you know when long-tailed ducks arrive here?*
- A: Ivory gulls arrive around June. They arrive at around the same time as eider ducks.

- J:** *Have you seen ivory gull nests?*
- K:** I haven't seen ivory gull nests but I have heard stories from people who have. My father told me that someone had seen ivory gull nests southwest from here on top of a high cliff.
- J:** *Do you know when ivory gulls start arriving?*
- K:** Around June.
- J:** *Do you know what ivory gulls eat during the spring?*
- K:** No. However, they do eat seal fat when we're out hunting seals during the spring. They may eat Arctic cod as well.
- J:** *Do you see ivory gulls in the summer as well?*
- K:** There are only a few around in the summer. Ivory gulls and their young can be seen in the fall when it starts getting cold again. There are not many ivory gulls in the summer, maybe I see 1 or 2 sometimes.
- J:** *Do you see ivory gulls in the fall?*
- K:** Yes I see them here.
- J:** *Do ivory gulls associate with other animals?*
- K:** They associate with glaucous gulls and jaegers. Although ivory gulls also associate within their own species as well.
- J:** *Do you know when ivory gulls start leaving?*
- K:** They leave when it starts getting cold and when the floe edge starts forming.
- J:** *Have ivory gull numbers increased or decreased or has their numbers remained relatively the same?*
- K:** There aren't as many ivory gulls today. Although we don't hunt ivory gulls we've paid attention to them. The spring here is a beautiful season and the ivory gull is a nice bird that arrives here in the spring.
- J:** *Do you know why ivory gull numbers have decreased?*
- K:** I think ivory gulls have moved off to other areas. I think they stayed in one area for a while and then moved off someplace else. I believe that their numbers rise and fall.
- J:** *Do you know when you noticed their numbers started going down?*
- K:** There were more ivory gulls around and prior to 1973. At around 1980 their numbers had decreased and today their numbers have decreased further.
- J:** *Do you see ivory gulls when you're out hunting or near Arctic Bay?*
- K:** I see ivory gulls when I'm out hunting. In the past we'd go seal hunting together and pay attention to the wildlife around us. Today we sometimes don't even see 1 or 2 ivory gulls.
- J:** *Do ivory gulls rely on ice?*
- K:** I don't think they do because they are birds. Although we don't eat them they are beautiful birds that arrive here in the spring.
- J:** *If you have nothing further to add then we are finished.*

Long-tailed Duck

- J:** *Have you seen this bird?*
- K:** Yes.
- J:** *Do you see long-tailed ducks in and around Arctic Bay?*
- K:** I grew up northwest from here and I didn't move to Arctic Bay till my adult years. Where I grew up I had seen a lot of long-tailed ducks. Since I moved to Arctic Bay, however, I've only seen a small number of long-tailed ducks. I can't tell if long-tailed duck numbers are decreasing or not.
- J:** *Have you seen long-tailed duck nests?*
- K:** Absolutely. I've seen long-tailed duck nests where I grew up.
- J:** *Do you know when long-tailed ducks arrive?*
- K:** I think I start seeing long-tailed ducks arriving around the middle of June. I think they arrive at about the time when the shoreline and the ice start forming puddles of water. Long-tailed ducks then move to lakes when the lakes are relatively free from ice.
- J:** *Do you know what long-tailed ducks eat during the spring?*
- K:** They eat shrimps. I think they also eat Arctic cod as well, however, I think they mostly eat shrimps.
- J:** *Is their diet the same throughout the summer and fall or does their diet change at these times?*

- K: I think their diet changes in the fall. I don't think long-tailed ducks eat as much during the spring because they are either actively looking for mates or are already mating. Before they leave in the fall I think they eat small zooplankton as well as shrimps and these are the foods that they get fat on.
- J: *The long-tailed ducks diet changes in the fall?*
- K: Yes.
- J: *Do long-tailed ducks associate with other birds?*
- K: They don't associate much with other birds. They tend to associate with other long-tailed ducks. Ivory gulls tend to associate with other bird species more so than long-tailed ducks. They sometimes, although rarely associate with geese and eider ducks. They mostly associate within their own species.
- J: *Do you know when long-tailed ducks start leaving?*
- K: I'd say around October. Before it starts getting too cold.
- J: *Do you know if long-tailed duck numbers are increasing, decreasing or have their numbers remained the same?*
- K: There are a lot of long-tailed duck young in the fall before they leave. I think there are a lot of long-tailed ducks in the fall when the young are able to fly. Long-tailed ducks produce a lot of young.
- J: *How many eggs do they lay?*
- K: Sometimes as much as 7 eggs. Although there may be from 5 to 6 eggs and up to 7 eggs during a good season.
- J: *Do you think that long-tailed ducks rely on ice?*
- K: No I don't think they do. I think that Inuit have use for them in times of hunger because they are edible. I don't think long-tailed ducks rely on the ice.
- J: *If you have nothing further to add then we are finished.*
- K: We're finished then.

Arctic Bay Sea-Ice

- J: *Have you observed any changes in the ice near and around Arctic Bay?*
- K: Yes there have been changes in the ice conditions this spring. In the past the ice used to be much thicker. During past springs, the ice wasn't as favorable as it is today to travel on because back then the ice would form deep puddles of water that we would have to travel through. Now that the ice is thinner there aren't any deep surface puddles of water that we have to travel through during the spring. It is very good now for traveling on by ski-doo.
- J: *Have you observed any changes in the seal holes and the polynyas here?*
- K: There haven't been significant changes in the polynyas here. Sometimes it is harder and more dangerous to chase animals like seals on the ice now that it is thinner.
- J: *Are there more seal holes now or less of them now that the ice is thinner?*
- K: Since the ice is thinner there are more seal holes because seals can maintain as well as form seal holes easier nowadays.
- J: *There are more seal holes now?*
- K: Yes.
- J: *Now that the ice is thinner does the ice break up sooner as well?*
- K: Only a small change there. In the past when the ice was thicker, thick solid ice would form between the floe edge and the land and this would cause the ice to break up sooner due to the pressure from the thick ice. Now that the ice is thinner the ice does not seem to break up as early as it did before to me. The ice is not as solid and thick to break up the ice and the thin ice is too weak to crack and break up the ice these days.
- J: *Do you know why the ice is thinner these days?*
- K: I know exactly why the ice is thinner. In the past the fuel that we used in our stoves to keep our homes warm would freeze in the middle of January around the 1960's because it was so cold. Now the fuel never freezes because it is not as cold as it was in the past. In the past the weather was much colder and today the weather is significantly warmer.
- J: *Have there been any changes in the polynyas here?*
- K: Yes there haven't been much changes with the polynyas here. Now that the ice is thinner I think that polynyas are bigger.

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Nakjugaq Akpaliapik - August 3, 2001

Ivory Gull

- J: Have you seen this bird in Arctic Bay?
- N: Yes, however, I only see them during the spring.
- J: Have you seen ivory gull nests?
- N: No I haven't. I've only seen ivory gulls when they start arriving.
- J: Do you know when ivory gulls start arriving?
- N: Ivory gulls start arriving in the spring.
- J: Do you know what ivory gulls eat during the spring?
- N: They appear to like to scavenge a lot of meat. Ivory gulls like eating seal fat.
- J: Do you know if their diet changes in the summer?
- N: I don't see them in the summer. I only see ivory gulls during the spring when the ice forms puddles of water.
- J: Do you see ivory gulls in the fall?
- N: I only see them in the spring.
- J: Do you know if ivory gulls associate with other birds?
- N: They associate with glaucous gulls.
- J: Do you know when ivory gulls start leaving?
- N: I think they leave at the same time as other birds.
- J: Did you go out and spend time on the land more in the past?
- N: Yes, we used to always be on the land by means such as dog teams.
- J: Do you still actively go out on the land?
- N: No I don't go out on the land anymore.
- J: Have you observed any changes in the number of ivory gulls? Have their numbers increased or decreased?
- N: I don't know because I don't go out on the land anymore.
- J: Do you think that ivory gulls rely on the ice?
- N: Ivory gulls arrive here when there is still ice and I don't see them when there is no ice around.
- J: If you have nothing further to add than we are finished.
- N: Yes I'm finished.

Long-tailed Duck

- J: Have you seen this bird before?
- N: Yes.
- J: Have you seen long-tailed ducks in and around Arctic Bay?
- N: Yes. Long-tailed ducks lay nests at around the same time as eider ducks although they don't necessarily associate with each other.
- J: Have you seen long-tailed duck nests?
- N: Yes, up further west.
- J: Did you also say earlier before the interview that you had seen long-tailed ducks in Clyde River as well?
- N: Yes and I've seen long-tailed duck nests in Clyde River as well. They tend to nest near eider ducks.
- J: Do you know when long-tailed ducks arrive?
- N: Yes. They arrive at around the same time as eider ducks.

Long-tailed Duck

J: *Have you seen this duck around here?*

L: Yes, I have seen it.

J: *Have you seen the long-tailed duck in the Arctic Bay area?*

L: Yes, just recently we saw a couple of long-tailed ducks that were feeding around here right on our beach.

J: *Have you consistently seen the long-tailed duck in the Arctic Bay area?*

L: Yes, all around this area but usually in the spring when the cracks in the ice start to build up with water. They feed in those areas during the spring as well as in open water areas. They tend to migrate with eider ducks.

J: *Have you seen long-tailed duck nests?*

L: Yes I have seen the nests of long-tailed ducks and eider ducks. Usually they lay eggs in July.

J: *What time of the year do long-tailed ducks arrive?*

L: Late spring when there is open water. We don't usually see them until there is open water in creeks, lakes, and sea and in small ponds by the shore.

J: *Do you know what long-tailed ducks eat during the spring?*

L: I've shot one before and I checked its stomach contents and I could see that they eat small clams. At least the one that I shot.

J: *Do you think that their diet changes in the summer or fall?*

L: I don't think there is much difference. I think their diet does not change during the summer or the fall - they eat the same kind of food. Every year they tend to stay in pretty much the same area. Like in inlets or marshy areas. I have seen them eating roots like geese in marshy areas sometimes.

J: *Do you know when they start migrating back south?*

L: Around the first full moon in the fall. That's when the strong winds and strong currents occur. The wind carries a lot of birds to where they migrate.

J: *Have you seen long-tailed duck numbers go up or down or have they remained unchanged?*

L: It's difficult to answer that because they scatter around here and the only time we tend to see them are when they are migrating and gathering with eider ducks. Other than that we don't see long-tailed ducks together unless we are down by the floe edge during their spring migration.

J: *Do you think that long-tailed ducks rely on the ice?*

L: I don't think they rely on ice. They come up when the ice is melting and when there is enough water for them to feed.

J: *Anything else that you would like to add?*

L: I really don't know where they nest but usually we see them in areas where there are small ponds and in small islands. That's where we see them nesting.

Arctic Bay Sea-Ice

J: *Have you noticed any changes in the ice in Arctic Bay and Lancaster Sound?*

L: Yes, when we heard about El Nino it really affected the ice and us. We weren't surprised because we have seen El Nino in the past and we thought that it wasn't going to affect us that much, however, after El Nino we noticed that the condition of the ice had significantly changed. The ice has been really thin and although the ice thickness varies every year, the ice over the past 2 years this spring has been noticeably different. The ice usually stays a little bit longer. The ice condition this year affected our narwhal hunt. It affected most of our hunting season.

J: *Do you think that the ice is thinner or thicker or has it remained unchanged?*

L: Because we find this year a lot warmer the ice was a lot thinner than it usually is. Every year the ice seems to be a lot thinner because when we check seal holes each spring we find that the ice is getting thinner. We know that some areas have polynyas and they tend to break up a lot faster now. We also find that the ice around the mouths of rivers that drains into the sea tends to break up a lot faster as well. The inlets that we've seen around here through satellite pictures have also shown that they've broken up faster.

J: *Are there more or less seal holes now or have they remained unchanged?*

L: There won't be more seal holes unless the ice starts to crack up and melt. Seals generally use the same seal holes that they've used over the winter but this spring there was more open water for them to traverse and breathe. As I said the polynyas tend to break up sooner so seals now have

more open water available. There was definitely more open water for seals this spring. I know that because we hunt seals around seal holes and there have been hunters who've had difficulty catching seals because of the increase in open water.

J: *The seal holes are thinner?*

L: Yes they are thinner. I don't think there would be more seal holes because seals make enough seal holes for themselves. If the ice is thicker there would still be the same number of seal holes but with the thinner ice there is more open water available.

J: *So seal holes tend to appear in the same area?*

L: Yes, however, in the spring the seals start moving around to more places because of cracks along the shoreleads.

J: *Do you find that open water arrives earlier now?*

L: This spring the open water came much earlier. When there is a lot of ice here we usually have quite a bit of wind coming from the north, which blows the ice away as well as helps melt the ice. But this year we hardly had any winds.

J: *With these changes like thinner ice, thinner seal holes and early break up have you noticed any changes in the number of birds?*

L: Not really. We have a seagull colony just around the corner from Arctic Bay and I haven't noticed any changes there. I can't really tell.

J: *How about changes in the marine life in general?*

L: With the thinner ice there is more open water, however, the number of marine life like narwhals tends to vary year-to-year. The change in the ice conditions though did affect our hunting, for instance, when we're traveling back from the floe edge.

J: *If you have nothing further to add on this topic than we are finished.*

L: Even hunters in Pond Inlet have noticed changes in the ice conditions. When I've talked to the hunters that I know in Pond Inlet they expressed the same perspective on the ice conditions this season. I think that the ice conditions were affected all around the High Arctic.

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ᑕᑦᐃ: ᐸᑦᐸᑦ ᐸᑦ ᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦ.

ᑭᐸᑦ: ᐃᑭᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦ ᑕᑦᐃᑭᑦᐸᑦᐸᑦᐸᑦ?

ᑕᑦᐃ: ᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ.

ᑭᐸᑦ: ᐸᑦᐸᑦᐸᑦ ᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ?

ᑕᑦᐃ: ᐸᑦᐸᑦᐸᑦ ᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ.

ᑭᐸᑦ: ᐸᑦᐸᑦᐸᑦ ᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦ?

ᑕᑦᐃ: ᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ.

ᑭᐸᑦ: ᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ?

ᑕᑦᐃ: ᐃᑭᑦᐸᑦ ᑕᑦᐃᑭᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ.

ᑭᐸᑦ: ᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ?

ᑕᑦᐃ: ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ.

ᑭᐸᑦ: ᐃᑭᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ?

ᑕᑦᐃ: ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ.

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ᑕᑦᐃ: ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ.

ᑭᐸᑦ: ᐃᑭᑦᐸᑦᐸᑦ ᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ?

ᑕᑦᐃ: ᐃᑭᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦ.

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ᑕᑦᐃ: ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ?

ᑭᐸᑦ: ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ ᐃᑭᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦᐸᑦ.

- J:** *Do you know when ivory gulls start leaving?*
John: I think ivory gulls start leaving around September because I see less and less of them during that month.
J: *Do you think that ivory gull numbers have increased or decreased?*
John: I have no idea.
J: *Do you think that ivory gulls rely on ice?*
John: Although I don't know for sure I have heard from the Elders that ivory gulls are not land birds. The Elders have told me that ivory gulls favor being by ice as well as multi-year ice. I, however, don't know this for myself but I haven't ever seen ivory gulls out in the middle of the land. I typically see ivory gulls when I'm out narwhal hunting along the floe edge.
J: *If you have nothing further to add on this topic than we are finished.*
John: I don't see ivory gulls that much but my father has seen their nests.

Long-tailed Duck

- J:** *Have you seen this bird around Arctic Bay?*
John: Yes I have seen it near Arctic Bay, however, there aren't a lot of them here.
J: *Have you consistently seen long-tailed ducks in the past as well as today?*
John: Definitely, however, I remember that when I was a young boy I would see a whole group of long-tailed ducks.
J: *Have you seen long-tailed duck nests?*
John: Yes. Long-tailed duck tend to nest along the edge of lakes and ponds. I know of two pairs nesting by a lake now.
J: *Do you know when long-tailed ducks start arriving?*
John: I think I start seeing them arriving around June.
J: *Do you know what they eat during the spring?*
John: I have no idea because I've never examined their stomach contents.
J: *Do you know where long-tailed ducks go to feed?*
John: During the spring I typically see long-tailed ducks along broken up shoreline ice where they dive to feed and also in lakes where they probably feed on small fish.
J: *Do long-tailed ducks associate with other birds?*
John: I'm not sure but they do sometimes gather with eiders ducks.
J: *Do you know when long-tailed ducks start leaving?*
John: I don't know exactly when they start leaving, however, I see less and less of them around August. That's when their young are usually able to fly.
J: *Do you know if long-tailed duck numbers have increased or decreased?*
John: I didn't think about that until you started asking me questions about the long-tailed duck. When I was a young boy my mother and father would eat a whole variety of country food including long-tailed ducks. Today, however, I haven't heard of people hunting or eating long-tailed ducks. Because we don't actively chase long-tailed ducks anymore it is hard to tell the current status of them.
J: *Do you think that long-tailed ducks rely on ice?*
John: I have no idea so I won't be able to answer that question.
J: *If you have nothing further to add on this topic than we are finished.*
John: Thank you we are finished then.

Arctic Bay Sea-Ice

- J:** *Do you know if the ice conditions around Arctic Bay and Lancaster Sound have changed?*
John: Yes I have noticed changes in the ice conditions. The ice conditions around here and up north are definitely thinner now. The ice has been thin for about 4 or 5 years now.
J: *Do you know why the ice is thinner?*
John: I don't know for sure, however, I think that over in Newfoundland, Greenland and Alaska and all along the southern areas as well, oceanographers have stated that there is less and less sea-ice because the ocean is warmer. This is only what I think. If you look at eco-region maps of Greenland you can see that their vegetation is taller than in Nunavut and the ocean there is warmer as well. I don't think that the climate here is colder just that the ocean is warmer. Like I said earlier, I don't know the exact reasons why the ice is thinner but this is what I think.

- J: *Have you seen ivory gulls in the past?*
M: Yes.
J: *Do you still actively go out on the land today?*
M: When I have time. I frequently go hunting in the spring.
J: *Have you seen ivory gull nests?*
M: No.
J: *Do you know when ivory gulls start arriving here?*
M: I think they start arriving here around April and May or when there is still ice around in June. I often see ivory gulls in June when I'm out seal hunting.
J: *Do you know what ivory gulls eat during the spring?*
M: I think they eat fish, however, I do know that ivory gulls eat seal meat and seal fat. I think they scavenge like glaucous gulls.
J: *Do you know where ivory gulls go to find their food?*
M: Around the floe edge where people are hunting seals. I think they mostly stay in the ocean. I don't think they go inland very much. They frequent the shores and the floe edge.
J: *Do you see ivory gulls in the summer?*
M: I see ivory gulls during the summer when I'm out boating.
J: *Do you see ivory gulls in the fall?*
M: I don't see ivory gulls in the fall.
J: *Do you know if ivory gulls associate with other birds?*
M: I think they go at the same time as glaucous gulls.
J: *Do you know when ivory gulls start leaving?*
M: I don't know when they start leaving. Maybe some ivory gulls are around during the end of August and perhaps they aren't seen anymore during September. I don't think I have seen ivory gulls in the fall.
J: *Do you know if ivory gull numbers have been increasing or decreasing?*
M: I'm not sure, however, when we're out hunting in the spring a lot of ivory gulls start arriving when we catch a seal. When we're cutting up seals they frequently start showing up. I don't think that ivory gull numbers are decreasing.
J: *Do you think that ivory gulls rely on ice?*
M: I think they do rely on ice. I think that ivory gulls follow the ice because I often see ivory gulls near and on top of ice.
J: *If you have nothing further to add on this topic than we are finished.*
M: I have heard that there is an ivory gull colony across from Arctic Bay. I don't know of any nest or an ivory gull colony right near Arctic Bay. Although ivory gulls do sometimes fly around close to town. They are more abundant in places like Admiralty Inlet and Lancaster Sound.

Long-tailed Duck

- J: *Have you seen the long-tailed duck before?*
M: Yes.
J: *Have you consistently see long-tailed ducks near and around Arctic Bay?*
M: Yes I have consistently seen long-tailed ducks.
J: *Have you seen long-tailed duck nests?*
M: Yes I have around places like lakes.
J: *Do you know when long-tailed ducks start arriving here?*
M: I think long-tailed ducks start arriving around May. I start seeing them when the ice starts thawing and forming puddles of water.
J: *Do you know what long-tailed ducks eat during the spring?*
M: I don't know. I think they eat small fish.
J: *Do you see long-tailed ducks during the summer and fall?*
M: Yes. One can see long-tailed ducks during the months of August and September.
J: *Do you know if their diet changes over the summer or fall?*
M: I haven't examined their stomach contents. Although I think they eat small fish and zooplankton in lakes.
J: *Do you know if long-tailed ducks associate with other birds?*

- J: Have you seen long-tailed ducks consistently?
 P: Yes, however, there does not seem to be as long-tailed ducks around lakes today.
 J: Have you seen long-tailed duck nests?
 P: Yes.
 J: Do you know what long-tailed ducks eat in the spring?
 P: Shrimps and other foods that I don't know of.
 J: Do long-tailed ducks associate with other animals?
 P: Sometimes with eider ducks, however, they associate more within their own species.
 J: Have you seen long-tailed ducks in the summer and do you know what they eat during this time?
 P: I've seen long-tailed ducks in lakes; however, I don't know what they eat.
 J: Do you know what long-tailed ducks eat during the fall?
 P: No, because long-tailed ducks leave early.
 J: Do you know when long-tailed ducks start leaving?
 P: Nothing comes to mind.
 J: Have you seen long-tailed duck numbers go up or down or have you noticed any changes?
 P: There used to be lots of long-tailed ducks around the ice in the spring but now there isn't as much.
 J: Have you got any thoughts of why?
 P: I think they've moved off to other areas.

Arctic Bay Sea-Ice

- J: Have you noticed changes in the sea ice in and near Arctic Bay?
 P: Yes, the ice is thinner. In the wintertime it was more dangerous to travel on because the ice was thinner.
 J: Have you any thoughts of why?
 P: The winter wasn't as cold. Around January the land doesn't emit as much mist anymore because the climate isn't as cold anymore.
 J: Have you noticed any changes in the polynyas?
 P: The polynyas aren't as strong anymore. They are more dangerous because they are thinner now, however, the number of polynyas hasn't changed.
 J: Does the ice break-up earlier now that the ice is thinner?
 P: There doesn't seem to be much change there.
 J: Have you observed any changes in the number of seabirds or changes in the number of other sea animals? Have you noticed any changes in their habits?
 P: No change for birds. There aren't as many seals but my father told me that their numbers go through cycles. There aren't as many narwhals but I suspect that they've just moved off because of motor noises.

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- J:** *Have you seen ivory gull nests or ivory gull colonies?*
D: No I have not seen ivory gull nests or their colonies.
J: *Do you know when ivory gulls start arriving around the Arctic Bay area?*
D: I start seeing ivory gulls arriving around June. We often see ivory gulls when we're eating seals at the floe edge.
J: *Do you know what ivory gulls eat during the spring?*
D: They eat seal meat and seal fat. They scavenge the animals that we catch.
J: *Do you see ivory gulls in the summer?*
D: I used to see more ivory gulls in the past during the summer. I don't see them as often during the summer anymore. There also used to be a lot of ivory gulls in the fall.
J: *There used to be a lot of ivory gulls in the fall?*
D: Yes.
J: *Do you know when ivory gulls start leaving?*
D: Like most other birds, ivory gulls tend to start leaving in September.
J: *Have you observed any changes in the number of ivory gulls? Have their numbers gone up or down or have their numbers remained unchanged?*
D: I think that the ivory gull numbers around Arctic Bay have decreased. I used to see more ivory gulls in the past.
J: *Do you know why their numbers have decreased?*
D: I've heard that ivory gulls don't nest in one area but that they move to different areas to nest now and again. Maybe the ivory gulls that nested near here have now moved to different areas to nest and that may be why we don't see them as often anymore.
J: *Do you think that ivory gulls rely on ice?*
D: I don't think they rely so much on ice but they do seem to fly around ice, not necessarily because they rely on ice though.
J: *If you have nothing further to add on this topic than we are finished.*
D: The information I've provided is only based on what I've seen and on my experience on the land and sea.

Long-tailed Duck

- J:** *Have you seen this bird?*
D: Yes I have. They are long-tailed ducks. I do see long-tailed ducks, however, I don't see as much of them near Arctic Bay as I did in the past. There seemed to be more of them during the springtime in the past. I think some long-tailed ducks nest here, however, more of them nest further north. I haven't been up that way this spring so I don't know their current status, however, I think there is typically more long-tailed ducks up that way.
J: *Have you seen long-tailed duck nests?*
D: Yes.
J: *Do you know when long-tailed ducks start arriving?*
D: Around June. Long-tailed ducks start gathering along broken up shoreline ice during the spring. I also see a lot of long-tailed ducks along the floe edge.
J: *Do you know what long-tailed ducks eat during the spring?*
D: They eat animals that live at the sea or lake-bottom. I don't know what specific type of animal they eat though.
J: *Do you see long-tailed ducks during the summer?*
D: Yes.
J: *Do you see long-tailed ducks during the fall?*
D: Yes. I see long-tailed ducks with their young around August.
J: *Do long-tailed ducks associate with other birds?*
D: They associate with eider ducks. Long-tailed ducks typically nest near eider ducks that are nesting as well.
J: *Do you know when long-tailed ducks start leaving?*
D: Long-tailed ducks start leaving around September.
J: *Do you know if long-tailed duck numbers have changed?*

- middle of June and long-tailed ducks frequent along the broken up ice. They also frequent lakes as well.
- J: *Do you consistently see long-tailed ducks?*
- K: Yes I have consistently seen long-tailed ducks. I can't say whether their numbers are increasing or decreasing because I only typically see long-tailed ducks in small numbers.
- J: *Have you seen long-tailed duck nests?*
- K: No I have not seen long-tailed duck nests.
- J: *Do you know when long-tailed ducks start arriving?*
- K: Long-tailed ducks start arriving when the ice along the shores breaks-up. They like to frequent along the broken up shoreline more so than in lakes during the spring.
- J: *Do you see long-tailed ducks during the summer?*
- K: I don't see long-tailed ducks as often during the summer. I do sometimes see them but only in small numbers.
- J: *Do you see long-tailed ducks during the fall?*
- K: Birds often gather together before they leave so I have seen long-tailed ducks before they start leaving.
- J: *Do you know what long-tailed ducks eat during the spring?*
- K: They eat zooplankton that live along the bottom of the lake and sea.
- J: *Do you know where long-tailed ducks go to feed?*
- K: During the spring the ice along the mouths of rivers tends to break-up earlier and I often see long-tailed ducks diving in those areas.
- J: *Do long-tailed ducks associate with other birds?*
- K: I don't often see them associating with other birds but I do sometimes see them near eider ducks.
- J: *Do you know when long-tailed ducks start leaving?*
- K: Long-tailed ducks probably start leaving around September like other birds.
- J: *Have you observed any changes in long-tailed duck numbers?*
- K: I don't know whether or not long-tailed duck numbers have changed or how many of them there are currently.
- J: *Do long-tailed ducks rely on ice?*
- K: I don't know if they rely on ice or not. Long-tailed ducks do, however, search for broken-up ice.
- J: *If you have nothing further to add on this topic than we are finished.*
- K: Yes I'm finished thank you.

Arctic Bay Sea-Ice

- J: *Have you observed any changes in the ice conditions around and near Arctic Bay or the ice conditions at Lancaster Sound?*
- K: The ice definitely has changed from the past seasons. Multi-year ice are typically very thick and they usually get blown near Arctic Bay and I think some multi-year ice even comes from as far away as Greenland, however, I noticed that multi-year ice has recently gotten significantly thinner.
- J: *Do you know why the ice is thinner now?*
- K: I typically go out camping and hunting around May and June and I first noticed how thin the ice was during those months. I think that the seawater is warmer now maybe because the climate is also warmer.
- J: *Have you observed any changes in the polynyas?*
- K: There aren't any polynyas near Arctic Bay but there are polynyas in Admiralty Inlet and I heard from hunters that went out to that area in May that the polynyas are more dangerous today because the ice is significantly thinner.
- J: *Does the ice break-up any sooner today or has there been no changes there?*
- K: The ice typically breaks-up when there are strong winds during the spring. But I don't think it is all that windy here so I don't think that the ice breaks-up any sooner. The ice, however, was significantly thinner because I could also see how the overall color of the ice was dark.
- J: *Have you observed any changes in any of the birds here?*
- K: Seabirds now arrive here earlier.
- J: *Have you observed any changes in the marine wildlife?*
- K: I don't know whether there have been any changes there.
- J: *If you have nothing further to add on this topic than we are finished.*

ՀՀԳ: ԵՐԳՆԻՃԸ ԸԺՅԸԸՅԼԻՐԸ?

[illegible]

ՀԱՅԵ: ԿՆԴՐԵԼԻՄ ՔՐԴԸ ՎԵՐՎԵԼԸ ՄԱՆՈՒԼԻՇ ԵՒ ԵՐԱՅԵՐԵՎԱՆԻ՞ՆԵՐԸ:

b▷C^{sb}: Δ^{sb}▷L^{sb}▷b. P^aJ^aσ^c▷◁L^cC▷Δ^{sb}b^c▷C▷J^aσ σ_{LR}.

ኃይል፡ ዲግሪዎች ርዕሲያል ማረጋገጫ ማረጋገጫ ማረጋገጫ

[illegible][illegible][illegible]

ኃይል፡ ልዩ ስልጣን ማሳሰቢያ ለሰጠው ሰው ማረጋገጥ ይገባል?

ბმც⁹⁶: CΔL^aა^cCΔ^aა^c▷^cბ^c▷^c CⁱL^σ \uparrow ΠΛ^α▷ Λ^ρΔ^σσ^αL^σ Δ▷^cL⁹⁶◁^b▷^b▷^c C^Lლ.

[illegible][illegible]

ኢልኤ: ልሳላል፤ ስለዚህ ስለሚታወቅ?

[illegible]

$\Delta^{\frac{1}{2}} = C_1 \Gamma^{\frac{1}{2}} + D_1 \Gamma^{\frac{1}{2}} + E_1 \Gamma^{\frac{1}{2}} + F_1 \Gamma^{\frac{1}{2}} + G_1 \Gamma^{\frac{1}{2}} + H_1 \Gamma^{\frac{1}{2}}$

$$b \triangleright C^{\text{sb}}; \quad \Delta \quad {}^{\text{sb}}d \leq^{\text{a}} a \vdash.$$

rd

ኃይሉ፡ ርዕረ ሥድስት ምዕተ ልሊት ምዕተ ልሊት ርዕረ ሥድስት ምዕተ ልሊት (Lancaster Sound) ሥድስት ምዕተ ልሊት ርዕረ ሥድስት ምዕተ ልሊት

[illegible]

Δ^a: $\frac{b}{\sigma} \Delta^L \subset \mathcal{C} \cap d$ $\frac{a}{\sigma} \sigma^b \Delta^L \subset \frac{a}{\sigma} \mathcal{C}$ $\frac{a}{\sigma} \mathcal{C}$?

[illegible]

ՀԱՅ: ԲՆԱԾՈՒՄ ԿՐԾԱԾ ՎՐԱՅԵՐԼԵՆՆԵՐԸ?

[illegible]

ከሆኑ ለሀገራችን ምን ዓይነት ምርቶች ይፈጠሩ?

[illegible][illegible][illegible]

3A3^a: CALC^cCD AL^cTPCA^c σ^cν^cη^c Δ^cρ^cγ^cδ^cCD^cδ^cρ^cε^c?

b▷C^{5b}: Δ¹γ¹▷^{5b}C▷σ²γ¹C ▷^{5b}γ^{2a}α²γ¹C^bb CL^bdΔ

ኢልሳ፡ ርኅረዥኒ ደኄይሶኤል ንጉሥ ለፋቲካር

6D C^{9b}: Δ⁹ d⁵ z² o² Γ_g.